

# Leaping Tall Barriers in a Single Bound: Knowledge Sharing, Simulations and NATO

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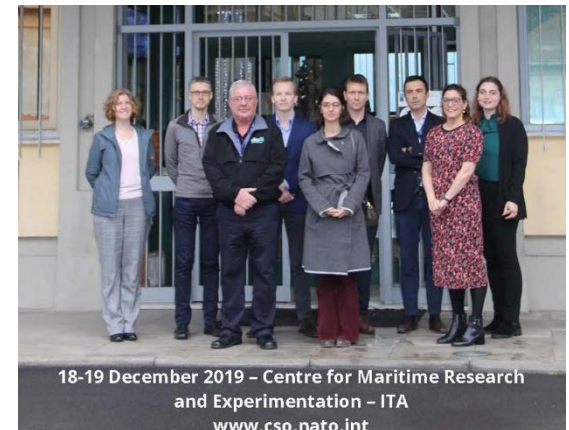


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  - Barriers to sharing Models and Simulations across the Alliance
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  - Model and Data Exchange Framework
  - Framework in Action
- Parting Thoughts

# Introduction and Aim

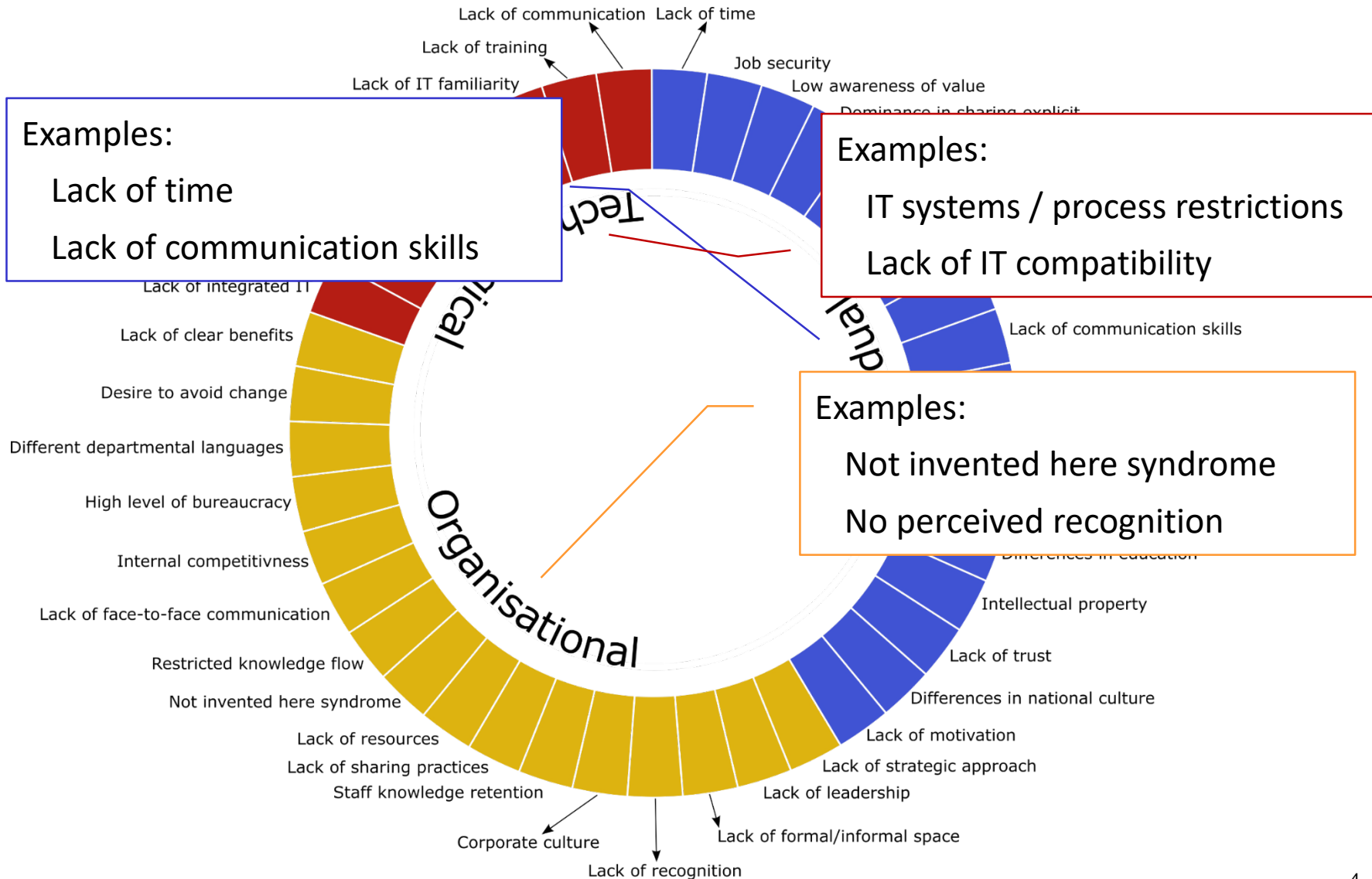
- As analysts we recognize the benefits of having models and simulations in our analytical toolkit
  - ...but they can be costly and take time to develop, validate, and maintain
- NATO is an Alliance; there are many models and simulations within the analytical communities
  - ...in Nations, NATO Entities, supporting industries and academia
- Greater sharing of models and simulations would be a benefit to NATO; the analysis and simulation communities set up a joint panel
  - MSG-SAS-178: Using Simulation to Better Inform Decision Making for Warfare Development, Planning, Operations, and Assessment



**Aim is to develop ways to benefit the Decision Maker by increasing access and sharing of models and simulations across the Alliance**

# Reasons Knowledge is not shared

Results from a knowledge sharing literature review



# NATO has specific Barriers to sharing Models and Simulations (M&S)

## **Firstly: Decision to outsource**

Barriers related to preventing a decision to outsource a M&S requirement

Barriers: a lack of trust in M&S capabilities, an organizational preference to conduct the study in-house, time pressures, situational awareness of M&S available

## **Second: Enabling mechanisms**

Procedures and processes required to enable the sharing arrangement, or contract

Barriers: availability of a suitable contracting mechanism, intellectual property rights, sharing of classified material.

## **Lastly: Achieving success**

Barriers that occur once the sharing mechanisms are in place

Barriers: building trust with decision makers, awareness of verification and validation, time required to understand the M&S provided

# How we think about Barriers

Barriers provoke specific responses...

- something to overcome
- obstacles to conquer
- destroy them
- break them down
- holding people back



# Diversion... Satellite Navigation



What it doesn't do:

- Ask me to build a bridge, or a new road
- Tell me to get out and help resolve a blocked route
- Tell me to wait till later date



What it does:

- Provides a route
- Options to avoid a toll, or see more scenery
- On occasion, finds a better route during the journey



# A new mind-set to sharing Models and Simulations

**Destination:** greater sharing, and access to M&S within the Alliance.

- There are two parties involved
  - Supplier: An organization with a Model or Simulation
  - Client: An organization that wants to make use of that Model or Simulation
- Two of the most significant barriers specific to NATO are
  - (1) How we share the Model or Simulation
  - (2) How we share the required data
- We have options to navigate these Barriers



# A new mind-set to sharing Models and Simulations

## Analysis

### Analysis undertaken by the Client

Identify and obtain the simulation from the Supplier, with full rights

- Client has to resolve hardware & software, training, licences, IPR
- Client can then do all the analysis as they see appropriate

multiple options in the middle

### Analysis undertaken by the Supplier

Client identifies the Simulation, contracts Supplier to undertake the analysis

- Supplier runs, analyses simulation; Client has to fully understand outputs
- Client receives results to use, supplier retains control of their simulation

- This forms the first axis of our framework:

Analysis on  
client side

Share source code and right to alter

Run model on client system

Share model on dedicated hardware

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Analysis on  
supplier side

Share detailed model description

Share detailed output

Only share aggregate output e.g. graphs

# A new mind-set to sharing Models and Simulations Data

- Secondly, **How we share the required Data**

Use Unclassified Data

A middle ground

Use Shared Classified Data

- This forms the second axis of our framework:

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Use unclassified  
data

Use supplier side  
classified data  
(not accessible  
to client)

Use client side  
classified data  
(not accessible to  
supplier)

Use classified data  
(accessible to both  
parties)

# A Model and Data Exchange Framework

<b>Analysis on client side</b>	Share source code and right to alter				
	Run model on client system				
	Share model on dedicated hardware				
<b>Analysis on supplier side</b>	Share detailed model description				
	Share detailed output				
	Only share aggregate output e.g. graphs				
		Use unclassified data	Use supplier side classified data (not accessible to client)	Use client side classified data (not accessible to supplier)	Use classified data (accessible to both parties)

# A Model and Data Exchange Framework

<b>Analysis on client side</b>	Share source code and right to alter				
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## Colour Key

How much effort is required to navigate obstacles related to sharing the model and data?

Unlikely combination	Least effort required	Less effort required	More effort required	Most effort required
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# Framework in Action

By using the framework we are making choices to get to our destination

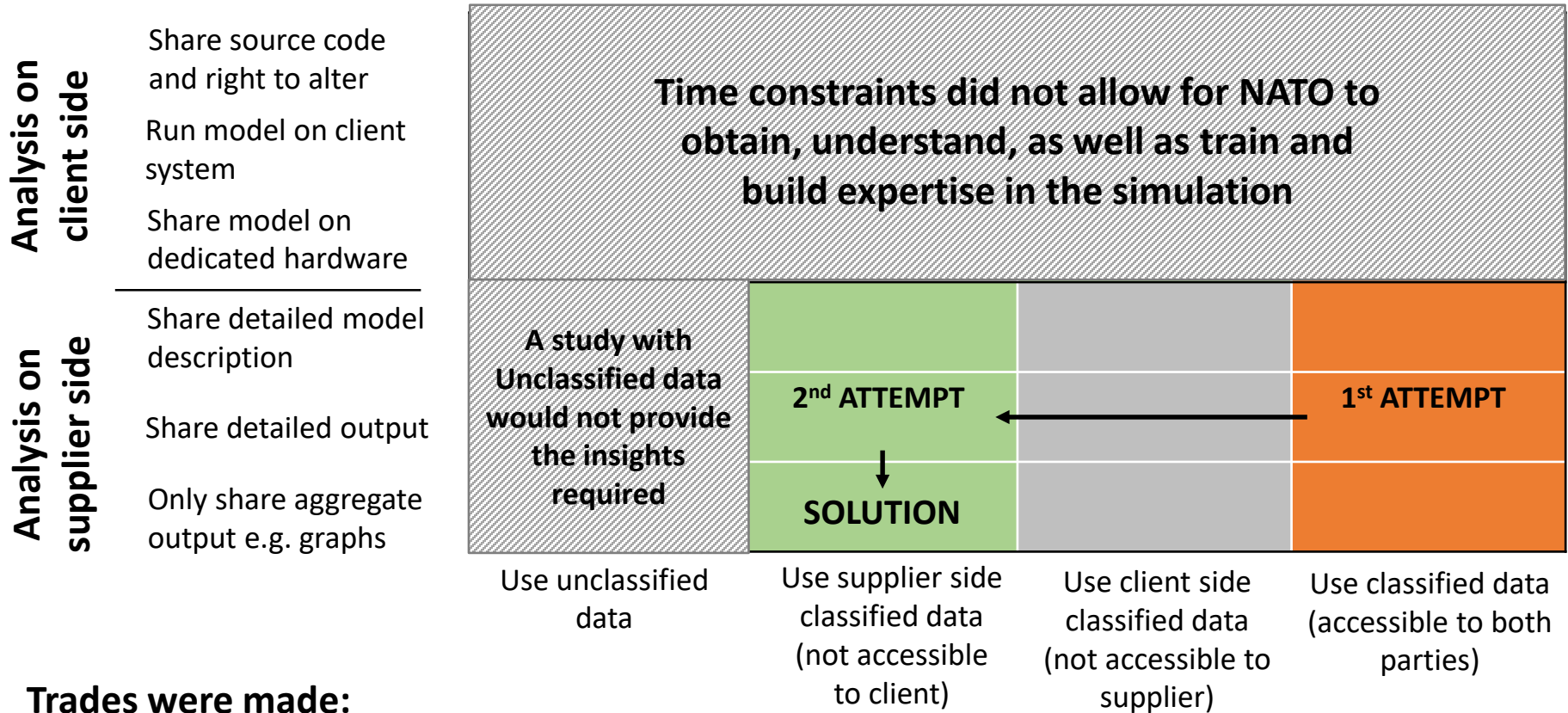
Examples:

- If we cannot have a nation's simulation delivered and packaged to use ourselves, can we utilise them as a service to run it for us?
- If we cannot see all the data in a model to build confidence and trust in the outputs, can we substitute for the reputation of the organization that built it?
- If we do not have time to put in place a specific contract or MoU for the service required, is there an existing one that can be utilised?
- Can we gain quick simulation access by hosting a supplier capability, in exchange for granting physical access and a reliance on the supplier?

# Framework in Action: A2AD Simulation (1)

- Situation: NATO Allied Command Transformation required the use of a simulation to inform and support an analytical study relating to Anti-Access/Area Denial (A2AD), no suitable simulations were available within NATO entities, but an appropriate National simulation was identified.
- There were a number of important barriers
  - **Time:** was limited
  - **Data:** Simulation required a breadth and depth of the data could not be sourced by NATO
    - + Nation's existing data had national caveats and proprietary restrictions and could not be fully shared
  - **Expertise:** specific to the simulation lay within the nation, specific to the question lay in NATO

# Framework in Action: A2AD Simulation (2)



## Trades were made:

- Time: analysis now with reliance on a Nation, over analysis in future using a NATO developed capability
- Trust: The manner in which trust and confidence was built in the simulation outputs
- Who interprets which simulation outputs are most useful to the study

# How to tackle the Other Barriers

The Framework tackles the most significant barriers specific to NATO, general Knowledge sharing literature provides insights into tackling the other Barriers

- Create a knowledge sharing culture**
  - Senior leaders need to create an encouraging environment and transfer of M&S, and be the advocate and example that all follow
  - Need organizational mechanisms that balance enabling information protection from advanced integration
- Make knowledge sharing a direct part of business strategy of key initiatives, and part of common business practice**
  - Include sharing of information in the organization strategies and integrate use into the development of new M&S
- Make space for ‘collaborational knowledge sharing’; that enable individuals to ‘create and share knowledge through dialog with questions and answers’**
  - Provide opportunities for individuals to network and converse across alliance, e.g. conference attendance, Communities of practice, social sharing platforms
- Provide recognition and reward to individuals**
  - Ensure success in sharing knowledge is rewarded at the individual and team level.





# Summary

- A core strength of the Alliance is to leverage and connect the joint capabilities of its members; this includes Models and Simulations
- There are many Barriers to sharing Knowledge, and to sharing Models and Simulations
  - ...there will always be Barriers
- By changing our mindset, and using the Model and Data Exchange Framework, we can identify ways to increase sharing and collaboration now

**Don't think Obstacle Course...think Sat Nav!**

- For more information, look out for the forthcoming MSG-SAS-178 Technical Report

# Questions ?

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