

F-X,
“Penetrating Counterair”

F-22 Restart

F-35

A-10
Replacement

F/A-18E/F

HEDGEYE  POTOMAC RESEARCH *Defense Policy*

HUNTED: THE F35 PROGRAM

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HUNTED: THE F35 PROGRAM

- 1. The Landscape: State of US TACAIR Market**
- 2. The Prey: The F-35 Program**
 1. Procurement
 2. Sustainment
- 3. The Hunt and The Hunters**
 1. Changes in Requirements Coming From Biggest Customer
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- 4. Assessment and Forecasts**

US TACAIR LANDSCAPE

1

USAF FIGHTER FLEET DATES FROM REAGAN ERA

From 1980 to 1992, the USAF bought an average of 230 F16s and F15s *per year*

2

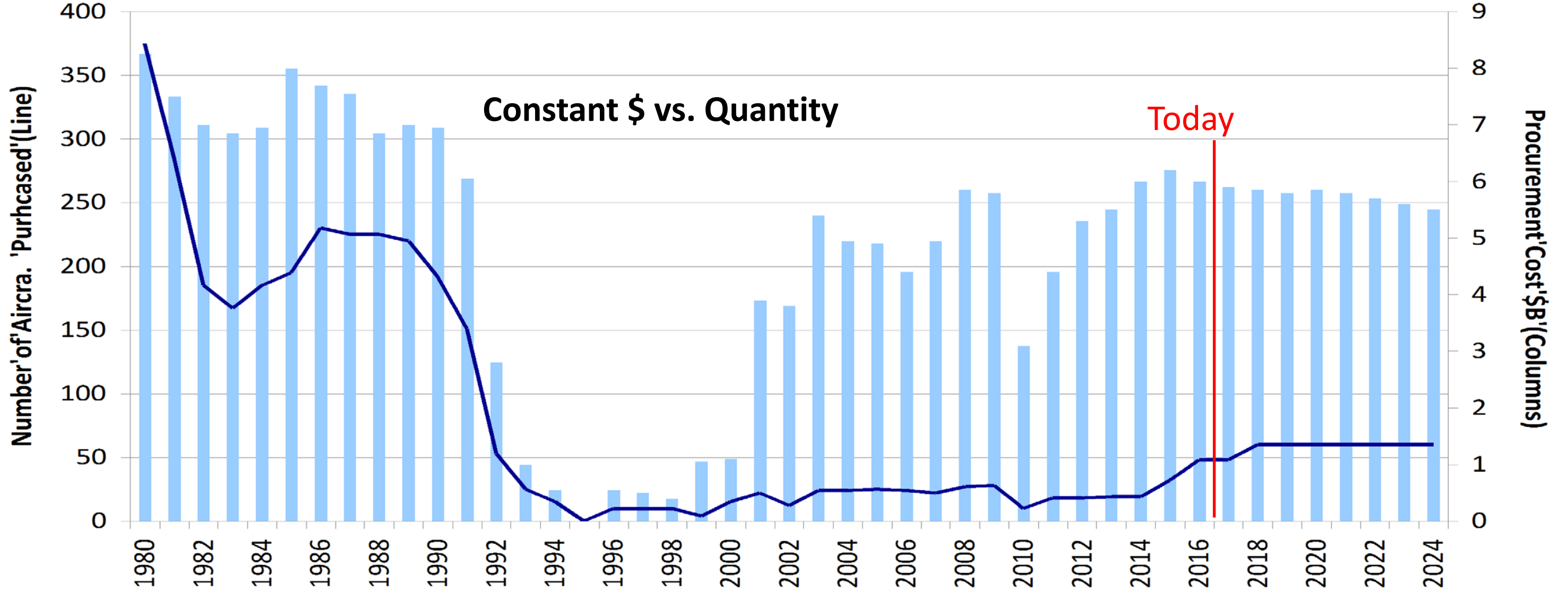
RECENT SPENDING SURGE BYPASSED FIGHTERS

While the 2004 to 2010 surge in defense spending was greater in constant dollars than the previous surges since WWII, it went toward force protection, communications and partner nation support and NOT for recapitalization of aircraft and ships bought in the 1980s.

3

RECAP PROGRAM OF RECORD IS INADEQUATE AND USAF CANNOT AFFORD PROGRAM OF RECORD

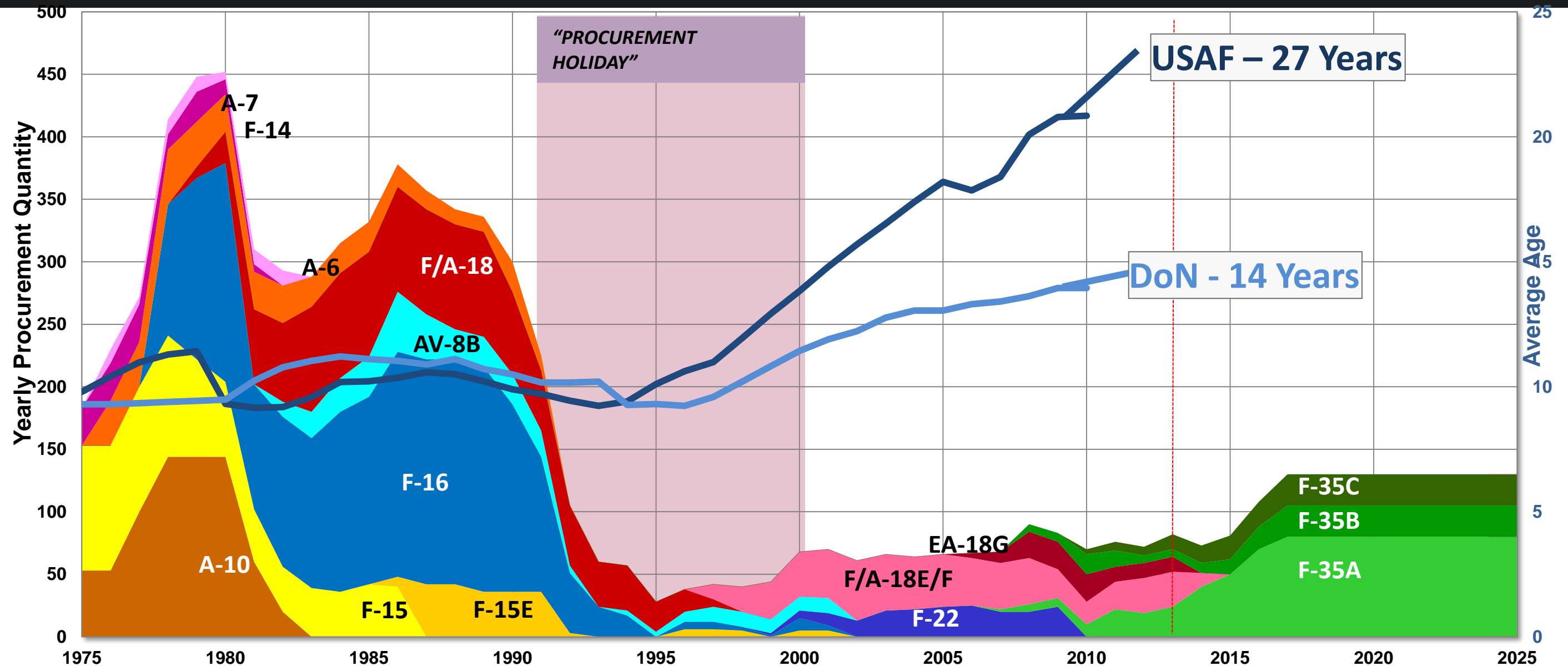
USAF TACAIR NUMBERS CHALLENGE



Spending less and getting less:

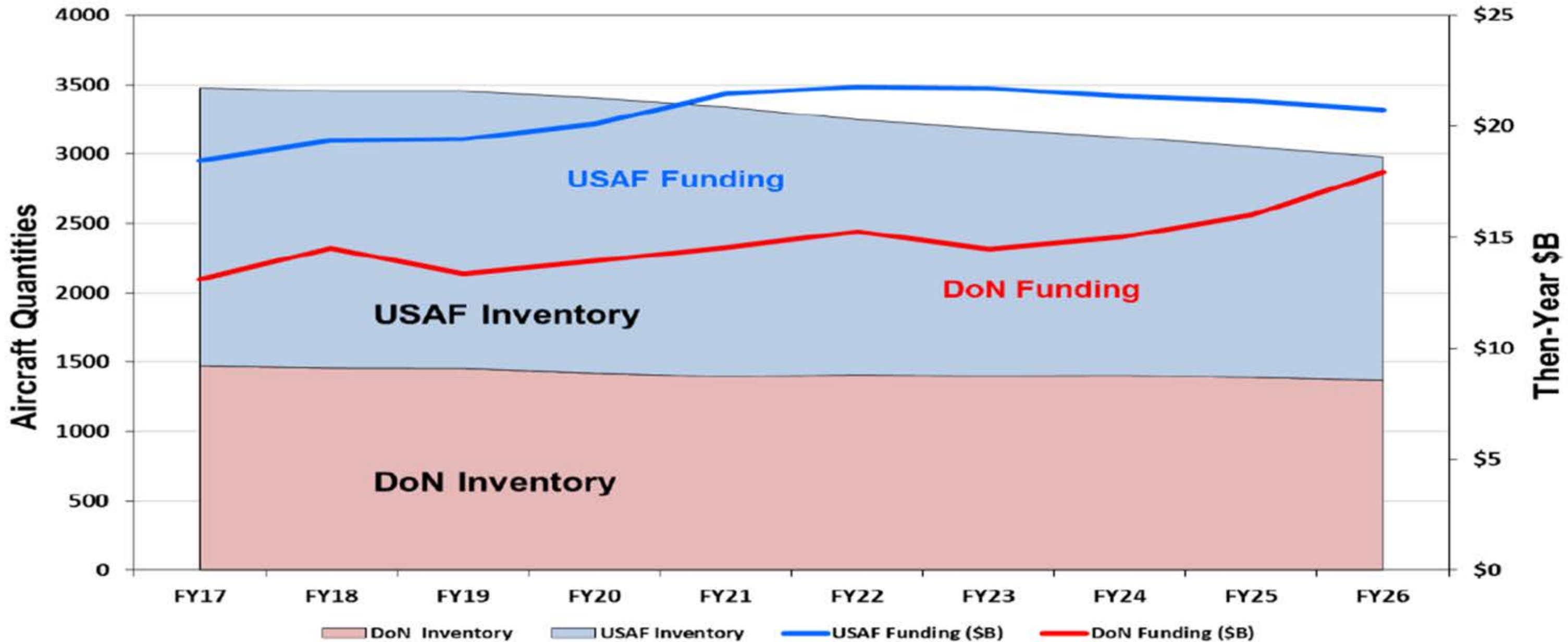
- USAF bought @ 230 aircraft/year in the 1980's, fleet now faces block obsolescence
- Now planning to spend ~15% less on TACAIR and buy one third the number of aircraft annually

U.S. FIGHTER PROCUREMENT / AGE



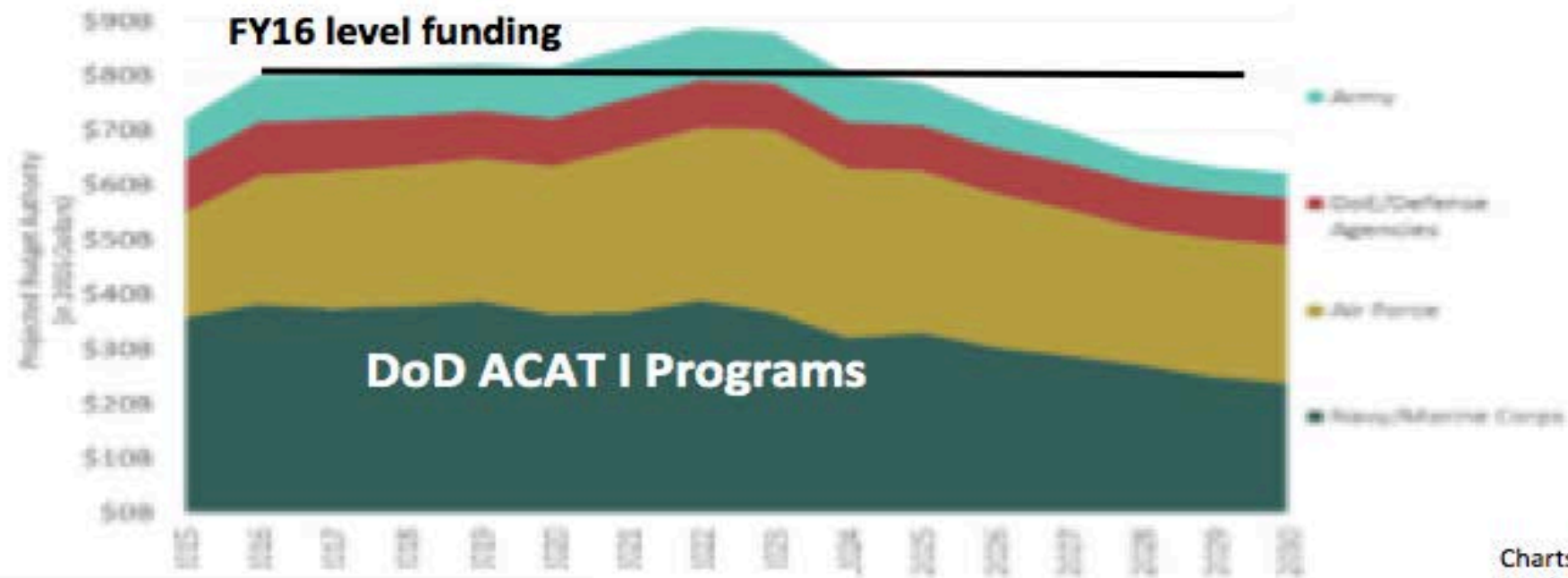
Recapitalization Needed for Aging Fighter Inventory

US FIGHTER INVENTORIES/FUNDING FY2017-2026

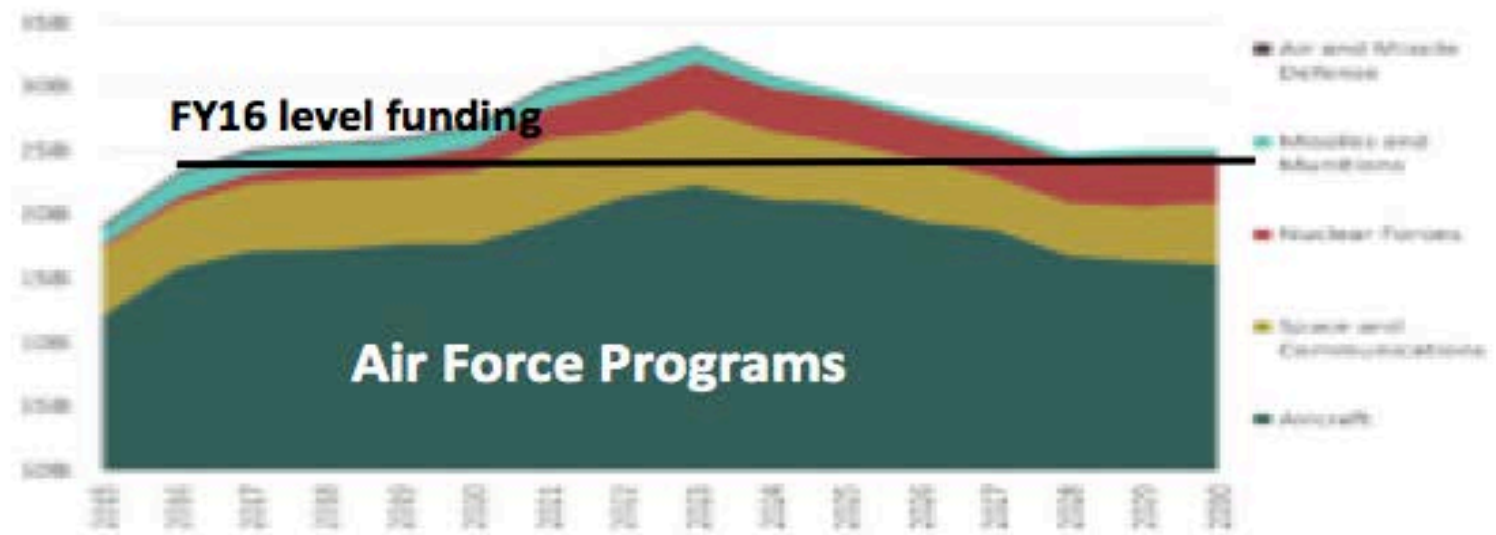
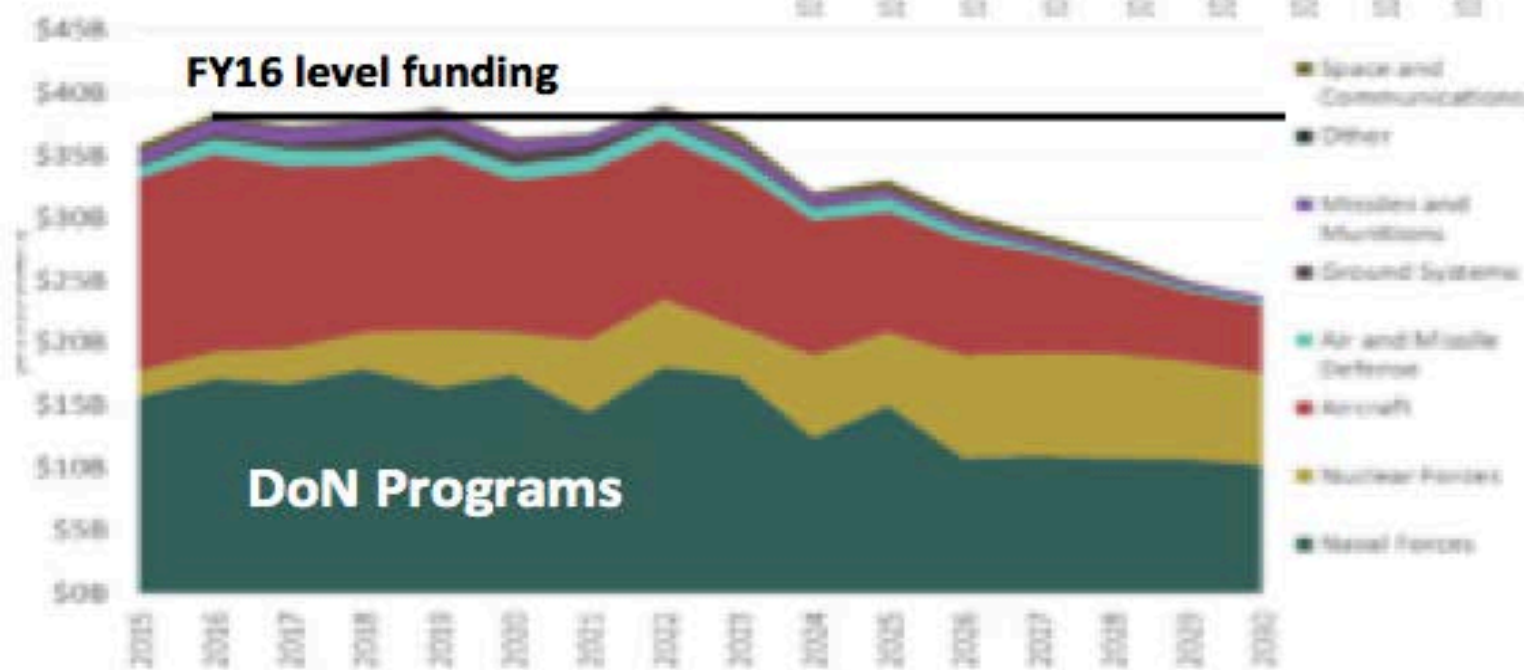


Aircraft: A-10, F-15C/D, F-15E, F-16, F-22, F-35, F-X, AV-8, TAV-8, EA-18, EA-6, F-16, F-5, F-35B/C, FA-18, FA-XX

AIR FORCE IS DOD'S 2020'S CHALLENGE



Charts from CSIS's Todd Harrison's "Defense Modernization Plans through the 2020's"



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THE PREY: THE F35 PROGRAM

1

THIS IS WHERE THE MONEY IS

With the exception of Congressional adds for F/A-18E/Fs, all new fighter aircraft procurement \$ are currently devoted to the F35. The \$1.4 *Trillion* program is much more than a “Lockheed program.”

2

F35 ON TRACK TO TRIPLE PRODUCTION BY 2019

Development and testing program will complete in 2018. FY15 and FY16 contracts for production of 150 US and international aircraft will be announced this month. **Annual deliveries will triple from 45 jets in 2015 to 136 jets in 2019.**

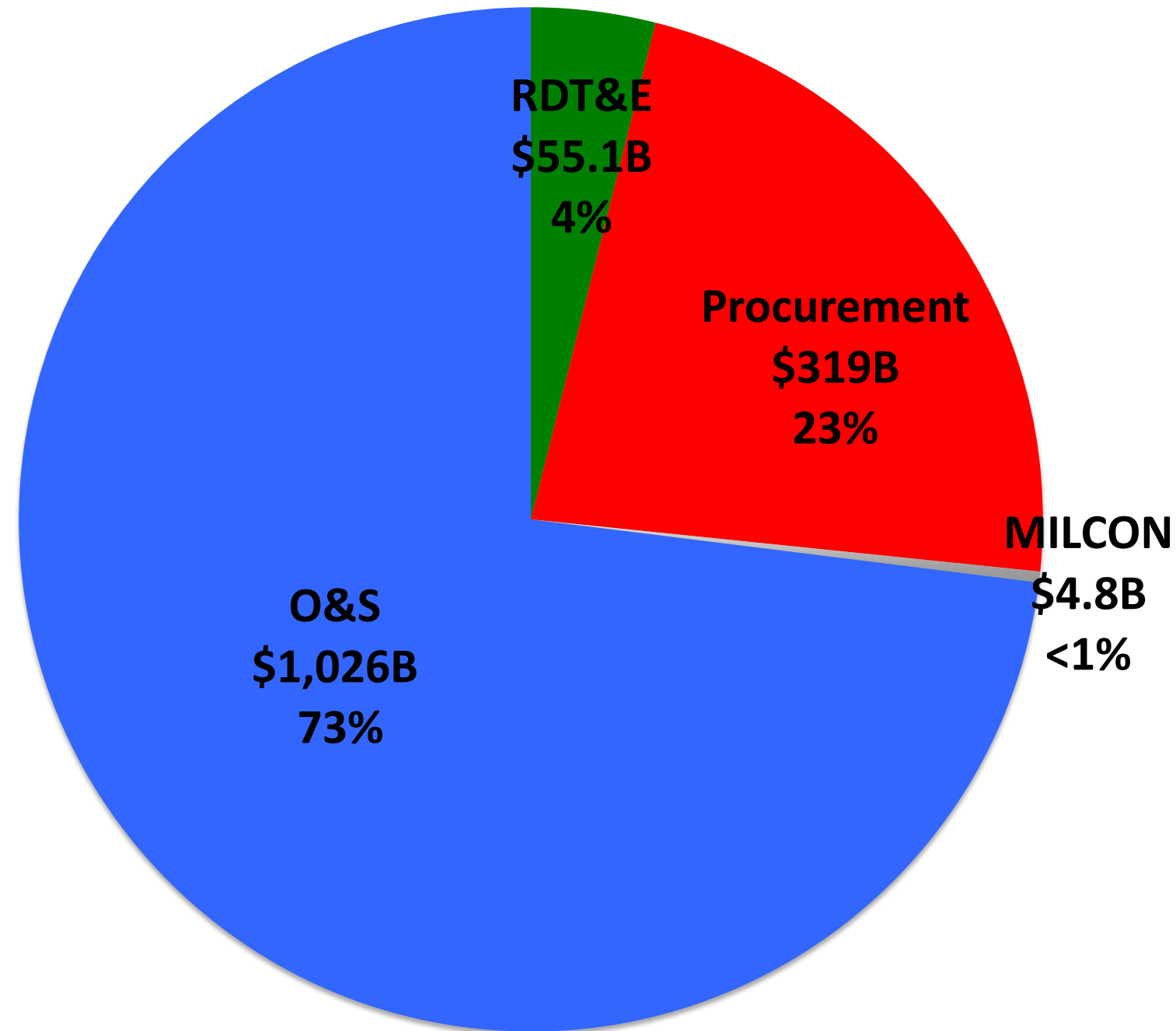
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KEY DECISIONS TO BE ANNOUNCED AT FARNBOROUGH

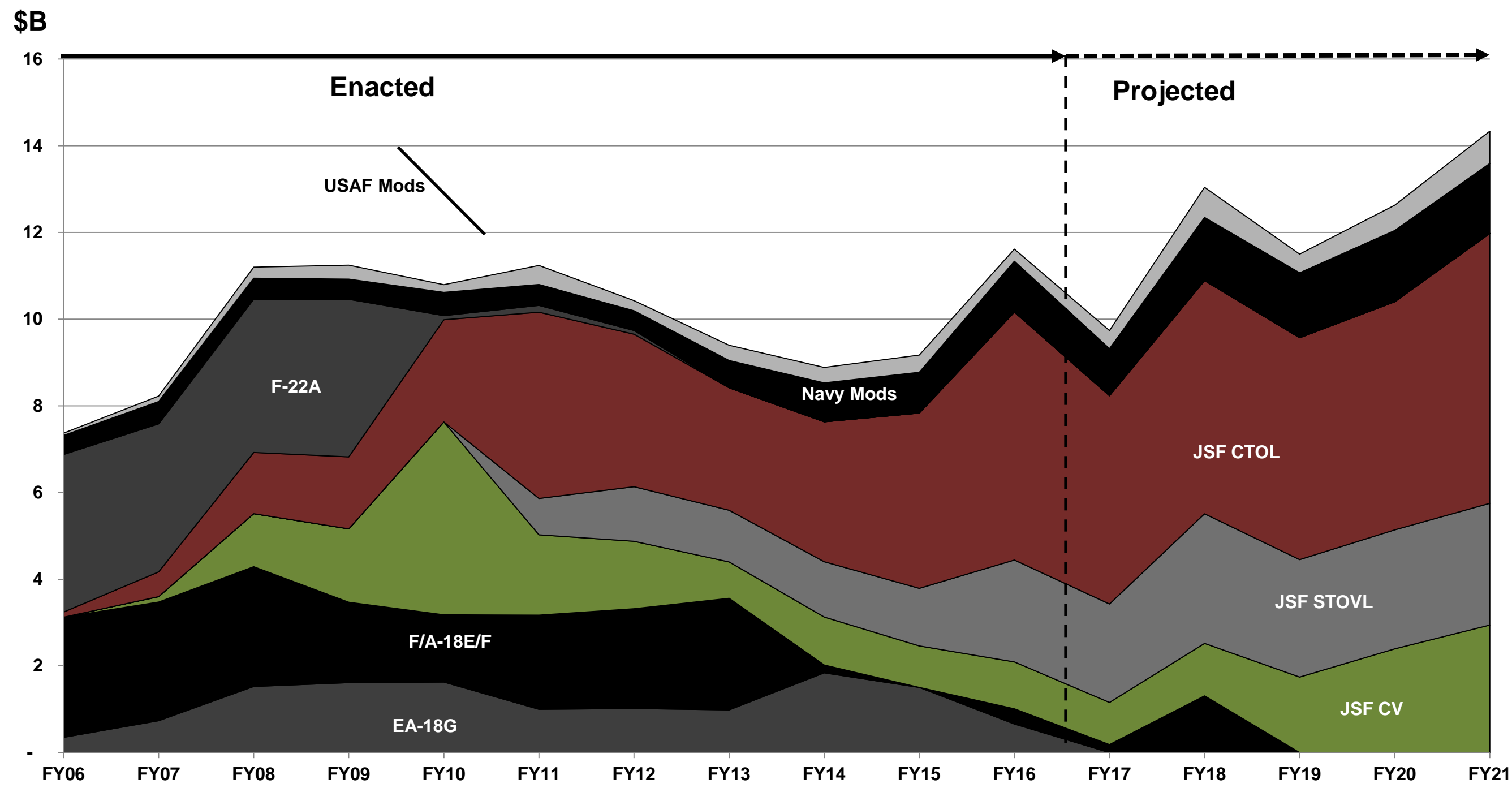
Pentagon will announce Product Support Integrator concept critical to management of over \$1T in O&S costs through 2070. Pentagon will likely confirm delay of first Block Buy by one year to 2019.

F35: THIS IS WHERE THE MONEY IS

**Total cost through 2070 (!)
\$1.4T (TY\$)**

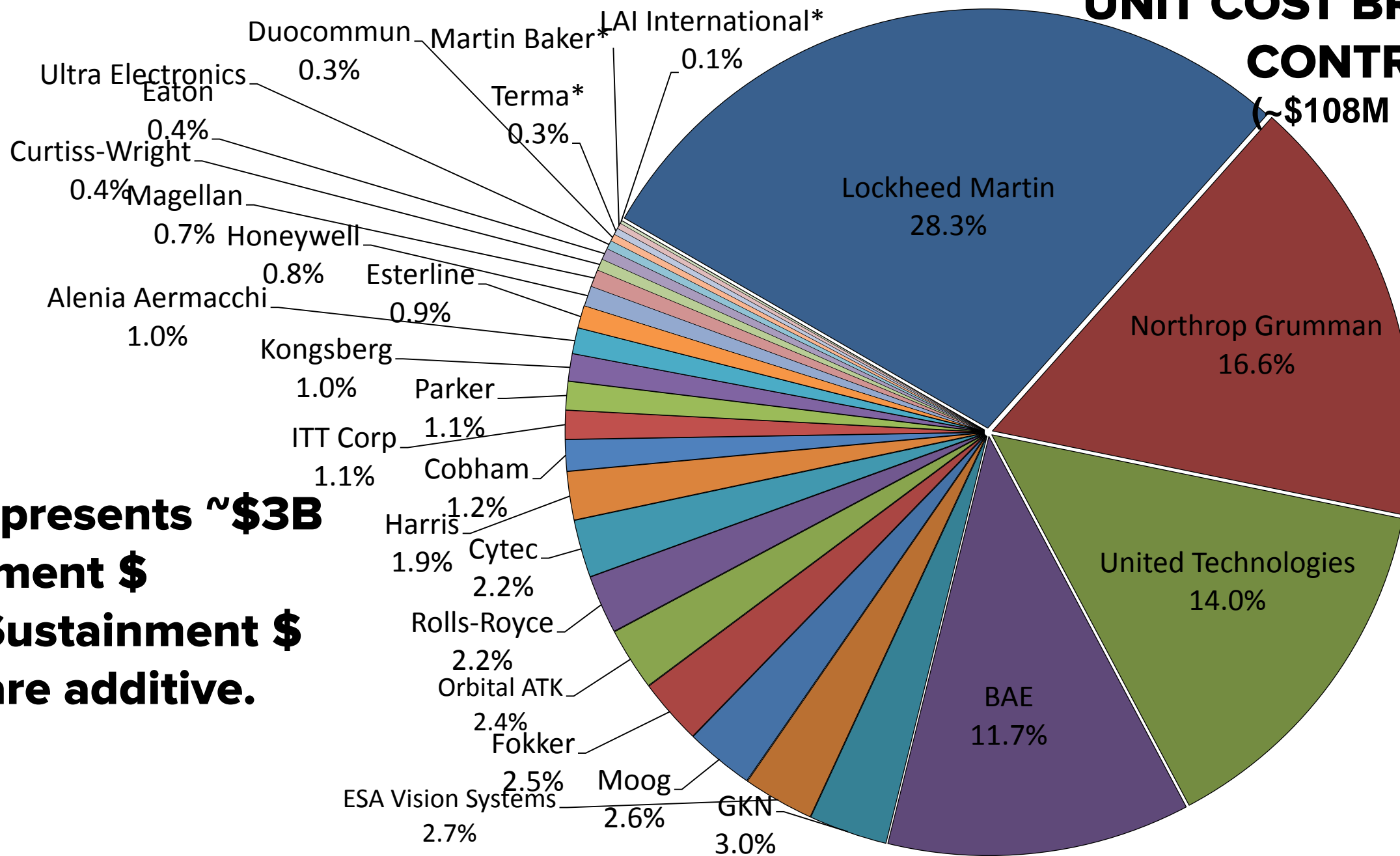


US TACAIR PROCUREMENT FY06-21



F-35: NOT JUST A LOCKHEED PROGRAM

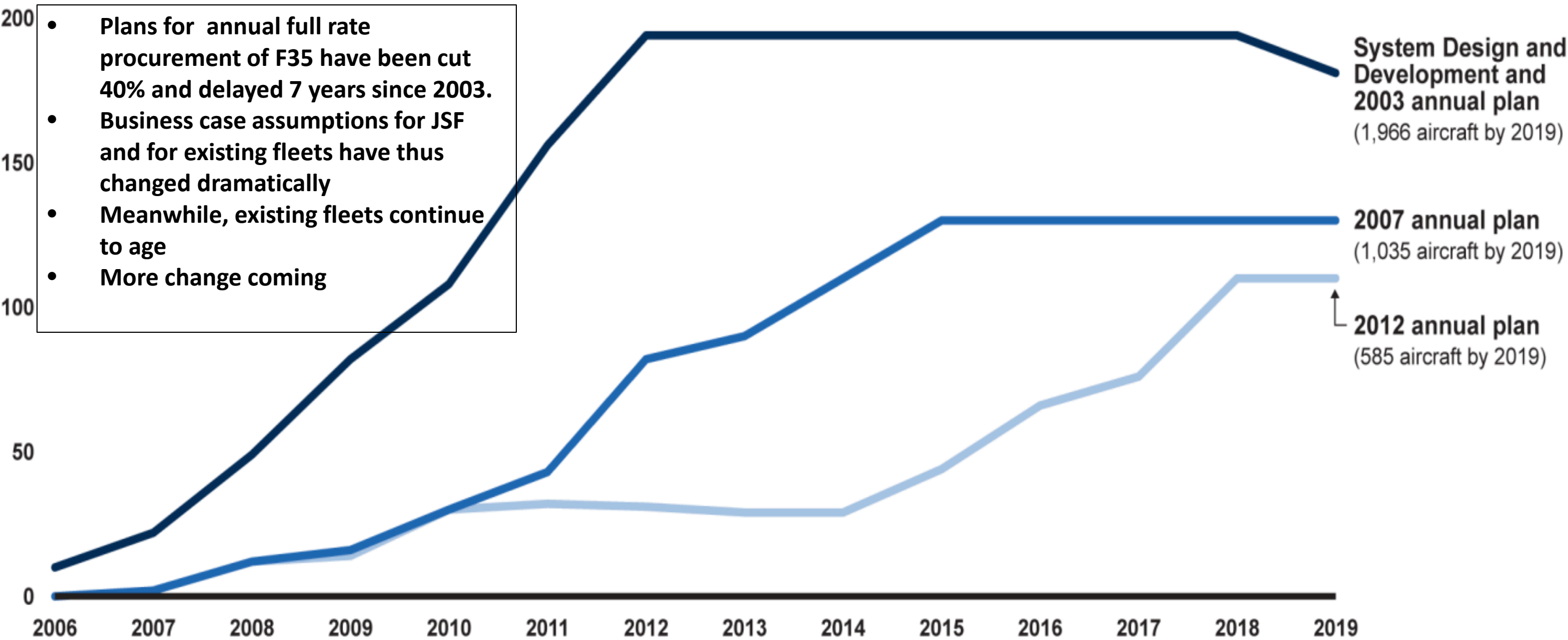
UNIT COST BREAKDOWN BY CONTRACTOR (~\$108M per F-35A)



**Each 1% represents ~\$3B
in procurement \$
backlog. Sustainment \$
revenues are additive.**

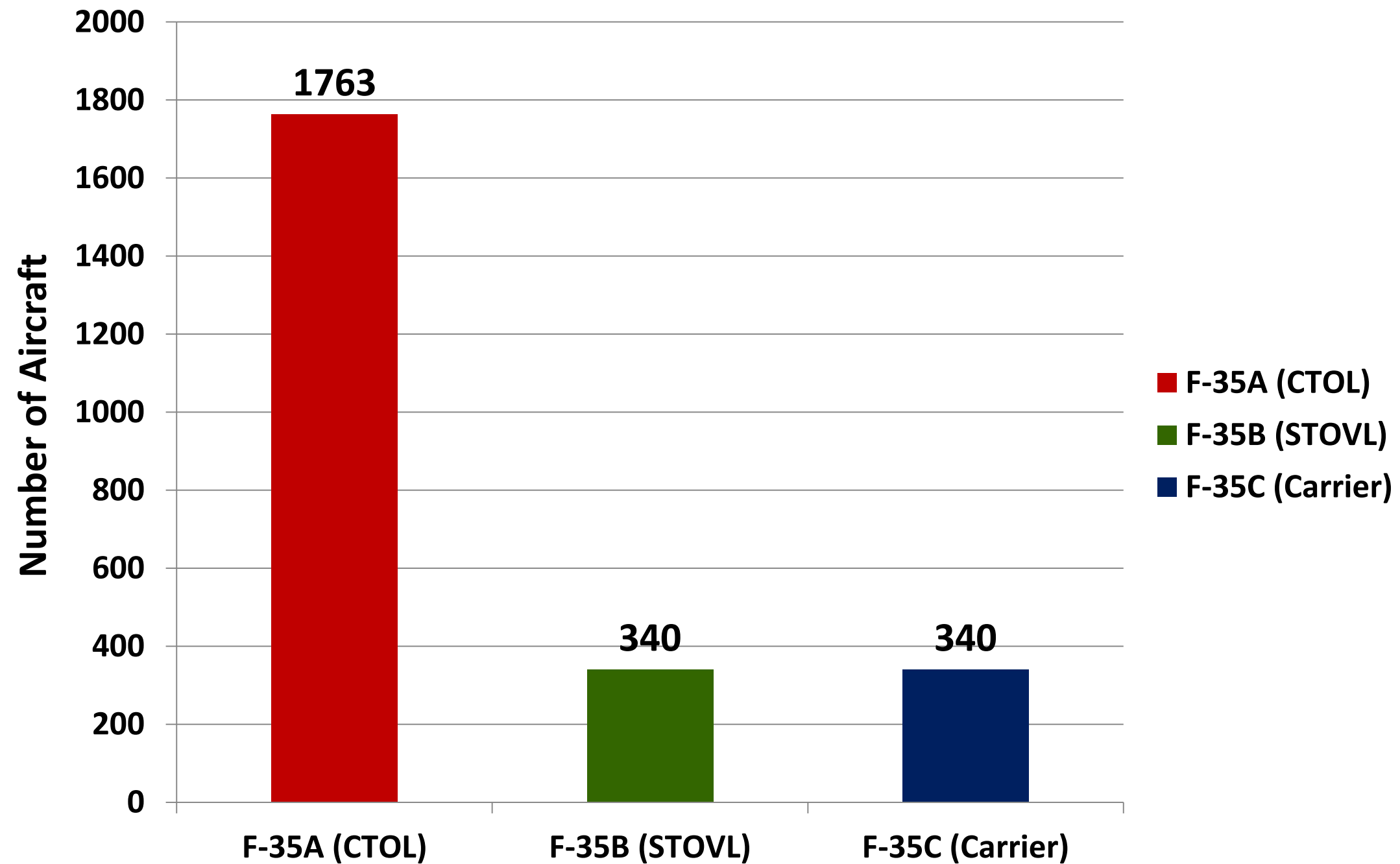
THREE MAJOR PROGRAM CHANGES SINCE 2003

Annual procurements of F-35 aircraft



Source: GAO analysis of Department of Defense data. | GAO-16-390

PLANNED TOTAL US ORDERS

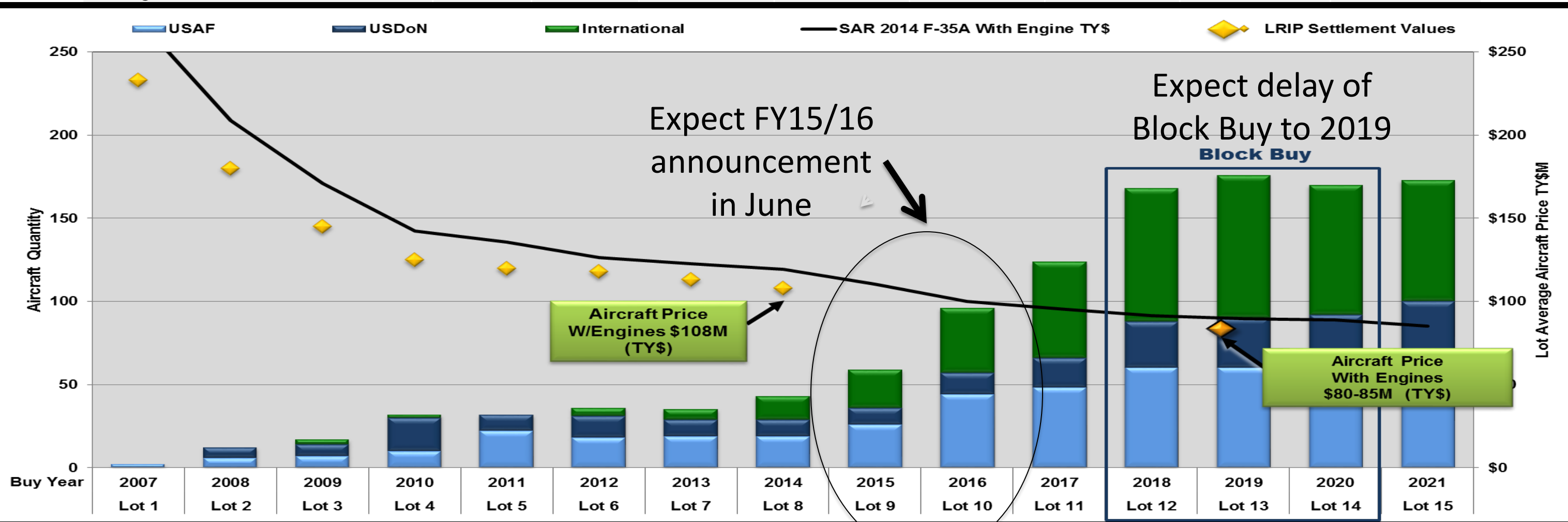


PROJECTED INTERNATIONAL ORDERS							
COUNTRY	FY16	FY17	FY18	FY19	FY20	FY21	TOTAL
United Kingdom	3	1	3	6	8	7	143
Italy	2	3	3	3	3	3	76
Australia	8	8	15	15	15	9	98
Canada	0	0	0	0	0	4	65?
Denmark	0	0	0	2	6	6	27
Netherlands	0	8	8	8	8	3	35
Norway	6	6	6	6	6	6	42
Turkey	2	4	8	8	8	8	100
Israel	6	10	6	2	0	0	24
Japan	4	6	6	6	6	6	36
South Korea	6	10	12	12	0	0	40
Belgium	0	0	0	0	0	0	34?
Finland	0	0	0	0	0	0	60?
Total	37	56	67	68	60	52	620-700

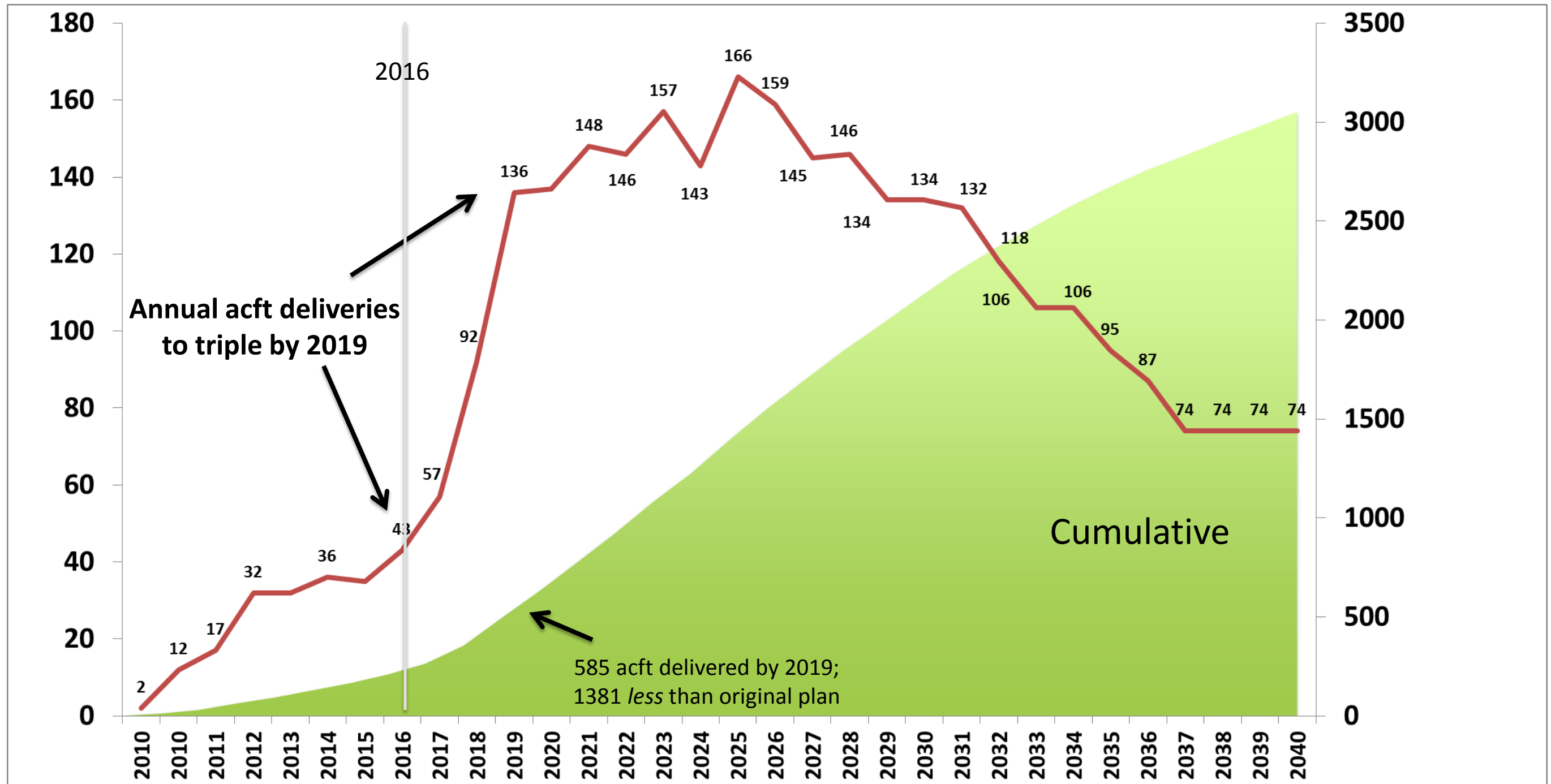
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16

PROJECTED JSF ORDERS/PRICES

	FY14	FY15	FY16	FY17	FY18	FY19	FY20	FY21
US (PB17 estimate)	29	34	68	63	70	80	86	105
International (-CA)	14	23	37	56	67	68	60	52
Likely Total Orders	43	57	105	119	137	148	146	157



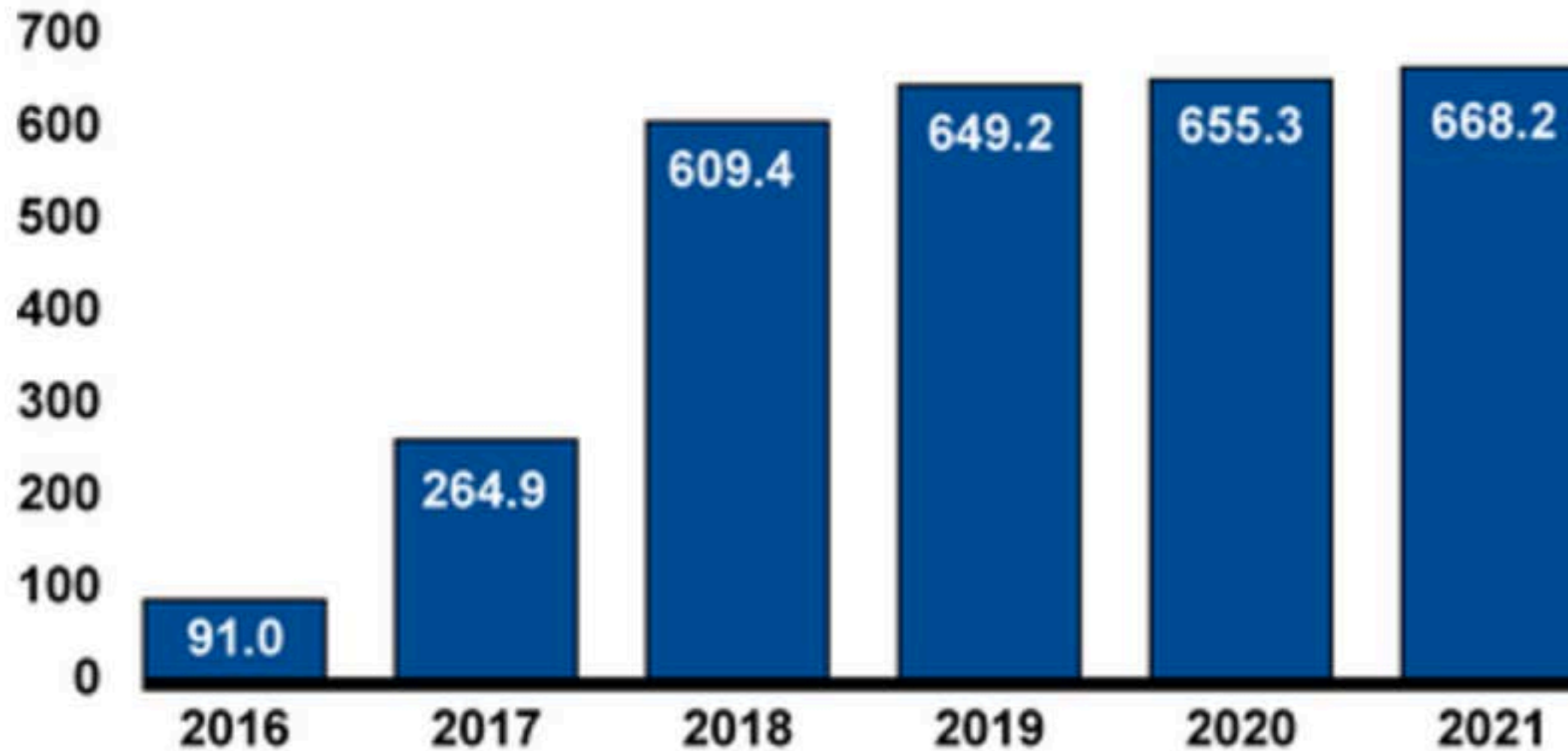
F35 DELIVERIES: ANNUAL/CUMULATIVE



\$3B BLOCK 4 DEVELOPMENT LOOMING

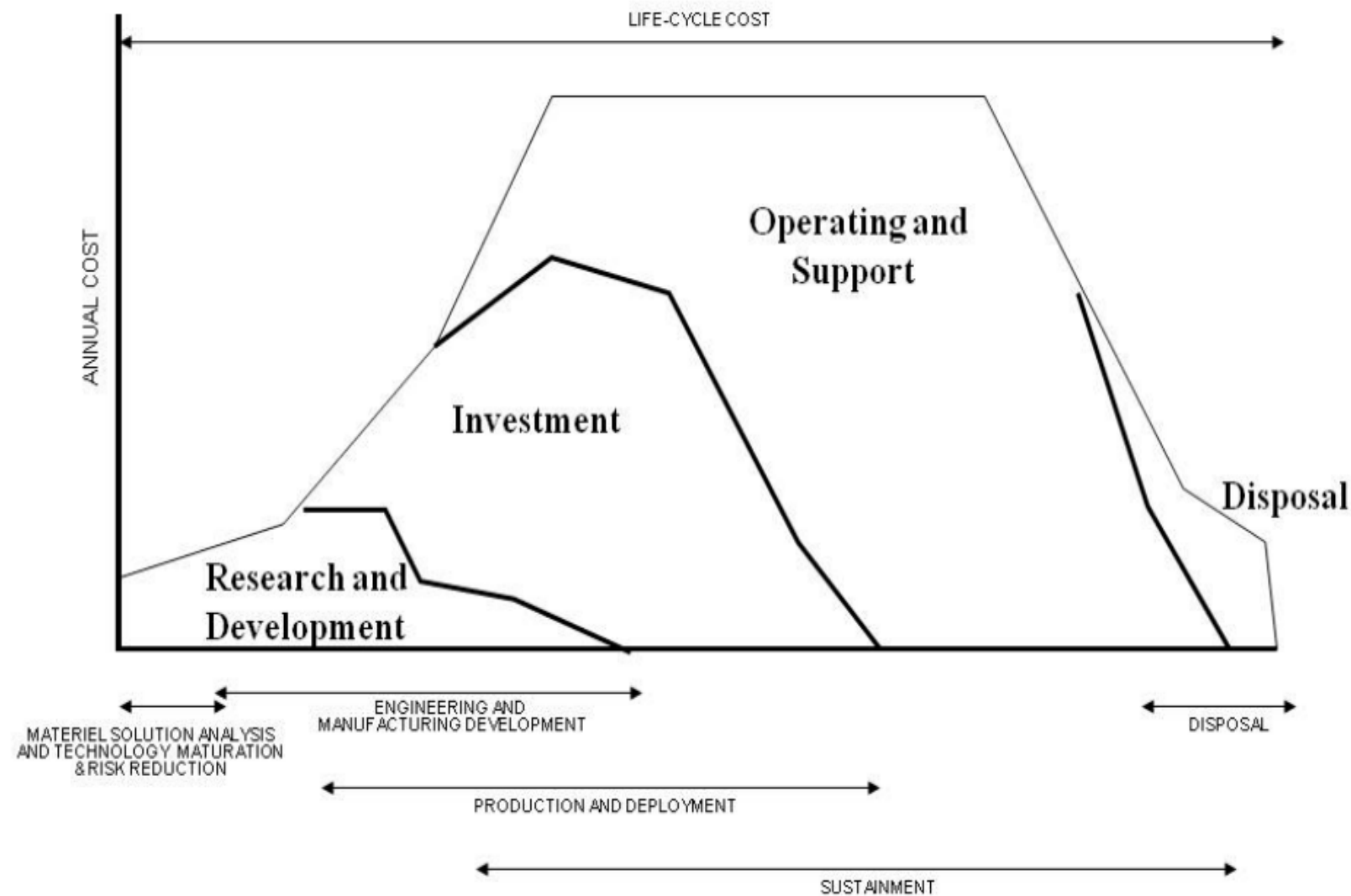
F-35 Joint Strike Fighter Block 4 Development Costs Increase Near-Term Funding Needs

Dollars (then-year millions)

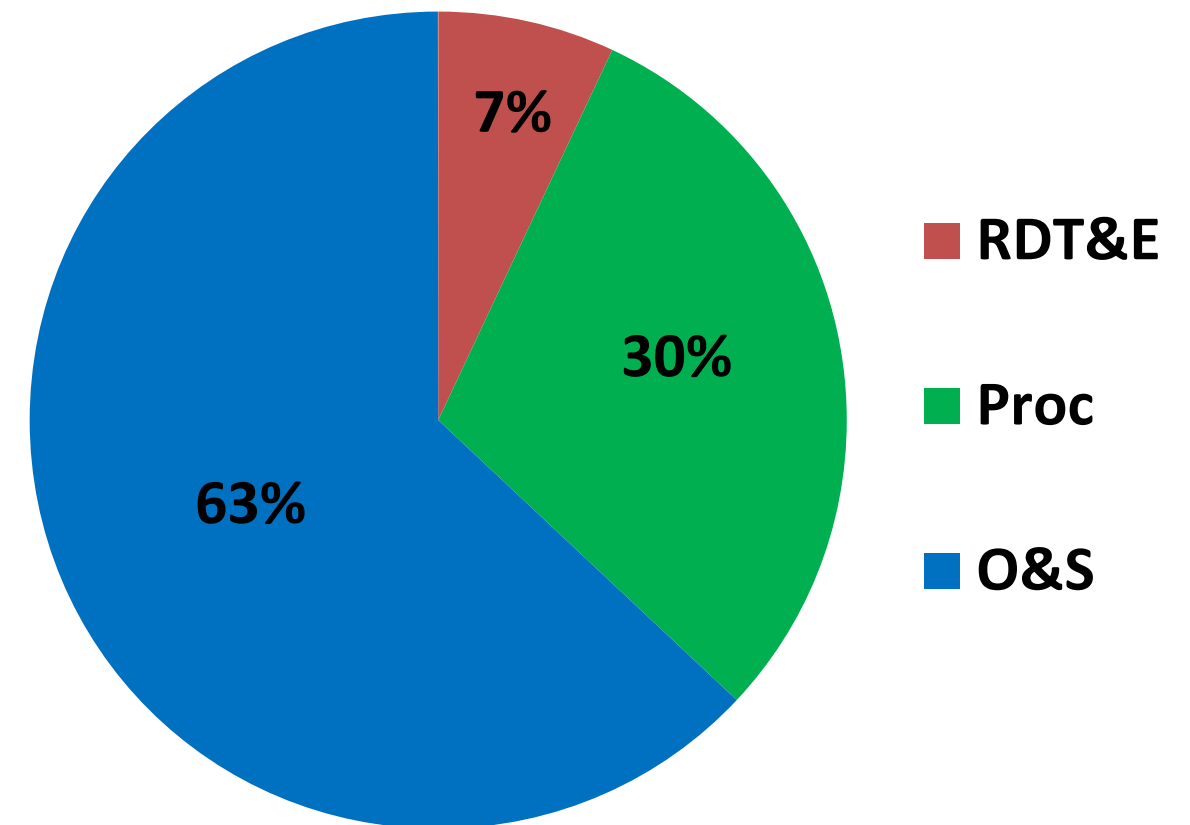


Source: GAO analysis of Department of Defense data. | GAO-16-390

SUSTAINMENT: WHERE THE \$ ARE



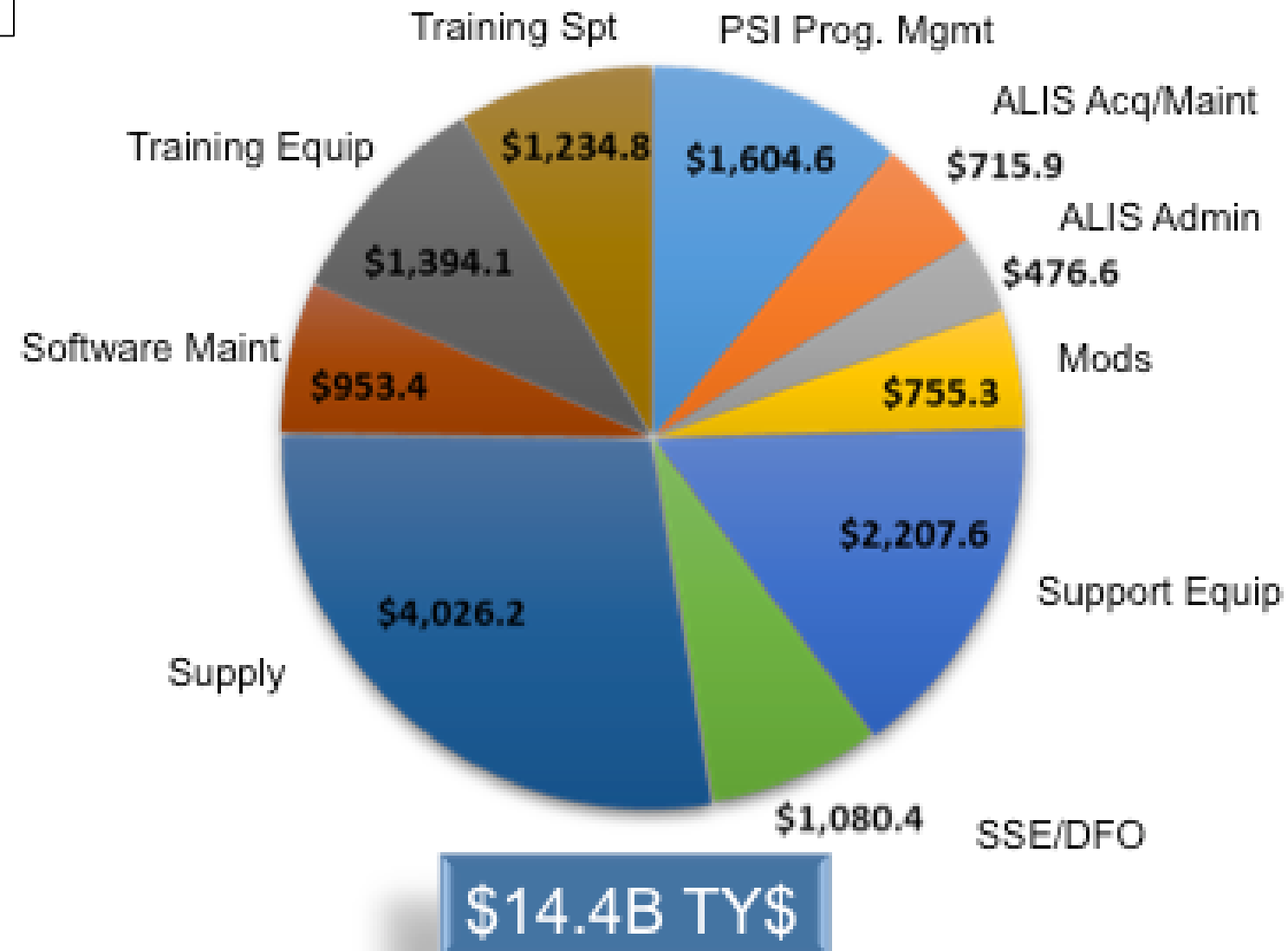
**% of Program Life-Cycle Cost Average:
Fixed Wing Aircraft**



F35 SUSTAINMENT ADDRESSABLE MARKET

Value proposition grows
as size of fleet grows

Total Cost By Element 2018-2022 (TY\$M)



F35 SUSTAINMENT STRATEGY

- Design, develop, deliver and sustain a single, integrated, and global system of sustainment products, processes and business practices.
- Tailor the global system to meet warfighter-defined and PSM-supported readiness and cost objectives.
- Maintain life-cycle focus, including the reduction of costs.
- Create a mutually-beneficial enterprise that – with relevant metrics and incentives – operates, manages, and supports the global system.
- Leverage the global resource base – government and commercial – to take advantage of stakeholder capabilities, human capital, best practices, and similar critical contributions.

F35 PRODUCT SUPPORT CONCEPT

Multi-billion \$
decision:

- Contractor
- USAF
- Hybrid

Product Support Manager (Joint Program Office) integrates requirements and budget and oversees execution of support.

Product Support Integrator integrates all sources of product support, *public and private*, via a PBL contract. Responsible for business management, supply chain management, global fleet management, sustaining engineering, etc.

Product Support Providers deliver services: component repair, training services, ALIS administration, etc.

Anticipate the decision to be a Joint Venture of LMT, Pratt, BAE, NOC and RR.

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THE HUNTERS: CHALLENGES TO F35

1

USAF CHANGING ITS TACAIR PORTFOLIO

Based on its study “Air Superiority 2030” USAF is moving away from its current plan for an all F22 and F35 fleet to a more diverse fleet to include a new penetrating counterair capability and an “affordable” low-end replacement for the A-10. Expect decisions on a new 10 year plan by FY18.

2

USN LOOKING TO REDUCE AVIATION COSTS

Shipbuilding costs have increased to the point that the Navy can’t afford to put 5th gen aircraft on their newest aircraft carriers. Meanwhile they want to develop a new aircraft by 2030.

3

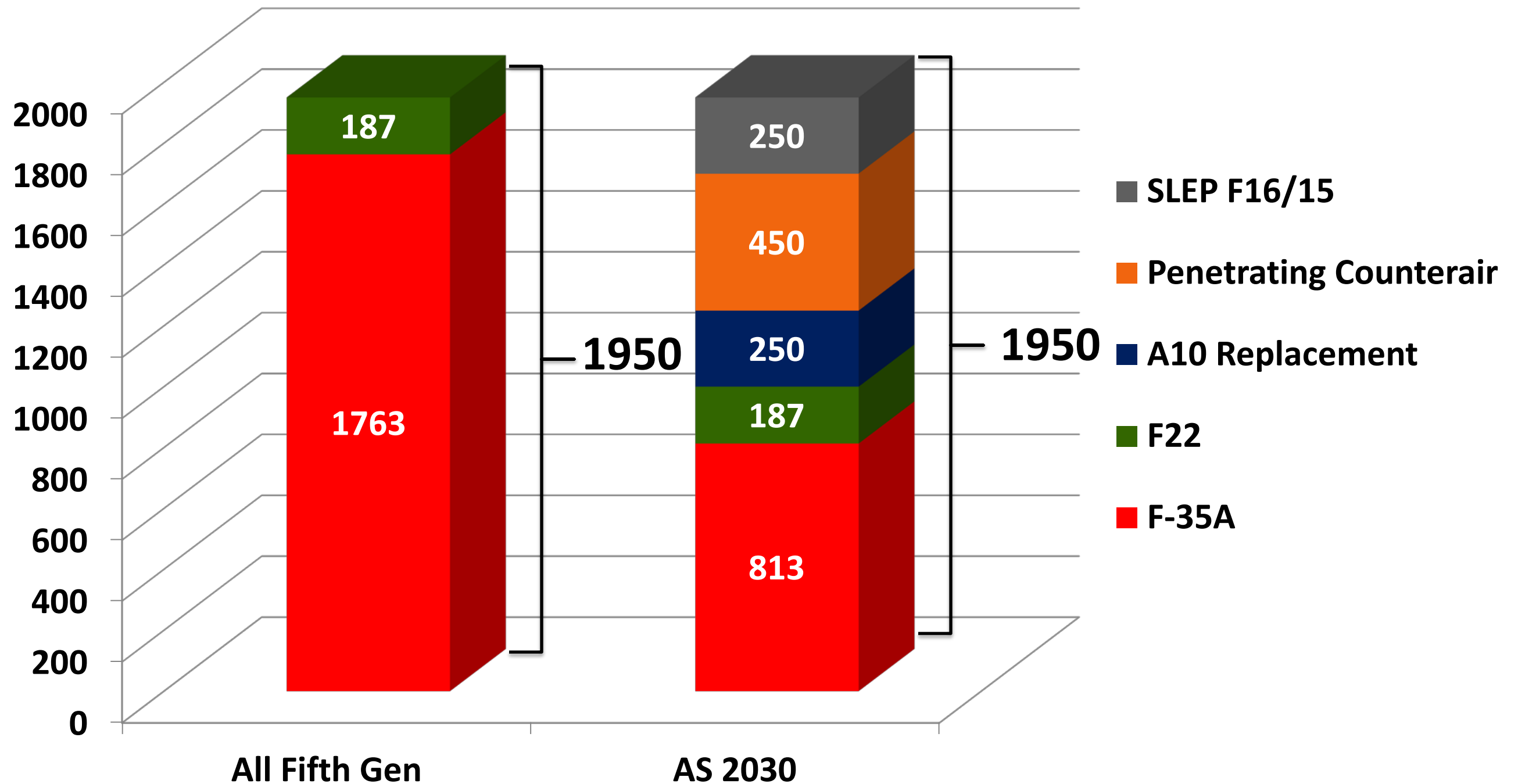
ZERO SUM GAME: ALL CHANGES TO US TACAIR PROGRAM WILL COME AT EXPENSE OF F35 PROGRAM

To generate \$2-3B per year to develop new AS 2030 capabilities, USAF will have to reduce annual buy.

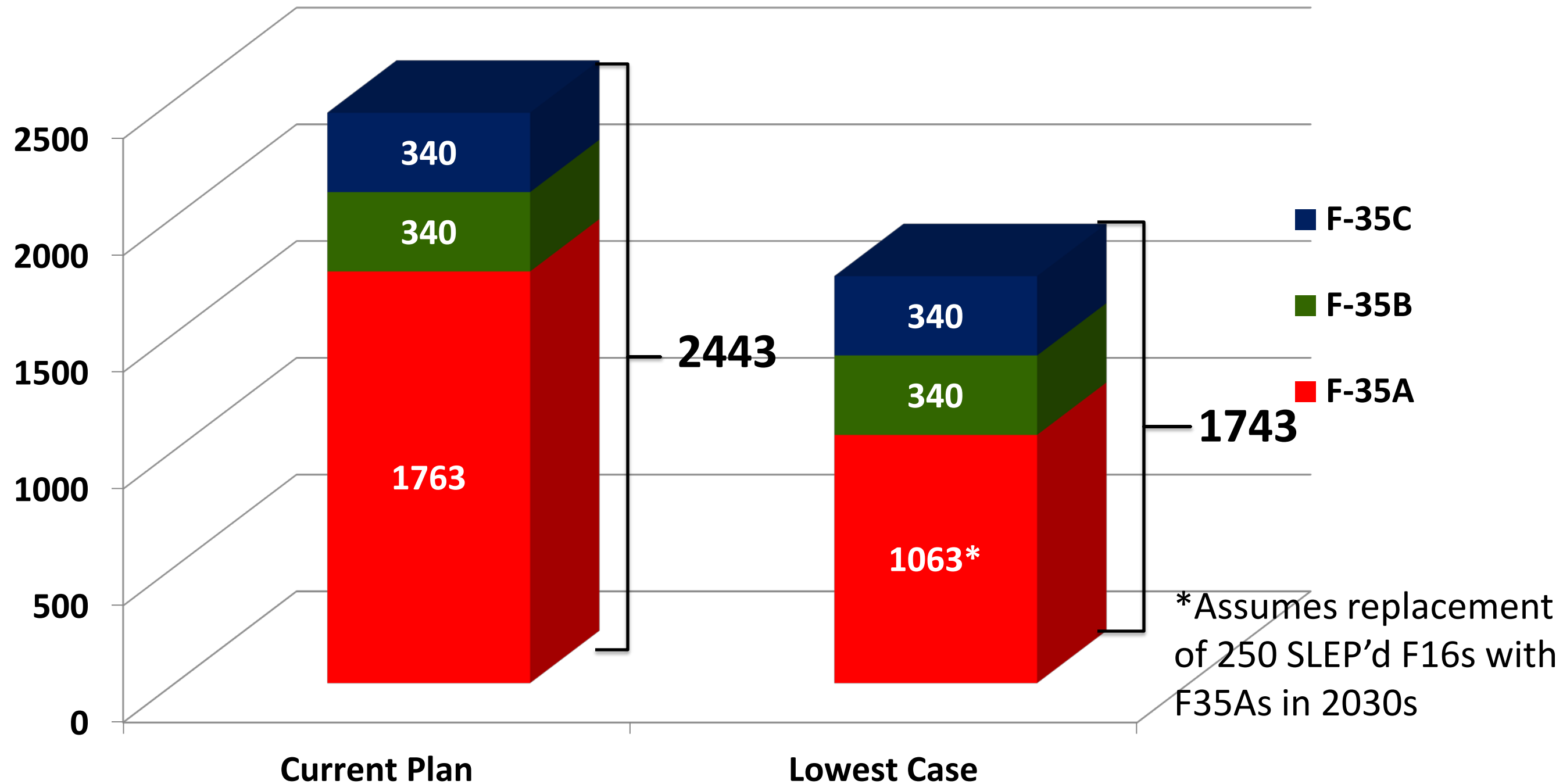
AIR SUPERIORITY 2030 FLIGHT PLAN

- After a year-long study, USAF has concluded that its **“projected force structure in 2030 is not capable of fighting and winning against the array of potential adversary capabilities.”**
- The AS 2030 Flight Plan foresees **an integrated and networked family of capabilities** operating across air, space and cyberspace as the most viable way ahead. The study calls for an experimentation campaign and steadily refreshing developments rather than silver bullet solutions.
- One of the most salient material requirements is **the need for a Penetrating Counterair capability** with a year long Analysis of Alternatives to commence in a few months. The Stand Off Arsenal Plane, the B-21 bomber, longer range weapons and EW are cited as essential.
- **Changes to the current program of record are certain and will be detailed by next year.**
- To execute the diverse program broadly laid out in its AS 2030 flight plan, **the Air Force must generate ~\$2-3B in funds annually from its zero sum budget.**
- **Reducing its planned F-35A buy rate to 48 per year vice ramping up to 60 in 2018 and 80 by 2022 would free up \$1 - \$2.7B per year. The reduced capacity would be made up by extending 250 F16s/F15s and replacing 250 A-10s with something far cheaper than an F35.**

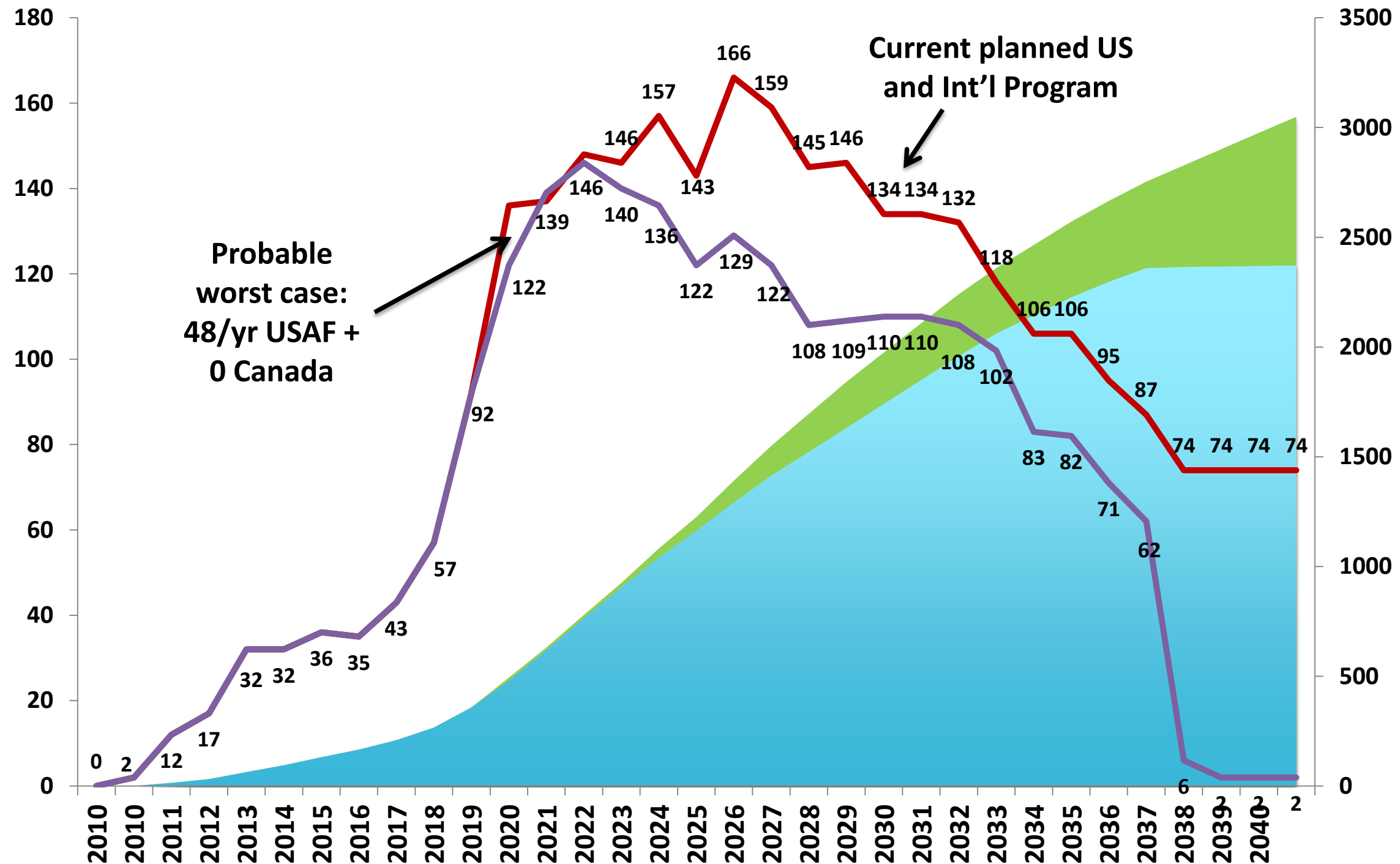
POSSIBLE USAF TACAIR MIX UNDER AS 2030



POTENTIAL IMPACT OF AS 2030 ON F35



AS 2030 IMPACT: ANNUAL/CUMULATIVE



A-10 REPLACEMENT (A-X)

- USAF currently planning to retire the A-10 fleet by 2022 and wants to rapidly acquire low cost, permissive environment replacement ASAP.

Candidates include:

- **Embraer Super Tucano:** Brazilian light turboprop aircraft capable of using numerous munitions. The USAF purchased 20 for Afghanistan's military in 2015.
- **Textron Scorpion:** Company-funded light attack, ISR, trainer jet aircraft. Optimized for very low operating cost per flight hour (<\$5K). No buyers to date.
- **Beechcraft AT-6:** Light turboprop trainer aircraft used by USAF, USN and others. Typically used as a trainer, but could be equipped for permissive close air support.
- **Lockheed/KAI T-50 Golden Eagle:** Currently Lockheed's proposed aircraft for the T-X trainer competition. Already operated by South Korea and the Philippines as ground attack aircraft. Most capable of this group.

SERVICE LIFE EXTENSIONS

- Service Life Extension Programs for F15 and F16 would be relatively low cost means for USAF to maintain required number of combat aircraft while freeing up F35 procurement funds for new capabilities.
- While originally planned to be completely replaced by 2030, Block 40/50 F16's have been tested and rated to have sufficient airframe life left to last until 2040.
- Numerous contractors (BAE, RTN, LMT, NOC, BA) have relatively low risk, contract-ready programs to upgrade radar and other systems F15s and F16s.

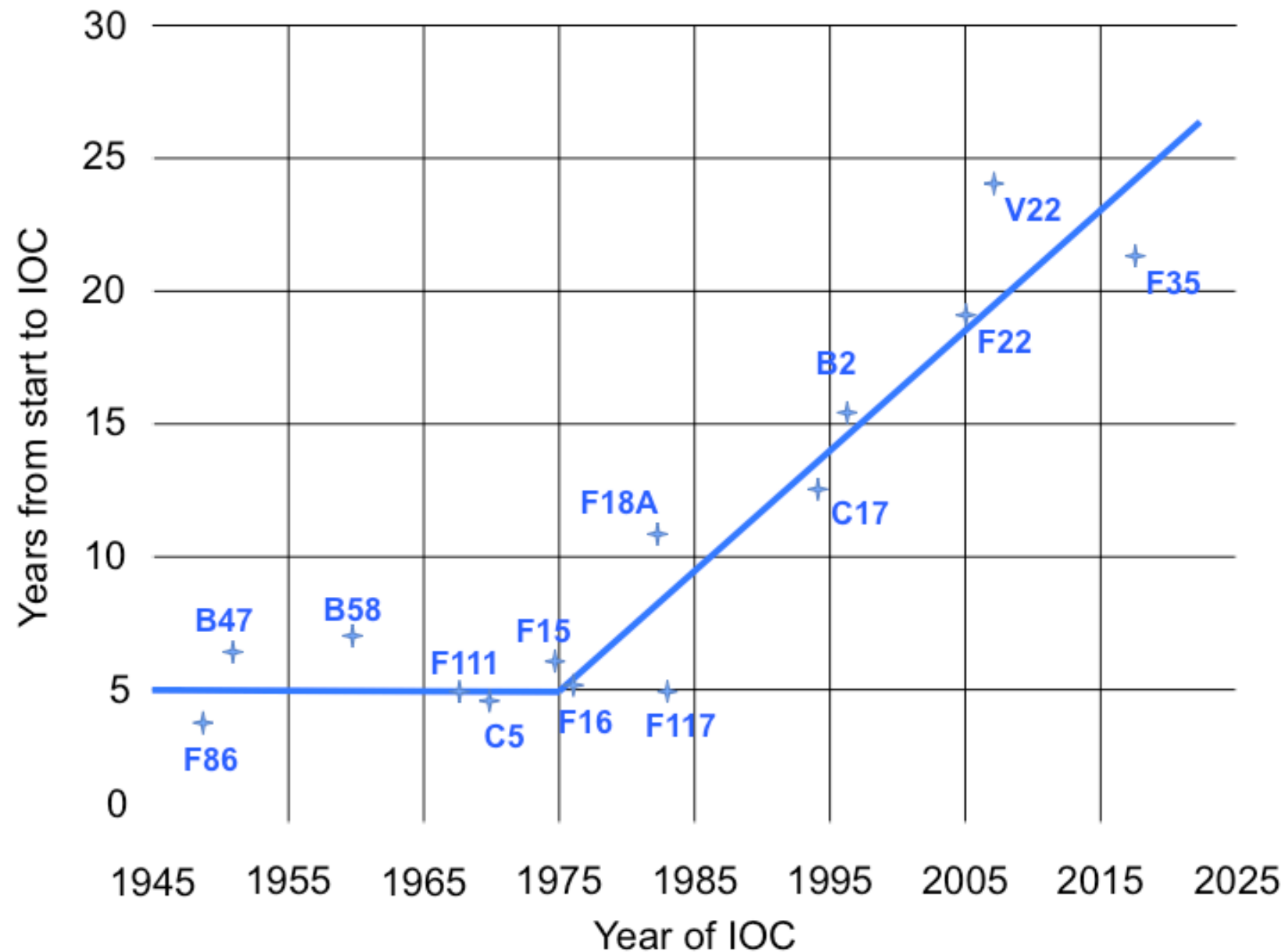
RESTART F-22 LINE

- One of the Penetrating Counterair alternatives is sure to consider the F22.
- Lockheed and Boeing teamed to produce 187 F22s at Marietta, GA between 1996 and 2011. Original acquisition objective of 750 had been reduced to 375 and then 280 when SecDef Gates decided in 2009 that 187 was enough. USAF has never gotten over it.
- Restarting F22 line would have very expensive non-recurring costs (estimated ~\$2B) even to build exactly the same 1990s technology aircraft. Of course no one wants a 1990s technology aircraft in the 2030s. Inserting modern stealth materials and weapons systems into an existing design would mean more non-recurring costs with unknown effectiveness. Production costs after development would likely approach \$200M per aircraft.
- Ironically, while the money to restart F22 line would come at expense of LMT's F35 program, much of it would come back to LMT as the F22 prime.

F/A-18E/F AND F/A-XX

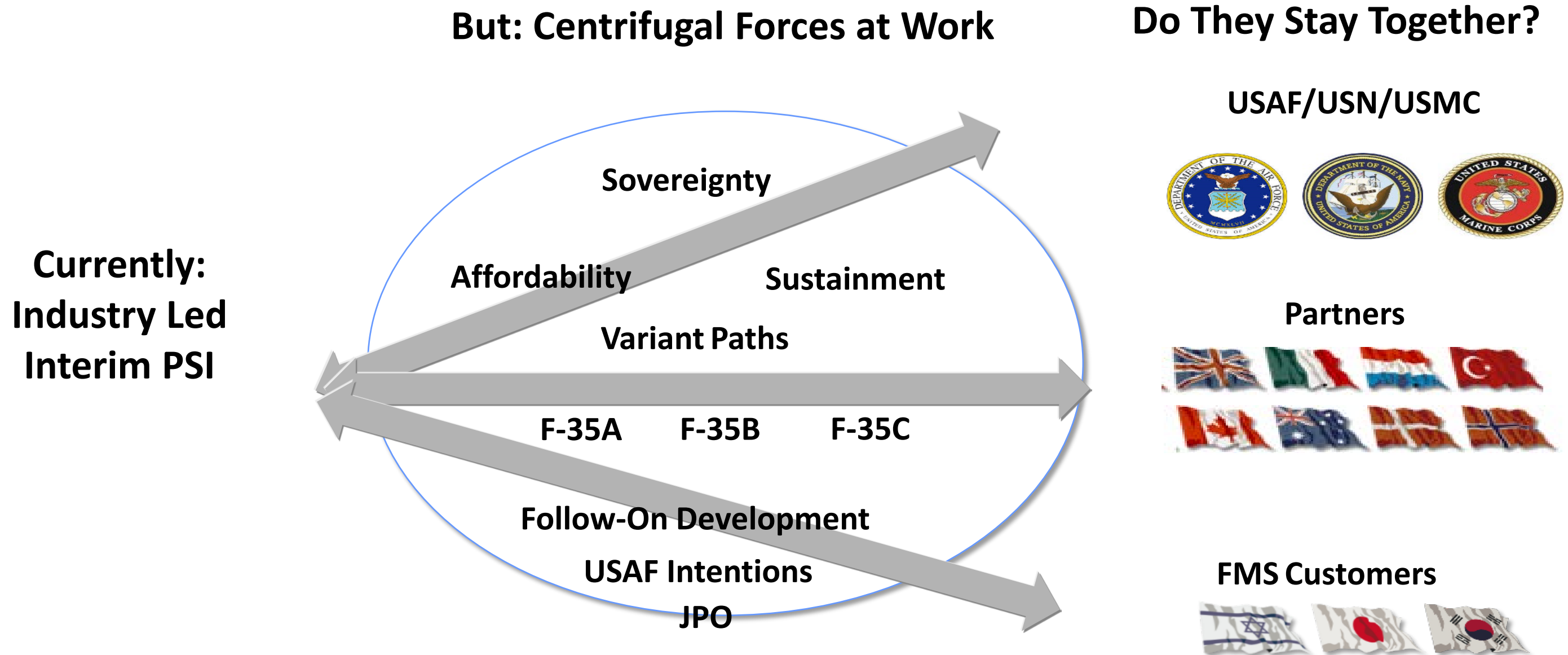
- USN foresees 340 F-35Cs as replacement aircraft for F/A-18C/Ds owned by USN and USMC. IOC in 2018. Navy acknowledges it needs two squadrons of F-35Cs for each of its ten carrier air wings to be effective after 2024.
- USN considers replacement of their F/A-18E/Fs after 2030 as still being an open question that is called F/A-XX.
- Analysis of alternatives for F/A-XX will begin this year. Possible candidates include more F35Cs, a modified F35 (D?), and clean sheet designs. Costs for clean sheet will be high because of unique carrier aircraft requirements and relatively small size of buy (350?).
- Meanwhile, the current F/A-18E/F fleet is being used faster than planned, leaving a gap in late 2020's. Congress helping Navy to keep F/A-18 line open. Expect line to remain funded at least until F-35C IOC in 2018.

NEW ACFT DEVEL TIMELINES OUT OF CONTROL



USAF and USN plans to develop clean sheet aircraft by 2030 appear optimistic

HOW LONG WILL JSF BE JOINT?



F35 affordability is premised on joint synergies and smart logistics

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ASSESSMENT

1

NEAR TERM PROGRAM OK; LONG TERM DOWN 30%

- Development and testing are on track; unit costs coming down as forecast (\$97M in FY16)
- Annual rate more important than total; USAF likely to buy 48 vice 80/year (~\$2.7B) after 2022
- Line likely to stay open for very long time just like F16s and F18s today.

2

OBSCURE SUSTAINMENT DECISIONS ARE KEY

Contractor-managed logistics is key to overall program affordability as well as LMT and partner margins; look for announcement at Farnborough

3

\$ DIVERTED FROM F35 FOR NEW PROGRAMS LIKELY TO COME BACK TO THE SAME PLAYERS, JUST LATER

While potentially losing \$2.7B in annual F35 sales, LMT likely to recoup some of the money on F16 SLEPs and Penetrating Counterair development with F22 restart a long shot.

F35: ITS TOUGH TO BE THE LARGEST PROGRAM

- Size of F35 program evokes endless attacks and erosion, e.g., challenge of 1 for 1 thesis; need for a different CAS aircraft; discussion of “sixth gen” before fifth gen fielded; promised logistics support franchise reverting to biz as usual
- Constant need to *keep sold*; it will take a war to stop the noise
- Relentless Gov’t pressure to achieve F35 annual savings *one year at a time* with no promise of long term recoupment pressurizes margins
- Protracted contract negotiations (FY15 *still* not done) and constantly evolving changes in long term assumptions hurt margins, damage reputation and limit investment in real long-term cost reduction

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