



**MAERSK DATA DEFENCE**



# The role of GIS in next-generation Command and Control Information Systems

**Presented by:**

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Maersk Data Defence



## Danish Army Command and Control Information System – Implementation Status

- HQ/Danish Division
  - HQ/1 Jutland Brigade
  - HQ/3 Jutland Brigade
  - HQ/1 Zealand Brigade
- HQ/Danish Reaction Brigade/ 1(UK) Armoured Div

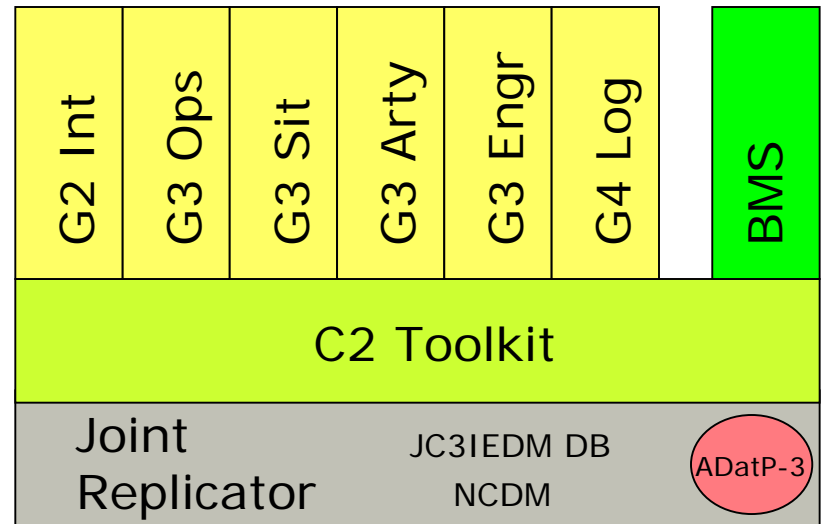
***17 HQs***

***DACCIS is Field Proven***



## MDD C2 Component/ Product Portfolio

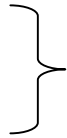
- Joint Replicator
- Data Engine
- C2 Toolkit
- C2 FAS  
(Functional Area Services)





# MDD Joint Replicator

- Product benefits:
  - Translation during replication
  - The ability to replicate major NATO standards, including
    - *ARM*
    - *MIP*
    - *ADatP-3*
    - *LINK11/16 Gateway*
    - *other tactical datalinks*
- Flexibility
  - *DBMS*
  - *Run-time Platform*
  - *JC3IEDM Version*



*Operational End 2004*

*Per Customer Specification*



*Independent*

*... true for all  
DACCIS  
components*



## MDD Data Engine

- Product benefits:
  - Track correlation engine
  - Object-oriented interface to a [Common Data Pool](#), making it possible for all [Functional Area Services \(FAS\)](#) to access the [Data Layer](#)
  - Complies with NCDM standard & reqs.
  - JC3IEDM prepared



## MDD C2 Toolkit

- Product benefits:
  - FAS Framework, as a foundation for further branch- or task-specific modules
  - Extended GIS functionality
  - Supporting multiple parallel planning processes
  - Modular user interface, allowing for customisations; automatic dialog generation
  - Prepared for best-of-breed integration (e.g. GIS)



## MDD C2 Functional Area Services

- Product benefits:
  - Already covering all standard Army and basic Joint FAS needs
  - Extensible “plug-in” capability for user modules (FAS)
  - Expandable and customisable to conform with new user requirements





## DACCIS Product Development

- DACCIS ver. 6.0
  - Fall year 2004
  - Enhanced architecture and new GIS platform
  - New C2 functionalities
- DACCIS ver. 6.1
  - Summer 2005
  - Military Decision Making Process (O/ECoA)
- DACCIS ver. 7.0
  - Spring 2006
  - New C2 functionalities



## Data Model Upgrade

- Upgrade to JC3IEDM
  - Started

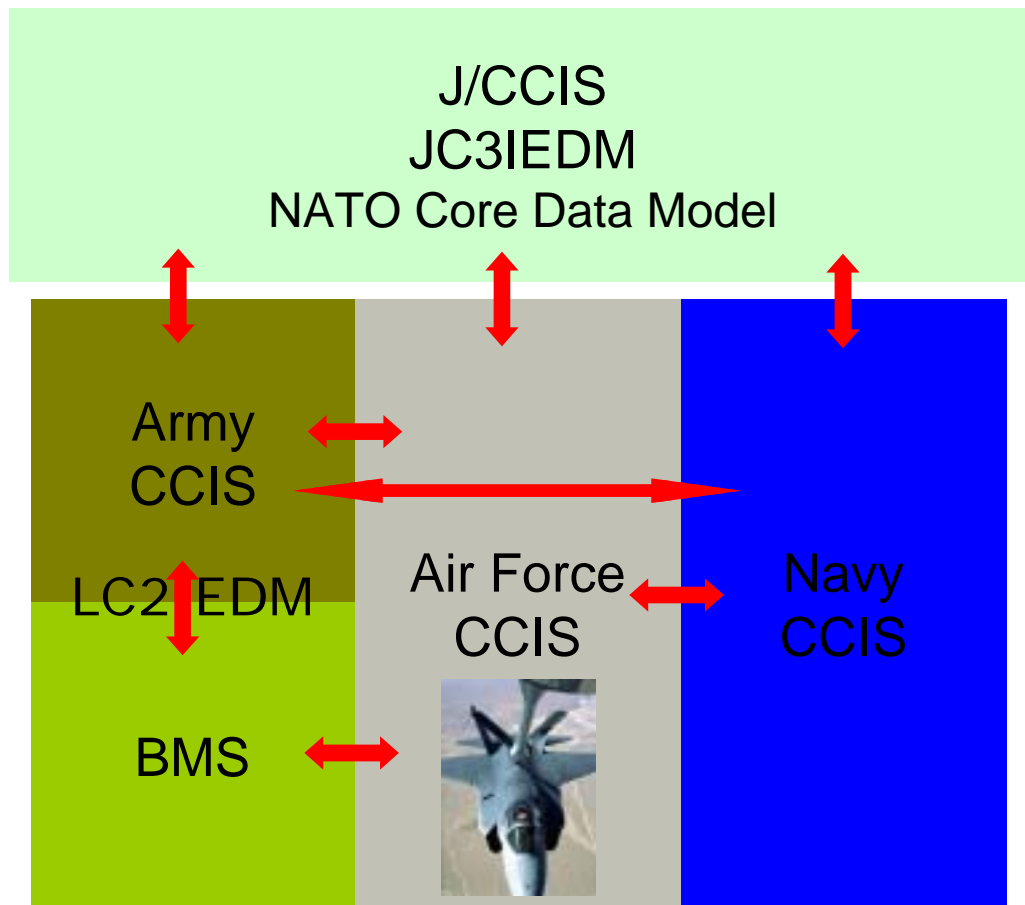


## New C2 Functionalities

- Military Decision Making Process
  - Intelligence Preparation of the Battlefield (IPB)
  - Terrain Analysis
- Civilian Military Corporation (CIMIC)
- Peacekeeping
- Army Aviation
- Air Space Management Means
- Air Defence incl. Threat Domes
- Communication
- Integration of NBC/Analysis (Bruhn Newtech A/S)
  
- All branches supported by DMP, FoP and SIT functionality



# J/CCIS Overall Architecture





# Structure

- What is GIS?
- FAQ
  - Vector/Raster Data
  - Map Scales
  - Coordinate Systems
- Functionality
  - System Management
  - C2
- Architecture
- The Future
- The Past



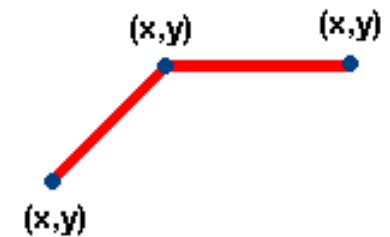
## What is GIS?

- GIS = Geographic Information System
- A GIS is a computer-based system for storing, viewing, manipulating and analysing data.

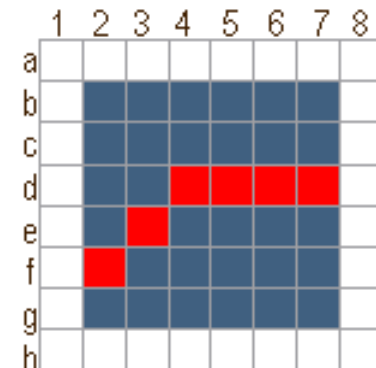


## FAQ: Vector/Raster Data

- Vector Data
  - Points, lines and areas
  - E.g. lamp posts, coastlines and buildings



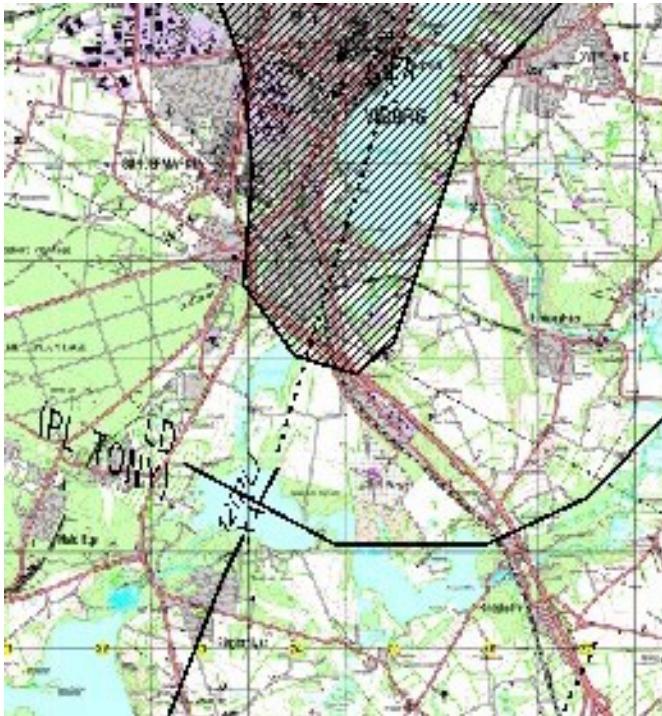
- Raster Data
  - Cells
  - E.g. aerial photographs, satellite images and scanned maps



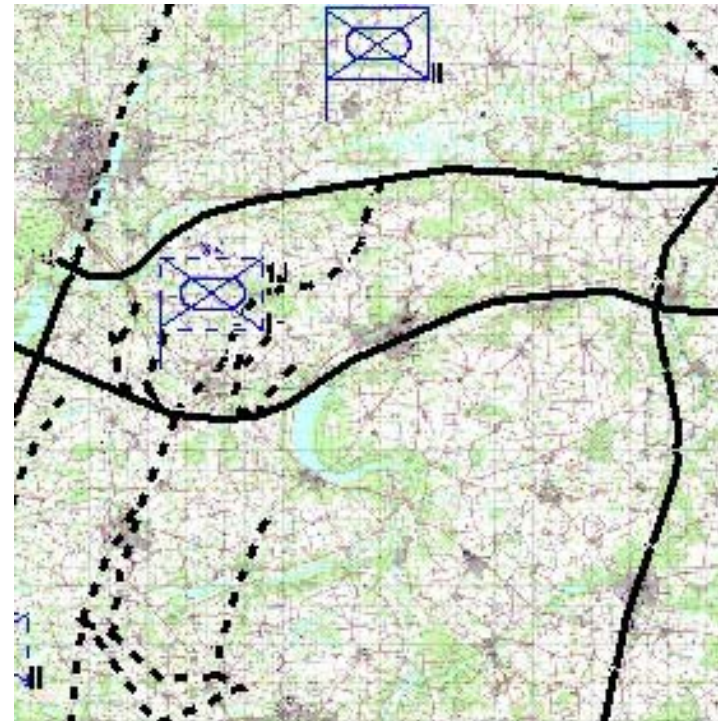


## FAQ: Map Scales

- Larger scale:
- e.g. 1:50.000



- Smaller scale:
- e.g. 1:500.000







## FAQ: Coordinate Systems

- Geographical data uses a coordinate system to describe its location on the world.
- Two types of coordinate systems:
  - Geographic Coordinate Systems (GCS)
    - *WGS84 Spheroid (e.g.: 8.8395E, 56.0351N)*
  - Projected Coordinate Systems
    - *UTM (e.g.: 32N 490.000, 6.210.000)*
    - *MGRS (e.g.: 32V MH 90000 10000)*
- More information: CC:\C2Framework\Modules\GIS Framework\Analysis and Design\Docs\UTMandMGRS.doc



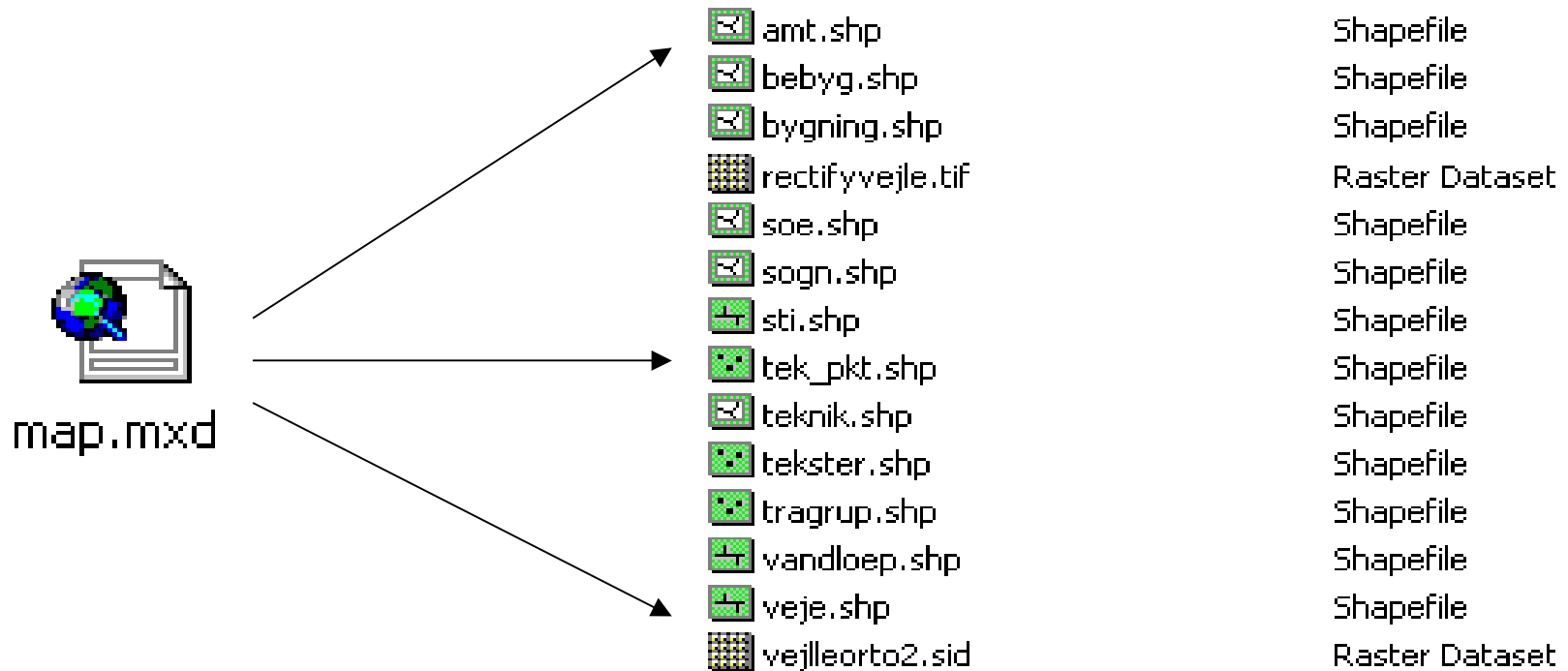
## Functionality: System Management (1/2)

- ESRI's products for the system administrator to manage maps and geographical data (Map Management):
  - ArcMap: viewing data, creating maps, geo-referencing
  - ArcCatalog: manage data, creating metadata
  - ArcToolbox: converting data, project data
  - ArcSDE: gateway to DBMS that handles geographical data
- Note that some functionality overlaps in ESRI's products



## Functionality: System Management (2/2)

- The maps used in DACCIS C2 are stored in an MXD-file made in ArcMap:





## Functionality: C2

- All Map Handling:
  - Load map, etc.
  - Drawing order, etc.
  - Pan, zoom, etc.
  - Show coordinates
- Plan:
  - Military symbols
- GIS Analysis:
  - Find location
  - Area of sight
  - Line of sight



G3

G2Sit



Map features

Vejle TOP10DK  
World

Add Map...

Remove map

Remove all maps

Move up

Move down

Help

Exit

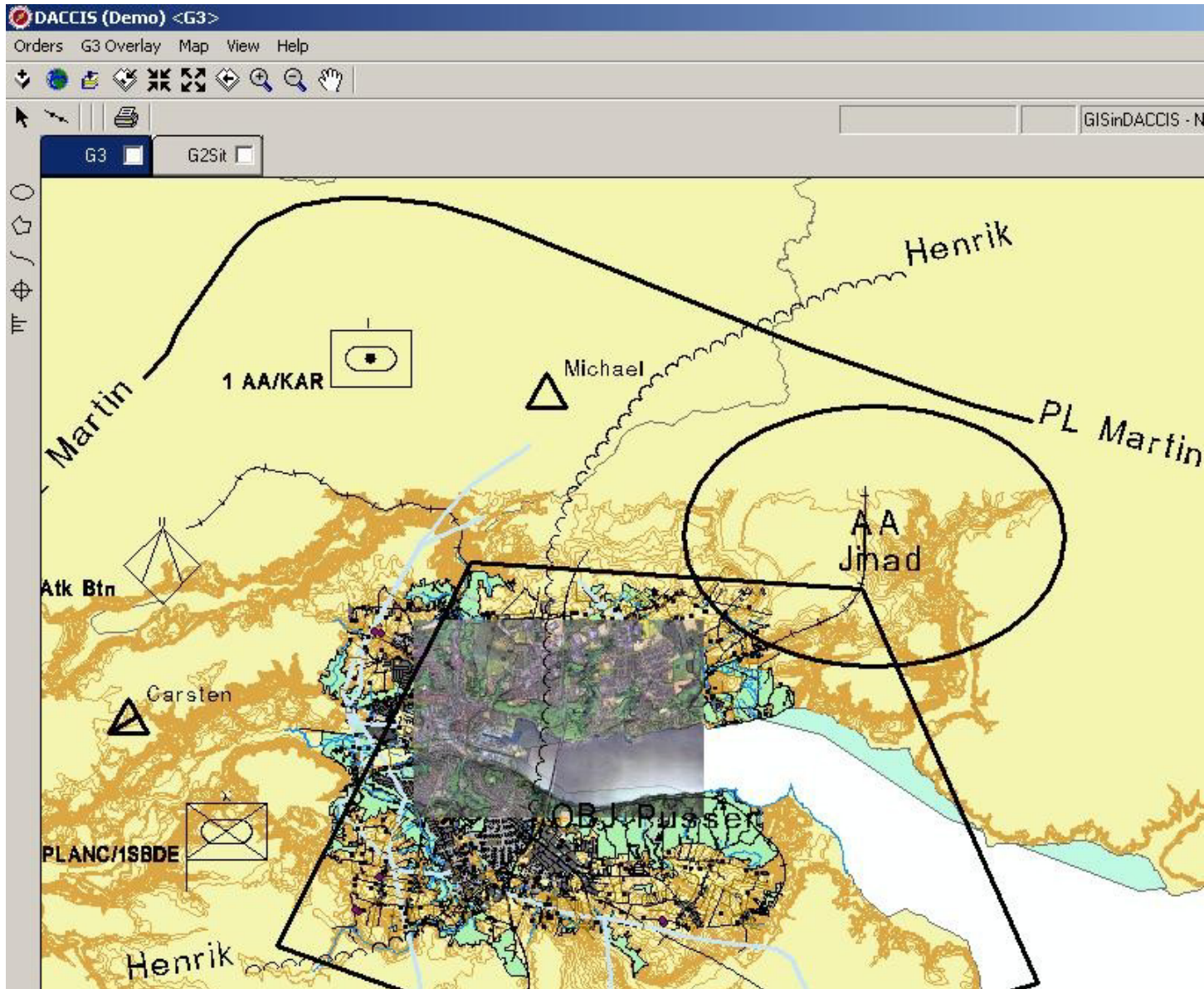
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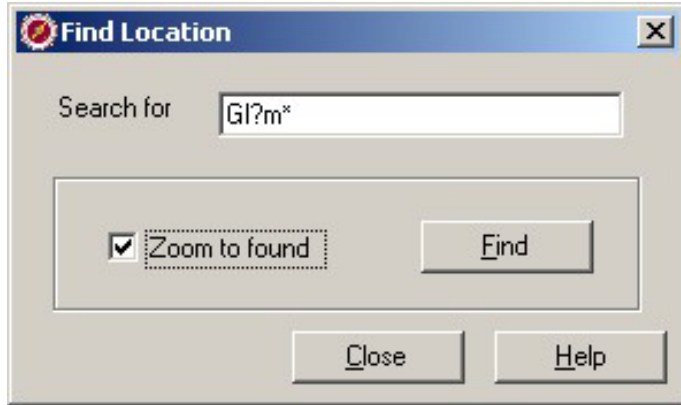


Layer features

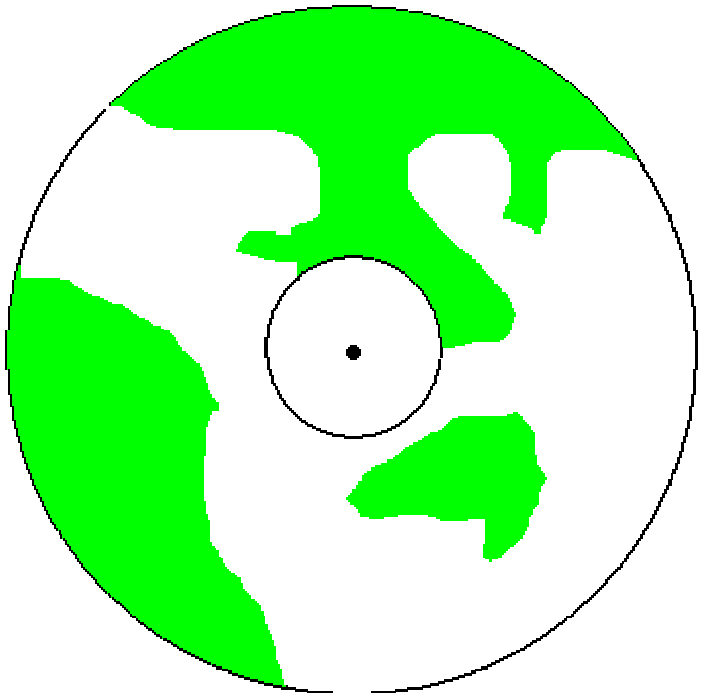
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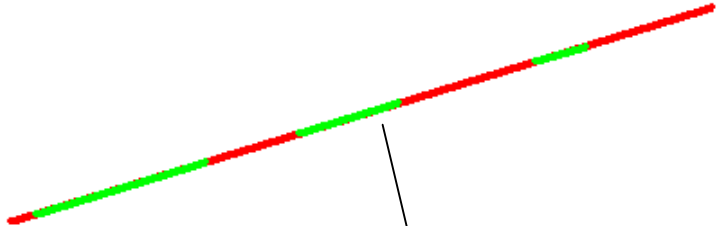




Find Location



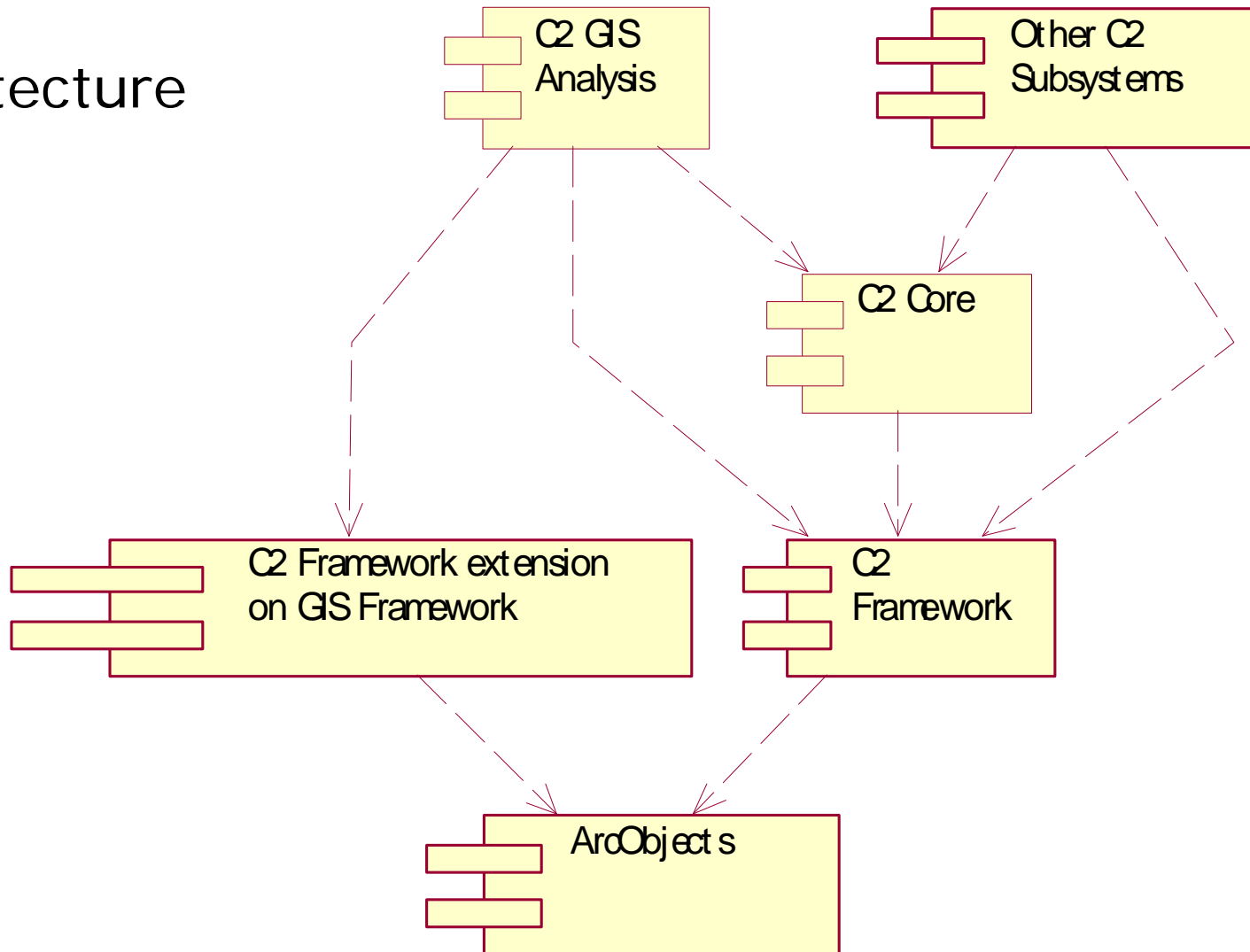
Area of Sight



Line of Sight



# Architecture







## The Future

- Among others:
  - Terrain Analysis (No-Go/Slow-Go)
  - 3D View/Fly-through
  - Waypoints
  - Animation in time (tracking)



## DACCIS Builds upon Lessons-Learned from MNO's

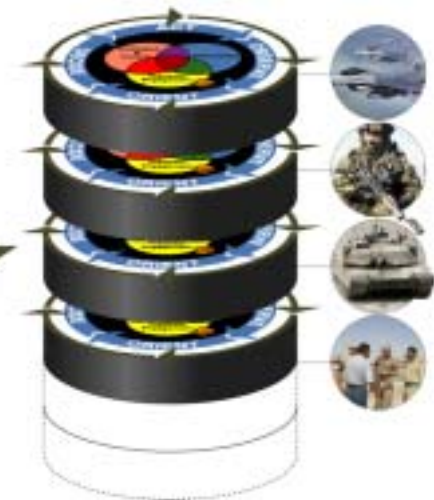
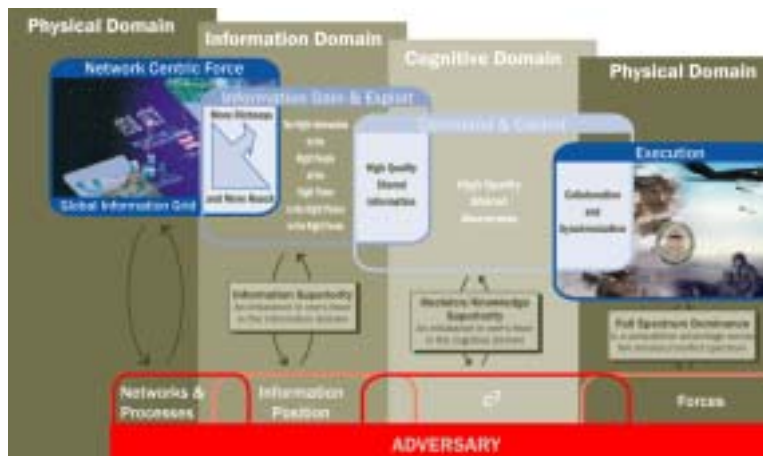
Our approach on the future of Command and Control applications draws upon operational experiences and lessons learned from multinational operations in the Balkans, Afghanistan and Iraq during the past 10 years.





## The DACCIS Challenge

To deliver a C2 System with the ability to support timely and appropriate decision-making throughout all phases and levels of the Engagement Life-Cycle.





## DACCIS Key Enablers – Part 1

- **Situational awareness across the Network Centric Environment**  
To ensure Situational awareness in all staff branches within all critical operational areas in a Network Centric Environment.
- **Strong interoperability for Combined Forces**  
To maintain multi-national interconnectivity of Combined Forces on both the semantic, cognitive and physical level
- **Joint CCIS and capability overview**  
To ensure the Commander in the Joint Environment has a COP (RIARTARP) including cross-service military capability packages



## DACCIS Key Enablers – Part 2

- CIMIC system gateways  
To establish gateways to CIMIC systems including NGO systems and Post Combat Operations in politically unstable areas.
- Decision support for command decision-making  
Timely and relevant operational simulation and decision support for all services and staff branches throughout all phases of operation (Synthetic Battle Space)



## The new Shape of the Engagement Life-Cycle

- C2 support for Combat Forces, CS, CSS throughout the offensive operations. And then post combat...:
- "Complex Emergencies" dealing with
  - Organized violence,
  - Health and medical problems
  - Hunger and food problems
  - Refugees
- Breakdown of Critical National Infrastructures like
  - Healthcare and hospitals in general
  - Power supply
  - Law and order
  - Transport (Rail, road, air, and sea transport)



## Focus On Peace Support

### NATIONAL FOCUS

- Increased focus on military and civil cooperation by government
- The establishment of coordination bodies
- Lesson learned from the field (e.g. lack of cooperation amongst the Danish Military and NGOs in relation to mine clearance in Eritrea).



ICRC

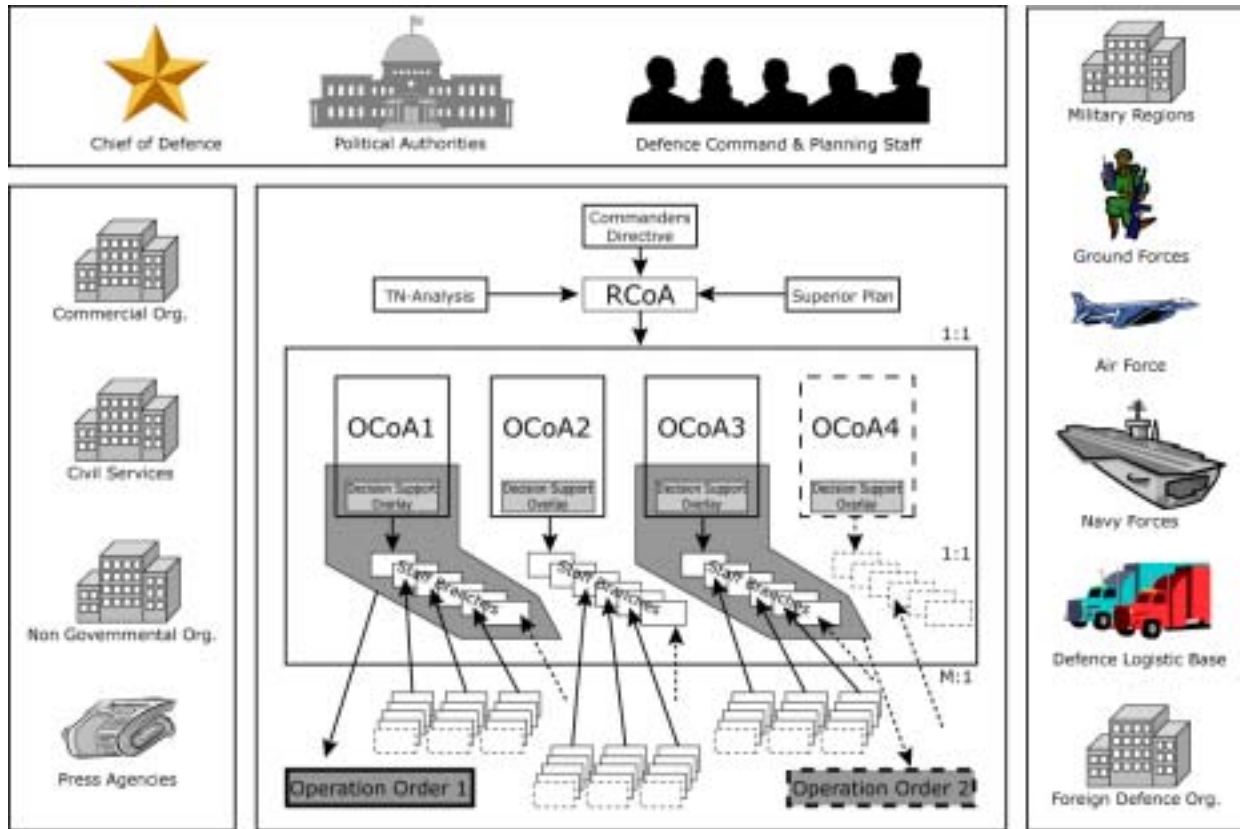


### INTERNATIONAL FOCUS

- World wide political agenda
- EU crisis management
- Enhanced cooperation amongst military forces and NGOs



# Planning and Decision-Making Framework in a Network Centric World







## Tradition

**WAR**            **ELIMINATION/DESTRUCTION**



**'WIN'**            **RECONSTRUCTION**

**PEACE**



## International Focus

- Peace supporting operations - world wide agenda
- EU crisis management
- Enhanced cooperation amongst military forces and NGOs

