

# ARCHIVED REPORT

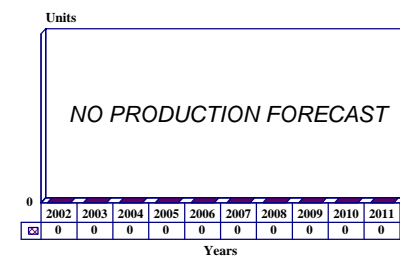
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## Advanced Infrared Search & Track (AIRST) – Archived 01/2003

### Outlook

- Forecast International expects the US Air Force to install an infrared search and track system into the F-22
- Whether the US Air Force chooses to install the Advanced Infrared Search & Track (AIRST) system is uncertain
- Forecast will continue to analyze AIRST developments as they arise

10 Year Unit Production Forecast  
2002 - 2011



### Orientation

**Description.** The Advanced Infrared Search & Track (AIRST) system is a research, development, and production effort undertaken by the US Air Force. The AIRST system will identify and track long-range targets for the F-22 next-generation fighter. It will detect targets earlier and at greater ranges without using the APG-77 radar.

#### Sponsor

US Air Force  
Air Force Systems Command  
Aeronautical Systems Center  
ASC/PAM  
Wright Patterson AFB, Ohio (OH) 45433-6503  
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#### Contractors

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USA  
Tel: +1 301 897 6000  
Web site: <http://www.lockheedmartin.com>

**Status.** Unknown

**Total Produced.** Only developmental models to date.

**Application.** To identify and track long range targets for the F-22 next generation fighter.

**Price Range.** As a reference point, the price of the AAS-42 IRST system (for F-14D aircraft) has been estimated at US\$1.7 million in 1992 dollars. The advanced nature of AIRST, coupled with inflation, can be expected to push this figure substantially upward.

## Technical Data

**Design Features.** The Advanced Infrared Search & Track (AIRST) system consists of the sensor assembly, window assembly, and an Interface/Control Electronics (I/CE) assembly. The optics are a series of narrowing lenses that focus received infrared energy on a focal plane array. Installation design meets F-22 observability and aerodynamic specifications. The design builds on past IR/EO sensors developed by the company, including the AAS-42 IRST of the Navy's F-14D air superiority fighter. The AAS-42 IRST consists of 256 individual detectors (1x256 configuration, with four 64-element modules) operating in the 3-5 micron mid-wavelength band or the 8-12 micron long-wavelength band. The AAS-42's field of view is +/-75 degrees.

The window assembly consists of four panels integrally bonded into a conformal frame. Each panel is coated to optimize window assembly infrared transmittance, aircraft electromagnetic compatibility, and environmental durability. It was designed to meet F-22 low observability characteristics and a 4,000-hour life requirement.

**Operational Characteristics.** The F-22 is expected to be a first-look, first-shoot, first-kill, air superiority fighter. It will combine a variety of passive and active sensors to achieve beyond-visual-range (BVR) engagements. These include the radar, radar warning receivers, and missile warning arrays. All sensors will work together through a powerful central processor to detect, track, and engage targets as well as provide maximum situational awareness for the pilot.

The AIRST sensor detects heat sources, or hot spots, within its field of view and frequency band. To distinguish targets from background clutter, system software automatically processes these heat sources. Targets are presented on cockpit displays with accompanying azimuth and elevation data.

The AIRST system is also considered a valid sensor for anti-theater ballistic missile operations and provides rapid long-range target declaration. The AIRST can also be used against cruise missiles. It would provide a wide field of view for search and good tracking capability against a cluttered background.

## Program Review

**Background.** The Infrared Search & Track System (IRST) program was initiated by the US Air Force (USAF) in 1981. In May of 1986, General Electric was selected to develop the IRST for both the USAF and US Navy.

Originally, the USAF/Navy program was scheduled to begin full-scale development and incorporation into the F-14 and F-15 in 1987. However, in mid-1986, the USAF changed its participation in IRST development. High retrofit costs and schedule problems caused the USAF to drop the F-15 program. The IRST program was restructured, and the US Navy assumed program management for full-scale development and production for the F-14D.

The USAF focused on developing a fighter IRST system, known as EOSS, that would meet the requirements of the Advanced Tactical Fighter (ATF). EOSS was conceived as a passive optical system for maintaining the F-22's low observability.

In 1990, the USAF dropped EOSS from the ATF baseline, believing that the IRST design had not matured enough to be included in the baseline avionics mix. The service was also looking at possible funding chokepoints as the fighter was developed. The deletion

was part of service efforts to revise downward fly-away costs for the advanced fighter. EOSS prototypes completed 41 flights aboard testbed aircraft in 1990.

In December 1991, a *Commerce Business Daily* notice, issued by Air Force Systems Command's Wright Laboratories, stated that the USAF intended to issue a draft Request for Proposals (RFP) for the IRST system. The notice named Martin Marietta (now Lockheed Martin) and GE as the qualified sources.

**Latest Information.** In November 1992, Martin Marietta was selected the prime contractor for the new F-22 IRST endeavor that later became the AIRST program. (**Note:** EOSS was the name Martin gave to its EO effort for the US Army's RAH-66 Comanche.)

As a result of the higher costs associated with the F-22 development program, the USAF dropped AIRST from the initial production aircraft. Instead, the USAF decided to make AIRST part of a future upgrade for the F-22. It is unknown whether or not AIRST will be included in the F-22 preplanned product improvement program.

## Funding

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No AIRST funding is known to exist at this time.

## Recent Contracts

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No US Department of Defense contracts specifically for AIRST have been identified.

## Timetable

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<u>Year</u>	<u>Major Development</u>
FY 1981	Infrared Search & Track System program initiated by US Air Force
FY 1992	Martin Marietta selected as prime contractor for F-22 AIRST program
FY 1997	Flight-test hardware supposedly delivered
FY 1998	Deliveries of production standard F-22 begun

## Worldwide Distribution

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The F-22 Raptor effort, including AIRST, is a **United States Department of Defense** program.

## Forecast Rationale

The Advanced Infrared Search & Track (AIRST) system is a research, development, and production effort undertaken by the US Air Force. The AIRST system will identify and track long range targets for the F-22 next generation fighter.

The AIRST sensor detects heat sources, or hot spots, within its field of view and frequency band. To distinguish targets from background clutter, system software will automatically processes these sources of heat. Targets are presented on cockpit displays with accompanying azimuth and elevation data.

At the present time, there are no known contracts for the production of the AIRST system. Consequently, the **Ten-Year Outlook Chart** has been omitted.

That said, the F-22 fighter is designed to have an infrared search and track system installed into it. As a result, Forecast International is confident the US Air Force will eventually affix some sort of infrared search and track system into the F-22. Whether the US Air Force chooses to install the Advanced Infrared Search & Track (AIRST) system is another story. Forecast will continue to analyze AIRST developments as they arise.

## Ten-Year Outlook

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No production is projected for this system.

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