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**„Telemedicine via Satellite“,
DLR Workshop, 17 . of November 2004, Bonn, Germany**



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Why Global Health Care?

To move from
patient care and disease management
towards
prophylactic services for healthy citizens

from

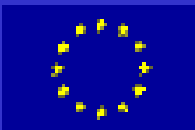
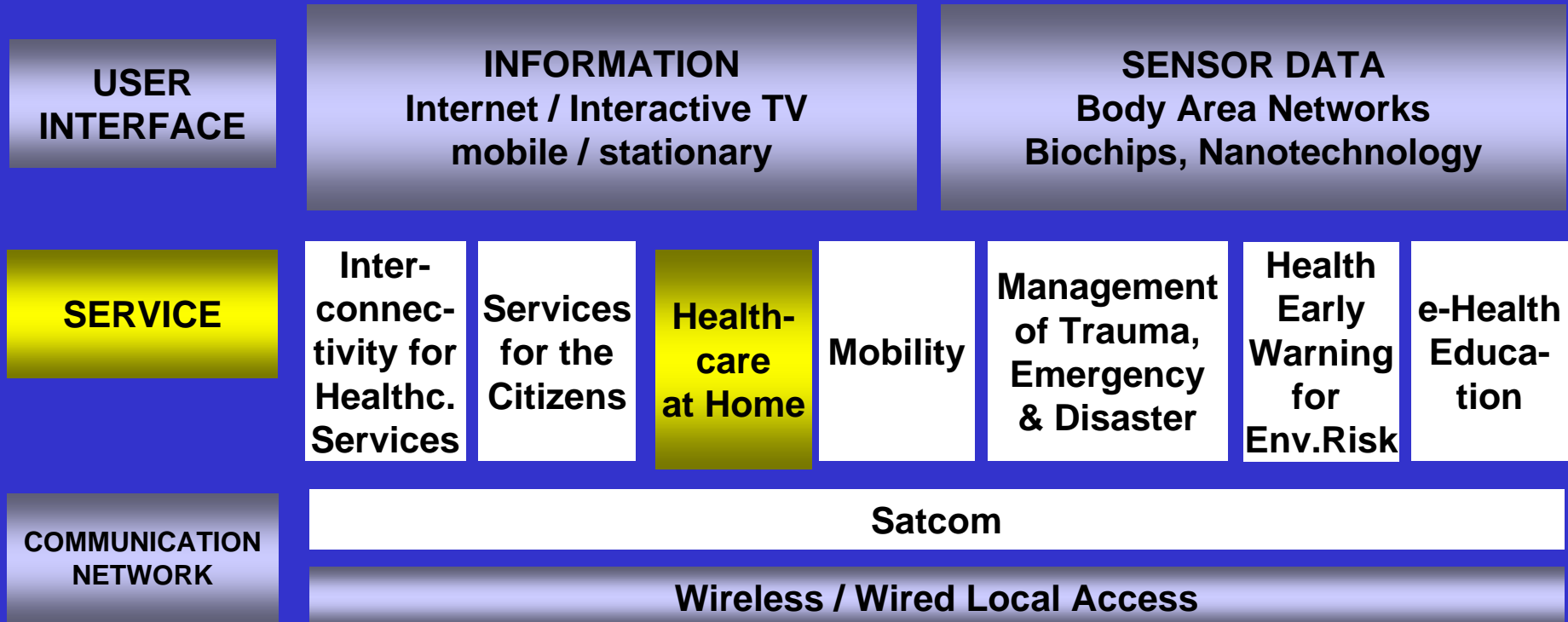
*„mens sana in corpore sano“
- in a healthy body healthy mind -*

towards

*„corpus sanum per mente sana“
- healthy body through a healthy mind -*



eHealth and Telemedicine today



THE WORLD OF MEDICAL MONEY

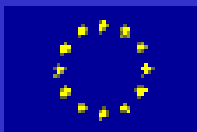
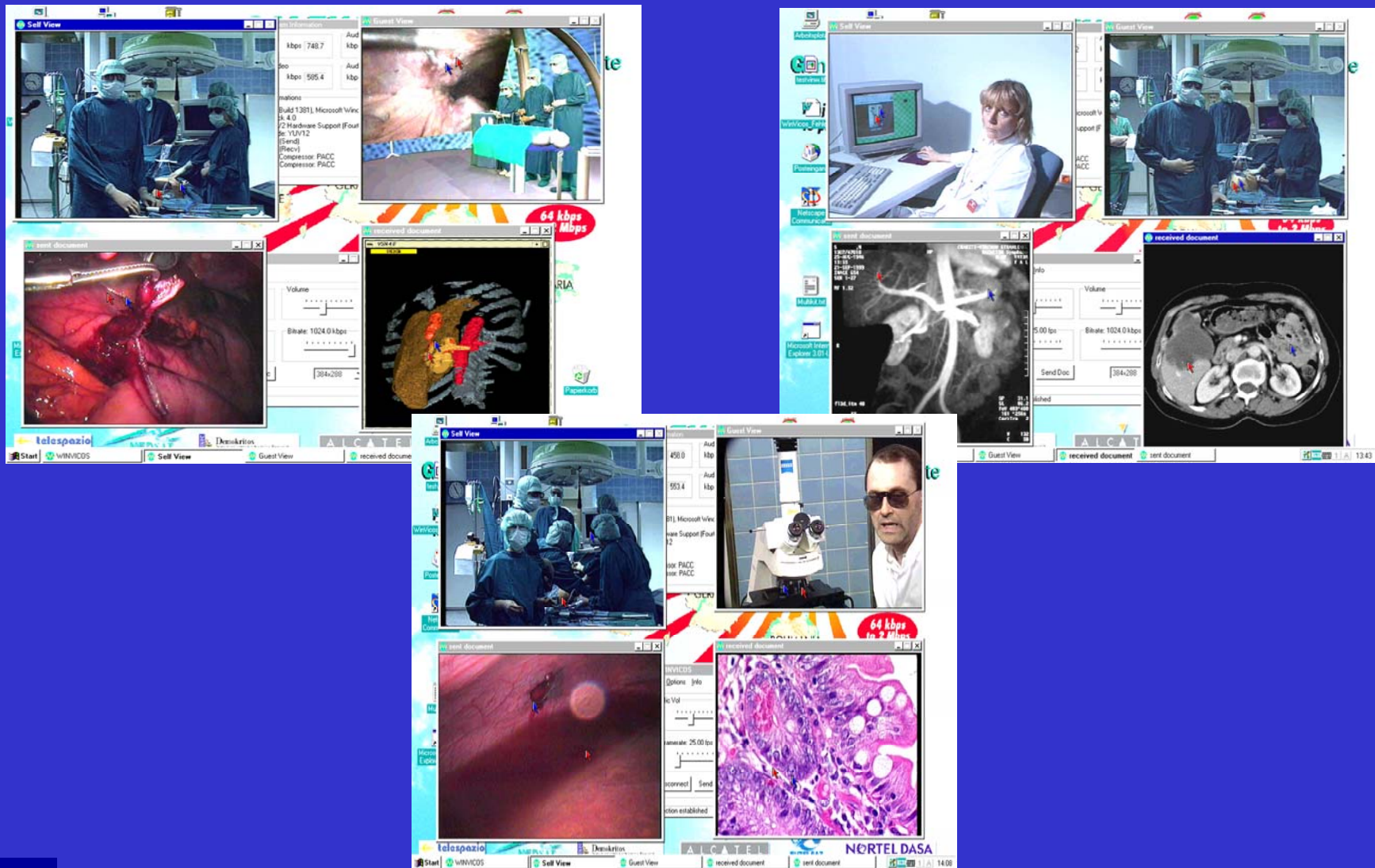
Total health expenditure/capita

USA	\$ 3,724
Germany	\$ 2,952
Japan	\$ 1,759
Czech Rep.	\$ 640
South Africa	\$ 396
Zimbabwe	\$ 130
Congo	\$ 22

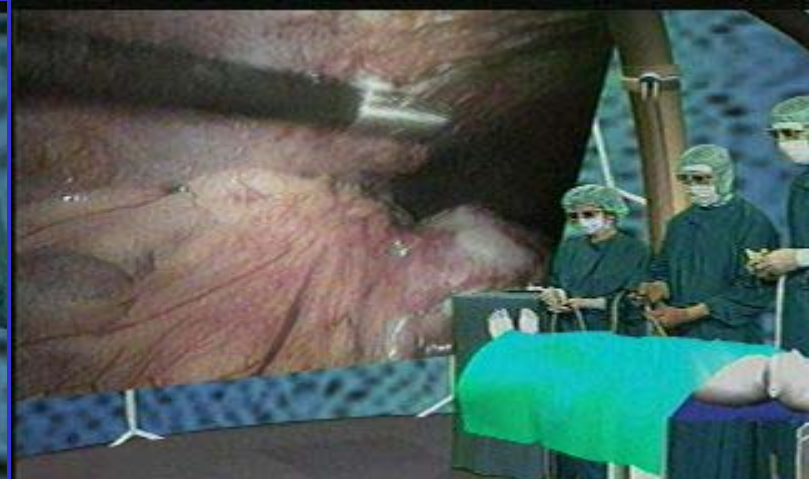
Source: MedSMART 2003



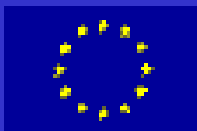
Real Time Telemedicine



Telementoring and Telemanipulation

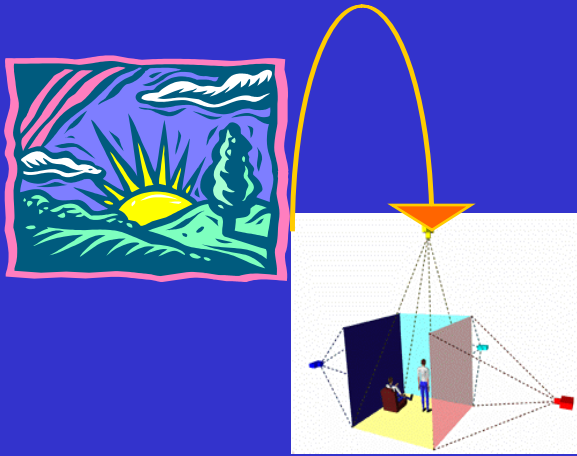


⇒ Staging laparoscopy in cyber space OP 2000

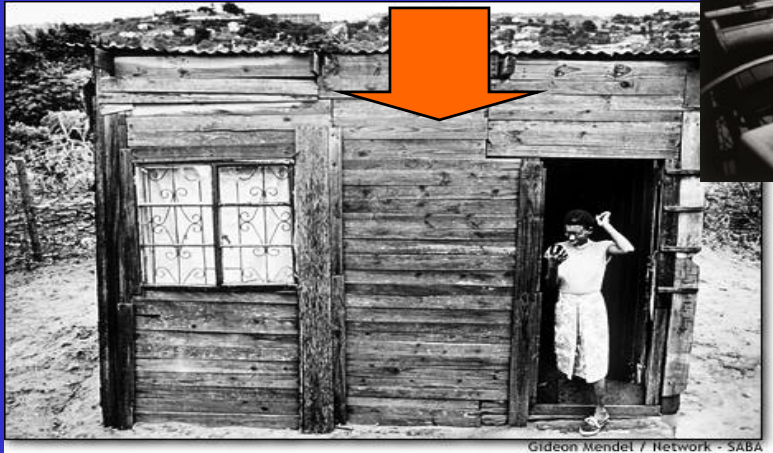


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TECHNOLOGY FOR.....? NOT QUITE...

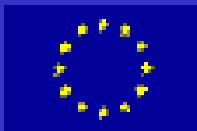


Gideon Mendel / Network - SABA



Gideon Mendel / Network - SABA

⇒ Source: MedSMART 2003



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Bridging the Digital Divide of the World

- Application centers for new treatments
- Remote treatment of patients
- Training centers and use of new medical devices from distance
- Centers of distributed medical intelligency
- Integration of medical competence



SICONET –

**Stereoscopic Image Communication Network
(Satellite link with 34 Mbit/sec)**

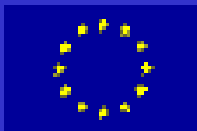
Deutsche Telekom-funded:

Co-ordinator – OP 2000 (D) (1990 – 1998)

PANORAMA (1997 – 1999)

EU fundet: Co-ordinator Siemens (D)

**Terrestrial and Satellite based Network for
Telemedical Applications
(2 Mbit/sec)**



GALENOS

Generic Advanced Low-cost trans-European Network Over Satellite

Project carried out with the support of the European Union



64 kbps
to 2 Mbps

Bi-directional
exchanges



*Pilot network
in the field of
medicine*

- Tele-consultation
- Tele-diagnosis
- Tele-monitoring



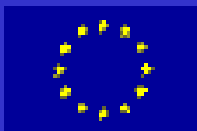
**EU-funded: Co-ordinator Eutelsat (F)
(1999 – 2000)**



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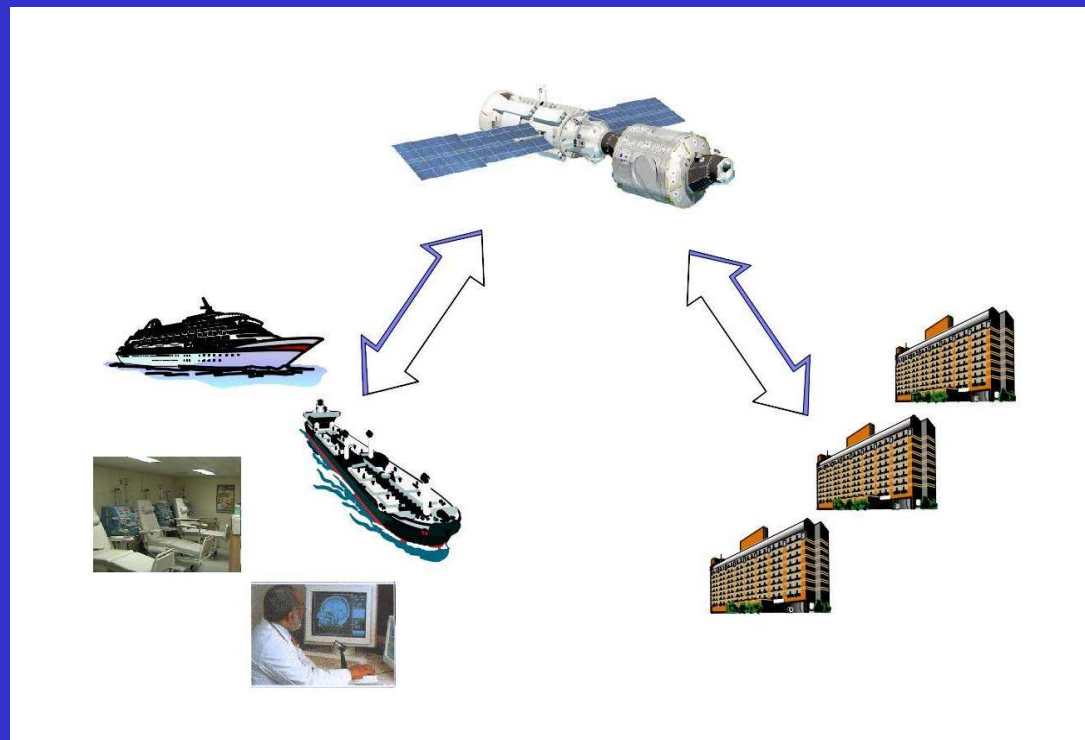
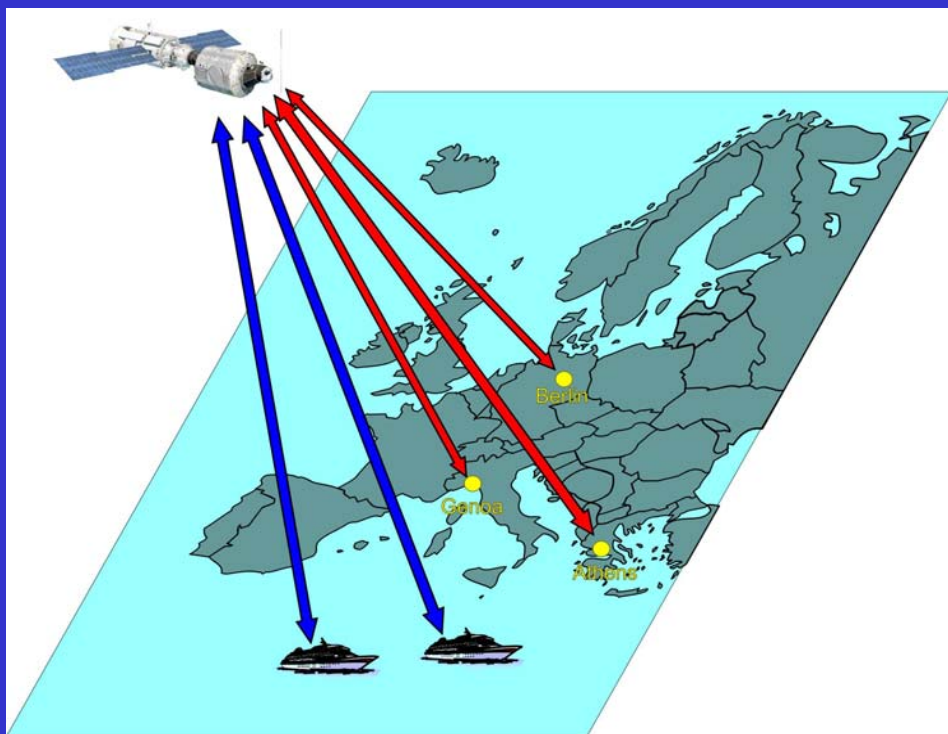


ESA-funded: Co-ordinator CNES (F) (2001 – 2002)



MEDASHIP Satellite Network

EU-funded: Co-ordinator D'Appolonia (I) (2002 – 2003)

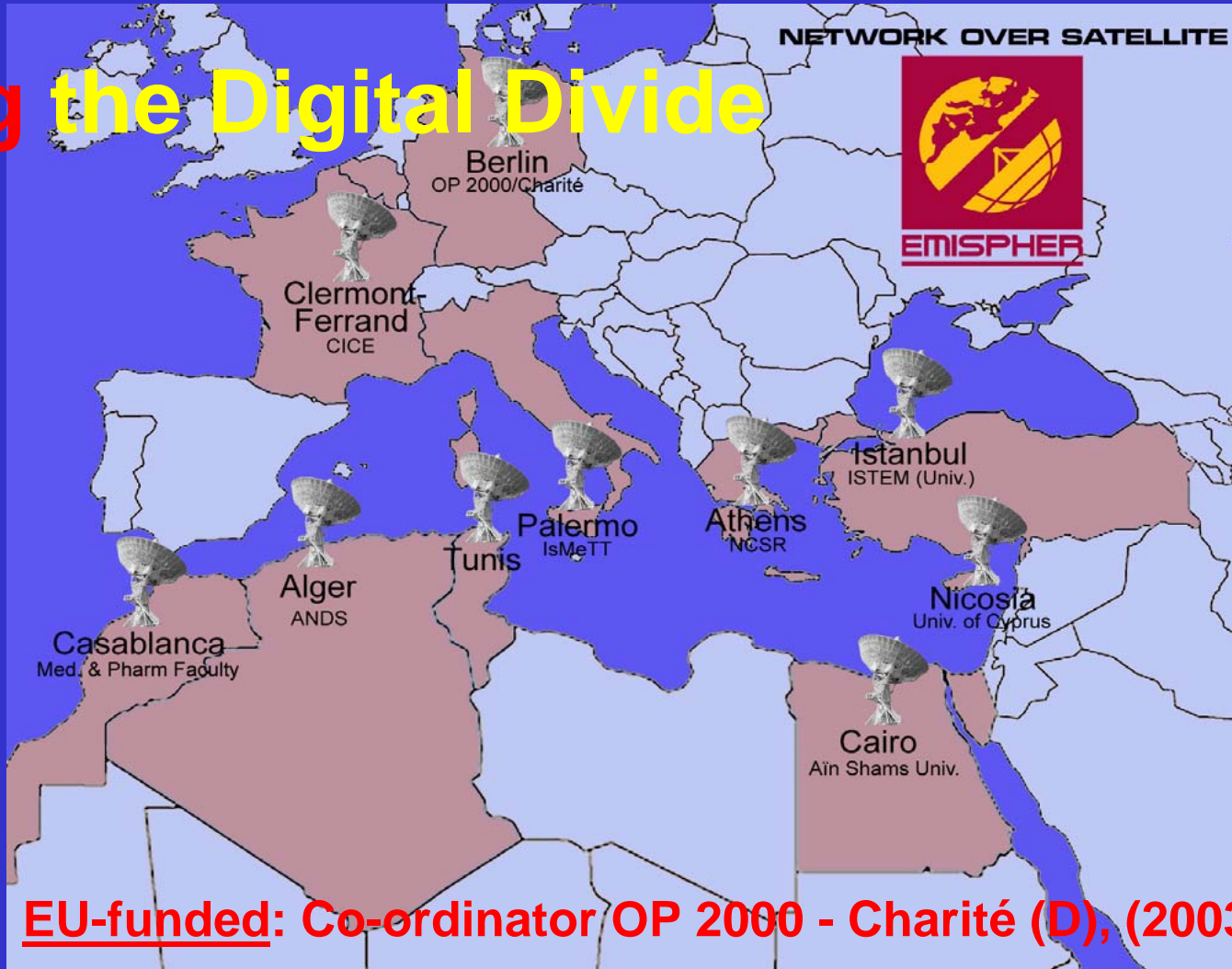




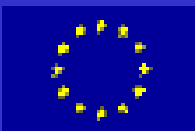
EMISPHER



Bridging the Digital Divide



EU-funded: Co-ordinator OP 2000 - Charité (D), (2003 – 2004)



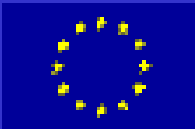
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Lessons from the applications

Different protocols



- Security
- Firewall
- Language
- Law



Realised by the year 2008 (EU)

- **Electronic Health Records**
- **Electronic Health Insurance Cards**
- **Europe-wide patient identifiers**
- **Interoperability of the various cards, etc.**
- **Medical eLearning for health professionals**
- **Harmonisation of reimbursement and liability issues**
- **European Public Health Portal for citizens**

⇒ *Creation of an European eHealth Area*



Why Global Health Care?

Needs and Demands:

- Dedicated 24/7 Telemedicine and eHealth services
- Reliable and high Quality of Service (QoS)
- Open source / open standards for interoperability & integration
- Gateways to other communication networks
- Enhanced Telediagnosis by remote control of medical devices
- Re-evaluation of medical workflow and decision-making tree
- New management tools & strategies for global virtual alliances
- Mental / intellectual / educational e-services for citizens



Why Global Health over Satellite?

- Communication platform with global coverage
- Interactive multimodal and multimedia communications
- Point-to-point and multipoint communications
- Meshed topology
- Tools and services for health professionals and authorities
- Personalised health systems for patients and citizens



GHOS: from Telemedicine towards Telepresence

Status quo of Telemedicine

- *patient data transfer*
- *patient administration & management*
- *patient monitoring*
- *consultation*

⇒ **interaction with patient's data per se**

Medical Telepresence

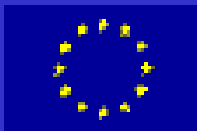
- *live interaction - telemanipulation & telerobotics*
- *haptic telesensation*
- *telementoring & teleteaching*

⇒ **site-independent access to best medical expertise**



GHOS: New elements to be developed

- **Dedicated Network Control Centres for high and reliable QoS**
- **Intelligent data mining tools**
- **Health GRID computing infrastructure**
- **Modular personal Health monitoring systems with integrated micro-sensory and micro-acting elements**
- **Harmonisation of relevant legislation and regulations**
- **Personalised avatars for Assisted Cognition**
- **Multilingual support**
- **Virtual Euro-Mediterranean Hospital Infrastructure**



Background of VEMH: Virtual Euro Mediterranean Hospital

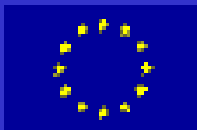
- Telemedicine aims at equal access to medical resources for everyone at any time and anywhere
- Digital divide: ICT amplifies disparity in quality of life

⇒ Need for real integration
of ICT platforms and telemedical services

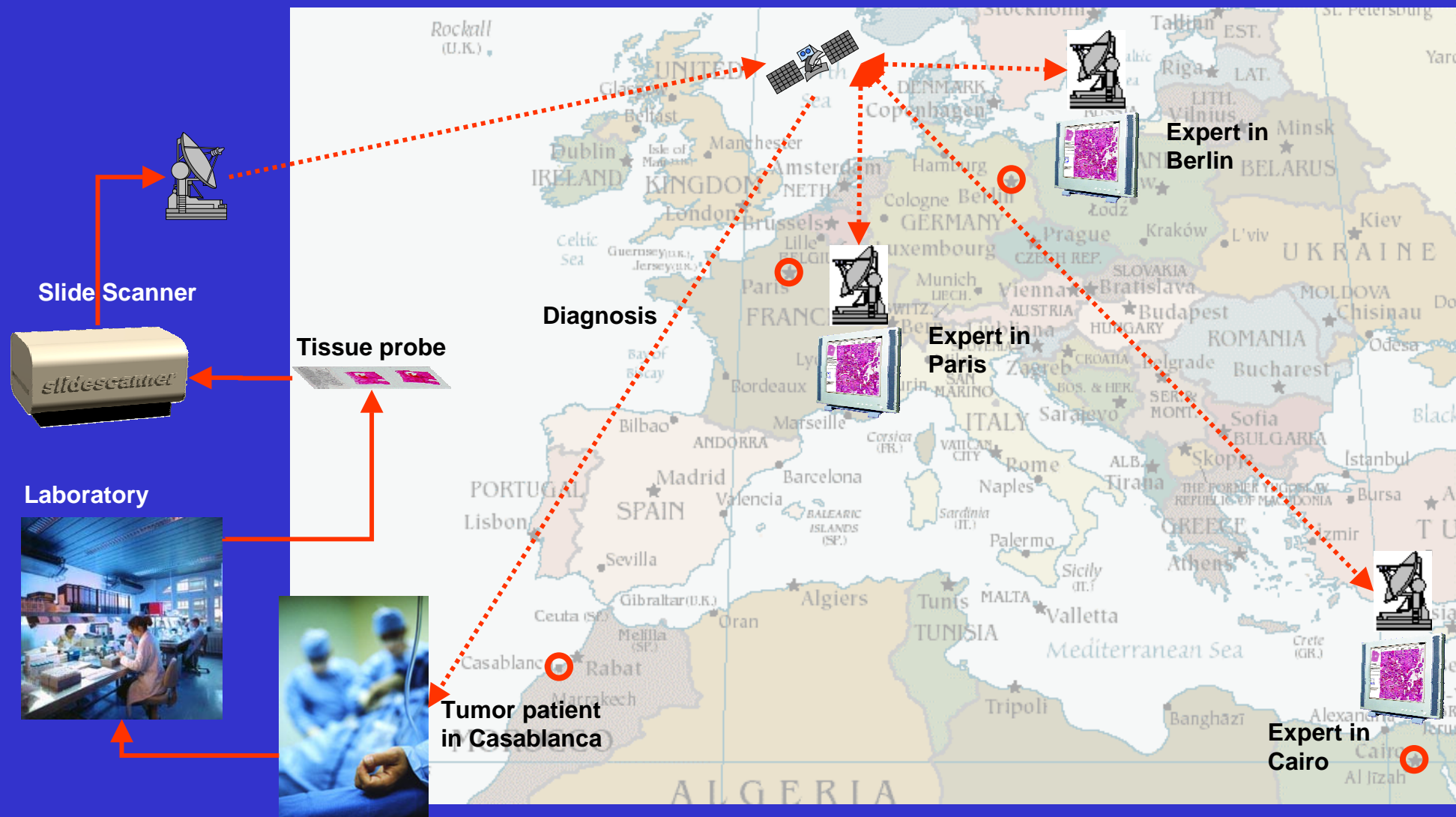


Services of VEMH

- **Euro-Mediterranean Medical University**
improved qualification by exchange and standardization of educational modules
- **Real-time Telemedicine**
improved quality of patient care and qualification of staff
- **Medical assistance**
improved continuity of care to stimulate tourism
- **Implementation of Evidence-based medicine**
improved disease management and individual therapies
- **Fellowship programmes for young professionals**
improved qualifications in multi-cultural and inter-disciplinary settings

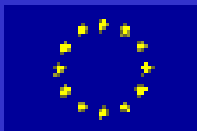


VEMH - Real Time Telemedicine

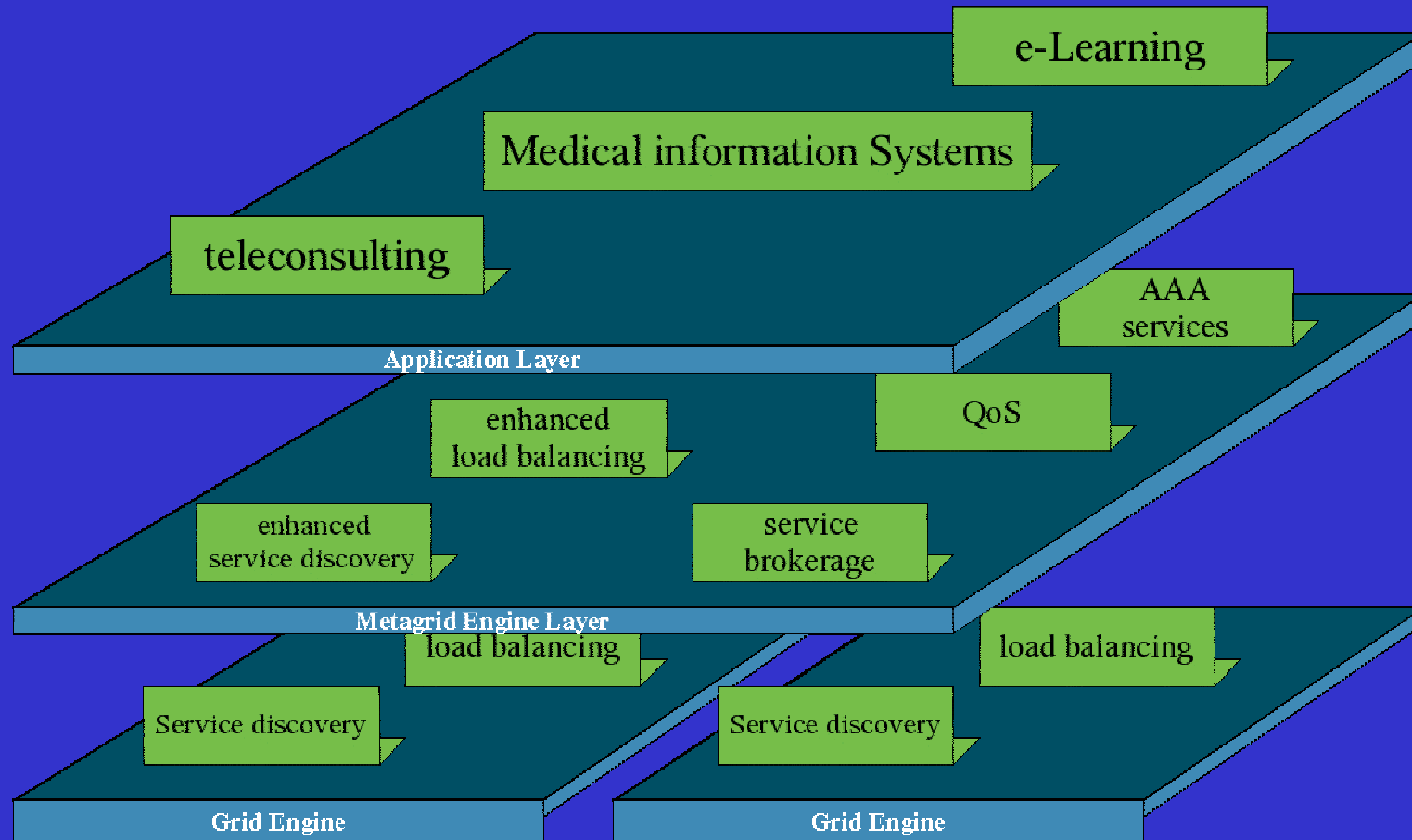


GRID for VEMH

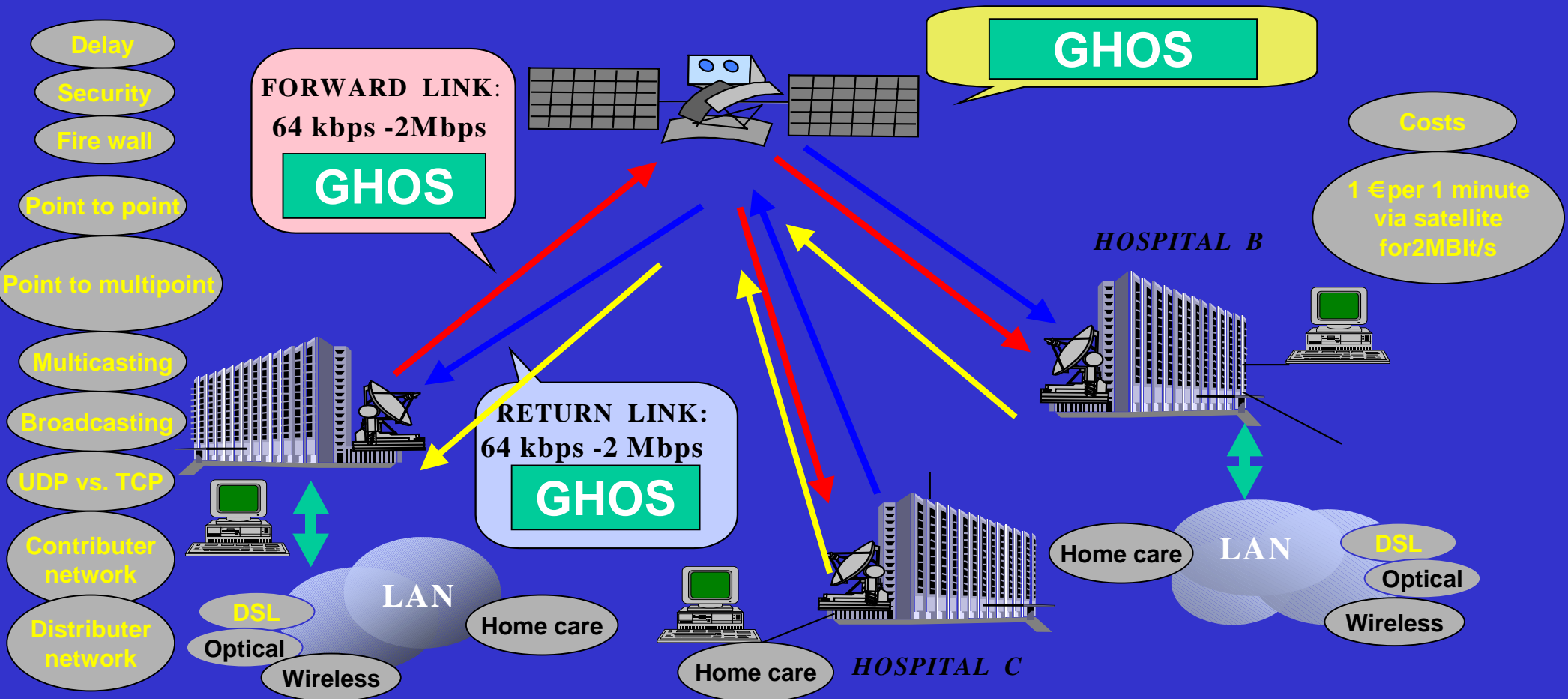
- **Medical Services need higher computing capabilities**
- **Grid is a suitable approach to realize Medical Services**
- **Existing Grid approaches are not sufficient for developing Medical Services**
- **The idea behind the Euro-Mediterranean Virtual Hospital is to provide citizens with sufficient Medical Services in every place**
- **Medical Services have to be useable via divert devices and networks, that means seamless**



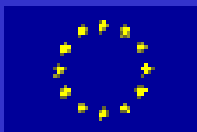
Approaches



The Future



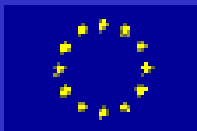
⇒ **Combination of different Networks**



Challenges & Opportunities of GHOS

- Raising awareness and consolidation of the demand
- Development of economic models for sustainable services
- To move from curative to preservative tourism
- To account for ethical and privacy aspects:
 - Is health a human right or a social duty?
 - Freedom is the comprehension of necessity!

⇒ To prepare for Mars



1919
Radiology Doc



1999
Surgical Doc



20??
GHOS Doc

