

Optical interconnect for upgraded military aircraft sub-systems



The *LightABLE* is now used in numerous sub-systems of the recently upgraded SH-60K of the Japan Self-Defense Forces.

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Military aircraft either consist of rotary-wing or fixed-wing aircraft that are used for combat or surveillance missions, or for the transportation of military personnel and supplies. Many of the global military aircraft fleets are designed to be in service for decades.

Nowadays, because of budget constraints, defense administrations are focusing on upgrading and retrofitting the existing fleet of aircraft with advanced avionics, flight control, weapons, and other systems to make their aircraft more efficient and keep pace with the changing nature of modern warfare.

Description of the application

Many of the world's military forces are renewing their military aircraft fleets to add or improve sub-systems.

- Infrared countermeasures
- Radar upgrades
- Situational awareness systems
- Cockpit data links
- Communication equipment
- Integrated flight deck systems
- Mission management computers
- Displays, including head-up displays
- Airborne intelligence gathering systems
- Precision guidance systems
- CNS systems

In addition, several surveillance systems are being installed in airplanes as emergency warning systems to enhance aircraft situational awareness of pilots and reduce their workload.

Special mission airplanes and UAVs are also being deployed for reconnaissance and surveillance missions across land and maritime borders, which necessitates the retrofitting of communication, navigation and surveillance (CNS) systems into existing military fleets.



Upgrading with commercial off-the-shelf (COTS) components and technology

As the industry is forced to become more cost effective in system designs for avionics retrofits, the use of COTS technology becomes more prevalent. COTS avionics components and systems have numerous advantages: they shorten the design cycle, are more affordable and can be used on multiple platforms.

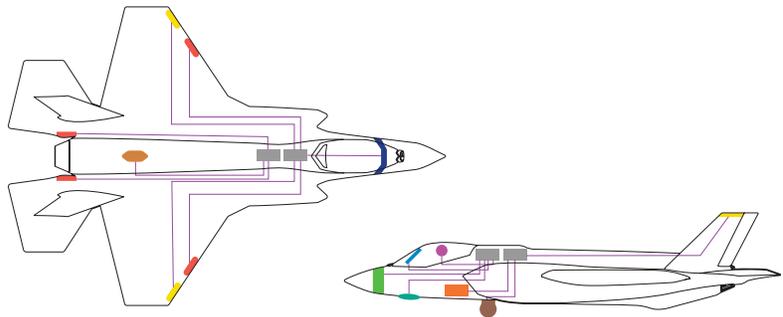
It is expected that the increased utilization of COTS systems in military aircraft will provide growing opportunities for suppliers to enter the military aircraft modernization, upgrade, and retrofit market.

Optical interconnect for modernization, upgrade, and retrofit of military aircraft sub-systems

As explained above, aircraft modernization is needed to maintain a relevant defense system. Optical interconnects deliver the high bandwidth to accommodate AESA (active electronics scanned arrays), high resolution cameras, and other advanced aircraft sub-systems. As well, optical interconnects with its inherent EMI immunity and small SWaP is the interconnect of choice for modern aircraft.

Reflex Photonics' rugged embedded optical modules with their small footprint, high I/O density, and low power consumption have enabled many aircraft sub-systems to achieve the high performance and reliability needed for aircraft modernization.

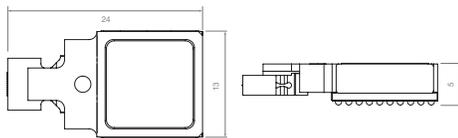
- Radar warning receiver (RWR)
- Missile launch detector (MLD)
- Active electronically scanned array (AESA) radar
- Mission computers
- Head-up display
- Multi-function display (PMFD)
- Data link
- Helmet mounted displays and sights
- Cockpit management systems
- Targeting systems
- Optronic payloads
- Optical bus



Optical transceivers upgrade for 100/140 μm aircraft optical cabling

The *LightABLE™* embedded optical module can also be used with 100 μm fiber optic cables commonly found in older aircraft, eliminating the need to re-cable the aircraft to achieve higher interconnect bandwidth.

Reflex Photonics has demonstrated its *LightABLE* optical transceiver delivers error-free operation at 10 Gbps with older 100 μm fiber thus, alleviating the need to replace the installed optical cables.



Real size

Benefits of using Reflex Photonics' *LightABLE LM*

- **Small:** Less than 5 mm high
- **Rugged:** MIL-STD 883 shock and vibration qualified
- **Sealed:** Moisture and thermal shock resistant
- **Storage temperature:** -57 °C to 125 °C
- **Performance:** 12.5 Gbps/lane from -40 °C to 100 °C
- **Sensitivity:** -12 dBm for BER 10⁻¹²
- **Proven:** Thousands used in aerospace and defense applications
- **Low power consumption:** 100 mW/lane

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Reflex Photonics is certified to ISO 9001

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