SCSC - Safety Management and SMS Working Group

BBMF Chf Eng and TAA
Gp Capt Andy March

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The views expressed in this presentation are those of the author (Gp Capt A March) and not to be taken as the official MOD or DE&S position on Safety Management of BBMF

Gp Capt Andy March

- Joined the RAF in 1984 as an Aero Systems Engineering Officer
- Served in UK and overseas (Germany, USA, Middle East) in support of many different aircraft types
  - Fast Jet (Tornado)
  - Large aircraft (C130 Hercules, Nimrod, VC10, Voyager)
  - Helicopters (Sea King, Wessex)
- Also worked as a structures specialist following Aircraft Design MSc at Cranfield
- For the last 8 years as Deputy Chief Engineer BBMF (2017-2022) and Chief Engineer/Type Airworthiness Authority (2022 – present)
- I am also a private pilot and own my own vintage aircraft (1964 Cessna 172) which I fly from RAF Cranwell

BBMF

BBMF

5 Spitfires

2 Hurricanes

Lancaster

Dakota

2 Chipmunks

The BBMF Challenge

Can you identify some of the challenges of keeping BBMF in the air?

- 5 aircraft types, 4 engine types and 3 propellor types
- 1930s/40s designs: Spitfire, Hurricane and Lancaster were never certified or designed to meet a defined design standard (it was wartime!)
- OEMs no longer exist – industry support is from historic aircraft specialist companies that work to civil (CAA) regulations
- Most original records lost
- Uncontrolled configuration until 20 yrs ago (each aircraft is unique)
- Mostly using the original Aircraft Document Set - not aligned to the configuration of our aircraft
- Technical aspects that are no longer taught to RAF technicians nor do DE&S engineers have a background in 1930s/40s technology
- An MAA Regulation Set (MRP) only suitable for modern types; BBMF aircraft operate on the Military Aircraft Register and not the CAA's G- Civil Aircraft Register

How do we operate BBMF safely?

- As far as possible we treat the BBMF aircraft as we would any other UK military aircraft. In practice this means the MOD's operating and support structure is the same as for other military types :
  - We have an Aviation Duty Holder (ADH) chain that has overall responsibility for safe operations and managing Risk to Life.
  - The ADH has an Air Systems Safety Case (ASSC) (7 pillars) that makes the argument and provides the evidence that BBMF Air Systems are acceptably safe to operate in-Service to defined limits, within their support framework.
  - Continuing Airworthiness (CAw) is managed by a Military Continuing Airworthiness Mgt Organisation (CAMO) lead by an RAF Wing Commander engineer
  - Type Airworthiness (TAw) is managed by the DE&S BBMF Project Team lead by the Type Airworthiness Authority an RAF Group Captain Engineer
  - Operations are led by Officer Commanding BBMF who reports to Commander Display (RAF Group Captain Pilot) who is also the Delivery Duty Holder

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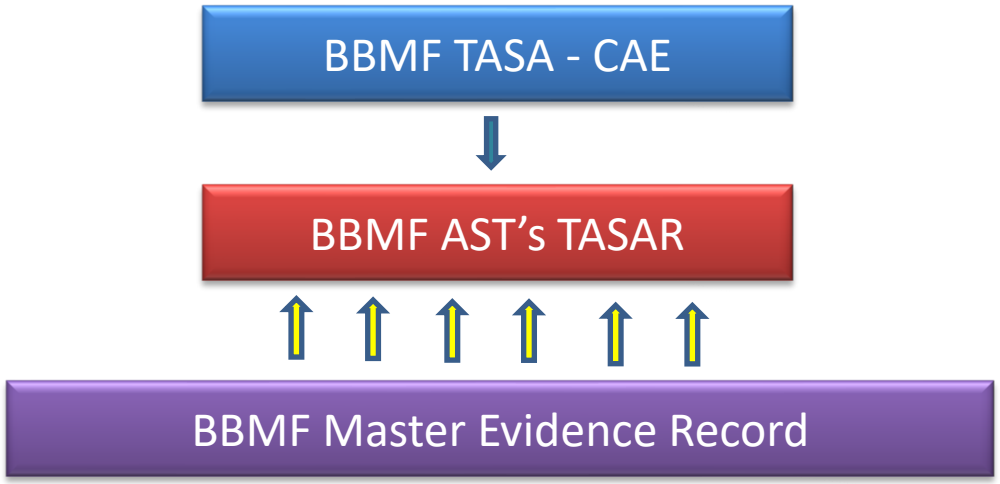
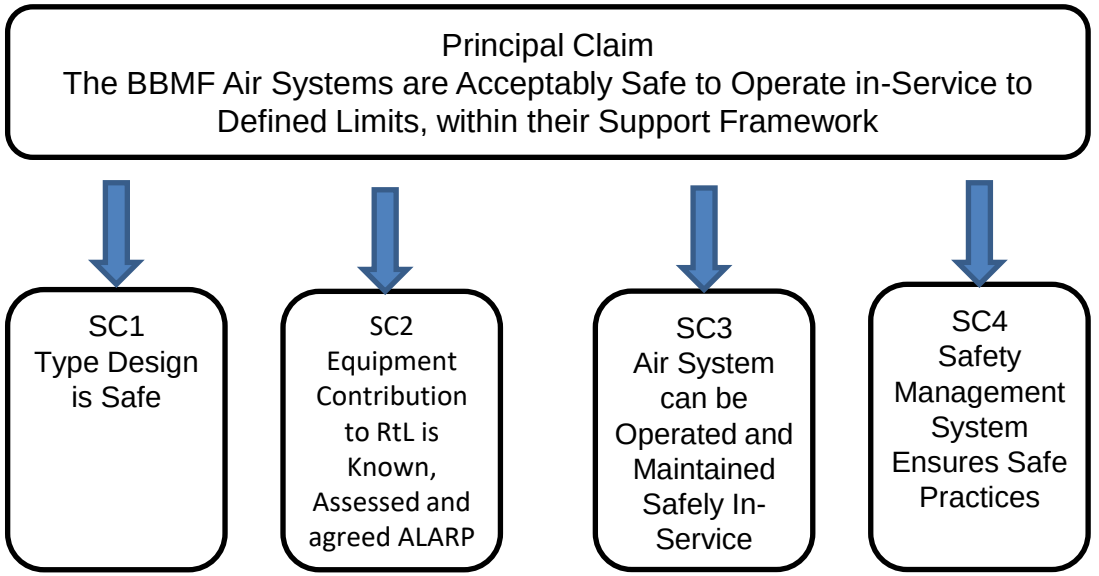
The Role of the TAA

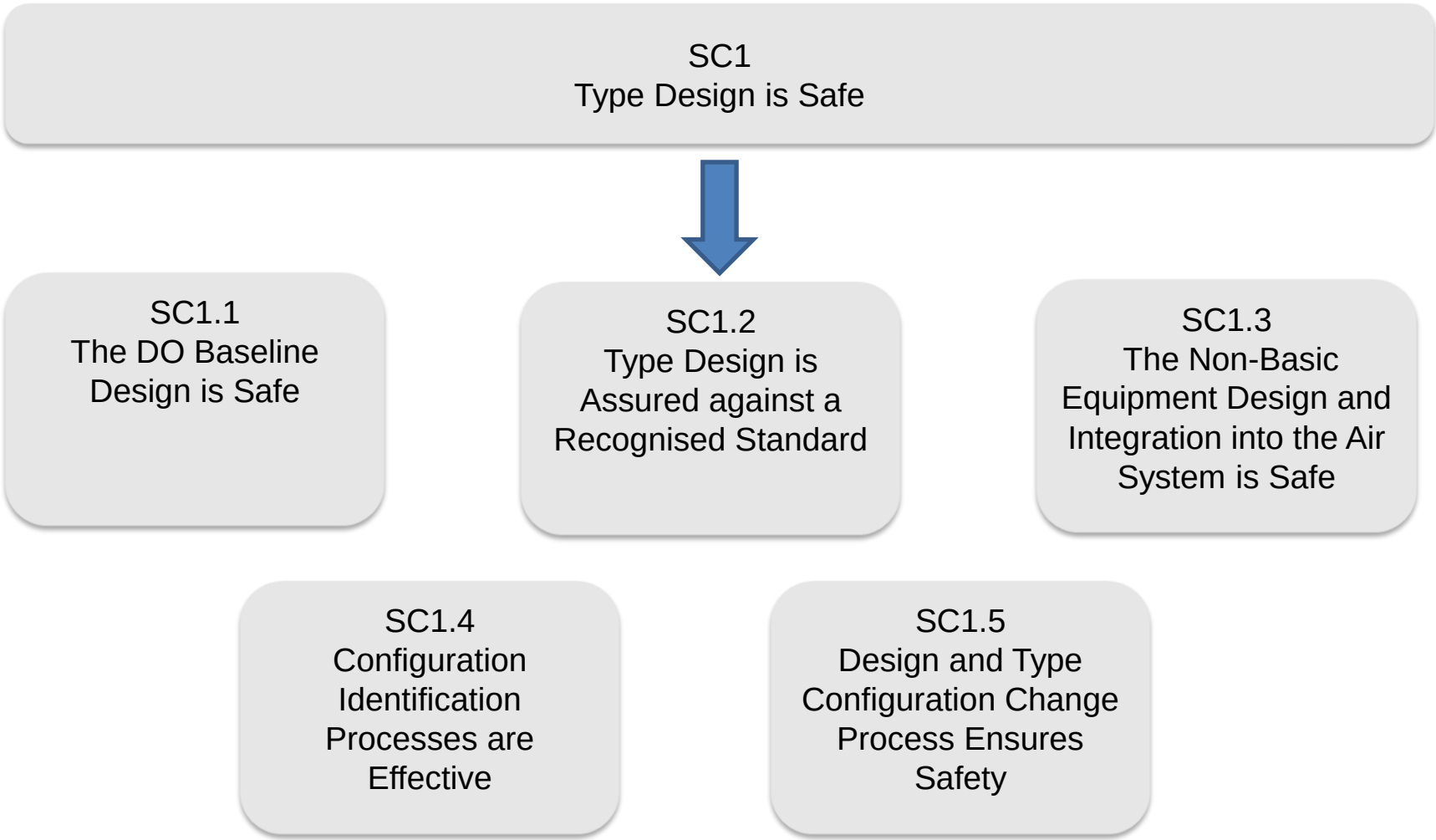
- Is set out in the MAA's MRP RA1015
- In the context of today's discussion I'll concentrate on the Safety Mgt System and Safety Case. The TAA:
  - Sets out how airworthiness will be managed in an Airworthiness Strategy and Air Safety Management Plan
  - Establishes a Safety Management System iaw RA1200 that must work alongside and dovetail coherently with numerous other SMSs
  - Initiates and maintains an up-to-date Type Airworthiness Safety Assessment (TASA)
  - Communicates Equipment Risk to the Duty Holders

BBMF Type Airworthiness Safety Assessment (TASA)





Sub-Claim 1 - Overview



Risk / Hazard Identification

- A key role of the TAA is to identify and mitigate equipment-related risks that might lead to a Risk to Life (RtL) and to communicate these to the Duty Holders.
- Having established a baseline, it is identifying change in RtL that is crucial for BBMF
  - Occurrences (are we informed, what do they mean)
  - Information from other Airworthiness Authorities and operators
  - RtL change is generally reliability driven rather than consequence driven
  - Mitigation options – are we ALARP today?
    - New funding and Cost Benefit Analysis?
    - Timelines to implement mitigation(s) – who agrees and how is this recorded?

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Andy’s Top 5 Tips

#1 Communication

- Establish and maintain regular communication with all parts of the enterprise:
  - Risk to Life holders
  - Operators (your own and others)
  - Maintainers(your own and others)
  - Industry
  - Other Airworthiness Authorities (UK and overseas)
  - Your own team!
- I cannot do my job sitting at my desk – get out and about – devote the time to visiting and speaking to others F2F at their place of work
- Make sure your Team and especially your Safety Mgr also gets away from the desk. Safety Mgt is not an academic exercise!

Andy's Top 5 Tips

#2 Vision, Strategy and Plan

- What is your vision for your Safety Management System?
- Set out your Strategy to achieve your vision and get buy-in from key stakeholders
- Communicate how your strategy will be achieved in a Plan
- Make clear to your team where your priorities are and the standards your team should work to; mentor and guide less experienced

Why I have I underlined 'your' 8 times above?

- Because I see TAA's and Chief Engineers who fill in a template Strategy document and deliver a Plan that gives no understanding of what they are aiming to deliver for their aircraft Type

Andy’s Top 5 Tips

#3 Regulation and Process

- Know the applicable Regulations and established processes BUT do not be a slave to them
- Challenge the Regulator/process owner if the Regulation/processes do not work or drive waste and tick box mentality. Propose alternative approaches
- Encourage your team to have a questioning approach and think about the safety benefit before they commit time and effort to being compliant
- Trust your judgement/experience – you know more about your systems than the Regulator or the process owners who are trying to cater for every eventuality/system type

Andy’s Top 5 Tips

#4 Culture

- Easy said – difficult to get right (and know you have got it right)
- Use Independent Safety Assurance and anonymous surveys to counter complacency
- Does your whole team understand the part they play in delivering safe and airworthy systems? Some of your multi-disciplinary team (Finance, Commercial, Project Mgt etc) may have different priorities and different Regulations/rule sets/processes that pull them in a different direction
- Reward good behaviours rather than just good outcomes

Andy’s Top 5 Tips

#5 Reduce Actual Risk

- The Equipment Contribution to Risk to Life is reduced by reducing the probability of occurrence or the consequences of failure not by putting paperwork on the shelf, following a process or holding hundreds of meetings (something DE&S is very good at!)
- For Air Systems this involves improving reliability:
  - Modification
  - New parts (as opposed to 80-year-old ones in BBMF case)
  - Appropriate Maintenance Policy both on and off-aircraft (plus parts in store)
  - Using competent Design, Production and Maintenance organisations
- Reducing maintenance errors
  - Aircraft Document Set
  - Training
- The above changes must be done at pace to be able to claim risk is ALARP; lack of funding is not an acceptable defence/excuse

Conclusions

- BBMF Safety Management has many unique challenges not faced by any other Type Airworthiness Authority
- BBMF is as far as possible managed as any other military Air System Type; however, there is frequently the need to deviate from Regulation and standard processes (in a controlled way)
- To operate safely BBMF relies massively on experienced people and organisations, whether pilots, engineers, technicians or the myriad of other support staff.
- Trust, communication and teamwork are key to an effective SMS and safe operations

TAA

QUESTIONS?