

Taking FATE on the Road

Gitanjali Adlakha-Hutcheon

Centre for Security Science
Defence Research & Development Canada
CANADA

Gitanjali.Adlakha-Hutcheon@forces.gc.ca

Jim Maltby

Defence Science Technology Laboratory
UNITED KINGDOM

jfmaltby@dstl.gov.uk

Antony Butts

Defence Science Technology Laboratory
UNITED KINGDOM

abutts@dstl.gov.uk

Silke Römer

Fraunhofer Institute for Technological Trend
Analysis INT
GERMANY

silke.roemer@int.fraunhofer.de

Robb Wilcox

US Army DEVCOM Soldier Center
UNITED STATES

robb.c.wilcox.civ@army.mil

Richard C. Arthur

Office of Naval Research, US Navy
UNITED STATES

richard.c.arthur.mil@us.navy.mil

Sebastian Wagner

Fraunhofer Institute for Technological Trend
Analysis INT
GERMANY

sebastian.wagner@int.fraunhofer.de

ABSTRACT

The SAS-123 Research Task Group developed a method called FATE or Futures Assessed alongside socio Technical Evolutions in October 2020. The FATE method enables both individuals and teams to conduct futures research systematically by a defined process to guide a better understanding of impacts on the wider socio-technical systems for diffusion and adoption of technologies. Furthermore, it examines the development of technologies, and their use in various future contexts for impacts on defence and security capabilities. The FATE method enables defence and security organizations to make more informed decisions about longer-term plans and strategies. The FATE method thus provides a common approach for use by multinational organizations like NATO, thereby facilitating understanding, collaboration, and interoperability, across member nations and partners in future planning.

The FATE method comprises four steps, each of which may be used as an independent standalone module. While the preferred method of delivery of the training sessions is in-person, the series is being offered through a combination of in-person and online means due to pandemic induced remote work arrangements. The value-added of a technical course on FATE lies in training participants on the FATE method with participatory examples illustrating the potential applications of the FATE process and in so doing enhancing the futures literacy across NATO and its stakeholders.

1.0 INTRODUCTION

1.1 What is FATE?

The Futures Assessed alongside socio-Technical Evolutions (FATE), is a foresight method within the domain of operations research and analysis (OR&A). It was the outcome of a NATO Systems Analysis and Studies (SAS) Research Task Group (RTG) 123 (SAS-123), see report at [1]. The objective of SAS-123 was to determine how to study the interactions between diverse futures and socio-technical evolutions concurrently, to help the NATO nations better consider the defence implications of technological developments. In particular, the task group aimed at (1) developing criteria to evaluate and analyse the interactions between the two variables (diverse futures and socio-technical systems) to determine their evolutions and (2) assessing the ability of these two variables to cause disruptions in defence and security. SAS-123's work was thus colloquially known as the 'FATE method' or 'FATE' and will be referred to as thus in this document.

2.0 WHAT IS *TAKING FATE ON THE ROAD*?

2.1 What is *Taking FATE on the Road*?

Taking FATE on the road is a research technical course (RTC) NATO SAS-176 set up to train the trainers or in other words train those who will use the FATE method to respond to the needs of their client organizations that pertain to the future. It is intended to provide senior analysts an ability to provide senior decision-makers with options relative to at least two future scenarios and thus enable organizational strategic planning.

2.2 What will the course cover?

In this course participants will learn about the FATE method, why it is important to use FATE?, and when FATE is more applicable than other OR&A methods. All course attendees will be given access to a FATE specific page on NATO Science connect where resources for running FATE will be available. They will have access to the technical report from SAS-123 [1], the guide for facilitator's and a paper on FATE which compares two illustrative examples of the use of FATE [2] and additional documents related to FATE [3][4][5][6].

2.3 Why take FATE into one's hands?

Strategy development and planning requires thinking about the future systematically which is a challenging task without tools that consider emerging technologies within the context of future scenarios. FATE is a tool that uses pre-developed and pre-described scenarios such as those developed by the office of the Director of National Intelligence [7]. FATE enables futures research through a systematic process useful for better understanding the impacts of socio-technical systems (STS) on the diffusion and adoption of technologies. The emergence of technologies and adoption for both society and security has many complexities impacted by economic, environment, demographic, technology dimensions. To think and explore about the future requires the objective thinking about the complexities of STS. The concept of socio-technical systems is applied within FATE to approach two (sub-) systems that differ yet overlap – the social and the technical. They are entangled and influence each other in a way that needs consistent analysis for exploration.

Systems thinking needs to consider complexity:

- Systems have interdependent parts (that may be attributed to the technical or social aspect) with more options of possible relations than can actually be realized).
- Subsystems may be social systems (including social considerations such as people, work, context and organizations) or technical systems.

- Systems may have and pursue goals in external (complex) environments.
- Systems have equifinality (that is, system goals may be achieved by more than one means).
- System performance relies on the joint performance of its subsystems.

FATE specifically addresses sociotechnical complexities that include the following components: Organizations, People, Policies, Processes, Technology and Infrastructure (OPPPTI). Through a structured brainstorming, the components of STS in the OPPPTI framework allow for an integrated approach to communicate and understand the STS. Linturi and Kuusi provide examples of 100 technologies that could be studied as STS [8].

FATE also addresses the impact of external factors/complexities that will impact the STS in future scenarios: Technological, Economic, Military, Political, Legal, Environmental, Social (TEMPLES) components. This framework provides a more comprehensive perspective to discuss, explore and help explore futures with different level perspective of niches, regimes, and landscapes [4][5]. The method studies the interactions and impacts of the complexity of futures research through a consistent approach of analysis of a socio-technical system in a future scenario(s). In STS, while the technical system refers to the processes, technologies, and infrastructure needed to transform inputs to outputs, the social system deals with the attributes of people (attitudes, skills, or values), policies (e.g., reward systems) and organization (relationships among people, authority structures).

The FATE method has the potential to support NATO member nations in conducting defence and security planning with a systematic exploration of future scenarios comprising complexities of diverse (technical and non-technical) drivers and resistors in sociotechnical systems. The consistent use of the same method (the FATE method) for conducting futures research will allow for improved collaborations and effective communications for those involved in technology strategy development and planning across NATO, within its member nations and across its partners.

3.0 WHAT DOES FATE INVOLVE?

FATE is a four-step process:

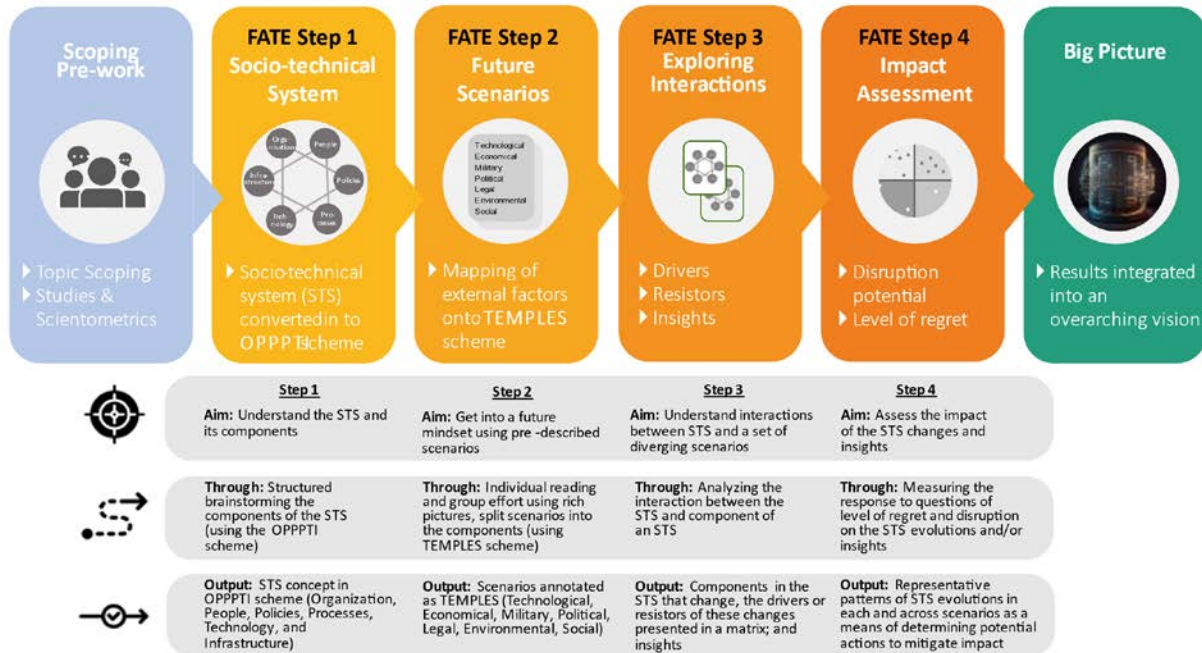
- Step 1: The problem is scoped as an STS with OPPPTI components
- Step 2: Pre-defined future scenarios are transformed into the TEMPLES
- Step 3: Evolution(s) of STS from its baseline to potential future states are determined from the analysis of the interaction between the STS and the scenarios
- Step 4: Impact of the evolutions in the STS is assessed for relevance (e.g., on a set of capabilities or the goal(s) of the STS).

The placement of a technology or a non-technological issue as a part of a socio-technical system (addressed in step 1) and analysing the STS in alternative futures through pre-developed scenarios (addressed in step 2) provides a much richer exploration of the possibilities (addressed in step 3). The impacts of these possibilities are then assessed in step 4. The output thus provides ways to track the emergence of the technological or social developments postulated, disruptions and/or evolutions, thereby opening avenues for the decision makers to respond to these changes.

These four steps do not need to be used in a linear, single process, but may be used iteratively to generate deeper and more complex insights. The method is designed primarily to be applied in a workshop setting but can be adapted as a desk-based exercise, with others or individually, and be augmented with additional tools to explore the information even more profoundly.

Further details of the entire FATE method including a guide for facilitators can be found within the final technical report of the SAS 123 [1] (the Facilitators Guide, Annex E [1]).

Figure 1: The FATE method at a glance



4.0 WHEN TO USE FATE?

When the answer to a question at hand requires systems thinking about the future, for example thinking through a socio-technical system, the FATE method can play to its strength. When stakeholders have approached analysts with topics that are wide scoped and involve the future, such as Arms control or impacts on Arctic operations, several OR&A approaches need to be used. FATE can be a single stop for responding to these types of topics. As already documented in Adlakha-Hutcheon, G. et al [1] it is better to work with answer seekers to formulate the topics into questions. The following are examples of topics restated as questions:

1. Arms Control – What are the potential future roles (and limitations) of technology and verification on arms control, disarmament and non-proliferation?
2. Arctic operations – How could joint operations be realized in cold and austere environments (access, manoeuvrability and sustainment capabilities; joint planning and resourcing)?
3. Biotechnology – How would biotechnology enable novel capabilities (example human enhancement) to be realized under technical and social constraints?
4. Human machine teaming – How to verify trust in human-machine teaming in combat and non-combat situations?
5. Weapons in space – How would militarization of space shift the balance between science and security?

The following are examples of questions that relate to NATO Emerging and Disruptive Technologies [9]:

1. How will AI/autonomy impact armed conflict of the future? Or how will society shape/influence the development of AI/autonomy technologies?
2. How will developments in neuromorphic and quantum computing impact security?
3. How will hypersonic technology impact global defence and security?
4. How would conversion to all-electric transportation economies impact militaries?
5. How will next-generation (and beyond) communication networks impact security of future private and military communications?

Finally, to quote from Adlakha-Hutcheon, G. [10]: *“A couple questions that merit exploration via FATE are: How would digitalization of personal and sensory data, its processing and AI affect operations? How would a world divided along possession or lacking access to technology with the potential of trade war and one comprised of technophiles and technophobes affect the adoption of AI technologies?”*.

The FATE method could also be used in situations where a complete system analysis is available, and there is need/desire to validate or contest the outcomes.

4.1 When FATE may be a less effective method?

Like other operational research methods, FATE is not necessarily the method of choice when the timeframe of the research question does not go beyond 10-15 years into the future, or when the research question involves a non-complex setting, e.g., both the system and relevant influence factors can be described quantitatively in an adequate and sufficient way, or when an answer is needed immediately.

4.2 Minimum time taken for FATE?

One and a half days for training the trainers is the necessary minimal timeframe. Ideally, a core workshop (duration: 2 days) is prepared and wrapped by a dedicated team of at least two trainers. The expenditure of additional time before and after the workshop for preparation and documentation could vary depending on the problem being addressed and the experience with FATE or comparable foresight or workshop concepts (and amount to 2 and 3 days, respectively).

The users of FATE are encouraged to refer to the Facilitators Guide, an annex to the SAS-123 report ([1] Annex E) for additional details.

4.3 FATE resources

The following is a list of the basic resources for FATE that will be available to course participants:

- FATE Technical Course education notes (this document)
- FATE presentation slide decks for each step
- The original FATE method facilitators' guide (Annex E in [1])
- FATE method spreadsheet analyses templates (Annex D in [1])
- Access to a bespoke page on NATO Science Connect to share FATE method experiences within the FATE Community of Practice.

5.0 CONCLUSIONS

The FATE method is a structured method specifically geared for conducting strategic foresight, which is made available to the Operational Research and Analysis (OR&A) community for use in the context of long-term

planning processes. The four steps of the FATE method can be applied to client questions to derive drivers, resistors, and insights and provide mitigation options relative to at least two future scenarios to make informed choices[1][11]. Alternatively, each FATE step can be conducted as a standalone independent module. The value-added of the *Taking FATE on the road* technical course (NATO SAS-176) is threefold: (1) training participants in the use of the FATE method; (2) enhancing their awareness of the potential applications of the FATE method using participatory examples; and (3) enhancing the futures literacy for all stakeholders across the NATO Alliance and the partner nations.

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