SAE INTERNATIONAL

PROTECTING THE DEFENSE SUPPLY CHAIN IN A GLOBAL MARKETPLACE

AA&S Australia

19.07.2016

BRIEF INTRODUCTION TO SAE INTERNATIONAL

ABOUT SAE

- Not for profit, non-lobbying technical society
- Global, industry-managed, industry-led programmes
- Standards Development Organisation (SDO)
- Wealth of engineering knowledge in books, standards, papers, online content
- Technical conference provider
- Engineering training provider
- Offices in North America, Asia, Europe:
  - World Headquarters – Warrendale PA, USA
  - ARINC HQ – Bowie, MD, USA
  - Aerospace Standards – Washington DC
  - Asia – Shanghai, PRC
  - Aerospace Standards Europe – London

THE SAE PORTFOLIO

a global association of more than 140,000 engineers and related technical experts

PUBLICATIONS

100,000+ collection of technical publications

TECHNICAL STANDARDS

35,000+ aerospace and ground vehicle standards

ENGINEERING EVENTS

Over 30 global technical events annually for the aerospace, automotive, and commercial vehicle sectors

FOUNDATION

Charitable arm of SAE International, supporting STEM for over 30 years; 76,000 K-12 students and over 7,000 college students.

MEDIA

Magazines, *e*Newsletters, custom publishing, Tech Briefs Media Group

MEMBERSHIP

140,000 members worldwide, multiple-tiered/benefit model

PROFESSIONAL DEVELOPMENT

400 courses portfolio, webinars; in-house, corporate and self-paced learning

SAE HISTORY – AND FUTURE

1905

LAND SEA AIR SPACE

SAE International

SAE INTERNATIONAL

SAE formed in 1905 to promote safety and common practices for the emerging automobile market.

SAE charter expanded in 1916 to incorporate aeronautics

1st SAE Aerospace Standard, 1917

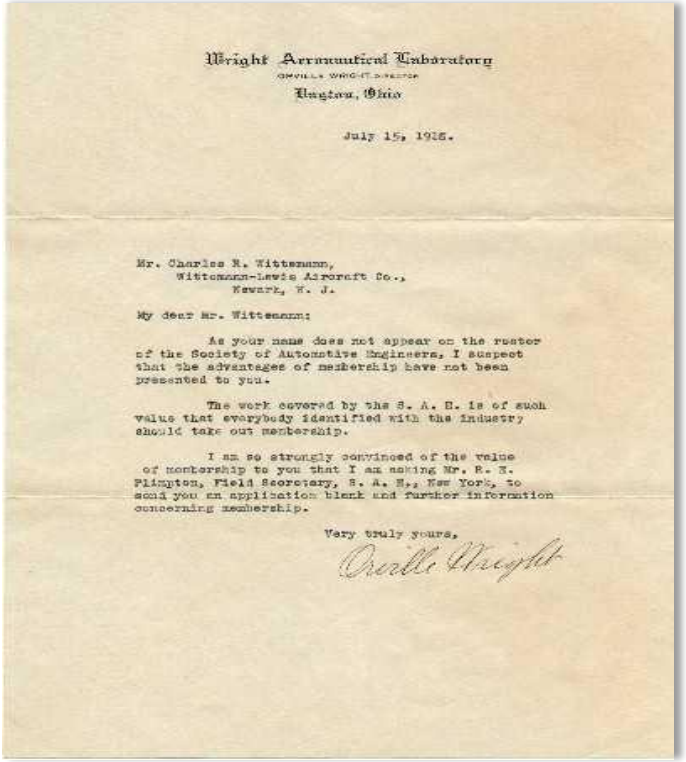
SAE member Elmer Sperry created the term “Automotive” - from Greek autos (self), & Latin motivus (of motion) to represent any form of self powered vehicle

Electronic publishing, 1980s

Opened offices in Washington DC, London, Shanghai

100 year anniversary of the 1st aerospace standard, 2016

SAE AEROSPACE STANDARDS HISTORY – FROM 1916



Wright Aeronautical Laboratory
ORVILLE WRIGHT, DIRECTOR
Dayton, Ohio

July 15, 1918.

Mr. Charles R. Wittemann,
Wittemann-Lewis Aircraft Co.,
Newark, N. J.

My dear Mr. Wittemann:

As your name does not appear on the roster of the Society of Automotive Engineers, I suspect that the advantages of membership have not been presented to you.

The work covered by the S. A. E. is of such value that everybody identified with the industry should take out membership.

I am so strongly convinced of the value of membership to you that I am asking Mr. E. E. Plimpton, Field Secretary, S. A. E., New York, to send you an application blank and further information concerning membership.

Very truly yours,

Orville Wright

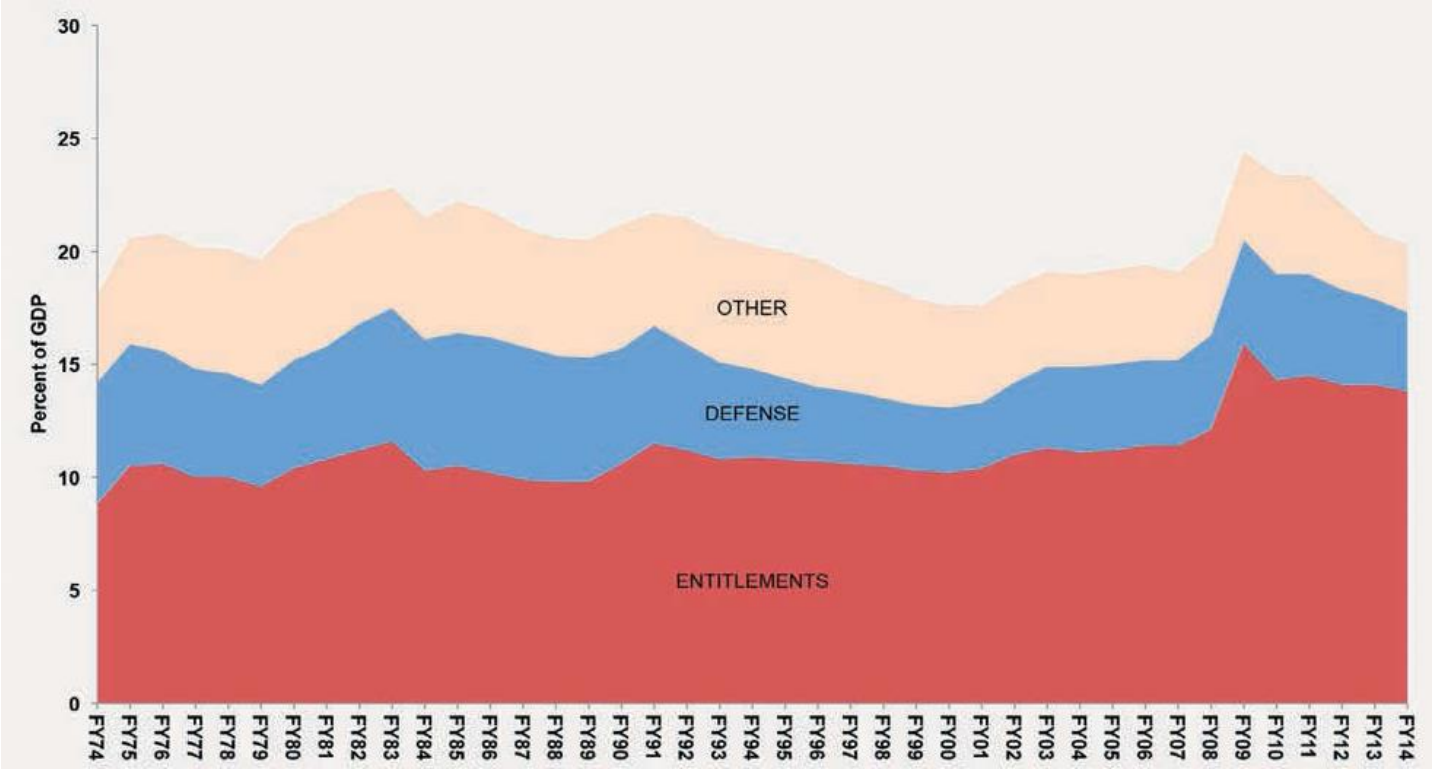
The Wright Brothers

“The work covered by the SAE is of such value that everybody identified with the industry should take out membership.”
Orville Wright, 1918

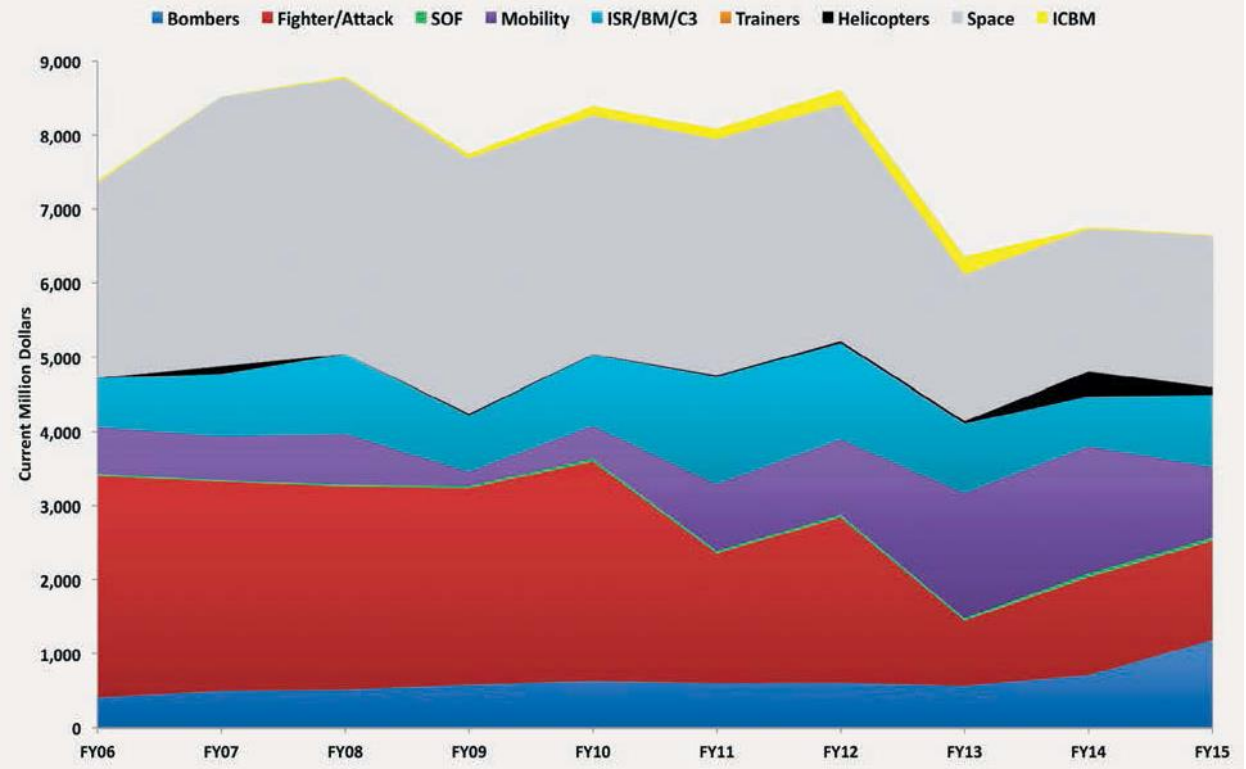
STATE OF THE U.S. AIR FORCE BUDGET AND FLEET

SOURCE: U.S. AIR FORCE ASSOCIATION 2015 ALMANAC

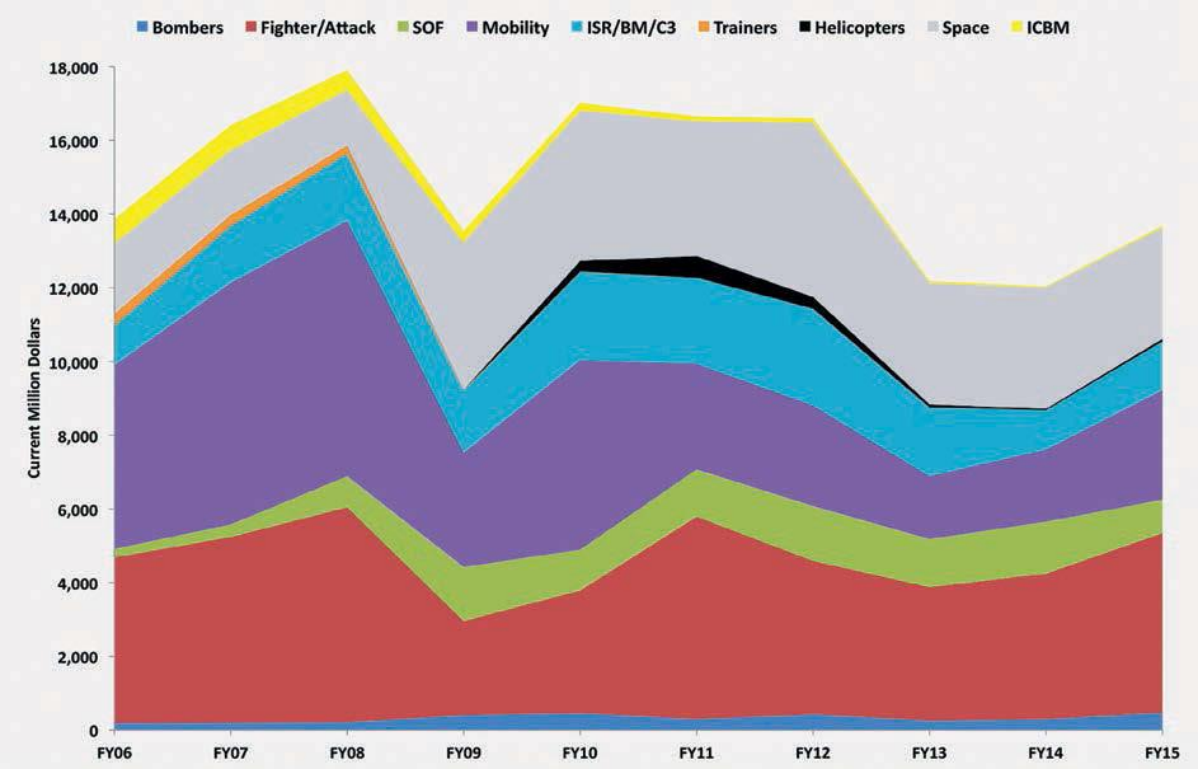
U.S. Federal Budget Outlay Categories



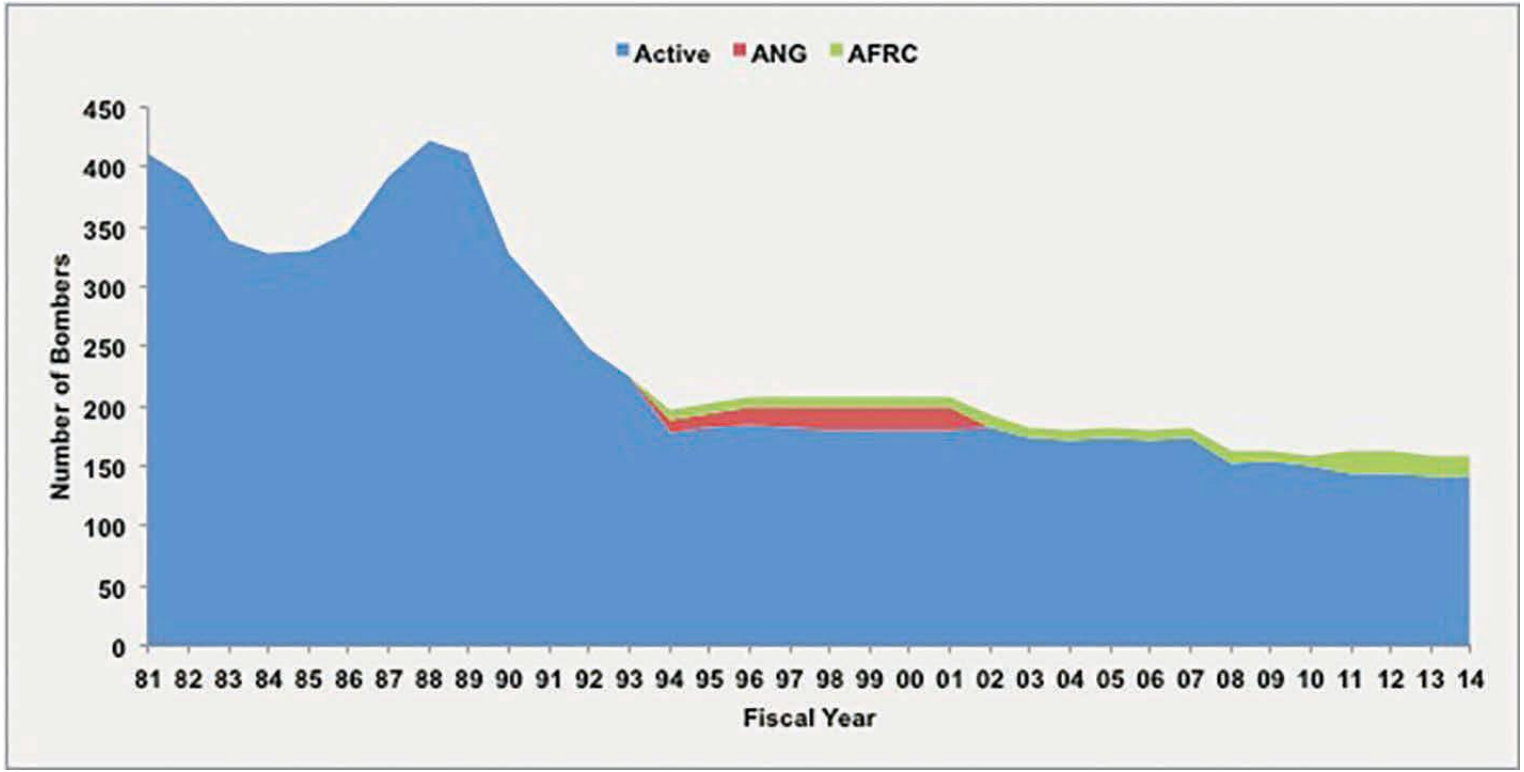
10 Years of RDT&E Funding for USAF Major Programs by Category



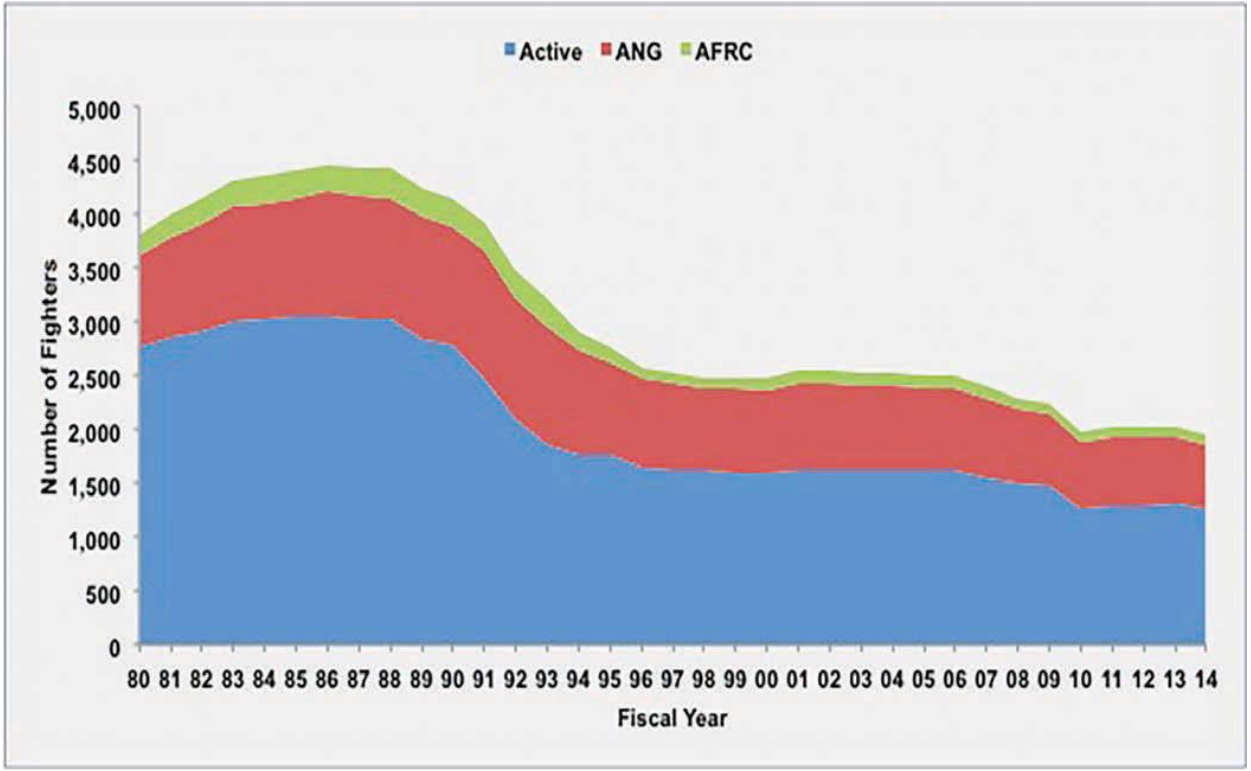
10 Years of Procurement Funding for USAF Major Programs by Category



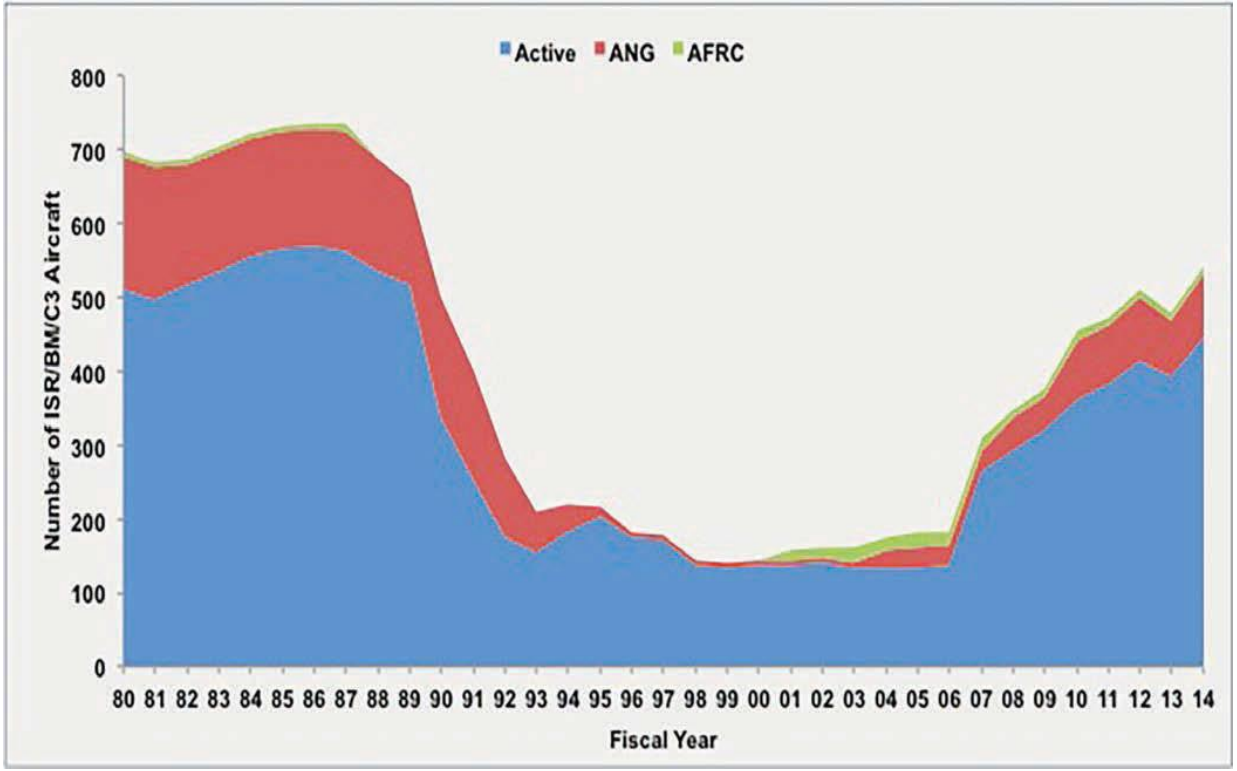
USAF Bombers Over Time



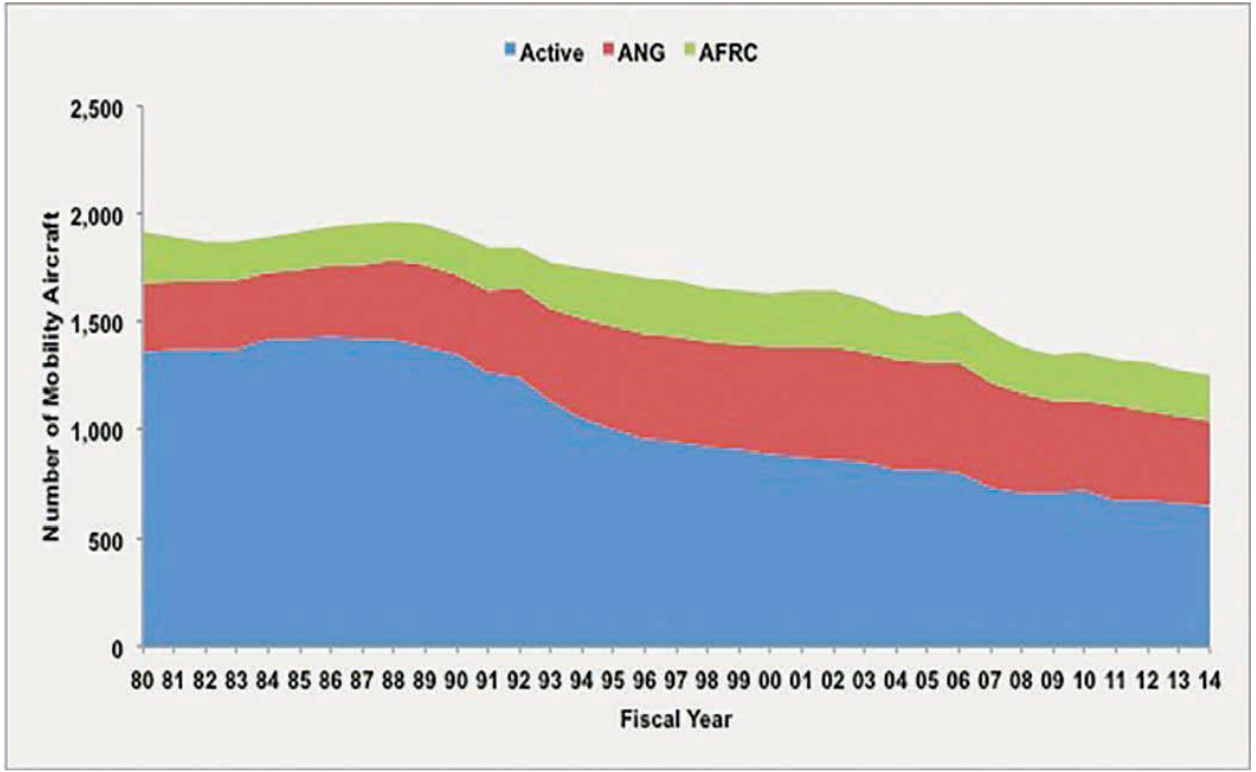
USAF Fighters Over Time



USAF ISR/BM/C3 Aircraft Over Time



USAF Mobility Aircraft Over Time



USAF Total Force Aircraft Age - Averages (As of Sept. 30, 2014)

Category	Total Force	Average Age
• Bombers	159	32.7 Years
• Fighter/Attack	1,955	21.6 Years
• Special Ops Forces	128	21.2 Years
• ISR/BM/C3	539	32.9 Years
• Tanker	497	36.9 Years
• Transport	768	23.4 Years
• Helicopter	169	24.9 Years
• Trainer	1,189	26.9 Years
TOTAL	5,404	27.6 Years

AGING AIRCRAFT APPROACHES

ENABLE SAFER AND MORE EFFICIENT AVIATION

Approximately 1800 SAE International standards are used in the development of a typical aircraft.

The first aerospace standard was written in 1916.

Today there are over 8500 active aerospace standards and over 17500 historical standards in circulation.

A Few Threats for Aging Aircraft

- **Proprietary Parts Not Available**
  - Solution: Use standard, widely available parts

- **Lead-free Solder Used in Replacement Parts**
  - Solution: Follow mitigation practices in SAE standards

- **Counterfeit Electronic Parts**
  - Solution: Counterfeit Parts Control Plan based on SAE AS5553

- **Other Counterfeit Materiel**
  - Solution: Supply Chain Procedures based on SAE AS6174

SAE AEROSPACE STANDARDS PROGRAM TOPICS

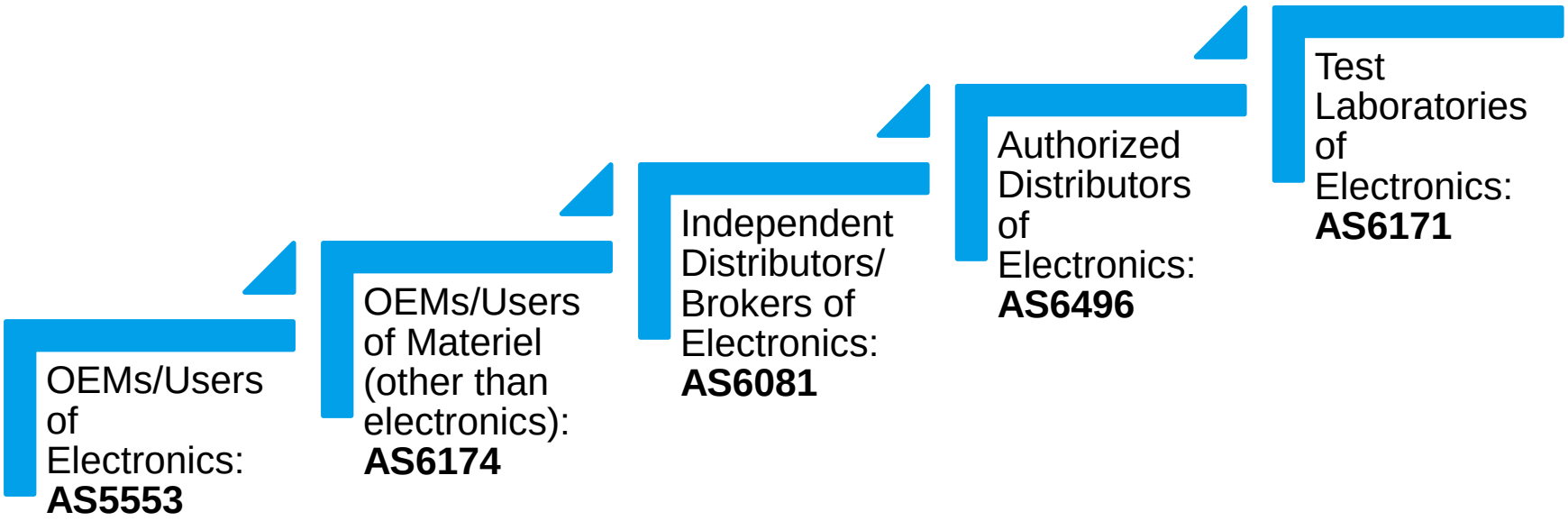
- Metals finishes, processes, fluids
- Nonferrous alloys
- Carbon & Low alloy steels
- Specialty steels and alloys
- Corrosion & heat resistant alloys
- Titanium
- Beryllium
- Refractory materials
- Metals engineering
- Elastomers
- Polymers
- Composite materials (fabric & resins)
- Composite repair materials
- Composite inspection
- Composite repair techniques
- Organic Coatings
- Seals and Sealants
- Maintenance chemicals and materials
- Greases
- Lubricants
- Nondestructive testing and inspection
- Mechanical/Electrical/Hydraulic actuators
- Hydraulic fluids
- Filtration
- Tubing
- Hydraulic components
- Fuel, oil, and oxidizer systems
- Pumps
- Couplings, Fittings, Hose
- Tubing installation
- Engine starting systems
- Auxiliary Power
- Nuts/Inserts
- Bolts/studs/screws
- Fluid connectors
- Ignition systems
- Emissions measurement
- Engine condition monitoring
- In-flight propulsion measurement
- Engine controls
- Support equipment and tools
- Helicopter powerplants
- Inlet flow distortion
- Avionics networks
- Aircraft store integration
- Avionic subsystems
- Embedded computing systems
- Architecture description language
- Fiber optics
- Unmanned systems
- Lightning
- Electromagnetic compatibility
- Electrical Power and equipment
- Power management
- Aircraft systems installation
- Protective devices
- Relays
- Electrical connectors
- Terminating Devices
- Wire & cable
- Safety assessment
- Human Factors
- Flight Deck tools and instruments
- Displays
- Human modeling
- Quality system standards
- Fuel operations
- Radio Frequency Identification
- Air cargo handling
- Aircraft ground equipment and systems
- Aircraft servicing
- Aircraft Deicing
- Airport snow and ice removal
- Landing gear systems
- Oxygen equipment
- Aircraft interior/exterior lighting
- Aircraft noise measurement
- Environmental systems
- Aircraft icing
- Safety equipment
- Cabin interiors
- Survival equipment
- Seats
- Maintainability
- Probabilistic Methods
- Reliability
- Structural Health Monitoring and Management
- Air Traffic Management
- Integrated Vehicle Health Management

Lead-Free Electronics – SAE G-24 Pb-free Risk Management Committee for Aerospace Defense & High Performance

- GEIAHB0005_1A: Program Management/Systems Engineering Guidelines for Managing the Transition to Lead-Free Electronics
- GEIAHB0005_2: Technical Guidelines for Aerospace and High Performance Electronic Systems Containing Lead-free Solder and Finishes
- GEIAHB0005_3: Rework/Repair Handbook to Address the Implications of Lead-Free Electronics and Mixed Assemblies in Aerospace and High Performance Electronic Systems
- GEIASTD0005_1A: Performance Standard for Aerospace and High Performance Electronic Systems Containing Lead-free Solder
- GEIASTD0005_2A: Standard for Mitigating the Effects of Tin Whiskers in Aerospace and High Performance Electronic Systems
- GEIASTD0005_3A: Performance Testing for Aerospace and High Performance Electronic Interconnects Containing Pb-free Solder and Finishes
- GEIASTD0006A: Requirements for Using Robotic Hot Solder Dip to Replace the Finish on Electronic Piece Parts

COUNTERFEIT AVOIDANCE STANDARDS

G-19 & G-21 COUNTERFEIT PREVENTION & DETECTION STANDARDS



G-19 & G-21 COUNTERFEIT PREVENTION & DETECTION STANDARDS

- G-19 CI - Continuous Improvement Subcommittee
  - AS5553A: Counterfeit Electronic Parts; Avoidance, Detection, Mitigation, and Disposition
- G-19 D - Independent Distributor Subcommittee
  - AS6081: Counterfeit Electronic Parts: Avoidance, Detection, Mitigation, and Disposition; Independent Distribution
- G-19 AD - Authorized Distributor Counterfeit Mitigation Subcommittee
  - AS6496: Counterfeit Electronic Parts Counterfeit Mitigation AD's
- G-19 DR - Distributor Risk Characterization Subcommittee
  - ARP6178: Counterfeit Electronic Parts; Tool for Risk Assessment of Distributors

THE G-19 & G-21 COUNTERFEIT PREVENTION & DETECTION STANDARDS OF GLOBAL STANDARDS

- G-19 A - Test Laboratory Standards Development Subcommittee
  - AS6171: Test Methods Standard; Counterfeit Electronic Parts
  - Tampered Parts: Leading to work on Cyber-Physical Security
- G-19 C - Standards Compliance Verification Subcommittee
  - AS6462: AS5553, Verification Criteria AS6301: AS6081 Verification Criteria
- G-19 T - Definitions Task Group
  - AIR6273: Terms and Definitions - Counterfeit Parts
- G-21 – Counterfeit Materiel Committee
  - AS6174A: Counterfeit Materiel; Assuring Acquisition of Authentic & Conforming Materiel
  - AS6886: Counterfeit Materiel; Assuring Acquisition and Use of Authentic & Conforming Refrigerant
  - AS6174/1: Compliance Verification Matrix (VM) Slash Sheet (passed ballot)
  - AS6174/2: Fasteners Slash Sheet (pre-ballot coordination)

QUESTIONS?

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