Title III Night Vision Systems Project Improves Capabilities, Saves Millions

Payoff

An Air Force-managed Defense Production Act (DPA) Title III Project successfully orchestrated a dual use insertion of commercial hardware into a military helmet-mounted display system. The new Small Flat Panel Display is less expensive, lighter, more reliable and can be used in up to 600 Air Force aircraft and 3,000 other aircraft throughout the Department of Defense (DoD). This new system enhances mission success and safety with minimal changes in pilot training and enhances users' ability to extend the duration of flight without increasing stress levels and fatigue associated with high-value missions. This technology could save millions of dollars and is transferable throughout DoD and commercially.

Accomplishment

The Air Force Research Laboratory's (AFRL's) Materials and Manufacturing Directorate (ML) contracted with Marconi Aerospace Defense Systems and Planar Systems Inc. to develop a Night Vision Enhanced Head Up Display (NVIS EHUD) with dramatically improved capabilities as compared to the current night vision systems used by Special Operations Forces (SOF). The new system is lighter, more reliable, less expensive, and uses commercial off-the-shelf components, to help ensure the availability of hardware.

Background

SOF aircrews are required to fly at very low levels at night. Night vision goggles provide the capability to see in very low light conditions, however pilots must be aware of critical aircraft flight data information without looking into the cockpit. An existing Head Up Display (HUD) integrated with night vision goggles helps satisfy these needs, but is costly, heavy, unreliable, and impedes movement in the cockpit. It uses a cathode ray tube (CRT) to generate symbology and a fiber optic cable to carry the images to the helmet. The Air Force needed more affordable technology, with higher reliability, greater functionality, and greater safety. The DPA Title III Program Office initiated its Small Flat Panel Display project, an $875,000 effort, to qualify a new system incorporating small active matrix electroluminescent (AMEL) flat panel displays, and to help establish a viable domestic production base capable of affordably producing these displays. In 1997, the Title III Project brought Marconi and Planar together to qualify an AMEL flat panel display integrated with the night vision goggle eyepiece for use in military applications. The new system replaces the CRT with an AMEL flat panel display, adds a circuit card assembly with surface-mounted commercial electronics, and incorporates a high-speed digital data cable in place of the fiber optic cable. The video symbol display unit is smaller, lighter, and its hardware is available commercially. The system presents a high quality display of aircraft flight information imposed over the scene viewed through night vision goggles. The AMEL display technology increases the type of information normally viewed on the goggles with clear visual acuity and the newer technologies involved increased the mean-time-between-failure from 450 hours to 10,000 hours. The Small Flat Panel Display system costs 32 percent less than the old system, and has an integrated eyepiece with an improved, more convenient rotational focus. The Air Force has purchased four of the new units and plans a long term purchase of 461 units.