

How New Test and Evaluation Policy is being used to De-risk Project Approvals through Preview T&E



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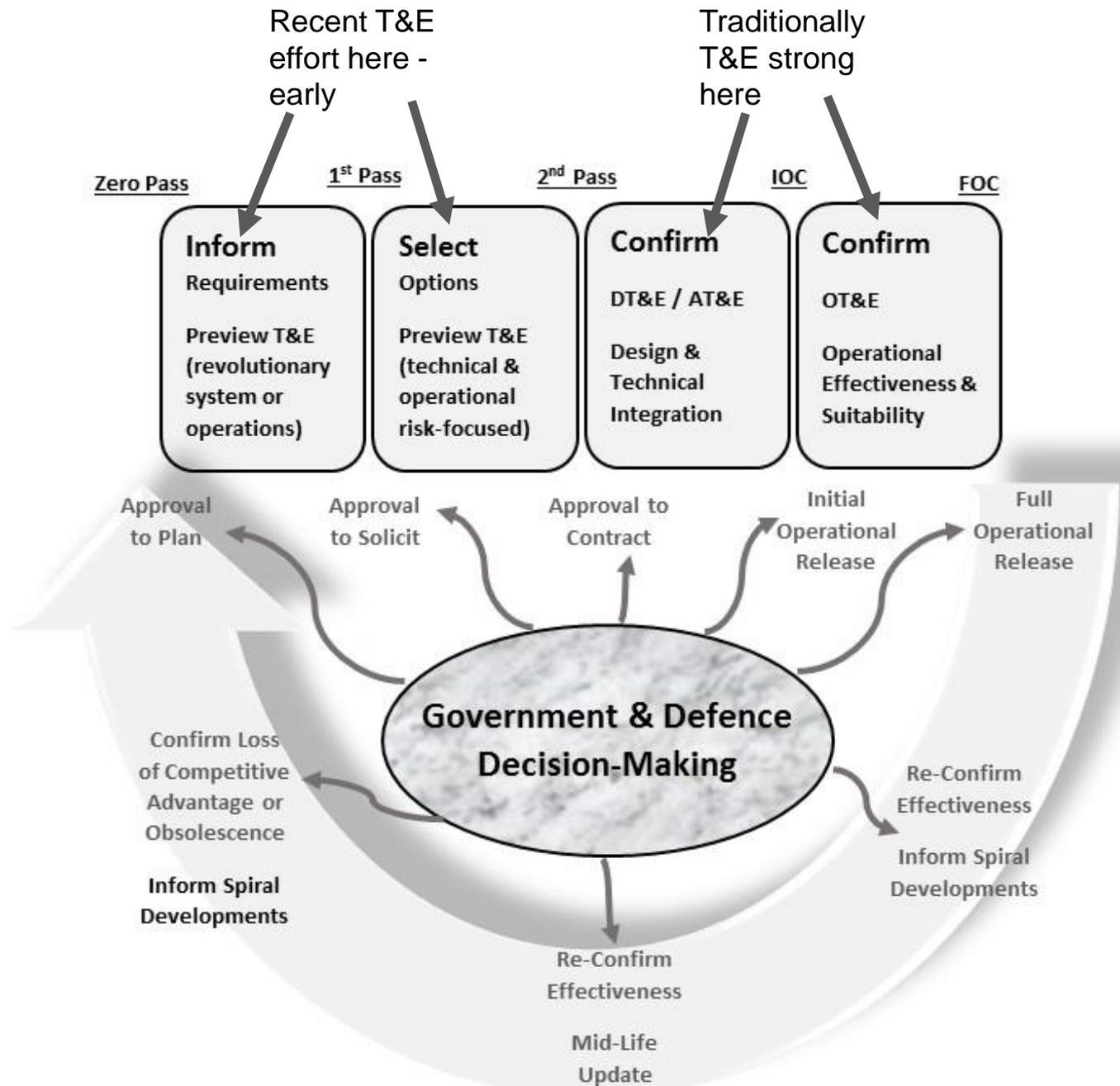
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Informing Capability Life-Cycle

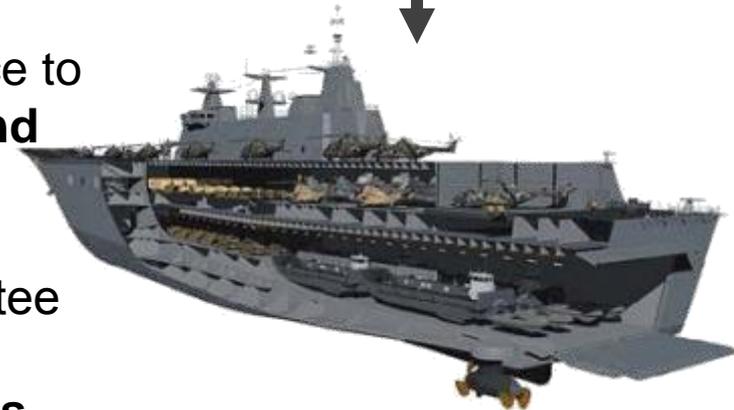


Australian Senate Inquiry 2012

- *“risk...inadequately described during the capability definition and planning phase... ”*
- *risk identified by domain or subject matter experts but downplayed, misinterpreted, or ignored by more senior non-experts...*
- *failure to appreciate the challenge of being a customer of a first-of-type program;*
- *under-estimation or understatement of the level of technical maturity with programs proceeding without the requisite level of knowledge – numerous examples where developmental projects were deemed incorrectly to be MOTS;....*
- *Under-estimation of complexity of integration;*
- *Inadequate specifications;...*
- *Poor understanding of overseas certification standards and Australia’s requirements;...*
- *Inadequate planning of testing and acceptance;...*
- *Inadequate testing of contractors’ claims with a “shallow” understanding of industry’s capacity to deliver”*

Chapter 12 finds:

“Witnesses have presented numerous cases whereby the expectation that a procurement activity is **OTS (off the shelf)** has led Defence to believe that a product is more mature or an outcome more predictable than experience (or an experienced review) would indicate. The **conspiracy of optimism**, referred to by a number of witnesses, appears to have led Defence to **undervalue the role that developmental test and evaluation can play in the early stages** of the acquisition cycle to identify and analyse risk in a quantifiable and defensible manner...The committee notes that this conspiracy of optimism may have tended to **crowd out or ignore dissenting voices** that could alert Defence to the true extent of capability, technology, integration and certification (hence cost and schedule) risk represented by a proposed project”



Impact on Australian T&E Policy

Summary:

- Poor compliance with Defence T&E policy in general, but particularly during acquisition
- Failure to do the required T&E planning
- Insufficient consultation during T&E planning
- Insufficient early T&E to inform decision makers early enough to influence key decisions

Defence agreed to following on pre-view T&E (recommendation 25):

“T&E policy to make it mandatory at first pass [approval to solicit] to formally scope a preview T&E by a T&E agency before materiel contract, even if Military Off The Shelf (MOTS) equipment has been proposed, and offer that as a costed option in every Government capability submission”

Preview T&E: How does the term fit in T&E ontology?

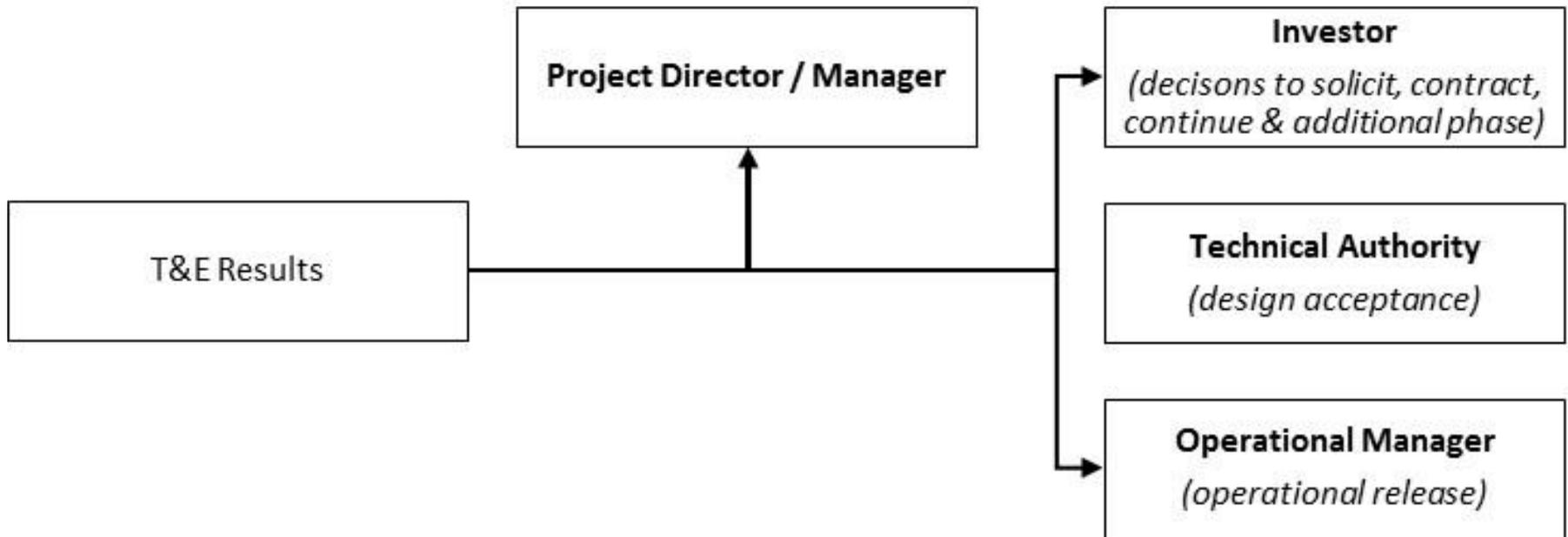
Term arose from questioning by Senator Fawcett (Hansard, 13 June 2012) to clarify early 'try-before-buy' T&E from other later T&E that has more contractual depth, is more comprehensive & is usually focused on engineering acceptance & then operational release.

The online Oxford dictionary (2015) defines preview as:

'An opportunity to view something before it is acquired or becomes generally available ... A publicity article or review of a forthcoming film, book, etc., based on an advance viewing... See or inspect (something) before it is used or becomes generally available'

Popular use of the term concerning films is important because it captures that a **critic** will experience the item in advance of it being acquired or made available. Therefore the term now implies **independence** or even **contestability**, & **operational exposure** by a **representative user** – elements brought out in the new T&E policy.

Independence in T&E



How does the term fit in T&E ontology?

U.S. Theory Developmental T&E	ADF Focus of Preview T&E
<p>U.S. definitions 3 assumptions:</p> <ul style="list-style-type: none"> - system contractor to work with, - sufficient Government resources to check contractor's T&E, & - a system to be developed <p>US also increasingly contractor-led T&E</p>	<ul style="list-style-type: none"> - Developmental is reluctant term for OTS - Most ADF submissions involve OTS or major mature elements - Proportion increasing & giving schedule benefits - ADF has term acceptance T&E to cover V&V - AT&E increasingly contractor-led
Expertise largely contractor	Customer focused, led & independent
Complex contract required	Pre-contractual Tender or Offer Definition Activity
Looks for design improvements to iterate	Selective – determine <i>if it is even worthwhile to proceed</i> (i.e. leaves out the how)
Follows strict checklists, very complete	Risk-focused, challenging, usually incomplete by normal acceptance T&E standards

Preview T&E is ontologically proposed “***as that developmental T&E conducted to evaluate the feasibility & performances of alternative capability options & identify risk areas prior to a final decision to acquire.***”

Test Concept Document – First Pass

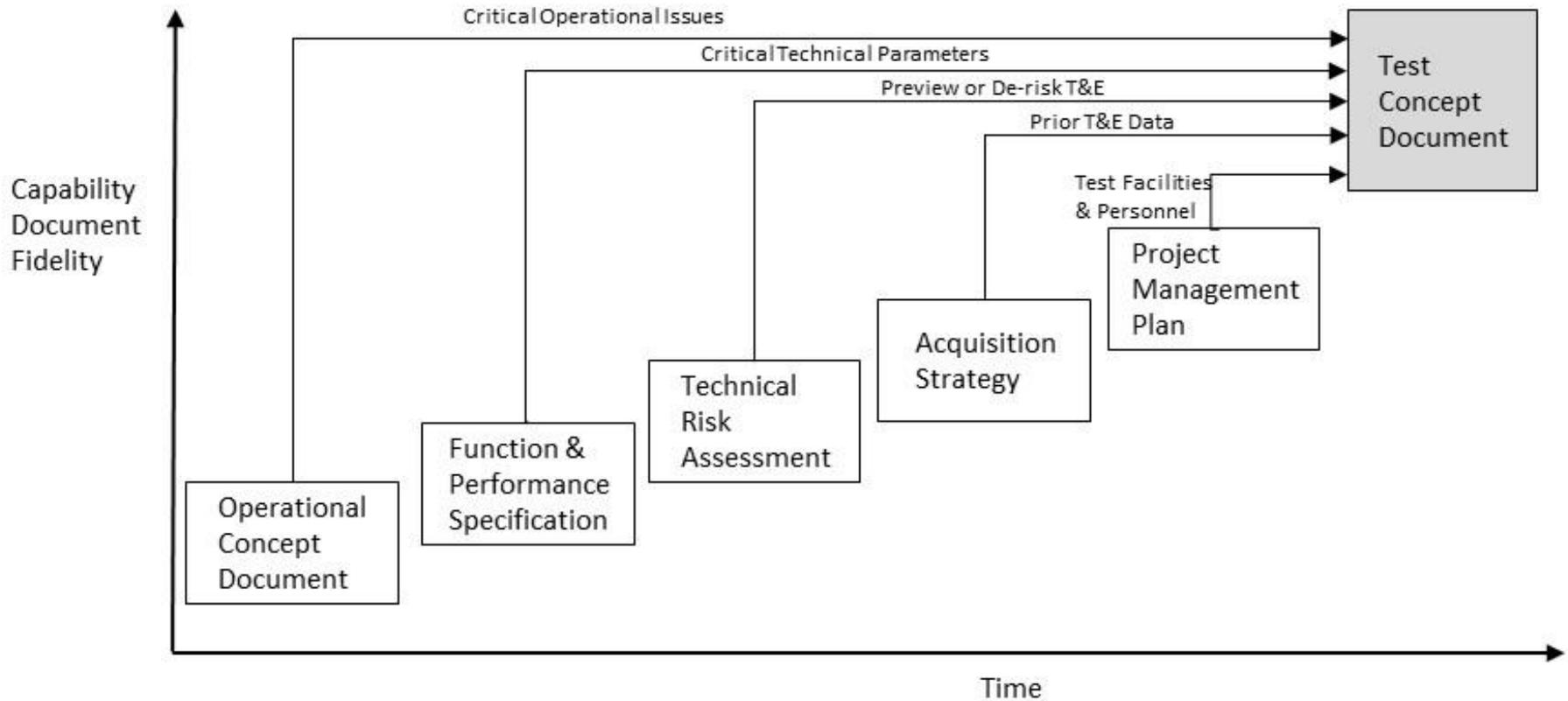
U.S. Equivalent is TEMP Milestone A at approval to solicit

TCD Status: OCD, FPS and TCD are the core System Engineering documents that define the capability support, the rest our how you will project manage

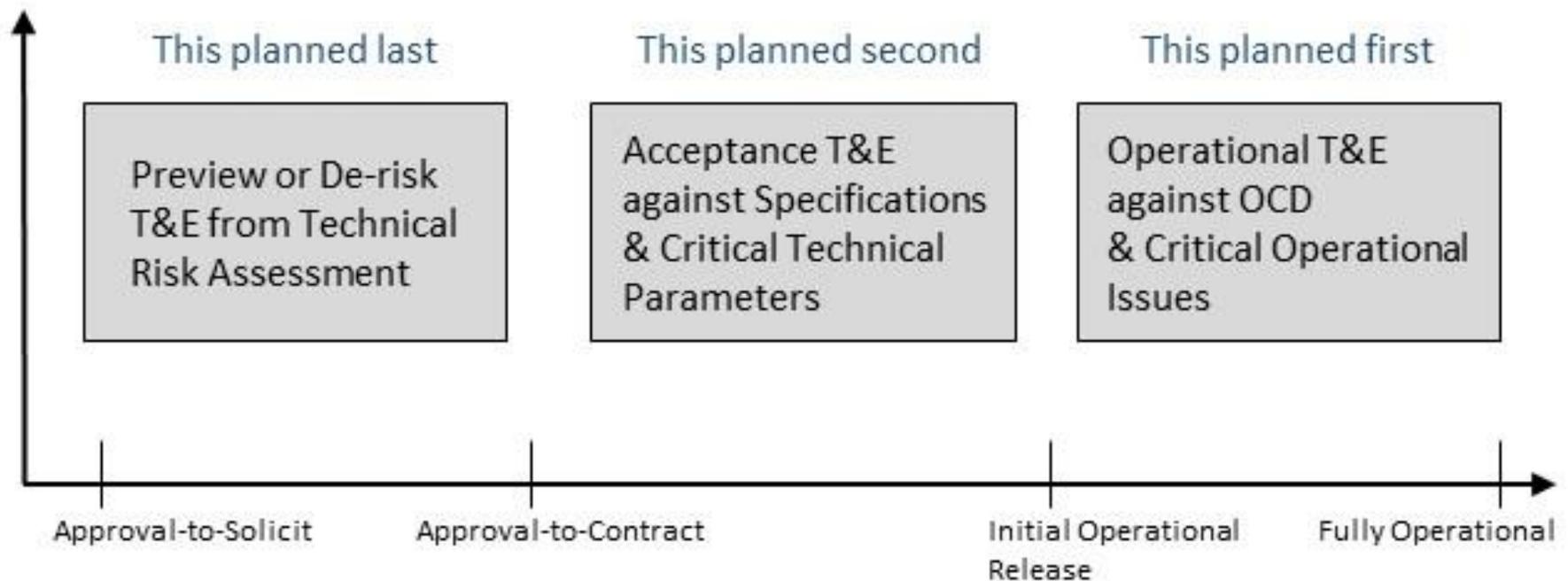
TCD Purpose: to inform how capability will undergo real testing to confirm the materiel designs are fit for purpose and all the fundamental inputs to the capability have been established so the applicable Service(s) can accept the capability into safe and effective operational service.

Caveat: before solicitation, lack access to industry & maybe foreign governments to establish detailed T&E plans = concept

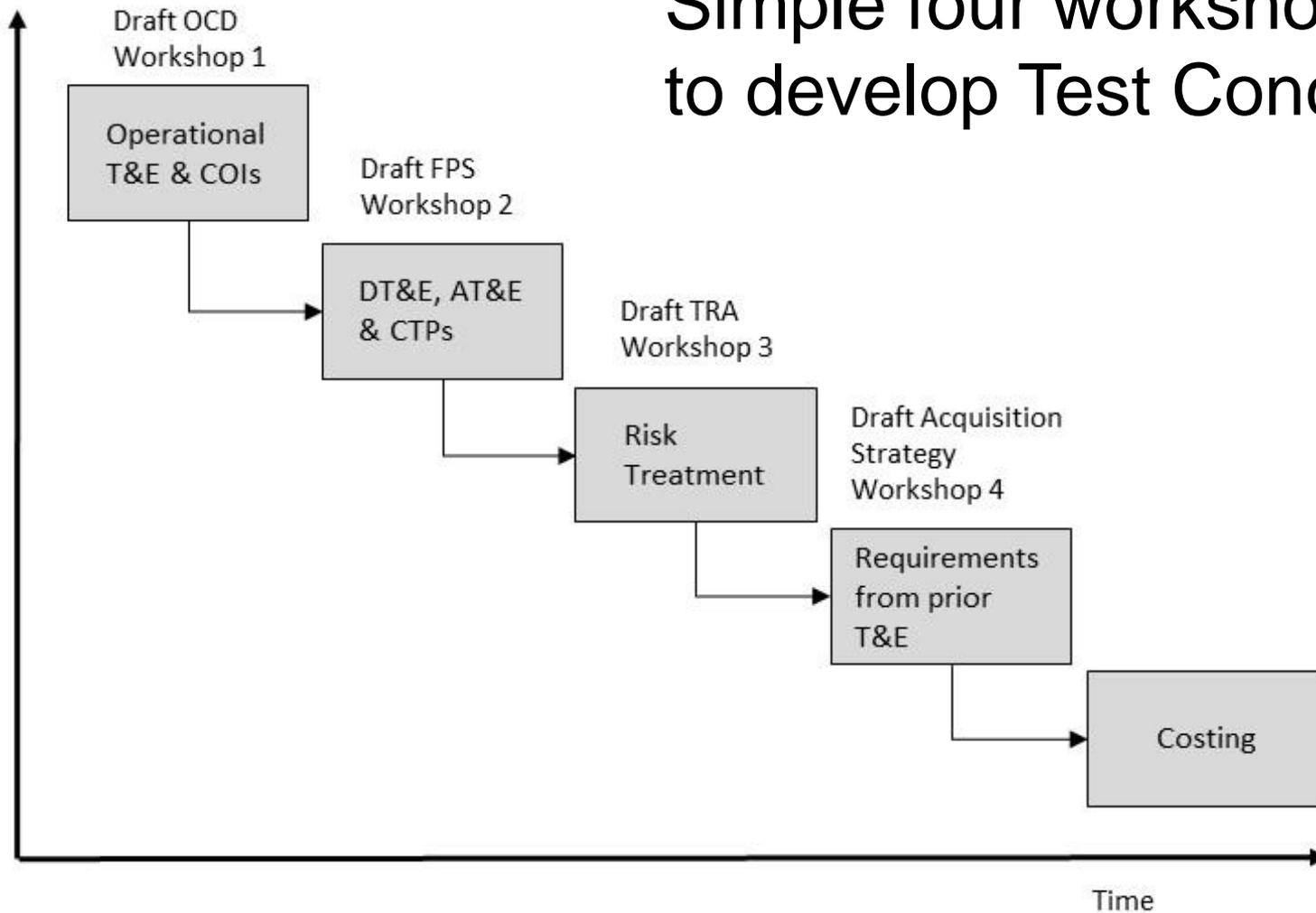
Evolving a Test Concept



Planning order versus when the T&E will occur



Simple four workshops to develop Test Concept



Workshop 3 – Risk Treatment from the TRA

Entry Criteria: - draft technical risk assessment (TRA) & operational risks (workshop 1)

Attending: scientific staff performing the TRA, all affected Service T&E agencies, project proposal IPT

Issues: Review each likely technical & operational risk assessed medium or high & confirm with T&E agencies experiences

For each high risk or medium & linked to a COI or CTP, the workshop considers what preview or de-risk T&E could be undertaken as part of the solicitation phase to treat

Must avoid simply starting DT&E or AT&E checklists normally used after approval-to-contract as these will not be targeted & wasteful

All preview T&E proposed must be overseen by a T&E agency, funded from First Pass, be integral to the solicitation process for probity & access, & include at least a simplified FCA/PCA process so results are traced

Decide if necessary to do in Australia & if operate by ADF or just have demonstrated

Outcome: Preview T&E plan

Preview T&E Planning Examples

Submarine:

- Risk in signature assessment capability – purchase test equipment & practice assessments with extant submarine
- Risk in anthropometric differences – measure sailor force IOT BPT do HF assessments in CAD or LBTS which can now be mostly virtual
- Collins Submarine did too much T&E in actual submarine & has almost no legacy LBTS to spirally develop systems – develop or access multiple LBTS (power, combat, sonar, C4ISR, IPMS) to prove as much of the submarine before first-of-class build

Land Fighting Vehicle:

- Testing for survivability to IEDs has been variable between manufacturers & countries especially to soil preparation – conduct consistent blast tests to confirm claims
- Power, space, weight & EMC may not allow Australian BGC3 & CIED equipment fits – demonstrate integration
- Vehicles unlikely to be trialed in hot-wet climates or anthropometrically fit Australian crew – limited user trials in hot-wet training area

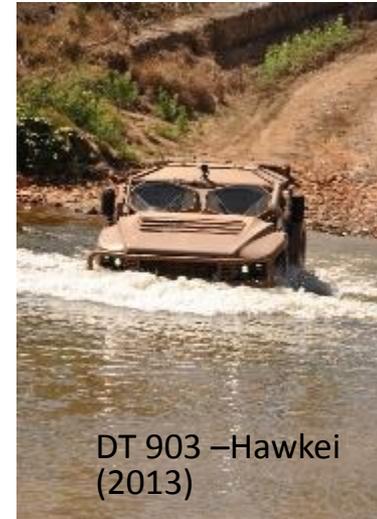


Large Maritime UAV:

- Risk radar may not be effective against small maritime targets in littoral clutter in hot-wet environment
 - Embed Australian radar specialist in radar final development
 - invite OT opportunity in Australian area of interest
- Risk remote piloting may not be effective in Australian SATCOM infrastructure or in direct support of Australian major fleet units
 - Embed Australian communications specialist in final development
 - Invite OT opportunity in Australian area of interest
- Risk of capability gap of several years if Australia waits for U.S. Milestone C prior to placing production orders
 - Earlier insight through cooperative T&E program (i.e. embedded T&E personnel)
 - Potential joint operational squadron to cover areas of interest through early test crews and test aircraft

Examples of preview T&E

- Confirm manufacturer claims of performance
- Understand different manufacturer's design philosophies
- Quantify capability differences between tendered options



DT890 AIR 5408
MICRO-DAGR
(2012)

DT 908 – LAND
125 Ph3B SCE-
LCE (2013)



What if we fail to conduct: Could this be a good outcome?

Risks to conducting preview T&E include:

- (1) that the prototype is not released to foreign countries & would only be released if a commitment to buy is received,
- (2) the system is no longer in production or the precise configuration we tendered is not available,
- (3) Foreign government access approvals are required.
- (4) Delivery to, & contractual support in Australia are problematic

Respectfully, such impediments to preview T&E are risks in the project that need to be overcome anyway before seeking Government approval to contract.

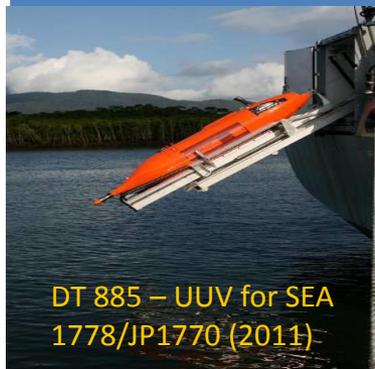
Example: The lightweight torpedo project undertook at selection to do a preview trial (ANAO, 2010, p. 110, para. 4.5). Had this occurred in 2001 it is highly likely the misunderstanding concerning the developmental nature of the torpedo would have been disclosed to Government much sooner than it was in 2005, & importantly, before contractual commitment to ship integration, aircraft integration & warstocks (ANAO, 2013). Despite extensive auditing, the reasons that the in-water trial did not proceed are unknown.



Even Earlier Preview T&E: Requirements Phase

Done when operationally revolutionary for ADF & it is difficult to be confident of requirements

Trial Description	Indicative Findings or Objectives
<p>Exemplar UUV trialled in rapid environmental assessment & mine countermeasures roles to develop requirements for three maritime projects. The trial operated with a temporary fit to a Naval vessel in turbid tropical waters. A follow-on trial with an ally is examine their solutions to the risks seen.</p>	<ul style="list-style-type: none">• Multiple numbers & types of UUV necessary to perform the tasks beyond horizon.• Accuracy proportional to surfacing frequency & needs improving for revisit tasks• Very high rate of data generation by UUV.• Post-processing of data time consuming necessitating some real-time datalink & real-time re-task.• Australian turbidity & marine-life noise are significant



Trial Description

Exemplar light protected vehicle prototypes trialled for the necessary mobility & survivability to be a landrover replacement in a high-IED threat environment



Indicative Findings or Objectives

- All prototypes had features that improved the requirements in areas like visibility, safety, mobility, carrying capacity, reliability & maintainability.
- Requirement to under-sling a helicopter is fundamentally challenging, causing design compromises to save space & weight.
- All prototypes needed more attention to human factors in their design.

No military has an expeditionary e-Health system deployed, so proposed a developmental demonstration version.



- Determine the value-for-money proposition of delivery of electronic health records in a number of expeditionary treatment conditions with representative health users.

Trial Description

Two trials captured anthropometric profiles of Australian soldiers & sailors to prepare for human factor assessments of candidate combat vehicles, ships & submarines.

Indicative Findings or Objectives

- Australian anthropometric profiles differ from other countries.
- Army profiles differ from general population
- Special forces profiles differ as a subset from Army
- Army profiles have undergone generational change from data of previous decades
- Sailor results are not yet available
- Has substantially assisted uniform & other close-equipment designs & purchases



Conclusions

- Senate Inquiry found numerous complex projects where unrealised technical complexity lead to substantial acquisition difficulties that could have been mitigated with better T&E planning, policy & compliance.
- Government agreed to improve T&E, including mandatory provision of options for preview T&E in all capability submissions, even if the acquisition is off-the-shelf.
- New T&E policy provides a structured process to plan, conduct & assess preview T&E designed to capture & mitigate high operational & technical risks
- Aims to take preview T&E from what was largely an undocumented process involving best practice of some projects to a compulsory & comprehensive process for all.
- The process of planning & conducting preview T&E has been applied in capability submissions for two years, including use in some legacy submissions.
- Term preview T&E should be defined *as that developmental T&E conducted to evaluate the feasibility & performances of alternative capability options & identify risk areas prior to a final decision to acquire.*
- Preview T&E is usually applied during the solicitation phase through offer definition activities, however in some operationally revolutionary capabilities it should, & has been, used in the requirements phase using exemplar systems.