Optimized Dual Polarization Performance

/ VAISALA WEATHER RADARS

VAISALA

For decades, Doppler weather radar has been one of the most important tools for meteorologists. The weather radar has always been the most important tool for nowcasting and related applications, such as aviation and severe weather monitoring. Today's weather radar technology employs dual polarization technology to produce clear, clutter-free high-resolution pictures of rainfall events. Dual polarization weather radar has become the standard for modern weather radar systems.

Developed in collaboration with leading universities in the US and Finland, Vaisala Weather Radars are designed to meet the most demanding customer requirements. Intelligent mechanical design, online remote monitoring and control, as well as calibration and data monitoring utilities, produce superior data quality and high data availability when combined with dual polarization technology. This enables the delivery of world-class radar applications incorporating intuitive graphical displays.

Vaisala Dual Polarization Weather Radar brings additional value to users by providing precise quantitative precipitation estimation (QPE). This method allows meteorologists to gather rainfall accumulation measurements that support the authorities in everything from aviation safety and flood warnings to hydropower optimization. Vaisala C-band

Applications

- Weather surveillance
- Severe weather monitoring
- Hydrometeorological applications, such as flood forecasting
- Airport wind shear detection
- Hurricane/typhoon/cyclone tracking
- Hail detection
- Weather modification
- Agriculture
- Meteorological research
- Launch support systems

Optional functionalities

- Weather radar networking
- Vaisala Rain Gauge Network
- Vaisala Lightning Detection Network
- Weather satellite images composites
- Vaisala Automatic Weather Stations
- Low Level Wind Shear Alert System Integration (LLWAS)

dual polarization magnetron and klystron weather radars incorporate HydroClass – the world's first automatic hydrometeor classification software for dual polarization radars – which enables meteorologists to clearly distinguish between variations in types of precipitation. In addition to melting height detection, Vaisala Dual Polarization Weather Radars also enable improved data quality through the elimination of moving, non-meteorological targets.

Optimized antenna performance

The antenna plays a vital role in determining the overall quality of radar data. For this reason, the radar antenna dish shape and structure have been carefully designed to optimize the radar's performance for dual polarization. This precision design, combined with a slightly larger than normal dish – with a beam width of less than one degree and a tapered feed pattern – provides excellent side-lobe performance. Vaisala's balanced and lightweight antenna pedestal also gives more flexibility in scanning strategy, and the integrated cross-polarization isolation is greater than -35 dB, making it the best in the industry. All Vaisala antennas are subject to comprehensive field testing to ensure they deliver the highest standards of performance and quality for every customer.

World-leading data processing quality with Sigmet

Vaisala Weather Radars provide comprehensive 16-bit/100 MHz digital receiver and signal processing functions on an industry-standard Linux platform for flexibility and ease of use. Fast processing enables the use of sophisticated clutter filtering in real time. Vaisala Sigmet Digital Receiver and Signal Processor RVP900 and Interactive Radar Information System IRIS bring you the world's most sophisticated application software and signal processing, with a scalable architecture that works with either a single radar or a large network of radars. Used in hundreds of weather radars around the world, it is the most comprehensive, user-friendly and robust software package in the industry.

Simplified maintenance

The Vaisala Weather Radar system is a cost-effective solution for a wide range of weather-related applications. Vaisala systems can be accessed from anywhere in the world via a secure internet link, for example. This helps to minimize both the number of site visits and the Mean Time To Repair (MTTR). Single-seat network administration, testing, upgrade, and maintenance further reduce the need for site visits. In addition, high-quality components and an integrated, compact mechanical system design are key factors in delivering a high Mean Time Between Failures (MTBF).

In addition to mechanical support structures, the antenna pedestal also holds motors and drivers, gears, belt drives, shelters for control modules, and waveguide structures. Convenient hatches provide easy access for motor and bearing maintenance, and all parts can be accessed without the need to dismount the antenna or pedestal with a crane.

Furthermore, the Vaisala Radar Antenna Controller provides complete fail-safe operation to protect the antenna/pedestal structure from operating outside its limits, including an acceleration limit, slew rate limit, overspeed check, and elevation software and hardware limits. These operational parameters help to significantly reduce maintenance costs. The integrated Uninterruptible Power Supply (UPS) ensures continuous operation even during temporary power outages.

Features

- High data availability
- Industry-leading data accuracy
- Easy and reliable identification of precipitation phenomena
- Elimination of side-lobe echoes in data, enabled through ultra-low side-lobe antenna
- Pure dual-polarization data suitable for advanced dual polarization-based filtering and classification algorithms, enabled through extreme cross-polarization isolation
- Wide dynamic range
- Flexible pulse width selection
- Lightning protection

ATTENUATION CORRECTION

OPTIMIZED DUAL POLARIZATION PERFORMANCE

VAISALA KLYSTRON AND MAGNETRON WEATHER RADARS

HYDROCLASS HYDROMETEOR CLASSIFICATION

QUANTITATIVE RAINFALL MEASUREMENTS

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www.vaisala.com

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