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# ACES CADPAD COMMONALITY -

Driving \$1B+ Savings For The World & Maintaining The US CAD/PAD Industrial Base

**2024 CADPAD TEW**  
**13-15 August 2024**

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# EJECTION SEAT HISTORY

## 1950S/1960S HISTORY (BEFORE ACES)

- Almost every USAF fighter and bomber had a unique and proprietary ejection seat
- No standardization of life limited explosive components (CAD/PAD)
- Surveillance testing/service life extensions were challenging
  - Low numbers of fielded units
  - Many part numbers
  - No standardization of LAT procedures and equipment
- No standardization of seat support equipment
- No standardization of seat training
- Seats were expensive to own/maintain
- All seats were proprietary aircraft OEM contractor furnished equipment

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# EJECTION SEAT HISTORY

## USAF ACES EJECTION SEAT OBJECTIVES

- Develop a standardized USAF ejection seat with improved performance that would be Government Furnished Equipment (GFE)
- Government owned data rights to allow competitive procurement and avoid proprietary costs
- Multiple supplier base to assure competition
  - Diverse competitive supply sources
  - Seat was first USAF Leader/Follower Program
- Common and low-cost maintenance equipment and training procedures
- Robust CAD/PAD surveillance testing program to:
  - Increase service lives
  - Lower Life Cycle Costs (LCC)

# EJECTION SEAT HISTORY

1970S - ACES II FIELDIED ON F-15 AND A-10 AIRCRAFT



Original ACES II F-15



ACES II A-10

- A-10 CAD/PAD Same as F-15 Except
- No TDRM
  - Sequencer P/N



# EJECTION SEAT HISTORY

1980S - ACES II FIELDIED ON F-16, B-1B, B-2, AND F-117 AIRCRAFT



**ACES II F-16**

F-16 CAD/PAD same as F-15



**ACES II B-1B**

B-1B CAD/PAD same as F-15 except

- Arm Restraint Cutter
- Aft Seat Unique TDRM
- Sequencer P/N



**ACES II B-2**

B-2 CAD/PAD same as F-15 except

- TLX Initiation



**ACES II F-117**

F-117 CAD/PAD same as F-15

# EJECTION SEAT HISTORY

1990S - ACES II FIELDIED ON F-2 AND F-22 AIRCRAFT



## ACES II F-2

F-2 CAD/PAD same as F-15 except  
- Sequencer P/N



## ACES II F-22

F-22 CAD/PAD same as F-15 except  
- Electrical Initiation  
- Drogue mortared with Parachute Cartridge

# ACES II FIELDING

## ACES II PROGRAM

- ACES II
  - Total production exceeds 12,000 seats
  - ~6000 seats flying today
  - Operational in ~30 countries
  - F-15 & F-16 ACES II production line continues today

F-15	F-16				F-2	B-1B, B-2, F-22, F-117, A-10, WB-57
USA	USA	Israel	Taiwan	Slovakia	Japan	USA
Japan	Bahrain	Italy	Romania	Bulgaria		
Singapore	Belgium	Jordan	Singapore			
Israel	Chile	Morocco	South Korea			
Saudi Arabia	Denmark	Norway	Thailand			
Qatar	Egypt	Oman	Netherlands			
South Korea	Greece	Pakistan	Turkey			
	Indonesia	Poland	UAE			
	Iraq	Portugal	Venezuela			



# EJECTION SEAT HISTORY

## ACES 5 PLATFORMS



B-2 SSIP



F-16 EFS



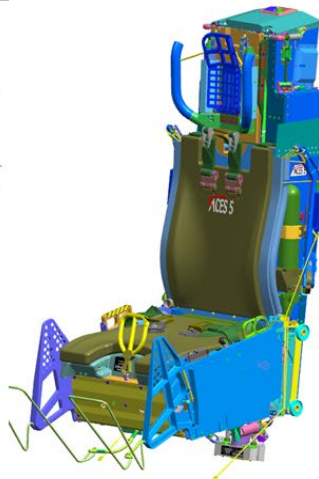
T-7A



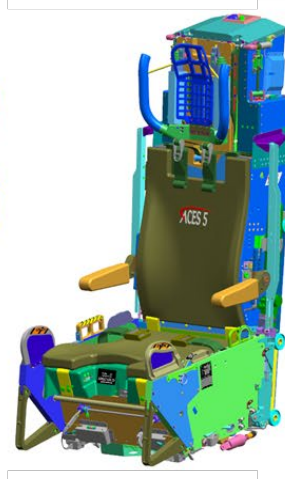
NGES F-15



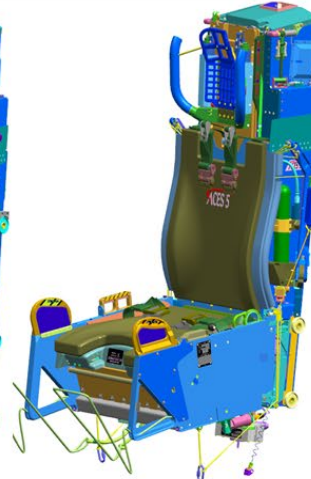
NGES F-16



NGES F-22



NGES B-1



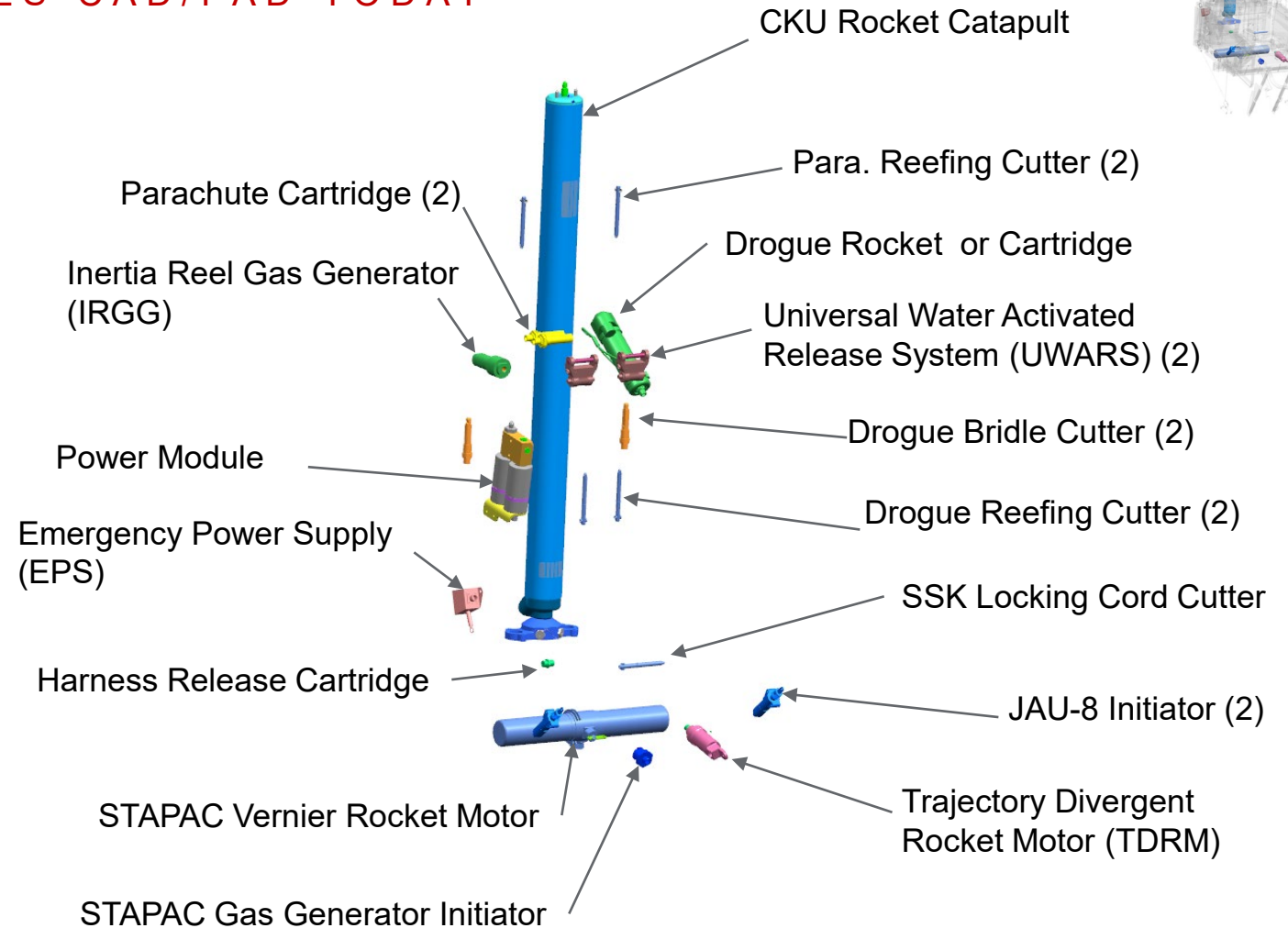
NGES A-10



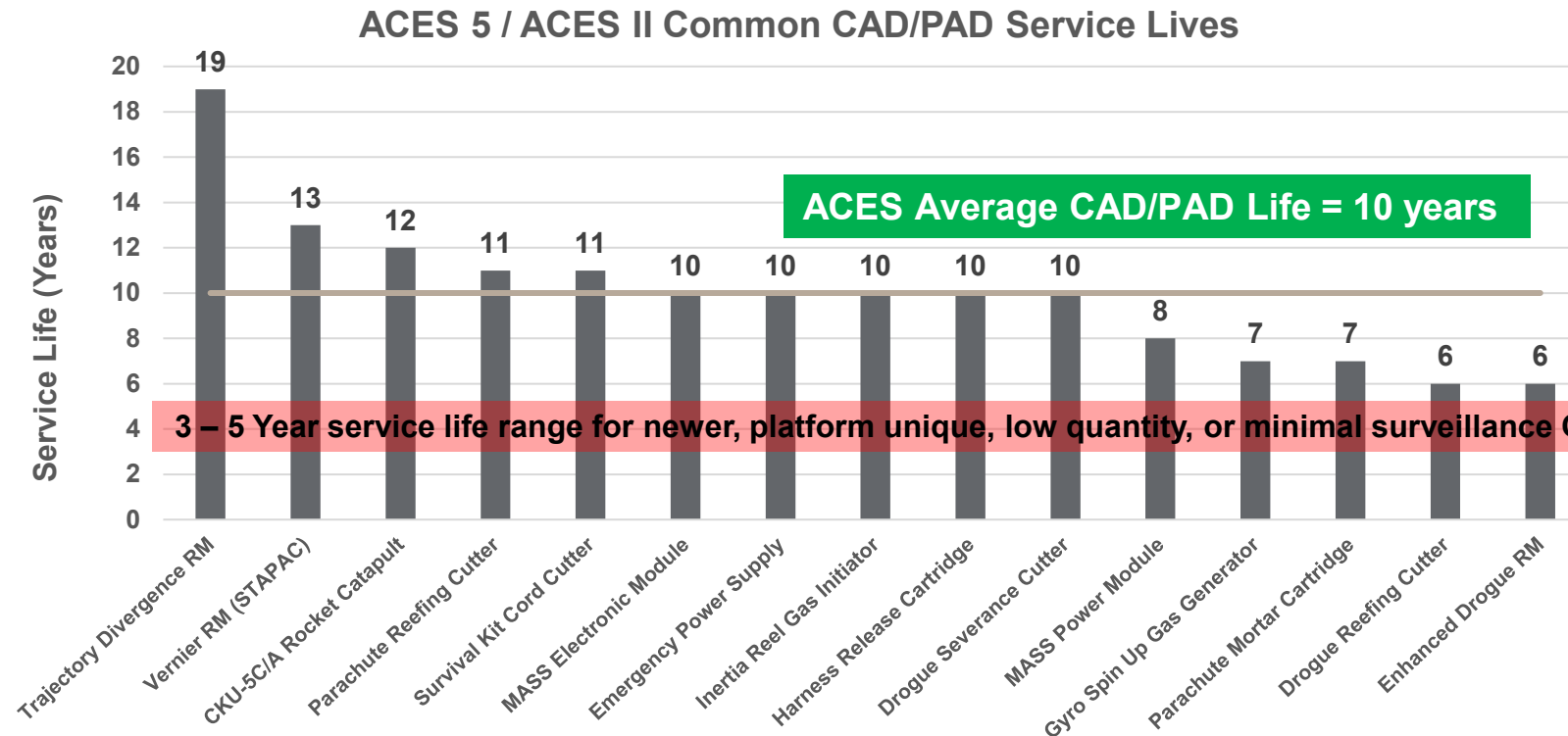
# ACES US CAD/PAD INDUSTRIAL BASE

## EIGHT COMPANIES PROVIDE ACES CAD/PAD TODAY

1. Collins Aerospace
  2. JPO NSWC-IH
  3. Chemring Energetic Devices
  4. Pacific Scientific
  5. Eagle Picher
  6. Thales/Cobham
  7. Roberts Research
  8. Nammo
- 2<sup>nd</sup> Source reefing cutter underway
    - PTI Technologies/NEco



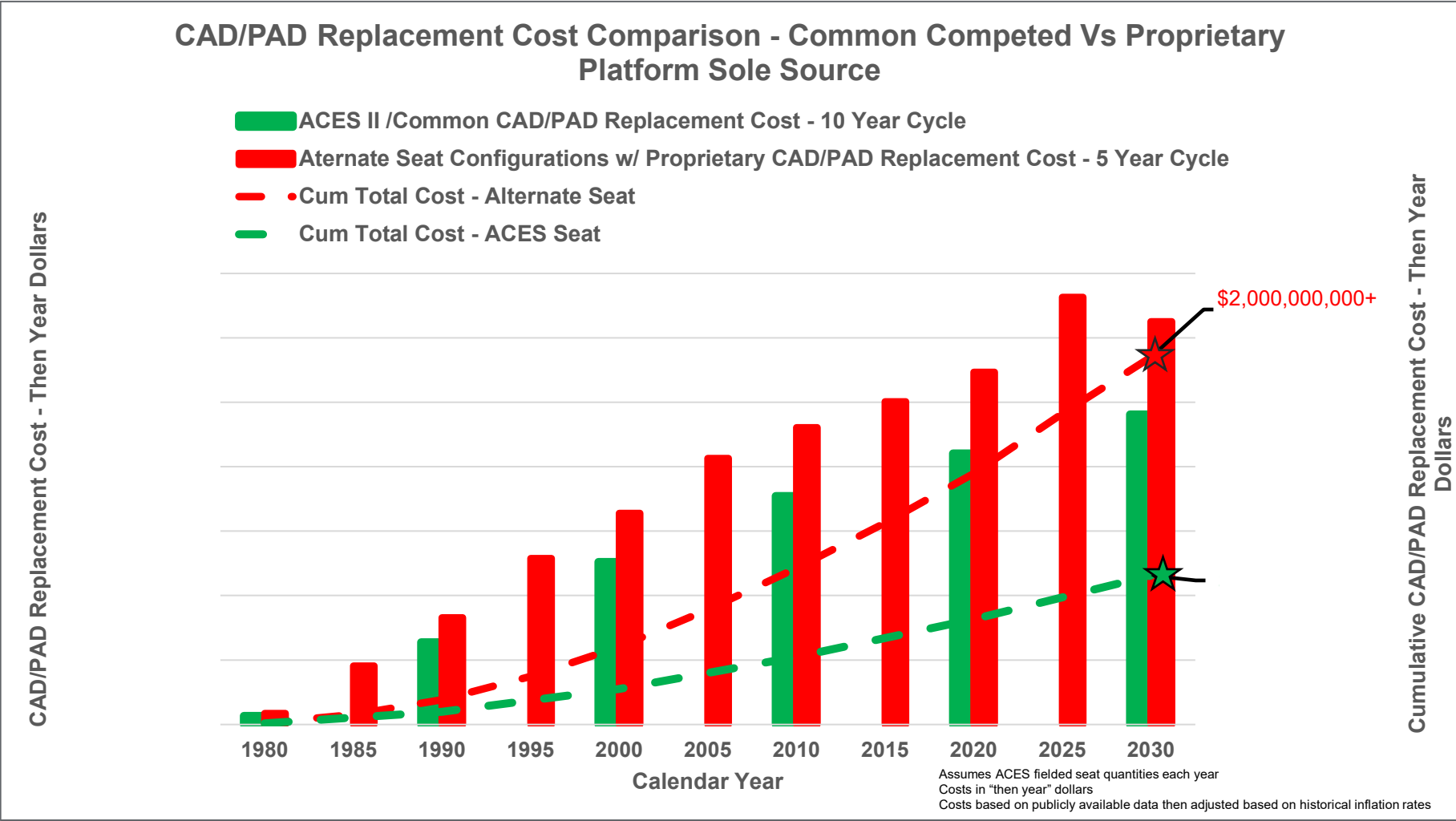
# SERVICE LIFE OF COMMON CAD/PAD SYSTEMS



## DATA RIGHTS TO AFFORDABLY SUSTAIN

- ACES CAD/PAD items have average installed service lives of 10+ years
- Government-Owned ACES Data Rights Enable Competitively Sourced, Producible Spares Pipeline

# BILLION-DOLLAR CAD/PAD SAVINGS ACHIEVED



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# SUMMARY

## COMMON US SEAT IS CRITICAL FOR MISSION READINESS & EXECUTION

- Common CAD/PAD across platforms saves billions over time
  - Enables competition
  - Enables large quantity procurement
  - Enables surveillance tests/service life extensions
- Billions more saved by
  - High volume initial seat procurement
  - Common support equipment & technical orders
  - Common training
  - Common seat LRUs
  - Common global logistics
- 100% Engineered, Tested, and Built In The USA
  - 1000+ USA employees and 100+ USA companies
  - Essential to maintaining the Escape Systems & CAD/PAD United States Industrial Base



# QUESTIONS

## ADVANCED CONCEPT EJECTION SEAT (ACES)

**710+**

Aircrew Lives  
Saved

**< 1%**

Spinal Injury  
Rate

Industry benchmark – Achieves  
spec compliant terrain  
clearance without breaking  
aircrew back via Load  
Compensating Catapult

**Billions  
\$ Saved**  
Lowest LCC

High volumes, data rights,  
competitive procurement,  
multiple sources, common SE  
& tech orders, common  
training, common LRUs,  
common logistics

**Made In  
The USA**

Key to DoD  
Industrial Base

Produced by 100+ companies,  
produced by 1000+ employees  
across multiple states in the USA

