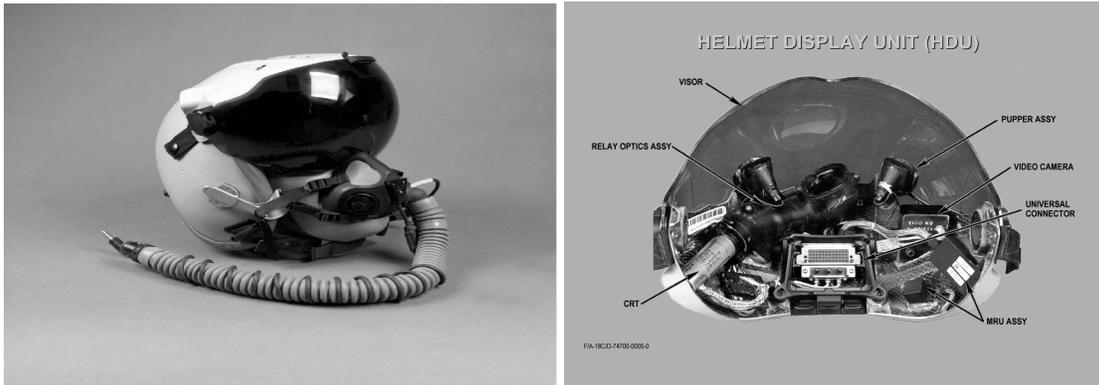


## JOINT HELMET MOUNTED CUEING SYSTEM (JHMCS)



The Joint Helmet Mounted Cueing System (JHMCS) is a modified HGU-55/P helmet that incorporates a visor-projected Heads-Up Display (HUD) to cue weapons and sensors to the target. This new cueing system improves effectiveness in both Air-to-Air and Air-to-Ground missions. In close combat, a pilot must currently align the aircraft to shoot at a target. JHMCS allows the pilot to simply look at a target to shoot. This system projects visual targeting and aircraft performance information on the back of the helmet's visor, enabling the pilot to monitor this information without interrupting his field of view through the cockpit canopy. The system uses a magnetic transmitter unit fixed to the pilot's seat and a magnetic field probe mounted on the helmet to define helmet pointing positioning. A Helmet Vehicle Interface (HVI) interacts with the aircraft system bus to provide signal generation for the helmet display. This provides significant improvement for close combat targeting and engagement.

The JHMCS system will be employed in the FA-18C/D/E/F, F-15C/D, F-22 and F-16 Block 40/50, with a design that is 95 percent common to all four platforms. When used in conjunction with an AIM-9X missile, a pilot can effectively designate and kill targets in a cone more than 80 degrees to either side of the nose of the aircraft or High Off-Boresight (HOB).

### **BACKGROUND INFORMATION**

A Joint Mission Needs Statement for JHMCS was signed in January 1994, with a Milestone II decision to enter EMD in December 1996. A Navy Operational Assessment (OA) began in August 1999 and was completed in February 2000, resulting in Low Rate Initial Production (LRIP) approval in May 2000. A joint OA concluded in August 2000 and supported a LRIP-2 decision in May 01. An LRIP-3 decision is scheduled for April 2002 after completion of Initial Operational Test and Evaluation (IOT&E) with a full-rate production decision planned for August 2002. The system is scheduled to reach IOC for the F/A-18E/F and F-15C in FY03, the F-16 by FY04.

### **TEST & EVALUATION ACTIVITY**

Despite some concerns with system maturity, DOT&E approved the JHMCS Test and Evaluation Master Plan and the USAF and USN initial operational test plans for the system. Initial Operational Test and Evaluation of JHMCS began in June 2001 for the USAF and October 2001 for the USN.

## **TEST & EVALUATION ASSESSMENT**

Initial DT results using the FA-18C/D and F-15C found significant reliability and maintainability issues (particularly with the FA-18C/D) with the connector between the helmet and the aircraft, the HVI. It was also recommended that pilot training adequately address visor focal length issues and cockpit scan practices prior to flying with the new helmet. The Operational Assessment reported the JHMCS on the FA-18C/D as potentially effective and potentially not suitable due to numerous breaks in the HVI with long fix times and a high false alarm rate by the built-in test equipment. Initial F-15C flight tests found that the legacy computer throughput provided slow support to the JHMCS. This computer latency problem, coupled with the F-15C high buffet, affected target designation performance.

Efforts to correct HVI reliability included replacing an unreliable coaxial cable with a different form of shielded wiring. Unexpected in-line release connector disconnects were corrected by re-routing the cable and adding an exo-shell to eliminate side load effects within the cockpit. The FA-18E/F maintainability issue was corrected by re-designing the connector to allow the ability to re-mate, as in the F-15C connector, and to provide limited organizational-level repair capability. On the USAF F-15 platform, the system is performing well with respect to effectiveness, but reliability has been poor. Mean time between failures is falling well short of the operational requirement threshold value. Our assessment of the results of this on-going OT&E will be reported in the 2002 Annual Report.

Since these initial tests, several corrective designs have been introduced that should improve reliability to an acceptable level of performance. DOT&E's assessment is ongoing and will be reported upon completion of initial operational test and evaluation.

The Joint Helmet Mounted Cueing System was the subject of a DoD/IG audit, initiated in June 2000. The draft DoD/IG report identified shortcomings in the proposed OT test plans to include a lack of clearly-defined quantitative measures of performance and pass/fail criteria as well as an inadequate sample size leading to poor statistical significance. Working in concert with DOT&E, the operational test agencies identified and implemented corrections to the test plans. The final DoD/IG report deemed the revised plans to be acceptable.