



Armament Directorate



FMS USAF F-15/F-16

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Overview



- **CAD/PAD Health Status**
- **F-15 Components**
 - Canopy Remover Cartridge
- **F-16 Components**
 - Canopy Jettison Rocket Motor (CJRM)
 - Emergency Canopy Release Line (ECRL)
 - M99 Initiator
 - 0.33/0.40/1.0 Dual Delay Initiator
 - Gas-Actuated DTA Initiator
 - Manually-Actuated Detonation Transfer Assembly (DTA) Initiator
 - Thin Layer Explosive (TLX) lines (DTA Lines)
- **New Qualified Components**
- **Shelf/Service Life Changes**



CAD/PAD Health

Platform	STATUS						ISSUES
F-15 (one medium risk Hazard Risk Assessment (HRA) - Canopy Remover Cartridges)	Yellow	Green	Green	Green	Green	Green	Internal Canopy Jettison Initiators, Canopy Remover Cartridges, Ejection Sequence Selectors, and Shielded Mild Detonating Cord (SMDC) to Gas Initiators are the only F-15 specific components on a temporary life extension for lack of parts. Late contract awards, manufacturer production problems, Lot Acceptance Test (LAT) failures, capacity, delinquent contract deliveries, 5808.32 propellant/Diminishing Manufacturing Sources and Material Shortages (DMSMS)
F-16 (one medium risk HRA - TLX Lines)	Yellow	Green	Green	Green	Green	Green	TLX Lines, M99 Initiators, and Dual Delay Initiators are the majority of F-16 specific components on a temporary life extension for lack of parts. Late contract awards, manufacturer production problems, LAT failures, product recalls, capacity, and delinquent contract deliveries
ACES II (two medium risk HRAs - DRS, Harness Release Cartridges)	Yellow	Green	Green	Green	Green	Green	Reefing Line Cutters, Trajectory Divergence Rocket Motors, Harness Release Cartridges, and DRS are majority of components on a temporary life extension for lack of parts affecting F-15 and F-16 aircraft. Late contract awards, manufacturer production problems, LAT failures and delinquent contract deliveries
	FY19	FY20	FY21	FY22	FY23	FY24	



F-15 Canopy Remover Cartridge



▪ **Issue:**

- No contract in-place to deliver replacement components since 2010.

▪ **Cause:**

- HES 5808.32 propellant experienced repeated production failures by industry.
 - ✓ **Obsolescence of key ingredient – Plasticizer**
- USG challenged for several years to produce useable quantities of propellant.
- Defense Contracting Audit Agency (DCAA) investigation into corporate rates took 6 months to complete.
 - Stopped all contract awards to sole source manufacturers Oct 2015 – Mar 2016.
- Contract Required Delivery Date (Original): Sep 2012.
 - Contract awarded 10 Jun 2016 (4 years of requirements).
 - Contract award delayed due to non-availability of propellant.
 - Lot Acceptance Test (LAT) failures in early stages of production.

▪ **Impact:**

- Determination was made by the F-15 System Program Office (SPO) through a Hazard Risk Assessment (Medium Risk), dated 16 July 2016 that warfighters could fly at risk on temporary life extensions up to 48 months beyond original expiration date.
- 53 aircraft are on temporary life extensions.



F-15 Canopy Remover Cartridge



▪ **Get Well:**

- **Four (4) successful 5808.32 propellant mixes produced – Mar 2016**
- **FY11/FY12/FY13/FY14 Contract awarded – Jun 2016**
 - ✓ Lots 2,3,4,5 & 6 (190 assets) completed as of May 2018
 - ✓ Lot 7 (2-Seat); 25ea – ECD Sep 2018 Shipping In-work
- **FY15/FY16/FY17 Contract awarded – Apr 2018**
 - Lot 1; 40ea (2-Seat) – Delivery due Jan 2020
 - Lot 2; 70ea (2-Seta) – Delivery due Jan 2020
 - Lot 3; 75ea (2-Seat) – Delivery due Jan 2020
 - Lot 4; 43ea (1-Seta) – Delivery due Jan 2020
- **FY18/FY19/FY20 PR; 107ea (2-Seat) – Estimate contract award by Aug 2019**
- **Complete mechanistic aging assessment and Aging & Surveillance Tests – Aug 2018**
 - ✓ Evaluate results for potential permanent service life increase



F-16 Canopy Jettison Rocket Motor



■ **Issue:**

- **Three ruptured motor failures since 2010 at Manufacturer**
- Lot Acceptance Test (LAT) failure 9 Aug 2010
 - Cold test unit experienced rapid overpressure (exploded)
- Batch check unit failure 9 Mar 2012
 - Hot test unit experienced rapid overpressure (exploded)
- LAT failure 28 Oct 2013

■ **Hot unit (+200°F) experienced rapid overpressure (exploded) Cause:**

- Manufacturer A - Insufficient bond strength between propellant, liner, and motor tube case lead to excessive surface area burning and overpressure.
- Manufacturer B - Propellant grains (PN 55012) cast from TAL-1526 B161 propellant exhibited soft propellant at the machined ends of the grain.
- Exhibited inadequate material strength and was deformable with light hand pressure.

■ **Impact:**

- Temporary life extensions will support up to 24 months and 48 months (based on lot) beyond original expiration.
- Manufacturer A product recalled; to be replaced by warranty.

■ **Get Well:**

- ✓ FY17 Contract; 158ea L/H and 253ea R/H – EDD Sep 2018
- ☐ FY18 Contract; 136ea L/H and 199ea R/H (Oct. 2018); EDD Apr 2020



F-16 Emergency Canopy Release Line



- **Issue:**
 - 255ea (P/N: 828282-008) delivered to partner countries do not fit in single seat aircraft
- **Cause:**
 - First Article Test (FAT) successful
 - Production lines failed fit check - tooling changed required by manufacturer
 - Fit checks conducted three times before “successful” fit approved
- **Impact:**
 - Lot Numbers MSV13L001-001 and MSV14F002-001 suspended from issue/use
 - Users directed to submit Supply Discrepancy Report (SDR)
 - User to dispose locally
 - To be replaced by warranty
 - Temporary life extensions supportable up to 36 months beyond original expiration to accommodate delivery and installation of replacement components
- **Get Well:**
 - Manufacture to rebuild and replace, via warranty, EDD July 2019



F-16 M99 Initiator

▪ **Issue:**

- Contract delivery of replacement components late to need

▪ **Cause:**

- Production delayed due to foreign material outside of primers during x-ray inspection
 - Primer is internal component to M91 Impulse Cartridge installed into the M99 Initiator
 - Loose primer composition is classified as a critical defect (Aging Characteristics)
- Late acquisition/delivery of hardware from sub-tier suppliers
 - Hardware delivery from vendor was rejected; being reworked causing delays

▪ **Impact:**

- Temporary life extensions are supportable up to 24 months beyond original expiration

▪ **Get Well:**

- FY14; (264ea) – Original delivery due December 2015; EDD June 2019
- FY15; (64ea) – Original delivery due October 2016; EDD June 2019
- FY16; (174ea) – Original delivery due January 2018; EDD January 2020
- FY17; (91ea) – Original delivery due April 2018; EDD April 2020
- FY18; (67ea) – EDD June 2020



F-16 0.33 Dual Delay Initiator



- **Issue:**
 - Production delays on one (1) contract; components late to need
- **Cause:**
 - Administrative delays within contracting to award FY15 procurement package delayed contract award by 15 months
 - High order quantity has driven significant delays in receiving hardware from sub-tier suppliers to meet contractual delivery date
- **Impact:**
 - Temporary life extensions supportable up to 24 months beyond original expiration to accommodate delivery and installation of replacement components
- **Get Well:**
 - ✓ FY15 Contract; 1,000ea – original delivery due Dec 2017
 - ✓ Lot 1; 350ea – now Sep 2018
 - ✓ Lot 2; 650ea – now Sep 2018
 - ✓ FY16 Contract; 364ea – EDD Jan 2019
 - ☐ FY17 Contract; 427ea - EDD Jul 2019
 - ☐ FY18 Contract; 202ea – EDD Oct 2019
 - ☐ FY19 PR; 111ea – estimate contract award May 2019



F-16 0.40 Dual Delay Initiator



- **Issue:**
 - Production delays on one (1) contract; components late to need
- **Cause:**
 - Administrative delays within contracting to award FY15 procurement package delayed contract award by 15 months
 - High order quantity has driven significant delays in receiving hardware from sub-tier suppliers to meet contractual delivery date
- **Impact:**
 - Temporary life extensions supportable up to 24 months beyond original expiration to accommodate delivery and installation of replacement components
- **Get Well:**
 - ✓ FY16 Contract; 120ea – EDD Feb 2019
 - ❑ FY17 Contract; 181ea - EDD Aug 2019
 - ❑ FY18 Contract; 91ea – EDD Oct 2019
 - ❑ FY19 PR; 296ea – Estimated contract award May 2019



F-16 1.0 Dual Delay Initiator



- **Issue:**
 - Production delays on one (1) contract; components late to need
- **Cause:**
 - Administrative delays within contracting to award FY15 procurement package delayed contract award by 15 months
 - High order quantity has driven significant delays in receiving hardware from sub-tier suppliers to meet contractual delivery date
- **Impact:**
 - Temporary life extensions supportable up to 24 months beyond original expiration to accommodate delivery and installation of replacement components
- **Get Well:**
 - ✓ FY16 Contract; 249ea – EDD Feb 2019
 - ❑ FY17 Contract; 129ea - EDD Jun 2019
 - ❑ FY18 Contract; 232ea – EDD Oct 2019
 - ❑ FY19 PR; 61ea – Estimated contract award May 2019



F-16 Gas-Actuated DTA Initiator



- **Issue:**
 - Contract delivery of replacement components late to need
- **Cause:**
 - Administrative delays within contracting to award FY15 procurement package delayed contract award by 15 months
- **Impact:**
 - Temporary life extensions supportable up to 24 months beyond original expiration to accommodate delivery and installation of replacement components
- **Get Well:**
 - ✓ FY16 Contract; 1,172ea – EDD Aug 2018
 - ❑ FY17 Contract; 823ea - EDD Aug 2019
 - ❑ FY18 Contract; 326ea – EDD Oct 2019
 - ❑ FY19 PR; 1,346ea – Estimated contract award May 2019



F-16 Manually-Actuated DTA Initiator



- **Issue:**
 - Contract delivery of replacement components late to need
- **Cause:**
 - Administrative delays within contracting to award FY15 procurement package delayed contract award by 15 months
- **Impact:**
 - Temporary life extensions supportable up to 24 months beyond original expiration to accommodate delivery and installation of replacement components
- **Get Well:**
 - ✓ FY16 Contract; 807ea – EDD Jul 2018
 - ❑ FY17 Contract; 2,139ea - EDD Aug 2019
 - ❑ FY18 Contract; 682ea – EDD Oct 2019
 - ❑ FY19 PR; 763ea – Estimated contract award May 2019



F-16 Thin Layer Explosive (TLX) Lines



▪ **Issue:**

- Obsolescence of Halar® 300 (Plastic beads used in TLX thin layer explosive cord)
- Sole source TLX manufacturer notified by sub-tier supplier they no longer produce small runs of Halar® 300
- March 2012, TLX manufacturer submitted Engineering Change Proposal (ECP) indicating Halar® 300 was obsolete & replacement material was Halar® 300LC (Low Corrosive)
- US Government required Halar® 300LC meet all F-16 specifications for TLX performance and shelf/service life
 - TLX manufacturer failed to provide adequate testing to prove the material would age to meet the assigned shelf/service life of TLX lines
- US Government rejected ECP
- CAD/PAD Joint Program Office asked Halar® 300 supplier to determine if a last procurement was possible
 - Contract awarded for production run of “lifetime buy”; shipped 2013
 - New contract negotiated with TLX manufacturer to extrude Halar® 300 plastic into explosive cord with stainless steel over-braid
 - Stocked at TLX manufacturer and provided as government furnished material (GFM) to be manufactured into TLX lines – 2014
 - Production resumed with increased operators and production shifts to meet backlog



F-16 Thin Layer Explosive (TLX) Lines



- **Cause:**
- **Product Recall/Suspension #1:** February 2015
 - Three production shifts implemented to fill backlog once GFM braided cord was available (~1,000 lines/month)
 - Production engineer identified new operator did not cut sufficient material from rejected sections & splices
 - Automated inspection equipment sprays red mark on areas with high or low explosive core load; 80” sections to be removed
 - Affected lines produced/delivered in 2014 are restricted from issue and currently pending warranty replacements
 - User to dispose locally
- **Lot Acceptance Test (LAT) Failure:** December 2014
 - During LAT a single line failed to propagate
 - Initial investigation evaluated many factors and identified test fixture causing line to kink
 - Fixture was modified with new “Z” bend fitting and double sampling added
 - Additional failures occurred
 - Explosive core load study revealed measurement inconsistency ranges from low to high
- **Product Recall/Suspension #2:** June 2016
 - Evaluation determined 2014/2015 produced TLX lines were suspect and issued recall
 - Identified low/high core loads were due to improper laser sensing system calibration

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F-16 Thin Layer Explosive (TLX) Lines



▪ **Impact:**

- Temporary life extensions supportable up to 72 months beyond original expiration
- F-16 System Program Office Hazard Risk Assessment (Medium Risk); 27 June 2016
- Multiple delinquent Contracts/Delivery Orders (DO)
 - FY12 Contract = 2,342ea
 - FY13 Contract; DO 1 = 1,448ea
 - FY14 Contract; DO 2 = 1,792ea

▪ **Get Well:**

- ~18,000 TLX lines on backlog (USAF/FMS, Navy, Commercial)
- FY12 Contract (Mar 2013)
 - ✓ -721 & -723 lines; Delivered Mar 2018
 - Remaining P/N lines; EDD Jun 2019
- FY13 Contract (DO 1/April 2014); EDD Nov 2019
- FY14 Contract (DO 2/Nov 2016); EDD Nov 2019
- ✓ Award 5-Year IDIQ Contract (Mar 2018)
 - FY15/FY16/FY17 Contract (DO 1); EDD Aug 2020
 - FY18 Contract (DO 2); contractual EDD Jan 2020
 - FY19 Contract (DO 3) contractual EDD Jun 2020



New Qualified Components



- **Canopy Remover Cartridge (F-15C)**

- P/N: 2297800-1

- ✓ Hazard Classification record updated due to increased Net Explosive Weight (NEW)
 - ✓ Technical Data Package and performance remains unchanged

- **.75 Time Delay Initiator (F-15)**

- P/N: 21301900-2

- ✓ Configuration changed from single primer to dual primer
 - ✓ Performance remains unchanged



Shelf/Service Life Changes



- **All SMDC Lines/Kits (F-15)**
 - ✓ Shelf/Service Life increased from 240/156 to 240/192.
- **Initiator, External Canopy Jettison**
 - ✓ Shelf Service Life increased from 108/96 to 120/108



QUESTIONS ?

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