

## Range Instrumentation Radar Upgrade and Service Life Extension Program

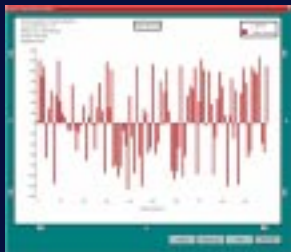
BAE SYSTEMS offers cost effective modifications and upgrades to improve performance and extend the operational life of existing radar systems. Comprehensive upgrade programs have been developed for specific types of radars including the AN/MPS-25, AN/MPS-36, AN/FPQ-6, AN/TPQ-39, NIKE systems and the AN/FPS-16. Upgrade features include the following:

- Interactive operator's console
- Central VME computer control
- Color Graphics
- Radar Signal Processor (RSP)  
(provides coherent on receive  
digital processing)
- Windows-based operator  
communications terminal

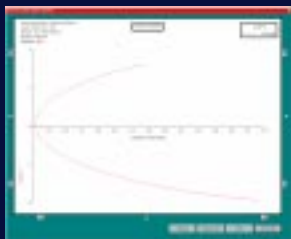
- Transmitter control from the console
- Automatic acquisition
- Laser rangefinder integration
- Solid state transmitter  
(both magnetron and CFA based)
- Pedestal refurbishment
- Computer-assisted servo system
- Custom software packages



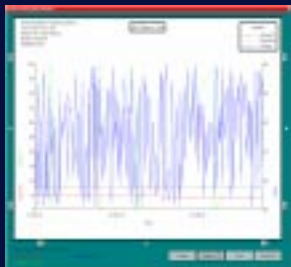
RSP Default Screen



Memory Plot



Typical Variable vs.  
Variable Plot



Typical Variable(s) vs.  
Time Plot

BAE SYSTEMS has an extensive background in operation, maintenance, modernization, and upgrade of precision instrumentation radar systems. The RIR-716 upgrade increases reliability and eases operation and maintenance of existing AN/FPS-16 radar, thereby improving performance, increasing supportability and reducing life cycle costs. Seven (7) AN/FPS-16 radars have been converted to state of the art RIR-716 Range Instrumentation Radars.

The RIR-716 is a high-precision, C-Band RF tracking system. The purpose of the RIR-716 is to acquire, automatically track, and generate precise, accurate target position, velocity and acceleration data from high dynamic and slow moving targets in skin or beacon track modes. The system is designed with the capability of precise angle and range RF track capabilities that is augmented by On-Axis Track. A VME-based host interface and computer are integral subsystems of the RIR-716. The VME host interface provides the I/O communication between the radar subsystems and the VME host computer. All operator commands, control and calibration functions, and drive signals are controlled via the VME host computer. The combination of VME host interfacing, interactive VME host computer operation, computer-aided calibration and track mode flexibility result in a reliable, accurate and versatile radar system. The RIR-716 can be operated independently or in conjunction with other test range systems. For independent operation, the RIR-716 is equipped with an automatic acquisition capability. For use in a multi-system environment, pointing data may be transmitted or received via the RIR data links.

### Technical Services

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Default tracking  
system display



Interactive Console



Solid state  
Transmitter

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## Radar Signal Processor



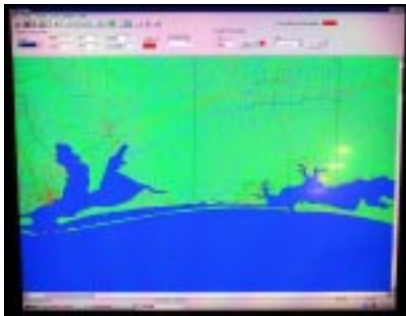
The 3-channel Radar Signal Processor (RSP) provides state-of-the-art, digital filtering techniques for signal processing. The RSP subsystem combines the functions previously provided by the Digital Moving Target Indicator Receiver and Intelligent Range Tracker in a single VME solution. It accepts 3-channel monopulse IF inputs, digitizes the 30 MHz IF, and produces filtered angle error and target range information. Additionally, it incorporates Doppler processing to reduce the effects of stationary clutter. This subsystem works with magnetron-based transmitters in a coherent-on-receive mode and with CFA-based transmitter in a fully coherent mode.

## Interactive Console

The Interactive Console is the prime man-machine interface for the current line of tracking systems and provides all the controls and indicators required for normal operation and control of the system. Any interactive computer subsystem associated with the system is “transparent” to the radar operator. Interaction with the computer subsystems occurs automatically through the use of dedicated console controls and does not require access through a keyboard terminal during the course of a mission. This console is made up of dual CRT monitors incorporating the latest multiple window and touch-screen technology.



## Color Graphics (Scenario Visualization)



The Scenario Visualization system displays radar tracked data textual information as well as historical traces of tracked objects superimposed over geographically referenced maps. The background map is the operational focus of the Scenario Visualization system. Images can be created and geographically referenced by the operator using aerial photographs, satellite images, and/or commercially available geographic data sets for background maps. The Scenario Visualization system supports eight types of geographical data sources. The system provides drawing wizards to render annotation primitives (point, line, circle, polygon, label) at precise geographical locations. The operator may also zoom the map view in or out and pan the view in any direction using the mouse.

The PC-based system consists of three main windows; the main operator interface window which displays the background map, the menus, and the toolbar buttons, the RIR data display window, and the Ground Range VS Altitude Plot window. The RIR data window and the plot window may be displayed or closed at any time.

## Central VME Computer Control

A combination of our field-proven VME host computer technology and recently developed VME subsystem technology allows us to introduce a more efficient, comprehensive and cost effective means of upgrading commonly used instrumentation class radars. The VME upgrade replaces existing hardware with new state-of-the-art, VME-based computer, disk drive, serial interfaces, Operator Communications Computer (XOPCOM), and specific VME interface cards to emulate the existing bus controller. Starting with a host VME computer upgrade, BAE SYSTEMS offer a foundation platform for expansion to meet long-term requirements. Utilizing Commercial Off the Shelf (COTS) boards and ‘C’ language, allows the new computer system to be easily maintained and upgraded. This new product line is specifically tailored for an electronic subsystem upgrade of RIR-series computer-based radars, as well as other computer-based and noncomputer-based instrumentation radars.

## Windows-based Operator Communications Terminal (XOPCOM)

Replaces the existing OPCOM PC with a new generation Graphical User Interface (GUI) which is referred to as XOPCOM. XOPCOM employs a Windows based personal computer to present the GUI. While the look and feel of XOPCOM is similar to the former PCOPCOM, it has expanded capabilities. XOPCOM uses an X/Motif window managing environment for interaction with the operator. The X/Motif environment is similar to the Microsoft Windows environment and as such, provides an intuitive point and click interface. Major features of the XOPCOM window include pulldown menus, toolbar, OPCOM command icons, I/O history window, and Status and Error Message window.

