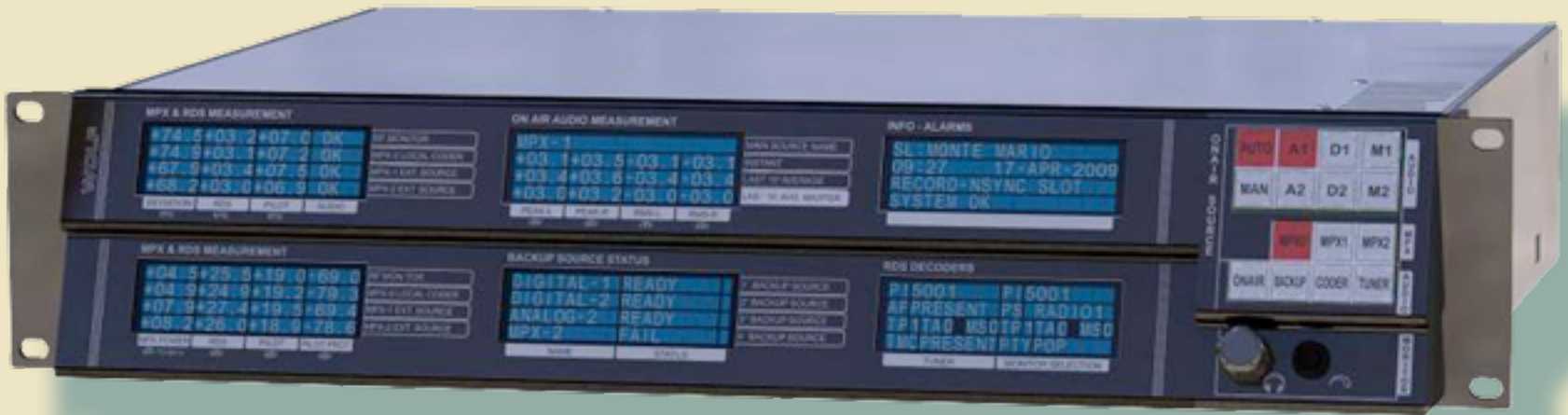




A Warm Welcome
by Axel
Technology !

WOLF Network

Measure, Control. Decision.



AXEL
TECHNOLOGY

WOLF

What is Wolf

- ▶ Wolf is the Automatic Digital Measurement and Monitoring system for FM Networks.
- ▶ Wolf also includes an High Quality MPX +RDS/RBDS Decoder and an Intelligent Changeover.

Main Features

- ▶ Accurate Instrument for Analog, Digital , MPX and RDS Signals
- ▶ Double Intelligent Changeover (Audio/MPX)
- ▶ First system that check the quality and reliability of Audio Backup source
- ▶ Double Decoder RDS – UECP Filter for RDS/RBDS service not wished.
- ▶ Double Decoder MPX Digital (sep 65dB)
- ▶ Double Decoder MPX Analogic (sep 35dB) used as Signal Monitor
- ▶ Streaming system in MP3 for monitor all the audio.
- ▶ Master system able to check the quality of the signal at the source
- ▶ Able to be connected to a MPX+RDS/RBDS for regenerate the MPXSignals.

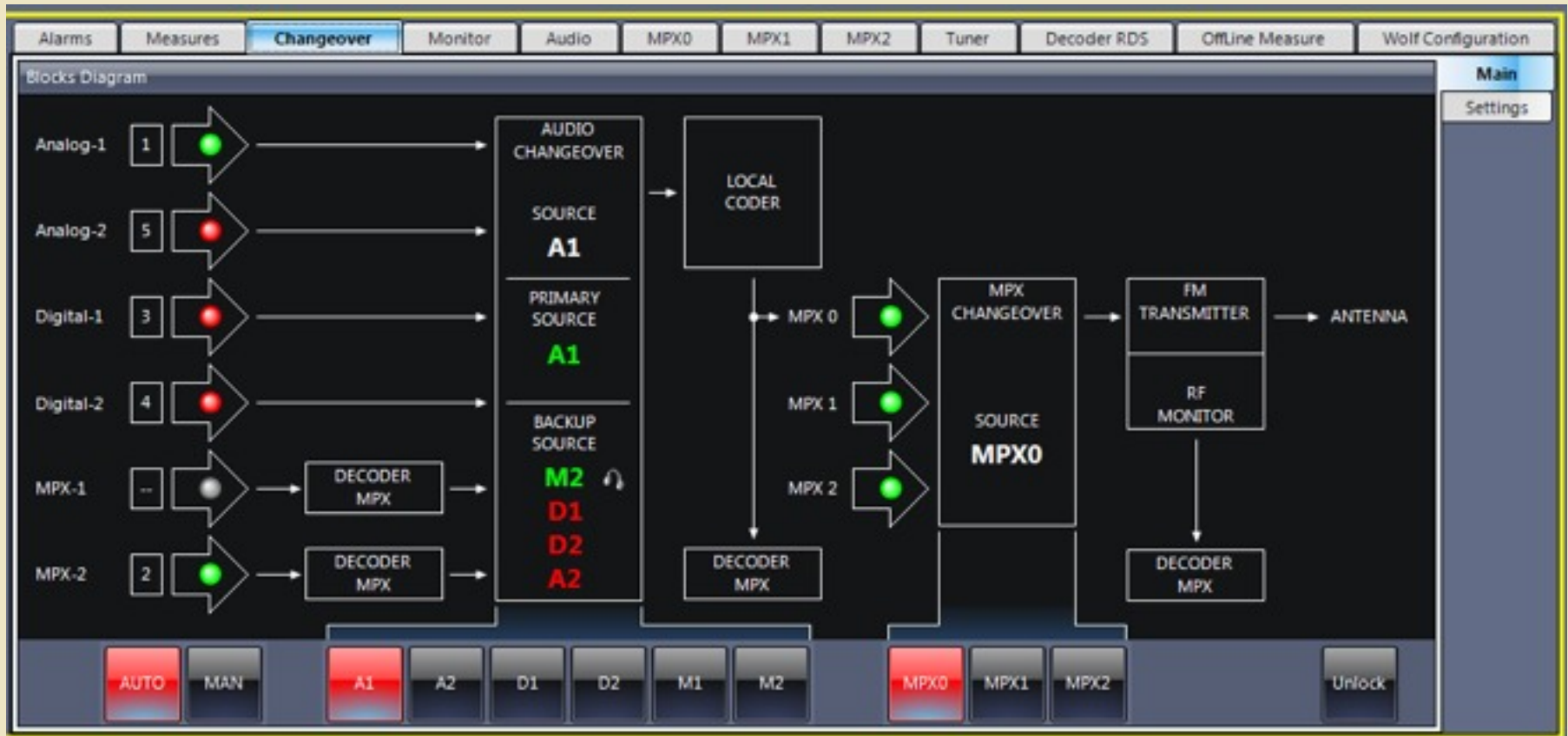
Auto check the “out-of-range” values

HW bypass on all the output (Analog/Digital/MPX)

How does Wolf work?

- ▶ Wolf analyzes constantly 24/7 audio sources, such as Analogic, Digital and MPX.
- ▶ The measures are always compared with customized working range
- ▶ If any of these values are not corresponding, Wolf manage the issue, inform about this one and solve it!

Wolf Changeover



Incoming Audio Sources and Audio/MPX Changeover

What is present in the MarketPlace?

- ▶ BT Monitoring
- ▶ Audemat/Aztec Goldeneagle
- ▶ Other FM Monitor, but not remotable.



Main differences between competitor

- ▶ Wolf it's an equipment unique in the marketplace!
- ▶ The equipments presents on the marketplace doesn't have the same features
- ▶ For achive the same performances the broadcaster need 6 or



Main differences between competitor

- ▶ Lot of this one doesn't exist on the marketplace
- ▶ Even if are available, it is not possible to place in communication and doesn't measure!
- ▶ Lot of equipment born for measure ONAIR Signals
- ▶ Wolf solve the issue independently the presence of a operator in the Tx Site.



Why Wolf...

- ▶ The main request came from the National Italian Broadcaster (RAI).

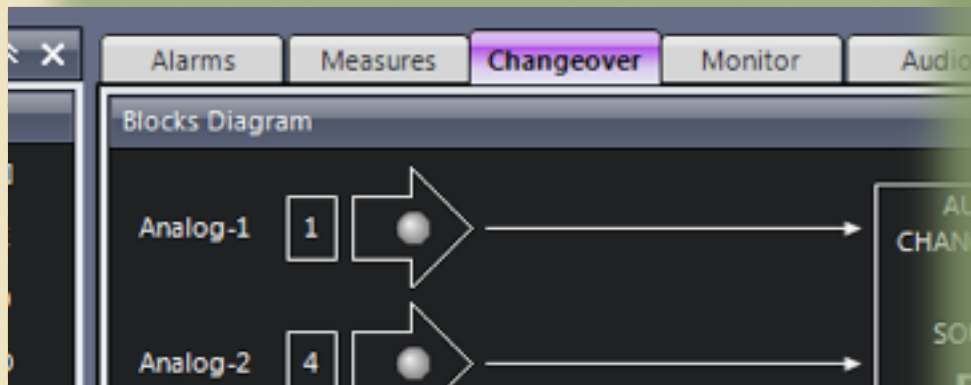
They need to know if the signal outgoing from the Studio, is the same that is broadcasted OnAir.

In Rai there are 2 structures.

- ▶ – CPRF (Centre of Production Radio) where all radio programmes are made.
- ▶ – RaiWay, the RF Network Manager that broadcasts Radio Programmes coming from

Why Wolf...

- ▶ CPRF pays RaiWay to broadcast its programmes.
- ▶therefore....
- ▶ RaiWay needs an INSTRUMENT to certify the quality of the CPRF Signals



The Birth of Wolf

- ▶ According to RaiWay's requirements, Axel Technology manufactured a Multifunctional Monitor System, an accurate Bf/Rf Instrument, a powerful (and intelligent) Changeover.

▶ We are talking about

The word "WOLF" is displayed in a large, white, outlined, sans-serif font. The letters are set against a dark blue rectangular background that has a subtle gradient and a slight shadow effect, making it stand out from the light-colored slide background.

Parameters checked by Wolf

- ▶ Wolf can continuously check:
- ▶ 2 Audio Analogic Input
- ▶ 2 Audio Digital Input
- ▶ 3 MPX+RDS Input
- ▶ Antenna Fm MPX+RDS/RBDS
- ▶ GPI / GPO



Wolf Time & Measure

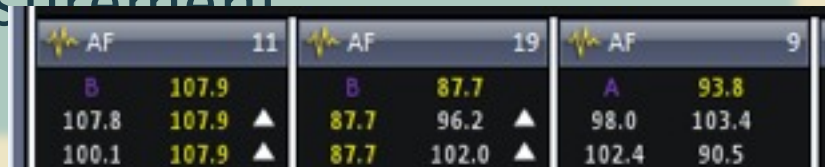
- ▶ Check Time: 500 mS
- ▶ 2 Times / Second
- ▶ Simultaneous total measures :
over 60

A New Concept: Wolf Master

- ▶ A New Concept in Measure:

The MASTER Side

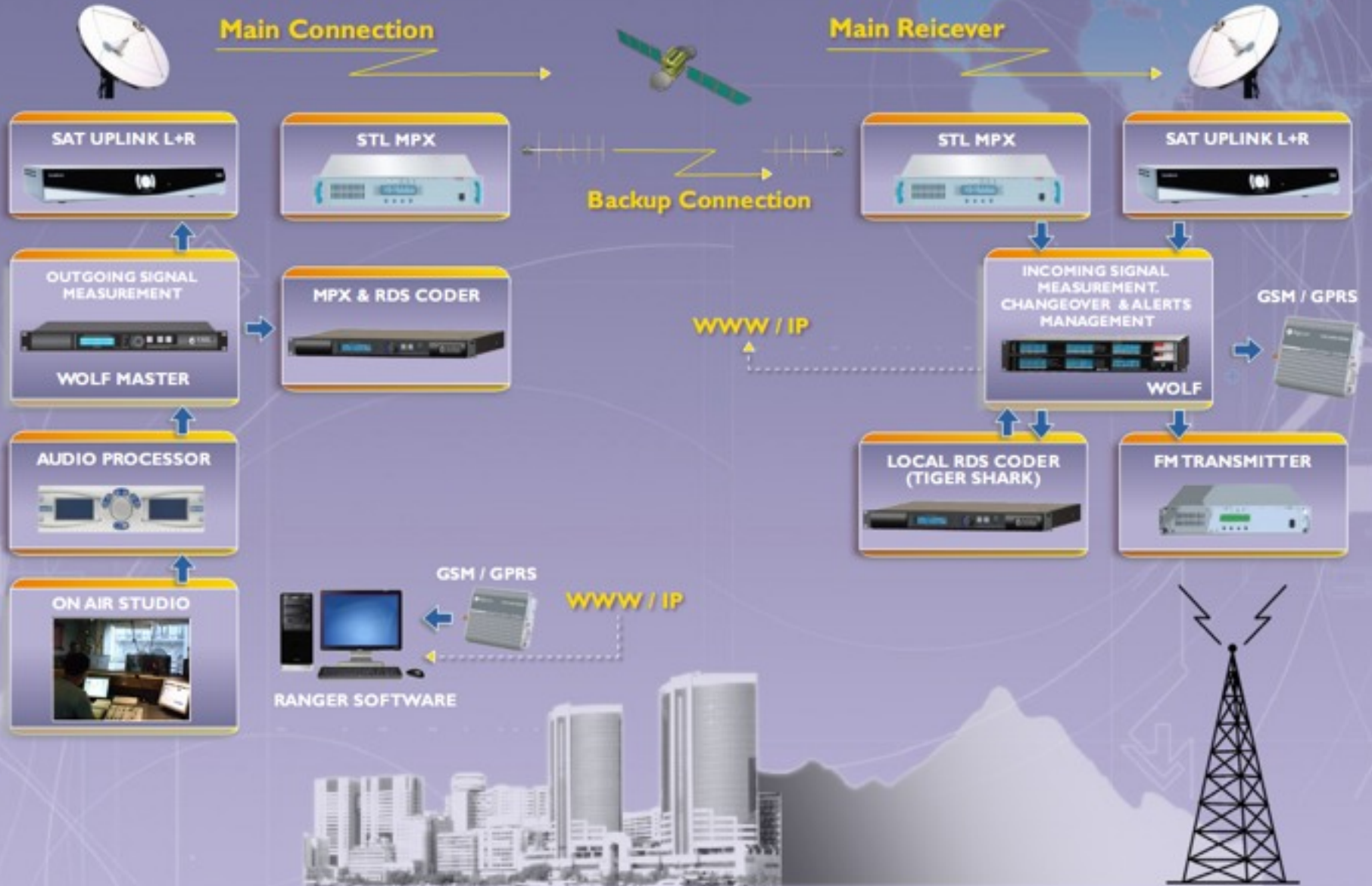
- ▶ Thanks to Wolf Master it's possible to measure continuously the signal outgoing from Studios.
- ▶ At the same time Wolf placed in the Tx side perform the same measurement



AF 11	AF 19	AF 9
B 107.9	B 87.7	A 93.8
107.8 107.9 ▲	87.7 96.2 ▲	98.0 103.4
100.1 107.9 ▲	87.7 102.0 ▲	102.4 90.5

WOLF

Measurement & Monitoring System for FM Networks



Wolf Master /1

- ▶ Two new way for check your Network.



InLine Measures



OffLine Measures

Wolf Master /2

- ▶ **InLine Measures:**
- ▶ Each 10 minutes Wolf Master send in Broadcast (so for all Wolf connected) a packet of measures, plus the single tollerancy for each measurement.
- ▶ Each site performs the comparison.

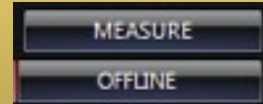


Wolf Master /3

- ▶ If a value is not compliant with the measure or with the range of tollerancy, Wolf makes an Alarm.
- ▶ At the same time,while Wolf measures Primary Input, check all the Incoming signals presents in the Tx Site.



Wolf Master /4



▶ OffLine Measures:

- ▶ OffLine measures are made in presence of NO AUDIO.
- ▶ The Master side generate a series of Tone with level and frequencies different, sending a series of command to all Wolf installed in the Network.

Wolf Master /4

MEASURE

OFFLINE

- ▶ This kind of measure is really powerful:
 - ▶ Wide set of measures available
 - ▶ High precision (0.1dB)
 - ▶ Measuring time from 3 sec/meas to increaseable time.
 - ▶ Detailed report for each site with “Out-of-Range” measures.
 - ▶ The measurement has been made for all the site in the same condition,so can be compared between Tx Site.

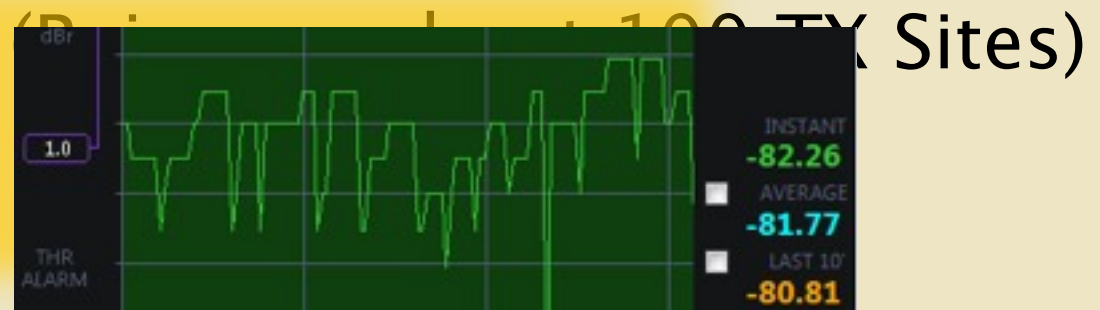
Case Study: RAI

RaiWay asked Axel Technology to design an INSTRUMENT able to check the entire Network, certify the quality, and in few seconds, avoiding the presence of a RF Technician at the TX Side.



Case Study: RAI

- ▶ Each month, RaiWay tests and trims the entire RF Network, checking parameters such as Signal/Noise, distortion, separation, L/R gain, bandwidth...
- ▶ Since then, all these measures were made spending a lot of time and money, for involving lots of Rf Technician at each Tx Side.



Case Study: RAI

- ▶ Rai use to Broadcast test tone for 5 minutes for each measure, this timing is for giving all the technician the right time to set all the parameters.
- ▶ For a complete Set of 30 measures, on 100 Tx site, Rai employ 2 hours and about 100.000 € !!



Case Study: RAI

- ▶ Using Wolf e.g it is possible to schedule a sequence of 120 measures employing 10 minutes, spending 0€ !

MPX2	Ref 0.00 dBu
DEVIATION	83.94 kHz
MPX POWER	5.51 dBr
PILOT	-19.88 dBr
RDS	-30.42 dBr
PILOT PROTECTION	-59.07 dBr
DEVIATION MAX	85.27 kHz
MPX POWER MAX	5.46 dBr
PILOT MIN	-19.88 dBr
RDS MIN	-30.45 dBr
PILOT PROT. MAX	-57.65 dBr

Save TIME using WOLF

- ▶ Your Network is always under Your Control!
- ▶ You always knows if something is not properly Working or what equipment give you problem.

▶ And then:

- ▶ You can check an issue via Remote.
- ▶ You can check Spike or Random Trouble without moving from the Headquarters.

Save ERRORS Using WOLF

- ▶ Your Network can be checked in Automatic Mode, and in Automatic can be calibrated.
- ▶ You can Custom your Calibration Sequence, making every kind of measurement.
- ▶ And then:
- ▶ You can achieve e.g one complete set of measures every 5 Minutes, that's means 120 Measure every 10 Minutes.
- ▶ But all the Timing and settings are Customizable
- ▶ That's means that if a Broadcaster SAVE TIME and SAVE ERRORS, at least a Broadcaster

= Save MONEY Using WOLF =

- ▶ Save Time and Save Errors means

saving Money by Broadcasters.

- ▶ The measurement made by Wolf are better than a “human” checking.
- ▶ All measures are at the same reference, so all measures are comparable.

= Save MONEY Using WOLF

- ▶ The National Italian Broadcaster (RAI) must check and re-Tune the entire Network. The RF Techincian employed are 200, the TX Side 100.
- ▶ The test time is about 30 Minutes FOR ONLY ONE MEASURE!
- ▶ The total ammount is:
- ▶ 100.000 € (Rf Technician) + NonAudio Time (marketplace) =

WOLF and TIGER. The perfect couple.

- ▶ Tiger Shark is the best RDS/RBDS and MPX Coder made by Axel Technology. The features and the service allowed are the “State-Of-Art” in MPX and RDS/RBDS service.
- ▶ Wolf can control directly Tiger Shark, to manage and re-Generate a new MPX+RDS.
- ▶ The RDS can be generated locally, and then it's possible to place new AF Frequency and



RANGER

The power in your Hand

- ▶ In the Jungle of Wolves and Tigers it could takes someone that can manage everything.
- ▶ Ranger is a powerfull Software that allows to:



- ▶ Log Data incoming from All Wolf Network, saving everything in a Server. Forever.
- ▶ Log Audio incoming from All Wolf Network, and make available audio for RF Technician. Forver.

Ranger can Show each single remote

device, logging each trasmitted parameter

RANGER

The power in your Hand

Ranger can also Log all data coming from Main Sources and Backup sources

The screenshot shows the RANGER VIEWER software interface. The title bar includes the RANGER logo, the text "RANGER VIEWER", the time "11:03:11", and several icons. The main window has a menu bar with tabs: Alarms, Measures, Changeover, Monitor, Audio, MPX0, MPX1, MPX2, Tuner, Decoder RDS, Offline Measure, and Wolf Configuration. The Measures tab is active, displaying a table of data:

Device Info	Audio	General	MPX1	Tuner	RDS
NAME (P) Site-2 TestD (192.168.56.22)	Ref 0.00 dBu	WOLF TYPE SLAVE	Ref 0.00 dBu	DEVIATION 72.50 kHz	RDS Quality 100
DATETIME 11/09/2009 11:05:08	Primary	FIRMWARE VERSION 1.1.0	DEVIATION 84.49 kHz	MPX POWER 0.54 dB	RDS PI 5320
MASTER DEVICE ID -1	TYPE ANALOGIC_INPUT_1	OPERATIVE MODE AUTO	MPX POWER 5.47 dB	PILOT -21.79 dB	RDS PTY Varied_Speech
	PEAK LEFT 0.98 dB		PILOT -19.92 dB		

The screenshot shows the TIME MACHINE software interface. It features a "Controls Panel" with buttons for "START", "PAUSE", and "RESET". A central display shows "00:00:00". Below this is a "DATETIME SLIDER" and a "SECONDS STEP" control. To the right, the "Time Options" section includes "DATETIME START" (13 settembre 2009 17:46:28) and "DATETIME END" (15 settembre 2009 17:46:28) dropdown menus, and a "LOAD" button. A "Device Info" sidebar on the left shows:

Device Info
SERVER DB NAME 192.168.99.131
SERVER DB PORT 3306
DB USERNAME root
DB PASSWORD ranger
DATETIME 000000

RANGER

The power in your Hand

RANGER VIEWER 11:04:57

WOLF Site-2 TestID (192.168.99.131) [X]

Alarms Measures Chargeover Monitor Audio MPX0 MPX1 MPX2 Tuner **Decoder RDS** Offline Measure Wolf Configuration

Device Info
 NAME (P) Site-2 TestID (192.168.99.131)
 DATETIME 11/09/2009 11:06:54
 MASTER DEVICE ID -1
 AUTO MAIN MEASURE
 DUNE OFFLINE
 SYNC
 Chargeover
 AUDIO SELECTED ANALOGIC_INPUT_1
 MPX ON AIR DECODER_MPX0
 Status
 STATUS --
 ERROR SYSTEM_OK
 Database Device Info
TIME MACHINE OFF
 00:00:00

Source MPX_1
 PI 5320
 PS COORR A/B 0
 RT RADIO DATA SYSTEM COORR ----- RDS VERSION
 DI Stereo, Static_PTY PTYN TP 1
 CT PBN TA 0
 PTY Varied_Speech MS Music

Stream
 2A 5320 2520 0A 176 (66.7%) 08 0 (0%)
 6A 5320 0528 5666 S 1A 0 (0%) 18 0 (0%)
 6A 5320 0529 7083 YS 2A 89 (33.6%) 28 0 (0%)
 6A 5320 052A 8783 TE 3A 0 (0%) 38 0 (0%)
 6A 5320 052F C9CD M 4A 0 (0%) 48 0 (0%)
 2A 5320 2520 5A 0 (0%) 58 0 (0%)
 2A 5320 252D 6A 0 (0%) 68 0 (0%)
 6A 5320 0528 EA31 S 7A 0 (0%) 78 0 (0%)
 6A 5320 0529 4848 YS 8A 0 (0%) 88 0 (0%)
 6A 5320 052A 5666 TE 9A 0 (0%) 98 0 (0%)
 6A 5320 052F 7083 M 10A 0 (0%) 108 0 (0%)
 2A 5320 252E 11A 0 (0%) 118 0 (0%)
 6A 5320 0528 8783 S 12A 0 (0%) 128 0 (0%)
 6A 5320 0529 C9CD YS 13A 0 (0%) 138 0 (0%)
 6A 5320 052A EA31 TE 14A 0 (0%) 148 0 (0%)
 6A 5320 052F 4848 M 15A 0 (0%) 158 0 (0%)
 2A 5320 2520 RA DI Total 265 Quality 100

AF
 A 92.4 X -- X -- X --
 94.7 95.0 -- -- -- --
 96.9 97.7 -- -- -- --
 100.0 100.6 -- -- -- --
 101.0 105.4 -- -- -- --
 107.6 -- -- -- -- --

TIME MACHINE [X] [R] [X]

Device Info
 SERVER DB NAME 192.168.99.131
 SERVER DB PORT 3306
 DB USERNAME root
 DB PASSWORD ranger
 DATETIME 000000

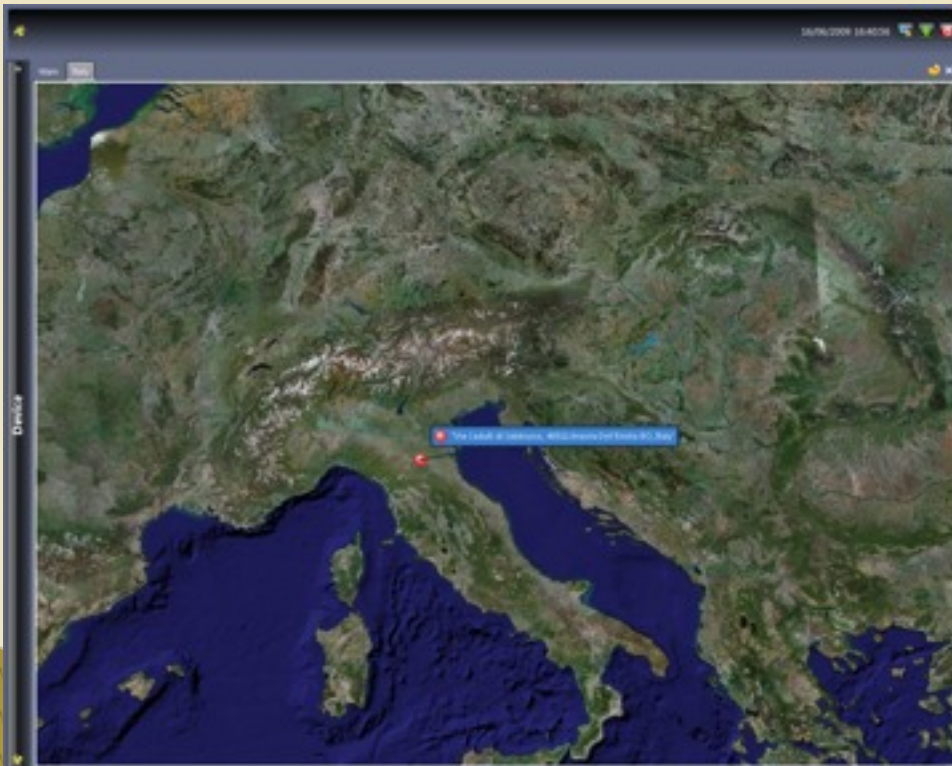
Controls Panel
 COMMANDS START PAUSE RESET
 TIMEMACHINE DT 00:00:00
 DATETIME SLIDER
 SECONDS STEP INTERVAL TIMER

Time Options
 DATETIME START 13 settembre 2009 17:46:20
 DATETIME END 15 settembre 2009 17:46:20
 COMMANDS LOAD

General
 Settings

24/7 Certification

- ▶ Using Wolf and Ranger is now possible to Certify 24 Hours /day, 7 Days/Week forever, all the Audio and Data Broadcasting.



There will not be more contestation about Not Broadcasted Programme or Advertising !

Wolf IN and Wolf OUT: The Analogic Breakout Box

8 XLR-Female + 8 XLR-Male Connectors

- ▶ Input A (Main) + Input B (Backup)
- ▶ Output A (Main) + Output B (Backup)
- ▶ Inputs are all transformer uncoupled.
- ▶ Outputs are all electronically balanced

All Input/Output are buffered and relay hardware bypassed in case of fault.

▶ Selectable Input Impedance

Wolf IN and Wolf OUT: The Digital Breakout Box

4 XLR-Female + 4 XLR-Male Connectors

- ▶ Input A (Main) + Input B (Backup)
- ▶ Output A (Main) + Output B (Backup)
- ▶ Inputs are all Unlink by Transformer
- ▶ Outputs are all Electronically Balanced

All Input/Output are Buffered and Relay Hardware Bypassed in case of Fault.

- ▶ Selectable Digital Input Impedance

Wolf IN and Wolf OUT: The MPX Breakout Box

9 BNC Female Connectors

- ▶ MPX 1 Input + MPX 2 Input
- ▶ FoldBack MPX 1 + FoldBack MPX 2 (Output)
- ▶ Inputs MPX 1 and MPX 2 Front and Rear Side
- ▶ Output MPX Main + Out MPX Test (copy)
- ▶ AUX Input in MPX Main Out

All Input/Output are Buffered and

Play Hardware Bypassed in case of Fault.

Wolf IN and Wolf OUT: The TELEMETRIC and GP I/O

- ▶ 8 Analog Telemetric Input Connectors buffered
- ▶ 8 Analog Telemetric Output Connectors buffered
- ▶ 8 Optocoupler GP Input
- ▶ 8 Relay Configurable by Software

- ▶ **Versatility On Air !**

Wolf measurement quality and sensitivity

° Both Analogic and Digital Audio Input:
Audio Peak + Audio Average Peak + Audio
RMS + Audio Average RMS

° Both MPX 1 and MPX 2:

Pilot Protection, RDS Presence, Peak
Deviation, ITUBS412 Power, RDS Quality and
Errors

RDS Service: PI, DI, PTY, TP, TA, MS, PS, AF + Show
Frequency method A or B, RT, EON and PS

Wolf measurement quality and sensitivity

- ▶ Decoder Stereo, decodes L + R from MPX Signal
- ▶ Decoding Silence in Left and Right Channel separated.
- ▶ MPX Changeover:
 - shows if changeover is activated and the reason.
- ▶ Audio Changeover:
 - shows if changeover is activated and the reason.
- ▶ Built-in FM Tuner.



Wolf measurement quality and sensitivity on AUDIO INPUT

- ▶ Separate Left and Right Channels measurement
- ▶ Band: 20 kHz
- ▶ Ripple: 0.05 dB
- ▶ Nominal Input Reference: -6 dBu +13dBu
- ▶ Typical Dynamic: -85 dB (ref +6dBu)
- ▶ Precision: 0.1 dB (read Measure0.01 dB)
- ▶ Measure sensitivity is the same for Analog and Digital Inputs



Wolf measurement quality and sensitivity on MPX INPUT

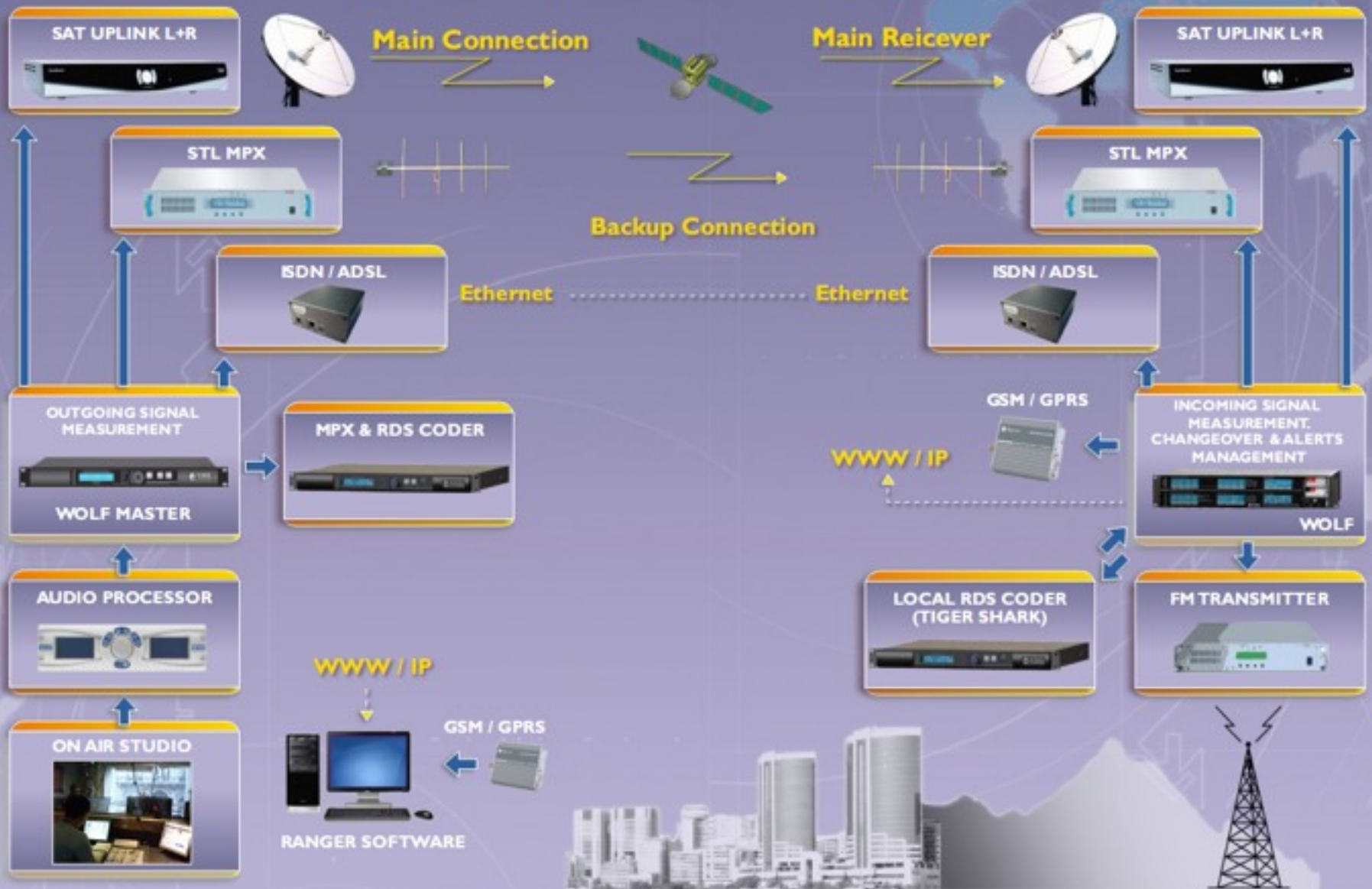
- ▶ MPX 1 and MPX 2
- ▶ Band: 59 kHz
- ▶ Ripple: 0.002 dB (200Hz–53kHz)
- ▶ Ripple: 0.1 dB (40Hz–58kHz)
- ▶ Nominal Input Reference: -6 dBu +13dBu
- ▶ Typical Dynamic: 82 dB (ref +6dBu)
- ▶ Precision: 0.1 dB (read Measure0.01 dB)
- ▶ Measure sensitivity is the same for MPX 1 and MPX 2 Inputs!



Wolf measurement quality and sensitivity on DECODER

- ▶ MPX 1 and MPX 2, built-in tuner, external tuner
- ▶ Type of decoding: Digital DSP
- ▶ Stereo Separation: 58 dB
- ▶ De-emphasys: 50 μ S or 75 μ S available on L-R decoding
- ▶ Sensitivity: 0.1 dB readable on SNMP the sensitivity is better
- ▶ Wolf is the first equipment in marketplace that can measure MPX/STL quality with noise under 70 dB !





Thank YOU by Axel

- ▶ Axel Technology is really proud of Wolf, so if you need further information feel free to contact Us !



- ▶ Sales Dept
- ▶ sales@axeltechnology.com
- ▶ Tech Dept:
- ▶ support@axeltechnology.com