ECTEC, Inc.
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RS712

Technical Description

High performance rf-signal surveillance, reconnaissance and localization system for maritime, airborne, and land based applications

RS712 SYSTEM DESCRIPTION

The RS712 reconnaissance system operates across the VHF and UHF electro-magnetic spectrum providing the user with a comprehensive and real time tactical picture of the area of interest. This is a versatile design that ECTEC has implemented into a ground-truth configuration identified as the RS7000.

RS712 FEATURES

The receiver is a contemporary-design, non-scanning hybrid channelizer, coupled with a phased array antenna that brings useful wideband capability to a small, cost effective package.

When integrated with an omni-directional, very wideband, non-scanning antenna, the user has a system optimized for:

- performing wide area surveillance with a very high probability of intercept,
- rf-signal surveys,
- signal geo-location,
- COMINT and SIGINT functions such as emission characteristics collection and recognition that support essential defense needs such as electronic order of battle determination

Options for the receiving system include modulation recognition, demodulation, signal recording, and protocol detection and recognition. Data visualization is supported in a variety of forms including Panoramic (Figure 1), Polar, Spectrogram, Waterfall, and AzGram.

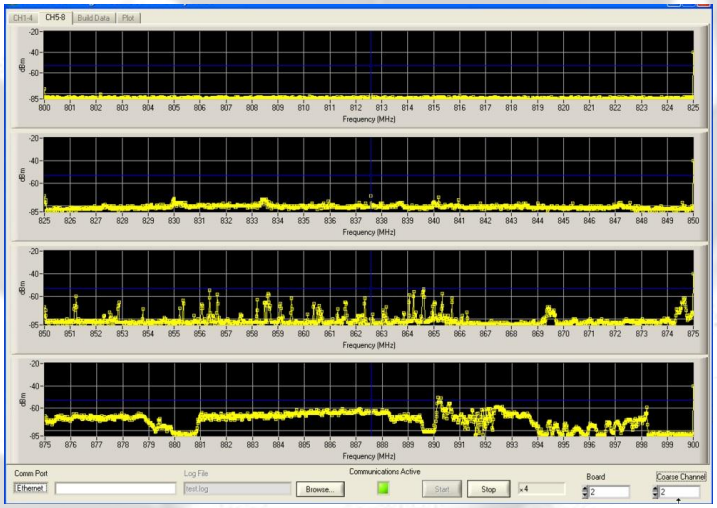

Figure 1: Panoramic Display of frequency vs amplitude

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PLATFORM APPLICATION EXAMPLE

The RS7000 is a complete ruggedized, mobile, self-contained surveillance system designed for outdoor test range use (Figure 2). The system uses the RS712 and a wideband, omni-directional, non-scanned phased array antenna. The system incorporates ruggedized, self-contained operational features and capabilities supporting unattended and remote operation. These include:

Figure 2: RS7000 with antenna deployed

- Environment-controlled Payload Bay
- Operation and Control over a covert data link
- Diesel-electric generator with on-board fuel supply for seven days of continuous operation
- Retractable mast assembly with total extension of 30 ft.
- Protective enclosure for antenna when not in use
- Sequenced interlocks with safeties for assured positioning of antenna when transitioning to or from operational to non-operational use
- IR and Video camera support for low-light or night-time surveillance and tracking

Other packaging options are available such as truck-bed installations.

In all packaging options, antenna protection from damage during transit or in-storage and when not deployed is provided by the special protective enclosure. There is no need to handle the antenna for deployment or for storage.

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BENEFITS

The receiver electronics are fully modular and able to serve in airborne, surface, and sub-surface applications and environments (Figure 3).

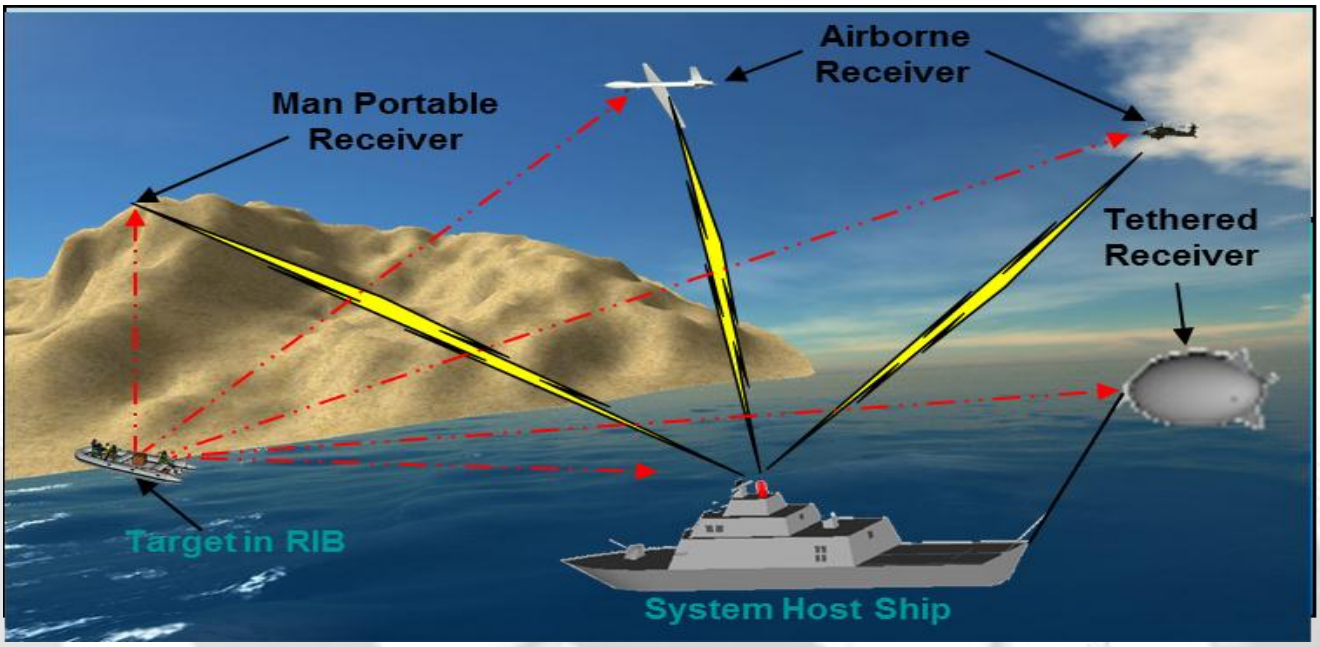

Figure 3: RS712 Receiver family system deployment scenario

The modularity in the architecture and packaging allows a user to purchase for current requirements. New and emerging threat requirements can easily be accommodated with modular upgrades in hardware and in the software applications.

The system is easily modified for rapid and expanded frequency range based on the wide bandwidth of the individual modules. Examples are shown in Figures 4 & 5.

As an example, if the current requirement is for VHF/UHF frequency coverage, the baseline system can be the solution with 20 – 3000 MHz of contiguous frequency measurement and direction finding capabilities. If the need arises for a 6000 to 8000 MHz requirement, that can be met as a modular frequency add-on to the receiver electronics along with a modular antenna upgrade. Both of these increased capabilities require minimal down-time.

The overall frequency coverage of the system can be configured for a contiguous range from 100 KHz on up to 40 GHz.

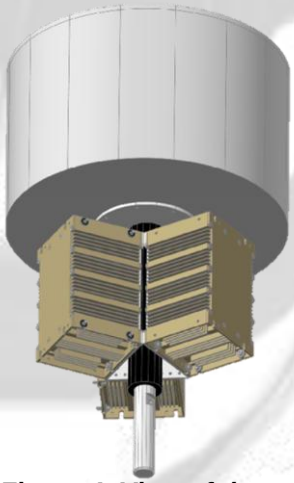

Figure 4: View of three electronics enclosures mounted under the antenna

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Included with the system is a server with an archival emission database application that can be customized for the initial user. Other applications are included for control of the receiving system (raise / lower antenna, operate the diesel generator, configure the surveillance operation, etc.).

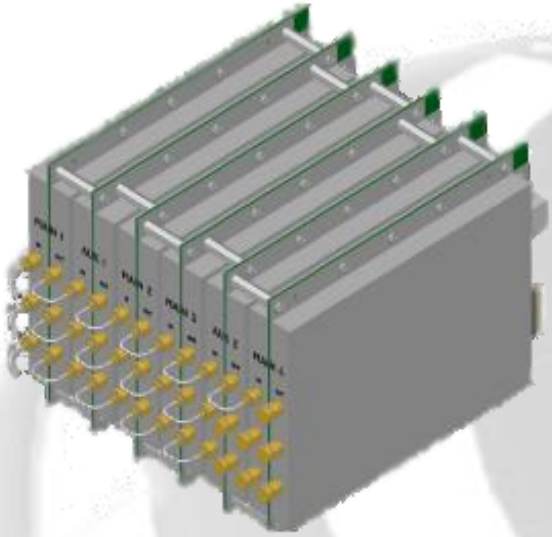

Figure 5: Mechanical view of one electronics sub-assembly (four per system) outside of the housing assembly (12" x 9" x 7", LWH)

System Performance Specifications

Frequency range	20 – 3000 MHz, non-scanned continuous monitoring
Freq. resolution	1 KHz
Amplitude. resolution	+/- 0.5 dB
DF resolution	Better than 5 degrees RMS
DF Coverage	360 degrees continuous
MDS (wide open mode)	-108 dBm

Note that the actual receiver electronics size for the baseline system including the server and power conditioning is 20" x 19" x 15" (LxWxH). Smaller form-factors are available for pod mounting or weatherdeck mounting.

Support includes options for training, maintenance, logistics support, and extended warranties. The system comes standard with a one year warranty. System availability is 120 days (ARO). Pricing information is available upon request.

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RS712

Technical Data Sheet

High performance rf-signal monitoring, emission localization and reconnaissance system for maritime, airborne, and land based applications

Frequency Range	20– 3000 MHz with expansion options to 40 GHz
Frequency Resolution	1 KHz (100 Hz optional)
Sensitivity	Better than 1 uv
Minimum Detectable Signal (MDS)	-108 dBm
Architecture	SiGe and CMOS mmic technology in hybrid channelizer and DDR array
	Fully synthesized rf section with 80 dBc spurious
Dynamic Range	> 80 dB
Noise Figure	14 dB
Direction Finding (DF) Latency	Instantaneous DF
Direction Finding (DF) Error	Better than 5 degrees RMS
Reference Aging	Less than 1 ppm per year
Non-coherent Integration Gain	6 dB
Data Management	Server and Solid State Drive (SSD) for streaming data storage
	Storage Area Network (SAN) for archival storage and Emission Data Bases
	Multiple display options including Panoramic, Polar, Waterfall and other visualization aids
Platform Options	RS7000: 16 ft. ruggedized off-road trailer fully self-contained, remotely operated, equipped for seven days continuous operation using on-board diesel electric generator, 30 ft. pneumatically actuated mast, dedicated storage enclosure for antenna on trailer with interlocks for automatic raising or storing of antenna without removal from mast, optional truck-bed installation
	Wheeled or tracked vehicle, shipboard mounting, pod or rack mount for airborne operation
Signal Processing Options	Signal demodulation
	Modulation recognition
	Programmable alarms
	Protocol detection Feature extraction (heuristics –based)
Featured Capabilities	Non-scanning signal acquisition, 100% Probability of Intercept, instantaneous direction finding
	Ruggedized for weather exposure
	Fully integrated SIGINT and COMINT support
	Independent hardware for continuous narrow band and wideband operations

OEM for high performance, wide bandwidth microwave receiving systems used for signal surveillance, reconnaissance and localization in maritime, terrestrial, and airborne platforms