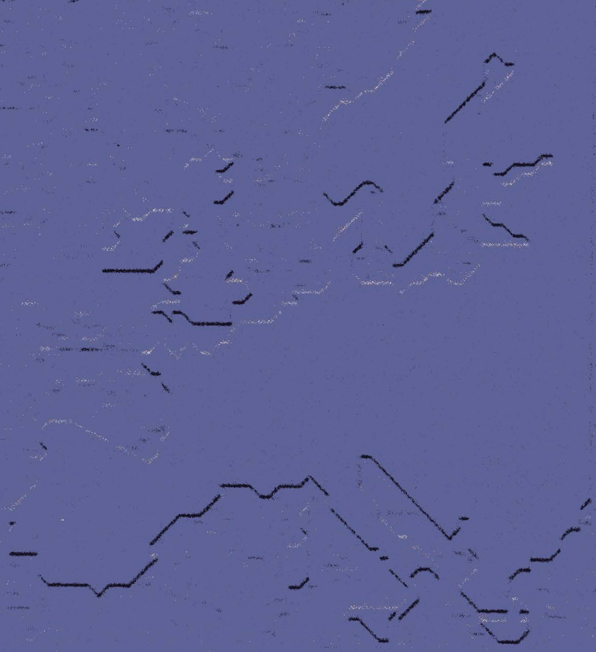
Advanced Communications Experiments

Remote Delivery of Expertise; Finance, Accounts; Multimedia Interpersonal Communication; Telepresence; Purchasing, Materials; Administration; Collaborative Distributed Decision Making; Multimedia Information Assembly, Access and Distribution; Distributed Collaborative Design; IBC Workspace; Technical Support, Service; Business Planning; Focussed Distribution of Entertainment; Operations, Production, Production Engineering; Flexible Learning & Training; Sales; Multimedia Document Distribution; Remote Access to Expertise; Marketing; Selective Access to Entertainment; MIS, Telecommunications; Multimedia Interpersonal Messaging; Telemarketplace; Design Engineering; Transport, Distribution; Distributed Multimedia Case Doc andling;



Results of an investigation of requirements and options in the field of

Specification of Priority RD&T Tasks

Operation 1992

COMMISSION OF THE EUROPEAN COMMUNITIES
Directorate General Telecommunications, Information Industries and Innovation -
Directorate RACE Programme and Development of Advanced Telematics Services

Draft

Ref: XIII/F/GE0197
Revision: 24 November 1989

Operation 1992

Results of an investigation of requirements and options in the field of

Advanced Communication Experiments

Specification of Priority RD&T Tasks

Address: Rue de la Loi 200, B-1049 Brussels, Belgium - Telephone: direct line 236 3456, central 235 11 11 -
- Telex: COMEU B 21877, JEPE B 25946 - Telegraphic address: COMEUR Brussels - Facsimile 235 06 54/236 29 80

Preface

The demand for IT and Communications-based services/applications is evolving rapidly as technology and improved cost-performance open up new possibilities.

Therefore, in the context of implementing the Council decisions on the RACE, DRIVE, DELTA and AIM programmes, sector actors have been invited to participate in the identification of future R&D Requirements and Options. This systematic consultation was given the name "Operation 1992". It involved representatives of telecommunication administrations, telecommunications manufacturing industry, service providers, IT manufacturing industry, users, social actors and national administrations. The scope of Operation 1992 derived from the scope of the existing programmes and their direct extension.

The areas covered include:

- *Advanced Communications-technologies (including Mobile Communications and digital HDTV)*
- *Integrated Service Engineering*
- *Advanced Communications Experiments*
- *Medical and Bio-informatics*
- *ITT&B-based Learning Technology*
- *Advanced Road Transport Telematics*
- *Applications of ITT&B in Rural Areas.*

The following criteria apply in Operation 1992:

> *strategic importance for Europe's future socio-economic performance;*
> *necessity or significance of "added-value" of transnational R&D cooperation (precompetitive, prenormative or preregulatory); and*
> *strong commitment of sector actors and support of national administrations.*

Operation 1992 reflects the thinking and contributions of over 2000 individuals and organisations which responded to the Call for Ideas. These contributions were developed and complemented by in-depth work of experts. For each area a Requirements Board investigated the need for action, and Technical Panels addressed the corresponding specific R&D requirements. The experts who participated in the writing and discussion of the reports are acknowledged in the respective volumes. The groups of experts (acting in a personal capacity) can in their overall composition be considered as representative of the respective sectors. However, in order to make the results as representative as possible, a series of workshops were held in September 1989. This document is a revision of the edition of 5 July 1989 which takes into account the contributions at these workshops. Further contributions and comments are invited.

The present document is part of a series covering the various areas. For each area there are at least two documents available: "Rationale for action" and "Specification of priority R&D tasks". In addition there are the reports of the Requirements Boards, which in some cases cover several related areas, as well as other background documents. The status of the present document is that of a draft.

The findings of this operation are contributing to the identification of requirements and options in R&D and as such also to the Revision of the Framework Programme for R&D collaboration in Europe. Operation 1992, as a requirements capture, should not be seen as implying any commitment to implement the identified R&D within the Community framework, but as a concerted effort to provide representative and objective statements on which to set priorities and formulate actions irrespective of the framework one may wish to use.

Acknowledgements

The Commission gratefully acknowledges the following individuals, each of whom contributed to Operation 1992 and shared their vision of the future in telecommunications and services for Europe. The overall concerted efforts relied on the joint work of Requirements Boards looking at the strategic context, Technical Panels investigating the technology requirements and Management Committees providing the link to the views of Member States.

The work reflected in this document would not have been possible without the hundreds of well-thought-out contributions that were received in response to the "Call for Ideas" issued in the context of "Operation 1992". The Commission takes this opportunity to express its gratitude to all contributors.

Finally, thanks are due to the staff of the Commission for the dedication they have shown in supporting the whole operation.

List of members of the ACE Technical Panels

NAME	COMPANY	COUNTRY
Baaken, Th.	VDI/VDE	D
Baneres, J.M.	Caixa Barcelona	E
Bisiaux, G.	Région Nord Pas Calais	F
Bock, W.	Anitra	D
Bradley, C.	International Stock Exchange	UK
Clark, P.	Logica	UK
Coman, C.	International Council of Museums	F
de Querol, R.	CENTRISA	E
de Wergifosse, P.	Brutélé	B
Dodel, H.	MBB	D
Dorrhyee, G.	SLIGOS	F
Dyer, N.	Commercial Union Assurance	UK
Elliot, J.	Interactive Media Systems	UK
Ensink, P.	KLM	NL
Ferrero, J.	Agencia EFE	E
Fürst, H.	Nassauisches Heim	D
Gianfranco, B.	Alpi Tour Informatica	I
Griesmar, C.	Télésystemes	F
Harre, D.	Telemarket	F
Holloway, B.	Midland Montagu	UK
Kelly, J.	Grand Metropolitan	UK
Morgan, K.	Science Policy Research Unit	UK
Nanson, B.	Ordnance Survey	UK
Puglisi, G.C.	Peugeot	F
Pohjanpalo, E.	Kone	B
Rambourdin, M.	Banque Nationale de Paris	F
Rasmussen, B	Scandinavian Airlines System	DK
Renoulin, R.	CCETT	F
Ruiz de Querol, R.	CENTRISA	UK
Sala, G.	Datamont	I
Schindler, S.	TELES	D
Seetzen, J.	VDI/VDE	D
Simonsen, J.	Struer Bredband	DK
Taibi, F.P.	Sigma	I
Timm, P.	DANISCO	DK
Waksman, G	Acta	F
Were, Richard	SPAG	B
Williams, I.R.	Littlewoods	UK
Wolstenholme, P.	CERN	CH

TABLE OF CONTENTS

VOLUME I - WORK AREA DESCRIPTIONS

VOLUME I (contd)

VOLUME II - TASK DESCRIPTIONS

VOLUME II (contd)

VOLUME II (contd)

VOLUME II (contd)

GE 0197D

VOLUME I

- Work Area Descriptions -

INTRODUCTION

This report on the results of an investigation into the requirements and options for work in the field of Advanced Communications Experiments (ACE) represents the considered views of experts drawn from a wide cross-section of telecommunications user organisations. In formulating this document, the panels of experts have taken into account the many ideas provided as a result of the Call for Ideas issued by the Commission in February 1989.

This reflection took as its starting point the work currently being carried out under Part III.2 of the RACE Programme (R&D for Advance Communications-Technologies in Europe). This consists of a set of user-based Application Pilots, addressing a spectrum of requirements covering a range of sectors of economic activity. The work of the Expert Panels dealt with two interrelated questions:

- What would be the appropriate subjects for future user-centred Advanced Communications Experiments?
- What format should these take to reflect adequately the interests of participating actors?

The areas identified reflect a perception of the scope and strategic importance of advanced communications to user organisations. The significant potential for application of telecommunications to the *solution of user problems*, to the *creation of competitive advantage* and to the *creation of new ways of doing business* has been emphasised in this work.

This document has been redrafted following comments and suggestions arising from the Workshops, Panel and Requirements Board meetings held in September and October 1989. Participants in these consultations included not only user organisations, but also representatives of network operators, ITT&B industry and service providers.

The document is subdivided into Volume I, containing Work Area Descriptions, and Volume II, containing the related Tasks.

OVERVIEW: THE ACE CONTEXT

1. Introduction

ACE is structured in such a way as to increase the understanding of the changes that advanced communications will introduce into business processes and of how businesses will be transformed as a result of these new technologies. This understanding is essential to the efficient & rapid uptake of the technology, and to its conversion into competitive advantage. In order to optimise the match between communications products and services and user requirements, ACE deals with both user/application lead processes and opportunities created by technological developments.

1.1 Background

Ideas for Advanced Communications Experiments (ACE) have been developed against the background of the work on telecommunications technologies carried out in the RACE Programme. The need to refine the understanding of user needs is recognised in some elements of the RACE Programme. This need has been addressed both by analytical processes and by the establishment of a set of Application Pilots covering a range of industry sectors. Pilots are user centred and where possible user lead, and aim to investigate and implement trial applications of advanced communications, using technology which is sufficiently stable to allow user participation.

In this process, it has become evident that the danger exists of a mismatch between the future capabilities of advanced communications technology, the fit of products and services to the needs of users, and the ability of user organisations to adopt the technologies in order to exploit the opportunities presented.

It has been recognised during these application pilots that much more work needs to be done with respect to research into applications and particularly to more comprehensive and systematic analyses of generic needs, and the relationship to business, residential and leisure user requirements.

1.2 The User Role

The approach of offering technologically innovative products and services to users without their detailed involvement has frequently failed to deliver users the tools and benefits they were lead to expect, and has simultaneously failed to deliver return on R&D investment. Indeed, it has been estimated that more than two-thirds of successful technological innovations originated as the result of inventive activity on the part of the user. The role of the user must thus be more than consultation to verify acceptance of technological findings - rather it must be an interactive and closely coupled part of developments. This problem is at its greatest where investments are large and lead times are long, as they are in telecommunications.

Early and close involvement of future users significantly enhances the identification of successful innovation. This implies the user being a partner in the design and development process. The user becomes a *co-inventor* and as such should occupy a leading position in the relevant projects.

2. Mission

ACE has the objectives of feeding the benefits of Advanced Telecommunications Technology to users in an experimental environment of technological competence, while at the same time providing the opportunity to cross-check necessary assumptions made on the basis of the development of the basic technology and system engineering considerations.

The mission is further described below.

2.1 Facilitating the match of user applications to telecommunications products and services

The problem which ACE seeks to address in a systematic and analytical manner is how the functionality delivered by advanced communications systems, including the capability to deal with high-quality still and moving images, may be matched with the varied requirements of business and residential user communities. Telecommunications services and products which have in the past appeared attractive from a technological point of view, have frequently failed in the light of practical experience. In ACE, this lack of understanding is addressed through a systematic and practical approach to the applications and user constraints, in addition to the technological potential.

2.2 Enabling User Opportunities Generated by Communications Technology

In addition to the approach of experimenting with user applications using appropriately advanced technology, it is necessary to consider opportunities which may be *created* by technology. Good examples of this are the rate of increase in the size of the market for mobile and personal communications, and the growth in the facsimile market. A bidirectional approach is thus necessary and envisaged. Part III relates to the application orientation. Part II remains closely connected to the concept of applications (ie relating to the users motivation), but addresses this from a viewpoint of opportunities created by technological advance.

2.3 Identifying Commonalities between Applications of Advanced Communications

Generic Applications of advanced communications have been identified in the planning exercise. These have tentatively been defined as applications that exhibit common operational requirements either across business sectors, or across business functions, or both. An analogy may be drawn between these Generic Applications and the packages that have formed the base for the development of the market for personal computers, ie the combination of spreadsheet, database and word processing, coupled with a growing demand for graphics. Such *generic applications relate to the motivation for purchase of communications resources*, and are thus defined to occupy significant areas of the market for advanced communications. The refinement of this set of ideas, and the associated operational requirements is potentially of major strategic importance in identifying entry strategies for the various players (users, network operators, service providers and manufacturers).

2.4 Identifying Potential Common Solutions

In parallel with the identification of and experimentation with Generic Applications, resource packages containing both product and service elements will be identified whose functional requirements match the operational requirements of the applications. The objective here is to identify the functional requirements of these resource packages in order to optimise the number of development variants necessary to fulfil the requirements of the competitive market.

3. Subject Areas Covered: The ACE Overview Model

In order to analyse the relationship of advanced communications to business, the three-dimensional model in Fig 1 has been used to relate Generic Applications of advanced communications to both business functions and business sectors. This enables easier identification of possible commonalities and economies of scale. The issue which is addressed by ACE in general is "*which Generic Applications, in which sectors and in which functions*?"

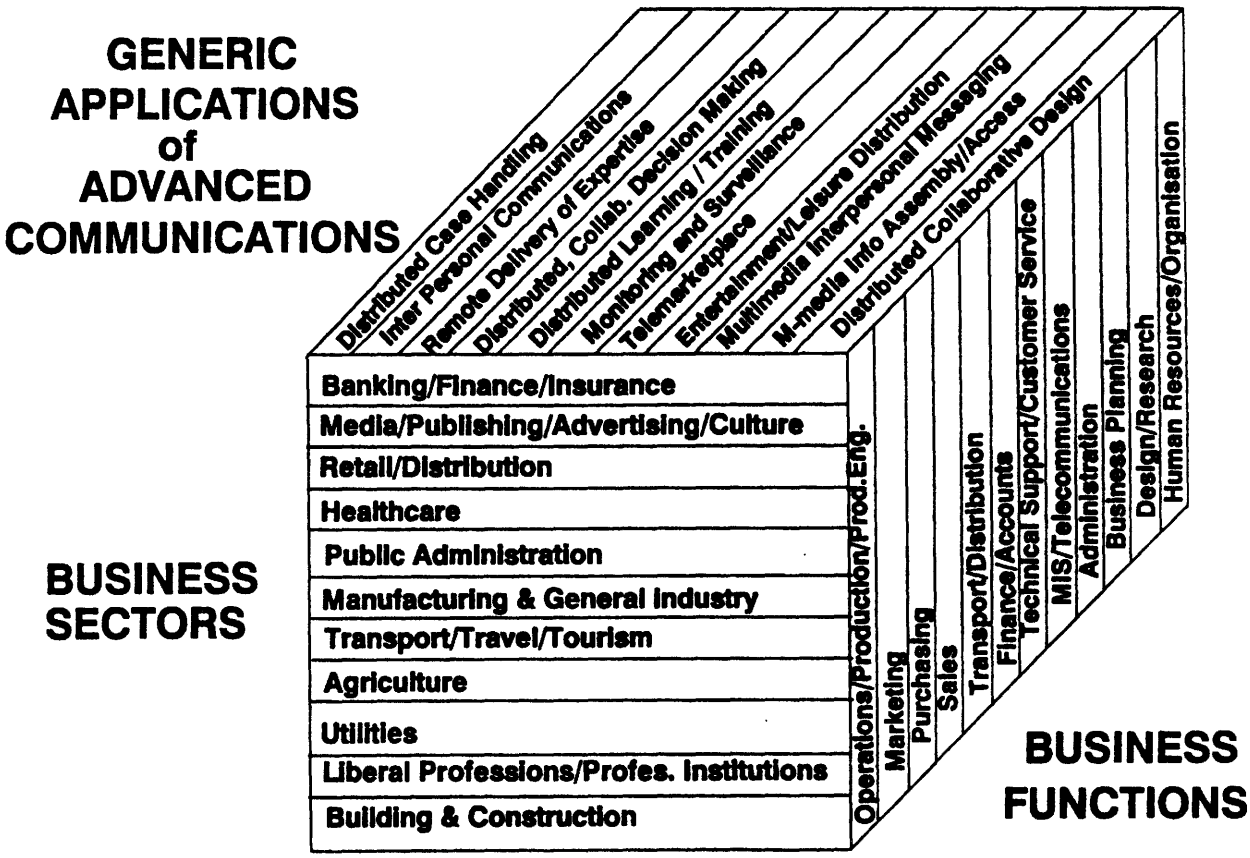


Fig 1: Advanced Communications Applications Domain

3.1 IBC Generic Application Strategies

Part I of ACE is concerned with identifying and building consensus on the operational requirements of the Generic Applications of advanced communications, and with the functional requirements of the associated resource packages. In addition work has been identified on the extension of the Usage Reference Model (URM) developed in RACE, and the extension of (Generic) Application Analysis. The extraction and consolidation of results from resource package prototyping and experimentation in Part II and on field application experiments in Part III (see below) is also covered by work in this area. A key output will be the identification of guidelines and criteria for success in the introduction of advanced communications. These are critically important from the viewpoint of the user, the network operator, equipment supplier and the service provider in order to determine optimum introduction strategies.

Since this work has its foundation in the technologies of Integrated Broadband Communications, consensus management will be established in direct connection with the existing activities in the RACE Programme.

3.2 Techniques for Advanced Communications Experiments

Part II is concerned with the prototyping of resource packages implementing the functionality required by Generic Applications, and experimentation with these prototypes involving users. Other techniques for eliciting user reaction to new communications technologies are also explored.

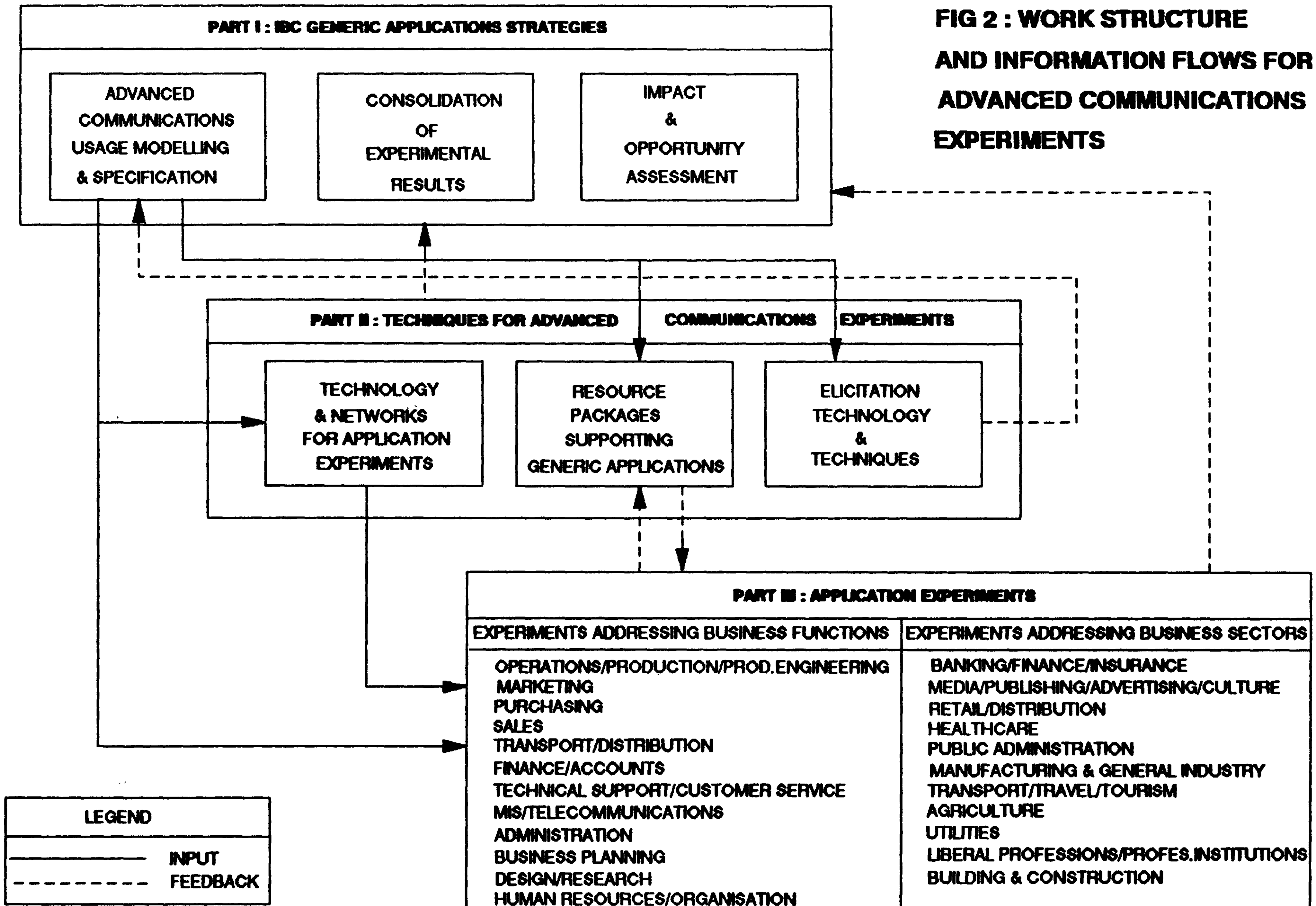


FIG 2 : WORK STRUCTURE AND INFORMATION FLOWS FOR ADVANCED COMMUNICATIONS EXPERIMENTS

In addition, work is addressed to providing technological support to field application experiments by identifying elements of a "module kit" including communications servers, network requirements and advanced communications workplace requirements.

3.3 Advanced Communications Applications Experiments

Part III consists of a series of user-based trials of advanced communications, exploiting where possible the concepts concerning Generic Applications. The subjects of these tasks are the result of the extensive investigation of the requirements and problems in various business sectors and business functions carried out in the Planning Exercise. Technological work in Part II will be exploited as appropriate and when available.

The basic flows of information between the work areas is as shown in Fig 2.

4. Interconnected Investment Requirements

Large-scale investments are necessary in basic infrastructure, system design and equipment, service development and user application adoption. These investments are all inherently interlinked and, considering the development cycles of complex and extensive telecommunications systems, are spread in time over a period of up to 20 years. This leads to problems of fitting the system to user requirements, particularly when design decisions at an early stage of the process may determine the future availability of options and facilities for users, and consequently commercial and economic success or failure.

A fundamental problem relates to the techno-economics of telecommunications service provision, which rests on identifying at an early stage sets of functionality that are common between users. The interactions then impact at all stages of development, including basic infrastructure, equipment, services and applications. For the economics of telecommunications to work, sufficiently large user communities must be found which share common requirements and which need to intercommunicate. In the absence of such 'communities of communication' the provision of products and services is viable for only a very limited range of cases. The interrelationship is presented in Fig 3, together with the associated investment problem.

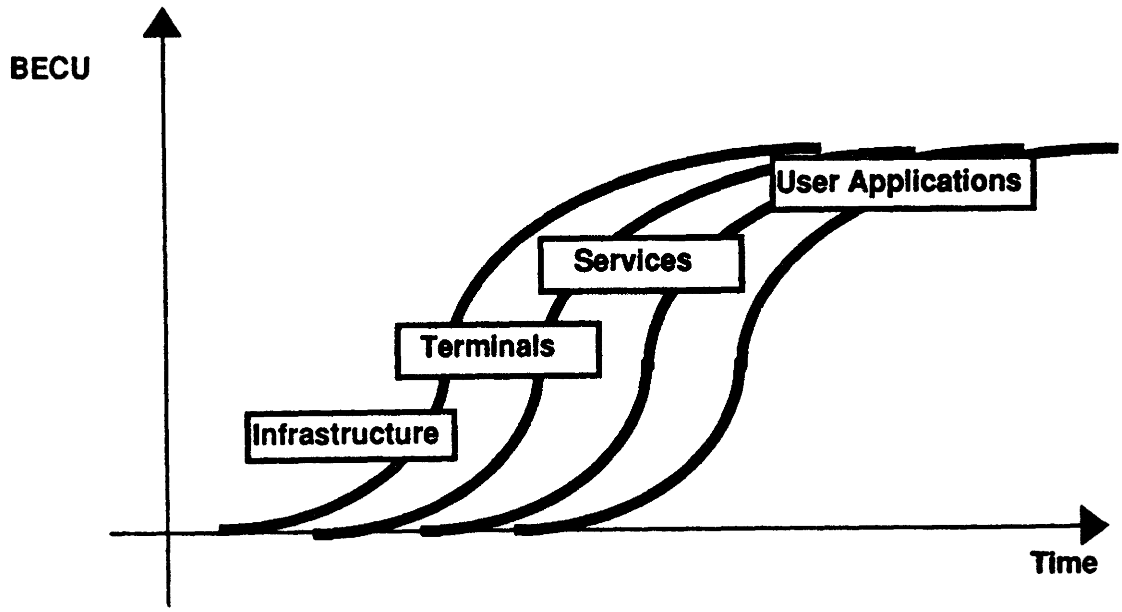


Fig 3: Four Interlocking Investment Cycles

5. Project Structures and Participants

The work of the Planning Exercise has identified priorities and options for action. It is structured into Volume I which identifies the Issues and Scope for action and Volume II, which identifies a series of tasks. The whole is additionally structured into three Parts, where Part I tasks relate to matter that is necessary for establishing consensus on issues of public interest, Part II relates to pre-competitive R&D and Technology, and Part III relates to integration and verification in the form of user based field application experiments to verify application concepts.

It is anticipated that projects may address a number of tasks. Projects that span more than one Part are also anticipated. However, it is likely that any project will have its "centre of mass" in only one Part. It is expected that all projects will contribute the formation of consensus in Part I. Possible project configurations are shown in Fig 4 below.

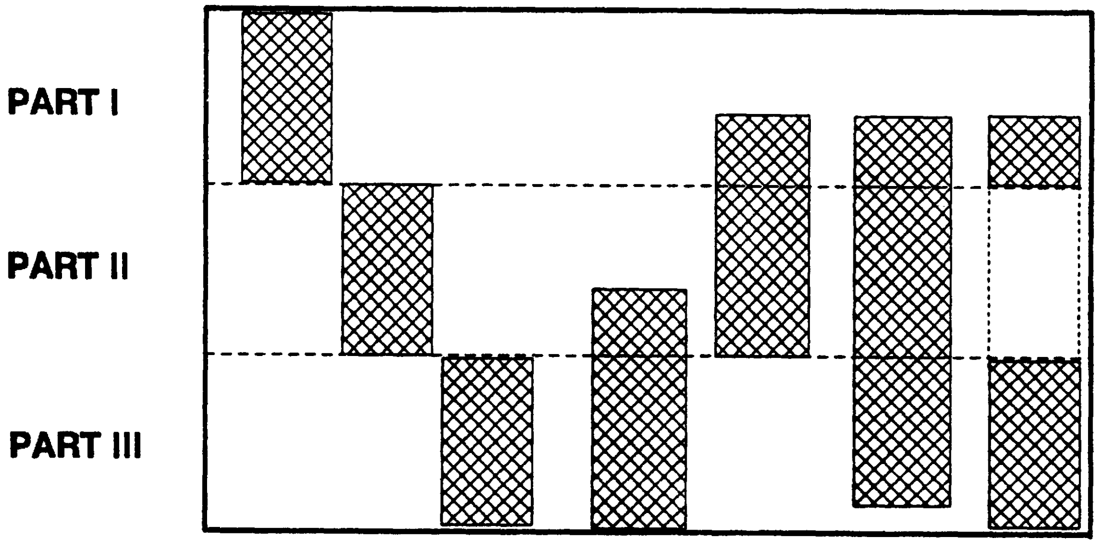


Fig 4: Project Configuration Options

5.1 Participants

In order to fulfil the objectives of the work, a variety of participants will be required including:

- Users
- Service Providers/Package Integrators
- Telecommunications Network Operators
- ITT&B Industry

It is considered that Part III projects will be most likely to meet their objectives if they are user or service provider lead. A variety of skills is likely to be necessary for the execution of Part I tasks, while Part II tasks will benefit from high quality technological leadership.

5.2 Timing

The bidirectional approach referred to in 2.2 above represents the need to operate projects from differing technological time bases. Part III projects will need to use technology that is sufficiently stable to enable the focus of the experiment to be on the applications in question, without interference from technological uncertainty. Part II projects however, will adopt be more technologically ambitious targets. Concertation will be facilitated to enable the Part III and Part II projects to operate in a mutually beneficial manner by maximising cross-fertilisation. The overall scheme is shown in Fig 5.

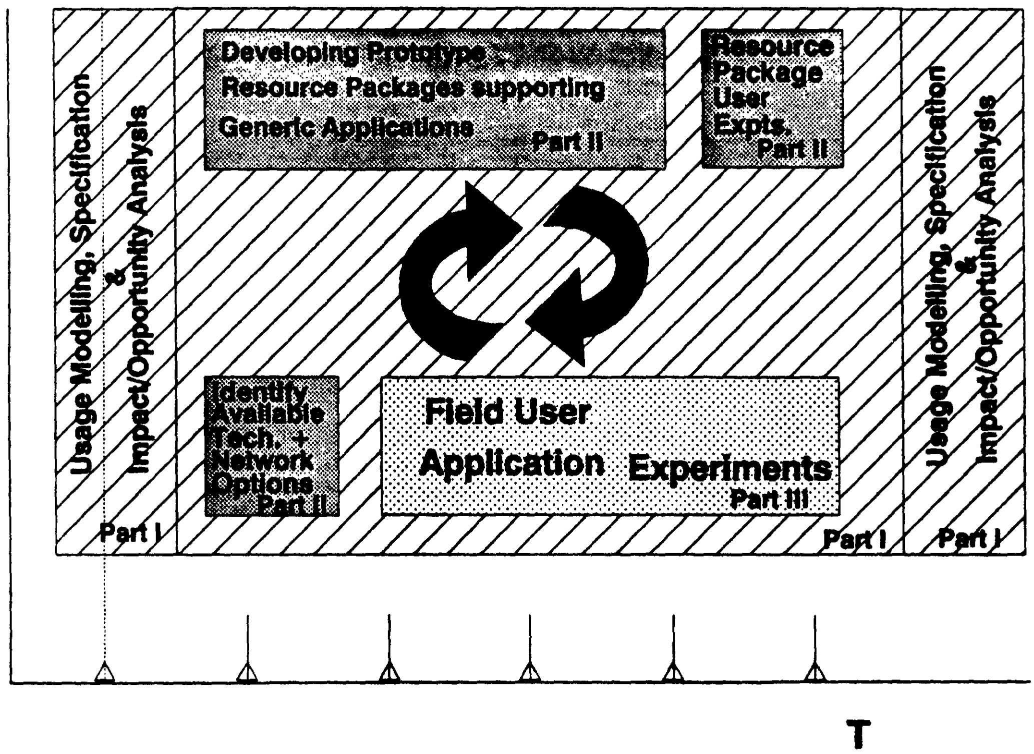


Fig 5: Activity Timing and Interrelationships

6. Milestone Plan

A milestone plan interrelating the various objectives of the tasks identified in Volume II and the Issues raised in Volume I has not yet been created. This will be necessary for overall consistency.

TERMINOLOGY AND CONCEPTS

In the course of the development of this "Specification of Priority RD&T Tasks", various concepts and related terminology have been developed in order to deal with the subject matter. The following text gives an explanatory and indicative usage of these terms. A set of formal definitions will be created as part of the further development of this set of concepts, and as part of any RD&T work undertaken, both in the context of Advanced Communications Experiments and in the context of Integrated Service Engineering.

Applications, Resources (Services and Products), User, Buyer

In the pursuance of their business and personal objectives, individuals and/or organisations have needs and wants that may be analysed/refined into tasks and processes. *Applications* are determined by these needs, wants and objectives, and to the derived tasks and processes. *Resources (services* and *products)* of various kinds may be used to fulfil the requirements of these tasks and processes. The individual and/or organisation then becomes the *user* of these resources. The same (or different) individual and/or organisation may also be the purchaser or *buyer* of the resources.

Applications of Advanced Communications

Some of the resources used by individuals/organisations may be communications products and services. *Applications of advanced communications* are those applications where the user chooses to achieve his/her objectives by the use of communications resources. Applications of advanced communications thus relate to the motivations for purchase of communications resources. As such they cannot be realised or implemented. Only the resources (services and products) can be implemented, and offered to the market. Applications themselves are the motivators of demand.

Generic Applications of Advanced Communications, Operational Specifications,

A set of *Generic Applications of advanced communications* may be identified, which covers a large proportion of the complete set of all applications of advanced communications. They relate to motivations for the purchase of communications resources, and are thus defined so that they offer significant potential in market terms for those offering resources (communications services and products) to fulfil the needs of the generic applications of advanced communications. All applications of advanced communications that belong to a generic application will exhibit common operational characteristics. ACE will identify the important generic applications of advanced communications and their *operational specifications.*

Resource Packages, Functional Requirements

Users need to have resources assembled into *resource packages* to fulfil the requirements of applications. ACE will define *functional requirements* for resource packages to support generic applications. Resource packages are considered to consist of a combination of facilities implemented in hardware and/or software, interface definitions and service definitions. The requirements will be defined initially by analysis, and subsequently by building and testing prototypes conforming to these initial requirements in laboratory experiments involving users. This work will also draw on the analysis and results of application experiments executed in the field. Commonalities between resource packages will be reflected in common functional requirement definitions.

Advanced Communication System

An *advanced communication system* may provide resources for more than one application. Advanced communications will form the dominant element in the system, which may at the same time be a data processing system, an information system, and/or, for example, a collaborative dealing or integrated CAD system.

The objective is that users, system integrators, equipment vendors and service providers would be able to build advanced communications systems from commonly available resources (products and/or services), with a minimum of special engineering and special service provision.

Call, Connection

Users of advanced communication systems perform communications processes or tasks. These tasks will be enabled by *calls* over IBCN *connections.*

Products, Services

To a large extent in general usage the terms *product* and *service* are interchangeable. For example, insurance companies which provide services nevertheless describe their various policies and investment vehicles as products. At the same time software products can be described as providing a service to the user.

However within an advanced communications context terminal hardware and software are naturally described as products, even though they may sometimes be supplied by service providers (as part of the service). Hardware and software vendors will provide advanced communication products which will be dependent on, and interface with, network services provided by network operators.

PART I - IBC GENERIC APPLICATION STRATEGIES *(TA.100)*

Issue

Advanced Communications technologies offer significant opportunities both for the realisation of a more dynamic market for telecommunications equipment and services and for the creation of a more efficient and competitive economy at large. If the potential of this set of technologies is to be fully realised, the historical focus of the telecommunications sector on the delivery of either services or equipment must be supplemented by a focus on applications of telecommunications. Applications are the purposes to which telecommunications is put, as seen by the users.

However, given the novel nature of the technology, services and applications in question, there is a danger of a mismatch between the capabilities of the IBC system and the requirements of the market and users as these emerge. It is thus necessary to relate the applications to underlying motivations of users (ie their needs and wants for telecommunications), to identify operational requirements of these applications of telecommunications, and to define functional requirements. These should be independent of specific implementations.

Experiments in Part III are based on an understanding of how technology will affect business strategies and business processes and cause change in communication patterns and needs for information. This will cause not only change within organisations, but also change in the structure of business across sectors and the positions of business in the environment/market. The combination of this understanding and the knowledge of the ways in which telecommunications can be applied to both process transformation and business sector transformation is essential to the efficient and rapid uptake of the technologies, and to the validation of system functionality at an early stage in the development process.

Scope

The scope for action includes:

- the establishment of IBC application strategies
- the collection and consolidation of data from a variety of sources, but primarily focusing on the experiments and laboratory prototypes created within ACE, in order to create an advanced communications reference model
- the assessment of opportunities created by and impact of advanced communications, focusing on information generated by the experiments in Part II and III, in order that conclusions may be drawn concerning introduction options and strategies
- the characterisation of Generic Applications and definition of their operational requirements
- the definition of functional requirements for resource packages supporting the Generic Applications.

I.1 Advanced Communications Usage Modelling and Operational & Functional Specifications *(TA.101, TA.106, TA.107)*

Issue

Advanced communications will be built on the underlying technologies encompassed by Integrated Broadband Communications (IBC). Despite the lack of prospect for any single dominating service (such as telephony in the case of the current market for telecommunications) and the general trend towards diversity, a limited set of Generic Applications of advanced communications is likely to emerge. These should relate to the needs and wants of users (and hence to their decisions to purchase telecommunications). They should be defined in such a way that they cover a significant part of the user requirements and emerging market for advanced communications. In addition, it is considered that these may form a foundation on which the interlocking investment decisions of the various actors (infrastructure, system/equipment, services, applications) can be based.

A common understanding of the Generic Applications will accelerate the development of the market by:

- avoiding fragmentation across sectors, geography or business functions
- reducing the separation between user requirements and implementations.

Generic Applications are loosely defined as requirements for applications of advanced communications which are widespread and which provide a market opportunity for product and service providers. Generic Applications will typically be common across sector and/or across business function (where business functions are for example marketing, operations, finance).

In addition, advanced communications experiments in Part III will generate information concerning the characteristics of usage. Operational requirements, which are as far as possible independent from particular implementations, will be identified. These will complement functional requirements of resource packages, which will also be defined, expressed from the viewpoint of the implementer.

Scope

An initial set of Generic Applications has been identified (see Fig 6 below). These are based on current perceptions of the technology / market match and the opportunities for the application of advanced communications. They are developed from a perception of the problems experienced by user organisations which telecommunications can address. The set of the Generic Applications and their inter-relationship will clearly evolve as more experience is gained, both through developments in the market and through the field experiments described in Part III.

The identification of Generic Applications and their characterisation in terms of operational requirements (user viewpoint) is of primary importance, together with a definition of the functional requirements (system viewpoint) for the resources needed for their support. The objective is to develop a system that is robust to variations and developments in the market.

Tasks have been defined dealing with the definition of operational requirements for Generic Applications and the definition of functional requirements of resource packages. In addition, a model of usage of advanced communications is to be further developed from the base work of the RACE Programme. The starting list of Generic Applications and their descriptions are identified in the following sections. These descriptions will be refined by the Part I tasks in the light of the results of prototype development and experimentation in Part II and field experiments in Part III.

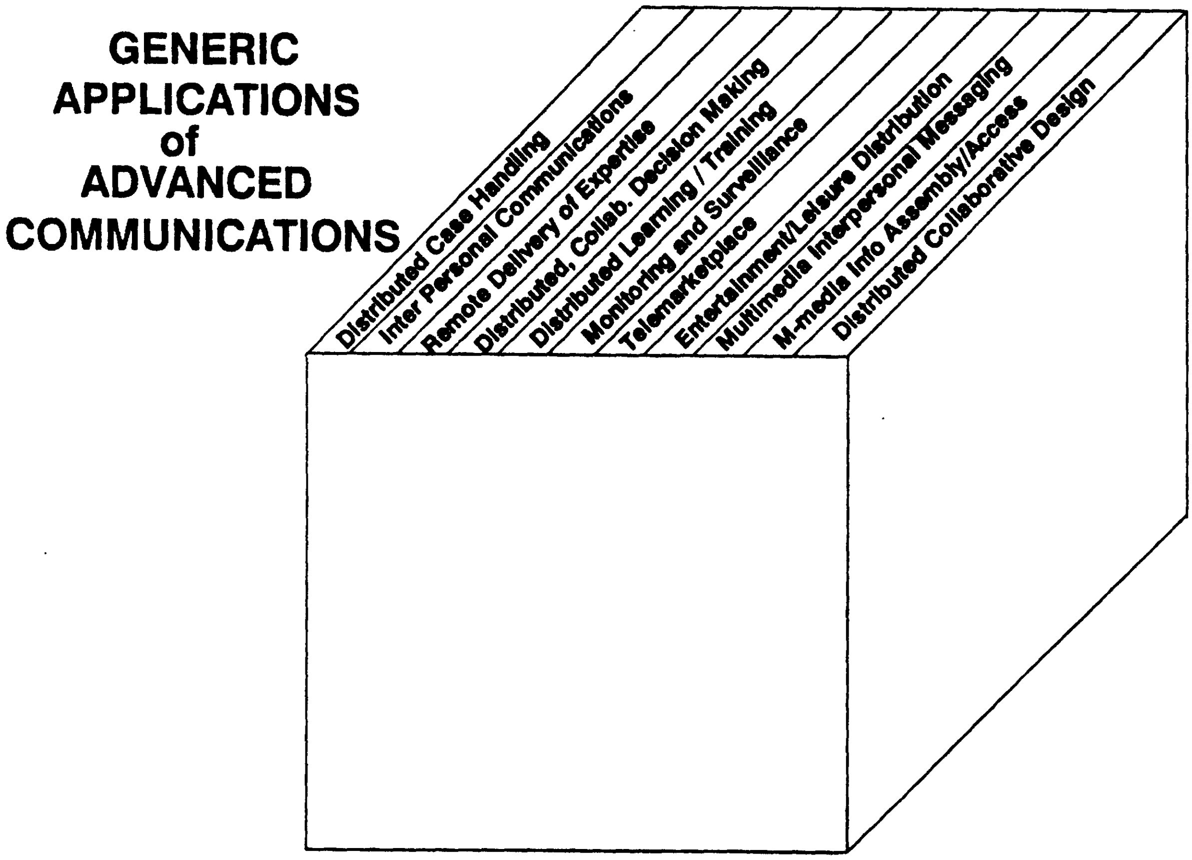


Fig 6: ACE Domain - Generic Applications Viewpoint

Operational specifications for generic applications and common functional requirements for associated resource packages will be defined. The basis of this will be the user requirements established by the field experiments in Part III, by extrapolation from work on user experiments in Part II.2 and other relevant sources both internal and external to ACE.

I.1.1 Distributed Case Handling (TA.101, TA.106, TA.107)

Issue

This relates to the case handling, management and collaborative processing of a series of (multimedia) documents (or separate documents in a variety of media) inter-related by a common theme, whose origin and ownership may be distributed across one or more organisations and locations.

In an office environment, documents circulate for editing/comment. Every editor performs certain tasks on the document, eg approving, correcting, editing. Tasks have to be performed within certain time limits, and frequently according to a particular, pre-defined process. It is essential to be able to follow the document in order to locate it and to determine which preparation steps have actually been performed.

The communication requirements can be considered as a special form of conference, only partly established in real time, including the management of the routing of the multimedia case file.

Scope

Case handling requirements include looking up documents, performing queries, and seeking the advice. The documents needed or the people to be consulted are frequently not situated at the same place as those handling the case. Indeed, IBC will allow the locations of the people and operations to be controlled by factors other than the need to be close to the information.

Case handling involves a number of inter-related activities to be performed on a (multimedia) document. Documents must be passed around in a controlled way, distributed, archived, retrieved, named; different versions of documents are created when, at the expansion point of a distribution list, multiple copies are spread and then considered independently. The resulting versions must remain identifiable or even be capable of recombination. Decision making on the case must be supported by appropriate interpersonal communications.

The complexity of this process is increased, and the relevance to IBC becomes evident, when the various stages of the process are distributed over a variety of sites as well as spread out in time. In the IBC environment, the case document material may be in any of a variety of media, eg text, image, graphic, video.

The above is true for an office environment in which documents are passed around editors. Every person applies some processing to the document. Documents may also be jointly edited. Editors then apply their considerations concurrently to the document which introduces a need for synchronisation and personal interaction mechanisms. Editing steps and decisions made concerning the case must be identifiable and changes may have to be propagated to every editor simultaneously.

The operational requirements of this Generic Application and the functional requirements for the related resource packages will be refined by analysis under the tasks in I.1, by prototype development and experimentation in Part II and by exploiting the results of field experiments in Part III.

I.1.2 Interpersonal Communications (TA.101, TA.106, TA.107)

Issue

Amongst other more specialised applications, IBC will deliver person-to-person multimedia communications. Video-phone and video-conference are both included within this Generic Application.

The Generic Application requirement is to enable people to communicate with each other, in a way that is as closely as possible equivalent to them being in the same room. This implies a means of identification or recognition, and a means of hearing and seeing each other and seeing the same material. However, the motivation for communication is personal contact, rather than for example the discussion of a document. The analogy outlined above inevitably has its limitations - it is also necessary to maintain a set of signals that provide the user with the conscious information that they are dealing with a communications mode that is remote, while the practical operation of the communications system is made as easy as possible.

In practice, the requirement is met by the provision of a *multimedia workplace*, which may be a desk, office or may be mobile in some implementations, with a user interface that facilitates easy multimedia communications to another workplace. Additionally, there is a variant of this application that relates to the domestic environment, where the process that the IBC is supporting is the need to maintain interpersonal contact for purely social reasons. It will be important to deal with communication between workplaces of different types, for example between an advanced IBC workplace and a PSTN workplace. Without this the takeup of the related technology and services will be slow owing to failure to achieve a critical mass of users.

Typical applications include communications between professionals, between a tele-worker and a supervisor, and between physically disabled people (with IBC they become intellectually mobile whilst being physically housebound).

Scope

All business function and business sector experiments require person-to-person communications support - this Generic Application will require personal identification and/or some form of access control. It also follows that a common style of human-machine interface should be established which would be available to meet the requirements of the other applications. The 'metaphor' or 'cognitive model' which is used to support this Generic Application will be of prime importance.

The concept of the IBC delivering the information to the person must be supported, rather than relating the person to a single workstation. Facilities for multiple users on one workstation and appropriate access controls are vital.

An important subset of this Generic Application is the requirement for personal mobility including the need for mobile and portable workstations and communications on the move.

Another aspect of this Generic Application concerns the media components approach where the IBC services are delivered to disparate attached devices under separate controls but which together are orchestrated into a seamless multimedia interpersonal communication. The personal user would then be able to select the most appropriate form of communication for the current task. A single telephone call might be appropriate for a simple factual enquiry whilst high quality video, stereo sound and a hard copy colour print might be needed for more demanding tasks.

The operational requirements of this Generic Application and the functional requirements for the related resource packages will be refined by analysis under the tasks in I.1, by prototype development and experimentation in Part II and by exploiting the results of field experiments in Part III.

I.1.3 Remote Delivery of Expertise (TA.101, TA.106, TA.107)

Issue

Many IBC applications will involve users consulting with human or machine sources of expertise. Several providers of expertise could be involved in a consultation session.

This Generic Application enables the skills/knowledge or expertise of an individual, or group of individuals, to be available, on demand by people without that expertise. The IBC will enable access to the expertise to be interactive and efficiently shared by many geographically remote 'customers'. There is particular relevance in an environment where demographic change renders skilled personnel yet more valuable, and where the increase in competition in traditional markets and the movement to information based economies increases the dependence on various skills.

Scope

The operational requirements for this Generic Application will include conference session management, both-way multimedia communication and possibly expert-system-based machine support.

Examples include:

- the ability to refer medical problems between specialist consultants without moving the patients
- the ability of individuals to consult a lawyer and
- the sale of stockbroking advice from a team of experts over multimedia systems.

The remote provision of expertise may require all kinds of IBC communications relations, varying between 'one to one' and 'many to many' relations between both people and computers in fixed and variable locations.

The most easily acceptable scenario of remote expertise provision would consist of:

- one or several expertise users
- being located at a single or at different places
- communicating with one or several expertise providers
- being located at one or several other places.

Both user(s) and provider(s) may wish to communicate with other people or computers during the session.

Workplace videoconferencing is one appropriate communications environment for remote expertise provision. By means of conferencing workstations, the expertise user(s) and providers(s) should have the ability to dynamically interconnect to and disconnect from other remote systems/people.

The operational requirements of this Generic Application and the functional requirements for the related resource packages will be refined by analysis under the tasks in I.1, by prototype development and experimentation in Part II and by exploiting the results of field experiments in Part III.

I.1.4 Distributed, Collaborative Decision Making (TA.101, TA.106, TA.107)

Issue

To support this Generic Application, IBC will provide a platform for multi-party distributed decision support.

For many applications a need to facilitate the usual decision-making process can be found, especially when many people are working together to achieve a common goal. In this case decision making is typically a multi-hierarchical and multi-party process, involving people who have the expertise to support a decision under technical and/or managerial and/or commercial aspects.

Such a decision-making process is even more complex if the people deciding are not at the same place. Until now these people had to come together or otherwise the decision had to be made in several stages - both proceedings are very time-consuming and often error-prone.

This Generic Application involves a number of IBC users in different locations participating in a decision-making process. It will require audio-visual conference facilities with appropriate conference control procedures, plus multimedia document transmission support and management.

Scope

During a typical decision-making process many discussions take place, (complex and/or technical) details have to be clarified, experts have to be consulted. Therefore the aspects of human interactions (taking into account the gestures and facial expressions of the involved people) and the need to present and explain detailed information are very important. In order to support distributed decision making a videoconferencing system is one appropriate facility which fulfils the above mentioned requirements. In such a videoconferencing system multimedia-document environments have to be taken into account. While working on multimedia documents during the decision-making process, revision control facilities will be used. If a formal agreement is made remote signature procedures will be applied.

The operational requirements of this Generic Application and the functional requirements for the related resource packages will be refined by analysis under the tasks in I.1, by prototype development and experimentation in Part II and by exploiting the results of field experiments in Part III.

I.1.5 Distributed, Collaborative Design (TA.101, TA.106, TA.107)

Issue

Many design processes involve the participation of a number of different people. The IBC will allow remote participation in this process. This Generic Application focuses on multiple (and iterative) remote contributions to a design process. The design is typically that of a physical object, though many other activities dealing with products that are other than physical goods may also have the same characteristics, eg the design of a software package. However, it is considered that this application is distinct from information-based decisions, which may have no single object as their focus.

In a decision-making process information plays a key role; in a design process a focus on the goods or object is more important, but without neglecting the possibilities to discuss design problems and to decide how to solve them. Therefore the multi-party distributed decision support mentioned above can be seen as the superset to facilitate remote contributions in a design process.

Scope

The Generic Application is relevant in the media and publishing sector as well as in the electronics, aerospace and automotive industries. In addition the major research institutes, already familiar with international collaboration on large projects should be considered, as should any other sector where a 'product' of some kind is created by the collaboration of a number of individuals.

General needs include inter-personal communications to support the iterative process of decision making in a phased or iterative development process.

Access via IBC to multimedia data bases will be required, maintained by each component maker or supplier, or possibly by a new class of brokers established as a "telemarket". In some cases the provision of the data base could be a third-party service. Data must be available as displays or hard copy, and as files which can be entered into the users' CAD systems.

The service aspects to be investigated would include the following:

- methods of establishing connections, over switched public networks or leased-channel networks

- access control, security of data, privacy and charging
- integration with different types of current and future workstations and software systems
- impact of ATM, and suitability to traffic patterns (potentially bursty with short response time requirement).

The operational requirements of this Generic Application and the functional requirements for the related resource packages will be refined by analysis under the tasks in I.1, by prototype development and experimentation in Part II and by exploiting the results of field experiments in Part III.

I.1.6 Distributed Learning/Training (TA.101, TA.106, TA.107)

Issue

The availability of multimedia communications will significantly improve the possibilities of remote education and training. Conferencing capability will be included to permit general interaction between the participants in the learning event.

Most application areas include the wish or need for users to gain knowledge and expertise using IBC as a vehicle for information flow. In all areas, technological change has necessitated the re-education of adults throughout their working life. This Generic Application will include elements of teaching (where the teacher defines the syllabus and controls the pace) and learning (where the pupil is given the means to acquire information and skills). It will also include the joint authorship and preparation of material.

Examples include instruction in the maintenance of aircraft and similar complex products, marketing of drugs coupled with information about their use, skills-based learning through access to material assembled off-line.

A key feature of this application is that it is usually non-symmetrical in information flow, as the provider of the material cannot cope with each of many pupils returning similar quantities of data.

Scope

The typical classroom situation is an example of a conference in which only one person is actively contributing, while others are listening. Direct visual contact is needed as it helps to clarify terms by employing gestures and facial expressions. IBC technology might change this pattern, but it is a basic model.

In many environments, particularly in scientific areas, participants need to coordinate their work, present results and discuss open issues. Groups may be small, possibly not more than ten people. Discussions often do not have an appointed leader. Contributions to the discussion are typically short and need support for visualisation in different ways, eg overhead slides, desk-top presentation.

In a seminar, participants are listening most of the time. Usually a lecture is supported by applying an overhead projector. Some support for discussion is needed.

Roles in these various environments are not statically assigned. Support for integration of different presentation mechanisms and media are required.

Learning requirements exist in many sectors, and in many business functions. This requirement for training is in part produced by the need to react to the pace of change caused by technology and economic shifts.

The operational requirements of this Generic Application and the functional requirements for the related resource packages will be refined by analysis under the tasks in I.1, by prototype development and experimentation in Part II and by exploiting the results of field experiments in Part III.

I.1.7 Monitoring and Surveillance (TA.101, TA.106, TA.107)

Issue

This Generic Application covers all situations where knowledge of what is happening at a situation remote from the enquirer is made available over the IBC. Associated with the transfer of this knowledge is the transmission of control information in the opposite direction. The application implies little or no human intervention at the remote situation, though this may not always be the case. The sensors involved may include microphones, video cameras, and static-state or dynamic-state measuring devices.

This Generic Application is relevant to process control, security monitoring and telemetry. Information in a variety of media will be transferred from a number of points, possibly a very large number, to a single information collector. The control of the process could be performed by a third party.

Scope

Examples of the application include security surveillance of property, monitoring of remote unmanned industrial sites, observation and control of motor traffic, remote monitoring of medical conditions, remote quality control in, say, the aircraft industry, remote baby-sitting/checking by parents of children in the home and in playschools and the support by monitoring of the housebound.

The operational requirements of this Generic Application and the functional requirements for the related resource packages will be refined by analysis under the tasks in I.1, by prototype development and experimentation in Part II and by exploiting the results of field experiments in Part III.

I.1.8 Telemarketplace (TA.101, TA.106, TA.107)

Issue

The telemarket concept involves the remote offering, ordering, and sale of goods or services together with means of funds transfer for payment, including authorisation and authentication.

Telemarket IBC systems would be found in quite different applications areas and would always integrate a broad spectrum of functionalities. While their business areas may range from retail to real estate and from healthcare to banking/insurance, their functionalities would integrate the whole spectrum from advertising, offering and selling to authorisation / authentication checking and payments.

Scope

The offering process may involve broadcasting multimedia information on the goods or services. Purchasers will be provided with means of order placement and funds transfer for payment. Auction management could form a useful part of the application. However, the IBC will also provide the facilities for increased accuracy of targeting of audiences for promotional objectives.

In a simple telemarketing scenario, a single telemarket user would browse through the information provided by an IBC telemarket system in search of items of interest. Eventually he/she would make up his/her mind and order one or several items and pay for them. The scenarios get more complex as the items being marketed are getting more expensive and/or more complex and/or more personal (such as fashion wear, high-value cars, housing, long-distance travelling, funds transfer, insurances, etc). In these more complex scenarios, the telemarketing system may need to provide functionality such as access to remote expertise and distributed decision support. In addition, professional telemarket applications may also exist for example for commodity trading.

The operational requirements of this Generic Application and the functional requirements for the related resource packages will be refined by analysis under the tasks in I.1, by prototype development and experimentation in Part II and by exploiting the results of field experiments in Part III.

I.1.9 Distribution/Entertainment/Leisure (TA.101, TA.106, TA.107)

Issue

The IBC environment will bring with it the possibility to distribute video material over the network. The system should be capable of delivering material at the user's request, rather than at the convenience of the programmer. This would increase consumer choice, and also broaden the range of material available. Variations in working-hour patterns need no longer constrain the material to which the audience has access. At the same time, programme suppliers would also be able to continue to deliver mass broadcast. Any combination of user selection, market targeting and broadcast should be possible, with or without individual user control of information.

Scope

Video, audio and text information will be communicated from a single point to a multiplicity of receivers. Management facilities will be provided to control the identity of recipients. Payment mechanisms may also be involved as in pay-per-view TV. The user will also be able to control the reception of information.

This Generic Application will involve the provision of distribution facilities for entertainment material but will also provide for active participation in competitions, games, etc. The system must also be capable of fulfilling the requirements for material other than entertainment, such as news or sport.

The operational requirements of this Generic Application and the functional requirements for the related resource packages will be refined by analysis under the tasks in I.1, by prototype development and experimentation in Part II and by exploiting the results of field experiments in Part III.

I.1.10 Multimedia Interpersonal Messaging (TA.101, TA.106, TA.107)

Issue

This Generic Application deals with the requirement for broadband, multimedia transmission of messages, generally person-to-person. Such messages may be structured multimedia documents.

In its most basic form the application will require store-and-forward and mailbox facilities for messages comprising a least two parts, an envelope containing information about user information being carried and the multimedia document representing that information.

Scope

The key feature of this Generic Application is the requirement to handle multimedia electronic mail in a manner compatible with the human-machine interface of implementations fulfilling the requirements of the other applications.

The application must require the writing and reading of such information, the latter process probably including the establishing of real-time links between the recipient and the distributed storage means, to enable the recipient to 'unspool' multimedia information using the simplest possible commands. The significant problems produced by mixtures of real-time (voice, video) and non real-time (text, image) media must be resolved.

The operational requirements of this Generic Application and the functional requirements for the related resource packages will be refined by analysis under the tasks in I.1, by prototype development and experimentation in Part II and by exploiting the results of field experiments in Part III.

I.1.11 Multimedia Information Assembly, Access and Distribution (TA.101, TA.106, TA.107)

Issue

IBC will provide access to data bases storing multimedia documents. These are structured combinations of text, audio signals and fixed and moving images of various qualities. The Generic Application requires facilities for the input of information to data bases, which could be in a distributed form, for maintenance of the record storage and for user-friendly and efficient information retrieval.

The necessary components to support this Generic Application are:

- assembly of multimedia information, by numerous parties, for a variety of purposes
- provision of mechanisms for access to the information, possibly including the necessary charging and user registration mechanisms
- provision of mechanisms for distribution of the assembled information on a selective basis controlled either by the supplier or purchaser of the information.

Scope

IBC will permit all the above processes to take place efficiently across distance. Many new applications will become possible, for example in the media industry where stores of images are directly equivalent to capital.

The scope of the Generic Application will have to be defined taking into account the experience of both public and private videotext systems, as well as other forms of databases providing information services.

I.2 Consolidation of Technical Results of Experiments *(TA.112)*

Issue

ACE experiments in Part III range across business functions and business sectors whilst also addressing strategies, common applications and common technologies. To ensure the maximum benefit from ACE, the results of the individual experiments need to be consolidated and summarised and the appropriate conclusions drawn at strategic, technological and application levels. The application and strategic issues are dealt with elsewhere in Part I. This area deals with the synthesis of technology and network related conclusions.

Scope

For the consolidation of results to be manageable some consistency between the tasks will be required. It will be necessary to develop consensus on methodologies and procedures both at the operational level and for results consolidation. A common terminology will also be necessary.

The effort under this heading will be required throughout the duration of the work on field experiments and prototypes, since after the procedures have initially been defined and agreed it will be necessary to monitor the experiments to ensure that the agreed procedures are operable and to determine whether changes or further agreements are necessary.

I.3 Impact and Opportunity Assessment *(TA.116)*

Issue

Since IBC will have a profound impact on economic and social life, it is important to identify techno-economic trade-offs in the relationship between system/technology and user (operational) requirements. The ability to identify the factors affecting the feasibility of advanced communications applications will be of critical importance.

It is important to assess the impact of the field experiments on their environments and to understand the way in which the characteristics of the different environments influence the experiments. Such an assessment will throw light on the factors which affect the feasibility of IBC applications and will identify the areas of maximum impact. These will form an important input to the development of IBC introduction strategies.

Similarly it is necessary to analyse the needs and wants in each business function and sector to help to identify the future feasible applications of advanced communications.

Scope

Each field experiment must be conducted in such a way that its effect on working practices, costs, etc, can be determined. User requirements must be established at the start of each experiment and the extent to which expectations are realised assessed.

The initial concern of the tasks under this heading will be with the techniques of technical and economic impact analysis and with the way in which this information is collected within each experiment.

An initial assessment of the impact of the experiments can be made on the basis of the specific characteristics of the experiments and the user requirements, once these are established. This can then be updated as real experimental results become available.

The overall objective is to build confidence in the feasibility of applications of advanced communications by determining the relevant techno-economic criteria for success.

PART II - TECHNIQUES FOR ADVANCED COMMUNICATIONS EXPERIMENTS

Issue

ACE addresses the application of advanced communications facilities to a wide range of business functions and business sectors.

The field application experiments in Part III are focused on currently identifiable user needs and the use of currently available advanced communications resources. Such resources are likely to be needed by a number of experiments. The selection of resources will be a matter of some urgency, if the application experiments are not to be unduly delayed, and will require a certain level of expertise.

Whilst the application experiments in Part III will be based as much as possible on the Generic Applications of advanced communications identified in Part I, it will not be possible within these experiments to take a long-term viewpoint or to take into account the generality of requirements across the spectrum of business functions and sectors. The Part III experiments need therefore to be complemented by tasks in Part II which are focused on the generality of the Generic Applications and on the definition of and experimentation with a set of related prototype resource packages. It may possible to retrofit the prototype resource packages into the later stages of the Part III field application experiments.

The building of advanced communications systems will be a task of some complexity. The introduction, development and exploitation of advanced communications is likely to be inhibited unless tools and techniques are developed to simplify the task.

The determination of users' needs for a range of facilities which do not yet exist is a problem of some complexity and at the same time a limiting factor in the development of advanced communications. Techniques are needed to elicit the responses and requirements of users in parallel with the operation of experiments. Such techniques will accommodate changes in perceived requirements as they evolve during the course of experiments. Also inputs from a wider range of potential users may be absorbed. A major problem facing the introduction of advanced telecommunications is the ability of potential users to grasp the impact and importance of new methods of operation. Any mode of working that will allow this to be investigated without major investment, both in terms of training and capital, would be highly beneficial. Such approaches embrace both simulation/emulation techniques, and the adoption of laboratory (or restricted infrastructure) experiments based on the technologies in question.

Scope

Tasks in Part II.1 will support Part III application experiments by recommending appropriate available advanced communications technologies. The tasks will also monitor the use of these technologies in the on-going experiments.

Part II.2 addresses the development of resource packages to support Generic Applications which are applicable across business functions and sectors. The resource packages will include the network capabilities of transport, switching and management as well as terminal facilities implemented in hardware or software. Human interface and other usability aspects will be particularly important. Prototype resource packages will be developed according to the requirements established by the Part I tasks and tested in a laboratory environment involving users.

The work will include the development of techniques and technologies for the building of advanced communications systems by configuring and customising the resource packages and, where appropriate, linking them together.

In Part II.3 support for the requirements capture process will be provided in the form of technologies for eliciting user requirements. In addition, user reaction to experimental results will not be effective if reported only in detailed technical terms. Presentation techniques, including graphics and particularly animation, will be developed to illustrate the impact of advanced communications to specialist but non-technical audiences.

II.1 Network and Technology Resources for Application Experiments *(TA.200 - TA.235)*

Issue

Experiments in Part III address a wide range of needs for advanced communications in a large number of business functions and sectors. For each experiment it will be necessary to select and assemble the appropriate resources at system and subsystem level. The integrated and multimedia nature of the experiments will raise issues of subsystem interworking and interoperability. Such subsystems may themselves be neither complex nor ultra-sophisticated. Part II.1 tasks will provide assistance to Part III experiments in the selection of these resources and will address the difficulty of building complete system solutions for application experiments which are inherently multidisciplinary.

Scope

Support will be offered by Part II.1 tasks which deal with the assessment of available solutions to the problems posed by experiments in Part III. A starting list of requirements has been created based on the perceived technical approaches of Part III tasks. It is anticipated that this will evolve as the precise requirements of experiments become known. Consequently Part II.1 and Part III tasks will run concurrently. The function of Part II.1 tasks in general is to offer advice and orientation and to disseminate information, not to impose solutions.

Three classes of requirements have been identified:

- server modules
- workplace modules
- network requirements.

Task TA.200 deals with integration and interworking of identified solutions.

The tasks under this heading essentially address the urgent needs of Part III experiments, although the tasks also include the monitoring of the implementation of the recommendations produced by the task. Valuable inputs based on this analytical and monitoring work could be provided to the tasks in Part II.2 addressing the longer-term solutions. There could therefore be some merit in projects which embrace both the shorter- and longer-term tasks.

II.1.1 Server Module Kit for Application Experiments (TA.200, TA.211 - TA.219)

Issue

Multimedia applications of advanced communications require a wide range of matched combinations of hardware and software. The range of applications and of business functions and sectors which are addressed will render such combinations *which interwork and meet the requirements* difficult to identify.

Server modules have been classified into six subdivisions.

Scope

In each case, the requirement of the related tasks is to identify and make known to Part III experiments possible solutions to their requirements. The objective is to avoid unnecessary duplication of effort across the range of application experiments by creating a pool of knowledge, and making this available. At the same time, no mechanism is proposed to control the choices made by Part III experiments, which must be free to select solutions meeting their functional and schedule objectives.

II.1.1.1 Translation / Interpretation Servers *(TA.211, TA.212)*

Issue

Multinational experiments will by their nature expose requirements for translation and interpretation. Such requirements appear in a variety of sectors and at a number of levels. Requirements range from on-line user guidance in the use of publicly available resources by the provision of textual instructions in the appropriate language, to the complexities of real-time interpretation integrated into multimedia conference systems.

Scope

Available solutions may range from the technologically sophisticated, but potentially error prone, automatic systems to systems directly employing human expertise. Such human expertise might itself be made available via the telecommunications infrastructure, using appropriate multimedia techniques. The ability of users to understand failure modes and to track back may prove to be an important determinant.

II.1.1.2 Integrity Mechanisms *(TA.213 - TA.215)*

Issue

Many advanced communications applications raise issues of integrity, security and privacy. The acceptability of such applications may critically rest on adequate levels being achievable in these domains. Advanced communications raises the fear on the part of users that sensitive or personal data may either inadvertently 'leak', or that systems may be prone to unwanted intrusion. A major problem may lie in this perception, and the unpredictability of such effects, in addition to the reality.

Scope

Solutions will be required for applications ranging from the residential delivery of entertainment material, where the requirement may be for the protection of copyright, to the guarantee of privacy of medical records when these are carried by the network. Financial mechanisms must have an acceptable level of protection against fraud and simple error, while medical systems must provide sufficient protection against liability for the practitioners concerned.

II.1.1.3 Conference Servers *(TA.216)*

Issue

Many applications require conferences, frequently covering a variety of media including sound, image and document transfer. Non-integrated systems exist to address these needs. However, to address the advanced communications environment, integration will be required, including user control mechanisms that are sufficiently easy to use and which provide sufficiently high levels of performance. A number of issues need to be addressed including:

- level and means of integration with other terminal functions both in hardware and software
- bandwidth requirement within the range 2 Mbit/s (minimum acceptable) to 2 Gbit/s (high quality uncompressed)
- application access method, taking into account security issues
- control of screen content and camera positions in a multiperson distributed environment
- ability to participate in several conferences at the same time.

Scope

The tasks will address the identification of solutions to conference server problems across the entire spectrum of applications. Conferences in the advanced communications context include text, data, image and voice, all of which must be dealt with at a sufficiently high level of quality and associated control. For example, the videoconference should provide not only an 'opposing studio panel' set up, but should also aspire to model the context which obtains in normal business meetings, ie the functions of chairman and meeting agenda control, document distribution, and the additional complexities of individual user control of view and focus.

II.1.1.4 Multimedia Mail Servers *(TA.217)*

Issue

Mail represents a significant complement to general interpersonal communications and is also a component of applications in many sectors. Advanced communications facilities will include multimedia mail. The mixture of real-time (voice, video) communications with the non-real-time (text, data, still image, graphics) represents a significant challenge. It is likely that particular configurations of mixtures of different media will prove to be appropriate in many specific contexts.

Scope

Solutions to the various levels of mail problem will be sought which meet the requirements of Part III experiments. Such solutions should specifically include required directory features. Additional features may be desirable to control and monitor the routing of multimedia files to support a case-handling facility.

II.1.1.5 Database Systems *(TA.218)*

Issue

Databases and their associated contribution, control, access and billing mechanisms will form a significant part of many applications, including public information and case handling systems. In the long term many of these will include material up to and including the image and/or video level. These multimedia databases may be physically distributed, which will impose access, routing and update coordination requirements on the telecommunications facilities.

Scope

Solutions will be sought which should be available in the time frames required by the experiments and which also provide the required functionality. While there may be some parallels with the needs of distribution servers (see below), it is anticipated that solutions in this area will come from the traditional database and/or videotext industries, rather than the cable TV and/or entertainment industries.

II.1.1.6 Distribution Servers *(TA.219)*

Issue

A number of applications, typically in the residential area require specific distribution systems, in terms of both hardware and software, which will be capable of supplying the necessary signal to the necessary termination with sufficient speed and selectivity, and of managing and controlling the commercial aspects of such systems.

Scope

Solutions will be sought to the critical problems which impede the exploitation of the full potential of advanced communications as a mass delivery medium for leisure/entertainment material and for the creation of 'telemarketplaces'. Advanced communications will be able to provide a high level of user selectivity, compared to that obtainable from traditional TV and film distribution and broadcast mechanisms. Problems of simultaneous access to a recorded material from a number of temporal and physical points must be addressed. Facilities must be provided for the offering, ordering, provision of and payment for goods and services.

II.1.2 Workplace Module Kit for Application Experiments (TA.221 - TA.223)

Issue

The advanced communications workplace will extend the limited 'desktop metaphor' of the approaches to document handling and creation that are observable in current personal computing. The advanced communications workplace will extend the metaphor to all aspects of communications, creating a 'network space'. This reflects a view of the world as seen through the user access to the network which, given high speed, low response times, and the ability to cope with mobility, makes the user relatively unaware of (and possibly uninterested in) the physical location of the resources which are used.

Scope

The advanced communications workplace/network space has been categorised under three headings in the tasks described:

- professional
- transportable/mobile
- residential/leisure.

The tasks will identify solutions for the above situations, as seen in the advanced communications environment.

II.1.3 Network Requirements for Application Experiments (TA.231 - TA.235)

Issue

All Part III application experiments will require network support. This is considered in three different areas:

- Customer Premises Networks covering advanced communications equivalents of both PABXs and LANs.
- Local Access Networks where the prospect of greater activity in the residential area may bring with it the need for the enhancement of existing cable resources. Additionally, the growing number of islands of high-quality, high-capacity infrastructure may prove to be suitable sites for application experiments.
- Trunk Networks which provide interconnection of the above and long distance communications.

Scope

Potential solutions to the above problems will be required, both at national and international level. In addition the mix of network cultures may necessitate novel approaches. Tasks are structured to cover the following aspects separately:

- network management - which can provide useful information to the experiments on usage and performance
- infrastructure - providing overall coordination of network infrastructure requirements
- advanced infrastructure interconnection - considering Teleports and other islands of advanced infrastructure at the local level

- cable system interconnection - addressing the opportunities to use existing cable systems either in conjunction with telecommunications networks or separately when enhanced to include up-stream communication capability

- EBIT or its extension could provide a general solution for both local access and trunk interconnection.

<u>II.2 Resource Packages Supporting Generic Applications</u> *(TA.250 - TA.261, TA.270, TA.275)*

Issue

In Part I a number of Generic Applications have been identified and described. These descriptions will be expanded in an analytical fashion by the tasks in Part I. They have been selected because of their potential relevance to a large number of business sectors and business functions.

Application experiments in Part III will address one or more of these Generic Applications together with requirements specific to particular business sectors or functions. In Part II.2 an effort dedicated to the definition and prototyping of resource packages to support each Generic Application will, together with appropriate user experimentation:

- enable concentration of relevant expertise

- enable standardisation requirements to be identified

- address in parallel the experimentation in live user environments, with "clean sheet" prototyping.

It will be possible and in some cases desirable to devise resource packages using different technical solutions while still meeting the requirements of each Generic Application. These solutions must accommodate the range of requirements posed by the different business sectors and business functions in which they will be employed. This implies solutions which:

- cover the most demanding case

- can be tailored to specific cases by means of the processes developed through task TA.275

- can be linked together efficiently

- will be cost effective in all envisaged cases.

Advanced communications will offer users sophisticated and powerful facilities. However, it will require a certain skill to assemble together the combination of terminal hardware and software in addition to value-added servers, and various network capabilities needed to satisfy users' needs. Techniques are required to help users and system builders manage this complexity.

Particularly the adaptation of resource packages to individual user needs and the process of linking them together will need to be simple and efficient. Only then will the potential of advanced communications be able to satisfy the dynamics of the rapidly changing business world.

Such techniques will also provide some level of insurance against the uncertainties inherent in developing products and services targeted at the markets related to advanced communications.

Prototypes of resource packages supporting Generic Applications should be targeted on wide scale use across business sectors and functions. As an initial stage, appropriate experiments should be formulated for this purpose, initially conducted in the laboratory rather than the field because of the range and diversity of users involved. An additional step is the introduction of such experiments into user premises, but using a simulation approach rather than a real life approach.

Scope

One or more resource package developments are envisaged for each Generic Application. These resource packages will consist of:

- transport and switching capabilities of the network
- terminal hardware and software to implement communication protocols and related information processing and storage
- protocols and procedures for the combination and manipulation of the network and terminal services involved
- guidelines for the customisation and interlinking of these resource packages to fulfil overall enterprise objectives.

The work in these tasks will be dedicated to development of prototype resource packages supporting Generic Applications. An intrinsic part of this prototyping will be laboratory experimentation including users, employing limited infrastructures. For example, much useful research could be carried out concerning the requirements of collaborative decision making by experimentation with a prototype installation between adjacent rooms, without the cost and logistic problems associated with the introduction of such new technology in a field application experiment. A "General Framework" task has been set out, identifying the general requirements of all other tasks relating to this area.

To be used in field experiments, resource packages would have to be customised and combined to produce a complete and usable system. This process should be verified and user reactions sought on a laboratory basis.

A task is therefore envisaged for each Generic Application as follows:

Distributed Case Handling

Case routing and control will be the basis of this Generic Application coupled with authority certification, privacy and necessary message handling. Different solutions need to be considered for systems dedicated to single-user organisations and those available on a broad basis from a value-added service provider.

Interpersonal Communications

In the form of an audio-visual teleconference, this Generic Application will be needed as a complement to many other Generic Applications. The approach to implementation must therefore be sufficiently flexible to permit cost-effective adaptation and combination.

Remote Delivery of Expertise

Many different situations can be envisaged for the delivery of remote expertise. Single or multiple experts may be involved and, in the latter case, they may need to consult each other. Expert systems and information bases have an obvious relevance. The relationship between the experts and their customers will carry and impose different communication and payment handling requirements.

Distributed Collaborative Decision Making

Based on a multimedia teleconference capability, this Generic Application will involve additional facilities (eg complementary document handling) to support the decision making process. Considering the importance of many of the decisions concerned, particular attention must be paid to privacy and authentication.

Distributed Learning/Training

Many different configurations will be encountered ranging from an individual student consulting a remote library, through a teacher remotely addressing a distributed class, to a seminar situation in which the learning and teaching roles are distributed and variable. An important aspect of this task will, therefore, be to devise a minimum number of solutions to cover the field.

Monitoring and Surveillance

These types of facilities are implemented on today's telecommunications networks. The distinguishing characteristic of advanced communications monitoring and surveillance will be its ability to provide additional bandwidth on demand to cover the needs that arise from abnormal or infrequent events.

Telemarketplace

A key issue to be considered in the case of this Generic Application is the location of the customer. Different technical solutions will be appropriate to home, in-store and industrial shopping/purchasing. In addition, the requirements of both the seller and the buyer must be catered for.

Entertainment/Distribution Leisure

Compared with conventional cable television networks, advanced communications offers greatly increased scope for individual selection and interaction. The approach to this Generic Application must seek to exploit this capability to the full.

Multimedia Interpersonal Messaging

The requirement for this Generic Application will extend the facilities provided by today's electronic mail services, incorporating both still and moving pictures together with voice annotation and audio sound tracks. As with interpersonal communications, it will be a frequent complement to other Generic Applications.

Multimedia Information Assembly, Access and Distribution

Advanced communications provides many opportunities and technical challenges for the provision of remote access to distributed databases which, either individually or collectively, provide multiple media capability. Enabling technologies will, amongst other sources, be available from

RACE and ESPRIT. The scope of this task is to devise and prototype combinations of these capabilities to meet real end-user needs.

Distributed Collaborative Design

This Generic Application addresses the convenient combination of automated design processes with inputs from people involved in the design process in different locations. The advanced communications capability to transport high-quality images will be particularly valuable.

A further task under this heading addresses the development of techniques for the manipulation of the resource packages which are combined and customised to address specific user needs. These techniques will eventually be incorporated as management facilities within the resource packages, able to be manipulated on both a static and dynamic fashion in response to real-life experience.

II.3 Elicitation Technology and Techniques *(TA.281 - TA.283)*

Issue

A major impediment to the introduction of advanced communications applications is the difficulty in determining users' needs and wants, interpreted into operational requirements. A range of sophisticated facilities can potentially be provided, based on the power and flexibility of advanced communications. However, what is provided, and in what form, needs to be based on user requirements. Users will find it difficult to express their requirements for a totally new system, providing capabilities that they may at best associate with "science fiction". The level of confidence in their expression of requirements will be low without real or simulated experience of their impact.

Techniques are needed to obtain from users the best possible statement of their needs and reactions to the facilities that are being proposed for demonstration on experimental systems.

Refinement of these expressions of user requirements can often be effected through the simulation of an environment using advanced communications capabilities. In such a simulation the real advanced communications network and terminal facilities would be substituted in a way which would produce the same effect for the user. These simulation techniques could be applied to best effect as a preliminary to larger-scale experiments.

Graphics and animation techniques can be an effective means of illustrating to the user the expected benefits of advanced communications and the results of experiments.

User requirements will be expressed in terms of total systems rather than individual Generic Applications. The translation between the two must be based on the techniques for manipulating the resource packages to meet specific user needs referred to above.

Scope

Recognising the importance of the dialogue between end users and the process of experimentation with advanced communications applications, it is proposed to devote effort to techniques and technologies that will assist this interaction under the following headings:

Elicitation Technology and Techniques

Studies of expert systems have led to the development of several knowledge engineering technologies and techniques, including knowledge elicitation. They could usefully be employed in the process of determining advanced communications requirements with respect to potential users.

Simulation for Application Experimentation

Simulation of both network capabilities and terminal systems could be a useful precursor to full scale experimentation. Appropriate techniques should be provided for the use of Part III application experiment teams, where possible in time for requirements capture phases of projects addressing Part III experiments.

Presentation for Application Experiments

Graphics and animation techniques will be developed under this task to assist both advanced communications terminal users and customers to understand the implications of the capabilities. Such techniques could also be used to improve terminal interfaces and management system reports.

PART III - APPLICATION EXPERIMENTS *(TA.300)*

Issue

Integrated Broadband Communications will provide the possibility of a widely increased variety of advanced communications media. Opportunities for the exploitation of these technologies should be correspondingly varied. The technologies that will drive this transformation are becoming widely understood and attempts are being made to create system designs that are as robust as possible, in order to cope with unforeseen variations in usage characteristics. These characteristics are not only in the form of the static parameters of service specification, but also in terms of the dynamic characteristics, including call pattern, call duration, geographic market development patterns, user configurations within a 'call', required 'call' set-up time and signalling load. Many of these characteristics can only be determined by considering the applications themselves.

While there is increasing confidence and optimism that applications will emerge, there is still a level of uncertainty that is significant when the scale of the investment required is considered. The investment covers not only the basic technology and system and product development for both the network/system and for terminals and CPN equipment, but also the massive investment required in network deployment and that on the part of users who must face changes in their modes of operation and in the structures of their businesses. Considering the novelty of the applications, and the variations in culture and corresponding communications habits not only across the European area, but also between companies, a user-centred process of experimentation is required that will allow users to explore the impact and potential of the new technologies. This should also allow those involved in telecommunications network and system development to verify the fit of their intended designs to the communications patterns that users exhibit under experimental conditions, which should be as close to the future environment as possible.

Scope

To address the above uncertainties for network operators, service suppliers, equipment suppliers and users alike, a coordinated set of advanced communications application experiments have been defined. These have been structured into two groups:

- advanced communications application experiments addressing business functions

- advanced communications application experiments addressing business sectors.

To create coherence and to generate a structure within which all actors can operate, an emphasis on Generic Applications (whose description and specification will be refined in Part I), adapted where necessary to the specific user circumstances, will be considered as of prime importance. In essence, the requirement is to confirm the identity of these Generic Applications, and to clarify their characteristics by a process of field experimentation. It is anticipated that the experience generated will form a base on which the relevant actors may orient and build their plans for standardisation, implementation and exploitation.

In order to identify the necessary and appropriate targets for advanced communications application experiments, an analysis has been undertaken of the problems in various business sectors and business functions whose solution may be approached by the use of advanced communications.

III.1 Application Experiments Addressing Business Functions *(TA.301 - TA.312)*

Issue

Advanced telecommunications provides a set of techniques and technologies that can be applied to improve the efficiency and effectiveness of processes within business organisations. The first effect of this is to change business processes within existing organisational structures, i.e. to modify the use of communications within existing business functions. Subsequently such process changes can be expected to produce changes in organisational structure itself.

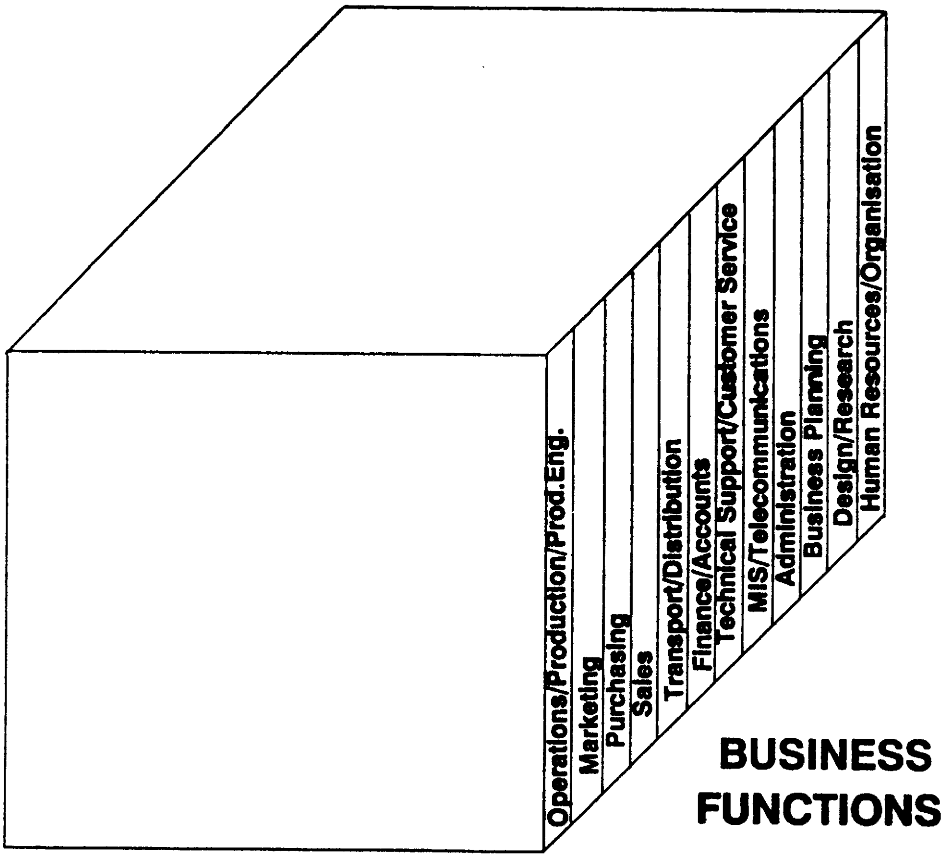


Fig 7: ACE Domain - Business Function Viewpoint

Scope

Experiments will test the relevance of the Generic Applications of advanced communications to the processes performed within a number of common business functions and will reveal how these processes may be transformed by the introduction of advanced communications. In general the experiments will embrace more than one business sector. The general aims of the experiments are:

- to determine user requirements for a range of advanced communications applications for each business function
- to determine the technology and system engineering implications of such requirements
- to identify technology requirements

- to determine in each case the techno-economic impact of the application of the advanced communications

- to learn how to develop and implement specific advanced communications applications

- to establish the suitability of the resource packages developed by the Part II tasks to support the Generic Applications, and to discover the amount of customising necessary in each case and the impact of such customisation on the generic base of the resource package

- to identify the need and targets for standardisation in order to accelerate the implementation of advanced communications facilities

- to promote awareness of the impact of, and opportunities for, advanced communications

- to enable a match to be established between network, equipment, service and applications.

The following sections describe the issues in a variety of business functions and the scope for action in those areas. Tasks related to these areas are described in Volume II, consisting of specific user-based application experiments.

<u>III.1.1 Operations/Production/Production Engineering</u> (TA.301, TA.301A, TA.301B)

Issue

Operations in three kinds of organisation are considered: administrative/information flow organisations, logistic (material/product handling) organisations, and service providing organisations.

- Operations in administrative/information flow organisations (eg banking, insurance, media, publishing) including information service providers:

  There will be increasing product specialisation operating simultaneously with product diversification in this area, especially for banking, insurance, travel, stock exchange, and securities and loans. Together with increasing competition this will emphasise the need to improve internal efficiency. This will be coupled with a need to separate front-office and back-office processes, ie to separate the administrative processes tied to the commercial activities from the purely administrative processes.

  There will be a need for better information exchange between departments (local and remote).

  New products concerned with the distribution of information (especially information services contracts) will be the basis of new processes (eg trends in stock exchange market).

  Customers will take over and/or participate in some of the business processes (eg system access for enquiry or updating/Electronic Data Interchange).

- Operations in logistic (material/product handling) organisations:

  Product diversity can be expected to increase. Rapid technological development will lead, in some cases to larger, automated plants.

  Increasing competition and the need for cost reduction will focus attention on the improvement of internal efficiency.

- Operations in service-providing organisations (eg health care/liberal professions), not including information service providers:

  The range of services provided by a business unit can be expected to grow wider. The number of collaborative associations will increase. Processes will increase in complexity.

  There will be a need for greater expertise and there will be many opportunities to increase quality.

Scope

Advanced communications will facilitate communication with experts and with expert systems. It will also enable customers to gain access to suppliers' systems and to take over some of the processes (this will raise problems of system access and network security).

The general task associated with this work area addresses a spectrum of the Generic Applications which are relevant to the requirements of this function. Specific tasks deal with multi-site remote surveillance and incident reporting, and project management for building and construction.

III.1.2 Marketing (TA.302, TA.302A, TA.302B)

Issue

Marketing will increase in importance as a business function. New and expanding markets provide opportunities to enlarge business volume and increase market share, thereby increasing competitive pressures.

A key requirement is to get the right information in the right place at the right time. Whilst much information exists, it is often in a format that makes information exchange very difficult and not easily assimilated. Such information is often in mixed media format, eg image, data and text.

Also in many companies marketing expertise may not be complete and may require backup from technical and market experts.

Scope

The use of advanced communications to provide information from distributed multimedia data bases and to enable remote access to technical, marketing and financial expertise will provide powerful support to the marketing function.

The general task associated with this work area addresses a spectrum of the Generic Applications which are relevant to the requirements of this function. Two specific tasks address targeted advertising delivery and billing, and sales optioneering and product specification.

III.1.3 Purchasing (TA.303, TA.303A, TA.303B)

Issue

The purchasing function needs to be aware of the opportunities afforded by a wider market for materials, finished components, etc. Knowledge of the goods available on the market depends on the free availability of information covering all aspects of their specification. This requires international access to catalogue files. In selecting goods, a face to face dialogue with sales people or technical experts may often be necessary. After goods selection, speedy completion of the contract procedures is needed.

There is also a tendency for the creation within large business organisations of small decentralised purchasing units to enable speedy purchasing agreements. The existence of such units implies an ever-greater need for information flow, so that the smaller purchasing units can take advantage of the purchasing power of the overall business.

ScopeAdvanced communications can enable a 'telemarket' to be provided in all areas of business activity. The facilities would include access to distributed multimedia databases.

The general task associated with this work area addresses a spectrum of the Generic Applications which are relevant to the requirements of this function. Two specific purchasing tasks address remote inspection for quality control and purchase, and product selection by a store buyer.

III.1.4 Sales (TA.304, TA.304A - TA.304D)

Issue

The dismantling of trade barriers will enlarge areas of distribution but also increase competition. Whilst this will lead to new opportunities for product introduction it will also bring a need for more rapid communication, greater efficiency and increased quality in the sales process.

The relations with existing clients will need to be improved. This includes special financial arrangements such as credit cards for department stores and fuel stations, or the arrangement of loans.

Scope

Advanced communications will enable products to be offered to a wider market via telemarketing systems, eg home shopping, electronic catalogue, in-store and wholesale systems. More structured communication with the client will be possible, including personal contact (image) and validation. It will be easier to derive the administrative data from the sales process.

The general task associated with this work area addresses a spectrum of the Generic Applications which are relevant to the requirements of this function. A number of specific tasks deal with support for tele-auctions, electronic catalogue showrooms, training for sales personnel, and the concept of an 'electronic trading post'.

III.1.5 Transport/Distribution (TA.305)

Issue

Customers requirements will become more demanding, eg quicker and just in time deliveries. The planning process will need substantial improvement and will frequently involve the contributions of several different people at different locations. They will need to share up-to-date information. Potential customers need better delivery schedule and tariff information.

There will be pressures to increase efficiency and reduce costs by, for example:

- selecting the best means of transport based on time/quality/cost considerations
- effective administration/recording of transported goods (elimination of lost goods)
- selecting the best sequence to place goods into the means of conveyance.

Scope

Advanced communications will support multiuser transport planning and administration by enabling wide area access to multimedia data bases and information service distribution.

The general task associated with this work area addresses a spectrum of the Generic Applications which are relevant to the requirements of this function.

III.1.6 Finance/Accounts (TA.306)

Issue

The most efficient enterprises will carefully control their stock levels and cash balances. Enterprises which are international in character will increasingly hold stocks in many different geographical locations and cash balances will be distributed among several bank accounts in a variety of currencies. It will be necessary to consolidate this information to optimise cash resources, borrowing facilities and exchange rate exposures.

Budgets and operating accounts from affiliates and subsidiaries will need regular consolidation, often with currency conversions. Divergences will need explanations and there will often be the need for face-to-face discussions to clarify uncertainties, resolve problems and agree on remedial actions.

As enterprises become more complex, with more affiliates and more people involved in the handling of accounts, opportunities for fraud become more common and security requirements become more stringent.

Scope

Advanced communications will provide access to distributed, multimedia data bases for the consolidation of accounts and for overall inventory and cash management amongst a number of geographically separated affiliates.

A high level of system and network security will be required.

The general task associated with this work area addresses a spectrum of the Generic Applications which are relevant to the requirements of this function.

III.1.7 Technical Support/Service (TA.307, TA.307A, TA.307B)

Issue

Increasingly, enterprises' operations are dependent on the continuous functioning of technologically complex equipment. A fast and efficient repair service is required in the event of equipment malfunction. At the same time, increasing concern about the environment, coupled with legislation, often increases the criticality and complexity of technical support activities.

These demands, together with rapid technological development and increasingly specialised equipment, require well-trained and supported technical support personnel.

In addition, many organisations regard service delivered to their customers after the sale of either a product or service as a source of business revenue. This aspect of the service activity is typically characterised by a scarcity of appropriately skilled staff who are suited to the function. Ability to use such skills over distance or to provide support from a distant base or head office will help to alleviate the problem.

Scope

Advanced communications will address these issues by providing:

- rapid equipment malfunction reports from monitoring systems or human operators to in-house or external maintenance staff
- multimedia enquiry facilities for specialised information (eg environmental legislation)
- remote technical support expertise (especially for small companies).

The general task associated with this work area addresses a spectrum of the Generic Applications which are relevant to the requirements of this function. Two specific tasks address after-sales support and a transportable/mobile communication unit for repair and maintenance.

III.1.8 MIS/Telecommunications (TA.308)

Issue

Whilst information technology continues to develop extremely rapidly, users are becoming more knowledgeable than hitherto. They are able to specify their requirements more fully and frequently impose exacting demands. Increasingly, users participate in information system development.

The need for standardisation - in technology, in application definition and in development methods - is becoming more accepted.

In communications the need is for speed (including real-time), information integrity and security (privacy). Requirements for multimedia storage and distribution (text, data, voice and image) will steadily increase.

Scope

Advanced communications will enable access to multimedia data bases describing information technology trends, including up-to-date information concerning standards and product approvals.

Advanced communications will also provide fast, multimedia communication facilities for the general purpose of linking MIS and telecommunications staff to their internal customers.

The general task associated with this work area addresses a spectrum of the Generic Applications which are relevant to the requirements of this function.

III.1.9 Administration (TA.309)

Issue

The skill shortages which are expected to develop over the next few years will accelerate a trend to accommodate a variety of work patterns. In particular, staff will often wish to avoid time-consuming and expensive commuting in crowded metropolitan areas or will be reluctant to relocate to other areas or countries where their skills may be in demand.

In large enterprises, regular (eg monthly) reports have to be consolidated from contributions from the different functions, projects and operating units within the organisation, and from any joint ventures in which the enterprise may be involved. The deadlines for the successive reporting steps usually imply a high degree of urgency at each stage. Items from the reports are frequently reused to provide material for various purposes, including company annual reports and information for external financial analysts. Increasingly, these reports will become multimedia in character.

Scope

Advanced communications can support distributed working, in a variety of forms, by providing multimedia communication, data base and conferencing facilities. With this support, staff can work at home, at a local office of another part of the organisation, or at a multiuser work centre.

Advanced communications can enable the assembly of regular and irregular internal and external reports by providing multimedia communications and access to distributed data bases.

The general task associated with this work area addresses a spectrum of the Generic Applications which are relevant to the requirements of this function.

III.1.10 Business Planning (TA.310)

Issue

Business activity is becoming increasingly internationalised, due to, amongst other things: developments in world trade, increasing product complexity, and the formation of large internal trading blocks such as the EC. At the same time business scope is being enlarged, joint ventures are becoming more common, and competition is increasing.

In this context the decision-making process must be improved at the same time as it is becoming more complex. More people will be involved in the decision-making process, decision makers will become more physically separated, and communication problems due to language difficulties will become more apparent. Furthermore, decision making will become more time critical and will have a larger impact. The right information will be required in the right place at the right time.

Business planning will assume a greater importance and will become a major instrument in the effort to secure increased market penetration and to distinguish the migration path of the business.

Scope

Advanced communications will enable decision-making processes to become more efficient by allowing collaborative decision making between geographically separated groups of people. Collaborative meetings requiring no physical travel can be set up quickly and can be supported by the transmission of moving images, text and data, and by translation servers. This will enable effective decisions to be made between business enterprises in several different countries.

Advanced communications will also enable the business planning process to become more efficient by facilitating the consolidation of information from different partners and affiliates to form coordinated business plans. It will also allow each party immediate and appropriate access to the plans.

The general task associated with this work area addresses a spectrum of the Generic Applications which are relevant to the requirements of this function.

III.1.11 Design (TA.311, TA.311A)

Issue

Most design processes are heavily concerned with new technology and are becoming more complex. Design processes are present in a variety of sectors ranging from the obvious impact in manufacturing, to the iterative and collaborative process of, for example, designing a full colour brochure for sales/promotion. The use of computer aids to design, including mechanical and functional modelling, is widespread. Frequently, a single design project will involve the collaboration of many designers in geographically separated locations. Design costs and design intervals often represent a large proportion of total costs and intervals, and although much of the design process is creative, the pressures for improved efficiency will increase.

The intermediate and final results of the design process have to be stored and distributed to the various users (other designers, production, operation and maintenance). These archives have to be maintained and updated with design changes. Increasingly these archives, and the associated communication facilities will become multimedia in character.

Designers need access to data on materials, components, reusable designs and production methods. In some industries (eg fashion) it is also important for the designer to be well-informed about up-to-date trends Critically, the interpersonal processes between the individuals involved must be well supported.

Scope

Advanced communications will provide support to the design function by:

- enabling computer-based design models to be communicated between geographically separated designers
- providing access to multimedia distributed data bases (archives) for designs and models
- enabling access to experts to update knowledge of trends
- providing multimedia conference facilities to support collaborative design activities.

The general task associated with this work area addresses a spectrum of the Generic Applications which are relevant to the requirements of this function. A specific task addresses collaborative design.

III.1.12 Human Resources/Organisation (TA.312, TA.312A - TA.312H)

Issues

Rapid evolution in technology, in markets, and the increasingly international character of enterprises demand new skills for personnel at all levels. At the same time the recruitment market for human resources is greatly enlarged. It will be necessary to address this international market to get the right person into the right job and to provide appropriate training/continuing education.

In most enterprises human resources are the most precious resource and in many companies the cost of human resources constitute the main element of total costs. It follows that the efficient administration of these resources represent a high priority in most organisations, particularly in a time of skill shortage through shifts in the age profile of the population.

Scope

Advanced communications will assist the optimisation of the use of human resources by:

- providing support for personnel recruitment (telemarket)
- supporting distance learning/education
- supporting the administration of personnel distributed over several locations
- motivating staff, (eg special campaigns) via multimedia data bases.

The general task associated with this work area addresses a spectrum of the Generic Applications which are relevant to the requirements of this function. Specific tasks address open management education, a distributed masterclass, and multimedia maintenance and training manuals, together with several tasks concerned with learning/training in a number of business sectors.

III.2 Application Experiments Addressing Business Sectors *(TA.321 - TA.331)*

Issue

One of the effects of the introduction of advanced communications will be to transform the characteristics of a number of business sectors. Probable changes include:

- increased product diversification
- enlarged distribution areas
- geographic dispersion of workforce to enabling access to required skills
- strengthened relationships between suppliers and customers.

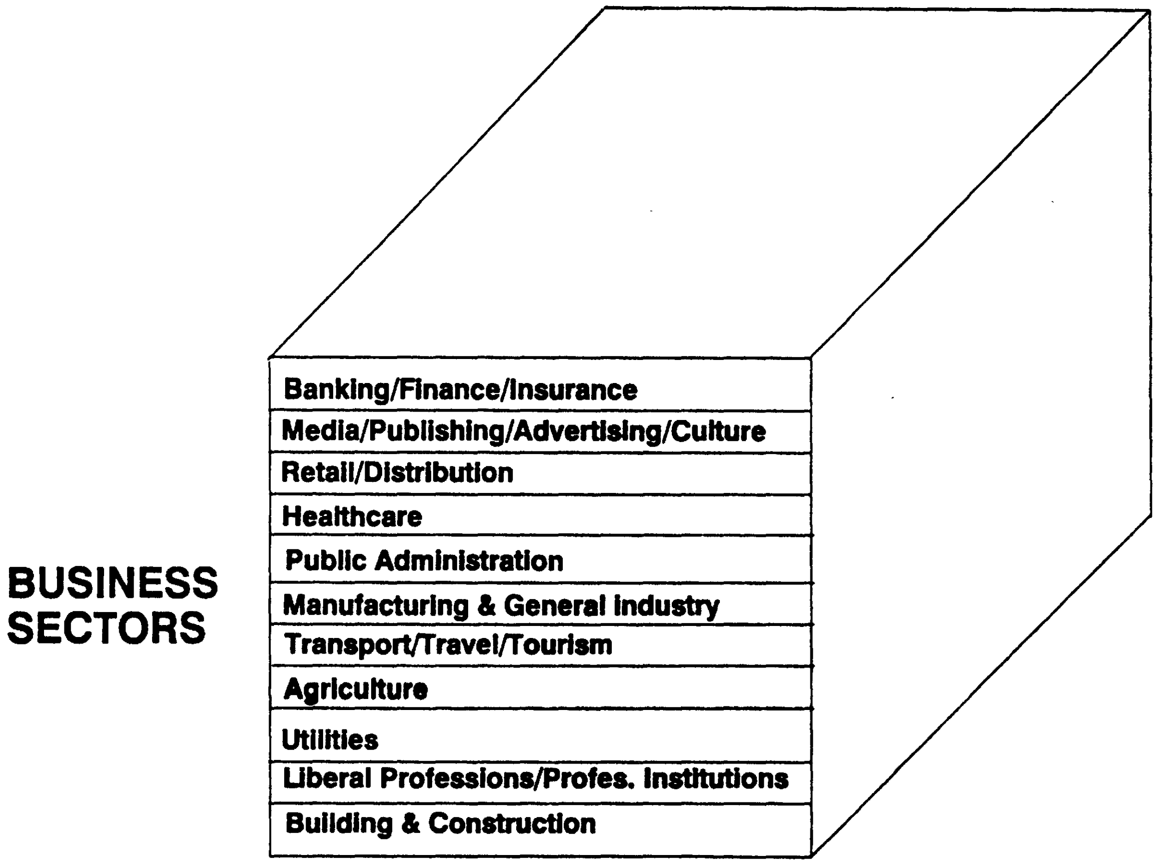


Fig 8: ACE Domain - Business Sector Domain

Scope

Experiments under this heading will test the feasibility of the application of advanced communications to the processes performed within a number of business sectors and will reveal the extent to which the sector will be transformed by the introduction of advanced communications. In general the experiments will embrace more than one business function. The general aims of the experiments are:

- to determine user requirements for a range of advanced communications applications for each business sector
- to determine in each case the impact of the application of advanced communications
- to learn how to develop specific advanced communications applications
- to establish the applicability of the resource packages developed by the Part II tasks, and to discover the amount of customising necessary in each case
- to identify the need for standardisation in order to accelerate the implementation of advanced communications facilities
- to promote awareness of the impact of, and opportunities for, advanced communications
- to enable a match to be established between network, equipment, service and applications.

III.2.1 Banking, Finance and Insurance (TA.321, TA.321A - TA.321E)

Issues

Personal Banking and Financial Services

The revolution in personal banking has already begun in many European nations. The use of 'plastic' money (both credit and debit types) is already widespread, and institutions predict continuing strong growth during the next decade, fuelled by increased availability of EFTPOS (Electronic Funds Transfer at the Point of Sale), together with the continuing relaxation of credit controls and international trading barriers.

In recognition of these forces for change, work in this sector is concerned with the mobilisation of advanced communications to provide advanced banking services to domestic users. The data speeds required at the user's premises for some services in this sector are likely to vary enormously - simple text and data will not require high bit rates but will require particular call types, eg fast set-up time and high integrity/security. The number of customers involved in any commercially viable system will require a very substantial bandwidth at the national and international trunk level. It may emerge that some forms of service even in the residential sector will require image-based and therefore high bitrate services (eg on-line personal help facilities).

In addition, it is clear that this sector contains leading-edge users who are used to looking to technology for competitive advantage, and that many other applications will not be feasible without the solution to a number of the problems posed in this sector. Personal banking could provide one of the triggers that will contribute to the penetration of the residential market by advanced communications services by allowing advanced user-friendly services to be developed. Tasks in this domain are designed initially to provide advanced services to local offices, but they will need to demonstrate clear and logical migration paths to fully-economic, domestic systems if cost barriers are to be reduced to an acceptable level in the medium term.

Automatic Teller Machines will provide a much higher level of service and will become more flexible in operation. Presentation will become more user-friendly and increasingly multimedia in character (image, voice, text, data). Requirements for user identification will become more stringent in order to control the cost of fraud.

There is clearly a cross-over of corporate and domestic banking characteristics in the area of Small and Medium sized Enterprises. Although small companies can generally justify slightly higher costs than the domestic user, they do represent a stiff challenge for advanced communications applications. System applicability to SMEs is therefore a key factor in this sector. Work is needed to meet specific requirements in the areas of machine translation, data security, electronic signature and special-purpose terminals.

Corporate Banking and Financial Services

Corporate banking services throughout Europe are already gearing up for 1992, with mergers, joint ventures and acquisitions being used by major actors to position themselves for maximum penetration of the deregulated market.

Advanced telecommunications will be a key factor in establishing and maintaining an open and competitive market in financial services which will avoid the over-dominance of any one centre.

One challenge in the corporate banking and financial services sector is therefore to provide migration paths for existing national and international systems into implementations based on advanced communications, which will provide the increased bandwidths and widespread geographical distribution necessary to exploit fully the computing infrastructure already being installed, whilst making services less dependent on today's major financial centres.

Advanced communications also provides a vehicle for a new range of advanced services, based on the transmission, interpretation and presentation of financial information (in numerical, pictorial or video form), targeted at improving significantly the performance of the financial markets.

Barriers to be overcome include the need to reach agreement with trading 'competitors' on standards for message transmission, and the very real need to ensure data integrity and security.

Insurance Services

In this sector both the diversity of products which individual organisations deal with and the level of specialisation or complexity of those products is increasing. One company may sell a whole range of banking, finance and insurance products. The presentation of information tc clients will need to become more sophisticated. As products become more diverse, expertise in any one topic will become increasingly scarce. Local branches of large companies, or brokers, will become largely selling organisations with a need to consult experts. Immediate and comprehensive access to remote experts will be required where direct selling of standard products will change the role of the intermediary to that of selling complex or one-off items.

On the operational aspects of insurance, provision of remote inspection facilities to validate damage claims and confirm provisional valuations, could help to improve company efficiency by increasing the utilisation of scarce resources.

There are many instances of cross-company collaborative initiatives (eg re-insurance). During the decision-making process, where time is of the essence, a large volume of information has to be communicated between the prospective parties to the deal.

Another major challenge in the insurance sector is to offer a communications infrastructure of sufficient capacity to stimulate the highly fragmented European industry to collaborate in the provision of comprehensive services. These should be made available initially to brokers and corporate users, but in time must lead to economically viable systems for domestic use. In this scenario, the role of brokers would gradually change to that of information providers within a fully homogeneous insurance services market.

Scope

Advanced communications can support this sector by providing the means of communicating a wide range of multimedia information, together with access to remote experts. High standards of security are required.

The general task associated with this work area addresses a spectrum of the Generic Applications which are relevant to the requirements of this sector. Specific tasks address personal banking services, collaborative dealing, direct marketing and selling of personal insurance services, re-insurance dealing, and a stolen goods register.

III.2.2 Media, Publishing, Advertising, and Culture (TA.322, TA.322A - TA.322G)

Issues

The businesses in this sector are characterised by their commercial exploitation of intellectual property. The use of telecommunications across the sector has been explosive over recent years.

Any business in the sector will seek to maximise profits from the exploitation of intellectual property assets by seeking new markets, new methods of delivering the product, increasing market share and by reducing costs.

The trend towards the digitisation of voice, data, text and image (still and moving) for storage and manipulation, leads to opportunities to exploit broadband digital telecommunications. This will lead to a better match between the capabilities of customer terminal equipment possessing powerful data processing, storage and graphics capabilities.

The approach to copyright issues is a key issue for the sector and could be a factor in terms of the competitive merits of alternative distribution mechanisms systems such as CD ROM.

The sector has experienced problems similar to those in the computer industry where incompatibility between equipment from different vendors can restrict the options open to the end user.

The sector embraces the following activities:

- commercial printing
- newspaper publishing
- magazine publishing
- newsletters
- book publishing
- databases and electronic information services
- record, tape, CD and other music publishing
- computer software
- over-the-air broadcasting
- CATV
- film and video distribution
- DBS and satellite broadcasting.

Trends

Since the early 1980s the media and publishing industries have seen a variety of developments which influence thinking about the role of advanced communications. Not all of these have occurred in all the countries of the European Community, but they demonstrate the potential for development. They include:

- an increasing concentration of media ownership
- liberalisation of European regulations concerning the operation of pay-TV and CATV services
- the launch of DBS services
- introduction of new technical broadcasting standards
- the mixed fortunes of videotext
- the success of audiotext services
- the development of over-the-air databroadcasting and preparations for similar services on DBS satellites
- the launch and success of compact discs as an entertainment medium and the growth of CD-ROM and discs with a read/write capability, to carry other types of information

- the start-up of closed user group broadcasting/information services, provided variously by public telecommunications operators and public broadcasting operators.

Both of the sector's key factors, the value of information and the importance of distribution, contribute to the development of natural oligopolies. Since high-value information (eg in the financial trading market or in films) is scarce, there is a strong incentive to concentrate ownership. Costs of distribution (allied in the broadcasting industry to the shortage of spectrum) also encourage the concentration of resources.

Simultaneously, however, the technology available is making the high quality production of specialist material increasingly cost-effective, and thus accessible to a wider community. A major force which may drive the development by the media and publishing industry of broadband communications applications will be a trend towards small providers and consumers of information which the combination of IT&T offers.

Factors reinforcing this trend include:

- increasing decentralisation in organisations leading to growing needs for efficient exchange and integration of information (although in some cases the opposite trend of centralisation is occurring)

- geographical growth in the size of the market

- the need for good logistics in information

- growth of variety of information and the need for integration of disparate media.

These patterns are highly visible in the publishing sector, for example:

- the breakdown of the printing/publishing distinction, propelled by the growth of high quality laser printers and colour photocopiers

- the growth of desk top publishing applications with a growing associated requirement for access to remote databases in order to assess and incorporate third party information

- the growth of variety and interest in specialised publications in leisure, culture and geographical sectors

- the growth of multimedia publications incorporating audio-visual-textual information, and of interrelationships between publications in different media.

Cost structures of service provision and those of users (organisations and individuals) will change in the light of the potential merging of the domains of telecommunications and broadcasting in response to pressure exerted by technological change. The scope for action and attitudes of network operators will be highly relevant. Costs of operating point-to-multipoint communications services and information services (eg for databroadcasting, business television, remote newspaper printing) will be of particular importance.

Language Barriers

The problem of languages and of translation is particularly acute and inhibits the exchange of information and Europe-wide integration of the information industries.

Opportunities and Increased Choice

Limited formats for information services are a potential problem. Most electronic information services (excluding broadcast TV and radio) employ narrowband user interfaces to obtain and select narrowband data - text and tabulations. Provided the necessary services can be effectively defined and promoted, there is clearly scope, for the development of databases which allow the user to select and view still and moving colour images, and for the implementation of broadband user interfaces (eg for rapid browsing or the use of the associative linking of material in a hypermedia context).

At present customers have a limited choice of broadcast entertainment, even in the CATV or DBS markets. Even though these technologies increase the number of programmes that are available at any given time, *the concept of the channel is still restrictive.* Advanced communications has the potential to remove this limitation.

Scope

Advanced communications will play a crucial role in the development of the media and publishing industry by providing the means of mass dissemination of information and entertainment, by providing broadband communication facilities for on-the-spot news coverage, and by enabling access to and the linking together of multimedia databases. Advanced communications will play an essential role in the widespread penetration of HDTV.

The general task associated with this work area addresses a spectrum of the Generic Applications which are relevant to the requirements of this sector. Specific tasks address: local/distributed publishing, editing and printing; domestic video/music library; professional film distribution; museum, art and exhibition catalogue; an ownership register for antiques and objets d'art; and distributed local access television.

III.2.3 Retail and Distribution (TA.323, TA.323A)

Issue

The retail and distributive industries operate in a highly competitive environment which is undergoing rapid change. The range of products is expanding, technical sophistication continues to increase and the interval between model changes is getting shorter. Broadening markets imply that products will be sourced from widening geographical areas, requiring increased coordination of the distributive chain. 'Just in time' and 'just in place' delivery methods will apply particularly to this sector with local stores and shops becoming showrooms outside the direct distribution chain. Opportunities for direct selling will increase. The customer will need better information and advice about the goods offered for sale and sales and maintenance personnel will need better and more up-to-date information on all products if they are to maintain their competitive edge.

Scope

By enabling access to multimedia databases and face-to-face remote personal interactions, advanced communications will facilitate the development of home shopping, electronic catalogue shopping and the training of retail personnel. Remote expertise systems providing specialised information and guidance for product maintenance could also emerge.

The general task associated with this work area addresses a spectrum of the Generic Applications which are relevant to the requirements of this sector. A specific task is aimed at home shopping.

III.2.4 Healthcare (TA.324, TA.324A, TA.324B)

Issues

The Health Care sector by its very nature due to common human basic biology and psychology renders itself to similar procedures of diagnosis and treatment. Objectives for healthcare take into account not only mobility, but also scarcely populated and/or distant areas (islands and isolated locations including passengers in an aircraft). Healthcare has undergone a series of major changes during the last forty years. Some of the most significant factors contributing to these changes are the following.

- Longer life expectancy has changed morbidity patterns. As the proportion of the elderly population increases, additional demands are placed upon specific aspects of the health care services. This leads to distortions and bottlenecks, in all European countries.

- Changes in lifestyle and environment, and the emergence of new diseases (such as AIDS) have led to changes in priorities for the Health Care sector.

- New bio-medical technologies and medical findings have lead to increased specialisation, shortage in skilled manpower (especially at the nursing level) and frequent mis-use of complex equipment. This leads to a significant requirement for training and 'on-the-spot' user assistance.

- Costs in the Health Care sector have exploded, making rationalisation and 'cost v quality' optimisation one of the major challenges throughout Europe.

- As a result of the changing labour market more and more families are scattered either within their own country or throughout Europe. This means that relatives are often far away when someone of the family needs care or help. Although this is not an entirely new trend it needs to be taken into consideration when the demand for advanced communications is considered.

The total set of information for any single individual is now distributed over an increasing number of locations - the local physician, the general hospital, various analytical laboratories, administrative authorities, etc. Other types of data recorded by the Health Care sector include administrative information (for patients, equipment, facilities, etc) and management information (for staff, facilities, etc).

The information for individual patients is not only becoming more widely distributed; it is also increasing in volume by orders of magnitude. An example of this is to be seen in the recent computer-based advances for Nuclear Magnetic Resonance Scanners and CAT Scanners. Computer techniques allow 'diagnostic imaging' - the construction of 'layered' three dimensional full-sized images of the skull, the heart or any part of the anatomy. This allows the rehearsal of surgical techniques on simulations, and eliminates the need for dangerous exploratory surgery. It is also cost effective; the cost of a complete layered image is quoted as equal to the cost of thirty minutes of operating room time.

Such methods generate very large amounts of data; with current techniques, it is only possible to use the results locally. With the advent of facilities for interrogation and rapid transfer of large quantities of data, current or historical data would be available in local medical care facilities from central diagnostic laboratories or data banks.

It is important that up-to-date and accurate patient data should be available in the normal course of treatment, and it is vital that such data can be obtained very quickly from any location (internationally) in case of emergency. The facility must also be available to update the appropriate data as required.

Patient data is stored on a wide range of systems, with different archiving methods. The method needed for accessing each installation may also be different. Furthermore, there is the telecommunication access problem to each location.

It is not the role of the physician or the administrator to know where data is stored, even less to know the appropriate methods for retrieval of the data. He needs access to data using a very simple interface, and must be able to retrieve such data in the shortest possible time. Modern technology now enables people to travel frequently and quickly throughout Europe. It must also allow their medical data to travel quickly and easily whenever it is needed.

Finally, as a consequence of the above, there is a trend to keep patients at home, providing them domiciliary rather than hospital care. This creates new problems as these patients have to be monitored and need special - often interactive - support from medical personnel.

Status and Consequences of IT&T Introduction in Health Care

The Health Care sector is known as a sector where Information and Telecommunication Technology has been introduced only hesitantly. IT&T, by its nature, requires changes in working habits and so its introduction necessitates planning, re-training and changes in attitude by all staff involved. As a result, it is introduced in particular locations for use by small groups of people, but financial and staff constraints preclude the longer-term planning and re-training which would be necessary for wide-scale introduction. The investment in Information and Telecommunication Technology is far lower in the Health Care sector than for other sectors such as the banking/finance world.

An important type of medical data are images and, more generally, multimedia documents (eg X-ray images augmented with comments). In the past several experiments on PACS (Picture Archiving and Communication Systems) have taken place in hospitals keen to experiment with advanced technology. Many experts of the medical world consider these experiences to be failures. Major criticisms are the low resolution of electronic images and the high cost of equipment and image storage. Despite past failures, it may be expected that new technologies, as related to broadband communications, together with general trends in computer equipment will change this situation and that PACS will therefore be an important service of the future.

Communication technology will play a major role in future hospital information systems. Integrated Broadband Communication must be taken into account in this context.

Privacy and data security are two of the most important areas for consideration is this sector. It is possible that a 'health card' based on either smart card or optical techniques will emerge concurrently with 'institutional networks in the sector'.

The introduction of IT&T in Medical care could change the relationships between patients and medical personnel giving to the patient a more active role in his treatment.

Scope

Advanced communications will support the healthcare sector by:

- providing multimedia facilities for distance learning and remote consultation (expertise)
- supporting collaborative treatment and consultation by providing multimedia medical record handling and remote conferencing facilities; one possibility is that patients could carry personal (smart) cards containing up-to-date details of their medical history
- providing multimedia interpersonal communication facilities

- facilitating the monitoring of old people staying in their own houses.

The general task associated with this work area addresses a spectrum of the Generic Applications which are relevant to the requirements of this sector. Specific tasks deal with information and communication between healthcare actors, and support for people with special needs.

III.2.5 Public Administration (TA.325, TA.325A - TA.325E)

Issues

There is a general recognition of the need to contain costs, to increase flexibility and to improve the service to the public.

Changing Work Patterns

Public administration offices are mainly concentrated in national and regional conurbations, contributing to congestion and the heavy load on over-burdened public services. This is particularly the case with respect to the transport services. Large-scale commuting encourages dormitory areas which during the day are lifeless and unpopulated. From an economic viewpoint commuting represents a serious waste of both material and human resources.

Policies to decentralise public administration in order to promote regional development, reduce staff and building costs, and to help to reduce congestion in large cities have been pursued. The success of these policies has been variable - one of the main difficulties has been inadequate communications facilities both within government (eg to other departments) and to other organisations.

The ability of advanced communications technologies to provide sophisticated multimedia person-to-person communication facilities and rapid access to common data bases will enable remotely-located staff to function in many ways as though they were centrally located. Advanced communications can support three patterns of decentralisation:

- the decentralisation of complete departments or functions to peripheral regions
- the establishment of multiuser local work centres, for example in commuter areas around large conurbations
- home 'teleworking'.

These patterns of decentralisation are equally applicable to the private sector.

Interface with the Public

The public interacts with many different parts of local and national administrations including social security, housing, personal and vehicle registration, local and national taxes and planning. Each interaction requires access to information held physically in local offices or other locations. The average citizen experiences great difficulty in finding his/her way around the system and can often become discouraged, leading to loss of entitlements or difficulties with the authorities.

Most national and local public administrations recognise the need to improve the way in which they relate to the public. Advanced communications can enable the provision of local single access points to a variety of public facilities, together with the appropriate expert help.

The effect of the Single European Act and the growth of the single market will increase the mobility of European citizens. This will produce an increasing demand for public help facilities operating across national borders to deal with interactions on social security, taxation, healthcare and other issues.

Security

Advanced communications may be harnessed to counter the dangers of personal attack, property damage, large-scale theft and terrorism. This will generate a need for broadband monitoring and surveillance systems, sometimes operating on a European scale.

Public Service Modernisation

The concept of modernisation covers a variety of policies from one administration to another, or even in one country from one ministerial department or service to another. It may include:

- providing more efficient and effective public administration with new and better services
- administrative rationalisation: simplifying administrative documents, improving contacts with the user, optimising procedures
- public management: introducing new operative tasks and methods (marketing, analytical accounting, etc) and transforming decision-making methods (combining operational tasks with financial responsibility, arbitration and evaluation of achievements, differentiated and individualised salary management, etc).

Investments in automation and telecommunication within public administrations is growing rapidly in each of the member states. The numbers of IT and Telecommunications professionals employed is increasing.

Although institutions of public administration will not be brought down to a small scale, the urge for smaller and cheaper organisations calls for greater efficiency in the use of resources - especially the human resources - and information processing. The imperative flexibility implies organisations with increasing interactive capacities, both to other institutions of public administration and to society. Bringing coordinated information to the public at a convenient access point is a prime example of how administration can reach and interact effectively with its citizens.

Tourism

The promotion of tourism is of considerable interest to local and national administrations. By its nature such promotion transcends the boundaries of the administrative region. The use of IBC to promote tourism is described elsewhere.

Local Economic Development

A legitimate and major concern of local or regional public administration is the encouragement of local economic development by the provision of advanced telecommunications infrastructure, in parallel with concerns over physical transport and general environmental attractiveness. This is leading to the existence of an increasing number of islands of advanced infrastructure. These may form attractive sites for user organisations to carry out field experiments.

Scope

Advanced communications can support the establishment of local citizens' advice centres by enabling access to distributed multimedia databases and providing facilities for face-to-face discussion with officials and experts in remote offices.

For disaster coordination the full facilities of IBC are clearly needed for the transmission and reception of images, data and sound. In addition disaster coordination demands a flexible link to IBC independent of local facilities.

Advanced communications can enable the remote monitoring of buildings and public places by providing image and data transmission facilities.

The general task associated with this work area addresses a spectrum of the Generic Applications which are relevant to the requirements of this sector. Specific public administration tasks addresss public information service centres, communication and information for public administration, and remote surveillance for traffic, security and the environment. Two further tasks of more general application have been included under this heading: local work centres, and IBC for local development.

III.2.6 Manufacturing and General Industry (TA.326, TA.326A - TA.326D)

Issues

Better communications have already contributed to exposing manufacturers to international competition. Increasingly, customers want products tailored closely to their needs. They demand high quality, early delivery and good after-sales service. The general trend in the manufacturing sector is therefore for products to have better functionality but become technically more complex. At the same time there is a strong tendency for products to have a shorter life in the market place, which increases pressure to reduce the time taken from design to product delivery. These trends encourage more automated and flexible design and manufacturing operations dependent on advanced computer and telecommunications techniques, coupled with product and process modelling and supported by data bases of components and completed designs. These facilities need to be accompanied by speedy ordering and purchasing negotiations and by rapid delivery of components and subsystems.

In responding to these market demands, companies have successfully simplified and rationalised their operations by:

- using smaller, more widely distributed business units
- using fewer people and layers of management
- placing more emphasis on people's abilities and teamwork
- increasing the flexibility of manufacturing plants in order to enable a diversity of products to be produced within the same business unit; these fully automated factories tend to be bigger, centralised business units
- building more automated and bigger plants in the process (including food) industries.

Increasingly manufacturing involves close collaboration between a number of enterprises, often across national barriers, and this trend will increase as trade barriers are dismantled. Complex products often contain components sourced over wide geographical areas. In some industries (eg automotive), manufacturers of such products form closely coordinated multi-supplier operations, exchanging computer-based design information with their suppliers and integrating supply logistics. Other cases (eg aerospace) involve the close collaboration of several design teams in different locations to produce a single functioning entity, such as an aircraft.

There is, therefore, an increasing need to transmit more information between the many separately located parts of a company, and between a company and both its suppliers and customers.

The establishment of new production plants in different countries and the continuing introduction of new machinery and processes reinforce the need for continuing education, on-the-job training, and consultations with remote experts.

The remote monitoring of process plants or unmanned installations may also become increasingly necessary as the consequences of serious accidents increases with the size and complexity of the plant itself.

Information Needs

The most important information to be communicated will be:

- products, tooling and facility definitions
- logistics, scheduling requirements
- operational (training, maintenance, diagnostics).

These will need IBC for effective co-operation and co-ordination between factories, partners and corporate offices and externally to distributors, customers and suppliers.

Products, Tooling and Facility Definition

Integration of the product creative process will expand outside the company to encompass both its customers and suppliers. Its aims will be:

- to match the product with customer requirements
- to co-ordinate all contributing design and production activities to achieve high quality, short lead times and low costs.

Logistics

Marketing and Sales:

If manufacturers are to be more responsive to market needs, they must:

- be more aware of market factors in determining their new products
- provide the means for greater involvement with the customer to define his requirements and to improve change management
- shorten the commercial procedures (enquiry to order acceptance).

External Supply:

The trend in external logistics is towards Just-in-Time delivery by single source suppliers working to call-off schedules. Successful suppliers will:

- have to meet stringent quality standards set by the manufacturer

- be able to interpret and convey manufacturers' specifications into high quality products and respond rapidly.

This means close relationships with suppliers will be essential.

Distribution:

Distribution of fast moving commercial goods will be characterised in the future by the move to delivery direct to multiple retailers, reducing or even eliminating intermediate storage and handling.

Distribution between suppliers and users within the manufacturing industry will be Just-in-Time as a means of minimising stocks and shortening lead times throughout the supply chain. This will require closely coupled communications between suppliers, users and transport systems.

Operation (Training, Maintenance, Diagnostics)

More responsive production systems (Just-in-Time) will require more precisely defined operational procedures and more predictable performance of people and machinery. Considerable improvements will be required in:

- specifying equipment, methods of operation, preventive maintenance and fault diagnostics

- training people to perform the production tasks consistently well and supporting them with information that will enable them to handle contingencies quickly

- development of remote-control systems for reliable performance of unmanned machinery

- development of remote diagnosis for more efficient trouble identification and remedial action.

Scope

The flexible, high-capacity, integrated IBC network will support collaborative activities in the manufacturing sector by:

- providing the fundamental infrastructure for the transmission of the large volumes of complex data associated with CAD physical and functional models

- enabling common access to multimedia design and component data bases

- enabling face-to-face contact for collective decision-making, negotiation, training and the provision of remote expertise.

The general task associated with this work area addresses a spectrum of the Generic Applications which are relevant to the requirements of this sector. Specific tasks address manufacturing and consultancy services, a product library, engineering and design for manufacturing, and remote control, diagnosis and maintenance.

III.2.7 Transport, Travel and Tourism *(TA.327, TA.327A - TA.327F)*

Issues

The rapidly growing European economy has brought with it an even more explosive growth in mobility. It has been estimated that 1% growth of the GNP generates 1.5% growth in passenger transportation and up to 3% growth in the transportation of goods. It is to be expected that these ratios will increase as Europe moves towards a single market.

Growth in demand for transport facilities is not necessarily matched by increased capacity, which results in increased congestion, delay and cost. There is therefore a growing incentive to increase efficiency and to mitigate wherever possible the effects of overcrowding on roads, rail and air and sea lanes.

Information Transmission Requirements

Associated with the transportation of people and freight is the transmission of information in the form of text, images and data.

- Transport system users need up-to-date information about routes, schedules and tariffs, including the availability of return journey capacity and 'special offers'.
- Transport system operators, particularly freight operators, need to provide their customers with access to sophisticated booking/reservation systems. Such systems need to have extremely short response times both for customer access and for communication with internal operations. The reservation systems of different operators need to intercommunicate so that customers may book a complete journey involving several operators via a single access point.
- Transport system operators need access to data describing the disposition and serviceability of their fleet and need to communicate rerouting instructions when scheduled operations are perturbed.
- Fleet maintenance and repair activities will often require the transmission of maintenance data from central maintenance units to outlying points on the network.
- Air transport authorities (and also marine authorities in congested seaways) have the need to transmit large volumes of data in real time from radar and traffic control systems and to neighbouring regions.
- Road transport authorities need to transmit data and images in order to monitor and control traffic flow and to advise the motoring organisations and the travelling public about traffic delays.
- Tourism and holiday travel bring with them the requirement for major increases in the availability of pictorial data showing locations, facilities and special events.

Growth in the use of transport facilities will give rise to a corresponding growth in message and data traffic. The effect will be compounded since congestion itself generates more need for information.

Maintenance and Repair

Transport vehicles and systems are increasing in sophistication and complexity and in the range of their specialised subsystems. By their very nature the vehicles are continually away from their prime sources of maintenance data and expertise. Routine maintenance and repair operations carried out at remote locations will need to be supported by data defining the detailed configurations of the included subsystems and the related maintenance and repair procedures. It will sometimes be necessary for the repair staff at these remote locations to consult specialists before a repair can be effected.

Specialist repairers of ships, aircraft, road vehicles, etc, need to survey the damage before estimating the work to be performed and providing a quotation. Specialised personnel from such repairers are continually required to travel to remote locations to carry out such surveys.

Tourism

Tourism is of considerable economic importance to many regions of the Community and its active promotion via diverse media is a high and growing priority in many member states.

Education and Training

The transport sector is evolving rapidly in response to user needs and the introduction of new technology. There is a strong need within the sector for continuing training for operational staff, for those dealing with the public, and for staff concerned with maintenance and repair of transport vehicles and transportation systems.

Safety

Increasing congestion and rapid technological evolution focuses attention on the safety of transport systems. This places particular emphasis on the maintenance and repair of vehicles, ships and aircraft, and on the communications supporting traffic control.

Scope

Advanced communications can support the transport sector by providing rapid image and data transmission facilities, access to multimedia data bases and telemarketing systems, and the provision of remote expertise.

The general task associated with this work area addresses a spectrum of the Generic Applications which are relevant to the requirements of this sector. Specific tasks are aimed at remote inspection and telesupervision for repair of aircraft, remote inspection of damaged goods, business traveller communications and work centres, telemarketplace for freight and transport, cultural event promotion and sale, and airport teleshopping.

III.2.8 Agriculture (TA.328, TA.328A, TA.328B)

Issue

Trends in Agriculture

Agriculture is engaged in a process of continuous structural change. Impressive productivity gains have led to production rationalisation and intensification based on dramatic technical change (mechanisation, new selection techniques, use of fertilisers). Together with market price support policies, these trends have resulted in a growing imbalance between supply and effective demand in the Community as well as for its major competitors.

Recognising this evolution, the Community has initiated since 1985 an adjustment of the Common Agricultural Policy based on three important guidelines:

- the necessity to re-establish a better balance in these markets
- the promotion of diversification and quality improvements for agricultural production, and
- the integration of regional and environment goals with market restructuring objectives.

Europe's agriculture is moving quickly away from traditional agricultural activities. Underlying this process is the combined influence of technological opportunities and the evolution of economic needs.

Two major technology driving forces, biotechnology and information and telecommunications technologies, are shaping the future of European agriculture's technical culture. These forces are complementary:

- Agro-biotechnology will exploit the potential offered by IT & T to improve genetic engineering techniques and to diffuse best practices among farmers and consultants/researchers.
- The expected rise in production efficiencies and yields awaited from a continuous application of genetic engineering techniques to animal production and plant technology might lead to a further concentration of European agricultural production, the top 20% of farmers in the Community - already accounting for 80% of agriculture output - thus setting the ground for a quicker diffusion of IT & T at least in the most advanced agriculture production systems.

Agriculture and rural areas are likely to serve four basic functions:

- Agriculture will have to respond to the increasing demand for healthier food and farming systems less injurious to the environment, and to give particular emphasis to issues relating to food quality and safety, but also to nutrition education and information, and food prices.
- Agriculture will also need to strengthen its links with upstream and downstream industries, ie the agro-chemical, seed, food (and non-food) processing, distribution and marketing sectors, and concentrate on the provision of genetic material and other agricultural inputs appropriate for effective primary production with the desired quality characteristics for subsequent processing.
- Rural areas will be concerned with land use policy considerations: they will need to promote 'non-production' land-using activities related to landscape, recreation, nature conservation, soil protection, water-pollution and water-flow control.
- Rural areas will also try to create the conditions necessary for the generation of rural employment in the non-agricultural, non-land using activities, in order to maintain acceptable income levels, especially in the less-favoured areas.

The long-term restructuring of European agriculture will mean a fall in revenue for most farmers. This could lead to an impetus to further introduce cost-saving and labour-compensating technology. However, this necessary development will have consequences for the structure of Europe's agriculture.

Information Needs and Requirements

Confronted with a changing economic, technical and possibly climatic environment, the farmer, who needs to manage efficiently and economically his holding and to increase its productivity, is more and more interested by the new IT and communication systems. These systems can help him to acquire a better understanding of the context in which he operates and to develop permanent economical and technical monitoring systems.

In the context of any of the scenarios envisaged for the future of Community agriculture (further rationalisation and concentration process vs a more balanced evolution taking into account regional, social, or environmental constraints/objectives), it is likely that data/sound/text/image production, transfer, storage, processing and presentation will be a major activity or sub-activity in agriculture production and in related economic sectors in rural areas.

A first typology of information needs and requirements for agriculture distinguishes between:

- Agricultural technical information needs related to:

  - technical standards (eg for soya bean production)
  - animal and vegetal genetics (eg genetic manipulations, new varieties, hybridisation procedures)
  - new production techniques (eg for crops and seeds)
  - raw materials for breeding (eg composition of an animal feed with respect to energetic properties)
  - technical standards for buildings (eg dairies)
  - machines (eg technical standards for milking machines or tractors), and
  - health protection of animals (eg disease eradication programmes, epidemiology studies from a preventive point of view)

- Agricultural techno-economic and market information needs for orientation of the production process and dissemination of best practices:

  - information on prices and markets, serving as input for sales forecasting or improved sourcing
  - data on techno-economic management standards achieved elsewhere (eg data for performance comparison in different farms for a specific production sub-sector)
  - data bases on EC or national regulations in the agricultural field, etc.

- Agricultural training related information needs: specific learning tools, including technologically advanced courseware.

- Farm management integrated information needs: (concerning accounting, orders, calculations of payment bases).

A second typology of information needs and requirements for agriculture focuses on various functions at the farm level:

- information for plant production (eg for draining, tillage, fertilisation, seeding and planting, irrigation, plant protection, harvest, meteorological data/weather forecast)

- information for crop utilisation (eg for preservation, storage and evaluation of forage; preservation, storage and sorting of grain, storage and sorting of fruit, vegetables and root crops, feedstuff production)

- information for livestock production (eg for individual identification; dairy herd, pig and poultry production; diagnosis and treatment of diseases)

- information for energy production (eg for solar energy, control of wind energy, biomass utilisation, biogas plant, vegetable oil and alcohol as engine fuel, equalising of electrical energy consumption, converting of composting plant)

- information for controlling agricultural machines (eg supervision and optimisation of tractors, optimisation of engine and machine functions, comfort and safety)

- farm management information (eg data bases covering feedstuff price lists, surveys covering seed grain offers with indications of test results, values showing the fertilisation requirements for various crops, extension service information, expert systems for animal or plant diseases, accounting and monitoring systems, record keeping).

A third typology distinguishes needs and requirements for improved information flows between actors (communication function) in the agriculture production system:

- two-way information flows between farmers, members of a cooperative, and those farmer members and the cooperative executive: farmer members can learn of new developments and receive advice, specific or general, from the cooperative; the executive can in turn learn from its members of their problems, successes and ideas

- two-way information flows between farmers or cooperatives and marketing/distribution channels

- two-way information flows between farmers and farming organisations which might lead to a more effective organisation with greater participation

- two-way information flows between farmers and agribusiness/agro-industry especially in the perspective of food policy/agro-industrial policy scenarios

- two-way information flows between the farmers or cooperatives and extension/consultant services/agriculture researchers which might continuously give technical advice and orientate specific R & D work

- two-way interface with the public sector at all levels (local, national and Community) to provide the farmer with regulatory, public policy, fiscal or other information.

Technological Needs and Requirements

Concerning the technologies which currently support and respond to these information and communication requirements, a simple classification can be made between:

- communication and information management technologies

- monitoring and control technologies

- telecommunications technologies.

Communication and information management technologies consist of on-farm digital communication systems technologies (LANs combined with the microcomputer-based information processing technologies used by the farm operator as the central information processing and management system). On-farm central computer systems may include remote terminals used for on-site data entry by the farm operator.

Monitoring and control technologies automatically monitor and control certain parts of the production process. These technologies are mainly used according to a decentralised location model (on-site equipment for eg livestock identification, irrigation, storage monitoring and control and mobile equipment such as tractors or combines). Monitoring and control systems are increasingly being connected to the central on-farm information processing system through fixed links or radio-links to the on-farm LAN.

Telecommunication technologies serve to connect on-farm systems with external partners/correspondents/systems. Telecommunication systems may combine both voice and data communications and they are based on three main technologies: satellite communications technologies, radio communications technologies, and land-based telecommunications technologies.

Scope

In the agricultural sector, the frequent need for specialised expertise is coupled with the importance of fixed and moving images to describe the state of crops, land, animals and machinery. With its ability to transmit moving and fixed images and to provide access to multimedia databases, IBC can make remote expert help available to the agricultural community for crop and disease control, animal care, repair of farm equipment, alternative land and building use, etc.

Advanced communications can provide links to the market places for agricultural products, supplies, and alternative use of the countryside, by multimedia mail and telemarket systems.

The general task associated with this work area addresses a spectrum of the Generic Applications which are relevant to the requirements of this sector. Two specific agricultural tasks address distributed multimedia agriculture information systems, and remote expert support.

III.2.9 Utilities (TA.329, TA.329A)

Issues

Each of the water, gas and electricity utilities maintains a network of watercourses, pipes and cables, interconnecting widely distributed pumping stations, power and transformer stations, exchanges and other installations.

Such installations need control, monitoring, surveillance, maintenance and repair.

The maintenance and repair of complex remote equipment may often require access to specialised expertise which may not be available at the remote site or within mobile repair teams. Repair teams inevitably spend a large part of their time travelling between remote locations and it will often not be a sensible allocation of scarce resources to make a high level of specialised resources generally available. Advanced communications can potentially make specialised expertise available when and where it is required.

There is a need to maintain accurate records of the supply networks and of the associated land use and to provide access to this data by other utilities or to the emergency services. This relates to the digitisation of records and the emerging field of geographic information systems (GIS), with the associated requirements for remote access, possibly from mobiles or transportable field units.

Scope

Advanced communications can support the utilities sector by providing access to multimedia data bases and enabling the provision of specialised expertise at remote sites, as well as supporting GIS.

The general task associated with this work area addresses a spectrum of the Generic Applications which are relevant to the requirements of this sector. A specific task deals with a utilities distributed information network.

III.2.10 Liberal Professions and Professional Institutions (TA.330, TA.330A)

Issue

Members of the professions need to keep abreast of new technologies and to publish the results of their own work to their peers.

One of the main functions of professional institutions is to provide the means for the gathering and dissemination of professional knowledge to its members. In addition to publications, a main vehicle for this activity is the holding of technical meetings, seminars and conferences. Increasingly such events are international in character, both in terms of those presenting papers and in terms of those wishing to participate. Frequently conferences are jointly sponsored by more than one institution, sometimes from different countries.

The time and cost of travel often prevents members participating as often as they would otherwise like, either as presenters or as attendees. The ability to hold conferences or seminars with remote participation would greatly ease this problem.

Scope

Advanced communications will support the liberal professions by providing facilities for multimedia communications and data bases, collaborative design, and the provision of remote expertise.

The general task associated with this work area addresses a spectrum of the Generic Applications which are relevant to the requirements of this sector. A specific task addresses professional seminars and conferences.

III.2.11 Building and Construction (TA.331, TA.331A, TA.331B)

Issues

Building and construction forms a major sector in the economy and is characterised by the need for collaboration between a number of actors in geographically separated locations, including the construction site. The need for collaboration, and therefore communication, is reinforced by the trend towards larger and more complex construction projects and an increasing emphasis on the completion of projects on time and to budget.

The principal actors normally involved in a construction project include the client, the designers (architect and/or consulting engineers), equipment suppliers, quantity surveyors and estimators, the construction company, planning and regulatory authorities, and subcontractors.

The needs for communication change as the project progresses.

Design and Planning

During the design and planning phase, depending on the complexity of the design process, there may be a need for collaboration among architects, structural engineers, land surveyors, foundation specialists, designers of specialised building components, planners, interior designers, etc, and for purpose-built constructions, eg power stations, designers of the equipment that the building is intended to house. Designers responsible for various parts of the construction need to:

- access multimedia data bases describing building materials and components, construction methods and codes of practice

- exchange drawings and specifications

- provide or consult specialised expertise

- participate in collective decision making.

The results of the design process have to be stored in appropriate archives where they need to be accessed by quantity surveyors, estimators and planners who themselves generate costing and planning data.

As in all design and planning processes there is a need to reiterate the design and the project plan at a number of intermediate phases to accommodate conflicting requirements and to achieve time and cost optimisations.

Construction

As the project moves into the construction phase the focus moves to the construction site, with strong communication links between:

- contractor's head office

- contractor's site office

- consulting engineers head office

- resident engineers site office.

On major construction projects these offices may well be located in different countries, separated by thousands of kilometres.

The emphasis in this phase is on on-site project control, project reporting and overall project management, with the need to address urgently any problems which may introduce time or cost overruns. This will often involve consultation with the various designers involved and with specialised expertise, including experts on the various items of equipment used in the construction. The site offices will need access to the archives containing the design and planning data and this data will often need to be updated as difficulties are encountered.

Scope

Advanced communications will support the building and construction sector by providing facilities for multimedia communications and data bases, collaborative design, the provision of remote expertise, telemarketplace and monitoring and surveillance.

The general task associated with this work area addresses a spectrum of the Generic Applications which are relevant to the requirements of this sector. Two specific building and construction tasks address collaborative design and planning, and a components library/telemarketplace. A further task included under the operations / production / production engineering function addresses project management for building and construction.

GE 0197E

VOLUME II

- Task Descriptions -

PART I - IBC GENERIC APPLICATION STRATEGIES

TA.100 IBC Application Strategies

Background

The range of technologies associated with advanced communications offer significant opportunities for many actors (corporate and individual users, service providers, network operators, telecommunications industry). However, the range of technological options is large, the range of services will expand both in capability and in complexity, and the impact on user organisation structures, objectives and modes of operation will be significant. Entry strategies are thus needed which maximise the common benefits, and which lead to exploitation levels that are both attainable and sustainable.

The analytical and experimental work performed within ACE will generate a great deal of information regarding the feasibility of advanced communications applications and their potential impact on the various business functions and sectors. The work of TA.101 and its related tasks in Part I and Part II.2 will investigate by means of detailed analysis, prototyping and experimentation the feasibility of defining Generic Applications of advanced communications each of which captures a large spectrum of user needs and provide market opportunities for product and service providers. In parallel the Part III experiments will explore the operational and economic feasibility of a wide range of advanced communications applications and will throw further light on the Generic Application approach.

From this information base it is necessary to form a view of the overall impact of advanced communications on the European and world economies and to devise strategies which enable advanced communications to reach its full potential both as a market and a tool for users. In this, the avoidance of fragmentary development at European level will be of prime importance, as will the competitiveness on an international scale. It is also particularly necessary to monitor continuously the viability of the Generic Applications approach and to determine any adjustments or changes of direction which may be necessary.

Objectives

The principal objectives of this task are to:

- assess the impact of advanced communications on European business
- monitor viability of the strategy to identify and support Generic Applications as a mechanism to encourage market development
- develop a strategy to enable/catalyse the advanced communications market arena.

Technical Approach

This task will operate at the strategic level, drawing inputs from the detailed analyses performed by the other Part I tasks, particularly tasks TA.101 and TA.116. These in turn will draw on inputs from the resource package prototyping tasks in Part II and the field application experiments in Part III.

The task will require the participation of senior members of the project teams addressing these tasks, together with contributions representing the user, service provider and telecom industry viewpoint.

Recommendations should be developed for migration planning for involved actors.

Key Results and Milestones

1 Strategic assessment of impact of advanced communications.

2 Evaluation of viability of Generic Application concept.

3 Advanced communications market creation strategy.

4 Synthesis of trends affecting uptake of advanced communications

5 Synthesis of major opportunities for the application of advanced communications.

TA.101 Usage Reference Model

Background

In order to develop a strategy for advanced communications market development it is necessary to understand in some detail the needs and wants of the various business functions and sectors and how these may be fulfilled by advanced communications applications.

Volume I, Part I identifies a preliminary set of Generic Applications of advanced communications which address users' needs and provide a market development potential to product and service providers.

The work under this task will develop the understanding of business requirements and market potential and evaluate and refine the set of Generic Application definitions. These will be used as the basis for the definition of resource packages which will be prototyped and tested in Part II.2. Together with the results of the application experiments in Part III this will lead to further refinement of both the concept and the specific selection and definitions.

In addition, attention must be given to the relationship between applications and services. One service may fulfil (wholly or partially) the requirements of a number of applications, while a number of services may be capable of fulfilling the requirements of a single application.

Objectives

The principal objectives of the task are to:

- consolidate and formalise available information into a structured Usage Reference Model relating user needs and advanced communications capabilities with service/product requirements

- develop and maintain an understanding of the trends in businesses, business functions and business sectors and of the corresponding requirements and opportunities for the application of advanced communications

- identify relationship with other related models developed in RACE (notably Functional Reference Model and Reference Configuration)

- use the model to identify and maintain a set of Generic Applications of advanced communications, each defined by a basic characterisation in terms of user needs.

Technical Approach

This task should draw on the work of RACE project R1077 to define an advanced communications Usage Reference Model and should extend and update it to take into account more recent business trends and foreseen changes in advanced communications capability, and to reflect the concept of Generic Applications. The results of the requirements analysis activities of the Part III application experiments should also be incorporated.

The model should include an analysis of the economic importance of each of the business functions in each of the business sectors. This should be matched with the perceived needs and wants and with the relevant advanced communications capabilities to discover 'hot spots' representing the most important market opportunities.

The model should also draw on any relevant information concerning advanced communications product, service and market development programmes elsewhere in the EC and in other regions.

With the set described in Volume I, Part I as a starting point, the information in the model should be used to identify a set of Generic Applications, each of which represents a set of advanced communications requirements which can be forecast to have a high market potential and widespread application, normally across business functions and/or sectors. Each Generic Application should be characterised by a basic definition. Whilst the primary motivation for the selection of Generic Applications will be in terms of user requirements, due regard should be paid to implementation factors.

The set of Generic Applications will be an input to task TA.106 which will produce corresponding detailed operational specification. These in turn will be an input to TA.107 which will produce the functional specifications for the related resource packages. The Usage Reference Model will be an input to task TA.116.

As ACE progresses, the Usage Reference Model, including the economic analysis and the Generic Application definitions, should be updated to reflect market and technology changes and ACE results and experiences.

Key Results and Milestones

1 Preliminary advanced communications Usage Reference Model, including economic analysis and identification of market 'hot-spots'.

2 List of advanced communications Generic Applications, with basic characterisation.

3 Final advanced communications Usage Reference Model.

TA.106 Generic Application Operational Specifications

Background

Task TA.101 will refine the set of Generic Applications of advanced communications, each characterised by a basic definition. Detailed operational specifications are required for each Generic Application which capture the requirements of the widest possible set of advanced communications users.

To perform this work, methods and techniques of collecting user requirements must be developed which allow comparison between the requirements of the various business functions and sectors and the definition of generalised operational requirement sets.

Operational specifications are required as an input to task TA.107 which will prepare functional specifications for the related resource packages.

The specifications will need updating to reflect the results of the experiments in Part II.2 and Part III and changes in perceived user needs.

Objectives

The objective of this task is to:

- define methods and techniques for collecting and processing user operational requirements; the methods/techniques have to be general and usable for all Generic Applications as well as allowing for continuous user involvement
- develop operational specifications for each of the Generic Applications identified by task TA.101.

Technical Approach

The task will address the following:

- development of methods and techniques to collect and process user requirements
- collection of user requirements
- translation of user requirements to operational requirements
- definition of a common set of operational requirements from an analysis of the requirements of the relevant business functions and sectors.

Key Results and Milestones

1 Requirement capture methodology.

2 Operational requirements specifications for each Generic Application.

TA.107 Functional Specifications of Resource Packages for Generic Application

Background

Task TA.101 will define a set of Generic Applications of advanced communications in terms of a basic characterisation. Task TA.106 will prepare detailed operational specifications for each Generic Application which capture the requirements of the widest possible set of advanced communications users. The Generic Applications will be supported by resource packages of terminal facilities implemented in hardware and/or software, interface definitions, and a set of integrated service definitions covering the network capabilities of transport, switching and management.

Functional specifications are required for the resource packages which meet the requirements of the operational specifications defined by TA.106.

Tasks in Part II.2 will assemble prototypes of the resource packages and test them in laboratory experiments. It may also be possible to retrofit some of the prototypes into the Part III application experiments. The functional specifications will need updating to reflect the results of these experiments and changes in the relevant operational specifications.

Objectives

The objective of this task is to develop functional specifications for resource packages supporting the Generic Applications defined by task TA.101, meeting the requirements of the operational specifications defined by task TA.106.

Technical Approach

This task will require a detailed knowledge of the possibilities offered by advanced communications products and services and how these may be configured to meet operational requirements.

A close collaboration will be necessary with the laboratory prototype development tasks, TA.250 to TA.261, task TA.270, which will perform the laboratory experiments, and task TA.275 which will develop advanced communication system building techniques.

It will also be necessary to reflect resource package implementation issues back to task TA.106.

Key Results and Milestones

1 Initial functional requirement specification for each resource package.

2 Updated functional requirement specification for each resource package, following results of prototyping in Part II.2 and application experiments in Part III.

Consolidation of Technical Results of Experiments

TA.112 Extraction and Consolidation of Network and Technology Aspects

Background

The network and technology aspects of the results of user field experiments and resource package prototype experiments require further analysis for:

- derivation of transport capability requirements
- indication of quality of service requirements
- consolidation of security, privacy and authentication requirements
- clarification of network management functionality and customer accessibility.

Objectives

The objective of this task is to provide feedback:

- to network operators on network and system planning
- to regulatory authorities on technology implications
- to equipment designers on operational and functional requirements for communications equipment.

Technical Approach

The task involves a special analysis of experimental results and close liaison with task TA.116 on the criteria and guidelines for the success of advanced communications, and with the outputs from experiments in Part II and Part III.

Key Results and Milestones

1 Report on network and technology implications.

2 Good Practices for Implementation.

Impact and Opportunity Assessment

TA.116 Criteria and Guidelines for Success for Advanced Communications

Background

With most new technologies, it is necessary to establish at an early stage the criteria for their successful introduction so that users can distinguish between applications which are merely technically possible from those which have the potential to provide lasting benefits. Ideas for applications may be appealing conceptually, but turn out to be unrealistic either because of inadequate technical performance or excessive cost.

Users will want a clear guide to the feasibility of applying advanced communications capabilities to the problems and processes involved in their businesses with the opportunities for process and business transformation and the criteria for success identified. These criteria will be based on:

- functionality
- implementation opportunities
- technological and economic impact of advanced communications
- financial constraints
- organisational considerations
- commercial impact.

An analysis of the impact of advanced communications will thus be necessary.

The analytical and experimental work performed within ACE will generate a great deal of information regarding the feasibility of advanced communications applications and their potential techno-economic impact in the various business functions and sectors.

This task will consolidate and extend this information and make it available to users in the form of guidelines for success. For each business function and sector this will require an understanding of:

- the trends
- the relevant needs and wants
- the strengths, weaknesses, opportunities and threats created by advanced communications applications.

The analysis of users' needs and of the opportunities for advanced communications should provide valuable inputs to the preparation of a market creation plan.

Methodologies and tools for techno-economic analysis will be required. These should be made available to the Part II application experiments and included in the published guidelines for success.

In addition, it will be possible to draw conclusions concerning entry strategies for network operators, service providers and communications equipment suppliers.

Objectives

The objectives of this task are to consolidate and analyse the results of ACE experiments and analytical tasks in order to:

- develop an understanding of the impact of advanced communications
- develop an understanding of the criteria for the successful application of advanced communications and disseminate this knowledge to potential users
- prepare an advanced communications exploitation strategy.

Technical Approach

- Review and select appropriate methods and tools for techno-economic analysis and assist Part III application experiments in their use.
- Consolidate ACE analytical and experimental results in terms of business function and sector trends, requirements and opportunities for the application of advanced communications.
- Translate results into a plain man's guide to the benefits of advanced communications and the conditions under which these may be obtained.

  The guide must be oriented to the business concerns of the user and should include the results of the modelling of business functions and communications processes in task TA.101.

  The Generic Applications which are important to each business and sector should be identified. For each potential application a check-list of feasibility criteria should be given together with quantified parameters derived from the ACE results.
- Prepare advanced communications exploitation strategy, based on user needs and wants.

Key Results and Milestones

1 Recommendations on methods and tools for techno-economic analysis; provision of assistance to Part III application experiments.

2 Report on techno-economic analyses of the consolidated results.

3 Identification of Generic Applications and resource packages which are particularly important to market start-up.

4 Guidelines for the successful introduction of advanced communications applications.

5 Advanced communications exploitation strategy.

6 User cost-benefit analysis, including cost/price considerations.

PART II - TECHNIQUES FOR ADVANCED COMMUNICATIONS EXPERIMENTS

Network and Technology Resources for Application Experiments

Server Module Kit for Application Experiments

TA.200 Integration and Coordination

Background

Tasks TA.211 to TA.235 are aimed at the provision of generic capabilities to support Part III application experiments. They cover:

- translation and interpretation services
- security, integrity and privacy mechanisms
- multimedia teleconferencing
- multimedia mail service
- multimedia distributed databases
- hardware and software modules for terminals
- network capabilities.

This task covers the integration of these resource modules.

Objectives

The objectives of this task are to:

- identify resource module integration requirements of Part III experiments
- integrate resource modules developed by other tasks in Part II into frequently required assemblies
- provide methodologies and tools for the verification of the integrated modules
- assist the Part III experiments on resource module integration issues
- provide a starting point for the formation of an integrated service infrastructure.

Technical Approach

ACE will use existing and proven technology where possible for the implementation of the equipment required by Part III experiments. Interconnection of resource modules and network services will use standardised interfaces and protocols when they exist.

Inevitably some adaptation and even small-scale development will be required. New configurations will place new demands on interfaces and protocols necessitating extensions and revalidation. To the extent that any of this development activity is required, it should aim to intercept the evolution of standards and the launch of commercial equipment and services rather than being specialised for ACE experiments.

This task will involve the following activities:

- survey of Part III application experiment requirements
- identification of resource module assembly requirements
- integration of selected assemblies
- selection/development of methodologies and tools for integration
- testing of assemblies.

Key Results and Milestones

1 Report on Part III integration requirements.

2 Specification of resource module assemblies.

3 Integration methodologies and tools.

4 test reports on generic assemblies.

TA.211 Translation

Background

Many of the ACE experiments implemented across national boundaries will need translation facilities if they are to provide a user-friendly interface. It is to be expected that a range of translation facilities of varying degrees of sophistication will be required between the languages of the member states. Since the state of the art in machine translation is evolving continuously, it will be necessary to identify realistic technologies which will be available within the required time scale to fulfil the needs of the planned application experiments.

Objectives

The objectives of this task are to:

- identify the generic and specific translation requirements for the application experiments

- recommend available technologies to meet the translation needs.

Technical Approach

The task will involve the cooperation of experts in the machine translation field, with those engaged in the application experiments requiring translation facilities.

The work will include:

- establishment of machine translation needs, including performance requirements and interaction with databases; extraction of common and specific elements for different applications.

  the work will identify translation requirements in a number of areas, for example translation of documents in the form of an alphanumeric data stream, syllabic typescript (Palentype, etc) or speech.

- investigation of state of the art and available technologies.

- assessment of options.

- recommendations.

Key Results and Milestones

1 Report on machine translation requirements in ACE projects.

2 Report on state of the art and available technology in machine translation and its relevance to the ACE projects, including recommendations.

3 Continued monitoring and updating of results as appropriate.

TA.212 Real-time Interpretation

Background

In many situations language and possibly other kinds of translation services will be required on-line in real-time. The effect that needs to be created is analogous to a meeting with simultaneous interpretation facilities in which the participants, including the interpreter, are all remote from each other. Visual as well as audio contact will be important for the interpreter. In multimedia communications or conferences, non-verbal interpretation could be required.

Objectives

The objectives of the task are to:

- identify real-time interpretation requirements for each of the application experiments
- analyse the telecommunications and terminal requirements associated with project needs
- provide guidance and support to application experiments in the implementation of these facilities.

Technical Approach

Requirements to be taken into account should include:

- verbal language translation
- non-verbal interpretation
- telecommunications channels and the means of controlling them
- audio-visual terminal facilities for users and interpretation service providers
- service usage recording and payment facilities.

Some coordination with task TA.216 may be desirable in the implementation of the telecommunications and terminal resources.

Key Results and Milestones

1 Requirements specification for real-time interpretation.

2 Report and recommendations on implementation technologies.

3 Support to application experiments in the implementation of resources.

4 Continued monitoring and updating of results as appropriate.

TA.213 Personal Identification

Background

The availability of reliable personal identification techniques is essential to the viability of many applications in the banking, finance and insurance sector. It is equally important to activities in the retail and distribution sector, and is likely to have applicability to other ACE tasks where financial and other sensitive transactions are to be handled.

Amongst the possible technologies for personal identification are:

Remote Graphic Validation of Signatures

Equipments are available which encode the static and dynamic characteristics of personal signatures in such a way as to make it virtually impossible to impersonate. The signature codes can be held centrally or can be magnetically recorded on plastic cards.

Public Key Systems

Commonly used public key data encryption systems, such as the US Data Encryption Standard (DES), suffer from difficulties of sender-authentication, which make them unsuitable for most financial transaction services.

More recent two key systems, such as the Rivest, Shamir and Adleman (RSA), offer a digital signature with sender authentication. This has led to their adoption for systems such as EFTPOS UK, but they suffer from significant data and processing overheads when implemented in practical systems.

Advanced communications will overcome many of these problems and will open the door to more sophisticated and secure electronic signature systems.

Anthropomorphic Identification

Anthropomorphic identification involves the encoding of such human characteristic as eye scanning, digital prints, voice recognition, hand scanning, etc.

Objectives

To identify practical solutions to the problems of personal identification in the context of ACE application experiments.

Technical Approach

The task will involve cooperation of experts in the data security field, together with those engaged in ACE Part III tasks.

The work will include:

- establishment of personal identification needs
- review of state of the art and of available technology

- assessment of options
- recommendations.

The following topics will be addressed:

- service definition and scope
- personal identification analysis
- messaging and protocol requirements
- security and audit trail issues
- standardisation and regulatory criteria
- terminal requirements
- operational and control issues
- implementation strategy
- deployment.

Key Results and Milestones

1 Report on personal identification requirements in ACE Part III tasks.

2 Report on the state of the art in personal identification techniques and its relevance to the ACE projects. Recommendations on personal identification techniques to be adopted on ACE application experiments.

3 Continued monitoring and updating of results as appropriate.

TA.214 Data Integrity

Background

The ability to transfer data in a totally secure fashion is essential to the viability of many applications in the banking, finance and insurance sector, as well as those in manufacturing (eg sensitive design information) and healthcare (stringent requirements for accuracy and completeness of information).

The level of security and integrity inherent in the IBC network will constrain its applicability and dictate the level of confidence which users will have in it.

Objectives

- To monitor, measure and report on the level of security and data integrity provided by the IBCN in its specification, design, implementation and operation.
- To develop principles which must be agreed as standards by the international community.

Technical Approach

The task will involve cooperation of sector actors in the data security field with those engaged in ACE experiments.

The work will include:

- establishment of data security and integrity needs
- study of RACE specifications for data security and integrity
- evaluation of operating performance of IBC against specifications
- recommendation of applicable data security standards
- reporting to other tasks
- evaluation of legal implications
- agreement of all interested parties on non repudiation criteria.

Key Results and Milestones

1 Report on data security and integrity requirements.

2 Report on RACE specifications for data security and integrity.

3 Report on measured data security and integrity performance of application experiments.

4 Report on recommended data security standards for application experiments within or if possible across sectors.

TA.215 Encryption

Background

The most common means of ensuring privacy of communicated information is encryption. The technology is well established for military and similar critical uses. For commercial application low-cost solutions are required. Different levels should be available to provide cost-effective means for a wide range of application needs.

Objectives

The objectives of the task are to:

- identify the requirements of application experiments which could be met by encryption
- propose solutions
- assist application experiments in the implementation of solutions
- make recommendations for large scale application.

Technical Approach

The achievement of low-cost solutions will require that encryption facilities in terminal equipment are mass produced. This implies standardised, open algorithms which are personalised for individual communications sessions by means of keys. In an open IBC network environment public key distribution facilities will be required.

Activities within the task include:

- review of experimental requirements
- review and selection of encryption algorithms and equipment
- proposals for key distribution
- assistance to application experiments for implementation.

Key Results and Milestones

1 Report on experimental requirements.

2 Recommendations on encryption algorithms and equipment for use by application experiments.

3 Recommendations on key distribution.

4 Report on results of the implementation of encryption facilities within the application experiments.

TA.216 Conference Control and Reservation System

Background

Multimedia teleconferencing will be a key element of many of the application experiments. It could be usefully employed whenever differently located individuals are involved in a cooperative activity. Examples include learning, decision making, collaborative design and consultation of multiple expertise.

Requirements for telecommunications bandwidth, terminal facilities and session control will vary according to the application. It will frequently be necessary to reserve the required network services in advance of the conference session. Some level of rationalisation of provision of these facilities will be required, initially for the implementation of the application experiments, and ultimately for large scale application. This will be an essential part of the service infrastructure allowing the cost-effective implementation of many advanced communication systems.

Objectives

The purpose of this task is to:

- analyse the variants and options relating to the provision of multimedia teleconferencing
- determine the needs of the application experiments in terms of these parameters
- provide recommendations and support for the implementation of conferencing facilities.

Technical Approach

Videocoding represents a large part of the cost of provision of audio-visual conferencing. Its sophistication, and hence cost, is largely dependent on the level of bandwidth compression to be achieved. This must be determined according to the content (degree of spatial and temporal variation) and quality requirements of the visual images to be transmitted and the cost of transmission.

Multimedia conferencing facilities will be most valuable when integrated with other services accessible through common terminal equipment. Means of achieving this integration, eg windowing on multipurpose workstations, should be defined.

Session control facilities could be complex and include camera control, displayed image selection and manipulation, addition or exclusion of participants, linkage of sub-conferences, multimedia conference recording, etc. Such facilities would probably be most effectively provided as a common service accessible via the IBC network.

Key Results and Milestones

1 Report on the state of the art and equipment availability.

2 Specification of experimental requirements.

3 Recommendations and support for experimental implementation.

TA.217 Multimedia Mail System

Background

Electronic mail is becoming a widely accepted form of business communications. Extension to incorporate multiple media opens new dimensions for its applications.

Task TA.216 considers multimedia teleconferencing as a general support mechanism for distributed cooperative activity when conducted simultaneously in real time. Many distributed cooperative activities do not have this characteristic of real-time relationship and are therefore best served by the mailing of multimedia messages in a controlled manner. This is a particular variant of multimedia mail and could be considered as multimedia case handling.

Objectives

The objectives of the task are to:

- determine the extent of the use of multimedia mail and case handling facilities by the application experiments
- recommend means of implementing these requirements
- extrapolate to suggest solutions appropriate to large scale exploitation.

Technical Approach

An open approach is essential to ensure potentially universal capability to send and receive mail. Consequently standardisation is critical. Electronic mail is rapidly converging on the CCITT X.400 Message Handling System standard supported by X.500 Directory services. In many cases the recipient will need to manipulate the received information necessitating the standardisation of the structure of the content. The Open Document Architecture approach in the CCITT T.400 series will be a good starting point. Extensions are required for video and audio information attachment.

Activities to be performed within this task are:

- review of the results and impact of recent standardisation activities
- survey of hardware and software available to implement appropriate standards
- correlation of solutions with the needs of the application experiments
- support to experimental implementation.

Key Results and Milestones

1 Report on the status and impact of standardisation activities.

2 Specification of the requirements of the application experiments.

3 Implementation support.

4. Recommendations for multimedia mail facilities to be included in a generalised service infrastructure.

TA.218 Distributed Multimedia Database Server

Background

Database technology is being advanced rapidly through research programmes both individual and collaborative, in the latter case particularly by ESPRIT. These databases will be capable of storing video, high resolution images and audio information as well as text and data. There is also a trend to distribute information over physically separate resources.

Objectives

The objectives of this task are to:

- survey the state of database technology and report on available equipment and services
- review the requirements of application experiments in this field
- support experimental implementation.

Technical Approach

The elements of the technical approach are:

- definition of the telecommunications aspects of database access and maintenance
- analysis of server requirements
- high level design of system
- assessment of available database systems
- assessment of storage technologies
- assessment of hardware adaptation required including network interface and bus requirements
- assessment of software adaptation required.

The following topics will be addressed:

- service definition
- networking requirements (bandwidths, connectivity, control)
- user interfacing over the IBCN and MMI
- data provider interfacing across the IBCN
- database architecture and design
- system management
- integration of database and real-time services
- implementation strategy

- deployment.

Key Results and Milestones

1 Report on available database technology, equipment and services.

2 Plan for the implementation and support of the database requirements of Part III application experiments.

TA.219 Multiple Access Multiple Delivery System

Background

Provision of infrastructure in the local access network will absorb the largest part of the investment needed for the IBC network. It is, therefore, likely to cover an extended time period and a multiplicity of technologies. It will be necessary to hide this variety from application implementers by the provision of an appropriate service infrastructure covering large volume residential IBC user market. Foremost amongst the capabilities of such an infrastructure will be broadcast and selective (narrowcast) distribution of information services together with a reverse direction communication for selection, purchasing and occasional contribution (phone-in).

Objectives

The objectives of this task are to:

- identify and consolidate requirements of application experiments
- analyse the range of physical support infrastructure that must be accommodated
- survey relevant technology and equipment
- assist experimental implementation.

Technical Approach

Solutions to the problem of multiple access and delivery will vary in detail according to the type of physical transmission facilities used. They should, however, all ultimately provide a common interface to the application provider. Facilities to be provided should include:

- selectable broadcast channels with different media combinations and quality levels
- offering of goods and services
- ordering of goods and services
- delivery of information services
- payment.

Key Results and Milestones

1 Survey of requirements of application experiments.

2 Report on solutions for the experimental needs.

3 Support for experimental implementation.

TA.221 Professional Workplace

Background

Many of the ACE projects will have requirements for special-purpose terminals, in order to realise in full the benefits of advanced communications.

It will be necessary to carry out, at an early stage, an evaluation of terminal requirements for ACE experiments and to agree, where possible, common requirements so that sector actors may develop and supply equipment to meet project needs in the most economical way.

Objectives

- To gather and harmonise professional workplace hardware and software requirements in other ACE tasks.
- To match these against requirements in other ACE tasks, and to prepare equipment specifications in cooperation with actors in the terminal supply industry.

Technical Approach

This work will involve cooperation with other ACE tasks, together with actors in the terminal supply industry.

The work will address the following topics:

- data, voice and video terminals
- voice recognition systems
- smart card readers/writers
- printers and copiers
- scanners and text readers
- multimedia man-machine interface software using windowing techniques.

Key Results and Milestones

1 Initial report on requirements of application experiments.

2 Discussion and agreement of terminal specifications with actors engaged in other ACE tasks.

3 Representation of equipment specification requirements to actors in the terminal supply sector.

4 Initiation of special equipment developments to fill gaps where necessary.

TA.222 Transportable/Mobile Workplace

Background

A number of application experiments may require transportable and/or mobile terminals with multimedia facilities, eg data, text, voice, fax and image.

Transportable workplaces in vehicles and temporary cabins may be able to connect into IBC networks via cable connections, satellite or point-to-point radio links. This will enable comprehensive broadband communication channels to be provided at bit-rates which are cost effective according to the combination of medium availability and application requirement.

Mobile workplaces will be dependent on the mobile radio service which may impose bandwidth and mobility constraints. However, the requirements of some applications may be satisfied by relatively narrowband mobile facilities forming part of a mainly broadband application. An important feature of this task is to establish what is practicable in terms of mobile communications facilities within the ACE timescale.

Objectives

The objectives of this task are to:

- identify the generic and specific transportable and mobile workplace requirements in application experiments

- recommend available technologies to meet the translation needs.

Technical Approach

System development will comprise:

- analysis and specification of human to terminal interface, processing, storage and network interface requirements

- identification of suitable available units

- procurement, integration, development and testing of units.

Key Results and Milestones

The key milestones are:

1 Initial report on analysis and specification of experimental requirements.

2 Report on the availability and relevance of hardware and software modules for the construction of mobile terminals.

3 Support and assist other ACE tasks in the implementation and integration of transportable/mobile workplaces for use in application experiments.

4 Report on requirements and technology for the implementation of mobile/transportable advanced communications terminals for large scale commercial application.

TA.223 Residential Leisure Space

Background

It is anticipated that the trigger applications in the residential IBC market will be leisure oriented. Consequently terminal facilities should accommodate this requirement initially but have upgrading capability to allow extension to other applications of potential interest to the domestic user.

Bearing in mind that TV distribution is the natural starting point for development in this area, IBC opportunities are seen in the potential ability to handle High Definition TV (HDTV), the selection capability allowing pay-per-view and video-libraries and the possibility of viewer participation. This latter facility could start with a modest data capability permitting interactive games, transmission of text, etc, and progress to audio-visual participation.

Objectives

The objectives of this task are to:

- identify and consolidate residential leisure space requirements for application experiments
- develop a generalised requirement specification
- propose solutions for the experimental needs and support their implementation
- make suggestions for longer term solutions.

Technical Approach

The requirement specification should be based on a survey of specific Part III experimental needs. Its generalisation could be made most effectively by the development of a metaphor equivalent to that of the 'desk top' used to simulate a workspace on personal computers. Human factors expertise will be involved in the design of visual, audio and tactile interfaces which give an adequate representation of 'virtual reality' at a sufficiently low cost to capture a large domestic market.

Partial implementations or simulations of the target terminal devices will probably be appropriate for the experimental phase.

Key Results and Milestones

1 Survey report on experimental requirements.

2 Generalised, forward-looking target specification.

3 Recommendations for partial implementations for experimental purposes.

4 Implementation support for application experiments.

TA.231 Network Management System for Usage and Performance Measurement

Background

Experimental projects in Part III provide a unique opportunity for access to network generated information which can be useful in elaborating the results and forecasting usage and performance requirements. This potential could be demonstrated and exploited through use of the power of advanced network management systems. These systems should therefore be used in the application experiments in order to exploit them to the full.

Objectives

A network management system has to be established to measure performance, usage and possibly other parameters. This will assess the effectiveness of the various experimental parameters such as tariffs and measure the overall quantitative and qualitative usage to which the system has been put. application potential which could be assessed could include for example:

- revenue earning potential of on-line databases from which subscribers can extract information uniquely suited to their requirements

- targeted advertising/offering in which the publishers are able to assess accurately the value of their offers/information in terms of the detailed profile of customers responding.

Technical Approach

The elements of the technical approach will be:

- definition of the network management system to be made available

- assessment of performance and usage measurements obtained from application experiments as the system is used

- quantitative and qualitative assessment of applications usage.

Key Results and Milestones

1 Specification of a network management system to be used in conjunction with application experiments.

2 Recommendations for equipment and software for the implementation of these facilities.

3 Collection and analysis of results in conjunction with the relevant application experiment.

TA.232 Infrastructure for Application Experiments

Background

Network capabilities to support application experiments can be considered under three categories:

Customer Premises Networks

These include the advanced communications equivalents of PABX voice networks and LAN or other forms of data network. High performance LANs, capable of supporting multiple media communications, are already becoming available. An example is FDDI 2 (Fibre Distributed Data Interface). Consequently it is reasonable to expect that experimental requirements, in this area, can be met from commercial sources.

Interconnection of LANs is dealt with in task TA.234.

Local Access Networks

This area covers the local loop and local exchange part of the IBCN. Simulation of IBCN capability will be needed and is considered in either task TA.233 or TA.235 depending on whether the starting point is the teleport concept or use of existing cable networks. Other approaches, such as satellite access, may be necessary in some cases.

Trunk Networks

These provide the long distance connectivity.

Advanced digital transmission systems on optical fibre cables are being installed extensively across Europe. The new Synchronous Digital Hierarchy allows flexible cross connection of channels at different bit-rates up to about 150 Mbit/s. For switched connections EBIT (European Broadband Interconnection Trial) will provide switched 2 Mbit/s services for the benefit of RACE application pilots. Any extension required to the EBIT capability will be handled under this task.

Objectives

The objectives of this task are to:

- establish the network infrastructure needed to support Part III Application experiments
- recommend appropriate commercial customer premises network types
- provide guidance to Part III experiments on the best approach for local access capability
- arrangement of the provision of trunk network services.

Technical Approach

For Customer Premises Networks a catalogue will be complied and maintained of technology and experimental equipment that could be available for use by application experiments.

For local access, coordination and general guidance will be provided under this task. Most requirements should be handled under tasks TA.233 and TA.235. Some special cases may need to be coordinated with the relevant network provider by this task.

Trunk network facilities will be arranged within this task through appropriate, commercial or experimental, PTT services or from EBIT.

Key Results and Milestones

1 Report on network capability requirements of application experiments.

2 Catalogue of broadband Customer Premises Networks.

3 Recommendations to individual application experiments on local access facilities.

4 Organisation of the provision of trunk network capabilities.

TA.233 Interconnecting Islands of Advanced Communication Infrastructure

Background

Advanced communications are of vital importance for the development of the European economy. To be effective, advanced communications networks throughout Europe should be harmonised and interconnected. It is well recognised that points where an advanced infrastructure is concentrated can play a strategic role in the homogeneous evolution of advanced telecommunication services in Europe.

These 'pockets of high quality infrastructure' can be the corporate communication networks of large companies (see task TA.234) but also special areas destined for experiments or special urban development programmes. In the Netherlands examples can be found in the ISDN experiment in Rotterdam and the teleport development in Amsterdam. In the following we concentrate primarily on the teleport concept without forgetting however that the realisation of a pan-European network suitable for advanced communications services could very well mean the interconnection of different types of experiments. Areas officially designated as 'teleports' are by no means the only areas of advanced infrastructure - *the term is used in this task to identify a particular type of area, rather than the specific examples.*

Teleports, however different their respective orientations may be, have in common that they offer an advanced telecommunication infrastructure suitable for a variety of leading-edge advanced communications services, often situated in a developing metropolitan area. Seen from a transportation point of view teleports can play a double role: as a centre of communication they offer ways of substituting the communication of information for physical transportation. In the second place they can also act as a concentration point where different kinds of transportation come together.

Keeping this in mind, several characteristics of major importance can be distinguished:

- The interconnection of several teleports and other experimental areas and developments could facilitate the reaching of a greater geographical coverage of advanced communications services and contribute to the evolution of a Europe-wide network.

- Another aspect is that teleports, offering an advanced infrastructure, can act as a backbone for strategies to reach wider markets. In other words, the teleport infrastructure could easily be used for the transmission of broadcasting and value-added services opening wider markets for advanced communications applications.

- Teleports, where these are a combination of the offering of advanced telecommunications services and urban real estate development, are a unique market-product combination and with that a specific 'real life environment'. In this respect they facilitate the identifying of users ('communities of communication'), the analysis of environmental factors and the development of assessment methodologies.

- Teleports could also be part of a support infrastructure for different experiments, directed to leading edge applications. At the same time a system of verification should be developed.

- Given these possibilities teleports could also play a strategic and practical role (supplementary to the theoretical work done in several European organisations) in providing inputs to Part I on standards for different applications.

Seen in this way the benefits for the user will be such that specific functions and a degree of standardisation are possible. Also dealing with one supplying authority makes meeting specific needs and requirements easier (one-stop shopping)

The benefits for the producers will be:

- the identification of a 'community of communication' in such a way that characteristics and needs are understandable
- uncertainties are minimised
- analytical activities are possible
- interconnected teleports in different countries can be used by a variety of suppliers, which means a considerable widening of suppliers' markets.

Objectives

To provide for an advanced infrastructure for the support of application experiments in such a way that:

- the role of islands of advanced infrastructure in the development of the service infrastructure can be identified
- a harmonisation of developments is possible
- interconnection between different sites and other areas of experimentation can be realised
- 'communities of communication' can be easily identified
- specific applications can be analysed
- practical standards can be set for the development of specific user interfaces for advanced communications
- the needs of users can be identified with respect to the measure of integration of different services
- assessment strategies for target applications can be designed
- the testing of application experiments is possible.

The result of realising these objectives should be creation of several 'building blocks' of advanced communications resources.

Technical Approach

Two different approaches should be pursued:

- A differentiation between timescale, scope and technical environment of domains suitable for interconnection has to be made in such a way that several scenarios are distinguished; criteria should be developed to choose between these different routes.
- A gradual approach with the introduction of specific applications and their technical requirements is advisable.

Key Results and Milestones

1 Analysis of potential users of teleports.

2 Identification of trigger application experiments.

3 Plan for interconnecting teleports and other high-quality infrastructure.

4 Coordination of infrastructure supporting systems.

5 Programme for verification.

TA.234 LAN/IBC CPN Interconnection

Background

Many large companies and other organisations are equipped with high capability local area networks (LANs). These LANs need to be internetworked to render company-wide communications and inter-corporate operations possible.

Objective

The objective of this task is to recommend facilities for interconnection of LANs of different types, architectures, and degrees of complexity, over long distances throughout Europe for the support of application experiments.

Technical Approach

The task involves the following activities:

- identification of application experiments involving use of LANs at different locations and a need for them to be interconnected

- identification of the different types of protocols involved and preparation of a rationalised plan for their interworking

- recommendations for gateway protocols and network topologies selected to interconnect the LANs for each relevant application experiment

- assist application experiments in the implementation.

Key Results and Milestones

1 Report on LAN interconnection requirements for application experiments.

2 Plan for gateways, protocols and network topologies for experimental LAN interconnections.

3 Support to the experimental implementation.

TA.235 Cable System Interconnection

Background

At present, the proportion of homes connected to a cable network in different European countries has been estimated as follow :

Netherlands	80 %
Belgium	86 %
Denmark	18 %
Germany	18 %
Luxemburg	70 %
France	1 %
UK	2 %
Ireland	35 %

and it can be anticipated that the number of people receiving leisure TV programmes through a cable will increase.

Cable systems therefore represent a broadband network with the limitation that the structure of this network is not symmetrical. On the other hand 60 % of the population are connected to the telephone network. These important facts have to be taken into account when planning integrated broadband communication networks.

There will be an appreciable delay before the IBCN provides comprehensive coverage across European countries. This is due to technical difficulties and practical problems that remain to be solved and additionally to the cost of the civil works and equipment. Therefore there will be a transition period between the present situation and the anticipated full IBCN.

During this transition period advantage can be taken of cable networks either by adapting them to support some of the services expected to be provided through the future IBCN or by transforming them to become part of the future IBCN.

Objectives

The objectives of this task are to:

- investigate the potential of cable networks to support application experiments
- evaluate adaptive development that may be required for this purpose
- support the implementation of cable network based application experiments.

Technical Approach

A first step could be the interconnection of the various head-ends of the cable networks by means of symmetrical broadband communication links using telecommunication network resources. The head-ends would then become equivalent to distribution points within the telecommunications network structure.

The next step would be to provide a return path from the subscriber to the head-end of the cable network.

A further step could be the augmentation of terminals with a local memory and intelligence to control the storage of the information needed for the necessary time.

The main control capacity of the system should be placed at the head-end.

Key Results and Milestones

1 Report on the suitability of cable systems to support application experiments.

2 Adaptation specifications for the use of cable networks in this context.

3 Support to application experiments in the implementation of such facilities.

Resource Packages Supporting Generic Applications

TA.250 Resource Package Development General Framework

Background

Tasks TA.251 to TA.261 are concerned with the development of resource packages to support Generic Applications. A preliminary description of the Generic Applications is given in Part I in terms of user requirements. Task TA.101 will refine this set and provide an outline definition in terms of a basic characterisation. TA.106 will prepare more rigorous operational requirements and task TA.107 will prepare functional specifications for the related resource packages.

User experimentation with the resource package prototypes will be performed on a laboratory basis in task TA.270.

It is likely that the functional requirements for the resource packages could be met by several different technical solutions. Evaluation of these alternatives is an important part of this series of tasks.

It may be possible for the results of these tasks to feed in to the later stages of the field application experiments in Part III. Some tailoring would inevitably be needed to optimise the resource package to the requirements of the particular activity, sector or function within the experiment concerned. Such customisation would fall within the scope of the Part III application experiment in question. Decisions on how many and which implementations to use in the Part III application experiments must involve those responsible for the experiments concerned and as far as possible be taken in the context of the consensus formation activities described in Part I. Recognition of these important linkages will be a key parameter in the evaluation of proposals for this series of tasks.

It should be clearly understood that it is not intended to develop enabling technologies within ACE. Technologies emanating from RACE, other collaborative projects or from proprietary R&D will be adapted and extended as necessary in order to undertake application experiments.

For each resource package development, the 'background' section of the task description includes a scenario as a first suggestion to guide the preparation of a prototype specification.

Objectives

All laboratory resource package development tasks have the general objectives of:

- providing specialist inputs to tasks TA.101, TA.106 and TA.107 in the characterisation of Generic Applications and the preparation of operational and functional specifications

- developing resource package definitions to meet the requirements of the operational and functional specifications generated by tasks TA.106 and TA.107

- selecting appropriate network and terminal capabilities for the realisation of a laboratory prototype

- generating the procedures and protocols necessary to bind the elementary network and terminal services into the resource package

- providing the necessary assistance to task TA.270 to establish the related laboratory experiments

- generating recommendations for the implementation of the resource package definition for this Generic Application, taking into account the results of the laboratory experiments in task TA.270 and relevant Part III field application experiments as collected and analysed by tasks TA.101, TA.112 and TA.116 in Part I.

Technical Approach

The tasks will involve the interpretation of the functional requirements for resource packages in terms of illustrative prototype implementations. Building of working prototypes will be achieved initially by the ad-hoc use of available technology and later through the systematic employment of Integrated Service Components generated by research into integrated services engineering. These prototypes will be exploited to run lab based trials involving the simulation of real life conditions, in order to develop the necessary specifications of the configurations of advanced communications resources that fulfil user requirements under particular sets of conditions.

Key Results and Milestones

The first phase of one to three years concerns the development of laboratory prototypes. Results in Phase 1 will be in the form of:

- survey and analysis report on appropriate network and terminal service components

- designs of protocols and procedures for the linking of network and terminal service components

- physical realisation of a laboratory prototype resource package.

Phase 2 covers the feedback from laboratory and field application experiments. Results in Phase Two will be in the form of:

- modification of prototype resource packages as indicated by experimental results in task TA.270 and usage in Part III application experiments

- assistance in the employment of the techniques and management facilities developed under task TA.275 and through research on integrated services engineering

- recommendations for large scale implementation.

TA.251 Lab Prototype Resource Package for Distributed Case Handling

Background

General background for all resource package developments is given in task TA.250.

In the particular area of distributed case handling, the Generic Application will most often be encountered in an office or similar environment. Consequently linkage with other Generic Applications appropriate to office environments should be kept in mind. Customisation of the related resource package must be foreseen as the case handling process must reflect the policies, procedures, organisation and authority structure of the end user's enterprise. These linkages and modifications should be effected through the management capabilities developed in task TA.275.

The scenario proposed in this case involves the handling of case dossiers each capable of holding text, still pictures and video sequences all with associated voice commentary. Dossiers will be routed under a scheme, defined by the user, through a sequence of human and machine work stations at which dossier contents can be retrieved, added or modified. The system will contain facilities for rigorous control of security, privacy, authentication and authority.

Objectives

These are stated for all resource package developments under task TA.250.

Technical Approach

Message communications systems are seen as the core capability on which the resource package for distributed case handling should be built. It is expected that the data communications standards in the CCITT X.400 series will form the basis of appropriate protocol sets. They will require extension to accommodate voice and video messages in a structured manner. Further capabilities are required to manipulate the different sections and media comprising the dossier.

Requirements for case circulation, authority certification, privacy, record keeping and similar aspects of this Generic Application could be conveniently included in this resource package definition as a value added service.

Key Results and Milestones

Results required from all resource package development tasks are defined in task TA.250.

TA.252 Lab Prototype Resource Package for Interpersonal Communications

Background

General background for all resource package developments is given in task TA.250.

Interpersonal communications is seen as the key to the realisation of 'telepresence' - a principal user benefit of advanced communications. Human factors will be a key aspect in the success of its implementation and should therefore be a feature in proposals for this task.

Elements of the implementation of the resource package supporting interpersonal communications will probably feature frequently in conjunction with those for other Generic Applications. Resource package definition and implementation should recognise this relationship and enable easy integration through the management capabilities developed in task TA.275.

The scenario proposed for this resource package is a multi-channel multimedia conference. Each participant would have a number of 'windows' through which to see and hear other participants under his own control. Multimedia document presentation should be part of the capability.

Objectives

These are stated for all resource package developments under task TA.250.

Technical Approach

According to the end use and particular conditions at the time many different levels of performance will be required in terms of communication configuration, media combinations, audio quality, image resolution, video motion rate, etc. These parameters may well vary during a communication session. The aim must be to deliver the appropriate cost/performance ratio at any instant. Use of management facilities developed in task TA.275 will be essential to meet this requirement.

Key Results and Milestones

Results required from all resource package development tasks are defined in task TA.250.

TA.253 Lab Prototype Resource Package for Remote Delivery of Expertise

Background

General background for all resource package developments is given in task TA.250.

In many cases of remote delivery of expertise, there will be a number of participants in the consultation session. Expert systems may also be consulted.

The scenario proposed would involve a number of independent or grouped experts. The resource package would provide means for:

- customers to broadcast requests for information and services
- experts to bid for their provision
- experts to consult other experts and knowledge bases
- delivery of responses to customers
- charging and accounting for all the services involved.

Objectives

These are stated for all resource package prototype developments under task TA.250.

Technical Approach

This resource package will require the combination of immediate interpersonal communications (TA.252), multimedia messaging for situations where questions and/or answers are queued and remote monitoring and surveillance for the control of computer-based expert systems (task TA.256).

In many cases security, privacy and authentication will be key features. Direct payment by electronic funds transfer should be an optional feature of the implementation.

Expert system capability should be foreseen as an integral part of the resource package. Links with large scale knowledge bases should also be considered, together with the relationship with task TA.251.

Management of all these options and linkages will use the capabilities developed in task TA.275.

Key Results and Milestones

Results required from all resource package development tasks are defined in task TA.250.

TA.254 Lab Prototype Resource Package for Distributed Collaborative Decision Making

Background

General background for all resource package developments is given in task TA.250.

The scenario in this case envisages a group of executives in different locations linked by advanced communications in a decision making role. Multimedia conferencing facilities would be needed coupled with access to experts and information bases. In the decision making process a rationale on the issue will be built up and made available simultaneously to selected participants as an 'electronic flip chart'.

Objectives

These are stated for all resource package prototype developments under task TA.250.

Technical Approach

From a technical implementation point of view this resource package can be seen as an extension of interpersonal communications (TA.252) employing the multimedia conferencing capability. Additional facilities are required in the areas of communication control and the ability to call up supporting expertise and information. Consequently the capabilities of the resource packages in TA.253 (remote delivery of expertise) and TA.260 (multimedia assembly, access and distribution) will also be required in this case.

Facilities to support the 'electronic multimedia flip chart' will be similar to those involved in distributed case handling (TA.251).

Management of all these options and linkages will use the capabilities developed in task TA.275.

Key Results and Milestones

Results required from all resource package development tasks are defined in task TA.250.

TA.255 Lab Prototype Resource Package for Distributed Learning / Training

Background

General background for all resource package developments is given in task TA.250.

Results from the DELTA programme must be taken into account in establishing requirements for this Generic Application and the development of the associated resource package.

The scenario suggested in this case is a distributed 'state of the art' type seminar in which a lecture team provide the majority of the communication material but all participants will make contributions in the discussion process. The system should compile a set of multimedia proceedings and handle payment of attendance and contribution fees.

Objectives

These are stated for all resource package developments under task TA.250.

Technical Approach

Multimedia conferencing will be the technical basis of the resource package for distributed learning / training. Its implementation should reflect the asymmetric nature of the communication configuration (mainly point-to-multipoint but with occasional and lower bandwidth requirements for communication in the reverse direction). It must be possible, however, to shift into the seminar/discussion mode reflecting a more balanced pattern. The configuration manipulation will be needed to make cost effective use of the resources since the total session could cover several days.

The need to refer to alternative information sources implies a need for a sophisticated directory system.

Management of all these options and linkages will use the capabilities developed in task TA.275.

Key Results and Milestones

Results required from all resource package development tasks are defined in task TA.250.

TA.256 Lab Prototype Resource Package for Monitoring and Surveillance

Background

General background for all resource package developments is given in task TA.250.

Many of the higher value forms of monitoring and surveillance could be characterised by the need for normally very low information flow when everything is proceeding normally, infrequently interspersed with the need for high volume, high quality, error free information bursts during critical events.

The scenario is aimed at such high value situations such as monitoring and control of a hazardous process with potentially extreme consequences of loss of control. Remote decision makers will need controlled access to extensive information under emergency conditions.

Objectives

These are stated for all resource package developments under task TA.250.

Technical Approach

This resource package provides an ideal match for the bandwidth flexibility of the Asynchronous Transfer Mode (ATM) that is expected to be the technical base for switching and multiplexing in advanced communications. However the scenario outlined above illustrates the need for sophisticated network management to ensure adequate performance of high volume information flows during critical situations.

Key Results and Milestones

Results required from all resource package development tasks are defined in task TA.250.

TA.257 Lab Prototype Resource Package for Telemarketplace

Background

General background for all resource package developments is given in task TA.250.

One scenario for the telemarketplace envisages home-based teleshopping built onto entertainment distribution. Auction and catalogue modes should be available both with multimedia presentation of the goods or services on offer. Individual purchasers should be able to request additional or replay information. Confirmation of dispatch and receipt and payment should be included.

A key issue to be addressed in the implementation of this resource package is low cost, particularly when usage is low. This probably requires that it is built as an incremental application to use resources justified primarily by other applications.

An additional scenario deals with professional telemarkets, dealing with goods and or services, where the market is between professionals. In this case the advanced communications application is expected to bring significant competitive leverage, and performance may outweigh cost as the primary criterion in the definition of the resource package.

Objectives

These are stated for all resource package developments under task TA.250.

Technical Approach

An entertainment distribution system (CATV) would require additional channels and the capability to use them for short periods exclusively for one individual. Upstream communication will be needed but bandwidth could be limited. Funds transfer and additional two way information flows will be required.

Key Results and Milestones

Results required from all resource package development tasks are defined in task TA.250.

TA.258 Lab Prototype Resource Package for Entertainment / Leisure Distribution

Background

General background for all resource package developments is given in task TA.250.

One part of the scenario suggested in this case is the support of distributed multi-participant video games. A second part is the user selection of video material over an advanced communications system, where access, control and timing are all at the users' request. A third concerns the requirements of contribution of programme material between programme suppliers, as might for example occur in local television or in contribution form "events" in journalism.

Objectives

These are stated for all resource package developments under task TA.250.

Technical Approach

The technical requirement is for narrowcast (selective broadcast) of high quality audio-visual information coupled with very fast response to upstream information. It is likely that the variants of the scenario outlined above will require appropriately adapted approaches.

Key Results and Milestones

Results required from all resource package development tasks are defined in task TA.250.

TA.259 Lab Prototype Resource Package for Multimedia Interpersonal Messaging

Background

General background for all resource package developments is given in task TA.250.

The scenario suggested for this resource package is a remotely accessible multimedia mailbox. Text, still pictures and moving images each with sound tracks could be deposited and retrieved. Security and authentication will be essential features of the remote retrieval. Means of controlling junk mail should be considered.

Objectives

These are stated for all resource package developments under task TA.250.

Technical Approach

Message communication is the core capability on which this resource package should be built. It is expected that the data communications standards in the CCITT X.400 series will form the basis of appropriate protocol sets. They will require extension to accommodate voice and video messages in a structured manner.

Together, interpersonal communications (TA.252) and this resource package provide the nucleus communication platforms on which other resource packages are built. A strong link is, therefore, needed with task TA.275 to ensure that convenient linkage mechanisms are produced.

Key Results and Milestones

Results required from all resource package development tasks are defined in task TA.250.

TA.260 Lab Prototype Resource Package for Multimedia Information Assembly, Access and Distribution

Background

General background for all resource package developments is given in task TA.250.

The scenario suggested in this case envisages a remotely accessible, on-line, multimedia, distributed database.

Objectives

These are stated for all resource package developments under task TA.250.

Technical Approach

The essential implementation tasks are:

- linking communications and database technologies
- providing remote access mechanisms appropriate to multimedia databases
- providing communications mechanisms for retrieval and update management of distributed multimedia databases
- associating security, authentication and charging mechanisms with database access.

Key Results and Milestones

Results required from all resource package development tasks are defined in task TA.250.

TA.261 Lab Prototype Resource Package for Distributed Collaborative Design

Background

General background for all resource package developments is given in task TA.250.

No matter what physical form the object being designed takes, the 'design' itself is pure information. Consequently it is eminently suited to exploit advanced communications capabilities.

The scenario proposed is a design facility for an organisation involved in producing a series of designs many of which would contain common components. Distributed facilities for specification, design, verification and production will all need access to the design information.

Objectives

These are stated for all resource package developments under task TA.250.

Technical Approach

The basis of this resource package could be considered as a special version of the resource package for distributed case handling. Cases will need structuring in a hierarchical 'bill-of-materials' form to represent component / assembly relationships.

Comprehensive features will be required for change and configuration control.

Key Results and Milestones

Results required from all resource package development tasks are defined in task TA.250.

TA.270 User Experimentation with Prototype Resource Packages

Background

Tasks TA.251 to TA.261 are concerned with the development of prototype resource packages to support Generic Applications. User based laboratory experimentation with these resource package prototypes will be required as a means of testing the fit to purpose of these prototype implementations. This task, TA.270, sets out the objectives of such experimentation for all resource package prototypes.

User field experiments in Part III will be demanding in terms of communications infrastructure and in terms of the level of commitment on the part of the participating user organisations. Resources will be selected on criteria including the necessary level of stability of the technology for use in a field application experiment, balanced against the requirement to maintain leading edge characteristics of the work.

The prototype resource packages produced by tasks TA.251 to TA.261 will be more ambitious technologically, and will embody a later understanding of the requirements of the applications. It is likely that they will not be suitable for user field experimentation. However, laboratory or limited user premises experimentation will provide valuable user exposure to, and experience of, the capabilities of the technology, and will verify the adequacy of the facilities provided by the resource package and the requirements of the Generic Application.

Objectives

The objectives of this task are:

- production of laboratory/user premises test specifications for resource package experimentation
- user based lab/user premises experimentation with prototype resource packages
- initial confirmation of the matching of functionality to user requirements
- generation of user opportunities for familiarisation with technological potential.

Technical Approach

User based experiments will require significant and careful preparation in order to derive generalisable results. Attention will need to be paid to the human factors aspects, not only of the applications, but also of the staging of the experiments themselves. Options include exposure of potential users to advanced communications systems in a development environment and the installation of an experimental system on a temporary basis on the users premises. Examples of the latter might include the installation of a multi-site (potentially wide area) conference system, or of a collaborative decision making system on a local site.

Key Results and Milestones

1 Analyses of success / failure criteria for advanced communications resource packages.

2 Test specifications for resource package experimentation.

3 Test reports on requirements for integration of resource package prototypes.

4 Test reports on requirements for customisation of resource package prototypes.

TA.275 Advanced Communication System Building Techniques

Background

Advanced communications will offer many new capabilities and more flexibility in their use. For the user this means more powerful tools but, if not countered, more complexity. Techniques are, therefore, required to manipulate the capabilities of networks, terminal systems and added value services to create user oriented resource packages.

The Generic Applications elaborated in Part I of Volume I give a guide to the shape of some of these resource packages which are expected to be frequently used in different business sectors. A review of the discussion on laboratory prototyping of these resource packages, given in tasks TA.251 to TA.261, reveals that there is a need to conveniently manipulate elements within resource packages and to combine them into larger packages.

Objectives

Techniques developed in this task will lead to the implementation of facilities for the management of resource package components or building blocks. Some of these facilities will be resident in the network. These management facilities, used in combination, provide the technical means of creating user oriented resource packages using the capabilities of networks, terminals and value added servers. *The work is strongly linked with research into integrated services engineering.*

The objective of the task is to specify and implement prototype versions of these management facilities.

Technical Approach

Advanced communications networks will have a limited number of powerful bearer capabilities. Definition of a particular use of these capabilities is by attribute value. Typical attributes are information rate (bandwidth), Transfer mode (circuit, packet, ATM), configuration (point-to-point, multipoint, broadcast) etc.

Network resource will be allocated as a result of negotiation between the network and the user terminal. Given the trend towards cost related tariffs, it will be important to ensure that the resources, allocated and used, do not exceed requirements more than is necessary to ensure adequate performance.

Management facilities are required to handle attribute selection and resource negotiation. They will also need to manage the information storage and processing capabilities within terminal systems and value added servers.

Key Results and Milestones

Results are required in two broad phases.

The first covers an initial period of one to three years in which experiments are being established. The following results are expected in phase 1:

- specification of prototype management facilities
- design of prototype management software packages

- definition of the hardware and software facilities required in terminals, networks and value added servers to support the prototype management packages

- integration and testing of the prototypes.

Phase 2 will be concerned with running the experiments and extraction of results. The results expected within phase 2 are:

- experimental modification of management capabilities

- cooperation with those undertaking tasks in Part III to trial alternative management strategies

- recommendation of management capabilities required to implement an integrated applications environment.

Elicitation Technology and Techniques

TA.281 Techniques for Elicitation of User Reaction

Background

The emerging discipline of 'knowledge engineering' is generating a number of techniques that could usefully be applied to the objectives of ACE. Amongst these the techniques of 'knowledge elicitation' seems to be particularly relevant. A deeper understanding of the mechanisms of communications and their place in organisations would contribute significantly to fully exploiting the potential of advanced communications. Techniques must be developed which complement the processes of technical trial, and application experiment.

The basic purpose of these techniques is to extract knowledge from 'experts' within a given domain. In this context, the "experts" are the users in a particular business sector or business function.

Objectives

In the context of ACE, knowledge elicitation techniques would be useful if they could provide information about the communications requirements of potential advanced communications users. Such information could be complementary to that obtained by direct experimentation. The overall objective is to further elaborate common functional specifications relating to user operational requirements.

Technical Approach

A variety of knowledge elicitation techniques exist. The most appropriate of these should be selected and applied to the problem of gaining user reaction to the possibilities offered by advanced communications technologies. Targets for such work are listed below:

- inducing alternative ways of thinking about traditional processes so as to better identify advanced communications opportunities *(Lateral Thinking)*

- systematic collection of unstructured ideas on how advanced communications could improve processes (*Structured Brainstorming*)

- obtaining views on advanced communications versions of current processes unconstrained by detailed knowledge of the limitations of current telecommunications technology (*'Science Fiction'*)

- identifying the main parameters involved in the process and then evaluating the systematic replacement of each by an advanced communications based alternative (*Morphological Analysis*)

- describing a possible future based on advanced communications in some detail, in order to help participants think about their area of expertise in an unfamiliar, advanced communications based, context (*Scenarios*)

- obtaining from a number of experts independent views on an advanced communications based future in an iterative process based on feedback of the 'middle ground' opinion until consensus is reached (*Delphi Method*)

- combining in tree structures alternative ways of reaching advanced communications based futures by means of combinations of the scenario and Delphi methods (*Relevance Trees*)

- examining the possible impact of major groups of factors, such as environmental, economic, social, on alternative views of advanced communications applications (*Cross Impact Analysis*).

Key Results and Milestones

Studies in this area could assist Part I tasks in the analysis of results and individual experiments in Part III in structuring the means of extracting results. Specific results will be:

- recommendations on the use of elicitation techniques

- tools to assist the process

- assistance to Part I in results analysis.

TA.282 Simulation for Application Experimentation

Background

In some cases it may be impractical to launch a full scale experiment on the feasibility of a Generic Application. The alternative is to simulate all or part of the experiment. The most obvious situation is in the avoidance of long-distance broadband communication by removing the actual distance barrier and simulating its effect.

Simulation can also be relevant:

- to substitute variations on an experimental theme
- to decide between alternative proposals for experiments
- to test hypotheses arising out of experimental results.

Objectives

A number of general simulation techniques could be relevant in this area. This task is to review the possibilities, recommend promising candidates and provide tools for their implementation.

Technical Approach

Simulation can be used for:

- terminals - to substitute for real display, storage, processing or control capabilities;
- network - to substitute for distance covering;
- service providers - to substitute for information, programming material, goods and services.

Simulation must not be used to substitute the involvement of real users.

Key Results and Milestones

Results of this task must be made available within the first two years of the application experiments to be effective. They include:

- recommendations on simulation techniques;
- development of simulators
- support to the use of simulators by Part III application experiments.

TA.283 Presentation for Application Experiments

Background

A key part of the results of advanced communications experiments is feedback from potential customers. This includes direct users of advanced communications terminals and purchasers of advanced communications capability to be used by others within their organisation. For both categories the impact of experiments may well be enhanced by appropriate presentation techniques and tools. These will be used to elaborate, extrapolate and illustrate experimental results.

For terminal users these presentation aids will reside in the terminals and improve the higher level aspects of the man-machine interface.

For the purchaser the problem is to portray the total impact of the of advanced communications on his enterprise.

Objectives

The task objective is to supply methodologies and tools to assist in the presentation of project results.

Technical Approach

Selection of techniques should be based on the following criteria:

- immediate and visual impact
- consistency with the spirit of advanced communications (ie extensive use of multiple media and real time animation)
- ability to transform the technique into product enhancements (improved terminal interfaces and reports from management systems).

Key Results and Milestones

1 recommendations on presentation techniques

2 terminal interface enhancement tool prototypes

3 system management report generation tools

4 experiment report presentation aids.

PART III - APPLICATION EXPERIMENTS

General Framework

TA.300 Application Experiments General Framework

Background

The initial demand for advanced communications services will stem primarily from business enterprises serving end users and/or other businesses. Advanced telecommunications will potentially provide a set of techniques and technologies that could be applied to improve the efficiency and effectiveness of processes within business organisations.

The first effect of this will be to change business processes within existing organisational structures. Subsequently such process changes can be expected to produce changes in organisational structure. Even further, advanced communication could change the nature of the businesses themselves and transform the way in which business is done. The geographic structure of the business, the relationships with suppliers and customers, the widespread adoption of distributed collaborative decision making, are examples of business transformations.

In essence, advanced communications serves to eliminate geographical constraints. It allows for the delivery of high quality information and expertise (moving pictures, still image, etc) 'just-in-place' and 'just-in-time', possibly in 'what you see is what I see' format, simulating live contact and/or facilitating other processes. As such advanced communications will have profound effects on all business activities and structures.

However, there is a basic difficulty in predicting exactly what these effects will be and what will be the levels of demand, for which kinds of facility. At the same time industry and service providers will be reluctant to make the necessary investments until the demand is evident. The application experiments in Part III are intended to address this difficulty by determining the effect of applying advanced communications to a range of business functions and business sectors and by demonstrating the usefulness of applications of advanced communications to a wider audience.

By focusing the application experiments in Part III on the Generic Applications described in Volume I, Part I, the experiments will also help to test the viability of the generic approach. The experiments will contribute to the definition of the Generic Applications in terms of the underlying needs of users, and to the identification of the functional requirements for the resource packages needed to support these applications.

The proposed experiments are structured in such a way as to increase the understanding of the changes that advanced communications will introduce into business processes and of how businesses will be transformed as a result of this new technology. This understanding is essential to the efficient and rapid uptake of the technology.

Two types of task are included within Part III - general tasks and specific tasks. Each general Task description relates to a particular business function or business sector, and identifies the Generic Applications which are considered particularly appropriate. In many cases the general task is supplemented by one or more tasks which address a particular application within the function or sector.

Proposals for projects may relate to one or more Tasks and may address more than one Generic Application within the Task(s). *In the light of the objective of identifying and characterising*

Generic Applications and verifying the requirements of the related resource packages, projects which address more than one business function or business sector will be of particular interest.

Objectives

The key objectives for Part III application experiments are:

- to advance understanding of users' needs and wants for advanced communications
- to identify by a process of trial implementation the range of advanced communications facilities required by business functions and sectors
- to verify the economic, commercial and technical feasibility of applications of advanced communications facilities
- to determine usage characteristics of advanced communications facilities in mainly transnational business applications
- to provide TA.100 with feedback on the results of applications experiments, particularly in relation to those service attributes and system specifications considered crucial to the viability of the application
- to contribute to inter-sector and intra-sector standardisation processes
- to assist in determining whether the Generic Application approach outlined in Volume I, Part I, can lead to the creation of an open technology platform for the construction of user-oriented resource packages
- to assist in the specification and verification of the resource packages supporting each of the defined Generic Applications.

Technical Approach

The primary characteristic of the application experiments in Part III is that they involve users at a detailed level and should where possible be user led. It is thus essential that they should relate to communications patterns in user organisations, and the technical approach should be adjusted to fit that objective. At the same time, from existing knowledge of communications patterns, the most appropriate technical approach appears to be to exploit the concept of Generic Applications as developed in Volume I, Part I as far as possible. This concept postulates the existence of an underlying layer of fundamental applications, common to several different business functions and business sectors. These Generic Applications will be supported by resource packages of products and services which will facilitate their introduction. It is expected that the identification of the common operational and functional requirements for these packages will have a major impact on the economics of product, service and market development.

However, the work in Part I to characterise the Generic Applications and the related work in Part II.2 to define and prototype the related resource packages will take place in parallel with the Part III experiments. It follows that the Part III experiments cannot initially be based on the results of the Part II.2 work, although it may be possible to retrofit some of the Part II.2 results into their later stages. On the other hand, support in identifying solutions to the advanced communications requirements of Part III experiments will be offered by tasks defined in Part II.1.

The approach envisaged, allowing users to develop understanding of the potential of advanced communications while also testing the viability of a Generic Applications approach is as follows:

- establish operational requirements for experiment
- define functional requirements for products and services to fulfil operational requirements
- evaluate feasibility of utilising server and workplace module kits identified by Part II.1 tasks
- initiate provision of required network services, using support provided by tasks TA.231 - TA.235, where appropriate
- assemble, configure and test the relevant resources (products and services) to provide the experimental platform
- run the experiment, evaluate the viability of the Generic Application(s) in the specific environment and assist in refining its operational requirements and the specification(s), functionality(ies) and interface(s) of the relevant resource package(s)
- evaluate the feasibility of introducing into the later stages of the experiment the prototype resource packages developed under the relevant Part II.2 tasks
- analyse, validate and report results of the experiment.

Experiments should be established on a collaborative basis, bringing together participants from established sectors together with participants capable of supplying telecommunications and informatics expertise.

Part I tasks will be responsible for coordinating the output from experiments involving the same Generic Application.

Key Results and Milestones

1 Regular evaluation reports on the running of the experiment and the provision of inputs on advanced communications Generic Application strategies to task TA.100 and on the criteria and guidelines for success to task TA.116.

2 Provision of inputs to usage reference model (TA.101).

3 Provision of inputs on the operational specifications of the relevant Generic Applications to task TA.106 and on the functional specifications of the related resource packages to task TA.107.

4 Provision of inputs on network and technology aspects to task TA.112.

5 Final report on the results of the experiment and the viability of the application.

Application Experiments Addressing Business Functions

Operations/Production/Production Engineering

TA.301 Operations/Production/Production Engineering General Task

Background

General background for all application experiments is given in TA.300.

Operations in three kinds of organisations are addressed within this task: administrative/information flow organisations, manufacturing organisations, and service providing organisations.

In administrative/information flow organisations (eg banking, insurance, media, publishing), including information service providers, greater product diversity and increasing competition will emphasise the need for better information exchange, specialised expertise and improved efficiency. In information services organisations, new products will bring the need for new processes. Customers will increasingly participate in business processes, eg via enquiry facilities or Electronic Data Interchange.

In manufacturing organisations product diversity can also be expected to increase. Rapid technological development will lead to corresponding changes in processes, in some cases to larger, automated plants. Increasing competition and the need for cost reduction will focus attention on the improvement of internal efficiency.

In the main service organisations (eg health care, liberal professions), the range of services can be expected to grow, processes will increase in complexity and the number of collaborative associations will increase. There will be a continuing need for specialised expertise and many opportunities to increase quality.

Objectives

These are stated for all Part III Advanced Communications Experiments in task TA.300.

Technical Approach

The approach will be to establish a working advanced communications installation, integrating new facilities as much as possible into the existing methods of working. The approach will involve one or more Generic Applications in the operations/production/production engineering function, for example:

Distributed Case Handling

This Generic Application deals with the procedures involved in handling sets of multimedia documents between remotely-sited specialists for example in the case of complex insurance quotations or claims, or medical records.

Interpersonal Communications

Direct interpersonal communication could have an important application in this function, for example video telephony to support the real time communication in collaborative processing.

Remote Delivery of Expertise

There will be a common need within this function for consultation with remote experts, for example when expert advice is needed from the medical profession by an agent in an insurance business in order to assess a risk.

Distributive Collaborative Decision Making

This Generic Application deals with the process of complex decision-making between geographically-separated individuals who need to refer jointly to common files or individual data sources in the process of making decisions. Such a process could for example be involved in collaborative dealing, in healthcare, and in production operations.

Whilst the above Generic Applications are considered to be the ones of major importance to this function, the relevance of others may become clear after further study.

Examples of application experiments in the operations/production/production engineering function are given in tasks TA.301A and TA.301B.

Key Results and Milestones

Results required from all Part III Advanced Communications Experiments are defined in task TA.300.

TA.301A Multi-Site Multi-Media Remote Surveillance and Incident Reporting

Background

General background for all application experiments is given in TA.300. General background for all operations/production/production engineering experiments is given in TA.301.

Remote surveillance has been operational for some time, utilising video bandwidth over short distances, and narrowband over longer distances using slow-scan techniques.

Each of these techniques typically entails a human operator viewing a small number of screens, and/or video recording from a small number of cameras. Computerised image comparison techniques are used to detect intrusion.

Advanced communications will permit the use of video bandwidth over long distances. The implications of this are:

- more centralised monitoring of remote sites with resulting reductions in central overheads
- the possibility of harnessing much greater computer power for intrusion detection using image and sound comparison.

Objectives

These are stated for all Part III Advanced Communications Experiments in task TA.300. Specific objectives for this task are:

- to demonstrate the impact of advanced communications on optimum topology for surveillance networks
- to demonstrate the impact of advanced communications on surveillance costs.

Technical Approach

Participants should include an international security and surveillance company.

Video and audio signals should be transmitted from remote locations to a centralised image/sound analysis system. There the signals should be:

- recorded on a referenced linear recording medium like video or audio tape
- subjected to frame by frame sound and image analysis for incident detection

On detection, the incident location should be displayed for observation, priority recording, and action if necessary.

Key Results and Milestones

Results required from all Part III Advanced Communications Experiments are defined in task TA.300. Specific results required from this task are:

1 Comparison of advanced communications type system with current surveillance techniques on cost effectiveness criteria.

2 Design and development of central processing system.

3 Development of automatic background/foreground.

4 Recording and archiving.

TA.301B Building and Construction Project Management

General background for all application experiments is given in TA.300. General background for all operations/production/production engineering experiments is given in TA.301. See also building and construction background in TA.331.

Background

As building projects become larger and more complex the opportunities for advanced communications applications in the building sector will increase. Also labour will become more specialised, experts more scarce and it will be too expensive to have overcapacity in working labour and engineers. Overcapacity must also be avoided in machinery and special equipment.

Building and construction project management will involve people and facilities in a number of different locations and they will be physically distributed on large construction sites. A need is therefore postulated for off-site control centres interconnected via broadband communications with each other and with on-site control centres.

Off-site Control Centres

There is a need for better planning and control of projects in order to avoid excessive risks. Most of the time, a construction company is involved in more than one project. So at the headquarters there is a need for an overall planning and control centre.

The purpose of an off-site control centre is to:

- manage the project and take overall responsibility for operations and reporting
- plan, on a multi-project basis, the best use of resources. The planning activity applies to all skills, equipment and building materials. Planning has to be dynamic, to respond to changing external conditions and other deviations.

On-site Control Centre

A mobile/transportable control centre on the project site will provide support for real-time communication with the off-site control centre and with other participants in the project via advanced communications links which may be established for the duration of the project.

The communications facilities will include:

- facilities for conferencing with designers and technical and project management
- multimedia access to the data bases containing the technical and planning data for the project, including 3D CAD models
- access to experts where specialised advice is required to clarify requirements or to address problems; such consultations may involve the transmission of images from particular regions of the construction site
- multimedia electronic mail.

The control centre will also include appropriate local workplace IT tools for:

- local planning, control and reporting

- site administration

- control of on-site building processes, including control of quality, eg use of the right materials and conformance to required construction practices.

Instruments may be used for control, monitoring and surveillance. The on-site centre would control the camera and other monitoring devices to check the state of construction and resources. The centre would register and record the resulting 2D or 3D images, data and sound. Monitoring and surveillance could be used to check continuously for process control, security and special events. Remotely controlled monitors may be used to access dangerous and inaccessible locations. Data from on-site monitors can be transmitted to the off-site control centre for special examination and analysis.

Objectives

These are stated for all Part III Advanced Communications Experiments in task TA.300. Specific objectives for this task are to establish facilities for building and construction project management using broadband communication facilities between the construction site and the offices of the various project participants.

Technical Approach

- Commercial and economical analysis of the use of advanced communications facilities to provide support to building and construction project management.

- Definition of required functions and elements.

- Identification of advanced communications network requirements.

- Special technical aspects are:

  - 3D image presentation and registration

  - monitoring facilities

  - transportable/mobile workplace and communication facilities.

Key Results and Milestones

Results required from all Part III Advanced Communications Experiments are defined in task TA.300. Specific results required from this task are:

1 Report on the opportunities for advanced communications applications in building and construction project management.

2 Definition of the required characteristics and the technical facilities required to support them.

3 Establishment and operation of experiment.

4 Measurement of performance, usage and other important parameters.

5 Report on the results and conclusions of the experiment.

TA.302 Marketing General Task

Background

General background for all application experiments is given in TA.300.

Marketing will increase in importance as a business function. New and expanding markets provide opportunities to enlarge business volume and increase market share. A key requirement is to get the right information in the right place at the right time. Whilst much information exists, it is often in a format that makes information exchange very difficult and not easily assimilated. Such information is often in mixed media format, eg image, data and text. Also many companies may require the backup of technical and market experts to supplement their in-house marketing expertise.

The use of advanced communications to provide information from distributed multimedia data bases and to enable remote access to technical, marketing and financial expertise will enhance existing services as well as providing additional new services. Due to the pace of development of new services and products, there is a growing need for the close interworking of marketing, RD&E and operations at all stages of the development process. This growing demand for integration could be satisfied by advanced communications in ways previously not possible.

Objectives

These are stated for all Part III Advanced Communications Experiments in task TA.300.

Technical Approach

The approach will be to establish a working advanced communications installation, integrating new facilities as much as possible into the existing methods of working. The approach will involve one or more Generic Applications in the marketing function, for example:

Interpersonal Communications

Direct interpersonal communication has an important application in the marketing function, for example video telephony and video conferencing used to support the links between marketing personnel both within organisations and between organisations.

Remote Delivery of Expertise

There will frequently be a need within this function for consultation with remote experts, for example when opening up new markets, entering new territories or for analysis of market trends.

Multimedia Interpersonal Messaging

Interpersonal messaging is of particular value when dealing with differences in time zone, or differences in working patterns as a matter of national culture. In the marketing function, the ability to extend such messaging to involve a variety of media is of particular value.

Multimedia Information Assembly, Access and Distribution

Apart from the interpersonal aspects, marketing is heavily dependent on survey and analytical techniques relying on data sources both inside and outside the company in question. This involves survey organisation and preparation followed by information assembly from a variety of sources, and in a variety of formats, both for onwards distribution and for further processing or analysis.

Distributed Collaborative Design

The marketing function may be extensively involved in the definition and realisation of promotional material that defines the positioning of products in markets. This process is heavily dependent on visual material, for example in the form of brochures, the design of which is the product of an iterative process, frequently involving outside agencies. In addition, the design of products themselves is frequently the subject of value judgements or decisions by the marketing function.

Whilst the above Generic Applications are considered to be the ones of major importance to the marketing function, the relevance of others may become clear after further study.

Examples of application experiments in the marketing function are given in tasks TA.302A and TA.302B. See also task TA.321C.

Key Results and Milestones

Results required from all Part III Advanced Communications Experiments are defined in task TA.300.

TA.302A Targeted Advertising Delivery and Billing

Background

General background for all application experiments is given in TA.300. General background for all marketing experiments is given in TA.302. See also media, publishing and culture background in TA.322.

The electronic delivery of information to individuals and groups permits a more highly targeted form of advertising than is currently available. At present advertisers may target their audience only at a relatively aggregated level, via paper publications, or by attachment to TV programmes that the target consumers may be viewing.

The benefits of targeting are apparent to both advertiser and consumer, the advertiser does not pay for 'redundant' readers and the consumer receives advertising messages only about those products or services in which he has expressed interest. A particular benefit of targeting in an advanced communications environment is that the payments system for advertising can be closely related to the effectiveness of the message as measured by the reaction of the receiver.

The scenario could be as follows. An advertiser wants to advertise his product to all IBC subscribers whose 'interest profile' includes model railways. His multimedia advertising message is created for him by an advertising agency which then can send the material directly to target consumers and/or associate the material in the database belonging to the model railway publisher. The advertiser pays a certain amount for this service, but in addition will pay for user accesses to his material on a scale determined by what users actually do with the material, eg a one-minute access is more valuable than a five-second access, and an immediate order for 200 of the product is more valuable still.

Objectives

These are stated for all Part III Advanced Communications Experiments in task TA.300. Specific objectives for this task are:

- to establish a targeted advertising delivery and billing system
- to develop an understanding of the advertisement billing system required for IBC
- to define a 'subscriber action' measurement and data collection system
- to establish 'user interest' declaration mechanism - under user control
- to measure the cost-effectiveness of multimedia targeted advertising.

Technical Approach

The likely participants are a multi-country advertising agency, a number of independent designers, a broadly-based publishing group, and a number of concentrated subject-defined user communities.

Other elements in the technical approach are:

- consultative definition of technical parameters
- use of multimedia creative workstation

- definition of user terminal requirements

- identification and resolution of confidentiality issues

- resolution of subscriber ownership issues (ie do the subscriber lists belong to the publisher, or because of user-declaration to anyone with use of the network?).

Key Results and Milestones

Results required from all Part III Advanced Communications Experiments are defined in task TA.300. Specific results required from this task are:

1 Completion of billing system.

2 Report on effectiveness of advertising.

3 Completion of system for subscriber-action measurement.

TA.302B Marketing and Sales Optioneering and Product Specification

Background

General background for all application experiments is given in TA.300. General background for all marketing experiments is given in TA.302. See also manufacturing and general industry background in TA.332.

The sale of complex engineered products has always been a lengthy process fraught with opportunities for technical misunderstanding, misinterpretation and error.

At the customer's premises, the technical representative does not have access to his organisation's technical, commercial and manufacturing data bases. Consequently, the process to reach an agreed technical specification and subsequent commercial proposal is extended with repeated technical submissions until the customer and sales person agree that the customer's perceived requirements have been matched.

Often a considerable amount of 'second guessing' takes place, which can mean that the subsequent 'real' design is at variance with the proposal, causing problems in performance, physical envelope, cost or delivery.

The opportunity for the sales person and customer jointly to 'optioneer' the technical proposal in face-to-face meetings would permit on the spot development of a user technical specification and engineering proposal. This would be an agreed accurate reflection of user requirements.

However, to achieve this goal, the sales person needs instant access to his organisation's technical, commercial and manufacturing data base. For anything other than the simplest of products, it is unlikely that the sales person could have all of the information in a portable system.

Using advanced communications, the sales person would access a specially prepared engineering and product data base which would provide him with high quality images and graphics building blocks. He would assemble these into a unique product specification model. The model would then be manipulated and optioneered in interaction with the customer until the optimum configuration was achieved.

Also using advanced communications, there would be the opportunity to call on expert human assistance via a conferencing facility.

The proposal would be completed using advanced communications with up-to-date commercial and delivery information from the commercial and manufacturing data bases.

Objectives

These are stated for all Part III Advanced Communications Experiments in task TA.300. Specific objectives for this task are:

- to demonstrate the commercial validity of using advanced communications to support sales of complex engineered products
- to demonstrate the technical feasibility of remote optioneering, specification and proposal preparation at the customer's premises
- to demonstrate the potential commercial benefits that using advanced communications will bring

- to investigate user acceptability
- to identify the interactions and data base structures necessary to support remote access to engineering, commercial and manufacturing data.

Technical Approach

The project should include the participation of component and parts manufacturers and their customers.

Approach:

- Establish experiment programme design guidelines.
- Investigate technical feasibility, define data base structures, transaction interfaces, and required equipment.
- Identify users.
- Design the programme for the experiment; assess technical and commercial risks.
- Implement and assess results.

Key Results and Milestones

Results required from all Part III Advanced Communications Experiments are defined in task TA.300. Specific results required from this task are:

1 Sized and agreed technical and commercial benefits

2 Agreed guidelines for experiment specification

3 Experiment specification

4 Experiment user specification

5 Implementation plan, including budget, timescale and resources

6 Selection of experiment users

7 Implementation of experiment and results feedback

8 Assessment of technical/commercial validity, risks and commercial potential

9 Assessment of user acceptability

10 Assessment of developments required to product a commercially acceptable system.

TA.303 Purchasing General Task

Background

General background for all application experiments is given in TA.300.

The purchasing function will need to adapt to the opportunities afforded by a wider market for materials, finished components, etc. Knowledge of the goods available on the market depends on the free availability of information covering all aspects of their specification. This requires international access to catalogue files. In selecting goods, a face to face dialogue with sales people or technical experts may often be necessary.

The tendency within large business organisations to decentralise purchasing units to enable speedy purchasing agreements brings with it a need for an effective information flow, so that the smaller purchasing units can take advantage of the purchasing power of the overall business.

Advanced communications can support the purchasing function by providing direct and indirect multimedia communications facilities, access to multimedia data bases, and by providing a 'telemarket' for a range of goods and services, together with pricing flexibility for time-critical goods and services.

Objectives

These are stated for all Part III Advanced Communications Experiments in task TA.300.

Technical Approach

The approach will be to establish a working advanced communications installation, integrating new facilities as much as possible into the existing methods of working. The approach will involve one or more Generic Applications in the purchasing function, for example:

Interpersonal Communications

The purchasing function relies extensively on business relationships built up between individuals in purchasing and supplying relationships. IBC based interpersonal communication could thus have an important application in this function, particularly the use of video telephony and conferencing between purchaser and supplier supporting, for example, just-in-place and just-in-time delivery regimes.

Telemarketplace

The prime role of the purchasing function is to maintain the flow of materials to the rest of the organisation, typically in response to purchasing schedules driven variously by sales forecast or by MRP (depending on the position of the organisation in the distribution chain - manufacturing vs wholesale vs retail). The advanced communications telemarketplace would allow accurate and current information concerning supply, price, availability and continuity of supply to be obtained. In addition the system should facilitate the deal-making function by providing appropriate communications packages, with constant updating where necessary.

Multimedia Interpersonal Messaging

As a function dependent on interpersonal communications, messaging will play a role that is complementary to that of real-time communications in supporting links between supplier and customer.

Multimedia Information Assembly, Access and Distribution

As part of the activity, access to databases of multimedia information will be required, in some cases as a replacement of catalogues or equivalent "availability listings" or sales material. This may be a stage in advance of the interpersonal part of transaction building.

Whilst the above Generic Applications are considered to be the ones of major importance to the purchasing function, the relevance of others may become clear after further study.

Examples of application experiments in the purchasing function are given in tasks TA.303A and TA.303B.

Key Results and Milestones

Results required from all Part III Advanced Communications Experiments are defined in task TA.300.

TA.303A Remote Inspection for Quality Control and Purchase

Background

General background for all application experiments is given in TA.300. General background for all purchasing experiments is given in TA.303.

This task will experiment with the use of remote inspection techniques for quality control - remote inspection by the purchaser of the quality of the purchased goods and their delivery.

More and more industrial goods are being purchased sight unseen. There is a growing desire by the purchaser to inspect these goods and verify their quality before signing the contract, and to observe remotely their delivery.

Objective

These are stated for all Part III Advanced Communications Experiments in task TA.300. The specific objective of this task is to test broadband links for the purpose of controlling the quality of goods to be purchased, and monitoring their delivery.

Technical Approach

The project could include the participation of electronic manufacturers, shipping companies, shipbuilders.

Approach:

- Identify goods and define associated quality parameters to be assessed and transmitted, using multimedia vehicles via broadband links, to locations of purchasers.
- Identify customers willing to cooperate in the experiment.
- Devise a test plan.
- Use these broadband multimedia transmissions as an add-on during the purchase and delivery processes.
- Assess their utility and recommend further action.

Key Results and Milestones

Results required from all Part III Advanced Communications Experiments are defined in task TA.300. Specific results required from this task are:

1 Report on the opportunities for advanced communications applications in remote inspection in manufacturing.

2 Definition of the common characteristics and the technical facilities required to support them.

3 Establishment and operation of experiment.

4 Measurement of performance, usage and other important parameters.

5 Report on the results and conclusions of the experiment.

TA.303B Product Selection by Store Buyer

Background

General background for all application experiments is given in TA.300. General background for all purchasing experiments is given in TA.303. See also retail and distribution background in TA.323.

A store buyer in a large store or large group of stores will have an almost unlimited choice of products from which to select. The ability to step outside a well-established group of contacts or geographic trading zone is not easily facilitated. The dismantling of trade barriers by the establishment of the Single Market will be highly significant but buyers and sellers of wholesale goods will also need improved means of communicating what products are wanted and what are available.

In an advanced communications environment it will be possible to redefine the 'market place' by the introduction of electronic catalogues containing textual, voice and image information accessible from a pan-European IBC.

Objectives

These are stated for all Part III Advanced Communications Experiments in task TA.300. Specific objectives for this task are to create an electronic marketplace, involving manufacturers, wholesalers and retailers, where a critically representative set of products can be traded. The experiment will examine the added-value potential of multimedia information, enabling sellers to promote products to a larger market and buyers to search for the right product at the right price.

Technical Approach

- Investigate and identify distribution enterprises' needs; establish requirement for computer-aided electronic catalogue show on IBC network services.
- Develop supplier information creation and input tools.
- Define salespoint access to the host system.
- Develop and implement the host application.
- Investigate 'narrowcast' despatching of electronic catalogues.

Key Results and Milestones

Results required from all Part III Advanced Communications Experiments are defined in task TA.300. Specific results required from this task are:

1. Report on the opportunities for advanced communications applications in this market sector.
2. Definition of the common characteristics and the technical facilities required to support them.
3. Establishment and operation of experiment.

4. Measurement of performance, usage and other important parameters.

5. Report on the results and conclusions of the experiment.

6 Proposal for communication standards for electronic catalogue distribution.

TA.304 Sales General Task

Background

General background for all application experiments is given in TA.300.

The dismantling of trade barriers will enlarge areas of distribution but also increase competition. Whilst this will lead to new opportunities for product introduction it will also bring a need for more rapid communication, greater efficiency and increased quality in the sales process.

Advanced communications will enable products to be offered to a wider market via telemarketing systems, eg homeshopping, electronic catalogue, in-store and wholesale systems. More structured communication with the client will be possible, including personal contact (image) and validation. It will be easier to derive the administrative data from the sales process and to simplify the flow of ordering and customising information from the customer to operations/production.

Objectives

These are stated for all Part III Advanced Communications Experiments in task TA.300.

Technical Approach

The approach will be to establish a working advanced communications installation, integrating new facilities as much as possible into the existing methods of working. The approach will involve one or more Generic Applications in the sales function, for example:

Telemarketplace

Of particular relevance to the sales function is the telemarketplace Generic Application. This use of advanced communications may create radically new and efficient ways of taking products to markets. A number of examples already exist of markets which *only exist in the telecommunications domain*. The capacity for telepresence of both objects and people that advanced communications will bring will broaden the scope for the creation of telemarkets enormously.

Entertainment/Leisure Distribution

In addition to the media uses of this Generic Application, distribution to the residential sector will provide a new mechanism for sales. The opportunity will also exist for new products to be sold over the network, or for existing products (eg films, videos) to be distributed by new channels with increased levels of user selectivity.

Multimedia Interpersonal Messaging

The sales function is heavily dependent on real-time and non-real-time interpersonal communication. Multimedia messaging will be of particular utility, enhancing feedback and enabling 'fine tuning'.

Interpersonal Communications

Direct interpersonal communication could have an important application in the sales function, for example video telephony between supplier and customer, or video conferencing to support the provision of services by salesmen to their customers.

Multimedia Information Assembly, Access and Distribution

Apart from the interpersonal component, a major factor in maintaining a healthy enterprise is the ability to maintain accurate sales data, allowing a picture to be maintained of the state of the market, customers, trends, problems, opportunities, etc. This Generic Application will facilitate the data picture, with enriched and time-critical information.

Whilst the above Generic Applications are considered to be the ones of major importance to this function, the relevance of others may become clear after further study.

Examples of application experiments in the sales function are given in tasks TA.304A to TA.304D. See also tasks TA.321C, TA.323A, TA.327D, TA.327F and TA.331B.

Key Results and Milestones

Results required from all Part III Advanced Communications Experiments are defined in task TA.300.

TA.304A Tele-Auction Support

Background

General background for all application experiments is given in TA.300. General background for all sales experiments is given in TA.304.

Fine art auctions are currently held in only a small number of centres throughout the world. A recent innovation has been tele-auctions where the physical auction centre, say London, is linked with New York or Tokyo or Frankfurt. The motivation behind tele-auction is the desire to sell to the widest possible market so realising the best price.

The current tele-auction system is based on ad hoc video links. It is delivered in the form of a video display at the bidder's (remote) end, firstly of the object for sale and subsequently of the auctioneer conducting the sale. The remote bidders are also in an auction room and their bids are passed to the sale auctioneer via another auctioneer at the remote site. This process inevitably slows down the conduct of the auction. It would be difficult to manage any further expansion of this type of remote auction due to the inability of the system to manage greater complexity.

The advanced communications tele-Auction could cope with much greater complexity, and thus further widen the market by increasing the number of tele-auction locations, increasing the number of participants, and hence the likelihood that good prices will be achieved . In addition the tele-auction environment might be designed to incorporate more advanced forms of imaging such as holography.

Objectives

These are stated for all Part III Advanced Communications Experiments in task TA.300. Specific objectives for this task are to experiment with a tele-auction environment enabling:

- a large number of sites to participate
- the auctioneer to maintain close real-time control over the process
- the remote participants to feel as if they are physically present at the auction, and to make bids directly
- all tele-auction locations to access the auction catalogue.

Technical Approach

Likely participants in the experiment are fine art auctioneers, art dealers, and collectors from a number of countries.

Approach:

- Produce a system whereby the auctioneer can accept and acknowledge bids in real time from both local and remote participants. The system should give the auctioneer instant identification of the bidder, and should keep the current highest bidder informed of the fact that the bid is with him, and the other bidders informed of the level of the current highest bid.
- All participants should have real-time audio-visual information as to the progress of the auction.

- Produce a multimedia cataloguing system for catalogue creation and access. At the time of auction information on the objects, such as contract of sale, should be available to participants.

- Investigate the practicalities of using holographic images for 3-dimensional objects.

Key Results and Milestones

Results required from all Part III Advanced Communications Experiments are defined in task TA.300. Specific results required from this task are:

1 Participants identified

2 Hardware, software and network specified and identified.

3 System installed and working

4 Assess cost-effectiveness of multisite tele-auction

 - for auctioneers

 - for sellers

 - for bidders.

TA.304B Electronic Catalogue Showroom

Background

General background for all application experiments is given in TA.300. General background for all sales experiments is given in TA.304. See also retail and distribution background in TA.323.

There are currently interactive information systems that allow customers to get information on various products. The dialogue is directed by customers through an input device, the answer comes as text, voice and images. Such machines are installed in ordinary shops (specialised stores, travel agencies, etc) but some stores have been created using exclusively these machines. In such a store, no actual product is shown any more, thus reducing operating costs (staff, surfaces, products, etc). This organisation is well suited for specialised stores in medium-sized towns (TV/HI-FI for instance).

However, those machines are operated through preformatted physical supports such as magnetic disks and videodisks. Storing this information on host computers and accessing it through advanced communications networks will have several advantages:

- reduced cost of updating the information (adding or deleting products, availability, prices, etc)
- reduced cost of access machine (no more disk or video disk devices)
- multilingual capability.

These advantages will considerably help retailers and distributors to sell their products widely across the Community.

Such a distribution scheme would also allow retailers to sell different categories of goods in the same showroom. This would be achieved by connecting the host computer of the company operating the store (eg TV/HI-FI) to the hosts of other distributors (eg travel agencies), via the IBC network.

Objective

These are stated for all Part III Advanced Communications Experiments in task TA.300. Specific objectives for this task are to establish 'electronic catalogue show rooms', for several categories of goods and services.

Technical Approach

The project will require the cooperation of at least a retailer and/or professional of the goods and services distributed. They might be for instance a specialised store and a tour operator or a travel agency.

The best results would be obtained if stores are implemented in several towns located in different countries, in order to test the transborder trade aspect of the project. Also, machines could be installed in fully automated stores (purely electronic catalogue showrooms) or in traditional stores, to extend the range of products.

The customer will conduct a completely interactive dialogue with the service, including text, audio, still images and video-clips. The machines should also be able to capture delivery instructions and payment.

The development will require expertise in:

- advanced communications network operation
- retail and distribution
- audiovisual communication
- systems engineering.

Emphasis should be put on preliminary work, mainly in the areas of:

- overall architecture
- definition of 'interactive selling machine'
- security requirements
- advanced communications network services requirements
- functional requirements of retailers and product marketing.

Work will be required in three main areas:

- definition of an 'interactive selling machine' using existing advanced communications network services and accepting payments through existing credit or debit cards
- development of at least one host application, including text and image management, advanced communications network services interfaces, store machine protocol support, and text, voice and image distribution through the advanced communications network
- development of inter-host communications to enable the same store to be used by different retailers or distributors.

Key Results and Milestones

Results required from all Part III Advanced Communications Experiments are defined in task TA.300. Specific results required from this task are:

1. Report on the opportunities for advanced communications applications in electronic catalogue showrooms.
2. Definition of the common characteristics and the technical facilities required to support them.
3. Establishment and operation of experiment.
4. Measurement of performance, usage and other important parameters.
5. Report on the results and conclusions of the experiment, including assessment of the economic implications and wider relevance of electronic catalogue showrooms.
6. Proposals for communication standards for the sector.

TA.304C Pre-sale, Product Knowledge and Campaign Positioning Training

Background

General background for all application experiments is given in TA.300. General background for all sales experiments is given in TA.304. See also retail and distribution background in TA.323.

High staff turnover and shortening product lifetimes present problems for retailers in keeping their staff up to date on sales procedures and techniques, and on technical and marketing information on their range of products. Many retailers also have the need to inform staff about new seasonal collections and special campaigns and promotions and this information has to be updated as changes are introduced.

The visual nature of much of the material to be presented means that it can only be distributed on videodisk or via the broadband transmission facilities of IBC. Advanced communications obviously enables a more flexible response to fluctuating trade positions and other changes.

Objective

These are stated for all Part III Advanced Communications Experiments in task TA.300. Specific objectives for this task are:

- to develop and implement a computer-aided workplace training system based on advanced communications for the retail and distribution sector
- to establish the requirements for computer-aided training over advanced communications network services
- to evaluate the merits and disadvantages of delivering training information by advanced communications compared with other methods such as video disc.

Technical Approach

Participants in this experiment could include large retail chains, product suppliers and training organisations.

Approach:

- Identification of the needs of distribution enterprises for training at the workplace.
- Research and definition of the required audio-visual needs.
- Identification of required advanced communications network services.

Key Results and Milestones

Results required from all Part III Advanced Communications Experiments are defined in task TA.300. Specific results required from this task are:

1 Report on the opportunities for advanced communications applications in workplace training for the retail and distribution sector.

2 Definition of the common characteristics and the technical facilities required to support them.

3 Establishment and operation of experiment.

4 Measurement of performance, usage and other important parameters.

5 Report on the results and conclusions of the experiment.

TA.304D Electronic Trading Post

Background

General background for all application experiments is given in TA.300. General background for all sales experiments is given in TA.304.

Throughout Europe there exist regions between which there are considerable areas of mutual interest from the viewpoint of creating trading partnerships. An example might be the high-tech industry near Grenoble and the high-tech industry of the Thames valley. Equally, an advanced communications experiment might build upon the existing social and commercial ties of twin towns.

Such areas could be linked to each other through a high bandwidth network terminating in Electronic Trading Posts. Such posts would allow for the reception/display of voice, electronic, image and video data and provide facilities for the advertisement, processing and completion of trading deals.

Objective

These are stated for all Part III Advanced Communications Experiments in task TA.300. Specific objectives for this task are:

- to demonstrate the usefulness of advanced communications in stimulating trade and the interconnection of specialised and complementary European regions
- to demonstrate the utility of special advanced communications terminal equipment by first using it in an electronic trading post
- to act as a testbed for the establishment of European electronic trading posts in other continents.

Technical Approach

The primary actors would be two or more specific regions in Europe linked by strong commercial or trading interests. Such regions may also be areas of high pre-IBC interconnectivity, eg Berlin, Biarritz. Secondary actors would be chambers of commerce, local manufacturers, traders, banks and manufacturers of terminal equipment.

Equally the participating regions might be in geographically peripheral locations where use of advanced communications in future could assist the socio/political objective of demarginalising the economies of disadvantaged/outlying regions.

Key Results and Milestones

Results required from all Part III Advanced Communications Experiments are defined in task TA.300. Specific results required from this task are:

1 Measure the volume of trade generated between the participating regions.

2 Assess from the results whether advanced communications might act as an instrument of European regional policy by giving outlying regions an 'infrastructure-pull' advantage in the location decisions of footloose information industries.

3 Establishment and operation of one or more experiments.

4 Measurement of performance, usage and other important parameters.

5 Report on the results and conclusions of the experiments.

TA.305 Transport/Distribution General Task

Background

General background for all application experiments is given in TA.300.

Customer requirements will become more demanding, eg in terms of faster and just-in-time delivery. The planning and operational processes will need substantial improvement and will frequently involve contributions by several different people or groups at different locations who will need to share up-to-date information. Potential customers will need better delivery schedule and tariff information prior to entering commitments.

There will be pressures to increase efficiency and reduce costs by, for example:

- selecting the best means of transport based on time/quality/cost and flexibility considerations
- effective administration/recording of transported and 'lost' goods, schedule contingencies, changes, rerouting, etc
- optimising available transportation with goods distribution needs.

Advanced communications will support multi-user transport planning and administration by enabling wide area access to multimedia data bases and information service distribution and, where necessary, geographic information systems coupled with vehicle tracking.

Objectives

These are stated for all Part III Advanced Communications Experiments in task TA.300.

Technical Approach

The approach will be to establish a working advanced communications installation, integrating new facilities as much as possible into the existing methods of working. The approach will involve the use of one or more Generic Applications in the transport and distribution function, for example:

Remote Delivery of Expertise

This Generic Application could be useful in case of rerouting, breakdown or delays, or to cope with flexible just-in-time, just-in-place delivery; also for supplying distant customers with plans, schedules, information, etc.

Multimedia Interpersonal Messaging

Rerouting may take place en route and interpersonal messaging may relate to optimal road routing coupled with goods and services selection or operation requirements.

Multimedia Information Assembly, Access and Distribution

Transport management and distribution are increasingly demanding as this can become the key to competitive edge. The ability to assemble, access and distribute information on an on-line basis will greatly enhance planning, monitoring and operational functions.

Whilst the above Generic Applications are considered to be the ones of major importance to the transport and distribution function, the relevance of others may become clear after further study.

An example of an application experiment relevant to the transport/distribution function is given in task TA.327D.

Key Results and Milestones

Results required from all Part III Advanced Communications Experiments are defined in task TA.300.

TA.306 Finance/Accounts General Task

Background

General background for all application experiments is given in TA.300.

Efficient enterprises aim to monitor and control financial data, particularly that relating to key aspects of their operations. As enterprises become more international in character this becomes more complex. For example, stocks may be held in many different geographical locations and cash balances could be distributed among several bank accounts in a variety of currencies. Thus information to optimise cash resources, borrowing facilities and credit and exchange rate exposures must be consolidated.

Budgets and operating accounts from affiliates and subsidiaries also need regular consolidation, often with currency conversions. Divergences need explanations and there will often be the need for face-to-face discussions to clarify uncertainties, resolve problems and agree on remedial actions. As enterprises become more complex, with more affiliates and more people involved in the handling of accounts, opportunities for fraud become more common and security requirements become more stringent.

Advanced communications will provide access to distributed, multimedia data bases for the consolidation of accounts and for overall inventory and cash management amongst a number of geographically separated affiliates.

A high level of system and network security will be required in most cases.

Objectives

These are stated for all Part III Advanced Communications Experiments in task TA.300.

Technical Approach

The approach will be to establish a working advanced communications installation, integrating new facilities as much as possible into the existing methods of working. The approach will involve the use of one or more Generic Applications in the finance/accounts function, for example:

Interpersonal Communications

Video telephony and video conferencing facilities will enable face-to-face communication among the financial staff of distributed organisations and between the organisation's staff and its partners and advisors.

Remote Delivery of Expertise

With decentralised, widespread locations, consultation with remote experts on currency movements and markets, sources of credit, etc, could be important.

Multimedia Interpersonal Messaging

Information, graphics, charts, etc, could be conveyed, discussed and adapted using the multimedia messaging facilities of advanced communication channels.

Multimedia Information Assembly, Access and Distribution

Advanced communications will facilitate the assembly and analysis of financial data, as well as its presentation and distribution, by means of multimedia data bases.

Whilst the above Generic Applications are considered to be the ones of major importance to the finance/accounts function, the relevance of others may become clear after further study.

Key Results and Milestones

Results required from all Part III Advanced Communications Experiments are defined in task TA.300.

TA.307 Technical Support/Service General Task

Background

General background for all application experiments is given in TA.300.

Increasingly, enterprises' operations are dependent on the continuous functioning of technologically complex equipment. A fast and efficient repair service is required in the event of equipment malfunction. At the same time, increasing concern about the environment, coupled with legislation, often increases the criticality and complexity of technical support/service activities.

These demands, together with rapid technological development and increasingly specialised equipment, require well-trained and supported technical support personnel.

In addition, many organisations regard service delivered to their customers after the sale of either a product or service as a major source of business revenue. This aspect of the service activity is typically characterised by a scarcity of appropriately skilled staff who are suited to the function. Ability to use such skills at a distance or to provide support from a base or head office will help to alleviate the problem.

Advanced communications will address these issues by providing:

- rapid equipment malfunction reports from monitoring systems or human operators to in-house or external maintenance staff
- multimedia enquiry facilities for specialised information (eg environmental legislation)
- remote technical support expertise (especially for small companies).

Objectives

These are stated for all Part III Advanced Communications Experiments in task TA.300.

Technical Approach

The approach will be to establish a working advanced communications installation, integrating new facilities as much as possible into the existing methods of working. The approach will involve one or more Generic Applications in the technical support/service function, for example:

Distributed Case Handling

This Generic Application deals with the procedures involved in handling sets of multimedia documents between remotely-sited specialists. Such is often the case in a technical support area where equipment and service records are maintained for each installation and where many experts may need to be consulted about a particular customer's case.

Interpersonal Communications

Direct interpersonal communication could have an important application to this sector, in particular video conferencing.

Remote Delivery of Expertise

Within this function there will be a common need for consultation with remote experts. Examples of this would include the transmission of complex information on maintenance, diagnosis and repair, help with the use of new complex machinery, advice on plant operation or malfunction or technical advice on products.

Distributed Learning/Training

The availability of multimedia communications will significantly improve the possibilities of remote education and training which is vital for the technical support function in maintaining its workforce up-to-date with respect to new products and maintenance procedures and techniques. For example, as new machinery is developed and installed, it will be necessary to ensure that training can be made available to local personnel who will in the future have to undergo training in new technologies throughout their working lives.

Multimedia Interpersonal Messaging

Messaging between service personnel, suppliers, experts, service management and customers will be an important application in a function where shift working is common and personnel are frequently away from their bases.

Multimedia Information Assembly, Access and Distribution

Access to multimedia databases containing structured and unstructured combinations of text, graphic, audio and video information could be especially relevant to the technical support function. Such data bases could contain equipment operating and maintenance information and installation and service records .

Whilst the above Generic Applications are considered to be the ones of major importance to the technical support/service function, the relevance of others may become clear after further study.

Examples of application experiments in the technical support/service function are given in tasks TA.307A and TA.307B. See also task TA.327A.

Key Results and Milestones

Results required from all Part III Advanced Communications Experiments are defined in task TA.300.

TA.307A After Sales Service Support

Background

General background for all application experiments is given in TA.300. General background for all technical support/service experiments is given in TA.307. See also retail and distribution background in TA.323.

There is a trend towards centralised repair and maintenance of consumer goods as modularity increases and skills become scarce. The delivery of training and/or remote expertise could provide an opportunity to maintain a capability at, or close to, the point of sale. Maintenance and repair data can change very quickly, and the frequency of access to particular data is quite low. This makes the central storage of such information attractive.

The data necessary for maintenance and repair operations at the retailer could be stored on a host computer and accessed via the advanced communications network.

Objectives

These are stated for all Part III Advanced Communications Experiments in task TA.300. A specific objectives of this task is to determine the requirement of Computer Aided Maintenance on IBC Network Services.

Technical Approach

- Assess retailers' requirements; define data necessary for maintenance and repair operations at points of sale.
- Analyse requirements for management of manufacturers' technical data; establish communication with manufacturers' information management centres.
- Define sales point access to the host.
- Technical implementation.

Key Results and Milestones

Results required from all Part III Advanced Communications Experiments are defined in task TA.300. Specific results required from this task are:

1 Report on the opportunities for advanced communications applications in after-sales service support.

2 Definition of the common characteristics and the technical facilities required to support them.

3 Establishment and operation of experiment.

4 Measurement of performance, usage and other important parameters.

5 Report on the results and conclusions of the experiment.

TA.307B Transportable/Mobile Communication Unit for Repair and Maintenance

Background

General background for all application experiments is given in TA.300. General background for all technical support/service experiments is given in TA.307. See also utilities background in TA.329.

Within the utilities sector, many of the locations where equipment is located lack connections to communications facilities or even to the electricity supply. During maintenance and repair activities, communication is frequently necessary with headquarters, for planning information and reporting, with technical and operational data bases, with other parts of the distribution network, and with sources of specialised expertise.

This task describes the experimental application of a transportable/mobile communications unit to support the maintenance and repair activity.

The unit must be able to operate in standalone mode where no direct connection into the infrastructure is available, or alternatively in directly-connected mode.

The unit should provide a range of real-time and batch-oriented communication facilities, such as voice and video interpersonal communication, access to multimedia data bases, and multimedia messaging. It should also provide workplace IT facilities such as graphics, word processing, data base, and planning.

The communication unit facilities should be integrated with the technical facilities provided for maintenance and repair, ie monitoring, instrumentation and test. Arrangements should be made for the retention of test records, together with still and moving images, in the appropriate archives.

Objectives

These are stated for all Part III Advanced Communications Experiments in task TA.300. Specific objectives for this task are to provide transportable/mobile communication facilities connected to the IBC, supporting maintenance and repair operations for the utilities.

Technical Approach

- Analysis of functions and specification of the communications unit.
- Building of unit prototype.
- Investigation of infrastructure requirements.
- Commercial and economical analysis.

Key Results and Milestones

Results required from all Part III Advanced Communications Experiments are defined in task TA.300. Specific results required from this task are:

1 Specification of requirements.

2 Functional description of prototype.

3 Definition of infrastructure requirements and associated interfaces.

4 Experiment implementation.

5 Report on operational experience.

6 Commercial and economic analysis.

TA.308 MIS/Telecommunications General Task

Background

General background for all application experiments is given in TA.300.

Whilst information technology continues to develop extremely rapidly, users are becoming more knowledgable than hitherto. They are able to specify their requirements more fully and frequently impose exacting demands. Increasingly, users participate in information system development. The need for standardisation - in technology, in application definition and in development methods - is becoming more accepted.

In communications the need is for speed (including real-time), information integrity and security (privacy). Requirements for multimedia storage and distribution (text, data, voice and image) will steadily increase.

Advanced communications will enable access to multimedia data bases describing information technology trends, including up-to-date standards position. Advanced communications will also provide fast, multimedia communication facilities linking MIS and telecommunications staff to their internal customers.

In many large distributed organisations, MIS/telecommunications is one of the few functions that affects all parts of the business. As such, the needs of those responsible for the facilities within companies for telecommunications must be considered.

Objectives

These are stated for all Part III Advanced Communications Experiments in task TA.300.

Technical Approach

The approach will be to establish a working advanced communications installation, integrating new facilities as much as possible into the existing methods of working. The approach will involve one or more Generic Applications in the MIS/telecommunications function, for example:

Interpersonal Communications

MIS and Telecommunications staff are frequently distributed throughout the organisation. They are responsible for both internal and external facilities on which the day to day operation of the business depends. As such, they have a significant need for enhanced interpersonal communications, both within the function and to other functions.

Distributed Learning/Training

Both information systems, and increasingly telecommunications, present complex and powerful products to users. These products are changing rapidly, and are frequently under-utilised through the inability of users to adapt to (frequently poorly engineered from a human factors/cognitive ergonomics viewpoint) systems. Learning and training are thus of major importance. One example would be the provision of video communications based help desk facilities.

Remote Delivery of Expertise

Within this function there will be a common need for consultation with remote experts. Examples of this would include access to experts within organisations supplying computing and telecommunications systems concerning maintenance and front line trouble shooting or clarification of system functions and operation.

Whilst the above Generic Applications are considered to be the ones of major importance to the MIS/telecommunications function, the relevance of others may become clear after further study.

Key Results and Milestones

Results required from all Part III Advanced Communications Experiments are defined in task TA.300.

TA.309 Administration General Task

Background

General background for all application experiments is given in TA.300.

The skill shortages which are expected to develop over the next few years will accelerate a trend to accommodate a variety of work patterns. In particular, staff will often wish to avoid time-consuming and expensive commuting in crowded metropolitan areas or will be reluctant to relocate to other areas or countries where their skills may be in demand.

In large enterprises, regular reports have to be consolidated from contributions from the different functions, projects and operating units within the organisation, and from any joint ventures in which the enterprise may be involved. The deadlines for the successive reporting steps usually imply a high degree of urgency at each stage. Items from the reports are frequently reused to provide material for various purposes, including company annual reports and information for external financial analysts. Increasingly, these reports will become multimedia in character.

Advanced communications can support distributed working, in a variety of forms, by providing multimedia communication, data base and conferencing facilities. With this support, staff can work at home, at a local office of another part of the organisation, or at a multi-user work centre. Advanced communications can enable the assembly of regular and irregular internal and external reports by providing multimedia communications and access to distributed data bases.

Objectives

These are stated for all Part III Advanced Communications Experiments in task TA.300.

Technical Approach

The approach will be to establish a working advanced communications installation, integrating new facilities as much as possible into the existing methods of working. The approach will involve one or more Generic Applications in the administration function, for example:

Distributed Case Handling

Many administrative tasks require the circulation of documents for editing and comment by a range of different actors. Advanced communications will facilitate routing, management and checking.

Interpersonal Communications

Videotelephony and videoconferencing will facilitate communications for administrative purposes, simultaneously reducing travel needs from remote locations and reducing cost and inconvenience. This Generic Application will provide important support to distributed working.

Multimedia Interpersonal Messaging

Interpersonal communication is essential for effective administration. Messaging permits the use of a variety of media both real-time and non-real-time to improve document and information exchange. Messaging facilities are an essential adjunct to distributed working arrangements.

Multimedia Information Assembly, Access and Distribution

The maintenance of up-to-date and accurate records is a key activity in the administrative process. Advanced communications will enable multimedia records to be remotely compiled and accessed.

Whilst the above Generic Applications are considered to be the ones of major importance to the administration function, the relevance of others may become clear after further study.

Key Results and Milestones

Results required from all Part III Advanced Communications Experiments are defined in task TA.300.

TA.310 Business Planning General Task

Background

General background for all application experiments is given in TA.300.

Business activity is becoming increasingly complex and internationalised. Factors include developments in world trade, increasing product complexity, technology advances and the speed of change. At the same time the business process is becoming more complex with joint ventures, leasing, franchising and subcontracting playing increasing roles.

In this context the decision-making process must be improved at the same time as it is becoming more complex. More parties are involved in the process, and in the light of globalisation of many markets, decision makers are increasingly physically separated. Also communication problems due to language difficulties become more apparent. In addition, decision making will become more time critical and will have a larger impact; the right information is required in the right place at the right time.

For all these reasons, business planning is assuming a greater importance and will become a major instrument in the effort to secure increased market penetration, and to prepare current and future development strategies.

Advanced communications will enable decision-making processes to become more efficient by allowing collaborative decision-making between geographically separated groups of people. Collaborative meetings requiring no physical travel can be set up quickly and can be supported by the transmission of moving images, text and data, and by translation servers. This will enable effective decisions to be made between business enterprises in several different countries. Advanced communications will also enable the business planning process to become more efficient by facilitating the consolidation of information from different partners and affiliates to form coordinated business plans to which each party can have immediate access.

Objectives

These are stated for all Part III Advanced Communications Experiments in task TA.300.

Technical Approach

The approach will be to establish a working advanced communications installation, integrating new facilities as much as possible into the existing methods of working. The approach will involve one or more Generic Applications in the business planning function, for example:

Distributed Case Handling

This Generic Application will enable the circulation and processing of multimedia documents from remotely-sited specialists, eg financial, technical, marketing, and geographical data, in preparation for the planning phase.

Interpersonal Communications

Video telephony and videoconferencing will facilitate the necessary interactive exchanges on a bilateral or multilateral basis, such as integrating regional and technical projections into global plans, building consensus, etc.

Distributive Collaborative Decision Making

This Generic Application will provide multi-party distributed decision support, involving expertise from different levels and sectors of the organisation. Audio-visual conferencing coupled with multimedia information processing will provide support for, eg target setting and adjustment.

Multimedia Information Assembly, Access and Distribution

The preparation of business plans involves the assembly of complex information from different locations and functional departments. Summarising, extrapolating and distributing will be facilitated by advanced communications in this Generic Application.

Whilst the above Generic Applications are considered to be the ones of major importance to the business planning function, the relevance of others may become clear after further study.

Key Results and Milestones

Results required from all Part III Advanced Communications Experiments are defined in task TA.300.

TA.311 Design General Task

Background

General background for all application experiments is given in TA.300.

Design processes are important in a number of business sectors including manufacturing, building and construction, clothing and fashion, and media and publishing.

Many design processes are frequently associated with new technology, and are becoming more complex. The use of computer aids to design, including mechanical and functional modelling, is widespread. Frequently, a single design project will involve the collaboration of many designers in geographically separated locations. Design costs and design intervals often represent a large proportion of total costs and intervals, and although much of the design process is creative, the pressures for improved efficiency will increase.

The intermediate and final results of the design process have to be stored and distributed to the various users (other designers, production, operation and maintenance). These archives have to be maintained and updated with design changes. Increasingly these archives, and the associated communication facilities will become multimedia in character.

Designers need access to data on materials, components, reusable designs and production methods. In some industries (eg fashion) it is also important for the designer to be well-informed about up-to-date trends. Critically, the interpersonal processes between the individuals involved must be well supported.

Advanced communications will provide support to the design function by:

- enabling computer-based design models to be communicated between geographically separated designers
- providing access to multimedia distributed data bases (archives) for designs and models
- enabling access to experts to update knowledge of trends
- providing multimedia conference facilities to support collaborative design activities.

Objectives

These are stated for all Part III Advanced Communications Experiments in task TA.300.

Technical Approach

The approach will be to establish a working advanced communications installation, integrating new facilities as much as possible into the existing methods of working. The approach will involve one or more Generic Applications in the design function, for example:

Distributed Collaborative Design

This Generic Application focuses on multiple (and iterative) remote contributions to a design process, enabling an effective interaction between designers, each in their own offices, having access to all relevant information.

Interpersonal Communications

In a creative area such as design interpersonal communications are an inherent part of the creative process: videophone and videoconferencing would promote exchange and crystallisation of concepts.

Remote Delivery of Expertise

Remote locations involved in the design process would require access to specialised expertise, in order to tap skills in an interactive basis.

Multimedia Interpersonal Messaging

Multimedia messaging is important for coordinating and integrating during the design process inputs and constraints which may originate from for example technical or aesthetic areas.

Multimedia Information Assembly, Access and Distribution

Design developments and information from a variety of sources and with a range of different formats can be assembled for processing or for onwards distribution using this generic application.

Whilst the above Generic Applications are considered to be the ones of major importance to the design function, the relevance of others may become clear after further study.

An example of an application experiment in the design function is given in task TA.311A. See also task TA.331A.

Key Results and Milestones

Results required from all Part III Advanced Communications Experiments are defined in task TA.300.

TA.311A Collaborative Design

Background

General background for all application experiments is given in TA.300. General background for all design experiments is given in TA.311. See also manufacturing and general industry background in TA.326.

Cars, airplanes, buildings, turnkey factories, etc, are increasingly becoming international projects involving different companies widely distributed throughout Europe collaborating in individual design projects. At the same time the interaction of the different partner companies is of increasing importance throughout the project, starting in the early proposal phase. For this type of project, typically a prime contractor would select and coordinate partner contractors for the specific project in hand. High resolution computer aided design in an interactive mode of operation involving several widely distributed locations are required.

Objective

The objective of this experiment is to prove that broadband links connecting a multitude of large colour bitmap work stations widely distributed is conducive to collaborative and creative design work in the car, airplane, construction or any other industry.

Technical Approach

The project could include the participation of multinational industries, such as aerospace, automotive, marine engineering.

Approach:

- Identification of an actual case example of collaborative design project.
- Delineation of interactive design approach and the hardware/software required.
- Establishment of a trials plan.
- Execution of the collaborative design.
- Continuous improvement of the system architecture as shortcomings are detected or better equipment becomes available.
- Final trials.
- Evaluation and preparation of a resulting recommendation.

Key Results and Milestones

1 Report on the opportunities for advanced communications applications in collaborative design.

2 Definition of the common characteristics and the technical facilities required to support them.

3 Establishment and operation of experiment.

4 Measurement of performance, usage and other important parameters.

5 Report on the results and conclusions of the experiment.

TA.312 Human Resources/Organisation General Task

Background

General background for all application experiments is given in TA.300.

Changes in technology, the accelerating pace of change and its relationship to the competitive edge in the marketplace as well as the globalisation of competition are creating new demands for complex skills. At the same time the recruitment market for human resources is changing: with scarce resources it is increasingly important to address this international market to get the right person into the right job; and also to provide appropriate training/continuing education.

In most enterprises human skills are the most precious resource and in many companies the cost of human resources constitute the main element of total costs. It follows that the efficient administration of these resources represents a high priority in most organisations.

Advanced communications will assist the optimisation of the use of human resources by:

- providing support for personnel recruitment (telemarket)
- supporting distance learning/education
- supporting the administration of personnel distributed over several locations
- motivating staff, (eg special campaigns) via multimedia data bases.

Objectives

These are stated for all Part III Advanced Communications Experiments in task TA.300.

Technical Approach

The approach will be to establish a working advanced communications installation, integrating new facilities as much as possible into the existing methods of working. The approach will involve one or more Generic Applications in the human resources/organisation function, for example:

Distributed Case Handling

Personnel support can be provided by advanced communications with respect to presentation (multi-media), routing and checking of documents. This should lead to a more accurate and faster process.

Interpersonal Communications

Videotelephony and videoconferencing will facilitate interactive use of scarce human resources, by eliminating travel requirements and enabling a just in time, and just in place approach where needed.

Distributed Learning/Training

This is particularly relevant to the process of skills update and training; also to presentations on new products and services which are emerging.

Telemarketplace

This will facilitate the matching of skills to needs in the marketplace through the remote offering of skills or human resources in response to identified business needs.

Whilst the above Generic Applications are considered to be the ones of major importance to the human resources function, the relevance of others may become clear after further study.

Examples of application experiments in the human resources/organisation function are given in tasks TA.312A to TA.312H.

Key Results and Milestones

Results required from all Part III Advanced Communications Experiments are defined in task TA.300.

TA.312A Open Management Education

Background

General background for all application experiments is given in TA.300. General background for all human resources/organisation experiments is given in TA.312.

Delivery mechanisms for business education suffer from a number of limitations such as the need to take time off from the mainstream tasks and the logistics of assembling at specific fixed times for group activities.

The establishment of an experiment for management education could overcome these and other limitations while retaining the interpersonal interaction that is a critical part of much management education.

Objectives

These are stated for all Part III Advanced Communications Experiments in task TA.300. Specific objectives for this task are:

- to assess the potential of advanced communications as a management education environment
- to establish suitable teacher/student student/student interaction mechanisms for future advanced communications use
- to establish a number of multimedia interactive management exercises for future advanced communications use.

Technical Approach

Potential players in the experiment are an established business school and managers of one or more multinationals acting in the capacity of users.

The multinational(s) in question should ideally have already installed an international broadband network.

Approach:

- Develop a self-contained multimedia management training programme with inbuilt assessment and tutorial software.
- Provide course participants and tutors with multimedia terminals.
- Provide one-to-one and many-to-many conferencing.

Key Results and Milestones

Results required from all Part III Advanced Communications Experiments are defined in task TA.300. Specific results required from this task are:

1 Management Education Server defined.

2 Course material completed, 'How to write multimedia advanced communications course material' manual version 1 delivered.

3 Course effectiveness comparisons completed.

4 Measure attitudes of participants to the experience.

TA.312B Distributed Masterclass

Background

General background for all application experiments is given in TA.300. General background for all human resources/organisation experiments is given in TA.312.

The 'masterclass' concept is one whereby outstanding individuals in the performing arts share their experience and knowledge with up-and-coming performers in the same field.

The essential feature of this process is an educational one - the creative interaction between the 'master' and the 'pupils'. In addition, the masterclass is regarded as good education/entertainment for non-participants, so the advanced communications masterclass may be broadcast to a wider audience.

The masterclass idea has broader applications than the performing arts. The concept applies equally well to many other fields including science, business, and computer science. In its broader application the concept could be labelled a multipoint tele-seminar.

Objectives

These are stated for all Part III Advanced Communications Experiments in task TA.300. Specific objectives for this task are:

- to create a multipoint tele-seminar framework whereby a series of tele-masterclasses can be conducted
- to demonstrate the high quality tele-presence capabilities of advanced communications
- to demonstrate the logistic advantages of an advanced communications environment for the organisation of masterclasses.

Technical Approach

Provision of a multipoint teleconferencing system capable of substituting for a face-to-face masterclass or intensive seminar.

The prime 'performance' participants would be a 'master' in the performing arts and a distributed set of students. Experiment participants would be music teaching institutes, and possibly TV programme makers.

Key Results and Milestones

Results required from all Part III Advanced Communications Experiments are defined in task TA.300. Specific results required from this task are:

1 Design and installation of multipoint teleseminar system.

2 Measure the benefits advanced communications might have for conducting masterclasses and tele-seminars.

TA.312C On-the-Job Training for Manufacturing

Background

General background for all application experiments is given in TA.300. General background for all human resources/organisation experiments is given in TA.312. See also manufacturing and general industry background in TA.326.

This task addresses interactive continuing education and special training of employees located in widely distributed areas.

Servicemen, operators, clerks, everybody needs continuously to be introduced to new systems, techniques, algorithms, procedures, standards, regulatory ramifications, etc.

Generally, a live demonstration and interactive multimedia instruction is preferable to the use of printed manuals. To bring these employees to training centres is, however, expensive.

Objective

These are stated for all Part III Advanced Communications Experiments in task TA.300. The specific objective of this task is to demonstrate the usefulness of broadband links to conduct interactive multimedia teaching and training conferences to multipoint locations, thus making fullest use of the teaching and instructing personnel, and at the same time attain highest 'user acceptance', ie the employee's attention.

Technical Approach

The project could include the participation of car manufacturers, large electronic manufacturers, universities for didactical research results, etc.

Approach:

- Definition of a specific application, preferably spanning several languages.
- Assessment of the media required and enumeration of the associated equipment, including translation and interpretation services.
- Consideration of transportability of such equipment.
- Establishment of a trials plan, taking into account the provision of live translation into several languages and including schemes to investigate trainees' responses.
- Conducting of teaching and training programmes.
- Evolutionary improvement as shortcomings are identified.
- Final evaluation and recommendation.

Key Results and Milestones

Results required from all Part III Advanced Communications Experiments are defined in task TA.300. Specific results required from this task are:

1 Report on the opportunities for advanced communications applications in training in manufacturing.

2 Definition of the common characteristics and the technical facilities required to support them.

3 Establishment and operation of experiment.

4 Measurement of performance, usage and other important parameters.

5 Report on the results and conclusions of the experiment.

TA.312D Multi-Media Maintenance and Training Manual

Background

General background for all application experiments is given in TA.300. General background for all human resources/organisation experiments is given in TA.312. See also manufacturing and general industry background in TA.326 and transport, travel and tourism background in TA.327.

Aircraft manufacturers update aircraft maintenance manuals on a continuous basis. The updates take the form of detailed technical drawings and associated information. These are physically distributed to all authorised maintainers (often the airlines themselves) of the aircraft model in question. The maintainers must then physically integrate the changes into the relevant manuals, and assimilate the changes next time they come to perform the relevant maintenance tasks.

Advanced communications can simplify this laborious update process and at the same time make the maintenance process more effective and accountable.

The routine maintenance scenario under advanced communications might look like this:

- Multi-media updates (high resolution graphics, still pictures, moving pictures, and voice instructions) are made to the manual located on the manufacturer's computer.

- When the maintainer next conducts routine maintenance he does so in company with his advanced communications multimedia terminal.

- The terminal assists him throughout the process using appropriate presentation interfaces, and additionally accepts user input from the maintainer. This input can take a number of forms such as voice acknowledgment of completed tasks, confirmation of aircraft identifications, and comments directed at the manufacturer.

- The essential elements of this maintenance dialogue are updated to the aircraft records held by the maker, and may also be stored by the terminal for maintainer archive.

Objectives

These are stated for all Part III Advanced Communications Experiments in task TA.300. Specific objectives for this task are:

- to demonstrate the utility and effectiveness of advanced communications in revolutionising high value aircraft maintenance procedures, with respect to:

  - more timely updates

  - better maintenance records

  - more accessible records

  - reduced maintenance time

  - reliable maintenance

- to discover the optimum mix of media in addressing such a task.

Technical Approach

The participants should be an aircraft manufacturer, an aircraft operator, and an aircraft maintenance company (perhaps the aircraft operator itself). The experiment should be restricted to only one type of aircraft.

The tasks are to create the multimedia maintenance manual, define and construct suitable user terminals (possible size constraints?).

Key Results and Milestones

Results required from all Part III Advanced Communications Experiments are defined in task TA.300. Specific results required from this task are:

1 Satisfactory terminal implementation.

2 Establishment of multimedia database.

3 Analysis of effectiveness, performance and cost savings.

TA.312E Training and Continuing Education in the Transport Sector

Background

General background for all application experiments is given in TA.300. General background for all human resources/organisation experiments is given in TA.312. See also manufacturing and general industry background in TA.326 and transport, travel and tourism background in TA.327.

This task addresses the establishment of advanced communication facilities at an educational centre for the transport sector. This centre should provide education services to remote users at a national as well as a European level. In the area of education/training related to *technical* maintenance and repair, education systems may be developed by an aircraft manufacturer and some airline operators. 'Just in time and Just in place' applies also to the educational and training systems of tomorrow. This implies that remote interactive education is a rapidly growing phenomenon.

Part of the task will also be to ensure that the facilities necessary to make use of such an offer can be provided at the location of the user of the educational services.

Objective

The general objectives of all Part III Advanced Communications Experiments are stated in task TA.300.

The specific objective of this experiment is to develop and test the necessary advanced communication services in relation to specific educational offers directed towards, eg transport buyers, truck drivers, counter personnel at airports and train stations, flight cabin personnel, etc.

The experiment must also identify the groups within the transport sector which may be potential users of such services. Common characteristics of these users are:

- They belong to a large group, who need the same basic education, so a critical mass can be obtained relatively easily.

- They understand one or more of the main European languages (English in air transport, French or German in road transport).

Concentration of transport education to a few common European education centres could result in more efficient use of resources, eg instructors, computer systems, etc, again resulting in less expenses for educating new personnel. It may also result in a higher quality education as well as a better communication and coordination between transport personnel across Europe.

The long-range objective is to concentrate educational resources into a few educational centres, which can be reached by a large number of participants, wherever they are located in Europe. In a longer term it may also be possible to export these services, ie to offer education to participants outside Europe.

Technical Approach

A trial of this character could be set up by an existing transport education centre together with organisations, eg hotels or tele-administrations having teleconference facilities. The trial can be based on existing technology as long as traditional teleconference facilities are needed. To obtain the critical mass (large number of participants) the trial must be initiated in a sector with a large number of users with the above mentioned characteristics. Involving one or more of the European railway organisations may be a good approach.

The telecommunication infrastructure could, in a first step, be established upon point-to-point high-speed links to selected locations, where participants are located. A second step could be to provide access to multimedia services, which require larger bandwidth. When multimedia services are introduced, this will pose additional requirements on the software and hardware used in the teleconference equipment, as well as the end user (participant) equipment. An example of an application which requires large bandwidth is terminal access to integrated dialogue systems with individual selection of video sequences recorded on centrally-located optical discs.

At a later stage in the trial it should be considered whether to provide access to the education services through switched network facilities, thereby enabling participants to access the teleconference facilities from varying locations. Some categories of participants may need access to these facilities from their home.

During the trial it should be analysed how important the need for interactive education is. Some education situations require a close dialogue between the student and the instructor. It may be very difficult to transfer these situations to an environment where student and instructor are located at each end of an electronic communication link. Other situations, eg conferences, mass education, etc can be handled by one-way video transmission. By providing one-way services with the possibility of individual selection of programmes, the participants may decide for themselves at what time of day they will make use of the services, thereby providing more flexibility in individual planning. It should though be noted that this type of service, as seen by the end user, is very similar to the possibilities available through video education programmes distributed on cassette. The critical factor is the need for very recent information, which necessitates cable or satellite transmission instead of physical transport of cassettes.

Key Results and Milestones

Results required from all Part III Advanced Communications Experiments are defined in task TA.300. Specific results required from this task are:

1 Report on the opportunities for remote training and education in the transport market sector.

2 Definition of the common characteristics and the technical facilities required to support them.

3 Establishment and operation of one or more experiments.

4 Report on the results and conclusions of the experiments.

TA.312F On the Job Training and Continuing Education in Healthcare

Background

General background for all application experiments is given in TA.300. General background for all human resources/organisation experiments is given in TA.312. See also healthcare background in TA.324.

This experiment will provide support for both medical personnel and patients in the use of complex bio-medical equipment. Other applications for training are for instance concerned with reactions to critical situations, on diets or on self-diagnosis.

Constraints are particularly harsh in the healthcare sector, as the transmitted knowledge has to be extremely reliable.

Objectives

These are stated for all Part III Advanced Communications Experiments in task TA.300. The specific objective of this task is to test advanced communications based training and on-line assistance in the medical context.

Technical Approach

An experiment should involve at least a hospital and a provider of bio-medical equipment.

Both automatic help and dialogue based on videotelephony with an operator should be included and integrated.

Key Results and Milestones

Results required from all Part III Advanced Communications Experiments are defined in task TA.300. Specific results required from this task are:

1 Report on the opportunities for advanced communications applications in education and training in the healthcare sector.

2 Definition of the common characteristics and the technical facilities required to support them.

3 Establishment and operation of experiment.

4 Measurement of performance, usage and other important parameters.

5 Report on the results and conclusions of the experiment.

TA.312G On-line Training in Agriculture

Background

General background for all application experiments is given in TA.300. General background for all human resources/organisation experiments is given in TA.312. See also agriculture background in TA.328.

Training aids are of particular interest to agricultural production, since there is a constant need, driven by market requirements, for the acquisition of new skills. Potential uses of training aids in the agricultural production could, for example, be:

- tutoring on cultivation of new crops, especially when switching from one product to another
- tutoring on standard as well as emergency procedures (eg animal/crop protection or diseases).

Objectives

These are stated for all Part III Advanced Communications Experiments in task TA.300. Specific objectives for this task are:

- to identify current practices and user requirements concerning advanced on-line training applications in the agricultural sector
- to identify the nature of advanced communications based on-line training applications for agriculture, as well as to determine the potential of these applications for wider exploitation.

Technical Approach

The implementation of an experiment in this area will mainly involve agricultural research institutes and experts, and farms/cooperatives on the user-trainee side. The experiment should be implemented in an environment characterised by a high level of telecommunications infrastructure development.

The survey of current practices and user needs will lead to the definition of the nature of the experiment and the identification of the implementation environment. The design and implementation stages will follow, with the aim of providing an interim service and assess its achievement and potential for exploitation.

Key Results and Milestones

Results required from all Part III Advanced Communications Experiments are defined in task TA.300. Specific results required from this task are:

1 Definition of user requirements.

2 Definition of quality of service requirements.

3 Specifications and design of the application experiment.

4 Implementation of experiment.

5 Assessment of achievement.

6 Assessment of exploitation feasibility.

TA.312H Corporate Culture and Procedural Training

Background

General background for all application experiments is given in TA.300. General background for all human resources/organisation experiments is given in TA.312.

Formal structures for training staff on such matters as company procedures, culture and philosophy are becoming an important corporate issue in a world where takeovers are increasing. The European company is already a fact of life and this trend can be expected to accelerate in the light of 1992 and beyond. This trend will present new challenges because the marriage of companies of different company culture will be complicated by cross-national cultural problems.

An attempt to rationalise procedures and methods across a number of operating entities within a group of companies is a natural corporate strategy for some types of business. In the packaged food and confectionery industry for example the same product can be manufactured and sold in many countries albeit with different packaging.

Objectives

These are stated for all Part III Advanced Communications Experiments in task TA.300. Specific objectives for this task are to demonstrate the advantages to be gained from providing procedural training and corporate culture briefing to the personnel of large pan-European organisations in the retail and distribution sector.

Technical Approach

The organisational implications must be fully analysed and understood.

The training package should make the best use of all types of presentation including video and should be multi-lingual.

A central data base should hold all training information and could also include for example the company magazine or newspaper.

Suitable terminals for input and access should be defined based on standard equipment.

Key Results and Milestones

Results required from all Part III Advanced Communications Experiments are defined in task TA.300. Specific results required from this task are:

1 Feedback on the potential of the system to improve workers performance, motivation and satisfaction.

2 An analysis of the implications of company wide implementation and impact for advanced communications.

3 Establishment and operation of experiment.

4 Measurement of performance, usage and other important parameters.

5 Report on the results and conclusions of the experiment.

Application Experiments Addressing Business Sectors

Banking, Finance and Insurance

TA.321 Banking, Finance and Insurance General Task

Background

General background for all application experiments is given in TA.300.

The banking, finance and insurance sector is currently in a period of dramatic change where markets are extending and the boundaries between areas of activity are shifting. In the future, one company may sell a whole range of banking, finance and insurance products, which increase the need for specialised expertise. Immediate and comprehensive access to remote experts will particularly be required in the insurance sector, where direct selling of standard products will change the role of the intermediary to that of selling complex or one-off items.

The importance of cross-company collaborative initiatives (is increasing. During the decision-making process, where time is of the essence, a large volume of information has to be communicated between the prospective parties to the deal and there is frequently a need for personal contact which can currently only be met by telephone communication.

Advanced communications can support this sector by providing the means of communicating a wide range of multimedia information, together with video telephone and conferencing facilities and access to remote experts.

In this sector, with information of a very high value being communicated, there is an urgent need for high standards of security and infallible user identification.

Objectives

These are stated for all Part III Advanced Communications Experiments in task TA.300.

Technical Approach

The approach will be to establish a working advanced communications installation, integrating new facilities as much as possible into the existing methods of working. The approach will involve one or more Generic Applications in the banking, finance and insurance sector, for example:

Distributed Case Handling

This Generic Application deals with the procedures involved in handling sets of multimedia documents between remotely-sited specialists as in the case of complex insurance quotations or claims.

Interpersonal Communications

Direct interpersonal communication could have an important application to this sector, for example video conferencing between bank branches or video telephony between bank employees, between employees and customers, or between dealers in dealing rooms.

Remote Delivery of Expertise

Within this sector there will be a common need for consultation between remote experts and clients or colleagues for example when a customer is being advised about investments or there is a complex matter under question which demands the interaction of a number of experts.

Distributive Collaborative Decision Making

This Generic Application deals with the process of complex decision-making between individuals who are remote from each other and have to refer to their own files or other complex data sources in the process of making decisions. Such a process could for example be involved in collaborative dealing.

Whilst the above Generic Applications are considered to be the ones of major importance to this business sector, the relevance of others may become clear after further study.

Examples of application experiments in the banking, finance and insurance sector are given in tasks TA.321A to TA.321E. See also task TA.327B.

Key Results and Milestones

Results required from all Part III Advanced Communications Experiments are defined in task TA.300.

TA.321A Personal Banking Services

Background

General background for all application experiments is given in TA.300. General background for all banking, finance and insurance experiments is given in TA.321.

The experiment implementation of a pan-European network for the delivery of personal banking and financial services is seen as a major opportunity to establish the advantages offered by advanced communications in the domestic environment, and to lead on to commercial exploitation. The large number of potential users in a future commercial system will place stringent data requirements on the IBCN, particularly at its interface with the central banking facilities from which such services will be provided.

The need for individuals to address personal banking needs during the normal working day (and thus from the *office* environment) should also be considered. Many large organisations facilitate this process by coming to arrangements with particular financial institutions to provide service to employees from within the employers site. This may provide fertile ground for an experiment requiring limited infrastructure, operating in a controlled environment.

The system will provide all common information and transaction services and will make extensive use of smart card technology. Close cooperation with projects in the retail sector may be expected and the system will be ideally suited for use by SMEs and domestic customers.

Objectives

These are stated for all Part III Advanced Communications Experiments in task TA.300. The specific objective of this task is to facilitate the inter-bank and international transfers which enable the establishment of an experimental personal banking and financial service system, accessible throughout the Community, linking sector actors and their customers.

Technical Approach

The task will involve the cooperation of major banks, especially those with overseas branches, and other financial institutions with equipment and service providers. It will address the following topics:

- analysis of user requirements and matching design of experiment
- service definition (domestic, business)
- network requirements
- solution to security/integrity concerns
- machine translation
- electronic signatures
- customer procedures and MMI
- terminal requirements
- central system and software needs

- operational requirements
- standardisation
- use of smart cards
- implementation strategy
- deployment.

Key Results and Milestones

Results required from all Part III Advanced Communications Experiments are defined in task TA.300. Specific results required from this task are:

1 Initial report on current status, trends and barriers.

2 Identify suitable application experiments.

3 Specification of experiment characteristics and services.

4 Initiation of standards discussions and cooperative agreements.

5 Definition of identification, authentication and data security procedures.

6 Design of system to meet specifications.

7 Deployment and evaluation.

TA.321B Collaborative Dealing in Banking

Background

General background for all application experiments is given in TA.300. General background for all banking, finance and insurance experiments is given in TA.321.

A trend within the financial community is towards deals which require many elements. Current collaborative deals are limited by the volume and timeliness of the communication.

The collaborative process involves the following steps:

- receive data, including broadcast, simultaneous data
- process the data into an acceptable format
- communicate between all participants and exchange information
- agree and execute consecutively to complete the transaction.

Objective

These are stated for all Part III Advanced Communications Experiments in task TA.300. Specific objectives for this task are:

- to facilitate the execution of Europe-wide and international multi-instrument deals
- to provide timely, high quality communications to enable the deal to be completed.

Technical Approach

- Propose method of broadcast data distribution to ensure simultaneous delivery of data.
- Consider workstation design to allow delivery of 'windows' of information.
- Ensure real-time communication with some degree of computer conferencing.
- Link to back office for trade confirmation and settlement.
- Define necessary inter- and intra-bank communication.

Key Results and Milestones

Results required from all Part III Advanced Communications Experiments are defined in task TA.300. Specific results required from this task are:

1 Initial report on requirements.

2 Specification of application experiments.

3 Discussions with actors to refine specification.

4 Design of system to specification.

5 Deployment, trials and evaluation.

TA.321C Direct Marketing and Selling of Personal Insurance Services

Background

General background for all application experiments is given in TA.300. General background for all banking, finance and insurance experiments is given in TA.321. See also marketing and sales backgrounds in TA.302 and TA.304.

The fragmented and parochial nature of the European personal/domestic insurance services industry suggests a major opportunity for the development of new international services, based on advanced communications.

Existing proposal, quotation and underwriting systems are primitive in functionality and narrow in applicability. They are usually linked by low-speed dial-up lines and are almost entirely constrained by national boundaries. Many situations in multi-site organisations require an expert to give advice and information either to customers or to decentralised staff.

There exist exciting potential applications for new systems, accessible in the intermediary and domestic environment, which would utilise the power of advanced communications to provide fast response, interactive insurance services. In particular, advanced communications brings with it the prospect of greatly enhanced techniques for direct marketing and selling of insurance services, together with opportunities to reduce significantly the cost and time involved in submission and processing of insurance claims.

Objectives

These are stated for all Part III Advanced Communications Experiments in task TA.300. Specific objectives for this task are:

- to establish a personal/domestic insurance service network to provide a full range of information from initial proposal questioning through quotation processing to underwriting decisions, policy printout and claims processing

- to set up a system allowing the expert to exchange information, (voice, video and/or data) in an interactive way with branches and/or customers.

Technical Approach

The task should involve the cooperation of major insurance companies, together with other service providers, brokers and systems suppliers.

The following topics will be addressed:

- service definition and scope

- data security and confidentiality

- customer interfacing and MMI

- electronic signatures

- interfaces to information providers

- network requirements

- management and control issues
- terminal requirements
- implementation strategy
- deployment.

The complexity of issues associated with many types of insurance will result in a high priority being given to the use of expert system techniques and advanced MMI in the realisation of an economical, practical and user-friendly experimental system. A mixture of video, pictorial and textual presentation is likely to be required.

Effort should be directed towards a system which is applicable to both brokers and end users. Where appropriate, migration paths between broker-targeted and domestic systems will be used.

Key Results and Milestones

Results required from all Part III Advanced Communications Experiments are defined in task TA.300. Specific results required from this task are:

1 Report on existing services and customer requirements.

2 Specification of experimental applications

3 Discussions with information providers to agree standards, data formats, confidentiality procedures, etc.

4 Design of network architecture, management and control systems.

5 Detail development and implementation.

6 Deployment, experiment and evaluation.

TA.321D Re-insurance Dealing

Background

General background for all application experiments is given in TA.300. General background for all banking, finance and insurance experiments is given in TA.321.

Existing procedures for underwriting large risks via syndicated re-insurance are almost entirely manual. Telecommunications activities in this sector are limited mainly to telephone and telex and there remains a significant element of personal contact (built on mutual trust and respect) in the conduct of such business.

The personal nature of many such transactions has, in the past, tended to prevent the impact of information technology from being felt in this sector. Actors have a natural affinity for this form of contact, as is the case for many other activities where judgement, confidence and risk assessment are important factors in reaching business decisions.

The advent of advanced communications provides the opportunity to develop this important international market without the loss of these essential qualities, by the introduction of integrated video and data communications systems, targeted to meet the needs of brokers and underwriters.

Objectives

These are stated for all Part III Advanced Communications Experiments in task TA.300. The specific objective for this task is the establishment of an experimental system to provide enhanced information on opportunities and deals in the re-insurance market.

The system will allow those wishing to do business to provide comprehensive information on the risk, by means of video and pictorial details where appropriate, and to conduct transactions in a 'face to face' manner by means of combined data, voice and videophones. Deal makers may broadcast their information globally or to targeted customer groups where appropriate. Interactive response systems will enable negotiations to take place in real time and at great speed.

Technical Approach

The task should involve the cooperation of actors in the syndicated insurance sector, together with network and system providers.

The work will address the following topics:

- service definition and scope
- user interfacing and MMI
- networking and control requirements
- electronic signatures
- machine translation
- terminal requirements
- implementation strategy

- deployment.

Key Results and Milestones

Results required from all Part III Advanced Communications Experiments are defined in task TA.300. Specific results required from this task are:

1 Initial report on requirements.

2 Specification of application experiments.

3 Discussions with actors to refine specification.

4 Design of system to specification.

5 Deployment, experiment and evaluation.

TA.321E Stolen Goods Register

Background

General background for all application experiments is given in TA.300. General background for all banking, finance and insurance experiments is given in TA.321.

The purposes of a register of stolen goods are to re-unite recovered goods with their rightful owners, and to aid crime investigation by making it easier to discern patterns of theft.

Advanced communications provides an opportunity to enhance the process of matching recovered property to a register of stolen goods since a central picture base of recovered property can be cross matched against the stolen goods register, either visually or by a centralised expert classification system.

Advanced communications provides the opportunity to establish a very centralised stolen goods register, which can be used as a resource in the establishment of patterns of theft.

Objectives

These are stated for all Part III Advanced Communications Experiments in task TA.300. Specific objectives for this task are:

- to prove the potential of advanced communications to enhance the process of matching recovered property against a register of stolen goods

- to investigate the usefulness of a stolen goods register in establishing theft patterns.

Technical Approach

Experiment participants could be police forces, and insurance companies.

Approach:

- Establish broadband nodes for video/still picture input at participating major baggage handling centres.

- Design central video-base of recovered property classified by location, size, description of items, ownership, weight, etc. The database should also contain matching information obtained from theft victims.

Access to the videobase should be possible from every node on the network.

The experiment should be confined to a specific narrow geographical area, or to a specific type of stolen property within a wider geographical area.

Key Results and Milestones

Results required from all Part III Advanced Communications Experiments are defined in task TA.300. Specific results required from this task are:

1 Design of videobase.

2 Establishment of broadband nodes.

3 Design of user interface to central videobase.

4 Assessment of benefits of advanced communications in stolen goods matching and recovery.

TA.322 Media, Publishing, Advertising and Culture General Task

Background

General background for all application experiments is given in TA.300.

The nature of the media, publishing and advertising industry is being transformed by a number of developments in the communications area and by the widespread availability of data processing equipment which enables digital storage of images and text, comprehensive reference databases, distributed printing and publishing and specialised local area production. In television, cable systems are becoming increasingly important either as a deliberate result of infrastructure policy in some countries or as a result of consumer demand in others. Direct broadcasting by satellite and the advent of HDTV are other major developments likely to cause change in the sector. News coverage is becoming progressively more international, with all the associated language problems, and there is an pressing demand for immediate and comprehensive news reporting directly from the place of action. News services require increasingly sophisticated support in terms of multimedia information and archiving. Advertising penetrates and finances all forms of media.

In many of the areas of development in this sector advanced communications will play a crucial role because of its ability to deliver high bandwidth information either as demanded by TV distribution or because of the access it will provide to multimedia databases.

Objectives

These are stated for all Part III Advanced Communications Experiments in task TA.300.

Technical Approach

The approach should be to establish a working advanced communications installation, integrating new facilities as much as possible into the existing methods of working. The approach will involve one or more Generic Applications in the media, publishing, advertising and culture sector, for example:

Entertainment/Leisure Distribution

This Generic Application will involve the provision of distribution facilities for entertainment and other material which is transmitted from one to many, narrowcast or broadcast. It will also allow for active participation in competitions, games, etc. As such this Generic Application is the dominant one in this sector.

Telemarketplace

The telemarket is fundamental to this sector involving as it does the remote offering, ordering, and sale of goods or services, in this case advertising space, articles, news, and background specialist information to the industry.

Multimedia Interpersonal Messaging

Multimedia interpersonal messaging is a logical extension of the electronic mail systems in widespread use today into the conveyance by the IBC of complex multimedia documents. As such this Generic Application is of great significance in this business sector.

Multimedia Information Assembly, Access and Distribution

Providing access to distributed multimedia databases is a vital function of advanced communications. Such multimedia databases contain structured and unstructured combinations of text, graphic, audio and video information. Advanced communications will remove all access constraints of distributed databases, giving the user the advantages of a centralised database without its disadvantage of remoteness from the information source. The Generic Application involves accessing, data maintenance, security and payment for such databases and is particularly relevant in this sector where pertinent data is likely to be widely distributed in its origins.

Distributed Collaborative Design

Many design processes involve the participation of a number of different people. Advanced communications will allow remote participation in this process. This Generic Application focuses on multiple (and iterative) remote contributions to a design process which for example in the media industry could be the design of an entertainment programme or of a publication. The Generic Application paves the way for a revolution in the design process by enabling an effective interaction between designers, each in their own offices, having access to all relevant information.

Whilst the above Generic Applications are considered to be the ones of major importance to the media, publishing and advertising industry, the relevance of others may become clear after further study.

Examples of application experiments in the media, publishing, advertising and culture sector are given in tasks TA.322A to TA.322G. See also task TA.302A.

Key Results and Milestones

Results required from all Part III Advanced Communications Experiments are defined in task TA.300.

TA.322A Distributed Publishing, Editing, Printing and Advertising

Background

General background for all application experiments is given in TA.300. General background for all media, publishing, advertising and culture experiments is given in TA.302.

The printing and publishing business is one whose various activities can involve large geographical separation from customers and suppliers.

Large information publishers will have increasing opportunities for receiving and delivering information both inside and outside the organisation, as the trend towards digitisation of text, voice and image continues. Broadband communications are necessary for delivering the volume of data and for providing the necessary level of interaction.

Objectives

These are stated for all Part III Advanced Communications Experiments in task TA.300. The specific objective of this task is to experiment with a distributed publishing environment. This environment should provide facilities to support a wide range of publishing functions. Additionally it should encourage the direct participation of other service providers and customers such as graphic design, advertising and public relations. The creation of a real publication in the experiment should be the objective.

Features of the implementation would be:

- remote access for information contributors and customers providing support for graphics, text, voice and video input and editing
- an appropriate level of security
- sophisticated access and search mechanisms.

The experiment can create an environment where telecommunications creates the opportunity for improving the quality of work and end product and saving costs through better logistics. It could facilitate the creation of a more competitive environment for the provision of services to the sector and assist in the development of standards and protocols for communication between equipment from different vendors.

Technical Approach

Likely participants in the experiment are publishers, printers, information providers and consumers. The approach is to provide each user with access to the system with appropriate functions at an appropriate cost.

Approach:

- Identify suitable target publication(s).
- Analysis and specification of database requirements in terms of volume, data rates and formats and security.
- Assessment of the current status of the in-house publisher database and available alternative systems.

- Design of the database.
- Procurement of base system, bespoke development and testing.
- Standardisation of protocols and access procedures.
- Ensuring compatibility between members of the family of servers proposed.

Key Results and Milestones

Results required from all Part III Advanced Communications Experiments are defined in task TA.300. Specific results required from this task are:

1 Creation of working multimedia database server and access system

2 Connection of local and remote users

3 Integration of elements of the production system

4 Successful production of target publication.

TA.322B Local Publishing, Editing, Printing and Advertising

Background

General background for all application experiments is given in TA.300. General background for all media, publishing, advertising and culture experiments is given in TA.302.

Market requirements are increasingly specialised in this sector. This provides an opportunity for the development of systems which provide publications specifically designed for particular requirements for content, time and place of delivery. The distinction between consumers and providers of information will become blurred, with organisations ranging in size from individuals to large corporations.

Objectives

These are stated for all Part III Advanced Communications Experiments in task TA.300. The specific objective of this task is the implementation of a local publishing experiment. The critical elements are:

- a simple to use, method for conducting dialogue with the user terminal
- automated personalisation of dialogue
- peripheral control of high quality colour printers, photocopiers and other output devices
- distribution by non-paper means
- provision of information to all sizes of information publishers and consumers.

Technical Approach

The elements of the technical approach are:

- analysis and specification of user requirements for interface
- specification of local publishing system
- assessment of available subsystems
- devise and implement a hierarchy of hardware / software
- solutions to meet the requirements of small, medium and large information providers / consumers.

Key Results and Milestones

Results required from all Part III Advanced Communications Experiments are defined in task TA.300. Specific results required from this task are:

1. Completion and reporting of system specification.
2. Completion and reporting of design.
3. Completion and reporting of implementation.

TA.322C Domestic Video/Film/Music Library

Background

General background for all application experiments is given in TA.300. General background for all media, publishing, advertising and culture experiments is given in TA.302.

Films (particularly on video media) are currently distributed by a number of ad hoc and diverse methods (off licences, petrol stations, newsagents, specialist video rental shops, etc). These distribution forms have proven successful largely as a result of convenience to the consumer, and despite the lack of variety available at any individual outlet.

Advanced communications has the capability to improve the convenience factor, to offer the consumer a very wide choice of entertainment material and additionally to offer novel forms of interactive home-based entertainment.

Objectives

These are stated for all Part III Advanced Communications Experiments in task TA.300. Specific objectives for this task are:

- to establish an appropriately sized library of digitised video, film, and music titles
- to adopt suitable data compression/decompression techniques for video, film, and music
- to establish a commercial service structure which handles different pricing for different levels of service
- to assess the impact of widespread advanced communications on the in-home entertainment sector.

Technical Approach

The likely players in the experiment are a major Film/Video/music rights owner, a switched broadband network operator, a media facilities company for operating the compression process, and some Cable TV Network users.

User terminals, constructed from off-the-shelf technology will permit both real time viewing and storage of material for later viewing.

Data compression will utilise supercomputer power because of processing load.

The library should be able to monitor and record all aspects of usage.

Key Results and Milestones

Results required from all Part III Advanced Communications Experiments are defined in task TA.300. Specific results required from this task are:

1 Digitised library complete.

2 Data compression technique(s) chosen and implemented.

3 Satisfactory testing and introduction of home unit.

4 Commercial service structure implemented.

5 Complete assessment of advanced communications impact.

TA.322D Professional Distribution of Film for Exhibition and Production

Background

General background for all application experiments is given in TA.300. General background for all media, publishing, advertising and culture experiments is given in TA.302.

The advent of HDTV and its anticipated use in feature film production opens up the possibility and requirement for new methods of delivering material from the shooting location to the editing facility, and for distributing copies of the master to the cinema or other place of exhibition. Current methods involving the transport of film negative or prints are costly, untimely and insecure. Using advanced communications, a producer or director could reliably receive material shot the previous day throughout the European Community. Motion picture releases could be distributed via 140 MBit/s links to cinemas, and be recorded and exhibited there in a tightly-controlled fashion, producing enhanced flexibility and control of the distribution chain.

The experimental setup would be functional from a practical viewpoint, ie it could be used in real film production and/or in front of a paying public. However it would not meet the quality, security or economic requirements of a final system. Having assembled a video cinema using off-the-shelf equipment, research would be conducted into quality requirements on the part of the general public, and on the part of professional users.

The project may offer an intermediate step towards HDTV distribution and store-and-forward systems to the home, using advanced communications.

Objective

These are stated for all Part III Advanced Communications Experiments in task TA.300. Specific objectives for this task are:

- to provide broadband facilities for the transmission of film material from studios and from location during the shooting/editing process
- to provide broadband facilities for the distribution of completed films to cinemas for public showing.

Technical Approach

- Assembly of an experimental setup using off-the-shelf equipment to clearly delineate system requirements, including system management layout.
- Modelling traffic on system.
- Selection of appropriate of codecs and VCRs.
- Selection of scrambling algorithms and system management procedures.
- Identification of suitable projection equipment, eg using light-valve techniques.
- Analysis of surround sound schemes.

Key Results and Milestones

Results required from all Part III Advanced Communications Experiments are defined in task TA.300. Specific results required from this task are:

1. Achievement of technical solutions to both the 'location' and exhibiting equipment.

2. Verification of suitability of algorithms for coding involving both professional and lay people.

3. Analysis of security issues and evolution into commercial exploitation.

TA.322E Museum, Art and Exhibition Catalogue

Background

General background for all application experiments is given in TA.300. General background for all media, publishing, advertising and culture experiments is given in TA.302.

Museums and galleries have long suffered from the problem of inability to reach audiences in remote areas, and inability to exploit more than a small part of available material. In extreme cases, museums have created mobile exhibitions. The concept is that the advanced communications network can act as a multimedia equivalent for the mobile museum/gallery, bringing a multimedia presentation of the museum to the wider community.

The modern equivalent may not be able to bring the touch and feel aspects of the museum, but could bring a wider section of the museum's contents, or indeed the contents of many different museums to a wide range of people.

In an experiment, the equipment for display might indeed be mobile, in order to cover areas where advanced communications networks may not be available.

An additional aspect of the concept is that many museums are unable to display their entire collection at any given time for reasons such as space, fragility, restoration, or a physical tour. A multimedia presentation of non-displayed or non-displayable parts of the collection at the museum itself may be a useful side-benefit of the multimedia production capability.

Objectives

These are stated for all Part III Advanced Communications Experiments in task TA.300. Specific objectives for this task are:

- to provide public access to a multimedia database of museum objects
- to assess the potential for advanced communications to bring remote locations access to the collections of large museums and other custodians of cultural heritage.

Technical Approach

The participants in the experiment may be museums in two or more countries.

Approach:

- Decide on the exact nature of the experiment, depending on curatorial priorities.
- Creation of a multimedia presentation of the contents of the museum.

Key Results and Milestones

Results required from all Part III Advanced Communications Experiments are defined in task TA.300. Specific results required from this task are:

1 Assessment of the potential of advanced communications as an access medium to museum and other cultural collections.

2 Evaluation of user interfaces.

3 Evaluation of multimedia presentations as surrogate museums.

TA.322F Ownership Register for Antiques and Objets D'Art (AOD)

Background

General background for all application experiments is given in TA.300. General background for all media, publishing, advertising and culture experiments is given in TA.302.

AOD is an international market where objects traded are generally of high and appreciating value. Fraud and theft represent a serious threat, to the extent that the industry already maintains lists of stolen AODs as a countermeasure. The victims of fraud and theft are owners, auctioneers, and insurance companies. This list is limited since it is difficult to update, refers only to stolen property, and limited in quality of presentation.

Reliable identification, valuation and certification of ownership is important to the AOD market as a deterrent against fraud and theft.

Similar considerations apply to the markets for classic cars, yachts, and other high value items.

Objectives

These are stated for all Part III Advanced Communications Experiments in task TA.300. The specific objective of this task is to provide an effective deterrent against theft or fraud in the AOD market. This can be achieved by centrally storing information on AODs and providing the means whereby participants in the trade, insurance companies and police can access the system.

The three critical functions of the experiment are to provide:

- identification
- valuation
- certification of ownership.

In this way, buyers of objects may have certification that the objet is not stolen, is genuine and is purchased at a fair market price.

Technical Approach

Experiment participants are likely to be insurance companies, auctioneers, art dealers, museums and galleries, and experts.

For identification, images of objects need to be input and stored in a pre-determined way. The experimental system should permit the user terminal to input the image of the object being identified to enable the identification system to compare the stored and new image and decide whether they are of the same object.

For valuation, the system must store details of recent transactions involving similar objects, and derive a current price. For certification of ownership the system must store details on the latest and previous owners of all objects.

The categories of objects chosen for the experiment should be sufficiently narrow to permit comprehensive coverage of those categories at the experimental stage, but sufficiently valuable and frequently traded to justify participation.

An image base of all objects will be constructed, together with records of transactions involving the objects and the names of all of the current and previous owners of the objects. An image analysis and comparison capability will be incorporated into the image base. User terminals should incorporate image input for object comparison.

Key Results and Milestones

Results required from all Part III Advanced Communications Experiments are defined in task TA.300. Specific results required from this task are:

1 Image base specified and implemented.

2 All objects entered into image base.

3 Register operational.

4 Monitor before and after levels of and theft in the sector concerned.

5 Conduct cost-benefit comparison on experiment.

TA.322G Distributed Local Access Television

Background

General background for all application experiments is given in TA.300. General background for all media, publishing, advertising and culture experiments is given in TA.302.

There has been a steady fall in the cost of technical equipment such that the cost of entry into local television is now relatively low. Cable TV and MVDS networks will grow in importance as one-way entertainment delivery mechanisms as a result of limited broadcast spectrum and increased TV programme availability.

There is a trend towards local communities demanding greater participation in the decisions that affect their lives, and demanding that their views be heard. Community or Local Access TV, using Cable TV or MVDS is one way for local communities to ensure that their voice is heard.

The logistics of conventional TV production act as a deterrent in the above process so some means of simplifying and demystifying TV production is essential if the vision of local TV is to be realised.

Advanced communications can bring to this issue the ability for community groups to produce local TV in a simpler and more decentralised way than is currently possible.

Objectives

These are stated for all Part III Advanced Communications Experiments in task TA.300. Specific objectives for this task are:

- to demonstrate the benefits of advanced communications in the production of Local Access Television programmes
- to train people in simple TV production techniques
- to promote the concept of Local Access TV.

Technical Approach

- Produce the advanced communications equivalent of the TV production studio.
- Produce a multimedia training programme for the advanced communications studio.
- Identify a suitable Cable TV installation(s).
- Recruit non-expert local groups
- Establish IBC-substitute network for co-operative remote production.

Key Results and Milestones

Results required from all Part III Advanced Communications Experiments are defined in task TA.300. Specific results required from this task are:

1 Delivery of working advanced communications studio.

2 Delivery of training package.

3 Production of 1st Local Access TV programme.

4 Measurement of usability of advanced communications studio.

5 Measurement of stimulus effect of experiment on local groups.

TA.323 Retail and Distribution General Task

Background

General background for all application experiments is given in TA.300.

The retail and distributive industries operate in a highly competitive environment which is undergoing rapid change. The range of products is expanding, technical sophistication continues to increase and the interval between model changes is getting shorter. Broadening markets imply that products will be sourced from widening geographical areas, requiring increased coordination of the distributive chain. 'Just in time' and 'just in place' delivery methods will apply particularly to this sector with local stores and shops becoming showrooms outside the direct distribution chain. Opportunities for direct selling will increase. The customer will need better information and advice about the goods offered for sale and sales and maintenance personnel will need better and more up-to-date information on all products if they are to maintain their competitive edge. The training of retail personnel to stay up-to-date with all developments will become a critical issue.

By enabling access to multimedia databases and face-to-face remote personal interactions, advanced communications will facilitate the development of home shopping, electronic catalogue shopping and the training of retail personnel. Remote expertise systems providing specialised information and guidance for product maintenance could also emerge.

Objectives

These are stated for all Part III Advanced Communications Experiments in task TA.300.

Technical Approach

The approach should be to establish a working advanced communications installation, integrating new facilities as much as possible into the existing methods of working. The approach will involve one or more Generic Applications in the retail and distribution sector, for example:

Distributed Learning/Training

The availability of multimedia communications will significantly improve the possibilities of remote education and training which is vital for the retail sector in maintaining its highly distributed workforce up-to-date with new products, sales procedures, etc. This Generic Application will include elements of teaching (where the teacher defines the syllabus and controls the place) and learning (where the pupil is given the means to acquire information and skills).

Telemarketplace

The telemarket is fundamental to this sector involving as it does the remote advertising, offering, ordering, and sale of goods or services together with means of authentication, authorisation, and funds transfer for payment. Telemarket systems in this sector can address either wholesale or retail customers. In each case the application will involve access by the potential customer to multimedia information describing the goods or services offered, together with interactive facilities dealing with the sales and payment processes. Auction management could form a useful part of the application. This Generic Application provides a path towards a major change in the methods by which retail and wholesale businesses will be conducted.

Multimedia Interpersonal Messaging

Multimedia interpersonal messaging can be expected to have widespread application in this sector, eg for communication between supplier and customer, and between central management and distributed retail outlets.

Multimedia Information Assembly, Access and Distribution

As with the telemarketplace Generic Application, there will be wide scope in the retail and distribution sector for the application of multimedia data base access and retrieval facilities for the dissemination of product advertising and descriptive material, to both the wholesale and retail market.

Whilst the above Generic Applications are considered to be the ones of major importance to the retail and distribution sector, the relevance of others may become clear after further study.

An example of an application experiment in the retail and distribution sector is given in task TA.323A. See also tasks TA.303B, TA.304B, TA.307A and TA.304C.

Key Results and Milestones

Results required from all Part III Advanced Communications Experiments are defined in task TA.300.

TA.323A Home Shopping

Background

General background for all application experiments is given in TA.300. General background for all retail and distribution experiments is given in TA.323. See also sales background in TA.304.

Home shopping is a large and long established business that began and still is largely based on the idea of the paper catalogue but has in recent times been offered over cable systems, particularly in the USA. The basis of the business is convenience and easier credit facilities when compared to retail outlets with larger overheads. Any new home shopping services will have to meet these requirements at least and possibly offer the opportunity to provide access to other services. Advanced communications offers a substantial improvement to the method of access and can transform the process into a highly interactive one. However there is a price to pay in the cost of the home terminal.

Electronic home shopping has not been widely offered by the large catalogue companies. One significant reason is that the benefits to the consumer have not justified the initial cost of the terminal and this will remain as a key issue in future offerings. The key is whether more information, services and improved presentation can change this picture.

Objective

These are stated for all Part III Advanced Communications Experiments in task TA.300. Specific objectives for this task are:

- assessment of the feasibility of a complete advanced communications home-shopping service
- verification, in a real environment basis, of the economics of advanced communications home shopping
- investigations of which advanced communications services would be useful for teleshopping
- proposals for advanced communication standards for home-shopping.

Technical Approach

Candidate participants in this project could include the major catalogue companies, the banks or the credit card companies and a network operator.

The realisation of such a home shopping system will require the development of secure, standardised, preferably pan-European, payment systems.

Expertise will be required in:

- teleshopping host application development, including text and image management
- advanced communications network services interfaces
- home device protocol support
- text, voice and image distribution through the advanced communications network.

Work will include:

- The development of a home device for teleshopping using existing advanced communications services.

- Proposals for advanced communication standards for teleshopping

- Assessment of functional and economic trigger factors for widespread introduction of home shopping.

Emphasis should be put on preliminary work, mainly in the areas of:

- functional requirements issued by the retailers or the professional for the sales chosen for the system

- overall architecture

- design of the home-shopping device

- security requirements

- advanced communications network services requirements for home shopping.

The experiment may need to target a customer base with a narrow range of interests in order to make results meaningful.

Key Results and Milestones

Results required from all Part III Advanced Communications Experiments are defined in task TA.300. Specific results required from this task are:

1 Report on the opportunities for advanced communications applications in home shopping.

2 Definition of the common characteristics and the technical facilities required to support them.

3 Establishment and operation of experiment.

4 Measurement of performance, usage and other important parameters.

5 Report on the results and conclusions of the experiment, including assessment of the economic implications and wider relevance of advanced communications to electronic home shopping.

6 Proposals for communication standards for the sector.

TA.324 Healthcare General Task

Background

General background for all application experiments is given in TA.300.

The rapid development of healthcare technology gives a continuing need for the further education and training of professional healthcare personnel at all levels and access to specialised expertise.

Medical records for each patient are held in many places - general practitioner, hospital, pharmacy, etc. They can consist of x-rays, pictures, laboratory analyses, treatment details, etc. With increasing specialisation there is a tendency for more professionals to be involved in the treatment of each patient and each of them will need access to, and will contribute to, the records. Case conferences involve a number of specialists coming together to consult each other and the relevant records. In emergency, urgent access to medical records may be needed from a location far removed from where they are physically stored. The handling of medical files require a high degree of privacy and security.

The dynamics of medical practice place a premium on the need for good real-time interactive and messaging communication between the practitioners.

In all countries there are continuous pressures to contain healthcare costs and concerns about the effect on healthcare costs of an ageing population and a desire to encourage people to remain in their own homes as long as possible.

Advanced communications will support the healthcare sector by providing multimedia facilities for distance learning and remote consultation (expertise). Collaborative treatment will be facilitated by providing multimedia medical record handling and remote conferencing facilities. Improving the monitoring of old people staying in their own houses and providing them with better "access" to the world outside could also be a major advance.

Objectives

These are stated for all Part III Advanced Communications Experiments in task TA.300.

Technical Approach

The approach will be to establish a working advanced communications installation, integrating new facilities as much as possible into the existing methods of working. The approach will involve one or more Generic Applications in the healthcare sector, for example:

Distributed Case Handling

This Generic Application deals with the procedures involved in handling sets of multimedia documents between remotely-sited specialists as in the case of a complex medical treatment.

Remote Delivery of Expertise

Within this sector there will be a common need for consultation between remote experts and clients or colleagues for example when there is a complex matter under question which demands the interaction of a number of experts such as the referral of a cancer patient to a remote specialist.

Monitoring and Surveillance

Monitoring and surveillance covers all situations where knowledge of what is happening at a situation remote from the enquirer is made available over the IBC. In particular, in this sector the remote monitoring of old or disabled people in their own homes could be of significant importance.

Multimedia Interpersonal Messaging

Multimedia interpersonal messaging is a logical extension of the electronic mail systems in widespread use today into the conveyance by the IBC of complex multimedia documents. As such this Generic Application is of great significance in this economic sector.

Multimedia Information Assembly, Access and Distribution

Providing access to distributed multimedia databases is a vital function of advanced communications. Such multimedia databases contain structured and unstructured combinations of text, graphic, audio and video information. They could be especially relevant to the healthcare sector where they could contain not only patient records but also much detailed information on the nature of diseases. Advanced communications will remove all access constraints of distributed databases, giving the user the advantages of a centralised database without its disadvantage of remoteness from the information source. The Generic Application involves accessing, data maintenance, security and payment for such databases and is particularly relevant in this sector where pertinent data is likely to be widely distributed in its origins.

Whilst the above Generic Applications are considered to be the ones of major importance to the healthcare sector, the relevance of others may become clear after further study.

Examples of application experiments in the healthcare sector are given in tasks TA.324A and TA.324B. See also task TA.312F.

Key Results and Milestones

Results required from all Part III Advanced Communications Experiments are defined in task TA.300.

TA.324A Information and Communication between Health Care Actors

Background

General background for all application experiments is given in TA.300. General background for all healthcare experiments is given in TA.324.

This experiment will test the use of advanced communications in a wide-area hospital information system including:

- communication in the hospital

- communication between primary healthcare and hospital or laboratory (eg an X-ray laboratory); this form of communication is considered to be particularly important by healthcare experts.

The following applications should be offered by the experiment:

- diagnosis sharing between experts

- storage and retrieval in PACS

- emergency telemedicine

- interactive assistance offered to the general practitioner

- management of patient records.

Objectives

These are stated for all Part III Advanced Communications Experiments in task TA.300. The specific objective of this task is to illustrate the impact of advanced communications on fully integrated wide-area information systems for healthcare.

Technical Approach

The experiment should take place in a region with an extremely well-furnished advanced communications infrastructure at 140 Mbits/s accessible to small professionals and residential users. The latter could be involved through professional associations.

The experiment should fully take into account healthcare standards and data formats that will be defined during the early stages of AIM.

Key Results and Milestones

Results required from all Part III Advanced Communications Experiments are defined in task TA.300. Specific results required from this task are:

1 Illustration of advanced communications based healthcare information system. From a technical point of view, this should allow illustration of use of services.

2 Definition of the technical facilities required to support these applications.

3 Establishment and operation of one or more experimental schemes.

4 Measurement of performance, usage and other important parameters in the experiment.

5 Report on the results and conclusions of the experiments.

TA.324B Support for People with Special Needs

Background

General background for all application experiments is given in TA.300. General background for all healthcare experiments is given in TA.324.

The number of elderly people will increase and the number of younger people will decrease. The problems of taking care of people that cannot take care of themselves will increase. The demand from people to stay in their own homes when they grow older will increase.

The experiment would provide:

- remote disability support
- surveillance in the home and remote call for help if necessary
- teleshopping for daily needs.

This experiment would extend current work in application experiment projects in RACE to provide a large application with a significant number of end-users.

Objective

These are stated for all Part III Advanced Communications Experiments in task TA.300. The specific objective of this task is to show the economical viability of advanced communications based monitoring of disabled persons compared to care in the hospital.

Technical Approach

Two concepts should be illustrated:

- The 'smart house': the home of the disabled person provides special support to monitor the data that need to be captured.
- 'Ambulant monitoring': the disabled person should be equipped with the means to render him/her as mobile as possible. This could include provision of special devices for communication that would be easily transportable or even portable. This approach to mobile communication replaces vehicle communication by mobile communication attached to an individual.

Monitoring the disabled will provide an interesting case for integration of different types of communication (home-based vs terminal). The disabled end-user should, in the ideal case, not see the difference when switching from one to the other.

Probably several levels of service to the disabled will have to be distinguished, depending on the support the individual needs and the data to be collected; this again would depend, for instance, on the form of disability and the continuity for monitoring.

It might be interesting to consider a modular approach based on a home terminal which would then have to be extended by facilities for communications inside and outside.

A major issue is how far mobile advanced communications devices will exist that have the requested features for ease of use and transportability.

Key Results and Milestones

Results required from all Part III Advanced Communications Experiments are defined in task TA.300. Specific results required from this task are:

1. A demonstration of how future broadband provides new levels of support for the disabled. This demonstration should be evaluated and compared to current practice.

2. Definition of the common characteristics of advanced communications applications and the technical facilities required to support them.

3. Establishment and operation of experiment.

4. Measurement of performance, usage and other important parameters.

5. Report on the results and conclusions of the experiment.

TA.325 Public Administration General Task

Background

General background for all application experiments is given in TA.300.

The citizen interacts with many different parts of local and national administrations (eg personal and vehicle registration, local and national taxes, social security). Each interaction requires access to information held physically in local offices or other locations. The average citizen experiences great difficulty in finding his/her way around the system and can often become discouraged, leading to loss of entitlements or difficulties with the authorities. The facility to interact with public administrations via a single access point, with expert help, would substantially improve the quality of service.

Local and national administrations are actively reviewing their plans for dealing with large-scale emergencies as the potential for serious accidents increases in modern technological societies with the possibility of natural disasters always present.

Monitoring and surveillance systems need to be improved to counter the dangers of personal attacks, property damage, terrorism and environmental hazards.

Advanced communications can support the establishment of local citizens' advice centres by enabling access to distributed multimedia databases and providing facilities for face-to-face discussion with officials and experts in remote offices.

For disaster coordination the full facilities of the IBC are clearly needed for the transmission and reception of images, data and sound. In addition disaster coordination demands a flexible link to the IBC independent of local facilities.

Advanced communications can enable the remote monitoring of buildings and public places by providing image and data transmission facilities. The ability to compare personal images with those in remote image banks could provide an important weapon counteracting terrorism.

Objectives

These are stated for all Part III Advanced Communications Experiments in task TA.300.

Technical Approach

The approach will be to establish a working advanced communications installation, integrating new facilities as much as possible into the existing methods of working. The approach will involve one or more Generic Applications in public administration, for example:

Distributed Case Handling

This Generic Application deals with the procedures involved in handling sets of multimedia documents between remotely-sited specialists. Such is often the case in all areas of public administration eg in planning applications, preparation of public enquiries, ministerial briefs, social security case work.

Monitoring and Surveillance

Monitoring and surveillance covers all situations where knowledge of what is happening at a situation remote from the enquirer is made available over the IBC. In particular, in this sector it is a major Generic Application with consequences in many areas of public administration activity eg border control, security monitoring of important or sensitive installations, traffic control.

Multimedia Interpersonal Messaging

Multimedia interpersonal messaging is a logical extension of the electronic mail systems in widespread use today into the conveyance via advanced communications of complex multimedia documents. As such this Generic Application is of great significance in this economic sector.

Multimedia Information Assembly, Access and Distribution

Providing access to distributed multimedia databases is a vital function of advanced communications. Such multimedia databases contain structured and unstructured combinations of text, graphic, audio and video information. They could be especially relevant to the public administration sector where they could contain detailed local and national records such as annotated maps, images of important buildings and areas and other items of major significance. Advanced communications will remove all access constraints of distributed databases, giving the user the advantages of a centralised database without its disadvantage of remoteness from the information source. The Generic Application involves accessing, data maintenance, and security for such databases.

Whilst the above Generic Applications are considered to be the ones of major importance to public administration, the relevance of others may become clear after further study.

Examples of application experiments in the public administrationsector are given in tasks TA.325A to TA.325E.

Key Results and Milestones

Results required from all Part III Advanced Communications Experiments are defined in task TA.300.

TA.325A Public Information Service Centres

Background

General background for all application experiments is given in TA.300. General background for all public administration experiments is given in TA.325.

European citizens have many dealings with administrative authorities, frequently of a complex nature. These can occur through taxation problems, social security claims and allowances, planning applications, local government taxation, passport or registration of citizens, legal matters etc. The administrations themselves must keep close control of their own costs and yet, at the same time, provide a better service. There is therefore a great need to develop cost-effective technologies which help citizens to find proper answers to their questions, and help bridge the cultural gap between Public Administrations and citizens they serve.

This problem could be ameliorated by the establishment of integrated multimedia public centres to supply customised information to citizens. These would use multimedia databases and could refer to remote experts in cases of difficulty. Such facilities should be made directly available to the consumer by designing easy-to-use systems.

The conveyance of pictorial, graphical and moving image data by via advanced communications provides a powerful resource to enable the contents of the resource to be well presented. Broadband communications will be necessary to connect the user to the various databases, the various public information service centres, and the offices of the expert advisers.

Objectives

These are stated for all Part III Advanced Communications Experiments in task TA.300. Specific objectives for this task are:

- to evaluate the potential market of new citizen oriented public administration services
- to stimulate public administration to build customised public services
- to validate the technologies for easy nontechnical access to complex multimedia databases
- to investigate the use of remote expertise in the area of public administration.

Technical Approach

Select an appropriate experimental environment. This could most usefully take the form of a wide approach to information requirements and focus on a narrow geographical area, perhaps in a location where the ratio of local government to central government service provision is high.

Analyse and select most suitable available technology and define development programme.

Key Results and Milestones

Results required from all Part III Advanced Communications Experiments are defined in task TA.300. Specific results required from this task are:

1 Selection of experiment location.

2 Definition of scope of preliminary application.

3 Develop and construct application.

4 Run application.

5 Analysis of results.

TA.325B Communication and Information for Public Administration

Background

General background for all application experiments is given in TA.300. General background for all public administration experiments is given in TA.325.

Public administration is continuously increasing its use of networking, computing and databases, eg in the implementation of social security, inland revenue, local taxes and police networks. Such growth will continue in order to improve productivity of the administrations and provide service to the citizen. With the widespread adoption of computerised workstations within the administrations will come the necessity of user-friendly access methods demanding high bandwidth transmission (eg advanced distributed windowing) and probably the need for usage training which could be provided by reference to remote experts. It is also likely that administrative databases will need to store images (eg stolen goods, photofit pictures, passport images, map data, etc.) in a rapidly retrievable form.

For all these purposes advanced communications will provide an essential infrastructural support. Experimental applications demonstrating the utility of advanced communications in internal administrative uses will assist substantially in the evaluation of advanced communications in public service.

Objectives

These are stated for all Part III Advanced Communications Experiments in task TA.300. Specific objectives for this task are:

- to evaluate the use of advanced communications in the provision of network infrastructure for public administration
- to gain user acceptance, within public administrations, for advanced communications networks.

Technical Approach

- Identify activities within public administration where advanced communications could most effectively form the basis of an applications experiment, preferably on a European scale.
- Procure equipment and organise network resources.
- Set up system.
- Analyse results in terms of user needs and acceptability, extrapolation to other areas of administration, network requirements, and overall economic and social gains.

Key Results and Milestones

Results required from all Part III Advanced Communications Experiments are defined in task TA.300. Specific results required from this task are:

1 Report on the development of advanced networking within public administrations and needs for advanced communications connectivity.

2 Report, analyse, and extrapolate experience to other areas.

3 Definition of the common characteristics and the technical facilities required to support these applications.

4 Establishment and operation of experiment.

5 Measurement of performance, usage and other important parameters.

6 Report on the results and conclusions of the experiment.

TA.325C Remote Surveillance for Traffic, Security and the Environment

Background

General background for all application experiments is given in TA.300. General background for all public administration experiments is given in TA.325.

In local and national administrations there are many instances where the transmission of images may be used as an aid to improve security or assist the authorities to carry out their tasks more efficiently by ensuring that manpower is employed exactly where needed.

The risk from sabotage and damage in major areas such as airports, railways, subways, public buildings, power stations, etc, is ever-increasing. Because people like to feel safe, surveillance and personal identification will become more popularly accepted in the near future.

In areas of high vulnerability to crime, banks, metro stations, shopping malls, etc, it may be useful to have security systems which either allow for direct monitoring by the police or have the facility of transmitting images quickly to a central control point.

Traffic centres have a need to monitor traffic flows to deal with problems of traffic control and rerouting.

Monitoring the environment is becoming increasingly important and increasingly possible.

In all these cases, in addition to image traffic, there may be a necessity to call up reference data from multimedia data bases and 'expert' assistance from an advanced computing resource. Advanced communications is able to provide image and other data from a number of sources allowing a flexibility of provision not attainable using conventional networks.

Objectives

These are stated for all Part III Advanced Communications Experiments in task TA.300. Specific objectives for this task are:

- to demonstrate the advantage of advanced communications in providing access to video and other data from a number of remote sources for the purposes of remote monitoring and surveillance in any one or all of the following fields of activity:
    - pollution monitoring
    - traffic control
    - building and property surveillance
    - crowd control
    - crime prevention
- to reduce cost of human surveillance whilst increasing the quality of security control by more automated and smart support systems being made available to the survey units through broadband services
- to gain user acceptance and experience in the design requirements for remote surveillance and monitoring.

Technical Approach

The main participant in the experiment should be a municipality or small administrative district, already possessing a broadband infrastructure. This will be the site for an experiment in intensive monitoring using advanced communications techniques to cover as many useful aspects of surveillance as it is possible to implement. Other participants will be system suppliers and user organisations.

Key Results and Milestones

Results required from all Part III Advanced Communications Experiments are defined in task TA.300. Specific results required from this task are:

1 Report on the opportunities for advanced communications applications in remote surveillance.

2 Definition of the common characteristics and the technical facilities required to support them.

3 Establishment and operation of experiment.

4 Measurement of performance, usage and other important parameters.

5 Report on the results and conclusions of the experiment.

TA.325D Local Work Centres

Background

General background for all application experiments is given in TA.300. General background for all public administration experiments is given in TA.325.

The concept of Local Work centres is attractive in terms of its potential impacts on commuting volume, organisational efficiency, and job satisfaction. Local work centres could themselves be provided by entrepreneurs or hotel chains as well as by the local or national administrations and the large organisations who would use them.

The potential flexibility of advanced telecommunications offers an alternative, due to its capacity to eliminate spatial barriers and to integrate different communication patterns. The first option: 'tele-work' - understood as work at home, leaving individuals at home behind their PC or terminal. Although again the expectations lagged behind, research indicates two types of jobs potentially suitable for home work:

(Although the set of tasks, related to this concept, has been placed in the administrative economic sector, it is relevant to almost every other as all involve some large organisations employing staff whose activities could be more economically decentralised.)

Local Work Centres may be closed, open, or a combination of both.

a) Closed Work Centres

Large organisations may establish a number of local work centres in commuter areas to accommodate members of their staff living in the vicinity. Such staff will normally come from different parts of the organisation.

Point-to-point communications are established linking the local centre and central office LANs, together with video transmission facilities.

b) Open Work Centres

In open centres, staff from a number of organisations are grouped together in centres close to where they live. The centres provide more sophisticated facilities than may be possible at home, social contact, and a work environment free from domestic distractions.

Broadband communications are required from such centres to a number of points.

Open centres may include 'public' areas for infrequent or casual users. An extreme case may be open work centres at airports or hotels.

Objectives

These are stated for all Part III Advanced Communications Experiments in task TA.300. Specific objectives for this task are:

- to set up sets of both open and closed Local Work Centres and demonstrate the utility of advanced communications in this area of activity

- to align administrative procedures and telecom support structures

- to develop concepts of flexible organisation both for public administrations and other enterprises which could make use of Local Work Centres either as open or closed entities.

Technical Approach

Experiment participants should include a large commercial enterprise, a public administrative body, individual tele-workers, and possibly a local authority keen to use telecommunications infrastructure as a factor in local economic development.

Approach:

- Analyse opportunities and needs for Local Work Centres.

- Procure equipment and organise network resources.

- Set up system.

- Analyse results in terms of user needs, network needs, user acceptability and overall economic gains.

Key **Results and Milestones**

Results required from all Part III Advanced Communications Experiments are defined in task TA.300. Specific results required from this task are:

1 Report on the available experience on distance work/tele-work; decide whether conclusions relevant to advanced communications.

2 Identify suitable processes for inclusion in Local Work Centres.

3 Set up experiment.

4 Report results.

TA.325E Advanced Communications for Local Development

Background

General background for all application experiments is given in TA.300. General background for all public administration experiments is given in TA.325.

Economic development follows from the investment in communications infrastructure. So in the past, cities have grown as a result of major transport route intersections, and nearer to the present time the provision of science park infrastructures close to higher educational establishments has resulted in growth of science-based industry.

The deliberate planned provision of advanced telecommunications system and service infrastructure can attract investment by footloose industry and promote the growth of a local economy. The city should be promoted as an infrastructure-led economic growth area throughout Europe.

Objectives

These are stated for all Part III Advanced Communications Experiments in task TA.300. Specific objectives for this task are:

- to demonstrate the growth generating capabilities of advanced communications systems and services
- to discern which aspects of advanced communications are the major contributors to economic growth.

Technical Approach

The major experiment participant should be a city or district in need of economic growth, system and service operators.

The local broadband network infrastructure must be highly accessible, as 'all pervasive' as the typical city road network. Advanced communications links to remote locations must be provided if needed by incoming companies.

Tariffing (if any) should reflect not the current costs, but the costs that might be expected in 10-20 years.

All advanced communications usage should be carefully measured to establish relative and absolute service values. Growth and perceived prestige of the user community should be carefully monitored over the period of the experiment.

Key Results and Milestones

Results required from all Part III Advanced Communications Experiments are defined in task TA.300. Specific results required from this task are:

1 Design and install broadband interactive network.

2 Establishment of core services.

3 Launch promotion campaign.

4 Attracted first business.

5 Measure economic growth attributable to existence of advanced communications.

TA.326 Manufacturing and General Industry General Task

Background

General background for all application experiments is given in TA.300.

The general trend in the manufacturing sector is for products to become technically more complex. At the same time there is a strong tendency for products to have a shorter life in the market place, which increases pressure to reduce the time taken from design to product delivery. These trends encourage more automated and flexible design and manufacturing operations dependent on CAD/CAM, coupled with product and process modelling and supported by data bases of components and completed designs. These facilities need to be accompanied by speedy ordering and purchasing negotiations and by rapid delivery of components and subsystems.

Increasingly manufacturing involves close collaboration between a number of enterprises, often across national barriers, and this trend will increase as trade barriers are dismantled. Complex products often contain components sourced over wide geographical areas. In some industries (eg automotive), manufacturers of such products form closely coordinated multi-supplier operations, exchanging computer-based design information with their suppliers and integrating supply logistics. Other cases (eg aerospace) involve the close collaboration of several design teams in different locations to produce a single functioning entity, such as an aircraft.

The establishment of new production plants in different countries and the continuing introduction of new machinery and processes reinforce the need for continuing education, on-the-job training, and consultations with remote experts.

Advanced communications will support collaborative activities in the manufacturing sector by providing the fundamental infrastructure for the transmission of the large volumes of complex data associated with CAD physical and functional models. It will enable common access to multimedia design and component data bases and facilitate face-to-face contact for collective decision-making, negotiation, training and the provision of remote expertise.

Objectives

These are stated for all Part III Advanced Communications Experiments in task TA.300.

Technical Approach

The approach will be to establish a working advanced communications installation, integrating new facilities as much as possible into the existing methods of working. The approach will involve one or more Generic Applications in the manufacturing sector, for example:

Remote Delivery of Expertise

Within this sector there will be a common need for consultation with remote experts. Examples of this would include the transmission of complex information on maintenance, diagnosis and repair, help with the use of new complex machinery, advice on plant operation or malfunction or technical advice on products.

Distributive Collaborative Decision Making

This Generic Application deals with the process of complex decision-making between individuals who are remote from each other and have to refer to their own files or other complex data sources in the process of making decisions. Such a process is common in the manufacturing sector where there is the involvement of many people of different disciplines eg design, marketing, manufacturing, purchasing, component suppliers, etc, involved in important decisions of a strategic nature.

Distributed Learning/Training

The availability of multimedia communications will significantly improve the possibilities of remote education and training. These are vital for the manufacturing sector, in order to keep its workforce up-to-date with new developments in techniques of design, production, and marketing.

Monitoring and Surveillance

Monitoring and surveillance covers all situations where knowledge of what is happening at a situation remote from the enquirer is made available via advanced communications. In particular, in this sector it is of use in the remote monitoring of process plants or oil platforms, in the inspection of component suppliers production lines as a check on quality, and generally to maintain security at remote sites or in especially sensitive areas.

Telemarketplace

The telemarket is important to this sector since it provides facilities for remote advertising, offering, ordering, and sale of goods or services together with means of authentication, authorisation, and funds transfer for payment. Telemarket systems in this sector can address either component suppliers or retail customers. In each case the application will involve access by the potential customer to multimedia information describing the goods or services offered, together with interactive facilities dealing with the sales and payment processes. This Generic Application provides a path towards a major change in the methods by which manufacturing purchasing and sales will be conducted.

Multimedia Interpersonal Messaging

The importance of graphics information in the manufacturing industry, in the form of drawings, illustrations, charts, etc, emphasises a widespread need in this sector for the multimedia messaging facilities provided by this Generic Application.

Distributed Collaborative Design

Many design processes involve the participation of a number of different people. Advanced communications will allow remote participation in this process. This Generic Application focuses on multiple (and iterative) remote contributions to a design process which for example in the manufacturing industry could be the design of any complex product ranging from a turnkey factory construction to a comparatively simple domestic product. The Generic Application paves the way for a revolution in the design process by enabling an effective interaction between designers, each in their own offices and having access to all relevant information.

Whilst the above Generic Applications are considered to be the ones of major importance to the manufacturing sector, the relevance of others may become clear after further study.

Examples of application experiments in the manufacturing sector are given in tasks TA.326A to TA.326D. See also tasks TA.302B, TA.311A, TA.312C, TA.312D and TA.312D.

Key Results and Milestones

Results required from all Part III Advanced Communications Experiments are defined in task TA.300.

TA.326A Manufacturing Consultancy Services

Background

General background for all application experiments is given in TA.300. General background for all manufacturing and general industry experiments is given in TA.326.

All functions within a manufacturing business require specialist skills. Some are continuously needed but many others are required only at times of change or to meet contingencies, for example:

- introduction of new products
- re-equipping
- machinery breakdown
- recruitment or training.

Large companies have many of the skills available but smaller companies fare less well. They partly make up the skill gap by reference to technical literature, educational and professional institutions and consultants, or they ask for advice from suppliers of equipment or services. These methods are costly, usually inadequate and cause delays resulting in reduced manufacturing performance.

This problem could be solved by sharing widely dispersed expertise within a cooperative group, or from such a group to other users, by networking the experts or consultants and other users via advanced communications. The communications may comprise:

- audio visual links between a consultant and the user
- interactive video
- interactive expert systems for all perceived manufacturing requirements held in a central bureau.

Source information would be provided by consultancies, product, equipment and service suppliers, universities, commercial institutions, and user companies.

Objectives

These are stated for all Part III Advanced Communications Experiments in task TA.300. Specific objectives for this task are:

- to provide a experimental network of skilled consultants, bureaux for training videos and expert systems accessible by users via advanced communications to supplement the skills required within their manufacturing businesses
- to establish technical and commercial feasibility.

Technical Approach

The project should include the participation of large and small manufacturing companies and their clients.

Approach:

- Survey large and small companies across different sectors of manufacturing industry to determine main skill deficiencies.
- Determine the technical and commercial feasibility of providing the network.
- Identify suitable and willing participants in a experiment.
- Design experiment.

Key Results and Milestones

Results required from all Part III Advanced Communications Experiments are defined in task TA.300. Specific results required from this task are:

1 Analysis of skill deficiencies in manufacturing industry

2 Analysis of technical and commercial feasibility

3 Identification of experiment participants

4 Project plan and resources required.

TA.326B Product Library

Background

General background for all application experiments is given in TA.300. General background for all manufacturing and general industry experiments is given in TA.302.

All manufacturing companies incorporate other companies' products into their own product designs, whether these are elemental assemblies or end user products ranging from a domestic appliance to an aircraft or power station.

The large number of available products is overwhelming. It is both costly and time consuming for a design office to maintain files on available products and to pursue the enquiry process with suppliers. At best, only a limited number of products can be considered for use in a design and interpretation of dimensions and performance can be a source of error.

It would be an advantage to both designers and product suppliers to have all commercially available engineering products recorded in a library accessed via advanced communications. The library would provide search facilities in response to user enquiries and then display and compare suitable products using:

- photographs
- videos
- graphics
- tabular performance data
- drawings with dimensions.

In addition, graphics could be down-loaded into the user's own CAD system for accurate integration into his design. The product purchase procedure would also be routed via advanced communications by an interactive exchange with the product supplier to establish price, delivery and order acceptance.

Objectives

These are stated for all Part III Advanced Communications Experiments in task TA.300. Specific objectives for this task are:

- to provide a comprehensive library of structured product information accessed by designers via advanced communications
- to provide a product library as a marketing tool for product manufacturers
- to demonstrate technical and commercial feasibility
- to simplify the purchase of the product.

Technical Approach

The project could include the participation of any large and small company in manufacturing and their clients, in manufacturing or electronics, information service companies and industries.

- Survey design offices of large and small companies across different manufacturing sectors to determine their product information needs, as well as the costs and difficulties of their current methods of assimilating information.

- Survey existing libraries providing technical information services based on selection and distribution of paper documents and analyse their services.

- Select an existing library and local user group to experiment with new advanced communications library service.

- Design experiment.

Key Results and Milestones

Results required from all Part III Advanced Communications Experiments are defined in task TA.300. Specific results required from this task are:

1 Analysis of designers' needs for product information.

2 Analysis of services produced currently by technical libraries.

3 Identification of suitable users and library services prepared to participate in the experiment.

4 Experiment project plan and resources required.

TA.326C Engineering and Design for Manufacturing

Background

General background for all application experiments is given in TA.300. General background for all manufacturing and general industry experiments is given in TA.326.

Shortening the time between product conception and production has benefits for all manufacturing industries. They may be:

- responding to a market need faster than others
- matching limited windows of opportunity in the market, eg clothes fashions or supply of products in support of major projects.
- obtaining an earlier return on the pre-production costs, eg design, development, tooling and facility investment for a new car model.

The integration of engineering analysis, CAD, CAM and simulation of the product and production facilities using powerful computers and software packages provides for an ongoing reduction in the lead time of the creative process. This results from simultaneous and interactive use of the processes involved and mostly electronic rather than physical prototyping of products and proving of facilities.

Generating new designs instead of using existing or modified designs is costly in both design and subsequent production processes. Automatic search and retrieval of previous designs or features is a way of avoiding these penalties. Few companies have achieved these benefits from automated systems. Small companies in particular rely on the memories of their designers. Advanced communications will provide better links into common design (CAD) files, leading to the possibility of home-based designers drawing on design bureaux offering structured files with multiuser access.

Large companies have been able to afford these technologies but are faced with either falling behind or continually re-investing to keep up with the latest refinements and innovation. Small companies have to continue with old methods and forego the benefits offered by the technology.

Advanced communications will provide the opportunity for service companies to offer powerful, up-to-date computing resources with supporting visual and audio support to a wide range of users. Each user will be able to access the most appropriate and advanced computing technology to match the variable needs of his business.

Objectives

These are stated for all Part III Advanced Communications Experiments in task TA.300. Specific objectives for this task are:

- to provide an engineering/design service to multiple users
- to assess the potential application of advanced communications to improving the interaction between design and product processes in manufacturing industry
- to demonstrate technical and commercial feasibility
- to investigate user acceptability

- to determine the practicality of setting up bureaux offering user access to structured design files.

Technical Approach

- Survey user needs and opportunities through a cross-section of manufacturing industries.
- Define technical scenarios and assess financial implications for users and service providers.
- Identify representative user groups and potential service providers (eg a large company currently using the technology) for a limited cost experiment.
- Design experiment.

Key Results and Milestones

Results required from all Part III Advanced Communications Experiments are defined in task TA.300. Specific results required from this task are:

1 Analysis of user needs.

2 Technical concepts for providing the engineering/design service via advanced communications.

3 Commercial evaluation comparing costs and benefits of the service proposed with user-dedicated facilities.

4 Experiment project plan and resourcing required.

TA.326D Remote Control, Diagnosis and Maintenance

Background

General background for all application experiments is given in TA.300. General background for all manufacturing and general industry experiments is given in TA.326.

This task will provide facilities for diagnosing malfunctioning systems or equipments from a central point, both as an after-sales service reducing the number of decentralised experts, and as a utility in-house, at the manufacturer's plant(s), for the same reason.

Machinery and manufacturing processes will be of increasing complexity, less and less amenable for diagnosis by local operators. Using high-definition cameras, heat sensors, etc, the problem can be presented to the expert and diagnosed remotely.

Objective

These are stated for all Part III Advanced Communications Experiments in task TA.300. The specific objective of this task is to demonstrate and evaluate the utility of broadband links to transfer multimedia information from the place where the problem exists to an expert/experts for remote diagnosis and initiation of repair activities.

Technical Approach

- Identification of a case example.
- Assessment of necessary equipment.
- Establishment of an experiment plan.
- Operation of the experiment.
- Evaluation of experience gained.
- Preparation of a recommendation.

Key Results and Milestones

Results required from all Part III Advanced Communications Experiments are defined in task TA.300. Specific results required from this task are:

1 Report on the opportunities for advanced communications applications in remote control, diagnosis and maintenance.

2 Definition of the common characteristics and the technical facilities required to support them.

3 Establishment and operation of experiment.

4 Measurement of performance, usage and other important parameters.

5 Report on the results and conclusions of the experiment.

TA.327 Transport, Travel and Tourism General Task

Background

General background for all application experiments is given in TA.300.

Transport system users need up-to-date information about routes, schedules and tariffs, including the availability of 'special offers' and, in some cases, expert advice and multimedia data (eg for holiday travel). Courier and freight organisations are particularly concerned with 'chain management' - linking together a variety of means of transport to ensure the lowest cost or delivery in the shortest possible time. Information regarding normal operations must be supplemented by topical information concerning delays or stoppages caused by traffic congestion, breakdowns or industrial disputes. Such information is of very little value, or can have a negative effect, if it is not completely up-to-date.

Transport system operators, particularly freight operators, need to provide their customers with access to sophisticated booking/reservation systems. They will themselves need access to operational data describing the disposition and serviceability of their fleet and need to communicate rerouting instructions when scheduled operations are perturbed. Fleet maintenance and repair activities will often require the transmission of maintenance data and the provision of specialised expertise.

Air transport authorities (and also marine authorities in congested seaways) have the need to transmit large volumes of data in real time from radar and traffic control systems and to neighbouring regions. Road transport authorities need to transmit data and images in order to monitor and control traffic flow and to advise the motoring organisations and the travelling public about traffic delays.

Increasing congestion and rapid technological evolution focuses attention on the safety of transport systems.

Advanced communications can support the transport sector by providing rapid image and data transmission facilities, access to multimedia data bases and telemarketing systems, and the provision of remote expertise.

Objectives

These are stated for all Part III Advanced Communications Experiments in task TA.300.

Technical Approach

The approach will be to establish a working advanced communications installation, integrating new facilities as much as possible into the existing methods of working. The approach will involve one or more Generic Applications in the transport, travel and tourism sector, for example:

Remote Delivery of Expertise

Within this sector there will be a common need for consultation with remote experts. Examples of this would include the transmission of complex advice on maintenance, diagnosis and repair of transport vehicles, road transporters, ships, airplanes, all of which are becoming more complex.

Distributed Learning/Training

The availability of multimedia communications will significantly improve the possibilities of remote education and training which could be of great use in the transport sector with its widely distributed work force, for example remote learning for ship crews.

Monitoring and Surveillance

Monitoring and surveillance covers all situations where knowledge of what is happening at a situation remote from the enquirer is made available via advanced communications. In particular, in this sector it is of use in the remote monitoring of traffic, parking areas, airports, goods distribution centres etc.. In particular, the system could be used to survey damaged or lost goods and monitor general cargo transfer processes.

Telemarketplace

The telemarket involves the remote advertising, offering, ordering, and sale of goods or services together with means of authentication, authorisation, and funds transfer for payment. The main use of Telemarket systems in this sector would be in the purchase of transport opportunities for both freight and passenger carriage. The choice between different means of transport could be facilitated and details of the load to be carried forwarded by image transmission. Additional information transmittable by images could include hotel and destination details or holiday information.

Multimedia Interpersonal Messaging

Multimedia messaging facilities will be of value in transmitting maintenance information, load details and holiday data.

Whilst the above Generic Applications are considered to be the ones of major importance to the transport sector, the relevance of others may become clear after further study.

Examples of application experiments in the transport, travel and tourism sector are given in tasks TA.327A to TA.327F. See also tasks TA.312D and TA.312E.

Key Results and Milestones

Results required from all Part III Advanced Communications Experiments are defined in task TA.300.

TA.327A Remote Inspection and Tele-Supervision for Repair of Aircraft

Background

General background for all application experiments is given in TA.300. General background for all transport, travel and tourism experiments is given in TA.327. See also technical support/service background in TA.307.

When aircraft need urgent repair (as distinct from regular maintenance) away from their main repair centres then the repair can either be carried out by the repair/maintenance company on location, or by flying in an expert to carry out or supervise the repair. In any event the parts required to effect the repair need to be available at the repair site.

Advanced communications will permit the expert to be 'telepresent' at the repair site to supervise the repair procedure. This will permit repairs to be carried out more speedily, and will result in a more efficient use of the expert's time. A knock-on effect of this is that expert availability will be higher (less 'down time' because of less travelling) and more tasks will receive expert attention.

Objective

These are stated for all Part III Advanced Communications Experiments in task TA.300. Specific objectives for this task are:

- to demonstrate the increased efficiency of aircraft repair when expert 'telepresence' is available

- to demonstrate the improvements in the use of expert time enabled by advanced communications.

Technical Approach

Experiment participants could include: a centre of expertise in aircraft repair - possibly a manufacturer or an airline, and a number of airport-based repair facilities where such expertise is not available.

The experiment should be implemented on a single aircraft type to keep costs down and to give a better basis for comparing the advanced communications scenario with non-advanced communications methods.

Either the local repair engineer or the expert (maybe both) should have access to the aircraft's technical history via the network.

Approach:

- Install an experimental network between the main technical centre and the chosen remote centres.

- Specify, design and deliver the terminals required for inspection, tele-supervision, and aircraft history delivery.

Key Results and Milestones

Results required from all Part III Advanced Communications Experiments are defined in task TA.300. Specific results required from this task are:

1 Specify and deliver multifunction terminals.

2 Define and install experimental network.

3 Create aircraft technical history databases.

4 Measure benefits in terms of reduction of expert 'down-time'.

5 Measure the increased efficiency of aircraft repair with expert telepresence.

TA.327B Remote Inspection of Damaged Goods for Authorisation of Replacement or Repair

Background

General background for all application experiments is given in TA.300. General background for all transport, travel and tourism experiments is given in TA.327. See also banking, finance and insurance background in TA.307.

Authorisation for repair of goods damaged in transit is delayed until the extent of the damage can be inspected and assessed for insurance purposes. In the increasingly commonplace context of urgent goods delivery the need for speed is a high priority.

Advanced communications will permit detailed remote inspection, and thus speedier authorisation of repair or replacement.

Objectives

These are stated for all Part III Advanced Communications Experiments in task TA.300. The specific objective of this task is to establish a tele-inspection environment which will enable:

- goods damaged in transit to be remotely inspected
- time to be saved in replacement/repair authorisation.

Technical Approach

- Establish a multipoint broadband framework with nodes at the heaviest freight traffic destinations.
- Provide remote input from camera, possibly controlled from the inspection end.
- Provide the ability to record in detail the extent of the damage, as a further aid to decision making.

The project participants should include a major, high value international shipper and a freight insurance company.

Key Results and Milestones

Results required from all Part III Advanced Communications Experiments are defined in task TA.300. Specific results required from this task are:

1. Multipoint broadband framework specified and in place.
2. Inspection 'studios' specified and constructed.
3. The process for remote control of inspection specified and delivered.
4. Measurements of the benefits of tele-inspection for the speed of subsequent decision making.

TA.327C Business Traveller Communications and Workcentres

Background

General background for all application experiments is given in TA.300. General background for all transport, travel and tourism experiments is given in TA.327.

Business travellers need communications between current location and other locations such as their 'home' offices, next destination, and other travelling colleagues.

This need is currently served by narrowband communications but the traveller will be better supported by the existence of broadband multimedia capability. This will enable text, graphics, pictures, and video to be interchanged between the traveller and his home base.

Any airline and hotel group establishing such a network could use its existence as a competitive advantage in the business travel market.

Objectives

These are stated for all Part III Advanced Communications Experiments in task TA.300. The specific objective of this task is to construct a business traveller support network which enables:

- travellers to easily communicate with other points in the network
- travellers to use multimedia communications
- an assessment to be made of the usefulness of advanced communications in the business travel context.

Technical Approach

A network of multimedia communications centres will be established at the airports which carry the heaviest business traffic, together with hotels close by.

Each centre in the network must have identical and simple user access, with facilities for teleconferencing, and for multimedia messaging. Store and forward of multimedia messages may be important.

The experiment participants could include multinational companies, an international hotel chain and an international airline.

Key Results and Milestones

Results required from all Part III Advanced Communications Experiments are defined in task TA.300. Specific results required from this task are:

1 Specification of business travellers' communications needs.

2 Design of a common user interface.

3 Specification and establishment of an experimental network.

4 Assessment of usefulness of the network.

TA.327D Telemarketplace for Freight and Transport

Background

General background for all application experiments is given in TA.300. General background for all transport, travel and tourism experiments is given in TA.327. See also sales background in TA.304 and transport/distribution function background in TA.305.

To buy and sell transport related services efficiently and to create an open, competitive market a telemarketplace should be created. Broadband facilities are need to describe the services offered in detail, especially the transport related services such as travel, hotels, holiday packaging, maps detailing how to reach a train station or airport or information about the travel destination (weather, things to see and do).

Objective

These are stated for all Part III Advanced Communications Experiments in task TA.300. The specific objective of this task is to establish and operate experimental advanced communications facilities to create a telemarketplace for freight and passenger transport services and transport related services.

Technical Approach

Both freight-oriented market and passenger/travel-oriented market should be addressed.

Organisations participating in this project could include:

- large airlines computer reservation organisations
- holiday tour operators
- freight operators.

Access points could be at airports, ports, hotels, public libraries and eventually private homes.

Key Results and Milestones

Results required from all Part III Advanced Communications Experiments are defined in task TA.300. Specific results required from this task are:

1 Report on the commercial opportunities for Telemarketplaces in the freight and passenger transport market sectors.

2 Definition of the technical facilities required to support promising opportunities.

3 Establishment and operation of a experiment.

4 Report on the results and conclusions of the experiment.

TA.327E Cultural Event Promotion and Sale

Background

General background for all application experiments is given in TA.300. General background for all transport, travel and tourism experiments is given in TA.327.

Cultural events all over Europe already draw their audiences from many countries. Either the event itself is the reason for travelling, or the travel itinerary by chance gives the traveller the opportunity to participate in the event.

There is currently no methodical way in which the traveller's itinerary can be cross referred against a database of events to generate an 'event/opportunity' listing.

Nor is there any comprehensive way in which travel can be planned deliberately to include a number of events.

The creation of a multimedia events database would enable these types of arrangements to be constructed, and in addition could serve as a purely promotional vehicle for the events in question.

Objectives

These are stated for all Part III Advanced Communications Experiments in task TA.300. Specific objectives for this task are:

- to gauge the effectiveness of a widely accessible multimedia calendar/database in the promotion of Europe-wide cultural events
- to have the ability to tailor a travel itinerary on the basis of desired events, and for an existing itinerary to schedule in possible events
- to make reservations to attend events and pay for these reservations as part of the same transaction.

Technical Approach

Participants would be organisers of cultural events, travel operators, municipalities hosting cultural events.

Approach:

- Establishment of a multimedia calendar of events.
- Definition of user access means to events calendar.
- Decision on experiment's requirement for advanced communications network facilities.
- Design and establish a payments and reservation system for each event in the calendar.

Key Results and Milestones

Results required from all Part III Advanced Communications Experiments are defined in task TA.300. Specific results required from this task are:

1 Multimedia calendar designed and completed.

2 User access mechanism designed and tested.

3 Measure level of reservations via experiment.

4 Measure all accesses to experiment's database to judge value of publicity.

5 Measure importance of cultural events in itinerary planning.

TA.327F Airport Teleshopping

Background

General background for all application experiments is given in TA.300. General background for all transport, travel and tourism experiments is given in TA.327. See also sales background in TA.304.

Most modern airports could be described as 'shopping centres from which people aspire to travel'. It is the existence of a large number of potential shoppers, with time to spare, concentrated in a single location that explains the rationale behind basing an advanced communications teleshopping experiment somewhere other than in the residential context.

Most of the features of the proposed catalogue showroom teleshopping experiment also apply to this proposed experiment.

Objectives

These are stated for all Part III Advanced Communications Experiments in task TA.300. The specific objective of this task is to assess the potential of advanced communications as a non-residential teleshopping medium.

Technical approach

Users would access a remote multimedia shopping database whose contents might be specially tailored for this type of teleshopping.

Products ordered would be delivered to any address world-wide specified by the user, with delivery included in price.

Experiment participants could be a number of airports and a number of wholesalers/suppliers.

Key Results and Milestones

Results required from all Part III Advanced Communications Experiments are defined in task TA.300. Specific results required from this task are:

1 Database contents decided.

2 Database created.

3 User terminals specified and installed.

4 Measurement of sales volume.

5 Measurements of usage.

6 Assessment of non-residential teleshopping potential.

TA.328 Agriculture General Task

Background

General background for all application experiments is given in TA.300.

The agriculture sector in the Community is characterised by its lack of homogeneity in terms of almost all the relevant parameters, from size of holding, holding income and degree of mechanisation to the application of scientific expertise. Agriculture is currently engaged in a process of continuous structural change driven by over-production in certain areas and low productivity in others.

Agricultural activity often takes place in areas of sparse population where specialised expertise is thinly distributed, whereas increasingly sophisticated machinery and chemical treatments are employed. Additionally there is an increasing emphasis on product quality and there are demands for a more ecological approach to farming activities.

Strong and efficient links with the food processing and marketing industries are necessary for the efficient and timely distribution of agricultural products.

Moving land away from direct agricultural production to leisure activities may introduce a need for the communication of expertise in hitherto unfamiliar topics.

In the agricultural sector, the frequent need for specialised expertise could be supported by , for example, fixed and moving images to describe the state of crops, land, animals and machinery. With its ability to transmit moving and fixed images and to provide access to multimedia databases, advanced communications can make remote expert help available to the agricultural community for crop and disease control, animal care, repair of farm equipment, alternative land and building use, etc.

Advanced communications can provide links to the market places for agricultural products, supplies, and alternative use of the countryside, by multimedia mail and telemarket systems.

Objectives

These are stated for all Part III Advanced Communications Experiments in task TA.300.

Technical Approach

The approach will be to establish a working advanced communications installation, integrating new facilities as much as possible into the existing methods of working. The approach will involve one or more Generic Applications in the agriculture sector, for example:

Remote Delivery of Expertise

Within this sector there will be a common need for consultation with remote experts. Examples of this would include the two-way transmission of complex information on the state of crops, animals, general problems with land or buildings, and the maintenance, diagnosis and repair of new complex machinery.

Distributed Learning/Training

The availability of multimedia communications will significantly improve the possibilities of remote education and training which is vital for the agriculture sector in maintaining its workforce up-to-date with new development in techniques for looking after or developing crops, animals, land and buildings. This is particularly relevant in the case of areas where the workforce is sparsely scattered in remote locations.

Telemarketplace

The telemarket is of particular relevance in the agriculture sector where the goods are often perishable and need to be marketed quickly and efficiently. The Generic Application encompasses remote advertising, offering, ordering, and sale of agricultural products or services, together with means of authentication, authorisation, and funds transfer for payment. Because of the comparative remoteness of many agriculture activities from the most populous areas this Generic Application provides the possibility of a major change.

Multimedia Interpersonal Messaging

Multimedia messaging will provide facilities for the transmission of fixed and moving images of crops, animals machinery and equipment.

Whilst the above Generic Applications are considered to be the ones of major importance to the agriculture sector, the relevance of others may become clear after further study.

Examples of application experiments in the agriculture sector are given in tasks TA.328A and TA.328B. See also task TA.312G.

Key Results and Milestones

Results required from all Part III Advanced Communications Experiments are defined in task TA.300.

TA.328A Distributed Integrated Multimedia Agricultural Information system

Background

General background for all application experiments is given in TA.300. General background for all agriculture experiments is given in TA.328.

The agricultural sector actors (farms, cooperatives, research institutes, sectoral organisations) represent agents in a systematic information exchange at the local, national or international level. Farms and cooperatives in particular, require a wide variety of information as background to their production activities.

This information ranges, for example, from technical information on plant/livestock production, crop utilisation and standards to information on market prices, sectorial performance indexes and national/international regulations. Its typology also ranges from the classic textual information (eg data on breeding materials composition) to the still/moving picture (eg machinery configurations or weather forecasts).

Objectives

These are stated for all Part III Advanced Communications Experiments in task TA.300. Specific objectives for this task are:

- to identify user requirements concerning advanced information systems application in the agricultural sector
- to investigate the potential for establishing advanced multimedia information systems in the agricultural sector and examine the exploitation feasibility of such applications.

Technical Approach

Two kinds of information can be distinguished, according to their interest:

- information of interest on a local/regional or national level (eg weather forecasts, technical information, national regulations, etc) and
- information of an international interest (eg EC regulations, information on international markets, technical bibliographical information).

For accessing this information there is the need to focus, apart from the level of technology required in terminal equipment and the available options for telecommunications interconnection, on the development of user-friendly interfaces employing comprehensive pictorial interaction and, especially in the second case, some degree of automatic translation mechanisms for retrieving the primary information.

The proposed task would involve most of the agricultural sector actors for its implementation. It is envisaged that agricultural research centres could form the nuclei of Agricultural Information Centres in the role of information and service providers. Sectorial bodies, public sector organisations and consultancy/extension services (experts, suppliers, market distributors, etc) would act as information providers as well as users. Cooperatives would be nodal points for access to the available information services (on both national and international level) by their farm members.

It should however be noted that elements of the total integrated system may be more easy to experiment with from the point of view of investment, logistics and risk management. Experiments could thus be created of *parts of the total integrated system.*

Key Results and Milestones

Results required from all Part III Advanced Communications Experiments are defined in task TA.300. Specific results required from this task are:

1 Definition of user requirements.

2 Definition of quality of service requirements.

3 Specifications and design of the application experiment (with special emphasis on the level of technology: eg terminal equipment, communications links; and required sophistication, eg access interfaces).

4 Implementation of experimental service.

5 Assessment of achievement (technological and functional, ie sectorial impact).

6. Assessment of exploitation feasibility.

TA.328B Remote Expert Support in Agriculture

Background

General background for all application experiments is given in TA.300. General background for all agriculture experiments is given in TA.328.

There are many cases in agricultural production where there is need for access to expert knowledge. This is more so since characteristics such as geographical dispersion, distance and facilities infrastructure in rural areas have a direct effect on the on-site availability of human experts.

Examples of the potential usage for off-site expertise in the context of agricultural production are:

- plant/animal disease diagnosis and treatment prescription
- maintenance/repair of machinery
- optimisation of production techniques.

This consultation can take the form of access to remote expert systems in the classic sense and/or that of a two-way communication with the off-site expert, through the establishment of video/speech links.

Objectives

These are stated for all Part III Advanced Communications Experiments in task TA.300. Specific objectives for this task are:

- to identify user requirements concerning the use of remote systems for expert support in the agricultural sector
- to investigate the potential for remote expert support usage in the agricultural sector and examine the exploitation feasibility of such applications
- to create an experiment of significant scale addressing the remote delivery of expertise in farming.

Technical Approach

The first stage will consist of the identification and analysis of those 'expertise services' provided in the agricultural production sector today (eg plant consultant, veterinary, researcher) and of their typology (users and usage, environment etc).

The categorisation of the identified 'expertise services' according to user criteria (importance, desired use, etc) will serve as the basis for the definition of the potential functionality for the proposed experiment, which will then be assessed on the basis of both technical feasibility and economic viability.

This task would involve cooperation mainly between farms/cooperatives, agricultural consultancy services (eg veterinary, plant consultant) and agricultural research centres. The two last actor types represent the 'expertise pool' to be drawn upon the proposed task.

The implementation of the experiment should take place in an environment characterised by:

- technology-intensive production, where systematic use of expert knowledge takes place, thus justifying the implementation of advanced support services, and

- sufficiently developed telecommunications infrastructure, in order to support such applications.

These criteria apply both to the consultation of 'classic' AI-based systems, as well as to the two-way communications with the expert through the establishment of video and speech links.

Key Results and Milestones

Results required from all Part III Advanced Communications Experiments are defined in task TA.300. Specific results required from this task are:

1. Definition of user requirements.

2. Definition of quality of service requirements.

3. Specifications and design of the application experiment (with special emphasis on the interface requirements for expert systems consultation and of the level of technology required, eg terminal equipment and communications links).

4. Implementation of experimental service.

5. Assessment of achievement (technological and functional / sectorial achievement).

6. Assessment of exploitation feasibility.

Utilities

TA.329 Utilities General Task

Background

General background for all application experiments is given in TA.300.

Each of the water, gas, electricity and telecommunication utilities maintains a network of watercourses, pipes, and cables, interconnecting relatively remote pumping stations, transformer stations, etc. There is a need to maintain accurate records of these networks and of the associated land use and to provide access to this data to other utilities or to the emergency services.

The maintenance and repair of complex remote equipment may often require access to specialised expertise which may not be available at the remote site.

Advanced communications can support the utilities sector by providing access to multimedia data bases and enabling the provision of specialised expertise at remote sites.

Objectives

These are stated for all Part III Advanced Communications Experiments in task TA.300.

Technical Approach

The approach will be to establish a working advanced communications installation, integrating new facilities as much as possible into the existing methods of working. The approach will involve one or more Generic Applications in the utilities sector, for example:

Remote Delivery of Expertise

Within this sector there will be a common need for consultation with remote experts particularly in cases where a complex repair to the fundamental infrastructure needs to be carried out which is not only difficult in itself, but also has repercussions on the neighbourhood and with other services or utilities.

Monitoring and Surveillance

Monitoring and surveillance covers all situations where knowledge of what is happening at a situation remote from the enquirer is made available via advanced communications. In particular, in this sector it is of use in the remote monitoring of process plants, other unattended parts of the supply infrastructure, pipelines, transmission systems or sensitive areas such as fuel dumps or waste disposal locations, and for environmental monitoring.

Multimedia Information Assembly, Access and Distribution

Providing access to distributed multimedia databases is a vital function of advanced communications. Such multimedia databases contain structured and unstructured combinations of text, graphic, audio and video information. They could be especially relevant to the utilities sector where they could contain detailed local and national records such as annotated maps.

Whilst the above Generic Applications are considered to be the ones of major importance to the utilities business sector, the relevance of others may become clear after further study.

An example of an application experiment in the utilities sector is given in task TA.329A. See also task TA.307B.

Key Results and Milestones

Results required from all Part III Advanced Communications Experiments are defined in task TA.300.

TA.329A Utilities Distributed Information Network

Background

General background for all application experiments is given in TA.300. General background for all utilities experiments is given in TA.329.

Public utilities, such as electricity distribution, gas, water, railways, telecommunications, cartographic institutions and local authorities, maintain large amounts of information on their infrastructure of pipes, cables, track and terrain.

The asset value and maintenance cost of this infrastructure is high and increasing. This suggests there is significant potential for Information Technology and Telecommunications to assist in the management of these resources; which in many cases are neighbours in, under, on, or over, the same ground space. Anecdotal evidence suggest a need to coordinate the installation and maintenance of these facilities in order to reduce the cost to the utilities and the economy as whole as a result of reduced disruption.

The digitisation of records and plans is still in its early stages, which provides the opportunity to reduce costs and improve coordination between the utilities by adopting a common approach.

Objectives

These are stated for all Part III Advanced Communications Experiments in task TA.300. Specific objectives for this task are:

- to identify the common elements of public and private distribution infrastructure which can be combined in a structure available to all the utilities from a range of locations including portable and transportable requirements

- to coordinate planning installation and maintenance activities of the utilities in order to reduce cost and disruption to the economy.

Technical Approach

The approach could be to create a database containing information on the routing of cables, pipes, track, etc, of all the major utilities. An overlay approach could be used so that each utility can have separate access to its own information when required. Information is likely to be of a multimedia nature and will contain three-dimensional information of the topology of the various interlinked systems.

Access to the system will need to be protected by a rigorous security system to protect the commercial interests of each utility. Methods of interworking between each utility will need to be established at management planning and operational levels.

It is likely that a range of terminal types will be necessary to cater for different requirements. Each will need to have sufficient processing power to manipulate 3D information in real time or close to real time and possibly have some image processing capability. Alternatively, this could be performed remotely and delivered by IBC.

Key Results and Milestones

Results required from all Part III Advanced Communications Experiments are defined in task TA.300. Specific results required from this task are:

1 Technical solution to the database design, access and communication systems.

2 Establishment of common management, planning and maintenance systems.

3 Operational use of the system.

4 Results analyses and implications for wider use of the system.

TA.330 Liberal Professions and Professional Institutions General Task

Background

General background for all application experiments is given in TA.300.

Many liberal professions, particularly those associated with healthcare, are associated with economic sectors which have already been addressed above. Members of these professions will often be involved in case conferences, collective decision making and the provision of specialised expertise.

Architects, particularly, will need access to multimedia data bases describing building materials and equipment, construction methods and codes of practice. They will frequently be involved in collaborative design projects with other professionals, with the construction industry, and with manufacturing enterprises providing major items of equipment for construction projects.

The IBC will support the liberal professions and professional institutions by providing facilities for multimedia communication and data bases, collaborative design, and the provision of remote expertise.

Objectives

These are stated for all Part III Advanced Communications Experiments in task TA.300.

Technical Approach

The approach will be to establish a working advanced communications installation, integrating new facilities as much as possible into the existing methods of working. The approach will involve one or more Generic Applications in the liberal professions and professional institutions sector, for example:

Distributed Case Handling

This Generic Application deals with the procedures involved in handling sets of multimedia documents between remotely-sited specialists. Such is often the case in the liberal professions where a number of experts of different disciplines who are normally sited in different geographic areas may be "called in" to give case advice on a certain case, eg legal enquiry or a planning brief. The Generic Application would pave the way for a major increase in the efficiency of this work.

Interpersonal Communications

Direct interpersonal communication could have an important application to this sector, in particular video conferencing.

Remote Delivery of Expertise

Within this sector there will be a common need for consultation with remote experts usually by clients or other colleagues.

Multimedia Interpersonal Messaging

Multimedia interpersonal messaging will facilitate communication between the liberal professions and their clients and collaborators.

Multimedia Information Assembly, Access and Distribution

Providing access to distributed multimedia databases containing structured and unstructured combinations of text, graphic, audio and video information could be especially relevant to the liberal professions sector where diverse material such as legal records or architectural components could be exchanged. The IBC permits removal of access constraints to distributed databases, giving the user the advantages of a centralised database without its disadvantage of remoteness from the information source. The Generic Application involves accessing, data maintenance, security and means of payment for the use of such databases.

Whilst the above Generic Applications are considered to be the ones of major importance to the liberal professions sector, the relevance of others may become clear after further study.

An example of an application experiment in the liberal professions and professional institutions sector is given in task TA.330A.

Key Results and Milestones

Results required from all Part III Advanced Communications Experiments are defined in task TA.300.

TA.330A Professional Seminars and Conferences

Background

General background for all application experiments is given in TA.300. General background for all liberal professions and professional institutions experiments is given in TA.302.

Professional participation in technical meetings, seminars and conferences is often limited by the time and cost of travel, and yet it is always important that professionals in various disciplines keep up-to-date and have the opportunity to present their work to their peers.

This task explores the use of the IBC to provide realistic facilities enabling the remote participation in meetings and conferences. To be effective, facilities need to be provided for two-way multimedia communication and for the presentation of demonstrations and visual aids (including moving image).

Advanced communications will also provide the possibility of professional multimedia electronic mail conferences which take place over an extended period and permit the widest participation from a range of time zones. Electronic mail conferencing facilities may be combined with fixed session conferences to provide an extended opportunity for discussion.

Objectives

These are stated for all Part III Advanced Communications Experiments in task TA.300. The specific objective of this task is to set up trials of the remote participation in technical meetings, seminars and conferences by teleconferencing techniques to achieve:

- wider dissemination of scientific and technical knowledge to professionals scattered throughout Europe
- support to enterprises and institutions in remote areas
- promotion of appropriate methodology and standards for remote conference participation.

Technical Approach

Participants should include professional institutions or conference organisers.

Initial studies should identify the technological requirements of a remote conference participation system, distributing television displays, speech, fixed and moving images and conference documentation to remote participants over the IBC. Programme control aspects should be considered, in both the outward and inward (for remote contributions) directions. The task may also include the special case of conferences jointly-held between two or more locations.

Experiments could initially use an existing conference-TV infrastructure so as to take advantage of existing conference rooms and telecommunications links. In the longer term, high-definition extensions to conference television should be considered for the video presentation of speakers and demonstrations.

For the display of illustrations, an independent display screen to a computer-graphics standard may be considered.

Optional transmission systems ranging from ISDN 2B+D through 2 Mbit/s to > 34 Mbit/s should be tested, to study their acceptability and economics, as well as the feasibility of providing two or more options in a final service, at different cost levels.

The approach may enable a remote participant to choose among a number of parallel sessions or to participate in one-to-one 'side meetings' or multimedia bulletin board type communication with other meeting 'attendees'.

The problems of translation and of multimedia conference publication should be addressed.

Key Results and Milestones

Results required from all Part III Advanced Communications Experiments are defined in task TA.300. Specific results required from this task are:

1 Identification of characteristics of terminal facilities.

2 Identification of specific telecommunications facilities and how they can be provided.

3 Experiment test specification.

4 Examine whether a common approach might be taken for formal training courses, such as a future version of the Euro Pace (satellite TV) project.

5 Report on economics and effectiveness of remote conferencing.

TA.331 Building and Construction General Task

Background

General background for all application experiments is given in TA.300.

The combination of distributed, collaborative design and planning activities, remote construction sites and the widespread use of detailed technical data, particularly graphical data, provide many opportunities for advanced communications applications.

Objectives

These are stated for all Part III Advanced Communications Experiments in task TA.300.

Technical Approach

The approach will be to establish a working advanced communications installation, integrating new facilities as much as possible into the existing methods of working. The approach will involve one or more Generic Applications in the building and construction sector, for example:

Remote Delivery of Expertise

Within this sector there will be a common need for consultation with remote experts. Examples of this would include explanation of the details of building design or construction processes, trouble-shooting problems in construction, and help with the use or repair of complex machinery.

Distributed Collaborative Decision Making

This Generic Application deals with the process of complex decision-making between individuals who are remote from each other and have to refer to their own files or other complex data sources in the process of making decisions. Such a process is common in the building and construction sector where there is the involvement of many people of different disciplines eg building owner, contractor, consulting engineer, major equipment suppliers, planning and environment specialists, etc, involved in important decisions of a strategic nature.

Distributed Learning/Training

The availability of multimedia communications will significantly improve the possibilities of remote education and training. These are important for the building and construction sector, in order to explain the details of a new construction to the workforce and to keep it up-to-date with new developments in construction techniques.

Monitoring and Surveillance

This Generic Application covers all situations where knowledge of what is happening at a situation remote from the enquirer is made available over the IBC. In particular, in this sector it is of use in the remote monitoring of construction sites and in the inspection of prefabricated component suppliers' production lines as a check on quality.

Telemarketplace

This Generic Application can provide a remotely accessible library/telemarketplace for the materials and components used in building and construction.

Multimedia Interpersonal Messaging

The importance of graphics information in the building and construction industry, in the form of drawings, illustrations, charts, etc, emphasises a widespread need in this sector for the multimedia messaging facilities provided by this Generic Application.

Distributed Collaborative Design

Many design processes involve the participation of a number of different people. Advanced communications will allow remote participation in this process. This Generic Application focuses on multiple (and iterative) remote contributions to a design process which for example in the building and construction industry could involve architects, structural engineers, interior designers, heating and ventilation engineers, and suppliers of major items of equipment, eg elevators.

Whilst the above Generic Applications are considered to be the ones of major importance to the building and construction sector, the relevance of others may become clear after further study.

Examples of application experiments in the building and construction sector are given in tasks TA.331A and TA.331B. See also task TA.301B.

Key Results and Milestones

Results required from all Part III Advanced Communications Experiments are defined in task TA.300.

TA.331A Building and Construction Collaborative Design and Planning

Background

General background for all application experiments is given in TA.300. General background for all building and construction experiments is given in TA.302. See also design background in TA.311.

A major construction project involves the collaboration of many different designers from a variety of organisations - architects, structural engineers, land surveyors, foundation specialists, designers of specialised building components, planners, interior designers, etc, and for purpose-built constructions, eg power stations, designers of the equipment that the building is intended to house.

Those involved need to:

- access multimedia data bases describing building materials and components, construction methods and codes of practice
- exchange drawings and specifications
- provide or consult specialised expertise
- participate in collective decision making.

The results of the design process have to be stored in appropriate archives where they need to be accessed by quantity surveyors, estimators and planners who themselves generate costing and planning data.

Design and planning information is always subject to continuous change.

Objectives

These are stated for all Part III Advanced Communications Experiments in task TA.300. The specific objective of this task is to establish facilities to support the collaborative design and planning of large-scale building and construction projects.

Technical approach

Project participants should include a variety of design and planning specialists involved in large-scale building projects, eg architects, structural designers, foundation engineers, interior designers, etc.

A major features of the project will be the mechanisms for the exchange of 2D and 3D computer models of construction projects. This may require interfacing between a variety of modelling systems.

Another critical feature will be the interfaces between a number of different data base systems containing the project design and planning data.

Key Results and Milestones

Results required from all Part III Advanced Communications Experiments are defined in task TA.300. Specific results required from this task are:

1 Report on the opportunities for IBC applications in the collaborative design and planning of building and construction projects.

2 Definition of the common characteristics and the technical facilities required to support them.

3 Establishment and operation of experiment.

4 Measurement of performance, usage and other important parameters.

5 Report on the results and conclusions of the experiment.

TA.331B Building and Construction Components Library / Telemarketplace

Background

General background for all application experiments is given in TA.300. General background for all building and construction experiments is given in TA.302. See also sales background in TA.304.

It is both costly and time-consuming for building designers and architects to maintain files on available products and to pursue the enquiry process with suppliers.

It would be an advantage to both designers and product suppliers to have data describing commercially available building components, materials and processes recorded in a library/telemarketplace accessed via advanced communications.

The library would provide search facilities in response to architects' enquiries and display and compare suitable products using:

- dimensioned drawings
- tabular performance data
- still images
- videos to show, eg erection procedures.

In addition, graphical data could be downloaded into the designer's own CAD system for integration into his design.

The system would permit an interactive exchange between the product supplier and the customer to establish price, delivery and order acceptance.

Objectives

These are stated for all Part III Advanced Communications Experiments in task TA.300. Specific objectives for this task are:

- to provide a product library/telemarketplace as a working tool for architects and building designers and as marketing tool for building product manufacturers
- to demonstrate technical and commercial feasibility
- to identify the common functions, elements and requirements for a building component library.

Technical Approach

The technical approach will involve:

- surveys of architects' and building designers' offices to determine the costs and difficulties of current methods of distributing information
- data base functions for multimedia information, especially for images with facilities to zoom to more detailed views, 3D images and detailed drawings

- communication facilities to access several databases at several locations with indexes showing which information will be available at which places
- surveying existing paper libraries to analyse their services
- design and implementation of an experiment.

Key **Results and Milestones**

Results required from all Part III Advanced Communications Experiments are defined in task TA.300. Specific results required from this task are:

1 Analysis of architects needs for product information.

2 Analysis of services produced currently by technical libraries.

3 Project plan and resources required.

4 Implementation of a experiment.

5 Report on results of experiment.