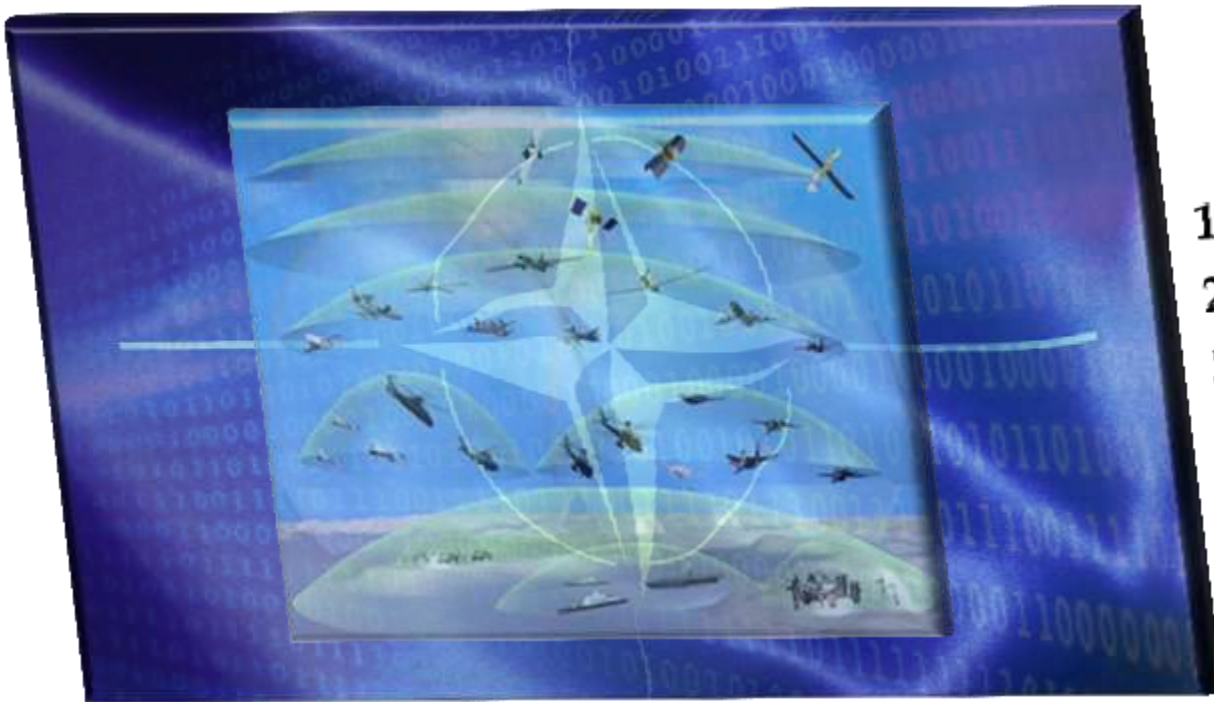# NATO Experience in building C4I Systems broad alliance

1. Drivers
2. Vision
3. Getting there
4. Key Capabilities
5. Way ahead

JSTARS in DESERT STORM 1991

if it moves, it can be seen

During the first ground engagement near Khafji in Saudi Arabia - attacked by the Iraqis on Jan. 29 - JSTARS identified the location of Iraqi troops, when and where they were moving, and confirmed the absence of any reinforcements en-route.

Applications:
- Ground Maneuver Support
- Close Air Support (CAS)
- Suppression / Destruction of Enemy Air Defenses (SEAD / DEAD)
- SAR/Personnel Recovery
- Maritime/Littoral Operations
- Theater Missile Defense
- Special Operations Forces (SOF) Integration
- MEDEVAC
- Border Watch
- Sensitive Reconnaissance Operations (SRO)
- Pattern of Life
- Traffic Pattern Analysis
- Backtrack

JSTARS in Unified Protector 2011

Libya as watershed

'Unified Protector' has clearly "*revealed shortfalls in precision-guided munitions; intelligence, surveillance, and reconnaissance assets; and experts trained to interpret the data they provide*". **NATO Secretary General Anders Fogh Rasmussen. Remarks at Press conference. Brussels 26 Feb 2014.**

NATO-Arab combat partnership

Hybrid Warfare – Military and Non-Military Instruments

„... a combination of conventional, irregular, and asymmetric means, including the persistent manipulation of political and ideological conflict ..."

Elements include
- Combination of special operations and conventional military forces
- Intelligence agents
- Political provocateurs
- Media representatives
- Economic intimidation
- Proxies and surrogates, para-militaries, terrorist, and criminal elements

NATO C4I capabilities - guided by Nations

Strategic Concept

- Active engagement
- Colective defence
- Comprehensive security
- Resilience against hybrid threat

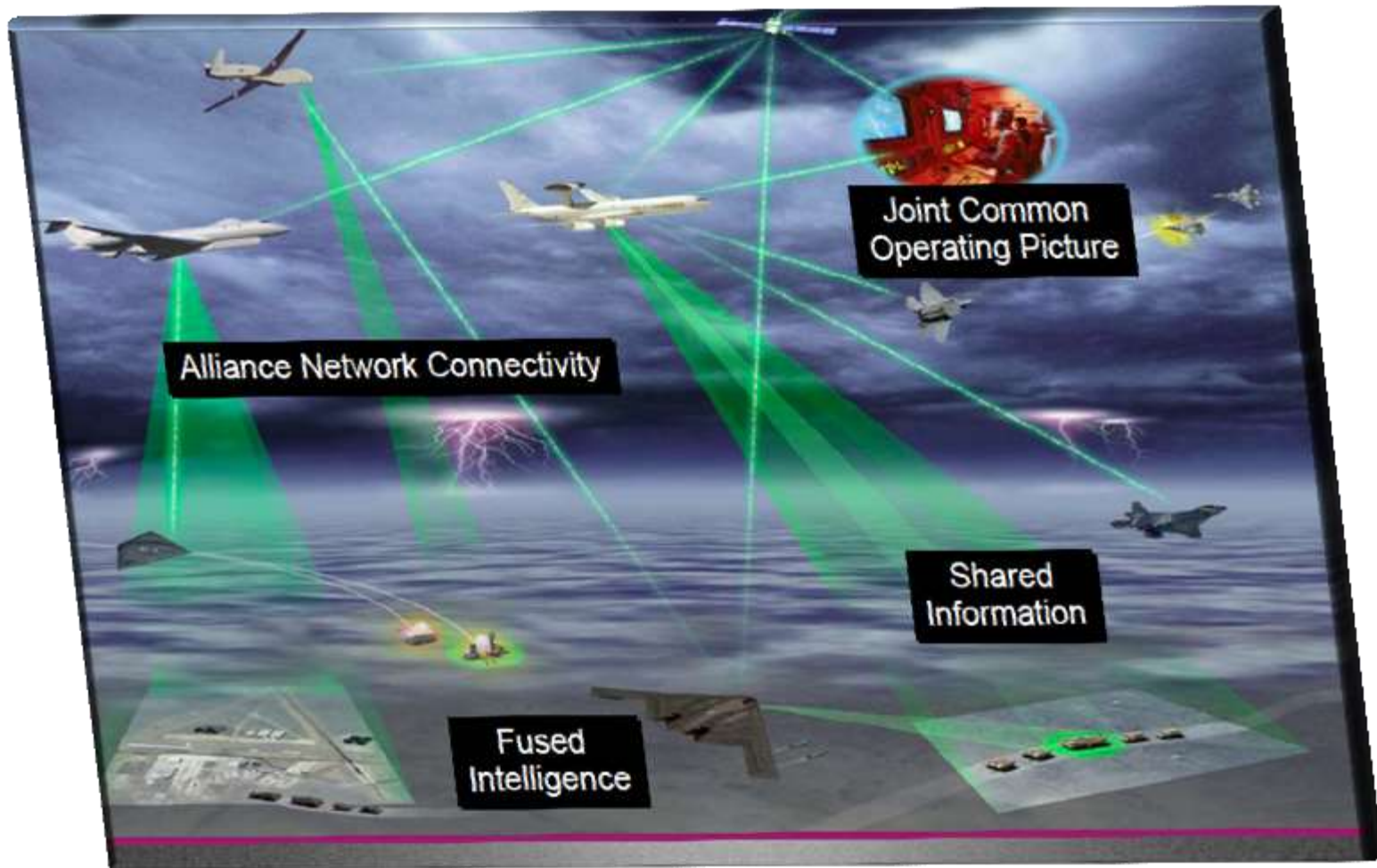**Political Guidance**

- NATO Defence Planning Process

Operational Needs

- Approximately 18,000 military personnel are engaged in NATO missions
- Operations in Afghanistan, Kosovo and the Mediterranean
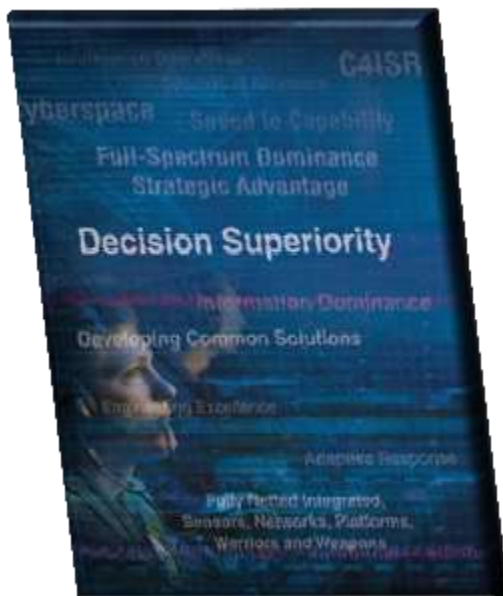- Supporting for the African Union and air policing missions on the request of Allies

Critical Capabilities

- **Federated Mission Networking**
- **Missile Defence**
- **Cyber Defence**
- **Joint ISR**
- ...

C4I – Network Enabled

Cyber Objectives

- **Build Capability** for control of the battlespace

- **Generate Advantage** in Command and control

- **Become Partner** in ISR, C2, Information & Knowledge Management

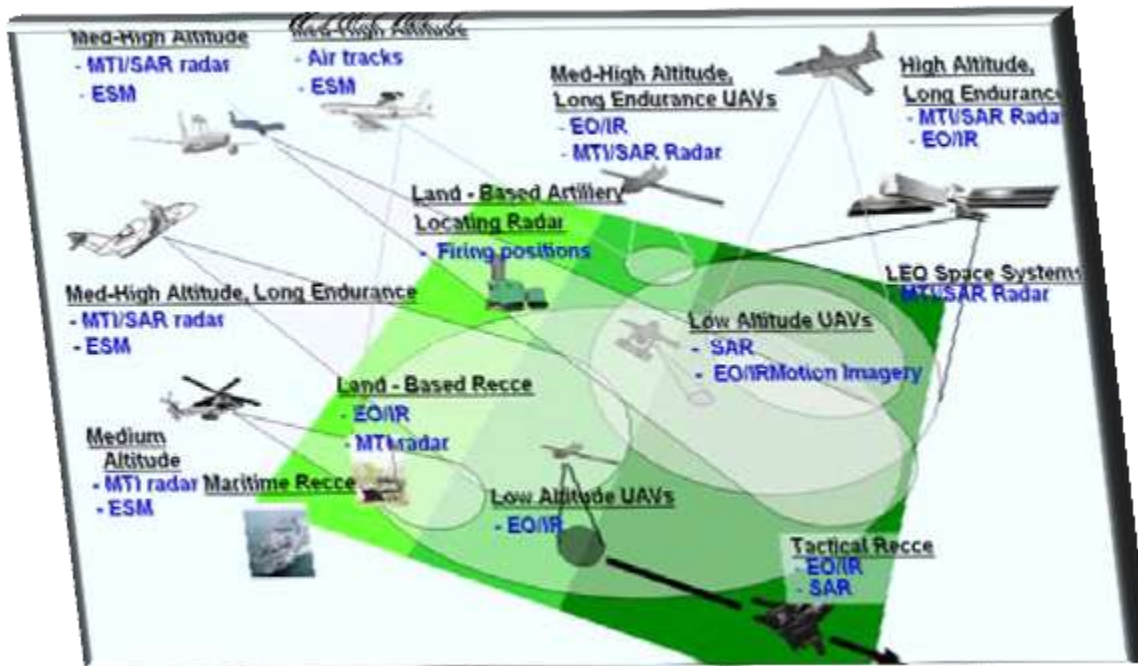- **Deliver Contributions** to the comprehensive approach

- Intelligence
- Networks
- **Electronic Warfare**
- Cyber
- Meteorology
- Oceanography
- Space
- Unmanned systems

Synchronize capabilities to achieve

Decision Superiority

Lessons from MAJIIC

A multinational interoperability project to maximise the utility of C4I resources

- Services & Information Modelling can be used to define operational processes and procedures
- Business Process Modelling
  - Drives clarity through discussion
  - Leads to a traceable, reconfigurable model of Mission
- Modern, Open Architectures & Legacy systems Co-exist

Unified Vision 2014 and 2016

coming up Unified Vision 2018

The NATO AGS programme, uses the RQ-4 Global Hawk UAVs as a key asset for the alliance, similar to its shared AWACS capability. It will be a major contribution to NATO's Joint Intelligence, Surveillance & Reconnaissance capability

Processing, Exploitation and Dissemination (PED) of data is a key area of development for NATO

Alliance Ground Surveillance

- The AGS Core will be an integrated system consisting of air, ground and support segments. The air segment includes five Global Hawk aircraft
- Excellent example of transatlantic cooperation, thanks to multinational industrial cooperation
- Essential enabling capability for forces across the full spectrum of NATO's current and future operations and missions
- Using advanced radar sensors, it will be able to continuously detect and track moving objects on or near the ground (i.e. tanks, trucks or helicopters) in all weather conditions and provide radar imagery of areas of interest on the ground and at sea
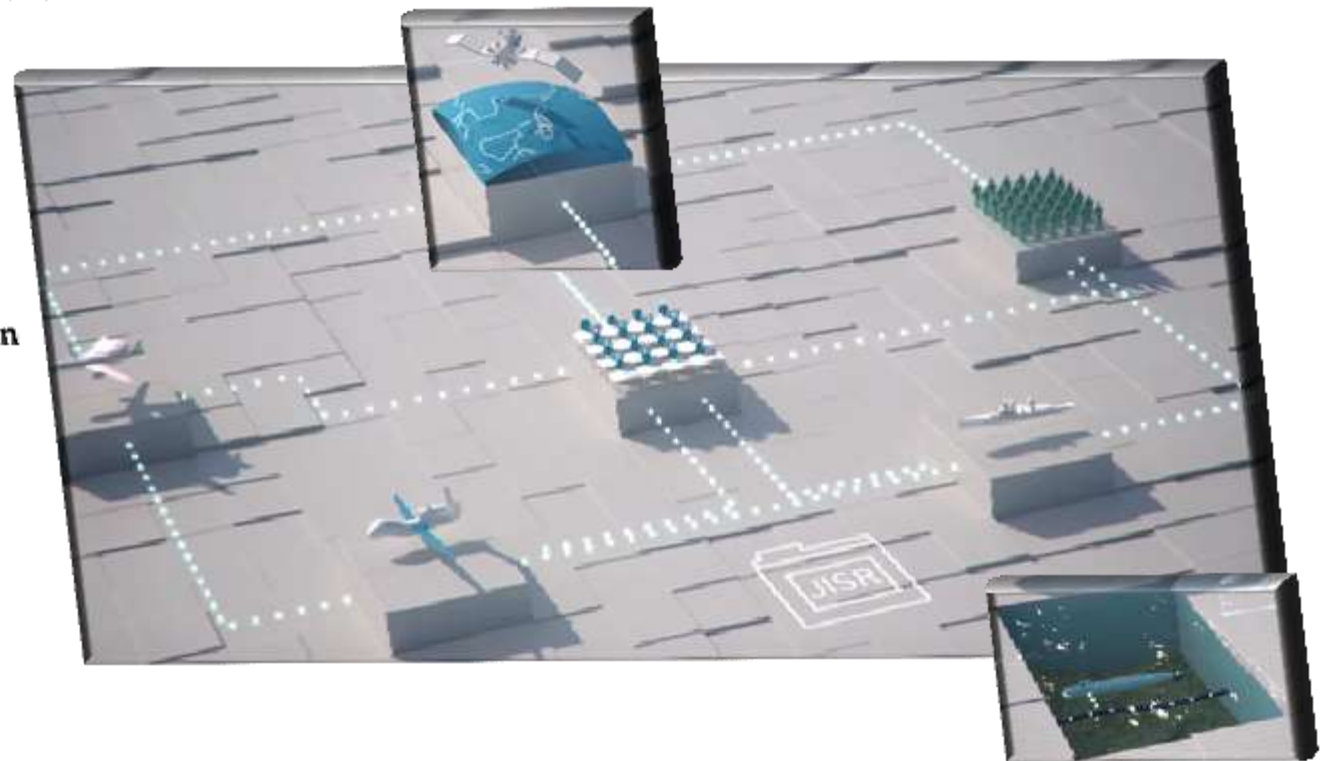

NATO Secretary General Jens Stoltenberg visiting the AGS Global Hawk display
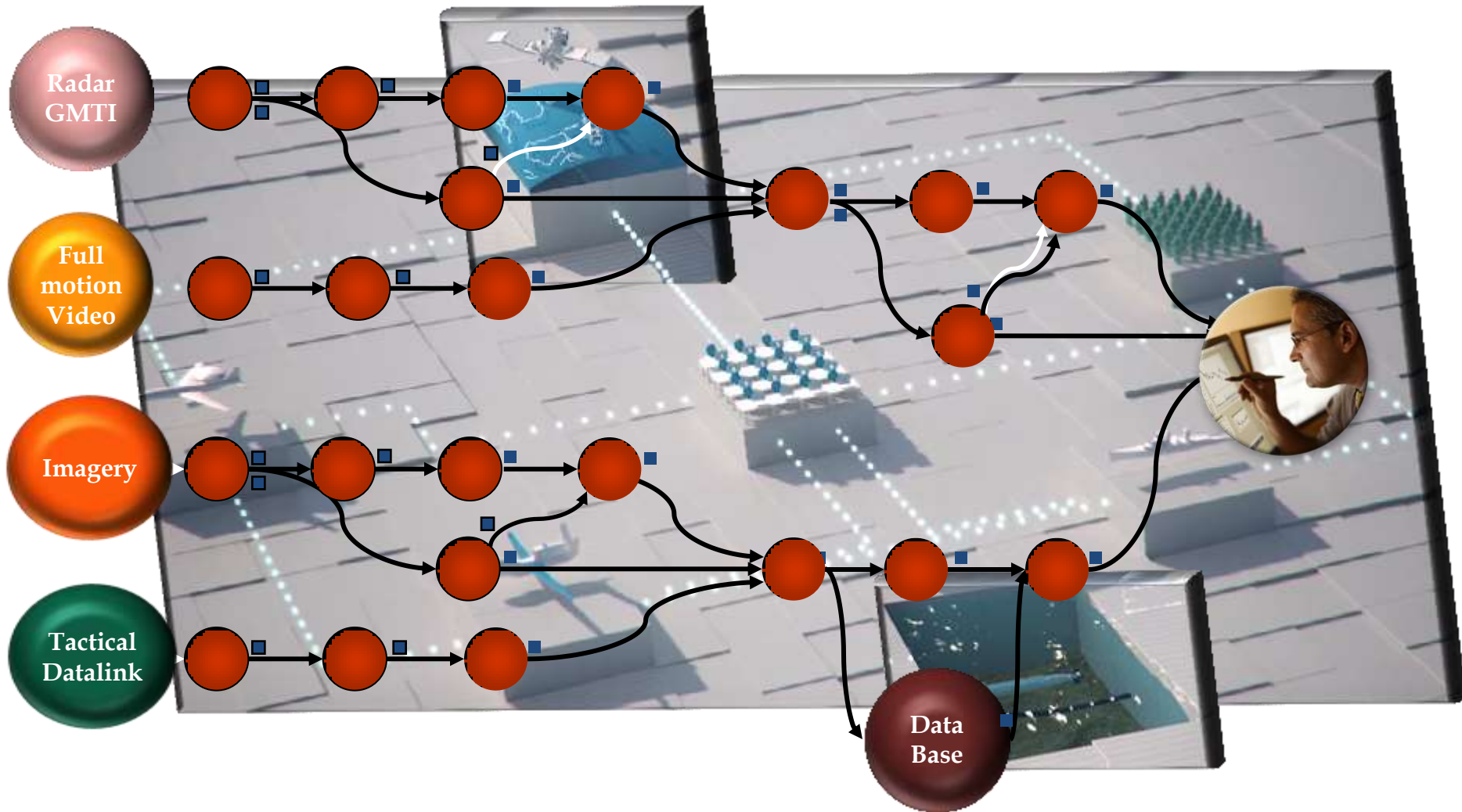
Generating actionable Information

Supported operations

- Joint Intelligence Preparation of the Operational Environment
- Targeting and Battle Damage Assessment/Combat Assessment
- Maritime Operations
- Air Operations
- Land Operations
- Special Operations
- Counter-IED Operations
- Force Protection
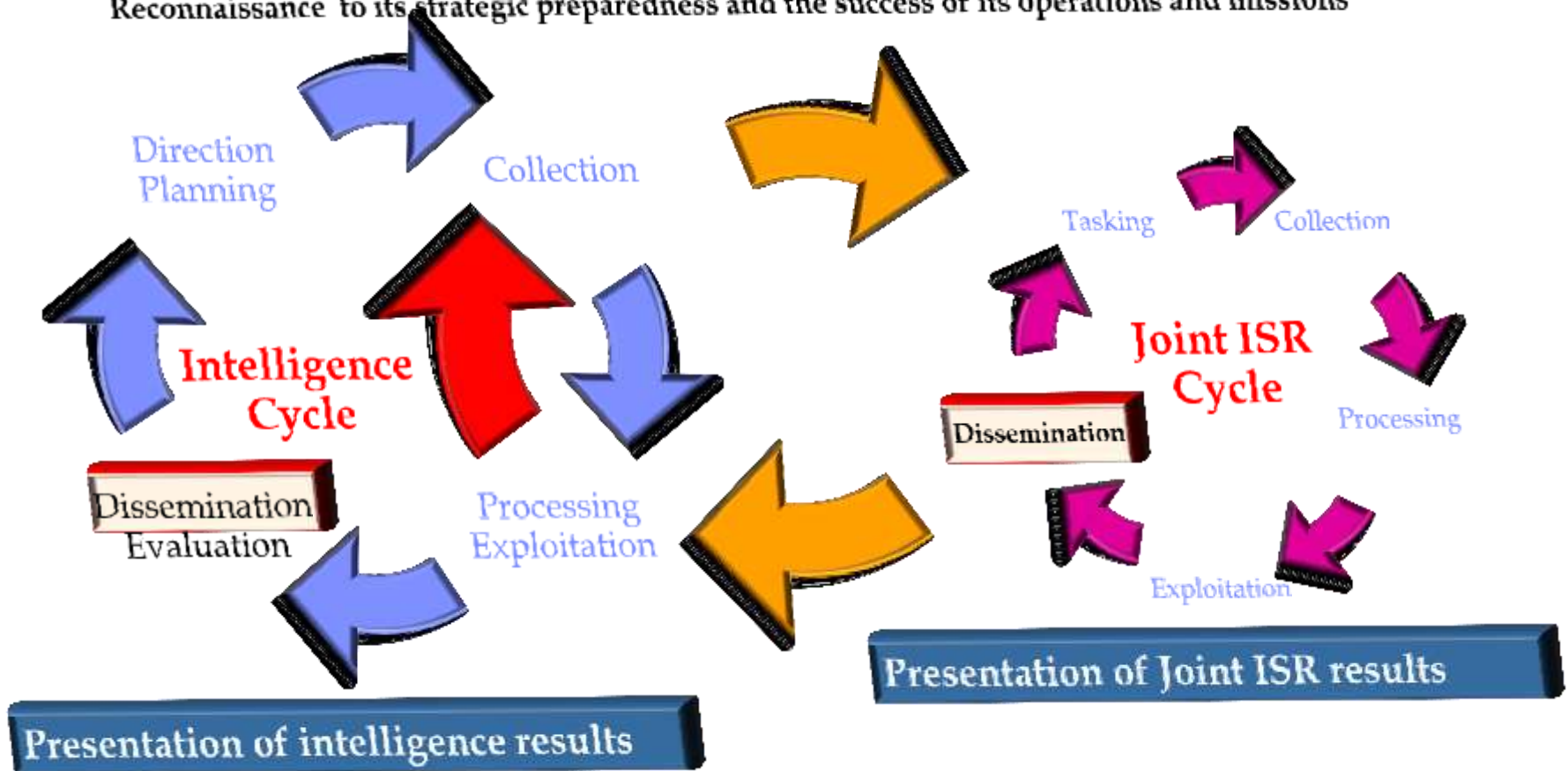- Civil-Military Co-operation

Force Multiplier "Big Data"

Joint Intelligence, Surveillance and Reconnaissance

NATO has recognized the fundamental importance of Joint Intelligence, Surveillance and Reconnaissance to its strategic preparedness and the success of its operations and missions

Direction Planning

Collection

Intelligence Cycle

Dissemination Evaluation

Processing Exploitation

Presentation of intelligence results

Tasking

Collection

Joint ISR Cycle

Dissemination

Processing

Exploitation

Presentation of Joint ISR results

Support the coordinated collection, processing, and sharing within NATO of ISR material gathered by the future Alliance Ground Surveillance system, the current NATO Airborne Early Warning and Control Force (NAEW&C Force) and Allies' own ISR assets

Federated Mission Networking

- Based on the Afghanistan Mission Network lessons learned
- Aims to support command and control as well as decision-making in operations through improved information-sharing.
  - Ensures consultation, command and control (C3) interoperability and readiness
  - Helps Allied and partner forces to better communicate, train and operate together
  - Underpins the Alliance's ability to connect its information systems and operate effectively together, including with partners, on training, exercises and operations

FEDERATED
- services for exchanging and sharing information
- provisions for bilateral agreements

MISSION
- execution environment, enabling information sharing
  - trusted,
  - secured and
  - assured
- . . . between mission participants.

NETWORKING
- Guides the establishment of all Mission Networks s for use in NATO operations
- (should be) Mandatory for NATO Response Force (NRF) operations.

Money
Time
Value

▶ CoNNECtingForces

Public Private Partnerships

i.e. Secure SatCom by Lux GovSat

- Public Private venture between the Government of Luxembourg and SES
- Combining the benefits of backing from a politically and economically stable European Government with a well established space industry

GovSat Secure Mission Operation Services		
Transmission Security • Anti-jamming		**Physical Security** • Accredited Facilities
Crypto Security • Encrypted TT&C • Encrypted Ground communications		**Emission Security** • Tempest capabilities
GovSat-1 Non-pre-emptible access to X-band and Military Ka band	**Secure Anchoring Services**	**Secure Facilities and Hosting** • NATO (SECRET) • EU (SECRET) • LUX (SECRET) • Hosted Nation

Framework Nation Concept as Game Changer

German Lead in Joint ISR

German and Romanian Ministers of Defence at Signing Ceremony, Feb 2017, Brussels

Building mutual security on close cooperation as groups of smaller and larger states, coordinate closely who will provide which assets and troops on a long term basis

The Framework Nations' Concept and NATO: Game-Changer for a New Strategic Era

The Way Ahead for C4I

- Common Control Centers
- Common interfaces, data formats & standards
- Increasingly unmanned platforms
- Data is discoverable & accessible by all
- Modular, scalable plug & play sensor payloads
- Every platform is a sensor
- Every sensor is networked

Increased Operational Access, Persistence, Flexibility, and Information Sharing