

AI in support of complex decision-making

Academia/Industry Multidisciplinary Project
« ANTICIPE »



“ANTICIPE”

“Augmented Near real-Time Instrument for Critical Information Process Experiment”



INTER 2
INTER 3
INTER 4
INTER 5



The Global Context of "ANTICIPE"

Complexity



Deluge of Data



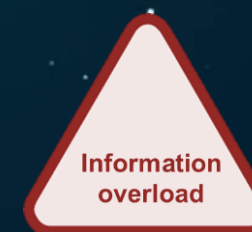
Tempo



Understanding



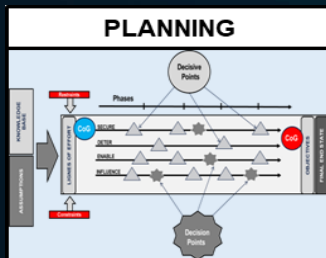
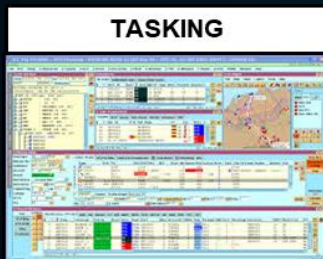
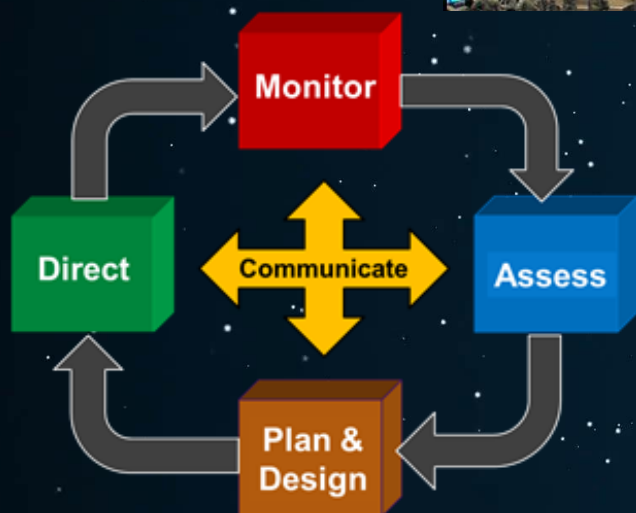
Sense Making



Toward a Cognition Augmented Decision Cycle



ASSESSMENT			
Date Cont.	Objective	Assessment	Trend
	Objective 1: Enable security through air operations	●	↑
	Objective 2: EL airspace superiority capabilities	●	↓
	Objective 3: IR essential air infrastructure & capacity required to pre-specified levels	●	↓
	Objective 4: Enable Humanitarian Assistance	●	↑
	Objective 5: Coalition mission accepted	●	↑



COMBAT SEQUENCES
REPLAY & ANALYSIS

OBSERVATIONS CAPTURE TOOL

Adversary Behavior & Actions Analysis

CCIR Augmented Tool

Decision Support

Autonomous Assessment

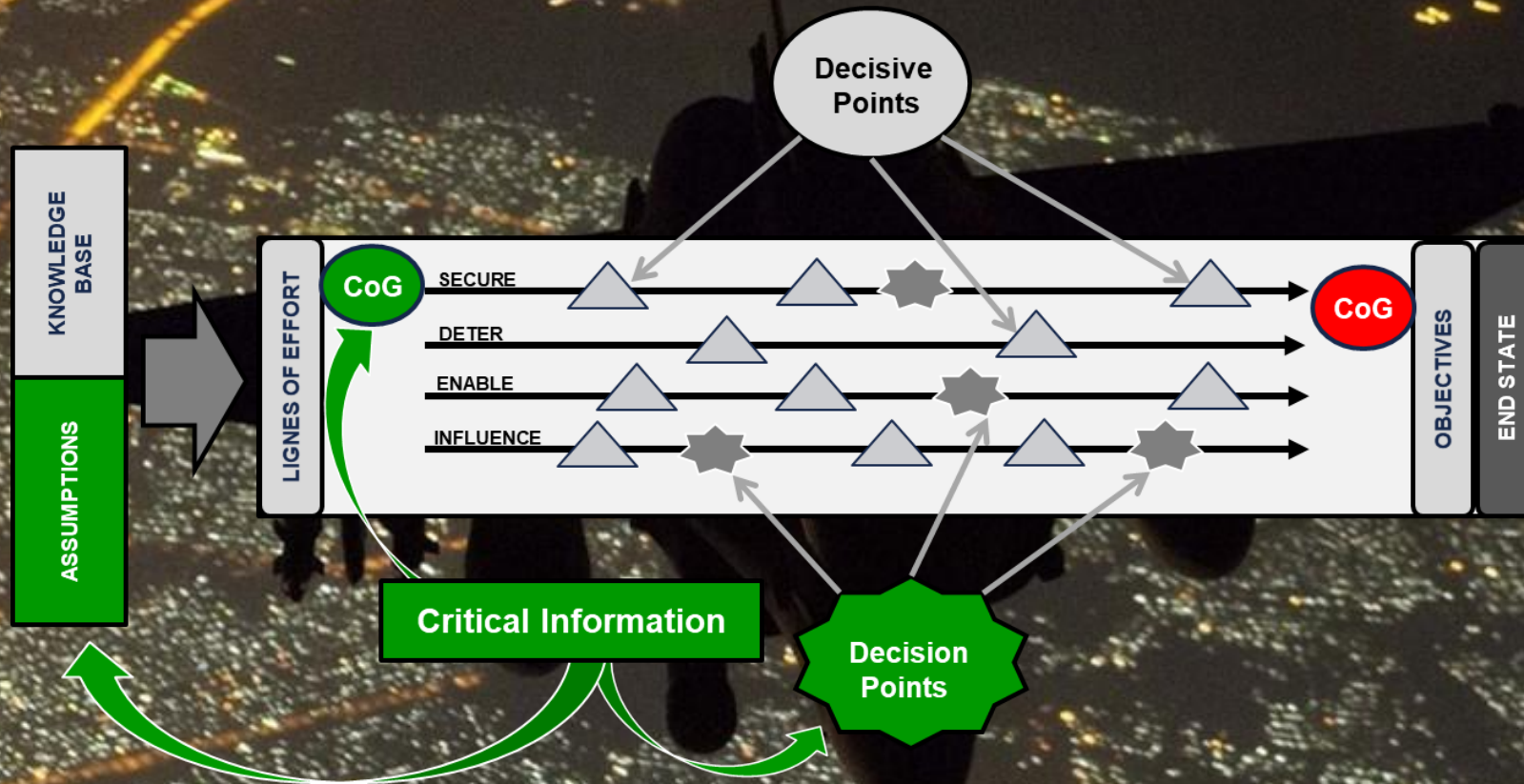
Digitalized Augmented Processes

Assisted Planning

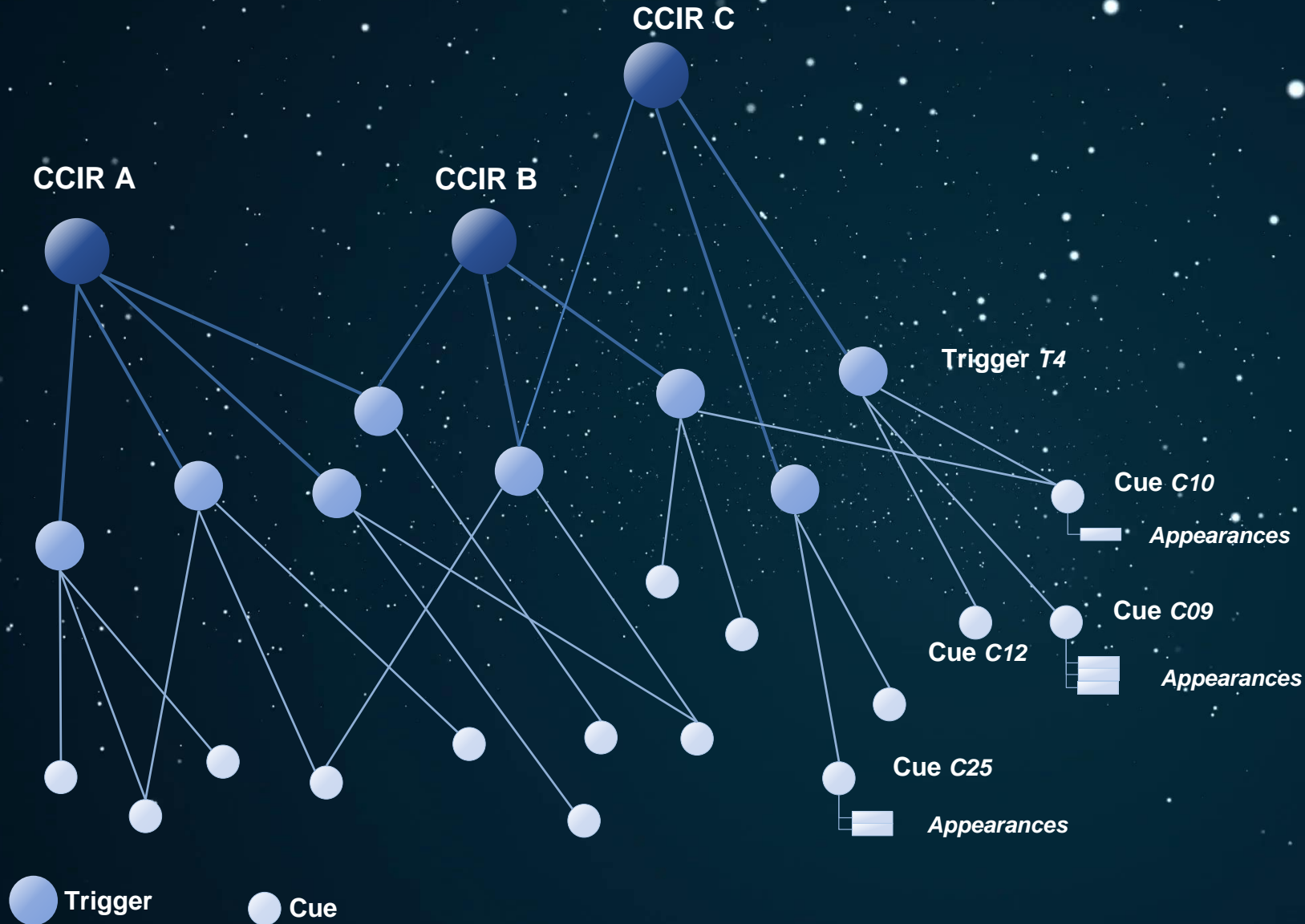
Automated CDE Tool

Wargaming Assistant

Commander's Critical Information Requirement in the Planning Process



An Innovative Data Model

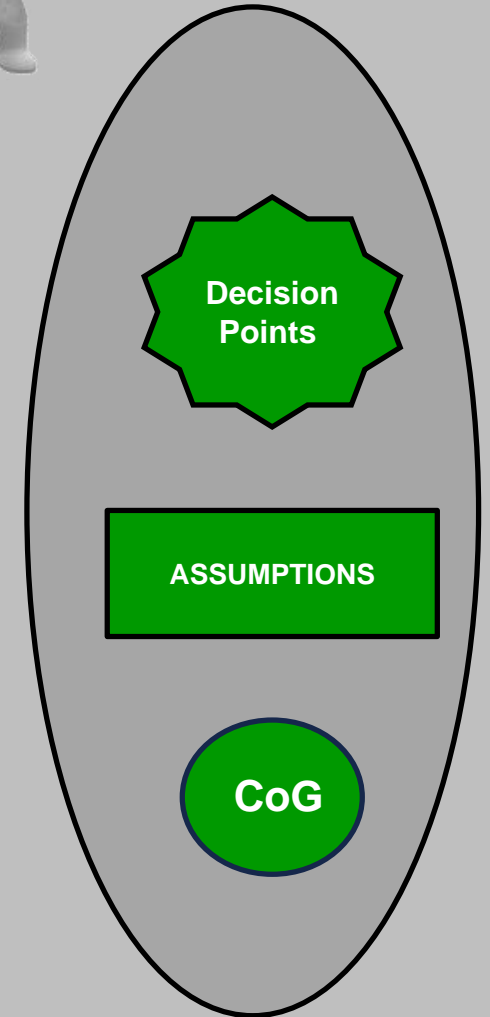


“Reading the Mind of the Enemy”

through “Critical Information” Collection & Processing

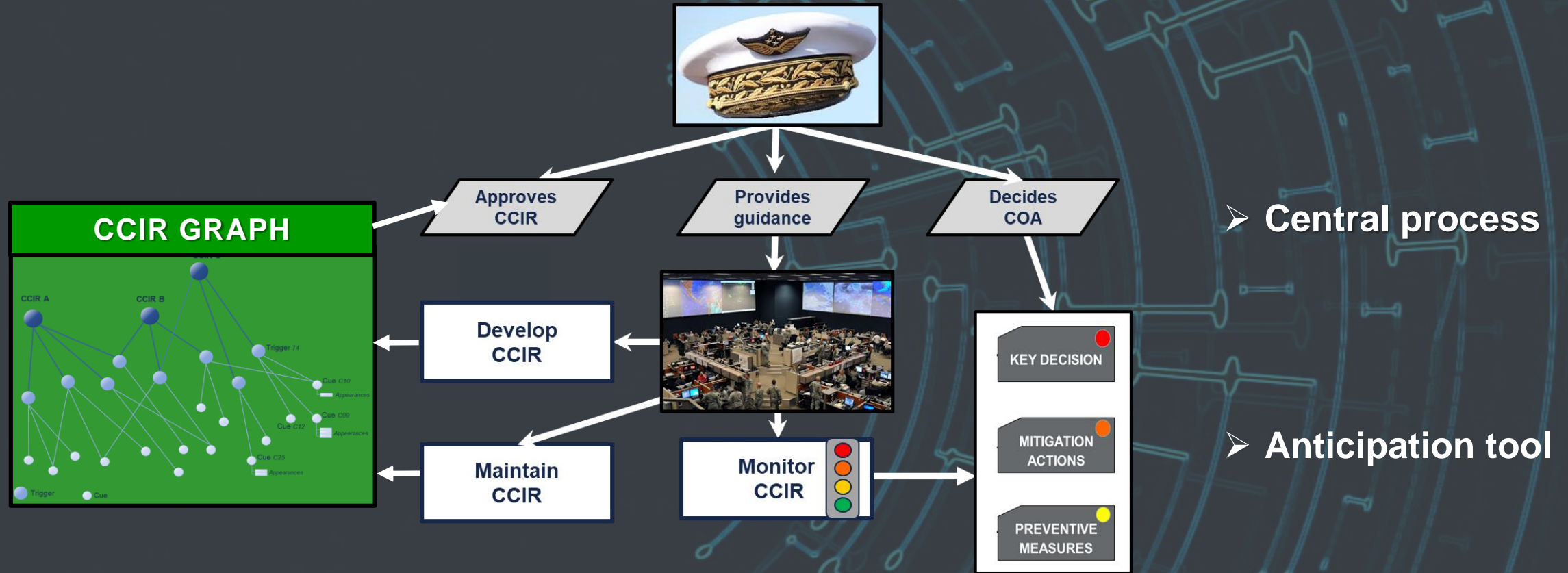


- Status of my Critical Vulnerabilities?
- Status of my Critical Capabilities? Are they threatened?
- Are my Assumptions still valid?
- How are the critical information needed to conduct the plan evolving?
- What might cause key conditions to change?
- What may hurt most?
- What are the opportunities and challenges?
- **How the enemy is conducting actions in multi-domains?**



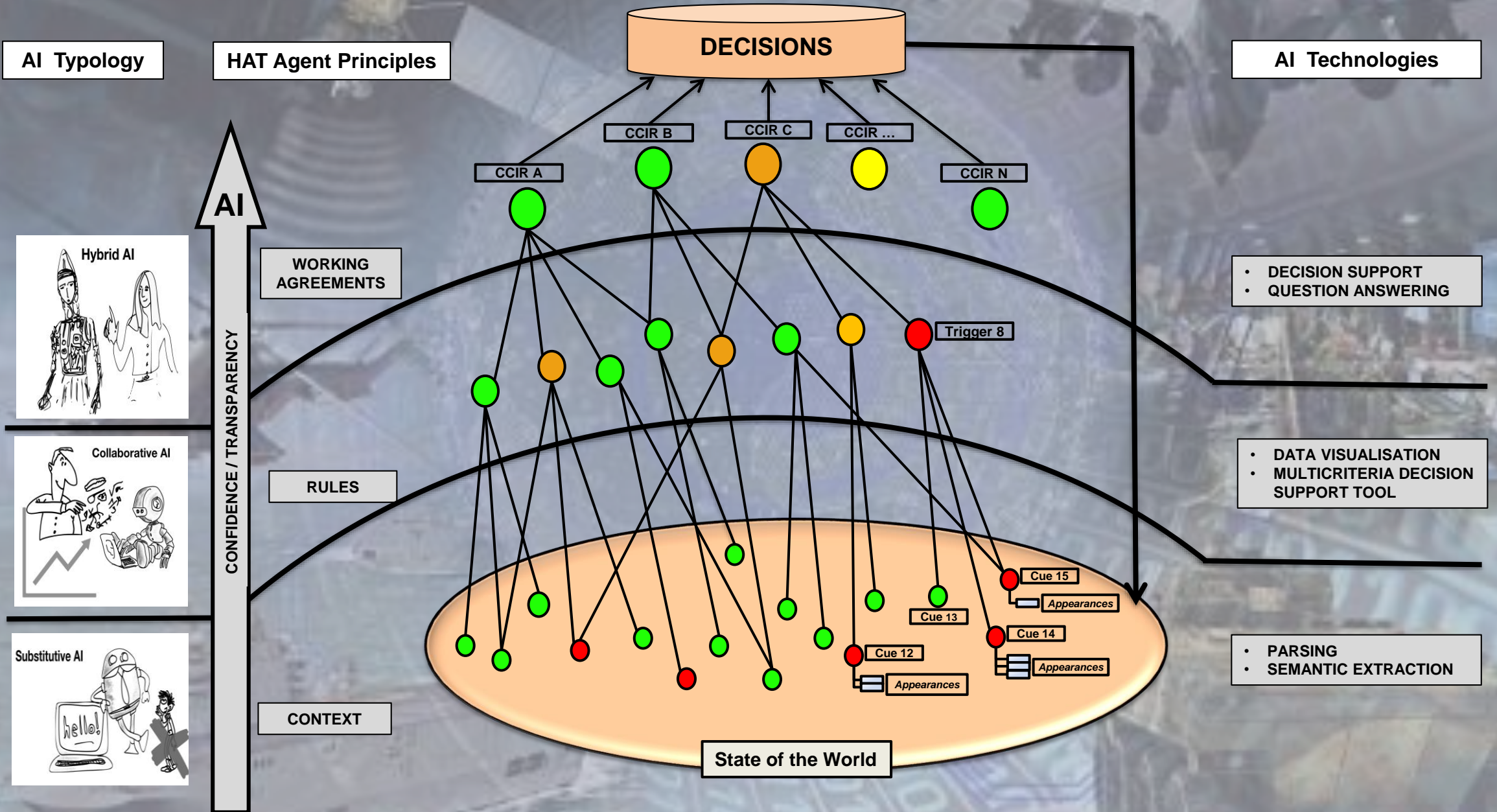
The CCIR Process

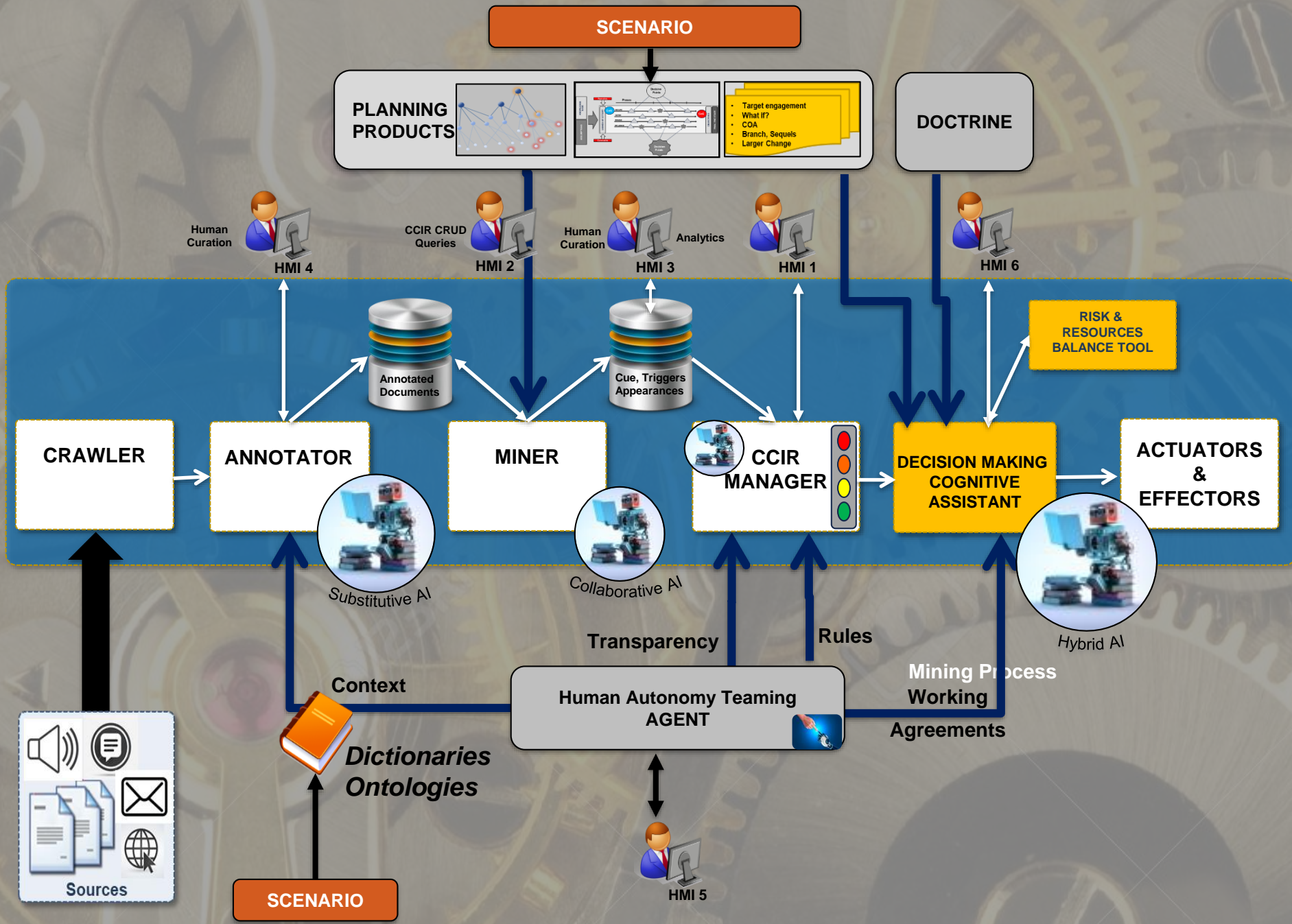
➤ Reducing Information Environment complexity



➤ Focusing on Commander's intents and concerns.

A broad spectrum Human Autonomy Teaming (HAT) System





SCENARIO

PLANNING PRODUCTS

DOCTRINE

Human Curation

HMI 4

CCIR CRUD Queries

HMI 2

Human Curation

HMI 3

Analytics

HMI 1

Human Curation

HMI 6

ANNOTATED DOCUMENTS

Cue, Triggers Appearances

RISK & RESOURCES BALANCE TOOL

CRAWLER

ANNOTATOR

MINER

CCIR MANAGER

DECISION MAKING COGNITIVE ASSISTANT

ACTUATORS & EFFECTORS

Substitutive AI

Collaborative AI

Hybrid AI

Human Autonomy Teaming AGENT

Context

Transparency

Rules

Mining Process Working Agreements

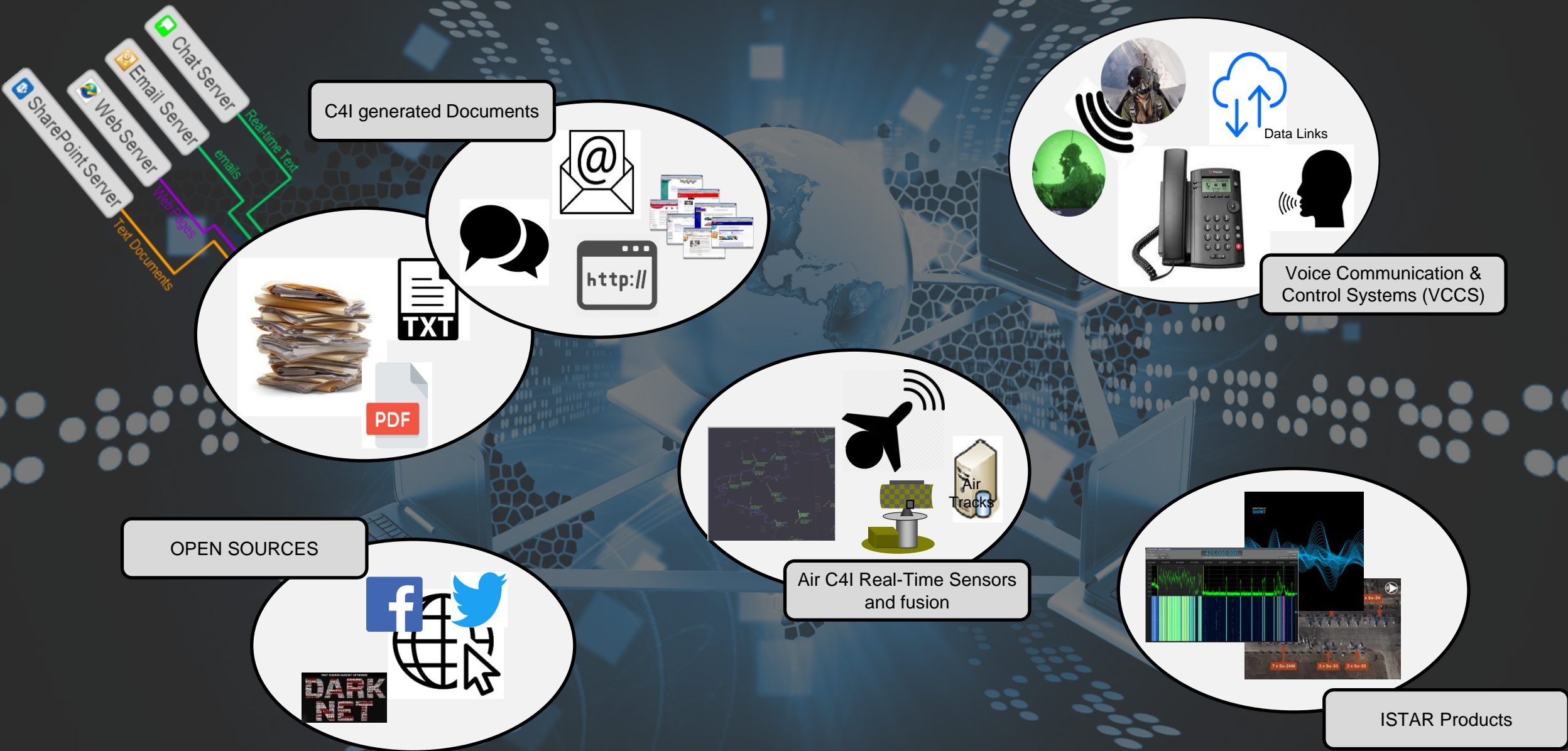
SCENARIO

Sources

Dictionaries Ontologies

HMI 5

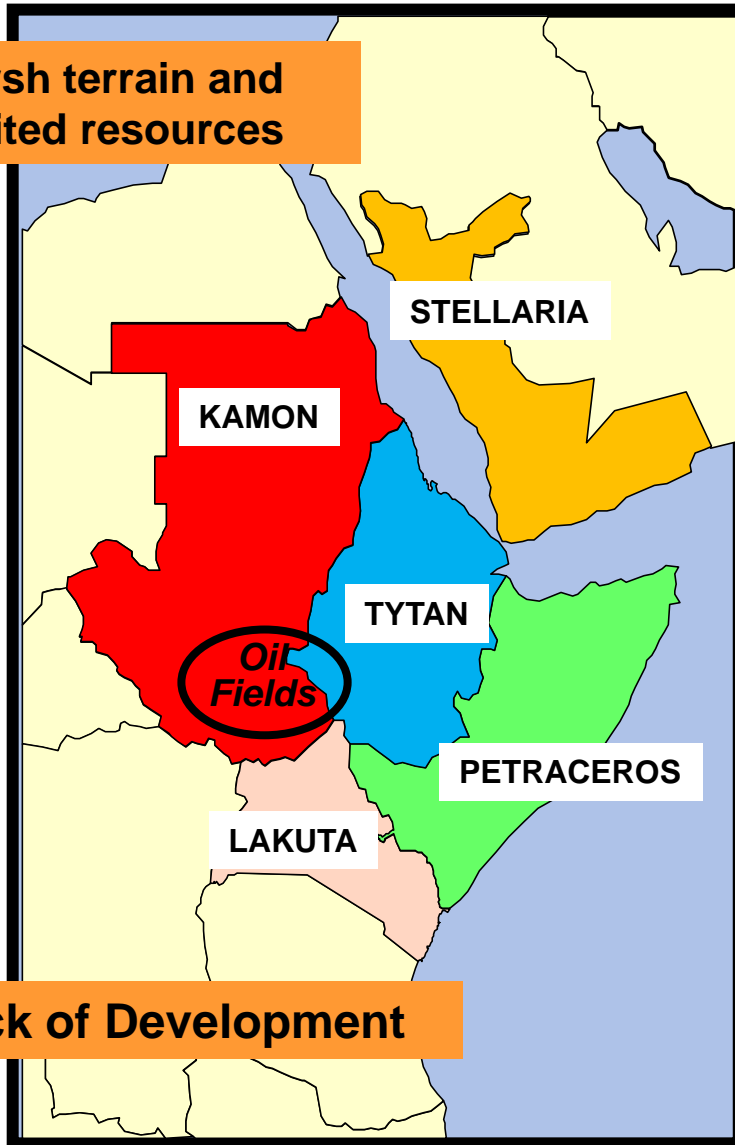
Very diverse and broad sources of information



Development based on a comprehensive and rich scenario

CERASIA Scenario Overview

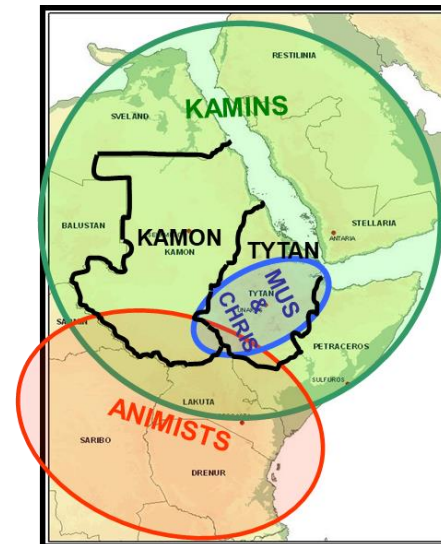
Harsh terrain and limited resources



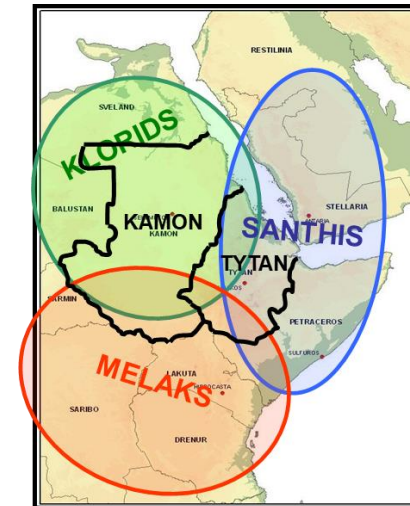
Lack of Development

❖ NATO is deployed in TYTAN.

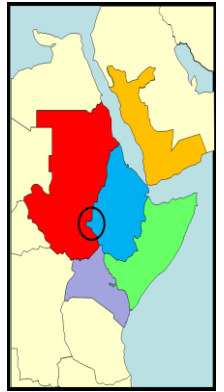
Religious factor



Ethnic factor



CCIR development from CERASIA scenario

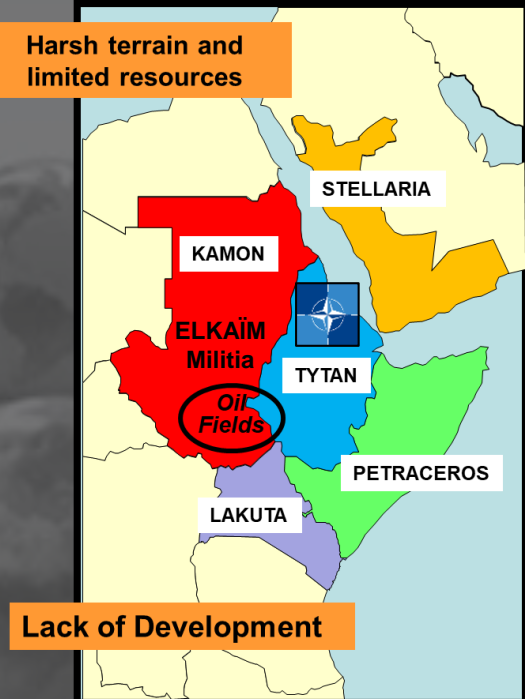


DOMAIN	CFAC CCIR
Physical	1 - KAMON or Proxies major offensive preparation
	2 - Serious disruption to theater Air Logistics
	3 - STELLARIA / KAMON TBM use or intent of use
	8 - Loss or Important threat to CFAC forces
Virtual	5 - Major Anti-Access/Area Denial to CFAC Forces
	9 - Any Event leading to high Media interest involving CFAC
	10 - Opponent Information Campaign leading to CFAC support change
Social	4 - Major threat to TYTAN internal stability
	6 - Humanitarian situation in TORI Pocket
	7 - STELLARIA change of posture



T3	TYTAN Border violation	
	C5	KAMON army Tori border activity
	C6	TYTAN Airspace violation
T8	Cyber activity	
	C16	C4I Malware attack attempts
	C17	DoS attacks – DNS-based Data exfiltration
T9	TYTAN Airspace Denial	
	C18	KAMON S400 activity and position
	C19	KAMON Air activity along border
T10	Space & EM Spectrum Anti-access	
	C20	GPS Jamming observation
	C21	Coms jamming and intrusions

CCIR N°1 Example



« **CAUTION** - Manpads seen with ELKAİM tribe fighters IVO BANJU »



KAMON activity along border

Violation of TYTAN airspace

C8

C9

Preventive Decisions

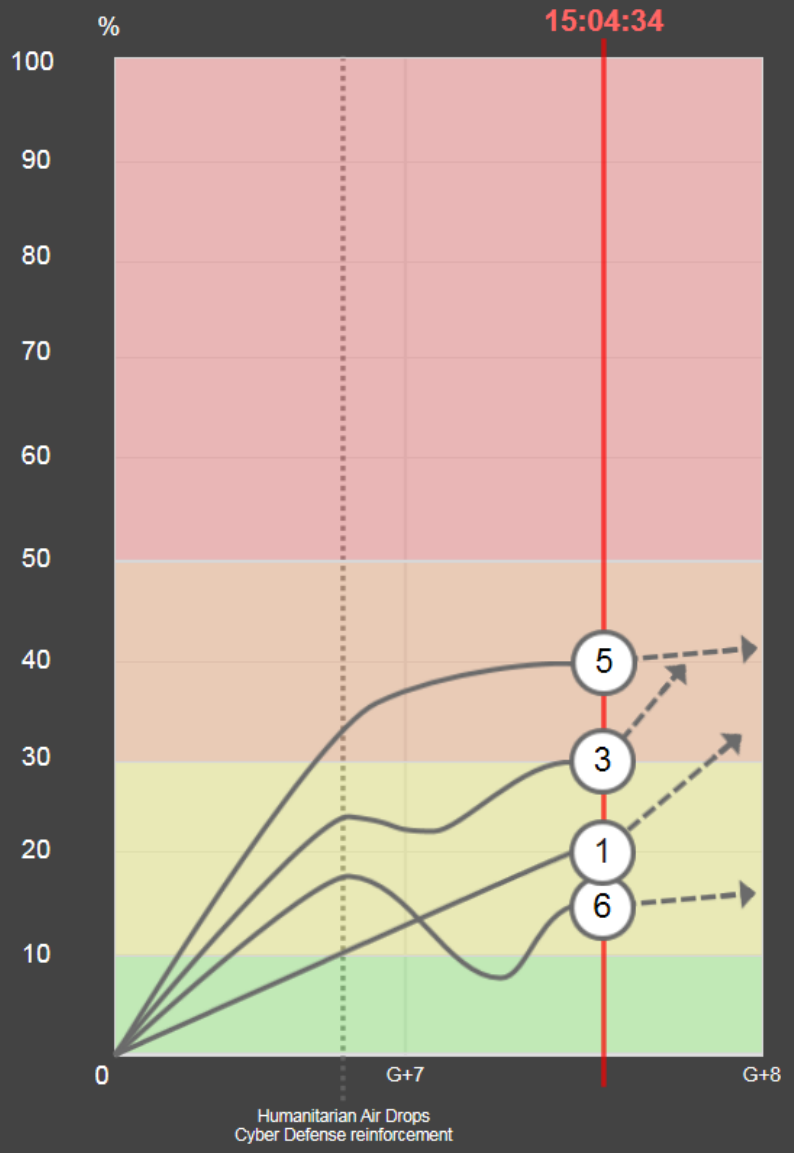
- Helo flights under restrictions
- BPT CAS CAP over Tori / Banju

CCIR DASHBOARD

- 1 KAMON or Partner major offensive preparation 20%
- 2 Serious disruption to theatre log 0%
- 3 KAMON TBM use / intend of use 30%
- 4 Major threat to TYTAN internal stability 5%
- 5 Major Anti-Access / Aera Denial to CFAC forces 40%
- 6 Humanitarian situation in TORI pocket 15%
- 7 STELLARIA change of posture 5%



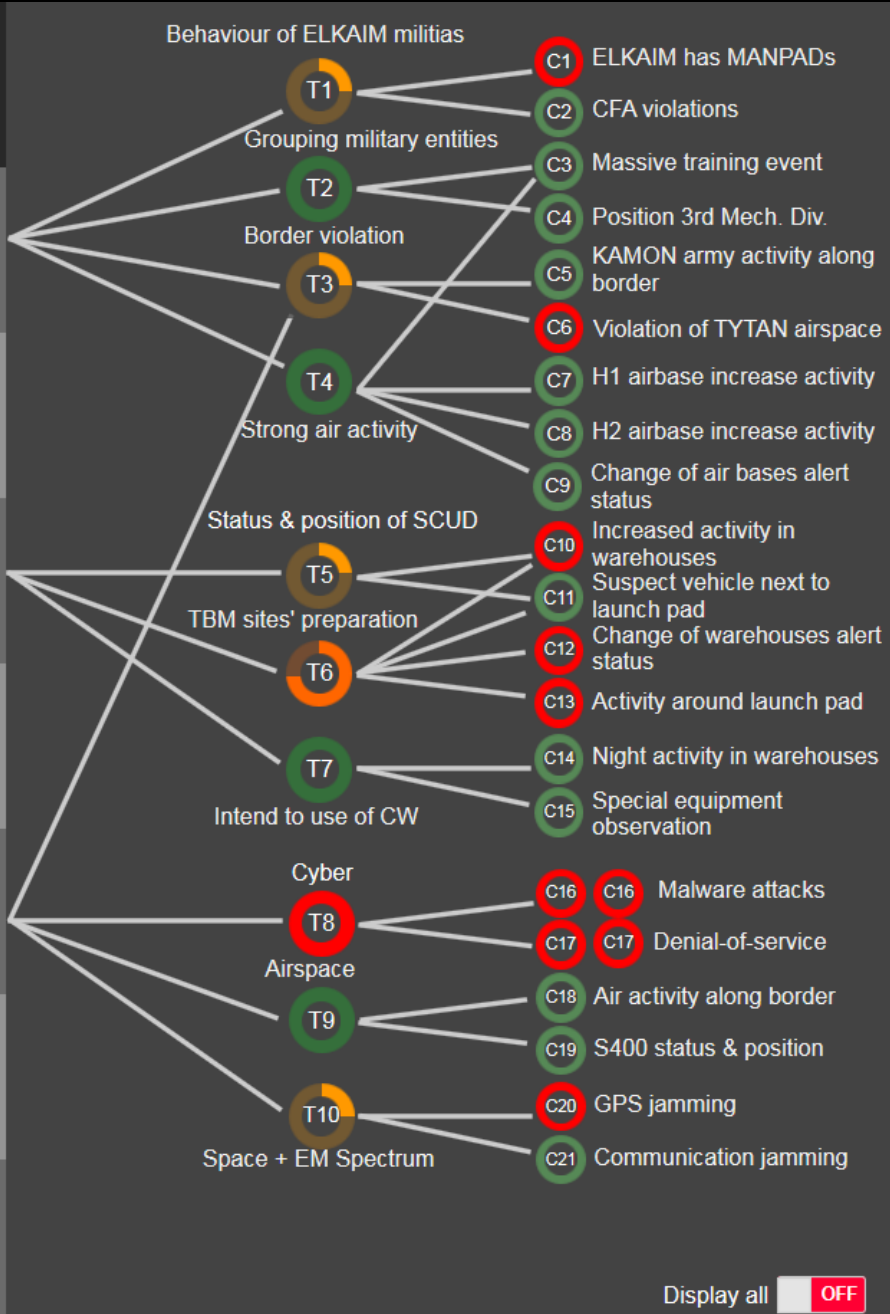
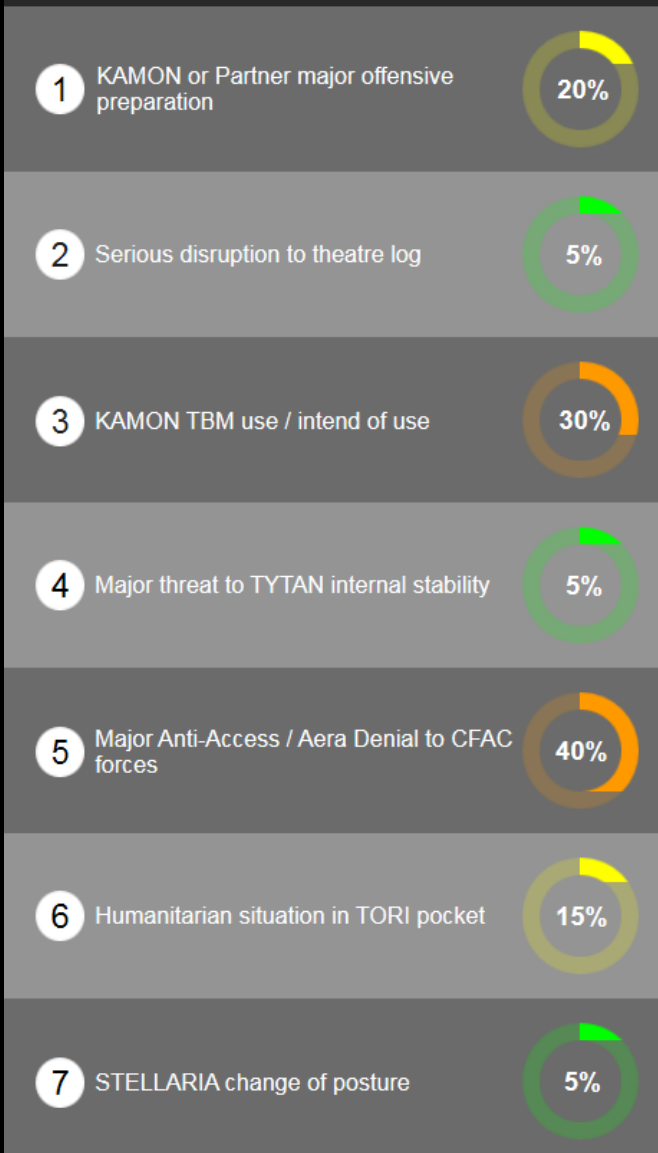
G+7



ONGOING ACTIONS

- 1 ISR surge
HUMINT reinforcement in TORI pocket
- 2
- 3 Elevate force protection level
Transfer OPCON of CBRN BN to LCC
SHAPE advised for diplomatic pressure
- 4
- 5 Space surveillance surge
Cyber counter measures in force
- 6 Increase humanitarian aid delivery by air drop
- 7

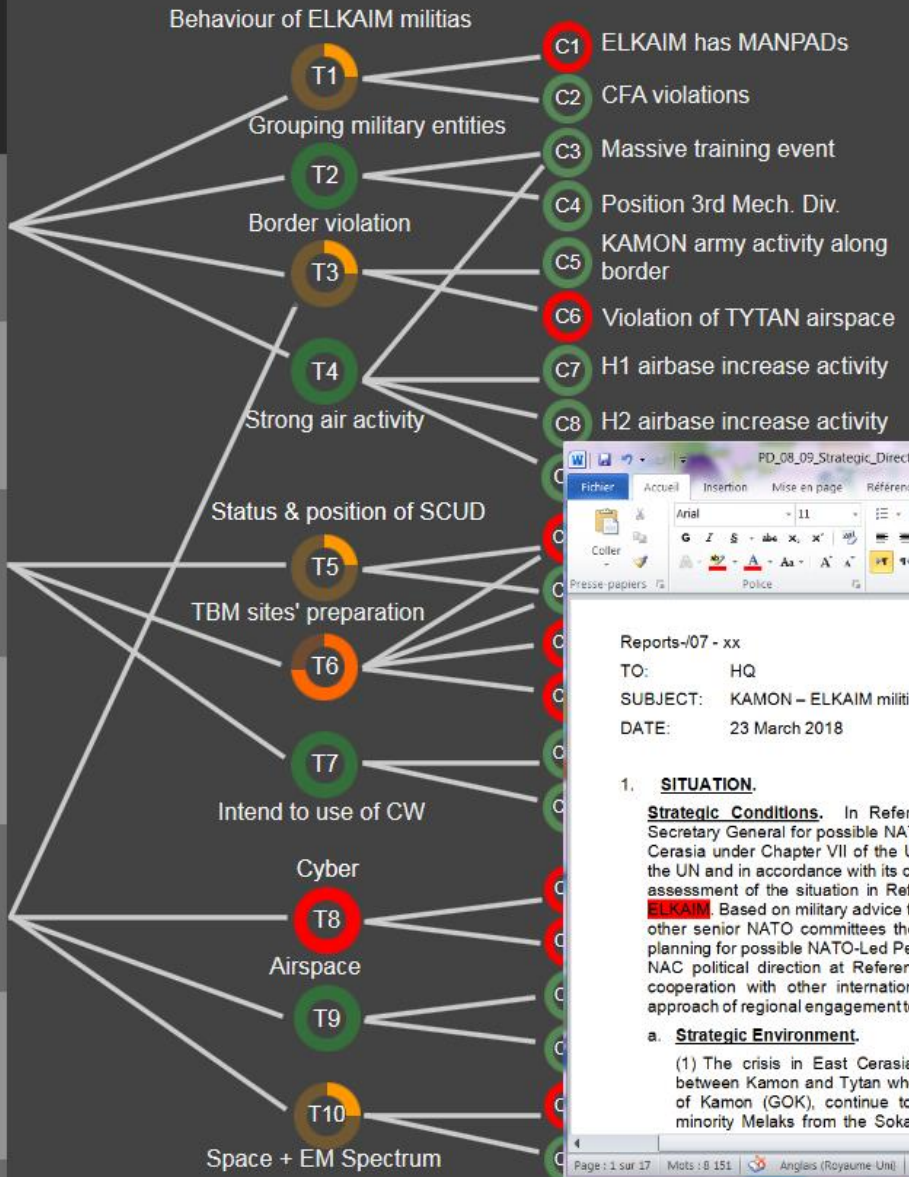
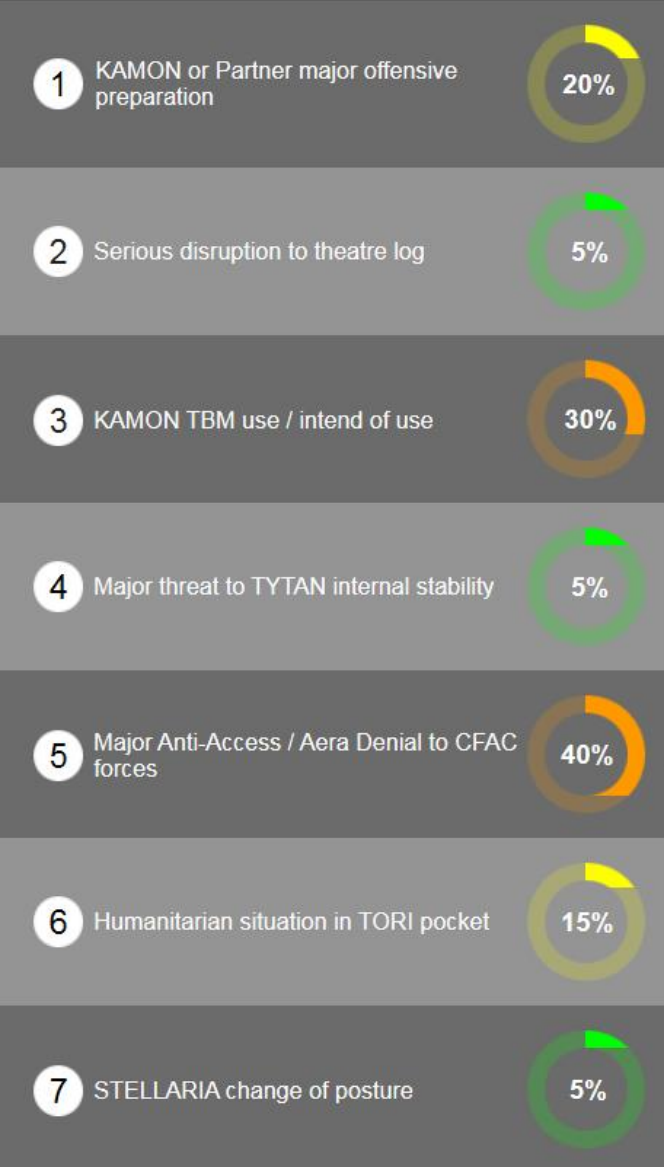
CCIR DASHBOARD



TRANSPARENCY

Display all OFF

CCIR DASHBOARD



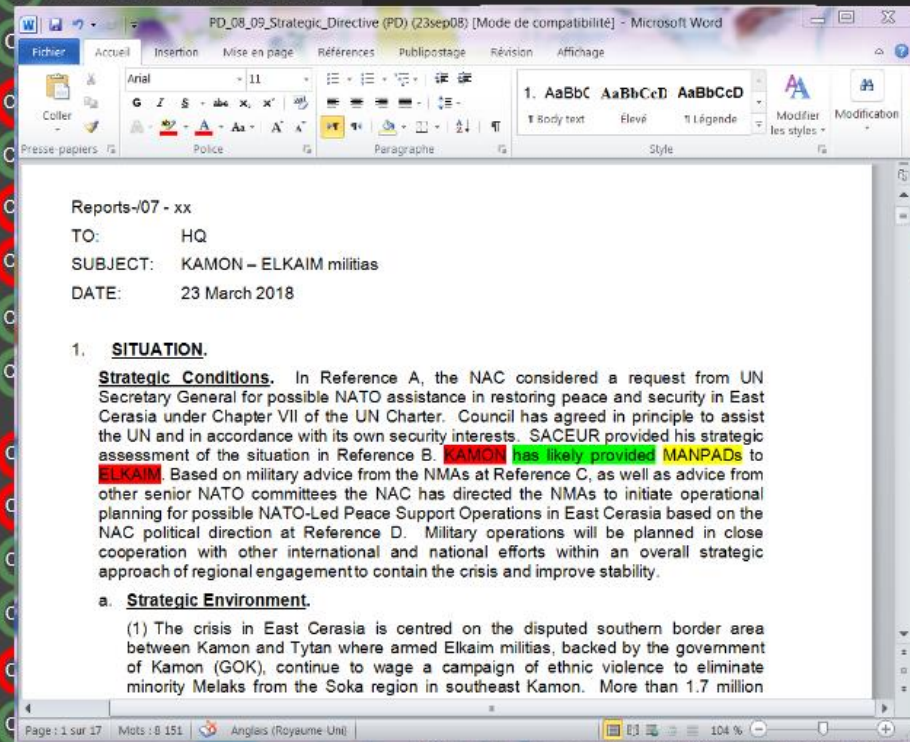
TRANSPARENCY



C1 ELKAIM has MANPADs

Day 02 - 23:54:07

HUMINT "KAMON has likely provided MANPADs to ELKAIM"



CCIR DASHBOARD

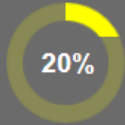


G+7

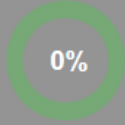


GOING ACTIONS

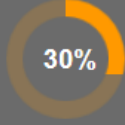
1 KAMON or Partner major offensive preparation



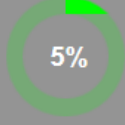
2 Serious disruption to theatre log



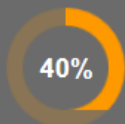
3 KAMON TBM use / intend of use



4 Major threat to TYTAN internal stability



5 Major Anti-Access / Aera Denial to CFAC forces



6 Humanitarian situation in TORI pocket



7 STELLARIA change of posture



%

100

90

80

70

60

50

40

30

20

10

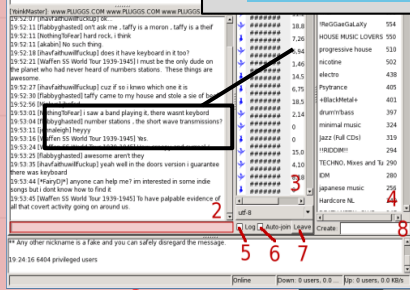
0

15:04

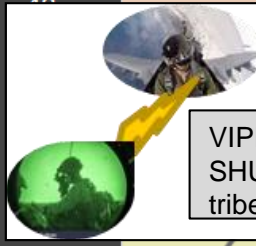
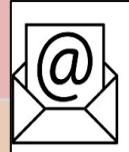


Kamon news: « ... S400 will be deployed to counter NATO aggression ... »

« 12H24 violation TYTAN Airspace at KM 234 567 by KAMON MIG29 »



« ... GPS jamming reported from 9.00 to 14.00 DAY 6 around MANRITA ... »



VIPER 43: « SHUKA 6 VIPER 43 Ready to copy 9 Line »
SHUKA 6: « CAUTION - Manpads seen with ELKAIM tribe fighters IVO BANJU »



« ... Elements of 3rd Division closing Border inbound Tori Pocket »

reinforcement in TORI pocket

Elevate force protection level
3 Transfer OPCON of CBRN BN to LCC
SHAPE advised for diplomatic pressure

Space surveillance surge
Cyber counter measures in force

6 Increase humanitarian aid delivery by air drop

7

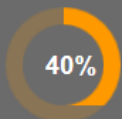
G+7

G+8

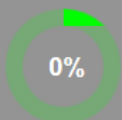
Humanitarian Air Drops
force reinforcement

CCIR DASHBOARD

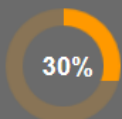
1 KAMON or Partner major offensive preparation



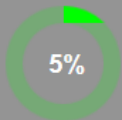
2 Serious disruption to theatre log



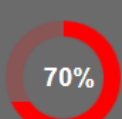
3 KAMON TBM use / intend of use



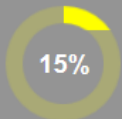
4 Major threat to TYTAN internal stability



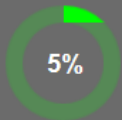
5 Major Anti-Access / Aera Denial to CFAC forces



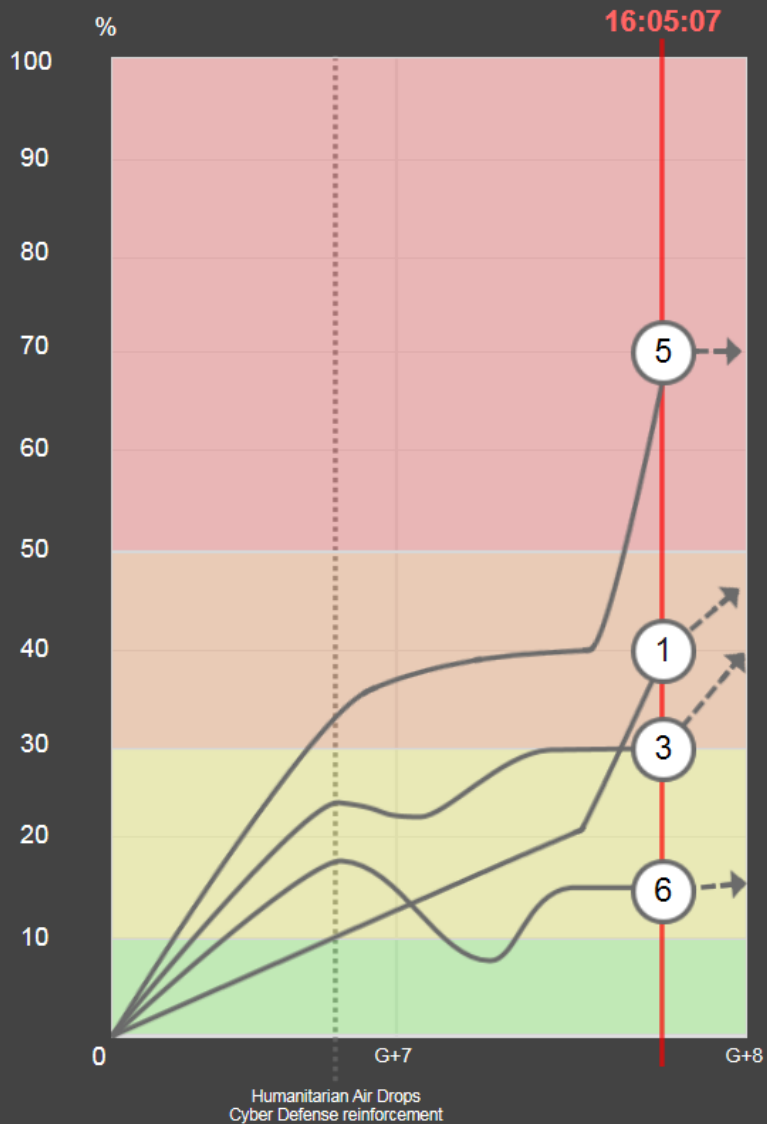
6 Humanitarian situation in TORI pocket



7 STELLARIA change of posture



G+7



ONGOING ACTIONS

1 ISR surge
1 HUMINT reinforcement in TORI pocket

2

3 Elevate force protection level
3 Transfer OPCON of CBRN BN to LCC
SHAPE advised for diplomatic pressure

4

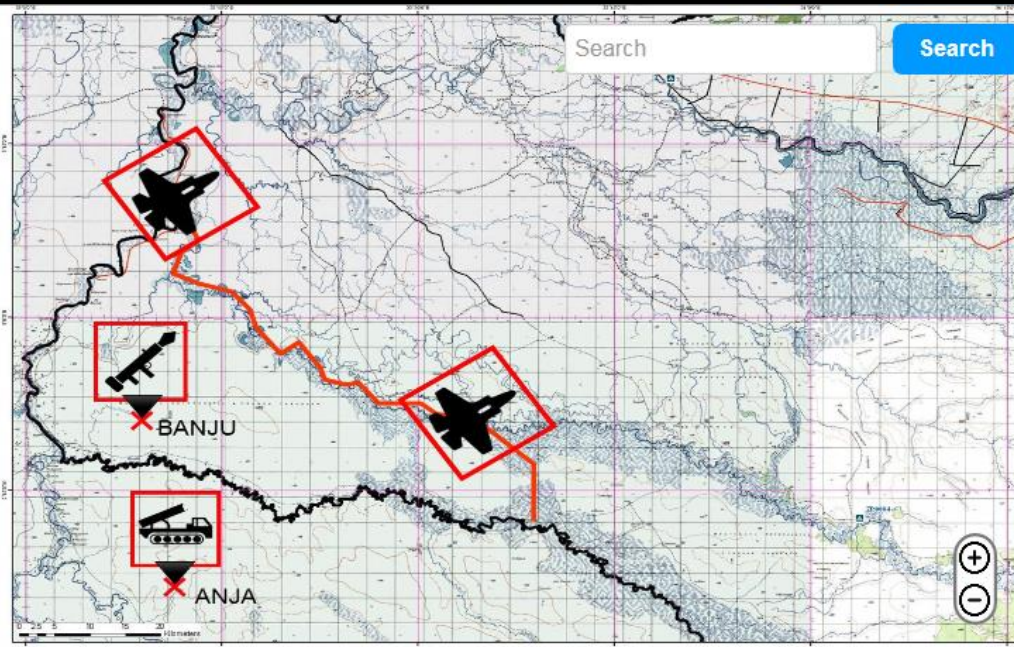
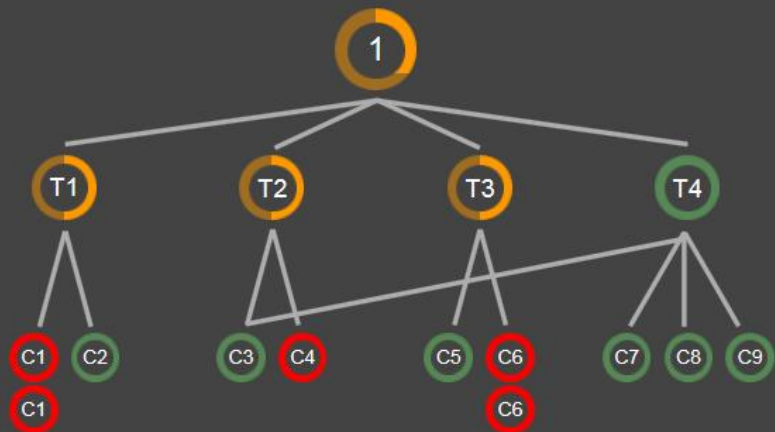
5 Space surveillance surge
5 Cyber counter measures in force

6 Increase humanitarian aid delivery by air drop

7



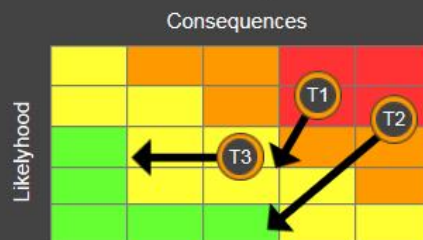
KAMON or partner major offensive preparation



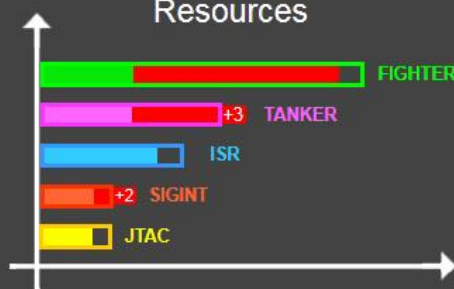
Synchronization Matrix & Recommendations

	G+7	
T1	HUMINT reinforcement in Tori Pocket Helo flight under restrictions BPT CAS CAP over Tori	
T2	Prepare Branch Neutralize 3rd Mec. Div. ISR Surge	
T3	Airborne SIGINT 24/7 Permanent CAP East Tori Pocket	
T4		


Risk Analysis





Resources



Query box

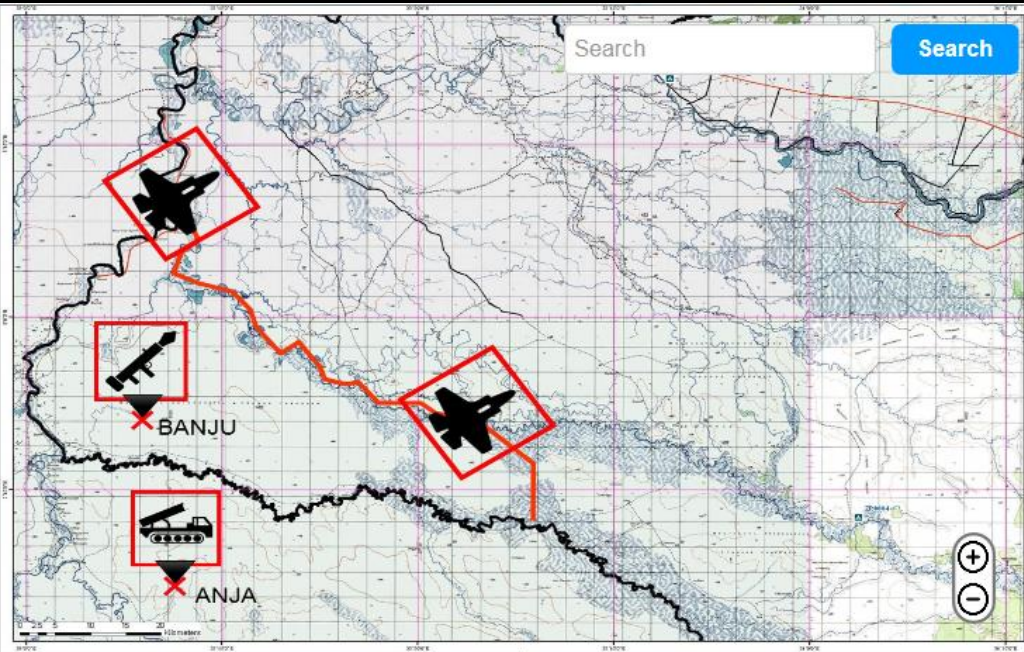
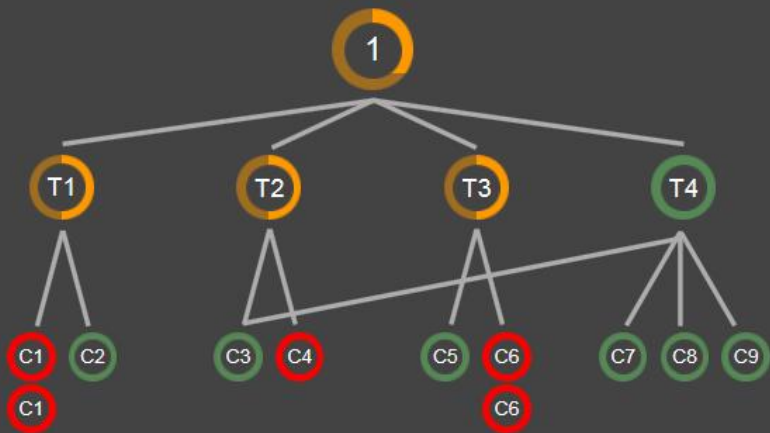
Query T3 : Number of tanker involved for permanent CAP ? 

4 tankers 

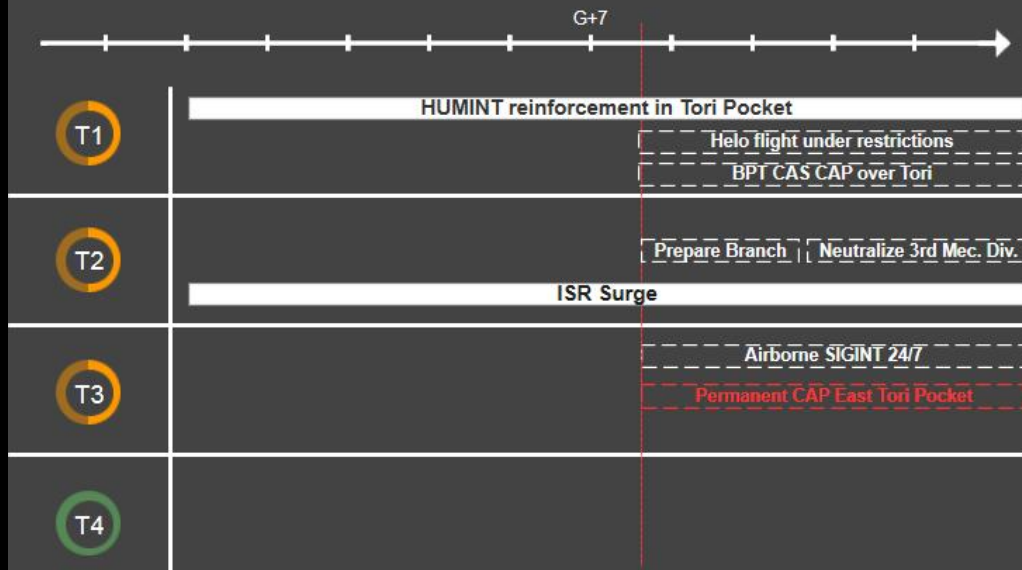
Query T1 : Available aircraft in range Banju ? 

Send your message

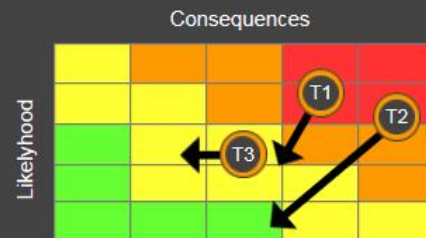
KAMON or partner major offensive preparation



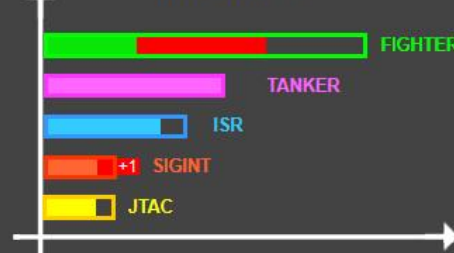
Synchronization Matrix & Recommendations




Risk Analysis





Resources



Query box

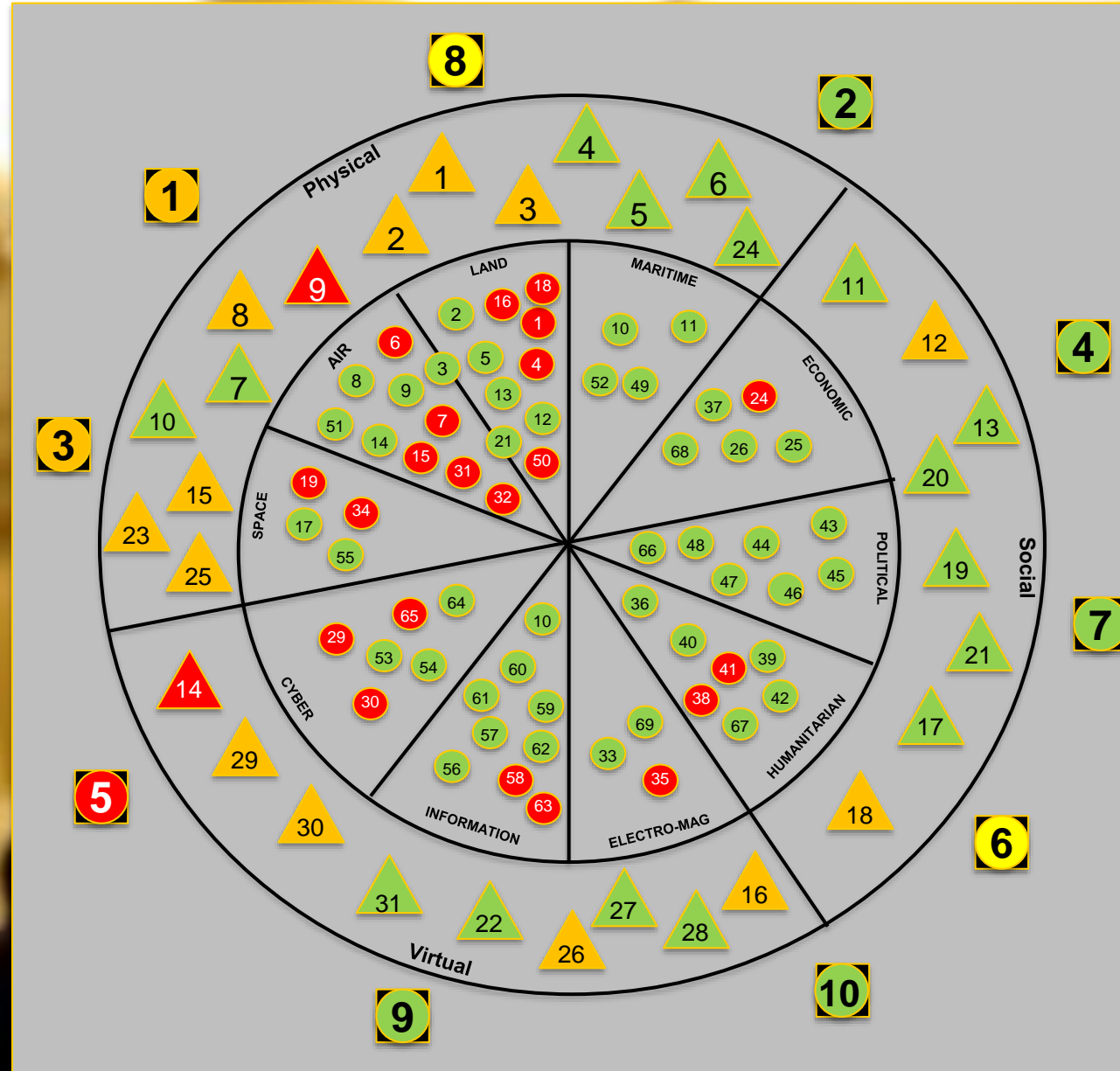
Query T3 : Number of tanker involved for permanent CAP ? 

4 tankers 

Query T1 : Available aircraft in range Banju ? 

Send your message

Multi-domain View

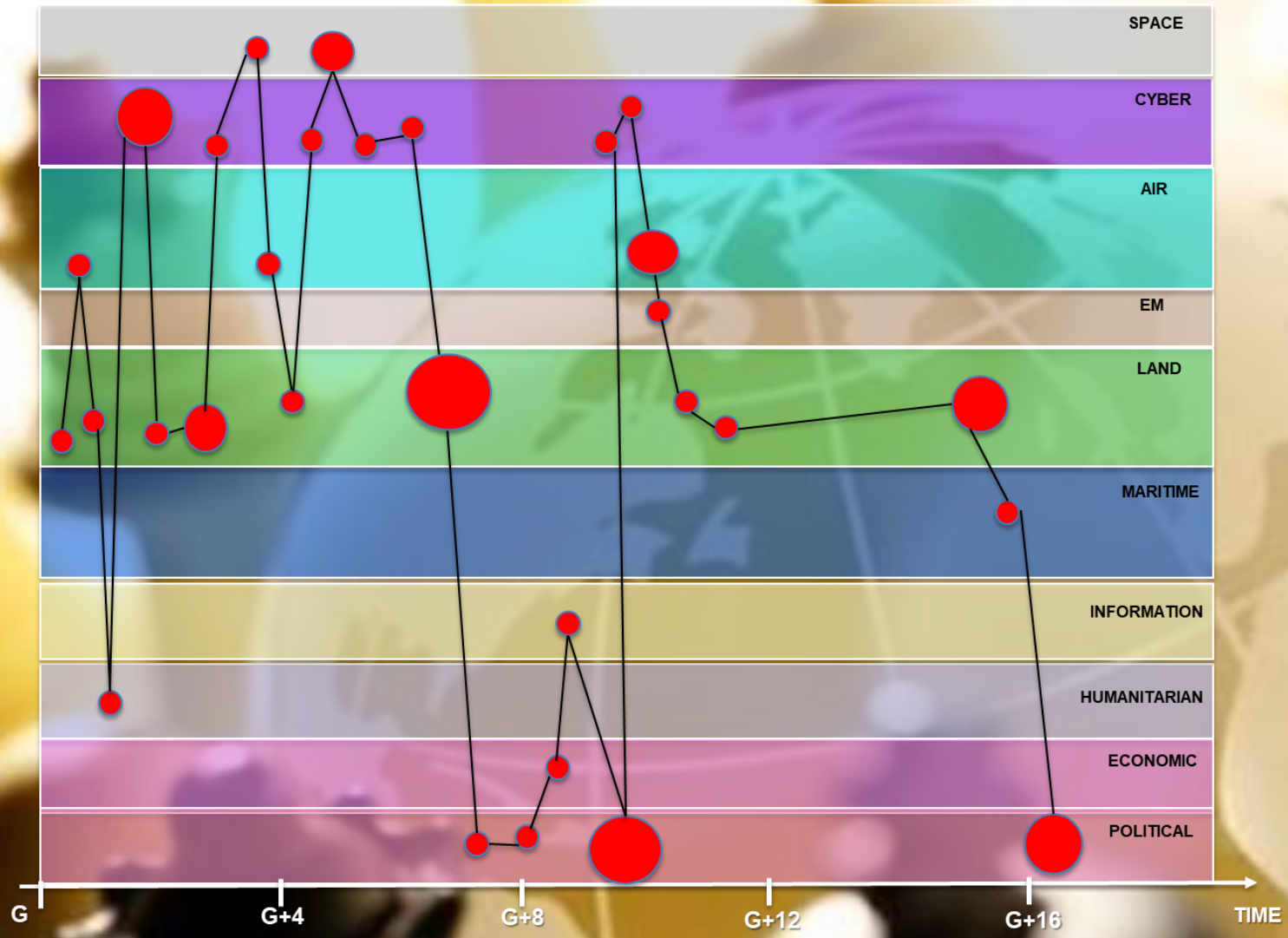






Adversaries Multi-domain Operations – RADAR VIEW



Adversaries Multi-domain Operations – SEISMOGRAPH VIEW

 Cues appearance and Weighting



	Know	Don't know
Know		
Don't know		

➤ **Addressing complexity**

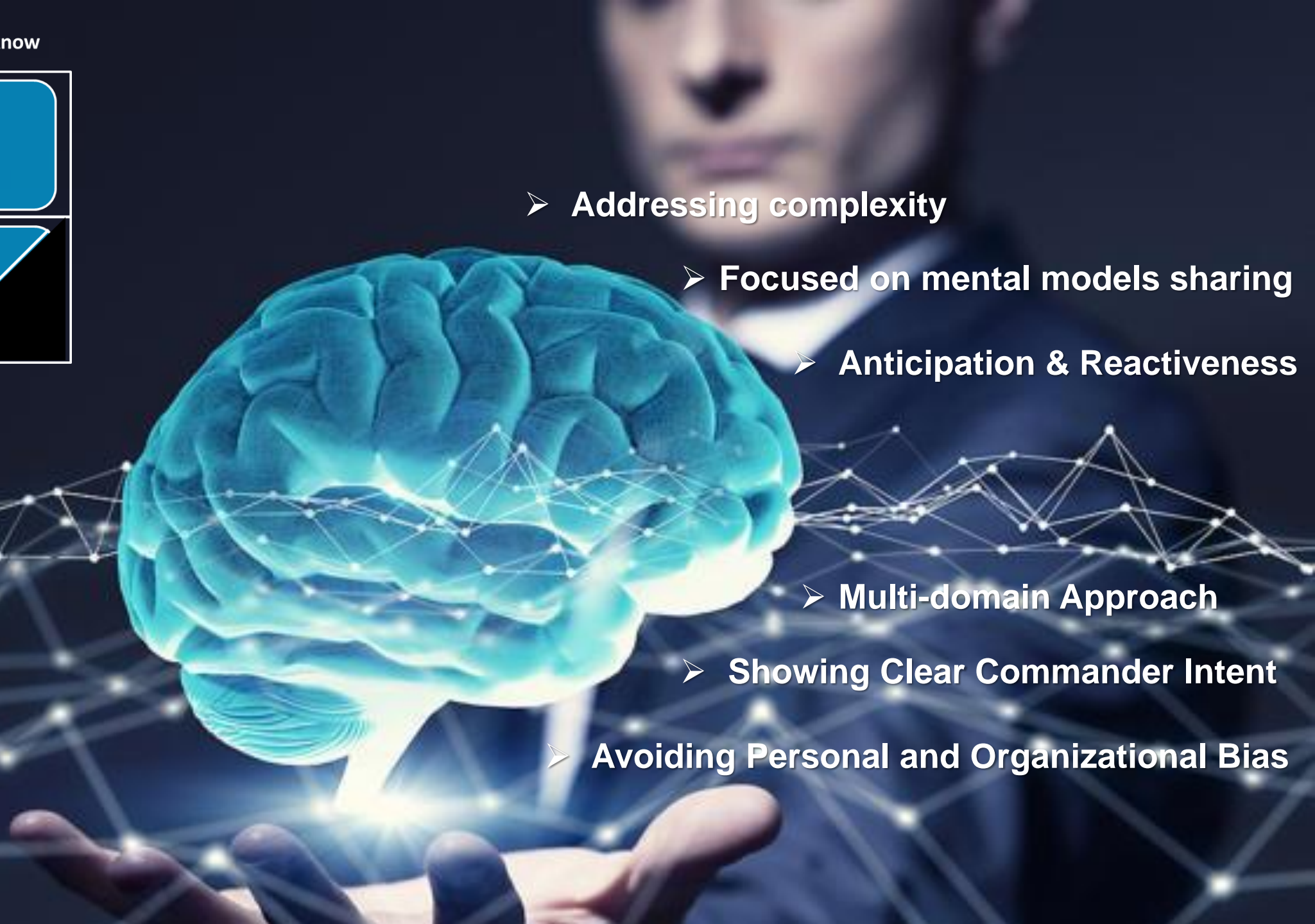
➤ **Focused on mental models sharing**

➤ **Anticipation & Reactiveness**

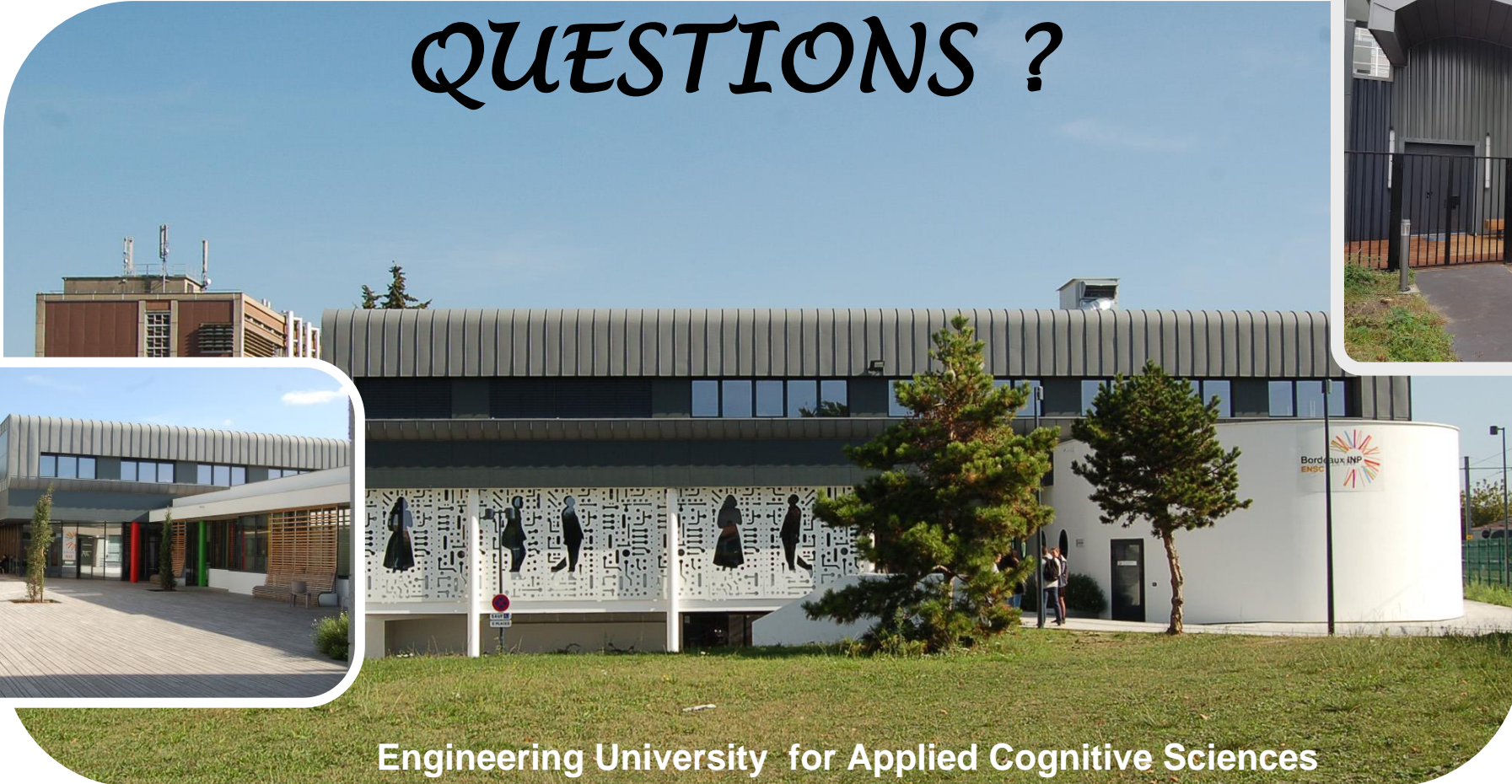
➤ **Multi-domain Approach**

➤ **Showing Clear Commander Intent**

➤ **Avoiding Personal and Organizational Bias**



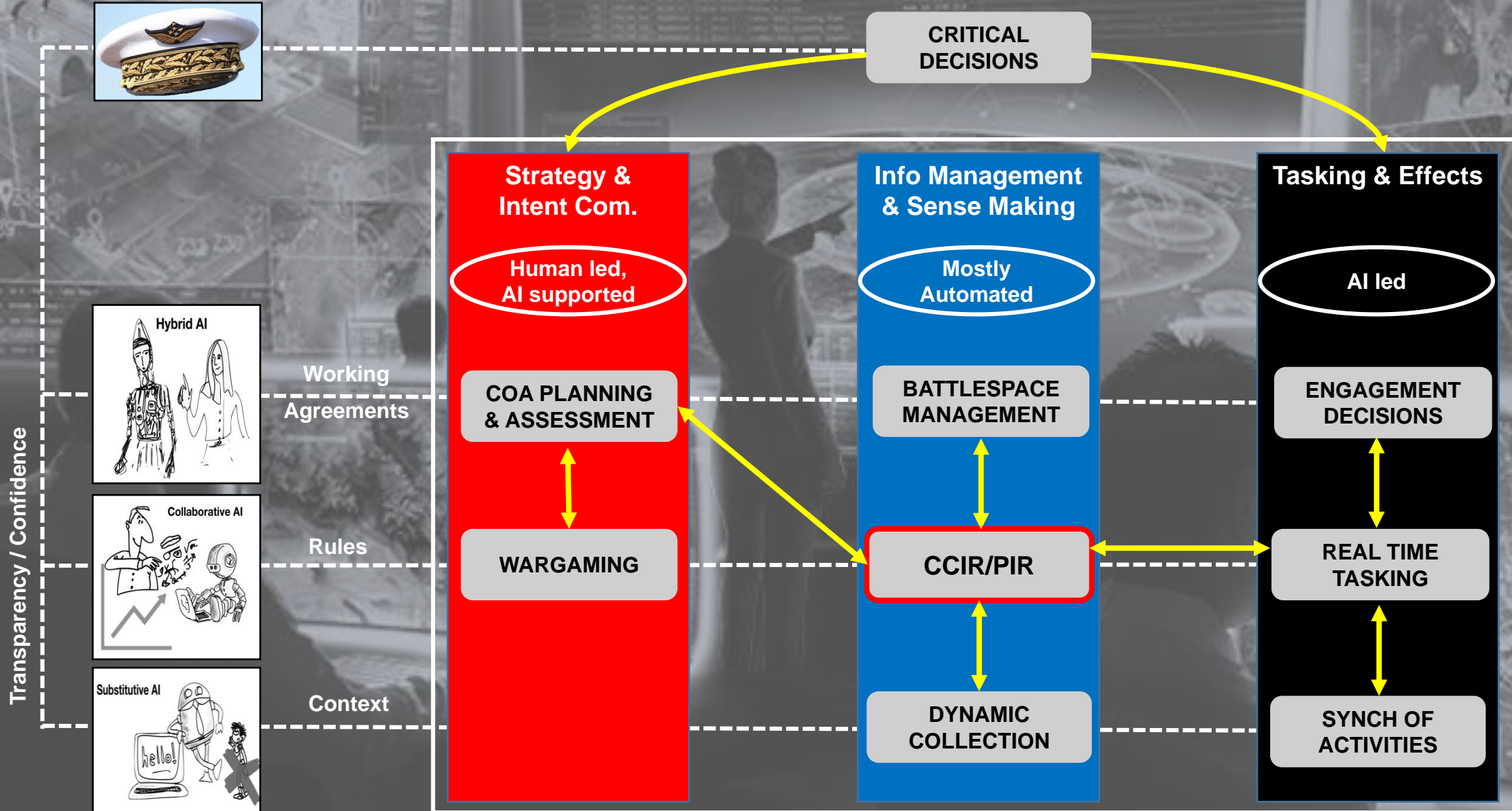
QUESTIONS ?



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Phd Damien MARION, THALES RAYTHEON SYSTEMS – damien.marion@thalesraytheon-fr.com
LAB Lead: Prof. Bernard CLAVERIE, Director ENSC – bernard.claverie@ensc.fr

Multi-Domain Ops Center* Organization / Key Functions



Key Definitions



CCIR:

Information requirement identified by commanders as being critical to facilitating decision making, allowing to verify assumptions or protecting our own centers of gravity. Limited in number, they are developed during the design and planning process and change as the mission, priorities and operating environment changes.

TRIGGER:

Anything, as an act, event or situation, that serves as a stimulus and initiates or precipitates a reaction or series of reactions that may cause the emergence of a critical information.

CUE:

A weak signal, an element of information that can appear random or disconnected, or at first taken for a background noise, but which is recognized as important by linking it to other pieces of information.