2011 ADF Aviation Software Symposium

Aviation Software Regulation: 12 Months of Progress

More Housekeeping – Distribution List

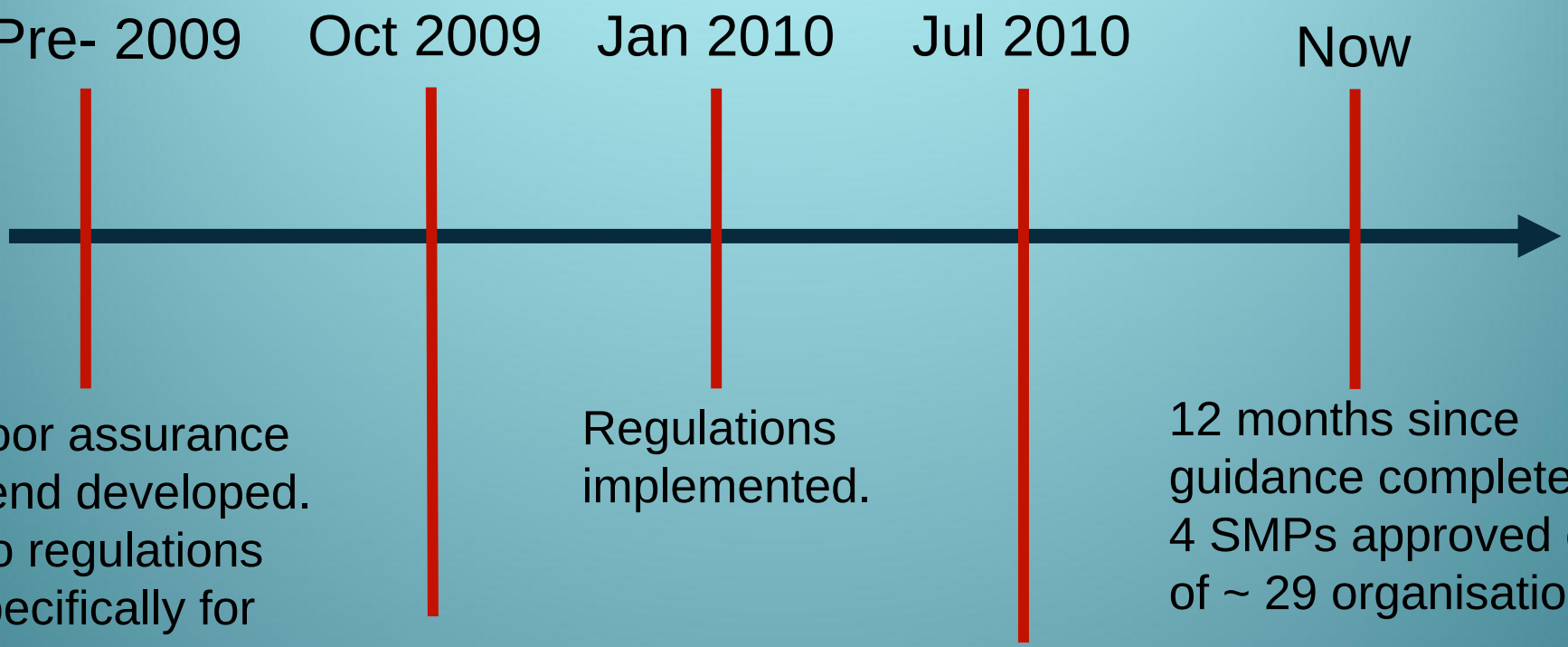
- SCI1 have created the ‘Aviation Software’ distribution list on the DRN.
- We will use it for:
  - advertising DGTA sponsored courses and this symposium, and
  - distributing newly published or updated guidance.
- By default, everyone attending with a @defence.gov.au email address will be added to the list. If you do not wish to be added to the list, please contact FLTLT Leon Burkamshaw.
- Can only add DRN users at this stage.
- You may use the distribution list to seek guidance.
  - Be aware of who is on the list!
  - Depending on how this goes, a public folder may be created (some day)
- We encourage use of the list! (acknowledging that SCI have not been active users to date…)

Background to the Theme of the Symposium: Why Regulate Aviation Software?

FLTLT Kristian Cruickshank

System Certification and Integrity (SCI)

Background


Pre- 2009
Oct 2009
Jan 2010
Jul 2010
Now
Poor assurance trend developed. No regulations specifically for software.
Regulations drafted. Notice of Proposed Rule Making released
Regulations implemented.
Additional guidance Developed in .054.
12 months since guidance completed. 4 SMPs approved out of ~ 29 organisations.

Why Regulate Aviation Software?

- **Why regulate software and not all other technologies?**
  - The TAMM provides a framework for certifying all aircraft technologies.
  - There is no need to make development of software so prescriptive.
  - Software can't hurt people!
- **Essentially – all the good software development techniques and activities that we (the regulator) would expect to be done were *increasingly* not getting done.**

Why Regulate Aviation Software?

- **Note that software is not entirely on it's own here.**
  - DGTA does explicitly regulate Aircraft Structural Integrity and Engine Structural Integrity.
  - System Safety is soon to be regulated.
- **Fortunately, the software regulations have not been written in blood like so many others.**
  - DGTA has noticed trends that could lead to blood written regulations, so rather than wait for it to happen we are getting ahead of the 8 ball.

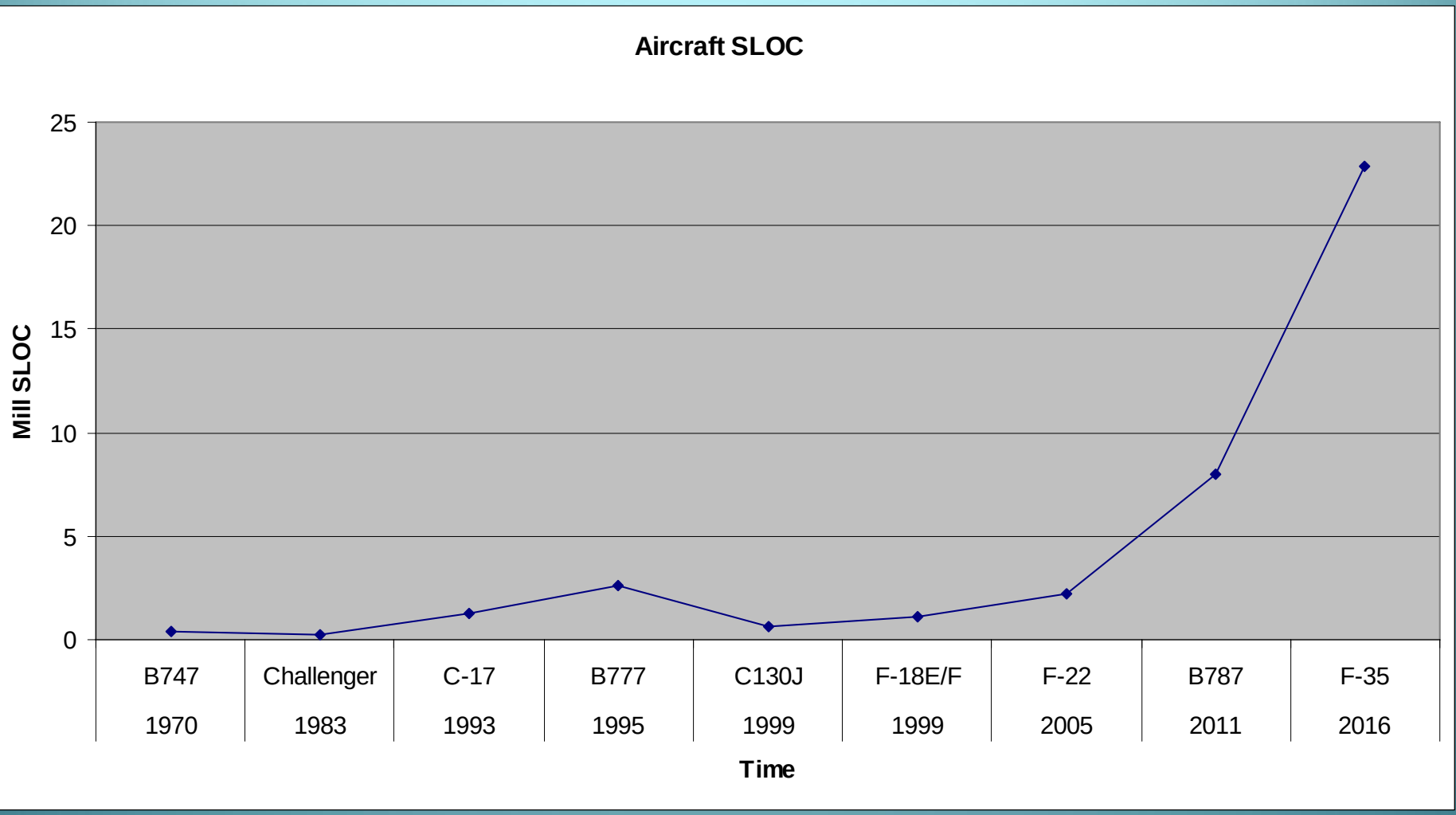
Emerging Trends

- **There has been an emerging trend in the management and acceptance of aviation software:**
  - Residual risks have been retained by the OAA because airworthiness requirements have not been properly imposed.
  - Software could not be *proven* to be of appropriate rigour (i.e. safe according to the benchmark set by either DGTA-ADF or other Airworthiness Authorities).
  - Software Load Control was also an issue – i.e. updates to software on hardware returned from repair facilities without the ADF conducting Design Acceptance.

Software Use in Safety-Related Applications

- **We hear it often – the use of software in aviation systems is becoming more prevalent with each generation of aircraft.**
  - Funnily enough – it is true!
  - As a result, where previously hardware interlocks were relied upon to make systems ‘safe’ we now rely on software to do the same job.
- **Example – C-130J-30 Electronic Circuit Breaker Unit.**
  - Circuit breakers are all software controlled where previously we would have relied solely on proven hardware in this role.

Software Use in Safety-Related Applications



More Reasons

- **Organisations applying regulations in a strict sense – i.e. what is the minimum I need to do to satisfy DGTA.**
- **Misunderstanding of how existing regulations apply to aviation software.**
  - We should all be aware that software cannot be treated the same way as other technologies (in most cases).
    - How much is enough testing, getting safety requirements correct, etc.
  - How do you conclude that requirements are met for software?
- **Lack of corporate knowledge on developing and assuring software.**

Outcomes

- **The end result – DGTA now regulates software through *explicit* regulations.**
  - TAREG 2.2.12 – Software Compliance Findings
    - Applicable to development of all aviation software.
  - TAREG 3.5.3 – Software Integrity Management Systems
    - Documented through an SMP.
- **Moving toward having every Authorised Engineering Organisation responsible for management of software having a TAR Approved SMP.**
- **Expect that development of all aviation software satisfy TAREG 2.2.12.**
- **Regulations assure that organisations have a greater awareness of the safety-related software they manage.**

Some Notes on the Regs

- **Intent is to make potential software shortfalls more obvious upfront.**
  - PSAC (or equivalent) and SCFP should make it obvious where the acquisition strategy does not align or satisfy the certification strategy.
- **Important to note that the regulations themselves will *not* ensure that software is safe.**
- **It is quite possible that even by satisfying the regulations software will not meet the benchmark.**
  - However – it is more likely that the ADF would be able to better treat any residual risk through a more definite understanding of the shortfall.
  - The regulations aim to increase the likelihood that a software-intensive aviation project will meet the benchmark.

Current Difficulties

- **We aren't the experts on what various AEOs are currently having trouble with in terms of compliance with the regulations.**
- **Some of the difficulties that we have encountered:**
  - Establishing a Software Safety Program
  - Compiling a Software List for legacy aircraft
  - SMP approval for AEOs that answer to multiple DARs (e.g. JEWOSU, GWB)
  - Over estimating the work required to fulfil the TAREGs
  - SPOs with a prime TLS contractor (an AEO) that assume they do not need an SMP

What Difficulties Is Your AEO Facing?

- **Encourage everyone involved with satisfying TAREG 3.5.3 and 2.2.12 to provide us some feedback.**
- **We will aim to have a quick read through your comments and try to provide some clarification throughout the day as time permits.**
- **If time does not allow us to answer some critical issues, we will aim to provide further clarification/guidance using the 'Aviation Software' email distribution list.**
- **Regardless – please contact us if you are unsure about any aspect of the regulations.**

2011 ADF Software Symposium

Presentation by DGTA

AIRCDRE Terry Saunder

Day Two Schedule

Time	Topic	Presenter
0830 – 0845	Symposium Administration	SCI-DGTA
0845 – 0945	Please note – Commonwealth Employees Only.	SQNLDR Derek Reinhardt (ALSPO)
0945 – 1015	Background to Theme, DGTA's Address	SCI-DGTA, DGTA
1015 – 1045	MORNING TEA	
1045 – 1115	Wedgetail In-Service Support SMP and 1st Year Lessons Learnt	FLTLT Scott Harvey, Mr Matt Sprakel (AEWCSPO, BDA)
1115 – 1200	Behaviour Trees	Mr Daniel Powell (Raytheon)
1200 – 1245	LUNCH	
1245 – 1315	Software Safety in TLS (ARH)	Mr Timothy Cervenjak (Australian Aerospace)
1315 – 1345	Functional Hazard Analysis: How and Why?	FLTLT Darryn Welham (RNZAF)
1345 – 1415	Performance evaluation of Airborne Mission Systems in the Acquisition Process	Mr Kiril Uzunov (DSTO)
1415 – 1445	AFTERNOON TEA	
1445 – 1515	Title TBD (Software Compliance Findings for F/A-18 Software Configuration Set)	SQNLDR Troy Hudson, FLGOFF Saarenpaa (HUG 2)
1515 – 1545	Title TBD (AA software development processes and satisfaction of TAREG 3.5.3)	DR Simon Rofe (Australian Aerospace)
1545 – 1615	Regulation of Mission Planning Systems and Aeronautical Data	SQNLDR Patrick Redmond (SCI-DGTA)
1615 – 1630	Wrap Up	SCI-DGTA


DILBERT, I WANT YOU TO DEVELOP A PROCEDURE FOR CREATING POLICIES.
DO WE HAVE A POLICY ON HOW TO DEVELOP PROCEDURES?
I THINK SOMEONE WROTE A WHITE PAPER ON THAT.
WHAT'S THE PROCEDURE FOR FINDING WHITE PAPERS?
MAYBE YOU COULD ASK AROUND.
LATER THAT NIGHT
SO, WHAT DO YOU DO?
I ASK AROUND TO SEE IF ANYONE KNOWS ABOUT A WHITE PAPER THAT TALKS ABOUT A POLICY FOR DEVELOPING PROCEDURES TO CREATE POLICIES.
YOU FIND THAT SEXY.
STOP DOING THE JEDI MIND TRICK!
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Questions?