Annex A.1

FollowMe

ESPRIT: 25,338

Project Programme

PART 2

Description of the RTD Project

Version 1.0

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FollowMe

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1 Objectives & Results

1.1 Overview

The objective of FollowMe is to exploit global networks such as the internet. It focuses on the requirements of mobile users; it aims to support these users in their day-to-day actions and, more generally, to enable them to exploit the vast array of information and services that are rapidly becoming available.

FollowMe attempts to improve on the desktop as the method of driving applications and accessing data. The replacement of the desktop will be network based. Mobile users will be able to access and share information from any node on the network. The project examines devices and ways in which users will interact with such an environment, how they will specify tasks and have these fulfilled. It explores means to aid the deployment of services with mechanisms to optimise their location and distribution.

The project will create two pilot applications to demonstrate and validate this new paradigm in utilising internet based services. The Ouest France newspaper and the resources and services of Bavaria Online ISPs will be the basis for these pilots.

1.2 Objectives

FollowMe builds on the potential offered by global networks. Its aim is to exploit the connectivity which they provide, allowing new facilities and services to be delivered. This will enable a wide range of users with new and easier means of performing tasks and accessing information. It will target remote users such as mobile executives, tele-workers and the domestic market. For SME's, the technology will simplify and unify the process of sharing information between offices. It will remove the boundaries of location, facilitating free movement and the expansion of the global electronic market.

The project will bring access to the internet and the electronic market place to a substantial cross section of the community. This will be realised through devices which are commonly available and in a form which is readily accessible. Personal agent technology will be deployed to automate and simplify tasks. It will take over much of the searching for, and interaction with, services. This will enable people outside the current internet fraternity to take advantage of the huge range of facilities which will be at their disposal.

The internet will therefore be open to a greater user community which in itself will a have cyclical effect. It will further stimulate vendors to move to the electronic market place providing new and enhanced services.

1.3 Results

FollowMe will create two pilot applications which will demonstrate the use of agent based technologies, validate the approach in real-world situations and provide direct exploitation paths. The pilots are drawn from two different spheres ensuring that FollowMe technology will be generally applicable. *Ouest France*, the largest regional newspaper in France will be the basis of one pilot, with infrastructure of the internet service *Bavaria Online* providing the other.

In order to achieve its objectives, the project investigates a number of key technology areas. This work is divided into discrete units of work. The outputs of each of these investigations have been designed to be beneficial both as part of the project and in their own right. When they are combined, they provide the platform to implement the goals of FollowMe. Separately, each component can feed a spectrum of other industry sectors. This approach ensures not only that the project as a whole can be exploited, but also enables the constituent parts to be brought independently to market.

The major exploitable results of FollowMe are:

Device independent access

This will provide mechanisms to enable services to be present through a range of user interface devices. It will implement tools to support a number of common devices. However, the approach will be generic, enabling other devices to be incorporated without the requirement to modify the service.

Personal Information Space

A key requirement of the mobile user is the ability to maintain and access their own information. A personal information space will enable a user to access data through one consistent logical view irrespective of their or the data's location. This area of work in FollowMe will provide transparency mechanisms enabling the location of data to be hidden. In addition, the system will employ the automatic movement subsets of the data aiding the efficient interaction. This work could be of advantage to many large companies and SMEs. It is enabling technology allowing employees to freely travel between company sites while still having access to their normal range of information.

Autonomous Mobile Agents

The rate at which services and facilities become available on the internet will increase. It is essential that users are provided with alternative means to locate, monitor and interact with electronic vendors. This area of work will create a framework enabling users to specify objectives and have these tasks carried out while they are off-line. The project will implement a number of instances of such agents. This will validate the approach and provide a guide for other applications. Mobile agent technology is employed in order to allow applications to transfer to the most appropriate location in order to access the service.

The field of mobile agent technology is an area which is currently generating very strong interest. This work has been again designed not only as a key part of the overall FollowMe objectives but could independently be applied to related applications such as data mining or to areas such as simulation. There are a number of agent technologies currently available. However, these are designed to cope with a relatively small number of agents working in a local environment. FollowMe will develop the infrastructure and security mechanisms to support very large numbers of agents operating in a wide area distributed environment.

Personal Profiles

Autonomous tasks need to be able to make decisions. FollowMe will create a profile of the user, holding a combination of facts and derived information such as their personal preferences. This will be used to direct agents and reduce the need to refer to the user for supplementary information. The work will yield a modular encapsulation of a users' profile. It will explore what essential facts need to be provided and which mechanisms are required to deduce preferences. Although the pilot applications will be used to drive the requirements of this work, the approach will, as far as possible, be generic.

Means of capturing and utilising the interests of users will be essential to the growth of the internet. Locating information is a particularly crucial area. The output of current internet search engines for example is not directed. The user is required to sift through hundreds of articles most of which are irrelevant. This problem will escalate as the number of services rise. Personal profiles could be employed to reduce the selection to those articles of interest to the user. FollowMe will demonstrate how user profiles can be built and used. The modular approach will enable the internal mechanisms to be easily improved or substituted.

Service Interaction

Current services on the internet are designed for human use. However, in order for applications to monitor, interrogate and interact with these services, an alternative interface is required. FollowMe will develop a template for creating services, a directory capability for locating them and an interface library for interaction. The results will enable providers to unilaterally enhance their service and provide means, to discover the facilities available.

Service Deployment

Anticipating the level and location of demand for a service is key to its efficient deployment. FollowMe will investigate mechanisms to estimate and cope with likely usage. It will attempt to project usage patterns based in part on Personal Profiles. The aim is to enable additional "points of presence" to be created dynamically, facilitating load balancing based on geographical and other factors.

2 Exploitation

2.1 Market and Competition

There are two market segments where the results of FollowMe are aimed for:

- Software components and infrastructure support for intelligent agents together with consultancy for other companies,
- Services based on intelligent agent technology

Both market segments are emerging, but are still in a pioneering phase. As with most emerging new technologies a huge gap between theory and practice in agent technologies is clearly visible.

The major goal of the consortium is therefore to bridge this gap by providing an architectural framework for the development of agent based services and to create a market for those services. In order to spread the use of the agent paradigm the project will deliver so-called “seedware” which will be made freely available for research and test to encourage external development of additional applications outside the project.

Most major research institutes such as MIT, Stanford, University of Maryland, USC, University of Toronto and CMU investigate in agent theories. Commercial products are among others developed by IBM Research Japan (IBM Aglets Workbench), Microsoft (ActiveX agent system), General Magic (Tabriz Telescript-based agent system) and SUN's Javasoft (Agent-TCL). All of these institutes and companies are currently competing in efforts to raise there developments to standards. Standardisation organisations dealing with agent related issues are OMG, FIPA and the W3C.

2.2 Exploitable Results

The following exploitable results are developed during the project:

- an **architecture** for mobile intelligent agents, to improve development processes and to ensure inter-operability of mobile agents,
- an **infrastructure prototype,** providing a complete basic version of the FollowMe working system, to be integrated into marketable products for servicing mobile agents (APM: Cage)
- a **pilot application** based on general internet services through the Bavarian ISP (FAST) to be offered as a add-on service also for other customers (e.g. saving banks),
- a **pilot application** ETEL++ based on a personalised version of the Ouest-France newspaper (TCM, INRIA) to be offered as a service to other newspapers,
- a **public report** on the architecture, user needs, implementation guide, and the pilots to distribute the know how of mobile intelligent agents.

The major exploitable result for the partners is to be a driver of leading edge technology. None of the partners could achieve this alone.

2.3 Summary of Individual Exploitation Plans

The partners of FollowMe will pursue three main streams of exploitation on the European and international level either individually or together with the other partners:

- It is planned to market developed **software components** of the infrastructure prototype or to integrate software components into marketed products (the CAGE by APM),
- The results of the **pilot-applications** will be developed further towards a value-added service and offered to other customers either directly (TCM, INRIA) or as add-on services for other established services (FAST).
- Finally the know-how acquired during the project will be used as an advantageous edge to extend their **consultancy** business (APM, FAST, UWE).

The individual exploitation plans are presented in the Annex.

A precise consortium exploitation plan for exploitation during project life will be agreed upon 6 month after project start together with a more precise agreement on the intellectual property rights. An affirmative consortium exploitation plan of the project results will be a deliverable in month 15.

3 Work Packages

3.1 Objectives

The objectives of the project is to create the infrastructure to support mobile users. Enabling them to connect using a variety of devices and from different locations. The project will implement a series of core facilities and a number of representative services. These will demonstrate tasks being performed autonomously with decisions based on information gleamed from personal user profiles.

There are ten technical work packages each with a definite objective. In addition, project management and exploitation are given separate work schedules.

3.2 Yardsticks

The progress of the project is measured by two types of yardsticks: The released versions of tested software and the demonstrators:

There will be three main releases of software based on the Mobile Object Workbench, the Service Shell and the Personal Assistant:

- Project month 7: Prototype (interface specification and some functional features available)
- Project month 10: Intermediate working version (most features available)
- Project month 13: Complete version

The results will be shown in two demonstrator pilots 1 and 2:

- Project month 10: Deployment of first prototype
- Project month 15: Deployment of revised demonstrator.

3.3 Deliverables & Dependencies

Each technical work package is geared towards producing a major component. Components are normally the responsibility of a single partner and have a high degree of independence. The interface of each component will be defined using object based techniques such as CORBA IDL and/or Java Beans. This simplifies the developed process and explicitly ensures that dependencies are realised.

The components from each work package will be delivered through a series of intermediate steps ranging from a requirements document to the final working version. A typical series of deliverables for a component will be:

- Report describing the support which needs to be provided by *other* components
- Component interface definition
- Prototype (some fundamental features available)
- Intermediate working version (most of the major features available)
- Complete version

This multi-stage approach will ensure that work can progress in parallel and will help minimise the impact of problems or other factors that could effect progress.

Not all deliverables may be necessary visible outside the project, since they are the result of a task that have some intermediate character on the way to a major project result. Deliverables that will be major input for reviews are listed in section 5.3 Reviews. Some deliverables (esp. Software: Prototype, intermediate working version(s), complete versions) will come in several versions. To distinguish them, the usual dot notation is used in the following (e.g. DD5.3).

Work Packages and Deliverables

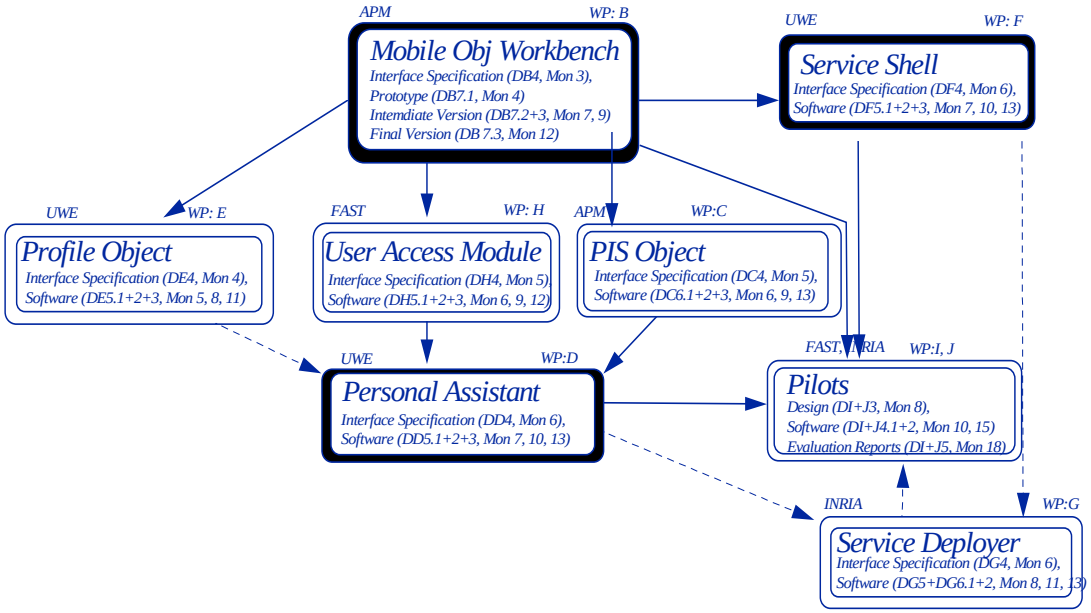
The following table describes the work packages, the main deliverables and the respective lead partner.

WP	Title	Leader	Deliverable Description	Deliverable Name
A	Architecture	APM	ODP models describing overall system	Architecture Report
B	Mobile Object Workbench	APM	(1) Mobile object infrastructure (2) Mobile object for general data storage	Mobile Object Workbench Mobile Data Object
C	Personal Information Space	APM	Access to, and maintenance of, users' personal data	PIS Object

WP	Title	Leader	Deliverable Description	Deliverable Name
D	Autonomous Agents	UWE	(1) Personal agent for performing autonomous tasks	Personal Assistant
			(2) General framework for developing agents	Task Agent Shell
E	Personal Profiles	UWE	Object based service for creating, maintaining and querying a user's profile	Profile Object
F	Service Interaction	UWE	Framework for creating and hosting services - to be accessed by agent software	Service Shell
G	Service Deployment	INRIA	Framework and mechanisms for dynamic service deployment	Service Deployer
H	User Access	FAST	Device independent user access	User Access
I	Pilot Application 1	FAST	Agent based access to internet services	Bavaria Online Pilot Application
J	Pilot Application 2	INRIA	Agent based access to newspapers	Etel++
K	Exploitation	FAST	Ensuring commercial success of project	Exploitation
L	Project Management	FAST	Timely running & delivery of project	Project Management

Major System Components & Dependencies

The following diagram demonstrates the interdependencies and the main deliverable flow between the major deliverables. In addition, it also details the delivery schedule for the final release and intermediate steps.



Notes: ***A strong dependency*** means that a component is unable to work without its dependent.
A second order dependency, is not critical. That is, an intermediate version of the component can be developed and released without its dependent.
Tasks that include major integration of components have a thick frame.

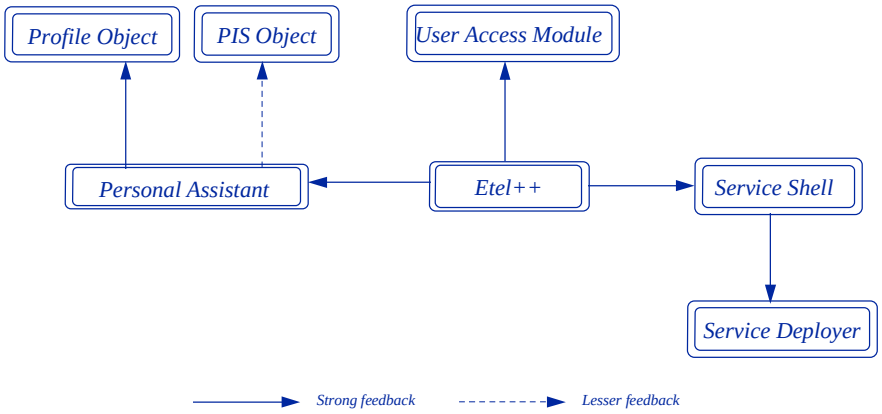
3.4 Pilot Application Feedback

Both of the pilot applications exercise all the main components of the system. Etel++ focuses on the use of ”personal profiles” to control autonomous mobile agents and in addition, the ”service deployment” measures to improve the quality of response to the user. Bavaria Online, with its range of services and user community will more heavily rely on the creation and use of users’ own ”Personal Information Space.”

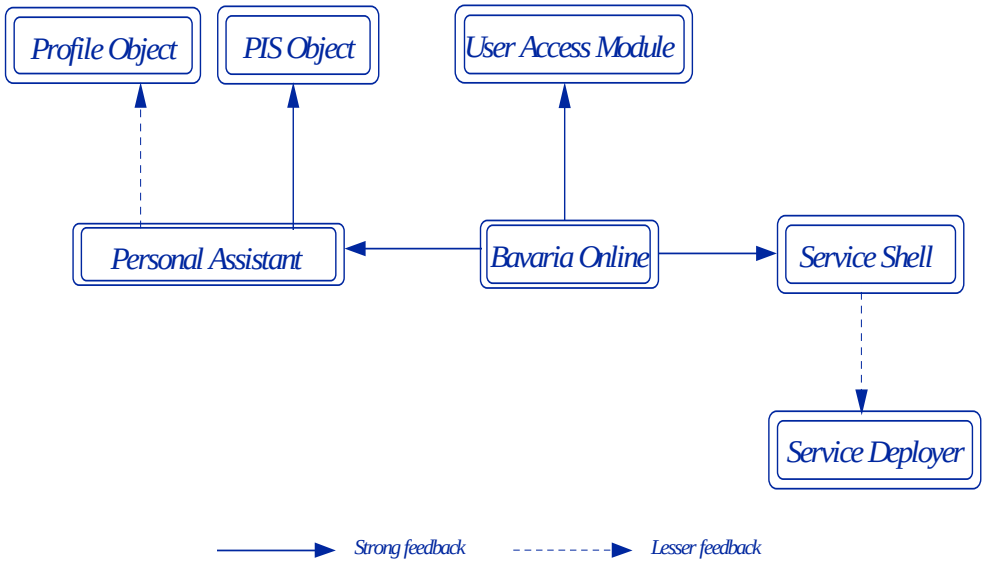
During the development, deployment and trials of the pilot applications, the system will be evaluated and a critique of the supporting infrastructure will be produced. This will enable improvements and changes to be developed and components re-deployed during the life of the project. This feedback process is intended to ensure that the FollowMe project meets its objectives and produces a system which reflects real user demands.

The following diagrams demonstrate for each of the pilot applications, the feedback paths for major components. It also indicates how heavily each pilot exercises them.

Personalised Newspaper Feedback Paths (Etel++)



Bavaria Online Feedback Paths



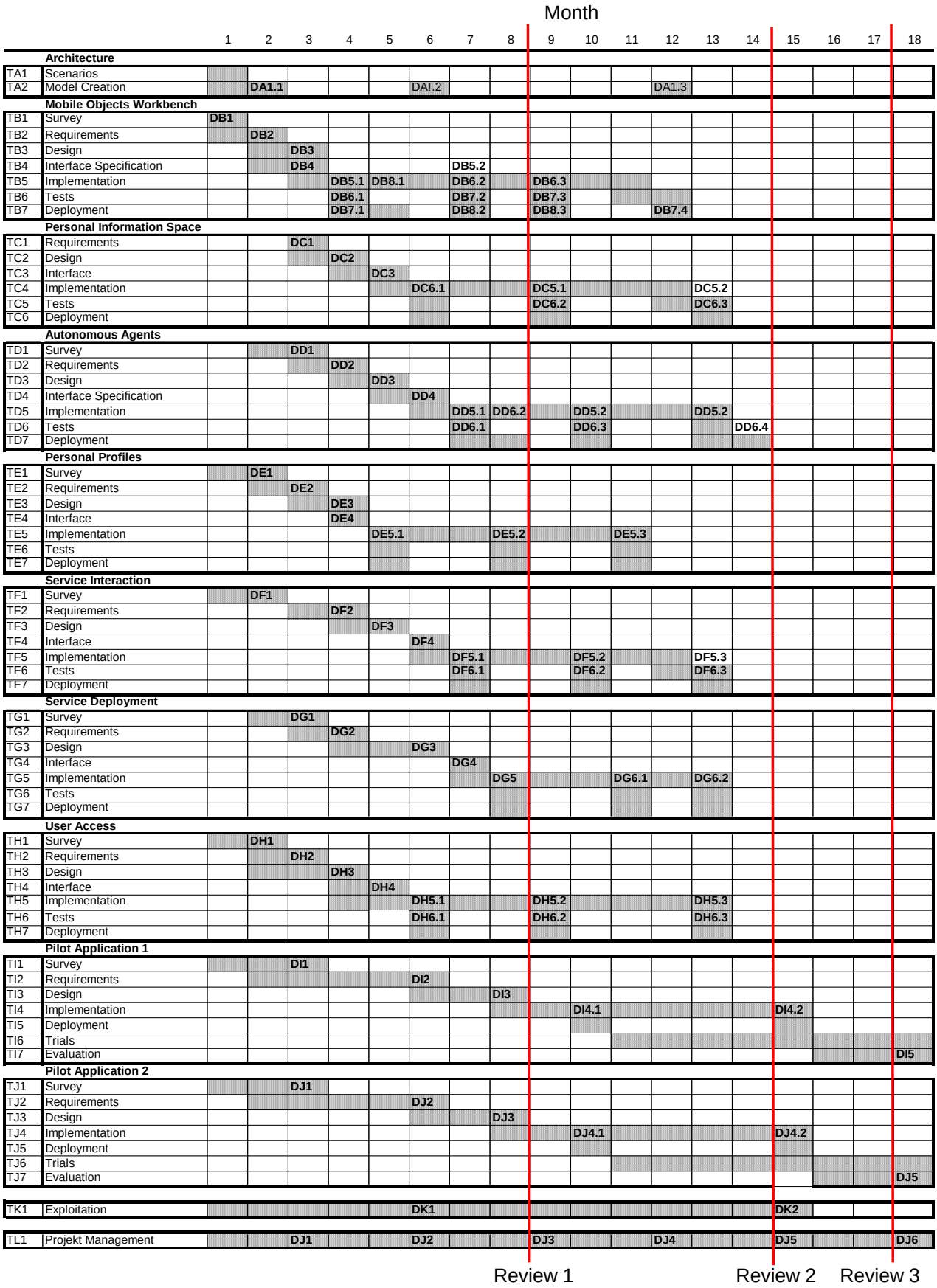
3.5 Effort Figures

The table below gives a summary of the expected effort required by each partner for all work packages.

	APM	FAST	INRIA	TCM	UWE	Months	Years
A Architecture	**5**	2	1	1	1	10	0,83
B Mobile Objects Workbench	**26**	1	1		1	29	2,42
C Personal Info Space	**8**					8	0,67

D Autonomous Agents	1				**30**	31	2,58
E Personal Profiles	1				**12**	13	1,08
F Service Interaction	1	2	1	1	**12**	17	1,42
G Service Deployment	1	2	**18**	1	1	23	1,92
H User Access		**30**				30	2,50
I Pilot 1 (Bavarian Online)		**51**				51	4,25
J Pilot 2 (Etel++)			**39**	6		45	3,75
K Exploitation	2	**2**	2	3	2	11	0,92
L Project Management		**9**				9	0,75
Months	45	99	62	12	59	277	23,08
Person Years	3,75	8,25	5,17	1,00	4,92		

3.6 Project Chart[1]



[1] Please note that due to space limitations, some deliverables are not precisely in the same line as the producing task

3.7 Work Package A: Architecture

Summary

Work Package Leader:	APM
Effort:	10 Person months
Start:	Month 1
End:	Month 2
Partners Involved:	ALL

Objectives

The aim of the architecture work package is to create a set of models which describe the overall FollowMe system. The ISO standard (10746) ”Open Distributed Processing Reference Model” (RM-ODP) will be the modelling technique employed. The pilot applications and a number of other scenarios will be the basis upon which models will be built. These will derive the user requirements, the system components and create an understanding of the information, engineering and computational issues. This will not only ensure that the specific requirements of the FollowMe demonstrators have been captured, but also that the system will be more generally applicable.

Approach

- Produce document describing FollowMe pilot and other possible application scenarios
- Create a five view point RM-ODP model for both pilots

Schedule

	Month:																	
TASK	**NAME**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**
TA1	Scenarios																		
TA2	Model Creation		**D**				**D**						**D**						

D = Internal or external deliverable

Resources

TASK	NAME	APM	FAST	INRIA	TCM	UWE
TA1	Scenarios	1	1	0,5	0,5	0,5
TA2	Model Creation	4	1	0,5	0,5	0,5
	Total:	5	2	1	1	1
					Grand Total:	10

Inputs

NONE

Outputs

DELIVERABLE	NAME	TYPE	MONTH(S)
DA1.1	Architecture Report	Report	2
DA1.2	**Architecture Report**	**Report**	**6**
DA1.3	**Architecture Report**	**Report**	**12**

Please note that all official deliverables, as listed in form 5.1 of part 1 are printed in bold face.

3.8 Work Package B: Mobile Objects

Summary

Work Package Leader:	APM
Effort:	29 Person months
Start:	Month 1
End:	Month 12
Partners Involved:	APM, FAST, INRIA, UWE

Objectives

The objective of the mobile objects to provide the infrastructure is to facilitate the provision of other services. Its major role is to provide the basis to build mobile applications and enable distributed data and services to be located and utilised. In addition, it will develop the security mechanisms to identify who created an object and provide encryption facilities to support secure communication.

This core infrastructure will support object encapsulation for applications, data and operating system facilities. Subject to physical constraints, all objects will potentially be mobile. The role of the infrastructure is to enable objects to be uniquely identified and accessed. The location of objects being accessed should be transparent. It provides facilities to enable the movement of objects - ensuring that they can be found and accessed in their new location.

In addition to generic mobile objects, this work package will develop a base object for data storage. This will be the underlying storage mechanism utilised throughout the project and will be mobile.

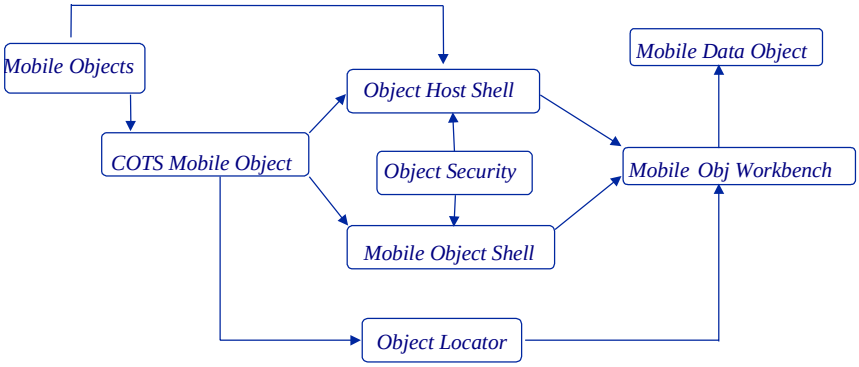
Approach

- Identify ”standard” commercial software (COTS) to form basis of mobile object workbench
- Create framework objects to encapsulate data, applications, services and operating facilities
- Enable certain classes of objects to freely move or be moved to different locations
- Design and implement a naming model to uniquely specify all objects
- Create mechanisms to locate specific objects
- Provide location transparent access to, and communication with, objects
- Create appropriate security mechanisms to protect hosts, objects and communication

Components & Dependencies

COMPONENT	DESCRIPTION
O/S Objects	Object encapsulation of system resources
COTS Mobile Objects	Identify & use commercially available ”base” software
Object Host Shell	Host environment support mobile objects
Mobile Object Shell	Framework to create mobile applications
Object Security	Encryption and verification facilities
Object Locator	Distributed service for tracking mobile objects
Mobile Object Workbench	Packaged complete system: *deliverable*
Mobile Data Object	Base object for data storage: *deliverable*

WP B: Component Interdependencies



Schedule

	Month:																		
TASK	**NAME**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**
TB1	Survey	D																	
TB2	Requirements		D																
TB3	Design			D															
TB4	Interface Specification			D															
TB5	Implementation																		
TB6	Tests																		
TB7	Deployment				D	D		D		D			D						

D = Internal or external deliverable

Resources

TASK	NAME	APM	FAST	INRIA	TCM	UWE
TB1	Survey	1				
TB2	Requirements	1	0,5	0,5		0,5
TB3	Design	2				
TB4	Interface Specification	2	0,5	0,5		0,5
TB5	Implementation	14				
TB6	Tests	3				
TB7	Deployment	3				
	Total:	26	1	1		1
				Grand Total:		29

Inputs

DELIVERABLE	NAME
DA1	Architecture Report

Outputs

DELIVERABLE	NAME	TYPE	MONTH(S)
DB1	Survey	Report	1
DB2	Requirements	Report	2
DB3	Design	Report	3
DB4	Interface Specification	Software	3
DB5.1	O/S Objects	Software	4
DB5.2	O/S Objects	Software	7

DELIVERABLE	NAME	TYPE	MONTH(S)
DB6.1	Object Locator	Software	4
DB6.2	Object Locator	Software	7
DB6.3	Object Locator	Software	9
DB7.1	Mobile Object Workbench	Software & Report	4
DB7.2	**Mobile Object Workbench**	**Software & Report**	**7**
DB7.3	Mobile Object Workbench	Software & Report	9
DB7.4	**Mobile Object Workbench**	**Software & Report**	**12**
DB8.1	Mobile Data Object	Software & Report	5
DB8.2	**Mobile Data Object**	**Software & Report**	**7**
DB8.3	**Mobile Data Object**	**Software & Report**	**9**

3.9 Work Package C: Personal Information Space

Summary

Work Package Leader:	APM
Effort:	8 Person months
Start:	Month 3
End:	Month 13
Partners Involved:	APM

Objectives

The aim of the Personal Information Space is to provide mobile users with a facility to maintain, access and collate information. The approach will be to develop a single consistent logical ”view” of this information irrespective of the where the user is connected. It will develop mechanisms to improve the efficiency of access by re-distributing subsets of data - reflecting the location of the user. In addition, it will create a user authentication procedure to control access.

Note: This packages creates ”views” of information. The format of how these views are presented to the user is the responsibility of the ”User Access” work package. This will vary depending on the particular device being employed. The term ”view” here is therefore analogous to use in databases.

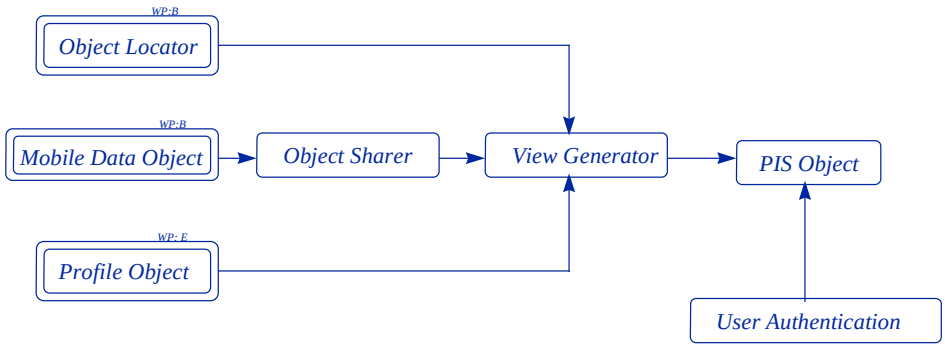
Approach

- Create mechanisms to view a collection of distributed objects as a single logical group
- Develop system enabling the efficient automatic movement of data, reflecting user location
- Investigate coarse grain multi-point access control methods
- Design and implement user authentication process

Components & Dependencies

COMPONENT	DESCRIPTION
Object Sharer	Provides concurrency control over base data objects
View Generator	Creates cross sectional views dependent on user & role
User Authentication	Provides security mechanisms to validate user
PIS Object	Object encapsulated personal information space

WP C: Component Interdependencies



Items with a double border are deliverables from other work packages

Schedule

	Month:																		
TASK	**NAME**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**
TC1	Requirements			**D**															
TC2	Design				**D**														
TC3	Interface Specification					**D**													
TC4	Implementation																		
TC5	Tests																		
TC6	Deployment						**D**			**D**				**D**					

D = Internal or external deliverable

Resources

TASK	NAME	APM	FAST	INRIA	TCM	UWE
TC1	Requirements	0,5				
TC2	Design	1				
TC3	Interface	0,5				
TC4	Implementation	4				
TC5	Tests	1				
TC6	Deployment	1				
				Grand Total:		8

Inputs

DELIVERABLE	NAME
DA1	Architecture Report
DB6	Object Locator
DE5	Profile Object

Outputs

DELIVERABLE	NAME	TYPE	MONTH(S)
DC1	Requirements	Report	3
DC2	Design	Report	4
DC3	Interface Specification	Software	5
DC4	Object Sharer	Software	9
DC5.1	User Authentication	Software	9
DC5.2	User Authentication	Software	13
DC6.1	**PIS Object**	**Software & Report**	**6**
DC6.2	PIS Object	Software & Report	9
DC6.3	**PIS Object**	**Software & Report**	**13**

3.10 Work Package D: Autonomous Agents

Summary

Work Package Leader:	UWE
Effort:	31 Person months
Start:	Month 2
End:	Month 14
Partners Involved:	APM, UWE

Objectives

Autonomous behaviour allows users to have actions carried out while they are ”off line.” It also enables regular or very long lived actions to be performed without the need for direct user intervention. It is envisaged that mobile agent technology will be used to implement such tasks. These applications will be based on the core object mobility support from the infrastructure.

The proposed approach is to create a library of ” taskspecific applications”. For the user to instigate a job, they would be asked to specify the required objective. One or more task agents would be selected to perform the work. This may involve some customisation of the ”standard” agents.

It will be essential to reduce the complexity of this work as a truly general solution is out with the scope of the project. The initial effort will be to define the areas and types of tasks and services which will be catered for. The following work will be required to create the autonomous agents

Approach

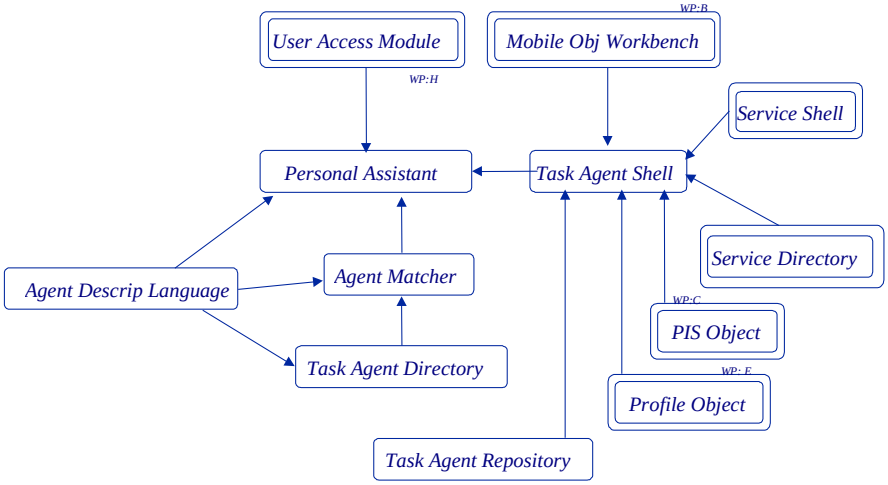
- Define the restricted domain
- Devise means to describe the behaviour of task agents
- Devise means to enable users to specify work by stating the objectives
- Devise means to select agent tasks based on objectives
- Devise means to adapt agent behaviour to more closely meet requirements
- Implement a number of core agent tasks
- Implement user mechanisms enabling user to state objectives and have tasks performed

Agent technology will be used throughout the project in various roles. Instructions will be provided to these software devices via the specification of objectives. This will enable them to achieve tasks both independently and in collaboration with other bodies. Persistent agents will be used to hold information about a user, other short lived entities will achieve specific tasks and then terminate.

Components & Dependencies

COMPONENT	DESCRIPTION
Agent Descrip Language	Goal oriented description notation
Agent Matcher	Mechanism to select agent(s) based on users goal
Task Agent Directory	”Trader” facility to register agents indexed by behaviour
Task Agent Repository	Library of available agents
Task Agent Shell	Framework for developing autonomous agents
Personal Assistant	Top level agent, responsible for taking users objectives and instigating their completion

WP D: Component Interdependencies



Schedule

	Month:																	
TASK	**NAME**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**
TD1	Survey			D															
TD2	Requirements				D														
TD3	Design					D													
TD4	Interface Specification						D												
TD5	Implementation																		
TD6	Tests																		
TD7	Deployment							D	D		D			D	D				

D = Internal or external deliverable

Resources

TASK	NAME	APM	FAST	INRIA	TCM	UWE
TD1	Survey					2
TD2	Requirements	1				2
TD3	Design					3
TD3	Interface					2
TD4	Implementation					16
TD5	Tests					3
TD7	Deployment					2
	Total:	1				30
				Grand Total:		31

Inputs

DELIVERABLE	NAME
DA1	Architecture Report
DB7	Mobile Object Workbench
DC6	PIS Object
DE5	Profile Object
DF6	Service Directory
DF5	Service Shell
DH6	User Access Module

Outputs

DELIVERABLE	NAME	TYPE	MONTH(S)
DD1	Survey	Report	3
DD2	Requirements	Report	4
DD3	Design	Report	5
DD4	Interface Specification	Software	6
DD5.1	**Task Agent Shell**	**Software & Report**	**7**
DD5.2	Task Agent Shell	Software & Report	10
DD5.3	**Task Agent Shell**	**Software & Report**	**13**
DD6.1	**Personal Assistant**	**Software & Report**	**7**
DD6.2	Personal Assistant	Software & Report	8
DD6.3	**Personal Assistant**	**Software & Report**	**10**
DD6.4	**Personal Assistant**	**Software & Report**	**14**

3.11 Work Package E: Personal Profiles

Summary

Work Package Leader:	UWE
Effort:	13 Person months
Start:	Month 1
End:	Month 11
Partners Involved:	APM

Objectives

The aim of a users' profile is to hold a range of personal information. Some of this will be facts about the 'owner' of the agents such a date of birth, home address and perhaps credit card information if suitable security features are available. The profile may also specify the location of the user at given times so that information can be delivered accordingly.

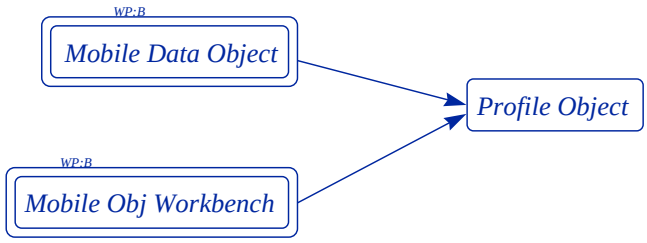
Approach

- Create an object to maintain a user's profile
- Provide mechanisms to update a profile given either specific facts, usage details or more general information
- Enable the querying of profiles resulting in simple answers

Components & Dependencies

COMPONENT	DESCRIPTION
Profile Object	Provider of user details and preferences

WP E: Component Interdependencies



Schedule

	Month:																		
TASK	**NAME**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**
TE1	Survey		D																
TE2	Requirements			D															
TE3	Design				D														
TE4	Interface Specification				D														
TE5	Implementation																		
TE6	Tests																		
TE7	Deployment					D			D			D							

D = Internal or external deliverable

Resources

TASK	NAME	APM	FAST	INRIA	TCM	UWE
TE1	Survey					1
TE2	Requirements	1				1
TE3	Design					2
TE3	Interface					0,5
TE4	Implementation					5
TE5	Tests					1,5
TE7	Deployment					1
	Total:	1				12
				Grand Total:		13

Inputs

DELIVERABLE	NAME
DA1	Architecture Report
DB7	Mobile Object Workbench
DB8	Mobile Data Object

Outputs

DELIVERABLE	NAME	TYPE	MONTH(S)
DE1	Survey	Report	2
DE2	Requirements	Report	3
DE3	Design	Report	4
DE4	Interface Specification	Software	4
DE5.1	**Profile Object**	**Software & Report**	**5**
DE5.2	Profile Object	Software & Report	8
DE5.3	**Profile Object**	**Software & Report**	**11**

3.12 Work Package F: Service Interaction

Summary

Work Package Leader:	UWE
Effort:	17 Person months
Start:	Month 1
End:	Month 13
Partners Involved:	ALL

Objectives

The most popular means of providing information and services on the Internet is currently through web pages. The effort in this work package will develop interface mechanisms that are designed to be interrogated by agents rather than by humans. The objective is to produce a flexible framework enabling goal oriented agents to interact with services. It should allow providers to unilaterally upgrade the interfaces to their services. The basic approach is through the definition and publication of well defined interfaces. A completely general system is of course outside the scope of this project, therefore an initial task will be to define the boundaries of the problem. In addition, this work will also devise and create directory facilities enabling tasks to search for and locate services.

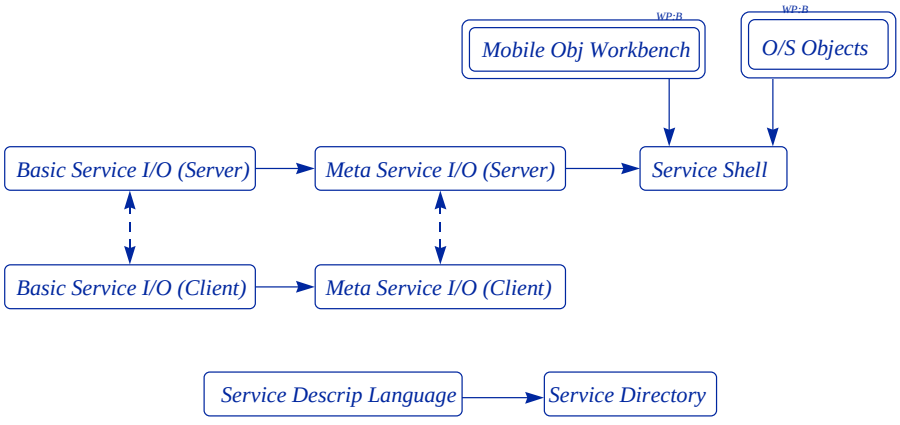
Areas for Work

- Define boundaries of problem domain
- Devise schema for defining interfaces to services
- Implement interfaces to enable tasks to interact with services
- Produce working demonstrator system
- Devise schema for describing services
- Implement a distributed directory service

Components & Dependencies

COMPONENT(S)	DESCRIPTION
Basic Service I/O (Client and Server)	Basic communication mechanisms between agents and services
Meta Service I/O (Client and Server)	Higher level communications
Service Shell	Framework for developing services
Service Description Language	Notation for describing types of services
Service Directory	"Trader" function for locating services

WP F: Component Interdependencies



Schedule

	Month:																	
TASK	**NAME**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**
TF1	Survey		**D**																
TF2	Requirements				**D**														
TF3	Design					**D**													
TF4	Interface Specification						**D**												
TF5	Implementation																		
TF6	Tests																		
TF7	Deployment							**D**			**D**			**D**					

D = Internal or external deliverable

Resources

TASK	NAME	APM	FAST	INRIA	TCM	UWE
TF1	Survey					1
TF2	Requirements	1	2	1	1	1
TF3	Design					2
TF3	Interface					1
TF4	Implementation					5
TF5	Tests					1
TF7	Deployment					1
	Total:	1	2	1	1	12
				Grand Total:		17

Inputs

DELIVERABLE	NAME
DA1	Architecture Report
DB5	O/S Objects
DB1	Mobile Object Workbench

Outputs

DELIVERABLE	NAME	TYPE	MONTH(S)
DF1	Survey	Report	2
DF2	Requirements	Report	4
DF3	Design	Report	5
DF4	Interface Specification	Software	6
DF5.1	**Service Shell**	**Software & Report**	**7**
DF5.2	Service Shell	Software & Report	10
DF5.3	**Service Shell**	**Software & Report**	**13**
DF6.1	**Service Directory**	**Software & Report**	**7**
DF6.2	Service Directory	Software & Report	10
DF6.3	**Service Directory**	**Software & Report**	**13**

3.13 Work Package G: Service Deployment

Summary

Work Package Leader:	INRIA
Effort:	23 Person months
Start:	Month 2
End:	Month 14
Partners Involved:	APM, INRIA, TC, UWE

Objectives

In a global network environment such as the internet, it is difficult to anticipate the demands on a particular service. Usage can often be extremely dynamic, with many unforeseen fluctuations.

The objective of this work package is to exploit the knowledge of user profiles for providing quality of service to users. In particular, we are interested in the design and implementation of a load balancing strategy that relies on the grouping of users according to the users' profiles. By grouping users having close profiles in terms of accessed services and geographical location, it is possible to assign groups of users to the servers of the infrastructure so that each server manages a reduced set of data and users, hence achieving load balancing among the servers. User groups further provide an adequate basis for improving the servers' response time. By keeping track of the patterns of requests from the users of a group, future requests of users may be anticipated based on their preceding requests to the server, hence allowing to treat a request before it is actually requested.

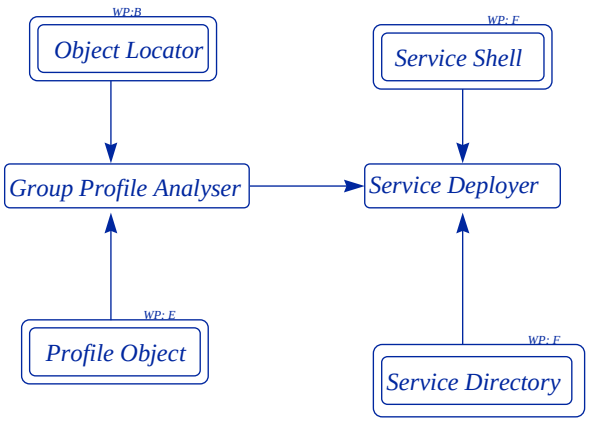
Areas for Work

- Investigate means to derive group trends from a collection of personal profiles
- Design of an algorithm for grouping user having both similar profiles and close geographical locations.
- Dynamic management of user groups based on the evolution of user profiles and on user mobility.
- Distribution of user groups over the servers of the infrastructure.
- Mapping of user requests with the server managing the corresponding group.
- Design of an algorithm for anticipating user requests based on requests usually performed by the users of the group.

Components & Dependencies

COMPONENT	DESCRIPTION
Group Profile Analyser	Mechanisms to survey groups of individual profiles
Service Deployer	Framework for automatically re-distributing service resources

WP G: Component Interdependencies



Schedule

	Month:																	
TASK	**NAME**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**
TG1	Survey			**D**															
TG2	Requirements				**D**														
TG3	Design						**D**												
TG4	Interface Specification							**D**											
TG5	Implementation																		
TG6	Tests																		
TG7	Deployment								**D**				**D**		**D**				

D = Internal or external deliverable

Resources

TASK	NAME	APM	FAST	INRIA	TCM	UWE
TG1	Survey			2		
TG2	Requirements	1	2	2	1	1
TG3	Design			3		
TG3	Interface			1		
TG4	Implementation			8		
TG5	Tests			1		
TG7	Deployment			1		
	Total:	1	2	18	1	1
				Grand Total:		23

Inputs

DELIVERABLE	NAME
DA1	Architecture Report
DB6	Object Locator
DE5	Profile Object
DF5	Service Shell
DF6	Service Directory

Outputs

DELIVERABLE	NAME	TYPE	MONTH(S)
DG1	Survey	Report	3
DG2	Requirements	Report	4
DG3	**Design**	**Report**	**6**
DG4	Interface Specification	Software	7
DG5	Group Profile Analyser	Software	8
DG6.1	Service Deployer	Software & Report	12
DG6.2	**Service Deployer**	**Software & Report**	**14**

3.14 Work Package H: User Access

Summary

Work Package Leader:	FAST
Effort:	30 Person months
Start:	Month 1
End:	Month 13
Partners Involved:	FAST

Objectives

A key objective of the project is to enable users to access the system through a variety of different media, but without losing quality of the interaction. In order to achieve this, a general mechanism for translating services onto devices needs to be constructed. The approach as far as possible will be generic, enabling additional devices to be supported without the need to modify the interface of existing services. *Web browsers, a hand held device, fax, and the telephone are the likely primary devices which will be targeted.* The general idea is to use Java-enabled devices to keep the interface as similar as possible.

User access is necessary in two contexts:

1. Access to the agent itself, to tell it what to do in terms of information collection
2. Access to the information retrieved by the agent system, via the agent

A significant portion of the first context will be addressed in Work Package F: Service Interaction. Access will occur with a web browser. The Work Package H: User Access will deal mostly with the second context, i.e., the user access to the information retrieved by the agent system. Here a variety of devices will be used.

The intended approach is to investigate mechanisms to give additional context to information. These annotations would influence the manner and content of the information presented. They could also describe the input required from the user. The ”mark up language” HTML is an example of this as it describes the presentation format of the data together with the data itself. Similarly, an ”agent information mark up language” would provide ways to present information retrieved by the agent system based on the output medium selected by the user. This would include, for example, the filtering of images for voice transmission and other information refinement steps.

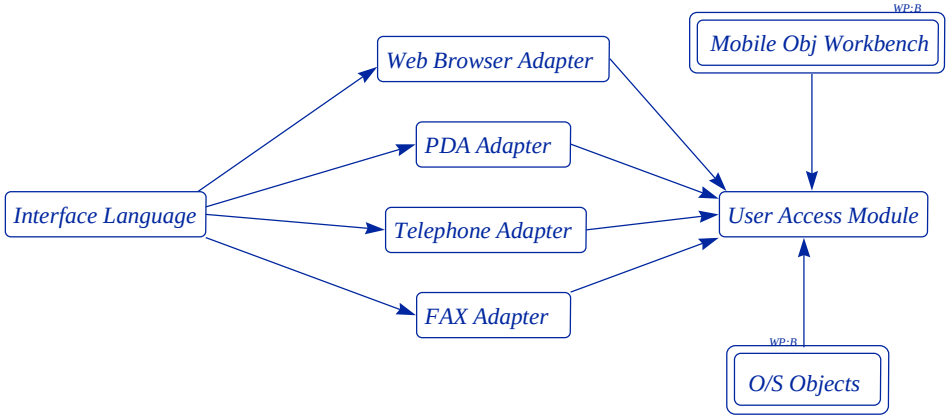
Approach

- Investigation into requirements of user access
- Design and specification of generic notation/language describing I/O functionality
- Module for interpreting and translating I/O requirements onto lower level adapters
- Creation of specimen device adapters

Components & Dependencies

COMPONENT	DESCRIPTION
Interface Language	Notation for adding presentational details to information
User Access Module	Primary object for handling communication with user. Routes I/O through relevant adapter(s) for session
Browser Adapter	Interface adapter for Java enabled web browser
PDA Adapter	Interface adapter for Java powered hand-held device
Telephone Adapter	Adapter built on top of commercial Java enabled telephone handling facilities
FAX Adapter	Adapter built on top of commercial Java enabled FAX handling facilities

WP H: Component Interdependencies



Schedule

	Month:																	
TASK	NAME	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
TH1	Survey		D																
TH2	Requirements			D															
TH3	Design				D														
TH4	User Interface Language					D													
TH5	Implementation																		
TH6	Tests																		
TH7	Deployment						D			D				D					

D = Internal or external deliverable

Resources

TASK	NAME	APM	FAST	INRIA	TCM	UWE
TH1	Survey		2			
TH2	Requirements		2			
TH3	Design		3			
TH3	Interface Language		2			
TH4	Implementation		16			
TH5	Tests		3			
TH7	Deployment		2			
	Total:		30			
				Grand Total:		30

Inputs

DELIVERABLE	NAME
DA1	Architecture Report
DB5	O/S Objects
DB7	Mobile Object Workbench

Outputs

DELIVERABLE	NAME	TYPE	MONTH(S)
DH1	Survey	Report	2
DH2	Requirements	Report	3
DH3	Design	Report	4
DH4	User Interface Language	Report & Software	5
DH5.1	Device Adapters	Software	6
DH5.2	Device Adapters	Software	9

DELIVERABLE	NAME	TYPE	MONTH(S)
DH5.3	**Device Adapters**	**Software**	**13**
DH6.1	User Access Module	Software & Report	6
DH6.2	User Access Module	Software & Report	9
DH6.3	**User Access Module**	**Software & Report**	**13**

3.15 Work Package I: Pilot Application 1, Bavaria On-line (FAST)

Summary

Work Package Leader:	FAST
Effort:	51 Person months
Start:	Month 1
End:	Month 18
Partners Involved:	FAST

Objectives

In order to demonstrate and validate the architecture and the underlying components of the system, pilot applications will be developed. Pilot 1 is intended to validate the agent concept in a part of the Internet called Bavaria On-line. The Bavaria On-line project is sponsored by the Bavarian government and provides a part of the Internet which is completely administered by the IZB with employees of FAST. It is planned to use agent technology to provide at least two different services on the Bavaria On-line part of the Internet. Servers (information brokers/service representatives) will be installed on the network, providing the following services:

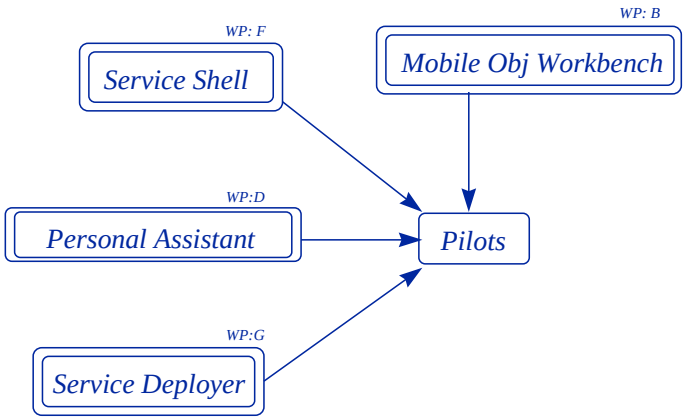
1. Provide information on the value of one's stock portfolio
2. Provide information on real estate objects for sale

The two applications were identified because they require different access through agents. For the first application, a user can indicate the content of his/her stock portfolio. Through a match maker (yellow pages) he accesses the single service provider which returns the information requested through the task executor (the agent). For the second application, a variety of different service providers will be available and information will need to be collected, summarised and presented to the user through the interaction of multiple agents.

During the pilot project, network traffic will be monitored to examine the possible change of load through the use of agents in the network. The results will then be evaluated and advantages or shortcomings of the agent system with respect to the network will be examined.

An important aspect in the context of human computer interfaces (HCI) is user modelling, i.e., the description of the possible different types of users and the corresponding response of the system. As the users of the Bavaria Online system are very varied in terms of computer experience, a user model should be set up to account for the different user expectations and behaviour in the pilot applications.

WP I: Component Interdependencies



Schedule

	Month:																	
TASK	**NAME**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**
TI1	Survey			**D**															
TI2	Requirements						**D**												
TI3	Design								**D**										
TI4	Implementation																		
TI5	Deployment										**D**					**D**			
TI6	Trials																		
TI7	Evaluation																		**D**

D = Internal or external deliverable

Resources

TASK	NAME	APM	FAST	INRIA	TC	UWE
TI1	Survey		2			
TI2	Requirements		3			
TI3	Design		4			
TI4	Implementation		24			
TI5	Deployment		6			
TI6	Trials		9			
TI7	Evaluation		3			
	Total:		51			

Inputs

DELIVERABLE	NAME
DA1	Architecture Report
DB5	Mobile Object Workbench
DD6	Personal Assistant
DF5	Service Shell
DG6	Service Deployer

Outputs

DELIVERABLE	NAME	TYPE	MONTH(S)
DI1	Survey	Report	3
DI2	Requirements	Report	6
DI3	Design & Objectives	Report	8
DI4.1	**Working system**	**Software**	**10**
DI4.2	**Working system**	**Software**	**15**
DI5	**Evaluation Report**	**Report**	**18**

3.16 Work Package J: Pilot Application 2, Etel++ (INRIA)

Summary

Work Package Leader:	INRIA
Effort:	45 Person months
Start:	Month 1
End:	Month 18
Partners Involved:	INRIA, TCM

Objectives

The ETEL electronic newspaper service that is developed by INRIA, Ouest-France, TC-multimedia, and O2 Technology (a well-known company in the data base area) aims at providing a service with the following features:

- Coupled production of paper and electronic editions, i.e. production of the two versions from the same data.
- Presentation of the information that combines the advantages of both the paper version and the electronic support.
- Integrated view of newspaper-based information and links to services.
- Addressing Quality of Service (QoS) requirements (responsiveness, scalability and availability).

A first prototype of ETEL is operational since August 1996. Its architecture is based on the client-server model, the server managing the data base and readers accesses. The reader accesses the service through a dedicated interface available for PCs running Windows-95. The communication system is based on the ISDN network. The next step of the ETEL prototype, will be the integration of our solutions to ETEL QoS requirements (responsiveness).

For many reasons (accessibility, deployment, ...), it is clear that the ETEL prototype will have to evolve to support *customisation* of the electronic newspaper content from the standpoint of both the reader's profile and the reader's geographical location. While the former type of customisation is already treated in the ETEL current prototype, the latter is not addressed due to dynamic issues as illustrated by the two following scenarios.

As a first scenario, we consider the "theatre" service provided by ETEL. In the current ETEL prototype, such a service lists movies played in pre-selected cities registered in the ETEL data base. Let us now imagine that one ETEL user living in Rennes is going to travel to Cambridge (GB) for two weeks. When he/she is connecting to ETEL and accesses the theatre service from Cambridge, he/she wants to know movies played in Cambridge and not those played in Rennes (F). To implement such a facility, one solution would be to implement the theatre service as an intelligent agent which can take into account that the reader is currently in Cambridge. Then, when he/she is accessing the theatre service through ETEL, he/she gets the list of movies played in Cambridge.

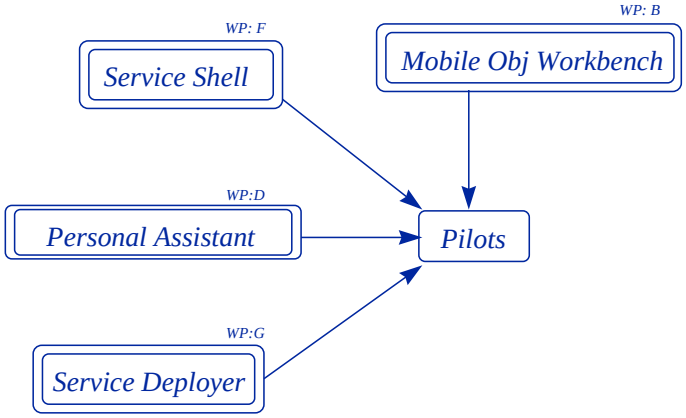
The second scenario is concerned with an ETEL user, who is travelling to New-York. If he/she wants to access the ETEL service each morning in order to get news from France, the best solution today is to use Internet. However due to the network traffic, he/she might have to wait a long time before reading the content of the newspaper. An alternative solution would be that the newspaper "follows" the reader in such a way that when he/she connects to ETEL, a copy of the newspaper already exists on a site located in New-York . Thus, long distant accesses become similar to local ones.

The implementation of dynamic customisation raises several problems, including:

- the location of ETEL users,
- the management of user accesses from a variety of locations using diverse access points,
- the use of the agent technology including the management of agent co-operation,
- the management of data access integrating mobility aspects.

To our knowledge, there is no available technology that solves the above problems. On the other hand, the FollowMe architecture will provide the necessary support for enriching ETEL with dynamic customisation, leading to the ETEL++ newspaper service.

WP J: Component Interdependencies



Schedule

	Month:																	
TASK	**NAME**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**
TJ1	Survey			D															
TJ2	Requirements						D												
TJ3	Design								D										
TJ4	Implementation																		
TJ5	Deployment										D					D			
TJ6	Trials																		
TJ7	Evaluation																		D

D = Internal or external deliverable

Resources

TASK	NAME	APM	FAST	INRIA	TCM	UWE
TJ1	Survey			2		
TJ2	Requirements			2	2	
TJ3	Design			3	1	
TJ3	Implementation			21		
TJ4	Deployment			6	2	
TJ5	Trials			3	0,5	
TJ7	Evaluation			2	0,5	
	Total:			39	6	
				Grand Total:		45

Inputs

DELIVERABLE	NAME
DA1	Architecture Report
DB5	Mobile Object Workbench
DD6	Personal Assistant
DF5	Service Shell
DG6	Service Deployer

Outputs

DELIVERABLE	NAME	TYPE	MONTH(S)
DJ1	Survey	Report	3
DJ2	Requirements	Report	6
DJ3	Design & Objectives	Report	8
DJ4.1	**Working system**	**Software**	**10**
DJ4.2	**Working system**	**Software**	**15**
DJ5	**Evaluation Report**	**Report**	**18**

3.17 Work Package K: Exploitation

Summary

Work Package Leader:	FAST
Effort:	11 Person months
Start:	Month 1
End:	Month 15
Partners Involved:	ALL

Objectives

This work package will prepare the detailed consortium exploitation plans.

This will include the agreement on intellectual property rights, joint preparation of basic marketing material, as e.g. project flyer, presentation material, planing for presentations of project results on conferences, exhibitions, and trade fairs.

Schedule

	Month:																	
TASK	**NAME**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**
TK1	Exploitation Plan						**D**									**D**			

D = Internal or external deliverable

Resources

TASK	NAME	APM	FAST	INRIA	TCM	UWE
TK1	Exploitation	2	2	2	3	2
	Total:	2	2	2	3	2
				Grand Total:		11

Outputs

DELIVERABLE	NAME	TYPE	MONTH(S)
DK1	Agreement on IPR	Report, External	6
DK2	Consortium Exploitation Plan	Report, External	15

3.18 Work Package L: Project Management

Summary

Work Package Leader:	FAST
Effort:	9 Person months
Start:	Month 1
End:	Month 18
Partners Involved:	FAST

Objectives

To ensure the smooth running of the project, the information flow inside the project, the timely production of deliverables, communication with the Commission and the organisation of consortium meetings and external reviews.

Schedule

	Month:															
TASK	**NAME**	**1**	**2**	**3**	**4,5**	**6**	**7**	**8**	**9**	**10,11**	**12**	**13**	**14,15**	**16**	**17**	**18**
TL1	Management	**C**		**C,D**		**C**	**D**		**C,R**		**C**	**D**		**C**		**C,R,D**

D = Internal or external deliverable
C = Consortium Meetings
R = External Project Review

Resources

TASK	NAME	APM	FAST	INRIA	TC	UWE
TL1	Management		9			
	Total:		9			
				Grand Total:		9

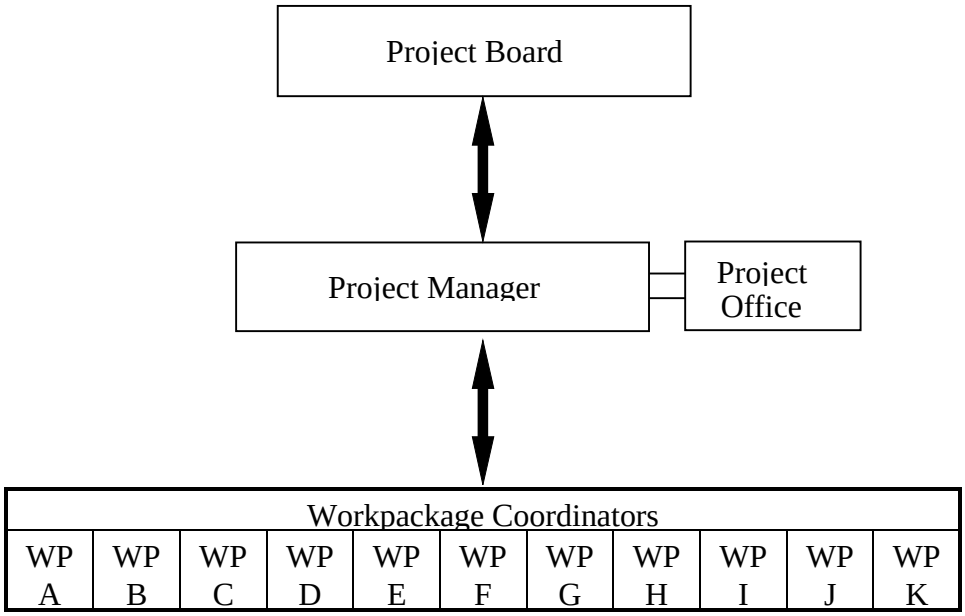
Outputs

DELIVERABLE	NAME	TYPE	MONTH(S)
DL1	Consortium Contract	Contract	3
DL2	**Project Progress Report**	**Report**	**6**
DL3	**Project Progress Report**	**Report**	**12**
DL4	**Final Project Report**	**Report**	**18**

In addition in month 3, 9, and 15 a Project Management Report is submitted to the European Comission.

4 Project Management

4.1 Project Management Structure



4.2 Project Board

The project board is the official project decision authority which is visible to the CEC and will lead negotiations with the CEC.

The Project Board is in charge of:

- contract management (planning and monitoring)
- strategic orientation of the FollowMe project. The Project Board will call for creation of specific task forces, with participation of representatives of participating companies,
- control of the Project Manager,
- approval of all promotional material and communication policy related to the project and its deliverables

The decisions in the board are taken by majority voting.

Members of the Project Board are high level representatives of each main partner. The Project Board shall as a minimum meet every 6 months, and at other times as dictated by relevant circumstances.

The initial composition of the board is the following:

Dr. Rudolf Haggenmüller	FAST
Dr. Andrew Herbert	APM
Dr. Michel Banatre	INRIA
Antoine de Tarlé	TCM
Dr. Michael Yearworth	UWE

Project Manager

The Project Manager is the principal officer of the consortium appointed by the Project Board. He receives assistance of the Project Office in the execution of this mission. His responsibilities are the following:

- Project management of the FollowMe - Project in front of the Project Board
- operational liaisons with the CEC
- liaisons with the Project Board that will give him guidance in co-ordinating the project.

The project manager is Dr. Michael Breu, FAST.

Project Office

The Project Office provides to the Project Manager the support needed for conducting the project. This includes in particular the following tasks:

- support to the Project Manager for the day to day management of the project
- monitor progress against the project plan
- set up and maintain appropriate procedures, plans and reporting techniques
- control costs and financial aspects
- WWW site management
- information distribution and communication infrastructure of the project
- etc.

Project office support will be provided by FAST

Work Package Co-ordinators

Each work package is under the responsibility of a Work Package Co-ordinator, appointed by the Project Board. They are senior people and will be responsible to the Project Manager in order to ensure an overall co-ordination. They will report on their progress, deliver the result of their work package and claim their cost statements to the Project Manager.

The co-ordinators are:

WP	Title	Co-ordinator
A	Architecture	Will Harwood, APM
B	Mobile Object Workbench	Will Harwood, APM
C	Personal Information Space	Will Harwood, APM
D	Autonomous Agents	Dr. Michael Yearworth, UWE
E	Personal Profiles	Dr. Michael Yearworth, UWE
F	Service Interaction	Dr. Michael Yearworth, UWE
G	Service Deployment	Dr. Michel Banatre, INRIA
H	User Access	Elcha Triep, FAST
I	Pilot Application 1	Hans-Günter Stein, FAST
J	Pilot Application 2	Dr. Michel Banatre, INRIA
K	Exploitation	Hans-Günther Stein, FAST

4.3 Project Procedures

Method of working

Software development and integration

As already explained, each of the technical work package (A to H) is geared towards producing a major component. Components are normally the responsibility of a single partner and have a high degree of independence. The interface of each component will be defined using object based techniques such as CORBA. This simplifies the developed process and explicitly ensures that dependencies are realised.

In order to ensure early availability to pilot applications early releases or interface specifications and prototypic versions will be produced.

Pilot Applications

The Pilot Applications will collect requirements to the technical work packages in order to allow specific development of the components.

Quality Assurance

The quality of the system components will be assured by several mechanisms

- reviews,
- by consistency checks by integration of different components
- by using it within pilot applications

Monitoring

FollowMe is an R&D project and must therefore be flexible enough to allow for amendments of the project plans, especially in terms of reallocation of resources.

Work package leaders are free to change their detailed plans if it does not impact the global plan. Updates of the project plan for the next phase will be presented to the Commission and will on acceptance form the basis for cost statements for the next period. If significant changes of the delivery plan become necessary between review points they have to be ratified by the commission in an additional change control meeting.

Acceptance of Results

The Project Manager will use the acceptance criteria as defined within the decision points of the deliverable plan, validate the deliverables, and report to the Project Board.

Change Control

Changing requirements or circumstances might demand a redefinition of the delivery plan. If the changes affect the scope or the objective of the project a formal Change Control Meeting of the Project Board and involved Work Package Managers and the Commission will be invoked. If possible the change control meetings should be scheduled during the review meetings.

Resolution of conflict

The project will use regular management meetings, technical workshops, electronic mail, and shared web services to ensure good information flow and cooperation between partners to minimise the risk of conflict. Should a conflict arise it will be processed as follows:

1. Technical conflict: In this case the conflict should first be discussed between the technical people and tried to be resolved. If a resolution cannot be found the conflict is reported to the respective work package coordinators. If no solution can be found on this level the problem is reported via the project manager to the management board.

2. Poor cooperation: If a team member does not or cannot cooperate adequately with other partners, the Project Manager can ask the respective Project Board member to replace that team member.
3. Inadequate deliverables: Shortcomings in the deliverables may result in cost statements not being validated by the Project Manager.
4. Conflicts in intellectual property rights (IPR): IPR issues will be solved in a dedicated IPR agreement in the consortium. Until then the standard IPR agreements for ESPRIT projects is adopted.

The general understanding of the partners should be defined in this proposal. Further conflicts concerning the general understanding between the partners of the consortium will be solved within a Conflict Resolution Meeting of the Project Board.

5 Reports and Reviews

There will be three levels of reporting:

- Internal work package and project reports,
- Project management and Progress reports for the CEC
- Reviews

5.1 Internal Project Reports

Every month each work package leader submits a short work package progress report to the project management. Based on the work package report the project manager produces a monthly project report for the project board and all project participants.

5.2 Project Management and Progress Reports for the CEC

The project manager will submit a periodic project management report to the CEC every 3 month.

The project consortium will submit periodic progress reports every six months. These progress reports will contain manpower figures (effort against tasks, progress against deliverables), and will be accompanied by the ”Project snapshots”.

At the end of the project, a final report will be issued covering all the work, the objectives, the results and the conclusions, including a suitable summary of all these matters. The consortium will also deliver edited annual and final reports, according to the contract.

5.3 Reviews

Two review meetings are planed. The reviews will be executed by independent reviewers and the CEC project officer. Prior to the review, a management report, relevant deliverables, and an agenda will be distributed to the CEC project officer, and the reviewers.

Review 1

Review 1 will take place after project month 8: Its main objective will be to judge

- the progress of the technical work
- the start-up preparations for the pilot applications
- the commitment of the partners and the exploitation plans
- the smooth running of the project

The main review items will be:

- A first demonstrable version of the Mobile Object Workbench based on deliverables DA1.2, draft DB7.2, draft DB8.2
- A first detailed specifications of autonomous agent systems and their components based on deliverables DC6.1, draft DD5.1, draft DD6.1, DE5.1, draft DF5.1, draft DF6.1, and DG3
- Start-up of the pilot applications based on the deliverables DI2 and DJ2

Review 2

Review 2 will take place after project month 14: Its main objective will be to judge

- the assessment of the technical implementation work done
- the operation of the pilot applications
- the smooth running of the project

The main review items will be:

- The reports on the technical results of the mobile object workbench (DB7.4, DB8.3), and the autonomous agents (DC5.2, DC6.2, DD5.3, DD6.4, DE5.3, DF5.3, DF6.3, DG6.2, DH5.3, DH6.3)
- The technical results and the evaluation of the pilots (DI4.1, DJ4.1)

Review 3

Review 3 will take place in project month 18: Its main objective will be to judge

- the results of the pilot applications
- the exploitation plans

The main review items will be:

- The technical results and the evaluation of the pilots (DI4.2, drafted DI5, DJ4.2, drafted DJ5)
- Exploitation plans (DK2)

6 IPR Issues

As a starting point the standard ESPRIT intellectual property rights regulations (Contract ANNEX II Part B) will be adopted. A detailed agreement on intellectual property rights will be planed after month 6.

All project partners have strong commercial interests in the results of the project and will wish to protect the foreground they have generated. It is important that IPR is carefully managed. Within the overall framework of cooperation and technology sharing within the project context, the project partners will be responsible for registering the status of generated results with the project manager and stating clearly the basis on which other partners can use the results outside the project. In addition all partners will make explicit background that is being introduced to the project (e.g. APM's CAGE).

A ANNEX

A.1 Individual Exploitation Plans

APM Exploitation

Core Business

APM Ltd has three lines of business: research, consultancy and software products. The research and consultancy business is focused on the application of leading edge technologies in support of business-to-business electronic commerce via the Internet. The research and consultancy businesses are based in Cambridge UK, but have customers world-wide. The product business is headquartered in Los Altos, California with the engineering based in Cambridge, England.

Research & Consultancy

The research business centres on the long running ANSA programme of technology innovation, evaluation and application pilots in the field open distributed processing. This programme delivers to APM and its research partners valuable insight into how technology will develop in the fast changing world of open networks and how the technology can be applied in applications that deliver competitive advantage to their users. Consultancy extends the APM's research capability and carries the results into our customers IT strategy and deployment. Consulting services are focused on systems architecture definition and validation, end-to-end techniques for business application security and dependability, strategies for integrated use of WWW, CORBA and Java and technology briefings. In addition, APM has the capability to develop critical system components where they are not available off-the-shelf, or outside the skills of the customer's development team.

Products

The product business produces software products for the deployment of mobile code. It trades under the name of Digitivity. The first product launched in June 1997 is the CAGE which enables secure enterprise use of Java without compromising Intranet integrity. Digitivity product strategy is strongly driven by technology input from the research business and customer requirements identified from the consulting business. Digitivity is currently planning to introduce two more products, the POLICY CAGE and the ENTERPRISE CAGE which add facilities to support business-to-business transactions between CAGES.

Exploitable Results

The primary exploitable results to APM Ltd from FollowMe will be three fold:

1. staying abreast of the leading edge in agent technologies for input to both APM's and our research partners IT strategies
2. developing skills in agent-based systems that APM Ltd can use to enrich the consultancy offering to our customers
3. extension of the CAGE product family to provide support for hosting mobile agents transferred between business partners.

To facilitate this exploitation APM Ltd will make the current CAGE technology available to the project partners and use this foundation to build prototypes with extended facilities.

Anticipated Impact on Core Business

1. the number of additional members to the APM research partnership joining on the basis of research supported by FollowMe (target £100K per annum)
2. the level of consultancy business generated on the strength of FollowMe expertise (target £250K per annum)
3. the introduction of agent facilities into the ENTERPRISE CAGE product by 2Q99.

FAST Exploitation

Core Business

FAST e.V., Bavarian Research Institute for Software Technology, was founded in 1993 by the Bavarian government to foster software technology in Bavaria. FAST has a collection of personal and industrial members (industrial members are the Bavarian States Bank, BMW, Siemens, and Softlab). One of FAST's roles is to support small and medium enterprises in Bavaria on their path into the information age and foster the use of new media such as the Internet. FAST has established close links to research institutes at universities and applies the results directly within the organisations of its members or promotes the results publicly for the industry in Bavaria.

FAST has a major role in designing the concept and administering the implementation of the state-sponsored "Bayern Online" project (http://www.bayern.de/BayernOnline) on behalf of the network department (IZB) of the Bavarian Statesbank. In the latter project, FAST is actively engaged in promoting the use of the Internet in the day to day business of the small and medium sized industries in Bavaria, by leading and administering pilot projects with prototype character.

In the context of the World Wide Web (WWW), FAST is a service and content provider for a variety of businesses whose web servers and database applications are administered and hosted there. In addition, FAST is active in a multimedia research project providing an integrated platform for developing multimedia applications for the WWW. Distribution, teleworking, business reorganisations and the Internet are and will be major issues for the years to come.

Exploitable Results

FAST is involved in two major work packages: User access and one of the two pilot projects. The results of these packages are:

- methods and interfaces for obtaining information from the internet with non-computer equipment,
- a set of agent-based services (real estate and stock market information and trading) and corresponding servers
- statistical information on user behaviour and experience reports

The result of the user access package will provide a variety of methods and interfaces for obtaining information (collected by agents on the Internet) with non-computer equipment such as the telephone, fax machine, hand-held portable devices (PDAs), etc. This would enable users to access standard information on the Internet, such as web pages or their personal electronic mail, through these devices. Most consultancy activities imply travel and the need of remote or mobile access to information. This means that some of the early users to benefit will be employees of FAST. Later on these services can be offered to consultants in the IT sector in general.

The pilot project is geared towards implementing a complete system with a number of agent-based services on the Bavaria Online network. Once these services have been implemented and tested, they can later be offered for a small fee.

At the end of the pilot project, users will be asked about their satisfaction with the system and the services, and they will also be asked whether they would be willing to pay for these services. Feedback about interest in other services will also be requested. The results of this survey will become very valuable in marketing agents and agent technology in Bavaria in specific and the European countries in general.

Exploitation Plan

The results of the user access work package will be offered to current and future customers of FAST who use the web hosting and administration services of FAST. These interfaces and gateway services could then become part of a standard web hosting package offered by FAST. For example, a group of FAST's clients, approximately 25 Bavarian Savings Banks, might be interested in letting their own clients obtain stock or bank account information via email, fax, or PDA instead of restricting themselves to Internet banking.

It is planned to use the servers designed and built for the pilot project outside the Bavaria Online network. This could become an additional service offered by FAST: in addition to the basic web hosting, FAST could also provide the hosting of information servers and services such as a real estate service.

The results of the user survey will be used in the consultancy aspects of FAST and will also become part of variety of publications in conferences or as part of the FAST book series on current topics in software technology.

The financial investment of FAST in the FollowMe project amounts to about 90 person month, of which 50% will be funded by the commission. This is a major investment on the part of FAST and it is expected to increase business through increased competencies and thus increase revenues to regain this investment over the course of approximately three years.

Exploitation activities in the project

There are a variety of exploitation activities in the project: as part of the pilot project, a number of services is provided for free to the users. At the end of the pilot project, users will be asked about their satisfaction, and they will also be asked whether they would be willing to pay for these services. Based on the results of the survey, such a services package will then be offered to new and existing clients of FAST.

In addition, as interfaces and gateways will be designed and implemented for user access, they will also be tested during the pilot. The complete user access package through the different media will then be offered for continued use to the participants of the pilot and later on to a larger community of users. FAST regularly presents its services on exhibitions and fairs. In 1997, FAST will present its Internet based services and consultancy on the second largest annual computer fair in Germany, the *Systems* fair in Munich. It is expected to present the new services and competencies in 1998 at the same fair.

Anticipated impact on core business

Through the involvement in the FollowMe project, FAST will strengthen its competencies in the area of Internet, web, and user access services. It is planned to add an additional work package containing user access services and user gateways to each new web hosting offer made. In addition, new servers providing these services (in contrast to simple information servers as offered predominantly on the WWW) FAST expects to install and host additional servers. The acceptance of such additional features would provide in increase in fees for FAST in the area of web hosting of an estimated 25% per hosting. With revenue in this area of business of DM 1,000,000 in 1996, and expected revenue of DM 1.5 million in 1997, we expect increased earnings of at least DM 375,000 in the first full year.

For FAST, an attractive feature is the ability to sell the agents themselves as products with virtually no costs for development once the pilot is successful. This allows for additional revenues without additional cost of labour.

INRIA Exploitation

INRIA is most interested in exploiting the results of FollowMe as well as its current results, and will consider this exploitation through two possible ways:

Foreground information coming from different partners of the project will be used by different teams at INRIA, working on close subjects. This diffusion can be extended, in the case of INRIA foreground information, to its own external relations, mainly academic institutes and universities around the world.

Furthermore, INRIA can integrate foreground results on current research prototypes. INRIA would not engage directly in the market place selling such prototypes. However, these prototypes can be commercialised by industrial companies, in particular by INRIA's spin-offs. In fact, in the case where the product is too innovative to be immediately commercialised by industry, INRIA has the possibility of creating spin-offs, and has done so since 1984.

In 1995, INRIA has 3 subsidiaries:

- SIMULOG (Computer Aided Engineering)
- ILOG (Artificial Intelligence and Software Engineering)
- O2 Technology (Object Oriented Data Base Management System)

and there exist 16 private companies in activity created by former INRIA researchers.

Since 1984, INRIA has signed roughly 60 transfer contracts with industrial partners in France and Europe to industrialise and commercialise research prototypes. Finally, it is also active in normalisation committees where research results are proposed to be integrated to standards.

TCM Exploitation

Core business

In 1982, Télématique de l'Ouest (ATO), was created by the newspaper Ouest-France, the City of Rennes, the SEMAEB, the CPAM, and Groupe HAVAS. This association's original aim was to test the then young and promising regional telecommunications market. This experiment lasted until 1986 when the parties concerned assessed the impact of their projects.

Ouest-France decided to create its own subsidiary, Télématique & Communication, by taking on the association's staff and material. In 1991, the group Ouest-France went through restructuring to ensure its independence and Télématique and Communication was spun off to its financial holding company, SOFIOUEST. In 1987, Télématique & Communication had a turnover of 3.5 million F.F. with a staff of 6 people. In 1994, it's turnover came in at 10.624 million F.F. with a staff of 16. In 1995, turnover amounted to 10.415 million F.F. with a 16 member staff

The 16th of June 1996, Télématique & Communication changed names to become TC MULTIMEDIA.

Exploitable results

TC MULTIMEDIA is the leader of the ETEL project whose objective is to provide a generic and modular electronic news distribution service for the press (regional dailies, weeklies, newsletters..). The uniqueness of this project resides in the continuity between the current paper version and its electronic edition. These two versions are generated from a single digital representation stemming from a given editorship's output. The electronic version respects the design and news content elements of the present print edition. The service handles the day's editions and implicitly archives preceding editions. The switch from paper-based to computer terminal-based reading must not sacrifice the reader's comfort. For this service, this means addressing the following constraints :

- response time : near-instant access to the pages of the edition. The loading delay must be a given time period of say, a few seconds , and this regardless of the size of the page being loaded.
- ergonomics : ETEL provides the reader with the navigational means necessary for easy readability.

It is within this context of the ETEL project that we have planned on the integration of project FollowMe's objectives and results. These are indeed a real opportunity to provide much more easily accessible information, an increase in the potential number of users by way of massive diffusion on the internet, and a generalisation of mobile personal communication devices. This is a guarantee of an international market for our product, and thus reinforces its pertinence with regard to local news services (movie schedules, weather...).

The principle motivation for users to subscribe to ETEL, the newspaper Ouest-France's electronic edition, is being able to consult the following on his/her terminal :

- 40 regional editions on-line per day.
- 2,500 articles and 1,500 photos.
- Access to archives.
- Being able to define one's own geographic and thematic profile.

This ensemble of services thus enables users to more quickly obtain a very thorough panorama of published news from this enormous information base, for either one or more precise subjects, or by region, department, or town. Being capable of accessing very precise information/news beyond one's local edition's range must be able to be reinforced by adjacent services provided by ETEL. It must be noted that our range with Ouest-France merely covers one fourth of French territory in terms of circulation (Normandy, Bretagne, Pays de la Loire). We thus believe that all of the local services managed by FollowMe will reinforce the usefulness of ETEL. Indeed, this represents an extension of ETEL's accessibility range for all subscribers living elsewhere than in western France, otherwise said for all our readers not residing in the 12 departments in western France, a perfect complementarity between news of western France provided by ETEL and local service-oriented news provided by FollowMe. Furthermore, the FollowMe project, planned to be accessible via typical personal computer terminals, will enable us to more widely circulate our news with the spread of consultation terminals.

Exploitation plan

Ouest-France has the largest information base available concerning news from western France. Consequently, whether it be for local or distant users, ETEL provides a range of services complementary to those of the paper

edition, yet distinctly original in terms of their content and presentation. The newspaper Ouest-France has a daily circulation of 800,000, making it the most widely circulated French daily paper.

Project FollowMe's business strategy is quite complimentary to project ETEL's. The latter is expected to be subscription-based, with an extra charge in order to access FollowMe's services. In the near term, we will be targeting those living in western France who often travel elsewhere in France or abroad. We shall also be targeting all expatriate Bretons, Normands, and inhabitants of Pays de La Loire as well as those foreigners interested in these regions and wishing to obtain information from western France and services from their local area. The second business objective is the marketing and sale of FollowMe software to other newspapers. TC Multimédia regularly works with numerous regional dailies which are keen on implementing this type of software. TC Multimédia has teamed up with Ouest France's advertising production agency to form a multimedia advertising branch. What is most pertinent for our products, owing to the introduction of FollowMe, is that they will thus open up to new national and international advertising perspectives.

UWE / ICSC Exploitation

1. Core business

ICSC is a self funding research organisation within the University of the West of England. Its mission is to transfer technology from the research domain into commercial organisations within the UK and Europe. This is achieved through a combination of collaborative research projects, such as FollowMe, funded by National and European initiatives, and through consultancy and contract based research and development. ICSC is also active in basic research, funded through normal academic grant programmes, which feeds the technology transfer process. Consultancy and contracts with industry account for about 15% of turnover.

2. Exploitable results

The main exploitable outcome from FollowMe for ICSC will be the experience and knowledge gained in carrying out the project which will be marketed as part of our portfolio in trying to increase the amount of direct industrial funding through consultancy and contracts.

ICSC has much experience of working within the transport, healthcare and financial services sector and the results of FollowMe will be applicable to certain commercial applications within these domains.

3. Implementation strategy: exploitation plan

ICSC would not engage directly in the market place selling products or services derived from FollowMe and would probably work jointly with one of the commercial partners.

4. Exploitation activities in the project

There is an important requirement for disseminating the results of the FollowMe project through normal academic routes and ICSC would see the generation of papers and WWW based information as an important exploitation activity within the project.

5. Anticipated impact on core business

We would expect to increase the number of consultancy and commercial contracts as a consequence of FollowMe and to increase the percentage income from these sources above 15%.

A.2 CVs of Key Personnel

Dr. Michel Banatre (INRIA/IRISA)

Michel Banatre received the "Docteur es Sciences" degree from the university of Rennes in 1984. Since 1986, he has held a research director position at INRIA/IRISA in Rennes. His research interests include distributed operating systems, fault-tolerant architectures and multimedia informations systems and appplications.
Michel Banatre is currently leading the Solidor research team composed of twenty persons working on distributed systems and applications programming, fault tolerant computing, the design of multi-media applications and their implementation on a distributed system platform based on ATM technology. These research activities are strongly supported by contracts from Bull, Thomson , France-telecom, OST and grants from EC, CNRS. Michel Banatre is the author of over 50 publications in the area of programming languages, distributed systems and fault tolerant architectures.

Michael Breu (FAST e.V.)

Employment

Since June 1995	FAST (Research Institute for Applied Software Technology,) Munich
Sept. 1994 - June 1995	Seconded to the European Software Institute, Bilbao, Spain
Since 1991	Siemens-Nixdorf Informationssysteme AG, Munich (now dormant)
1989 - 1991	Technische Universität München
1986 - 1989	Universität Passau

Professional Experience

Since Sept. 1996	Project manager of the electronic publishing project MeDoc,
Sept. 1994 - June 1995	Secondee at the ESI, development of publications on Euromethod (Management Brief, Procurer's Handbook), specification of the electronic document distribution centre, service provision for the European Software Process Improvement Training Initiative (ESPITI)
1994	Adaptation of the Booch Method to Grapes-OO. Participation in the development of Grapes-BM for Business Modelling
1993/1994	Project leader for a European Modelling Language (EML) sub-project of the ASSET initiative. Task director of the task "software engineering and tools" of the ASSET initiative
	Development of a Distributed Systems Guide for the BOS Engineering Method and SSADM in co-operation with CCTA
1991-1994	Project leader for the development of software engineering methods in the Bull, Olivetti, Siemens-Nixdorf co-operation
1987-1991	Teaching assistant at the Universität Passau and the Technische Universität München. Publications on abstract data types and formal implementation relations.
1986/1987	Co-operation in the ESPRIT project PROSPECTRA. Responsible for the definition of a robust formal implementation relation, participation in the definition of the formal semantics.

Will Harwood (APM)

Over the past 17 years William Harwood has been involved with many facets of computing. For the majority of that time he has combined technical and management roles, often being both technical leader and project manager. He has competence in practical and theoretical aspects of software development and design. He is an experienced programmer, designer and project manager, and works well at the interface between clients and technology. He has experience in Project Management and Planning, Team Leadership, Client Liaison and Bid preparation. He is also an expert in various aspects of formal methods.

Prior to joining APM he worked on developing models of safety critical and secure systems, including developing of security models for Java; the development of cryptographic packages and the development of tool support for formal methods. Since joining APM in December 96 William has become responsible for directing the activities in APM's security group.

Work Experience

1978 – 1979: Marconi Avionics at Borehamwood
Computer Assisted Requirements Analysis Project and Ada adoption project
1979 – 1981: Microprocessor Software Unit, South West Universities Regional Computer Centre
microprocessor/personal computer deployment
Ada Design and Programming Methodology Study (DTI funded)
MASCOT revision study (RSRE funded)
1981 – 1985: Standard Telecommunications Laboratories
Development of tools and methods for developing telecommunications systems, in particular techniques suitable for protocol and switch modelling (extensive use of formal methods, functional programming and object orient techniques)
1985 – 1996: Imperial Software Technology
ESPRIT and DTI research projects Consulting Activities (to, amongst others BT, CESG, AEA Technology). Developed techniques and tools for supporting the use of formal methods and their applications to security and safety critical systems. Development of security and safety critical systems models and specifications and their analysis.

Special Interests

- Logic
- Mathematical aspects of computer science including programming language semantics and formal methods
- Cryptographic Protocols
- Agent systems
- Evolution and Ecology

Key Memberships

- Member of the Association for Symbolic Logic
- Member of BCS Formal Aspects of Computer Science Sub-Group (BCS-FACS)
- Member of European Association for Theoretical Computer Science (ETACS)
- Member of BSI Standardisation Panel for the Z Specification Language
- Member of the Safety Critical Systems Club
- Member of the Hazard Analysis Interest Group

Andrew Herbert (APM)

Andrew Herbert is Chief Technical Officer of APM and Chief Architect of ANSA. ANSA is an industry sponsored programme of research and advanced development into the use of distributed systems technology to support applications integration in enterprise-wide systems. The current focus of the ANSA work includes support for interactive multi-media services, object technology for World Wide Web applications, distributed systems management and security and IPR issues in wide area information systems.

Andrew has led the ANSA technical programme since its creation in 1985, having been selected from a highly competitive international field of candidates. He has built up the ANSA team, created the ANSA architecture and made it known and respected in the industry.

ANSA results have been influential in OMG, OSF, TINA-C, ISO and ITU-TS. Andrew is editor of Part 3 of the ITU-TS/ISO Reference Model for Open Distributed Processing and a regular contributor to OMG activities.

ANSA has achieved notable successes in demonstrating the benefits of distributed object technology as a potent vehicle for applications integration in large scale systems; including for example the NASA astrophysics data system, a European paging system and an online customer service system for a major UK utility.

Andrew has served on numerable conference programme committees and is a project reviewer and strategy advisor for the European Commission and UK EPSRC. He interacts regularly with senior technical staff in the organizations which sponsor the ANSA programme, including Fujitsu, ICL, BT, CNET amongst others. He maintains strong links with the academic research community.

Special interests

Andrew is a member of Wolfson College Cambridge, BCS, ACM, IEEE and a liveryman of the City of London Worshipful Company of Information Technologists.

Work Experience

Prior to ANSA Andrew was a lecturer in the Computer Laboratory at the University of Cambridge during the pioneering days of local area networks and before that a research student active in the fields of operating systems and security. He spent a sabbatical at the MIT Laboratory for Computer Science in 1983 at the inception of project Athena and the X-Window system. He wrote his first operating system in 1976 and sent his first RPC in 1978.

Qualifications

BSc in Computational Science from the University of Leeds (1975)

PhD in Computer Science from the University of Cambridge (1978)

Publications

Andrew has presented ANSA at conferences and in numerous publications.

Dr. Valerie Issarny (INRIA/IRISA)

Valerie Issarny is an INRIA Researcher at IRISA since 1993. She obtained her doctoral thesis from the University of Rennes I in 1991, on parallel exception handling. She spent a one-year post-doctoral at the University of Washington in 1992 where she worked on the design of a single address space operating system. Her research interests are: distributed programming above large scale distributed architectures, and distributed multimedia applications. She has contributed to the design and implementation of a concurrent object-oriented language and its distributed object-based run-time system, developed at IRISA. She is now in charge of a project on the design and implementation of a configuration-based development environment supporting distributed system customisation according to application non-functional requirements.

Dr. Michael Yearworth (ICSC/UWE)

Dr. Yearworth received his PhD from the University of Southampton in 1987. He is currently the director of the Intelligent Computer Systems Centre (ICSC) at the University of the West of England, Bristol, managing a team of 18 staff carrying out applied research into distributed systems, machine learning and intelligent agents. His technical expertise is in the area of distributed systems architectures with emphasis on Open Distributed Processing (ODP). He was an author of the OpenLabs architecture specification for open clinical laboratory information systems (AIM project A2028), technical architect for the TRaffic Engineering Network Data System (TRENDS) project (ESPRIT 20.791) delivering real time road traffic information across the Internet and technical architect for the Management of Traffic in Open Systems (MOTOS) project, part of the Open Distributed Systems Architectures programme funded by the Department of Trade and Industry (DTI) in the UK.