

BlueMax G6 Instrumentation Radar System



BlueMax represents the industry standard in high-performance RCS and antenna measurements. The BlueMax G6 is highly-adaptable to meet the constantly evolving measurement industry.

- Automated calibration utilities
- Real-time imaging
- Versatile diagnostics
- Simultaneous monostatic and bistatic measurements
- Unsurpassed reliability
- Environmentally versatile
- Fast, full-polarization-matrix measurements
- Dynamic RCS measurements of moving targets (surface-based and airborne)
- Guaranteed cost of ownership for up to 5 years

BlueMax is a high-performance, wide-band Pulsed IF system capable of a pulse repetition frequency (PRF) above 2 MHz, with multiple range gates, multiple receive channels, and great frequency agility. When maximum data throughput or a very high sample rate is required, BlueMax is the answer. Redundant receive channels allow faster polarimetric measurements and use with multi-channel antennas such as tracking antennas.



RF System

BlueMax uses a common IF architecture for configuration to any desired frequency coverage. New frequency bands are added with the appropriate frequency-specific converter / HPA / LNA sub-system. Numerous loop modes at different stages in the IF and the RF circuits channel the transmit signal to the receiver allowing fast fault isolation

and convenient diagnosis of system health. An optional synthetic target generator steps up system-level diagnostics to distinguish system problems from external errors.

Signal Detection

Multiple, independent range gates sample the return at user-specified points. High-speed track-and-hold circuits

and A/D converters capture signal rise/fall times below 2 ns. BlueMax uses 16-bit A/D converters for over 70-dB dynamic range at a single pulse, and over 115-dB dynamic range with integration.

Digital System

The interface between the user-interface computer and the system hardware is digital. All system timing and control signals, receive-data processing, and data storage are digital. The digital system is based on VME64-bus architecture that provides a convenient standard interface for the data.



BLUEMAX G6 SYSTEM SPECIFICATIONS

Measurement Capabilities

| | | | |
|---------------------|---|------------------------|------------------------------|
| Frequency Coverage: | COTS 0.1 to 18 GHz coherent Expandable as required | Tx/Rx Polarization: | HH, VV, HV, VH |
| Receive Channels: | Multiple simultaneous (1, 2, 3, or 4) | Simultaneous Waveforms | 32 simultaneous, independent |

RF Performance

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|---------------------------|--|----------------------|---|
| Receiver Noise Bandwidth: | 1 to 300 MHz in 8 steps | Isolation: | Up to 120 dB |
| Receiver Sensitivity: | -85 dBm (RFBW = 100 MHz, single pulse) | Linearity: | 0.2 dB/10 dB 2 degrees/10 dB |
| Dynamic Range: | 70 dB (single pulse) | Transmit Power: | Up to +42 dBm, solid-state HPA |
| Noise Figure: | < 4 dB typical (design dependent) | Frequency Stability: | 5 x 10 ⁻⁹ /day |
| Resolution: | 0.001 dB, 0.01 degrees | LO Source: | Industry-standard frequency synthesizer |
| Frequency Waveforms: | Sequential, custom, hopped, and jittered | Multiple Pulses: | Up to 256 in the air |
| Complex Waveforms: | Intrapulse modulation, pulse compression | Multiple Frequencies | Up to 256 in the air |
| Phase Shifter: | 6 bit, 64 states | Phase Codes: | Lintek, circle, bi-phase, fixed, and custom |

Data Acquisition

| | | | |
|-------------------|---------------|----------------------|-------------|
| Detection Method: | I and Q | Output Data Format: | I and Q |
| A/D Conversion: | 16 bits | Max # of Frequencies | 128 K |
| Storage Rages: | Up to 10 Mb/s | Samples per Second: | > 2 million |

Collection Computer

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|---|---|---------------|---|
| Hardware: | High-end personal computer | Data Storage: | SCSI devices (HD, optical) Ethernet, SATA, FibreXtreme |
| Real-time Displays: (2-D, 3-D, Polar, Pixel, Waterfall, Global plots) | RCS vs. (AZ, EL, Time) Phase vs. AZ, EL, Time) RCS vs. Fine Downrange RCS vs. Frequency RCS vs. Doppler Frequency RCS vs. Doppler Velocity *numerous others | Diagnostics: | Digital and A/D statistics I/Q circularity Dual calibration Synthetic target generation (optional) Multiple loop modes Real-time subtraction |