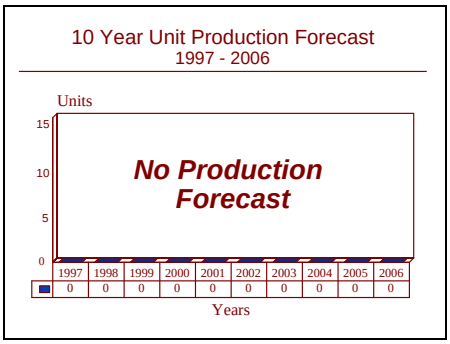
Compass Call (EC-130H) - Archived 6/98

Outlook

- In operational service
- Ongoing logistics support and upgrades
- No additional production is anticipated



Orientation

Description. Airborne special command and control standoff jammer.

Sponsor

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

Sanders, a Lockheed Martin Co
95 Canal St
Nashua, New Hampshire (NH) 06060
USA
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Hughes Aircraft Company
[formerly Magnavox Electronic Systems Co]
1313 Production Road
Fort Wayne, Indiana (IN) 46808
USA
Tel: +1 219 429 6370
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(Purchase by Raytheon Co in process)

GTE Government Systems Corp
Electronic Defense Sector
P.O. Box 7188
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USA
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Status. In service, ongoing logistics support and upgrades.

Total Produced. A total of 20 systems were produced to support 13 EC-130H aircraft.

Application. EC-130H

Price Range. Estimated cost of the ECM system is US$12.5 million each.

Technical Data

Design Features. COMPASS CALL is a specialized ECM system carried aboard an EC-130H aircraft. The high-power jammers are carried internally, with blade antennas installed under the wings, on the dorsal fins, and on the rear fuselage. Wing pods carry a long-wire antenna which can be trailed behind the aircraft for better jamming performance. The system produces a variety of special noise jamming signals.

Enhancement efforts focus on designing and updating low-band performance and developing more efficient antennas. Upgrade efforts include developing new analysis and jamming algorithms to maximize the performance of existing hardware. Mission simulator enhancements are also part of the effort.

The Air Force has plans to develop a "generic" receiver which will replace the current multiple receiver hardware. Efforts are attempting to improve the COMPASS CALL direction finding capability and will focus on developing a mid- and high-band jamming system.

Operational Characteristics. COMPASS CALL is employed as part of an integrated electronic combat package to complement both present and future air, ground, and sea-based systems to provide theater commanders with a coordinated jamming platform.. It works with ground mobile ECM systems to jam and confuse enemy command and control communications systems as well as air defense nets. It is especially quick reacting and can usually disrupt a communications net before any useful information is be passed. It can adapt its tactics real-time to a change in the mission or threat.

Information gathering can provide a very useful picture of enemy communications techniques. The system can be programmed to react to a variety of actions by targeted operators. So if an operator changes to a new frequency, often COMPASS CALL can either find the new link or sometimes beat the operator there and be jamming before the operator gets to transmit a useful message.

The operators can apply a variety of standard and unique countermeasures techniques, depending on the situation and requirement. The large crew and high- power standoff capability make COMPASS CALL an especially potent communications jamming system. In addition to using a series of either barrage or spot jamming techniques, COMPASS CALL operators can "spoof" a network with trained operators sending false or misleading information. This can either confuse enemy operations or make it necessary to resort to time-consuming authentication procedures, or force a switch to hard-wire systems.

COMPASS CALL carries a variety of classified jamming and disruption systems which have proven very effective in testing and training situations. In the Persian Gulf War, COMPASS CALL aircraft totally disrupted Iraqi air defense and battlefield control systems. It can be effective against both voice and data communications networks.

Variants/Upgrades

There are no identified variants of the COMPASS CALL system; although the hardware and software are constantly undergoing operational enhancements. Pre-planned improvements include increasing power and multi-jamming capabilities as well as reducing onboard interference between systems. Mission simulator upgrades are included in the program.

Current active upgrades are:

High Band System (HBS). This integrated High Band System countermeasures into the Block 30 platform.

High Band Exciter (HBE). This is a classified ECP to the High Band System.

TRACS (Tactical Radio Acquisition and Countermeasures). Details of this upgrade are classified.

P-35. This is a classified upgrade.

Program Review

Background. In FY78, the Air Force proposed the time-phased modification of a C-130 aircraft to perform C3CM tasks. The definition phase was completed and the Air Force performed a test and evaluation program to determine how well an improved receiver-analyzer could handle the electromagnetic environment. Program personnel started development of a high-band jammer. The Air Force deferred planned efforts to improve signal acquisition and analysis as well as updates to exciters and transmitters until a baseline modification was funded.

In FY79, the Air Force directed an EC-130H standoff jamming platform to be integrated into a defense-wide command, control, communications, and intelligence jamming strategy. The airborne capability would complement ground and sea-based systems to provide the

theater commander with a coordinated jamming capability. In FY80, the Air Force continued developing a classified jammer and started developing a mission simulator to help COMPASS CALL training and maintenance. In FY82, engineering improvement tasks on the EC-130H continued, and Engineering Development of classified C^3 CM support equipment started. A classified jammer was completed, as was the first phase of the mission simulator. EC-130H engineering improvements continued.

During FY84, engineering development of the analysis system of friendly emitter vulnerabilities began. An airborne demonstration of the special access Project 34 subsystem was completed in FY85. This constituted 12 of a total buy of 18 units. Three signal location (SILO) preproduction prototype subsystems were delivered. The COMPASS CALL Mission Simulator SILO update full-scale development was started.

In FY86, system software updates began as part of the Pre-Planned Product Improvement (P3I) program. Incorporation of the SILO direction finding subsystem updates concluded, and inclusion of this capability into the mission simulator facility continued. During FY87, efforts to include signal locating ability in the mission simulator continued. Improvements in jammer power and reliability were initiated, as was a rewrite of the baseline software.

In FY88, the Air Force began radio frequency distribution and antenna subsystem improvements. Program personnel also worked on improving radiation directivity, power and signal handling ability, and radiation efficiency. Studies to improve waveform development continued, and an effort to reduce interference with onboard radios received much attention.

The Air Force proceeded with a Full-Scale Development program in FY89 to enable the system to jam more targets simultaneously and at longer ranges. This would include upgrades to the synthesizers, power amplifiers, modulation generators and RF distribution/ antenna systems.

FY90 saw the development of upgrades to the low- band transmit antennas and the beginning of an effort to develop a new generation jamming system and RF distribution system. Planners began to work on software to improve the quick response capability of the system.

In FY91, engineers began to study the possibilities for replacing existing receivers with a single "generic" design. High temperature problems with the low-band system were addressed. Engineers completed the design and testing of a Low-Band transmit antenna upgrade kit and demonstrated the power handling capability and robustness of a single spigot radial combiner RF distribution design. Planners demonstrated that the new High-Band subsystem which could automatically acquire and identify additional new high band signals of interest, and initiated the development effort to design a "common receiver." Engineers also demonstrated the integrated High-Band subsystem which was derived from previous stand-alone subsystems and awarded a contract to provide capability to the aircraft platform.

In FY92, the Air Force awarded a contract to incorporate the Low-Band transmit antenna and continue upgrading jamming waveform algorithms. They began Engineering and Manufacturing Development (EMD) of low/mid/ high band RF distribution jamming system program and continued integration of the High-Band upgrade. They began Mission Simulator Mission Generation system improvement efforts.

During FY93, the Air Force closed out the P-34 EMD contract and continued P-38 EMD, at a cost of US$15.9 million. They also continued developing the High Band Subsystem (HBS), and began developing a High Band Exciter (HBE). Program personnel awarded a restructured contract for the Tactical Radio Acquisition and Countermeasures System (TRACS) to provide a Digital acquisition receiver, and interference cancellation development within a reduced funding profile (US$8.8 million). They revised the MOA with the SPM developing agency to expand its capabilities, and conducted a successful demonstration of SPM against 1st target radio system.

The Air Force submitted a follow-on PID on TRACS test program. The Program Office awarded an ECP and continued development of Jam Management/Situational Awareness Subsystem (JM/SA), costing US$5.5 million. The USAF awarded Foreign military Equipment Exploitation task orders (US$.7M), conducted flight and acceptance testing of the Low Band DF subsystem (US$.273M), and issued a System Support Contract, time and materials (US$.924M).

In FY94, the Air Force continued HBE at a cost of US$5.4 million and integrated HBS into the system support facility. This cost US$1.4 million. US$2.4 million was spent on TRACS EMD. Several classified efforts continued and program personnel began integrating upgrades into a test aircraft. A new US$500,000 time and materials contract was begun and planners closed out the low-band DF subsystem EMD contract.

Plans for FY95 were to spend US$2.9 million to complete integrating HBS into aircraft. There would be CONUS and OCONUS combined flight tests for HBS and JM/SA sub-systems. TRACS EMD was programmed at US$2.0 million and plans included updating the MOA with the

SPM developing agency. Block 30 integration completion was slipped from 3QFY95 to 1QFY96. The development test flight was slipped from 3QFY95 to 1QFY96.

In FY96, engineers had plans to complete integrating Block 3 upgrades (HBS and JM/SA) on aircraft. The Air Force would flight test Block 3 upgrades, correct any deficiencies found, and complete the users manual and training. US$1.3 million was programmed for these efforts. US$14,000 was re-programmed to pay the USAF Bosnia bill.

FY97 plans are to support IOT&E of Block 3 at a reduced spending level of US$0.5 million. A US$650,000 effort would continue TRACS EMD. With US$583,000 programmed to develop counters to the evolving threat.

Funding

US FUNDING

	FY94		FY95		FY96		FY97 (Req)	
	QTY	AMT	QTY	AMT	QTY	AMT	QTY	AMT
RDT&E (USAF) PE0604270F EW Development 2462 COMPASS CALL	-	10.8	-	4.9	-	1.3	-	1.7

RDT&E (USAF estimate)	FY98 (Req)		FY99 (Req)		FY00 (Req)		FY01 (Req)	
	QTY	AMT	QTY	AMT	QTY	AMT	QTY	AMT
2462	-	1.3	-	0.8	-	0.8	-	0.9

All US$ are in millions.

Recent Contracts

There have been no recent contracts recorded.

Timetable

	FY78	System definition
	FY79	Integration into mission capability
	FY86	Software upgrades initiated
	FY89	FSD of planned upgrades
1Q	FY91	Award contract for situational awareness and jam management capability, award contract for Low Band antenna design and testing
Dec	1992	Contract for EMD of High Band subsystem
Feb	1992	CDR of High Band antenna
Jun	1992	CDR, classified program
4Q	FY92	Award competitive contract for low-band jamming system improvements
Aug	1993	CDR, Classified program
3Q	FY93	Complete High Band subsystem software test and integration
Dec	1993	Acceptance testing of JM/SA software development facility

Dec	1994	Award contract for high band exciter improvements, software acceptance testing
2Q	FY94	TRACS CRD & ECP-2, P-35 ECP-3, and start of HBE CDR
3Q	FY94	Complete FH/CM integration into system support facility
4Q	FY94	Complete High Band CONUS test
1Q	FY95	Field direction finding changes
1Q	FY95	Begin fielding high band integration
3Q	FY95	Start Block 3 CONUS flight test, start AFOTEC OT&E
1Q	FY96	Block 3 system integration. Complete CONUS flight test
3Q	FY96	Complete High Band subsystem contract
1Q	FY96	Start Block 3 OCONUS flight test
3Q	FY96	First Block 3 delivery to ACC
	FY97	Begin fielding low-band jamming system improvements, begin fielding Mid/high -band jamming system improvements
2Q	FY97	Complete AFOTEC OT&E

Worldwide Distribution

This is a **US** only program.

Forecast Rationale

COMPASS CALL is a proven, valuable electronic warare and intelligence asset for exercises, test scenarios, and actual combat. It is an important countermeasure to command and control systems; able to completely disable and disrupt electronic combat resources and defensive networks, allowing strike missions to succeed. It saw extensive and effective use during Operation Desert Storm.

Exercise success was predictive of success in combat. COMPASS CALL was part of the electronic combat force deployed to the Middle East. Initially, it intercepted Iraqi communications, gathering information on Iraqi electronic orders of battle, as well as insight into operational plans. Once fighting, the EC-130Hs used high-power jamming to disrupt and disable Iraqi air defense command and control networks, as well as tactical communications within the Kuwait Theater of Operations (KTO). COMPASS CALL actively supported the initial air raid on Saddam Hussein's forces. Briefers noted that during Operation Desert Storm the Iraqi forces were sometimes forced to use ground couriers with written messages to get instructions to front-line forces.

Although the Air Force is continually seeking new ways to improve it, the EC-130H has proven itself to be effective in most threat scenarios. Operation Desert Storm was a convincing combat validation. It proved very effective, and can expect continued emphasis and support.

New technology and the large airborne platform will eventually limit the longevity of COMPASS CALL. Although the system can accomplish its mission well, a new generation of systems, which had their genesis in this program, will begin to be fielded by the end of the decade. RPV platforms may take over some COMPASS CALL missions in the future, especially as smaller, lighter, "smarter" jammers are developed. They cannot completely replace EC- 130H's with their large, high power equipment and on-board human operators on board; but RPVs can be sent further into high threat environments to accomplish select eavesdropping, intelligence gathering, and jamming missions.

COMPASS CALL will have an extended life. However, because the new systems will be unaffordable or unreleasable to many potential FMS users, new production is not expected. An active spares/repairs market will last through the end of the 1990s.

Production of the fleet of COMPASS CALL aircraft is complete. Future efforts will continue to upgrade hardware and software to meet new and increasingly sophisticated requirements. Desert Storm success encouraged continued upgrade work and improvements in mission training equipment. There has been talk of migrating Compass Call to the C-130J; but the significant up-front costs will have a cooling effect of planners' enthusiasm for this idea.

As RPV systems are perfected, work on COMPASS CALL enhancements will begin to decrease, as will the operational tempo and need for spare and repair parts.

Ten-Year Outlook

No further unit production is anticipated.

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