Vaisala Weather Radar WRM200

Features

- 250 KW magnetron transmitter with low-maintenance solid-state modulator
- High sensitivity mode processing to recover sensitivity loss in STAR mode.
- Vaisala's lightweight, semi-yoke style pedestal
- 1 degree beamwidth low side lobe antenna
- >35 dB integrated cross-polarization isolation
- Precision horizontal and vertical beam matching
- Modular single cabinet design containing transmitter, receiver, controller, processor, dehydrator, polarization waveguide assembly
- Built around Sigmet RVP900, RCP8, IRIS software
- Dual channel digital IF receiver
- Built-in automatic dual channel calibration
- Image rejection >80 dB (>100dB with Vaisala WG filters)
- Dynamic range >99 dB (2µs pulse)
- Integral flat screen display for local maintenance
- Remote control/monitoring
- HydroClass™ for real-time target identification (hail, graupel, rain, snow, wet snow, non-met)
- Accurate attenuation correction
- Rainfall estimation based on KDP
- Option: Low-loss, random-panel radome

Dual Polarization Adds New Dimension

The WRM200 is Vaisala's new dual polarization C-band magnetron Doppler Weather Radar. The radar operates in either STAR mode (simultaneous transmit and receive of H and V) or LDR mode (linear depolarization mode, during which H alone is transmitted and both are received). STAR mode enables use of the high sensitivity power estimator increasing detectability by up to 10 dB versus the competition. The polarization variables, depending on the mode, are ZDR, RHOHV, PHIDP, KDP and LDR. However, the goal of a polarization radar is not only to produce and display these outputs; rather it is to expand the capabilities of the radar for the operational forecaster.

The WRM200 provides the following benefits:

- Hydrometeor identification
- Attenuation correction
- Data quality improvement
- Improved rainfall estimates

HydroClass™ - Seeing much More

HydroClass™ software uses polarization measurements in a proven fuzzy logic algorithm to classify targets into categories. i.e. hail, graupel, rain, snow, wet snow or non-meteorological targets (such as sea clutter, birds, insects, wind turbines, interference, or military chaff). While traditional Doppler clutter filtering can remove stationary targets, HydroClass™ can also remove moving non-meteorological targets like sea clutter. The benefit is improved data quality and more accurate warnings for hazardous weather such as hail.

S-Band Performance at a C-Band Price

Attenuation by intervening heavy precipitation has been a long-standing problem with C-band weather radars, making S-band radars preferable, especially in tropical environments where heavy rain is common. However, with dual polarization, a radar performs accurate, real-time attenuation corrections. The benefit is that you can obtain the same precipitation measurement accuracy using the WRM200 as with an S-band system that typically costs two or three times more.

Experience, Innovation and Dependability

Vaisala Sigmet Product line has three decades of experience in providing signal and data processing systems for dual polarization applications, and delivers more dual polarization processing systems than any other manufacturer. Vaisala and Sigmet, as a part of Vaisala, continue developing the dual polarization applications with respected consultants in the research community.

Technical Data

System Performance

Modes	STAR or LDR
Phase stability	<0.5 deg rms
Maximum RhoHV	>0.99

Transmitter

Type	Coaxial magnetron
Operating frequency range	5.5-5.7 GHz
Peak power	250 kW
Average power	max 300 W
Duty cycle	0.12 %
Pulse widths	0.5, 0.8, 1.0, 2.0 µs
PRF	200 to 2400 Hz
Modulator	Solid State

Antenna

Type	Center-fed parabolic reflector
Diameter	4.5 m
Gain (typical)	45 dB
Beam width	<1 degree
Peak side lobe (typical)	-28 dB
Peak on horizontal axis (typical)	-33 dB
Integrated cross-pol	<-35 dB
H/V alignment (squint angle)	<0.1 degrees
Weight	620 kg

Pedestal

Type	Semi yoke elevation over azimuth
Elevation range	-2 to 108 degrees
Maximum scan rate	40 deg/sec
Acceleration	20 deg/sec^2
Position accuracy	Better than 0.1 deg
Weight	910 kg (total with antenna 1530 kg)
Motors	Brushless AC servo

RF-to-IF Receiver

Type	Dual stage, dual channel IF downconverter
Dynamic range	> 99 dB (2 µs pulse) > 115 dB option
IF frequency	442/60 MHz
Image rejection	>80 dB (>100dB with Vaisala WG filters)
Tuning range	5.5 - 5.7 GHz
Noise figure	< 2 dB

Digital Receiver and Signal Processor RVP900

Signal processor type	VAISALA SIGMET RVP900
IF digitizing	16 bits, 100 MHz in 5 channels
Range resolution	N*15 m
Number of range bins	Up to 4200
Velocity dealiasing	Dual PRF 2x, 3x, 4x
Range dealiasing	by random phase
Clutter filters	fixed, adaptive or GMAP
	to >50 dB clutter cancellation
High sensitivity STAR mode processing:	>3 dB dB detection gain

Radar Controller

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

System Specifications

PHYSICAL DIMENSIONS

Cabinet (w x h x d)	600 x 1800 x 1150 mm
Cooling	Air-conditioned
Weight:	380 kg
Total height	1890 mm

CABINET ENVIRONMENT

Operating	+10 ° to +40 °C, 0 to 95 %R.H., non-condensing
Recommended	+15 ° to +25 °C
Storage	-50 ° to +50 °C

ANTENNA/PEDESTAL ENVIRONMENT

Operating	-40 ° to +55 °C, 0 to 95 %R.H., non-condensing
Storage	-50 ° to +60 °C

INPUT POWER

Voltage	230/400 VAC ±10 %, 50 - 60 Hz ±5 %

POWER CONSUMPTION

Cabinet	2650 W
Antenna/Pedestal:	1050 W (max), 200 W (typical)

UPS

Size (w x h x d)	305 x 817 x 702 mm
Weight	165 kg
Uptime	Not less than 30 min

Options

Radome	Typical 6.7 m, foam core sandwich, random panel

Automatic calibration
Forward and reverse
transmitted power monitoring

CE