



MULTISERVICE
SATELLITE
PLATFORM

HYPER CUBE





HYPER CUBE

HyperCube is an innovative, cost-effective solution that meets the requirements of millions intelligent connected objects to boost machine-to-machine (M2M) applications and to make internet of things (IoT) a reality

This ambitious target can be made possible thanks to the use of state-of-the-art techniques, such as bandwidth efficient protocols and advanced signal processing, that supports tens of million devices, using low-cost and power-saving equipment.

This implies that HyperCube is a highly energy-efficient and green solution, which also proves to be resilient to unauthorized users and jamming operations: this can be achieved by means of the extremely low transmit powers that makes the signal almost undetectable by any third-party malicious receiver.

Thanks to a medium access mechanism optimized for M2M applications, HyperCube dramatically reduces the operational costs at the operator side. Exploiting its flexibility and modularity, HyperCube can be fully integrated with the operator's existing architecture, thus minimizing capital expenditure. Furthermore, the usage of software-defined radio (SDR) technology allows the system to be very flexible in terms of waveform design, reconfigurability, and interoperability, possibly addressing cognitive-radio systems with spectrum sensing.

Developed by MBI, HyperCube paves the way for the deployment of a satellite IP-based network, that enables M2M services, scalable to tens of millions users, with simple, consumer-grade equipment



HYPER CUBE

SYSTEM HIGHLIGHTS

- Support for multiple satellites, multiple frequency bands (C, Ku and Ka bands), regular and spot beam satellites
- Support for multi-channel and multi-beam support on both forward and return links
- Support from few terminals up to 1,000,000+ terminals
- High spectral efficiency using F-SIM CDMA-based protocol in the return link
- High spectral efficiency using DVB-S2X ACM in the forward link
- Dynamic spread spectrum management
- QoS management
- Protocol optimization for short messages (e.g., M2M and SCADA applications, IoT backhauling)
- Advanced network management system capabilities
- Support for virtual network operators (VNOs)
- Adaptive congestion and power control mechanisms
- Full support for all IP-based applications
- Full support for encrypted communications based on IP security (IPSec)
- Support for virtual routing & forwarding (VRF) domains and VLAN tagging

KEY FEATURES

- Easy integration with existing architectures on both forward and return links
- Highly scalable, modular and adaptive architecture, with full integration with existing management facilities
- Pay-as-you-grow modularity
- Stand-alone NMS and OSS/BSS systems, including web applications
- Integration with third-party OSS/BSS via open APIs
- Costs drastically reduced vs. present satellite solutions
- Automated terminal installation certification based on smartphone app
- Easy to use and fast network rollout
- Maximum availability and link robustness
- Full backward compatibility with existing coaxial cabling at the premises of DTH users

FORWARD LINK

- Standard: DVB-S2/DVB-S2X ACM (incl. VL-SNR)
- Modulation: from BPSK to 32APSK
- Carrier bandwidth: from 2 to 36 MHz (full transponder)
- Roll-off: 5, 10, 15, 20, 25 and 35%
- Target aggregate throughput: up to 128 Mbps

RETURN LINK

- Standard: fixed interactive multimedia services (F-SIM)
- Modulation: BPSK 1/3
- Carrier bandwidth: from 2.5 to 10 MHz
- Roll-off: 22%
- Per-terminal throughput: on 10MHz channel up to 160 kbps
- Target aggregate throughput: up to 11 Mbps
- Maximum demodulation latency: 600 ms

HUB INTERFACE

- IP User traffic: Gigabit Ethernet, 1 + 1 redundant
- IP Management traffic: Gigabit Ethernet, 1 + 1 redundant
- RF output: L-band (950 - 2150 MHz), IF (50 - 180 MHz)
- RF input : L-band (950 - 2150 MHz)
- 10 MHz ref. in/out 1+1 redundant input, 1 output

HUB ARCHITECTURE

- Multiple (de)modulation chains to support multiple channels in both forward and return links
- IP throughput: 400 Mbps aggregate forward and return
- Terminals: Up to 1 million+
- VRF domains: Up to 4k distinct domains (with optional IPSec support)
- Centralized telemetry subsystem
- Modulators: 1 + optional redundant per IF
- Demodulators: Maximum 2 + optional redundant per IF

MECHANICAL & ENVIRONMENT

- Housing: Collection of 1U/2U rack-mountable devices (standard 19-inch rack optional)
- Total number of units: Depends on configuration (typical: one full 42-U rack)
- Operating temperature: 10° to 35°C / 50° to 95°F
- Humidity: 10 to 85% relative, non-condensing
- Storage temperature: -30° to 60°C / -22° to 140°F

MAINS POWER SUPPLY

- Power supply: 100-120 V, 50/60 Hz, or 200-240 V, 50/60 Hz