eCAALYX
Enhanced Complete Ambient Assisted Living Experiment

Deliverable D3-M15
Scenario Description

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Project name: Enhanced Complete Ambient Assisted Living Experiment
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Project Duration: 36 months
Co-ordinator: Cetemmsa
Partners in the project: Cetemmsa
Telefónica Investigación y Desarrollo
INESC Porto – Instituto de Engenharia de Sistemas e Computadores do Porto
University of Plymouth Enterprise Ltd
University of Limerick
Corscience GmbH & Co KG
Fundació Hospital Comarcal Sant Antoni Abat (ABAT)
Fraunhofer Portugal
TeleMedic Systems, Ltd
National University of Ireland, Galway
Zentrum für Kardiovaskuläre Telemedizin GmbH

Partners involved in D4.M15: All Partners

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Dissemination level

<table>
<thead>
<tr>
<th>Dissemination level</th>
<th>Description</th>
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<tr>
<td>PU</td>
<td>Public</td>
</tr>
<tr>
<td>PP</td>
<td>Restricted to other programme participants (including the Commission Services)</td>
</tr>
<tr>
<td>RE</td>
<td>Restricted to a group specified by the consortium (including the Commission Services)</td>
</tr>
<tr>
<td>CO</td>
<td>Confidential, only for members of the consortium (including the Commission Services)</td>
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Lack of awareness amongst medical professionals, carers, and older people has also been seen as an inhibitor to the take-up of telehealth services in Ireland. Lack of IT orientation on the part of many older people and worries about privacy are also seen as barriers.

4.4 SPAIN

STRUCTURE AND ORGANIZATION OF HEALTH SYSTEM

- Spain is a constitutional monarchy. The Constitution established decentralization of the healthcare services by transfer of powers to the 17 Autonomous Regions of Spain (a process completed in 2001-2).

- The Spanish Health System is characterized by public funding, universal coverage and free healthcare services at the time of use (except for partial funding of medicines and other minor issues).

- Each autonomous region has its own Health Service, which is the administrative and management structure responsible for all the health centres, services and facilities in its region, provincial administrations, town councils and any other local administration located within the Autonomous Region. The responsibilities of each Autonomous Region include:

  - Health service management
  - Healthcare planning
  - Public Health

- Taxes are the basis of healthcare funding and account for 94.07% of total resources, which are redistributed to the Autonomous Regions (89.81%), the Central Government (3%), Local corporations (1.25%) and the Spanish Autonomous Cities of Ceuta and Melilla (0.01%).

- User access to healthcare services is organised in two care levels:

  - The first level – Primary Health Care – characterised by extensive accessibility and technical resources enough to resolve most frequent health conditions. Primary healthcare services are mainly delivered in Primary Care Centres staffed by multidisciplinary teams, which include general practitioners, paediatricians, nurses, administrative staff, and, in some cases, social workers and physiotherapists.

  - The second level – Specialist Care – has more complex and costly diagnostic and therapeutic resources, access to which is gained by referral from primary healthcare doctors. Both inpatient and outpatient specialist care is given in Specialist Centres and Hospitals.

- The Spanish National Health System (SNS-E) offers a set of basic services, access to which has to be ensured to all citizens by the Autonomous Regions. The Regions in turn, have the power to offer additional services, although on their own budget and financing. Spanish laws establish a basic common services portfolio available to every user of the SNS-E, which includes:
Description of potential user and patient scenario

- Public health (health policies and health surveillance)
- Primary care including the following activities specifically aimed at the elderly:
  - Health promotion and prevention
  - Detection and care of elderly people with health risks
  - Home care for homebound people
- Specialist care: outpatient clinics, medical and surgical day hospitals, hospitalisation on an inpatient basis
- Emergency care.
- Pharmaceutical services:
  - Hospital pharmacy: medicines not subject to co-payment
  - Medical prescriptions: medicines subject to co-payment by the user, except for pensioners and their beneficiaries.

- The common services portfolio does not include providing telemedicine services at the user’s home.
- Within the scope of their authority, autonomous regions may establish their respective service portfolios, which must necessarily include all those specified in the Basic Common Services Portfolio. Autonomous regions may include other techniques, technologies or procedures not stipulated in the common portfolio, for which they must provide the additional necessary resources. None of these supplementary services are financed by the SNS-E.
- Healthcare services are provided free of charge, except for pharmaceutical, orthopaedic and prosthetic services, which are co-financed by the users. Users in retirement age are provided with prescribed pharmaceutical products free of charge.
- Although current private health contribution is small, it keeps growing. It offers approximately 34% of hospital beds in Spain and is responsible for 21% of total hospital admissions (2006). Private Health coverage of the population aged 65 or over is rather low.

**TELECARE AND TELEHEALTH SCENE**

- In 2000, the Ministry for Health and Social Policy (in those days called Ministry for Health and Consumer Affairs) published – through the National Institute for Health (INSALUD) – the INSALUD TELEMEDICINE PLAN. The mentioned document acknowledges a “generalized awareness of the major contribution of new information and communication technologies to our society, particularly in relation
with health and welfare.” report considered that telemedicine included a variety of services: remote assistance (consultation/diagnosis, monitoring/surveillance), processes for providing support to continuing assistance (patient management and administration), health information services for the community and remote information and training service for healthcare providers.

- The objectives proposed for remote assistance (consultation/diagnosis, monitoring/surveillance) included:
  
  o Providing healthcare services where and when required, independently of the distance between patient and provider.
  
  o Overcoming barriers to access healthcare services by any group of patients or from any geographic area.
  
  o Providing home assistance to patients under special situations.
  
  o Providing healthcare services to patients in areas under war or catastrophe.
  
  o Improving global assistance to the citizens by meeting certain needs: rational use of high-value resources; continuing assistance granted (avoiding duplication of diagnosis tests, etc.); cooperative work between general and specialist practitioners in different fields.

- The above objectives have been only partially fulfilled. Main advances occurred in the group of services for the processes of support to continuing healthcare (patient management and administration).

- An important proportion of all projects for the healthcare application of information and communication technologies are funded by the AVANZA plan (www.planavanza.es). The AVANZA plan (www.planavanza.es) – under the direction of the Ministry for Industry, Tourism and Public Works – was designed to place Spain in a preferential position within the Society of Information and Knowledge, to improve its financial productivity and to enhance people's well being. The budget allocated to this Plan during 2005-2009 was higher than €6,500 millions.

- The AVANZA 2006-2011 Plan sets out an online-healthcare work-plan, which includes telehealth and consists of actions aimed at improving patients’ quality of life, reducing costs, developing tele-consultation and diagnosis in under-resourced areas and connecting primary and specialist care.

- The AVANZA Plan is co-ordinated in each Autonomous Region in accordance with their own Regional Strategy for the development of these services.
- The major achievement of the AVANZA Plan until 2009 concern Online-Healthcare. However, advances have been mainly done in two aspects: communication between different healthcare services, and patient management; but not in relation to the provision of remote healthcare services such as telemonitoring/surveillance.

- In view of the already achieved advances in the offer of IT services, the AVANZA2 plan has been launched (2009-2012) with the main objective of promoting the demand for such services.

- Since the Spanish Health System is characterized by decentralization of healthcare competences to the Autonomous Regions, telemedicine projects and resources have not been homogeneously developed and there are considerable differences among Regions. Furthermore, the involved technological systems often come from different providers with the consequent problems of incompatibility.

- Most of the projects are focused on supporting services for the healthcare community (patient management and administration); while those focused on remote assistance are mainly addressed to teleconsultation/diagnosis rather than to home-monitoring. Projects with objectives and design similar to eCaalyx (monitoring/surveillance) are usually temporary and developed in the context of European or National research studies.

**DRIVERS AND BARRIERS FOR TELECARE AND TELEHEALTH**

- The Law 39/2006 for the Promotion of Personal Autonomy and Assistance to dependent persons ("Law of Dependence") enacted in 2006, stipulates the creation of a System for Autonomy and Assistance to Dependent persons, which grants a minimum of rights to all of the citizens in Spain. The services portfolio includes telecare, though not telehealth (remote monitoring) programs. Approval of this law lead to the creation of institutions specifically aimed at providing assistance to dependent persons in some Autonomous Regions e.g. the Extremadura Service for Autonomy and Assistance to Dependent persons (SEPAD) (Autonomous Region of Extremadura); the Agency for Assistance to Dependent persons in Andalusia (Autonomous Region of Andalusia), and others. Such institutions acknowledge the beneficial role of technological resources and have also promoted telemedicine projects similar to eCaalyx (SEPAD has promoted the project Social-Sanitary Teleassistance). However, their financial coverage poses major difficulties.

- Due to decentralization of healthcare competences in favour of the Autonomous Regions, the development of programs or projects with telemedicine resources in Spain is rather heterogeneous with large variations from one Region to another. The Autonomous Regions of Andalusia, Madrid and Catalonia have probably made the largest advances in this field.

- The probably most interesting medical specialties for the use of systems like eCaalyx in Spain are: Geriatrics, Family medicine and Cardiology. Regarding Geriatrics, the Social-Sanitary Hospital network developed in Catalonia, specifically for providing assistance to elderly persons after acute phases of disease, lead to a noticeable growth in the number of Geriatricians in this Autonomous Region, which may be considered an ideal target for systems like eCaalyx.
• Partially due to the drive of plans specifically designed for technological development, in previous years (such as the AVANZA plan) great achievements have been made in overcoming difficulties for offers and implanting services like eCaalyx. The market scenario shows remarkable development of the offer, while development and preparation of the demand (patients, healthcare providers and healthcare authorities) emerges as the next challenge.

• A number of relevant aspects should be considered for successful implantation of telemedicine systems. In a local qualitative study (ref) – where the opinions of health providers, managers and representatives of the telecommunication industry were gathered – it was concluded that the human factor was the key for successful implantation of these systems in Spain. Further relevant aspects to be considered are: financial and institutional support, acceptance by health providers and patients (implantation of systems proposed by health providers would probably be more successful than that of systems chosen by the “higher-ups” e.g. directors or resource managers); and the need for information and previous training of health providers and users.

• Implantation of telemedicine systems requires organizational changes, which may be complicated by the compartmentalization and lack of connection currently affecting the Spanish organizational model (ref). Healthcare providers’ perceived workload increase was one of the two major barriers evidenced in a Delphi study (ref) conducted to evaluate the predisposition of Spanish physicians (sample of 985 physicians) to accept the use of telemedicine as a useful tool in daily clinical practice.

• Familiarity with telemedicine resources by healthcare providers may be another limiting factor. The above mentioned Delphi study reported that 80.2% of the participating physicians had never taken part in a telemedicine project, although most of them (80.2%) were willing to do so.

5. POTENTIAL SCENARIOS FOR ECAALYX SYSTEM

The eCaalyx’s scenarios arise from potential interactions between actors, actions and places. The following table shows these potential interactions.

<table>
<thead>
<tr>
<th>ACTORS</th>
<th>ACTIONS</th>
<th>PLACES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physician</td>
<td>Disease control</td>
<td>Ambulatory care setting (ext. consult)</td>
</tr>
<tr>
<td>Nurse</td>
<td>Acute*</td>
<td>Hospital care setting (early discharge or home hospitalization)</td>
</tr>
<tr>
<td>Physical therapist</td>
<td>Chronic**</td>
<td></td>
</tr>
<tr>
<td>Social worker</td>
<td>Decompensation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Palliative care</td>
<td></td>
</tr>
<tr>
<td>Treatment control</td>
<td>Drug</td>
<td>Home visits service</td>
</tr>
<tr>
<td></td>
<td>Exercise</td>
<td>Telemedicine center</td>
</tr>
<tr>
<td></td>
<td>Behavior</td>
<td>Nursing home?***</td>
</tr>
<tr>
<td>Prevention and promotion</td>
<td></td>
<td></td>
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</tbody>
</table>
4. HEALTH SYSTEM SCENARIO

I. SPAIN

1. POLITICS

After the termination of dictatorial regime, a new Constitution was adopted in 1978, whereby Spain became a constitutional monarchy. The Constitution established decentralization of the healthcare services by transfer of powers to the 17 Autonomous Regions of Spain (a process completed in 2001-2).

2. HEALTH SYSTEM

The information below has been extracted from two main sources: the latest report published by the Spanish Ministry for Health and Social Policies “National Health System. Spain 2010”; and the first Deliverable (D3M2 Scenario Definition).

The Spanish Health System is characterized by public funding, universal coverage and free healthcare services at the time of use (except for partial funding of medicines and other minor issues).

2.1 ORGANIZATIONAL STRUCTURE OF THE SPANISH NATIONAL HEALTH SYSTEM

The Spanish National Health System - SNS-E - is comprised by both the Health Services of the Central Government Administration and those of the 17 Autonomous Regions (except for Ceuta and Melilla, which are managed from the Central Administration through the National Institute for Healthcare Management). The management of Healthcare Services is based on a decentralized policy by which the different responsibilities are distributed between the Central Government and the Autonomous Regions in the following way:

Responsibilities of the Central Government

- Basic principles and general coordination of health services: refer to the establishment of standards determining the minimum conditions and requirements, in pursuit of a basic equality of conditions in the operation of the public healthcare services.

- Foreign health affairs and international relations and agreements.

- Legislation on pharmaceutical products, including evaluation, authorization and registration of medicines for human and veterinary use and medical products (such as eCaalyx).

Responsibilities of the Autonomous Regions

Each autonomous region has its own Health Service, which is the administrative and management structure responsible for all the health centres, services and facilities in its
region, provincial administrations, town councils and any other local administration located within the Autonomous Region.

The responsibilities of each Autonomous Region include:

- Health service management
- Healthcare planning
- Public Health

The Inter-territorial Board of the National Health System (CINS-E).

This is a permanent body responsible for the coordination, cooperation and liaison among the Central Government and the Autonomous Regions, in connection with health issues. The Chairman of the CINS-E is the Minister for Health and Social Policy; the deputy Chairman is one of the directors of the Health Services of the Autonomous Regions, elected by and among the Department directors comprising the Board. The CINS-E operates through its Plenary Meeting, an Executive Committee, technical committees, working groups, and a Consultative Committee. The later organ mediates social participation in the SNS-E through representatives of local administrations, employers’ organisations and major trade unions. The main duties of the Committee are to inform, give advice and make proposals on matters of particular interest for the operation of the SNS-E.

Research and Health Technology

The reference Research Centre for the SNS is the Health Institute Carlos III (ISC III), which is under the direction of the Ministry for Science and Innovation. Emerging Health Technology is evaluated by the National Agency for Health Technology (which is a part of the ISC III). At the regional level, some regulatory agencies have been created, which cooperate together.

2.2 HEALTHCARE FUNDING AND EXPENDITURE

Healthcare for ordinary illnesses and non-occupational accidents in Spain is a non-contributory benefit funded through taxes and included in the general funding of each Autonomous Region. Taxes are the basis of healthcare funding and account for 94.07% of total resources, which are redistributed to the Autonomous Regions (89.81%), the Central Government (3%), Local corporations (1.25%) and the Spanish Autonomous Cities of Ceuta and Melilla (0.01%).

Public healthcare funding in 2007 reached €60222 millions, including €54541 millions provided by the Autonomous Regions (90.57%).

In 2006, public funding was 71.2% of healthcare expenditure, while private funding was 28.8%, including 22.4% from direct payments by the users, 5.5% from private insurance companies and the remainder from payments by private non-profit organizations providing services to particular users.

Total healthcare expenditure in Spain reaches up to 8.5% of the Gross national product (GNP); public healthcare expenditure reaches 6.1% of the GNP (€ 1,421 per capita).
Public healthcare expenditure in 2007 was distributed in the different SNS-E levels and resources as follows (expressed in percentages):

- Hospital service and Specialist care: 54%
- Primary care: 15.7%
- Public health: 1.4%
- Community care: 3.1%
- Pharmacy: 19.8%
- Transportation, prostheses and therapeutic devices: 1.8%
- Capital expenditure: 4.3%

2.3 HEALTH DELIVERY SYSTEM AND SNS-E SERVICES PORTFOLIO

The SNS-E offers a set of basic services, access to which has to be ensured to all citizens by the Autonomous Regions. The Regions in turn, have the power to offer additional services, although on their own budget and financing. Healthcare services are provided free of charge, except for pharmaceutical, orthopaedic and prosthetic services, which are co-financed by the users. Users in retirement age are provided with prescribed pharmaceutical products free of charge.

User access to healthcare services is organised in two care levels:

The first level – Primary Health Care – characterised by extensive accessibility and technical resources enough to resolve most frequent health conditions. Primary healthcare services are mainly delivered in Primary Care Centres staffed by multidisciplinary teams, which include general practitioners, paediatricians, nurses, administrative staff, and, in some cases, social workers and physiotherapists.

The second level – Specialist Care – has more complex and costly diagnostic and therapeutic resources, access to which is gained by referral from primary healthcare doctors. Both inpatient and outpatient specialist care is given in Specialist Centres and Hospitals. Once specialist care is completed, the patient is referred back to the primary healthcare doctor together with the corresponding medical record for inclusion into the patient’s medical history.

Healthcare delivery is organised in Health Areas, established by each Autonomous Region according to demographic and geographic criteria aimed at guaranteeing service proximity for the users. Health Areas are in turn sub-divided into Basic Health Zones, which are the territorial framework for Primary Health Care and for the activity of Primary Care Centres.

Each Area has a general hospital as reference for Specialist Care. Some Healthcare Departments have established intermediate structures between the Health Area and the Basic Health Zone.
Spanish laws establish a basic common services portfolio available to every user of the SNS-E, which includes:

- Public health (health policies and health surveillance)
- Primary care including the following activities specifically aimed at the elderly:
  - Health promotion and prevention
  - Detection and care of elderly people with health risks
  - Home care for homebound people
- Specialist care: outpatient clinics, medical and surgical day hospitals, hospitalisation on an inpatient basis
- Emergency care.
- Pharmaceutical services:
  - Hospital pharmacy: medicines not subject to co-payment
  - Medical prescriptions: medicines subject to co-payment by the user, except for pensioners and their beneficiaries.

The common services portfolio does not include providing telemedicine services at the user’s home.

**PORTFOLIO OF SUPPLEMENTARY SERVICES PROVIDED BY THE AUTONOMOUS REGIONS**

Within the scope of their authority, autonomous regions may establish their respective service portfolios, which must necessarily include all those specified in the Basic Common Services Portfolio. Autonomous regions may include other techniques, technologies or procedures not stipulated in the common portfolio, for which they must provide the additional necessary resources. None of these supplementary services are financed by the SNS-E.
2.4 PRIVATE SECTOR

Although current private health contribution is small, it keeps growing. It offers approximately 34% of hospital beds in Spain and is responsible for 21% of total hospital admissions (2006). Private Health coverage of the population aged 65 or over is rather low.

3 SPAIN TELEHEALTH AND TELECARE SCENE

3.1 THE INSALUD TELEMEDICINE PLAN 2000

In 2000, the Ministry for Health and Social Policy (in those days called Ministry for Health and Consumer Affairs) published – through the National Institute for Health (INSALUD) – the INSALUD TELEMEDICINE PLAN.

The mentioned document acknowledges a “generalized awareness of the major contribution of new information and communication technologies to our society, particularly in relation with health and welfare.” It is based on the telemedicine definitions established by the World Health Organization (WHO): “Telemedicine is the delivery of healthcare services, where distance is a critical factor, by all healthcare professionals using information and communication technologies for exchange of valid information for diagnosis, treatment and prevention of disease and injuries, research and evaluation, and for the continuing education of healthcare providers, all in the interests of enhancing the health of individuals and their communities”; and the definition established in the document “Telemedicine Frame in the Insalud 1998”: “Telemedicine is the use of information and communication technologies for providing healthcare services, independently of the location of healthcare providers and receptors, and the information necessary for the assistance activity”. Since both definitions are rather wide, the mentioned report considered that telemedicine included a variety of services: remote assistance (consultation/diagnosis, monitoring/surveillance), processes for providing support to continuing assistance (patient management and administration), health information services for the community and remote information and training service for healthcare providers.

The objectives proposed for remote assistance (consultation/diagnosis, monitoring/surveillance) included:

- Providing healthcare services where and when required, independently of the distance between patient and provider.
- Overcoming barriers to access healthcare services by any group of patients or from any geographic area.
- Providing home assistance to patients under special situations.
- Providing healthcare services to patients in areas under war or catastrophe.
- Improving global assistance to the citizens by meeting certain needs: rational use of high-value resources; continuing assistance granted (avoiding duplication of diagnosis tests, etc.); cooperative work between general and specialist practitioners in different fields.
The benefits proposed for these services (remote assistance) included:

**For the citizens:**

- Improving healthcare quality both because patients have faster and simpler access to specialist care, and because doctors have more patient-related information available.
- Patients could avoid expenditures, time wasting, and inconvenient journeys – sometimes over long distances – for additional visits, when evaluation by a specialist practitioner is required.

**For healthcare providers:**

- It allows consulting with another physician in the process of diagnosing.
- Enhances clinical and therapeutic coordination.
- Provides support to physicians in isolated areas.

**For the organization:**

- Promotes equity and universality of the healthcare services
- Facilitates continuing healthcare
- Allows providing healthcare to users in remote areas
- Helps reducing hospital-stay, thus optimizing the use of resources and speeding-up patient’s return to their habitual environment.
- Reduces the need for transfer and transportation assumed by the healthcare system.

The general lines of the mentioned report in relation with remote healthcare included:

- Consensus on the use of remote services for a second medical opinion
- Tele-radiology was acknowledged as the most developed service
- The private sector has a remarkable influence on the development of remote healthcare

Prior to the promotion of telemedicine services, the INSALUD has placed considerable effort on the technological preparedness of the system through:

- Development of a Corporate Network for Communication Services
- Development of the INSALUD Intranet
- Project for Technological Updating of Hospitals
- Project for informatization of Primary Care Centres
After an initial phase, where independent projects for developing telemedicine services emerged, the INSALUD promoted coordinated development of such services on the basis of existing resources and experience, as one of its objectives.

The following directives were stipulated specifically for remote healthcare services and support to continuing healthcare.

- In the short term: Integration of Primary care and Specialist care
- In the medium term:
  - Communication between regional hospitals and reference hospitals
  - Experiences in teleconsultation
  - Support to home-based monitoring and follow-up. In pursuit of this type of service it was proposed to develop:
  - An audio-visual communication system for patients with trauma conditions, which enables monitoring the rehabilitation process from the hospital
    - A telealarm system for elderly persons who live alone, with a pressing-key to contact a call-centre, where an operator resolves queries or triggers emergency procedures when necessary, thus promoting monitored independence
    - A continuing electrocardiogram monitoring system for patients with chronic coronary diseases, which allows conducting follow-up procedures and reducing short-term complications
    - A telemonitoring system for patients under treatment by the Pain Unit, which allows monitoring their symptoms in order to put them under control without the need for a visit to the healthcare centre
    - Coordination of healthcare providers, who act in support of Palliative Care by doing home-visits, by providing them access to shared medical records and to an information exchange system

The above objectives have been only partially fulfilled. Main advances occurred in the group of processes of support to continuing healthcare (patient management and administration).

3.2 CURRENT SCENARIO OF TELEMEDICINE IN SPAIN

3.2.1 THE AVANZA PLAN

An important proportion of all projects for the healthcare application of information and communication technologies are funded by the AVANZA plan (www.planavanza.es).

The AVANZA plan (www.planavanza.es) – under the direction of the Ministry for Industry, Tourism and Public Works – was designed to place Spain in a preferential position within the Society of Information and Knowledge, to improve its financial productivity and to enhance people's well being. The budget allocated to this Plan during 2005-2009 was higher than €6,500 millions, which is five times higher than the budget for Information Society initiatives during the period 2001-2004.
The AVANZA plan comprises four areas within which several healthcare-related aspects are included:

**Digital Citizenship**, with the following objectives:

- To increase the proportion of homes equipped with and habitual users of ITs.
- To raise awareness on the benefits of the IT in the general population and to increase the proportion of persons using the IT in their daily life.

**Digital Economy**: To promote adoption of ITs and broadband connection by the SMEs.

**Digital Public Services**, with the following objectives:

- Fully-developed Electronic Administration
- To grant the citizens and companies the right to interact with the Public Administration through electronic means.

**Digital Context**, with the following objectives:

- To extend telecommunication infrastructures to areas where telecommunication demands are not covered.
- To spread broadband and mobility.
- To raise awareness and provide education on IT safety issues to the general population, companies and Public Administrations.
- To promote Digital Identity

The AVANZA 2006-2011 Plan sets out an online-healthcare work-plan, which includes telehealth and consists of actions aimed at improving patients’ quality of life, reducing costs, developing tele-consultation and diagnosis in under-resourced areas and connecting primary and specialist care.

The AVANZA Plan is co-ordinated in each Autonomous Region in accordance with their own Regional Strategy for the development of these services.

The major achievement of the AVANZA Plan until 2009 concern Online-Healthcare. However, advances have been mainly done in two aspects: communication between different healthcare services, and patient management; but not in relation to the provision of remote healthcare services such as telemonitoring/surveillance.

In view of the already achieved advances in the offer of IT services, the AVANZA2 plan has been launched (2009-2012) with the main objective of promoting the demand for such services through 5 major action lines:
3.2.2 TELEMEDICINE PROGRAMMES-PROJECTS IN SPAIN

Below is a description of the current scenario of telemedicine projects in Spain according to the report authored by Martinez-Ramos in 2009.

Since the Spanish Health System is characterized by decentralization of healthcare competences to the Autonomous Regions, telemedicine projects and resources have not been homogeneously developed and there are considerable differences among Regions. Furthermore, the involved technological systems often come from different providers with the consequent problems of incompatibility.

In general, the development of telemedicine in the Autonomous Regions is in line with the “Online Healthcare” Programme, within the frame of the “Lines for Digital Public Services” of the AVANZA plan, which are based on four lines: development of the Electronic Medical Record; electronic Prescription; Online Appointment; and remote services (teleconsultation/telediagnosis) and coordination of primary and specialist care.

Table 20 shows developing projects identified in some Autonomous Regions.

<table>
<thead>
<tr>
<th>AUTONOMOUS REGION</th>
<th>PROJECT OR PROGRAMME</th>
<th>CATEGORY(*)</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>EXTREMADURA</td>
<td>JARA</td>
<td>Patient management and administration</td>
<td>Informatization of the Extermaduran Healthcare Service; Computerized medical records; informatization of the financial and human-resources management.</td>
</tr>
<tr>
<td></td>
<td>Social-sanitary teleassistance</td>
<td>monitoring/surveillance</td>
<td>Pilot project with objectives and design similar to eCaalyx (**)</td>
</tr>
<tr>
<td>CORNALVO</td>
<td>Patient management and administration</td>
<td>Healthcare providers can access patients’ results of laboratory tests</td>
<td></td>
</tr>
<tr>
<td>ZURBARÁN</td>
<td>Patient management and administration</td>
<td>Healthcare providers can access digitized radiology</td>
<td></td>
</tr>
<tr>
<td>Description of potential user and patient scenario</td>
<td>administration</td>
<td></td>
<td></td>
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<td>---------------------------------------------------</td>
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<td></td>
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<tr>
<td>CIVITAS Patient management and administration</td>
<td>Information system on Population Basis, Health map, etc.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Telemedicine Project consultation/diagnosis</td>
<td>Consultation and teleconsultation between different specialists: surgery, dermatology, etc. Implanted in 18 Primary care centres and 11 Reference Hospitals</td>
<td></td>
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</tr>
<tr>
<td>ANDALUSIA Individualized Healthcare Card Patient management and administration</td>
<td>Identification card allowing access to the patient’s medical record.</td>
<td></td>
<td></td>
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<tr>
<td>TeleADM monitoring/surveillance</td>
<td>Time restricted project (3 years) for the development of an advanced teleassistance programme, patient tracking, videoconference and monitoring of vital signs.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PLAMSI monitoring/surveillance</td>
<td>Project for the development of domotic-home, alarm system (smoke, gas, etc.) and videoconference.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MobilAlarm monitoring/surveillance</td>
<td>Pilot project for promoting habitual use of teleassistance outside of home.</td>
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<tr>
<td>COMMONWELL Patient management and administration</td>
<td>Integration of healthcare services and social services into a common platform.</td>
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<tr>
<td>Digital Medical Record Patient management and administration</td>
<td>Digital medical record, which can be accessed from primary care centres and hospitals</td>
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<tr>
<td>Users database Patient management and administration</td>
<td>Patient’s information for management of health resources, access to services, choice of family doctor, etc.</td>
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<tr>
<td>Primary care network Patient management and administration</td>
<td>1125 primary care centres totally computerized and online, with digital medical record application</td>
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<tr>
<td>World of Stars non classifiable</td>
<td>Access to information technologies by hospitalized patients</td>
<td></td>
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<tr>
<td>Corporate Intranet Patient management</td>
<td>Information on more than 3,000 healthcare providers.</td>
<td></td>
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<tr>
<td><strong>Description of potential user and patient scenario</strong></td>
<td></td>
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<tr>
<td><strong>and administration</strong></td>
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<tr>
<td><strong>PRESCRIPTION XXI</strong></td>
<td>Patient management and administration</td>
<td>Access to chronic medication directly from the pharmacy (visiting the doctor’s for prescription, is not necessary).</td>
<td></td>
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<tr>
<td><strong>INTERS@S</strong></td>
<td>Patient management and administration</td>
<td>Online healthcare office with options for arranging appointments, asking for a second opinion, choosing the family doctor, etc.</td>
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<tr>
<td><strong>CEGES</strong></td>
<td>Patient management and administration</td>
<td>Support to healthcare providers in the use of healthcare digital resources.</td>
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<tr>
<td>Telemedicine network</td>
<td>consultation/diagnosis</td>
<td>Videoconference, data and image exchange (x-ray, ultrasound, etc.) among different Primary Care centres, Hospitals, Emergency Departments and Residences for the Elderly.</td>
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<tr>
<td><strong>MADRID</strong></td>
<td><strong>Technological centre</strong></td>
<td>Patient management and administration</td>
<td>Centralization of health-information systems of hospitals and primary care centres.</td>
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<tr>
<td></td>
<td><strong>Centralized Primary care</strong></td>
<td>Patient management and administration</td>
<td>Support to the administrative and clinical management of primary care centres.</td>
</tr>
<tr>
<td></td>
<td><strong>Implantation of unique management tools</strong></td>
<td>Patient management and administration</td>
<td>Different management-related issues</td>
</tr>
<tr>
<td></td>
<td><strong>Other projects</strong></td>
<td>Patient management and administration</td>
<td>Electronic medical record, electronic prescription, online appointment, telemedicine network and surgery waiting list</td>
</tr>
<tr>
<td>AIRMED</td>
<td>monitoring/surveillance</td>
<td>Temporary project with objective and design similar to eCaalyx(**).</td>
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<tr>
<td>Cibeles system</td>
<td>information services for the population</td>
<td>Integration of information relevant for the population into a unique database: pharmacies, healthcare map, healthcare providers, etc.</td>
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<tr>
<td><strong>CASTILE-LA MANCHA</strong></td>
<td>ESCULAPIO</td>
<td>Patient management</td>
<td>Computerization of primary care</td>
</tr>
<tr>
<td>Description of potential user and patient scenario</td>
<td>and administration</td>
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</table>
| MAMBRINO XXI-TURRIANO | Patient management and administration | Electronic unified medical record (hospitals and primary care)  
| YKONOS | consultation/diagnosis | Digitalization of image-based tests  
| RECAS | Patient management and administration | Development of electronic prescription to allow patients to obtain their medication directly from local pharmacies.  
| **BALEARIC ISLANDS** | TELE-ICTUS | non classifiable  
|  | Teleconsultation in diverse specialties | Establishing an inter-hospital network for early treatment of stroke in small under-resourced hospitals.  
|  | consultation/diagnosis | The geographical insularity of this Region promoted the development of teleconsultation in dermatology, ophthalmology, radiology and clinical sessions.  
| **VALENCIA** | ABUCASIS II | Patient management and administration  
|  | Unified medical record for primary care and hospital care.  
| **CANARY ISLANDS** | DRAGO | Patient management and administration  
|  | Digitalization of image-based tests and medical records in primary care centres and hospitals.  
| **GALICIA** | IANUS | Patient management and administration  
|  | Unified medical record for primary care and hospital care.  
| **CANTABRIA** | Hospital without walls | monitoring/surveillance  
|  | Home monitoring of patients assisted by the Home-Hospitalization service (**).  
| **ARAGON** | Health Optimum | consultation/diagnosis  
|  | Teleconsultation between primary care and specialist practitioners based in hospitals; teleconsultation for haematology (doctor-patient); and teleconsultation for radiology.  
| **BASQUE COUNTRY** | Auzolan Senior-ORUE | monitoring/surveillance  
|  | Pilot project including interaction between patients and healthcare centre through the TV-set, videoconference, technical alarms and measurement of vital signs.  

(**): According to the classification described in section 3.1  
(***): deeper commented in the text
Notice that most of the projects are focused on supporting services for the healthcare community (patient management and administration); while those focused on remote assistance are mainly addressed to teleconsultation/diagnosis rather than to home-monitoring. Projects with objectives and design similar to eCaalyx (monitoring/surveillance) are usually temporary and developed in the context of European or National research studies.

Below we describe some projects or programmes with objectives and design similar to eCaalyx, which have the characteristic of being promoted by the healthcare authorities:

1. **Social-sanitary teleassistance in Extremadura**

   This project is promoted by the Extremadura Healthcare Service in cooperation with the Extremadura Service for Promotion of Autonomy and Assistance to Dependent People and other non-public partners. It consists in implanting home-monitoring systems for 20 patients living in the town of Castuera, for a 3 months period (2009). The involved services include: activation of videoconference by pressing a key; domotic sensors (smoke, gas, physical inactivity, etc.) and monitoring of vital signs (blood pressure, body weight, glycaemia and heart rate). Depending on the results, the Healthcare Department of this Autonomous Region, will consider progressive implantation until 2011, of this system at the homes of dependent persons with a certain profile, as well as the possibility of including this service into the Services Portfolio of the Region. Financial coverage of this initiative will be a major aspect to be considered.

2. **Project AIRMED (2005)**

   This project is promoted by the Health Institute Carlos III in cooperation with 5 reference hospitals, a Specialist Care Centre belonging to the Autonomous Region of Madrid, the Ministry for Health and Social Policies and the Vodafone Foundation. Its objective is to develop a monitoring system for patients with chronic diseases (cardiac diseases, respiratory diseases and dependent elders) in 3 phases: exploration (4 pilot studies aimed at exploring the suitability of the offered systems to the target users’ needs); clinical trial (aimed at demonstrating the effectiveness and superiority of this system as compared with usual care); and use-under-guidance (consolidation of this novel service and protection by the health authorities and involved agencies). The project comprised six lines of action: 1) telemonitoring aimed at diagnosing sleep-disorders; 2) monitoring and control of patients with cardiac conditions; 3) monitoring and control of patients with chronic respiratory conditions; 4) home-hospitalization; 5) prevention of aging; and 6) new models of mobile personalized telemedicine. The project has been completed and the promoting institutions have reported – among others – the following conclusions: the need for appointments with the practitioner was reduced, the patient-doctor relationship was improved, and 85% of patients used the devices without help.

3. **Project Hospital free of Walls**

   This program is conducted at the University Hospital Marqués de Valdecilla, located in the Autonomous Region of Cantabria, with the objective of developing a home-telemonitoring system, which includes remote surveillance of vital signs and providing access to patient’s medical record from a portable computer, to a doctor visiting the patient at home. Access to the medical records from portable computers is already implanted.
3.3 DRIVERS AND BARRIERS

- The Law 39/2006 for the Promotion of Personal Autonomy and Assistance to dependent persons (“Law of Dependence”) enacted in 2006, stipulates the creation of a System for Autonomy and Assistance to Dependent persons, which grants a minimum of rights to all of the citizens in Spain. The services portfolio includes telecare, though not telehealth (remote monitoring) programs. Approval of this law lead to the creation of institutions specifically aimed at providing assistance to dependent persons in some Autonomous Regions e.g. the Extremadura Service for Autonomy and Assistance to Dependent persons (SEPAD) (Autonomous Region of Extremadura); the Agency for Assistance to Dependent persons in Andalusia (Autonomous Region of Andalusia), and others. Such institutions acknowledge the beneficial role of technological resources and have also promoted telemedicine projects similar to eCaalyx (SEPAD has promoted the project Social-Sanitary Teleassistance). However, their financial coverage poses major difficulties.

- Due to decentralization of healthcare competences in favour of the Autonomous Regions, the development of programs or projects with telemedicine resources in Spain is rather heterogeneous with large variations from one Region to another. The Autonomous Regions of Andalusia, Madrid and Catalonia have probably made the largest advances in this field.

- The probably most interesting medical specialties for the use of systems like eCaalyx in Spain are: Geriatrics, Family medicine and Cardiology. Regarding Geriatrics, the Social-Sanitary Hospital network developed in Calatonia, specifically for providing assistance to elderly persons after acute phases of disease, lead to a noticeable growth in the number of Geriatricians in this Autonomous Region, which may be considered an ideal target for systems like eCaalyx.

- Partially due to the drive of plans specifically designed for technological development, in previous years (such as the AVANZA plan) great achievements have been made in overcoming difficulties for offering and implanting services like eCaalyx. The market scenario shows remarkable development of the offer, while development and preparation of the demand (patients, healthcare providers and healthcare authorities) emerges as the next challenge.

- A number of relevant aspects should be considered for successful implantation of telemedicine systems. In a local qualitative study (ref) – where the opinions of health providers, managers and representatives of the telecommunication industry were gathered – it was concluded that the human factor was the key for successful implantation of these systems in Spain. Further relevant aspects to be considered are: financial and institutional support, acceptance by health providers and patients (implantation of systems proposed by health providers would probably be more successful than that of systems chosen by the “higher-ups” e.g. directors or resource managers); and the need for information and previous training of health providers and users.

- Implantation of telemedicine systems requires organizational changes, which may be complicated by the compartmentalization and lack of connection currently affecting the Spanish organizational model (ref). Healthcare providers’ perceived workload increase was one of the two major barriers evidenced in a Delphi study (ref) conducted...
to evaluate the predisposition of Spanish physicians (sample of 985 physicians) to accept the use of telemedicine as a useful tool in daily clinical practice.

- Familiarity with telemedicine resources by healthcare providers may be another limiting factor. The above mentioned Delphi study reported that 80.2% of the participating physicians had never taken part in a telemedicine project, although most of them (80.2%) were willing to do so.

II. UNITED KINGDOM (FOCUS ON ENGLAND)

1. POLITICS

The United Kingdom (UK) political system comprises of a constitutional monarchy which is administered by two houses of representatives, i.e., the democratically elected members of parliament (MPs) of the House of Commons and the hereditary and life peers of the House of Lords. The Prime Minister is the leader of the majority party in the House of Commons (since 27 June 2007 Rt. Hon. Gordon Brown, leader of the Labour Party). Devolution has occurred in the form of the creation of a National Assembly for Wales, a Scottish Parliament and a Northern Ireland Assembly.

2. HEALTH SYSTEM-UK

(Note: The National Health Service in Wales, Northern Ireland and Scotland have different organisational structures. Most of the current report focuses on the National Health Service in England.)

2.1 National Health Service (NHS)

The National Health Service (NHS) began in 1948 after the provision of the NHS Act of 1946. The NHS Act main principle was that a collective responsibility was required by the state to provide a comprehensive healthcare service which was freely available to the entire population. The establishment of a centrally government run NHS occurred, with concessions made regarding medical profession autonomy. GPs (General Practitioners) were given the freedom to operate as independent contractors within the NHS. Hospital specialists (although salaried NHS staff) were given freedom over their employment conditions. It was assumed that the establishment of the NHS would solve the demand for healthcare. In the 1950s demand outstripped supply, leading to extreme pressure being placed upon the underfunded hospital service. The 1962 Hospital Plan proposed major investment over the next ten years, allowing district general hospitals (DGH) to be built. One of the goals of the DGH was that each unit would be able to provide 600-800 beds, which could cater for the general medical needs of a local population of between 100,000 and 150,000. DGH remain, which have led to a series of local health care monopolies.

2.2 Organisational structure

The Department of Health (DH) is responsible for the health and personal social services in England. The department determines policies for public health and related areas, such as