International Symposium on Military Operational Research 2018
The Big Debate

These notes are intended as a record of the comments and findings from the Big Debate held on Thursday 19th July 2018. The Big Debate was an activity to stimulate thought and discussion on the future of Operational Research. It took the form of four separate teams from the conference attendees, two of which focussed on a utopian future where data analysis and reason are at the heart of defence decision making. The other two focussed on a dystopian future where truth is subjective, decision making inconsistent and OR is not valued. The teams were all asked to consider the characteristics of the future state, consider the path by which that state was approached and how the community might steer the future towards the utopian alternative.

Utopia
Team Gold

Team participants were struck by commonality of challenges in each of their areas – similar experiences resonated for a number of countries.

The Future State

Decision makers understand OR, formulate good questions and rely on the output.

Collaborative working relationships abound – between customers, suppliers, international peers. Connectivity between different organisations and within organisations is excellent.

There is a common understanding of the knowledge and skills required and used in OR.

There is proper funding. Organisations are sustainable, resilient, high performing and able to respond to changing demands.

There is better simulation.

Perfect data is available.

OR informs all levels and roles in defence – including operations, acquisition and planning etc – from tactical to strategic.

OR outputs have an impact – they make a tangible difference to the end user.

How did we get there?

Investment in data capture and accessible storage.

Education of decision makers in the value of OR. Address short-termism.

Links nurtured between OR groups, academia and industry.

Break down silos within organisations.

Promote innovation in order to produce new approaches. Allow for the possibility of failure.

Public relations campaign to enhance the reputation of OR – by showing what it can do.

Cross-disciplinary teams.

Actions required now to help <u>achieve</u> the utopian end state

Specify requirements for data capture, storage and access.

Make the case for investing in good data.

Allow failure in order to promote innovative ideas.

Encourage collaboration by finding ways to partner – instead of traditional customer/supplier.

Invest in data science/machine learning/artificial intelligence.

Team Green

Team Green chose between 3 potential Future utopias:

1. The Analyst is a tablet (analyst replaced by a computer) – this was rejected due to human interaction and problem structuring risks.

2. The Officer is the analyst – this was rejected due to risk of absolute power in one role, and it would be two jobs in one.

3. The Analyst is a respected part of the team – this was the future Team Green focused on.

The Future State

There is a universal appreciation of OR. It is fully integrated into military decision making (e.g. in J3(Ops), procurement).

There are rich, available, secure data sets ("big data").

Models can be created automatically.

We understand non-kinetic operations.

How did we get there?

Publicising OR widely in order to develop a strong brand. Provide high quality OR education and training – including awareness training for military officers (part of career requirements for the military?).

Active OR career management.

Ride the Big Data wave – invest in tools to utilise.

Actions required now to help <u>achieve</u> the utopian end state

Officer selection that is OR friendly.

Define ideal OA skills set.

Mandate data gathering.

Identify unique OA needs and data requirements.

Open architectures for modes – so there would be no obsolescence.

More radical thoughts?
- Don't put too much effort into process/design
- Distributed but communicating OA community
- "Burke and Hare bot" – harvesting and resurrecting old models
- "Gaming in the Big Brother house" – scripted game to stimulate public awareness (help move towards a more evidence based society).
- Broaden OR community eg involve politicians.

However, it would be easy to push over from Utopia to Dystopia – especially through the excessive use of AI.

Discussion of the Utopian groups' outputs: questions & comments

There was a widespread perception that we are not engaging with senior leadership. A lot of OR just reports into staff officers. This situation might be improved by better awareness of value of OR amongst decision makers. Should there be a 3* champion for OR? Therefore allowing automatic access to senior commanders.

The point was made that when there is greater distress amongst senior decision makers they often request more support – the fact they are not implies they think they are in a settled, understood situation. However, they might not be aware of the degree or levels of problem that they really face.

The idea of a catastrophic success was discussed. It was suggested that it had already occurred in some organisations: where OR was recognised as very valuable and had thus been institutionalised – leading to a lack of direct access to decision makers. Other organisations are less integrated and OR offers advice 'across the boundary' at higher levels.

AI is seen as a risk by some, especially the military, as decisions may be perceived to be taken away from them. AI seen as a risk - eg like 'Skynet' in Terminator.

Our response to AI should be to lift more OR activity to the architect/design level rather than remain at the 'grunt work' level where AI would likely have more impact and replace jobs. Focus on innovation and use.

OR needs suitable qualified people and there is a need for a common understanding of what that means.

There is the potential for OR to recognise and use (or account for) cognitive biases and constraints in decision makers. This would aim to understand the audience and their biases in order to ensure they trust and use. However, there is a risk here of the Dystopian outcome.

Could do better to understand decision makers' issues and realise why they are pushed to certain decisions.

Dystopia
Team 1

The Future State
Characterised by irrelevance: our work doesn't matter; no one cares; no-one takes any notice of the OR discipline at all.

How did we get there?
There are two obvious routes:

1. "We don't need experts anymore": The expert is not believed – so why should anyone ask any questions or take notice of the output?

2. "Ask the Oracle": Studies are no longer needed as answers can be just looked up. This could be due to reliance on all-encompassing AI which is used to generate analysis and answers. There is a danger that AI can correctly answer a subset of questions but is then used to answer others quite inappropriately.

Actions required now to <u>avoid</u> the dystopian end state
Don't build black boxes. Make sure that any model is understood, used on appropriate questions and used effectively.

Promote knowledge of OR amongst decision makers – including strengths and weaknesses.

Look towards and try and pre-empt potential future questions so OR is as prepared as possible.

Clarify and illustrate the OR discipline – what are OR's unique selling points compared to data sciences, Big Data etc?

Champion OR and what it can do. Establish senior ownership. Encourage secondments or other means of exposing OR to stakeholders.

Keep doing good stuff – then people will come back for more.

Team 2

The Future State
De-valuation of critical thinking – not seen as needed because of other interests.

Decision Based Evidence Making – and the use of OR to support this – decisions are pre-made, OR is part of the propaganda to sell them.

A world where the analyst is legally liable for errors, held to blame and scapegoated.

OR is descriptive not prescriptive.

How did we get there?
The community has broken down and diversity has been lost. Isolation of OR has undermined good quality analysis.

Group think and bias have become prevalent. Objectivity is no longer the goal.

Insufficient development of staff.

Poor management has thrived – leading to an organisation that is not able to recognise good analysis and skills. Management has lacked courage in the face of inappropriate client challenges and failed to provide top cover for analysts.

Actions required now to <u>avoid</u> the dystopian end state

Make sure interaction and interconnections can occur and are encouraged – e.g. ISMOR.

Encourage peer review (although harder in a classified domain).

Stress the importance of management trust and support to OR analysts.

Foster professional development.

Process needs to be kept secondary to the delivery of good, impactful analysis.

Facilitate access by OR to high level decision makers.

Discussion of the Utopian groups' outputs: questions & comments

We enjoy the challenge that the OR job provides – are we already in a form of utopia?

Competition between organisations is seen as a threat by some. However, it was suggested that competition drives innovation. There is a risk that a highly controlled, monolithic OR organisation will discourage innovation and drive out the free-thinking 'maverick'. We need a marketplace for ideas – an ecology of merit.

Risks for data gathering of using lowest common denominator – good quality data is essential – could there be some form of data standards defined?

Is there a role for OR to expose bad arguments and decisions before they are made? This would be best done in a way that resonates with customers and decisions makers. We need to get ahead of the questions – look at the trends in the problem space; shape thinking; start early and set the conditions for success. This would actually empower the decision makers more.

A different kind of dystopia is one where OR is in excellent health but has no impact – it is applied to unimportant questions or ignored.