18th ICCRTS

Paper 055

Target Network Modeling

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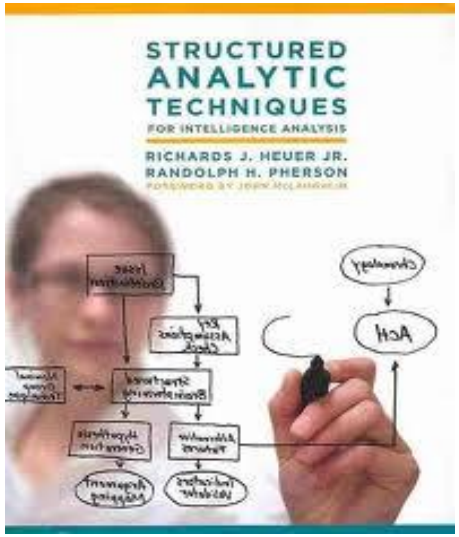
Agenda

- **Intro to SATs & TNM**
- **Battlespace Agility Framework**
- **Testing, Evaluation, Results**

What are SATs?



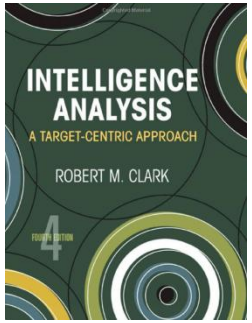
Structured Analytical Techniques for Intelligence Analysis
by
Richard J. Heuer Jr.
Randolph H. Pherson

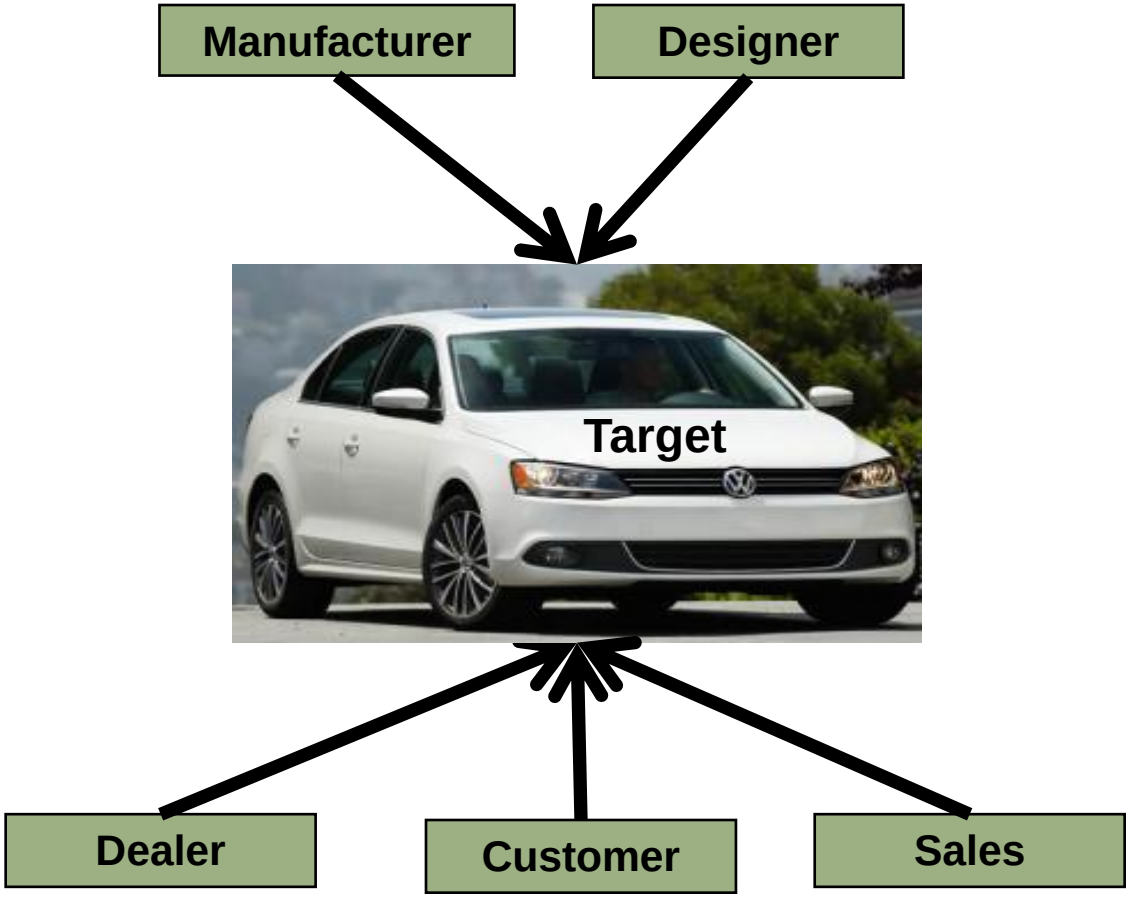
Putting forward a common taxonomy for developing a common understanding of methodology.

We are also talking about developing a common language for the discussion of intelligence analysis.

Decomposition and Visualisation

EXAMPLE: Robert M. Clarks TNM, the target centric view of automaking.



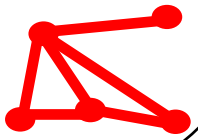


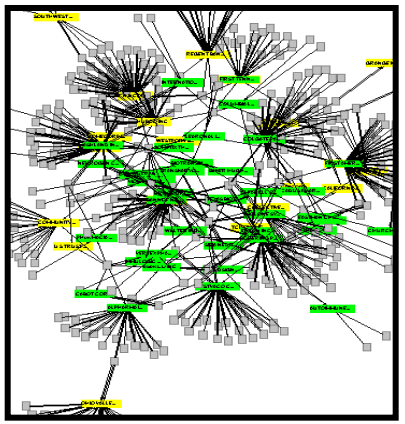
Clark suggests some generic characterisitcs for target models…

- **It is Complex**
- **It is a System; it has**
  - **<u>Structure</u> - components and their relationships**
  - **<u>Function</u> - results produced**
  - **<u>Process</u> - sequence of activities or events**
- **It is a Dynamic Network**

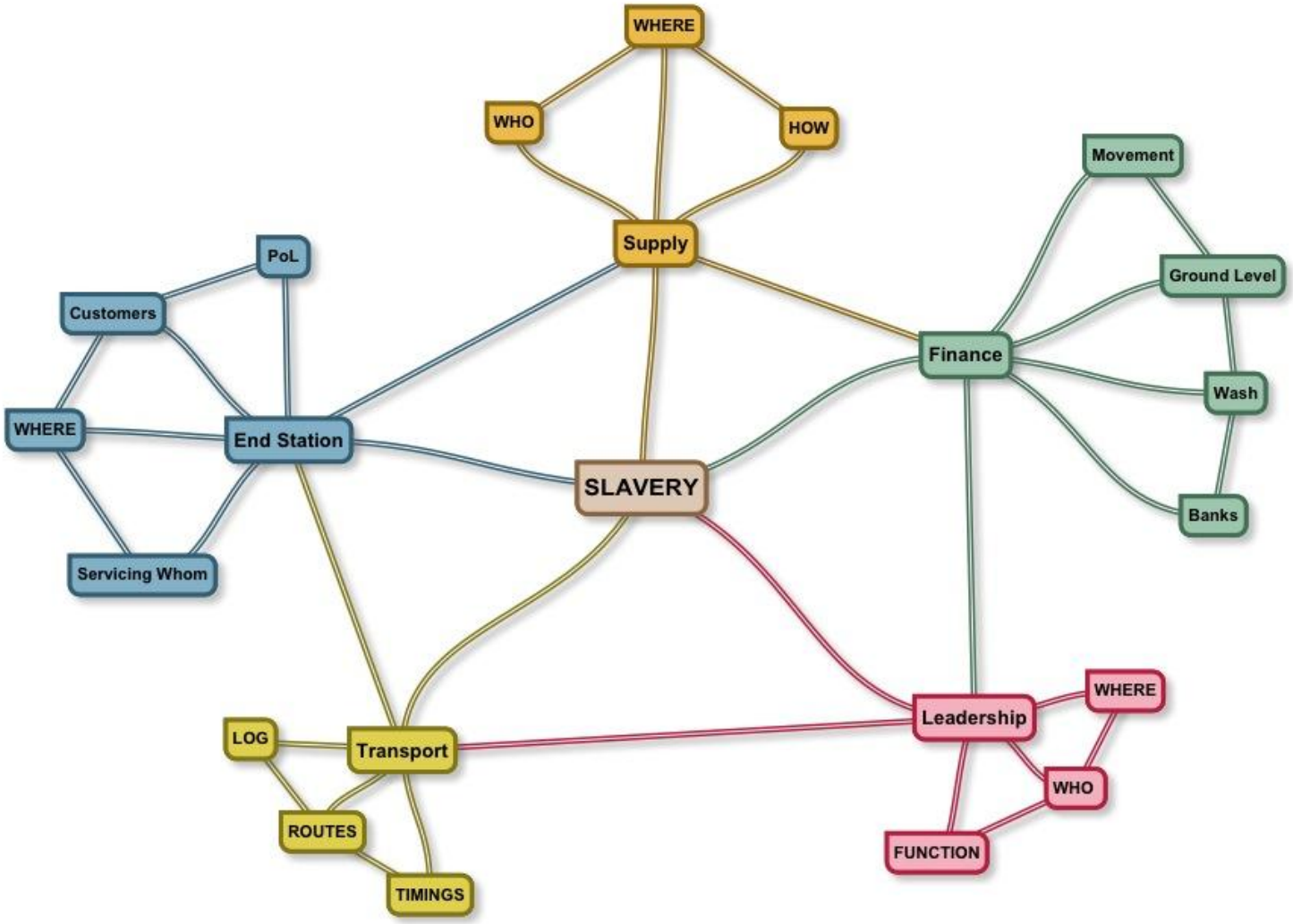
- **Many model types exist…**
  - **Profiles**
  - **Process models**
  - **Simulation models**
  - **Pattern models**
  - **Performance models**
- **…and many tools for creating them**
  - **GEOINT tools**
  - **Analyst Notebook**
  - **Palantir**

The target network:
People
Places
Things
Organizations





Ex. Slavery TNM



Battlespace Agility

The speed at which knowledge is turned into actions for desired effects.

Stems from SAS-050, SAS-065, SAS-85 Agility research

Flexibility
Adaptiveness
Responsiveness
Versatility
Innovativeness
Resilience

NATO DOCTRINE 2.0, 3.0, 3.9, COPD

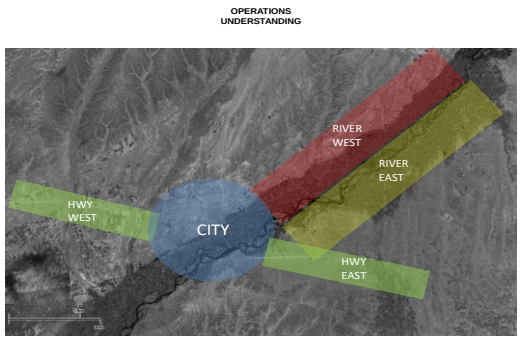
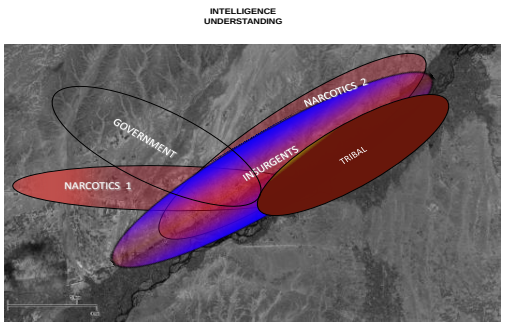
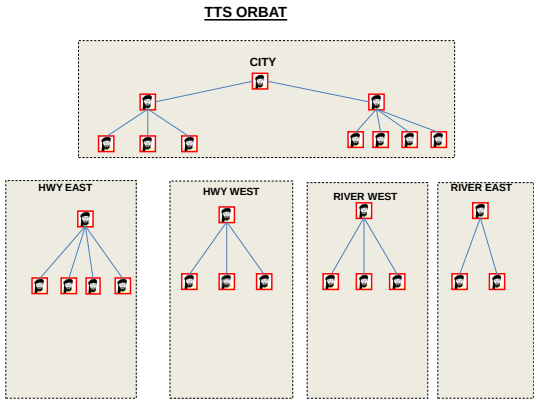
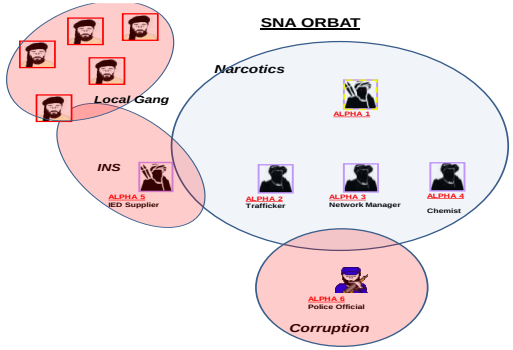
AGILITY IN A WARFIGHTING CONTEXT

Speed, Precision, Appropriateness

Does target network modeling increase battlespace agility?

- Project Kitae - Battlespace Helmand
- Project Crows Nest – Naval Exercise Joint Warrior
- Advanced Joint Intelligence Course

Project Kitae Situational Awareness/Situational Understanding (SA/SU)
Linear vs. Network models

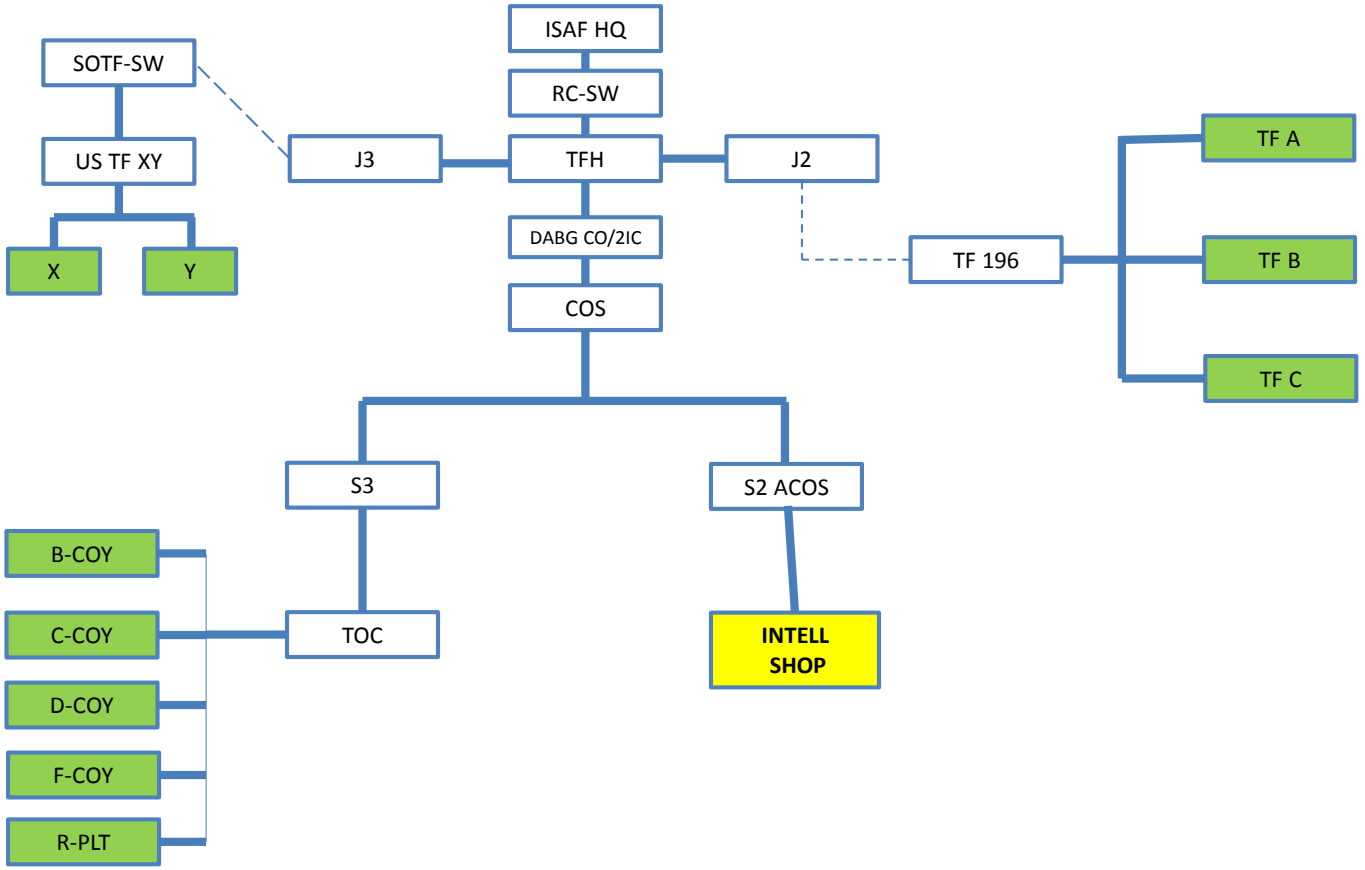
	S3 (Operations)	S2 (Intelligence)
Helmand 1 Area of Responsibility (AoR) Understanding		
Helmand 2 Order of Battle (ORDBAT) Understanding		

Example of Indicators of Intelligence Analytical Agility In The Battlespace

INDICATOR	DEFINITION	More Agile when …
Intelligence Timliness	Extent to which currency of information is suitable to its use.	**HIGH**
Intelligence Currency	Difference between the current point in time and the time the intelligence was made available	**LOW**
Intelligence Correctness	Extent to which intelligence is consistant with ground truth.	**HIGH**
Intelligence Accuracy	Degree to which intelligence quality matches what is needed.	**HIGH**
Intelligence Precision	Level of measurement detail in intelligence item.	**HIGH**
Intelligence Relevance	Extent to which intelligence quality is relevant to the task at hand	**HIGH**
Intelligence Completeness	Extent to which intelligence relevant to ground truth is collected.	**HIGH**

(Based NATO SAS-050 Variable Definitions)

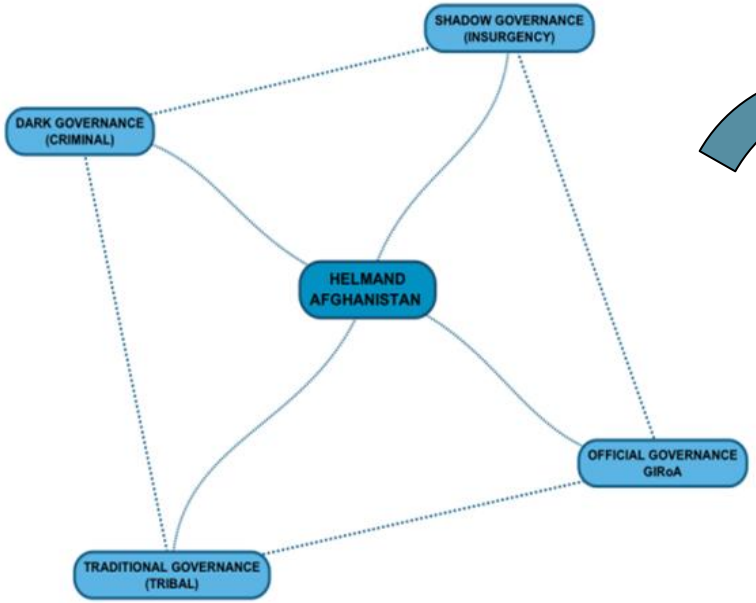
Project Kitae Targeting



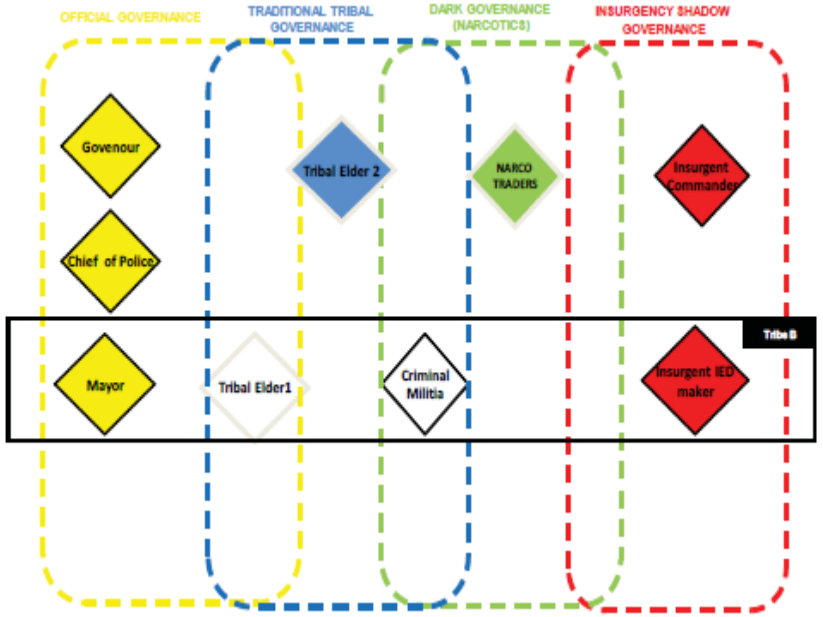
Shared SA/SU was faster and more precise

Project Kitae Targeting

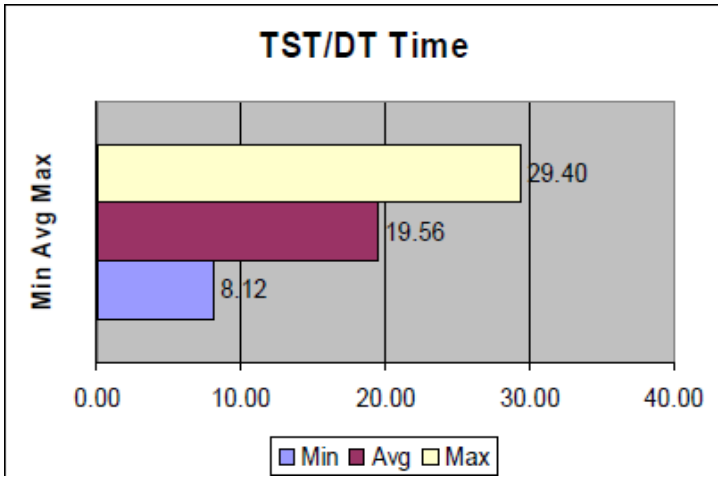
Master TNM: 4 State Model



Slave TNM: 4 State Model Populated Locally for Targeting



Project Kitae Targeting



Month	TGT Generated	TGT Actioned
AUG 10	**77**	**21**
SEPT 10	**89**	**54**
OCT 10	**182**	**67**
NOV 10	**426**	**79**
DEC 10	**268**	**56**
JAN 11	**317**	**49**

Shared SA/SU was faster and more precise

Project Crows Nest

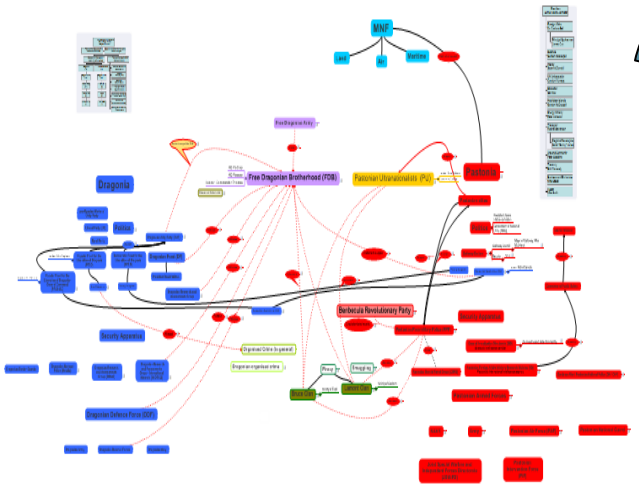
	SENSE-MAKING RELATIONSHIP TO BE MEASURED
1	N2 & Commander DATG
2	N2 & N3
3	N2 & Info Ops/
	N2 & N5
4	N2 & Assets & Sources (ICP – Tasking/RFIs)
5	

	SENSE-MAKING VARIABLE TO BE MEASURED
X	Shared Information
Y	Shared Awareness
Z	Shared Understanding

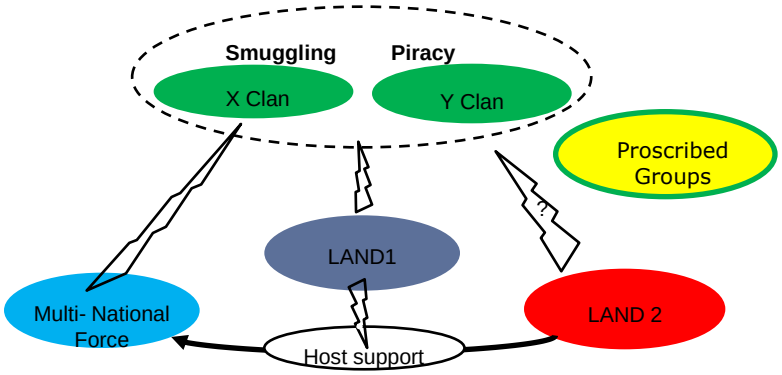
	INTERVENING ACTIVITIES TO BE TESTED
1	Target Network Modelling (AGM: Internal/External)
2	Narrative Report/Returns Format (AGM: Internal/External)
3	Battle Rhythm (AGM: Internal)
4	Indicators List (AGM:Internal)
5	HVTL Generation, Management, Effectiveness (AGM:Internal/External)
6	TARGETING PROCESSESS (AGM: Internal/External)

Project Crows Nest

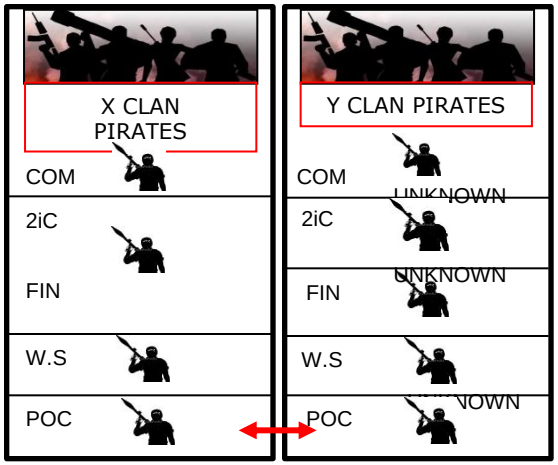
Master TNM: The Battlespace



Slave TNM: Pirating focus for targeting



Sub- Slave TNM: Populating the pirate clans



Project Crows Nest

Measurement Variables		Definition	Primary Battlespace Agility Component	HELMAND, AFGHANISTAN (2010-2011)	Projected in Degraded Environment
1	Shared Information Accuracy	Degree to which shared information quality matches what was is needed	Precision	TNM reduced the collection of frivolous information.	**If initial context established then information accuracy still improves**
2	Shared Information Completeness	Extent to which shared information relevant to ground truth is collected.	Precision	TNM ensured contextual flexibility with individual parts of the overall problem. (ex. Role of poppy farming)	**If initial context established then information completeness still improves**
3	Shared Information Consistency	Extent to which shared information is consistent with prior shared information and consistent across sources.	Precision	TNM improved the generic framework for collection that improved consistency especially on handovers.	**If initial context established then information consistency still improves.**
4	Shared Information Correctness	Extent to which shared information is consistent with ground truth.	Precision	TNM greatly improved the consistency with ground truth. It essentially stopped the organization from making the situation fit the organizational doctrine, and adjust the doctrine to fit the situation.	**If initial context established then information correctness still improves.**
5	Shared Information Currency	Difference between the current point in time and the time the shared information was made available.	Speed	TNM combined with 'flatling' technologies greatly increases currency.	**If initial context established then information currency does not get worse.**
6	Shared Information Precision	Level of granularity of measurement detail of shared information item.	Precision	TNM provided a framework that restricted the communication of frivolous information. Individual components better managed their own details by 'pulling' only the needed information within the improved context.	**If initial context established then information precision improved through better management and promotion of the 'pull' principle.**
7	Shared Information Relevance	Extent to which shared information quality is relevant to task at hand.	Speed & Precision	TNM greatly improved shared information relevance through providing a more broadly shared context platform reducing time wasted on irrelevant information.	**If initial context established then shared information relevance still improves.**
8	Shared Information Timeliness	Extent to which currency of information is suitable to its use.	Speed	TNM greatly improved timeliness as it promoted a common framework for information, it was easier to share.	**If initial context established then shared information timeliness still improves.**
9	Shared Information Uncertainty	Degree of uncertainty about the battlespace. The sum of unknowns.	Precision	TNM reduced uncertainty as to component commands' responsibility in the 'big picture.'	**If initial context established then shared information uncertainty is improved.**
10	**Shared Information Sharability**	**The extent to which an element of information is in a form or format understandable by all nodes in the Network.**	**Speed & Precision**	**TNM greatly increased information 'shareability' as it focuses on shared context between the component commands instead of details.**	**If initial context established then shared information share ability does not worsen.**

Shared SA/SU was faster and more precise

ADVANCED JOINT INTELLIGENCE ANALYSIS COURSE

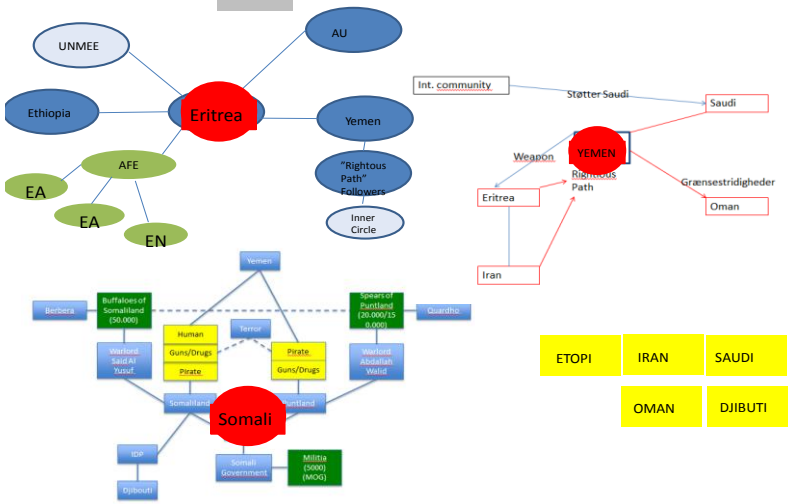
For the second year in a row TNM has been a central part of our analyst training.

Feedback on the use of TNMs has been extremely good.

Here is a comparitive example depicted by three different groups using the same complex exercise information to create a 1 slide TNM.

ADVANCED JOINT INTELLIGENCE ANALYSIS COURSE

1



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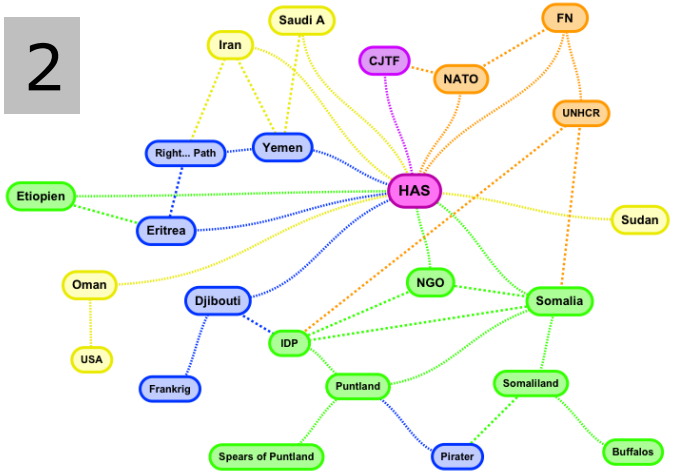

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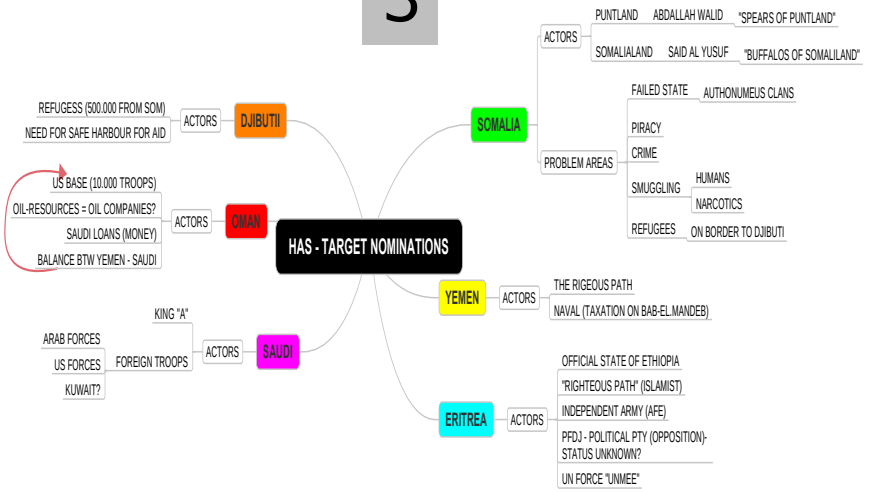

CONCLUSION

TNM as a formal structured analytical technique for decomposition and visualisation increases battlespace agility.

- Target network modeling should be taught as a fundamental skill for intelligence analysts for production of baseline SA/S products as well as targeting support models.
- Target network model reading skills should be taught to Commanders and planners at all levels.
- Tests need to be run on how the use of TNMs affects timeliness within the framework of inter-agency cooperation.