

EuroSkyWay

**A Regional Satellite Network for Global
Broadband Services**

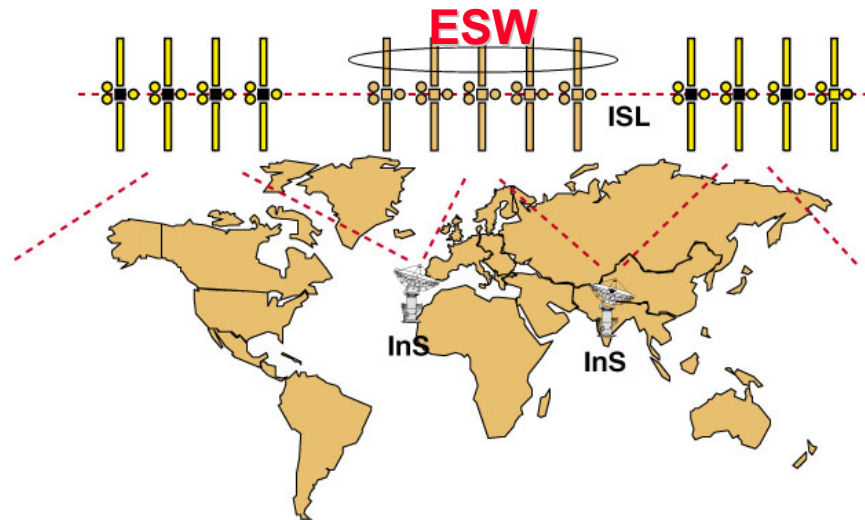
- EuroSkyWay Vision
 - Services
 - Network
 - Business
- System Characteristics
- Current Status
- Summary



- Provide Service Operators with inexpensive broadband connectivity
- Design, Build & Manage the Network
- Inter-operate with terrestrial networks & other regional satellite systems
- Provide “turn-key” services to social groups (hospitals, schools,...)

EuroSkyWay - A regional network for global services

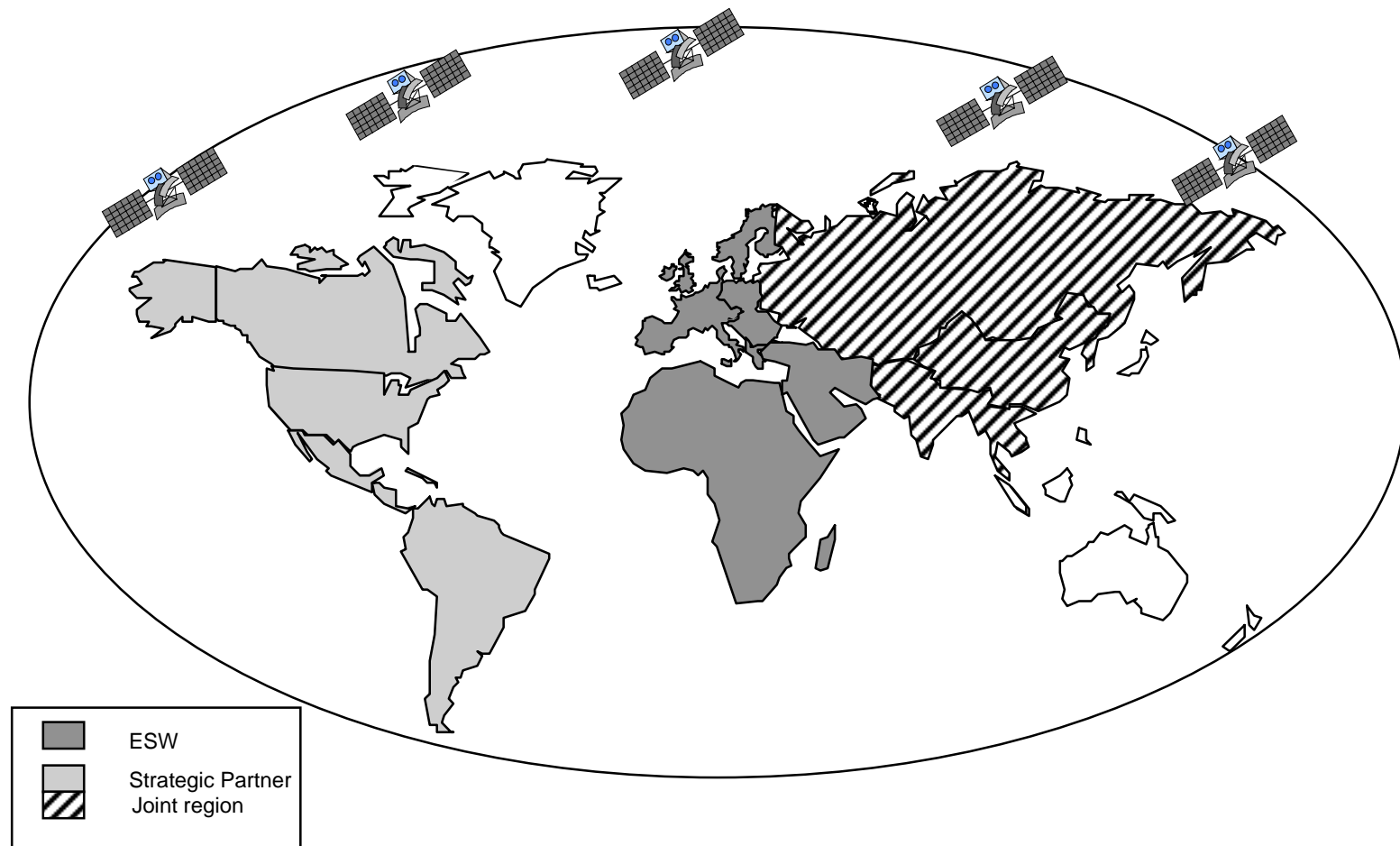
- EuroSkyWay is a regional broadband network using Ka-band GEO satellites to be integrated with a global network provider
- The Long-Term Vision is to establish a Global Multimedia Satellite Network together with a Strategic Partner to become a Leading Provider of Satellite Multimedia Services



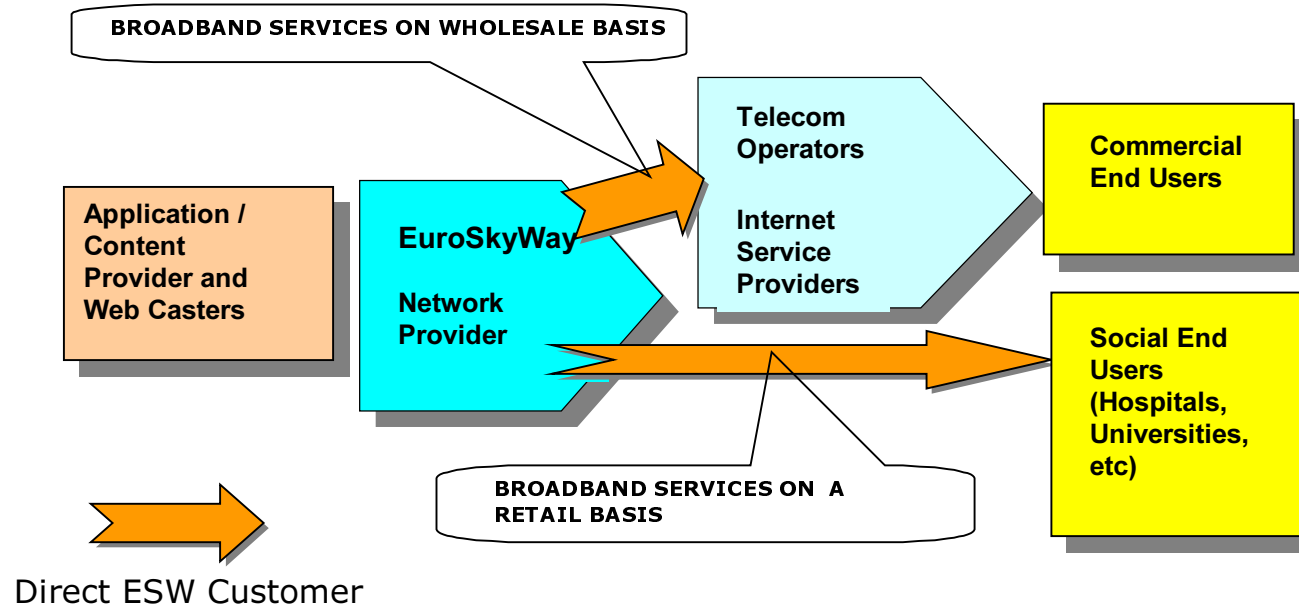
- EuroSkyWay is the natural evolution of ITALSAT, the world's first Ka-band satellite with OBP and switching operative in orbit since 1991

Long-Term Vision

To establish a Global Multimedia Satellite Network together with a Strategic Partner to become a Leading Provider of Satellite Multimedia Services



Business Segmentation



EuroSkyWay business structure

EuroSkyWay mission is to provide broadband connectivity to multimedia service providers

Services, Data Rates, Protocols



Connectivity Packages (Wholesaler)

- **Web-Way**
Entertainment & Business Services in the star-type configuration (Hub - Terminals):
 - access to Internet and on-line services
 - interactive applications

- **Connect-Way**
Business Services in the meshed-type configuration (complete interconnections):
 - Virtual Private Networks
 - LAN-to-LAN interconnections
 - Videoconferencing
 - Teleworking
 -

- **Secur-Way**
 - Transactional Services
 - Banking and Personal Finance

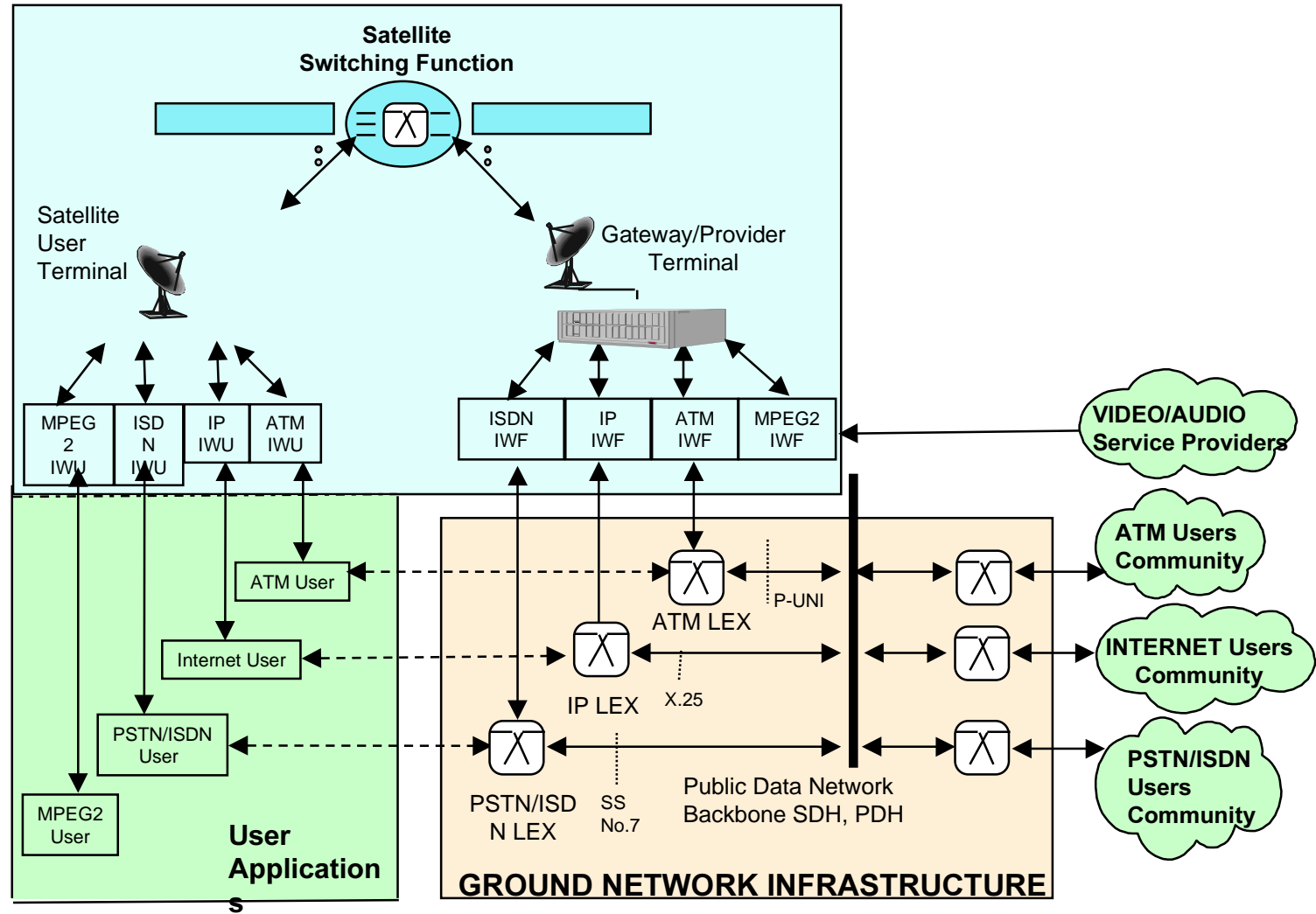
Service Packages (Retailer)

- **Health-Way**
 - Telemedicine
- **Learn-Way**
 - Teletraining
- **Travel-Way**
 - Teletourism

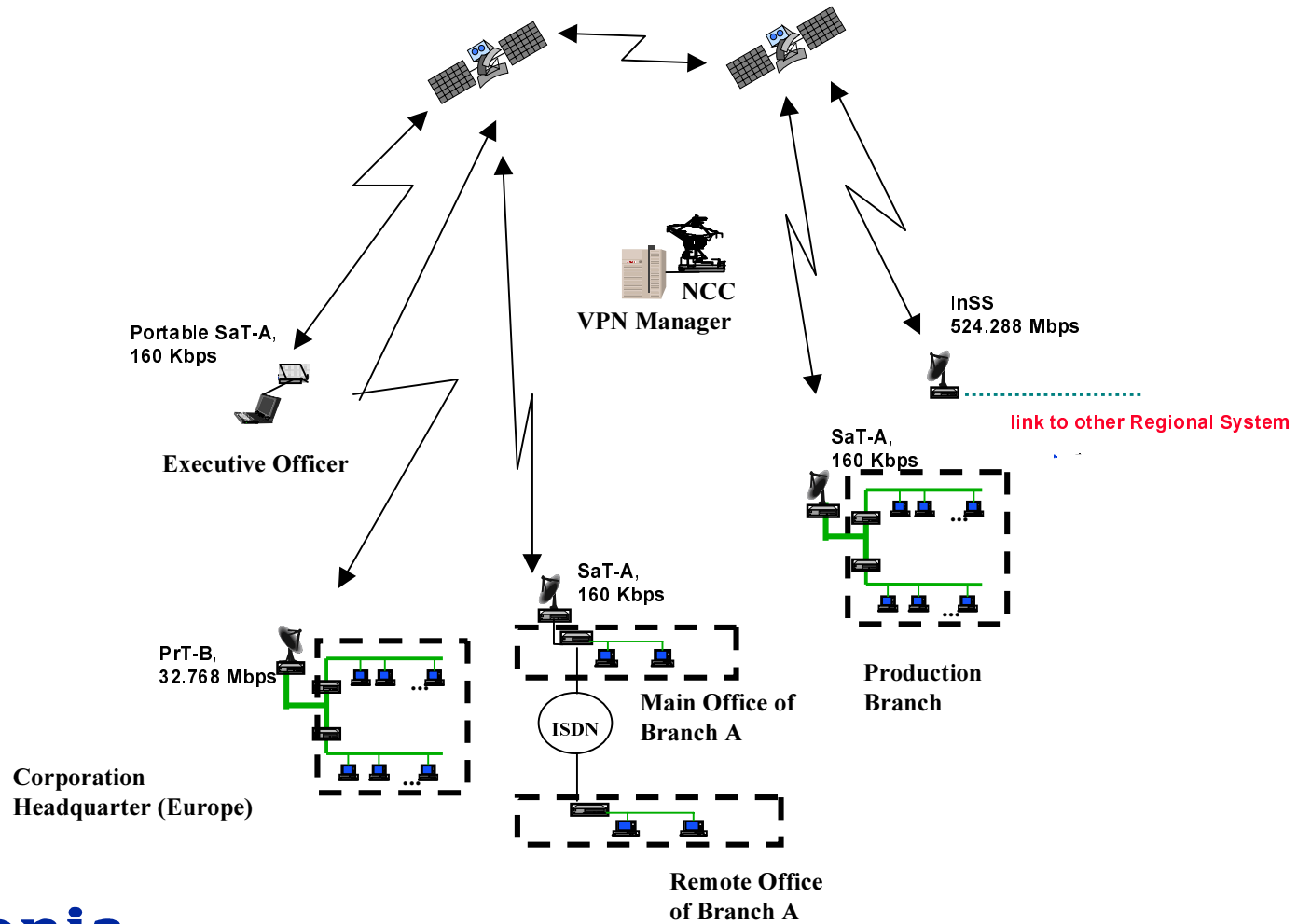
Network Services

- **Access Network**
- **Core Network**
- **Terminal and Personal Mobility**

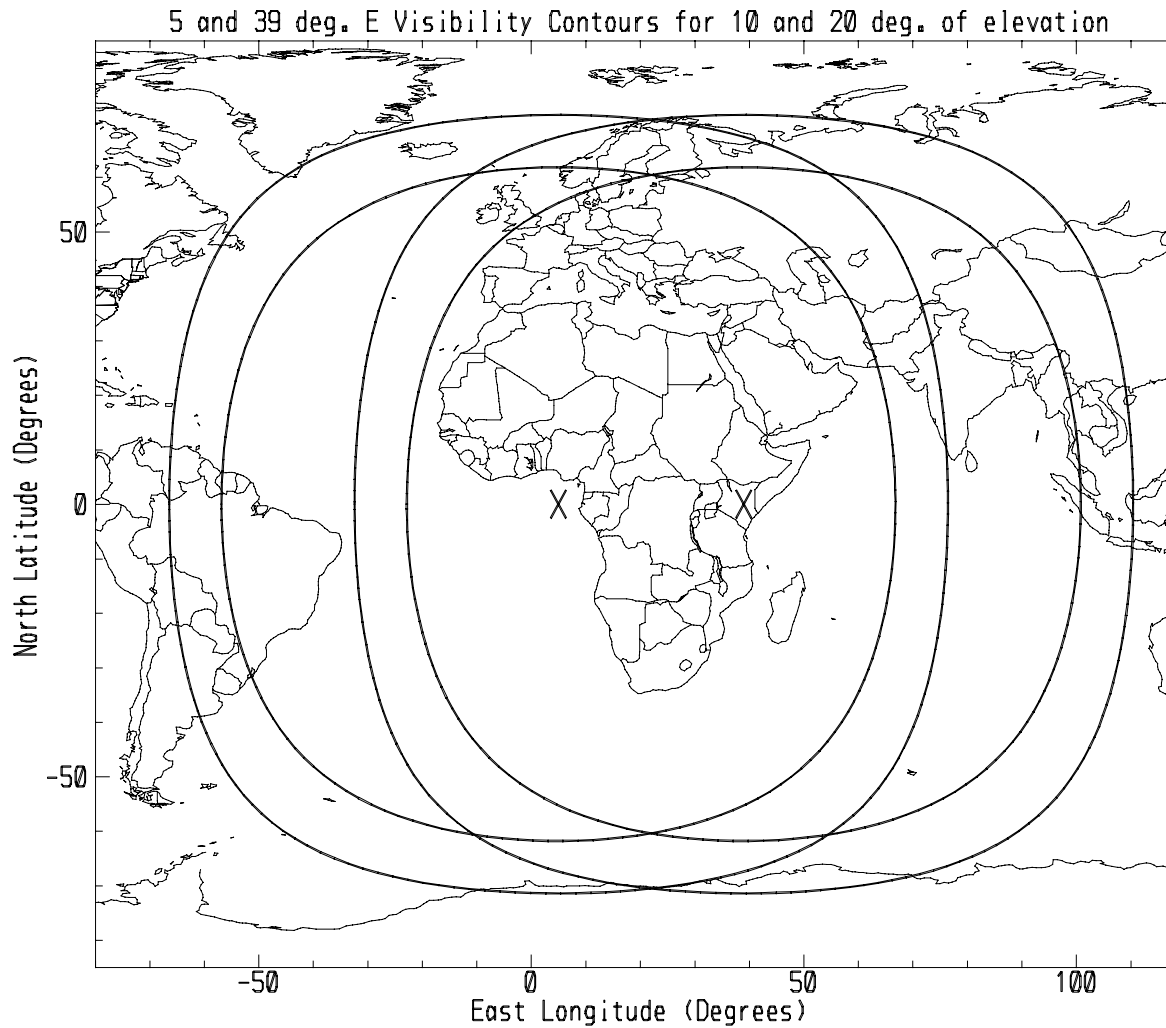
EuroSkyWay Access Network



Virtual Private Network



EuroSkyWay: Visibility Contours (5° - 39° East)



•65% world's population

+40 M sat users

•Prel.licence:
april,26 1996

•Adv.Publication:
march,25th 1996

Coordination request:
september 2nd 1997



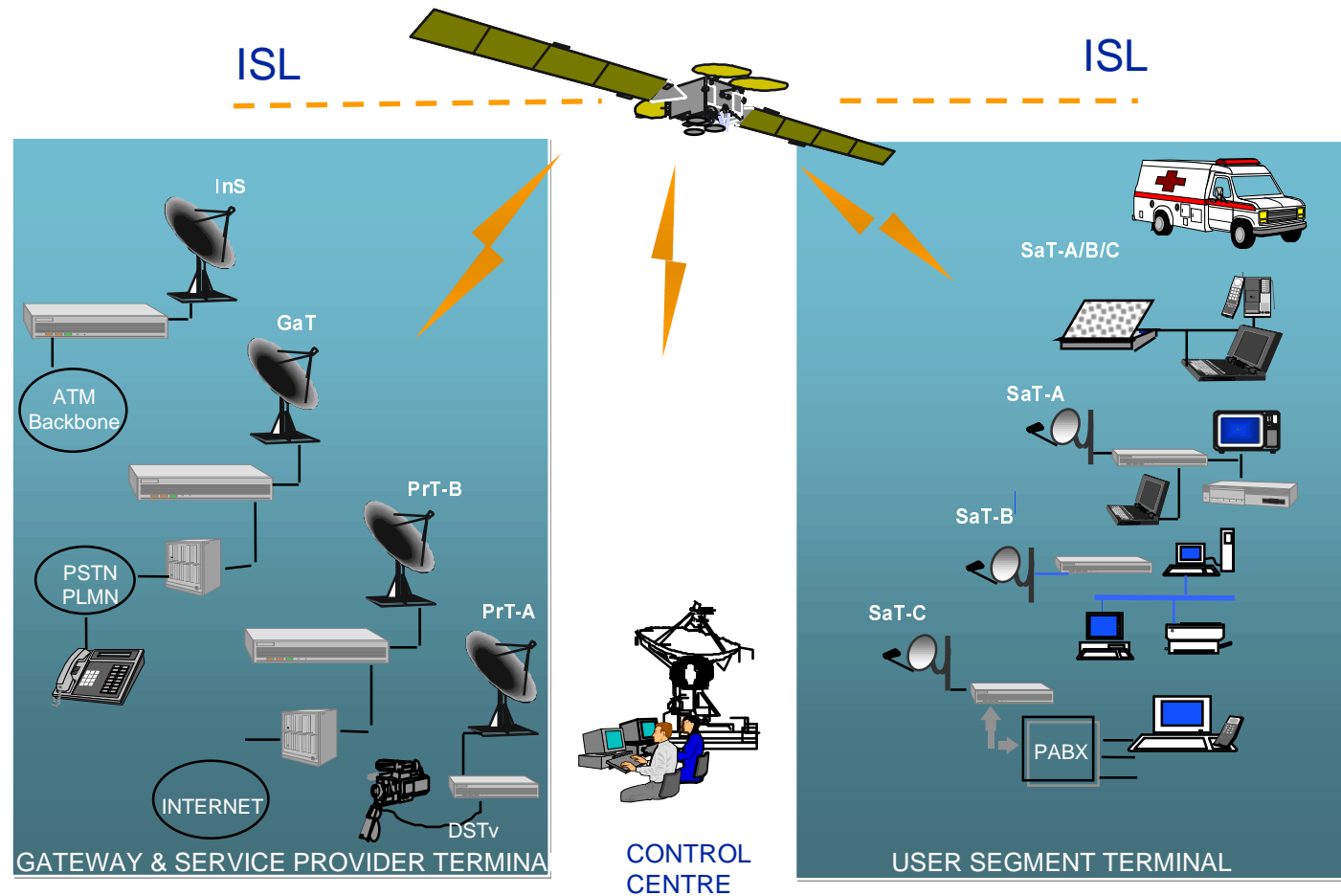
SPAZIO

EuroSkyWay's Property

A Finmeccanica Company

04/2000/11

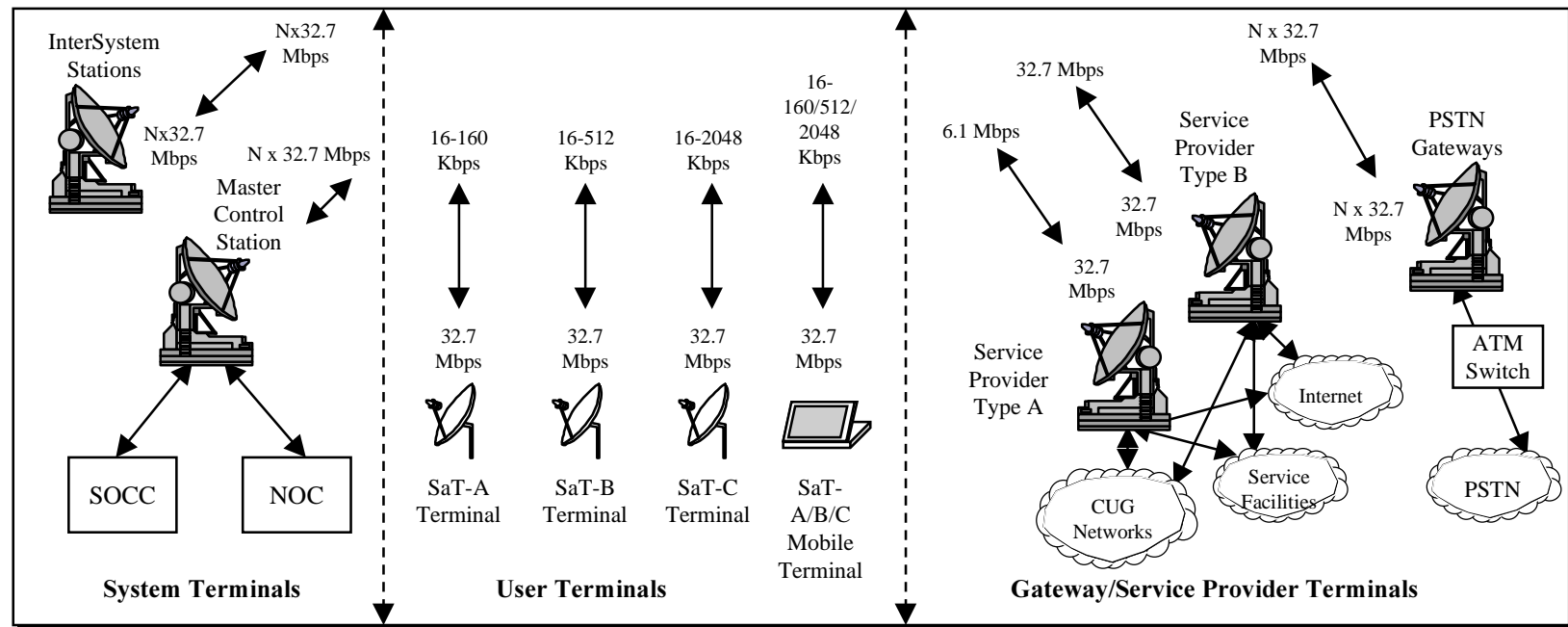
General Architecture



The Space Segment

- 2 GEO satellites (phase 1) + 3 additional GEO (phase 2)
- European, Africa, West Asia Coverage
- Satellite lifetime : 12 years
- Regenerative 20-30 GHz payload
- Payload mass : 1200 Kg
- Payload power demand : 13 KW
- Satellite mass : \approx 5500 Kg
- Eight + one steerable antennas
- Coverage through 32 highly focused spot beams
- Satellite gross capacity : 9.2 Gbps
- Inter Satellite Link in V-band
- Satellite compatibility with Ariane and Sea launch launchers


Ground Segment



- Subscriber terminals consist of satellite dish having ϕ 70 or 120 cm, and a card to be inserted in the Personal Computer. Portable terminals will be briefcase sized weighing from 4 up to 8 Kg

- Candidate orbital locations 5, 10.2, 13.2, 16.4, 22, 30, 39 deg.East
- Polarisation circular (opposite for RX,TX)
- Satellite gross capacity 9.2 Gbps
- Used bands K/Ka bands (20/30 GHz) earth-to/from-space
V band (56/64 GHz) for inter-satellite-links
- Up link used band 27.5-28.6 and 29.5-30.0 GHz
- Down link used band 17.7-18.8 and 19.7-20.2 GHz
- Coverage multiple high gain spot beams
- Cell structure 60 bytes
- Min. switchable rate 16 Kbps

Traffic Routing

- Traffic routing via on board processing techniques
- Traffic granularity 16 Kbps (circuit) / 53 bytes (packet)
- Connectivity matrix update interval 26.5 ms (frame interval)
- Cell rate / frame 466390 cells (29.8 Mbytes) received in 26.5 ms
- Adaptively to traffic satellite capacity re-allocation wrt beams and service types (CBR, VBR, etc.)
- Access / distribution MF-TDMA / TDM
- Link enhancements
 - up & down link Concatenated Coding RS(76,60,16) + R=3/4 convolut.
 - end-to-end ARQ based on FED for store-and-forward packet data
- Traffic Resource Manager On-board
- Advanced Traffic Management  Bandwidth-on-demand

EuroSkyWay Traffic Requirements



Total net traffic per satellite

8 Gbps

Switch fabric compatibility

all mix of data rates

Up link

SaT-A (max 160 Kbps)
SaT-B (max 512 Kbps)
SaT-C (max 2048 Kbps)
PrT- A (max 6.144 Mbps)
PrT-B & GTW (max 32.768 Mbps)
InSS (524 Mbps)
ISL (524 Mbps)

Example of Traffic Distribution

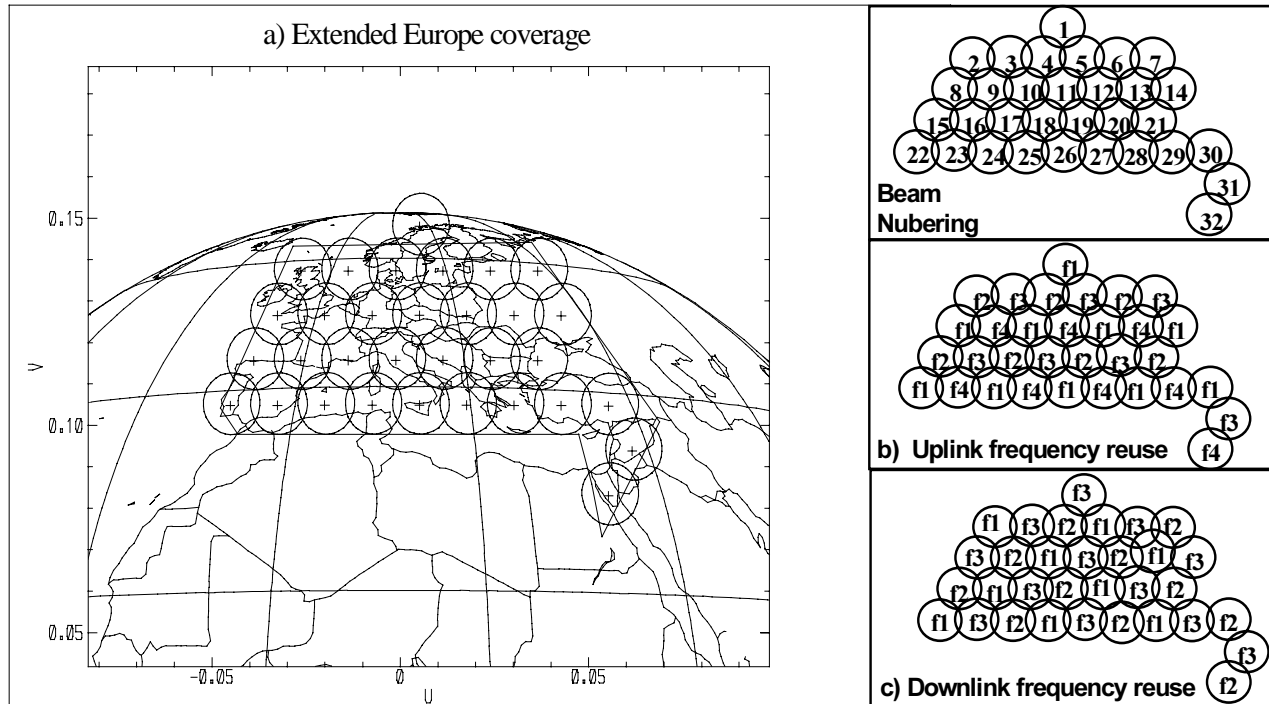
6834 carriers	}	= 3.34 Gbps
2112 carriers		
568 carriers		
200 carriers		= 1.23 Gbps
54 carriers		= 1.77 Gbps
2 carriers		= 1.05 Gbps
1 carrier		= 0.52 Gbps

Down link

SaT/PrT/GTW (32.768 Mbps)	198 carriers	= 6.49 Gbps
InSS (524 Mbps)	2 carriers	= 1.05 Gbps
ISL (524 Mbps)	1 carrier	= 0.52 Gbps



European Coverage and Frequency reuse



Subscriber Terminals

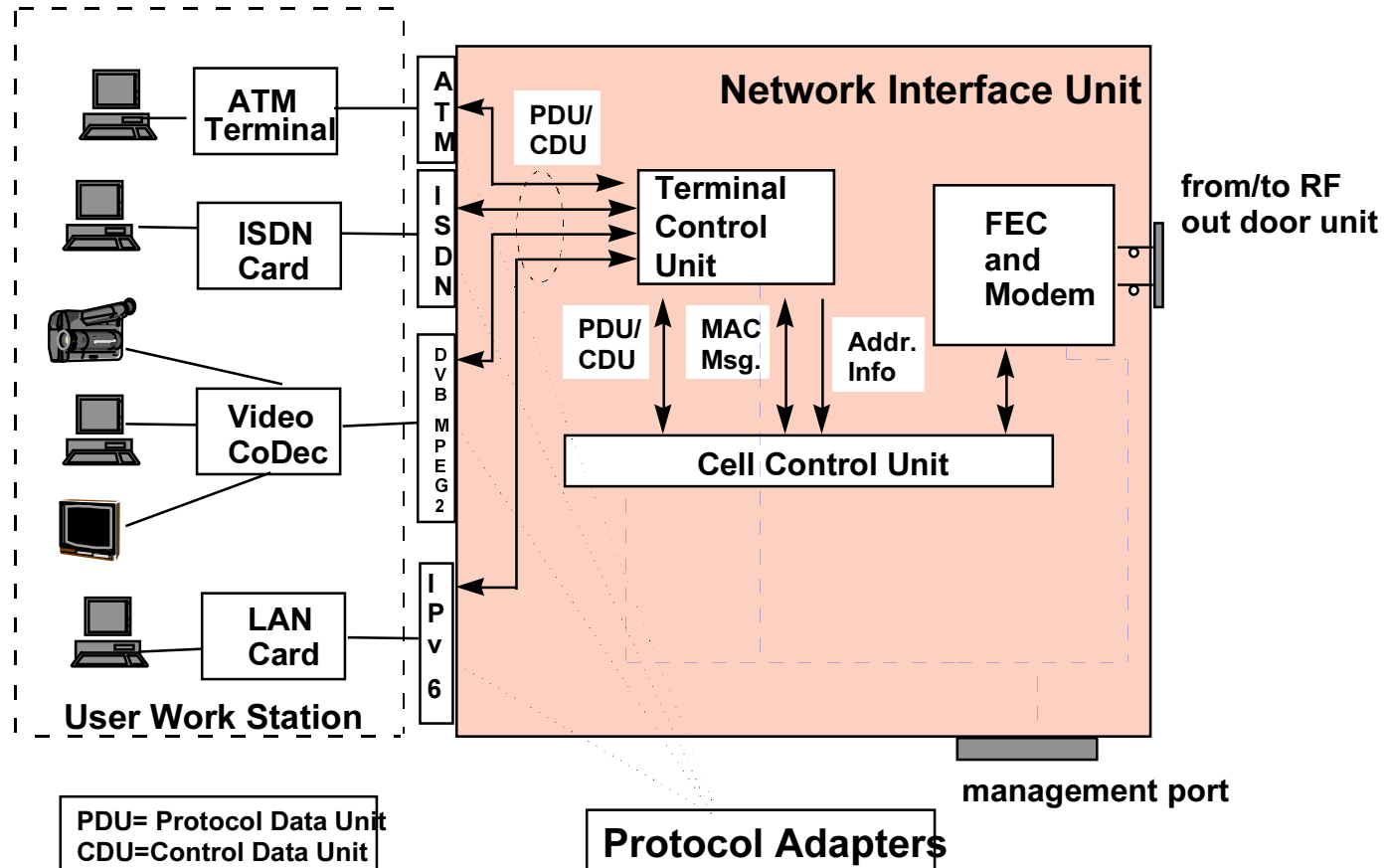


	SaT- A		SaT- B		SaT- C	
Uplink Data Rate	160Kbps		512 Kbps		2.048 Mbps	
Downlink Data Rate	32.768 Mbps		32.768 Mbps		32.768 Mbps	
Availability %	99	99.5	99	99.5	99	99.7
Operational Mode	Portable	Fixed	Portable	Fixed	Portable	Fixed
Use	Individ.	Individ.	Indiv./Coll.	Collect.	Collect.	Collect.
EIRP dBW	37.2	41.6	41.9	46.7	48	54.5
G/T dB/K (clear sky)	12.7	18.2	12.7	18.2	12.7	22.5
RF Power W	0.6	0.6	1.8	1.8	7.5	4.5
Antenna Size (cm)	30x45	70	30x45	70	30x45	120
Antenna Type	rect.	dish	rect.	dish	rect.	dish



End User Terminal

One or more physical interfaces can be selected by the user for single or multiple services/protocols



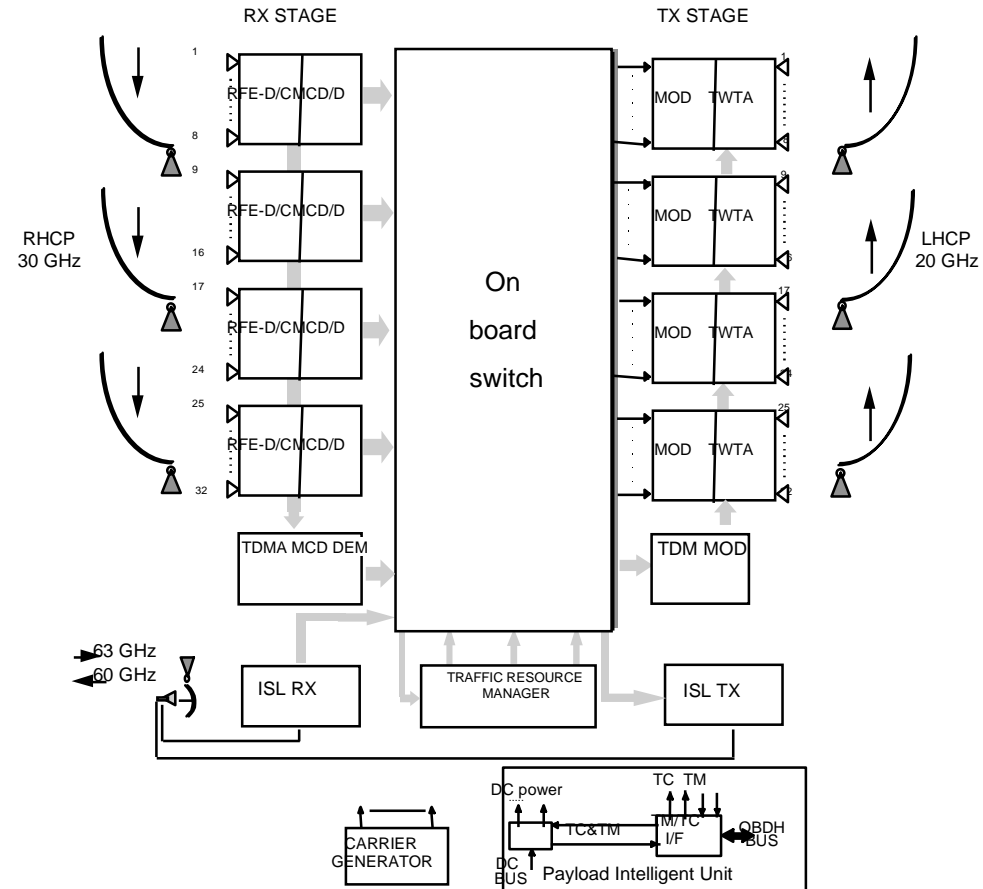
Gateways and Service Providers Stations



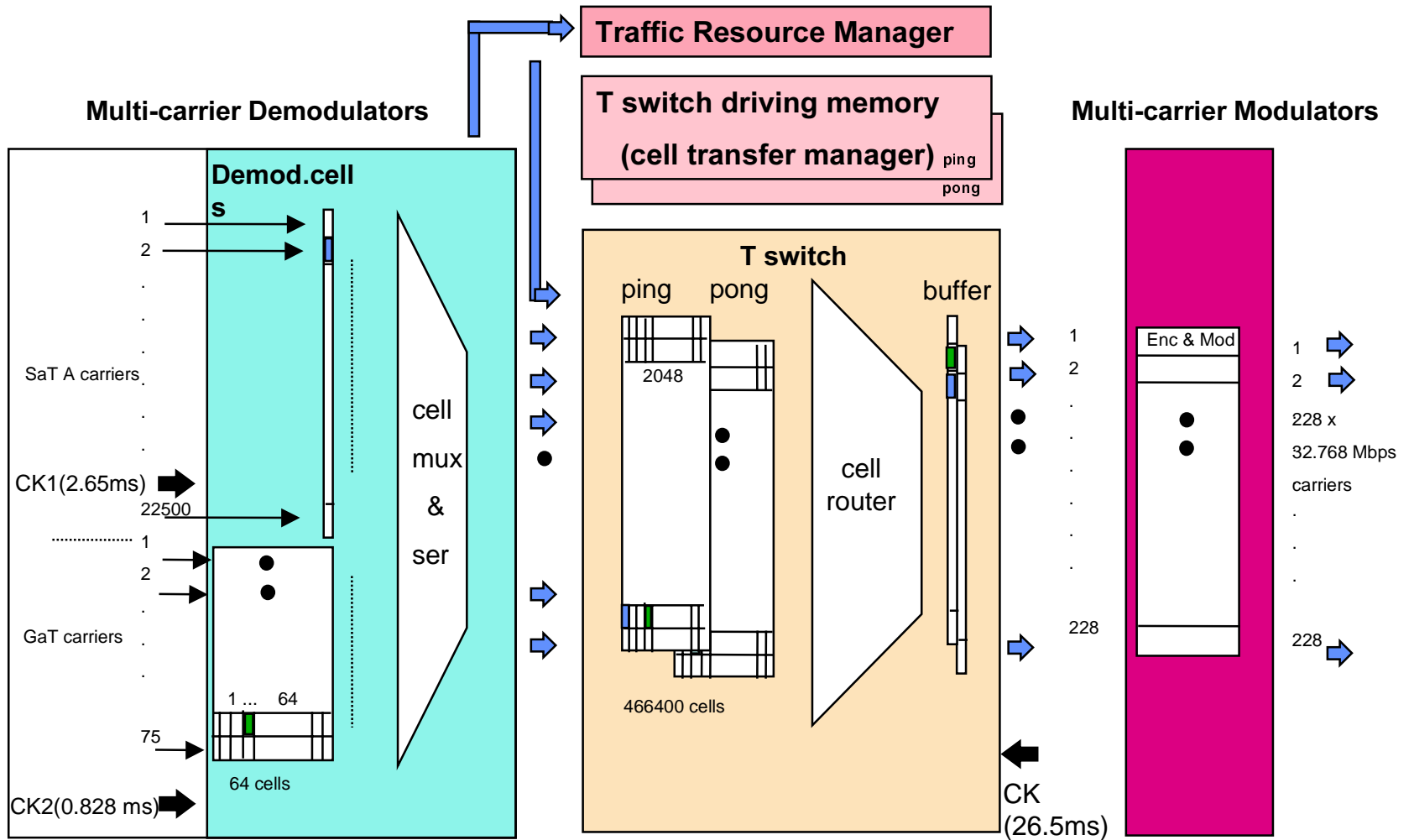
	PrT- A	PrT-B/GTW	InSS
Uplink Data Rate	6.144 Mbps	32.768 Mbps	524 Mbps
Downlink Data Rate	32.768 Mbps	32.768 Mbps	524 Mbps
Availability %	99.9	99.9	>99.9
RF Power W	16.5	34.9	41.3
Ant. Diameter (m)	1.7	2.7	6.
EIRP (dBW)	63.2	70.5	76.8
G/T (dB/K) (clear sky)	26	30.	33.6



Payload Concept



ESW On-Board Processing



- End to end architecture principles :
 - Turn-key network transparent to terrestrial protocols
 - Bandwidth on demand (16 Kbit/s up to 32.768 Mbit/s)
 - Terminal based on PC technology
 - Interoperability through global co-operation
 - High capacity 20-30 GHz payload with digital processing supporting cell switching
 - Spot beams coverage and flexible traffic allocation

- Program major drivers :
 - Reduce technical risks (Italsat & pilot projects heritage)
 - Secure date of operations (financing)
 - Favour early market entry (use of Ku/Ka band systems)

www.euroskyway.alespazio.it

