STATO MAGGIORE DELLA DIFESA

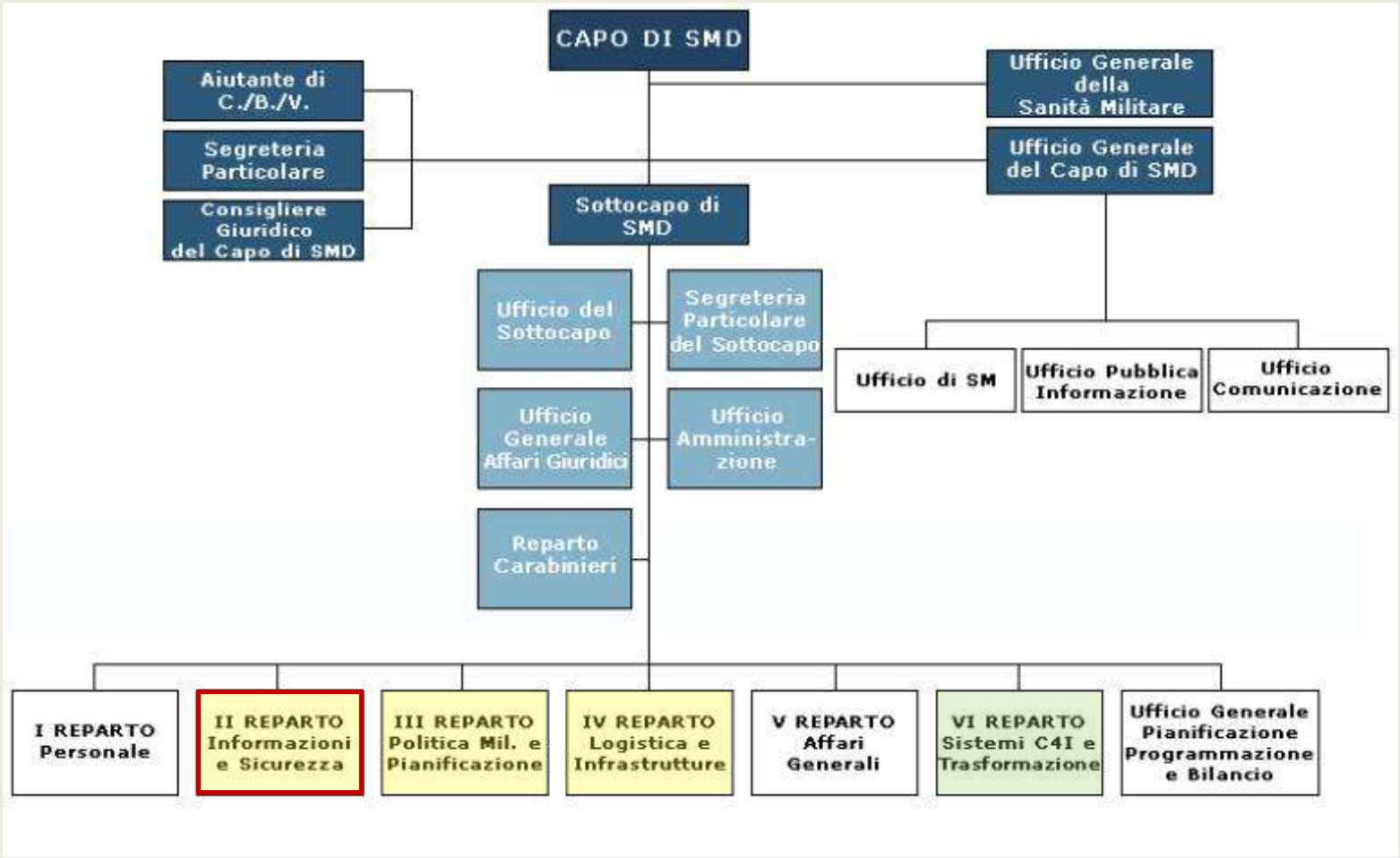
VI Reparto - Sistemi C4I e Trasformazione

L'accrescimento delle conoscenze e i vantaggi operativi attraverso il J-ISR: Vision sulle necessità future e possibile roadmap

Presentazione a cura del Gen. B.A. Giuseppe GIMONDO

Roma 10 ottobre 2013

Italian Joint Staff



DEFINITIONS

ISR: The integration of collection, processing, fusion, exploitation and dissemination systems, processes and personnel to provide the timely information needed by end-users to define objectives and plan, prepare for, and undertake the operations, missions, tasks and functions to achieve those objectives

(Source: The DRR Vision for an Alliange Joint Intelligence, Surveillance and Recconnaissance System)

The Right Information at the Right Time, in the Right Place, in the Right Way to the Right Person

ISR

Systems

Processes

Personnel

Collect

Process

Fuse Exploit

Disseminate

TIMELY INFORMATION NEEDED BY THE END USER

Define objectives

Plan, Prepare for and undertake

Operations, Missions

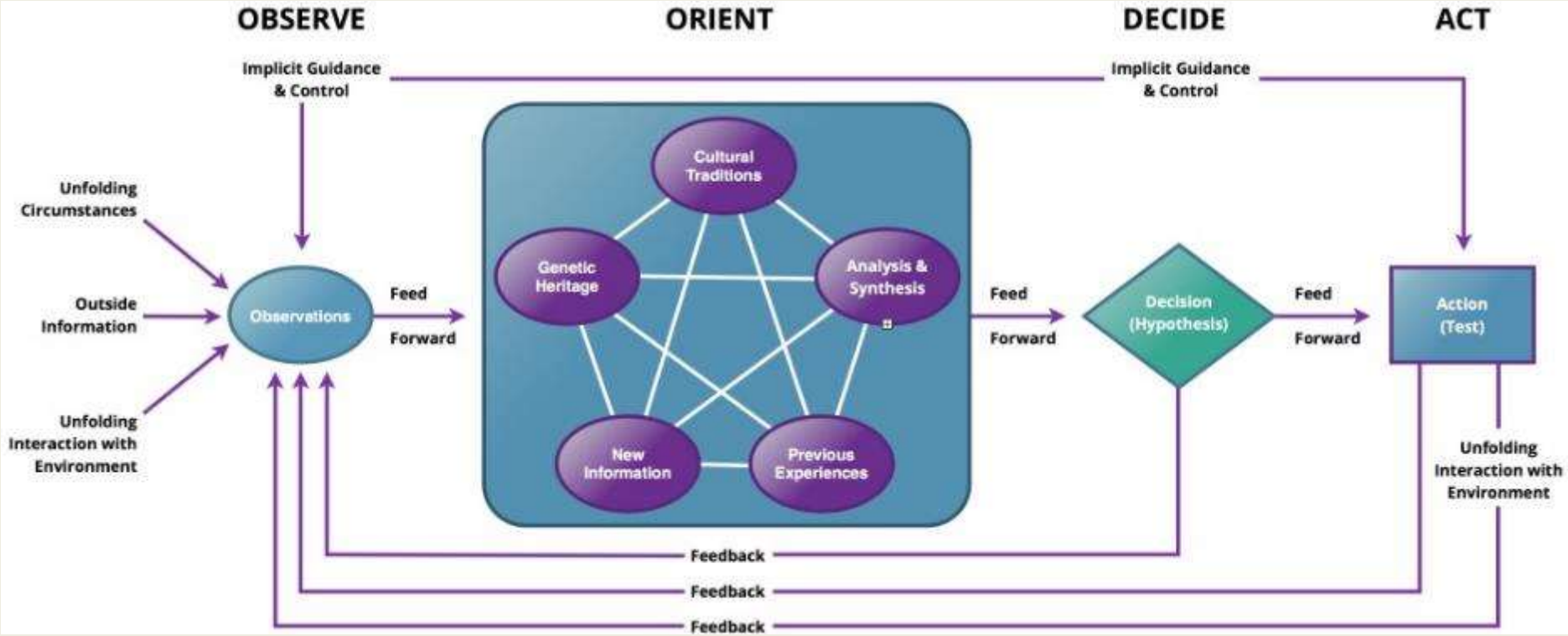
Tasks and Functions

ACHIEVE

THOSE OBJECTIVES

WARFARE DOMAINS

OODA LOOP

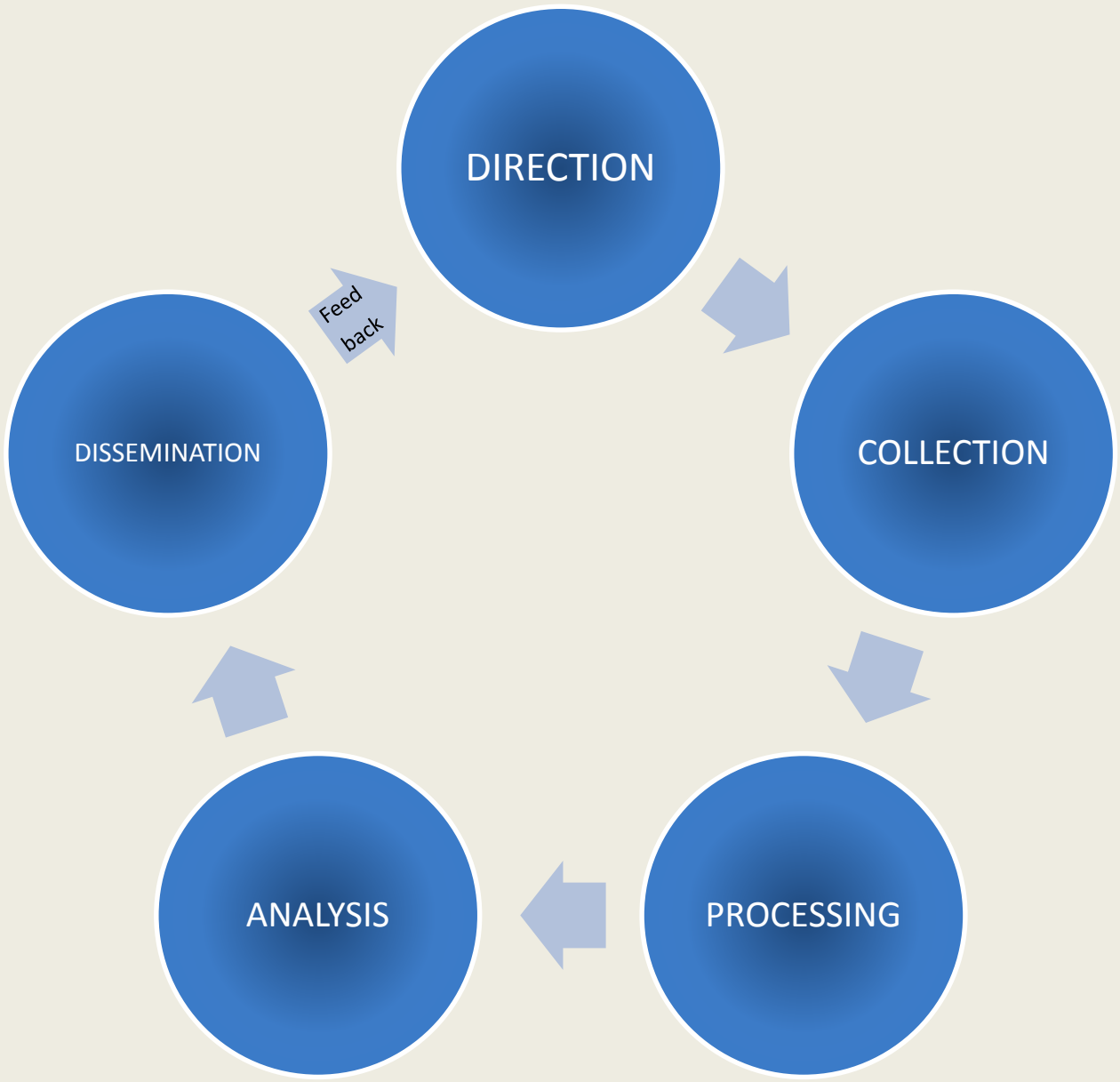


IN THE BATTLEFIELD, WHO IS

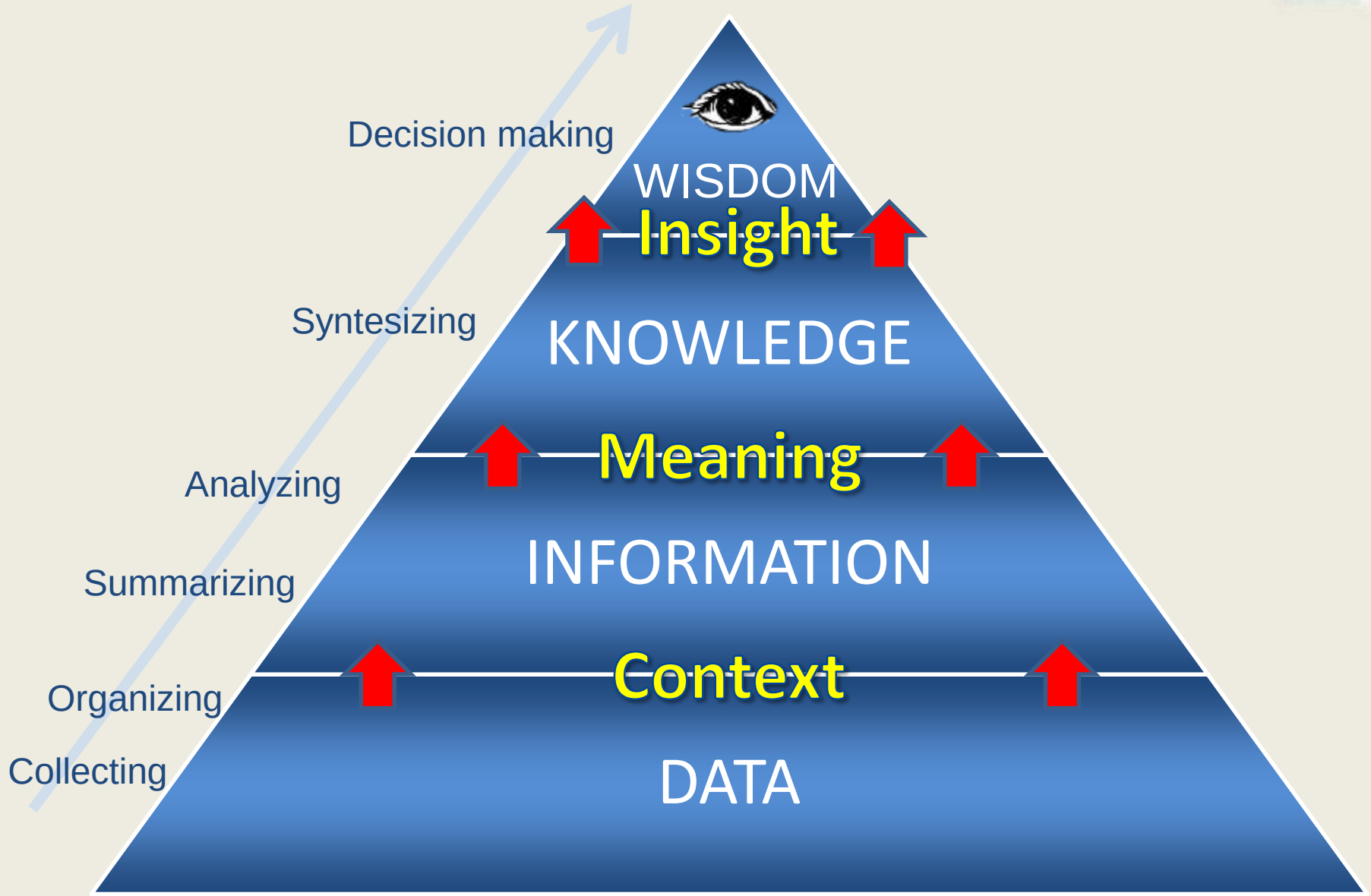
SMARTER, FASTER, MORE INFORMED

GAINS THE ADVANTAGE

THE INTELLIGENCE CYCLE



KNOWLEDGE MANAGEMENT



ISR AND OPERATION UNIFIED PROTECTOR

Operation U.P. uncovered NATO ISR shortfall masked during peacetime

- Operations relied heavily on ISR capabilities mostly provided by US.
- 4 out of 5 ISR flight missions where flown by US assets
- Limited Information sharing
- ISR personnel lack of training and experience (exp. targeting)
- NATO needs an increased ISR capability:
  - sensors
  - procedures
  - training and education
  - Networking environment

NATO JISR INITIATIVE

Aimed to rectify shortfalls in the JISR domain identified during operations in Afghanistan and Libya

- launched in 2012 after the Chicago Summit affirmed it as one of the Alliance's most critical capability needs.
- To help coordinate the gathering, analysis and dissemination of information.
- It will use information gathered by the Alliance Ground Surveillance system and other ISR assets
- In support of Alliance operations
- **integrating operations and intelligence**.

Connected Forces Initiative (CFI)

- The Connected Forces Initiative (CFI) aims to ensure the ability of forces to be able to communicate and work with each other.
- At the most basic level, this implies individuals understanding each other
- at a higher level, the use of common doctrines, concepts and procedures, as well as interoperable equipment
- Forces need to increasingly practice working together through joint and combined training and exercising
- standardize skills and make better use of technology
- CFI facets: Communication, practice and validation
- C4ISR provides glue to binds NATO forces together
- Greater use of education, training and exercises to reinforce links between forces of NATO member countries

Italian Defense JISR Operational Needs

Lessons identified from recent operations suggest that Italian Defense should :

- Improve ISR information generation capability
- Improve its Infostructure for ISR data dissemination
- Improve Collection Coordination Information Requirement Management (CCIRM) processes
- Improve intel personnel education and training
- Develop advanced multi-sensor, cross correlation and cross cueing data fusion capabilities
- Improve ISR data dissemination processes

Allied Ground Surveillance (AGS)

- RQ-4 Block 40 Global Hawk
- Unmanned aerial platforms operating at considerable stand-off distances
- All weather & light condition
- State of the art radar sensors
- LOS & BLOS wide band data links
- Detect and track moving objects
- Provide radar imagery of stationary objects

- AGS will operate from Sigonella Air Base which will serve a dual purpose as a NATO JISR deployment base and data exploitation and training centre.

- The AGS system is expected to be acquired by 14 Allies (Bulgaria, Czech Republic, Denmark, Estonia, Germany, Italy, Latvia, Lithuania, Luxembourg, Norway, Romania, Slovakia, Slovenia and the United States), and then will be made available to the Alliance in the 2015-2017 timeframe.

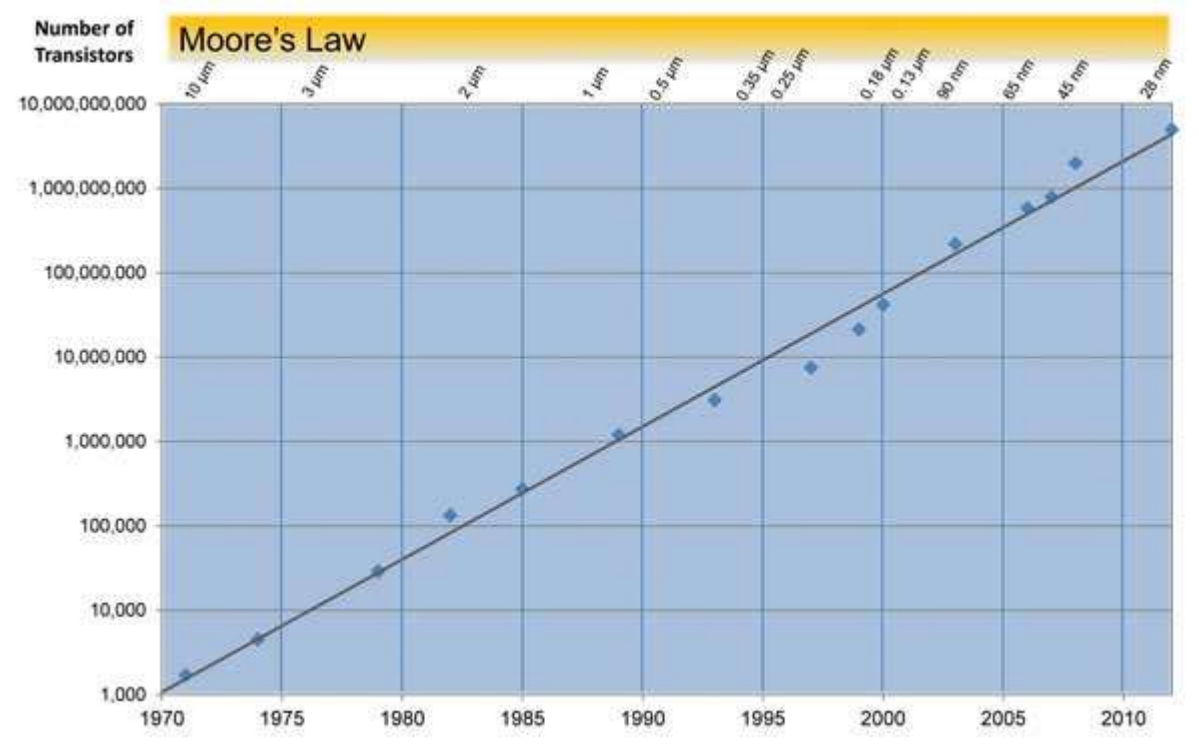
MAJIIC2
Multi-Intelligence All-Source Joint Intelligence Surveillance and Reconnaissance Interoperability Coalition

Improve the commanders situation awareness through collaborative employment and use of interoperable ISR sensor and exploitation systems

- multinational project (nine nations including Italy)
- Interoperability is addressed from Operational, Architectural and Technical perspectives:
  - **Operational**, including development and demonstration of concepts of employment (CONEMP) and tactics, techniques and procedures (TTP) for collaborative employment and use of coalition ISR assets in support of military missions
  - **Architectural,** including development of procedures and technology for sharing ISR data and information, system architecture design principles, tools and technology for collaboration and tools for managing coalition ISR assets
  - **Technical**, including definition and development of key data formats and protocols for the various sensor and data types.

- **NATO Standard for dissemination of near real time and archived ISR data by using Coalition Shared Database (CSD)**

MOORE'S LAW



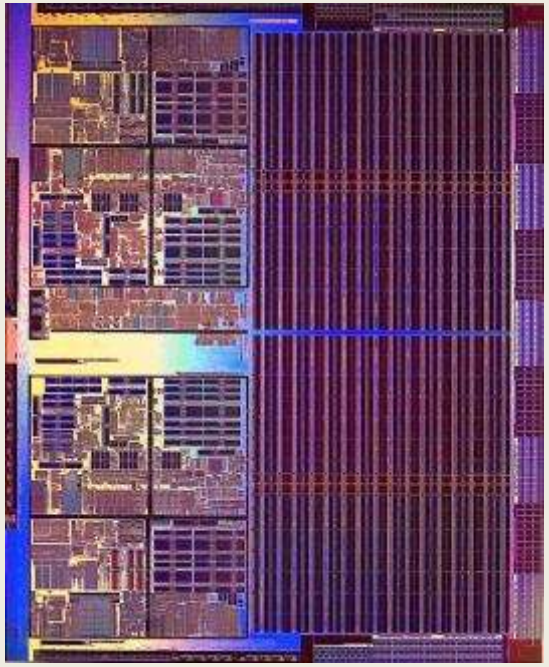
- First observed in 1965 by Gordon E. Moore (Intel co-funder)
- Number of transistors on I.C.s doubles aprox. every 18/24 months
- Capabilities of many digital electronic devices are strongly linked to Moore's law
- It will eventually meet economics and physics limits

In the near future, we may continue to enjoy ever increasing CPU Processing speed, memory capacity, number of pixels, etc. at lower prices

2013 XBOX ONE
System on chip (SOC)

- **363 mm^2**
- **5 BILLION transistors**
- **28 nm feature size**
- **8 x64 cores**
- **768 f.p. cores**
- **1,84 TeraFLOPS**

Videogame console priced under 500$



TECHNOLOGICAL ADVANCEMENTS

Expected technological advancements that will affect ISR capabilities include:

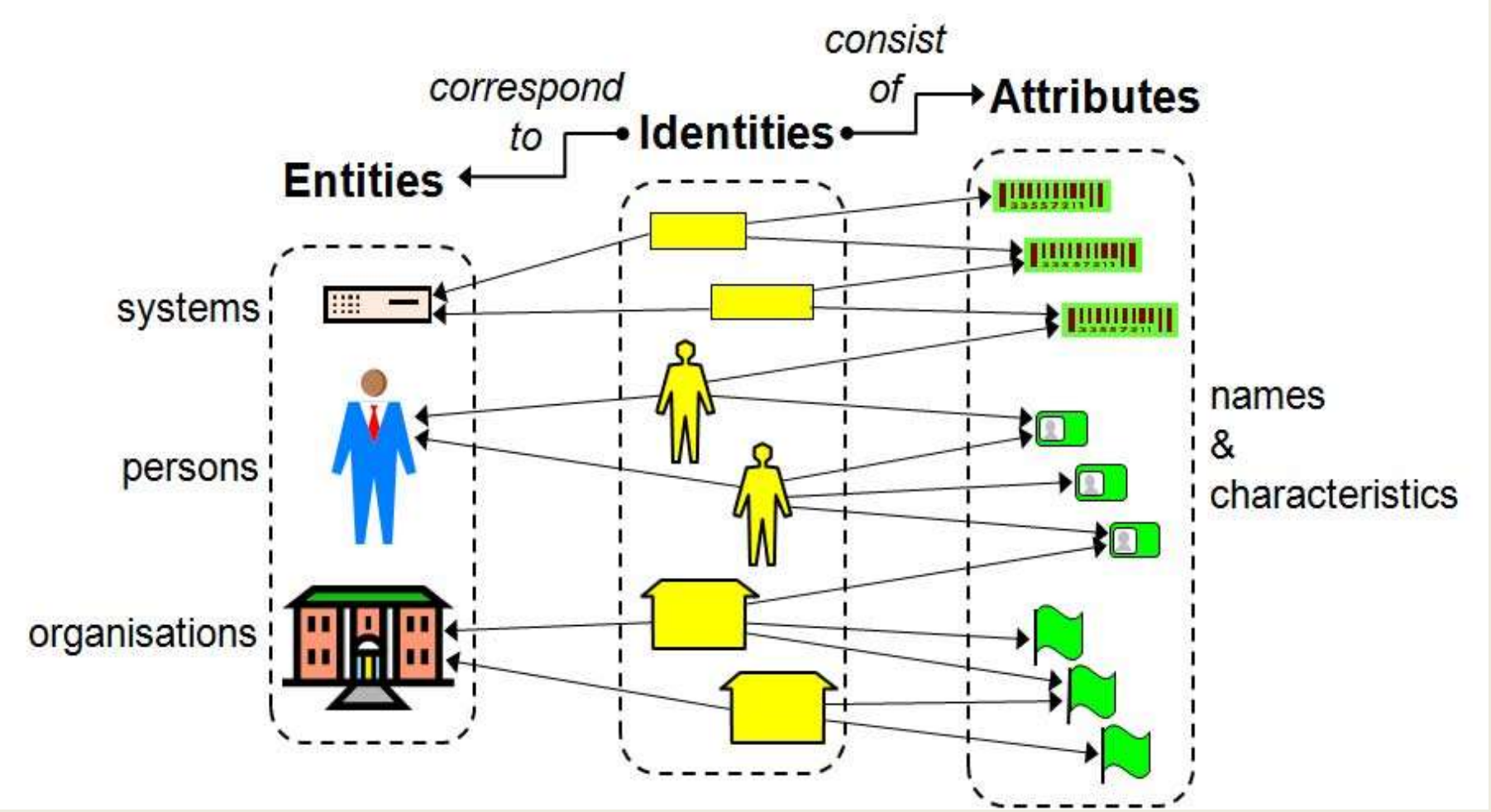
- Computing performance
- Network bandwidth
- Data storage
- Sensors capabilities
- Unmanned vehicles
- Mobile communications
- Miniaturized and integrated devices
- Software defined radio
- SATCOM

THE FUTURE OF SOFTWARE

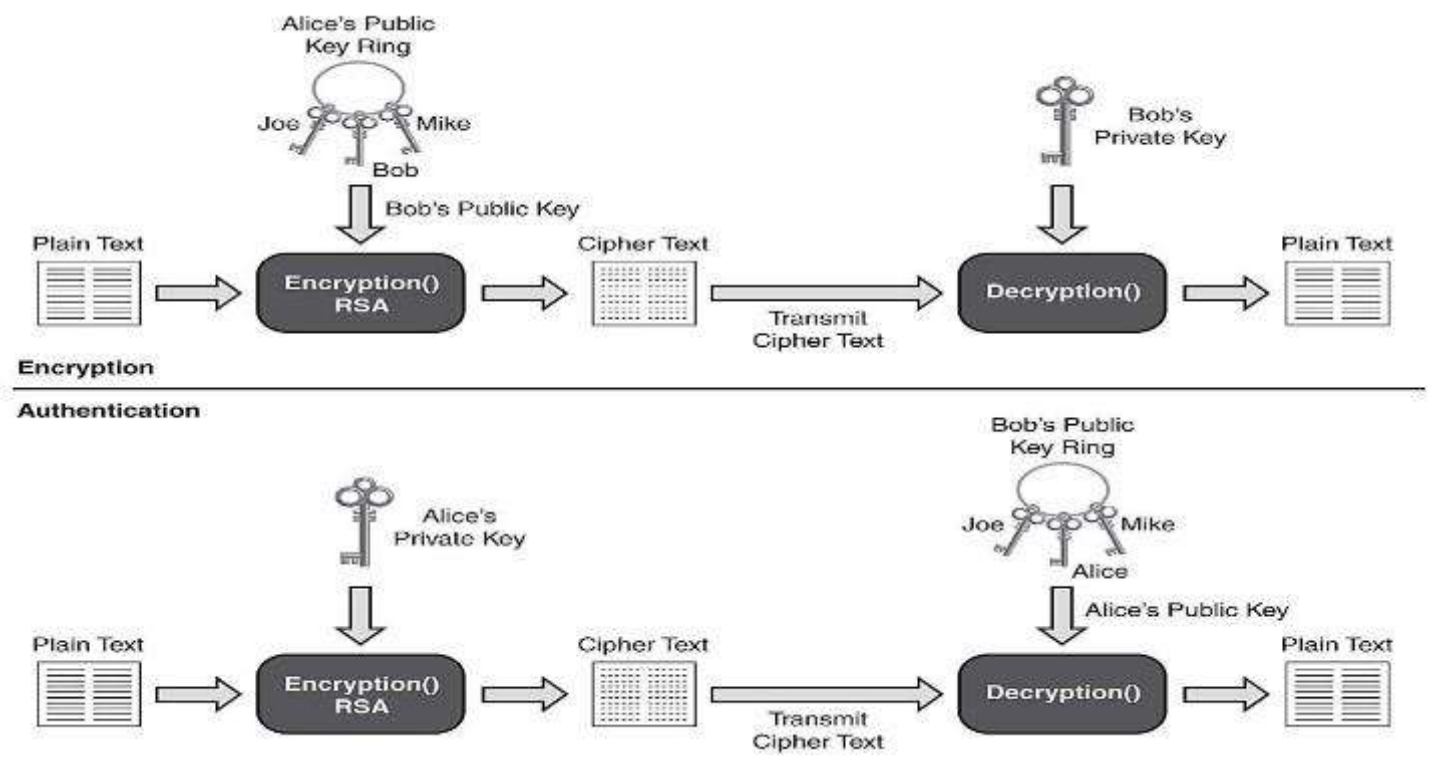
- Forget monolithic applications
- Everything will be available from the web
- Apps will feed from data services available in “the cloud”
- Better user experience with UI based on HTML 5
- Cross-platform
- Built-in collaboration
- Digital Rights Management
- Identity Management
- PKI Based security

IDENTITY MANAGEMENT

technologies, policies and practices for recognizing and authenticating entities in the cyberspace



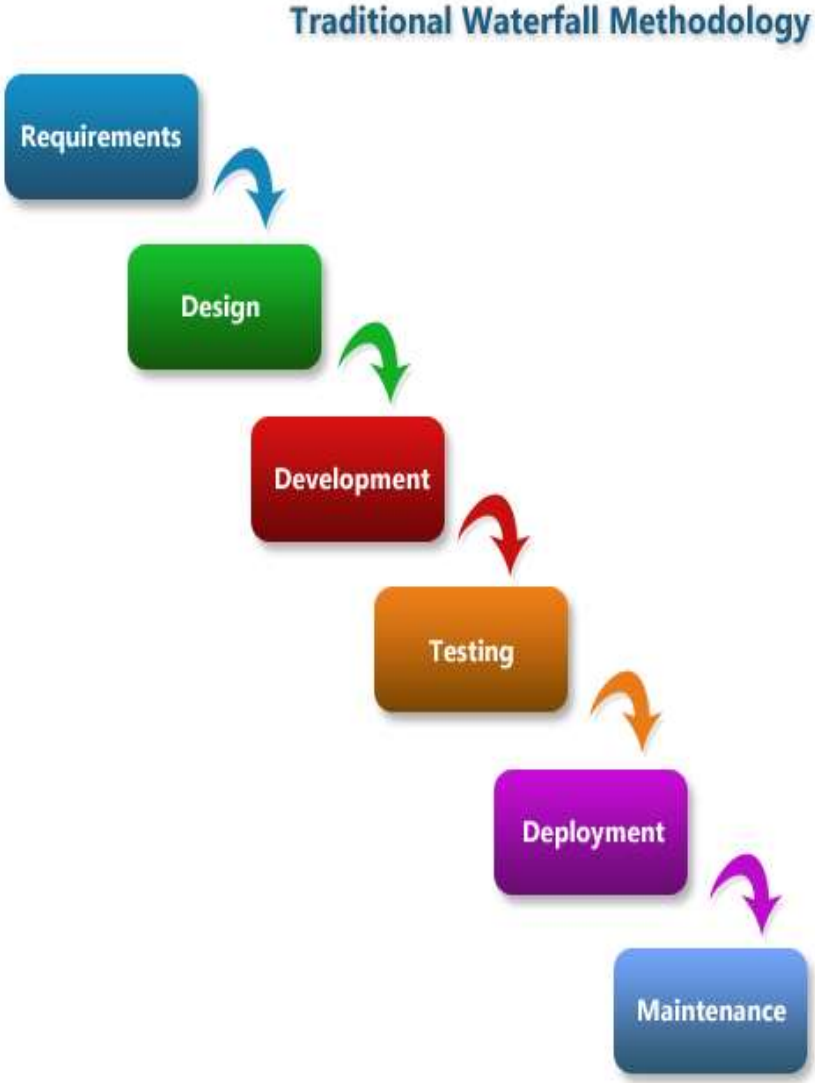
PUBLIC KEY INFRASTRUCTURE



- **Digital signature**
- **Authentication**
- **Encryption**
- **Non-repudiation**

Carta Multiservizi Difesa CMD

Traditional Software development methodology

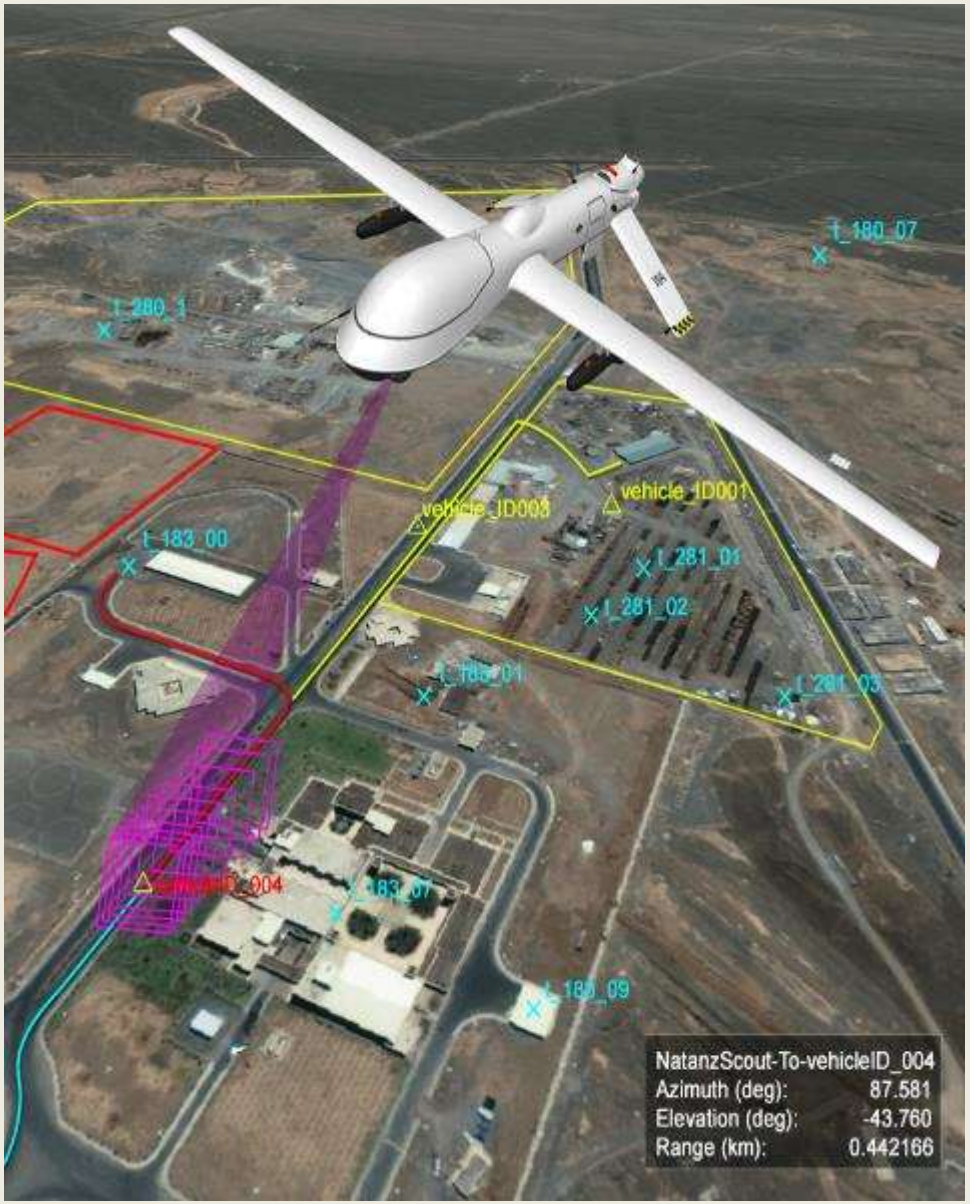


- Is difficult to go back a step
- If something is wrong on the design phase, the project is doomed
- Requirement are often found inadequate during development
- the client can see the software when the deployment phase is complete
- Product reach maturity only during maintenance phase, when user feed-back becomes available
- **… and developers finally find out what the user really needed …**

New development methodologies

- Many short development cycles
- small and self-consistent components are build on every cycle
- Product could be «releasable» to users at the end of every cycle
- Small teams with a mix of experiences
- Functional experts collaborate with developers and testers
- Initial requirement can be continuously reviewed in order to adapt to real needs
- Code is written with reusability and Maintainability in mind.
- User feed back is welcome
- Delivery is much faster

Modelling & Simulation

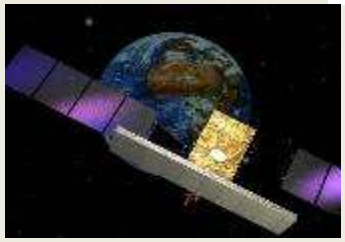


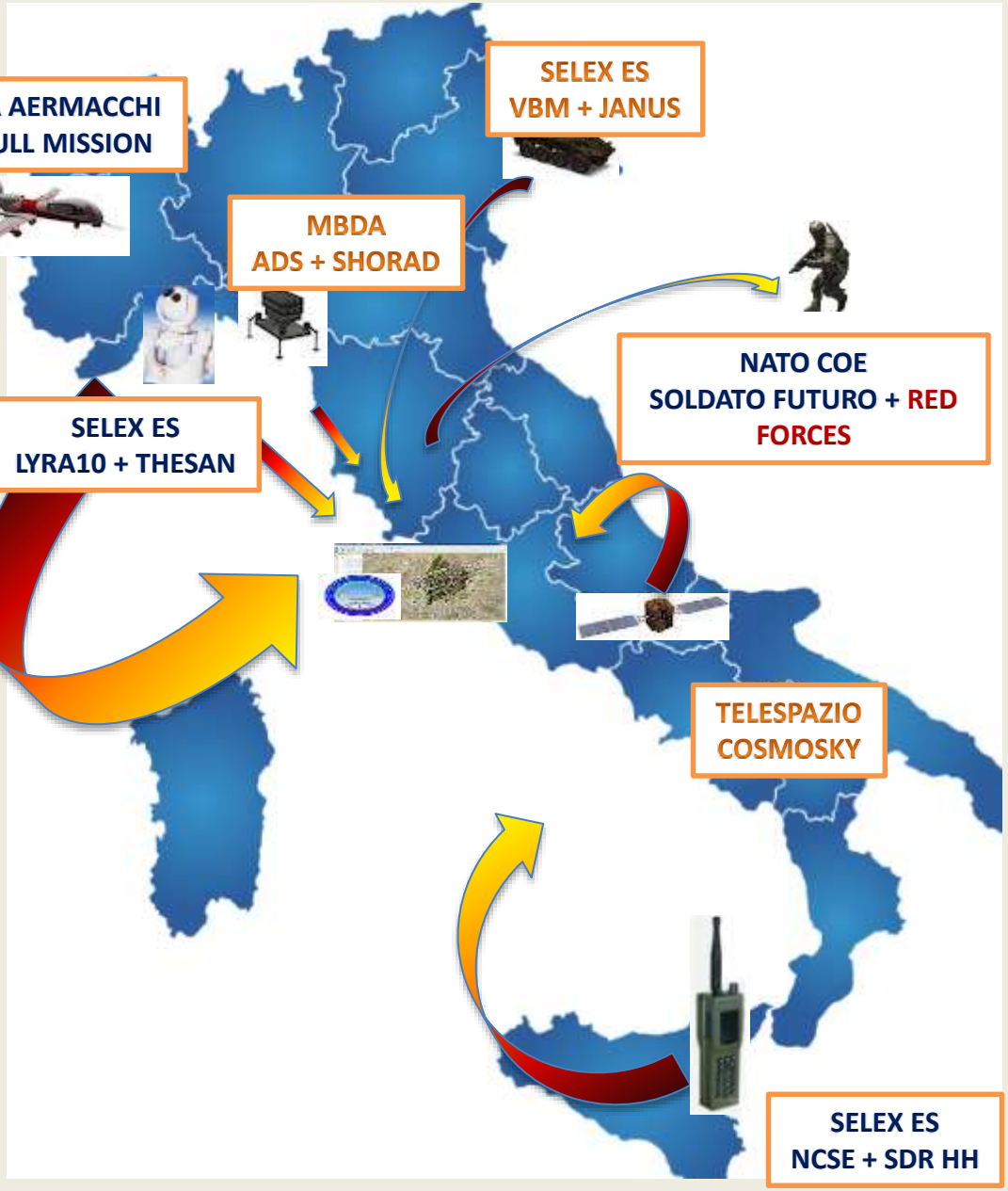
- Computer generated synthetic worlds
- High realistic geographically distributed simulations
- Live, constructive and simulated entities
- full immersive environments
- Standard architecture across platforms

Applications

- Research
- Experimentation
- Concept development
- Validation
- Training & Education

M&S applied to distributed training





NATO M&S Centre Of Excellence

Mission

To support NATO and Nations in their transformation efforts by providing subject matter expertise on all aspects of the M&S activities.

Core areas

- Education and training:
- Knowledge Management, Lessons Learned and Analysis
- Support to Concept development and experimentation
- Doctrine development, standards and interoperability

Member Nations

- Framework : ITALY
- Sponsoring :
  - CZECH REPUBLIC
  - U.S.A. (joining in progress)

WRAP UP

Technology will help but …

the real transformation needs to start in our mind

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