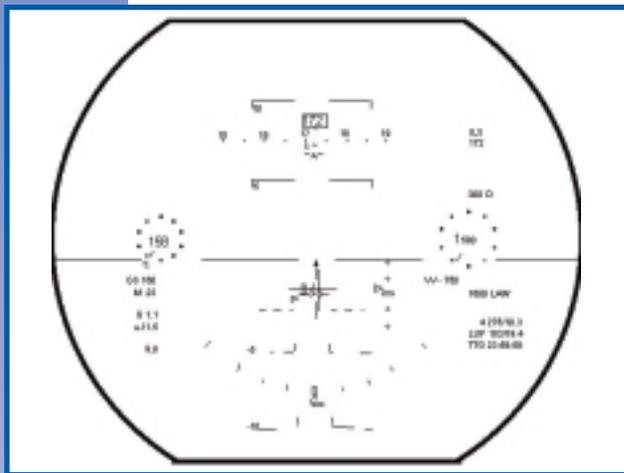




# ASC ENGINEERING FACT SHEET

... AN ENGINEERING SUCCESS STORY

## Primary Flight Reference Certification Process



### DESCRIPTION

The HUD was the first focus of the standardization process because it was the first flight instrument to incorporate all the elements of flight instrumentation (airspeed, altitude, pitch, heading, and bank angle) into a single, primary flight reference. Various HUD symbols and mechanizations were compared in simulation and flight test to establish a standard symbol set.

### SUMMARY

#### PROBLEM:

■ Numerous aircraft mishaps have been attributed to pilot spatial disorientation. Statistics show that mishaps involving head-up display (HUD) equipped aircraft are more frequent than conventional instrumented aircraft. The Air Force reviewed cockpit layouts and instrumentation design for the basic flight instruments. The review concluded that no standards were being used in the design of the instrumentation other than the "Basic T" convention.

#### SOLUTION:

- Develop a standard symbology set that is based on valid and confirmed performance data.
- Work with the Air Force Research Laboratories (AFRL) Joint Cockpit Office and Air Force Flight Standards Agency to develop an endorsement process for all Air Force manned and unmanned aircraft primary flight reference (PFR) symbology.

The contractors can implement changes to this symbol set, but they must demonstrate that the changes maintain or improve pilot performance as compared to the standard. The symbology has been designed to facilitate pilot situational

awareness of aircraft attitude and to provide quick recognition and recovery from an unusual attitude. This standard symbology is described in MIL-STD-1787, Aircraft Display Symbology. ASC/EN is responsible for the development of this standard. Revision C of the standard, dated 5 Jan 2001, incorporates head-down display symbology as well. Flight instruments in the newer, large "glass cockpits" have been combined into single displays. MIL-STD-1787 provides display symbology standardization that promotes pilot safety and training by ensuring aircraft are equipped with a standard set of flight symbology as they transition from one aircraft to another.

To further assure the integrity of aircraft primary flight references for a specific aircraft program, aircraft program offices are required to assemble a PFR endorsement document. The PFR endorsement

document describes the display symbology and mechanization of the aircraft. This document is presented to the Flight Standards Development Group (FSDG). The FSDG reviews the symbology and mechanization and then makes a recommendation to the Air Force Flight Standards Agency to endorse or not endorse the aircraft PFR(s). This process is designed to standardize basic flight symbology and decrease the incidence of spatial disorientation and the resulting loss of pilots and aircraft.

*For more information, contact:*

*Mr. Eric Crawford,*

*email: [eric.crawford@wpafb.af.mil](mailto:eric.crawford@wpafb.af.mil)*

*ASC/ENFC*

*Wright Patterson AFB, OH 45433-7101*

*(937) 255-7343*

For additional ASC/EN Engineering Directorate literature, contact ASC/ENOX at (937) 255-3979.