The Integral Satcom Initiative

Relationship between ISI Strategic Research Agenda and Objective 'The Network of the Future'

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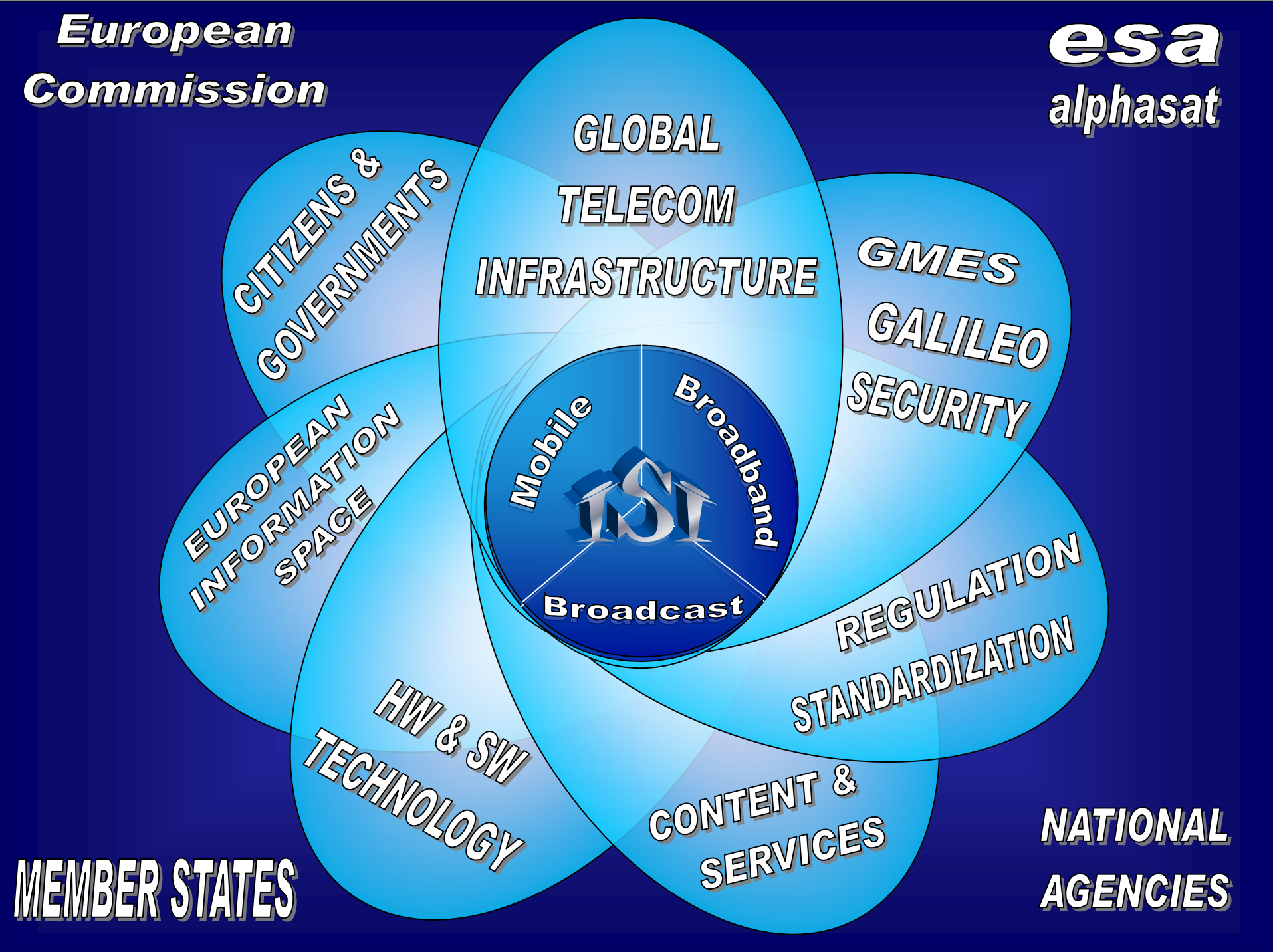
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CONTENT & SERVICES
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ISI: Market Segments

Critical step: Identification of user requirements and market segments

1. **Citizens and Governments: the CG institutional market**
   - **Security, public protection, disaster relief**
   - **Data Communications for Galileo, GMES, ATM**
2. **Individual users and families in their Homes: the IH market**
   - **Enhanced and interactive Broadcasting, HDTV, 3DTV, IP-TV**
3. **Individual users on the Move: the IM market**
   - **4G, Mobile Broadcasting, Infomobility**
4. **User Groups in villages and Remote areas: the UGR market**
   - **Broadband direct access and backhaul connectivity (Digital Divide)**
5. **User Groups on the Move: the UGM**
   - **Mobile broadband for aero, maritime, railway, vehicular user platforms**

Fundamental Areas of Satellite Communications

1. **Interoperability and Internetworking**
2. **Satellite broadband and broadcasting**
3. **Mobile satellite services**
4. **Security**

Objective 3.1.1.1 [1]: The Network of the Future
Target outcome

a) Ubiquitous network infrastructures and architectures
b) Optimised control, management and flexibility of the future network
c) Technologies and systems architectures for the Future Internet

Interoperability and Internetworking

- Multiple services are offered on IP networks
- Broadcast, multicast and unicast services are evolving with the introduction of new formats and new ways of service consumption
- Service continuity is mantained everywhere among heterogeneous networks: wired and wireless, fixed and mobile

- Satellite will be part of this convergence and will have to be:

- integrated in a trasparent way to final users
- seamlessly integrated with terrestrial networks, in terms of service offering, being part of heterogeneous networks

Interoperability and internetworking: TCs

- Heterogeneous networks: **terrestrial, wired and wireless, and satellite networks will have a crucial role in future infrastructures for multimedia applications**
- **Provide seamless service provisioning across heterogeneous networks**
- **End-to-end Quality of Service: network models for QoS has to be refined**
- **Application layer must allow the creation of flexible applications that adapt to the heterogeneous network scenario**

Match Targets

a) i) Convergence and interoperability of heterogeneous technologies
b) i) Enabling seamless end to end network …
c) … generalized mobility

Satellite Broadband: Technical Challenges (some)

Satellite broadband systems as part of the global telecom network which require significantly higher capacities to support future services and applications

1. **System and network aspects**
   - **Multiple beam satellite with on board processing and switching to support QoS**
   - **Mesh inter-satellite connectivity to achieve a flexible satellite overlay net**
   - **Interworking between satellite broadband networks and terrestrial wireless networks**
2. **Safe, secure and trusted applications and services**
   - **New techniques and technologies for reliable acquisition and distribution of information, integration of terrestrial repeaters**

Match Targets

a) ii) flexible radio access to broadband mobile services…
+ iii) elimination of the barriers to broadband access…

c) i) generalized mobility, security and trusted domains

Satellite Broadcasting

- IP based
- TV broadcasting from satellite is today the most popular way to access digital TV
- Digital broadcast technology platforms enable the implementation of new TV based interactive services
- Important trends:
  - Convergence between sat broadcasting and sat broadband services
  - This convergence will evolve with emphasis on service architectures, where QoS, security, roaming and integration with terrestrial TLC systems are crucial issues
  - Convergence between satellite broadcasting and mobile satcom, serving maritime vessels, land-mobile vehicles and portables, and aircrafts

Satellite Broadcasting: Technical Challenges (some)

1. **System and network aspects**
   - **Cross layer design of radio resource management techniques for supporting Mobile Broadband Multimedia Services (MBMS)**
   - **Inter-working between sat and terrestrial segments: inter-system handover of MBMS flows**
2. **Ground segment aspects**
   - **User will ask for access to contents and services through heterogeneous and mobile networks**
   - **Development of authentication and electronic payment systems**
   - **Explore context-awareness techniques to provide a flexible framework towards the concept of access to any content, anytime from anywhere**
3. **Applications and Services**
   - **Study the effects of latency and up-downlink asymmetry**

Match Targets

a) ii) Convergence +iii) Flexibile access +iv) Context awareness

b) iv) Enabling intelligent distribution of services…

Networking in Mobile Satellite Services

- **4G evolution**
  - **A flexible network requires optimal connectivity anywhere, anytime**
  - **Convergence of satellite and terrestrial standards**
  - **Efficient integration of IP QoS models (IntServ, DiffServ) in Mobile IP**
  - **New wireless TCP/IP protocol suite to deals with heterogeneous networks**
  - **Mobile IP: satellite positioning systems can help for real-time location tracking and optimal route selection**
- **Ad-hoc networks**
  - **Satellites for reliable and robust connection to WAN or MAN**
- **NAV-COM**
  - **Integration of navigation and communication components for safety and low risk, security, reliability/availability, integrity and continuity, etc…**
- **Security and disaster relief**
  - **Enhanced telecommunications for public agencies and organization dealing with law and order, safety of life and property, emergency and disaster relief**

Match Targets

a) i) Convergence and interoperability of heterogeneous technologies

b) iii) managing new forms of ad-hoc communications and connectivity

c) Generalized mobility, new forms of routing and content delivery

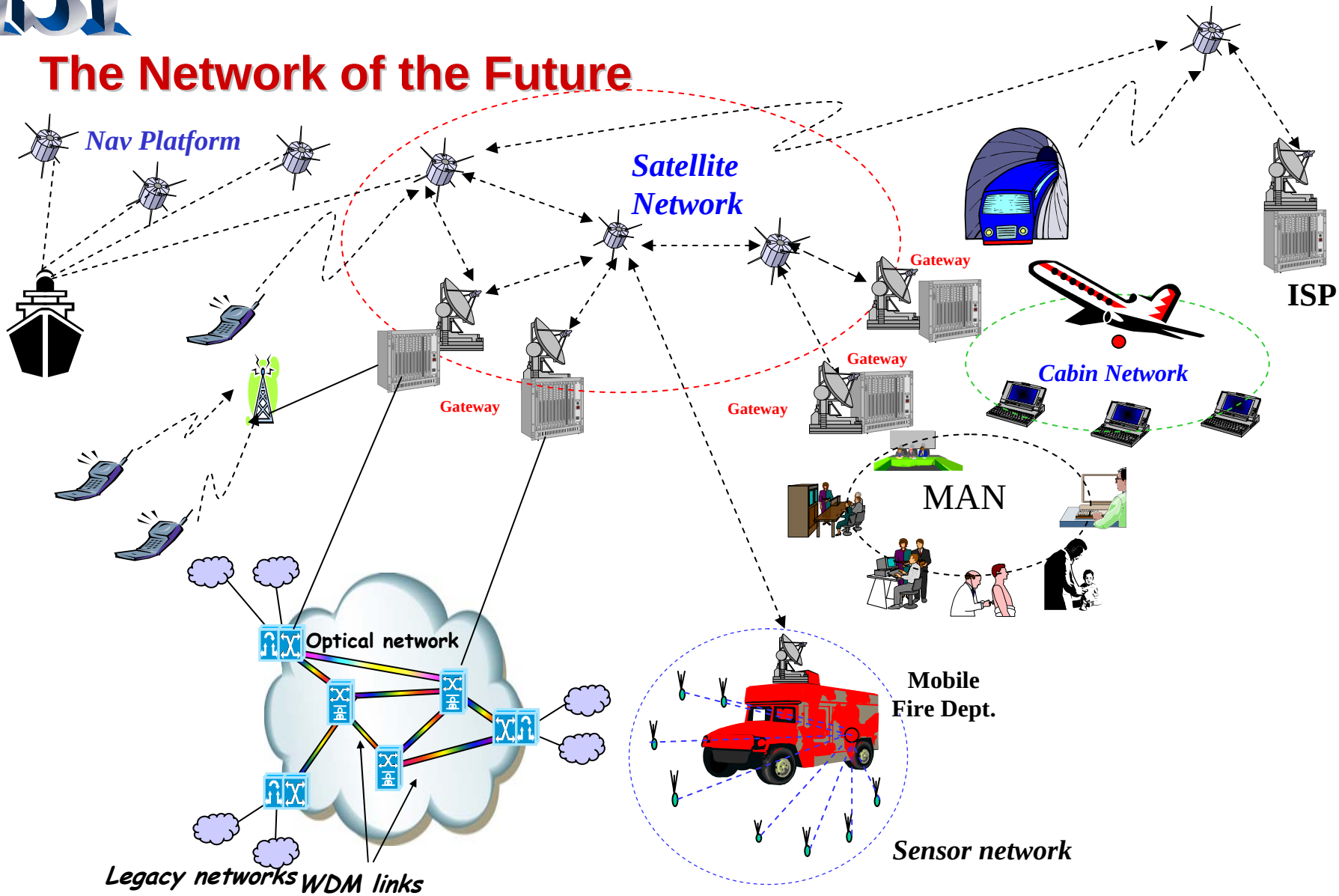
Security

- Overall security over heterogeneous networks
- Very high level of secure connectivity
- End-to-end secure and trusted communications (authentication, access control,etc..)
- Hardened systems (jamming protection, on-board processing)

Match Targets

c) Security, trusted domains

The Network of the Future



Conclusions

- The Network of the Future will be heterogeneous
- Convergence, Interoperability and Internetworking are keywords of the Network of the Future and Satellite Networks will play a strategic role
- In the Network of the Future satellite will be crucial for achieving a “Ubiquitous network”
- All technical and system challanges are focused towards the design and implementation of a “flexible network infrastructure”
- Seamless service, QoS models and networks have to interwork flexibly and transparently
- Network of the Future will have to support transparently user needs and application in a secure and trusted way

THANK YOU FOR YOUR ATTENTION

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… suggestions are very very welcome

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