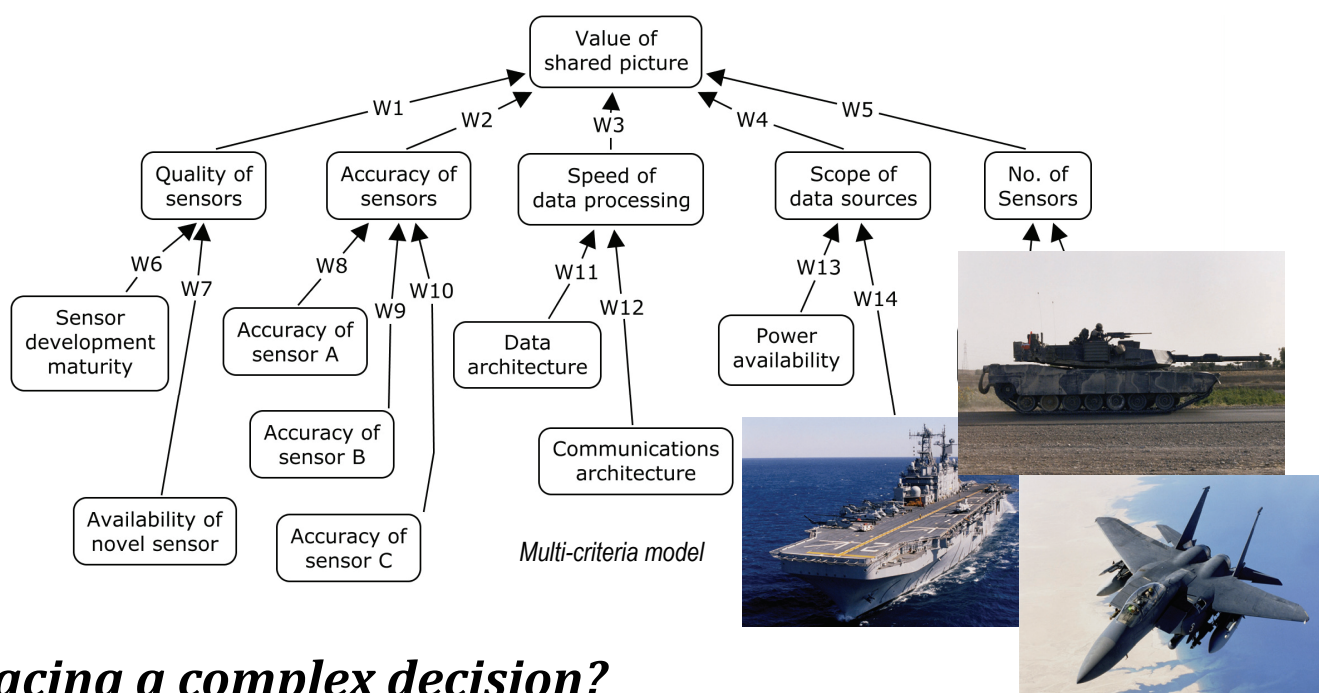


JUDGEMENT-BASED OPERATIONAL ANALYSIS FOR IMPROVED DEFENCE DECISIONS



Facing a complex decision?

Uncertain about the main issues and outcomes?

Conflicting interests preventing progress?

Operational Analysis (OA) is the discipline of applying analytical methods to help make better decisions. In the defence community, these methods can assist clients in finding options and ways to compare them, so that capability development or operational decisions may be made.

Judgement-based OA applies the methods of 'Soft Operational Research' developed in academia

WHAT IS JUDGEMENT-BASED OA?

Judgement-based OA is characterised by its methodical use of human expertise and predominantly non-mathematical models. It is used to inform decisions where the subject matter is incompletely known or understood, where many and possibly conflicting viewpoints are involved and there is, initially at least, no obvious single solution. Many real-world and military issues can be described in this way, particularly high level questions relating to **strategy, capability development and major acquisition**.

Supporting Defence Decision Makers

The defence environment is complex and dynamic. This is a result of the nature of modern conflict, rapid changes in technology, the need to deal with uncertainty in the face of limited resources, changed attitudes to risk, and the sheer diversity of actors from different cultural backgrounds. Defence decision makers are confronted with an increasing operational complexity which has strategic implications.

Decisions on defence policy and strategy are characterised by uncertainty and risk.

Planning, conducting and evaluating missions also include indirect and non-kinetic effects, dealing with other (non-military) actors, social effects on the local population, public sentiment and other human factors.

In addition, defence decision makers may be involved at any stage of the defence material cycle ranging from conceptual development, through to acquisition to use in conflict. Similarly, decisions need to be made in personnel-based activities such as career structures and training regimes.

All these decisions are made at strategic, operational or tactical levels. They may be aimed at the present or the far future, and may involve choices among tangible (materiel) and/or intangible (organisational structure, strategies) alternatives.

In OA, these types of issues are often characterised as “wicked problems” or “messes” in contrast to “puzzles” or “problems.” When dealing with them, many decisions will be made where judgement rather than known facts play a key role.

	Puzzle	Problem	Mess
Description	Well defined issue with a specific solution that can be worked out	Well defined issue, but with no single solution or approach	Complex issue which is not well defined
Formulation of the issues	Agreed objectives achieved through logical analysis	Agreeable after negotiation between clients and analysts and input by other interested parties	The lack of clarity and agreement of the issues themselves will make formulation <i>disputable</i>
Typical advice	Optimal solution	Preferred option based on ranking	Possible courses of action

Increasing opportunity for use of judgement-based OA

When to Use Judgement-Based OA

The strength of judgement-based OA lies in its ability to address complex or un-structured situations in which **what** needs to be done and **how** to do it are both unclear. Judgement-based OA also deals with the critical human aspects of a situation such as differences in stakeholder perspectives and agendas, organisational politics and disagreement on the way ahead. Judgement-based OA should be considered when a decision maker is faced with:

- ◆ Issues that are at an early stage of formulation → policy development
- ◆ Concepts being examined where there is a danger of going straight to a sub-optimal solution → replacing an old capability
- ◆ Completely new areas being examined → addressing newer forms of conflict, e.g. irregular warfare or newly identified risks or security threats
- ◆ Acquisition programs where there are competing aspects of capability → mobility versus lethality

Sometimes the use of a judgement-based OA is a necessity, as any attempt to treat such issues as something that can be logically addressed and mathematically solved will likely be flawed, and possibly lead to rejection or delay of a proposal.

The Value of Judgement-Based OA

Clients who use judgement-based OA can expect to benefit from:

- ◆ The ability to analyse, make progress on, and perhaps resolve, problematic situations that would otherwise remain intractable
- ◆ An improved and more widely shared understanding of issues and solutions
- ◆ An improved sense of common purpose and greater commitment to ways forward
- ◆ The discovery of alternative options for dealing with an issue
- ◆ The iterative development of acceptable ways forward
- ◆ The systematic gathering and analysis of relevant information and knowledge
- ◆ A better appreciation of different objectives, perspectives and values, and the ability to reconcile them

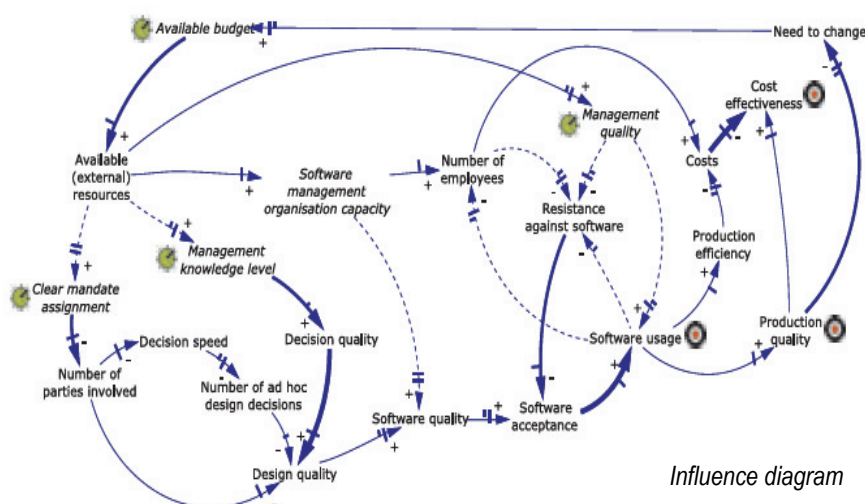
Workshops and facilitated model building, where stakeholders interactively develop and use models guided by the analyst, are tools often used in judgement-based OA. The development of conceptual models and visualisations through facilitated workshops allows participants:

- ◆ Greater freedom in articulating and addressing the essence of the issue
- ◆ To better understand viewpoints and belief systems of others
- ◆ To avoid (unconsciously) entrenched viewpoints
- ◆ Freedom to explore possibilities through an iterative and explorative approach
- ◆ The chance to find creative solutions



When a NATO nation was investigating new operational concepts for maritime mine counter measures, the study involved a 3-day workshop to help design and evaluate preliminary alternative options. It used expert opinion in addition to previously assembled information in an analysis where different methods were exploited to address different issues.

A technology-oriented description of the concepts was evaluated in a follow-on workshop: experts assessed different technology and its impacts on the operational concepts using multi-criteria analysis. The presence of technical and operational expertise as well as the relevant departments of the nation's navy proved to be crucial in developing the concepts through both workshops.



Clients of judgement-based analysis will need to support a study using it. There are a number of ways to do so: providing insights on the problematic situation; assisting the analyst in developing and evolving the study design; providing or helping to ensure access to appropriate experts, information, data, and documents; participating in and encouraging other stakeholders to contribute to the study; and taking ownership of the study and its results.



Qualitative frequency plot of concepts

Judgement-based OA may be used as part of a scoping study as it is a valuable way of providing an initial appreciation of the issues. As such, it may provide discrete milestones in the 'problem formulation' phase of a study. Agreement on an initial appreciation or shared common picture can help provoke an informed debate. The issue can then be worked upon further to provide insights to the client in the form of: option comparison; balance of investment and prioritisation or field testing requirements.

The three diagrams in this leaflet are examples of the types of method used in judgement-based OA. Their purpose can range from creating clarity and focus to enabling communication and debate. Such diagrams can be the basis for further analysis.

A NATO Guide for Judgement-Based OA: "Improving validity, credibility and acceptance"

Because of inherent uncertainty of the issues that the defence sector faces, procedures must be well documented to withstand intensive scrutiny. Where there is certainty, established procedure and verifiable mathematics, methods will be taken as a given and results will be treated on their merit. In judgement-based OA the danger is that the method rather than the results will be the subject of undue scrutiny.

In the absence of verifiable facts, it is proposed that a *due diligence* approach involving a Code of Best Practice (CoBP) should be adopted to ensure that the best possible advice is presented to decision-makers. The CoBP is the foundation volume in the NATO Guide. It will help to ensure sound procedure is followed and that there is an audit trail showing how relevant issues have been considered in a study.



Where Can I Find More Information?

The "NATO Guide for Judgement-based Operational Analysis in Defence Decision Making" is published in two volumes along with this brochure: a volume directed towards a potential client of judgement-based OA studies (these may include study sponsors, senior decision makers, end users and other stakeholders), and the full CoBP which is analyst-oriented, details the study methodology in more detail, and offers 'rules of the road' to analysts.

All parts of the "NATO Guide for Judgement-based Operational Analysis in Defence Decision Making" can be downloaded without charge at:

<http://www.rto.nato.int/abstracts.aspx>

The RTO promotes and conducts cooperative research and exchange of technical information amongst 28 NATO nations and 41 NATO partners.

This brochure was developed as part of the NATO Research and Technology Organisation, System Analysis and Studies Panel, Activity 087, Research Task Group 034.

Judgement-based operational analysis is a key, value-adding scientific activity that will support clients, ensuring decisions are made with less risk.