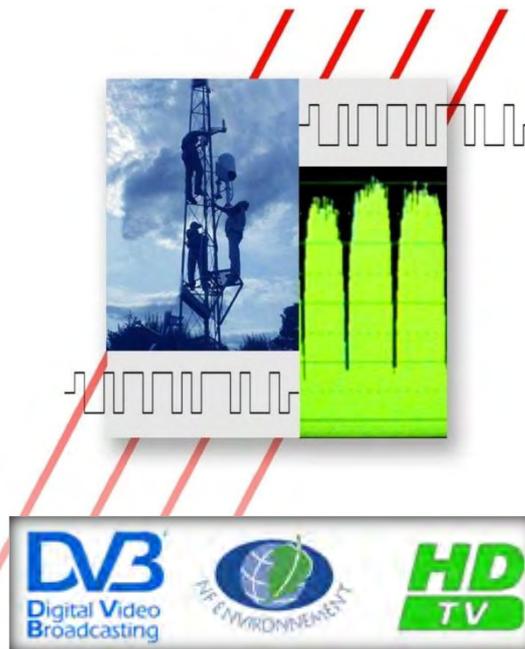




Hypercable™ System Overview V 3.0 English
Hypercable™ Gigaplex Transmitters & Transposers
The Wireless cable BWA
Compliant with DVB-MC/S2 ETSi EN 300-748



Hypercable BWA MVDDS Head End

Hypercable System Overview V 3

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1. Hypercable System Overview v 3.0 Introduction

INTRODUCTION

Frequencies are a strategic limited natural resource and this is the reason why they are usually managed by government offices. In the near future the need for frequency licenses will grow exponentially because of the coming HDTV and telecommunication explosion. The bandwidth attributed to each user will decrease and this is one reason why each hertz should be used efficiently to transmit data.

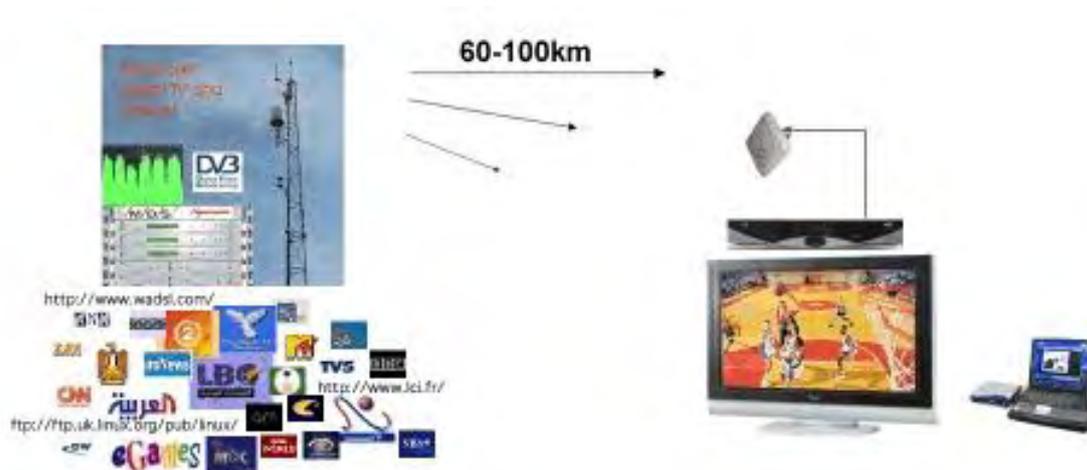
This is why main target at MDS is **efficiency of resources utilization**:

- Efficiency in term of frequency: one GHz of spectrum can transmit 6 Gbps of data with Hypercable
- Efficiency in power: a 10W emitter can transmit high quality signal up to 100 Km
- Efficiency in modularity: one Hypercable module is 1.5 Gbps of capacity and modules can be stacked up to 12 Gbps or more under APSK modulation!!!
- Efficiency in cost: an Hypercable system is cheaper than cable and satellite by a factor of 100 !!!
- Efficiency in frequency sharing and channel sharing (Hypercable patent and Hypercable design)

Hypercable is a **Triple Play WIRELESS Video and Data delivery system**, which can offer the same capacity as digital cable without the need for the actual physical cable itself.

The following services can be delivered through the Hypercable system:

- **Digital TV** (1,000 programs MPEG2, 4,000 programs MPEG4)
- Data (private data applications)
- **1 up to 32Gb/s Internet** (100 x 100Mb/s with IPE implemented)
- **High Definition TV** (HDTV)
- Interactive services (program guides, Pay per view, shopping...)
- Radios
- Local TV Programs
- Private movie channels
- Live local events,
- Network Games



2. HYPERCABLE main characteristics

The Hypercable system's transmission is capable of covering a very large area with very low power.

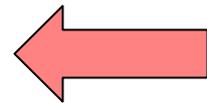
Distances from 15 up to 100 km can currently be covered with less than 10 watts transmission power, depending topography and client antenna size.

This means that hundreds of programs can be spread over a region with only a 10 watts transmission system.

- ✚ Max EIRP Power 10 watts for one Gigahertz bandwidth
- ✚ Coverage 60-100km (depending of topography)
- ✚ Fast deployment
- ✚ Low installation cost
- ✚ Low power (powered by solar cells and wind mills)
- ✚ Low running cost
- ✚ High capacity of programs
- ✚ No jamming
- ✚ No extra radio waves propagation



Fast return on Investment



3. Hypercable version HyperDSL for high density IP deployment in urban area



The advertisement features the HyperDSL logo at the top left and a smaller version at the top right. Below the logos is a collage of three images: a woman smiling at a laptop, a person in a blue dress walking on a wavy line, and a person sitting on the floor with a laptop. The text 'Cocoon yourself in communication pleasure' is overlaid on the first image. At the bottom, the text reads 'HyperDSL Hybrid Technology The Wan Lan Gigabit DSL'. The website 'www.hypercable.fr' and the number '1' are at the bottom.

Refer to the HyperDSL handbook; the Hybrid solution "mesh" and "ring" innovating Triple and Quadruple Play of unlimited capacity.

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4. Main Competition and their characteristics

- ADSL on pairs coppers:
 - Low density of networks of quality accepting TV and HDTV speeds.
 - Frequently out of service
 - Ridiculous flow at the peak hours
 - Expensive for guaranteed flows
 - Deployment cost
 - Cost of consumption in energy

- Cable:
 - High cost
 - low deployment
 - High Maintenance cost

- Satellite:
 - Very high cost (around 50M US\$ per year for 100 TV programs)
 - No local Channels
 - No Internet service at affordable cost
 - High Latency for Internet service
 - Wrong triple play
 - High cost for adding MPEG-4 capability to satellite services

- DVB-T (UHF/VHF)
 - Very High cost
 - High power transmitter (several KW/channel)
 - Thousands main kilowatts required
 - Low bandwidth capacity
 - Interferences with another analog and Digital UHF TV networks
 - Interferences with another transmitters experiencing long range waves propagation
 - No Triple Play

- MMDS L band 2,3-2,8 Ghz
 - Poor transmission quality (multi-path, microwave oven and WFi interferences)
 - Very low capacity (100 programs maximum)
 - Spectrum dedicated for mobile phone G4 in 2008, will have to be dropped by MMDS operators.
 - No triple play

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5. Case Study

When a wireless Hypercable Network is to be deployed, several steps need to be processed in sequence:

1. Obtaining a broadcast License (frequency, bandwidth, content)
2. Hypercable coverage Planning and determining transmission sites
3. Program Line up (determine the content to broadcast)
4. Specify the program sources (satellite, local, digital, analog, TV, Internet,...)
5. Integration, Installation and testing
6. Training
7. Client deployment
8. Radio coverage Planning (expansion)

5.1. Broadcast License:

The Frequency and **Broadcast License is the Key element** needed to begin the process of launching the system.

It is mandatory to acquire a license from the local regulatory authority.

The Local regulatory body will usually require the technical specifications of the Hypercable transmission system as well as the transmission locations before the license is granted.

5.1.1. Hypercable Technical Specifications:

SPECIFICATIONS

Frequencies:	10.7 GHz to 12.7 GHz - See Note ¹
Power:	Up to 40dBm (1Ghz spectrum) Up to 57dBm EIRP power (1Ghz spectrum)
Polarization:	Vertical <u>&/</u> Horizontal
Antenna Pattern	60-120° or 360°
Bandwidth:	Up to 40 Mhz per carrier
Modulation:	LDQPSK APSK
Standard:	DVB-M EN 300 748

5.2. Coverage Planning:

Initially, the Operator in coordination with MDS must determine a favorable transmission site location. The location of the transmission site is determined by its ability to offer the maximum of coverage zone.

A Computer coverage prediction is generated by MDS, which gives a clear picture of the expected coverage zone that emanates from each of the transmission sites that are chosen.

¹ **NOTE:** Other frequencies system can be provided by MDS: typically 3.4/4.2, 27/28 and 40/42 GHz but any other frequencies from 2 to 60 GHz can be developed on requests.¹

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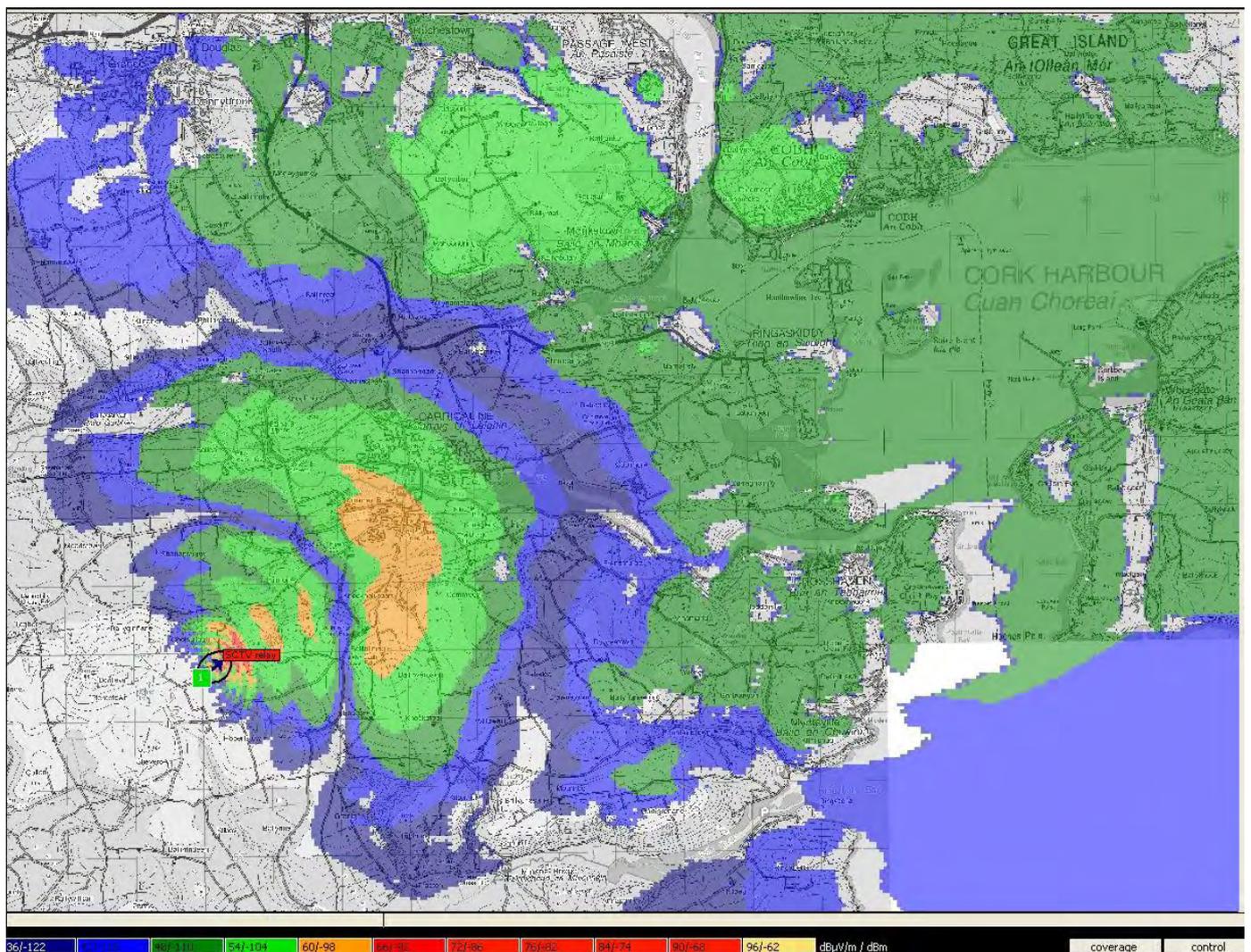


Figure 1: Coverage Prediction Example

The Example illustrates the expected coverage zone (colored zone). The monochrome zones are not covered due to the relief, however, using “Gap filler” relays, coverage can be achieved for the entire area.

Palette

>= μsec	>= %	>= dB C/I and Ec/I0	>=dBm	Label	
auto	auto	auto	-122	PA540 & Hycospa	█
auto	auto	auto	-116	PA540 & Hycospa	█
auto	auto	auto	-110	PA360	█
auto	auto	auto	-104	PA360	█
auto	auto	auto	-98	PA200	█
auto	auto	auto	-92	PA200	█
auto	auto	auto	-86	PA200	█
auto	auto	auto	-82	PA200	█
auto	auto	auto	-74	PA200	█
auto	auto	auto	-68	PA200	█
auto	auto	auto	-62	PA200	█

From 1 to 10000 From 1 to 100 From -126 to 126 From -999 to 253

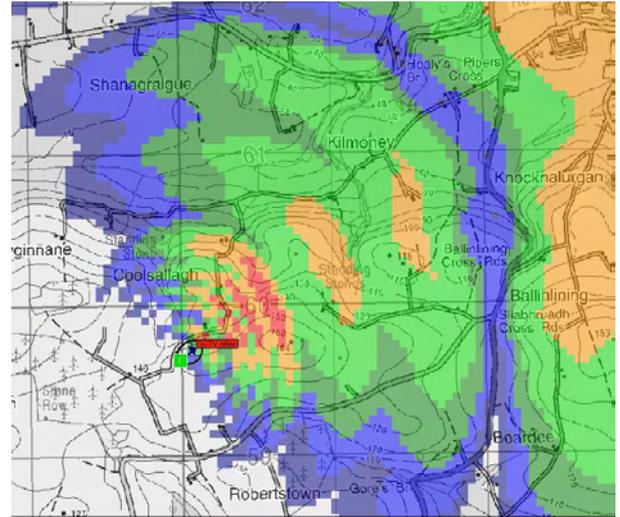
Click to change color

255 = infinity
32000 = infinity (TQA)

Used for best server coverage

256 color palette [dBμV/m]

Buttons: Close, Load..., Save..., Default colors, Default values dBμV/m dBm, Default values C/I and Ec/I0, Default values %, Default values μsec



5.2. Program Line-Up

Before designing the transmission system, the program line-up needs to be determined.

The program line up is the entire list of the programs and/or content that is desired to be broadcasted through Hypercable system.

The program Line Up will determine the type and amount of the technical equipment that will be used in the transmission system.

The program line-up will be a significant factor in the total cost of the transmission.

5.2.1. Program types:

- ✚ TV
- ✚ Radio
- ✚ Data services
- ✚ Internet services VOIP
- ✚ Pay Per View programs (Movies, football mach,..)
- ✚ NVOD (Near Video On Demand)
- ✚ TV program guide
- ✚ Shopping channel (interactive)
- ✚ Electronic Games
- ✚ Gambling channels



http://www.wadsl.com/

http://www.lci.fr/

ftp://ftp.uk.linux.org/pub/linux/

Logos include: CNN, EuroNews, LBC, TV5, DW, eGames, and others.

5.2.2. Program Rights:

The program rights must be negotiated with each program provider (ex CNN, LBC, TV5,....)

The cost for broadcasting each program is dependent of the program owner. These are usually determined by the type (movies, premium movies, sports, music,).

Some programs can be free, or can be negotiated at special low prices because of some local political circumstances.

5.3. Program Sources:

5.3.1. Transport:

It is obvious that for broadcasting the desired program Line-Up, these programs must be available at the Hypercable transmission site.

There are many ways to get these programs:

- ✚ Satellite
- ✚ Cable
- ✚ Microwave Link
- ✚ Local production (TV studio)
- ✚ Video Server (Program storage for private channel or PPV)
- ✚ Internet
- ✚ DVD
- ✚ VCR, ...

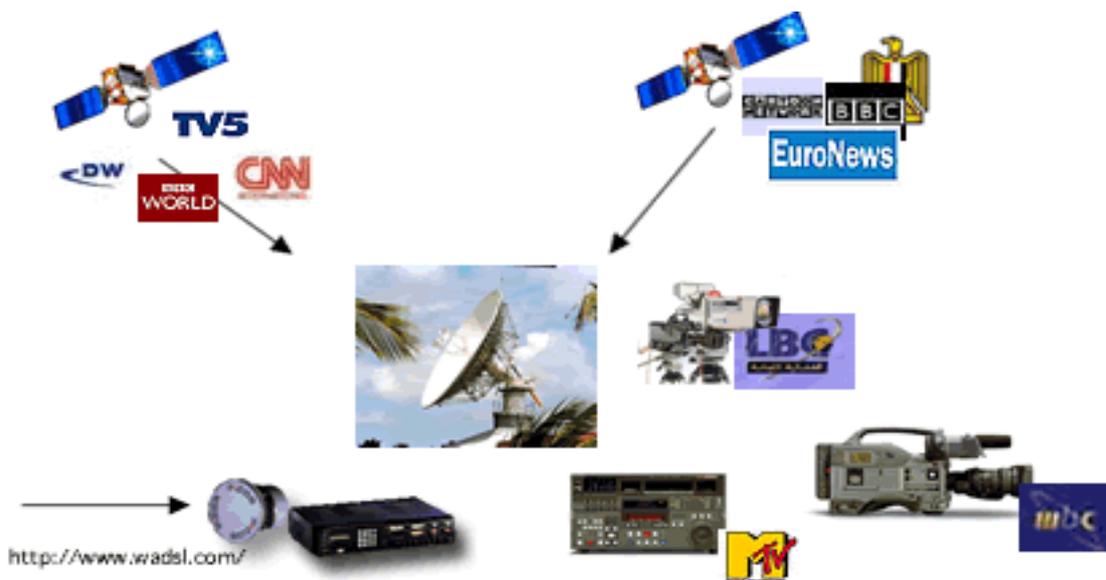


Figure 2: Sources for BWA System

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5.3.2. Program Type:

The Programs can mainly be delivered to the transmission site in 2 different formats:

- ✚ Digital (MPEG-2)
- ✚ Digital (MPEG-4)

The preferred format is MPEG2 programs sources.

It is less costly to acquire and process (encryption-transmission) programs that are already in MPEG2 format than programs that are available in Analog only.

For EACH Analog Program source, One MPEG2 DVB encoder will be required; as this is a costly solution (compared to digital) priority will be made for acquiring these programs in digital from a different source.

NOTE: In 2004, most of the programs are available in MPEG2.

The program Sources/Type will determine some of the technical equipment that will be used in the transmission system.

The transmission system's cost will also depend on the method of delivering the Programs Sources/Type at the Hypercable transmission site.

5.4. Hypercable Transmission Site Installation:

Once all the aforementioned have been successfully achieved, the system can be installed and switched-on.

The Transmission Equipment generally consists of the following blocks:

- **Program Acquisition:**
Acquiring all the programs from various sources (satellite, VCR, Studio, Internet...)
- **Program Re-Multiplexing:**
Organizing the program line up and “Bouquets” as we want to deliver it to the clients.
- **Encryption & SMS:**
Encrypting the programs and services, manage the client decoder, automatic billing (monthly fee or Pay Per View events...), includes the Subscriber Management System
- **Monitoring:**
Off-Air and On-Air monitoring, this allows to diagnose the system as well as to control and upgrade...
- **Redundancy & NMS:**
Each system is generally equipped with a Network Management System. This function also allows for the control of Automatic redundancy, which helps in avoiding any outages in the unlikely event that one of the equipment sets fails.
- **Transmission:**
Transmitting all the encrypted programs that have been prepared in the above steps.
It consists of Transponders + Transmitters + Antenna



Figure 3: Multiplexing Sources

- On Site Installation and Training:

MDS offers a turnkey solution with On-Site installation and training. The training allows the Operator to maintain and control the system without any help from the manufacturer.

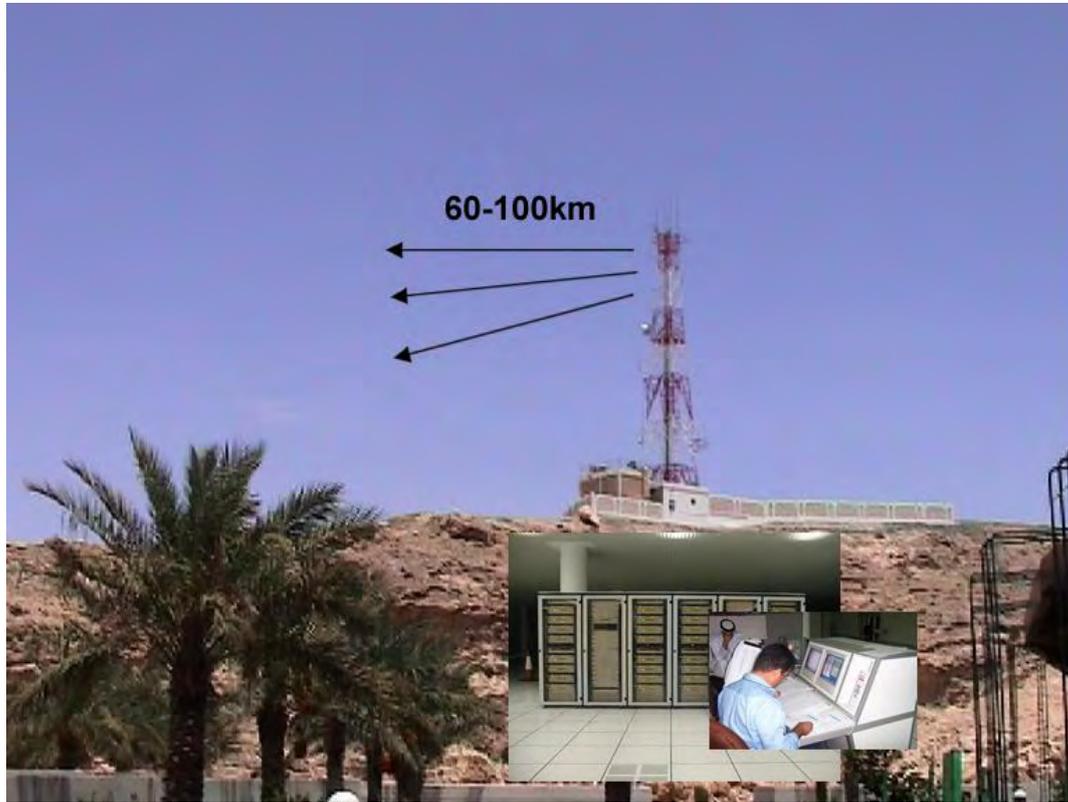


Figure 4: Head Station and transmitter

- Test Phase:

Once the transmission system is installed, the coverage prediction needs to be validated by doing a field measurement procedure.

This field measurement procedure is made with one or several team. It consists of measuring the reception signal levels to significant locations around the transmitter.

Once this data is collected, it is analyzed and compared with the prediction coverage levels.

This process also designed to allow the Operator to be trained for client site installations in addition it enables the operator to obtain a clear picture of how the coverage zone looks like.



Figure 5: Testing Coverage Prediction

5.1. Client Deployment

The Service can be sold to the clients.
The necessary equipment will be as following:

Antenna:  Patented RX antenna (I can see embedded)

Receiver:  Digital DVB-S & S2 Receiver

Smart card:  Smart Card for Conditional Access and PPV

TV set:  TV set for viewing the TV programs,
(Regular TV or HDTV)

Internet:  Reception set for High speed Internet access (USB
or PCI)

The client can chose which service he wants to subscribe to (TV, Internet Pay Per View,...).
The reception set for Internet is different than the one for the TV, however, the reception
antenna can be the same.

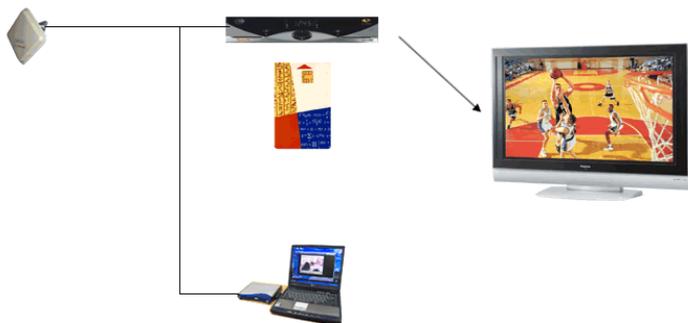


Figure 6: Client Design

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5.2. Hypercable Network Organization:

Once the Transmission system has been set up, it will be necessary to operate it, as well as to manage the subscribers.

There are several ways to organize the operational aspect of the service; the following organizational layout is one suggestion.

5.2.1. Radio Planning Division:

In order to offer the best coverage zone to the subscribers, a Radio Planning Division must be involved.

This department functions are to:

- ✚ Analyze the covered zone
- ✚ Identify the "Dead Zones"
- ✚ Planning the relays implementation
- ✚ Installing the relays
- ✚ Verifying the relay coverage

5.2.2. Technical Support Division:

A skilled technical staff must be permanently available for keeping the transmission site operational 24H/D:

- ✚ System monitoring
- ✚ System Upgrades
- ✚ Technical assistance and maintenance
- ✚ Programs Upgrades

5.2.3. Customer Support Division

The customer support division must be separated into 2 subdivisions:

✚ Sales support:

This subdivision objective is to assure the sales of the services that are broadcasted as well as the extended services (Pay Per View, Bouquets upgrades or downgrades, promotions, account activation or re-activation...)

✚ Technical support:

Assuring the client technical support (reception quality, decoder manipulation...), coordinating the actions with the Client Installers and the Radio Planning division.

5.2.4. Client Installer Teams

As the programs are sold to clients, the reception set need to be installed at the client Location (home, building...)

The installation team must be trained for being able to set up a proper reception Installation compliant with MDS specifications. This team must be equipped with the necessary tools and measurement equipment for achieving precise antenna installations using the right cable and connectors.

The planar antennas equipped with I Can See[®] version 3 and above can be installed easily by most customers so to save truck rolls and efficient deployment.

Your project deserves more investigation and **Hypercable** staff will help you to make your enterprise prosperous in a long term relationship.

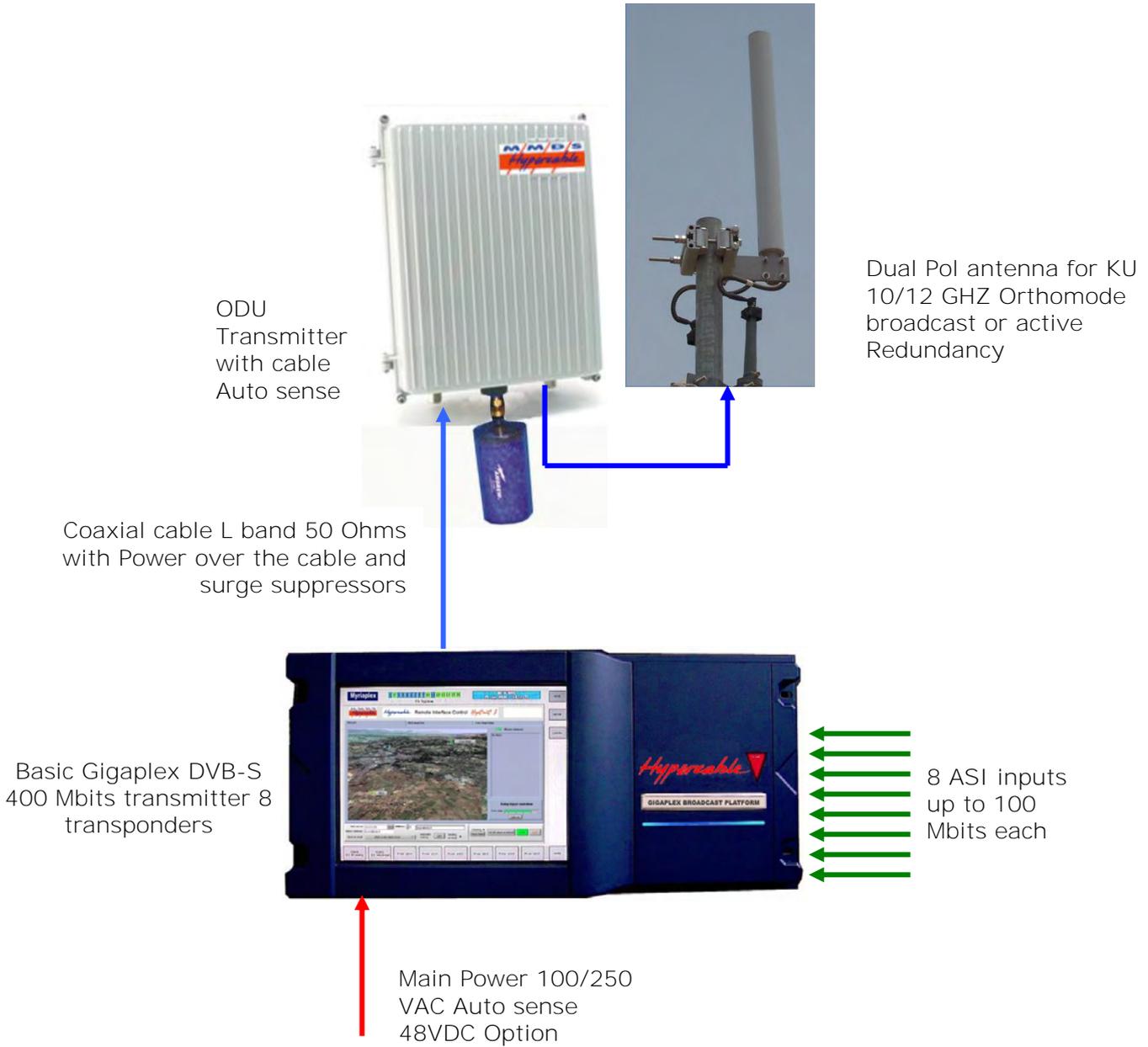
GIGAPLEX DIAGRAMS

6. Gigaplex Diagrams

- Hypercable BASIC Gigaplex is a concept extrapolated by the family of Broadcast Hypercable Gigaplex Platforms at the request of the **WCAA** to answer closer in the specific technical and financial imperatives in Africa and in isolated sites. Basic rules to respect for the infrastructure of the BASIC Gigaplex MVDDS Hypercable of broadcasting are the following ones:
- Maximum material MPG2 DVB-S cost by TV channels 1.000 euro HT for the head station for a basic capacity of 400Mbits not including the acquisition and the signal processing. (Base 100 TV Channels or equivalent Mix IP)
- Maximum material MPG4 DVB-S2 cost by TV channels 400 euro HT for the head station for a basic capacity of 800Mbits not including the acquisition and the signal processing. (Base 400 TV channels or equivalent Mix IP)
- Cost of a transparent relay in the signals from the head End:
 - Without filtering of transponders no more than 30.000 euro for 1 Gigahertz of bandwidth
 - With filtering of transponders no more than 40.000 euro euro for 1 Gigahertz of bandwidth.
- Maximum material cost for a Master relay with signal regeneration and identical signal processing than the head end. Network cost is for the models BASIC with 8 transponders of 40 MHz activated or not.
- Energy ,supply is 100 to 250 volts AC automatic sense or 48 VDC from solar and wind power
- Emitted power maximal EIRP of 42 dBm for one 1GHz of used bandwidth.
- Power of 28 dBm by transponder for 24 simultaneous Transponders (2,4 Gigabits)
- Commercial reach at line of sight in Tropical environment in 99, 95 % of the time for 40 km ranges omni directional or sector-based.
- Outside equipments Radio TX waterproof and without forced ventilation, additional solar and rain protection, no waves guide, no specific connectors, no specific coaxial cables.
- Installation without dedicated equipment or expensive measuring device.
- No tune or adjustments, system cable auto sense, has its length and at the detected levels.
- Repair by replacement of the block ODU without adjustments or particular equipment.
- Block IDU radio identical for the simple relays, relays Master and Head End
- Transparent and compatible with all the digital DVB signals whatever is the way of transporting and modulation.
- Expansion by “stacking” of several Basic Gigaplex.

Extension for IP TCPIP and IP TV by simple addition of Gigaplex sources in the ASI format from the IPE Hyperg@te station

Synoptic Basic Gigaplex Head End



Synoptic Basic Gigaplex Main relay

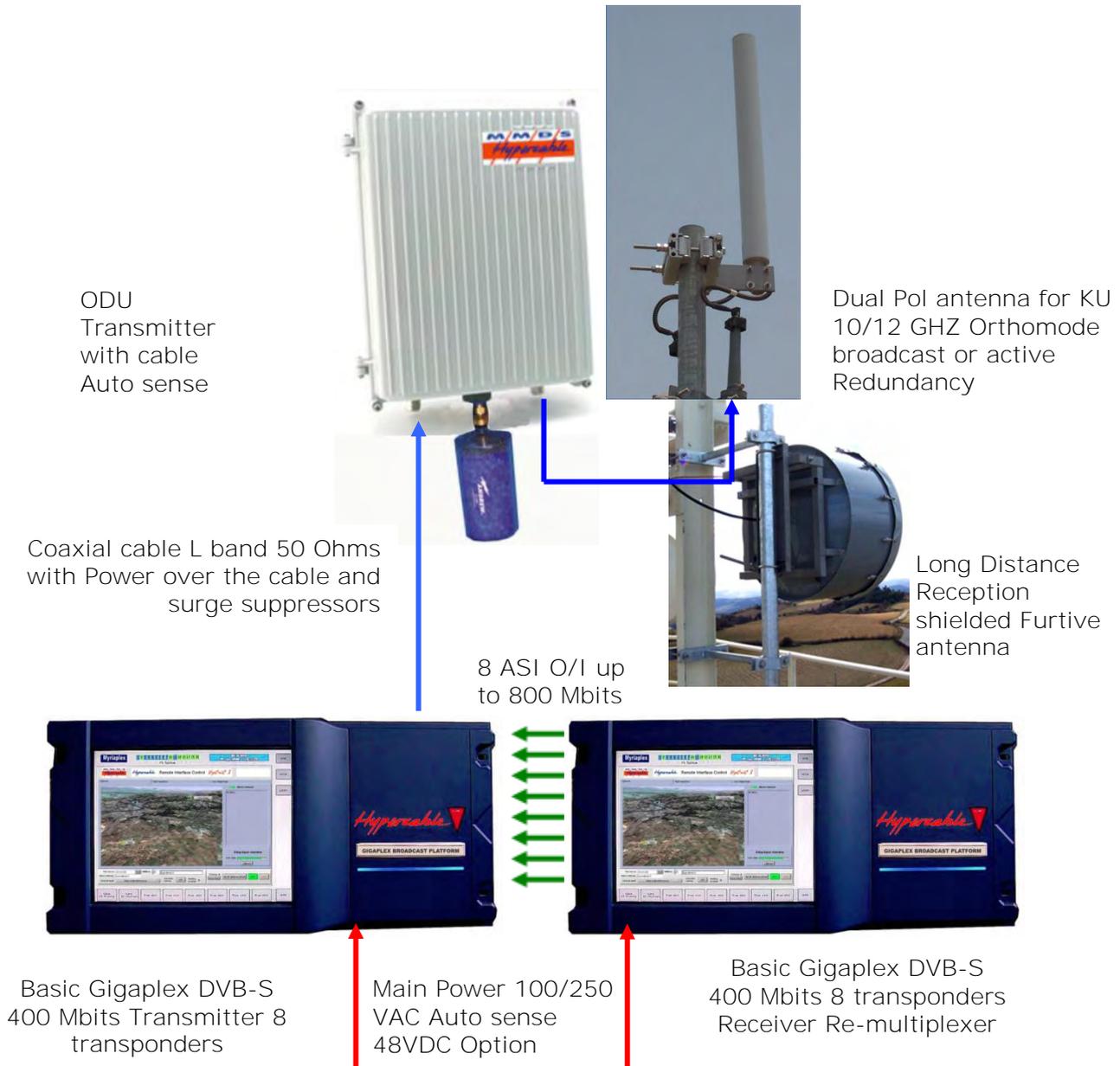
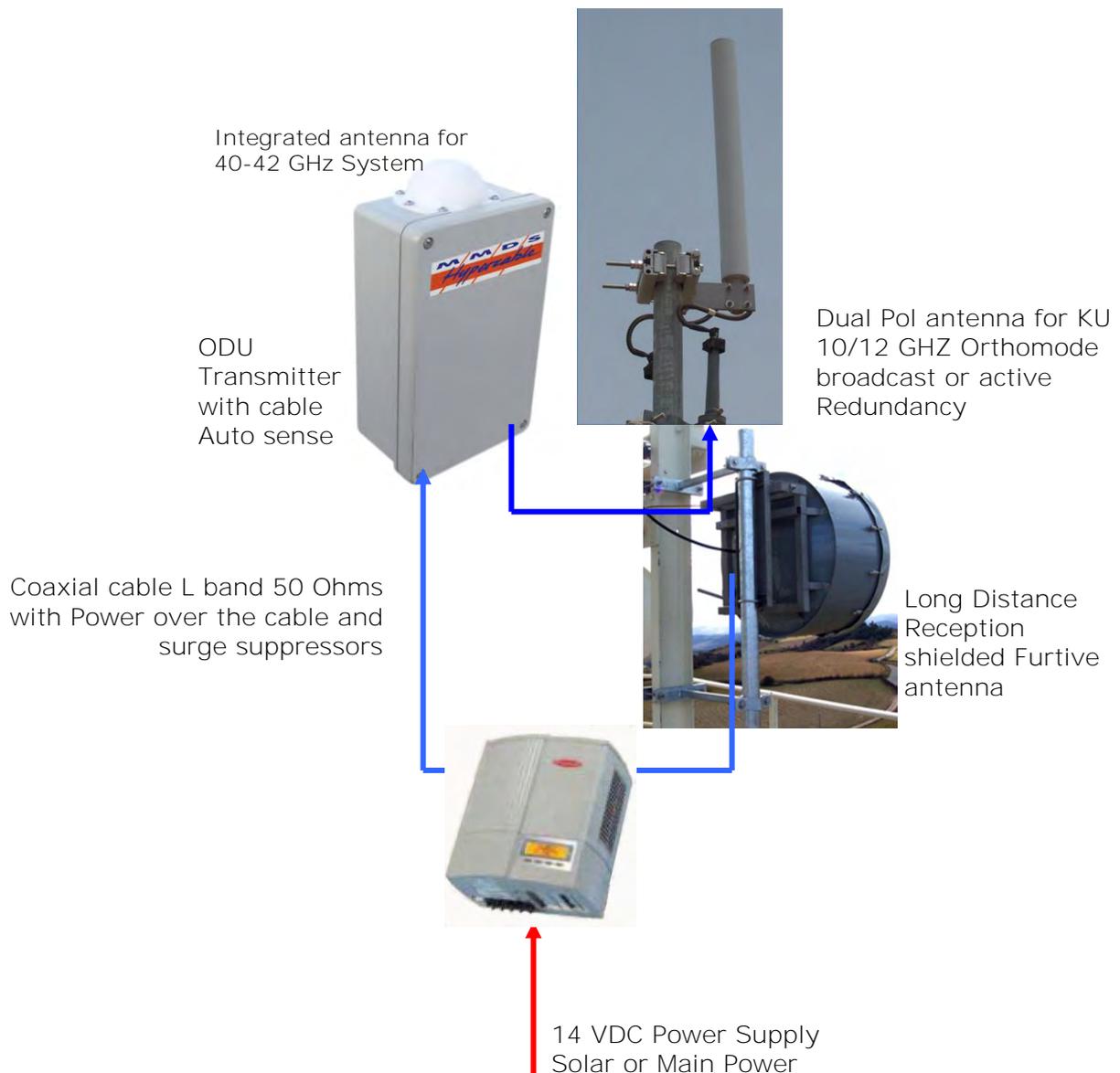


Diagram from live équipements

Synoptic Repeater Gapfiller with double frequency conversion



Live system in France Ardèche Mountains

**Live Hypercable C band Repeater
powered by Solar panel.
WADSL - SIVU Ardèche France.
Lamastre city Bandwith 1 Gigahertz**



*Zoom on the client antenna,
Space Diversity active Planar
with 85 dB Gain*

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CONTACT DETAILS

7. Pour plus d'informations contactez nous:

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Hypercable® **The Wireless Broadband**®

8. Notes

NOTES
