



QT Canberra | Australia

29 April – 1 May 2019

SYSTEMS ENGINEERING TEST AND
EVALUATION CONFERENCE 2019



SYSTEMS SCIENCE & ENGINEERING FOR A BETTER AUSTRALIA SETE2019.COM.AU

Ratcatchers, Regulators, and Zealots – A Hitchhiker’s Guide to Cyber T&E

Simon Reay Atkinson PhD MPhil BSc CEng Eur Ing FEANI FEIT



QT CANBERRA | AUSTRALIA

29 APRIL – 1 MAY 2019

Authors

- Assoc Prof Simon Reay Atkinson (USYD, RAN)
- Stuart Fowler
- Assoc Prof Jean Bogais (USYD, USBS)
- Dr Keith Joiner (UNSW, Canberra)



QT CANBERRA | AUSTRALIA

29 APRIL – 1 MAY 2019

Except

-except.
 - Except when, as now, the system no longer works and the very zealous certainty necessary for managing the status quo is creating yet more instability. It is at these times of change when leadership is necessary to break the bandwidth-yolk imposed by conformity, through normification.
- A new set of maths is needed to deal with “radical uncertainty”.
- The problem is not capability, per se – but capacity.
 - That means a new “war-time thinking” approach that considers how we take in people from a broad range of the population – Sir Edwin Hardy Amies, the Queen’s dressmaker from her accession to the throne 1952 until his retirement in 1989, was also a member of Churchill’s WW2 Special Operations Executive – and educate and develop them to ‘be’ those thinking people humanity needs.
- It was no accident that GCHQ and Bletchley Park both began also as Code and Cypher Schools – and we need such Cyber Schools again, and the mentality that enables and thrives on the imperfection of the good and the many (the *populus vulgaris*) – and Robert Watson-Watts’ (1935) “Cult of the Imperfect”.



QT CANBERRA | AUSTRALIA

29 APRIL – 1 MAY 2019

On Ethics

Ethics deal with morals and the principles of morality pertaining to right and wrong conduct and being in accordance with the norms, rules or standards for right conduct or practice, such as the standards of a profession;

Morals are concerned with the principle of first doing no harm; then of right and wrong behaviour with regard to holding or manifesting higher values for proper conduct.

- The tension between morals and ethics is implicit within an understanding of Command and Control; Leadership and Management; their application and the maintaining of trusts and values throughout an organisation life cycle.
- *Assurances* are vested in higher values:
 - ‘rule-driven strategies (for example certification, alone) give the enemy the opportunity to harness and so fix one’s own tactics to their advantage. They confuse strategy and tactics, with strategic objectives and lead one to define one’s enemies in terms of their tactics and capabilities rather than their strategy’.



QT CANBERRA | AUSTRALIA

29 APRIL – 1 MAY 2019

Assurance & Accreditation

Assurance & Accreditation Stage	Description
Certification (Static – rules-based)	Certification by an accredited organisation, or equivalent certification body, in relation to cyber. The end result of a process which provides the formal acknowledgement that a capability conforms to a specialised standard at different threat levels and may be given: Interim Authority to Test (IATT); Authority to Connect (ATC); and Interim Approval to Operate (IATO)
Accreditation & Certification (Moving towards the Dynamic)	Formal recognition by an Authorised body that an organisation has demonstrated competence to carry out certain duties and tasks and that a system can be authorised to operate in a defined configuration recognising, approving and accepting the associated residual security risk with its operation in a specified role and a particular cyber threat environment, for example a capability or system may be granted IATT, ATC, or IATO.
Assurance & Accreditation (Dynamic)	<p>Assurance looks to provide confidence that the specialised standards applied during certification were both appropriate to the target system and accurately assessed. Cyber Test & Evaluation provides the Accrediting Authority with assurance that platforms, systems, and networks are capable of operating securely at different cyber security threat levels.</p> <p>Accreditation means that an Authoritative Body has given formal recognition, approval and acceptance of the associated residual security risk with the operation of a system in its intended cyberspace environment, meaning:</p> <p style="padding-left: 40px;">Accrediting bodies granting ATO and FOC caveated upon meeting specified standards giving Approval to Connect and to Operate Securely at different cyber threat levels.</p>



QT CANBERRA | AUSTRALIA

29 APRIL – 1 MAY 2019

A Critical Juncture

- There are also questions to do with cyber and its application, not simply in Defence, specifically in the region of new and emerging sciences and technologies that offer the potential of ‘completely removing humanity from the loop’.
- The separation of the human from the artefactual, the arte from the fact (through, for example, AI – (see Klemas & Chan, 2018), marks a fundamental critical juncture of this new age with all other scientific ages and human generations that have come before.
- There will inevitably come a time when the Knowledge that was previously sovereign to humanity may also be non-human and non-natural (as in nanotechnology); vested in some form of AI.

Arte may be considered as a form of social knowledge that is a product of the abstract, the conceptual and the arts, and to be a form of nonverbal communication depending on internal form and visualisation rather than pictorial representation.



SETE



ENGINEERS
AUSTRALIA



SESA



INCOSE

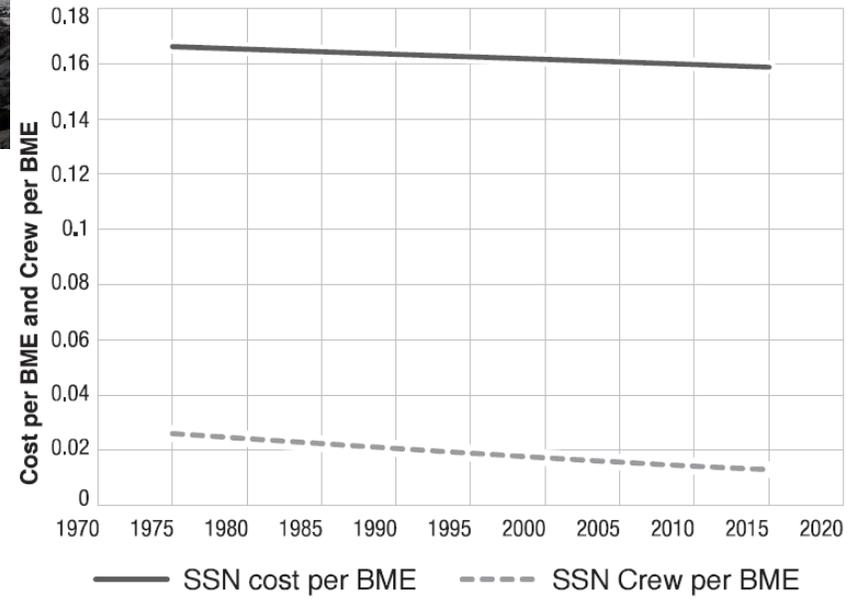
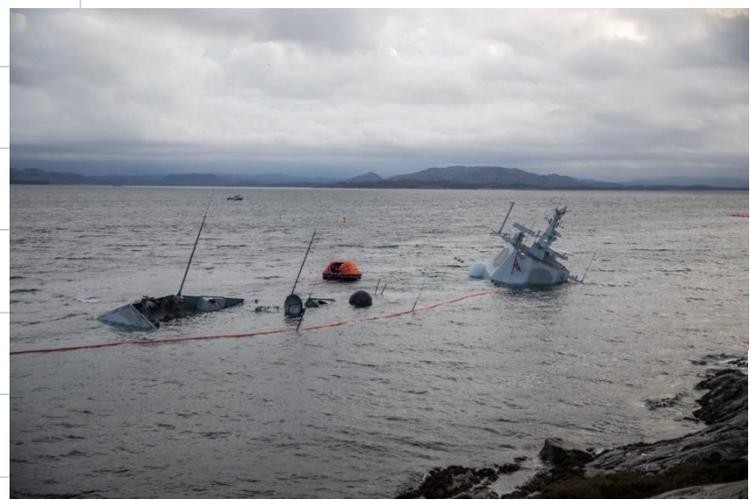
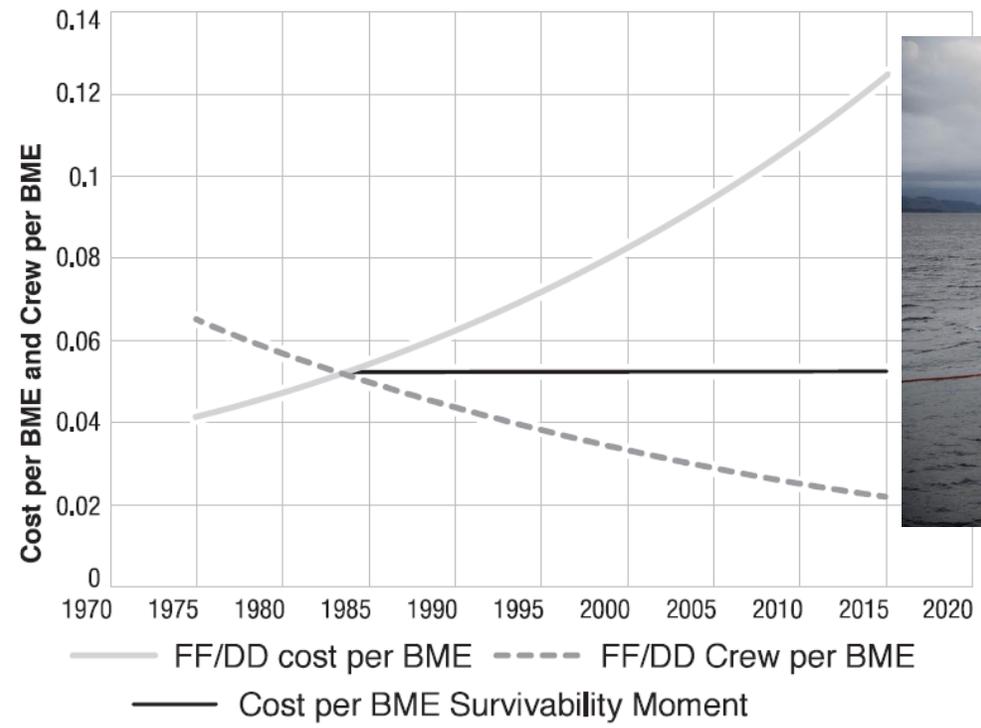


SOUTHERN CROSS
ITER
CHAPTER

QT CANBERRA | AUSTRALIA

29 APRIL – 1 MAY 2019

A Maritime Juncture?



Blake, R. C. (2019). The Emergence of Zombie Fleets (And BMW Builds Minis in Oxford). *The NAVY Magazine of the Navy League of Australia*, Vol. 81, No. 2, Apr-Jun, pp. 13-18.



QT CANBERRA | AUSTRALIA

29 APRIL – 1 MAY 2019

A Hitchhikers Fit?

Blue Team Lead (responsible for Assuring and bringing together the Accreditation, Certification and Testing teams):

Arthur Dent: Humble, with an omega-autocratic (as opposed to alpha-regulatory) style of leadership, through *falsification* he looks to find the humour in any situation. Resilient, he keeps on bouncing back, overcoming adversity, and fighting on as hard as he can.

Green Team Lead (responsible for Certification): *Zaphod Beeblebrox* a hedonistic, multi-headed (brained), eternal gap-year thrill-seeker, clever, imaginative, control-order narcissist – almost to the point of zealousness and obsessive solipsism applies over-compartmentalisation and control of his mind at the unit/tactical level.

Red Team Lead (responsible for scenario and Table Top development): *Trillian* a strategic analyst, mathematician and astrophysicist developed the ‘Guide Books for the AI (synthetic) universe’ and saves the Krikketers. a Sub-Etha scholar-practitioner – a specialist in interstellar faster-than-light, superluminal, hyper-subliminal, networked telecommunications systems, used by hitchhikers to flag down passing spaceships – under the handle, *Trillian [ad] Astra*.

Assessors (for example individuals licensed under the Information Security Registered Assessors Program (IRAP)): *Ford Prefect*, an existentialist who takes an independent, broad, sometimes nihilistic view of the universe.. In *Hitchhikers*, he acts as a guide to the universe.

Testers (including Ethical Hackers/Penetration Testers): *Marvin* [the Paranoid Android] a depressive stoic consumed more by doubt, than paranoia and a need to think, test, analyse – with a perfectly rational feeling that all his companions want him to do is “open the door”.



QT CANBERRA | AUSTRALIA

29 APRIL – 1 MAY 2019

A Paradox

The paradox appears two fold.

1. The first is in recruiting, identifying, educating and developing the skill sets required for effective Assurance & Accreditation Teams (described in our Hitchhikers analogy by two Aliens; an Android; a man and a woman!);
2. secondly, in *fitting* these teams into normative managerialist structures, controlled and scripted by various Performance Management regimes – such as Lean / 6 Sigma, project management, systems engineering etc. – into which these Teams simply may not *fit*, be accepted or be subordinate to the extant tensions between them (i.e., Bradley et al., 2019: submitted & Gray et al., 2017).

Professionalization (for all its goods) has inevitably led to *normification* – which, in turn, has created closed-shops, restricting entry to all but increasingly narrow, qualified-elites.

Variety, in terms of thinking and behaving differently to prescribed norms, has potentially become *proscribable* – today it may be perfectly permissible to proscribe against those who think differently, and who disrupt the norms.



QT CANBERRA | AUSTRALIA

29 APRIL – 1 MAY 2019

Hope in Adversity

- Assurance & Accreditation (Cyber) capability skill-sets exist and can be brought forward; educated and developed.
- Our argument – running throughout this paper – is that our institutions need to be “broad churches”, open to a variety of different thinking and thinkers if we are to answer the critical questions currently and forever facing humanity.
- This is not confined to Cyber, but we would be wrong not to acknowledge that we are creating, or on the cusp of creating a new existence within Cyber, and potentially new ‘AI beings’ to live alongside humans, in these synthetic ecologies.
- Similarly, we do not believe in an “ultimate answer”.
 - We argue, instead, that at key moments in our existence humans have created the institutions and organisations to engender and enable such thinking, and thinkers – such as Bletchley Park, which stands as a talismanic beacon of hope in adversity to this very day.



QT CANBERRA | AUSTRALIA

29 APRIL – 1 MAY 2019

Interesting Times

- Finally, while we do not necessarily suggest that humanity should not be involved in calculating the “Answer to the Ultimate Question of Life, the Universe, and Everything” – which may be 42, or 54, or possibly both – we do believe that the liberal democracies provide the best models to enable humanity to answer these questions, and to “live long and prosper”.
- May you live in interesting times.

Old English curse, although often ascribed to the Chinese – as Descartes might say ‘he was blessed by the interesting times of hardship, and cursed by the stability of normal times’. Perhaps it is actually a blessing from the perfidious English?



QT CANBERRA | AUSTRALIA
29 APRIL – 1 MAY 2019



In Future Memory?



except. Except when, as now, the system no longer works and the very zealous certainty necessary for managing the status quo is creating yet more instability. It is at these times of change when leadership is necessary to break the bandwidth-yolk imposed by conformity, through normification. A new set of maths is needed to deal with “radical uncertainty”.

Authors

- Simon Reay Atkinson
- Stuart Fowler
- Assoc Prof Jean Bogais (USYD, USBS)
- Dr Keith Joiner (UNSW, Canberra)