Future F-35 Panoramic Cockpit Display System to Feature Better Processing, Memory

A new Panoramic Cockpit Display – Electronics Unit (PCD-EU) for the Lockheed Martin [LMT] F-35 is to feature significantly enhanced processing and memory.

The PCD-EU "is considered a new development effort under the F-35 Technology Refresh 3 (TR3) effort and will provide improved processing capability and video formatting," Lt. Cmdr. Keith Goodsell, a spokesman for the F-35 Joint Program Office, wrote in an Apr. 24 email to sister publication *Avionics International*.

"The system is comprised of independently controlled display management computers for each half of the Panoramic Cockpit Display – Display Unit (PCD-DU), allowing for greater situational awareness as well as redundancy for flight critical displays," he wrote. "The PCD-EU also incorporates both safety and non-safety critical processors, allowing for approximately four times the processing capacity and 32 times increased memory capacity. Finally, the PCD-EU will enable Hardware Open Systems Technology (HOST) to address power distribution, signal traffic dynamics, module diagnostics, signaling protocols and module commonality."

Last month, San Jose-based Lynx Software Technologies and Tampa-based Core Avionics & Industrial Inc. (CoreAVI) said that they are providing key technologies for PCD-EU.

Last December, Lockheed Martin received over $172 million to acquire long-lead materials, parts components and effort for 28 Lot 15 F-35s, with work expected to be completed by December 2023. The PCD-EU is to be fielded first in that lot. Nearly $82 million was awarded to procure hardware and software elements for the forthcoming Block 4 capability upgrade. The Block 4 upgrades, to take place over this next decade, will include new information technology capabilities, particularly the TR3 package with an updated integrated core processor (ICP) by L3Harris [LHX] and the PCD-EU. An open-architecture backbone is also expected to be integrated into the F-35 as part of the Block 4 capabilities.

Lockheed Martin awarded Lynx Software Technologies a $14 million subcontract in February last year to provide the "low-level operating system software for the TR3 Integrated Core Processor and PCD," Goodsell wrote in his email to *Avionics*. "CoreAVI is a subcontract to L3Harris and provides the temperature-screened graphics processor units and supporting driver software. We do not have cost/award information at this time."

Last December, Lynx Software Technologies said that the F-35 program office had chosen the company's LYNX MOSA.ic framework to help upgrade the F-35's mission system avionics under the F-35 program's Technology Refresh 3 effort. Will Keegan, the chief technology officer of Lynx Software Technologies, said that the LYNX MOSA.ic framework "lowers the cost, effort and risk of multicore certification compared with traditional SMP RTOS [Symmetric Multi-Processing Real-Time Operating System] approaches."

L3Harris has been developing the new, F-35 ICP, which, like the PCD-EU, is to go aboard F-35s starting with Lot 15 in 2023. Lockheed Martin built the legacy ICP at a facility in Eagan, Minn., which closed in 2012. Avionics work done there has moved to the company's Rotary and Mission Systems (RMS) division in Owego, N.Y.

The new, L3Harris ICP "is based on advanced open systems architecture and COTS technology, which pave the way for system upgrades to the F-35 well into the future," Bryant Henson, president of L3Harris Space and Airborne Systems' mission avionics sector, wrote in a recent email to *Avionics*. "Much of the F-35's sensor and ISR capabilities will be made possible by the ICP. The new processor will increase by 25-times the collection of data from the aircraft's sophisticated sensor suite to identify enemy radar and EW [electronic warfare] emissions that will provide the pilot with 360-degree situational awareness of threats and then prioritize and recommend to the pilot how to counter or negate the threat."

In February, L3Harris' plant in Alpharetta, Ga., announced that it had delivered its 1,000th PCD for the F-35 to Lockheed Martin.

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