Propulsion Structural Integrity Section

Contribution to safety, capability and cost of ownership

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Scope of brief

• Propulsion Structural Integrity section mandate

• Track record & examples of value (with DSTG and QinetiQ)

• Is there a future need?

• The importance of DSTG and QinetiQ
PSI Section mandate

• **DASA Vision:**
  – *'Capability First, Safety Always’*

• **DAVENG Business Model** describes a **stewardship role** for SI management ---* safety, capability & cost of ownership:*
  1. Ensure safety is maintained to acceptable levels
  2. Ensure platforms reach their PWD
  3. Avoid unforcasted refurbishments
  4. Optimise maintenance / minimise maintenance downtime
  5. Contribute to the achievement of planned aircraft availability

• **Notes:**
  – **Policy:** DEFLOGMAN Part 2, Vol 10, Chap 18
  – Identical roles to our airframe SI section peers
  – These roles should be common to all in this room
Track record & examples of value

• **Complex / difficult business:**
  – Access to data
  – Access to SME resources (QQ, DSTG, OEM)
  – Relatively fragile QTE construct compared to FW SI:
    • Fewer Masters qualifications
    • Smaller pool for OIC ESI position
  – **Acknowledge:** at times our support has been limited / imperfect

• **Many recent examples of value add:**
  – MRH-90 turbine blade RA (avoid blade replacement program – capability)
  – S-70B-2 EOT life limits (simplified logistics system – cost of ownership)
  – F/A-18F/G engine RA for continued operations (capability)
  – P-3C critical part inspection limits (safety)
  – PC-9 mission analysis (safety)
  – F/A-18A/B HPT ACP / RS risk assessment & MPTF (capability)
  – WDA laboratory (safety / capability)
  – Evolution to PSIP (clarity and more holistic management)
Is there a future need? Strategic view:

- **Sovereign Structural Integrity Capability**
  - Some capabilities are so important for national security that they must be retained and controlled by Australian Defence and industry
  - A sovereign SI management capability:
    - Supports capability and cost of ownership
    - Provides independence from foreign governments and companies
  - How much / what level is enough? DAVENG currently working to define

- **Challenges (or opportunities?) for PSI:**
  - How much / what level is possible?
  - Greater collaboration with OEMs
    - Eg Rolls Royce industry placement
    - How do we access more OEM information?
  - DSTG support to Force-in-Being – already too weak in some areas
  - Greater utilisation of QQ
  - Greater partnering with foreign militaries
Is there a future need? Tactical view:

• **Do more of the same, eg:**
  – **Cross-platform issues:**
    • Support component lifing issues / RA
    • Optimise HUMS and how we use, certification requirements
    • Advance CM programs (eg Chipcheck) / discrete issue management
    • Support for Mission Analyses
    • DSTG task sponsorship
  – **Romeo Seahawk:** validate ADF usage
  – **Chinook:** quantify effect of IRSS (potential for increased engine life limits)
  – **Taipan & Tiger:** higher fidelity HUMS (data quality, uses for data)
  – **HAFT-TD:** refined/new RW certification requirements, MOC and approaches
    • Spinoffs for engine critical part lifing?
  – **F-35 JSF:** engine certification
  – **C-27J:** propeller balancing certification requirements
Is there a future need? Tactical view:

- **Do more of the same, eg:**
  - **PSI sees across the entire community, objectively**
    - Ability to steward / lead problem resolution effectively
  - **Important conduit between DSTG and the community. Generally:**
    - PSI understands DSTG better than the operating community
    - PSI understands the operating community better than DSTG

=> Link problems with solutions
=> Steward tasks to completion
The importance of DSTG

• **Essential S&T support to PSI and for the F-I-B:**
  – Component/structure life management, independent of OEM
  – Validation / exploration of OEM life limits and related analyses
  – Validation of OEM risk assessments for technical issues
  – Conduct of independent risk analyses for in-service events
  – Independent research/investigation into in-service events & issues
    • HUMS
    • Condition Monitoring
    • Lifing policy
    • Component durability, reliability
  – Forensic investigation services
  – Emerging NDT technology, processes, equipment, methods, etc

  – LRR supporting capacity to undertake activities such as those above
  – Access to OEMs, other S&T organisations and academia
What PSI wants from DSTG in future

• Continued support to PSI and the F-I-B:
  – AD Plan ‘Roadmaps’ (AD strategy):
    • Certified Additive Manufacturing
    • Advanced Sensors
    • Data Analytics
    • Composite lifing
  – But also, more of the same from the last slide
    • Propulsion system support already ‘too thin’ in some areas
What PSI wants from DSTG in future

- **My view: need for DSTG support to the F-I-B will grow:**
  - Ever increasing complexity in aero engine design / performance
    => new, difficult problems
  - Reducing fleet sizes and increased cost
    => Each individual asset is more important
  - Challenges of:
    - Data access
    - Influence / innovation / inflexibility in global fleet management models
What PSI wants from DSTG in future

• **Growing need:**
  – Innovative ways to ‘work around’ typical limitations (eg access to data)
    • Eg indigenous relifing of critical parts
    • Eg indigenous HUMS improvements
    • Eg greater support to CM in all forms
  – Continued and greater engagement with peers (eg US military S&T organisations) and academia
  – Greater liaison with OEMs for specific projects (eg new lifing methods)

• **So if you agree – make a noise**
  – DSTG task planning
    • Engage PSI for coordination
  – Engage DSTG direct
Opportunity for DAVENG industry partner (QinetiQ)

• PSI has not historically utilised QQ to any significant degree
• Opportunity to increase PSI capacity / output
  – See relevance increasing in similar way to DSTG

• Increasing challenges relating to IP (access to data that the ADF holds)?
QUESTIONS?

PSI section contribution to safety, capability & cost of ownership:
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