Antenna-mounted receivers for C-band weather radars

/ THE QUICK, EASY WAY TO UPGRADE TO DUAL POLARIZATION.
All the benefits of dual polarization without the downtime and cost

With their precise rainfall measurement capacity, dual-polarization weather radars have superseded single-polarization radars as the standard for modern systems. But upgrading old single-polarization radars has been an expensive and time-consuming project – until now. Vaisala’s new antenna-mounted receivers have changed all that.

Now you can reap all the benefits of dual polarization for a fraction of the cost, and – just as importantly – in a fraction of the time. Vaisala’s new antenna-mounted receivers allow you to upgrade, rather than completely replace, your existing single-polarization system. Apart from the obvious data quality and availability benefits this brings, it will also greatly reduce your maintenance costs – and at a lower initial investment than a full radar replacement.

Dual polarization in less than two weeks
An antenna-mounted receiver makes it possible to send and receive both signal channels through one channel rather than separately through the pedestal. As the need for expensive and time-consuming mechanical modernization of the pedestal is eliminated, the upgrade is simple and quick to perform. The upgrade is a tried and tested one-size-fits-all product that only requires minimal site-specific adjustments.

Before each installation, we carry out a detailed site survey to ensure that the upgrade is suitable for your equipment and that the installation phase proceeds quickly and smoothly. Each delivery has its own defined project flow that details exactly what will happen when. Our extensive project-management expertise means that we can typically have your upgrade fully operational with less than two weeks’ radar downtime.

Easy maintenance
The savings don’t stop when the upgrade is installed – maintenance costs over the upgraded radar’s remaining lifetime will also be considerably lower than your current radar. Because calibration and so much of the maintenance can be carried out online, there is less need for site visits, reducing associated travel and labor costs. And when a technician is required on site, the easily accessible and replaceable units mean that repairs are quick and easy.

Better for your budget, better for the environment
Extending the lifetime of existing mechanical hardware, rather than scrapping it prematurely, not only makes financial sense, it makes environmental sense too, as no new natural resources need to be used.

Is an upgrade the right choice for you?
For many organizations, upgrading to dual polarization makes more sense than completely replacing existing single-polarization technology. If you have a good enough antenna and mechanical parts that will last another ten years, you will benefit from the upgrade. For older systems, the mechanical hardware will likely fail before the lifetime of the upgrade is over, so full replacement with a dual-polarization radar, such as Vaisala WRM200, would be the better option.

Contact sales@vaisala.com to find out whether upgrading to dual polarization is right for you.

Updated components are shown in blue.
Benefits of upgrading to dual polarization
Weather radars upgraded with Vaisala's dual-polarization solution offer a host of advantages over their single polarization predecessors.

**Improved data quality**
- Quantitative precipitation estimation
- Hydrometeor classification
- Elimination of non-meteorological targets
- Attenuation correction
- Better detectability of weak precipitation
- The latest software and algorithms

**Enhanced data availability**
- Remote data monitoring and control
- Remote calibration and maintenance

**Site survey**
A site survey checks details like antenna type and hardware to ensure an upgrade is feasible.

**Minor site-specific adjustments**
The AMR is a one-size-fits-all product so only minimal additional planning is needed.

**Building and delivery**
After the AMR is built, it is thoroughly tested before delivery to the site.

**Installation**
Highly experienced Vaisala service personnel carry out the installation.

**Operation**
After site acceptance testing, the new C-band radar is ready for use.

**Customer training**
Vaisala provides training to ensure customers receive maximum benefit from the upgrade.

**AMR installation component set.**
Technical data

System Specifications
Dual polarization receiver
STAR and LDR
Calibration
Built in automatic and remote calibration
Supported transmitter technology
Designed for magnetron systems

Physical and Environmental Specifications
UNITS INSTALLED INSIDE RADOME
Ingress protection rating
IP54
Operating temperature range
-40 ° to +55 °C
Storage temperature range
-50 ° to +60 °C
Humidity
up to 100 %
Pressure
700 ... 1100 hPa
Antenna mounted receiver unit
Physical dimensions (w x h x d)
800 x 564 x 367 mm
Weight
36.5 kg
Temperature stabilization
Thermoelectric
Vibration
Sensitive parts vibration isolated
WAVEGUIDE MATRIX
Physical dimensions (w x h x d)
816 x 542 x 259 mm
Weight:
16 kg
POWERSupply UNIT
Physical dimensions (w x h x d)
331 x 386 x 201 mm
Weight:
12 kg
UNITS INSTALLED IN EQUIPMENT ROOM
Ingress protection rating
IP54
Operating temperature range
-25 ° to +40 °C
Storage temperature range
-50 ° to +60 °C
Humidity
up to 100 %
Power reset unit
Physical dimensions (w x h x d)
235 x 600 x 200 mm
Weight:
15 kg

Operating voltages and Power consumption
RECEIVER UNIT, WAVEGUIDE MATRIX, POWER SUPPLY UNIT AND POWER RESET UNIT
Input voltage
100 – 240 VAC, 50 – 60 Hz
Power consumption
750 W (max), 500 W (typical)
RADAR SERVER COMPUTER
Input voltage
100 – 240 VAC, 50 – 60 Hz
Power consumption
1050 W (max), 200 W (typical)

Interfaces
Data connection
Ethernet interface min. 1 Mbit/s
Transmitter trigger
default 5 V, 50 ohm, surge protected
Remote reset
GSM quad band 850/900/1800/1900, SMS control
Radar control interface
Vaisala RCP8 interfaces and IO62 panel

Waveguide matrix
Waveguide type
WR187
Operating frequency range
5.5 ... 5.7 GHz
Peak power
max 300 kW
Average power
max 600 W
Duty cycle
max 0.12 %
Pulse width
max 3.0 μs
PRF
max 2400 Hz
VSWR
< 1.2

RF-to-IF Receiver
Type
Dual stage, dual channel IF down converter
Dynamic range
> 99 dB (2 μs pulse)
IF frequency
442/600 MHz
Image rejection
>80 dB
Tuning range
5.5 ... 5.7 GHz
Noise figure
< 2 dB

Digital Receiver and Signal Processor
Signal processor type
VAISALA RVP900
IF digitizing
16 bits, 100 MHz in 5 channels
Range resolution
N*15 m
Number of range bins
Up to 4200
Maximum Range
1024 km
Processing Modes
PPPF/FFT/DFT, Random Phase
Data Outputs (8 and 16 bit)
Z, Zc, ZHV, W, ZD, ZDR, LDR, RH0HV, PHIDF and KDP
Optional Data Outputs
HCLASS, IQ
High Sensitivity STAR mode Processing
>3dB improvement in detectability
Azimuth Averaging
2 to 1024 Pulses
Velocity de-aliasing
Dual PRF/Velocity de-aliasing 2:3, 3:4, or 4:5 for 2X, 3X or 4X de-aliasing
Range de-aliasing
Random phase
Clutter filters
IIR, Fixed and Adaptive Width or GMAP >50 dB clutter cancellation

Radar Controller
Type
VAISALA RCP8 with IRIS/Radar
Scan modes
PPI, RHI, Volume, Sector, Manual
Local display
Real time, ascope, BITE, products
Radar control interface
RCP8 interfaces

Options
Optional wide dynamic range receiver
>115 dB

For more information, visit www.vaisala.com or contact us at sales@vaisala.com

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