



# THE OPERATIONS INTENT AND EFFECTS MODEL: A COMMAND AND CONTROL METHODOLOGY FOR INCREASED AUTOMATION

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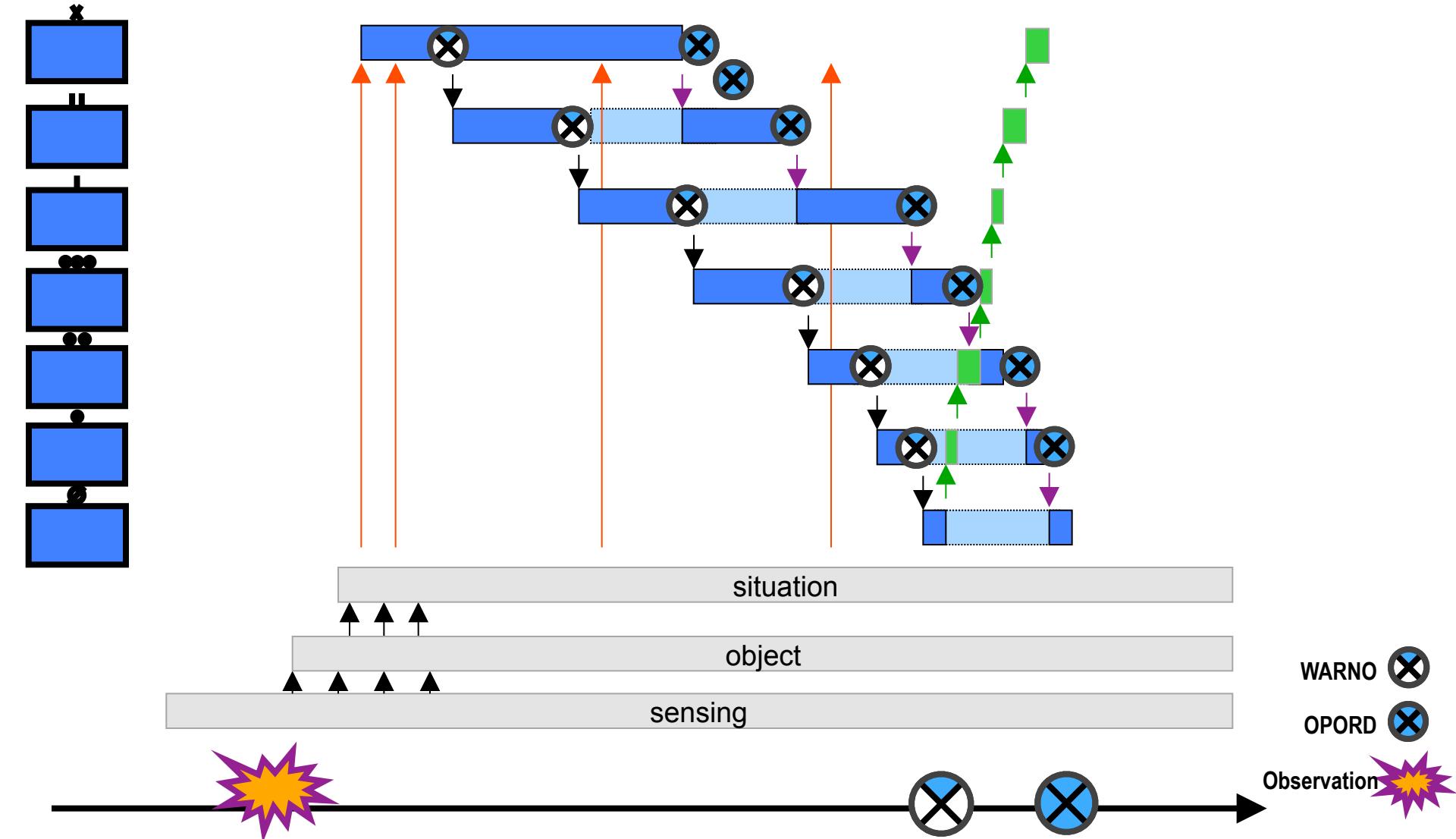
18th ICCRTS  
20 June 2013

- Command and Control (C2) is viewed as an increasing important part of future military technologies.
- While recent C2 theory has focused on desirable features of complex organizations, such as Agility, and emerging work is looking at social media approaches – the key issues for many nations and programs are how to integrate and benefit from increased automation.
- Rapid advances in Robotic and Simulation technologies are very apparent and challenge the current C2 methodologies that rely upon intensive human intervention and monitoring.
- Future C2 will need to accommodate “mixed” forces of Humans and Robots.

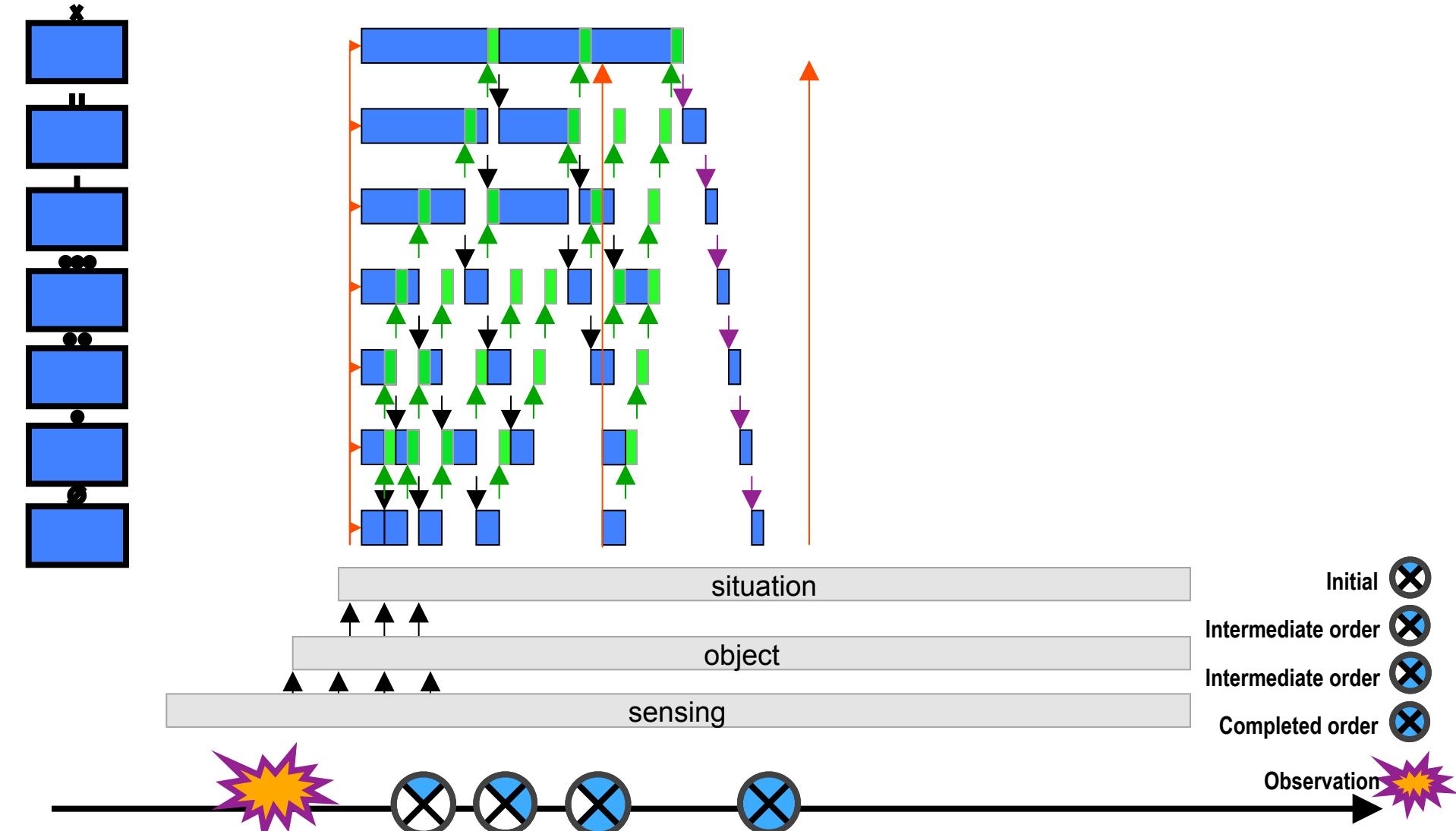
# C2 AGILITY



# GOP / MDMP etc.

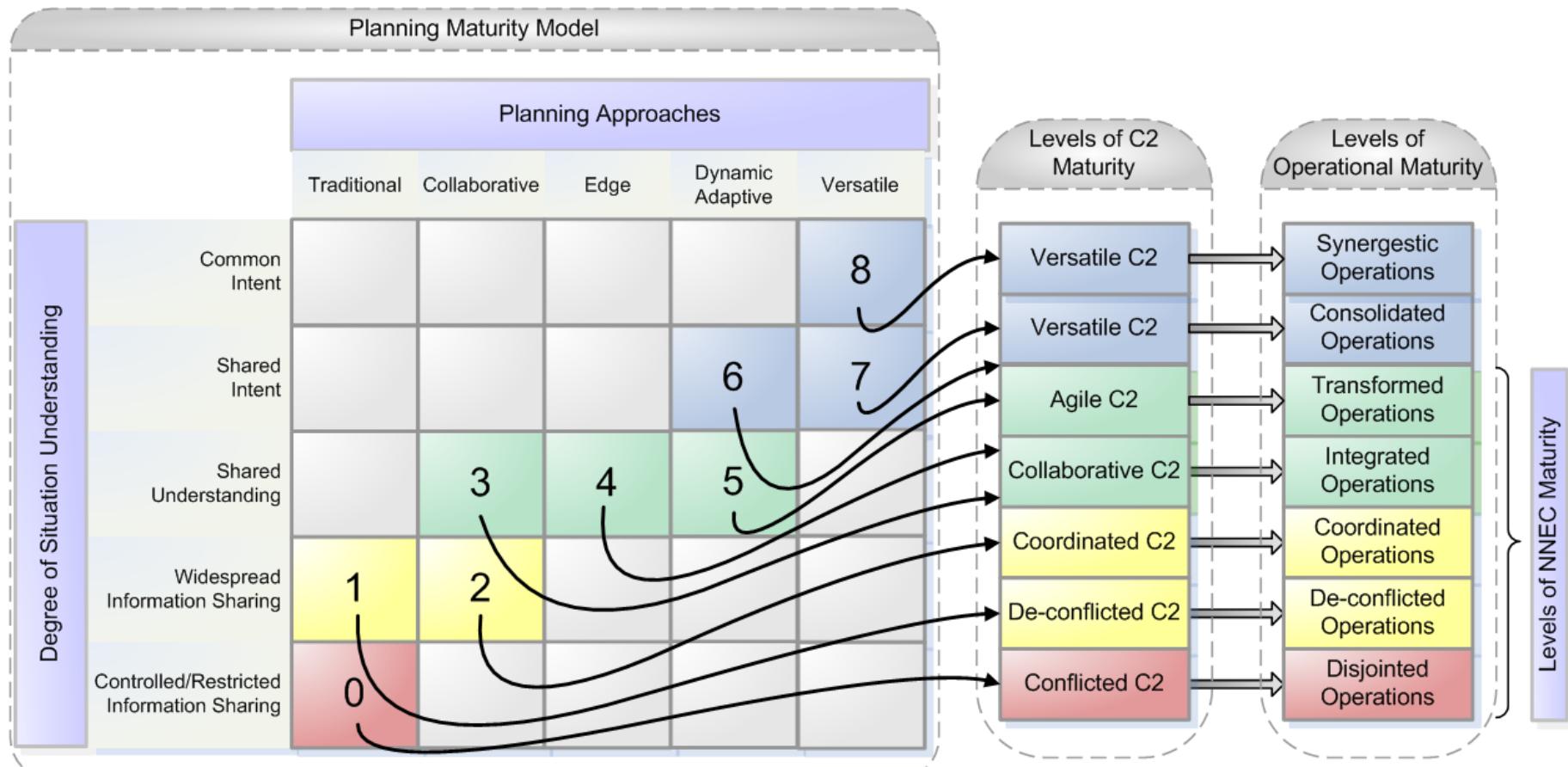


# Planning Under Time Pressure (PUT)

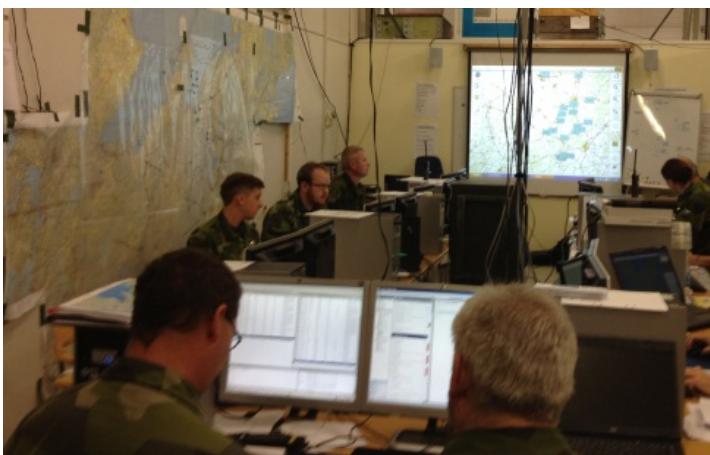


# MATURITY MODEL

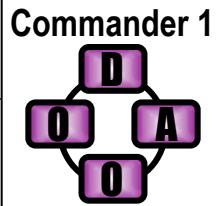
## after Alberts & Hayes (2007)



# SOCIAL MEDIA



expressives  
Com 1



## WARNO,OPORD,FRAGO 1

Situation  
SAw  
Adv  
SAw  
Own

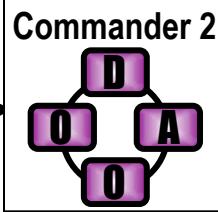
Mission

Execution  
Intention

Service  
Support

Command  
and  
Signal

expressives  
Com 2



## WARNO,OPORD,FRAGO 2

Situation  
SAw  
Adv  
SAw  
Own

Mission

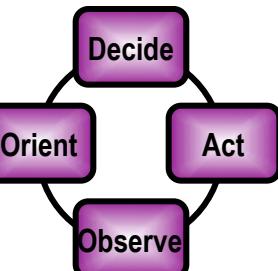
Execution  
Intention  
1,2

Service  
Support

Command  
and  
Signal

expressives  
Com 3

Commander 3



## WARNO,OPORD,FRAGO 3

Situation  
SAw  
Adv  
SAw  
Own

Mission

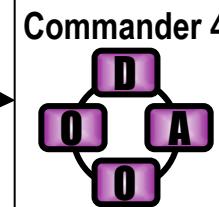
Execution  
Intention  
2,3

Service  
Support

Command  
and  
Signal

Doctrine

expressives  
Com 4



## WARNO,OPORD,FRAGO 4

Situation  
SAw  
Adv  
SAw  
Own

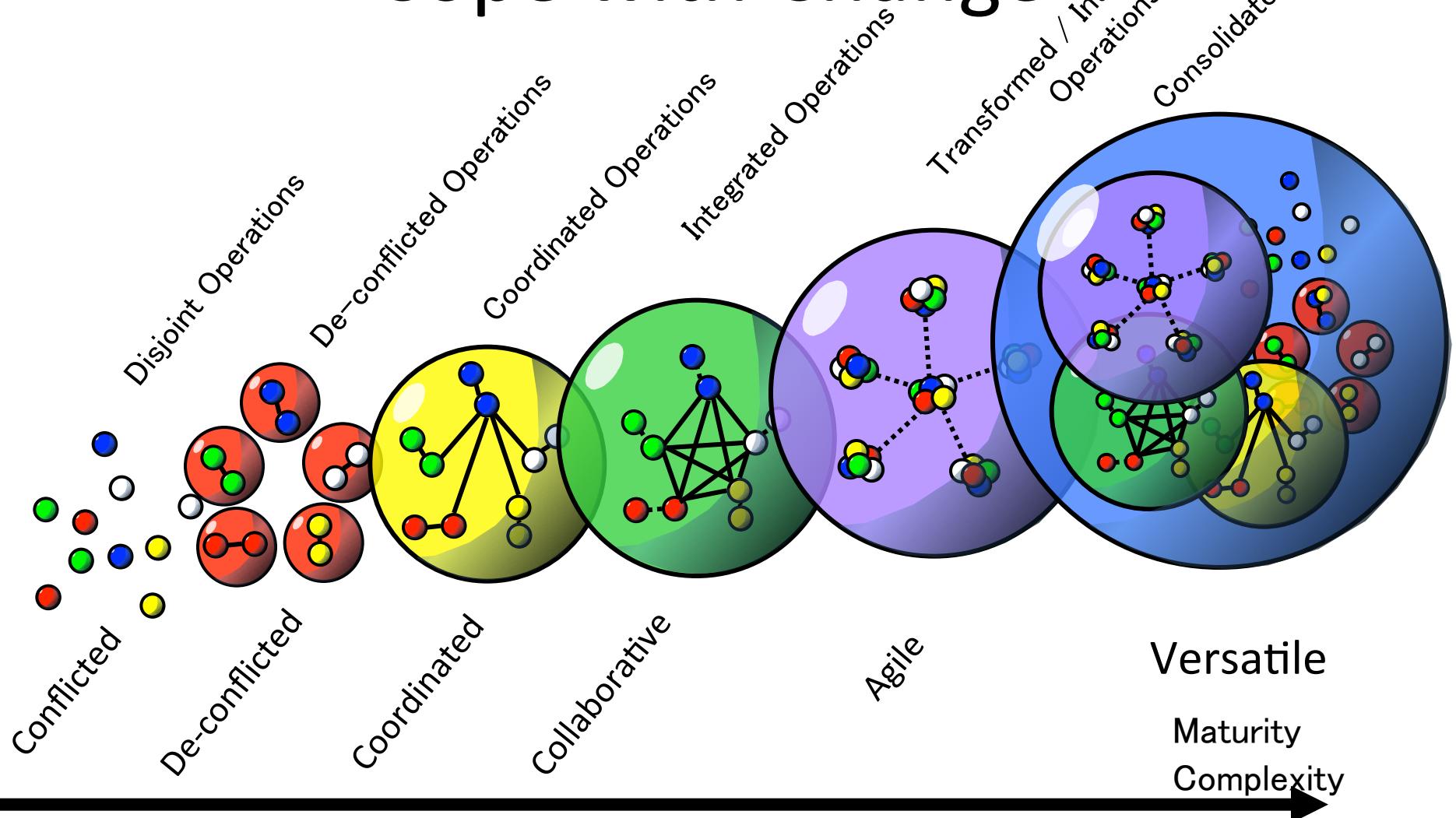
Mission

Execution  
Intention  
3,4

Service  
Support

Command  
and  
Signal

# Cope with Change



After Nato Network Enabled Capabilities, Hayes et.al Focus and Convergence (2008),

# AUTOMATION



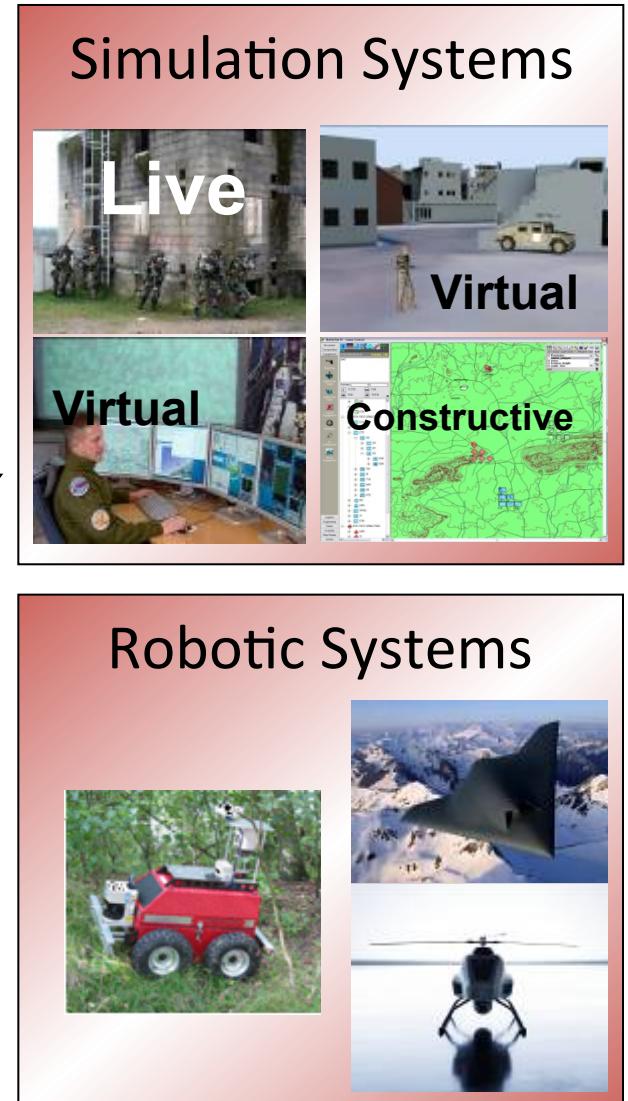
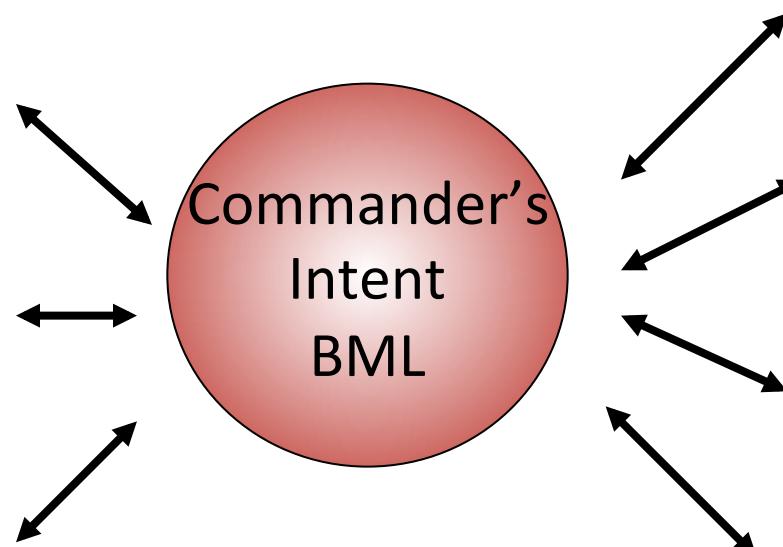
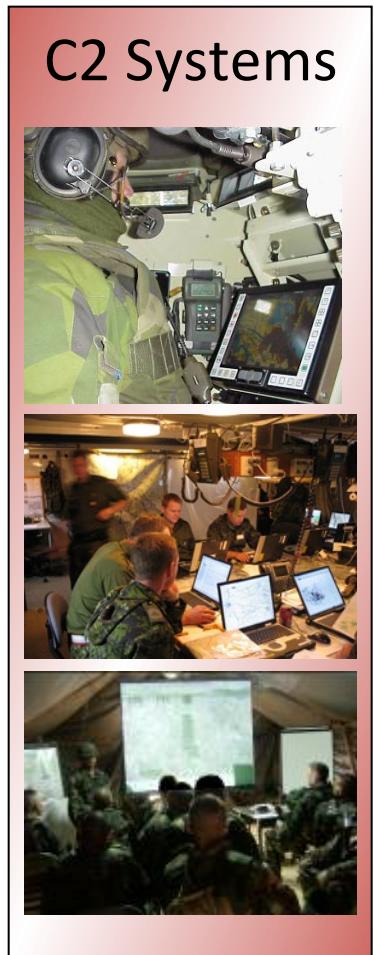
# AUTOMATION



Future C2 will need to accommodate "mixed" forces  
of Humans and Robots.



# Battle Management Language



# Battle Management Language

## C2 Systems



Robotics (119 Schade)

Cyber (111 Machado)

Infrastructure SBML (021 Pullen)

Infrastructure CBMS (121 Diallo)

Commander's Intent  
BML

Controlled Grammar (083 Poteet)

C-BML (117 Heffner)

C-BML SDL (122 Heffner)

## Simulation Systems



## Robotic Systems





FOKUS PÅ SITUATIONS FÖRSTÅELSE



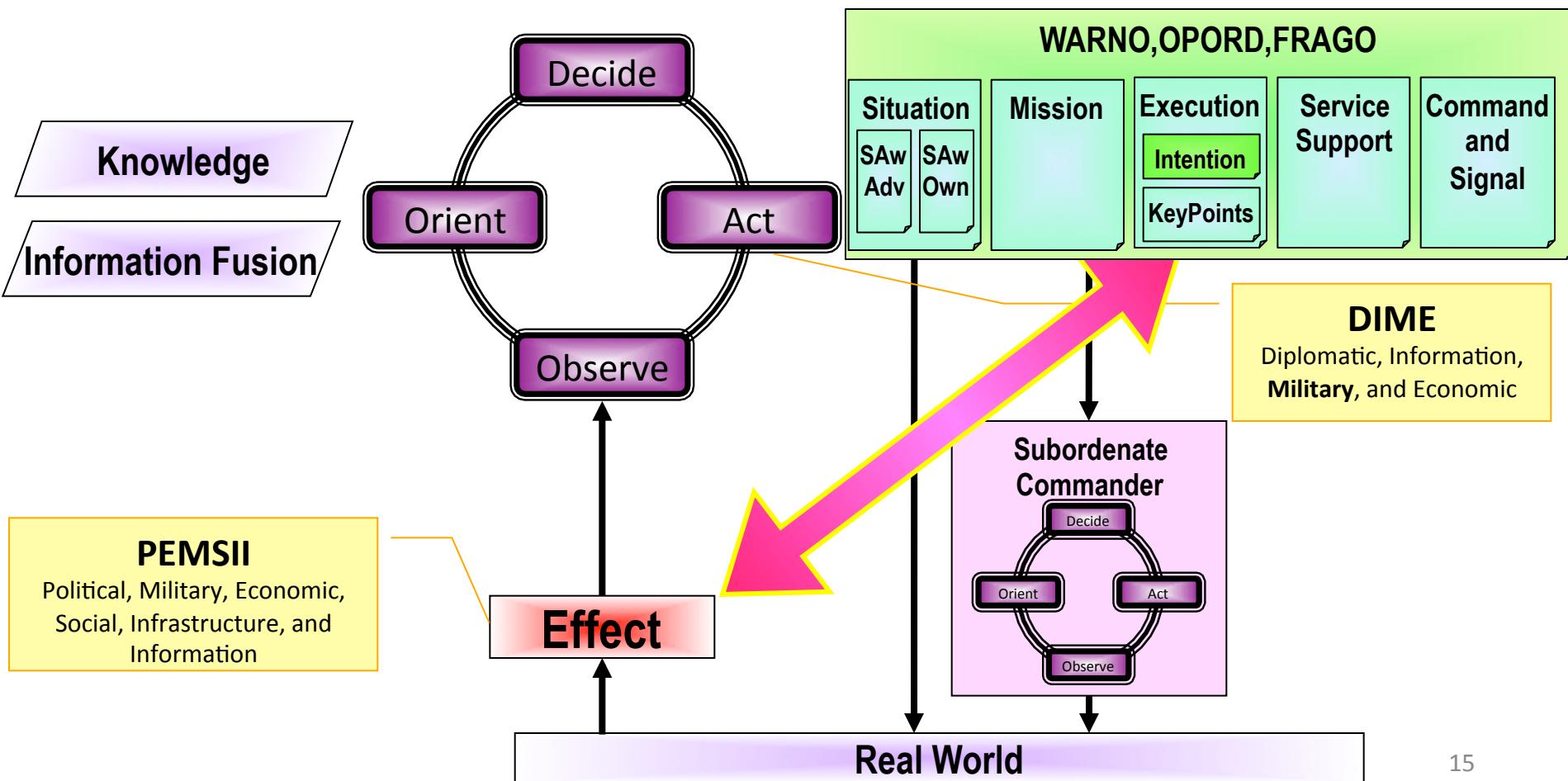
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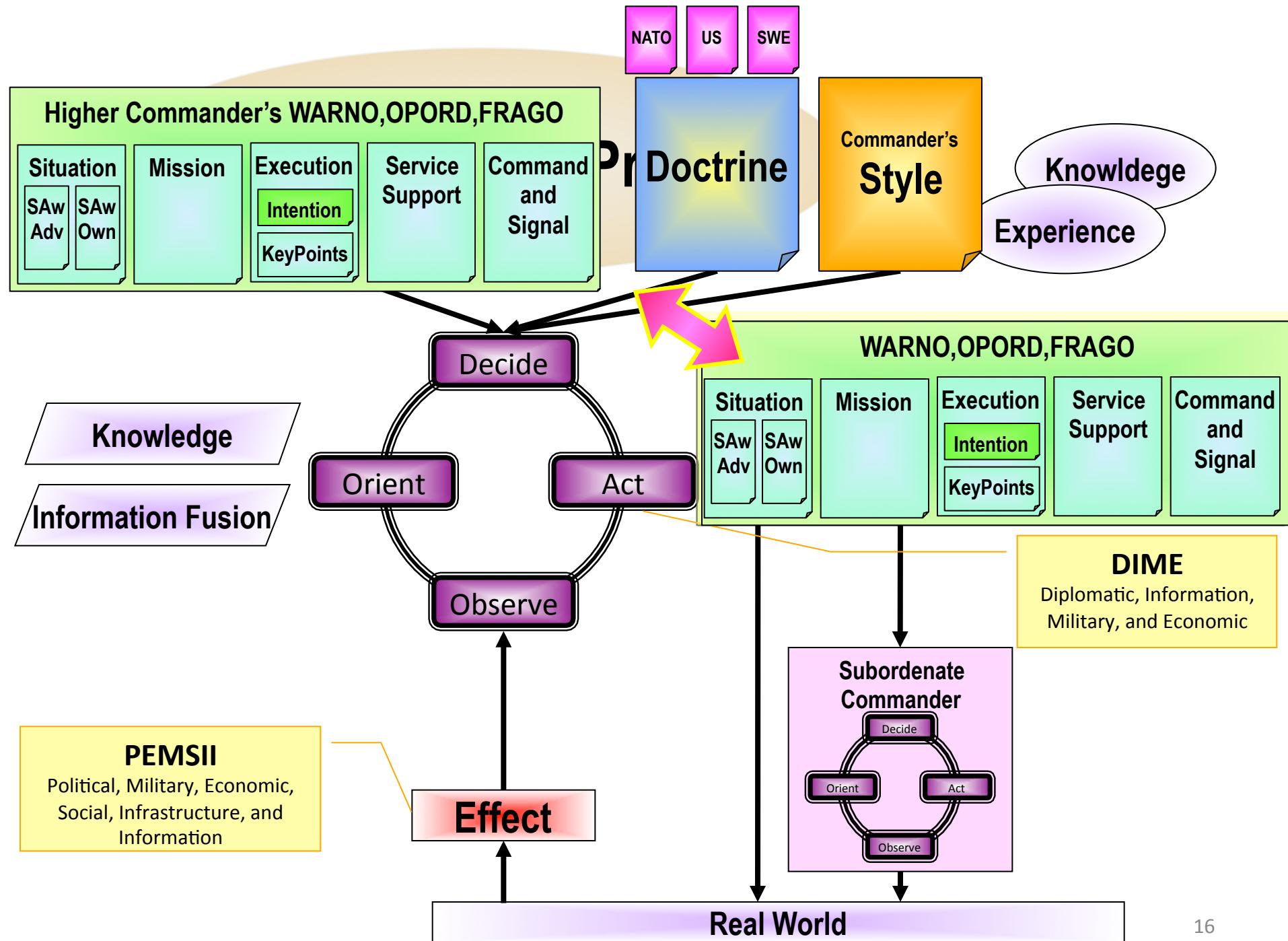
# INTENT

...

# Decision Making Process

Knowledge  
Experience







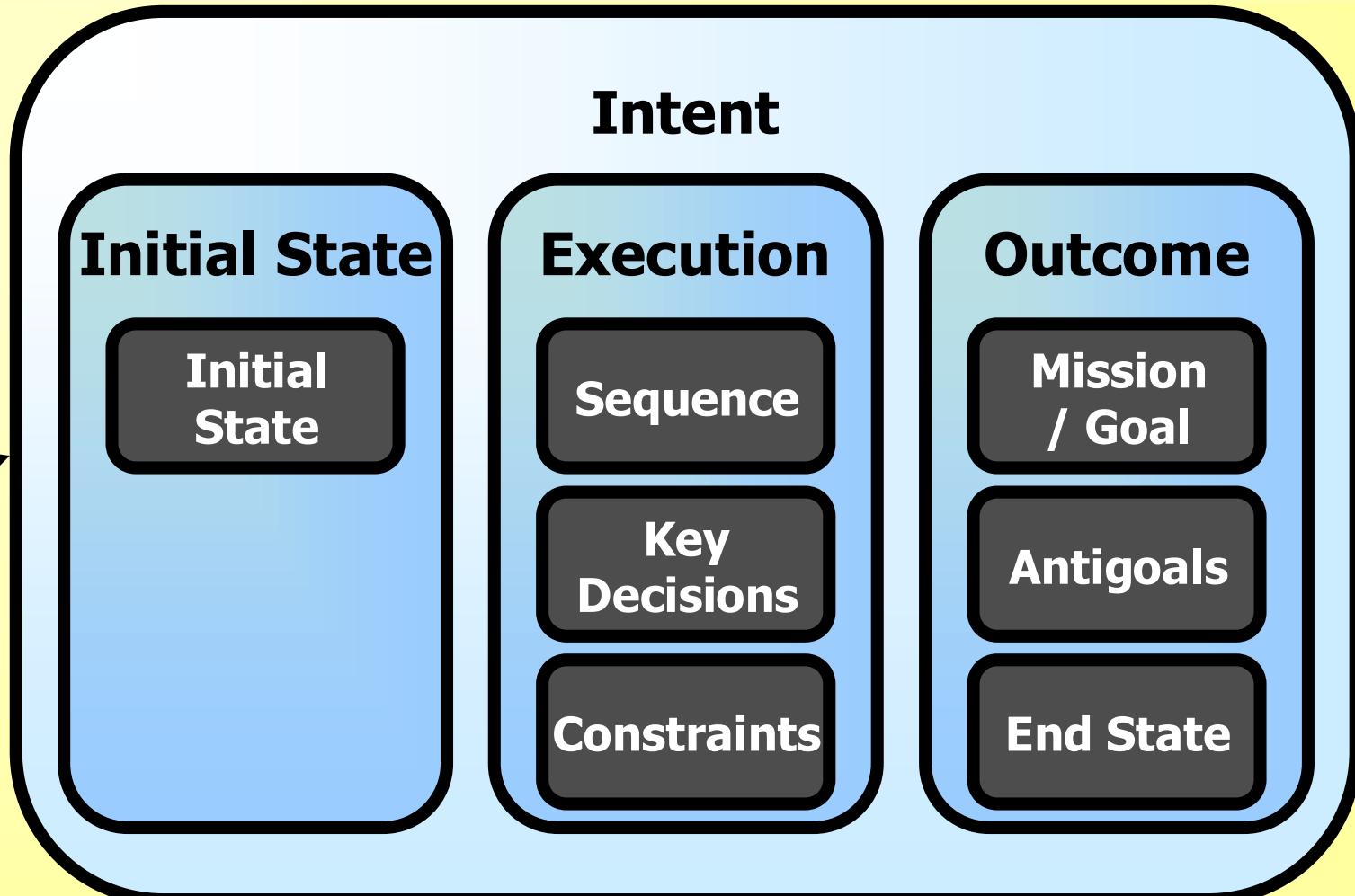
# INTENT

*Intent is the state of mind with which an act is done and can describe the formulated or planned intention. (Merriam-Webster, 2009)*

# DEFINITION OF INTENT

- UK Army Doctrine Publication – Operations (DCDC 2010, para.0622) is the British Army's capstone doctrine, containing the enduring philosophy and principles for the UK army approach to operations. *"Intent is similar to purpose. A clear intent initiates a force's purposeful activity. It represents what the commander wants to achieve and why; and binds the force together; it is the principal result of decision-making. It is normally expressed using effects, objectives and desired outcomes..."*
- Swedish Armed Forces - Integrated Dynamic Command and Control (IDC2) (Josefsson, Marklund, and Hansson 2007) defines intent as *"Intent is a concise formulation of the overall goals and purpose. The focus is to describe operations, restrictions and resource allocation."*
- Canadian Forces Joint Publication 5.0 (Chief of the Defence Staff 2008, 5E-2) *"Commander's Intent. This summary should provide the Commander's overall intent and establish the purpose of the plan. It is an important focusing statement for subordinate commanders. (1) Military Objectives. (2) Desired Military End-State. (3) Transition Conditions".*
- US Field manual 5.0 (U.S. Army 2010, 2-90) constitute the US Army's view on planning, preparing, executing, and assessing operations. *"The commander's intent is a clear, concise statement of what the force must do and the conditions the force must establish with respect to the enemy, terrain, and civil considerations that represent the desired end state (FM 3-0[1]). The commander's intent succinctly describes what constitutes success for the operation. It includes the operation's purpose and the conditions that define the end state. It links the mission, concept of operations, and tasks to subordinate units."*
- NATO allied Joint publication 1 (AJP-01) (NATO 2010, 0538) provide the keystone doctrine for the planning, execution and support of Allied joint operations. *"The intent defines the end-state in relation to the factors of mission; adversary, operating environment, terrain, forces, time and preparation for future operations. As such, it addresses what results are expected from the operation, how these results might enable transition to future operations, and how, in broad terms, the Commander expects the force to achieve those results. Its focus is on the force as a whole. Additional information on how the force will achieve the desired results is provided only to clarify the Commander's intentions. "*
- US Joint Publication 3.0 (US Joint Chiefs of Staff 2010, IV-25) provides the doctrinal foundation and fundamental principles that guide the Armed Forces of the United States in the conduct of joint operations across the range of military operations. *"Commander's intent is a clear and concise expression of the purpose of the operation and the military end state." and continues "It also includes where the commander will accept risk during the operation. The initial intent statement normally contains the purpose and military end state as the initial inputs for the planning process. "*
- Other doctrinal work that has been used in this survey are US Field Manual 6.0 (U.S Army 2003, 1-68) describe doctrine on C2 for tactical Army echelons (corps and below), US Field Manual 3.0 (U.S. Army 2008, 5-55) presents overarching doctrinal guidance and direction for conducting operations and is one of the two capstone doctrine hand books for US army, SwAF - Regulations for ground operations (Regler för markoperationer) (SwAF 2009, 143) UK Glossary of Joint and Multinational Terms and Definitions (The DCDC 2006, pp.C-16)
- [\[1\] FM-3 – U.S. Army, 2008. \*Field Manual 3.0 - Operations\*, Washington D.C.: U.S. Department of the Army. Available at: <http://www.fas.org/irp/doddir/army/fm3-0.pdf> \[Accessed January 20, 2011\].](http://www.fas.org/irp/doddir/army/fm3-0.pdf)

# INTENT CONTAINS



# Dimensions of Intent

Commander's Intent

Command Intent

Common Intent

Shared Intent

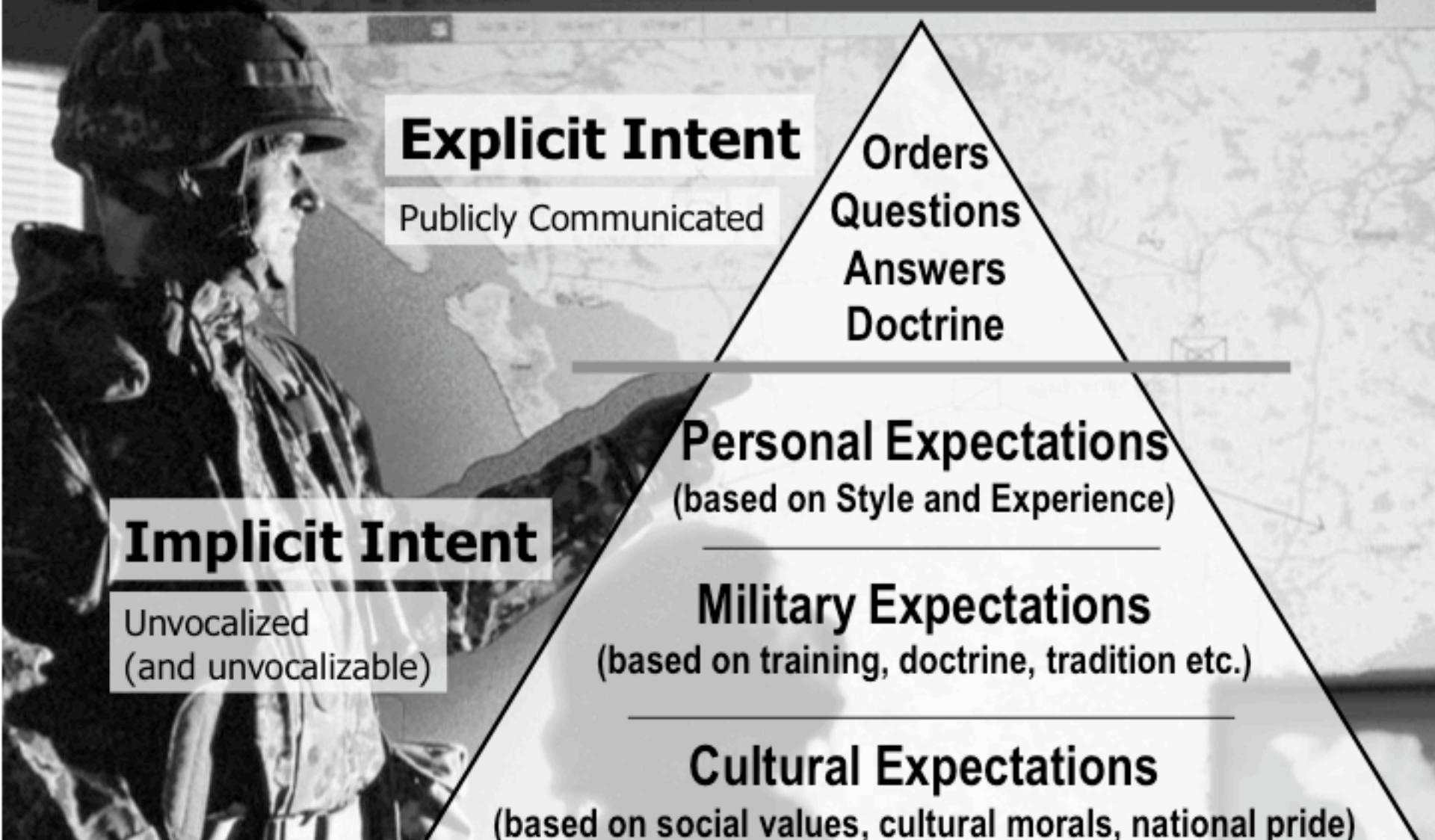
Increasing Control

Increasing Hierarchy

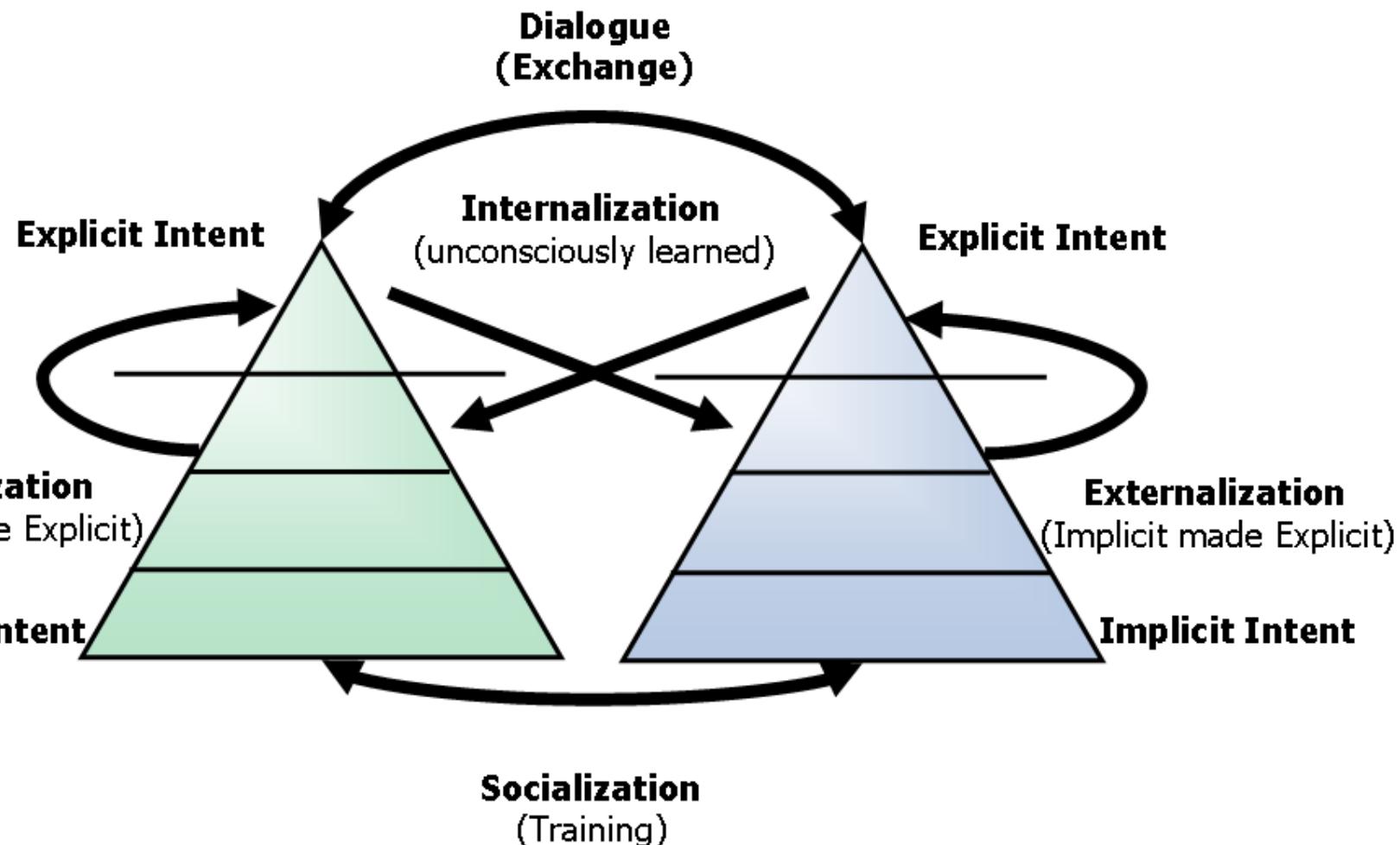


# Intent

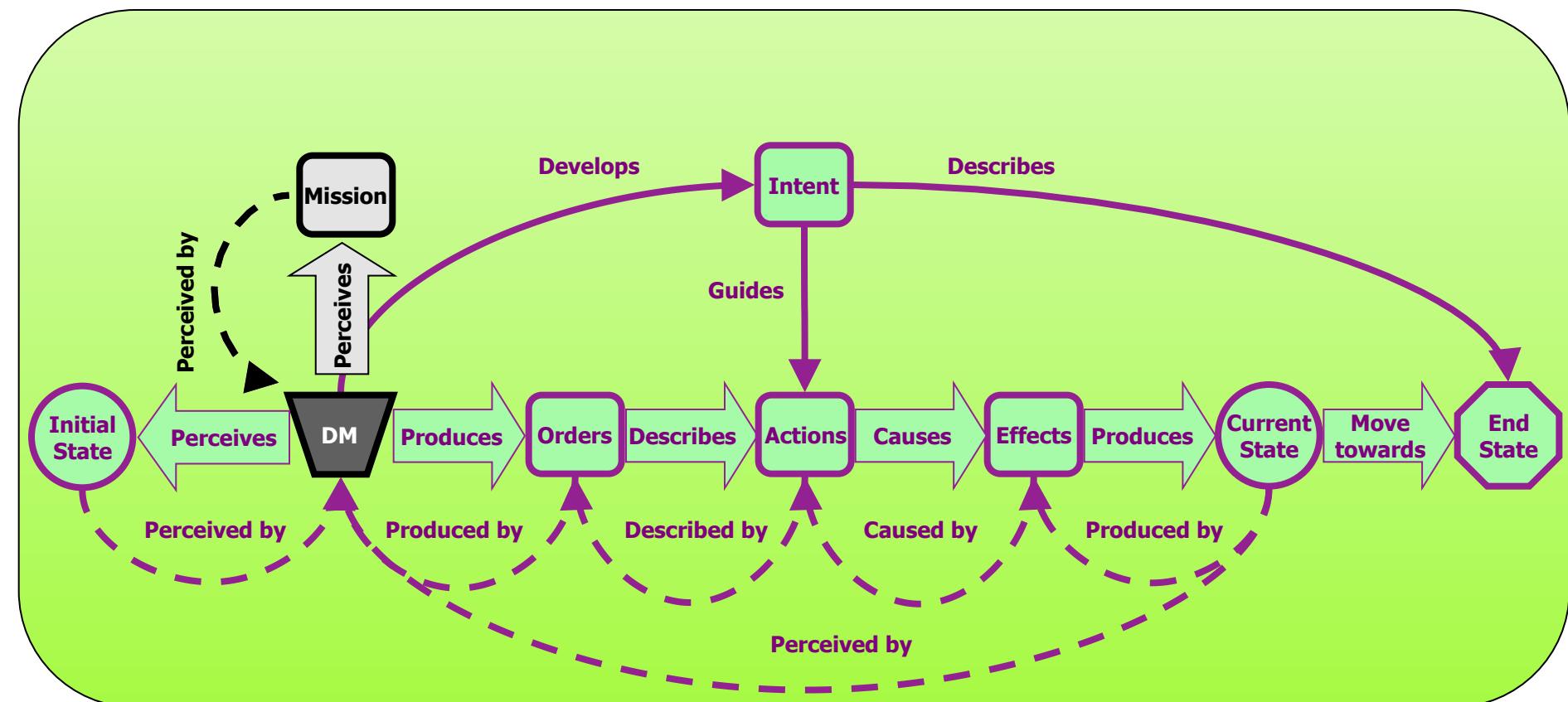
After Pigeau and McCann (2000,2006)



# INTENT SHARING

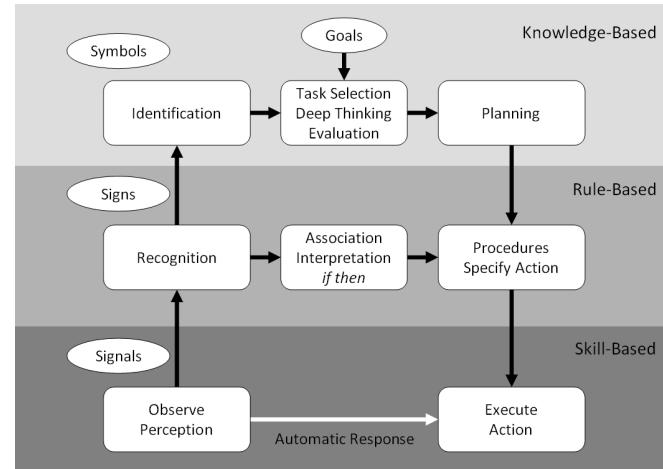
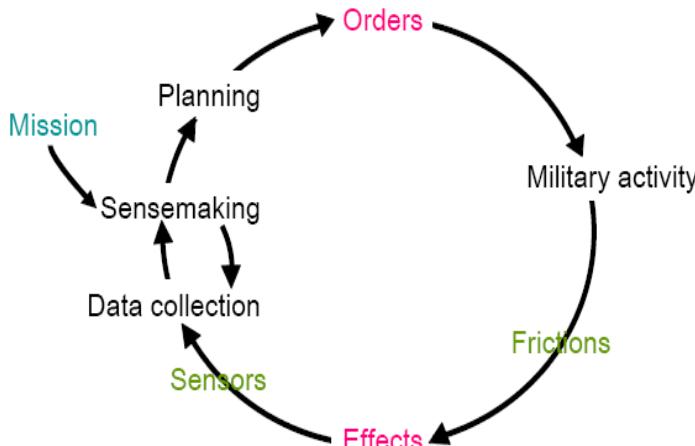
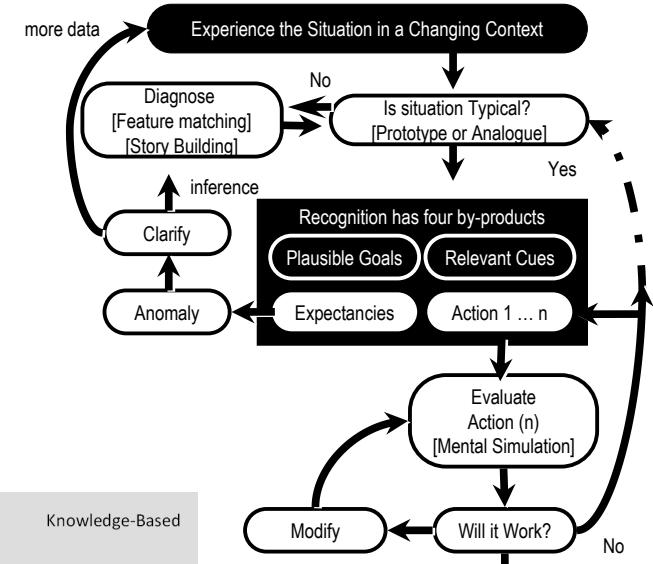
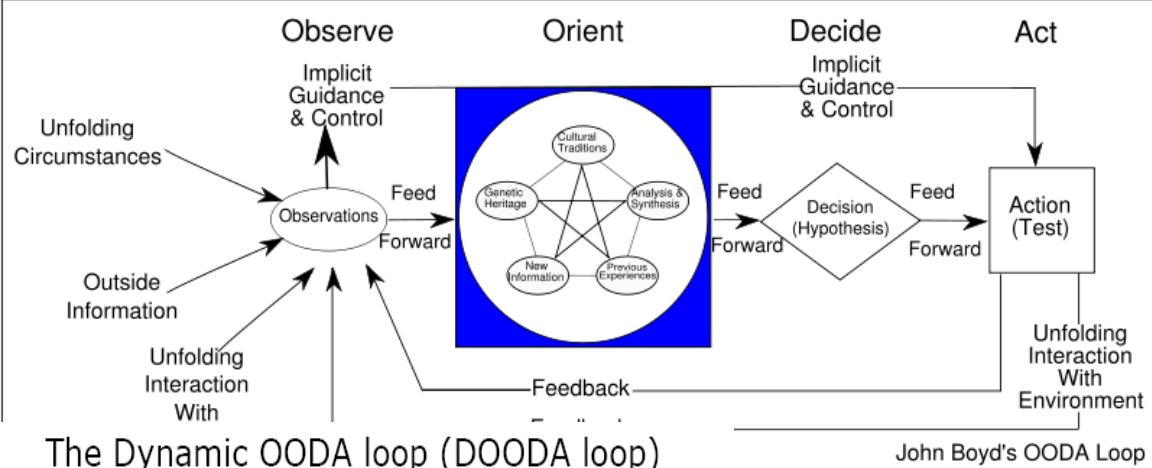


# OPERATIONS INTENT AND EFFECTS MODEL



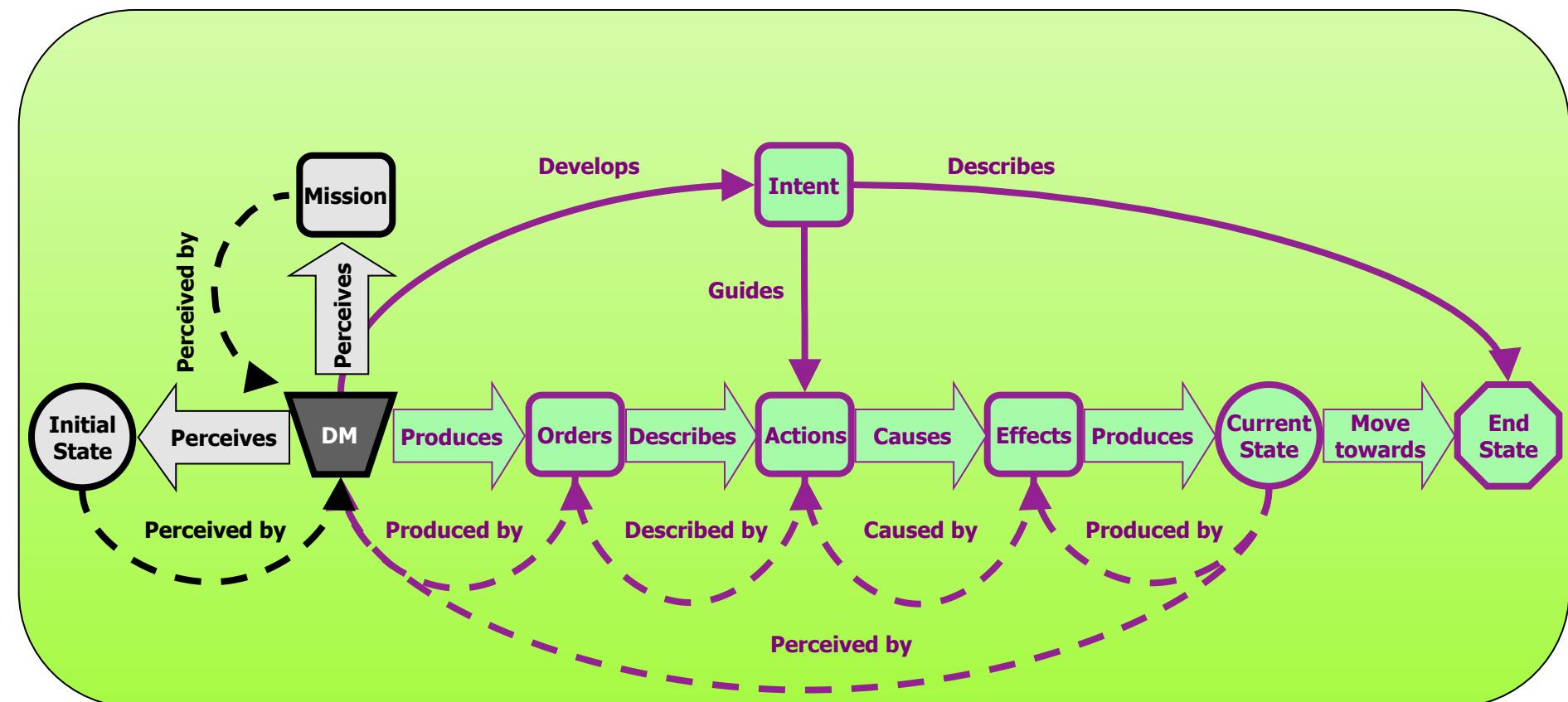
Decision Making

# Decision Making Models



**Processes**  
MDMP  
GOP  
IDC2  
PUT

# OPERATIONS INTENT AND EFFECTS MODEL





# SITUATION AWARENESS

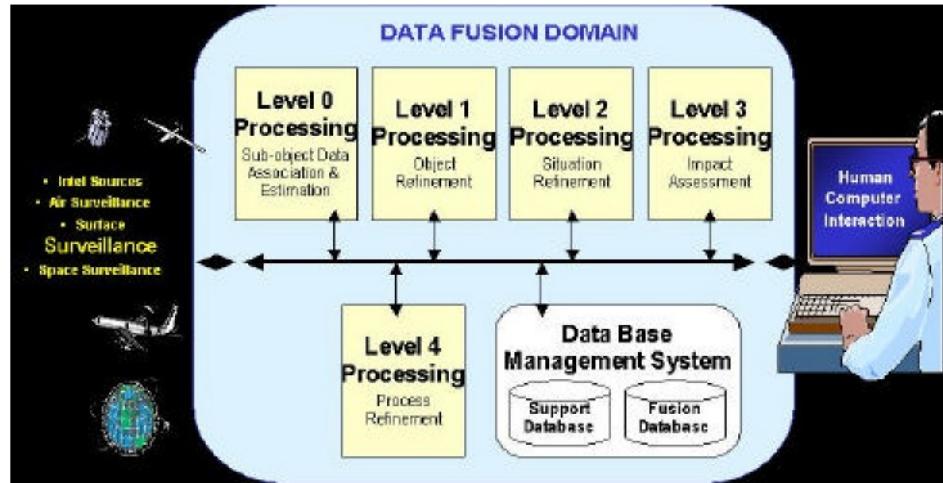
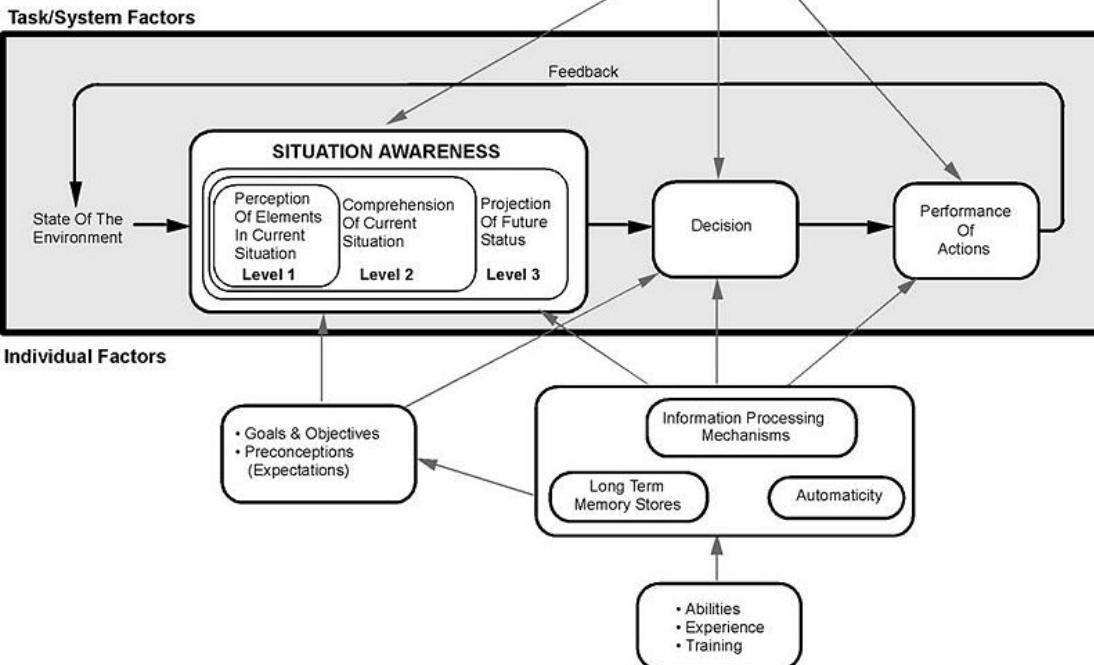
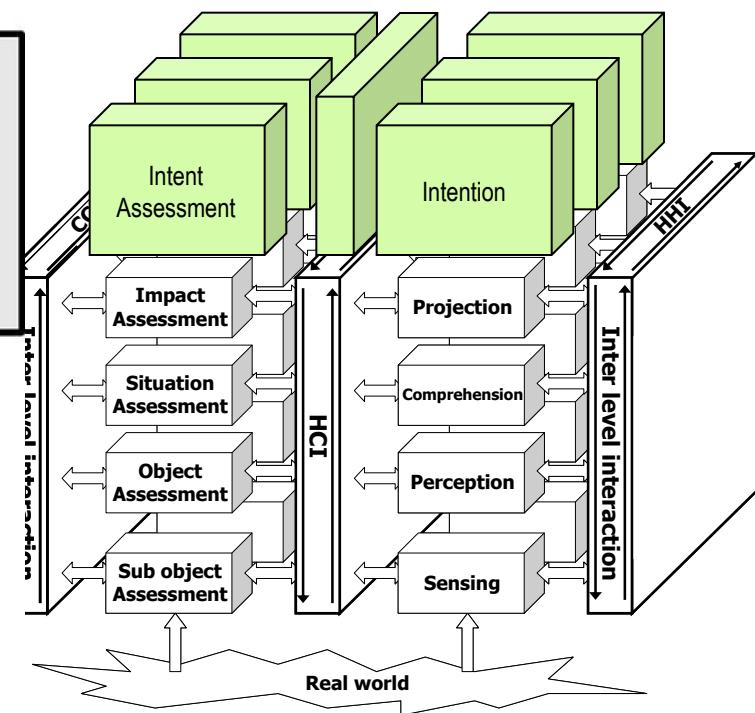
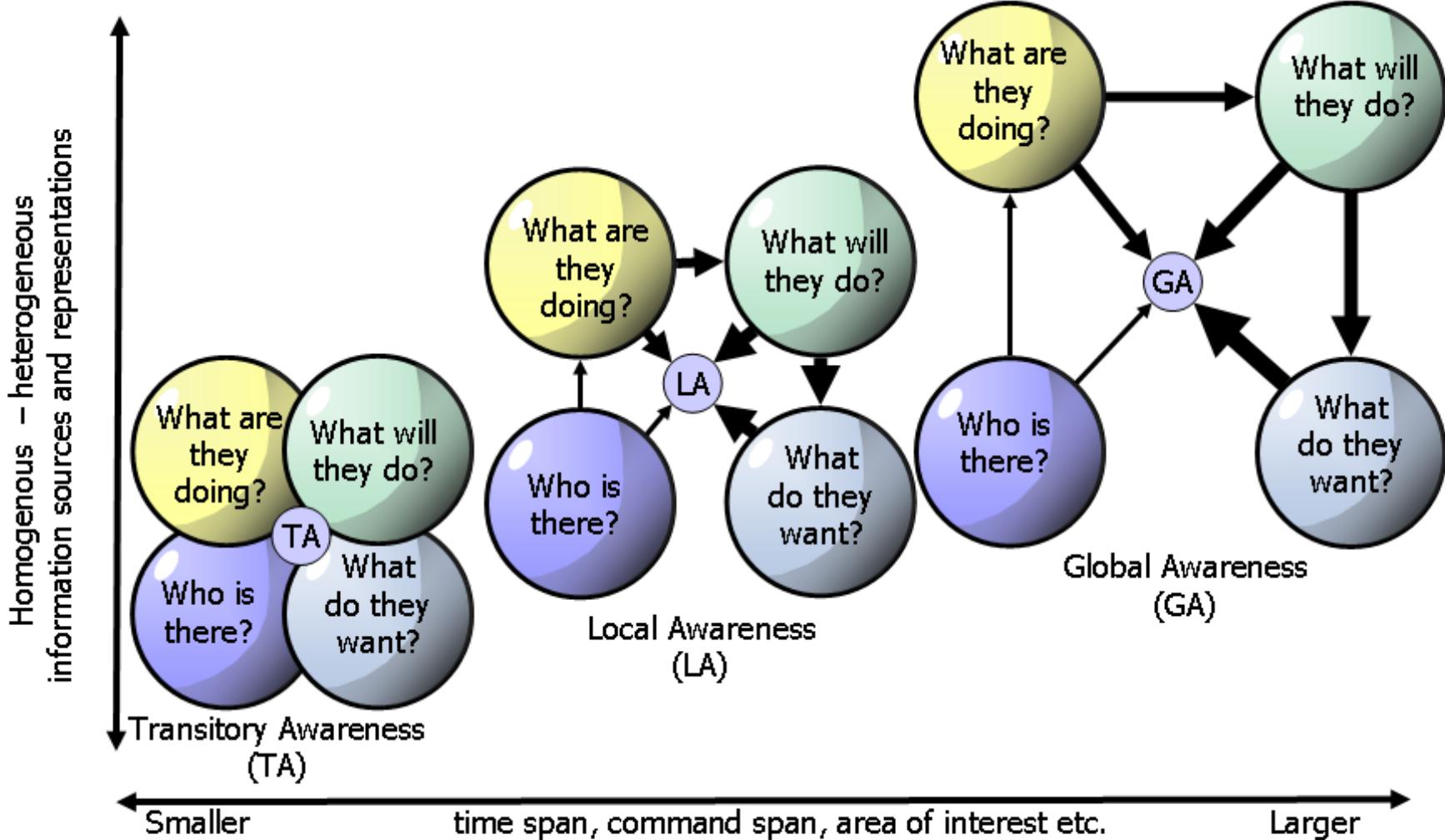


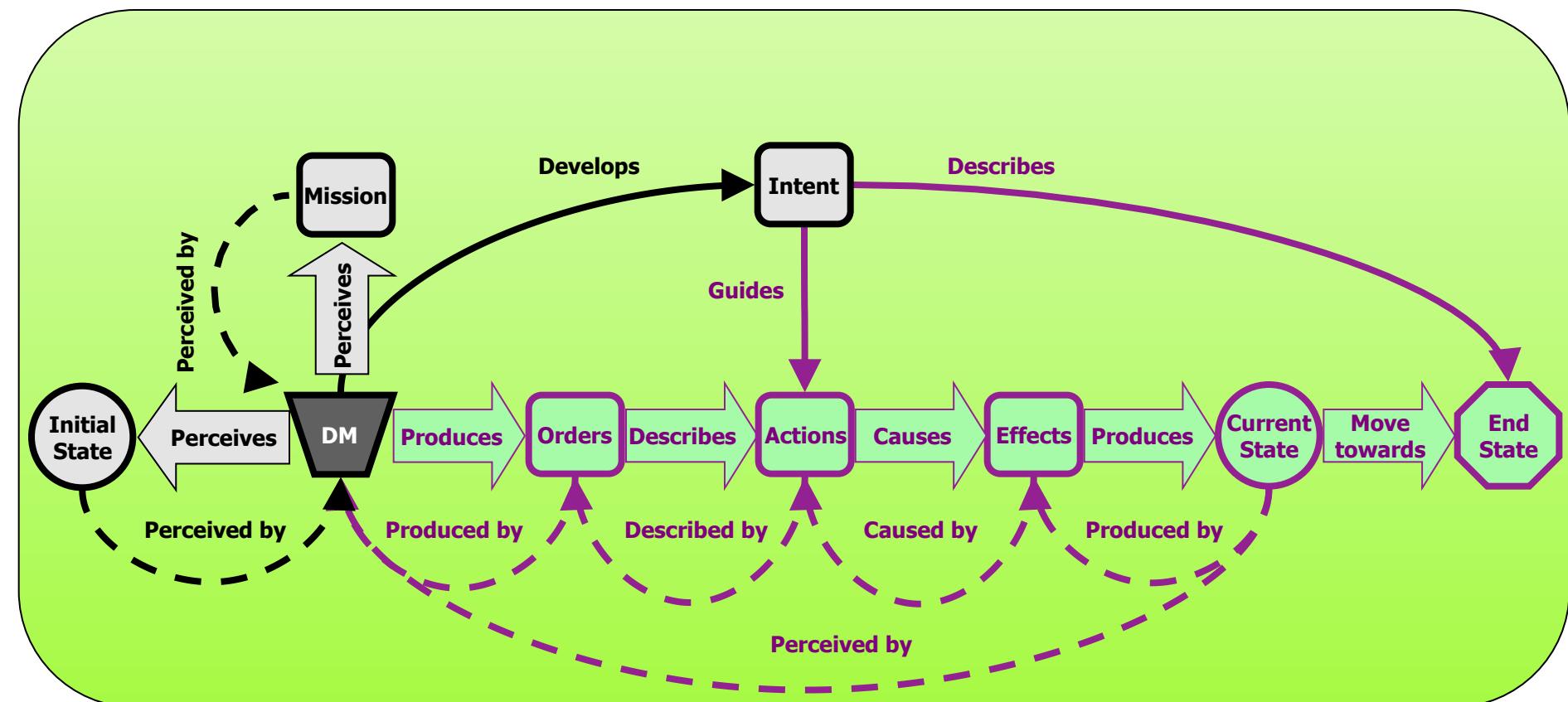
Fig. 1. JDL data fusion model (1999 revision).

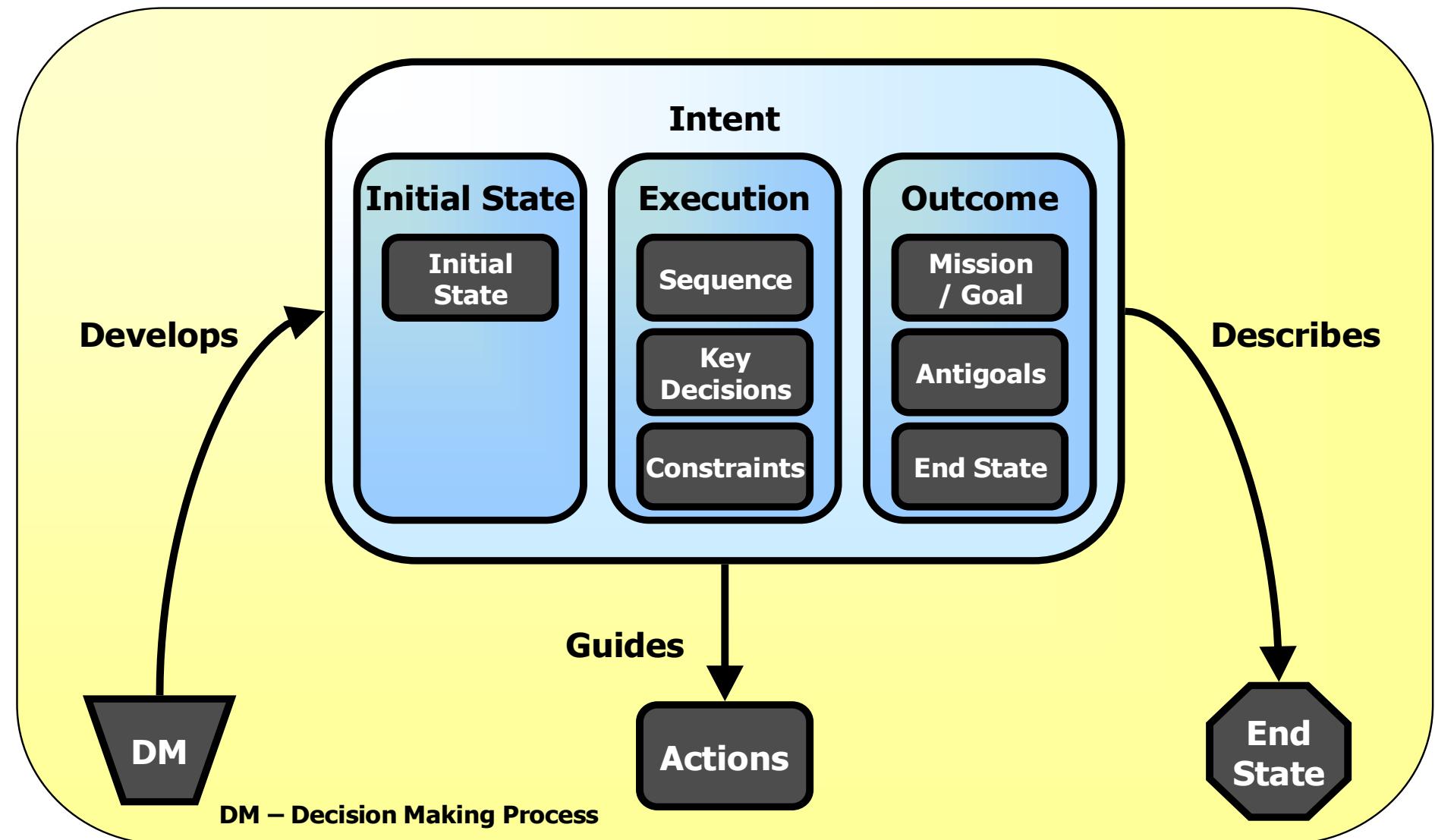


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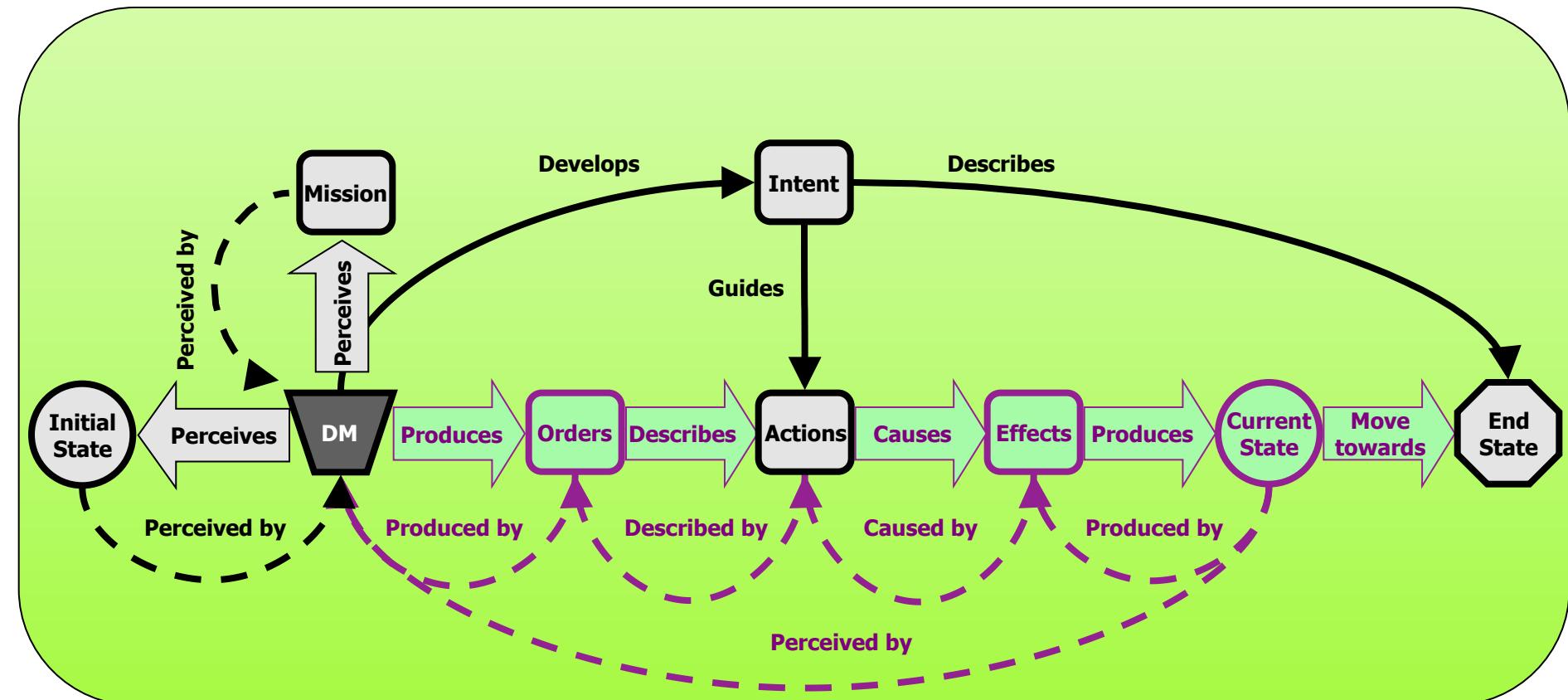


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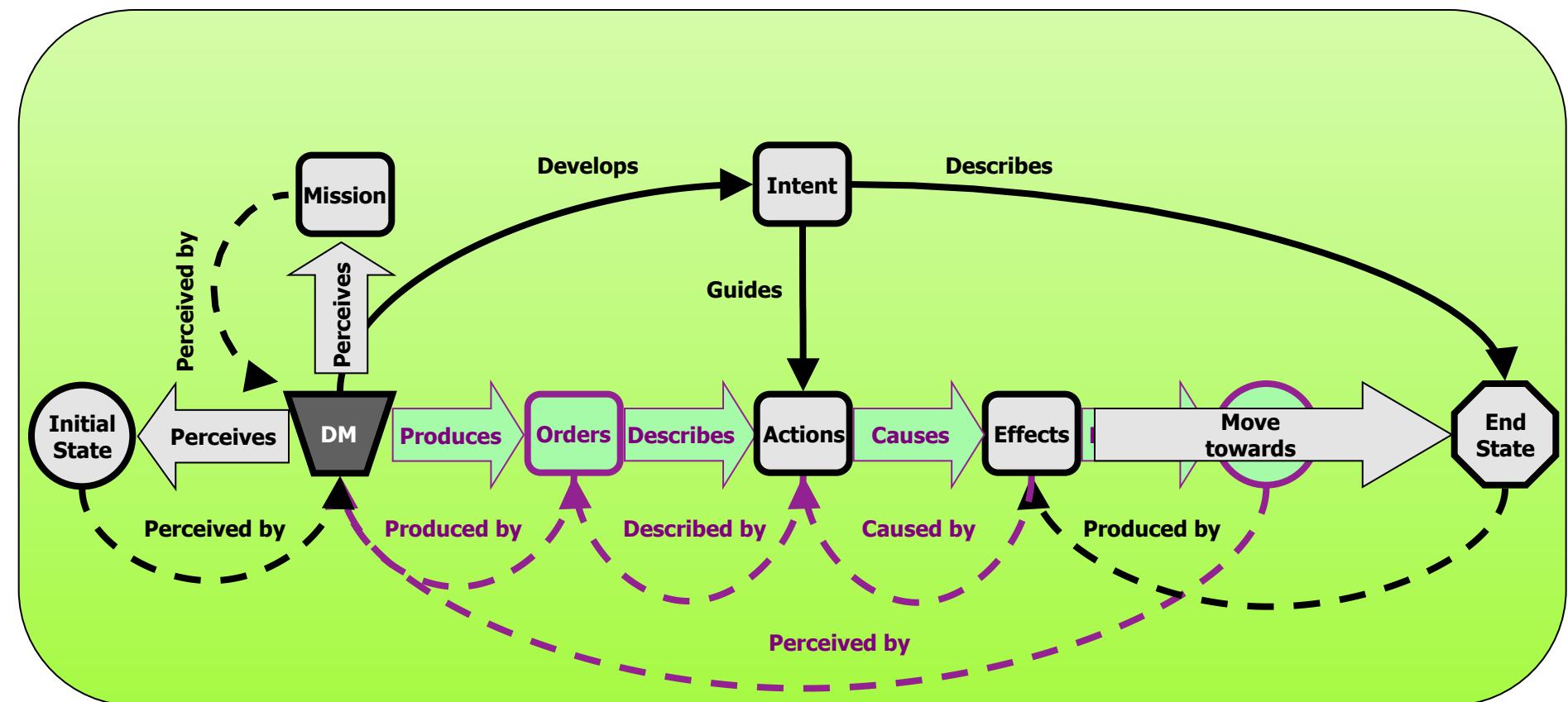


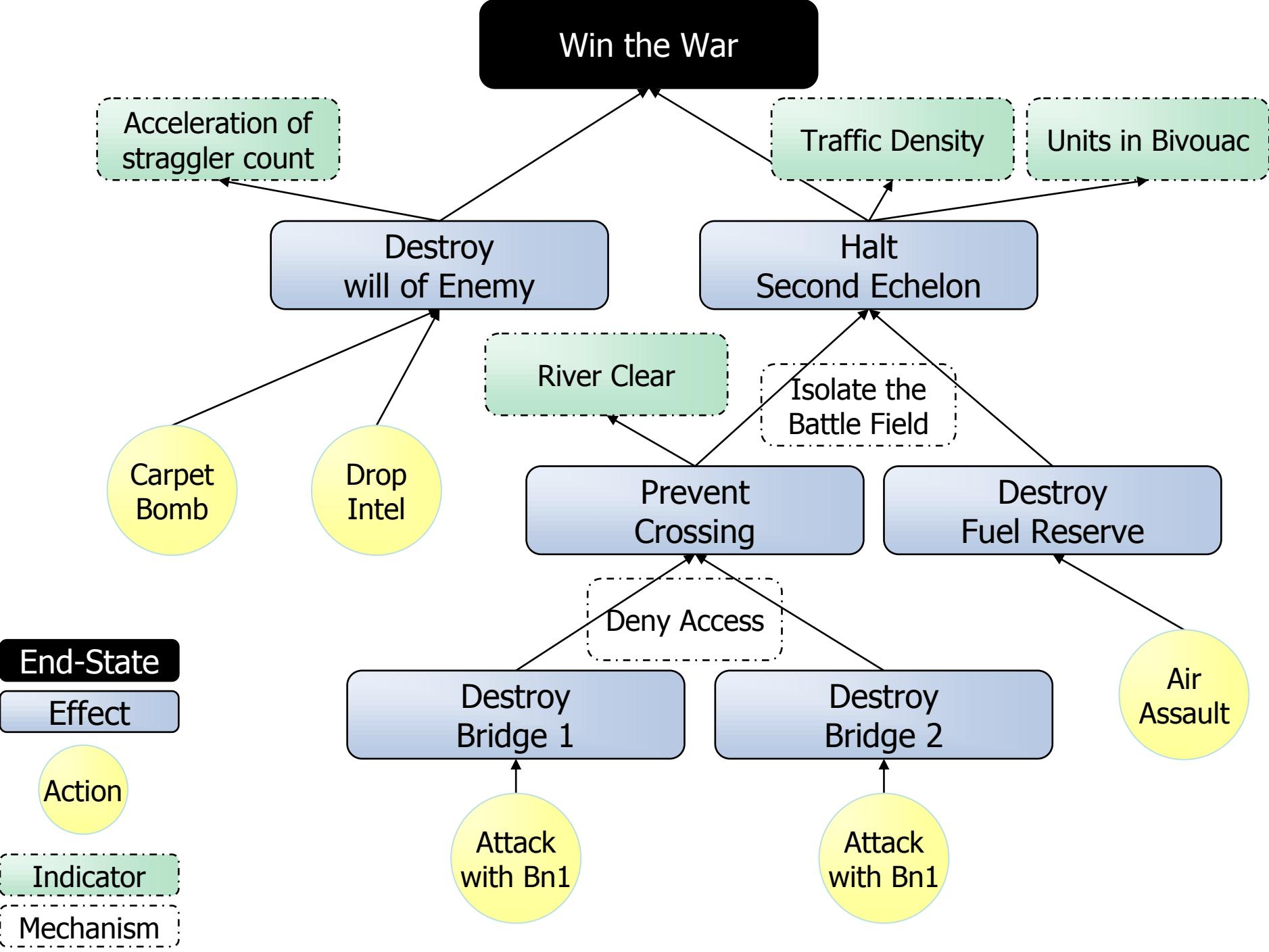


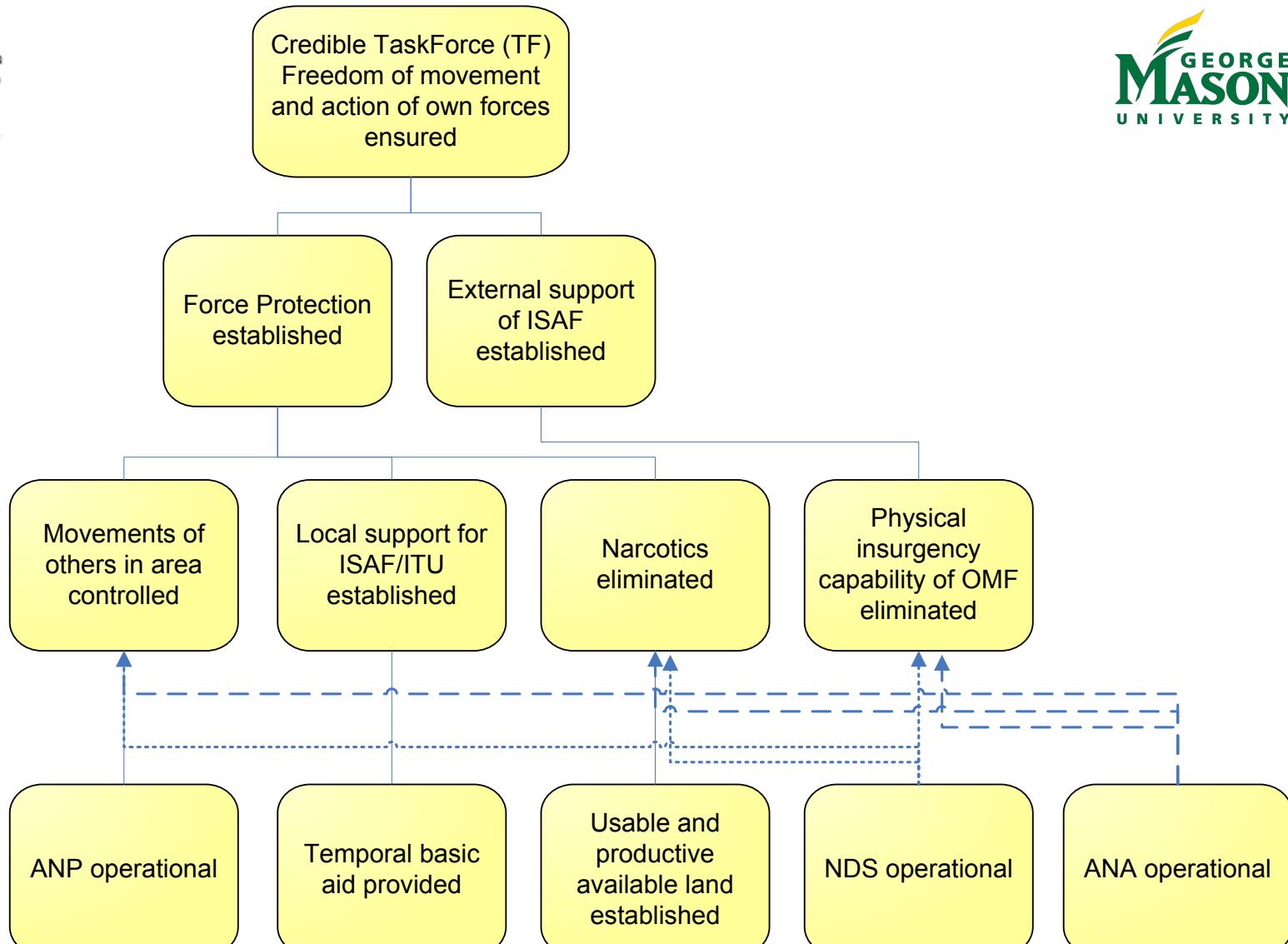
# OPERATIONS INTENT AND EFFECTS MODEL



# OPERATIONS INTENT AND EFFECTS MODEL

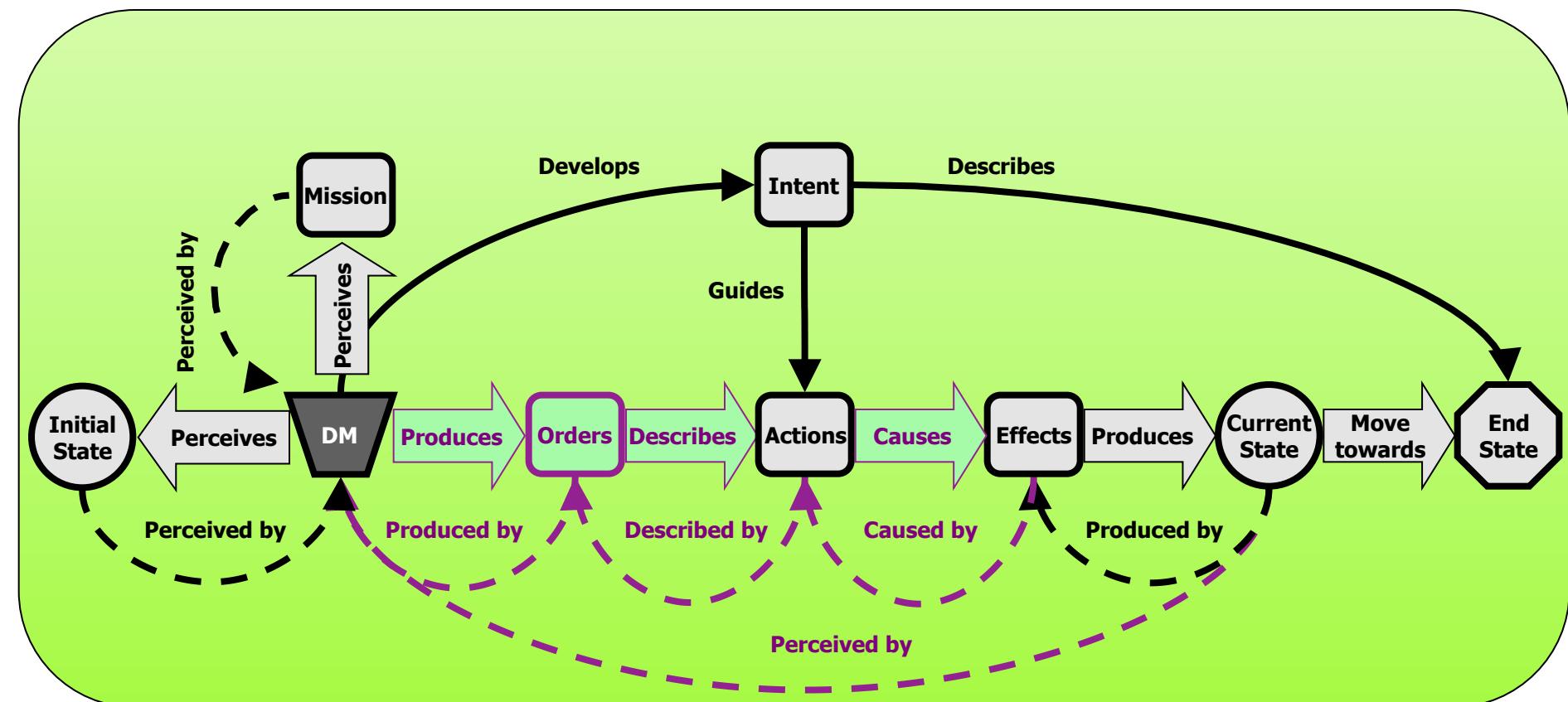




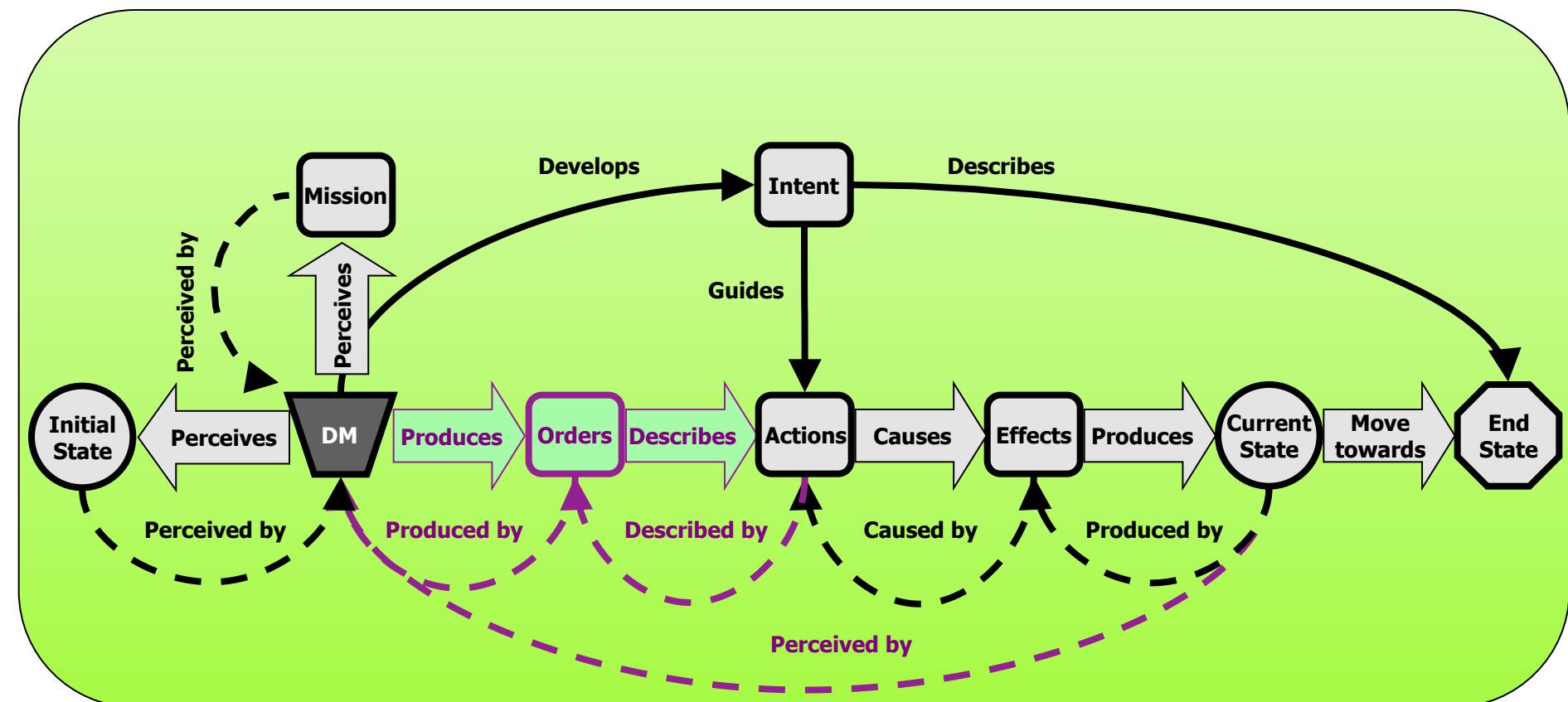


**ISAF** - International Security Assistance Force  
**TFU** - Task Force Uruzgan  
**OMF** - Opposing Military Force  
**ANP** - Afghanistan National Police  
**NDS** - National Directorate of Security  
**ANA** - Afghanistan National Army

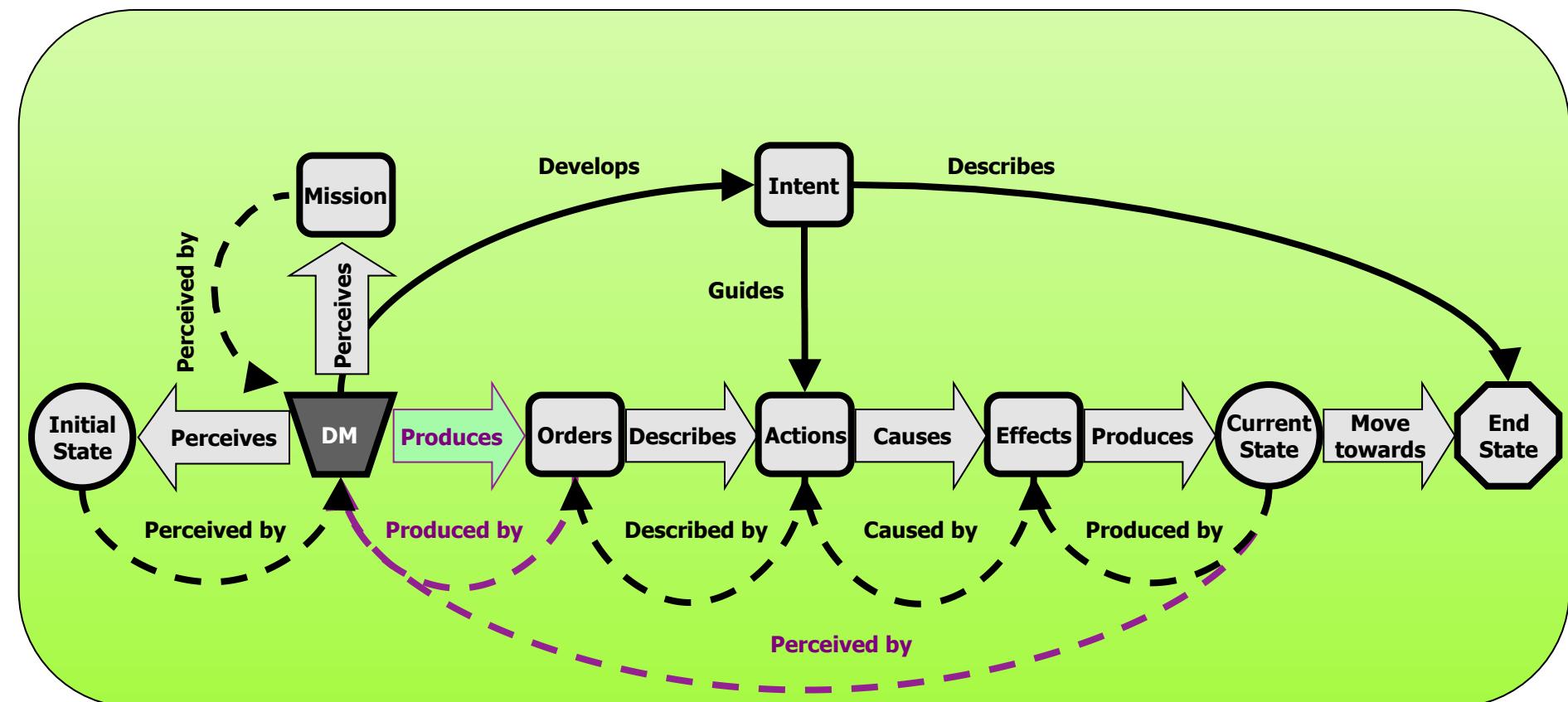
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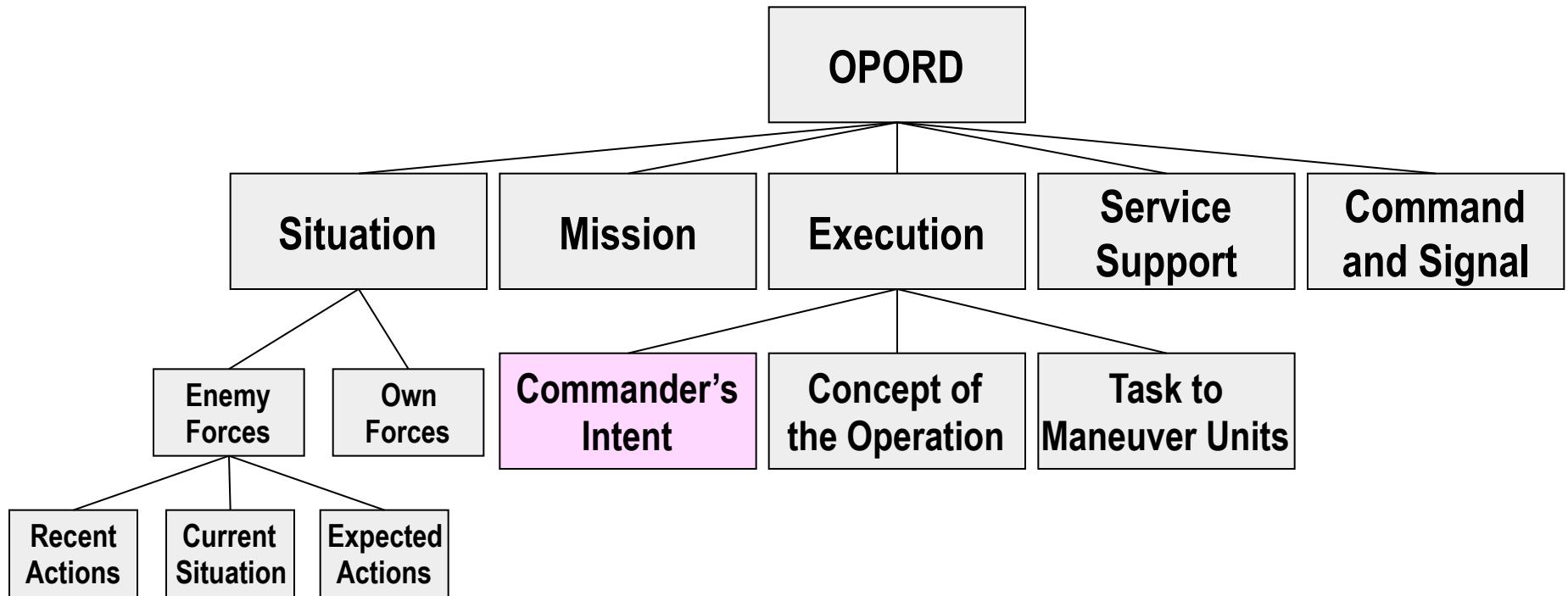
# OPERATIONS INTENT AND EFFECTS MODEL



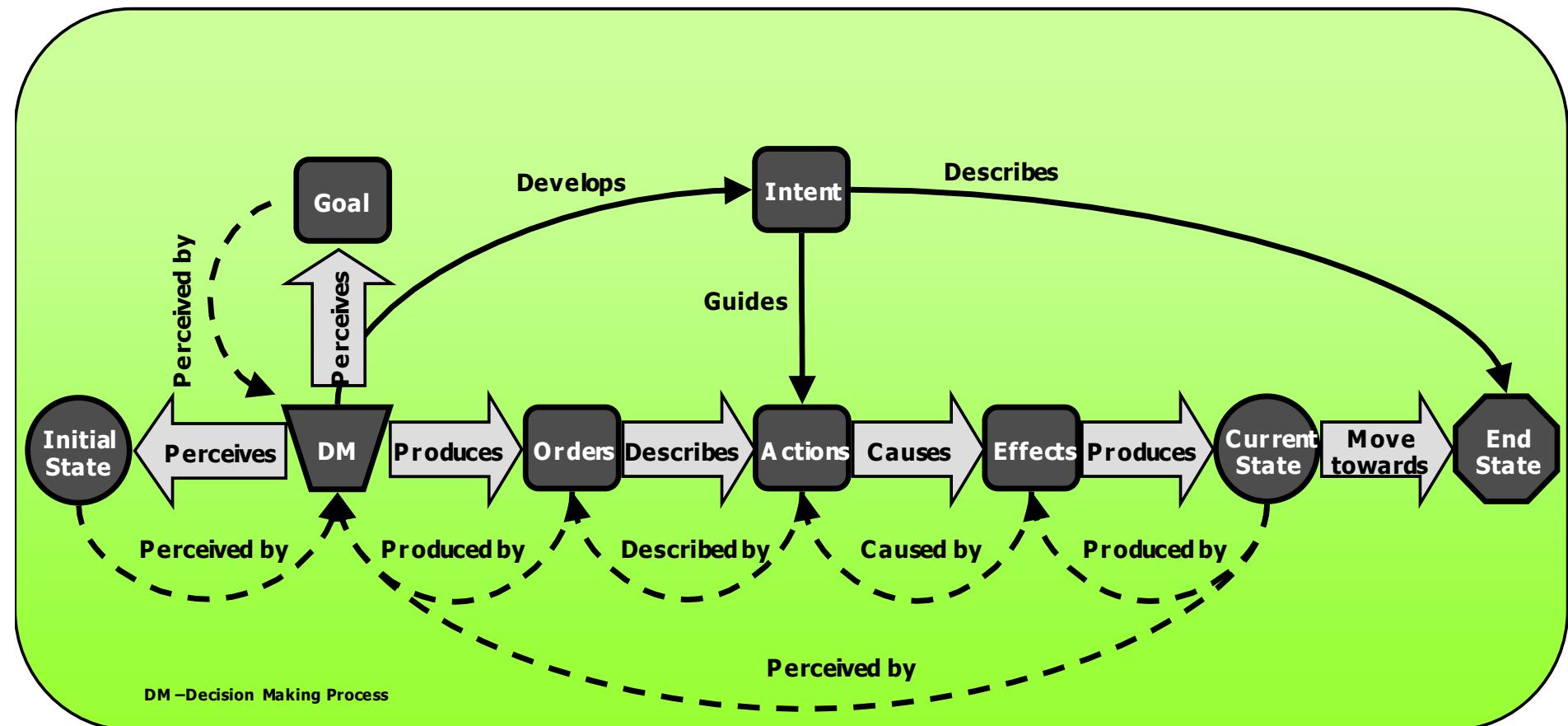
# OPERATIONS INTENT AND EFFECTS MODEL



# Five Paragraph Order



# OPERATIONS INTENT AND EFFECTS MODEL



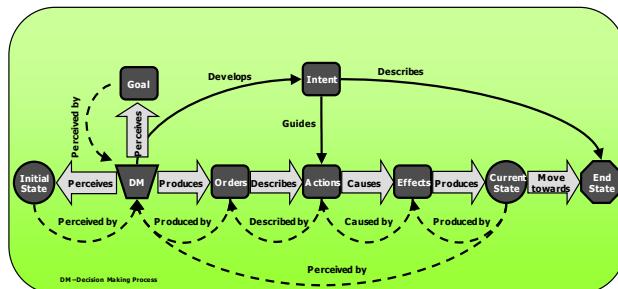


# MODEL SUMMARIZATION

The OIEM model is a general and high-level description of C2 information constituents, their relations and causality in the view of an organizational planning context.

## 2007 BLACK-CACTUS C4I-Center ↔ SAAB

### Model



### Formalization

Robotics (119 Schade)

Grammar (083 Poteet)

C-BML (117 Heffner)

C-BML SDL (122 Heffner)

### Implementation

C2-SIM SBML (021 Pullen)

C2-SIM CBMS (121 Diallo)

Cyber (111 Machado)

Robotics (119 Schade)

2008,2009,2010,2011

2006 Hieb and Schade

2008,2009,2010,2011

NMSG-048, NMSG-085

SISO 2004 →

# Systems enabled for MSDL / C-BML by SBML/WISE

