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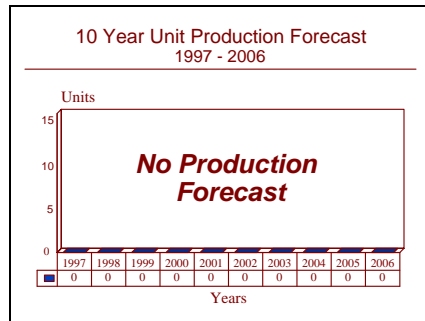
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BMD Microwave Radar Technology - Archived 10/98

Outlook

- In technology development
- Supports GBR-T and TMD GBR program milestones
- No funding anticipated to support production



Orientation

Description. This program develops high-risk radar technologies for Ballistic Missile Defense applications (BMD was formerly known as the Strategic Defense Initiative or SDI prior to May 1993).

Sponsor

US Army

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(Radar imaging assessments and optical systems analysis)

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(GaAs central processing units)

Status. Developmental.

Total Produced. This is a technology development program.

Application. The goal of this project is to develop the technology that will have direct benefit for ground-based radar operation in electronic countermeasures and nuclear environments.

Price Range. Indeterminate due to the developmental nature of the program.

Technical Data

Design Features. Originally, this project was composed of four tasks: Large Radar Array Technology, Large Radar Technology, Near-Term Imaging, and Satellite and Aircraft Imaging Radar. Due to the sanitization of the program element descriptors for the BMD (formerly SDI), however, it is difficult to ascertain whether work continues or has ceased in each task.

Large Radar Technology. This task was responsible for developing an advanced radar technology base necessary to meet the functional performance requirements of large aperture, phased array radars to support strategic and theater missile defense during all phases of threat flight, emphasizing endo- and exo-atmospheric tracking, fire control, and engagement functions with focus on developing solid state radio frequency components, fiber-optic interconnects and waveform processors.

Innovative Radar Technology. This task was responsible for developing radar technologies which have direct benefit for national and theater radars operating in electronic countermeasure and nuclear environments. Activities included resonant target phenomenology, synthetic aperture radar hardware and demonstrations, and track error compensation technologies.

Large Radar Array Technology. This task was directed toward the development and demonstration of key technologies for large phased-array imaging radars. Development of various radar components was a major portion of the task.

Near-Term Imaging Demonstration. This task provided the hardware and software necessary to implement and demonstrate high-frequency radar systems. Initially, sufficient hardware and software was to be developed and implemented in a simulation facility. This simulation would be capable of playing back data recorded by other sources. After successful demonstration of the imaging capability in the simulation facility, the hardware and software were to be expanded, so that operational measurements could be made at an existing radar facility.

Satellite and Aircraft Imaging Radar. Under this task, technologies developed under other tasks, principally imaging algorithm development, large radar array technology, and real-time signal processing, were to be integrated with consideration given to various radars for demonstration of this concept.

Variants/Upgrades

Due to the technological development nature of this program, there is a constantly evolving process of design changes that will eventually be implemented in specific

systems. As such, there are no identifiable variants or upgrades.

Program Review

Background. Before FY84, the Army Ballistic Missile Defense Organization (later redesignated the Army Strategic Defense Command; not to be confused with the Strategic Defense Initiative Organization that was retitled the Ballistic Missile Defense Organization) was responsible for demonstrating the feasibility of achieving capabilities needed to detect, track, and discriminate objects in all phases of the ballistic missile trajectory.

The Army BMDO was responsible for measuring the optical, infrared, and radar characteristics (signatures) of re-entry vehicles and penetration aids. In addition, Army BMDO was involved in the development of both new radar imaging techniques and new optical imaging techniques using lasers, rather than radar beams.

Since 1984, a series of small research contracts have been awarded for various parts of this technology. Nichols Research, Rockwell, Microwave Monolithics (in Simi

Valley, Calif.), and Dynetics (in Huntsville, Ala.) were among the firms whose early work paved the way for many antenna, CPU, and circuit developments of what would become the Microwave Radar Technology project.

That name was taken from a 1991 report to Congress on the SDI, and tasked with the development of high-risk radar technologies that would have direct benefits for ground-based radar operation in electronic countermeasures and nuclear environments. The project was to develop innovative concepts that exploit neural network aperture controllers, resonant target phenomenology features, and advanced beam forming.

This project now also supports the effort to build and test the TMD (Theater Missile Defense) demonstration/validation Ground-Based Radar, and the independent radar discrimination engineering developments needed for exo-atmospheric target identification for GPALS (Global Protection Against Limited Strikes) deployment. These technologies further complement radar enhancement programs being undertaken in the TMDI (Theater Missile Defense Initiative) office. Emphasis is on solid-state MIMIC RF modules and wide bandwidth waveform processing.

High-power X-band solid-state transmit/receive modules for populating a 32-element tray have been built, as have medium-power X-band transmit/receive modules, and 32 high-power, solid-state transmit and receive modules have been assembled onto a single tray with 32 antenna elements. An additional 20 medium-power transmit and receive modules and 10 antenna elements have been delivered.

Changes. A change in program emphasis by the Clinton administration led to a funding shortfall of US\$10.3 million that limited the testing of key components already developed, as well as continuing advanced development of the key components themselves. This funding cut delayed the scheduling of the system Fiber Optic Control of Phased Array Technology program and the Real Time Waveform Processor program by six months. Three other efforts slated to start in FY93 were also postponed until 1994.

In mid-1994, the BMDO selected 94 US businesses for 116 Phase I research awards, averaging about US\$61,000 each. Research funded by these awards was aimed to channel the several new related technologies into related government and commercial applications.

Funding

Once funded under Program Element 0603215C - Limited Defense System, Project 1102 Microwave Radar Technology; funding appears to have been shifted to other radar work in a weeding-out process that claimed a number of inadequately defined offshoot programs such as this one.

Recent Contracts

Due to the sanitization of most of the funding documents for the BMD program, it is now very difficult to determine those contracts that are specifically part of this particular program.

Timetable

	FY84	Antenna definition work completed.
	FY85	Selection of antenna material. Construction of scale model test samples. Execution of structural/electrical and thermal/vacuum tests.
	FY86	Start of technology base program to develop advanced items.
	1991	Scope of project downsized to cover just microwave radar technology.
4Q	FY92	X-Band T/R radiating elements completed (20 total). Resonant target measurement demonstration.
2Q	FY95	Real-time Waveform Processor completed. Acceptance test for waveform generator.
4Q	FY95	Demonstration test for fiber-optic beam-forming components.
2Q	FY97	Radar waveform processor demonstration.

Worldwide Distribution

This is a US program only.

Forecast Rationale

This project experienced a significant number of changes over its course. The most notable change a few years ago was a downsizing in the scope of the work. Yet, such a reduction applied to several elements of the BMD program; consolidation shrank the number of affiliated projects to enable the completion of at least *some* elements of the ambitious BMD system. This move toward attaining a realistic goal sat better with the historically wary Congress.

Much of the work undertaken in the Microwave Radar Technology program has supported the Ground-Based Radar effort. The present objective of this project is to support the achievement of GBR-T and TMD GBR (two of the GBR radar variants) program milestones.

Specifically, the project supports the building and testing of the TMD Dem/Val GBR (also called the THAAD radar), as well as the independent radar discrimination engineering developments required to enable exo-atmospheric target identification for GPALS deployment.

Unlike its microwave cousin, the GBR is an ongoing concern, and is continuing to receive funding. Otherwise, the scope of the radar technology development work has diminished. No funding for BMD Microwave Radar Technology has been identified in US procurement documents for some time, and at this point, none is forecast.

Ten-Year Outlook

At this time, no further funding is anticipated to support production for this effort.

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