UNIVERSAL HARDWARE PLATFORM

TDM/TDMA HUB
WHY USE UHP?

- **One-for-all** technology: Software-Defined Functionality
- **Made for HTS** VSAT with support of multiple beams and frequency bands
- Efficient **DVB-S2X** MODCODs and highest **TDMA efficiency**: 96%
- **Mesh** capability: eliminate double bandwidth allocation due to double hop
- Layer 3 routing architecture and **Layer 2** bridging mode
- Superior IP router **productivity** and rich set of supported protocols with **QoS**
- NMS with support of **VNO** and **API** for interfacing with OSS/BSS, etc.
- **Smallest**, lowest power consumption, most **reliable** IDU
- The most versatile and lowest-cost hub with **M:N local/geo-redundancy**
UHP TDM/TDMA HUBs

**Mini HUB**
- Single Satellite
- One Forward Channel
- MF-TDMA Return Channels
- Permanent SW licenses
- Up to 2000 terminals

**Standard HUB**
- Multiple Satellite
- MF-TDMA and SCPC Return Channels
- Permanent SW licenses
- Up to 500K terminals

**HTS HUB**
- Up to 64 HTS spot-beams
- MF-TDMA and SCPC Return Channels
- Dynamic SW licenses
- Smart Redundancy
SCALABLE HUBs

TDMA carriers: 1
Terminals: 2000
IC Rate: 27 Mbps

SW key for multi-channel TDMA demodulator

TDMA carriers: 4
Terminals: 2000
IC Rate: 27 Mbps

And so on...
Up to 252 TDMA Return Channels or MF groups per Forward Channels

TDMA carriers: 8
Terminals: 4000
IC Rate: 54 Mbps
STANDARD HUB

- Scalable design: up to 64 FWD, 252 RTN channels per FWD and 500k terminals
- Independent IF interface for each FWD and associated RTN links
- FWD: TDM up to 65 MspS DVB-S2X ACM QPSK - 64APSK
- RTN: MF-TDMA up to 8 MspS LDPC ACM with QPSK, 8PSK and 16APSK
- RTN: SCPC up to 65 MspS DVB-S2X ACM up to 64APSK
- 5% & 20% roll-off for TDM, SCPC and TDMA
- Smart bandwidth distribution every 30-100 ms
- Rich set of supported protocols with QoS, acceleration and compression
- Hot-standby 1:1 local redundancy
HTS HUB

- Multi-spot, multi-band, self-healing, enterprise-class VSAT Hub
- Scalable design: up to 64 FWD, 252 RTN channels per FWD
- Universal controllers with dynamic SW licenses assignment
- Required functionality is activated by SW license as network grows
- FWD: TDM up to 500 Mps DVB-S2X ACM QPSK - 256APSK
- RTN: MF-TDMA up to 8 Mps LDPC ACM with QPSK, 8PSK, 16APSK
- RTN: SCPC up to 65 Mps DVB-S2X ACM up QPSK - 64APSK
- 5% & 20% roll-off for TDM, SCPC and TDMA
- M:N local and geographical Smart Redundancy / Site-Diversity
HTS HUB
ARCHITECTURE

- One HTS NMS per multi-sat network
- Optional 1:1 redundant server

- One router for each universal controller (UC)
- Idle UC will act as a redundancy

- Required number of OC and IC licenses
- Common licenses for local- or geo-redundancy

- Support for multiple beams and satellites
- Easy scalability by new UC and licenses
- Local- and Geo-redundancy
HTS HUB

CONTROLLERS & LICENSES

- HTS Hub is based on Universal Controllers (UC) which can perform any role in the hub architecture.
- HTS NMS supports two types of licenses:
  - OC – Outroute Controller (1 DVB carrier)
  - IC – Inroute Controller (MF-TDMA or SCPC carriers)
- HTS Licenses are installed directly into HTS NMS.
- HTS NMS dynamically assigns licenses and defined configuration of universal controllers (UC).
- If the number of available UC is less than required, HTS NMS will consider the predefined priorities.

Abbreviations (roles):
OC – Forward channel controller
IC – Return channel controller
HTS HUB

SELF-HEALING EXAMPLE

A. HTS Hub consists of 4 UC, 1 OC and 3 IC licenses. All licenses are assigned to UC and the network operates with 1TDM forward and 3*4=12 MF-TDMA carriers.

B. If one UC is unavailable (failed) its role will be reassigned to another UC with a lower priority and preemption of its previous role. The network is restored and continues to operate in a reduced configuration: 1 TDM forward and 2*4=8 MF-TDMA carriers.

Legend:
[1], [2], [3] – Predefined priority (1 - highest)
**HTS HUB**

**SMART INVESTMENTS**

- Minimal cost of expansion
- Effective local-/geo-redundancy
- All features are enabled

- Significant cost of HTS NMS
- All controllers are bound to NMS
- HTS Hub cannot be split

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**UHP HUBs PRICING**

Significant savings for redundant and/or multi-spot HTS Hubs

<table>
<thead>
<tr>
<th>Configuration</th>
<th>10C/1IC</th>
<th>10C/1IC</th>
<th>10C/2IC</th>
<th>10C/2IC</th>
<th>20C/4IC</th>
<th>20C/4IC</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Red.</td>
<td>0%</td>
<td>-40%</td>
<td>-6%</td>
<td>-49%</td>
<td>-24%</td>
<td>-58%</td>
</tr>
<tr>
<td>1:1 Red.</td>
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</table>

**HTS**

**Standard**
HUB REDUNDANCY

- UHP routers support Base and intelligent Smart Redundancy
- Base redundancy provides 1:1 backup configurations and requires double set of equipment
- Smart Redundancy is intelligent NMS-controlled system that dynamically assigns network roles to universal controllers
- UHP Smart Redundancy saves over 35% of Hub CAPEX due to dynamic SW license reuse

Abbreviations (roles):
OC – Forward channel controller
IC – Return channel controller
SMART REDUNDANCY
LOCAL-/GEO- REDUNDANCY AND SITE DIVERSITY

- Smart Redundancy NMS dynamically assigns network roles to universal controllers of the Active Teleport and ensures the highest service availability.
- If no more universal routers available for system failover on the Active Teleport, the Smart Redundancy moves all network roles to the Standby Teleport.
- Smart Redundancy avoids service degradation caused by rain fade by automatic switchover of the Teleports depending on the current atmospheric conditions.
- Smart Redundancy supports M:N Redundancy and Site Diversity configurations, while uses just one set of SW licenses and ensures tremendous CAPEX savings.
NETWORK MANAGEMENT SYSTEM

- Support of multiple networks with different satellites or modes of operation
- Multiuser VNO access to divide global network infrastructure
- Full details on status, alarms, levels, traffic, terminals activity, weather conditions, etc.
- API interface to external OSS/BSS systems
- Group management and scheduled firmware update of network terminals
- M:N Local- and Geo-Redundancy of Hubs
NETWORK MANAGEMENT SYSTEM
MODIFICATIONS (SW UPGRADABLE)

HTS
• Universal Controllers
• Dynamic SW Licenses
• Smart Redundancy

VNO
• Multiple Networks
• VNO users
• NMS Server Redundancy

BASIC
• One Network
• 2000 terminals
• Unlimited Features
AUTO-COMMISSIONING

- Streamlines the pointing and commissioning
- Smartphone-based tool, assisting the installer
- Integrated compass and inclination tool
- Fast and accurate pointing to the satellite
- Cross-polarization (CPI) nulling
- 1dB compression point automated calculation
- High scalability: for small and large networks
- Compatible with all modes of UHP routers
- Standard solution (GVF514 training course)