

System Specifications

General System Description

- cPCI-based, open system architecture
- Self-contained conduction cooling
- Standard system components: antenna, pedestal, receiver/transmitter, interface unit
- System weight: typically less than 75 lbs/34 kg
- Size: R/T – 3/4 short ATR; I/U 1/2 short ATR; antenna-radome dependent
- Power required: 28V @ 22A and 115V, 400 Hz @ 100 mA
- Operating modes: search, weather, SART/Beacon; Optional: ISAR, spot SAR, strip-map SAR
- Control configuration: standalone TDMS GUI
- Special features: sector blanking, PRF jitter, frequency agility

Performance

- Detection: 1 sq. meter target beyond 15 nmi in sea state 3 from low altitude (typical)
- Maximum radar range: 120 nmi
- Display range resolution: 0.01 nmi (1 meter for imaging)
- Search radar range resolution: 26 ft.
- Azimuth Tracking accuracy: 0.5° or better
- Range Tracking accuracy: 100 meters
- Reliability: 2000 hour MTBF (Airborne Inhabited Cargo)
- DO-160D tested

Antenna

- Corporate fed planar array to fit any size radome or requirement
- Bandwidth: 300 MHz
- Gain: 26 - 31 dB (antenna dependent)
- Polarization: horizontal (vertical optional)
- Sector scan: 45° to 300° or continuous 360° scan (operator selectable) 28, 45, 90 deg/sec
- Stabilization: ±30° pitch-and-roll using weight-saving antenna tilt technique
- Searchlight for ISAR/SAR antenna steering

Transmitter

- Helix TWT type (MPM)
- Peak Power: 1 kW at MPM output
- Average Power: 40W nominal
- Frequency: 9.2 to 9.5 GHz; 300 MHz agility
- Pulse Width: 0.06 to 80 µsec
- 31 frequency channels
- Waveform Generation: digitally synthesized
- PRF: multiple PRF up to 7000 Hz

Receiver

- Dual conversion, fully coherent, selectable Sensitivity Time Control (STC)
- Receiver noise figure: 2.0 dB max at the LNA
- Bandwidth: matched to pulse width
- Processing: STC at RF under operator control
- Automatic Gain Control (AGC) controls receiver gain over temperature

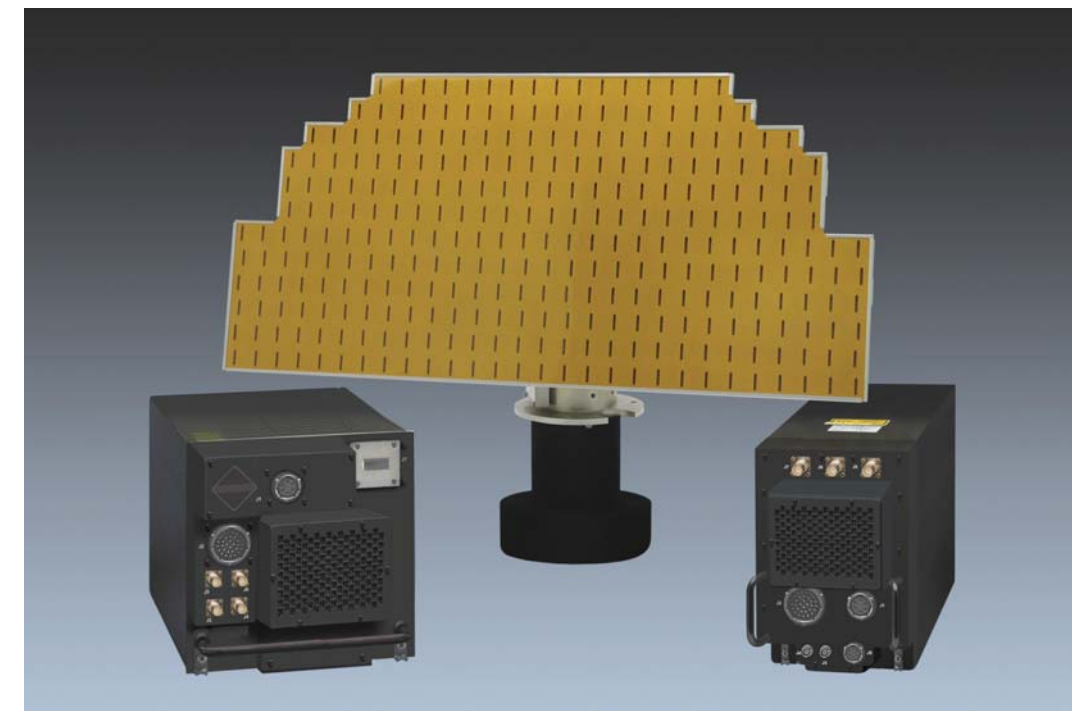
Display & Processing

- Radar monitor: RGB, SXGA (1280 x 1024)
- Off-center to 5 radii
- Ground Reference Stabilization: over 5 radii of offset
- Scan-to-Scan Integration
- Clutter Processing: 2-parameter CFAR with spike detection, sweep integration, m of n scan integration
- Track-While-Scan with automatic track initiate
- Range scales: short, 30, 60, 120 nmi
- Display Formats: 800 x 800 4-bit grayscale radar video and 1280 x 1024, 8-bit color graphics
- Weighted digital compressed pulse width: 52 nsec (search modes)
- Standard interfaces available to allow integration/operation with onboard display and control systems on larger Maritime Patrol Aircraft
- Display scales 1, 2, 4, 8, 16, 32, 64, 128, 256 nmi
- Standalone consoles available using TDMS GUI with LCD color display

Telephonics provides the best value solution for your lightweight, high performance detection requirements.

RDR-1700B

Search, Surveillance, Tracking and Weather Avoidance Radar System



The Telephonics RDR-1700B Maritime Surveillance Radar is an evolutionary development of our widely deployed RDR-1500B, infused with new capabilities from our RDR-1700 and APS-143B(V)3 systems.

The RDR-1700B is a 1 kW X-Band, airborne, coherent, search radar providing manned or unmanned, fixed or rotary wing aircraft with the ability to search for, detect, and track targets while performing over water surveillance. The RDR-1700B provides surface search, real beam mapping, weather avoidance and Search and Rescue Transponder (SART) beacon detection using advanced radar techniques including digital-waveform generation, digital-pulse

compression, frequency agility over the entire band, Constant False Alarm Rate (CFAR) processing, and scan to scan integration. The basic radar can be enhanced to include the following optional growth modes: Inverse Synthetic Aperture Radar (ISAR), strip-map SAR and spotlight SAR. Control of the RDR-1700B is via Telephonics' self-contained Tactical Display Management System (TDMS) Graphical User Interface (GUI).

Telephonics has designed the RDR-1700B using a COTS, Compact Peripheral Interconnect (cPCI) based, open architecture for superior flexibility in adapting to specific platform and mission

requirements. All hardware is lightweight, reliable and all options are functionally modular. Flexibility through programmability enables the RDR-1700B to be tailored and optimized to a wide variety of maritime surveillance missions including:

- Airborne Maritime Patrol
- Search and Rescue
- Contraband/Illegal Immigration Control
- Weather Avoidance
- Coastal Surveillance
- Fisheries Protection

With 35 years of continuous leadership in the maritime surveillance arena, Telephonics provides the best value solution for your lightweight, high performance detection requirements.

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A customized version of the RDR-1700B will be integrated on the USCG HV-911 VUAV

Rugged and Lightweight

The RDR-1700B's three, primary Line Replaceable Units (LRUs) are ruggedly constructed to withstand the rigors of long surveillance missions on helicopter and fixed-wing maritime patrol aircraft. Lightweight, flat plate array, corporate fed antennas can be customized to suit any installation. All LRUs are tested to DO-160D environmental specifications. Telephonics' efficient package design provides complete maritime functionality with minimum consumption of critical airframe space, power, and payload. For a radar of its capability, it is extremely lightweight (<75 lbs/34 kg), low prime power (625 Watts), highly reliable and cost effective.

Search and Mapping

In the sea search mode, the radar will detect and display surface targets at various ranges. The operator can choose scan speeds of 90, 45 and 28 degrees/second. The RDR-1700B will provide terrain mapping to detect and display surface objects

such as land masses, land/water transitions and large prominent objects. At closer range, the system is optimized for high resolution ground mapping.

Weather Avoidance

The RDR-1700B furnishes continuous weather information relative to rainfall rate, thunderstorms and other precipitation such as wet hail or wet snow. The 4-color display provides a means to determine the relative density of the rainfall areas.

Color	Rain Rate (mm/hr)
Black	0 to 0.7
Green	0.7 to 4
Yellow	4 to 12
Red	12 to 50
Magenta	>50

SART Beacon

The RDR-1700B is capable of interrogating and receiving pulses from SART beacons that are in use by the USCG for private boating and commercial shipping. In the SART beacon mode, the system can interrogate and receive pulses from SART beacons at a range of up to 15

nautical miles. Asynchronous replies can be received out to 60 nautical miles.

Tracking

The RDR-1700B provides the capability to track 200 targets and display the operator selected tracked targets data. Target tracking takes place in a Track-While-Scan (TWS) process and consists of acquiring, updating and dropping target tracks in response to operator commands. Tracks can be formed both manually or automatically.

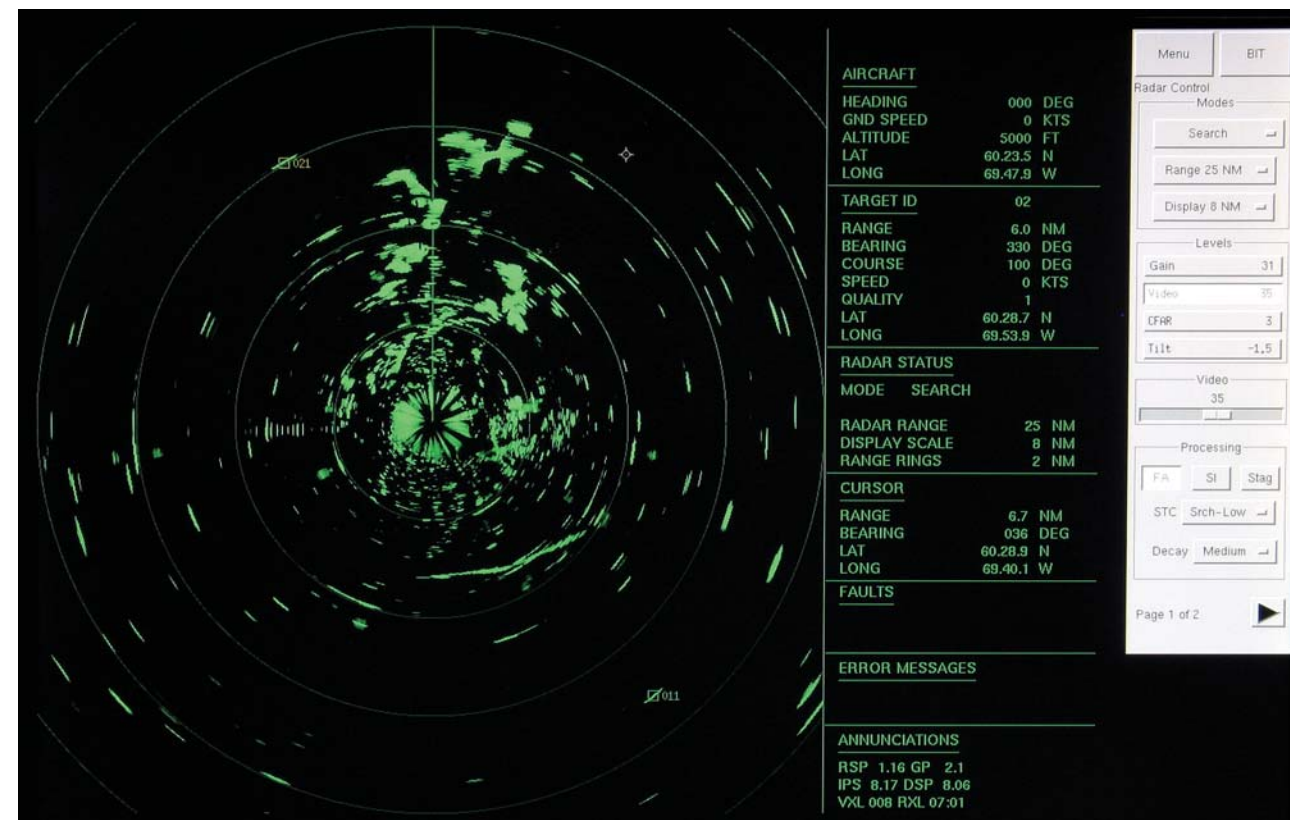
Display Modes

The RDR-1700B provides two display stabilization modes: aircraft stabilized and ground stabilized. In the aircraft stabilized mode, there are two display orientation options: North toward the top of the display, or aircraft heading toward the top of the display. In the ground stabilized mode, only North orientation is valid. In this mode, land and fixed objects remain stationary on the display while the aircraft symbol and concentric range rings on the screen travel past stationary

objects. Moving objects appear on the display as if seen by a stationary observer facing North. In all display modes a radial strobe is output indicating the aircraft's heading. The offset zoom mode may be selected at any time to offset the sweep origin and to expand the display at any point up to 4 to 1. A hold function is available to retain the last presented image in order to evaluate its significance on the screen.

Optional SAR and ISAR Modes

The RDR-1700B can provide three optional growth modes of operation for imaging targets to aid in the identification of target types. Inverse Synthetic Aperture Radar (ISAR), strip-map and spotlight SAR modes provide high-resolution images of targets or terrain, in both range and cross-range, using pulse compressed waveforms and Doppler processing techniques. ISAR imaging uses target rotational motion to provide the cross-range resolution and stretch-pulse compression to provide one meter range resolution. The RDR-1700B provides integration times from 0.25 up to 4 seconds. It maintains its performance over a 4-second integration time using sophisticated focusing algorithms.



Typical RDR-1700B TDMS Display

System Features

Radar

- Multi-Mode Operation:
 - Surface Search
 - Terrain Mapping
 - SART/Beacon Detection
 - Weather Avoidance
- Programmable Digital Waveforms
- Digital Demodulation
- Digital Pulse Compression
- Target Tracking

Optional Modes

- ISAR: 1 meter
- Strip-Map SAR: 1, 2, 4 and 8 meter
- Spotlight SAR: 1, 2, 4 and 8 meter

Situation Display Capability

- Radar PPI Display
- Aircraft Heading Reference
- North Reference
- Fixed Ground Reference (True Motion)
- Variable Display Offset
- Range Rings
- Track Symbolology

- Target Marker: Range Bearing or Latitude/Longitude

Optional Features

- Navigation Waypoint Overlay
- Ground Map Overlay
- Radar Data Recorder

Interface Capabilities

- Navigational:
 - ARINC 429
 - MIL-STD-1553B
- Output Video:
 - RGB, SXGA (1280 x 1024)
 - Other Formats Available
- Upgradable Firmware/Software

Tactical Display Management System Features

- Graphical User Interface
- Trackball or Joystick Operation
- Radar Horizon Indicator
- Readouts of:
 - Target Track Data
 - Radar Status
 - Navigation Data
 - Built-In-Test