ASQ-213(V) (STING)

Outlook

- With newer systems in the pipeline, production of the ASQ-213 sensor has likely stopped
- Raytheon in 2006 delivered the first HARM Targeting System Release 7 (R7) to the U.S. Air Force
- R7 uses advanced technology to locate radar emission sources, allowing the pilot to launch guided munitions

Orientation

Description. The ASQ-213 is a pod-mounted sensor that provides input to the AGM-88 High-Speed Anti-Radiation Missile (HARM) for Suppression of Enemy Air Defense (SEAD) operations. The pod is known as the HARM Targeting System (HTS) or the Smart Targeting and Identification via Networked Geolocation (STING). The name change did not affect program content.

Status. In service, in production, upgrades, and support.

Application. Carried by the F-16CJ Block 50. Any MIL-STD-1553 aircraft can be adapted to carry the system.

Price Range. Unit cost is estimated to be $2.7 million.

Sponsor

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Contractors

Prime

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Comprehensive information on Contractors can be found in Forecast International's "International Contractors" series. For a detailed description,

ASQ-213(V) (STING)

Technical Data

	Metric	U.S.
Dimensions		
Pod		
Length	142 cm	56 in
Diameter	20 cm	8 in
Weight	41 kg	90 lb
Characteristics		
Frequency Range	0.5 to 20 GHz	
Pod Life	3,000 hours (planned) 6,000 hours (increase goal)	
Modes	Search Multiple target track Single target track	

Design Features. The ASQ-213(V) STING gives select F-16 aircraft the ability to launch the High-Speed Anti-Radiation Missile against ground radars. The sensors are located in a small pod mounted beneath the starboard side of the air intake. The system was developed as an interim replacement for the F-4G Wild Weasel, providing 80 to 90 percent of the F-4Gs HARM capability, until the F-22 becomes operational.

Signals received by the STING sensor antennas are processed to determine the angle-of-arrival. The processor also provides rough range data to the missile, making it possible to fire in a range-known mode, significantly improving the effectiveness of the anti-radiation missile. In a range-known operation, if the radar transmitter is shut down, the missile could still hit it by flying to the last known position of the signal source.

Operational Characteristics. When ground radars are used to detect, track, or target aircraft, they generate a distinctive radio frequency signature that can be used to locate the radar. The High-Speed Anti-Radiation Missile uses this energy to home in on the antenna (radiation source) and explode its 146-pound-blast fragmentation warhead to destroy or disable the antenna. Radar operators learned (often the hard way) about the lethality of HARM and as a countermeasure would turn off the transmitter to prevent the radar system from being hit. This impedes the air defense system, so in either case, HARM did its job and eliminated (even temporarily) the threat. Although many aircraft can fire the HARM, better inputs improve the missile's performance. Range information is significant.

Although it is a smaller system than the F-4G Wild Weasel's APR-47(V) and extensive antenna array, the ASQ-213(V) performs the same basic functions. Operators have generally been pleased with STING performance. Operations in Iraq were a baptism of fire for the system.

STING also provides a somewhat larger HARM footprint and greater target specificity. The ASQ-213(V) can autonomously detect, identify, and locate radar-guided threats at long ranges. It displays the target location to the pilot for HARM designation and firing, and is fully field-programmable.

Variants/Upgrades

The HTS/STING upgrades are hardware and software enhancements that make it possible to track more targets, improve the system's target identification capability, and increase ranging speed. Designers have replaced the central processor, and increased search speed and memory size to improve target identification and handling. There have been five software releases, and two configurations were developed.

Testing of the modified pods began in FY98. The software change to the F-16 operational flight program was released in FY99. The HTS R6 upgrade was considered complete in FY99.

The HTS Revision 7 (R7) P3I program was a Program Definition & Risk Reduction (PDRR) effort. The FY01 effort involved changing the HTS engineering to permit

the F-16 to carry both an HTS/STING pod and an advanced targeting pod. These improvements were the Air Force's near-term solution (until replaced by JSF) for the Destruction of Enemy Air Defenses (DEAD) mission. The R7 upgrade allows Joint Standoff Weapons, and possibly other precision-guided munitions, to be targeted in order to destroy the enemy's fixed and mobile air defense systems. R7-derived coordinates of threat emitters will be made available to all joint forces via Link 16.

ASQ-213(V) STING

Source: Raytheon Corp

Program Review

The Air Force retired the F-4G Wild Weasel fleet when the aircraft reached the end of their operational life. For years, operational adjustments extended the life of the old war birds, but the service had to put them out to pasture. The last aircraft was retired in May 1998.

ASQ-213 Reasonable Replacement for Wild Weasels

Although the full capability of the Wild Weasel was not completely replicated, the ASQ-213(V) HARM Targeting System (HTS) was developed to provide what was considered a reasonable replacement. The system was used in conjunction with other aircraft such as the Compass Call. It is the only system currently in service with a Suppression of Enemy Air Defenses capability.

In FY00, P3I development of HTS Revision 7 (R7) addressed evolving threats and incorporated a precision geolocation capability to target precision-guided munitions (PGMs) with data from the ASQ-213(V) pod. The HTS R7 P3I program was renamed Smart Targeting and Identification via Networked Geolocation (STING) to better describe the capability to target PGMs, as well as the HARM missile.

In FY01, the R7 P3I Program Definition and Risk Reduction was completed, and the contract was awarded for system development and demonstration. STING (R7) designers came up with changes that would enable the F-16 to carry both an ASQ-213(V) STING (R7) pod and an advanced targeting pod (ATP), by relocating the STING (R7) pod to the aircraft's left inlet hard point.

ASQ-213(V) (STING)

The FY02 STING (R7) SDD included a Preliminary Design Review, integration efforts for F-16 software, Critical Design Review, and flight test planning. FY03 marked the start of STING (R7) flight test activities.

These improvements were a near-term solution for reactive time-critical targeting for the Destruction of Enemy Air Defenses mission, a capability that can be transferred to the F-35 JSF, a UCAV, or a yet-to-be-defined system. STING (R7) will generate target data for the Joint Standoff Weapon, and potentially target other PGMs, to destroy fixed and mobile enemy air defense elements. STING (R7) precision coordinates will be available to all joint forces via Link 16.

In FY04, the Air Force continued flight testing and hardware qualification in preparation for retrofit of HTS pods to STING pods.

Test and Evaluation Ends in 2006

Other FY04 to FY07 efforts include continued work on the STING (R7) geolocation upgrade development. Funding was $15.278 million in FY04, $10.360 million in FY05, $7.40 million for FY06, and $509,000 in FY07. The remaining funds support test and evaluation, as well as other mission/project support. The STING (R7) upgrade was completed in 2006, at the same time production began.

In September 2006, Raytheon delivered the first HARM Targeting System Release 7 (R7) to the U.S. Air Force. The R7 uses advanced technology to locate radar emission sources, allowing the pilot to launch guided munitions, particularly the HARM missile, to destroy the target. The more advanced technology keeps pace with more advanced emitters. Deliveries were part of a retrofit program completed in 2008.

The U.S. Air Force procured 35 pods between FY07 and FY09. Many of the pods have been deployed to U.S. operations overseas, leaving a shortage in the U.S. for training purposes. These additional pods meet that need.

Timetable

Month	Year	Major Development
Mar	FY92	Milestone I
Sep	1993	AF signs Mission Need Statement (MNS)
	1993	52nd Fighter Wing switches to F-16C/D Block 50, adding ASQ-213(V) HTS for Operation Deny Flight operations
Apr	FY94	PDF dem/val award
2Q	FY94	F-16 HTS R5 software development, R5 fielding
4Q	FY94	F-16 HTS prototype development starts
Sep	1994	HTS IOC
2Q	FY95	F-16 HTS prototype development completed
2Q	FY96	F-16 HTS upgrade EMD starts
2Q	FY97	F-16 HTS upgrade EMD completed, Light Defender follow-on test starts
2Q	FY98	F-16 HTS 50T5 flight test, retrofit component contract award
4Q	FY98	New buy Lot 1 pod deliveries
1Q	FY99	New buy Lot 2 contract award, Lot 1 deliveries completed
3Q	FY99	New buy Lot 3 contract award
4Q	FY99	HTS upgrade development completed, R6 fielding
1Q	FY00	F-16 HTS R7 development initiated
2Q	FY00	R7 PDRR contract award
3Q	FY00	R6 upgrade development completed, initial fielding
2Q	FY01	R6 Lot 4 contract award, R7 SDD contract
Dec	2001	R6 fielding completed
2Q	FY02	R6 Lot 2 pod deliveries completed (16 pods), R6 Lot 3 pod deliveries completed (13 pods)
4Q	FY02	R6 Lot 4 pod deliveries (31 pods)
3Q	FY03	STING R7 test program begins
4Q	FY03	Initial F-16 integration in System Integration Lab completed, STING flight tests begun
2Q	FY04	Microwave Circuit Board (MCB) Producibility, Reliability Enhancement Program (PREP) contract award Phase 1
2Q	FY05	STING Retrofit decision, Retrofit kits contract award
3Q	FY05	MCB PREP contract award – Phase 2
2Q	FY06	Retrofit Kit Installation contract award
3Q	FY06	STING (R7) RAA (R6 capability with F-16 OFP M3+)
4Q	FY06	STING (R7) precision targeting capability (with F-16 OFP M4+)

Worldwide Distribution/Inventories

The United States Air Force operates the ASQ-213. **Turkey** is believed to operate the system as well. Other U.S. allies may also use the HTS.

Forecast Rationale

With newer systems in the pipeline, production of the ASQ-213 sensor should be winding down. In 2006, Raytheon delivered the first HARM Targeting System Release 7 (HTS R7). This is the newest version of the ASQ-213, which should keep the U.S. Air Force's F-16CJs up to date for many years. It will help maintain the ASQ-213's ability to conduct its Suppression of Enemy Air Defense (SEAD) mission as emitters become more advanced. It is also compatible with more advanced F-16 operational flight program (OFP) software.

While pilots flying over Iraq and Afghanistan do not face radar-guided missile threats, the U.S. has deployed many of its HTS R7 systems overseas. This has created a need for additional systems.

The U.S. Air Force contracted Raytheon to begin development in 2001 and was cleared to proceed with the retrofit program in 2005.

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