Australian Government
Department of Defence
Capability Acquisition and Sustainment Group

Army Aircraft Systems Program Office Design Organisation (AASPO-DO)

Aircraft and Airworthiness Sustainment Symposium 2017

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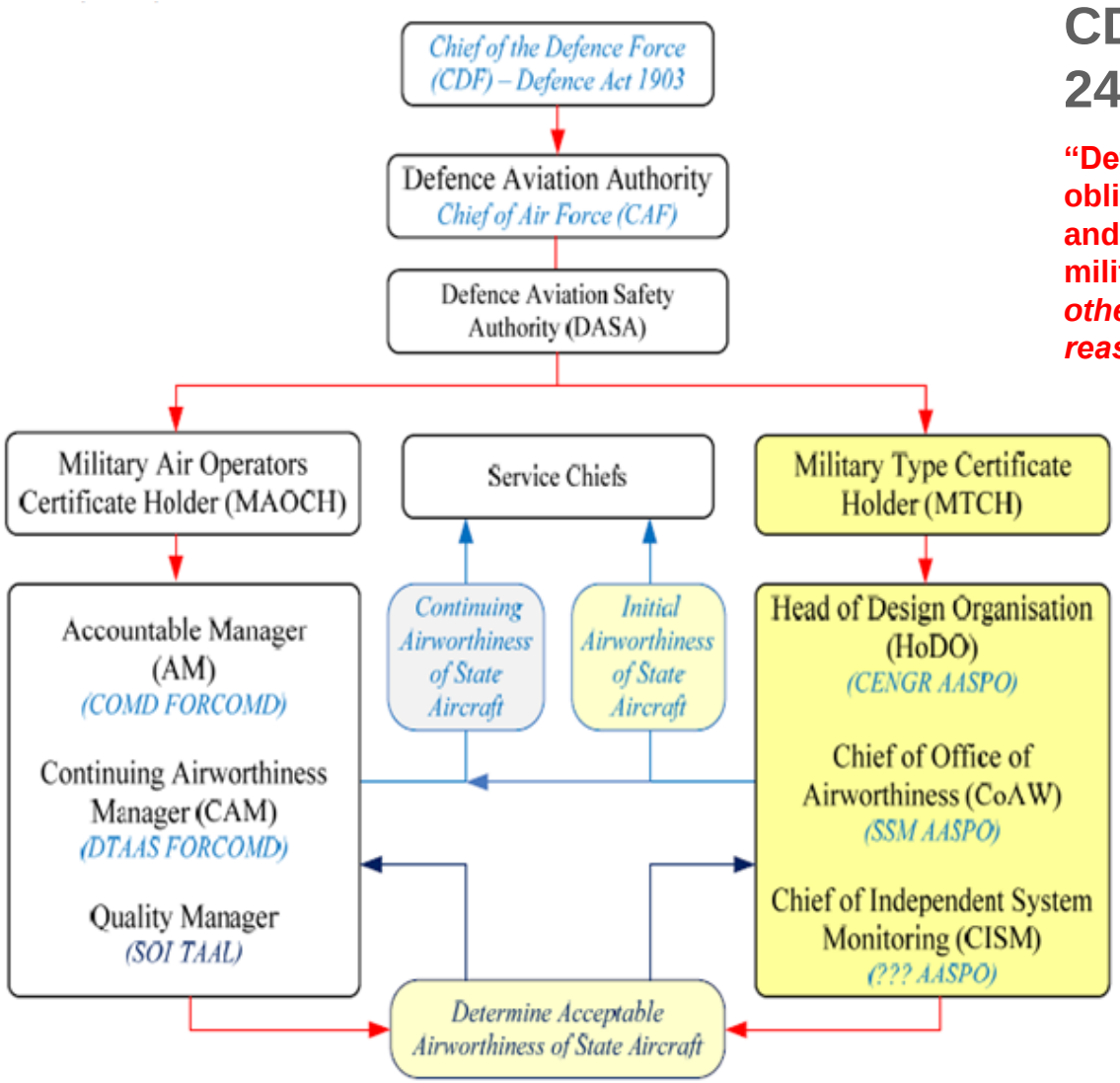
Bell 206B-1 Kiowa, S-70A-9 Black Hawk, CH-47F Chinook

SCOPE

- Background – Defence Aviation Safety Framework
- DASR Participants – Army Aviation FEG
- AASPO-DO ORPR
  - Organisation, Resources, Procedures, Responsibilities
- Design
  - Levels and Types
  - Recent Examples and Issues
- Risk Communication
- Engineering Support Network Requirements

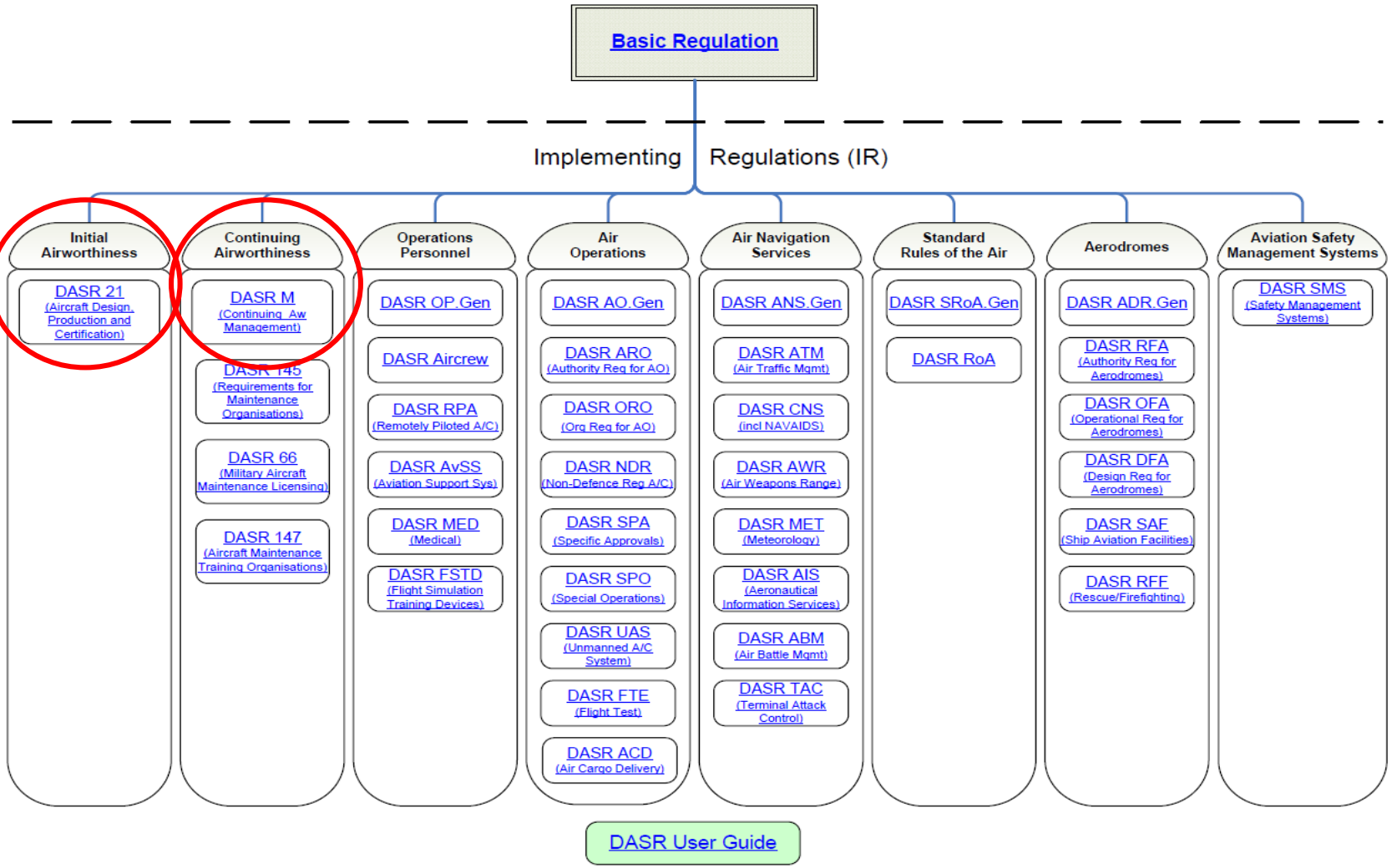
Background –
Defence Aviation Safety Framework (DASF)



CDF Joint Directive 24/2016

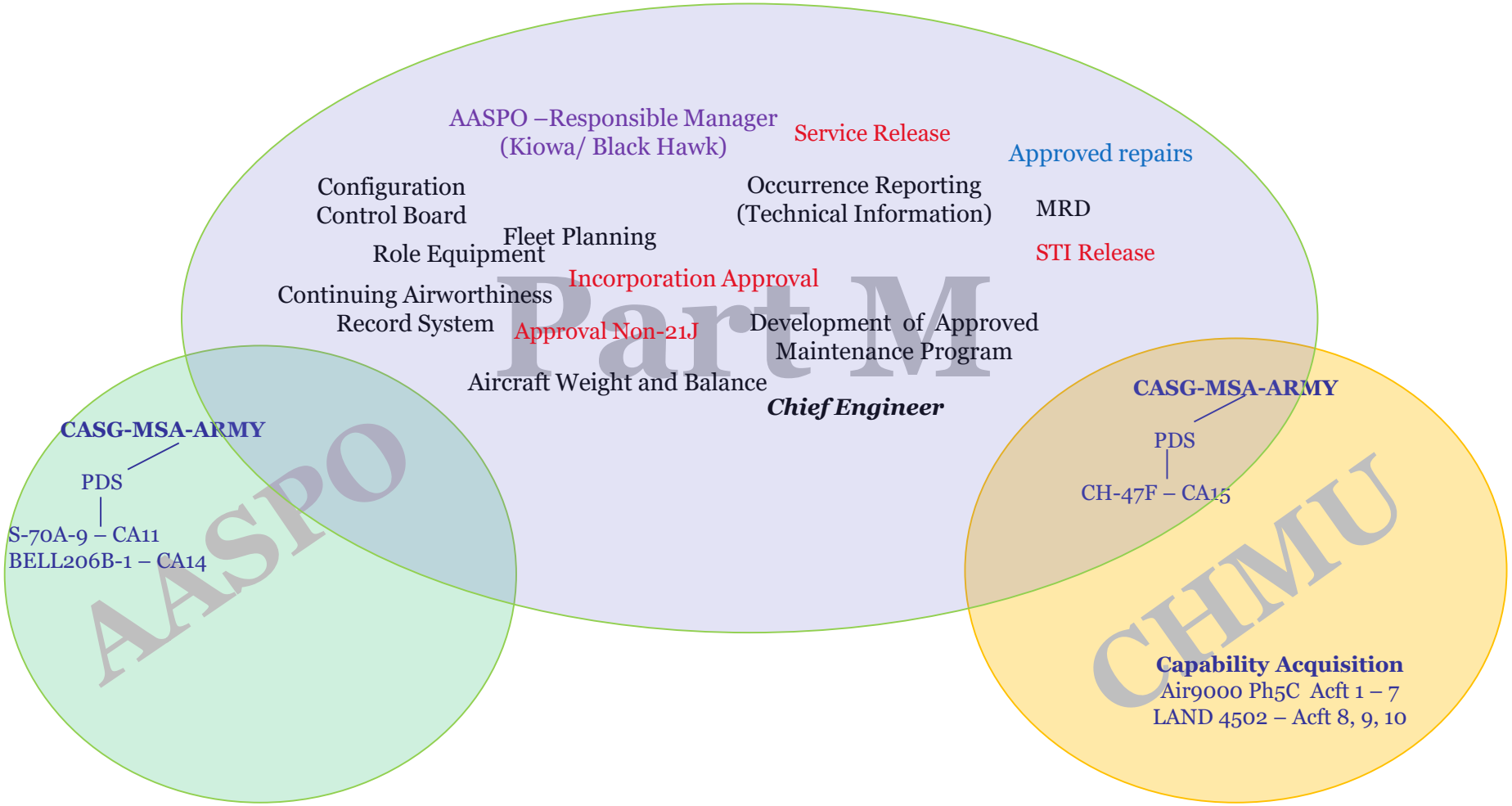
"Defence has a moral and legal obligation to ensure risks to health and safety of personnel arising from military aircraft *are eliminated or otherwise minimised so far as is reasonably practicable (SFARP)".*

Defence Aviation Safety Regulation (DASR)

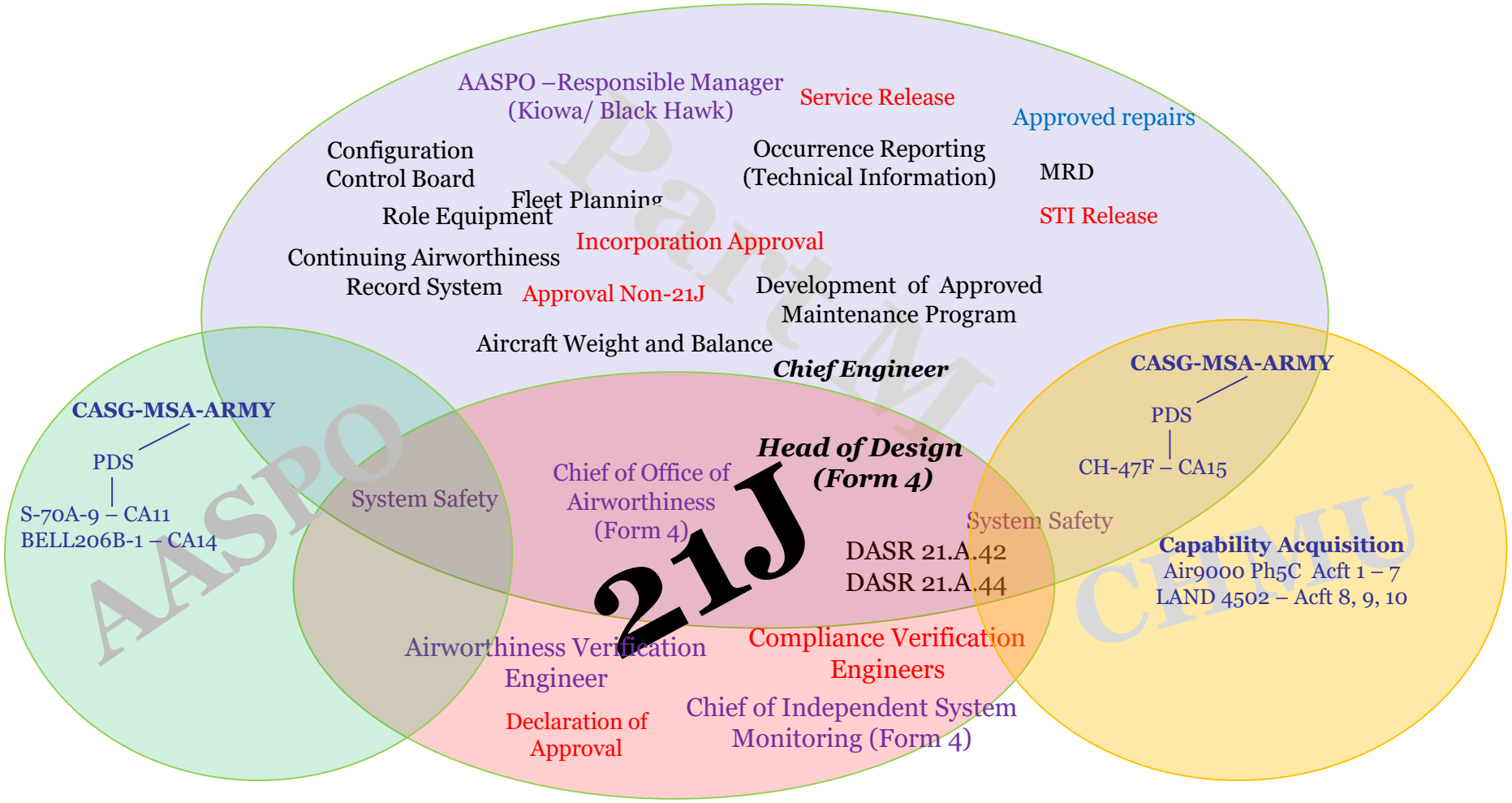


DASR Participants –
Army Aviation Force Element Group (FEG)

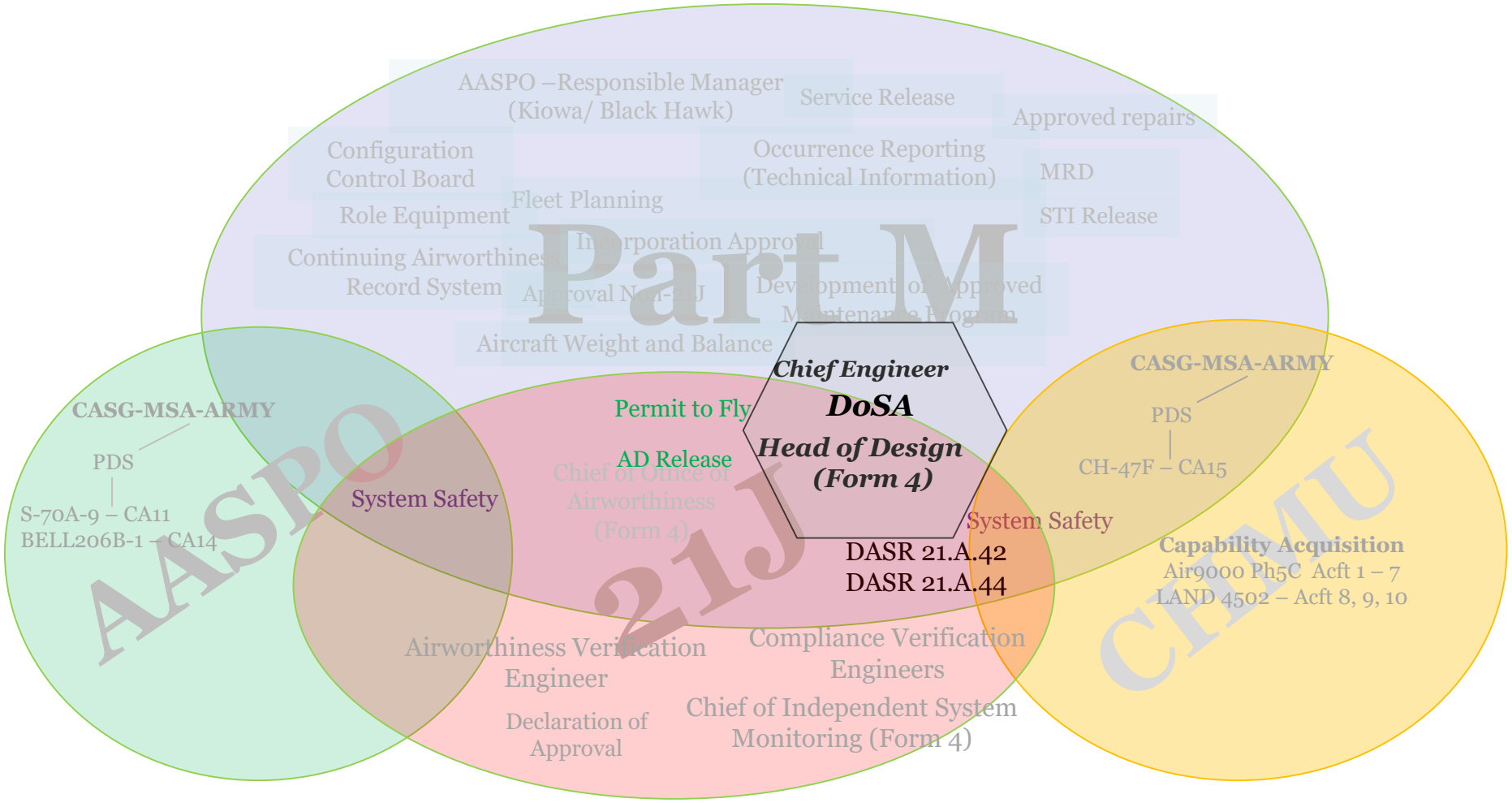
DASR Participants – Army Aviation FEG



DASR Participants – Army Aviation FEG



DASR Participants – Army Aviation FEG



AASPO Design Organisation –

Organisation, Resources, Procedures, Responsibilities (ORPR)

AASPO Design Organisation

A DASR 21J Approved Military Design Organisation (MDOA) established to provide Initial (Continued) Airworthiness design services to the Military Air Operator (MAO) and to fulfill Military Type Certificate Holder (MTCH) obligations for Army's Kiowa, Black Hawk and Chinook aircraft


Department of Defence

APPROVAL CERTIFICATE

AUS.DASA.21J.0005

ARMY AVIATION SYSTEMS PROGRAM OFFICE

DARNO-000000

as a MILITARY DESIGN ORGANISATION

JD Hood

AUS.DASA.21J.0005 Military Design Organisation Approval Certificate

Scope, Platforms, Privileges and Limitations

ORGANISATION

- Engineering Management Plan
- Military Design Organisation Approval
- Design Organisation Exposition
- Chief Executive
- Head of Design
- Chief of Office of Airworthiness
- Chief of Independent System Monitoring
- Design Assurance System

RESOURCES

- Design Engineers, System Safety, LOGENGs
- Compliance Verification Engineers
- Independent system monitoring personnel
- Design tools and data (E2, Objective)
- Production, Manufacturing, Suppliers
- Design Support Network
- Facilities
- Contracts

PROCEDURES

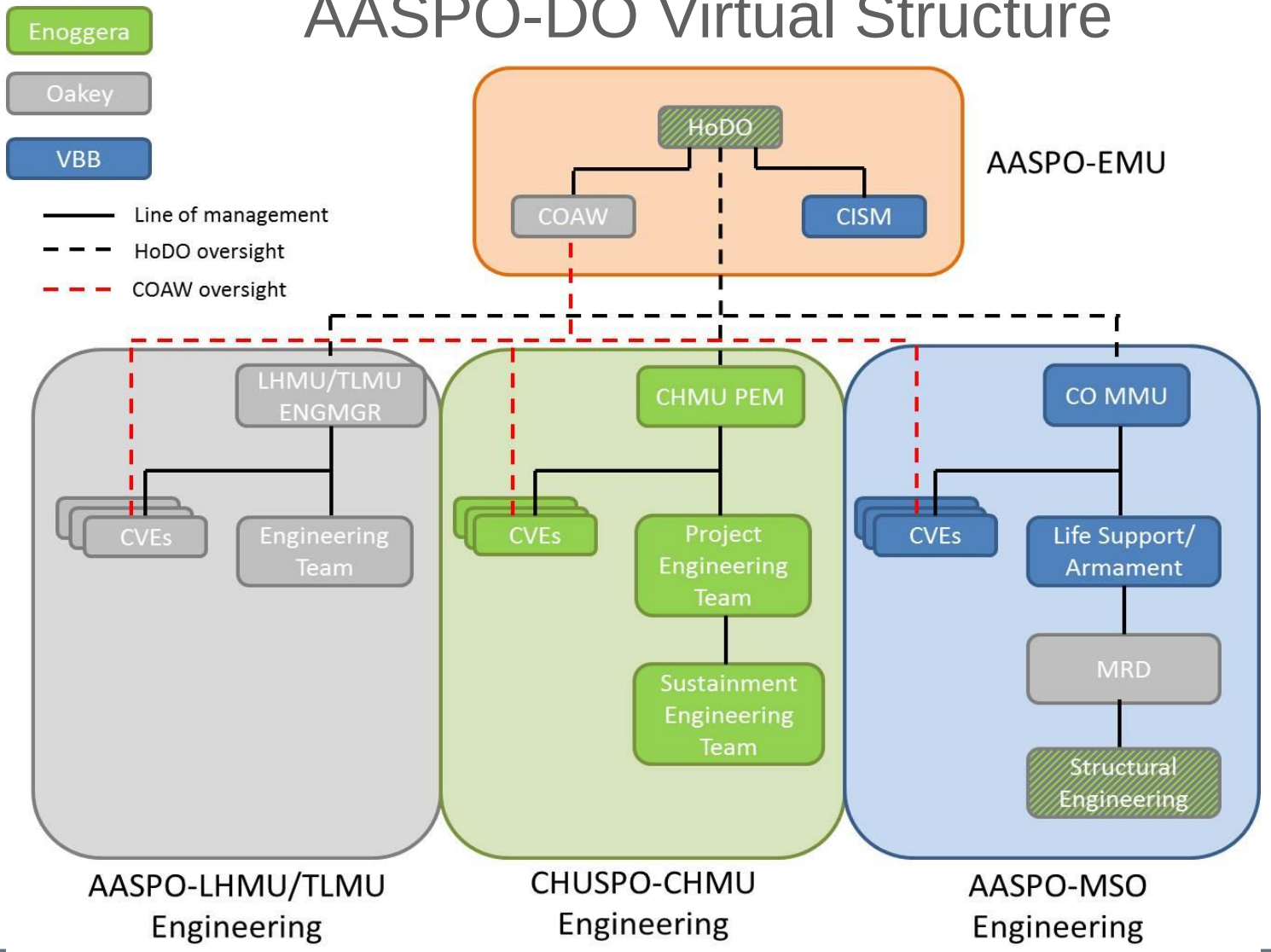
- DASR GM, AMC
- Design Manual (procedures)
- Independent checking procedures
- Authorised signatory (CVE) selection
- Engineering Authority
- Independent system monitoring
- Design Change classification procedure
- Design Approval procedure
- CASG QMS Procedures (DMSP)

RESPONSIBILITIES

(and Liability)

- Safety Risk Management
- Reasonable Knowledge
- Work Health and Safety (ensure)
- Military Type Certificate Holder Obligations
- DAAD, AD, TAD, AC
- Contemporary Design Standards and Codes
- ‘Absence of Negligence’

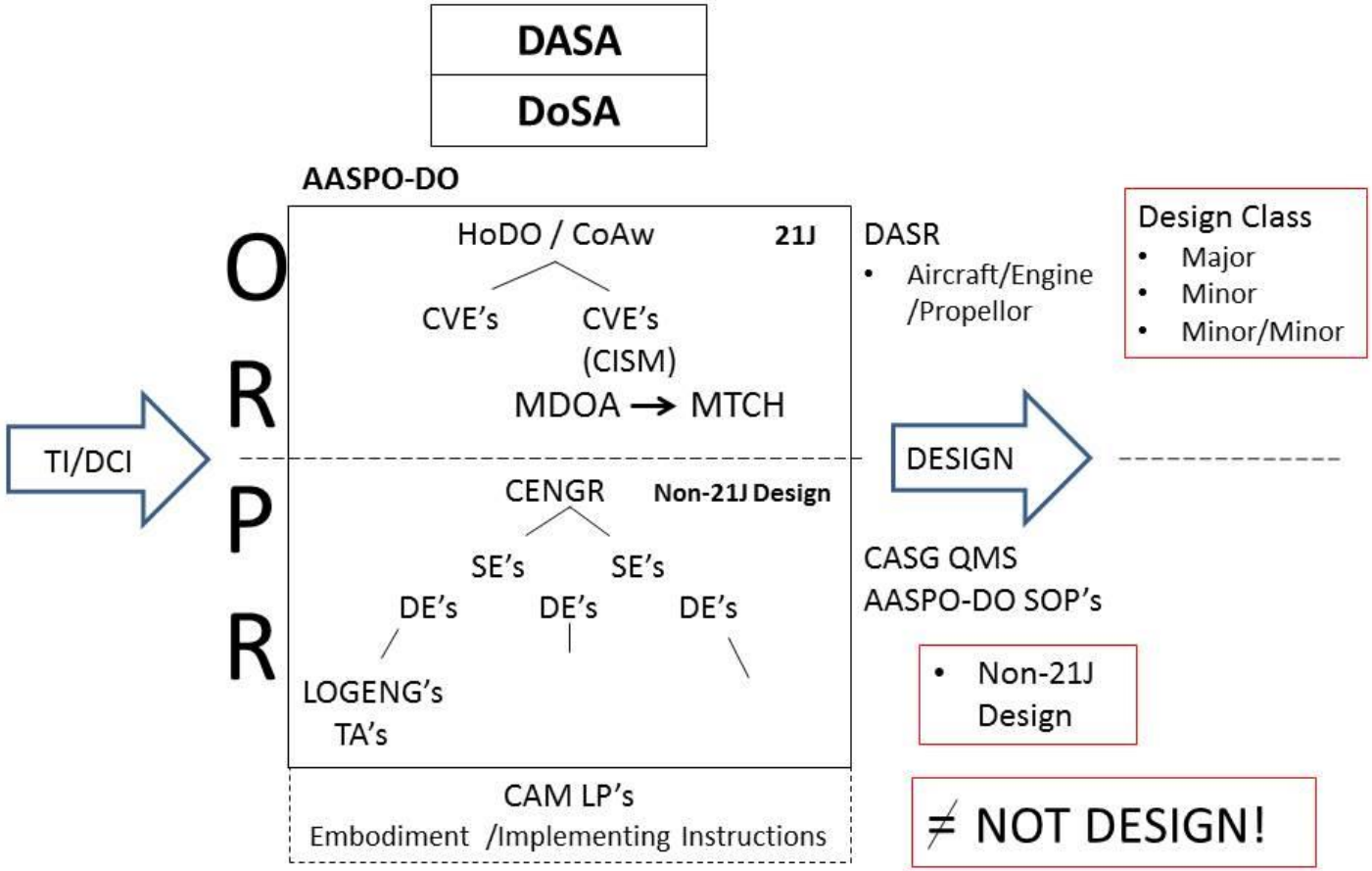
AASPO-DO Virtual Structure



AASPO-DO Design

- Level and Type
- Examples and Issues

AASPO-DO Design – Levels and Types



Airworthiness

The ability of an aircraft, or other airborne equipment or system, to operate in flight and on ground without significant hazard to aircrew, ground-crew, passengers (where relevant) or to other third parties

- Maintain Aircraft Type Certification Basis (Major / Minor)
- Modifications (Capability / Safety)
- Repairs
- Engineering Evaluation 21J / Technical Advice (CENGR)

Army Aircraft Fleet Life Cycle Status

Kiowa
(x 23)

AIR 9000 Phase 7

PWD 2019

Black Hawk
(x 34)

AIR 9000 Phase 2,4 & 6

PWD 2022

Chinook Foxtrot
(x 10)

AIR 9000 Phase 5C
Land 4502

PWD 2040

Design Examples and Issues – Kiowa

- Bell 206B-1 Kiowa (PWD 2019)
- Cockpit lower shell inner skin corrosion (Fig 1) – Maintenance
- Altitude Hi Warning (RADALT Mute) - Safety
- Dual Tacho Modification (Obsolescence management) (Fig 2)
- Fatigue cracking at Pitch control rod
  to clevis attachment point - Maintenance

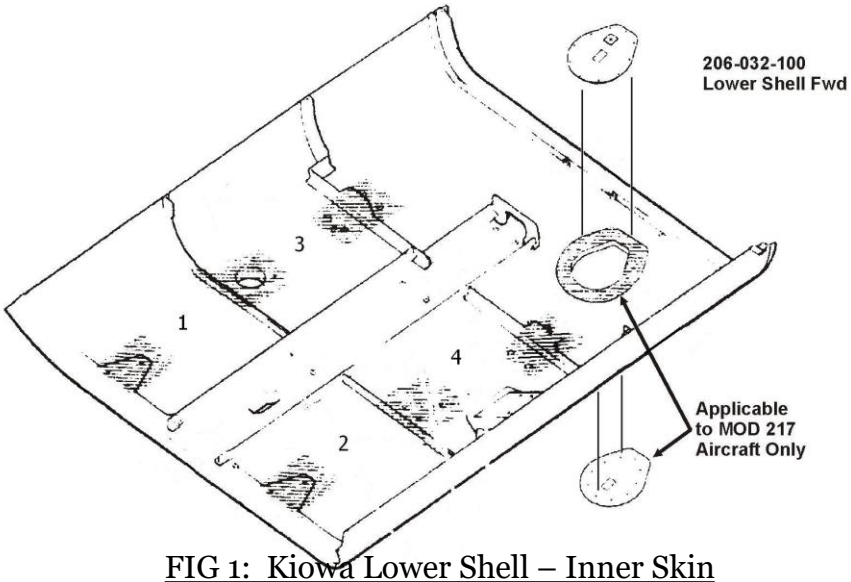
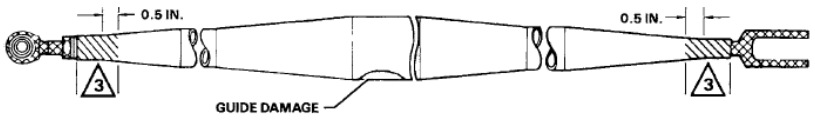


FIG 1: Kiowa Lower Shell – Inner Skin

FIG 2: New v Old (Obsolete)

A17 Kiowa – Pitch Change Link Cracking (SCC)

AAP 7210.010-3(AM1) Sect 2 Chap 10



TYPICAL CONTROL LINK ASSEMBLIES AND CLEVISES

Design Examples and Issues – Black Hawk

- S-70A-9 Black Hawk (PWD 2022)
- High Readiness Capability – No tolerance for availability impacts
- Ageing fleet with increased maintenance (CAPT Wardill)
- Pri Servo Wear Pad Disbond – Repair Procedure
- Communications, ISR, EW enhancement - Capability
- Specialist Rescue Equipment
- AMEE
- Crashworthy fuel tanks

Passenger Carriage of Dangerous Goods (DG)

10. Technical advice is that OAAC 01/2016 and SFI 18/2008 AL 10 (and SI (Avn) OPS 3-103) should remain compliant with the requirements of current policy and that no emitter/transmissions are permitted onboard the aircraft until assessed for EMI/EMC effects **(Flag I)**. SOCOMD advice **(Flag J)** is that compliance is generally achievable with minimal impact. However, it may be necessary for some transmissions to be made. There is insufficient data and time to assess the effects of this on the acft and consequent risk. Technical advice is that these emitters are to remain prohibited until cleared through the airworthiness process.

c. **agree** that DOPAW draft a minute to SOCOMD requesting SOR to facilitate the testing of SOCOMD emitters/transmitters for use in Army RW.

AGREED/~~NOT AGREED/PLEASE DISCUSS~~ ADDRESS AS A PRIORITY [illegible]

Design Examples and Issues – Chinook

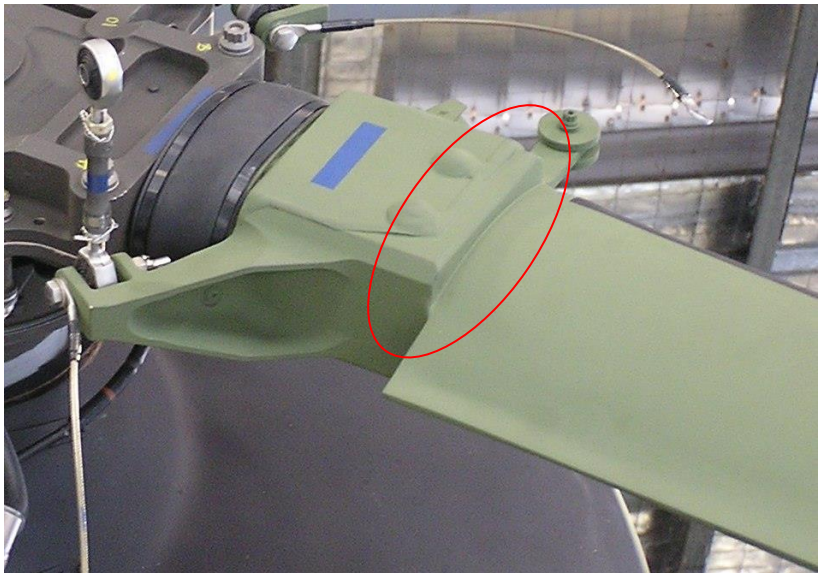
- CH-47F Chinook (PWD 2040)
- FOCFT (LHD / CHOULES) – ASIP FM/UM/EDA - Marinisation
- LAND 4502 IIS – Deviation – CAAS v9.2.2, Rotor Brake
- CCPP - Crashworthy Pilot Seat
- CCPP - Crashworthy Cabin Seating
- CH-47F RNP/RNAV Operations

CH-47F First of Class Flight Trials (FOCFT)

Risk Communication

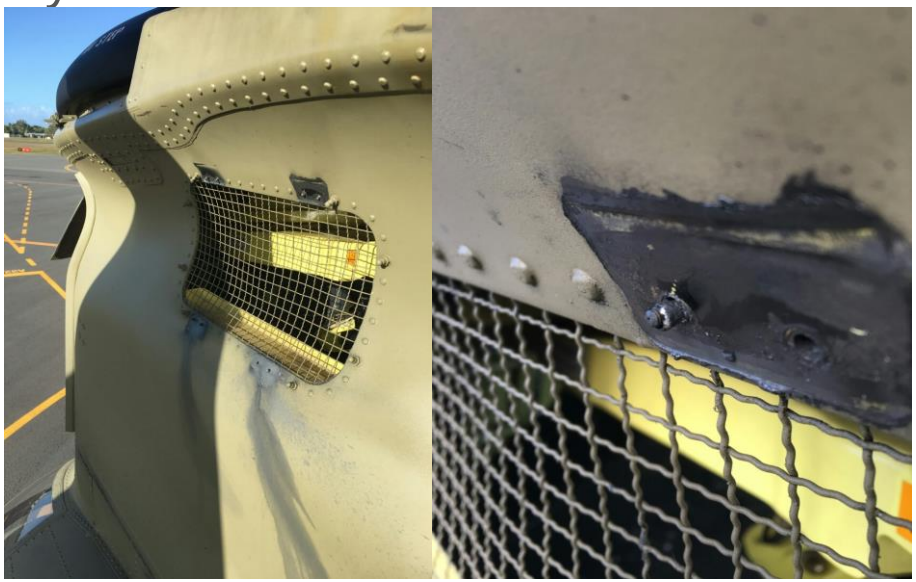
Torque Tube Failure

- US Army SOF - Failure of Tail Rotor (TR) Torque Tube
  - Pitch horn to Torque Tube bond failed
  - Resulted in outboard migration of the pitch horn and physical failure (disintegration) of the Torque Tube



Infra-Red Line of Sight Blocker Separated During Flight

- During flight LH IR LOS blocker separated from the forward pylon
- Unit ASOR
- Occurrence Report (DASA Form 44)
- 21J System Safety Assessment
- MIL-STD HRI translated to AVRM Very Low
- Maintenance Investigation



Engineering Support Network Requirements

- **Structural Assessments**
  - Kiowa Instrument panel MOS assessment
  - Structural assessment for Chinook Aircrewman seating
  - Black Hawk ICS 500 structural integrity assessment
  - Kiowa Bathtub Damage Assessment
  - MPTF A25-109 Cracking
- **ASIP / Fatigue life Substantiation**
  - Annual Fatigue Assessment (AFA)
  - Structural Condition Assessment Reports (SCAR)
  - Environmental Degradation Assessments (EDA)
- **Feasibility assessments**
  - Feasibility for Improved Black Hawk Seating (MIL-STD-85510)
  - Kiowa head strike potential assessment with KEASP fitted
- **Repairs**
  - Various/ad-hoc Structural repair for Black Hawk, Kiowa and Chinook
  - MPTF Structural Assessment
- **Modification development**
  - Cargo retention device
  - Black Hawk extra seats with FRIES bar
  - Chinook M134 Overboard Dump Tube
  - Chinook Station 120 seat
  - Base Structural Engineer, DE and CVE support
  - Test and Evaluation
- **Investigations**
  - Defects and Failures

Questions?