

# RANGE INSTRUMENTATION RADAR (RIR-980)

The RIR 980 Range Instrumentation Radar is a state-of-the-art, computer-based autotracking radar, available in C- and X-Band frequencies and in mobile, transportable, or fixed installation configurations.

## RIR 980 RANGE INSTRUMENTATION RADAR

This data sheet describes a typical configuration. The RIR 980 basic design is customized and tailored to meet specific requirements.

The RIR 980 Radar System consists of an antenna/pedestal, transmitter, receiver, touchscreen-based operator's onsole, signal processor and recorder, a VME architecture computer, Windows-based PC terminal, and optional equipment.

The radar RF functions are performed with modern, conventional radar equipment but the radar calibration, digital signal processing, computation, and control functions are performed with an interactive computer. This technique greatly reduces the number of hardware circuits performing radar system functions, thereby eliminating the balance, gain, and stability problems inherent in hardware circuits and greatly improving system reliability. System operation is also enhanced by computer interaction with the mode control touchscreen to provide operator feedback.

### Typical Range @ 12dB Signal-to-Noise

ANTENNA DIA (FT)	PEAK POWER	FREQ. (GHz)	MAX RG 6 INCH SPHERE	MAX RG 12 INCH SPHERE	MAX RG 1 SQ METER
16	1MW	5.6	103 KM	146 KM	280 KM
12	1MW	5.6	77 KM	109 KM	210 KM
10	250KW	9.0	58 KM	82 KM	157 KM
8	250K2	9.0	46 KM	65 KM	125 KM

The interactive console provides the following features:

- Console alphanumerics are generated and controlled by the host computer
- Radar system status, test, and calibration
- Smooth output data in Cartesian coordinates to the second order
- Subsystem maintenance diagnostics
- Compensations are made for mount anomalies; nonorthogonality, droop, RF skew, and mislevel
- Angle servo inputs are either developed or processed by the host computer
- System reconfiguration and calibration after relocation are minimal
- Automated Pre-mission setup and calibration
- Capable of supporting remote operation

## KEY FEATURES

- Open System VME bus Architecture
- Interactive Computer Control
- Touchscreen-Based Operator Console
- Coherent-On-Receive Digital Signal Processing
- Automated Test and Calibration
- Quantifiable Static and Dynamic Calibration
- Real-Time Corrected Output Data
- Mobile, Transportable, or Fixed-Site Configuration
- Total Turnkey System or as Upgrade to Legacy Systems
- Optional Pulse Compression for Enhanced Range Resolution

**BAE SYSTEMS**

INSPIRED WORK

# TYPICAL SYSTEM CONFIGURATION

## COMPUTER

- Type: Open Architecture, VME, Power PC
- Features: Removable disk recording; High-Speed color printer

## DATA (OUTPUTS & INPUTS)

- Type: Time-tagged Polar/Cartesian position, velocity, and acceleration data
- Sample Rate: Normally, 100 samples per second
- Range Granularity: 0.5 yard
- Other rates and formats available

## DISPLAYS

- Color A-scope: Trace 1&3 - Full range uncanceled (1), Canceled (3)
- Trace 2&4:  $\pm 2k$  or  $4k$  about center of range, uncanceled (2), Canceled (4)
- Center Trace: 64 kyds sweep around range gate
- Boresight Video: Video with A,E,R,T,H alphanumeric displayed
- Optical System: Zoom optics coupled CCD high sensitivity camera
- Pulse Doppler: Coherent on Receive (Optional Fully Coherent Pulse Compression)

## ACCURACY

- (12 dB S/N ratio, excluding glint, scintillation, multipath and target induced errors)
- Angles: 0.1 Mil 1 SIGMA
- Range: < 3 Yards 1 SIGMA

## TRANSMITTER

- Type: Magnetron with solid state modulator
- Pulse Width: 0.25, 0.5, and 1.0  $\mu s$  (5 $\mu s$  optional)
- Duty Cycle: 0.001 maximum
- Pulse coding: Up to four 0.25  $\mu s$  pulses not to exceed the duty cycle.
- Detected Pulse Droop: Less than 1 dB for a group of four 0.25  $\mu s$  pulses
- Power: 250kw or 1mw (typical)

## TYPICAL OPTIONS

- IR Sensor; Video Tracker; Optics System; Graphics Station; No Drop Bomb
- Scoring; TMR Recording; IFF Acquisition; Remote-controlled Boresight, Remote Console

## ABOUT US

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## RECEIVER

- Microwave: Three-channel monopulse system with low noise RF amplifiers and built-in switchable attenuators
- Mixers: Double balanced image reject
- Local Coherent Oscillators: Two solid state, digitally controlled synthesizers that can be operated either individually or simultaneously. Tunable and frequency monitored from console
- AFC: Skin and Beacon
- IF Receiver Type: Three-channel DMTI

## ANTENNA

- Type: Cassegrain
- Polarization: Vertical linear
- Construction: One piece fiberglass or aluminum
- Feed: Four-horn monopulse

## PEDESTAL

- Azimuth Motion: Continuous
- Elevation Motion: -5 to 185 degrees
- Angular Rates\*: 30°/s
- Angular Acceleration\*: 30°/s<sup>2</sup>
- Leveling: Computer corrected
- Encoders: 19 Bits Absolute
- Radar Signal Processor (RSP)
- Type: Fully digital, coherent-on-receive 3 channel monopulse

## RADAR SIGNAL PROCESSING (RSP)

- Type: Fully digital, coherent-on-receive 3 channel monopulse

	METRIC	IRIG
RANGE COVERAGE	0 TO 524 KM@286 PRF	0 TO 512 KYDS.@320 PRF
PRFS AVAILABLE	143	160
	286	320
	572	640
	1144	1280
RANGE TRACKING VELOCITY	0-20 KM/S	0-20 KYDS./S
RANGE TRACKING ACCELERATION	0-2 KM/S <sup>2</sup>	0-2 KYDS./S <sup>2</sup>
RANGE RESOLUTION	FLOATING POINT < 0.5 M	FLOATING POINT < 0.5 IRIG
TRACKING BANDWIDTHS	PROGRAMMABLE 0.18 TO 24 HZ	

\*Higher performance pedestals available