FACT SHEET

BMDO FACT SHEET JN-00-19

X-BAND RADAR

INTRODUCTION

The X-Band Radar (XBR) is a ground-based, forward deployed multi-function phased array radar (MFAR) evolved from the Ground Based Radar (GBR) family including the NMD GBR Prototype (GBR-P) and the Theater High Altitude Air Defense (THAAD) radar. The XBR offers limited-field-of-view electronic beam steering, coupled with a mechanically slewable antenna mount, to provide an extremely flexible multi-target capability. It also incorporates multiple wideband waveforms for improved range resolution, target identification, and discrimination. In support of NMD the XBR is designed to perform cued search, detection, track, discrimination, and kill assessment of threatening missile complexes. Additionally, the XBR may be tasked to perform collateral missions in support of space surveillance activities.

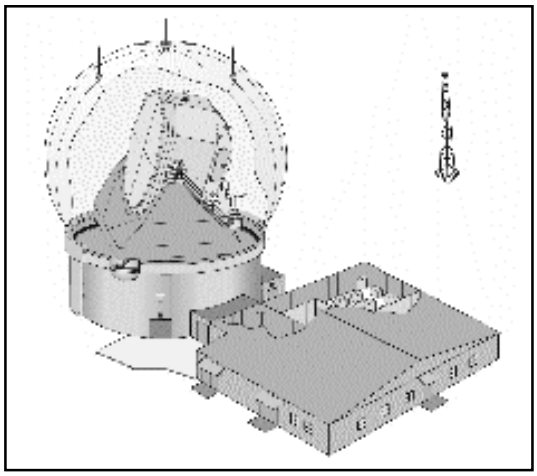
SYSTEM DESCRIPTION

Like the GBR-P and THAAD radar, the XBR uses high frequency and advanced radar signal processing technology to improve target resolution. This technology permits the radar to resolve and identify closely spaced warheads, debris and penetration aids. The XBR is designed to provide information about the early phases of a ballistic missile's trajectory and to provide real-time in-flight tracking data to the NMD Battle Management, Command, Control, and Communications (BMC3) element. Besides radiating during ballistic missile attacks, the XBR will radiate during tests, exercises, training, and collateral missions such as space debris tracking or space shuttle support. The XBR transmit /receive radiation pattern is a narrow beam. Most of the radar's radiating energy is contained in the main beam, but lesser amounts of energy could be emitted in the form of grating or sidelobes in the area around the main beam. Each beam consists of a series of electromagnetic pulses which can be directed to any slant angle above the site. At no time could the main beam be directed towards ground level.

The XBR interfaces with external systems for the exchange of strategic, tactical, planning, exercise, and maintenance information. This information consists of status reports, task plans, command and control, timing, maintenance, and support data. The XBR interface for exchanging information with all other external systems and centers is through the BMC3 element. The XBR will receive the Coordinated Universal Time (UTC) directly from the Global Positioning System (GPS), a space-based radio navigation system, in accordance with IDC-GPS-200. Host facilities support XBR by providing shelter, power, and air conditioning. The XBR equipment to host facilities interface requirements will be defined in the System Consolidated Facilities Requirements Document (FRD). The XBR will exchange test and exercise initialization data, scenarios and test or exercise data from the embedded Test, Training and Exercise Capability (TTEC). Also, the XBR interfaces with BMC3 to control maintenance and TTEC activities, provide health and status reports, receive sensor tasking, and exchange command and control, tactical and strategic information.

SITE DESCRIPTION

The XBR site consists of the radar mounted on its pedestal, an associated control and maintenance facility, a power generation facility, and a 150-meter (492-foot) controlled area. The XBR site encompasses an area approximately 7 hectares (17.46 acres) for the radar alone. Other support infrastructure is site dependent. Manpower support requirements depend upon the location and amount of existing site infrastructure.



FREQUENTLY ASKED QUESTIONS

1) What are the potential health effects from electromagnetic radiation (EMR) emissions from the XBR?

There are no public health effects from operation of the XBR. Representatives from industry and the public, scientific communities, physicians, and government agencies have worked together through the American National Standards Institute/Institute of Electrical and Electronics Engineers (ANSI/IEEE) to develop safety standards for EMR emissions. The exposure limits established by ANSI/IEEE C95.1 1999 are used to ensure that public health will not be impacted by EMR emitted from the XBR. These EMR exposure limits are a function of exposure time, radiated power and transmit frequency.

There are two major exposure environments: within and without a controlled area. The area within 150 meters (492 feet) of the radar will be a controlled area of government owned land that is fenced and monitored by security personnel to prevent any unauthorized access. In addition, XBR software will be programmed to ensure that power densities are in accordance with prescribed safety standards within this controlled environment. Uncontrolled environments, where there are no access restrictions such as public areas, will have EMR no higher than the permissible power density levels specified in ANSI/IEEE C95.1 1999. In particular, pacemakers will not be affected by XBR produced EMR in the uncontrolled environment.

2) Will the EMR emissions from the XBR affect my home electronics such as the television or radio?

There is a possibility that EMR may effect television reception out to a distance of 4 kilometers (about 2.5 miles) from the XBR and that occasional static may occur in some radios out to 7 kilometers (about 4.3 miles) from the XBR. However, the probability that this interference may occur is less than 0.05 percent at any given time. Computer monitors and other home television electronics should not be impacted by EMR from the XBR.

3) Will the XBR affect local airspace or airport operations?

XBR operation does not require any restricted airspace or impose any flight restrictions. However, a radio frequency radiation area notice should be published on the appropriate aeronautical charts notifying aircraft of a 6.7 kilometer (3.6 nautical mile) radius high energy radiation area around the proposed XBR site.

4) Could wildlife in the radar's vicinity be affected by EMR emissions?

Wildlife will not be adversely affected by EMR emissions. There is a potential for higher levels of exposure to birds flying through the area of the main XBR beam, but this possible exposure would only be for a short duration. Time-averaged power densities would not raise body temperatures or cause adverse biological effects.

5) How does the EMR generated from the XBR compare to the EMR people are exposed to in everyday life?

XBR generated EMR at the 150 meter (492 foot) controlled area boundary is similar to EMR measured 5 centimeters (2 inches) from a microwave oven and EMR measured 10 centimeters (4 inches) from a walkie-talkie. See Table 1 for a comparison of EMR exposure.

TABLE 1
COMPARISON OF EMR EXPOSURE

System	Distance metric/english	Power Density*
Microwave Oven	5cm / 2 in	5.0 mw/cm^2
X-Band Radar [at fence oundary]	150m / 492 ft	2.5 mw/cm^2
Walkie-Talkie	10cm / 4 in	2.5 mw/cm^2
Cellular Phone	1cm / 0.4 in	0.6 mw/cm^2

* Milliwatt per square centimeter

6) Would there be any air or noise emissions during radar operations?

The backup electrical generators designed to power the XBR site will produce air and noise emissions in the event that they are activated. These generators would only be required, however, if commercial power to the site failed or if they are required to support a mission. At sites where no commercial power is available or where the reliability of commercial power does not meet NMD requirements, the XBR site generators would operate continuously. The air cooled condensing units which operate continuously and the XBR antenna mount which operates only occasionally both produce audible noise. These noise emissions would not be as loud as those associated with the XBR site electrical generators.

Ballistic Missile Defense Organization, External Affairs
7100 Defense Pentagon
Washington, D.C. 20301-7100
(703) 695-8743