

STEP 1 – STS

Taking FATE* on the road

* FATE – Futures Assessed alongside **socio**-Technical Evolutions

NATO SAS-RTC-176

The *FATE* Method

A problem – scope it as a Socio-Technical System (STS)

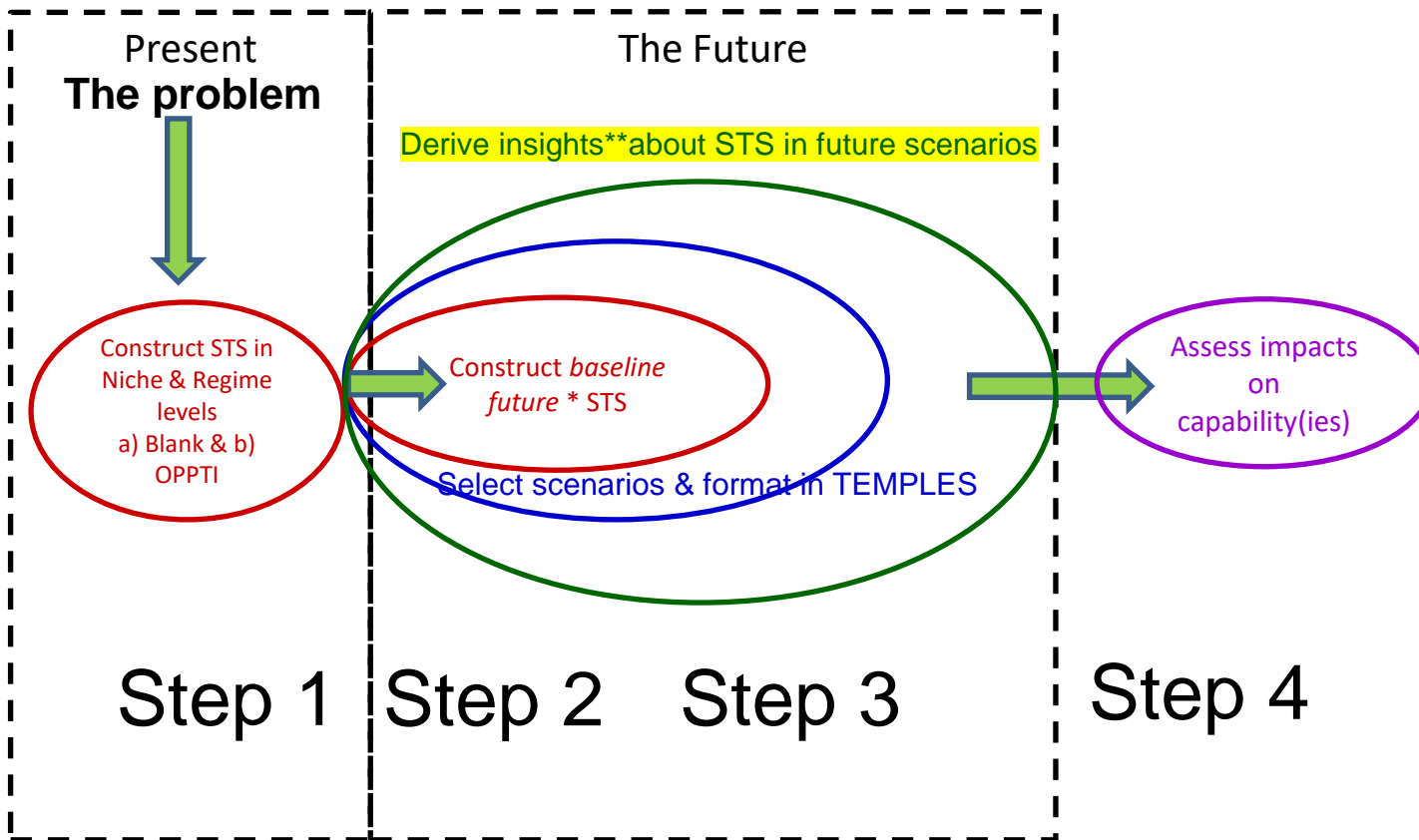
- Step 1 – Socio-Technical System (STS)

Elaborate an STS into

Niche and Regime levels and *OPPPTI** ontology

* *OPPPTI* – Organization, People, Processes, Policies, Technology, Infrastructure

The *FATE* Method



* *Baseline future* is an idealised *extrapolation* of what is emerging today, **Insights from analysis, changes in STS, drivers and resistors of change in future scenarios and/or STS

Socio-Technical Systems (STSs) are made of two systems that differ yet overlap—the social and the technical. They are entangled and influence each other...In STS, while the technical system refers to the processes, tasks and technologies needed to transform inputs to outputs, the social system deals with the attributes of people (attitudes, skills, or values), the relationships among people, reward systems, and authority structures.

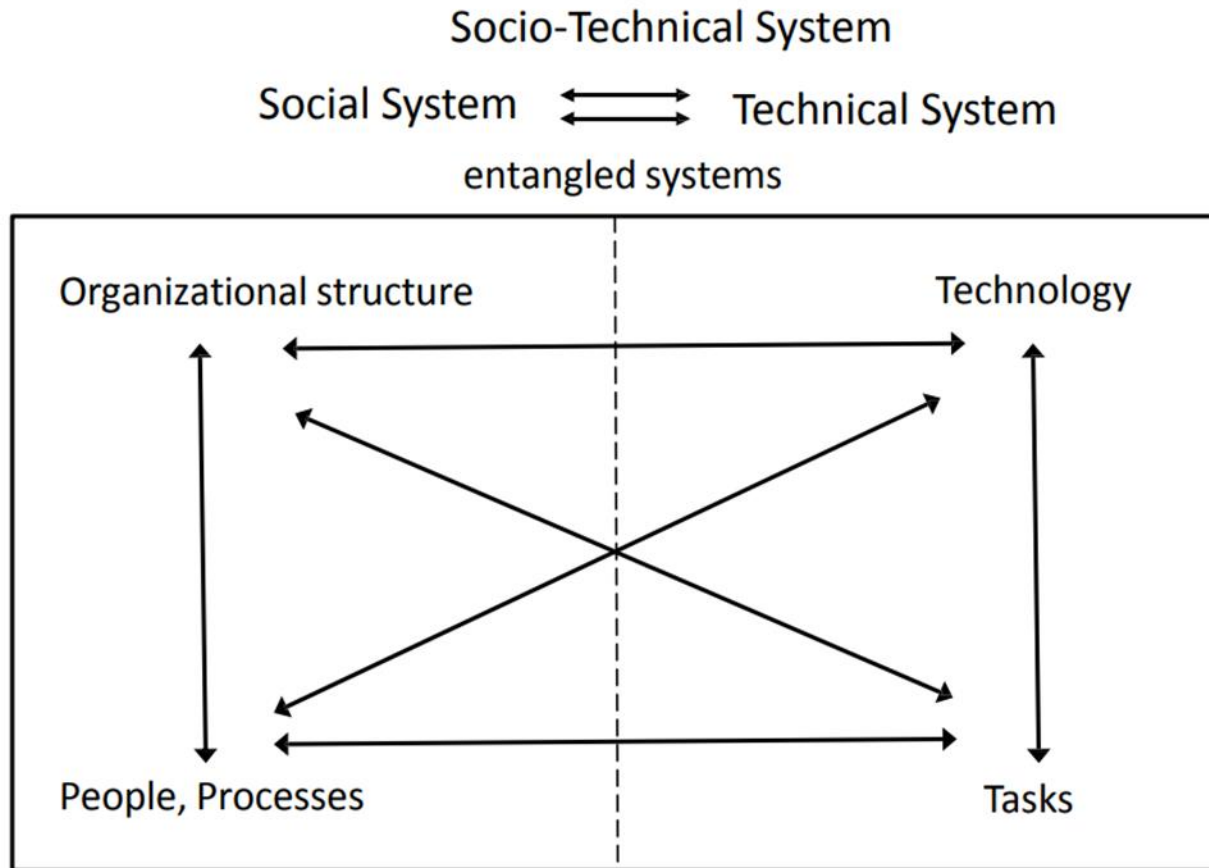


Figure 2: An STS adapted from [39].

Socio-Technical Systems (STS)

- Socio-Technical Systems (STS) are made of **two** systems that **differ yet overlap**—the social and the technical.
- They are entangled and influence each other...
- The technical system refers to the processes, tasks and technologies needed to transform inputs to outputs.
- The social system deals with the attributes of people (attitudes, skills, or values), the relationships among people, reward systems, and authority structures.

Socio-Technical Systems (STS) cont'd

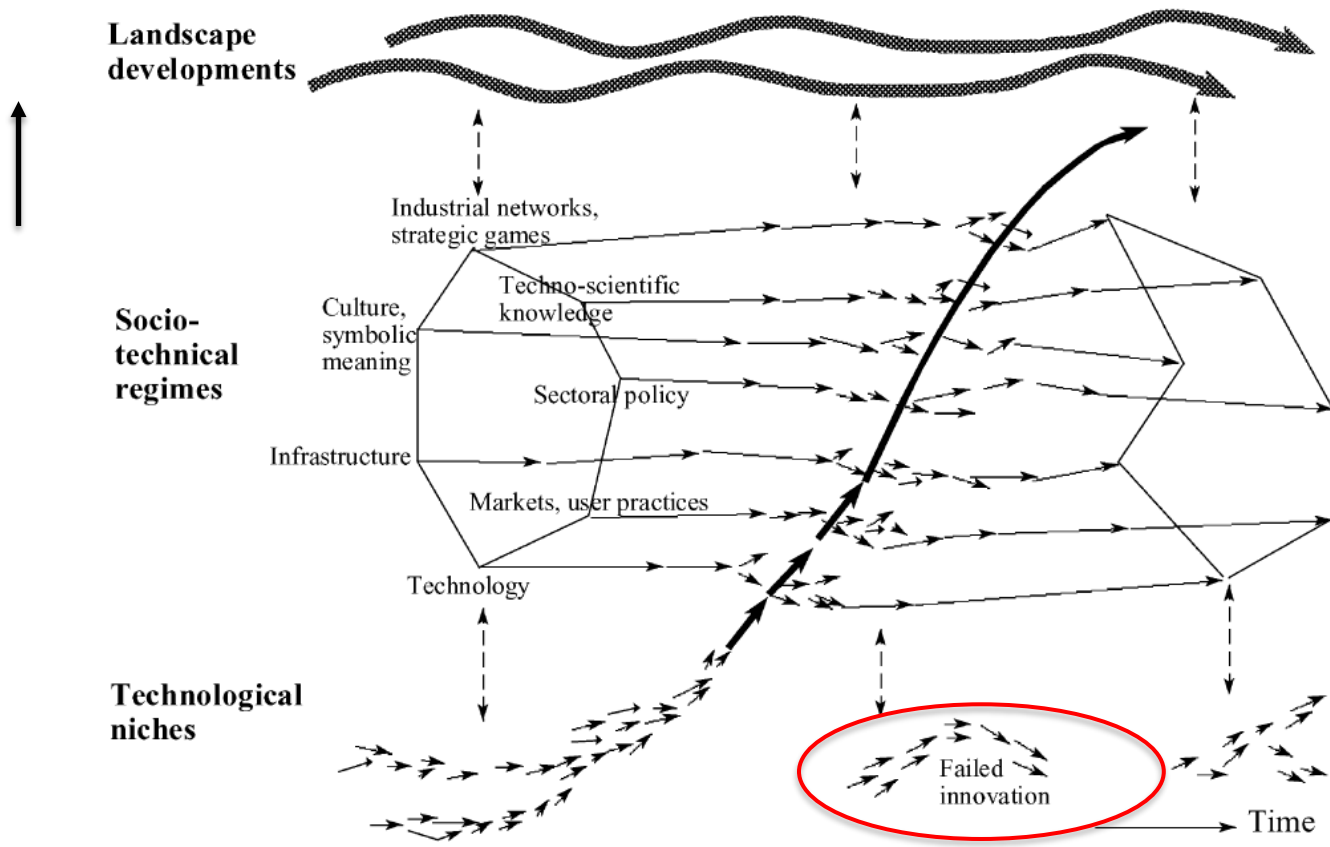
1. Systems should have interdependent parts.
2. Systems should adapt to and pursue goals in external environments.
3. Systems have an internal environment comprising separate but interdependent technical and social subsystems (such as people, work, context and organizations).
4. Systems have equifinality (that is system endpoints may be achieved by more than one means).
5. System performance relies on the joint optimization of the technical and social subsystems.

FATE – Step 1 – STS in action

Step 1 – Socio-Technical System (STS)

- Elaborate STS into the Multilayer Perspective (MLP) and the OPPPTI ontology
- What is MLP?
 - Niche, Regime and Landscape levels

MLP - Socio-technical transitions



Geels FW (2002, 2010)

What is the OPPPTI ontology?

- Organization,
- People,
- Processes,
- Policies,
- Technology,
- Infrastructure

Form associations for each letter of OPPPTI

Step 1 – STS – 2 examples

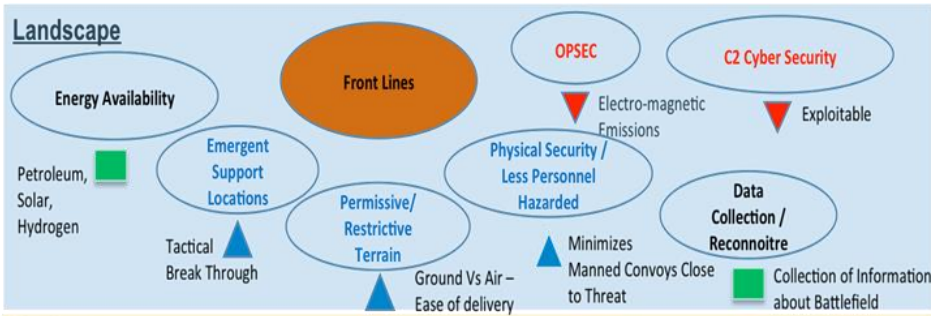
What is the impact of delivery to front lines by autonomous means? How could ‘wearables’ effect urban operations?

1. Traditional operations,
2. Automated delivery adds a contemporary flavor,
3. Reducing number of soldiers in harm’s way.

1. Urban operations,
2. Contemporary equipment used to collect data facilitating near real time decision making,
3. Minimizing risks for both soldiers and civilians.

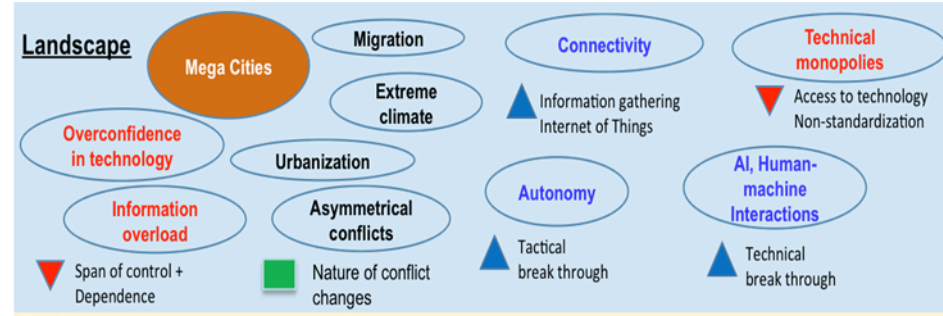
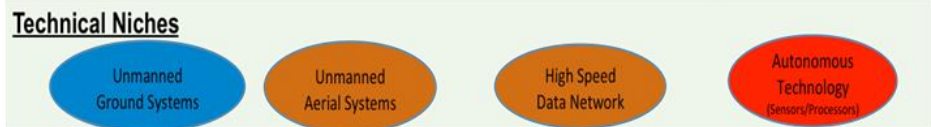
Delivery to front lines by **autonomous** means

How could **wearables** effect urban operations?



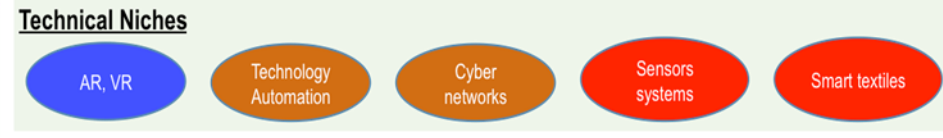
Regimes

Organizations	People	Technology	Infrastructure
<ul style="list-style-type: none"> Armies <ul style="list-style-type: none"> Cultural Norms Existing Doctrine Needs Wants Commercial Industry Manufacturers 	<ul style="list-style-type: none"> Commanders <ul style="list-style-type: none"> Innovators Biases Understanding Forward Units (Infantry, Tanks, etc) Logisticians Mechanics (Training Challenges) 	<ul style="list-style-type: none"> Sensor Prolif (Wright's Law) LIDAR Cameras Marsupial Capabilities <ul style="list-style-type: none"> Technology Sea to Land Land to Air Battery Technology Electric = Quiet; Petroleum = Loud 	<ul style="list-style-type: none"> Roads Landing Points Automated Resupply Nodes Expeditionary <ul style="list-style-type: none"> Rapid Charging/ Refuel Capability Data Networks



Regimes

Organizations	People	Technology	Infrastructure
<ul style="list-style-type: none"> Dispersed armies <ul style="list-style-type: none"> New doctrines Tech. challenges Wants Tech Monopoly Commercialization Big companies <ul style="list-style-type: none"> Power to development Access to tech Needs 	<ul style="list-style-type: none"> Social hierarchies <ul style="list-style-type: none"> Changing structures Self-governed Trust in authorities variable Spearheaded education/ knowledge Legal framework <ul style="list-style-type: none"> Changing norms Perspectives 	<ul style="list-style-type: none"> Widespread <ul style="list-style-type: none"> High level of accept Integration Autonomy Private sect innovation Quantity of information <ul style="list-style-type: none"> Slight distrusted Quality of data 	<ul style="list-style-type: none"> Networks everywhere <ul style="list-style-type: none"> Accessibility Secrecy Closed combat zones <ul style="list-style-type: none"> Tech depended Security Demand driven needs



Develop an STS

How will Biotechnology impact soldier health and performance in 2040?

1. In the present 2023 specific to this question consider each letter of OPPPTI and note down all that you know
2. Form associations and decide whether there are dependencies, linkages between them

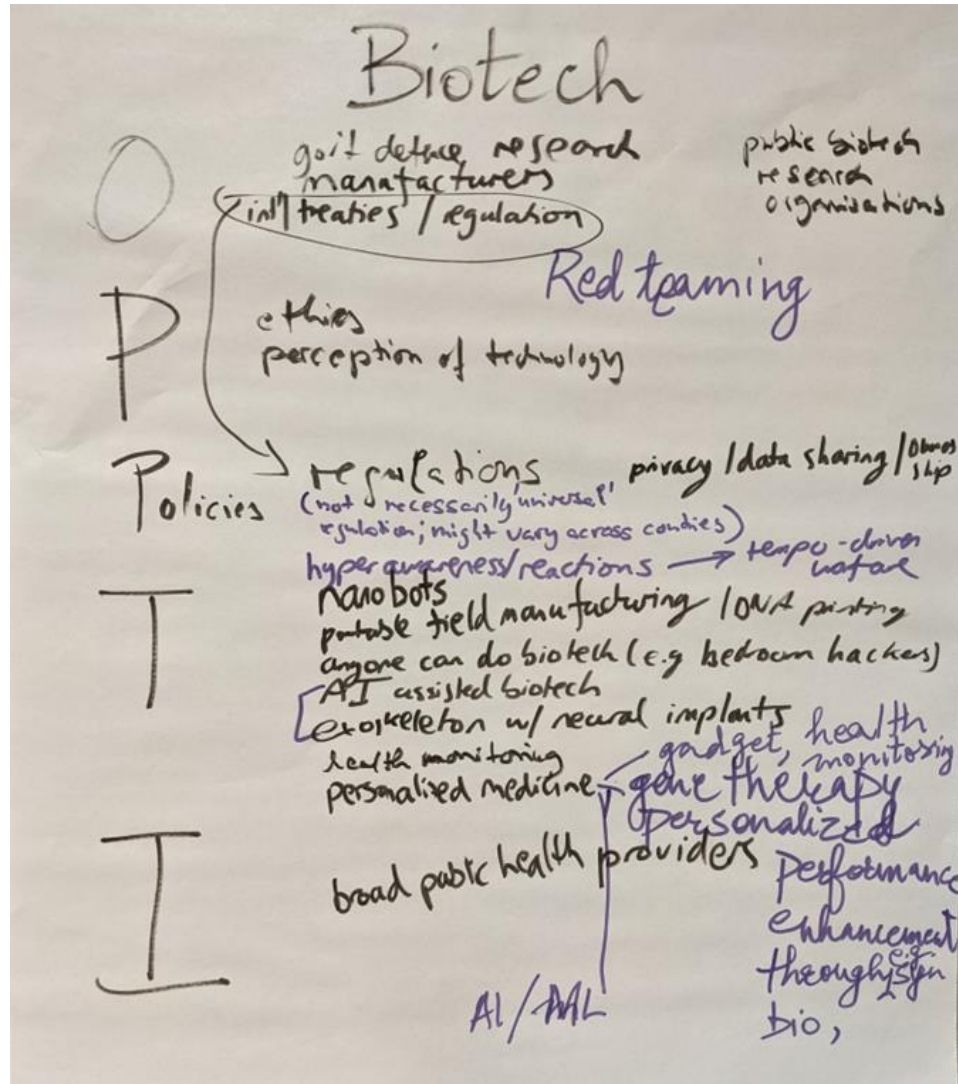
Practice

FATE → Pre-steps
STEP 1 Client/sponsors
• Question sort

How will biotechnology
impact soldier health and
performance in 2040?

Pre-worked Step with Biotech as example

How will Biotech impact soldier health in 2040?



References

1. Adlakha-Hutcheon, G. et al (2021) Futures Assessed alongside socio-Technical Evolutions (FATE), DOI: 10.14339/STO-TR-SAS-123, ISBN 978-92-837-2322-6.
2. Adlakha-Hutcheon, G., Bown, K., Lindberg, A. Nielsen, T. G. Roemer, S. Maltby, J.F.J. (2020) The Use of FATE for Illuminating Disruptions, Proceedings of The 14th Annual NATO Operations Research and Analysis Conference, 2020.
3. Geels, F.W. (2002). Technological transitions as evolutionary reconfiguration processes: a multi-level perspective and a case study. Research Policy, 31(8–9), pp. 1257–1274. [https://doi.org/10.1016/S0048-7333\(02\)00062-8](https://doi.org/10.1016/S0048-7333(02)00062-8)