Armament Directorate

FMS-USAF
C-17 Components

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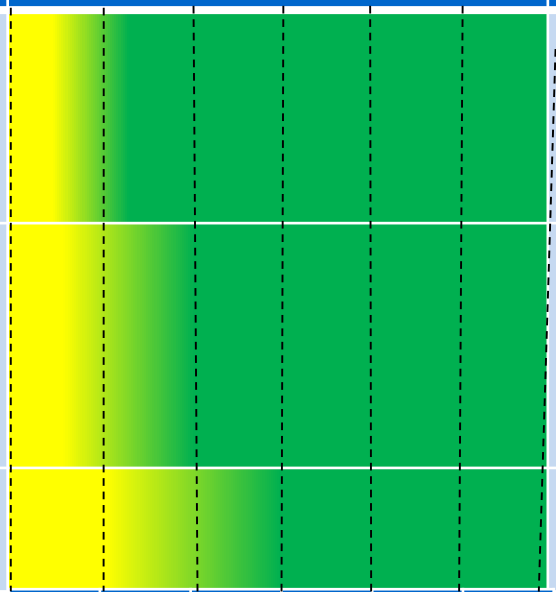
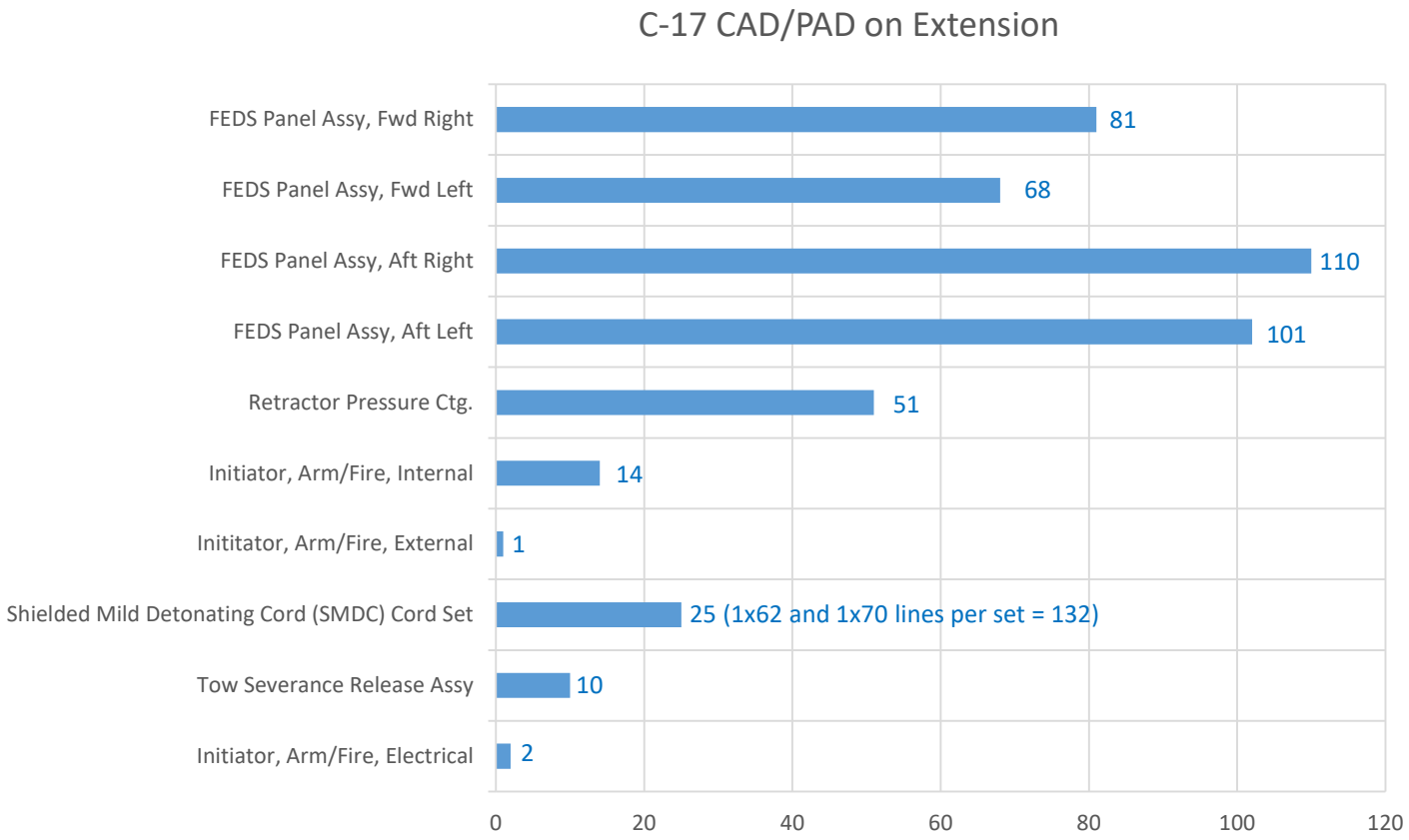
Overview

- **Health Outlook**
- **Cartridge Actuated/Propellant Actuated Devices (CAD/PAD) on Extension**
- **Flotation Equipment Deployment Systems (FEDS) Panel Assemblies**
- **FY19 Surveillance Testing**
  - Lot Acceptance Test (LAT) failure (2008 to 2015)
- **FEDS Panel Contract Schedule**
- **CAD/PAD Status**
  - FEDS Panels
  - Tow Severance Release Assembly

Health Outlook

Platform	STATUS	ISSUES
C-17 FEDS (one medium risk informal HRA)		***Previous LAT failures and contract award delayed impacting delivery of Flotation Equipment Deployment System (FEDS),*** **combined with the relatively short shelf/service life of the FEDS panel assemblies have resulted in major backlog.**
Tow Severance Release Assy		**Solicitation for IDIQ Contract (Awaiting a certified PR with additional funding to award contract). Engagement of the historical and qualified supplier to appeal/compel/ negotiate with the supplier to produce the initiators to meet the specification.**
SMDC Ship Set		**Contract awarded 12 Mar 2018. Contractor is in the process of creating labels for the C17 SMDC lines.**

CAD/PAD on Extension



17,190 installs

463 items on extension

2.6% of installs extended as of:
May 2019
No A/C grounded

Note: Data (provided by CAD/PAD SPO) reflects active extensions only and does not capture mx that has taken place. If mx has taken place, extensions will drop out of the system upon expiration

Flotation Equipment Deployment Systems (FEDS) Panel Assemblies

- **Delivery Delays**
  - Contracting delays, technical issues, and previous Lot Acceptance Test (LAT) failures combined with the relatively short shelf/service life of the FEDS panel assemblies have resulted in major backlog
- **5-Year Indefinite Delivery Indefinite Quantity (IDIQ) contract was awarded in Sep 2017**
  - Administrative lead time greatly reduced
  - Orders for new FEDS panels in place with contractor
  - Contractor looking into capacity expansion to keep up with production requirements
- **Surveillance test scheduled for FY19 using FEDS panels that were installed for an extended amount of time and removed from aircraft as a result of current deliveries**

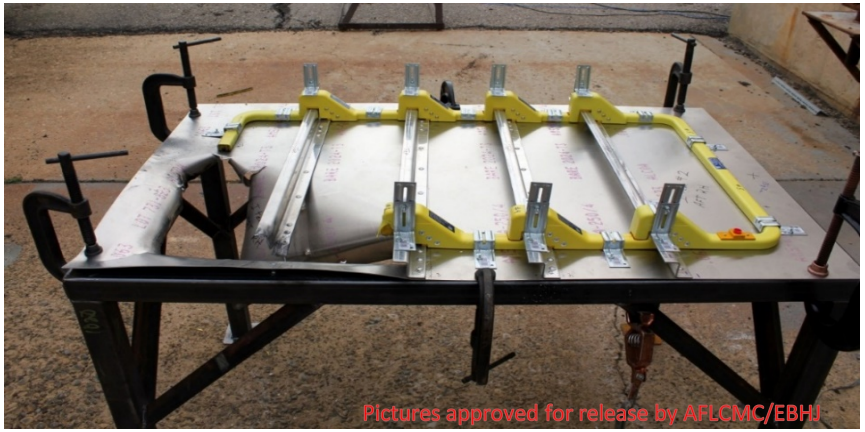
FEDS Panels: Original Design

- **Original design qualified in late 80s, early 90s**
- **Specified temperature extremes of –65°F to +128°F**
- **Components selected with thermal characteristics compatible with this temperature range**
- **Surveillance and lot acceptance test failures revealed design flaws**
  - Surveillance test failure in 1997 resulted in design overhaul
  - LAT failures between 2008 and 2015 resulted in design improvements

FY19 Surveillance Testing

- **Test the latest configuration (lot MSV11K017-002 and later)**
  - Forward Right (MSV13B020-002, qty 1 & MSV12J020-001, qty 1)
  - Aft Left (MSV12M020-002, qty 2)
  - Aft Right (MSV12G020-001, qty 1 & MSV12M021-002, qty 1)
  - Forward Left (MSV12K020-001, qty 1 & MSV13B020-002, qty 1)
- **Shelf/Service Life**
  - 72/48 months (testing based on shelf life, not service life)
  - Last surveillance test 2015 – Next test FY19 (panels received for field will be used for the next surveillance test, (Projected test date 4 Oct 19)
  - Data obtained will determine if assets Shelf/Service life can be increase.
  - Assets will be between 6 and 7 years old when tested, compared to the current shelf and service life of 6 and 4 years
- **Full-scale test fixture and panels closely match aircraft condition**
- **Successful test must completely sever aluminum test panel and Z-longerons**
- **One SMDC line used to initiate test (two used in aircraft for redundancy)**
- **Small section cut out of test assembly to force detonation in one direction**

Failed Detonation Transfer



- **Surveillance test failure**
- **Detonation failed to transfer to up-and-over section of 2nd Z-longeron**
- **Attributed to gap length between Linear Shape Charge (LSC) ends**

LAT Failures (2008 to 2015)

- **Several lot acceptance tests failed between 2008 and 2015**
  - Did not fully sever aluminum test panel and Z-longerons
  - Detonation did not transfer through up-and-over sections
- **Failures attributed to:**
  - Incorrect spacing/gaps between LSC sections
  - Migration of bonding adhesive
  - Test fixture not matching aircraft condition (insufficient restraints of charge assembly to test panel and test panel to test fixture)
- **Design improvements included:**
  - Gap studies conducted to determine appropriate specification limits
  - Modified adhesive application process to prevent migration
  - Added X-ray criteria for verification
  - Added more brackets, clamps to test fixture to match aircraft condition
  - Updated test procedures and drawings accordingly

FEDS Panels: Background Summary

- Original FEDS panel design and test process was flawed
  - Original materials could not withstand aircraft environment
  - Poor design, process controls led to incorrect gaps between assembly components
  - Test fixture restraints (brackets, clamps) did not match aircraft condition, resulting in reduced cutting force
- Test failures led to design and manufacturing improvements
  - Improved materials, material properties
    - LSC/sheath materials changed (reliably used in many CAD/PAD items)
    - Backblast shield retainer material changed
  - Gaps between components are better understood and more tightly controlled
  - Adhesive application process modified to prevent migration
  - More restraints added to test setup to match aircraft condition
- Issues have led to acquisition delays and temporary life extensions
- Most recent LAT (2018) was 100% successful (13 panel assemblies tested)

FEDS Panel Contract Schedule

- **FY16 Contract**

Lot	Noun	Qty	Delivery Date
~~1~~	~~FWD RIGHT~~	~~63~~	~~SHIPPED 14 MAR 2018~~
~~1~~	~~FWD LEFT~~	~~60~~	~~SHIPPED 20 MAR 2018~~
~~2~~	~~AFT RIGHT~~	~~56~~	~~SHIPPED 25 JUN 2018~~
~~2~~	~~AFT LEFT~~	~~49~~	~~SHIPPED 25 JUN 2018~~
3	FWD RIGHT	85	~~65 Panels shipped as of 27 March / 20 panels shipped 2 May 19~~
3	~~FWD LEFT~~	~~78~~	~~SHIPPED SEP 2018~~
4	AFT RIGHT	71	EST. LATE MAY 2019
4	AFT LEFT	68	EST. LATE MAY 2019

- **IDIQ Contract**

Lot	Noun	Qty	Est Delivery Date
1	FWD RIGHT	48	AUG 2019
1	FWD LEFT	45	AUG 2019
2	AFT RIGHT	49	NOV 2019
2	AFT LEFT	49	NOV 2019
3	FWD RIGHT	80	FEB 2020
3	FWD LEFT	80	FEB 2020
4	AFT RIGHT	90	MAY 2020
4	AFT LEFT	95	MAY 2020

C-17 Flotation Equipment Deployment System (FEDS)

- **Issue:**
  - 360 FEDS Panels on temporary life extension
  - FEDS panels are used to cut four emergency escape hatches in the overhead fuselage; Quantity per Aircraft (QPA) is 4
- **Cause:**
  - Contracting personnel shortages, pricing not being fair and reasonable, and LAT failure in Oct 2015 resulted in delayed contract award for C-17 FEDS components
- **Impact:**
  - Several USAF and FMS aircraft are flying on service life extensions/ Impacting field maintenance schedules
  - C-17 System Safety Program Office and Boeing conducted informal Risk Hazard Assessment (RHA) determining two to five year extensions beyond the current assigned shelf/service life are acceptable but must be reviewed & finalized by Special Project Office (SPO) – C-17 SPO re-evaluating/updating HRA
- **Get Well:**
  - FY16 requirements awarded for panel assemblies (1 Aug 2016)
    - ✓ Support USAF and FMS customers with shelf/service life extensions
    - ✓ Requested accelerated delivery (vendor is working at capacity)
    - ✓ Incremental delivery of Lot 1: 157 fwd panels (123 USAF/34 FMS)
    - ✓ Incremental delivery of Lot 2: 139 aft panels (105 USAF/34 FMS)
    - ✓ Incremental delivery of Lot 3: 163 fwd panels
    - ❑ Incremental delivery of Lot 4: 139 aft panels
  - Awarded FY17 – FY21 IDIQ contract to drastically reduce lead times

Tow Severance Release Assy

NSN:1377013941227ES, PN:5120100

- **Issue:**
  - USAF: 10 / FMS: 8 (<5%) serial numbers on temporary extension
- **Cause:**
  - Initiator supply running out, supply of a sole source sub-assembly (Part Number 4516450-CFM, Assembly in Part Number 5120100), the supplier (Autoliv) will no longer manufacture. Paid contractor to buy 600 initiators in FY12.
- **Impact:**
  - 108/84 month (testing based on shelf life, not service life)
  - Surveillance test closed out Jun 2018; shelf/service life increasing from 84/60 to 108/84 months
  - Technical order posted 19 Nov 2018 to reflect shelf/service life increase to 108/84 months
- **Get Well:**
  - FY16 requirements:
    - ✓ 120ea delivered Mar 2018
  - FY17 requirements (FY16:USAF 45/ FMS 6)
    - ❑ 45ea – 8 Jan: : Energetic certification effort is complete and the production order is with Final Inspection
    - ❑ Purposed: Contractor coordinating with AutoLiv for a one-time purchase of 2,500 Initiators.
  - FY19 requirements (Q18284): solicitation for a quantity total of 91 units.
    - ❑ FY17 USAF 79 / FMS 12: Unit price of $4,580.64 for 91 deliverable units. Resulting in an overall total price of $416,838.39 for the line solicitation. The Government reviewed contractor proposed profit rate of 15%. A 5% risk factor was also used for the contract type risk for the Firm Fixed Price (FFP) contract. Resulting in a Government objective 10% profit rate.

Questions