



## **FLEXIBLE LOW-POWER TV TRANSMISSION SYSTEMS**



**MARTYN HORSPOOL**  
**PRODUCT MANAGER –TV**  
**MASON, OHIO, USA**



# FLEXIBLE LOW-POWER TV TRANSMISSION SYSTEMS

## Today's Virtual Event Covers:

- New and cutting-edge solutions for the unique demands of low-power TV transmission. Learn about compact highly efficient and cost-effective systems that feature simple modular construction that delivers the lowest total cost of ownership. Key features such as intuitive HTML-5 GUIs, network security, integrated Off-Air & Satellite receivers and IP-based content distribution options.

## *Future Virtual Events (not covered in detail today):*

- Outdoor and Desktop Transmitters and Applications
- Total Cost of Ownership - The Economics of Deploying High-Efficiency Transmitters

# GATESAIR IN USA + ITALY

## United to Create One Company

- GatesAir USA had a long-term relationship partnering with Onetastic Italy for low power products for over 5 years.
- Italy has some of the finest RF engineers in the World.
- Top-notch support from all major component suppliers.
- Onetastic customers very enthusiastic regarding product quality and design and GA ownership.
- Engineering from both sides are now integrated - The best technology from Europe is being combined the best technology from the USA



**Bruce Swail**  
CEO – GatesAir  
USA



**Luca Saleri**  
General Manager - GatesAir Srl.  
Italy





**QUINCY, IL USA**



tesAir IBC-TV 2016 Worlds Largest Manufacturing Facilities



**BRESCIA, LOMBARDY, ITALY**



# GATESAIR LPTV (LOW POWER TV) PRODUCTS

GatesAir USA – Quincy, IL

- Digital TV ✓
- Analog TV ✗
- Translators / SFN GF ✗
- Supports ATSC 3.0 ✓
- Liquid-Cooled UHF ✓
- Liquid-Cooled VHF ✗

XTE Exciter



Maxiva™  
UAXT / VAXT



Up to 200W

Maxiva™  
UAXT / VAXT



Up to 600W

Maxiva™  
Air-Cooled  
UAXTE (UHF)  
UAXTE (VHF)



1.2kW to 19.2kW



1.4kW to 93kW

Maxiva™  
Liquid-Cooled  
ULXTE (UHF)

## Today's Topic

### Multi-Compact



Up to 8 x 15W

### Ultra-Compact



Up to 150W



Up to 400W



Up to 700W

### UAX/VAX-OP Series



Up to 2,000W

GatesAir S.r.l. - Brescia (Italy)

- Digital TV ✓
- Analog TV ✓
- Translators / SFN GF** ✓
- Supports ATSC 3.0 (In dev.) ✓
- Liquid-Cooled UHF ✓
- Liquid-Cooled VHF ✓

UAX/VAX OP Series



Up to 7kW

ULX/VLX-OP Series



Up to 44kW

# SPECIALTY LOW POWER TV PRODUCTS (PREVIEW)



**IMTX-70 DESKTOP TX**



- Lightweight and portable
- 230 x 485 x 320mm (9.1" x 19.1" x 12.6")
- Up to 6 separate transmitter modules
- Output power: 70W rms per module (Pre-Filter)

For more on both products –  
***Virtual Event*** on 4/29

- Outdoor weatherproof design
- Flexible mounting (pole, wall, etc.)
- Self-contained with mask filter
- 50W post-filter power



**PMTX-1 OUTDOOR TX**



# GATESAIR LPTV (LOW POWER TV) PRODUCTS

**UHF**

Ch 14 -51

20W, 40W, 70W, 130W, 150W



1RU

200W, 400W



2RU

800W, 1000W



3RU

Maxiva™ UAXT Ultra-Compact

1300W, 2000W



1 + 3.5RU

Maxiva™ UAX-OP Series

**VHF High**

Ch 7 - 13

120W, 150W



1RU

350W, 450W



2RU

700W, 900W



3RU

Maxiva™ VAXT Ultra-Compact

1100W, 1800W



1 + 3.5RU

Maxiva™ VAX-OP Series

**VHF Low**

Ch 2 - 6

70W



1RU

300W



2RU

400W



3RU

Maxiva™ VAXT-L Ultra-Compact

1200W

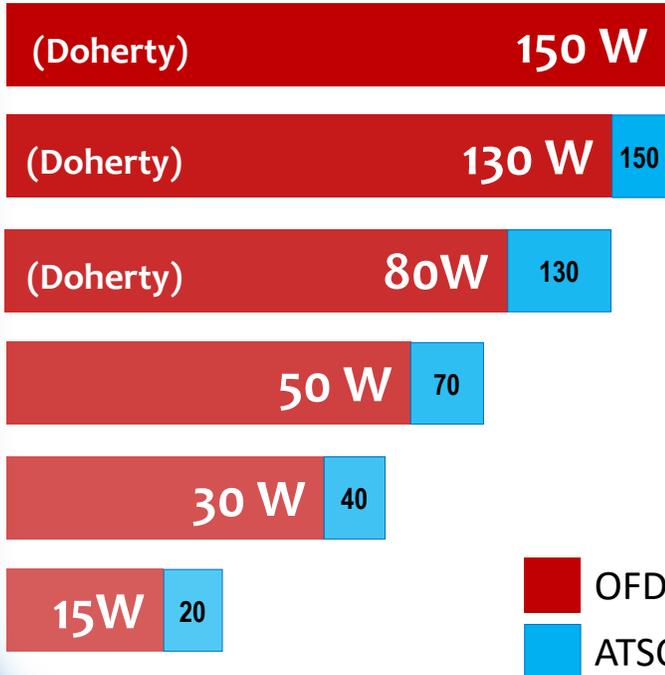


1 + 3.5RU

# 1 RU ULTRA-COMPACT MODELS

1 RU Models – All can be configured as Transmitters or Transposers/On-Channel Gap Fillers

*UHF digital power levels shown  
(VHF also available)*



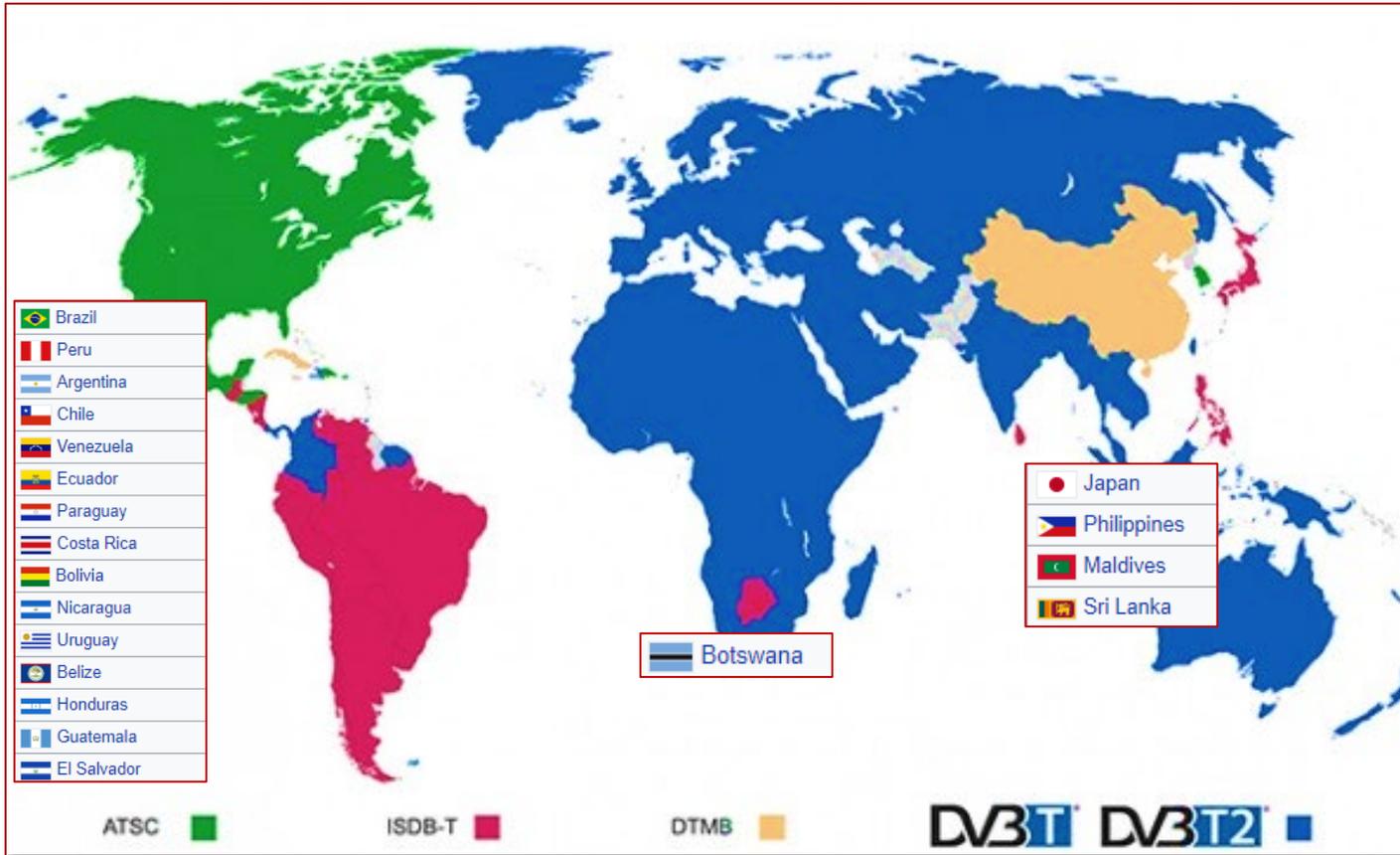
## 1RU ULTRA-COMPACT

- Available output power: 15W to 150W average power
- High-efficiency, broadband UHF & VHF
- Adaptive pre-correction SNR/MER 40dB typical
- Multiple input interfaces available
- Configurable as: Transmitter, Transposer, On-channel SFN Gap-Filler
- Plug-in (rear) Power Supply & RF amplifier, each replaceable in less than 1 minute.



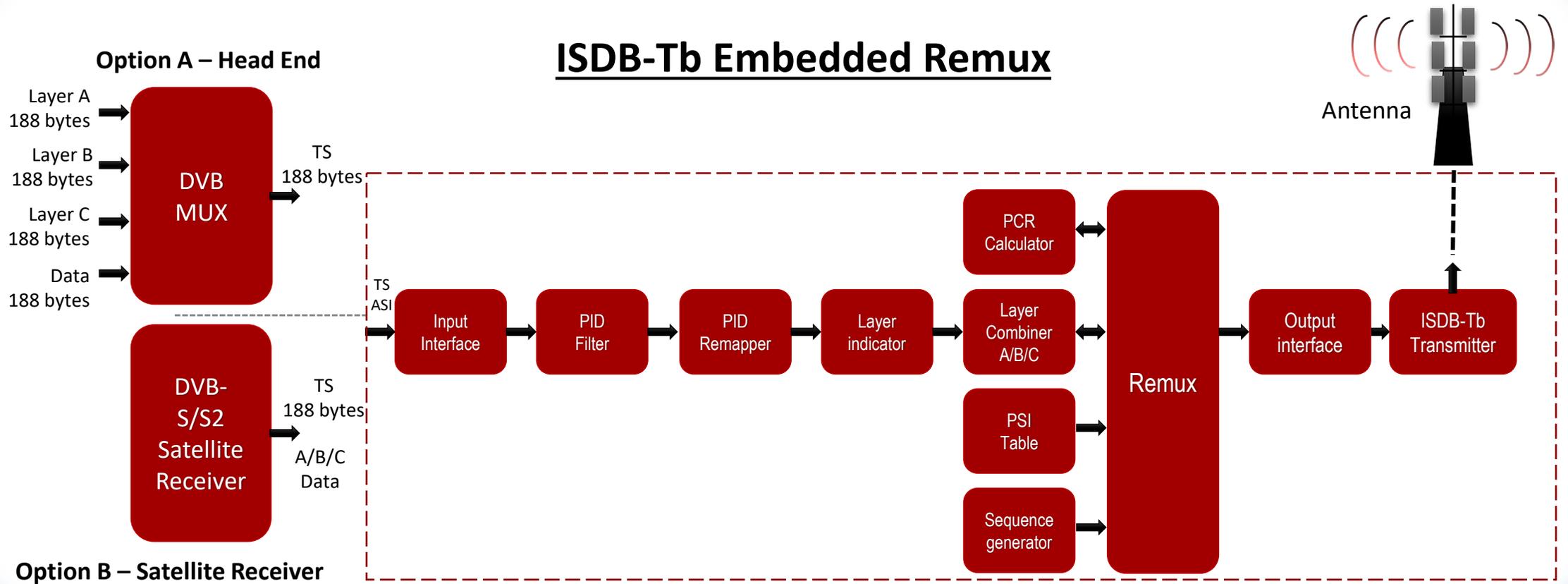
# ISDB-Tb TRANSMITTERS

20 Countries deployed ISDB-T/Tb ■



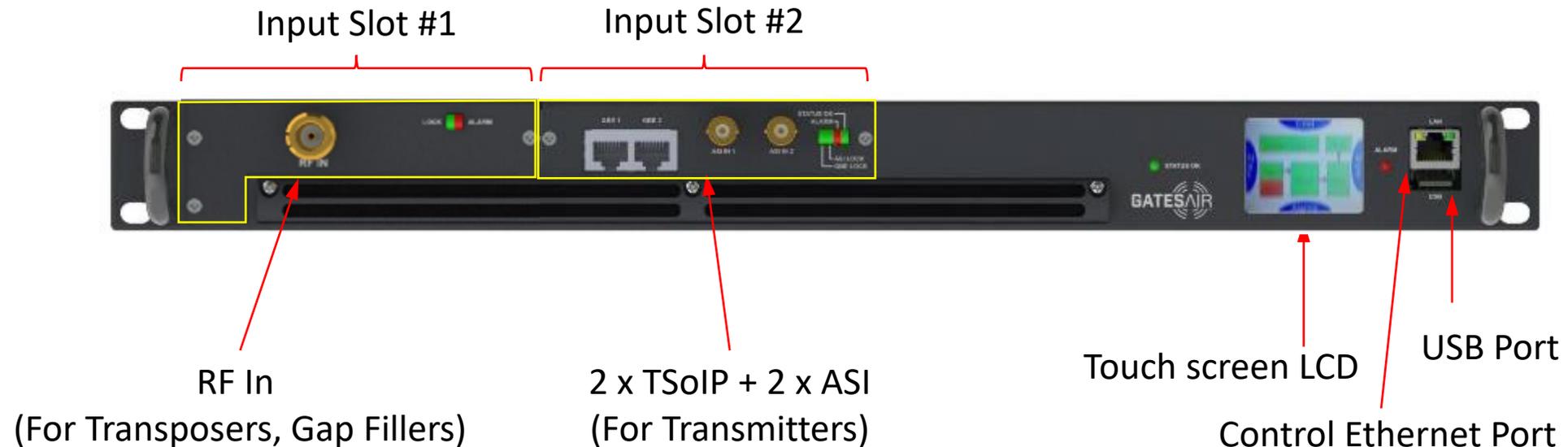
## KEY FEATURES for ISDB-Tb Version:

- Dual Mode: Analogue / Digital
- SFN: Static delay and relative synchronization
- REMUX option with following functions:
  - Layer combiner: A/B/C
  - PID Remapping / Insertion
  - Program Filtering



## FRONT PANEL

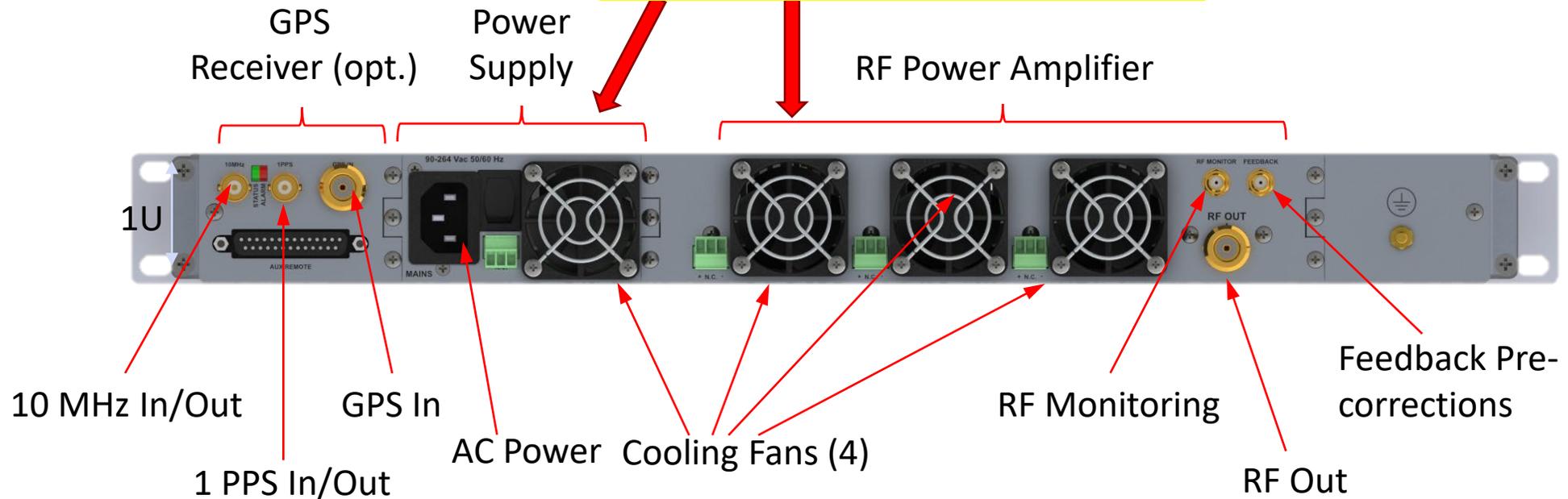
Note that one or two input cards can be used, for flexibility



***More information on input cards later in presentation***

## REAR PANEL

✓ Power Supply is plug-in  
✓ PA Module is plug-in  
Can be replaced in < 1 minute!



# WHERE ARE THE CABLES?

“No Cable” Design!

RF Power Amplifier

Modulator Board

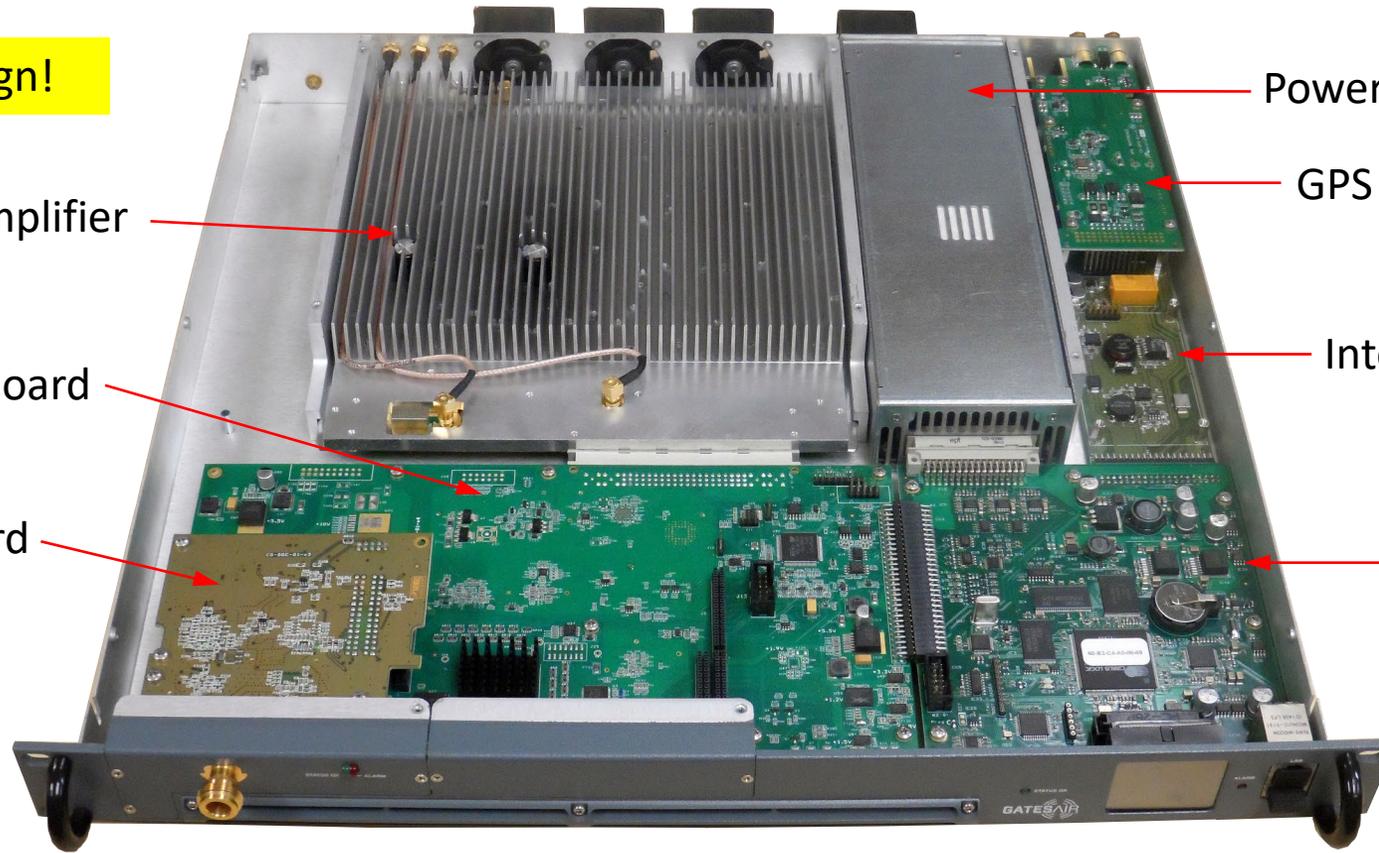
Input Card

Power Supply

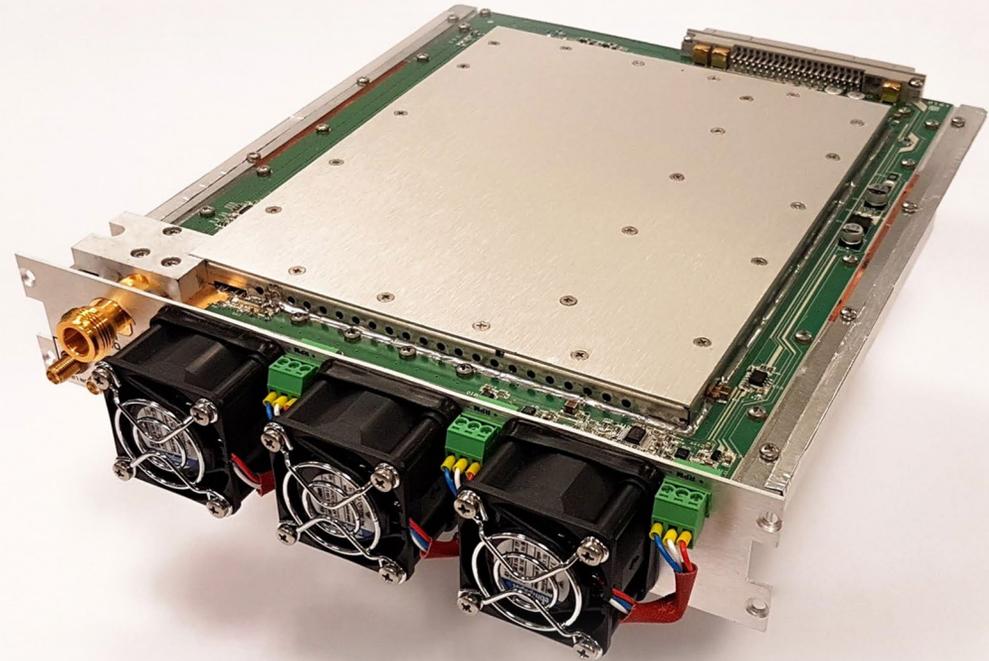
GPS Receiver Board

Interface Board

Controller Board



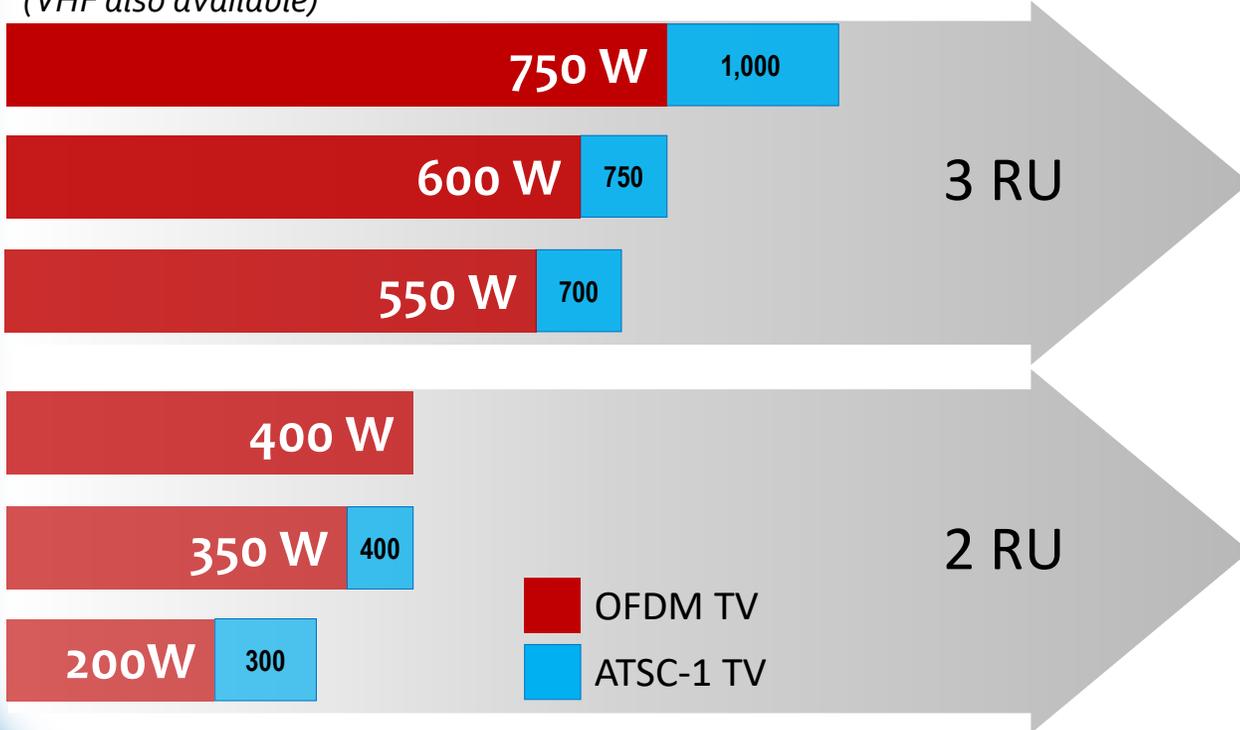
- Plug-in PA Module Assembly
- Complete unit is easily removed and replaced in a few minutes



# 2RU AND 3 RU SINGLE CHASSIS UNITS

2 & 3 RU Models – All can be configured as Transmitters or Transposers/On-Channel Gap Fillers

*All feature Doherty HE PA stage - UHF digital power levels shown  
(VHF also available)*



## UAX / VAX OP SERIES

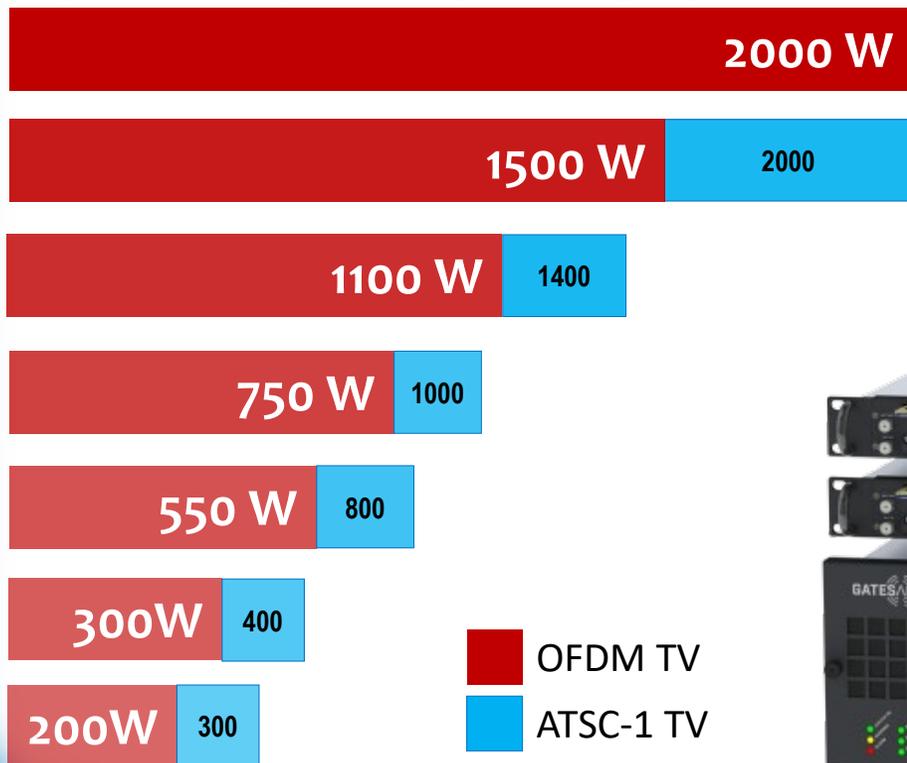
- Separate Exciter/Driver + PA Module
- Available output power: 200W to 2,000W
- Efficiencies typical 38% to 41%
- Adaptive pre-correction circuits with MER up to 39-40dB, typical
- Same input interfaces options as 1RU
- Embedded ASI & RF Switch Over matrix for Dual Redundant Exciters
- Hot Swappable Power Supplies
- ATSC-1, DVB-T, DVB-T2, ISDB-Tb, DAB+, Analogue



# UAX / VAX OP SYSTEMS

3+1 & 3.5+1 RU Models – All can be configured as Transmitters or Transposers/On-Channel Gap Fillers

All feature Doherty HE PA stage - UHF digital power levels shown (VHF also available)



3 + 1 RU

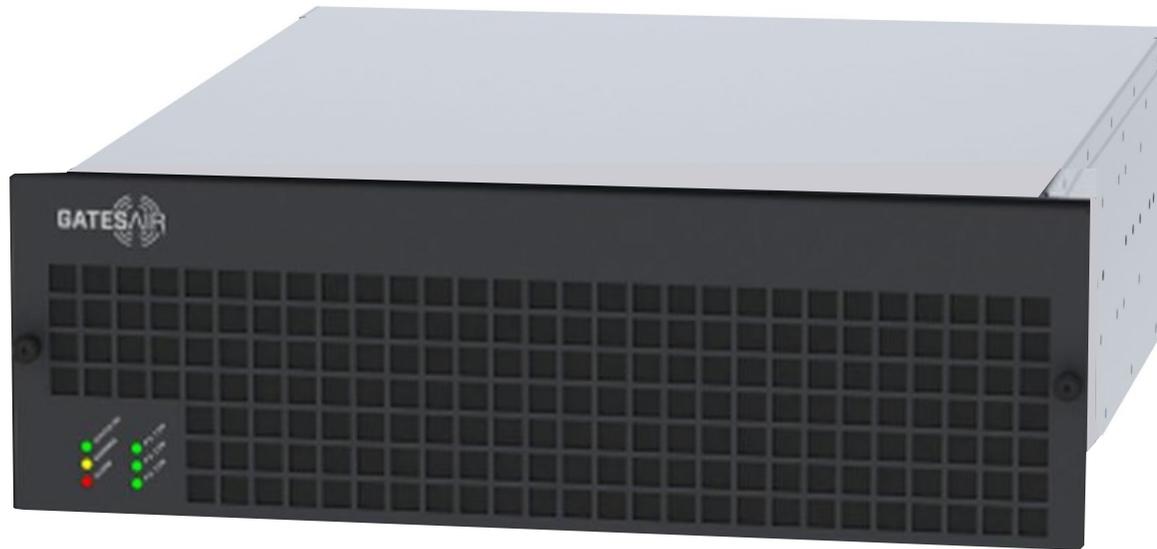


Note: Dual Drive Available

3.5 + 1 RU

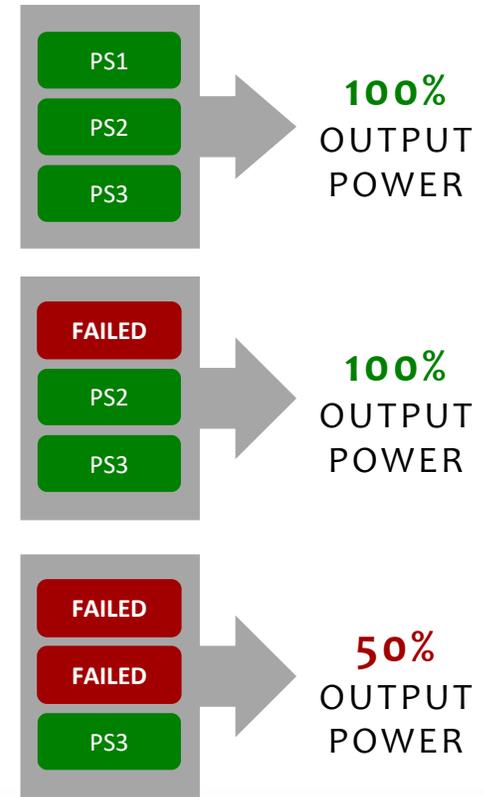


# 3.5RU PA MODULE



Note:  
Same Power supply as used in several  
other GatesAir products (FAX / FLX)

## Full Power with any PS Failure



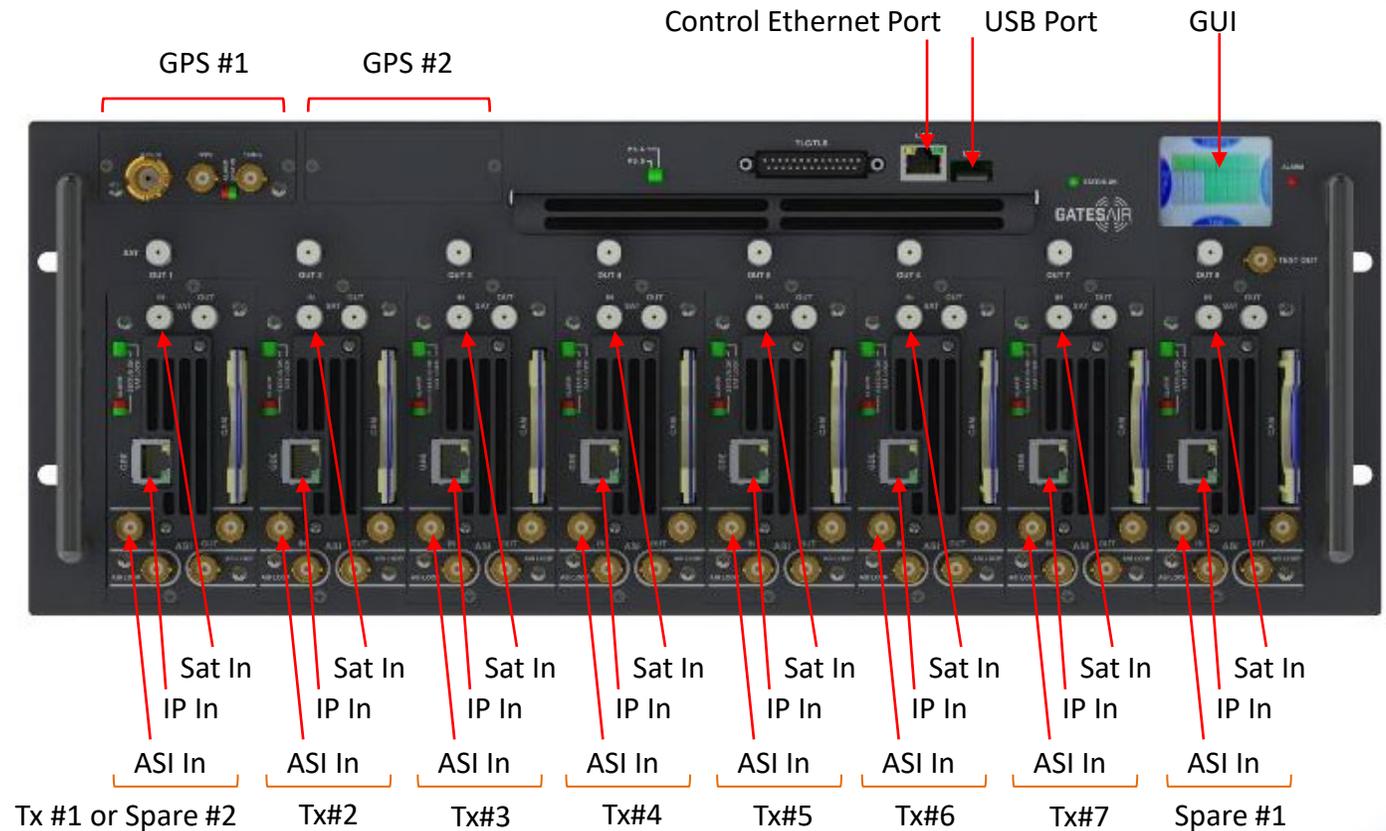
## UAX MULTI-COMPACT

- Up to 8 separate transmitter modules in a single 4 RU chassis
- Each can be configured separately
- Transmitter, Transposer or SFN Gap-Filler
- 15W per module

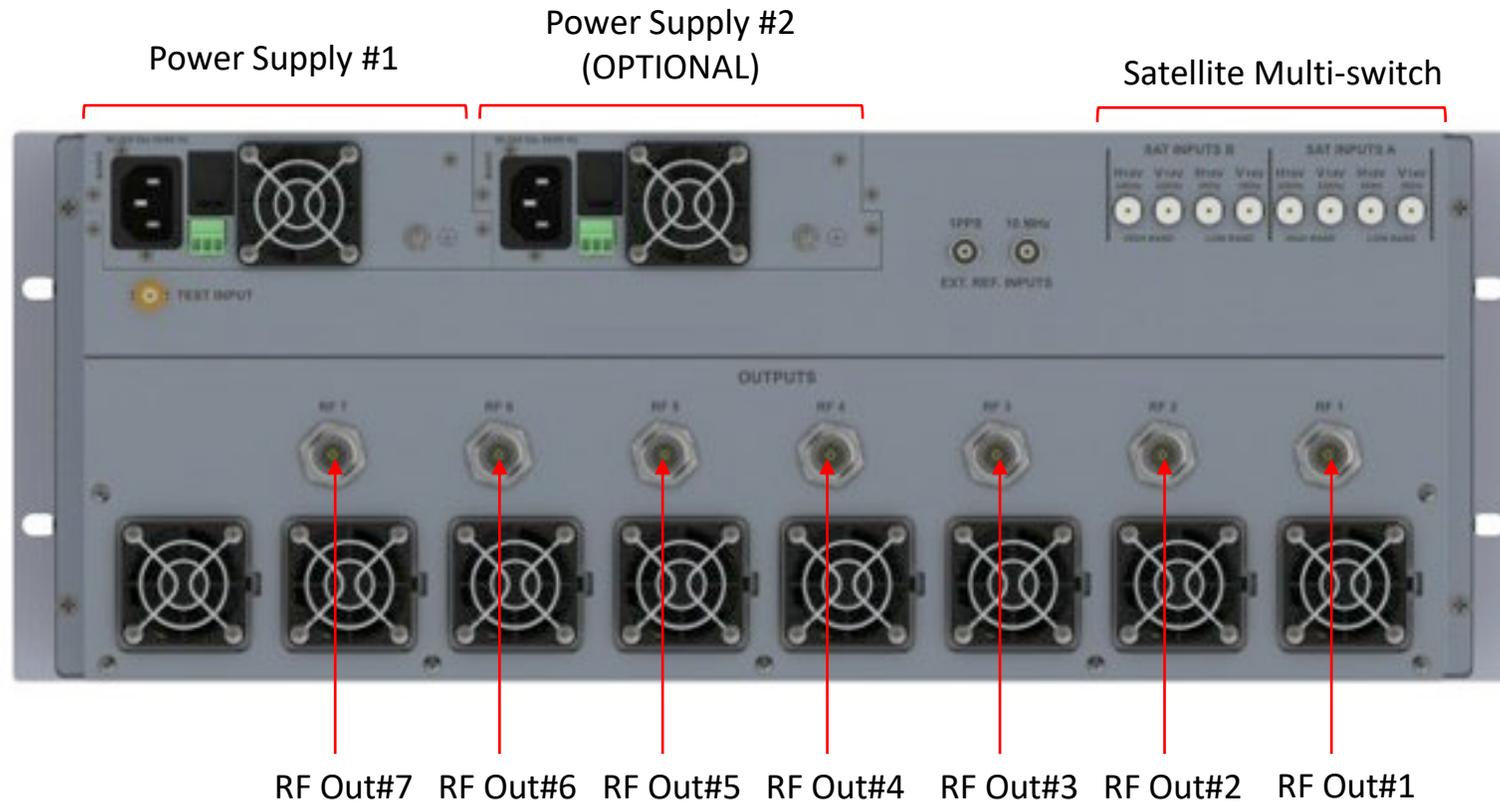


## FRONT PANEL

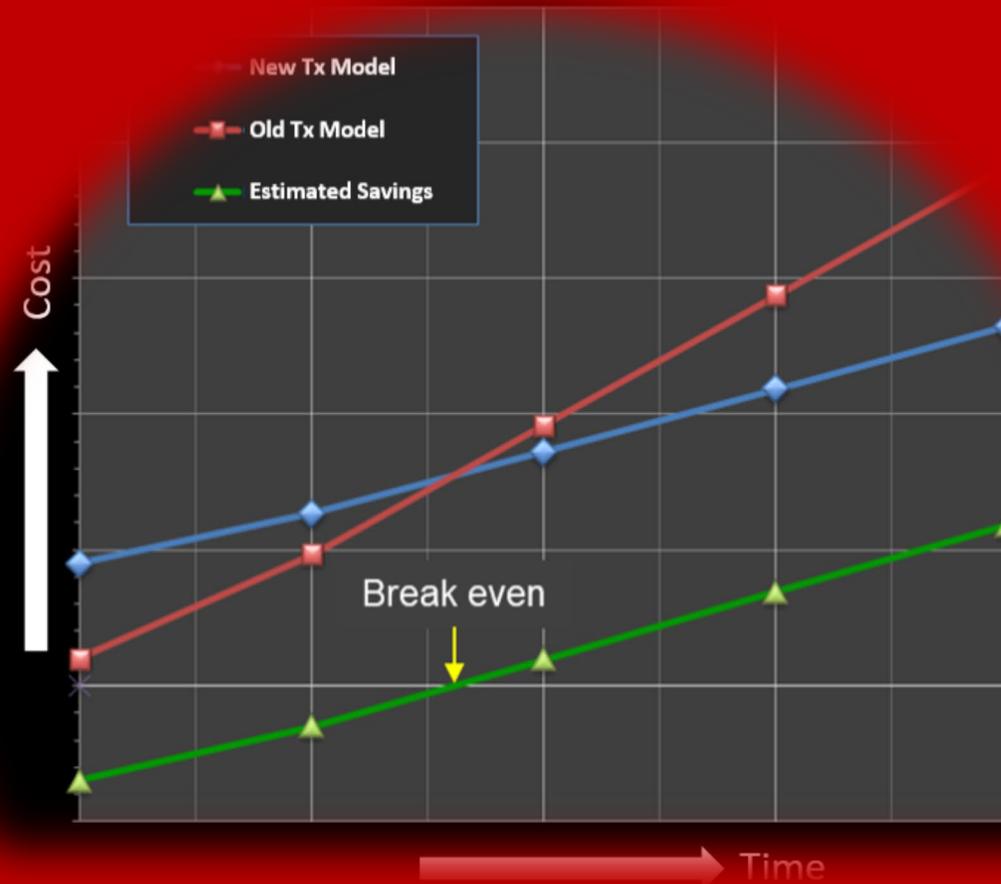
- Available output power: 8 x 15W rms
- Adaptive pre-correction circuits with MER up to 42 dBs
- ASI + IP + DVB-S/S2/S2 + RF input interfaces
- Embedded switch over matrix for 6+2 or 7+1 configurations
- Optional dual redundant GPS receiver & dual power supplies



## REAR PANEL



# EFFICIENCY AND TOTAL COST OF OWNERSHIP (TCO)



# LPTV TRANSMITTERS AND TCO

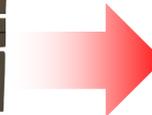
- There are some compelling reasons to update older equipment:
  - Efficiency has significantly improved, reducing electrical energy costs
  - Reduce room HVAC costs
  - Dramatically reduce maintenance/adjustment (reduce site visits)
  - Older units often difficult to repair
  - Parts availability!
  - Recent calculations for one customer:
    - Breakeven in < 3 years

*To be covered in more detail at a later Virtual Event (May 7<sup>th</sup>)!*

Total Cost of Ownership (TCO): The Economics of Deploying High-Efficiency Transmitters - <https://go.gatesair.com/virtual-events.html>



2007 [Mxi Series]  
200W ATSC  
13.3% Efficient  
6 RU height



2020 [UAXTE-400-UC]  
400W OFDM/ATSC  
37% Efficient  
2 RU height



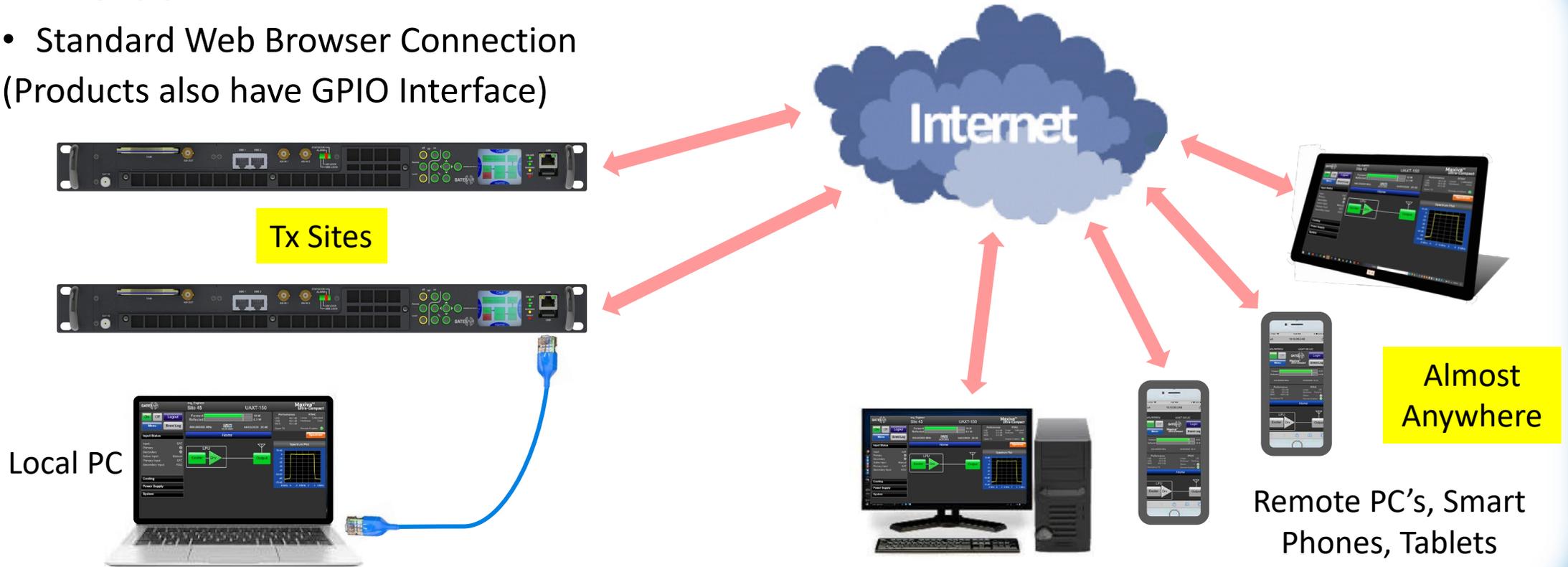
2 x Power  
3 x Smaller  
3 x Efficiency  
= **18 x "better"!**



# INTUITIVE GUI AND ENHANCED SECURITY FEATURES



- HTML-5 GUI
  - Standard Web Browser Connection (Products also have GPIO Interface)



HTML-5 GUI Screens captured remotely on April 3<sup>rd</sup>, 2020 remotely - Brescia (Italy) Lab unit – UAXT-150-UC

**Home Screen**

eng, Engineer  
Site 45  
UAXT-150  
Maxiva™ Ultra-Compact

Forward 10 W  
Reflected 0.1 W

Performance  
LSB: 49.0 dB  
USB: 49.0 dB  
MER: 43.0 dB

RTAC  
Linear: Calibrated  
Nonlinear: Error

666.000000 MHz  
DVB-T  
04.01.0001  
04/03/2020 20:40

Input Status  
Input: SAT  
Primary:   
Secondary:   
Active Input: Manual  
Primary Input: SAT  
Secondary Input: ASI2

Cooling  
Power Supply  
System

Home

Spectrum

Spectrum Plot

10 dB  
0  
-10  
-20  
-30  
-40  
-50 dB  
-60  
-70 dB

-6 MHz -4 -2 0 MHz 2 4 6 MHz

LPU  
Exciter → Drv → Output

Home Screen

**FTR GNSS Status**

eng, Engineer  
Site 45  
UAXT-150  
Maxiva™ Ultra-Compact

Forward 10 W  
Reflected 0.1 W

Performance  
LSB: 49.0 dB  
USB: 49.0 dB  
MER: 43.0 dB

RTAC  
Linear: Calibrated  
Nonlinear: Error

666.000000 MHz  
DVB-T  
04.01.0001  
04/03/2020 20:37

Input Status  
Input: SAT  
Primary:   
Secondary:   
Active Input: Manual  
Primary Input: SAT  
Secondary Input: ASI2

Cooling  
Power Supply  
System

FTR GNSS Status

GNSS: GPS  
Sat In View: 14  
Sat Used: 8  
Time (UTC): 19:34:58  
Latitude: 45° 30' 56.7"  
Longitude: 10° 9' 30.4"  
Altitude: 125.016 m

Satellite SNR (dB)

60  
50  
40  
30  
20  
10  
0

1 7 8 10 11 14 16 20 21 22 26 177 30 32

SV ID

■ Satellite in use, SNR >= 5 dB  
■ Satellite not used, SNR >= 5 dB  
■ Satellite not used, SNR < 5 dB

FTR GNSS Status

- The Event Log screen
  - Filter enables Faults, Warnings, Info, Events to be selected
  - Active only, Active + Cleared, Cleared
  - Functions available for print file, e-mail and log file

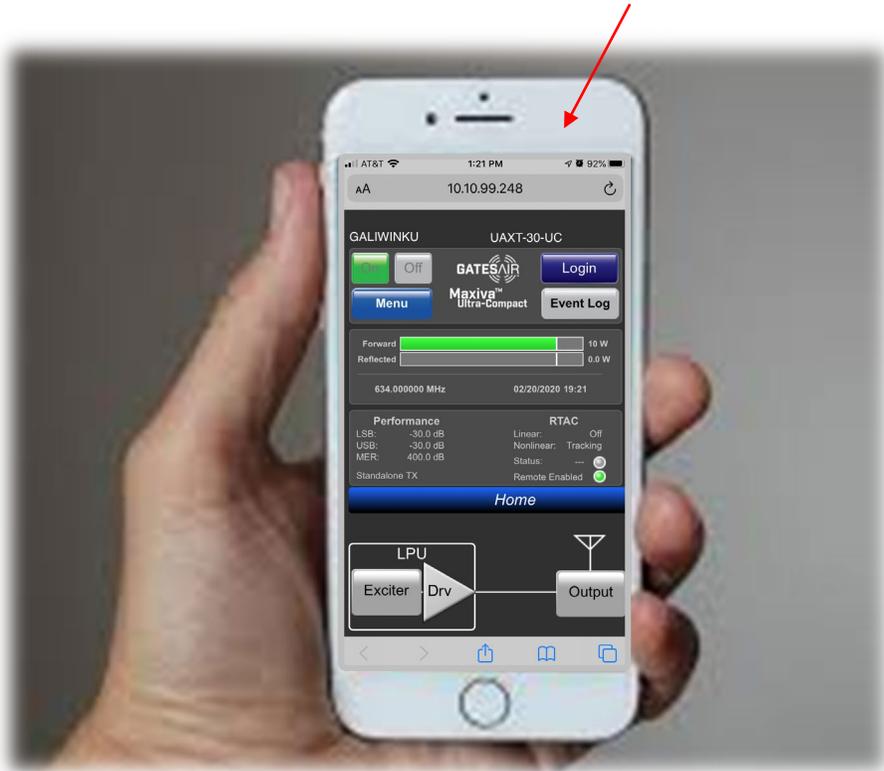
Captured April 3<sup>rd</sup> remotely:  
Brescia (Italy) Lab unit – UAXT-150-UC




The screenshot displays the GATESAIR remote GUI for Site 45, UAXT-150. The interface includes a navigation menu on the left with options like Home, Event Log, Input Status, Cooling, Power Supply, and System. The top status bar shows power levels (Forward 10 W, Reflected 0.1 W) and performance metrics (LSB, USB, MER). The central event log table lists various events and warnings, such as 'Operating Status = Operative' and 'Shoulder Under Threshold'. A filter menu is open, allowing selection of event types (Faults, Warnings, Information, Events) and active states (Active+Cleared, Active Only, Cleared Only).

Event Log

Content auto-fits rotated mobile tablet and phone devices



## 1. E-mail with encrypted security features

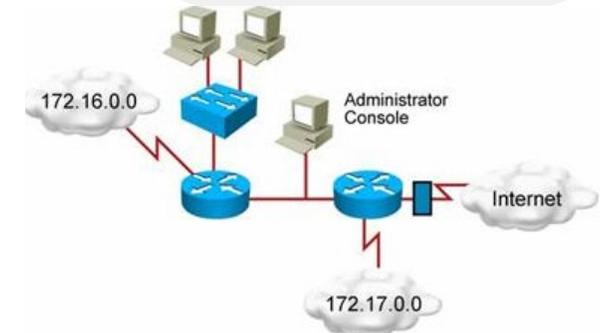
- Transmitters will have the ability to send an e-mail to up to 5 addresses, when a fault and/or warning occurs. Encryption can be enabled/disabled. In addition, a fault log can be optionally attached.

## 2. Access Control List

- Customers can limit staff who can access the transmitter management interfaces. The user adds the IP address and subnet mask of systems allowed to access the transmitter in the IP access table. Using the subnet mask, you can open it to every computer on a particular subnet, or limit it to single computer, using a 255.255.255.255 subnet mask.

## 3. LDAP (*Lightweight Directory Access Protocol*)

- For those customers using LDAP on their network, we've added a LDAP client. If LDAP is enabled on the transmitter, login credentials are first sent to the configured LDAP server to be validated before allowing access to changing system parameters. If the LDAP server can't be reached, the credentials are checked against the local user accounts and access is allowed if they match.



# ADVANCED SECURITY FEATURES

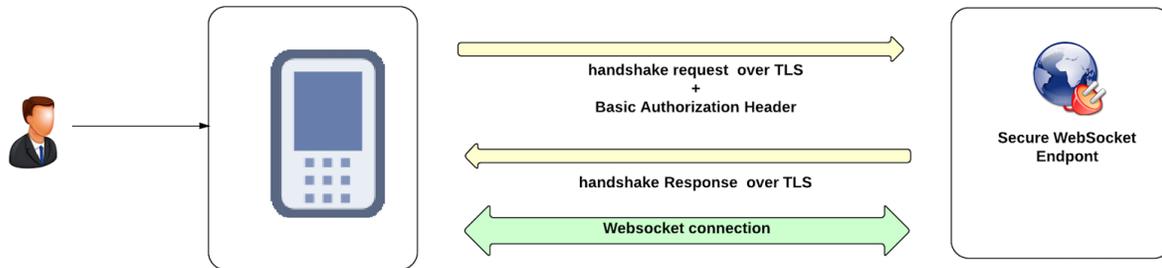


## 4. Secure Web GUI

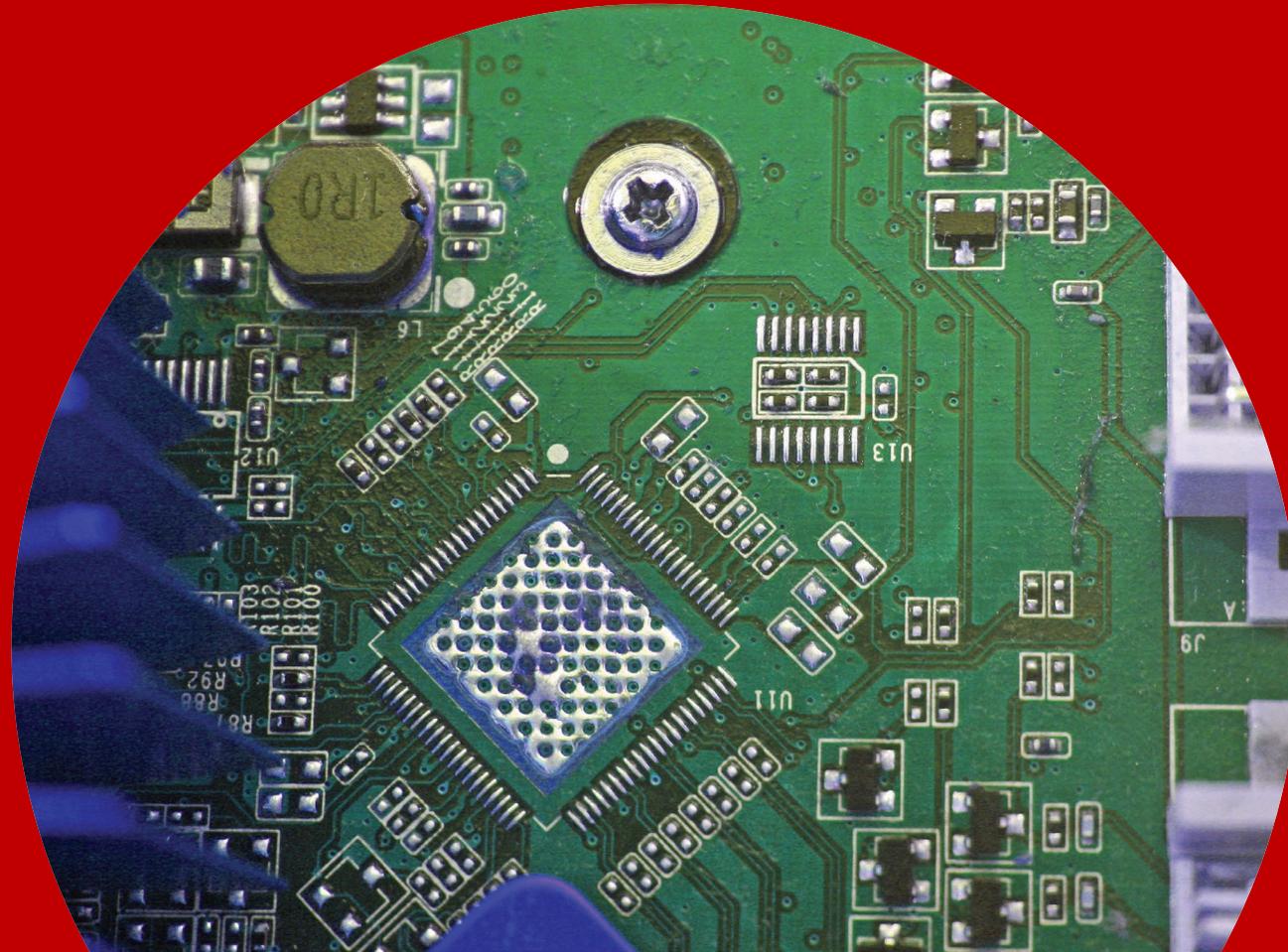
- A customer can now select if they want a secure web GUI. On our Linux based products, it's a typical **https** (*Hypertext Transfer Protocol Secure*) connection. All data and commands flow through the **https** connection.

## 5. Secure WebSocket

- On some products with less processing power, we are using a technology called “**Secure WebSocket**”. All commands and configuration data are passed through the encrypted socket. Non-critical data such as meter information are passed as before using unencrypted sockets.



# INTEGRATED INPUT OPTIONS



- **Receive Cards**

- Off-Air Receivers
- Satellite Receiver

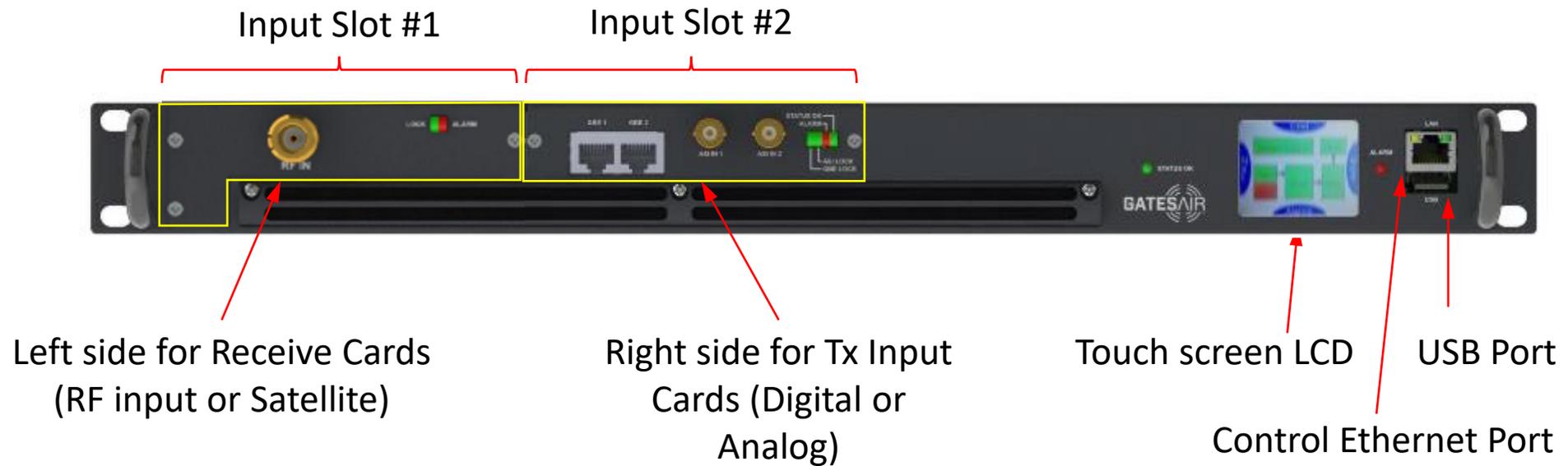
- **Tx Input cards**

- ASI / T2MI / SMPTE-310M
- TSoIP
- Analog Video/Audio



## FRONT PANEL

Note that one or two input cards can be used, for flexibility



# 4 X ASI INPUT CARD

Input Slot #2



- For use in all GatesAir SRL Systems: UltraCompact, UAX/VAX-OP and ULX/VLX-OP models
- **4 x ASI** (Also used with **T2MI** or **SMPTE-310M**)
- Can seamlessly switch between any two of these inputs
- Lowest cost card for basic DTV tx systems



# 4 X ASI + ANALOG INPUT CARD

Input Slot #2



- For use in all GatesAir SRL Systems: UltraCompact, UAX/VAX-OP and ULX/VLX-OP models
- **4 x ASI** (Also used with **T2MI** or **SMPTE-310M**)
- **1 x Video / Audio** for analog systems
- “DualCast” software available

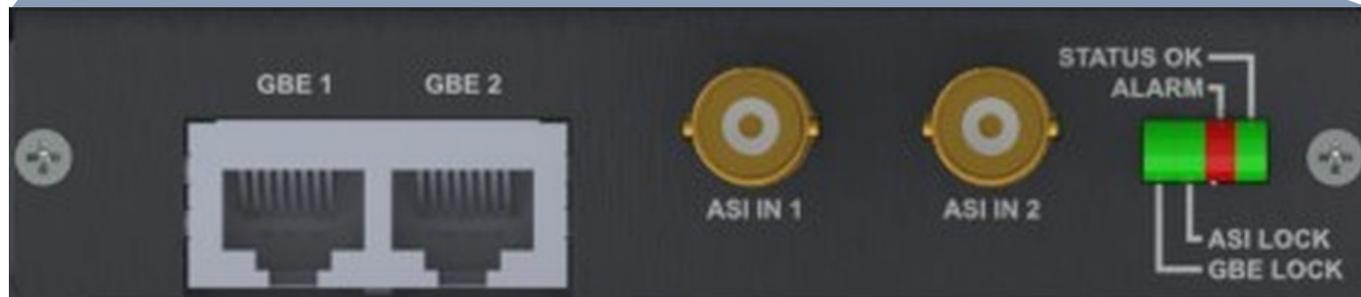


## 2 X ASI + 2 X TSoIP INPUT CARD

Input Slot #2



- For use in all GatesAir SRL Systems: UltraCompact, UAX/VAX-OP and ULX/VLX-OP models
- **2 x ASI** (Also used with **T2MI** or **SMPTE-310M**)
- **2 x TSoIP / a.k.a. GbE** (or ASI over IP) - Encapsulates the native Transport Stream into IP packets
- Can switch between any combination of 2 inputs



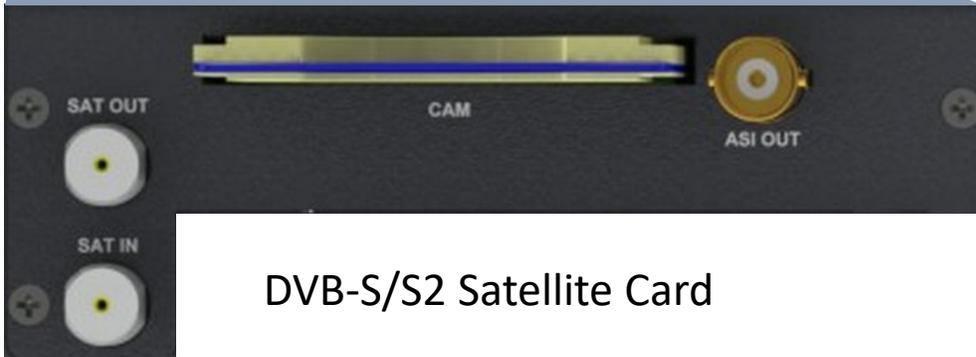
Input Slot #1



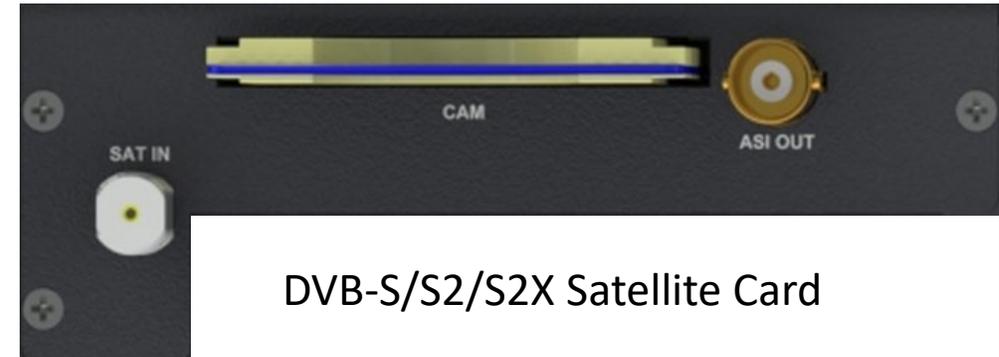
- For use in all GatesAir SRL Systems: UltraCompact, UAX/VAX-OP and ULX/VLX-OP models
- **1 x RF Input**
- 4 Versions:
  1. Direct Conversion (Zero IF) – used for on-channel gap fillers or Transposers (OFDM)
  2. Regenerative OFDM – Used for high quality Transposers
  3. Regenerative ATSC - Used for high quality Transposers
  4. ATSC Spectrum Restorer – Used for On-Channel ATSC Gap Fillers only (Includes new modulator board)

# SATELLITE INPUT CARDS

Input Slot #1



DVB-S/S2 Satellite Card



DVB-S/S2/S2X Satellite Card

- For use in all GatesAir SRL Systems: UltraCompact, UAX/VAX-OP and ULX/VLX-OP models
- **1 x SAT Input**
- 2 Versions
  - DVB-S/S2 (existing design)
  - DVB-S/S2/S2X (New version released soon)

# GATESAIR DVB-S2 GUI SCREENS

VIRTUAL events

HTML-5 GUI Screens captured remotely on April 15<sup>th</sup>, 2020 remotely - Brescia (Italy) Lab unit – UAXT-150-UC

**Site 45 UAXT-150 Maxiva™ Ultra-Compact**

Forward 10 W, Reflected 0.1 W

Performance: LSB: 47.0 dB, USB: 49.0 dB, MER: 43.0 dB

RTAC: Linear: Calibrated, Nonlinear: Tracking

666.000000 MHz, DVB-T, 04/15/2020 18:00

**Satellite Receiver**

**Input Status**

Input: SAT  
Primary:   
Secondary:   
Active Input: Manual  
Primary Input: SAT  
Secondary Input: ASI2

**RF**

Tuner Lock:

IF Frequency (MHz): 1885  
Power (dBuV): 75  
Power (dBm): -32  
Standard: DVB-S2  
Link Margin (dB): 4.6  
Frequency Error (KHz): 5  
MER (dB): 11.6  
BER: <10-8

**DVB-S2**

ISI: 1  
FEC Mode Code: 8PSK 3/5  
FEC Frame: Normal  
ISSY: Off  
Pilot recognized: On  
PLS code active: 131070

**TS**

Transport Stream ID: 1  
Bit Rate (Mbps): 22.39  
Network ID: 12289

**CAM Service Descrambled**

Name	Status	Set
Rai 1	Not Descrambled	<input type="radio"/>
Rai 2	Not Descrambled	<input type="radio"/>
Rai 3	Not Descrambled	<input type="radio"/>
Rai Radio1	Not Descrambled	<input type="radio"/>
Rai Radio2	Not Descrambled	<input type="radio"/>
Rai Radio3	Not Descrambled	<input type="radio"/>
Test HEVC main10	Not Descrambled	<input type="radio"/>
Rai News 24	Not Descrambled	<input type="radio"/>

CAM Name: NOT PRESENT  
CAM Reset

**Smart Card**

Operator:   
Classes:   
Rights:   
Serial Number:   
Download Info

**Site 45 UAXT-150 Maxiva™ Ultra-Compact**

Forward 10 W, Reflected 0.1 W

Performance: LSB: 47.0 dB, USB: 49.0 dB, MER: 43.0 dB

RTAC: Linear: Calibrated, Nonlinear: Tracking

666.000000 MHz, DVB-T, 04/15/2020 18:02

**Satellite Receiver Config**

**Input Status**

Input: SAT  
Primary:   
Secondary:   
Active Input: Manual  
Primary Input: SAT  
Secondary Input: ASI2

**Cooling**

**Power Supply**

**System**

Local Oscillator: 9750  
Frequency: 11635  
Symbol Rate: 30000  
LNB Supply: 18V  
DiSeqC: Off  
ISI: 1  
Multi Stream Mode: Multi Stream

**PLS Configuration**

PLS Mode: PLS 2  
PLS 1 Code: 131070  
PLS 2 Code: 131070  
PLS 3 Code: 262140

**CAM Service Descrambled**

Service	Enable
Rai 1	<input type="checkbox"/>
Rai 2	<input type="checkbox"/>
Rai 3	<input type="checkbox"/>
Rai Radio1	<input type="checkbox"/>
Rai Radio2	<input type="checkbox"/>
Rai Radio3	<input type="checkbox"/>
Test HEVC main10	<input type="checkbox"/>
Rai News 24	<input type="checkbox"/>

Download List

**Alarm Threshold**

MER On (dB): 5  
MER Off (dB): 6  
BER On (dB): 1X10-6  
BER Off (dB): 1X10-6

**Sat Alarms**

Unlock:   
LNB Overload:   
MER:   
BER:

**CAM Alarms**

TS Change:   
No CAM:   
No Smart Card:   
Encrypted:

**BISS CAM**

Service To Set: All  
BISS Mode: 1(8-byte key)  
Service ID (hex):   
Session Word (hex):   
Injected ID (hex):   
Set Keys

# INPUT CARDS – SOME SELECTIONS



**Transmitter (Digital)**

4 x ASI



**Transmitter (Analog & Digital)**

4 x ASI + Analog



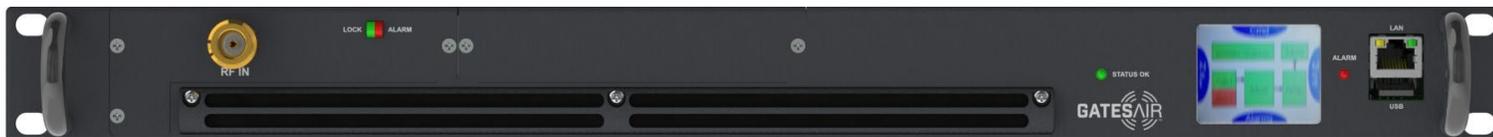
**Transmitter (Digital)**

2 x ASI + 2 x TSoIP (2 x GbE)



**Transposer (Regenerative)**

1 x RF (Regenerative)



**SFN Gap Filler OFDM**

1 x RF (Direct Conversion)



**Satellite In + Transmitter (Digital)**

Sat In + 2 x ASI + 2 x TSoIP (GbE)

# THANKS FOR WATCHING QUESTIONS?

More Upcoming Virtual Events: <https://go.gatesair.com/virtual-events.html>



Martyn Horspool  
Product Manager, TV Transmission  
[martyn.horspool@gatesair.com](mailto:martyn.horspool@gatesair.com)

