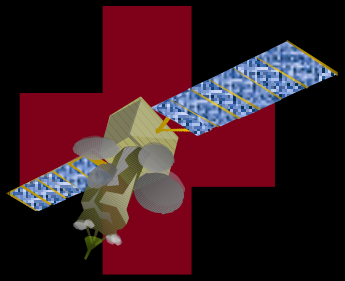
Overview of the ESA Telemedicine Initiative



Francesco Feliciani

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ESA is an inter-governmental organisation with a mission to provide and promote - for exclusively peaceful purposes - the exploitation of :

- space science, research & technology
- space applications

ESA achieves this through:

space activities and programmes

- long term space policy
- a specific industrial policy
- coordinating European with national space programmes

ESA Member States and Establishments

ELDO (1962), ESRO (1962), ESA (1973)

Introduction to ESA: Two Types of Programmes

All Member States participate in activities and a common set of programmes related to space science (mandatory programmes)

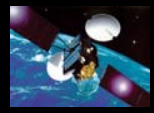
In addition, members chose the level of participation in optional programmes

- **Manned Space Flight**

- **Microgravity Research**

- **Earth Observation**

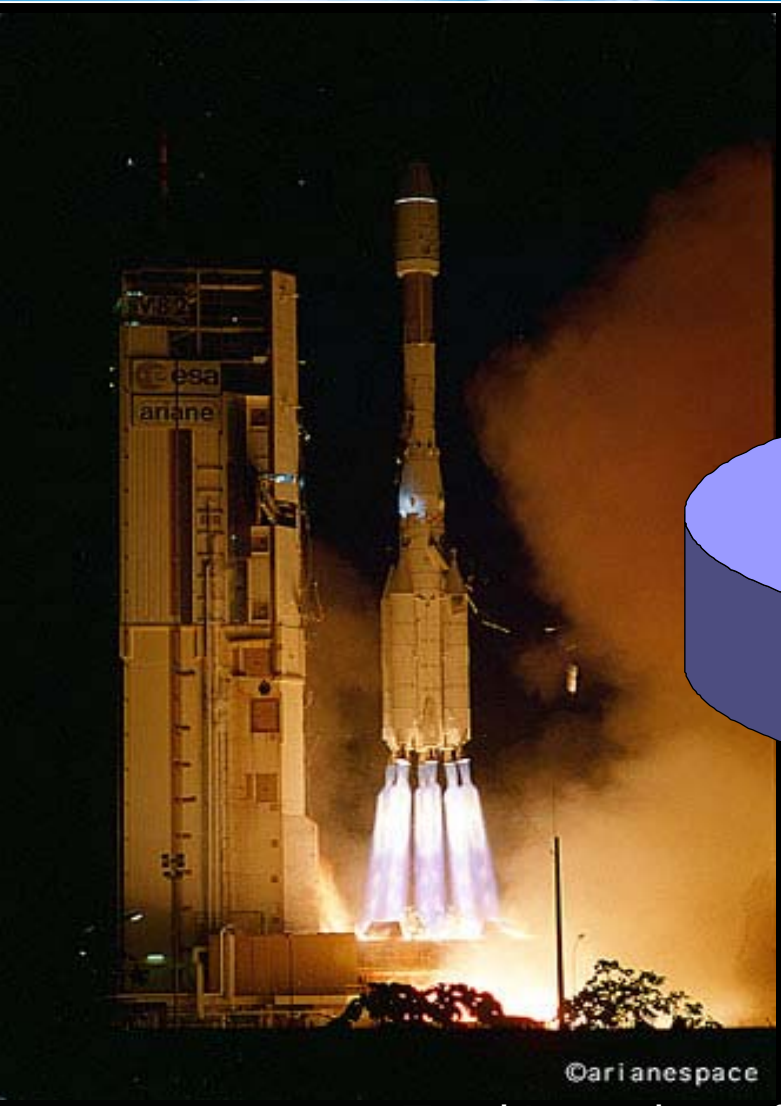
- ***Telecommunications***

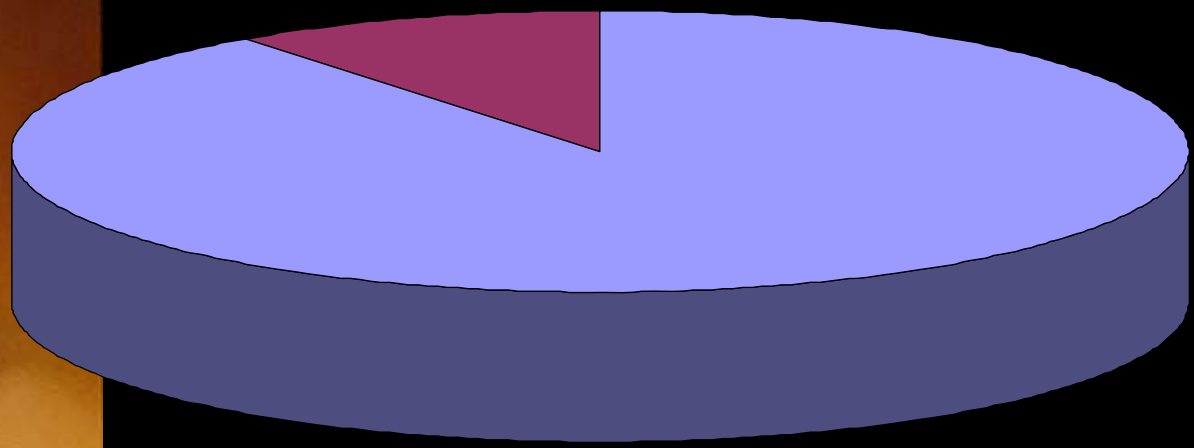


- **Navigation**

- **Launcher Development**

The Weight of Telecom in Space





Launches for Non-Telecom Satellites: 16

Launches for Telecom Satellites: 139

Total Launches of ARIANE 4 in the period 1988-2003: 155

Applications: the Bridge Between End Users and Technology



The World of the End Users



Telemedicine / Medical Education

Relief of Disaster/ Emergency

Distance Learning

e-Government

.....

Infomobility


The World of the Satcom Technology
(HW, SW, TERMINALS, SYSTEMS)


The Applications in Satcom

- In the ICT (Information and Communications Technologies) area, Applications are the bridge between the World of the End Users and the World of Technology
- Applications represent the ultimate good for which the End Users are willing to pay the bill (NO APPLICATIONS = NO BUSINESS)
- In the value chain that brings Applications to the End Users, i.e.

Subsystems > Systems > Services > Applications

the Satcom infrastructure is a commodity to transfer bits

- The market of Satcom based Services and Applications is larger than the association of the markets of satellite manufacturing, launch services, lease/sale of capacity and ground segment

The Applications in Satcom

- **Beyond DTH TV broadcasting (nowadays well consolidated), market opportunities exist for new Satcom based Applications and Services**
- **Whenever integral part of a problem solving solution for the User Community, Satcom can become a driver for the launch of new Applications and Services**
- **This requires a shift of focus from Satcom as a carrier of bits to Satcom as vertically integrated in an end-to-end solution**
- **A specific line to support Satcom based Services and Applications opportunities has been introduced in 1997 as part of the ARTES Programme**
- **Area of Applications is today vital for satellite telecommunications growth**
- **ESA has built up an outstanding experience in the Applications arena**
- **In the period 1998-2004, ~110 Applications Projects have been launched for a total value of 150 MEUR (mostly funded 50% by ESA)**
  - 60% of the projects contracted to SMEs
  - 50% of the projects contracted to new entrant into ESA Telecom

Pilot Satcom Applications Projects

Telemedicine/ Medical Education

- *SHARED (I)*
- *EUROMEDNET (I)*
- *MULTIMED (UK)*
- *SECOM (UK)*
- *EMN (CH, D)*
- *SANTTSUR (UK)*
- *IEMN (CDN)*
- *MIST (CDN)*
- *WEBGMS (I)*
- SM@RT (I)
- SKYMED (I)
- *HPS (UK)*
- *DELTASS (F, D)*
- *TELANY (I, N)*
- MAYFLOWER (I, N)
- I-DISCARE (F, I, N)
- *Telecare (CDN)*
- HIS (D)
- NESA (I)
- SKYNURSE (I)
- TEMOS (D, F)
- REACH (CDN)

Satcom Networks Systems & Services

- *DESNET (I)*
- *SKYPLEXNET (I)*
- WEB-SAT (IRL)
- *SATXPRESS (D)*
- *SWB (IRL)*
- *CollaBOD (CDN)*
- eWAVE V.S. (D)
- *Freetimers Int. (UK)*
- Wired Ocean (UK)
- *Broadband in the Sky (B)*
- SDS (B)
- *ILSE (A)*
- *Fusion St. (IRL)*
- *World-Link (I)*
- RTI-TVS (L)
- EODIS (I)
- BARRD (UK)
- Pacific Skies (NL)
- HOST (GR)
- BB to Train (UK)
- INDIGO (UK)

B2B / B2C

- *ABARIS (UK)*
- *SUNRISE (UK)*
- *MULTIMAP (UK)*
- *JUPITER (NL)*
- *VERDI (F, CDN, I)*
- MRSTREAM (UK)
- E-SCREEN (I, UK)
- *D-CINEMA (B)*
- ESEMAR (I)
- IMPSAT (UK)
- *S@Commerce (I)*
- *TV Snapshot (L)*
- *EDIBS (A)*
- *MeCA (CDN)*
- Multi-PID (UK)
- *S@Commerce (I)*
- SATMODE (L)
- SatServ (N)
- BizSmart (GR)
- BrandTV (UK)
- Sat-n-Surf (L)

Infomobility

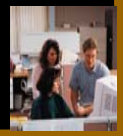
- *GWAS (CDN)*
- *WICOR (D)*
- *Mobile WS (NL)*
- *Wireless IbDN (F)*
- *I4S (F)*
- MoMoSat (D)
- PERUSE (IRL)
- MUTIS (A)
- In Fligth Reporting Tool (IRL)
- AeroFleet (D)
- BIRDCOM (I)

Relief of Disaster/ Emergency

- *REMSAT (CDN)*
- *EMERGSAT (F, E)*
- REMSAT II (CDN, E)
- SASS (D)
- I-GARMENT (P)
- SARFOS (CH)

Community Information Services

- *RCST (CDN)*
- *CROCUS (I, NL)*
- *TV Beyond 2000 (F)*
- *Mediaspace (F, SP)*
- *MAMS (IRL)*
- Space For Science (F)
- *TESEO (I)*
- *SAT@ONCE (L)*
- *DISaV (I)*
- *SILC (D)*
- My Home T.TV (NL)
- *OTV Ch. (UK)*
- Lift Ch.(IRL)



Distance Learning

- *ESPRESSO (UK)*
- *HERMES (I)*
- *MODUS (I)*
- *TRAPEZE (B, UK)*
- HAMLET (I)
- *SchoolSat (B,IRL)*
- *ESMEE (I)*
- *e-Learning DVB (IRL)*
- SchoolCast (IRL)
- *eLearning DVB (IRL)*

e-Government

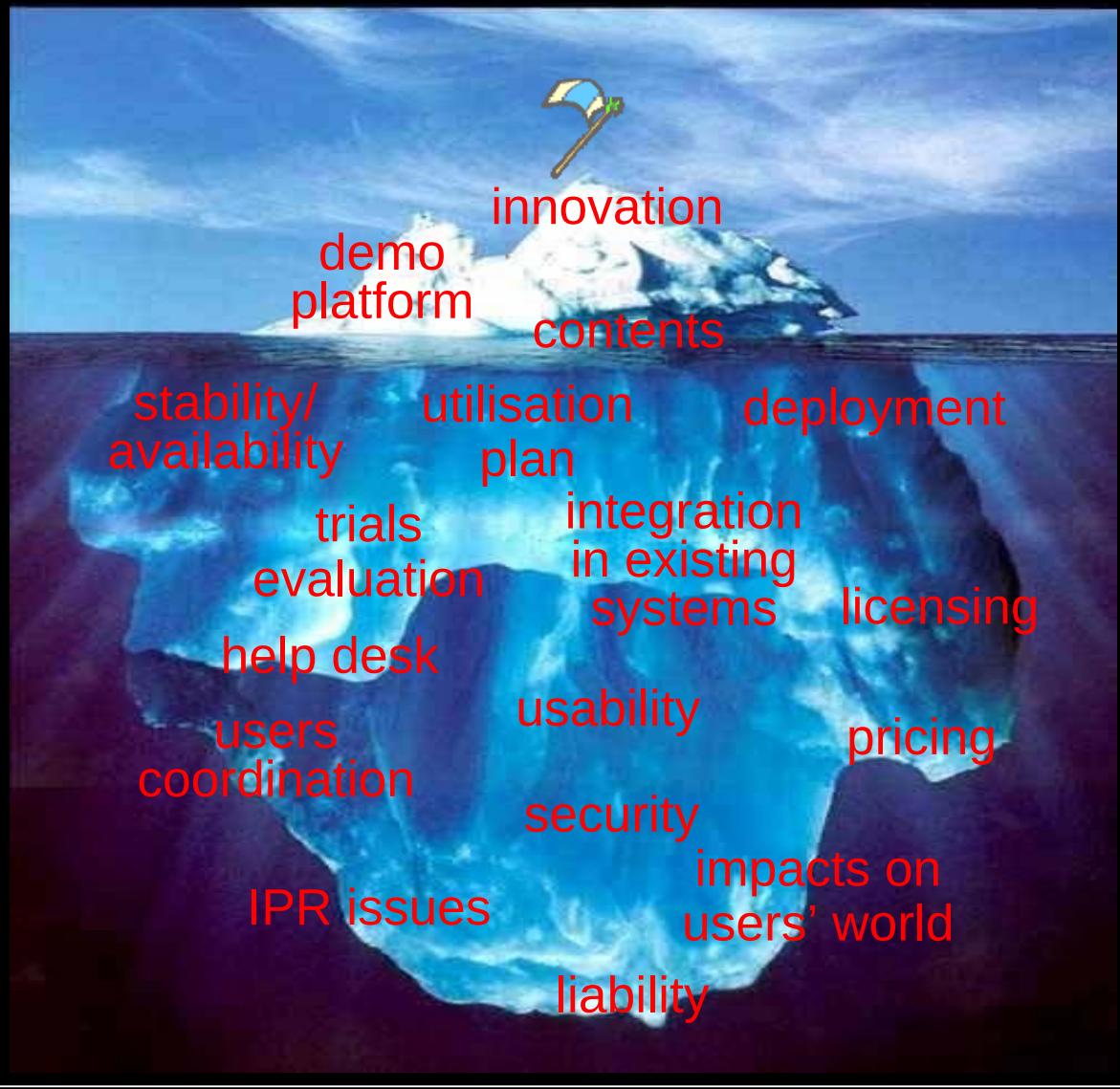
- e-regSAT (I)

Project Concluded in Italic COLOURS: ARTES 3 Line 1 ARTES 4 ARTES 5 Start-Up Opportunity

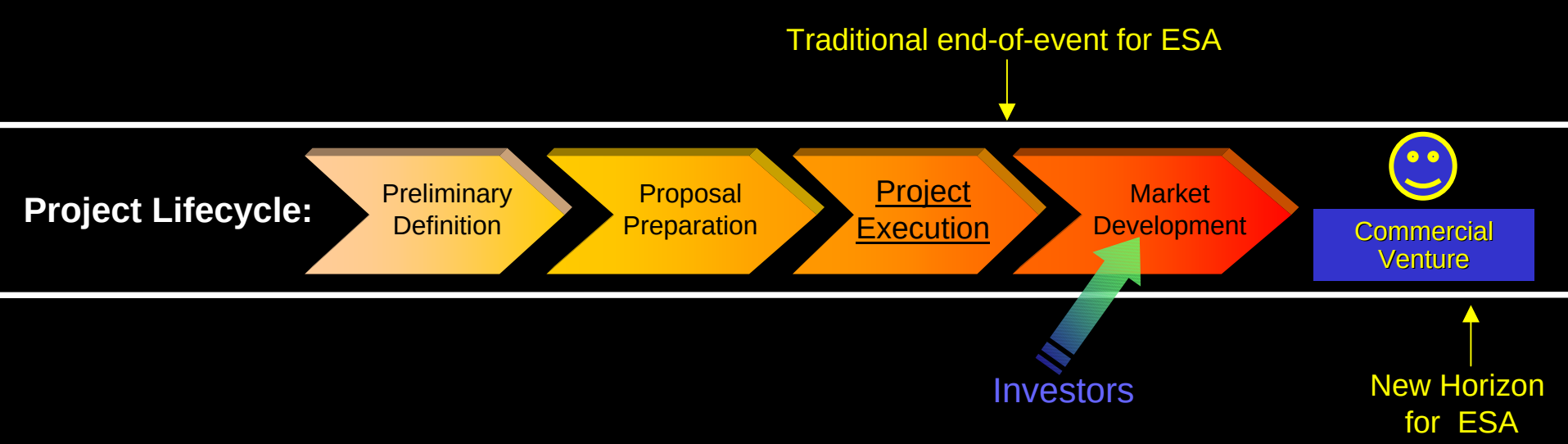
Moving from the R&D towards Pilot and Operations

Exploring Feasibility:
Look, it works!

Exploring Sustainability:
Get it, it's worthwhile!



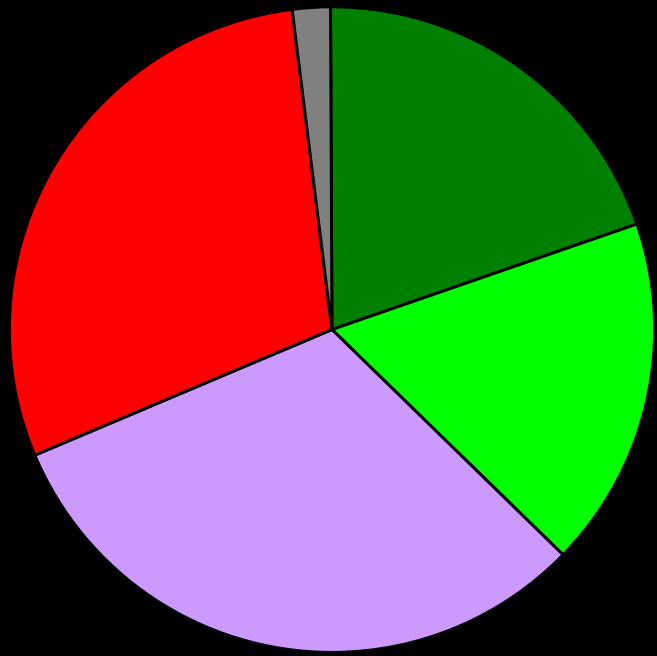
Applications Initiative: The Need to Extend ESA Vision



Evaluation Approach

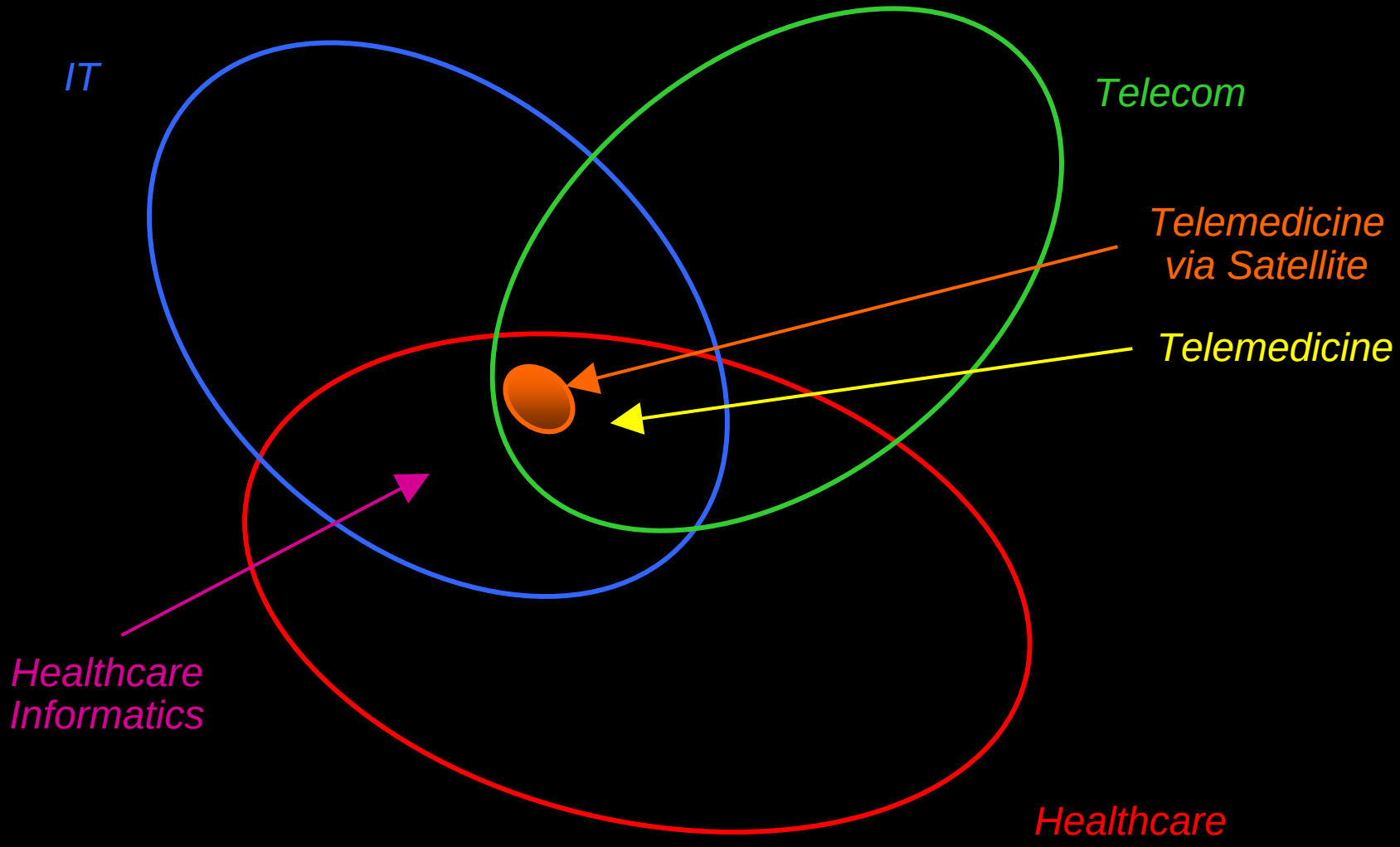
Success Criteria: successful completion of the contract,
Tangible Outcomes *(New Technologies/Products developed, Markets accessed, Customers Base, Production Volume, Licenses, Employment)*
Intangible Outcomes *(Acquisition of New Methodologies / Procedures / Know How / Linkages / Partnerships generated)*

Commercial Achievements



Out of 51 Applications Projects Concluded

Telemedicine: an intuitive model



Telemedicine via Satellite: Stuck at the Starting Blocks?

- **The market for Telemedicine systems and services is very large, and to a large extent still untapped**
- **Satellite Communications can play a crucial role for Telemedicine**
- **Starting from 1996, several exploratory activities launched by ESA through Telecommunications Programme Elements (i.e. ARTES 3, 4 and 5) to develop the role of Satcom in Telemedicine**
- **They addressed opportunities not yet mature for a fully operational deployment, due to a number of barriers, as indicated during the ESRIN Telemedicine Symposium of 2003**

  e.g. Technical / Operational Immaturity, Lack of Consolidation of the Demand, Resistance to Changes, Lack of Legal and Financial Framework

Telemedicine Areas in ESA Applications

Emergency Consultation

- *SECOM (UK)*
- *IEMN (CDN)*
- *MIST (CDN)*
- *DELTASS (F,D)*
- *TELANY (I, N)*
- I-DISCARE (F, I, N)
- NESA (I)

Distributed Environment for Medical Simulation

- *MULTIMED (UK)*

High End

- *DELTASS (F,D)*

Teleconsultation and Tele-Homecare

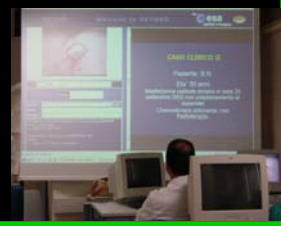
- *SHARED (I, A)*
- *EUROMEDNET (I)*
- *RCST (CDN)*
- Telecare (CDN)
- TEMOS (D,F)
- REACH (CDN)

Clinical Research & Access to Patient Multimedia DBs

- *WEBGMS (I])*
- *HERMES (I)*
- *TELANY (I, N)*

Continuing Medical Education

- *EMN (CH, D, F)*
- *SANTTSUR (UK)*
- MAYFLOWER (I,N)
- SM@RT (I)
- SKYMED (I)
- *HPS (UK)*
- HIS (D)
- SKYNURSE (I, R)



Project Concluded in Italic

Satcom Positioning in Telemedicine

Satcom Peculiarities → / Telemedicine Areas ↓	High Mobility, Communications in Emergency and Disaster Situations	Broadband Access from Underserved Areas	Multicasting/ Dissemination of Multimedia Contents	High Capacity / Fast Deployment for Temporary Use
Hi-End		+	+	+ +
Distributed Environment for Medical Simulation			+ +	+ +
Emergency Consultation	+ +	+		
Teleconsultation		+ +		+ +
Clinical Research			+	
Access to Patient Multimedia DBs	+	+ +		
Continuing Medical Education		+	+ +	

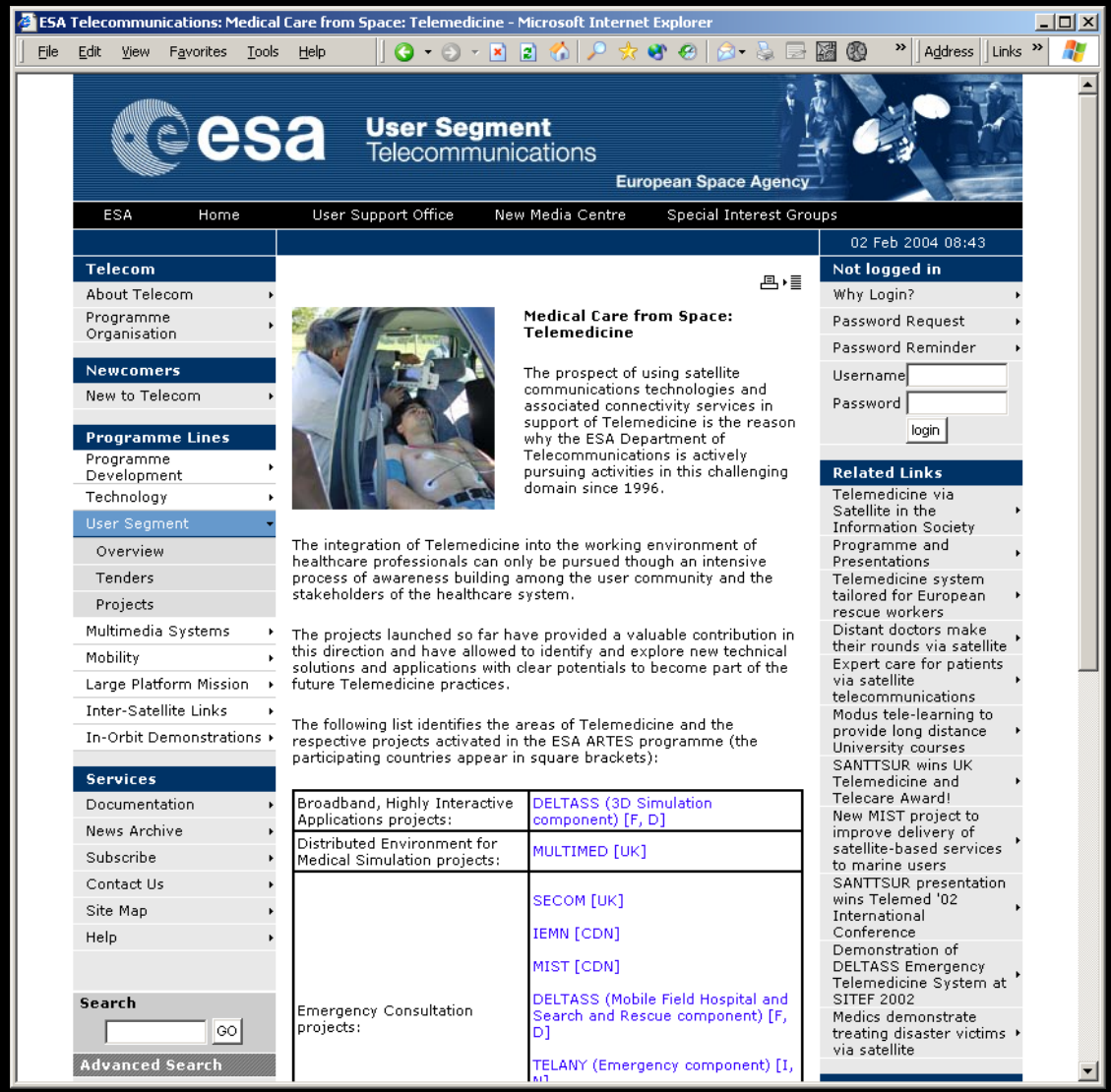
Actors involved in ESA Telemedicine projects

- **Medical Associations:** UEMS (F), GIMEMA (I), RCoS (UK), AOGOI (I)
- **Hospitals:** OP2000 (D), San Raffaele (I), ISMETT (I), Bristol Medical Simulation Centre (UK), Clinical University Centre of Sarajevo (BH), Reparto Sanità Centrauro (I), Deutsche Bundeswehr (D), IDI (I), Victor Bebes Hospital (R), Aziende Sanitarie Locali Veneto Region (I), Private Hospital Gurgaon/Delhi (India), Lawson Health Research Institute (CDN)
- **Pharmaceutical Companies:** Bayer (I), Pfizer (I)
- **Telemedicine Service Providers:** Telbios (I), TETRA (CDN), Centre for Travel Medicine - COR (D), Russian Telemedicine Foundation (Russia)
- **Healthcare Content Providers:** EMN (CH), Healthtrack (UK), Real Media (D), Professional TV (D), SMM (I), University of Perugia (I)
- **Communication in the Healthcare Sector:** Sudler & Hennessey (UK)
- **Research Centres:** JR (A), CNES (F), Padova Ricerche (I), MEDES (F), NST (N), CRC (CDN), DLR(D)
- **Manufacturers of Medical Device:** Medtronic (I), Ortivus (S)
- **Manufacturers of Telemedicine HW/SW Solutions:** March Networks (CDN), Kell (I), ColabNet (CDN), MS&I (F), Telemedicine Technologies (F), Vaasah (CDN)
- **Telecom Operators:** Fantastic (CH), Telecom Italia (I), Telespazio (I), Deutsche Telekom (D), Telesat (CDN), Elsacom (I), NDSatcom (D), Eutelsat (F), Plenexis (D)
- **Satcom Industry:** Alenia (I), Alcatel (I), EADS (F), EADS (D)
- **Consultancies in Satcom:** ESYS (UK)

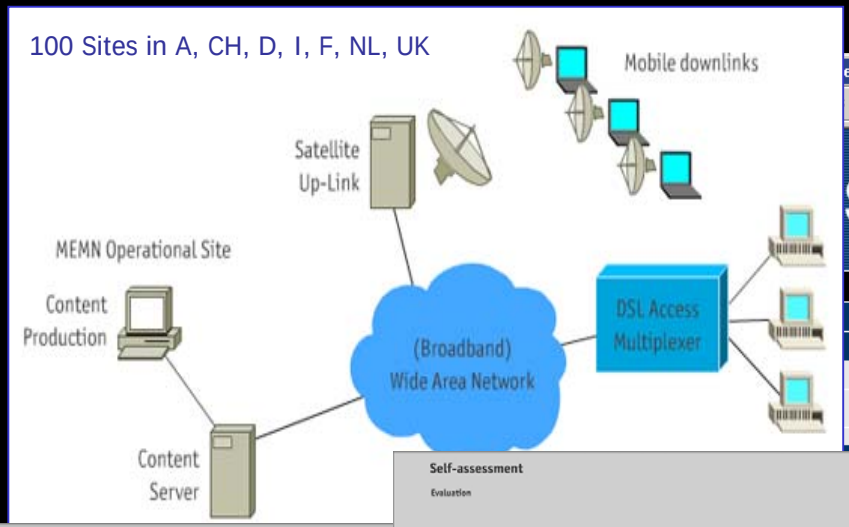
Need to Move Beyond the Exploratory Phase

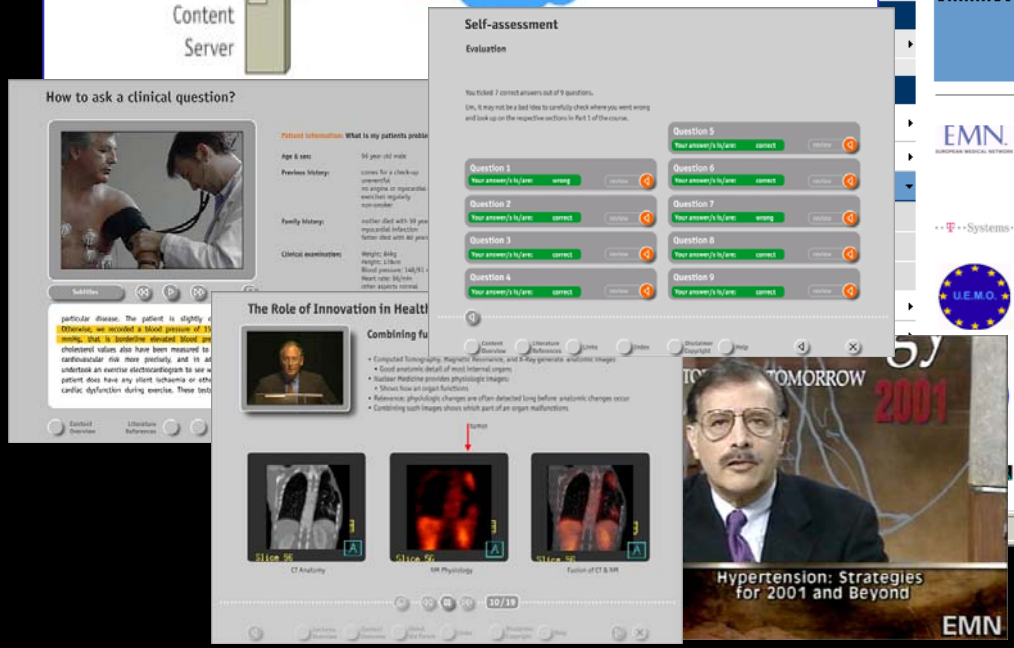
- The socio-economic effects of Telemedicine become tangible only when Telemedicine becomes integral part of the healthcare operational environment
- Only at that point healthcare stakeholders will gather evidence of the benefits, and will accept Telemedicine
- There is a need to complement the supply-driven approach (pushed by those who sell Telemedicine) with a demand-driven approach (pulled by those who buy Telemedicine)
- Need to supplement R&D Activities with Pilot and Operational Development
- Final objective: making satcom a key element in the provision of eHealth and Telemedicine services

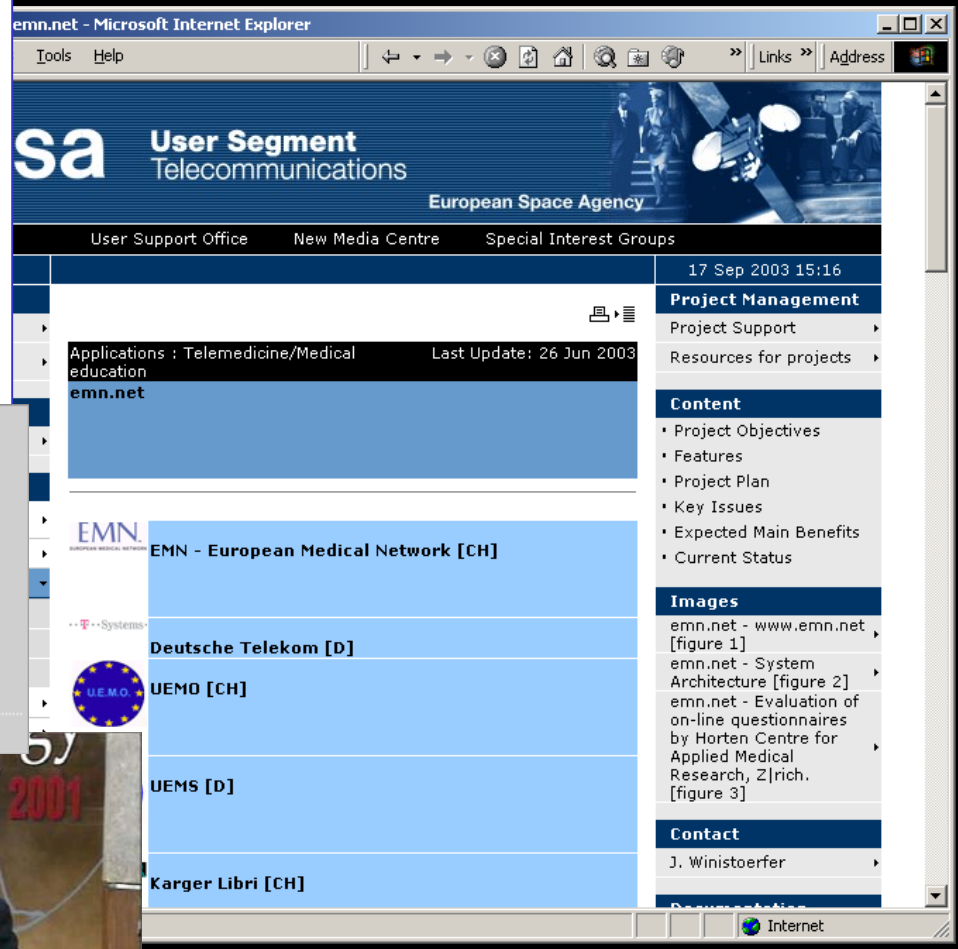
http://telecom.esa.int/applications/telemedicine



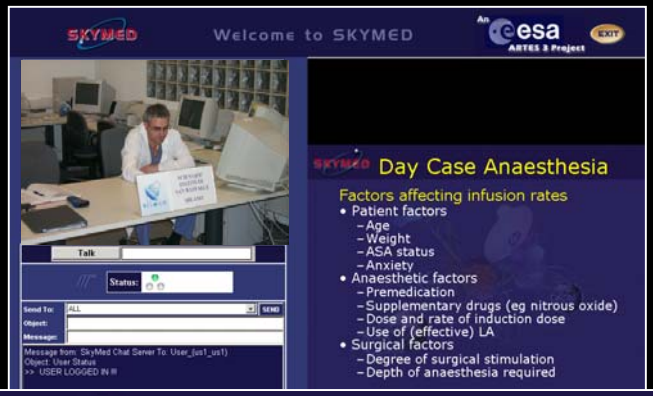
http://telecom.esa.int/emn.net

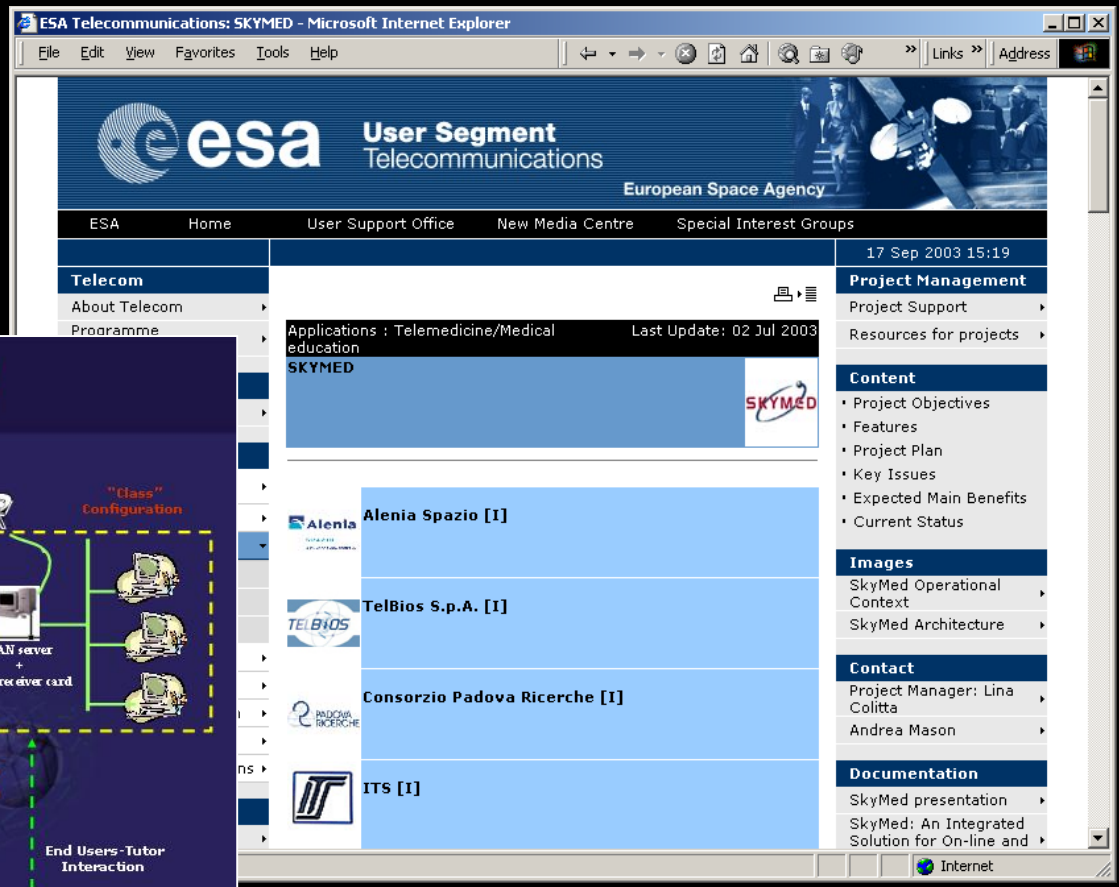


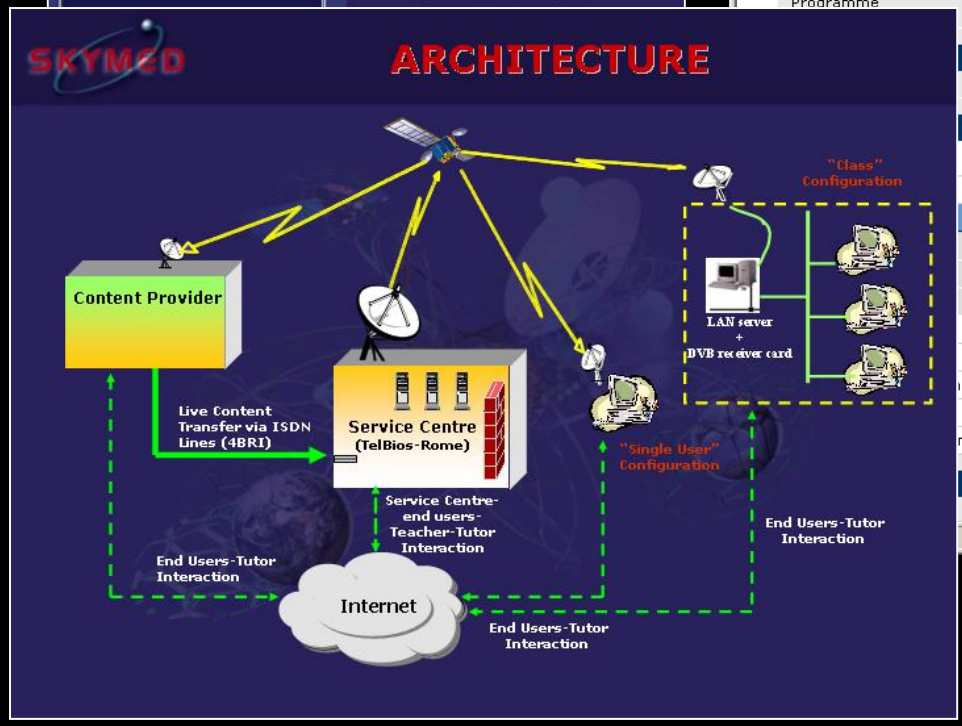




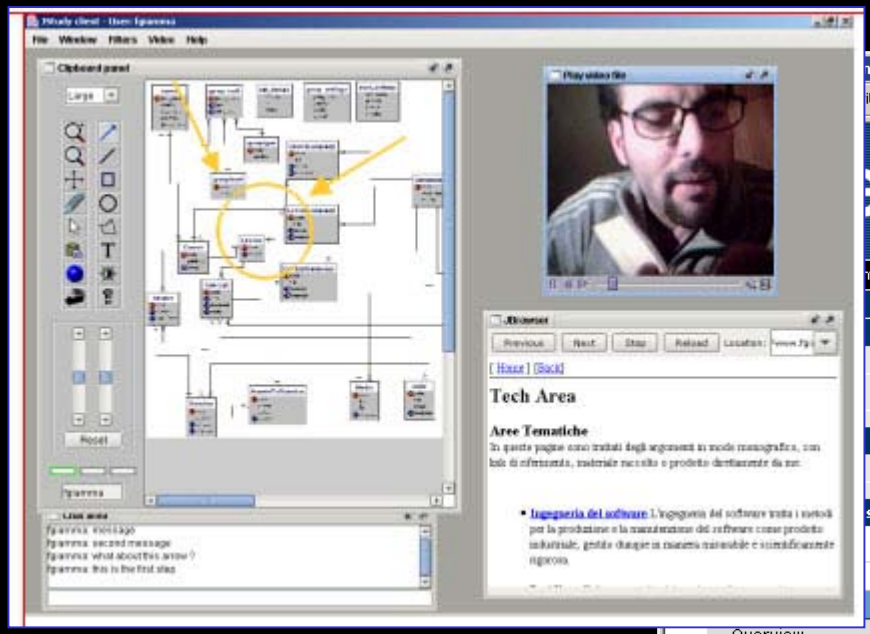
http://telecom.esa.int/skymed



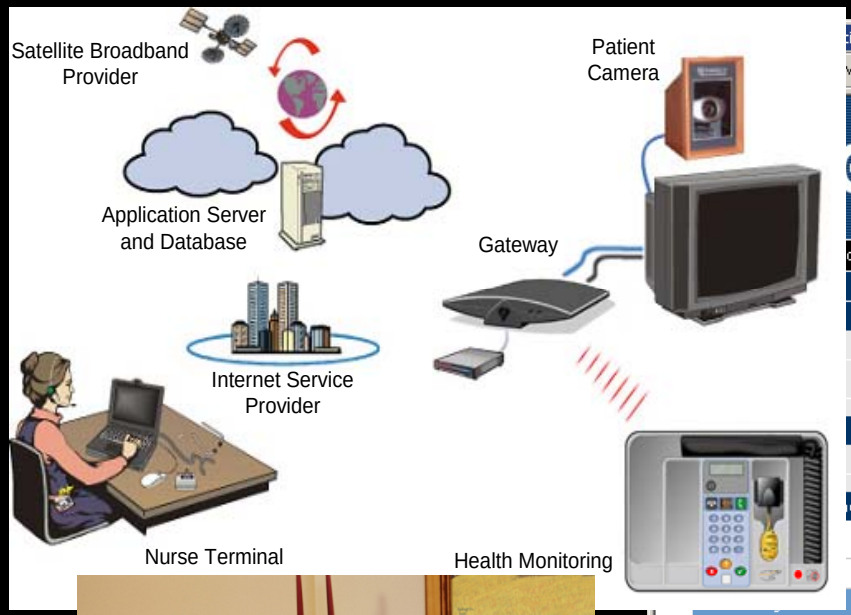


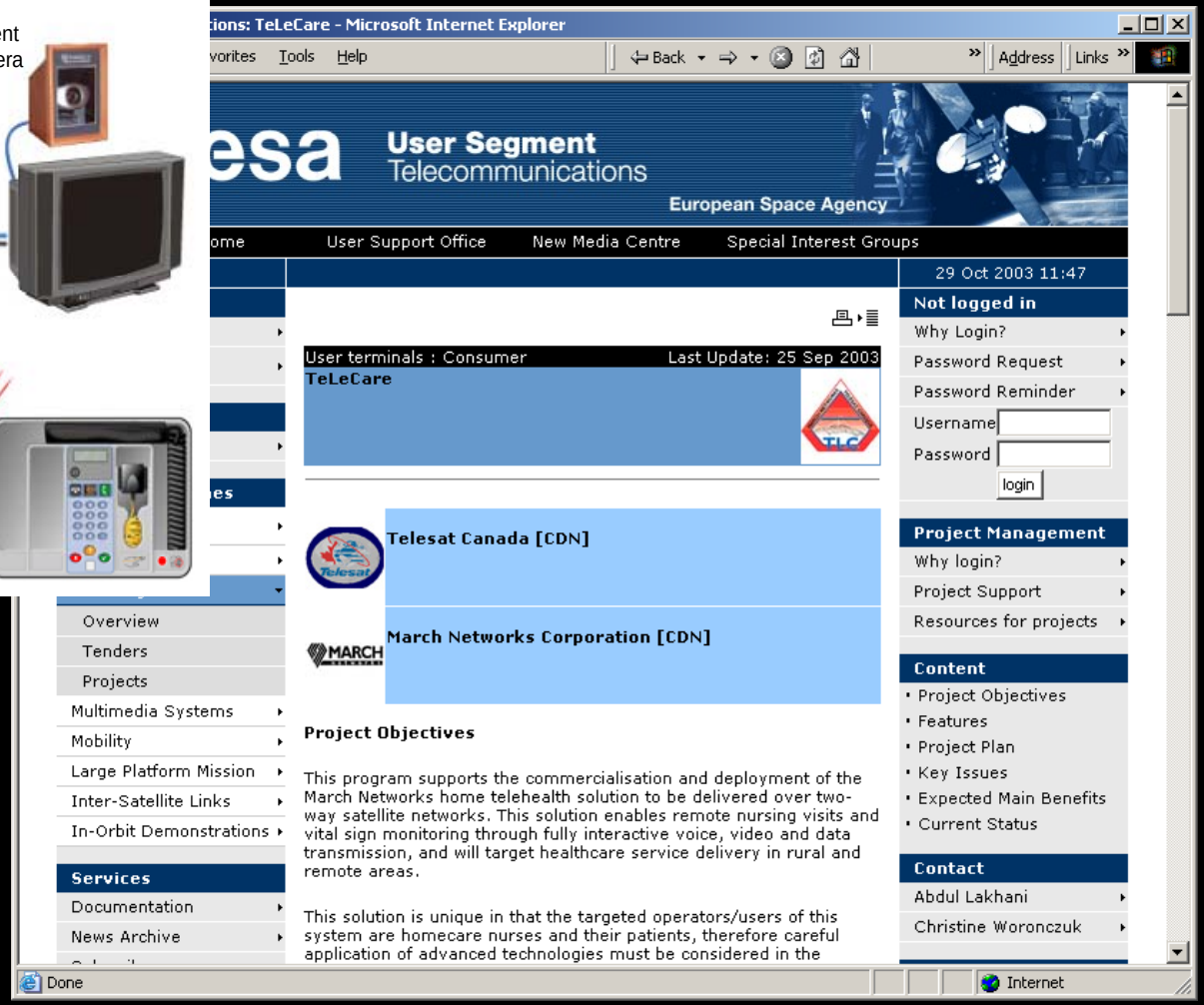


http://telecom.esa.int/mayflower



http://telecom.esa.int/telecare





http://telecom.esa.int/deltass

ESA Telecommunications: DELTASS - Microsoft Internet Explorer

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Back Address Links

esa User Segment Telecommunications

European Space Agency

ESA Home User Support Office New Media Centre Special Interest Groups

29 Oct 2003 12:04

Applications : Telemedicine/Medical education

Last Update: 13 May 2003

DELTASS

CNES [F]

MEDES [F]

SPACEBEL [B]

Alcatel Space [F]

SRU OP 2000 [D]

News Archive

Not logged in

Why Login?

Password Request

Password Reminder

Username

Password

login

Project Management

Why login?

Project Support

Resources for projects

Content

- Project Objectives
- Features
- Project Plan
- Key Issues
- Expected Main Benefits
- Current Status

Images

DELTASS System Architecture

Contact

Done

Internet

Great potentials in terms of:

- **better utilisation of healthcare system resources**
(infrastructures, assets, people)
- **improve reach of healthcare services**
(e.g. Tele-assistance for elderly people)
- **reduce indirect cost for patients**
(e.g. avoiding cost incurred by patients to move into the healthcare structure when not strictly needed)
- **opportunity of CME**
(e.g. the guidelines of the Italian ministry of health foresees that 80% of CME will be based on distance learning, 20% on traditional on site event like congresses)

HOWEVER .....

….and Barriers for Telemedicine

High barriers exist in terms of:

- **lack of awareness**

(Telemedicine is still largely an untapped area, where the immaturity of the demand and the lack of a consolidated offer get often stuck in a vicious cycle)

- **resistance to changes in the healthcare organisation** (lack of incentives, conservatory approach of healthcare professionals, chronic lack of resources and time, patients sometime perceive Telemedicine as a “surrogate”)
- **difficulty in providing evidence of Telemedicine benefits**

(Telemedicine is not healing in itself; its effectiveness is influenced by a number of external dependencies that have nothing to do with the Telemedicine)

- **lack of a reimbursement scheme**

(partly linked to the previous point)

- **tight dependencies with generic healthcare informatics policy**

(Telemedicine becomes fully exploitable only when associated to an integrated informatics healthcare system)

- **lack of a coordinated approach**

(the many barriers make extremely difficult the uptake of initiatives beyond exploratory pilot projects with local characterisation)

Telemedicine: a Sensible Approach

Key Requirements for Telemedicine Activities sponsored by ESA:

1. **Provide evidence of the added value to the end users**
2. **Coexist with traditional medical practise**
3. **Elaborate a roadmap on how to get integrated into the healthcare organisation**
4. **Serve existing paths of communications among healthcare professionals rather than inventing new ones**
5. **Be tackled in a holistic, end-to-end approach involving the different actors (from the patient to the political stakeholder)**
6. **Maintain a business oriented vision to foster the self-sustainability of the initiative**

Telecom website

http://telecom.esa.int

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