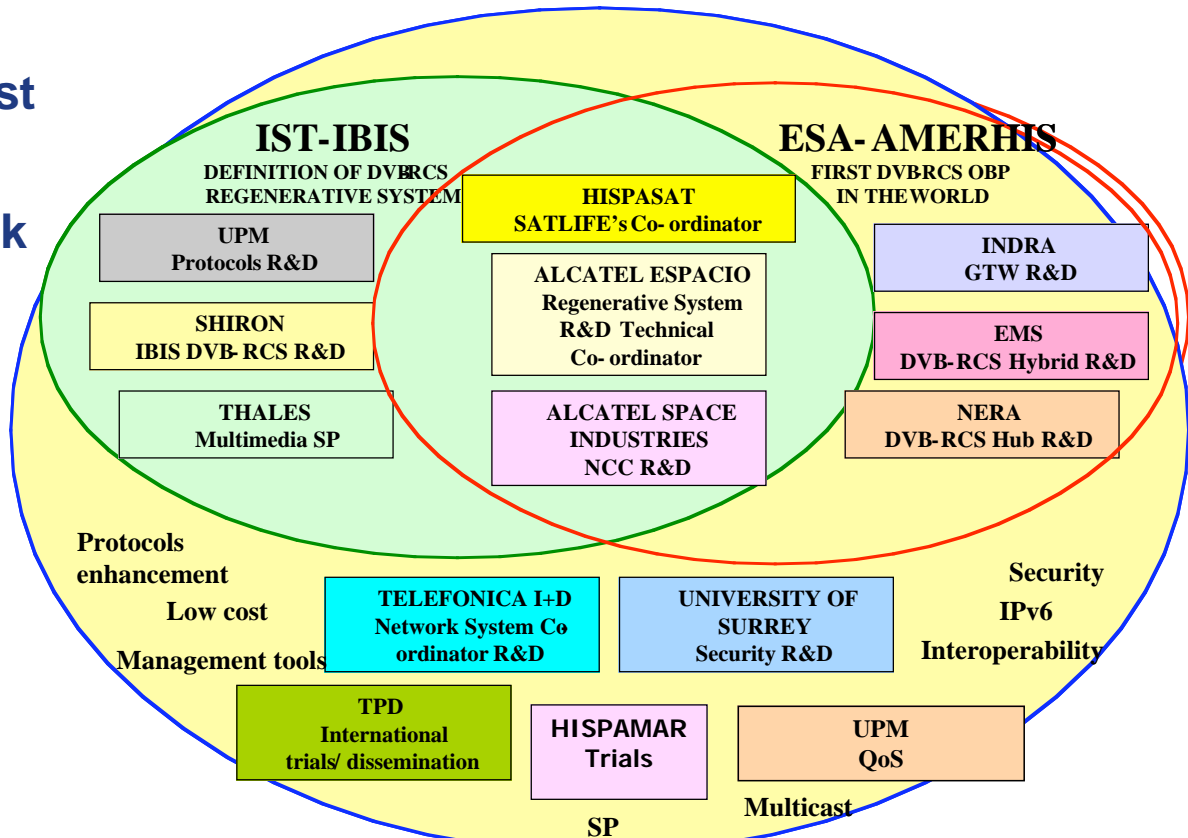




**ThalesAlenia**  
A Thales / Finmeccanica Company *Space*

# Service Integration in Satlife Regenerative Network

- Rural issues and Low cost
- Interoperability
- New concepts for network management
- Increased bandwidth capacity
- Optimised access technologies. Integration with terrestrial networks
- QoS

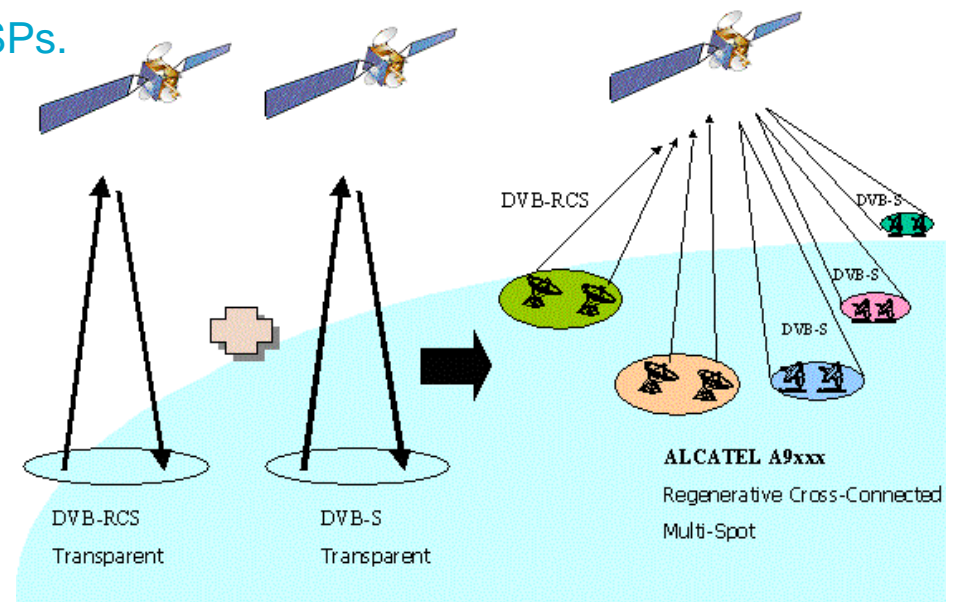


## Starting point: AmerHis

- up-link: MF-TDMA (**DVB-RCS**, MPEG) & down-link **DVB-S**
- OBP routes MPEG packets from UL to DL beams in a flexible way providing **on-board multicast support** & single hop connectivity (**mesh**) between users
- Dynamic capacity allocation.
- Access to external networks such as
  - PSTN/ISDN
  - private IP networks belonging to ISPs.
- The system supports:
  - Integrated IP based data services
  - Native-MPEG videobroadcasting

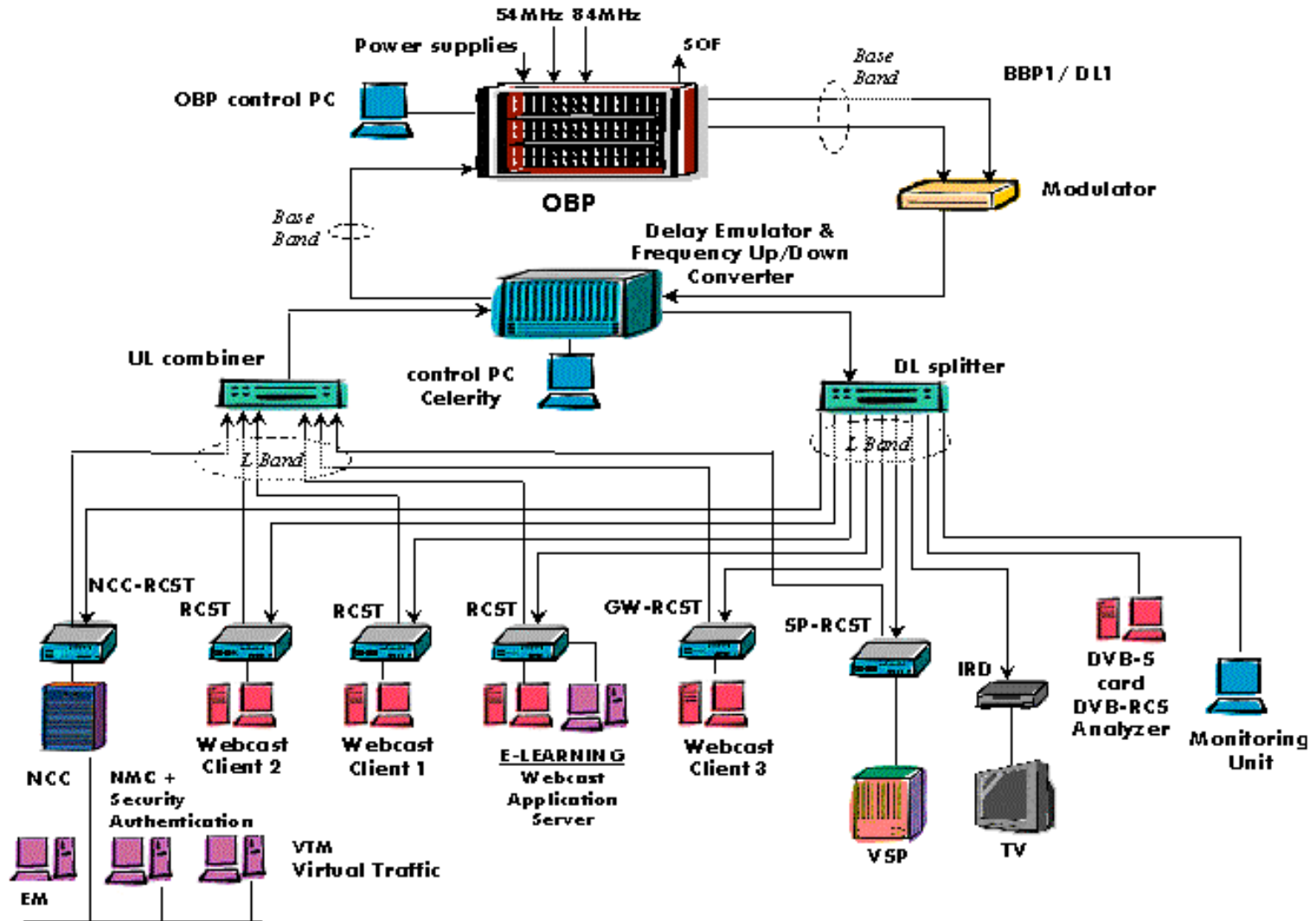
## SATLIFE System specification

- AmerHis/IBIS services enhancements
- New services and applications
- Multimedia applications integration



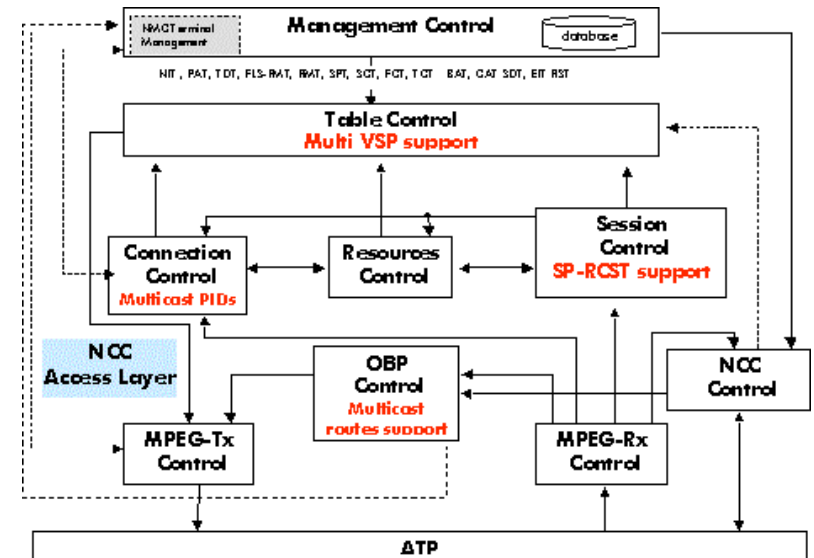
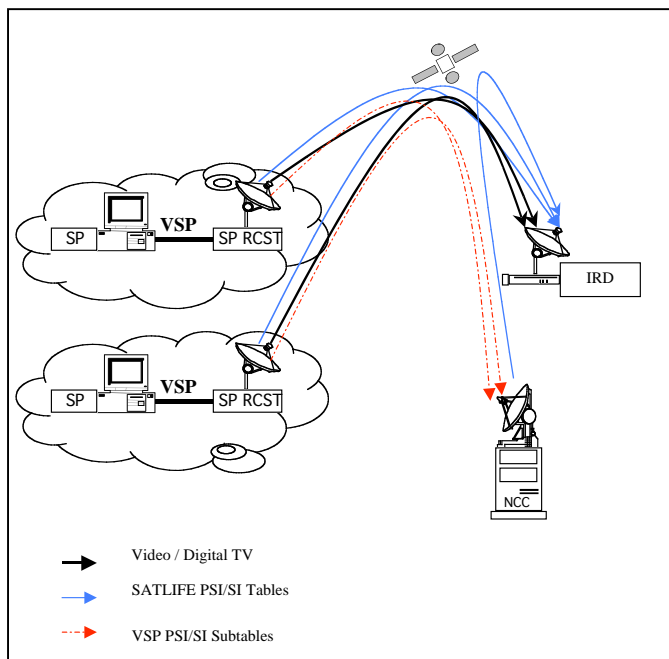
## Subsystems development and IF testing & In-orbit trials

- Signalling and traffic simulators (VTM/TGM)
- SP-RCST integration tests
- VSP and H.264 Monitoring Unit
- MCU scenarios
- Middleware
- ADSL & Satellite internetworking
- Home Gateway
- Content Service Provider
  - Digital TV, Video On Demand, SW Download
- NCC upgrade
- RCST developments & low cost integration
- RSGW enhancements
- Streaming
- SIP
- Webcast for Corporate Services
- Internet/Intranet Access
- Security authentication application
- Multicast
- Management
- EMS Nomadic terminal integration



## Satlife NCC Integration

- IP multicast resource management
- OBP multicast routes support
- multi-VSP tables management



## NERA RCST integration

RCST and GW-RCST have been upgraded to support Satlife services:

- QoS: increase in flow-types, reverse firewall
- Enhanced multicast
  - Simultaneous mesh and star multicast
  - GW-RCST multicast reception
- PEP: symmetric PEP for mesh and regenerative star scenarios
- NAT/NAPT
- MIB updates including **security** OIDs

## Low-cost terminal integration (NERA Satlink 1000 IDU & same firmware)

- Performed tests:
  - Logon procedure, Connectivity regression & Compatibility tests
  - Management operations & Unicast/multicast traffic tests
- Successful results for low bitrates
- Operation pending on NCC modification

## NCC – SPRCST Integration

### Logon TIMu:

- Return Path Interaction Descriptor
- Network Information Descriptor

### Configurable SYNC masking

## SP – SPRCST Integration

### Handshake before traffic:

- Management MSG
- SYNC period and info MSG
- Resources MSG
  - PSI tables configuration
  - Burst capacity configuration

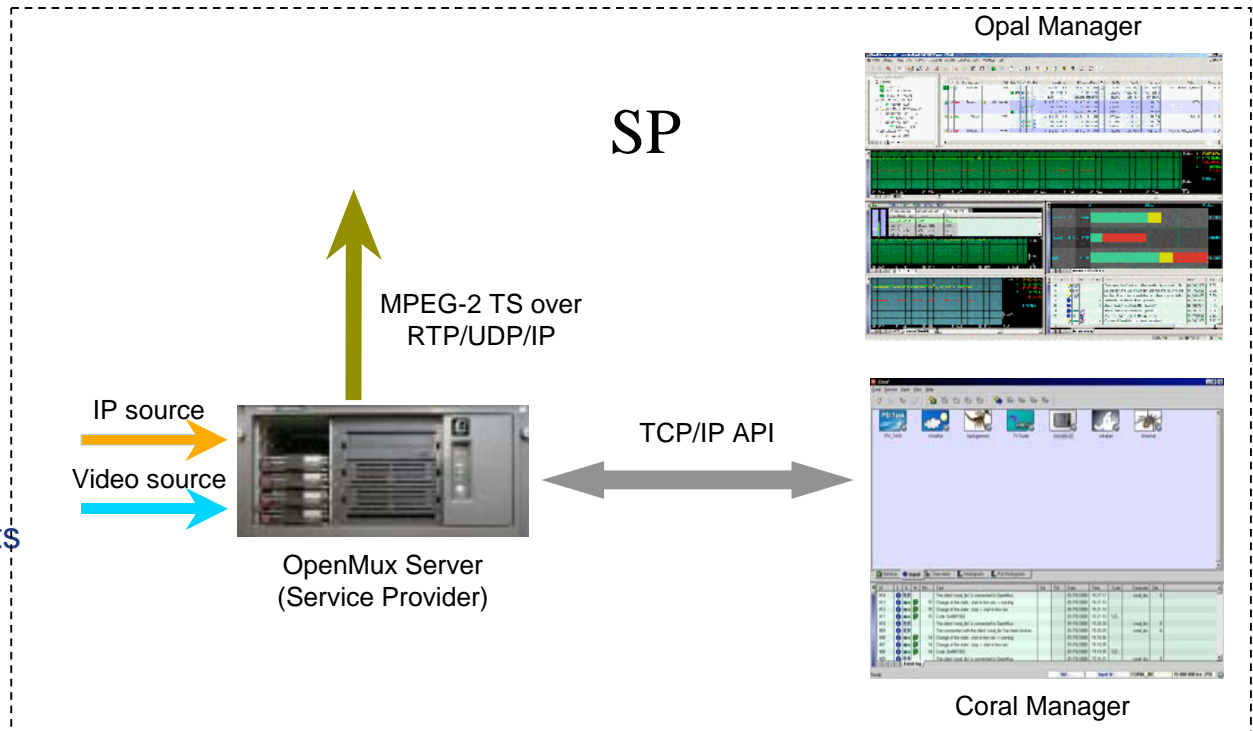
### Traffic phase:

- SYNCs embedded into TRF bursts
- SOF MSG over IP/TCP
- H.264 or MPEG-2 video

SP-RCST



NCC



## Digital TV services integration

### Elements:

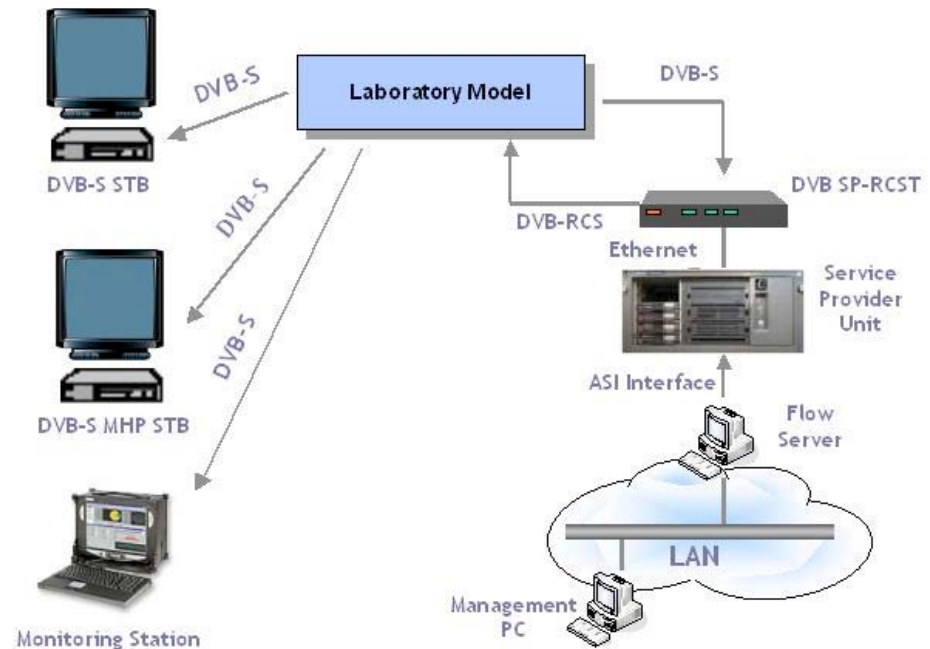
- TID Flow server
- THALES SP (ASI live input)
- SHIRON SP-RCST
- IRD, MHP STB, PC with DVB-S card
- H.264 Monitoring Unit

### Services:

- Video
- Interactive applications
- SW download

### Advantages of Satlife VSP:

- Mono or multi-beam multicast routes
- Multi VSP support (NCC PSI tables management)

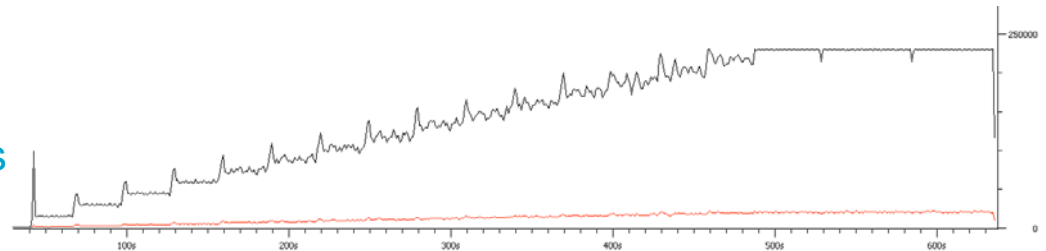


## VTM (Virtual Traffic Module)

- VTM connects to NCC ethernet interface
- Signalling traffic from virtual RCSTs in different downlinks
  - Logon & Synchronization maintenance
  - Connection establishment, release & Dynamic capacity requests (CRA, RBDC)
- NCC responses analyzed
- Applications:
  - NCC robustness analysis
  - NCC SW regression

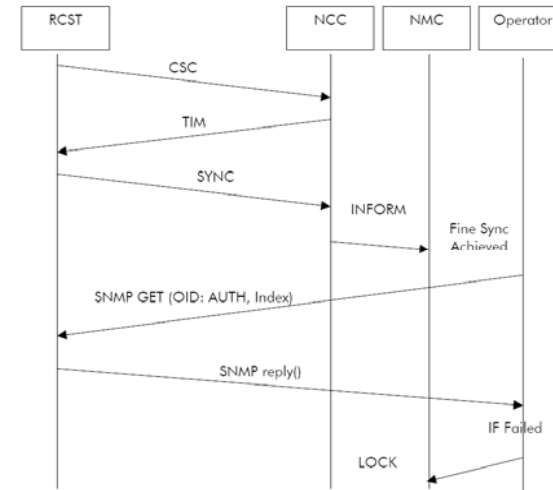
## TGM (Traffic Generator Module)

- TGM modules connected to RCSTs UI
- TCP and UDP traffic injected
- RCST configuration:
  - 1 channel, 1 and 2 traffic queues
  - With and without PEP
- Analyzed packet loss, delay, throughput



## Security NMC application

- Uses SNMP (management channel)
- Integrated in the MS (NSM)
- Accesses system database for terminal info (logon\_id, satellite IP addr.)
- New objects in RCST MIB
- Possible evolutions
  - Modifiable nonce and cookie from the GUI (per RCST)
  - Integration with CAC
  - Automatic actions for unauthorized terminals (lock, C2P cnx reject, etc)



**DVB-RCS Authentication of Terminals using SNMP as Transport**

MACHINE NAME	IP ADDRESS	MACHINE NAME	IP ADDRESS				
36	00-1E00-00	10.255.0.19	Authenticate	37	00-1E00-00	10.255.0.24	Authenticate
38	00-1E00-00	10.255.1.12	Authenticate	39	00-1E00-00	10.255.1.8	Authenticate
40	00-1E00-00	10.255.1.7	Authenticate	41	00-1E00-00	10.255.0.27	Authenticate
42	00-1E00-00	10.255.1.3	Authenticate	43	00-1E00-00	10.255.0.29	Authenticate
44	00-1E00-00	10.255.0.30	Authenticate	45	00-1E00-00	10.255.1.14	Authenticate
46	00-1E00-00	10.255.1.4	Authenticate	47	00-1E00-00	10.255.1.3	Authenticate

Terminal Output:

```

E8B9A0C4A00095A81030FB43E1A8C007BA9884DE8E3FC207A8FF1
The Cookie for all the NMC is:
3182036485956768096AB8E0C06E8F7071727374
The configured nonce of the NMC is:
31323334353637383E8B9A0C4A00095A8
The NMAC generated by the NMC is:
05F81C0605A4540204FC00606030009E3E83
The results of the auth parameters at the NMC from terminal are:
E8B9A0C4A00095A81030FB43E1A8C007BA9884DE8E3FC207A8FF1
The client is already connected. There is a clone in the network. There is a security breach!!!!!!
    
```



## EMS Nomadic Terminal



- Self deployable antenna in MPV
- Automatic pointing and NCR lock from SAT degrees and DL freq.
- GPS position transmitted to EMS IDU
- Integration in the real System
- Regression tests
  - Log on from different locations
  - FTP, Internet Access
  - Multicast TX/RX



## RSGW

- Satlife enhancements
  - SIP support, NAT support for SIP user agents
  - Improved NAT support for H.323 clients
  - Optimized termination of H.323 calls (access to multiple external ITSPs)
- RSGW trials
  - Internet access, Star PEP scenario with SLA enforcer. SIP and H.323
  - Multicast reception and Multicast forwarding to the Internet
  - Foreseen: multi-MCU test

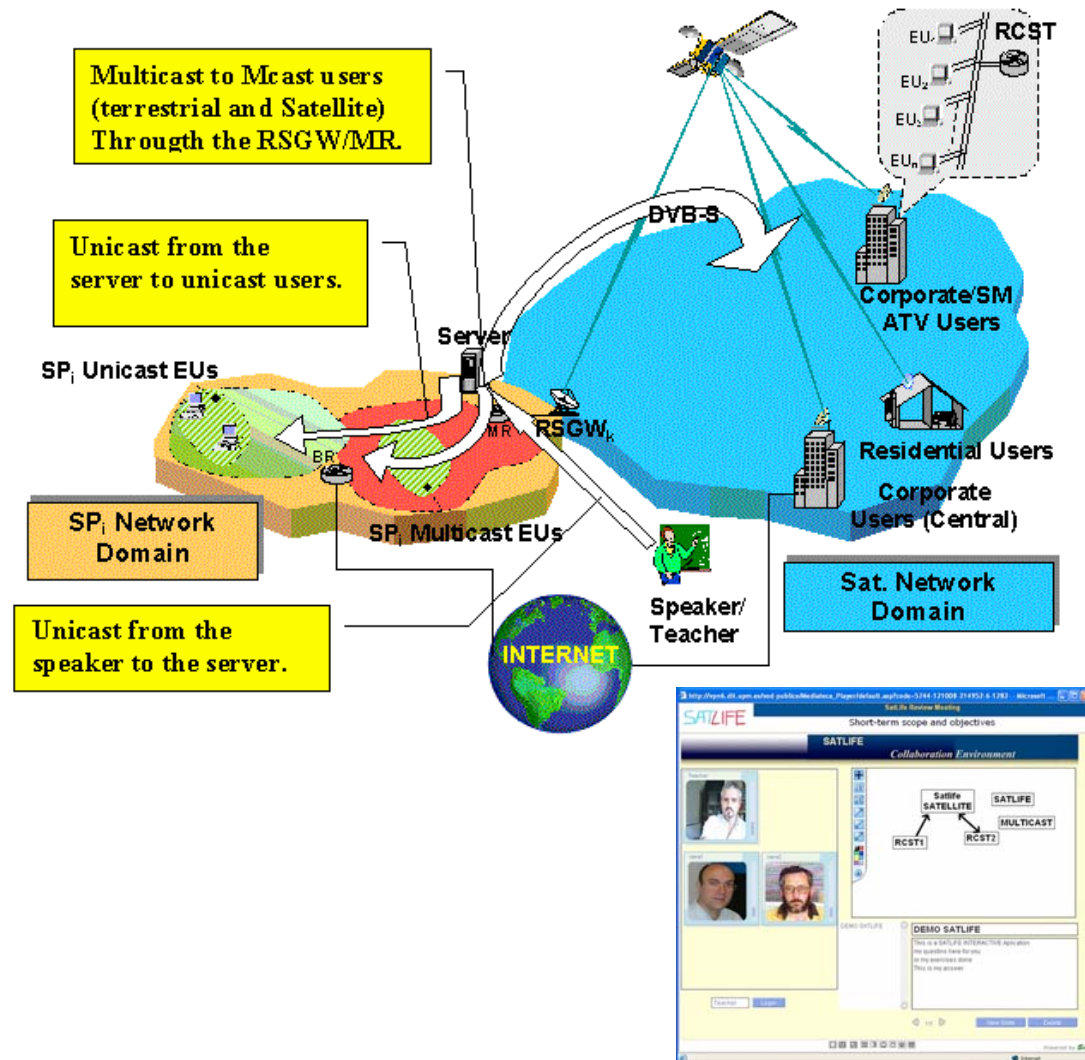


## ADSL & Satellite Internetworking

- Integration of ADSL & Satellite for BB access to rural environments or small communities
- Satlife solution: RCST + mini-DSLAM
- Functionality Successfully tested on several scenarios:
  - PPPoE: single user access (USB ADSL modem) and multi-user scenario (ADSL modem-router)
  - Single user bridging scenario and Multi-user routing scenario

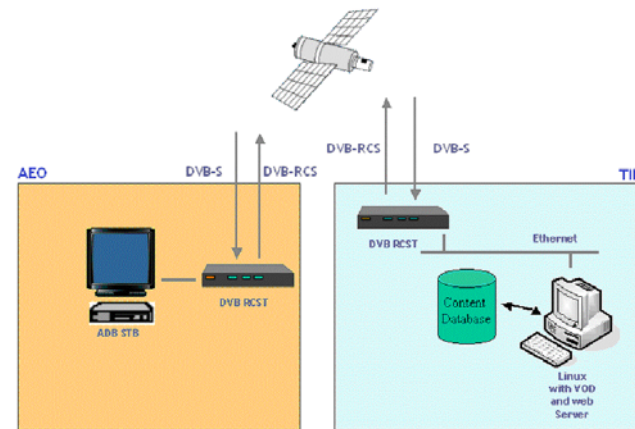
## E-Learning Webcast application

- Web-based Corporated oriented services
- Tested applications:
  - Live events (multicast video and .ppt slides)
  - E-Learning
    - Low interactivity (chat)
    - High interactivity (multiconference)
  - Media Repository
  - Webcasting Channels



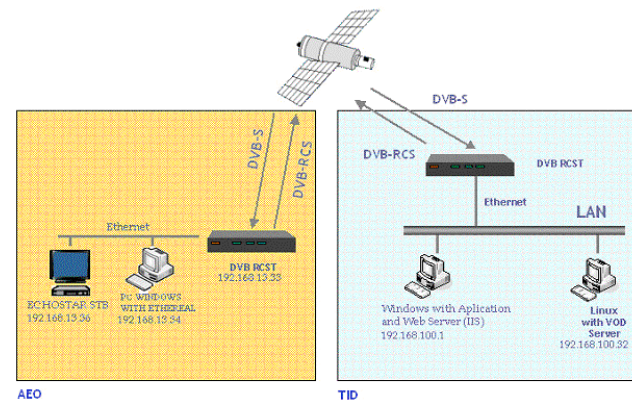
## Video On Demand

- Unicast MPEG-2 TS over IP
- Not targeted on mass development
- Applicable for
  - tele-education and remote demonstrations
- Bandwidth requirements
  - SDR : 64 Kbps, PDR: 1 Mbps (MP4 HQ video)
- Use of standard protocols (RTSP, HTML)
- Easy integration with the VOD IP STB



## Middleware

- Supports services such:
  - TV broadcasting, VOD, Internet Access
- Tested features:
  - Multicast support
  - VOD authentication
  - Web browsing on the TV set
  - JavaScript code execution
  - HTML 1.1 support



## Home Gateway

- Remote surveillance and management of a home using regenerative platform as access
- Pylix™ Siemens gateway using Lonworks protocol
- Demonstrator with following domestic devices: lights, shutter, dishwasher, oven
- Result:
  - Seamless integration with involved networks
  - Video surveillance required BW: 100Kbps

## Streaming

- Required capacity: 100 Kbps – 1 Mbps
- Some SDR needed for High Quality video
- Tested Multiple bitrate contents
- Applications
  - Real-time retransmissions
  - Video surveillance of sensible or dangerous areas (around 100 Kbps needed)
- Seamless integration with all technologies involved: RCST; Various media servers: RM, Windows Media, Darwing, Quicktime; Corresponding media players and IP MP4 camera

## ETSI

- RSM-B closed specifications
  - ETSI TS 102 429-2 “Satellite Link Control Layer”
  - ETSI TS 102 429-3 “Connection Control Protocol”
  - ETSI TS 102 429-4 “Specific Management Information Base”
- STF-283 task force contributions
  - ETSI TS 102 460, IP routing mechanism in RSM-B networks
  - ETSI TS 102 461, contribution on multicast ‘mesh-push’ and ‘star pull’ scenarios
  - ETSI TS 102 464, “Satlife System summary”
- C2P
  - ETSI SES BSM C2P for DVB-RCS Systems rapporteur
    - Liason DVB-RCS, ETSI, TIA, ESA SatLabs

## DVB

- Joint proposal for mesh networking
- Objectives:
  - define a ‘connection control’ for DVB-RCS
  - Mesh connectivity scenario

- Services only possible in star configurations have been demonstrated in the regenerative Satlife System
- Advanced System Laboratory with remote support from all partners has increased experience on prototype integration.
- Successful integration of all Satlife prototypes in laboratory System tests
- Important upgrade of AmerHis ground segment.
  - NCC enhancement supporting multi-VSPs, multicast routes and enhanced IP multicast.
  - Development of DVB-RCS terminals while keeping interoperability
- Real trials with RCSTs in European and American beams
- Standardization: ETSI and DVB contributions
- The work done will allow commercial exploitation of new services and applications (HISPASAT, HISPAMAR SPs)