17th ICCRTS
"Operationalizing C2 Agility"

SYSTEMIC APPROACH AND TECHNICAL SOLUTION FOR LEGACY SYSTEMS INTEGRATION

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OBJECTIVE

- To present the systemic approach adopted by Brazilian Ministry of Defense to develop and integrate C^2 systems.

OUTLINE

1. Introduction
2. Agility
3. Brazilian C^2 SoS
4. Methodology
5. Challenging Technical Issues
6. Challenging Cultural Issues
7. Close Air Support Capability Test
8. Conclusion

FOR WHAT ARE WE STANDING BY?

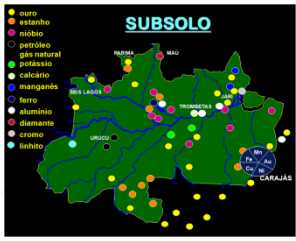
INTRODUCTION

- Areas

8.5 Million km^2 (5th)

22 Million km^2

INTRODUCTION



Rio2016

FIFA WORLD CUP Brasil 2014

BRASIL 2013 FIFA CONFEDERATIONS CUP

Short Duration

Agility

Permanent Protection

Unexpected

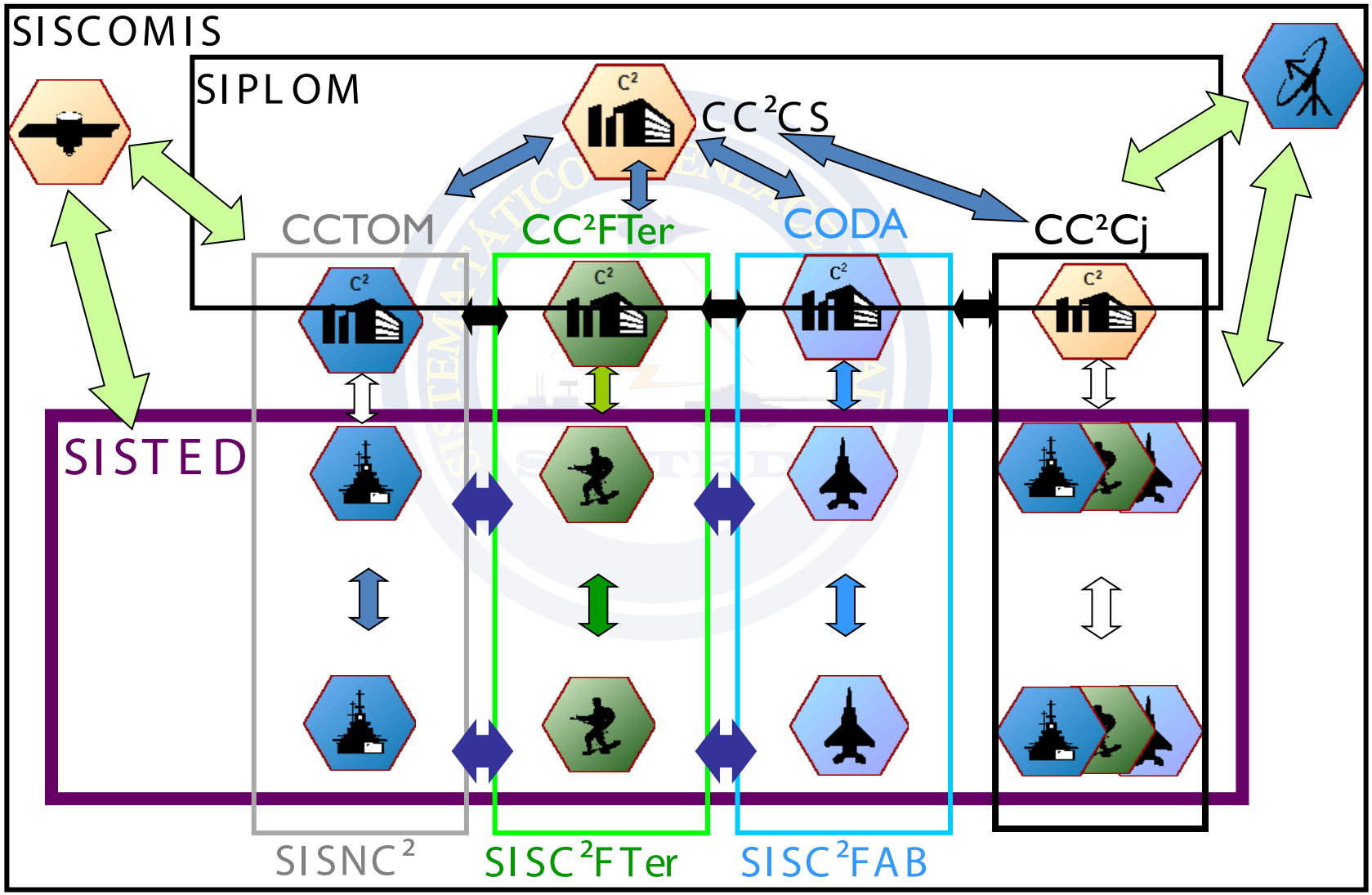
AGILITY

- The Six Aspects

Robustness	Resilience	Responsiveness	Flexibility	Innovation	Adaptation
Ability to maintain effectiveness across a range of tasks, situations, and conditions, spanning the spectrum of conflict, operating environments, and/or circumstances.	Ability to recover from or adjust to misfortune, damage, or a destabilizing perturbation in the environment.	Ability to react to a change in the environment in a timely manner.	Ability to employ multiple ways to succeed and the capacity to move among them.	Both the ability to do new things and the ability to do old things in a new way.	Ability to alter force organization and work processes when necessary as the situation and/or environment changes.

Source: Alberts, Power to the Edge

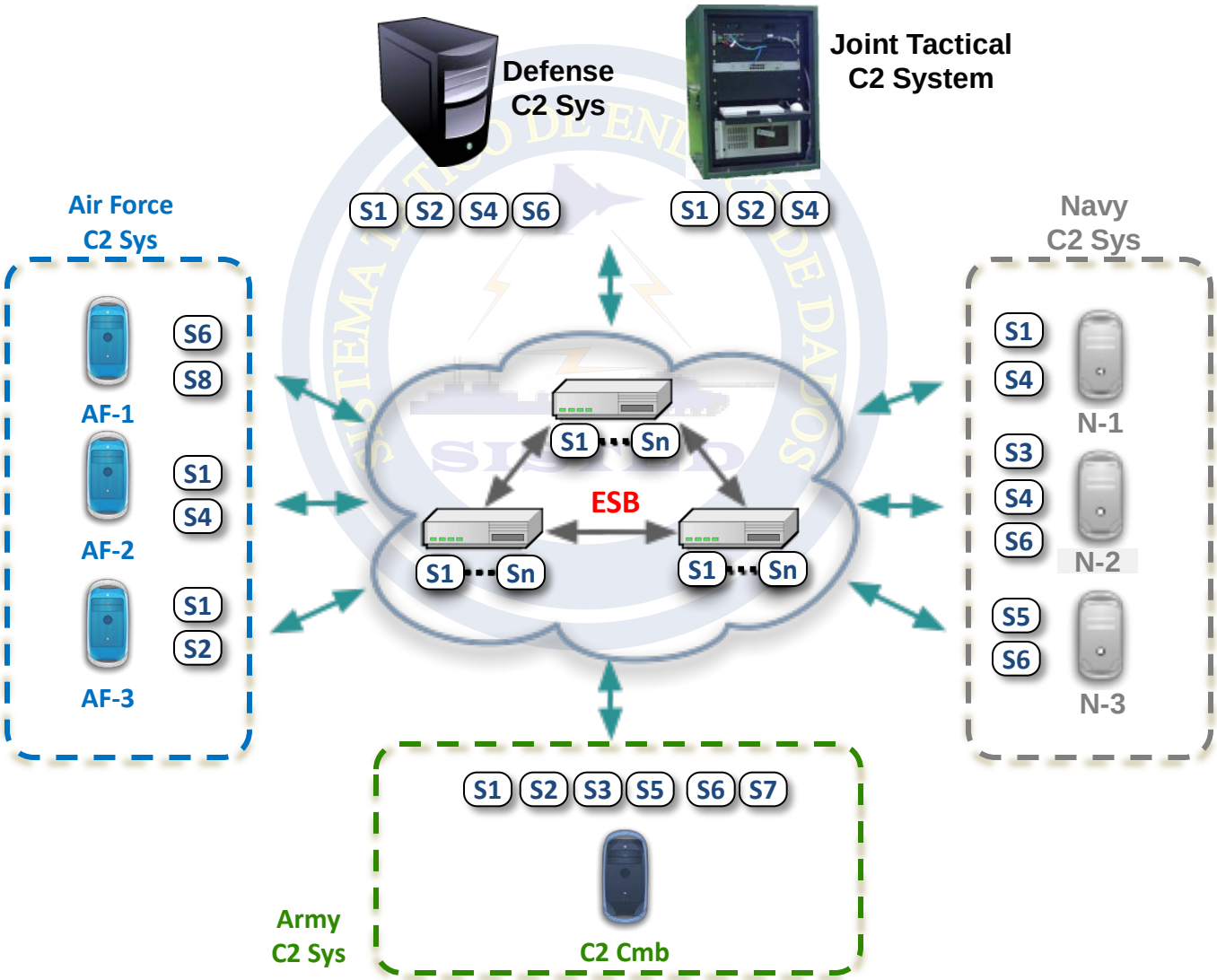
BRAZILIAN C² SoS



SISMC²

BRAZILIAN C² SoS

- Integration by SOA (Logical)



BRAZILIAN C^2 SoS

- Joint Tactical Data Link System - SISTED

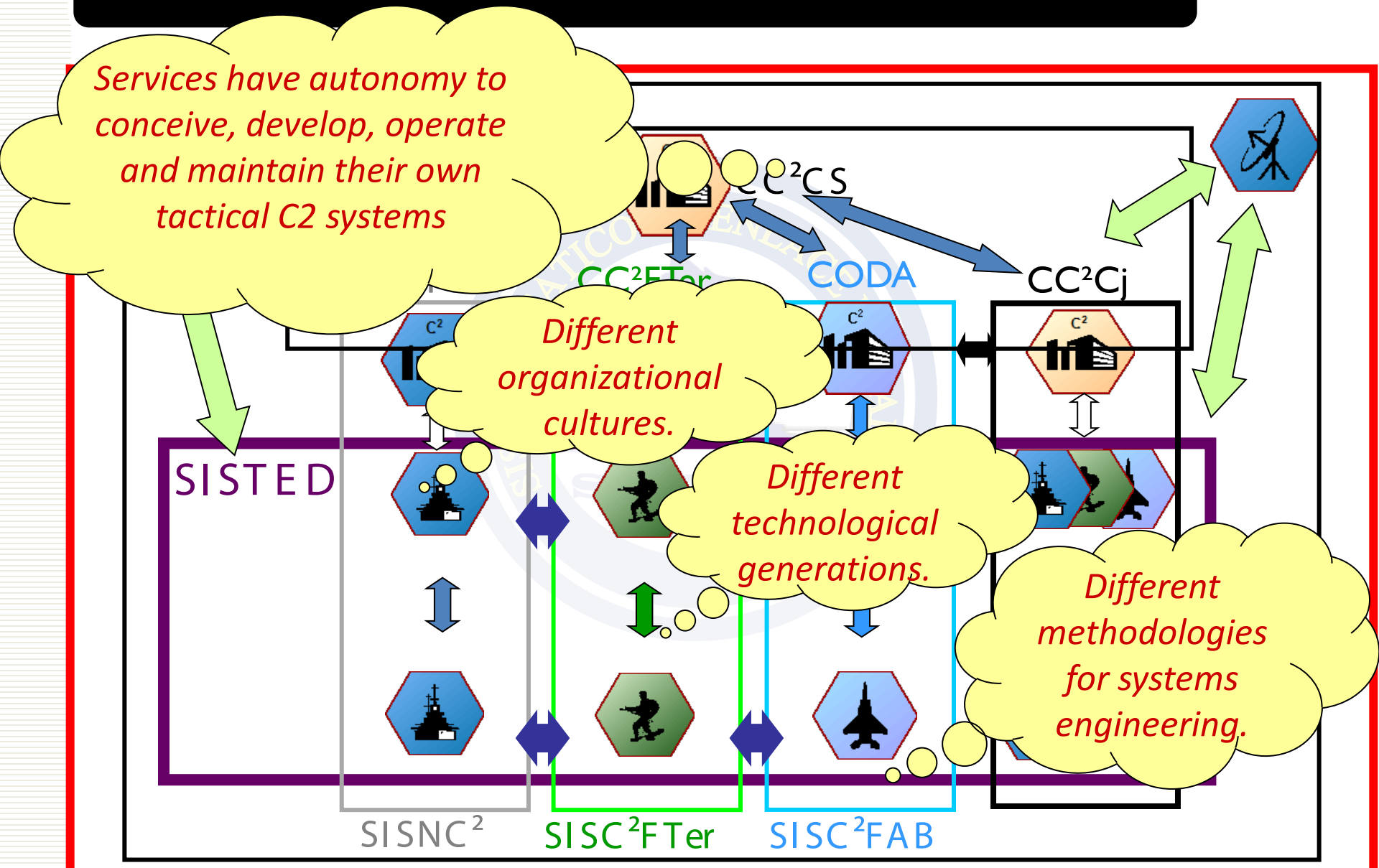
Purpose

"To exchange tactical messages among Services, in a standardized and parameterized way throughout the processing,

in order to

ensure that the actions in interservice tactical scenarios are conducted with efficiency, effectiveness, safety and without mutual interference."

BRAZILIAN C² SoS



METHODOLOGY

- Systems Engineering - Life Cycle Phases

Concept

It is executed to assess new business opportunities and to develop preliminary system requirements and a feasible design solution.

Development

It is executed to develop a system-of-interest that meets acquirer requirements and can be produced, tested [verified], evaluated, operated, supported, and retired.

Production

It is executed to produce or manufacture the product, to test [verify] the product, and to produce related supporting and enabling systems as needed.

Utilization / Support

It is executed to operate the product, to deliver services within intended environments and to provide logistics, maintenance, and support services, to ensure continued operational effectiveness that enable continued system-of-interest operation and a sustainable service.

Retirement

It is executed to provide for the removal of a system-of-interest and related operational and support services, and to operate and support the retirement system itself.

* *ISO/IEC 15288 - Systems Engineering - System Life Cycle Processes*

METHODOLOGY

- Systems Engineering - Technical Processes

Stakeholder Requirements Definition

Requirements Analysis

Architectural Design

Implementation

Integration

Verification

Transition

Validation

Operation

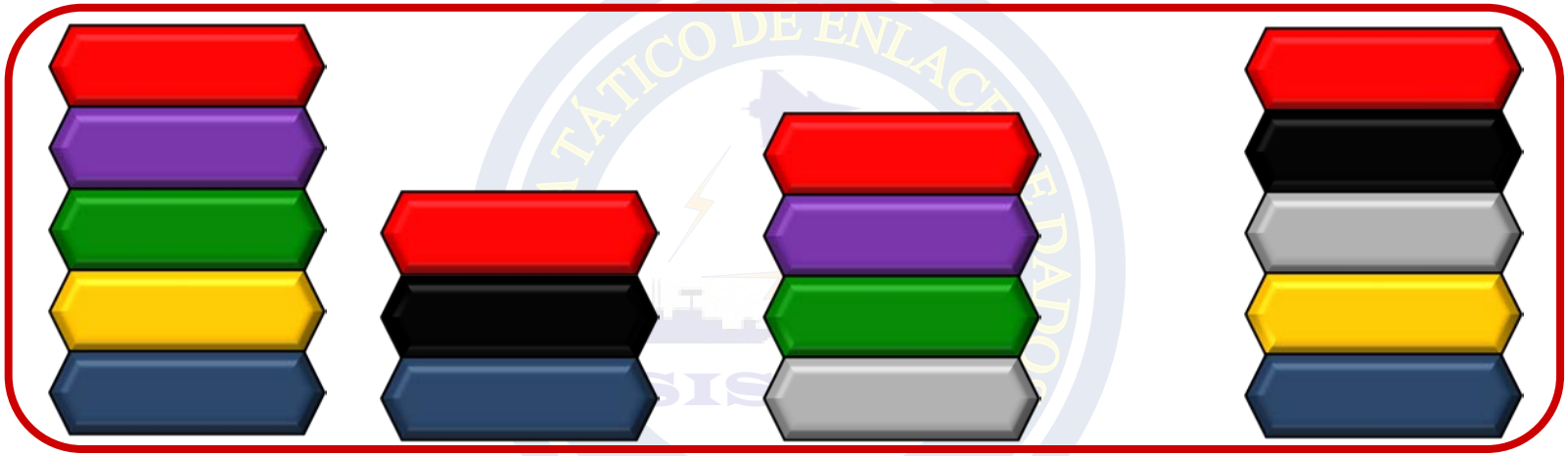
Maintenance

Disposal

** ISO/IEC 15288 - Systems Engineering - System Life Cycle Processes*

METHODOLOGY

- Systems Engineering - Joint Tactical Scenarios



29 scenarios were sharing some degree of commonality about the *mission threads* and the *operational effects* involved, e.g., demand for intelligence, close air support.

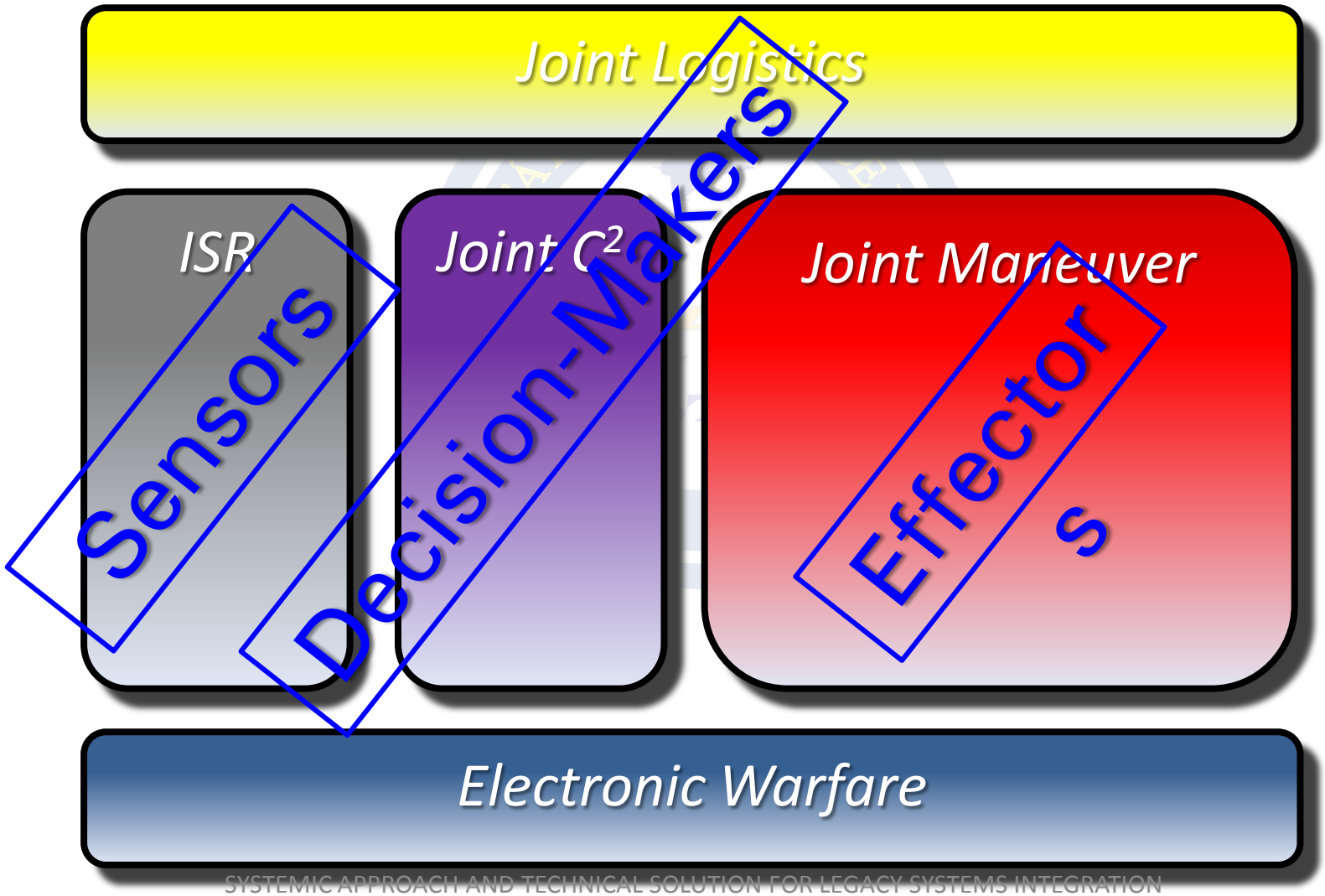
METHODOLOGY

From Scenarios…

…to Capabilities.

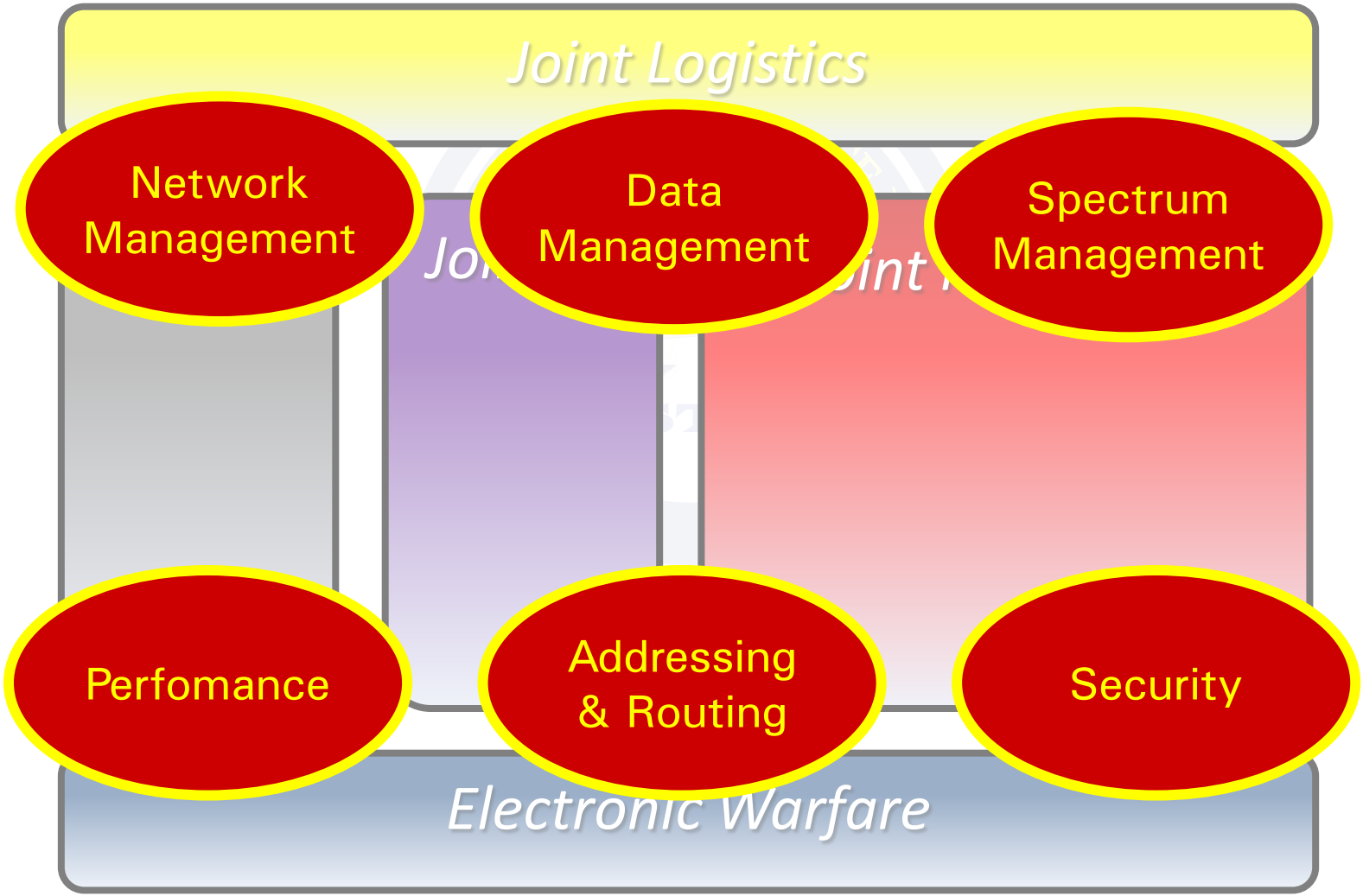
METHODOLOGY

- High Level Operational Capabilities



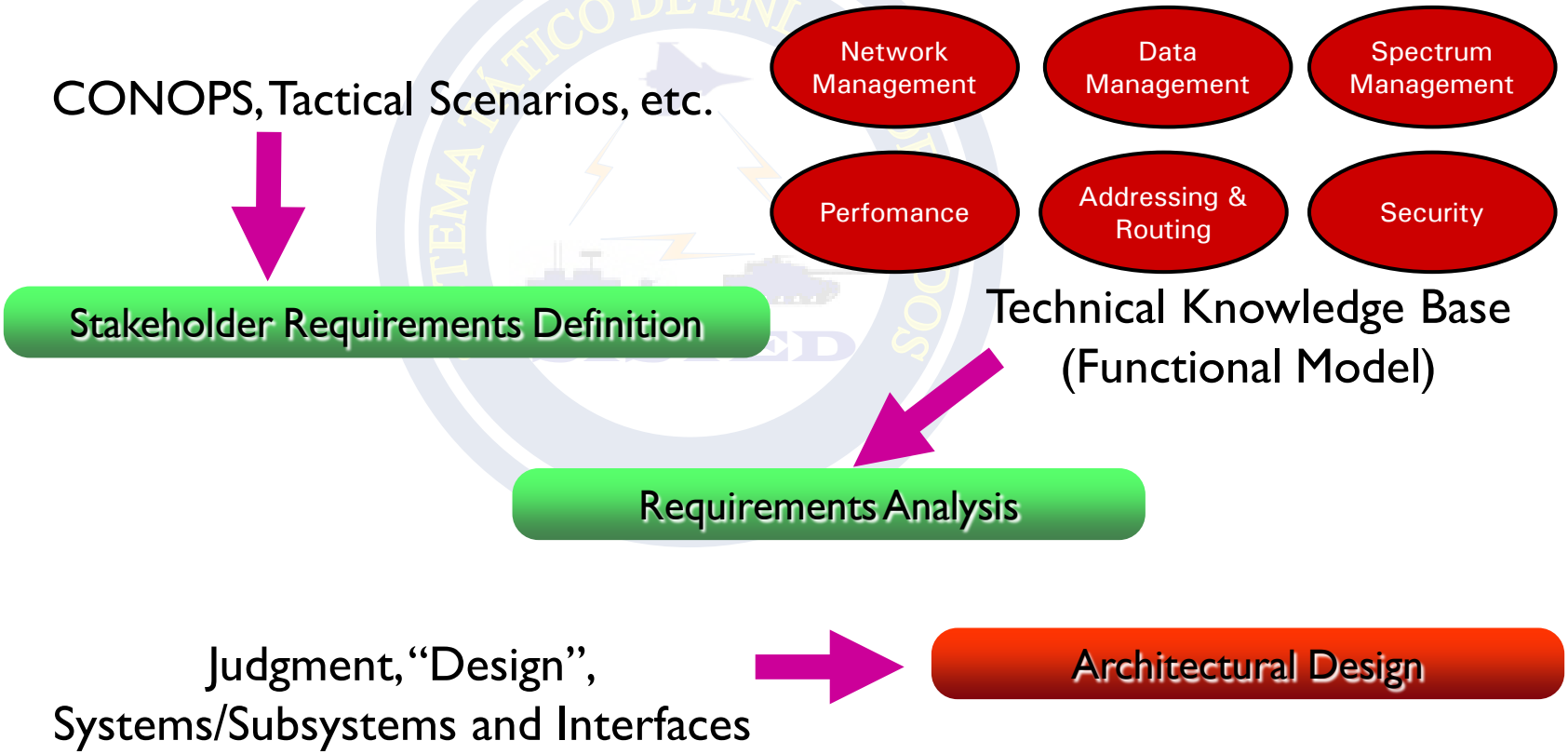
METHODOLOGY

- Functional Model



METHODOLOGY

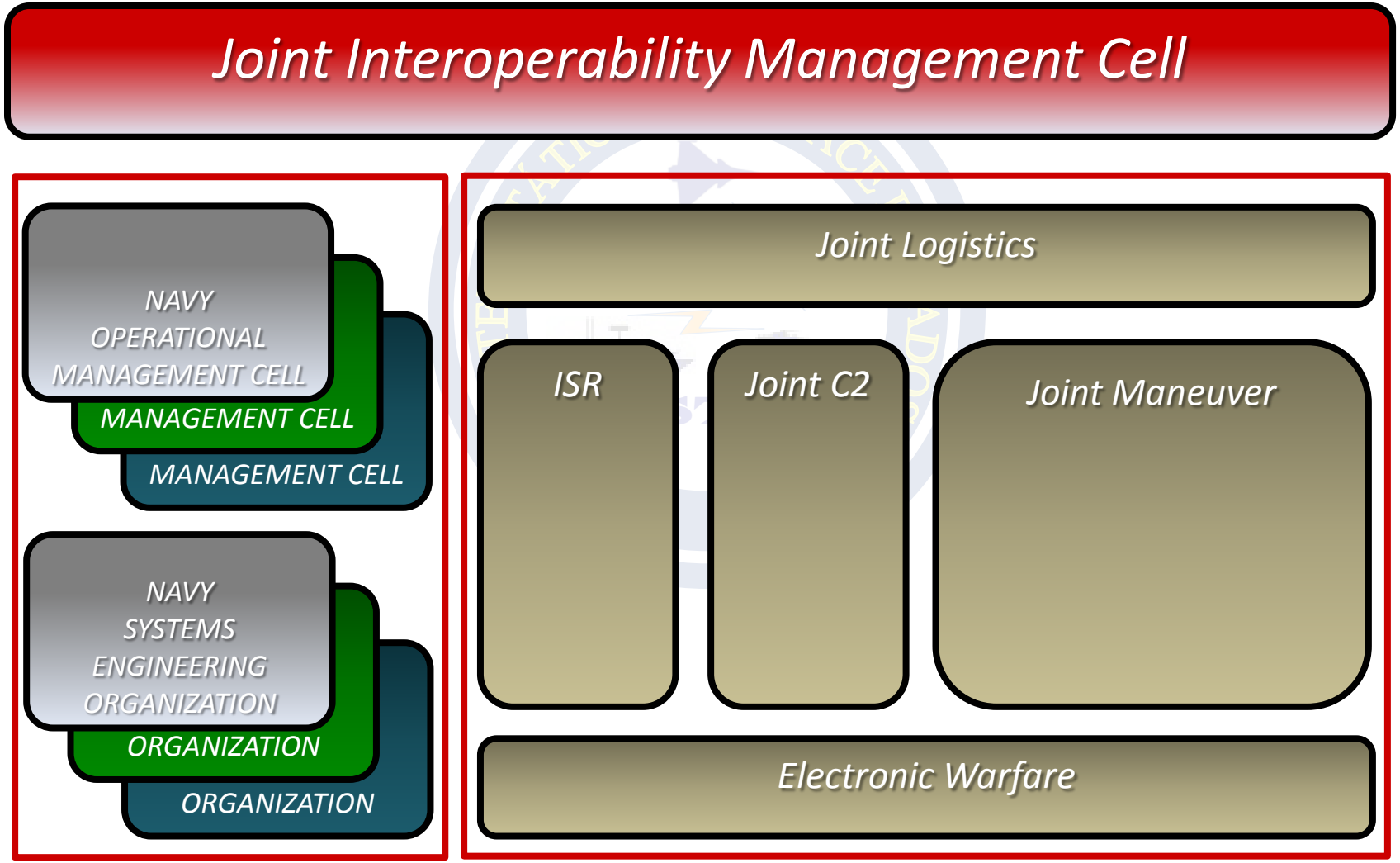
- Functional Model



** ISO/IEC 15288 - Systems Engineering - System Life Cycle Processes*

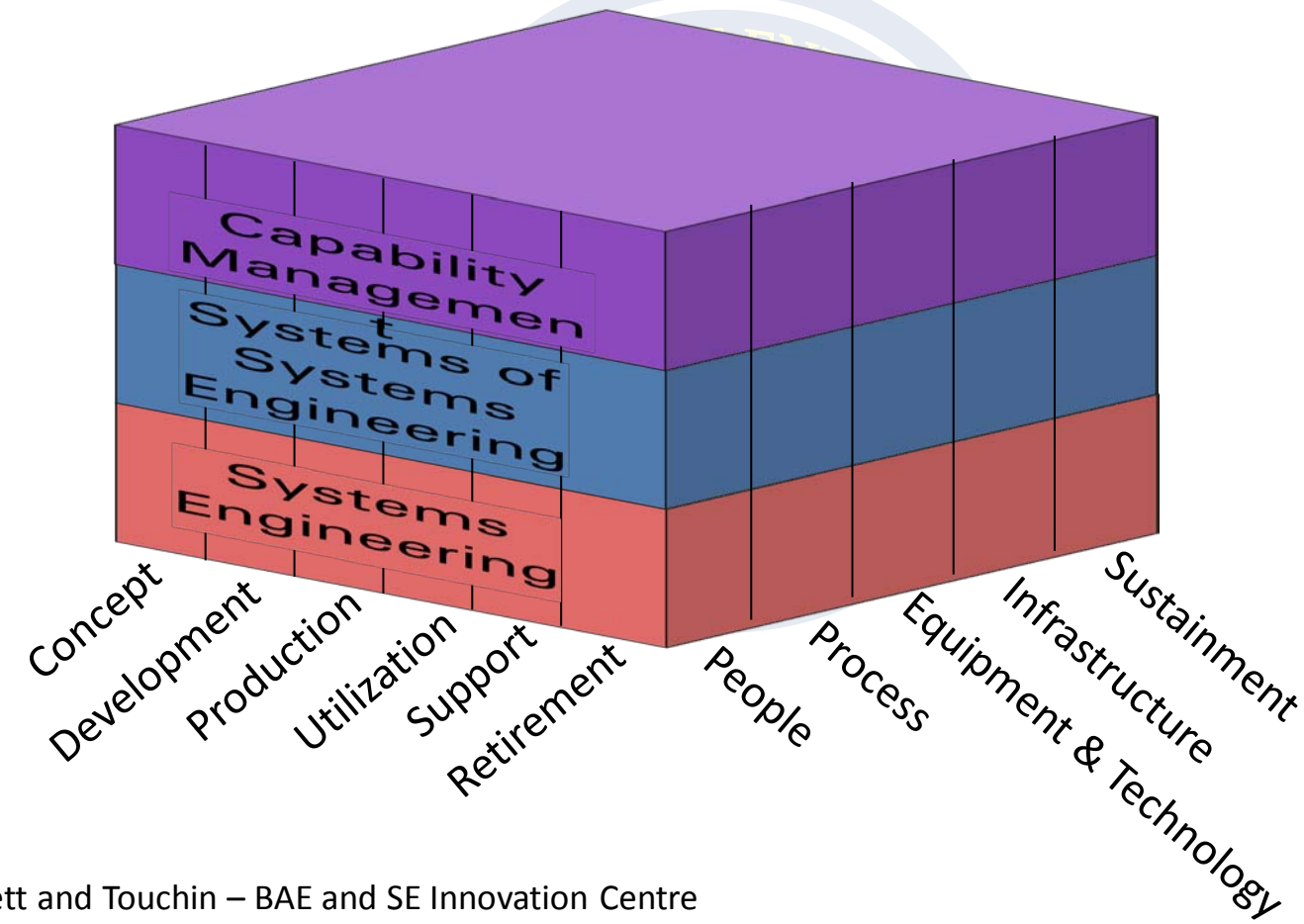
METHODOLOGY

- Architectural Design



METHODOLOGY

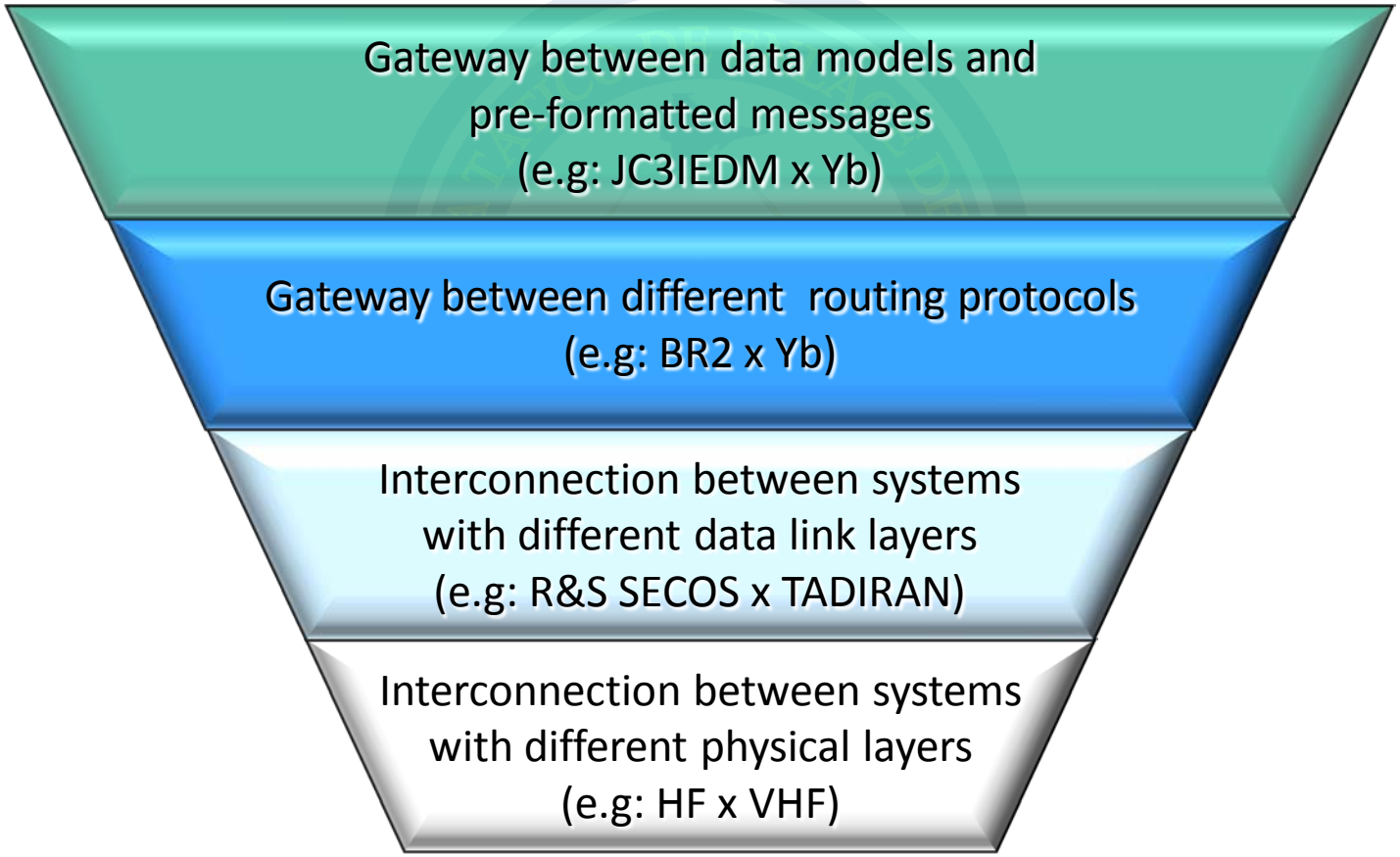
- Long-term planning and management



Harding, Mollett and Touchin – BAE and SE Innovation Centre

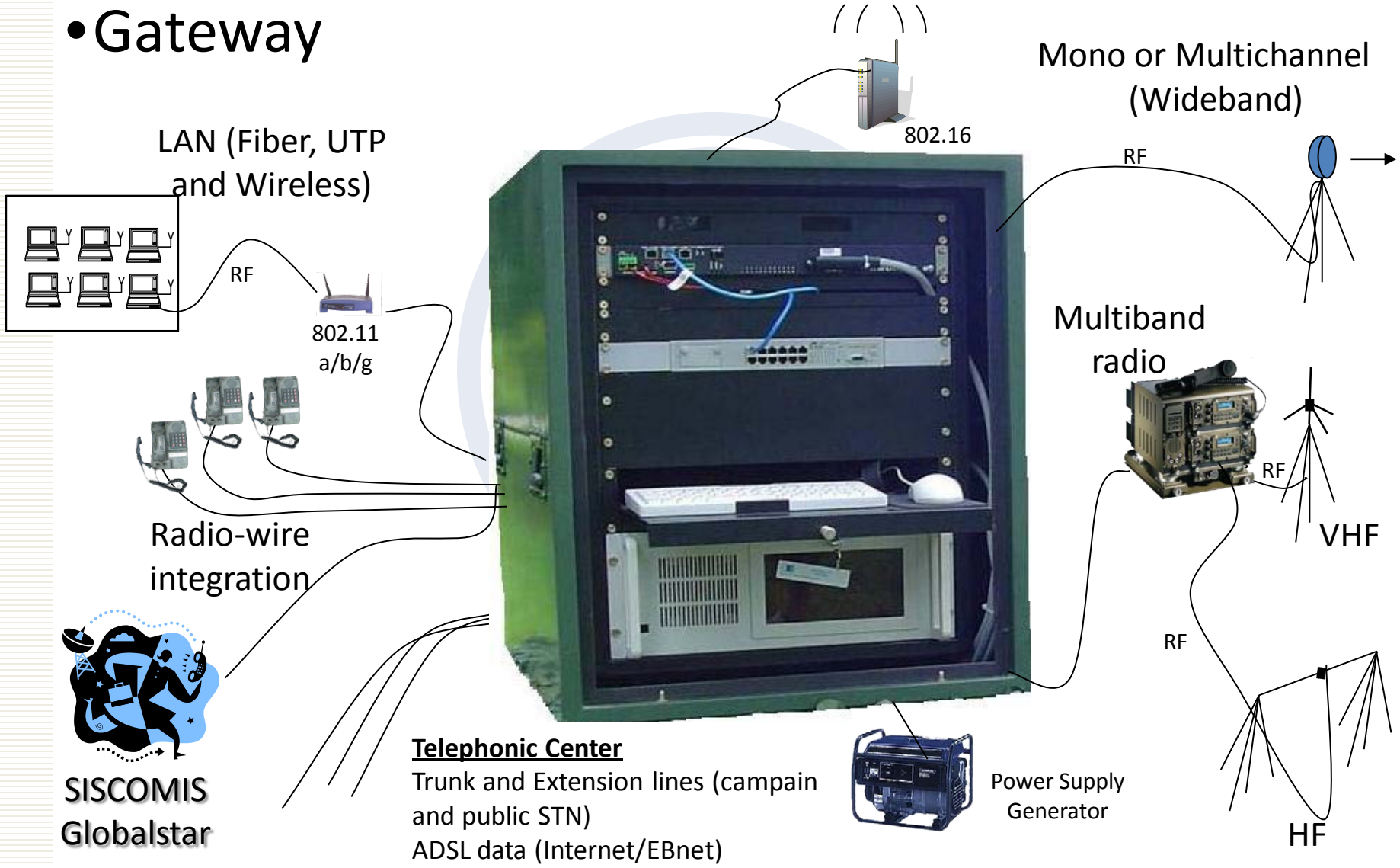
CHALLENGING TECHNICAL ISSUES

- Legacy Systems



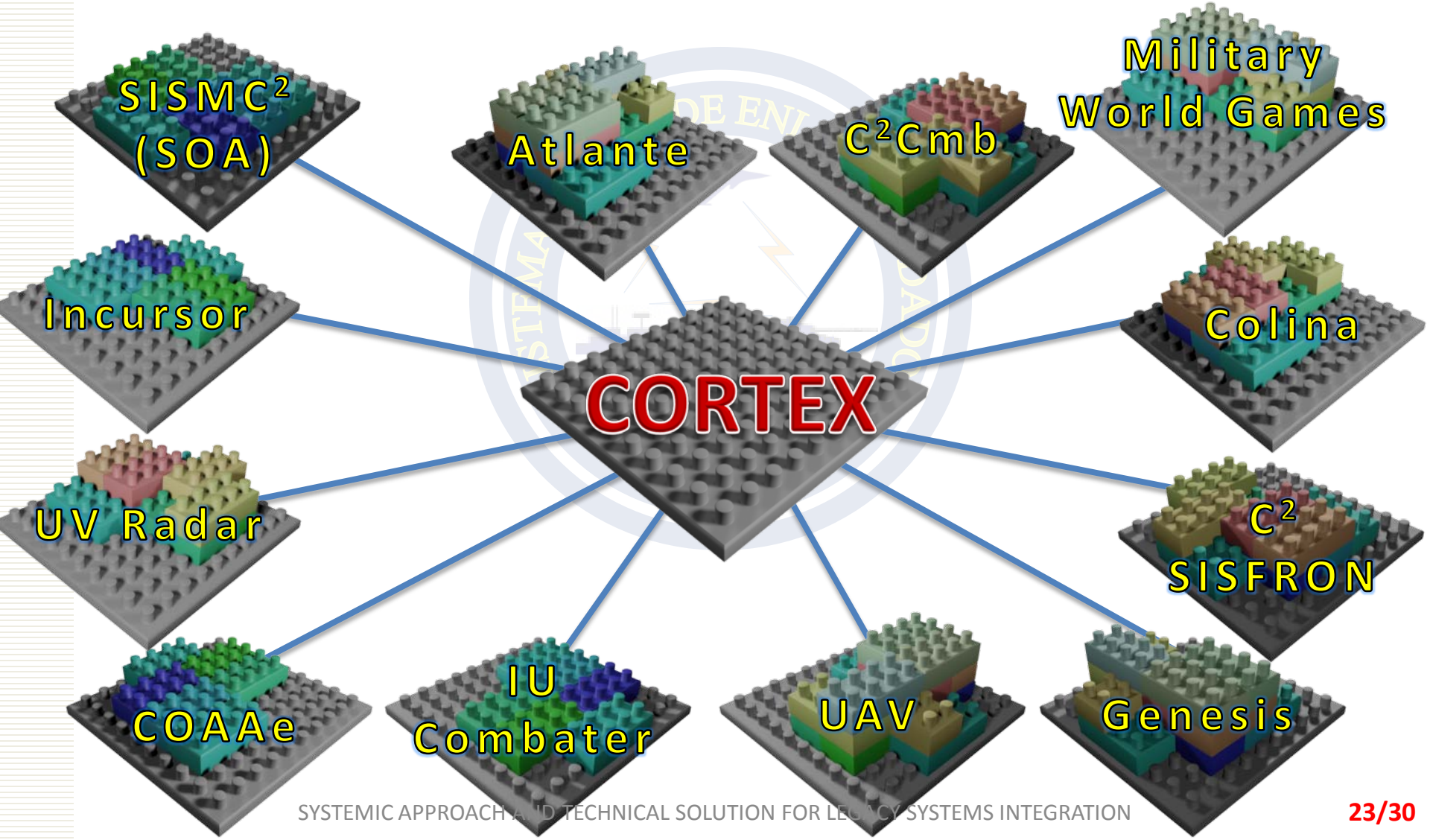
CHALLENGING TECHNICAL ISSUES

- Gateway



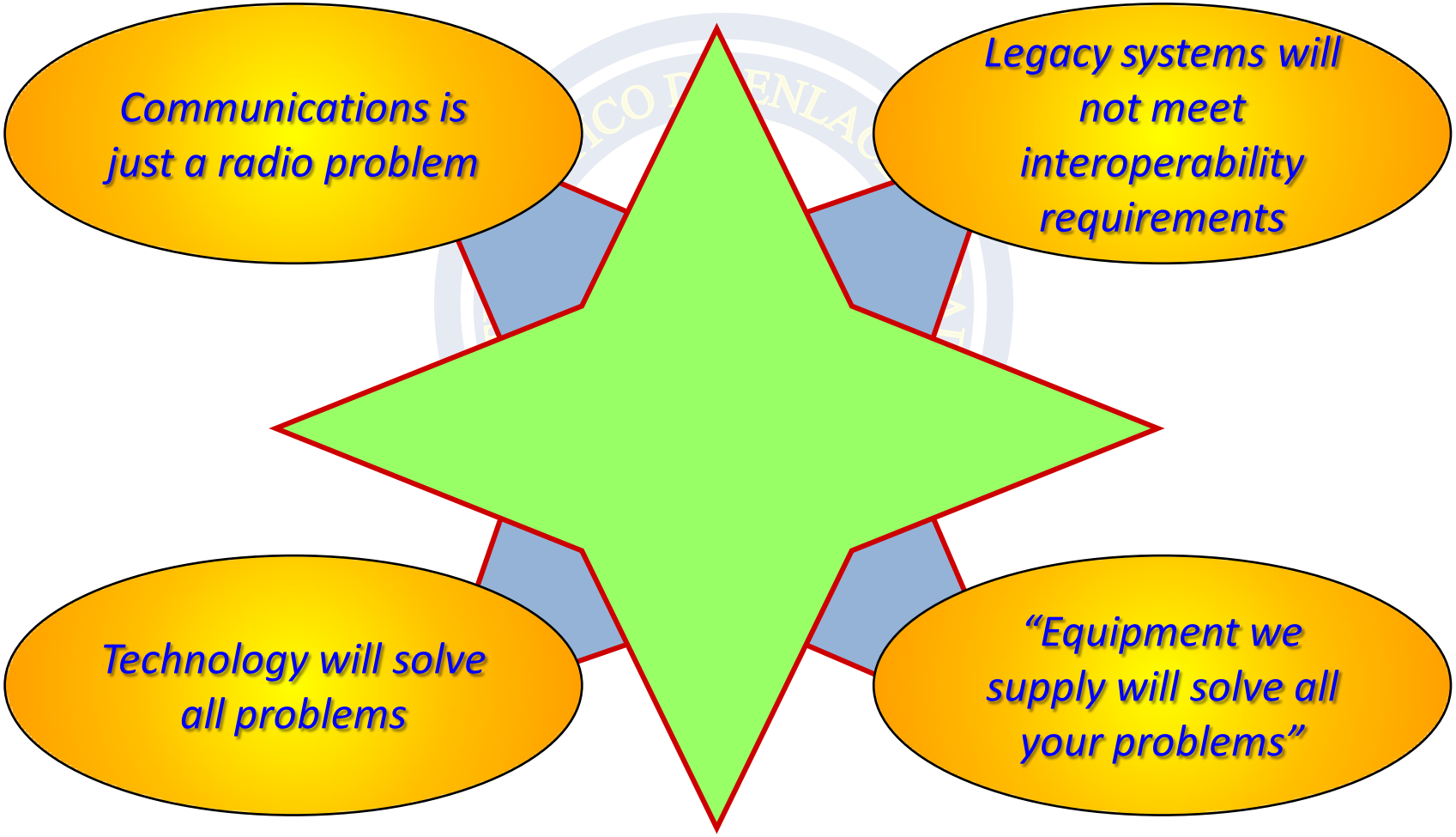
CHALLENGING TECHNICAL ISSUES

- Cortex - Development Framework



CHALLENGING CULTURAL ISSUES

- Disassembling Some Myths

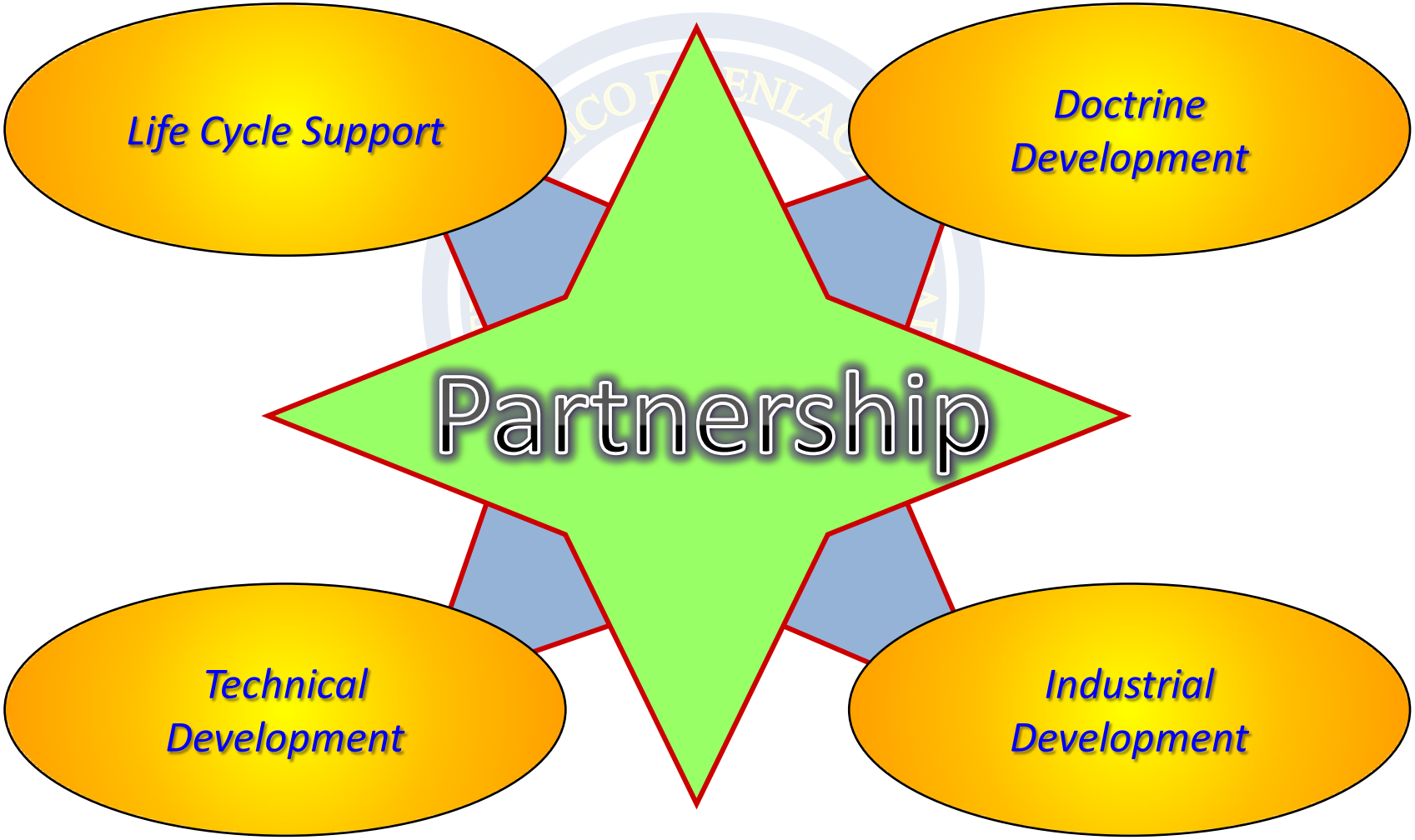


CHALLENGING CULTURAL ISSUES

- Metrics Results
  - Development Time Frame
  - Increased Lethality
  - Efficiency Improvement
  - Effectiveness Increase
  - Situational Awareness Improved

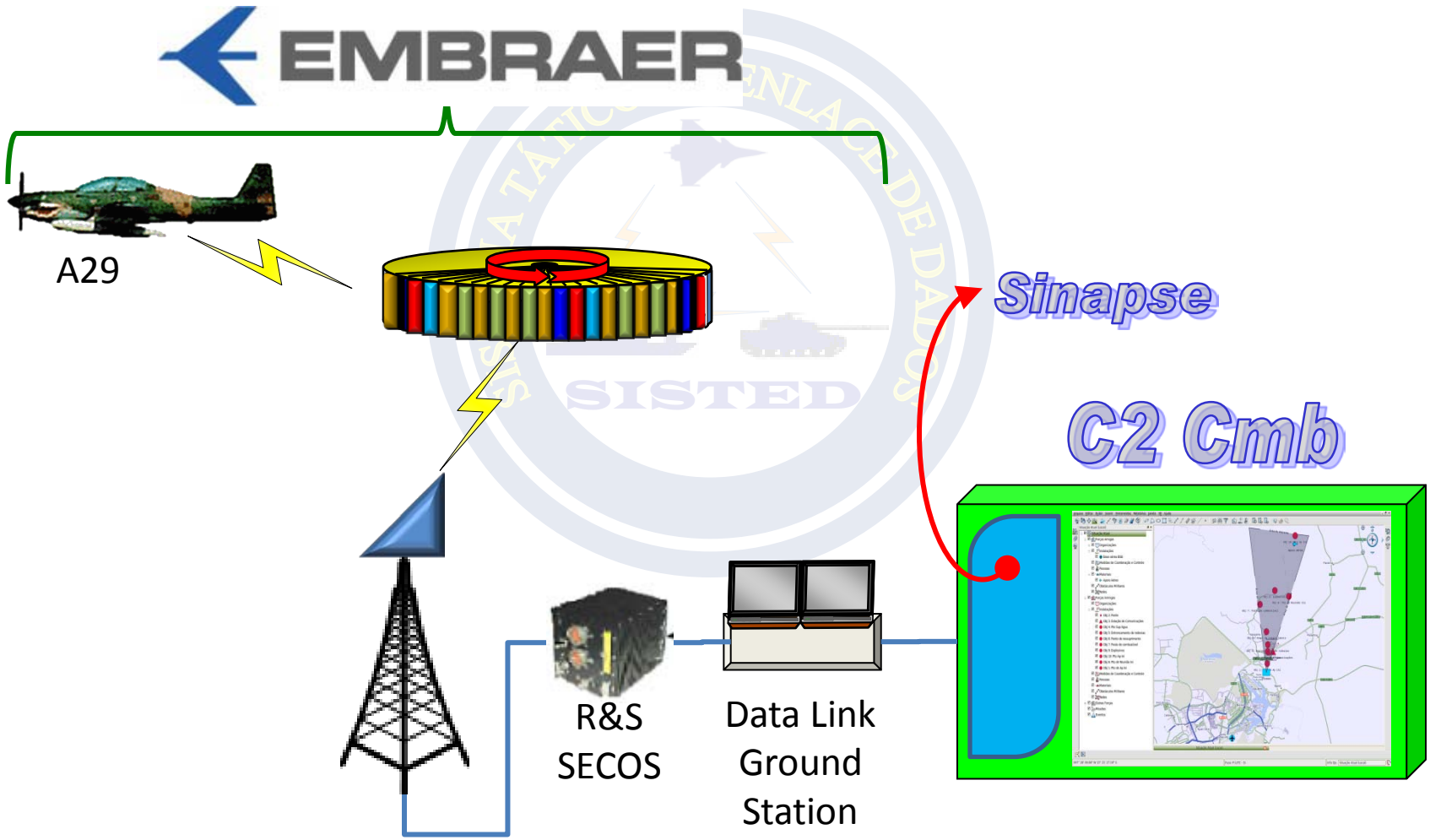
CHALLENGING CULTURAL ISSUES

- Business Approach



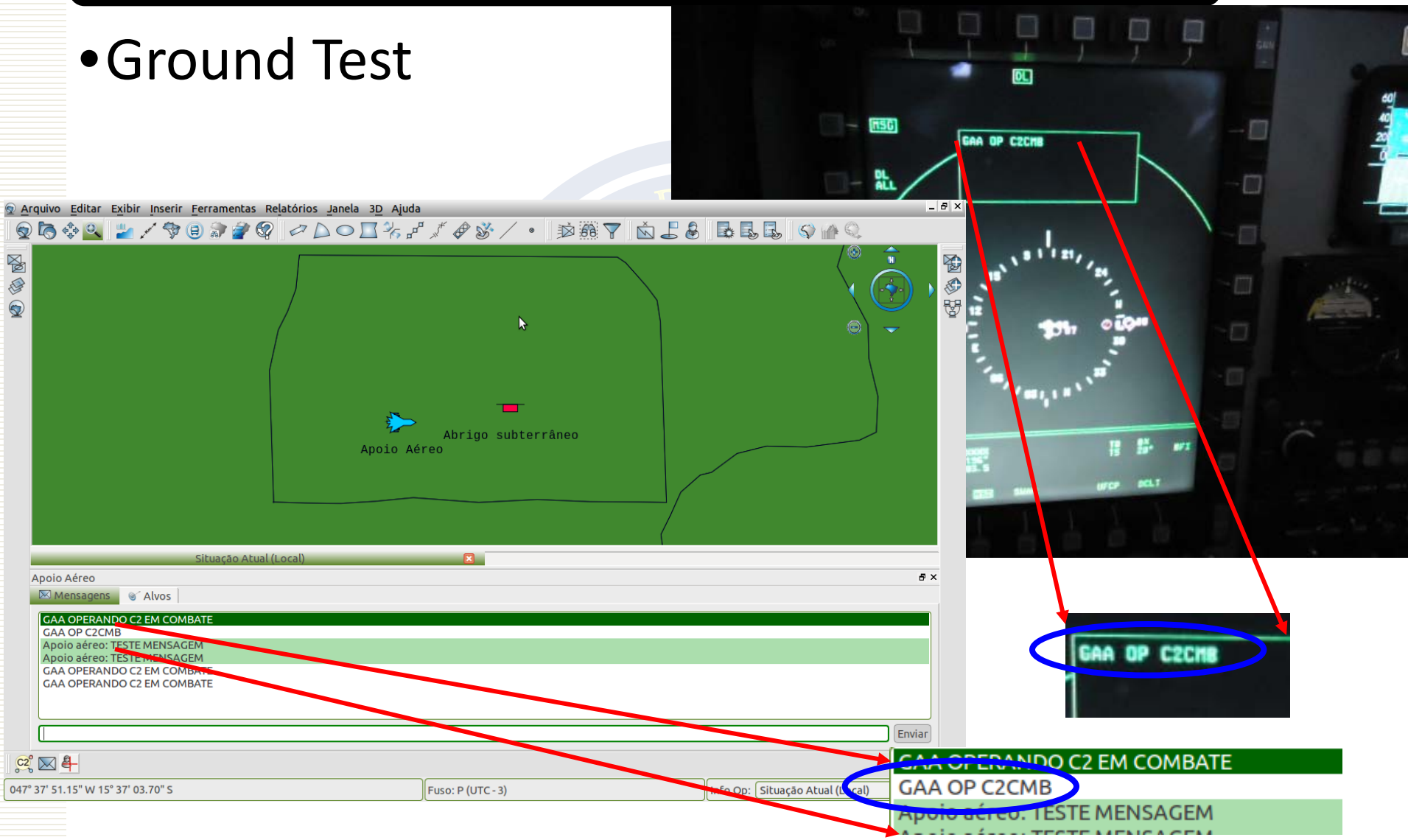
CLOSE AIR SUPPORT CAPABILITY TEST

- General Test Concept



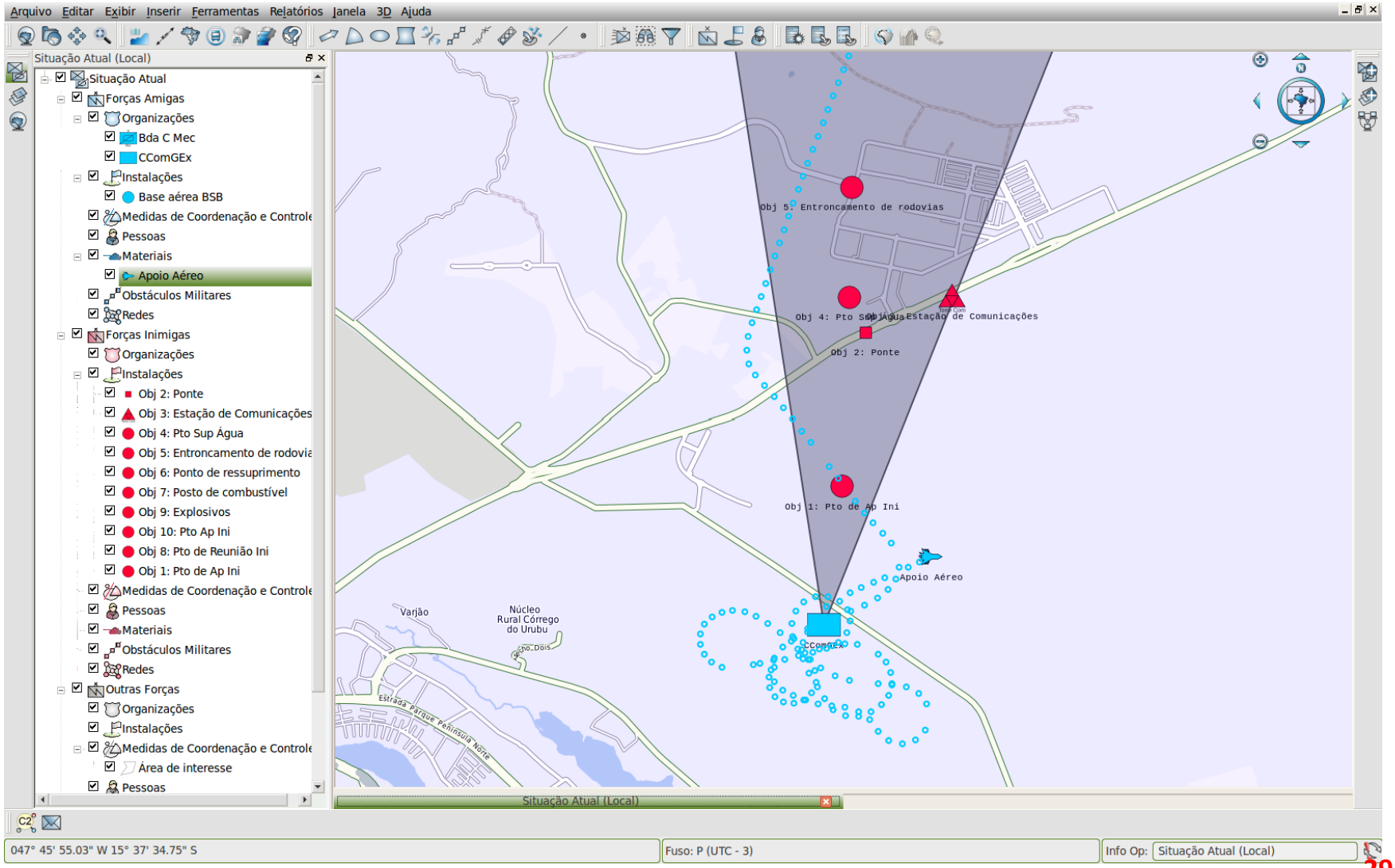
CLOSE AIR SUPPORT CAPABILITY TEST

- Ground Test



CLOSE AIR SUPPORT CAPABILITY TEST

- Flight Test



http://www.softwarepublico.gov.br/ver-comunidade?community_id=27016128

CONCLUSION

- There is a solid basement to delivery Agility to Brazilian Armed Forces.
- The very first step towards this direction was demonstrated under the CAS capability test, with the average time performance of mission reduced by a 4 factor.
- With this approach, Agility aspects of Innovation and Flexibility were demonstrated.

ORDEM E
BRASIL