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Topic 2: Information representation, visualization and communication

**Increasing military capability through information and communication**

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# The role of NATO & information

- International organizations such as NATO have an **increasing role compared to national governments.**
- NATO maritime operations concern maritime safety and navigation security, including: METOC, anti-piracy, border and migration control, counter-trafficking, fishing activity, etc.
- **Attention** about NATO **increased** along with its **role** and **importance.**
- The **impact** of **information** and **communication** on **civilian/military maritime operations** should be addressed in a **social and political perspective.**
- Thus, it is crucial that a NATO **authoritative information** is available to a wide audience.

# Background (social-political factors)

- A fully-informed and **favourable** outdoor and indoor **environment supports** and **facilitates** the **achievement of military objectives**.
- It is appropriate to realize **tailored communicative actions, customised actions**, bearing in mind the **peculiarities of target audience and background**.
- Background include: **citizens** - comprising ecological and industrial pressure groups - **media** and **civil authorities (policymakers)**.
- They are all **stakeholders**, and are part of a **decision circuit** in which **consensus building** takes place **in a circle**, or through **bi-directional flows**.
- The political authorities, which are the decision makers, are influenced by citizens, media and pressure groups which, in their turn, influence each other.





**NATO funding rely on consensus by members=stakeholders=decisionmakers**



**No money, no party**

## Scope of information representation, visualization and communication

- The scope is to pursue and **increase the quality levels of the military instrument to enhance the effectiveness, operational capabilities and overall employability** by providing a timely information representation and a catchy and tailored visualization and communication support.
- Communication to be strength, must represent information in a **simply and clear** way through **short text elements integrated with interactive visual representations**: they capture at best the audience attention, without compromising the efficacy of the information content to be transmitted.
- Online availability through **user-friendly and intuitive interface**, enabling a positive user experience, is strongly recommended.
- **Language** should be **natural for not military audience**, and **glossary** should be **available**.
- Information should be **manually categorized for not military audience**.
- Communication **results** should be **measured** through a **validation and verification process**.

# Information representation (InfoRep)

- Information representation (InfoRep) is any information required to understand and render both the **digital material** and the associated **metadata**. It regards how information is handled for retrieval purpose (**abstracting and indexing**), and deals with **information selection, information preservation, information searching**.
- A crucial concerns the **retrieval dimension** of the **information management** (referred with the same meaning to **information access, information seeking, and information searching**).
- **People** (including the user, the information professional, and the system developer), **information** and **systems** are the three intertwining entities that function jointly in the process of information representation.



# Structural and semantic composition of InfoRep

- Information representation regards all **levels of abstraction** and refers to both the **structural and semantic composition**.
- Information representation includes the **extraction of some elements** (*e.g.*, keywords or phrases) from a document or the **assignment of terms** (*e.g.*, descriptors or subject headings) to a document so that its **essence can be characterized and presented**.
- Typically, information representation can be done via any combination of the following means: **abstracting, indexing, categorization, summarization, and extraction**.

# Natural language vs. artificial language

- **Language in information representation** can be identified as either **natural language** or **artificial language** (*controlled vocabulary*, Wellisch, 1995).
- **Natural language** is commonly used for **representing information** or **forming a query** using **search features** (*e.g.*, Boolean operators).
- There are three common types of **controlled vocabulary**: classifications, subject heading lists, and thesauri, each with its own special usage in information representation.
- **Natural language**, generally speaking, allows the **highest degree of specificity** and **flexibility** in **representing** and **retrieving information**. People **do not need any training or practice in using natural language** because it is what they use for oral and written communication every day. Natural language is **the right choice for information to be delivered to a non-specific audience**.
- If is applied in information representation an **artificial language**, such as **military language** whose vocabulary, syntax, semantics, and pragmatics are limited, a **dictionary with glossary** (such as the US Department of Defense Dictionary of Military and Associated Terms) should be **available to non-specific audience**.



# Human categorisation

As it is **impossibly difficult** for users to predict the **exact words, word combinations, and phrases** that are used by all (or most) relevant documents (Blair and Maron, 1985) and fully automatic indexing and retrieval is not possible as it is never possible to verify whether all documents relevant to any request have been found (Swanson, 1988), it is **recommended** that a **human categorisation**.

# Information visualization (InfoVis)

- Visualization is the **use of interactive visual representations of data to amplify cognition** (Card et al., 1998).
- The purpose of information visualization (InfoVis) is to **amplify cognitive performance** and help us **speed our understanding** by transforming and representing abstract data in a form that facilitates **human interaction** for exploration and understanding.
- Information visualization is the **communication of abstract data through the use of interactive visual interfaces** (Keim et al., 2006).
- Information should be visualized through **computer-supported, interactive, visual representations of abstract data, computer graphics and interaction**, using a set of technologies.
- Information visualization is a method of presenting information in non-traditional, **interactive graphical forms, information design, computer graphics, human-computer interaction**.
- By using **2-D or 3-D color graphics and animation**, these visualizations can show the structure of information, allow the user to navigate through it, and modify it with **graphical interactions**.

# InfoVis: a tool to reinforce/amplify cognition

- Important aspects of information visualization (InfoVis) are the **interactivity** and **dynamics** of the visual representation.
- Information visualization produces **(interactive) visual representations of abstract data to reinforce/amplify cognition**; thus enabling the viewer to **gain knowledge** about the internal structure of the data and causal relationships in it.
- Information visualization focuses on **graphical mechanisms** designed to show the **structure of information** (Averbuch, 2004).
- In printed form, information visualization has included the **display of numerical data** (e.g., bar charts, plot charts, pie charts), **combinatorial relations** (e.g., drawings of graphs), and **geographic data** (e.g., encoded maps) (Averbuch, 2004).
- Computer-based systems, such as the information visualizer and dynamic queries have added **interactivity** and new visualization techniques (e.g., 3D, animation) (Averbuch, 2004).



# Information communication (InfoCom)

understanding  
connected, one who  
communicate, commanice  
mu/ni·ca'tor n.  
**com·mu·ni·ca·tion** (1)  
communicating; transm  
messages, or informatio  
cations (used with a si  
words effective

# Outdoor & indoor communication

The effectiveness of communication, both indoor and outdoor, is essential for achieving goals. A fully-informed and favorable outdoor and indoor environment supports and facilitates the achievement of military objectives.

## Outdoor communication purpose



- ✓ Reach a broad consensus among stakeholders, in order to gain support to achieve goals.

## Indoor communication purpose

- ✓ Reach a broad consensus among military and civilian personnel in order through the construction of a shared narrative on NATO policies and objectives.
- ✓ This is linked to motivation and following goals' achievement.

# Multimedia InfoCom

- Digital multimedia **enhance the users' experience**, and make it **easier and faster to convey information**.
- **Content** should use a **combination of different forms**: text, audio, images, animation, video and interactive content (Marsili, 2009).
- Enhanced **levels of interactivity** are made possible by **combining multiple forms of media content**.
- Online multimedia allows **collaborative end-user innovation** and **personalization** on multiple forms of content over time.



# Multiplatform InfoCom

- We live in a transmedia, globally connected world in which we use **multiple platforms to connect and communicate** (Jenkins, 2010).
- **Convergence applied to storytelling** involves creating content that engages an audience using various techniques to permeate their daily lives.
- This new culture shifts the spotlight of literacy **from being one of individual expression to one of community**.
- Using transmedia storytelling as a **communication tool**, wherein **audience interact with platforms**, such as Twitter, Facebook, Instagram, or Tumblr permits users' viewpoints, experiences, and resources to establish a **shared collective intelligence** that is enticing, engaging, and immersive, catching the users' attention, ensuring users a stake in the experience (Warren, Wakefield and Mills, 2013).
- Transmedia storytelling offers the communicator the ability to lead audience to **think critically, identify with the material and gain knowledge** (Teske & Horstman, 2012).
- Transmedia storytelling allows for the interpretation of the story **from the individual perspective, making way for personalized meaning-making** (Jenkins, 2010).

# Multilevel InfoCom

## Sharing information

In order to reach a wide consensus on NATO policy and operations, we stress the importance of a **broad sharing of information**, both classified (e.g. restricted, confidential, secret and top secret) both unclassified **at different levels**:

- among military and civilian personnel;
- among the general public (including civilian institutions and media).

## Hierarchical level

- Even if a formal security clearance is required to access classified documents or access classified data, is strongly recommended **not excluding all the staff from the basic information** related to operations.
- Access to information must meet **hierarchical levels of security**.

**Thanks for your kind attention**

*“That’s all Folks!”*

**La commedia è finita!**



# Follow me!



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