

ARCHIVED REPORT

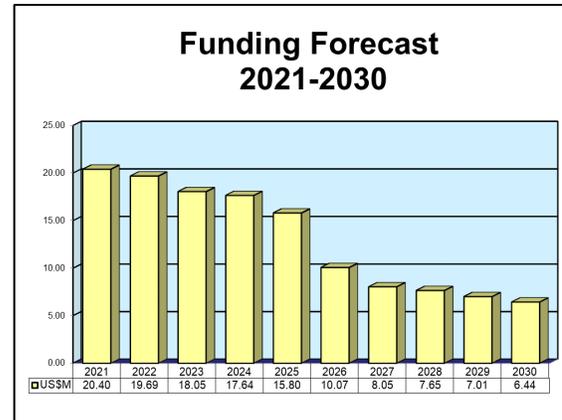
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AAQ-13/AAQ-14 LANTIRN

Outlook

- In 2020, production of LANTIRN systems concluded
- O&M sustainment and upgrade funding remains a source of value to contractors, but this potential earnings stream is drying up
- Newer, more versatile systems have largely replaced the LANTIRN systems



Orientation

Description. Low-Altitude Navigation Targeting Infrared for Night (LANTIRN) is a forward-looking infrared (FLIR) navigation and fire control system consisting of a navigation pod (AAQ-13) and a targeting pod (AAQ-14) that can be used both day and night.

Sponsor

U.S. Air Force (USAF)
 Warner Robins Air Logistics Center
 Robins AFB, GA 31098
 USA
 Tel: + 1 (912) 926-1110

Status. In service.

Application. LANTIRN provides nighttime navigation and targeting capabilities for F-15E and F-16C/D aircraft.

Price Range. According to an August 2007 Air Force Combat Command factsheet, the AAQ-13 navigation pod costs \$1.38 million and the AAQ-14 targeting pod costs \$3.20 million. Since the LANTIRN system consists of both pods, the price of a LANTIRN system is \$4.58 million.

Contractors

Prime

| | |
|---|--|
| <p>Lockheed Martin Missiles & Fire Control - Orlando</p> | <p>http://www.lockheedmartin.com, 5600 Sand Lake Rd, Orlando, FL 32819-8907 United States, Tel: + 1 (407) 356-2000, Fax: + 1 (407) 356-2080, Prime</p> |
|---|--|

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| | |
|--|--|
| Leonardo DRS | http://www.leonardodrs.com, 2345 Crystal Dr, Ste 1000, Arlington, VA 22202 United States, Tel: + 1 (703) 416-8000, Email: info@drs.com (Optical Window) |
| Meggitt Control Systems | http://www.meggitt.com, 12838 Saticoy St, North Hollywood, CA 91605 United States, Tel: + 1 (818) 765-8160, Fax: + 1 (818) 759-2190 (ECU Coolant Pump) |
| Moog Components Group, Blacksburg Operations | http://www.moog.com, 1213 N Main St, Blacksburg, VA 24060-3127 United States, Tel: + 1 (540) 552-3011, Fax: + 1 (540) 557-5390, Email: mcg@moog.com (Actuator) |
| Northrop Grumman Mission Systems, Laser Systems | http://www.northropgrumman.com, 2787 S Orange Blossom Trail, Apopka, FL 32703 United States, Tel: + 1 (321) 354-3000, Fax: + 1 (321) 354-3848, Email: laser-systems@ngc.com (Dynamic & Receiver Benches) |
| Raytheon Intelligence & Space | http://www.raytheonintelligenceandspace.com, 2501 W University Dr, McKinney, TX 75071 United States, Tel: + 1 (972) 952-2000 (Rotary Couplers) |

Contractors are invited to submit updated information to Editor, International Contractors, Forecast International, 22 Commerce Road, Newtown, CT 06470, USA; rich.pettibone@forecast1.com

Technical Data

| Characteristics | <u>Metric</u> | <u>U.S.</u> |
|-------------------------------------|------------------------------------|--------------------|
| <u>AAQ-13 Navigation Pod</u> | | |
| Diameter | 34.8 cm | 13.7 in |
| Length | 198.6 cm | 78.2 in |
| Height | 55.4 cm | 21.8 in |
| Weight | 204 kg | 450 lb |
| Field of View | 21° x 28° | |
| <u>AAQ-14 Targeting Pod</u> | | |
| Diameter | 38.1 cm | 15 in |
| Length | 250.2 cm | 98.5 in |
| Weight | 250 kg | 551 lb |
| FLIR Aperture | 20.6 cm | 8.1 in |
| Fields of View | 6° x 6° wide, 1.69° x 1.69° narrow | |
| <u>F-14 Targeting Pod</u> | | |
| Weight | 249 kg | 549 lb |
| Addition | IMU, GPS | |

Design Features. LANTIRN is a two-part system made up of separate navigation and targeting pods.

AAQ-13 Navigation Pod. The AAQ-13 houses a wide-field-of-view (FOV) FLIR unit; a Raytheon multimode, Ku-band terrain-following radar; a control computer; a power supply; and an environmental control unit. The radar's principal features include a low-altitude capability with set clearances as low as 100 feet, high-speed maneuverability (up to 5.5 degrees/second turn rates), and an electronic counter-countermeasures (ECCM) capability with broadband random-frequency agility.

FLIR terrain imagery and radar flight information are displayed on a wide-FOV head-up display (HUD). The FLIR sensor's common module design is enhanced by a

digital scan converter for automatic control of channel balance, gain, level, and focus. The FLIR look-into-turn and snap-look features augment the pilot's visual FOV for low-altitude maneuvering.

AAQ-14 Targeting Pod. The AAQ-14 consists of a stabilization system, a FLIR sensor, automatic dual-mode trackers, a missile boresight correlator for target handoff to IR Maverick missiles, a laser designator/rangefinder (including a combat laser and an eyesafe training laser), a power supply, an environmental control unit, a control computer, and growth capability for an automatic target recognizer. The FLIR sensor features a wide-and-narrow FOV, with imagery displayed on a head-down display. The pod interfaces with aircraft controls, displays, and fire control systems for semi-automatic target acquisition

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and delivery of both unguided and guided weapons. With laser-guided munitions, the pod can be configured for designator use only.

Operational Characteristics. Thermal imagery from the AAQ-13 navigation FLIR is superimposed on the pilot's HUD. To increase the pilot's FOV, a rotating prism mounted in front of the thermal imager supplies a snap-look capability, with the ability to look either left and right or up and down, thus allowing the pilot to look into a turn to check for obstacles while maneuvering.

Because cloudy conditions degrade the FLIR video, the terrain-following radar penetrates obscured weather conditions and allows the pilot to descend to a level under the weather and follow ground contours at low altitude and high speed. Test pilots descended as low as 100 feet above level ground while flying at 480 knots (550 mph). Terrain following is either manual, with the radar driving a fly-to box on the HUD, or automatic. The pilot first sets the desired clearance height and then follows the steering cue. Specific radar operating modes allow for flying in rain, in addition to increasing jamming resistance and reducing the possibility of detection.

If the pilot detects a potential target on his HUD thermal image, the AAQ-14 targeting FLIR can be steered to look at the target area. The pilot then views a magnified thermal image of the target on a head-down display. The two available fields of view are 6° and 1.69°, which roughly correspond to 3X and 12X magnifications.

When the pilot has identified a legitimate target, he engages the automatic tracking feature, which will keep the targeting FLIR on station throughout subsequent maneuvering. Should the aircraft be equipped with IR Maverick air-to-surface missiles (ASMs), LANTIRN will carry out an automatic boresight correlation and target handoff, which guarantees that the selected missile is locked on the chosen target. In those cases where the aircraft is armed with a laser-guided bomb, target illumination by the LANTIRN laser rangefinder/designator will automatically occur. The pods are physically interchangeable on the F-16 and F-15, but the AAQ-13's computer requires a minor modification when switching aircraft.



Infrared Imagery from LANTIRN Projected on the HUD of a USAF F-15E

Source: U.S. Air Force – Senior Airman Brad Fallin

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Variants/Upgrades

FRACTIL. The FLIR and Automatic Cue Technology Insertion into LANTIRN (FRACTIL) replaces the AAQ-14 first-generation FLIR with a design based on the second-generation infrared focal plane array that offers higher resolution, greater target-detection range, and improved cockpit-display image quality.

The automatic target cue is based on the Lockheed Martin-developed Geometric Arithmetic Parallel Processor (GAPP) technology, which analyzes images provided by EO sensors to determine whether they match pre-established target signatures. The automatic target cue limits exposure to attack aircraft. Low-flying aircraft visible to anti-aircraft surface-to-air missiles (SAMs) for 30 seconds have a low survival rate. However, if exposure is for 20 seconds or less, the vulnerability rate drops dramatically. The automatic target recognition (ATR) system allows the pilot to pop up for less than 20 seconds for a FLIR look. Flight tests began in 1993 aboard an F-16 and a Boeing 757.

LANTIRN II. LANTIRN II featured sensors embedded into the aircraft nose instead of a pod configuration. LANTIRN II entered development in 1989. All LANTIRN sales have been in the form of one or both pods.

Pathfinder/Sharpshooter. This is a scaled-down, less expensive export version of the LANTIRN system. The Pathfinder navigation pod eliminates the terrain-following radar and offers a dual FOV; the Sharpshooter targeting pod is configured only as a laser designator, without the Maverick handoff capability. Egypt purchased the first Pathfinder, and Israel, Bahrain, and Saudi Arabia have purchased Sharpshooter pods. In 1998, Taiwan purchased both systems.

F-14 Integration. In 1995, an upgraded LANTIRN pod was deployed on the U.S. Navy's F-14A/B/D squadrons to enable laser-guided and conventional bombing, fully automatic target tracking, precision altitude and position updates, bomb damage assessment, and reconnaissance capabilities. The F-14A/B versions were optimized for air-to-ground bombing missions. They incorporated an infrared sensor and laser designator/rangefinder, with a GPS and inertial measurement unit replacing the role of the AAQ-13 pod. A modification to the rear cockpit added a pod controller. In the F-14D application, LANTIRN was paired with the AAS-42 infrared search and track (IRST) system to enable the passive detection of airborne targets.

LANTIRN 2000 and 2000+. In 1997, Lockheed Martin announced the improved LANTIRN 2000, which incorporated a third-generation, 8- to 12-micron

FLIR sensor based on quantum-well technology; an advanced diode-pumped laser; and an enhanced computer system – all intended to expand mission capabilities to include air-to-air tracking, theater missile defense, and battle damage assessment. LANTIRN 2000 also raised the operational ceiling from 25,000 feet to 40,000 feet. USAF-sponsored tests on an F-15E took place from mid-1997 to late 1998.

LANTIRN 2000+, which was limited to the U.S. military, consisted of an ATR system, laser spot tracker, and digital disk recorder, resulting in increased targeting flexibility and a reconnaissance capability.

Improved Software. In 1998, the U.S. Air Force received a new 40T5 software package for its F-16C/D Block 40/42 aircraft. The upgrade integrated an improved data modem (IDM), digital terrain system, and horizontal display into the cockpit. It also improved the air-to-air performance of the APG-68 radar and LANTIRN. In 1999, the U.S. Navy received upgraded software to employ weapons and target coordinates more accurately. Using the Fast Tactical Imagery (FTI) system, the F-14 aircrew could transmit LANTIRN digital images to another Tomcat or to the battle group commander.

LST. In 2000, Lockheed Martin received a modification award from the Royal Danish Air Force (RDAF). The modification facilitated the inclusion of the Laser Spot Tracker (LST), which allowed pilots to acquire targets designated by ground troops, unmanned air vehicles (UAVs), or other aircraft. This modification increased the range of the laser designator up to 40,000 feet.

LANTIRN-ER. The current version adds the ER designation for Extended Range. LANTIRN-ER offers improved maintenance with its Battlefield Reconfigurable Instrument for Test of Electro-optics (BRITE) test stations. It features downsized test equipment, improved fault isolation, and a greater use of commercial off-the shelf (COTS) products.

The navigation pod features a third-generation mid-wave FLIR and terrain-following radar. The upgrade includes enhanced image signal processing and improved image quality.

The targeting pod has many components, including a third-generation mid-wave FLIR system, a CCD TV with continuous zoom, and a video downlink. The pod has a 40K laser, a laser spot tracker, and an IR pointer that is compatible with night vision goggles. It features an inertial measurement unit and a missile boresight correlator. It is J-series compatible and provides

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geo-location information for targeting GPS-guided weapons. It also has a digital recorder system option and a digital, high-resolution bomb damage assessment option.

The LANTIRN ER was made available either as a newly fabricated pod or as an upgrade to existing pods.

Program Review

Background. LANTIRN was developed to give USAF tactical aircraft the ability to conduct close air support and interdiction missions at night and under poor weather conditions. These missions require accurate target acquisition and weapons delivery against small ground-based mobile and fixed targets.

\$18 million contract to provide eight F-16 pods under the Litening Precision Attack Targeting System program.

The USAF: Tests and First Contract

Foreign Interest

The USAF carried out extensive LANTIRN testing in 1984 using modified F-16s. Successful low-level navigation tests were completed in varying weather conditions and over diverse terrain. Martin Marietta received the go-ahead for low-rate production in 1986, and Initial Operational Capability was achieved in 1992.

The Netherlands. In 1996, Litening and LANTIRN competed for the RAAF F-16 midlife upgrade. In 1997, Lockheed Martin won a \$31.6 million contract to provide 10 LANTIRN targeting systems. With this order, the Netherlands became LANTIRN's 10th customer nation. The navigation portion, however, was supplied by GEC-Marconi's Atlantic FLIR pod.

The USAF originally negotiated a contract to buy approximately 700 pod sets and 29 sets of support equipment. The contract included the option to reduce the quantity at no cost to the government. With plans to terminate F-15E production ahead of schedule, the USAF exercised this option and reduced procurement to 561 navigation pods and 506 targeting pods. Of these, 200 sets were for the F-15E, while the remainder were slated for F-16C/D Block 40 aircraft. This cut reflected revised procurement of the F-15E.

Denmark, Belgium, Taiwan, Egypt. LANTIRN experienced healthy export sales in 1999 and 2000. In 1999, Denmark chose the AAQ-14 targeting pod for its F-16 midlife update. In mid-2000, Belgium and Taiwan made requests for sales. The Belgian sale was estimated at \$25 million, while the Taiwanese order for 39 sets of the Pathfinder/Sharpshooter pods was valued at \$234 million. In support of the Egyptian Air Force modernization plan, the country awarded a contract worth \$70.5 million for 15 sets of LANTIRN navigation and targeting pods in May 2000.

The Ultimate Test: Combat

Republic of Korea. In 2002, Lockheed Martin was awarded \$163.7 million to provide the advanced Tiger Eyes sensor suite for the Republic of Korea Air Force. Billed as a derivative of LANTIRN, Tiger Eyes would provide Korean F-15K aircraft with targeting, navigation, terrain-following, and additionalIRST capabilities.

During Operation Desert Storm (January-March 1991), the bulk of LANTIRN pods deployed were AAQ-13 navigation pods. Despite the fact that only a handful of targeting pods were available for use with F-15E aircraft, the LANTIRN system validated the Air Force's attack concepts for conducting night and low-visibility bombing missions during the Gulf War.

Litening Strikes

Egypt. In October 2003, Lockheed Martin received a \$9.6 million contract to provide Egypt with Advanced Deployment Kit/Electro-Optical test sets for the upgrade of LANTIRN support equipment. This work was completed in mid-2006.

In 1994, the Israeli Air Force (IAF) chose Rafael's Litening system to replace LANTIRN on its F-16s. The initial order was for 13 units, with contract options for more than 60 units. Litening thus emerged as LANTIRN's main competitor. The single-pod Litening system is approximately half the price and half the weight of a full LANTIRN two-pod system. Notably, the LANTIRNs that were replaced were transferred to IAF F-15 aircraft.

Singapore. In June 2006, Singapore ordered more F-15 fighter jets. Lockheed Martin will provide the EO sensor suite for these aircraft, which includes the AAQ-33 Sniper Advanced Targeting Pod (ATP), the Tiger Eyes navigation pod, and anIRST system under a five-year contract. Deliveries were reported to have begun in 2007.

In 1998, the USAF Reserve Command and Air National Guard awarded Northrop Grumman an initial

Denmark. In May 2006, *Jane's International Defence Review* reported that LANTIRNs from Belgium, Denmark, and the Netherlands would be enhanced with

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LST and IR pointer modes. It was no surprise that a few months later, in November 2006, Lockheed Martin announced that it had been awarded a \$20 million contract for three new ER pods and to upgrade the RDAF's 13 existing LANTIRN pods, in addition to spares and training. Contract work lasted 26 months.

Making LANTIRN Even Better

The last two LANTIRN improvement programs of significance were the Tactical FLIR Pod Modification (TFPM) program and the Laser 40K program. The TFPM program, also known as the Bomb Assessment Modification program, equipped LANTIRN with a two-band radiometer and a tactical disk recorder system. The radiometer, using a 3-5 micron band, exploits plume signature data to determine whether a weapon has penetrated a target. In May 2000, Lockheed Martin was awarded a \$6.84 million engineering and manufacturing development (EMD) contract. It has since completed the work.

The Laser 40K enables the LANTIRN-ER system to operate at an altitude of 40,000 feet, which provides a greater standoff range for weapons release. This increases pilot safety and aircraft survivability. The Pentagon approved a \$10.9 million release in 1999, and an \$8.9 million Laser 40K contract was awarded to Lockheed Martin in January 2000.

A Major Loss to Sniper

In search of a better and less expensive system, the USAF launched the Advanced Targeting Pod contest in 1999. The ATP contest was an acquisition competition to put targeting pods on U.S. F-16CJ Block 50 aircraft. In August 2001, after fierce competition, the USAF chose Lockheed Martin with its newly developed Sniper targeting system. This decision took away a large market segment from LANTIRN.

Several International Losses to Competitors

In 2006, the RCAF purchased Litening pods to replace LANTIRN, and the U.K. Royal Air Force (RAF) selected Litening targeting pods for its Tornado GR4 aircraft. In March 2007, Finland selected the Litening AT system for its F-18 MLU program. Finally, in November 2007, the Dubai Air Show news service reported that Saudi Arabia was acquiring 20 Thales Damocles pods for its Tornado update.

Putting Old LANTIRNs to Good Use

In 2006, the U.S. Navy approved the modification of 13 S-3B Viking aircraft to carry LANTIRN to fulfill non-traditional intelligence, surveillance, and reconnaissance (NTISR) mission requirements in

support of the global war on terror. The Navy obtained the AAQ-14 pods from retired F-14D Tomcats. The pod provides the aircraft with real-time video, recorded intelligence video, and FLIR capability. Additionally, a video data transmission system was installed to facilitate the transmission of aircraft sensor video to ground units equipped with the Remote Operations Video Enhanced Receiver (ROVER) tactical ground station.

In May 2006, Naval Air Systems Command (NAVAIR) delivered the first Viking equipped with the LANTIRN / ROVER data transmission system. Installations were completed in 2007. In January 2008, *AirForces Monthly* reported that Lockheed Martin had supplied the Vikings with LANTIRN-ER modification kits to bring the pods up to the latest configuration. The last S-3B Viking sea squadron was deactivated in January 2009.

LANTIRN Customers Switch to LM Sniper

Lockheed Martin is steering customers to its Sniper/PANTERA one-pod system. In 2007, Belgium, Canada, and Pakistan ordered Sniper pods, and the U.K. Ministry of Defence selected Sniper for its newly upgraded GR9 Harriers. In 2009, the Royal Saudi Air Force (RSAF) issued a Sniper contract to replace its LANTIRN pods.

LM Delivers Trainer to Israel

In July 2008, Lockheed Martin delivered the IAF F-16I flight and system trainer. Lockheed Martin provided the hardware and software to simulate F-16I systems, sensors, weapons, and flight dynamics. The training system includes NxView Sensor Image Generator software. Lockheed Martin also developed a certification process for the System Integration Lab to use in certifying LANTIRN terrain-following avionics. This \$17.1 million effort was completed in 2009.

Sale for Turkey

In December 2009, the U.S. Department of Defense announced that Lockheed Martin had been awarded a \$118 million Foreign Military Sales (FMS) contract to supply Sniper ATPs and LANTIRN-ER AAQ-13 navigation pods for Turkish Air Force F-16 aircraft. The DoD did not provide information on the breakout quantities or delivery schedule. However, in September 2008, Congress was notified of a possible FMS to Turkey of 30 Sniper pods, 30 AAQ-13 LANTIRN-ER navigation pods, and other items and services, together worth as much as \$200 million.

Lockheed Martin reports that seven Sniper pods were delivered by June 2010 to support the FMS contract.

AAQ-13/AAQ-14 LANTIRN***Money in Maintenance Contracts***

In the late 2000s, Lockheed Martin was awarded several lucrative contracts for LANTIRN O&M.

In November 2010, the U.S. Air Force awarded Lockheed Martin a contract worth an estimated \$7.6 million for LANTIRN repairs to support F-15 and F-16 aircraft.

In June 2009, Lockheed Martin was awarded a five-year, \$60 million contract to continue depot maintenance at the Worldwide Depot at Warner Robins AFB, Georgia. This contract also supported repairs to LANTIRN pods for both USAF and FMS customers through 2014.

In May 2010, *Aviation Week* reported that the Dutch government was looking to refine its LANTIRN targeting pod system. The Netherlands was also looking to upgrade 75 F-16 aircraft in order to keep the fighters

viable until the arrival of the F-35 Joint Strike Fighter (JSF).

One-Pod Systems Replace LANTIRN

Instead of LANTIRN, end users have been purchasing one-pod systems such as the Lockheed Martin Sniper, Raytheon ATFLIR, Rafael/Northrop Grumman Litening, and Thales Damocles. These newer offerings cost less than \$2.5 million, compared with approximately \$4.5 million for the LANTIRN two-pod system.

The active-duty U.S. Air Force has switched to Sniper pods, whereas the USAF Reserve and Air National Guard and the U.S. Marine Corps have chosen Litening. The U.S. Navy has specified the ATFLIR system for its operations. As a result, in July 2010, the Worldwide LANTIRN Depot at Robins Air Force Base was renamed the Fixed Wing Targeting Depot.



LANTIRN Pod System

Source: Lockheed Martin

Funding

USAF FY07 budget documentation stated, "Advanced Targeting Pods (ATPs) are non-developmental items that supplement and replace the aging LANTIRN Targeting Pods." LANTIRN was not mentioned in FY08 budget documents, and has not been mentioned since.

AAQ-13/AAQ-14 LANTIRN**Contracts/Orders & Options**

| <u>Contractor</u> | <u>Award (\$ millions)</u> | <u>Date/Description</u> |
|--------------------------------------|--------------------------------|--|
| Lockheed Martin | 13.7 | Apr 2003 – A firm-fixed-price (FFP) contract to provide multiple spares for the AAQ-13/14. This effort supported FMS to Greece and Israel and was completed in 2004. The Warner Robins Air Logistics Center, Robins AFB, GA, was the contracting activity. (F09603-03-G-0003-0003) |
| Lockheed Martin | 6.9 | Oct 2003 – An FFP contract modification for the development, fabrication, assembly, integration, inspection, test, and delivery of the LANTIRN Aerospace Expeditionary Force Tester and Electro-Optical Test Stand upgrade. Work was completed by Mar 2006. The Warner Robins Air Logistics Center, Robins AFB, GA, was the contracting activity. (F09603-01-C-0341, P00009) |
| Lockheed Martin | 9.6 | Oct 2003 – An FFP contract to provide Egypt with Advanced Deployment Kit/Electro-Optical test set upgrades for LANTIRN support equipment. Work was completed during 2005. Wright-Patterson AFB, OH, was the contracting activity. (F33657-99-D-2046, 000204) |
| Lockheed Martin | 17.1 | Mar 2006 – An FFP contract modification to develop a certification process for use by the System Integration Lab in certifying LANTIRN terrain-following avionics. This effort supported FMS to Israel. Work was completed by Mar 2009. Wright-Patterson AFB, OH, was the contracting activity. (F33657-99-C-2048, P00071) |
| Lockheed Martin | 20.0 | Nov 2006 – Royal Danish Air Force contract for three new LANTIRN-ER pods, upgrades to 13 existing LANTIRN pods, "organization-level" spares, maintenance training, and pilot-familiarization training. Work was completed in 26 months. |
| Lockheed Martin | 60.5 | Jun 2009 – A requirements contract for repair of various LANTIRN system assets of the USAF and FMS countries. The funding was to be obligated at the time of the individual delivery orders. (FA8522-09-D-0004) |
| Lockheed Martin | 60.0 | Jul 2009 – USAF five-year contract to continue maintenance at the Lockheed Martin Warner Robins Worldwide Depot. The depot supports repairs to USAF and FMS LANTIRN pods. Lockheed continued to operate the government-owned depot at Warner Robins AFB, GA, through 2014. |
| Salish & Kootenai Aerospace | 77.0 | Oct 2009 – Third-party logistics management services contract to support the F-15, LANTIRN program offices, and the Royal Saudi Air Force. An initial \$23.3 million was budgeted at time of award. (FA8505-10-D-0001) |
| Lockheed Martin | 118.3 | Dec 2009 – FMS contract for Sniper ATPs and LANTIRN pods in support of Turkey. 448 SMG/PKHCB Robins AFB, GA, was the contracting activity. (FA8522-10-C-0002) |
| Al Raha Group for Technical Services | 44.4 | Sep 2010 – FMS, third-party logistics, repair, and return management services contract for the F-15 and LANTIRN support equipment that supports USAF F-15s, the LANTIRN program office, and the Royal Saudi Air Force. An initial \$27.1 million was obligated at time of award. (FA8505-10-D-0006) |
| Lockheed Martin | 7.6 | Nov 2010 – USAF contract for repair of LANTIRN pods on F-15 and F-16 aircraft. WR-ALC/GRSKA, Robins AFB, GA, is the contracting activity. (FA8525-11-D-0001) |

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| <u>Contractor</u> | <u>Award (\$ millions)</u> | <u>Date/Description</u> |
|--|-----------------------------------|---|
| Lockheed Martin Missiles & Fire Control | 1.6 | Nov 2012 – USAF contract supporting LANTIRN-ER M6.5 and Sniper M6.5 avionics development for European participating air forces. The period of performance was 36 months. (FA8540-13-C-0005) |
| Raytheon | 59.73 | Jun 2015 – USAF requirements contract for spares, repairs, and engineering services. The contract supports various systems, including but not limited to the GPN-22/TPN-25, ALQ-161/-172, APG-63/-70, APX-114, ARC-187, and AAQ-13. Work was expected to be completed by Jun 18, 2020. (FA8522-15-D-0004) |
| Lockheed Martin Missiles & Fire Control | 18.38 | Sep 2015 – USAF FFP contract for repair of various LANTIRN assets. Work was expected to be completed by Sep 21, 2020. The contract involves FMS. (FA8539-15-D-0005) |
| Lockheed Martin Missiles & Fire Control | 262.84 | Oct 2015 – USAF FFP indefinite delivery/indefinite quantity (IDIQ) contract for sustainment efforts. Lockheed Martin will provide the AAQ-33 Sniper, AAQ-13 LANTIRN, and AAS-42 IRST. Sustainment includes repair and return activities for line replaceable units, and includes procurement of bench stock, support equipment, depot lay-in parts, and data deliverables. Work will be partially performed in Saudi Arabia, as the contract involves FMS. Work was expected to be completed by Oct 29, 2020. (FA8540-16-D-0001) |
| Lockheed Martin Missiles & Fire Control | 67.31 | Nov 2016 – Definitive contract for replenishment spares and incidental services, providing support for the Sniper ATP, LANTIRN, and IRST systems. Work was expected to be completed by Mar 31, 2020. This is a 100 percent FMS contract supporting Saudi Arabia. (FA8540-17-C-0001) |
| Lockheed Martin Missiles & Fire Control | 200.00 | Jun 2017 – A not-to-exceed IDIQ contract for Sniper ATP and LANTIRN navigation pod sustainment. Lockheed Martin is to provide sustaining activities, including depot-level repair and return of LRUs, the LANTIRN Forward Imaging Navigation Set, Sniper ATP support equipment and data, program support, depot lay-in, program reviews, and on-call technical support. Work is expected to be completed by Mar 31, 2022. The contract is a 100 percent FMS to various nations, including Egypt, Iraq, Jordan, Kuwait, Morocco, Norway, Oman, Pakistan, Poland, Romania, Taiwan, Thailand, and Turkey. (FA8540-17-D-0001) |
| Lockheed Martin Rotary and Mission Systems | 99.90 | Jul 2018 – An IDIQ contract for production and sustainment of LANTIRN LM-STAR support equipment. The contract provides for production and sustainment of and repairs for the FMS customers' LANTIRN systems. Work was expected to be completed by Jul 24, 2023. (FA8540-18-D-0004) |
| Lockheed Martin | 485.00 | May 2020 – An IDIQ ceiling contract for Sniper, IRST, and LANTIRN hardware production for U.S. DoD and FMS customers. The contract provides for management, fabrication, upgrade/retrofit, integration support and testing, and shipping. Work is expected to be completed by May 2025. (FA8540-20-D-0001) |

Timetable

| <u>Month</u> | <u>Year</u> | <u>Major Development</u> |
|---------------------|--------------------|--|
| Sep | 1980 | Basic contract awarded |
| Jul | 1983 | Navigation pod development, test, and evaluation |
| Oct | 1983 | Target pod development, test, and evaluation; first navigation pod delivered |
| Jun | 1986 | USAF awards Martin Marietta \$83.3 million contract for LRIP of targeting pods |
| Nov | 1986 | USAF approves high-rate production of navigation pod |
| Mar | 1987 | Delivery of first production navigation pod |

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| <u>Month</u> | <u>Year</u> | <u>Major Development</u> |
|--------------|-------------|---|
| Jun | 1988 | Delivery of first production targeting pod |
| | FY89 | Decision to terminate F-15E procurement after FY91; LANTIRN procurement scaled back |
| Sep | 1992 | U.S. plans to sell Saudi Arabia F-15s equipped with a less capable version of LANTIRN |
| Sep | 1995 | First LANTIRN contract for USN F-14 aircraft |
| Mid | 1997 | Flight tests of LANTIRN 2000 begin aboard F-15E |
| | 1998 | Flight tests of LANTIRN 2000 completed |
| Aug | 1999 | Pentagon releases \$10.9 million for Laser 40K program |
| May | 2000 | Contract awarded to Lockheed Martin for Bomb Assessment program |
| Apr | 2003 | Contract awarded to Lockheed Martin for LANTIRN spares to Greece and Israel |
| Oct | 2003 | Contract awarded to Lockheed Martin for LANTIRN test sets |
| Oct | 2003 | Contract awarded to Lockheed Martin to upgrade Egypt's LANTIRN equipment |
| Jun | 2006 | First flight of a USN S-3 Viking aircraft with a LANTIRN targeting pod |
| Nov | 2006 | Royal Danish Air Force contract for new LANTIRN-ER pods and upgrades to existing pods |
| Dec | 2008 | Contract for Sniper ATPs and LANTIRN for FMS customer Turkey |
| Jan | 2009 | Last S-3B Viking squadron deactivated |
| | 2020 | LANTIRN ER deliveries to Saudi Arabia conclude |
| | 2021 | Funding continues |

Worldwide Distribution/Inventories

LANTIRN users include **Bahrain, Belgium, Denmark, Egypt, Greece, Israel, the Netherlands, Saudi Arabia, Singapore, South Korea, Taiwan, Turkey, the U.S. Air Force, and the U.S. Navy.**

Forecast Rationale

Two distinct components make up Lockheed Martin's LANTIRN electro-optical pod system: the AAQ-13 navigation pod and the AAQ-14 targeting pod.

After many years of service, LANTIRN has ceased to be produced. At the beginning of 2020, Saudi Arabia was the sole remaining customer for new-built AAQ-13 units. By the end of 2020, Saudi Arabia had received its final AAQ-13, leaving little chance that Lockheed Martin would receive further orders.

For the time being, some additional value for LANTIRN contractors will be gained through O&M

service and upgrade contracts. However, even this revenue stream is drying up.

Air forces are migrating to newer, more versatile systems that can perform the LANTIRN pods' functions within a single package – often including additional, expanded capabilities. At the same time, LANTIRN's platforms are aging, and the potential for O&M earnings will be reduced as aircraft transition out of operators' fleets.

Ten-Year Outlook

| ESTIMATED CALENDAR YEAR O&M FUNDING (in millions US\$) | | | | | | | | | | | | |
|---|-----------------|-------|-------|-------|-------|-----------------|-------|------|-------------|------|------|--------|
| Designation or Program | High Confidence | | | | | Good Confidence | | | Speculative | | | Total |
| | Thru 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | |
| MFR Varies | | | | | | | | | | | | |
| LANTIRN System <-> Worldwide - Various O&M <-> F-15/F-16 | | | | | | | | | | | | |
| | 112.60 | 20.40 | 19.69 | 18.05 | 17.64 | 15.80 | 10.07 | 8.05 | 7.65 | 7.01 | 6.44 | 130.79 |
| Total | 112.60 | 20.40 | 19.69 | 18.05 | 17.64 | 15.80 | 10.07 | 8.05 | 7.65 | 7.01 | 6.44 | 130.79 |