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SPEAR Pod (Compass Call) - Archived 10/07

Outlook

- High-power jamming pod for EC-130H Compass Call jamming aircraft, part of Block 35 upgrade
- Production of SPEAR Pod complete, but there should be ongoing upgrade work associated with the system throughout the next several years
- Heavy use of Compass Call in Iraq and Afghanistan will see the steady demand for the upkeep of the aircraft and its critical subsystems for many years to come

Orientation

Description. Compass Call – the EC-130H – is a U.S. DoD/USAF offensive, wide-area communications jamming system. The SPEAR Pod is a high-power jamming add-on to enhance the capabilities of Compass Call.

Sponsor

U.S. Air Force
Air Combat Command
355th Wing/12th Air Force
41st Electronic Combat Squadron
43rd Electronic Combat Squadron
Davis-Monthan AFB, AZ
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Status. In service. Ongoing logistics support and upgrades.

Total Produced. Through 2005, 19 pods (eight shipsets plus a spare) had been produced.

Application. The EC-130H Compass Call Block 35.

Price Range. Estimated cost of the pod is \$1.8 million.

Price is estimated based on an analysis of contracting data and other available cost information, and a comparison with equivalent items. Individual acquisition costs may vary depending on program factors.

Contractors

Prime

**BAE Systems Electronics &
Integrated Solutions**

<http://www.eis.na.baesystems.com>, 65 Spit Brook Rd, Nashua, NH 03061-0868 United States, Tel: +1 (603) 885-4321, Fax: +1 (603) 885-2772, Prime

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

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go to www.forecastinternational.com (see Products & Samples/Governments & Industries) or call + 1 (203) 426-0800.

Contractors are invited to submit updated information to Editor, International Contractors, Forecast International, 22 Commerce Road, Newtown, CT 06470, USA; rich.pettibone@forecast1.com

Technical Data

	<u>Metric</u>	<u>U.S.</u>
Dimensions		
Length	528.5 cm	208 in
Diameter	96.5 cm	38 in
Weight	544.8 kg	1,200 lb
Characteristics		
Frequency	UHF, VHF (communications/data)	
Features	Four independently controlled, simultaneous jamming beams Automatic beam tracking on targets (position & beamwidth) High-fidelity exciter (frequency, time, modulation) Automatic Power Control Redundant high-power amplifiers Composite case for lightness Forced air cooling through middle of pod Right-left interchangeable Few single-point failures; can predict the impact of a degraded pod	
LRU	High-power phased arrays (144 elements) Exciters Controller	

Design Features. The EC-130H Compass Call electronic countermeasures aircraft was developed in the 1980s to disrupt the voice and data communications of adversaries, preventing effective command and control of their forces in the field. The Tactical Radio Acquisition and Countermeasures Subsystem (TRACS-C) is replacing the aging compressive receiver suite responsible for acquiring target systems with a digital, reprogrammable receiver that will cope with the next generation of communications equipment.

The reprogrammable nature of TRACS will allow it to remain viable in the future through software upgrades that will continue throughout the life of the program, ensuring Compass Call stays abreast of emerging threat technologies.

The SPEAR (Special Emitter Array) Pod is a special-purpose, very high-power jamming pod that was moved quickly from development to operation for the war on terrorism. It complements the existing Block 30 and 35 systems, with a design to interoperate with the TRACS-C upgrade.

Originally developed in the 1990s, the pod was upgraded in 1997. In November 2001, an emergency SPEAR manufacturing development frequency extension (MDFE) was rushed into production for the

three shipsets of pods, and deployed with the two EC-130H aircraft sent to Afghanistan for the war on terrorism.

The pods are carried on the wing stations, with their 144 element antennas pointed out. Jamming is abeam of the aircraft, with the system capable of generating four independently steerable beams from each pod. There are redundant high-power amplifiers that receive jamming assignments from processors/operators on the Compass Call aircraft. The pods were designed to jam the newer, more sophisticated communications systems commonplace today. They can also receive an offboard feed, and have jamming techniques established during pre-mission planning.

All SPEAR pods are identical and the antennas are on one side of the pod only, but the cable connections were designed so any pod can be mounted on either side with the antennas pointing out.

Operational Characteristics. Compass Call missions are flown primarily in support of tactical air operations, but can also be used to provide information to ground and sea forces. The aircraft employs "surgical" jamming to prevent specific communications or to degrade the transfer of information essential to

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command and control of weapon systems and other resources.

EW operators and linguists aboard the EC-130H monitor the communications and datalink frequencies in an operational area, deciding when to jam and disrupt a particular link. When a jamming assignment is made, the operators can select the SPEAR Pod to put one of four steerable jamming beams on a targeted link.

In Afghanistan and Iraq, Compass Call operated in concert with the USQ-113(V)s of the EA-6Bs. There was no integrated air defense system (IADS) radar net to speak of for the Prowlers to take down. The two made a good jamming team, with Compass Call linguists providing valuable inputs regarding the selection of jamming targets to the Prowler crews. During most missions, the EC-130Hs focused on

discrete, individual targets, while the USQ-113(V)s jammed broader parts of a net.

As improvised explosive devices (IEDs) became an increasingly serious and deadly threat in Iraq, planners sought new ways to reduce their lethality. One way was to use a variety of jamming platforms, Compass Call among them, to jam the detonation signal insurgents were using to set them off or to transmit a false signal, predetonating IEDs before they could cause harm.

Earlier upgrades changed the configuration of the original Block 20 aircraft to Block 30, featuring more automation and a physical layout that makes it possible to get to the rear of operator consoles while in flight, facilitating maintenance. The 43rd ECS (Central Asia and Europe) flies six Block 20 aircraft, while the 41st ECS (the Far East) flies eight aircraft with the Block 30 system.



SPEAR Pods for EC-130H Compass Call

Source: BAE Systems - North America

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Variants/Upgrades

Block 35. This upgrade includes Group B kits and brings all aircraft to the Block 30 standard, with upgrades to the receiving system. It adds extended and overlapping frequency ranges to increase target capability. Digital narrowband acquisition capability will address new target sets, while programmable wideband exciters allow greater flexibility for

prosecuting next-generation targets, reducing the time needed to deploy new jamming techniques. High-power amplifiers support extended-range and simultaneous missions, while the SPEAR Pod high-power transmitter improves the surgical jamming capability. An integrated datalink makes communications with other theater assets possible.

Program Review

Background. The EC-130H was developed in the 1980s and proved very effective during Red and Green Flag combat training exercises. Compass Call has been successfully used in a military conflict. During the 1999 allied operations in Kosovo, EC-130Hs equipped with the Compass Call system were in the air on an almost constant basis.

A Compass Call upgrade effort began in FY99, modernizing the old compressive receiver suite with the TRACS-C unit. TRACS-C development and integration was completed by the end of FY01, with flight tests beginning in FY00 and continuing throughout FY02.

The SPEAR effort began in the mid-1990s with a contract to develop one prototype shipset (two pods)

under the previous Advanced Concept Technology Demonstration (ACTD) program. This was followed by a 1997 order for two more shipsets, and a retrofit upgrade of the original R&D pods. In November 2001, the Air Force awarded a \$13.7 million contract to extend the frequency range – the manufacturing development frequency extension (MDFE) – and to provide one more shipset of pods.

Information superiority allows forces to collect, process, and disseminate information while denying an enemy the ability to do the same. Jammers must perform effectively over an area of engagement that contains both friendly and adversarial forces. The ability to dominate depends on having access to the electromagnetic spectrum without causing fratricide – i.e., generating electromagnetic interference (EMI) of

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friendly systems. This problem applies to standoff jammers (Compass Call), unmanned airborne jammers, and ground-based distributive jammers (Wolfpack).

Compass Call Proves its Worth in Battle

In September 2001, Compass Call was deployed to Operation Allied Force, the war against al-Qaeda terrorists and the Taliban in Afghanistan. The SPEAR Pods proved useful to this effort.

There were only enough pods to outfit three aircraft (two per EC-130H), and it took some intense last-minute work by BAE and the Air Force to field the capability. However, like the aircraft, which deployed on two days' notice, the pods were made ready and proved their worth operationally.

As a result of SPEAR's demonstrated utility, in November 2001 BAE Systems-North America was awarded a contract from the Air Force to extend the design of the SPEAR Pods. Modifications included a frequency extension and upgrades to the hardware and software.

Critical, New Upgrades for the Workhorse Compass Call Feature SPEAR Pod

In March 2002, BAE Systems-North America received a contract to upgrade EC-130H equipment. Under this effort, various systems would be modernized in support of the aircraft's Block 35 upgrade. The Block 35 upgrade includes support for the SPEAR Pod.

In FY02, the Compass Call program received \$12 million as part of the Defense Emergency Relief Fund (DERF). This allocation would be used to integrate Project Suter, an effort that would involve linking RC-135 Rivet Joint with Compass Call through the procurement of Airborne Information Transfer (ABIT) datalinks. Begun in January 2000, this effort has evaluated the synergistic effects of integrating the intelligence collectors. In FY02, \$19 million was budgeted against the Project Suter line.

\$2.482 million was budgeted for Compass Call RDT&E in FY03 for the development and integration of classified capabilities using new technologies against growing C³I threats.

Funding

U.S. FUNDING								
	FY05 <u>QTY</u>	FY05 <u>AMT</u>	FY06 <u>QTY</u>	FY06 <u>AMT</u>	FY07 <u>QTY</u>	FY07 <u>AMT</u>	FY08 <u>QTY</u>	FY08 <u>AMT</u>
RDT&E (USAF)								
PE#0207253F								
4804 Compass Call	-	3.9	-	9.9		4.4	-	0.0
	FY09 (Req) <u>QTY</u>	FY09 (Req) <u>AMT</u>	FY10 (Req) <u>QTY</u>	FY10 (Req) <u>AMT</u>	FY11 (Req) <u>QTY</u>	FY11 (Req) <u>AMT</u>		
RDT&E (USAF)								
4804	-	0.0	-	4.9	-	4.9		

All \$ amounts are in millions.

Contracts / Orders & Options

(Contracts over \$5 million.)

<u>Contractor</u>	<u>Award (\$ millions)</u>	<u>Date/Description</u>
BAE Systems	53.0	Mar 2002 – Contract to enhance and modernize various systems in support of the Block 35 upgrade. This effort includes support of the SPEAR subsystem.

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Timetable

<u>Month</u>	<u>Year</u>	<u>Major Development</u>
mid	1990s	SPEAR Pod development begins
Fall	1999	Compass Call utilized in Operation Just Cause
Sep	2001	Compass Call deployed to Afghanistan
Nov	2001	MDFE contract and one additional shipset ordered
	2002	Plans to begin production of 10 shipsets evaluated
	2003	Compass Call deployed to Iraq
2Q	FY04	Frequency extended SPEAR Pod inboard design complete
1Q	FY05	Frequency extended SPEAR Pod outboard design complete
	2006	Enough pods to be available for the entire fleet
Late	2008	Plans for all 12 Block 35 upgrades to be complete
	2025	Compass Call to remain in service

Worldwide Distribution / Inventories

Compass Call is a **United States**-only program.

Forecast Rationale

With production of the SPEAR (Special Emitter Array) Pod complete, the major story for the years ahead is likely to be one of ongoing upgrade work and enhancements to keep the system, and its primary platform, the EC-130H Compass Call jamming aircraft, up to date to face emerging challenges. Compass Call is being upgraded to keep pace with today's threats and newer mission concepts, including cell phone intercept and jamming. Under the U.S. Air Force's Compass Call RDT&E program, a total of \$24.1 million has been budgeted to continue to evolve the aircraft to match enemy developments.

Compass Call consistently and effectively jams an enemy communications link before an operator can get more than a couple of syllables out, thus having a devastating cumulative effect on enemy morale and confidence. The current focus of the upgrade program is on upgrading all aircraft to the Block 35 standard, which prominently includes SPEAR. Plans are to have all 12 Compass Call aircraft fully upgraded to Block 35 by the end of 2008.

Since the SPEAR Pod program has become a predominantly upgrade and enhancement program, the Ten-Year Production outlook has been removed from this report.

Ten-Year Outlook

With production and procurement complete, the Ten-Year Outlook chart has been removed.

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