

A large, illuminated sign for the 15th International Command and Control Research and Technology Symposium (ICCRTS) 2010. The sign is arched and features the text "SANTA MONICA" at the top, "★ 15TH ICCRTS ★" in the middle, and "THE EVOLUTION OF C2" in large green letters. Below this, it says "WHERE HAVE WE BEEN? ★ WHERE ARE WE GOING?" and "2010". The sign is set against a dark blue background with silhouettes of palm trees and a Ferris wheel.

SANTA MONICA
★ 15TH ICCRTS ★
THE EVOLUTION OF C2
WHERE HAVE WE BEEN? ★ WHERE ARE WE GOING?
2010

C2 framework for interoperability among an air component command and multi-agency systems



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GOAL



- To present a C² Framework for interoperability among an air component command and multi-agency systems



SUMMARY



- Introduction
- JFAC C² Process
- C² Framework for JFAC
 - Air Component WS Applications
- Study Case
- Challenges
- Conclusions



introduction



- C² system:
 - Exists to speed up the decision process and optimize the expected results;
 - Is a support tool for the decision makers;
- C² process:
 - Brazilian Armed Forces peculiarities;
 - Focus on JFAC;



introduction



- ITA's C² Group:
 - Support of C⁴I Center at George Mason University;
 - Research aimed to increase the current level of automation in JFAC's processes;
 - MAAP process definition;



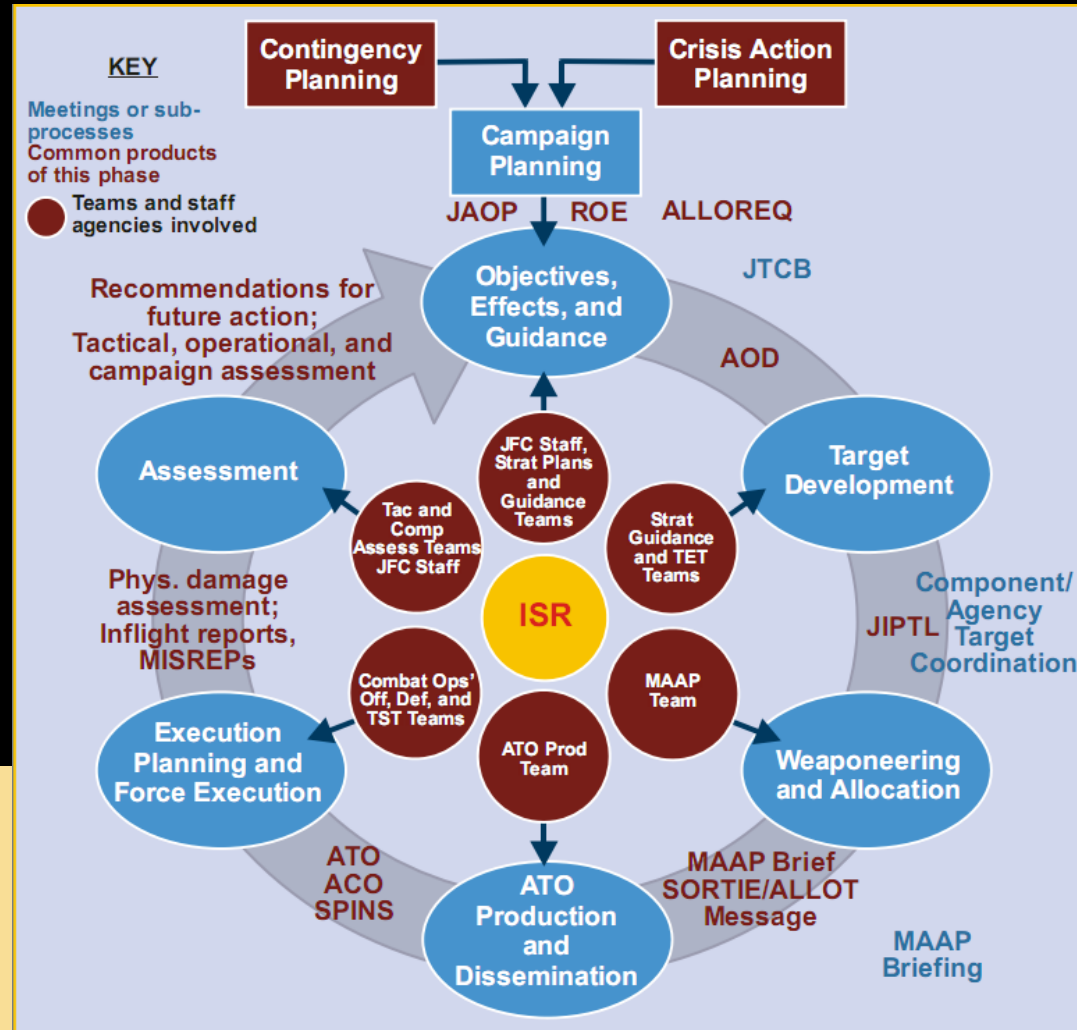
JFAC C² Process



• Joint Air Tasking Cycle

- AOD
- JIPTL
- MAAP
- ATO/ACO

JP 3-30



LEGEND

ACO	airspace control order	MISREP	mission report
ALLOREQ	allocation request	Off	offense
AOD	air operations directive	Ops	operations
Assess	assessment	Phys	physical
ATO	air tasking order	Prod	production
Def	defense	ROE	rules of engagement
ISR	intelligence, surveillance, and reconnaissance	SORTIE/ALLOT	sortie allotment
JAOP	joint air operation plan	SPINS	special instructions
JFC	joint force commander	Strat	strategic
JIPTL	joint integrated prioritized target list	Tac	tactical
JTCB	joint targeting coordination board	TET	targeting effects team
MAAP	master air attack plan	TST	time-sensitive target



JFAC C² Process



- Master Air Attack Plan - MAAP
 - Relies on a common operational picture (Information Fusion);
 - Planning based on AOD and JIPTL inputs;
 - Highly dependent on subject matter experts;
 - Time-consuming process;
 - Error-prone;
 - Output: Weaponneering and Allocation



JFAC C² Process



- Humanitarian Relief Operations
 - Relies on a common operational picture (Information Fusion);
 - Planning based on AOD and Prioritized List of Locations and Activities as inputs;
 - Highly dependent on subject matter experts;
 - Time-consuming process;
 - Error-prone;
 - Real-Time implications
 - Output: Allocation



C² Framework for JFAC



- MAAP requires a successful interpretation of the commander's intent;
- Simulation and Optimization before ATO production;
- A rigorous semantic alignment between the simulation language and the terms adopted by the doctrinal body of the operational level is a nonnegotiable requirement;
- Interoperability issues;

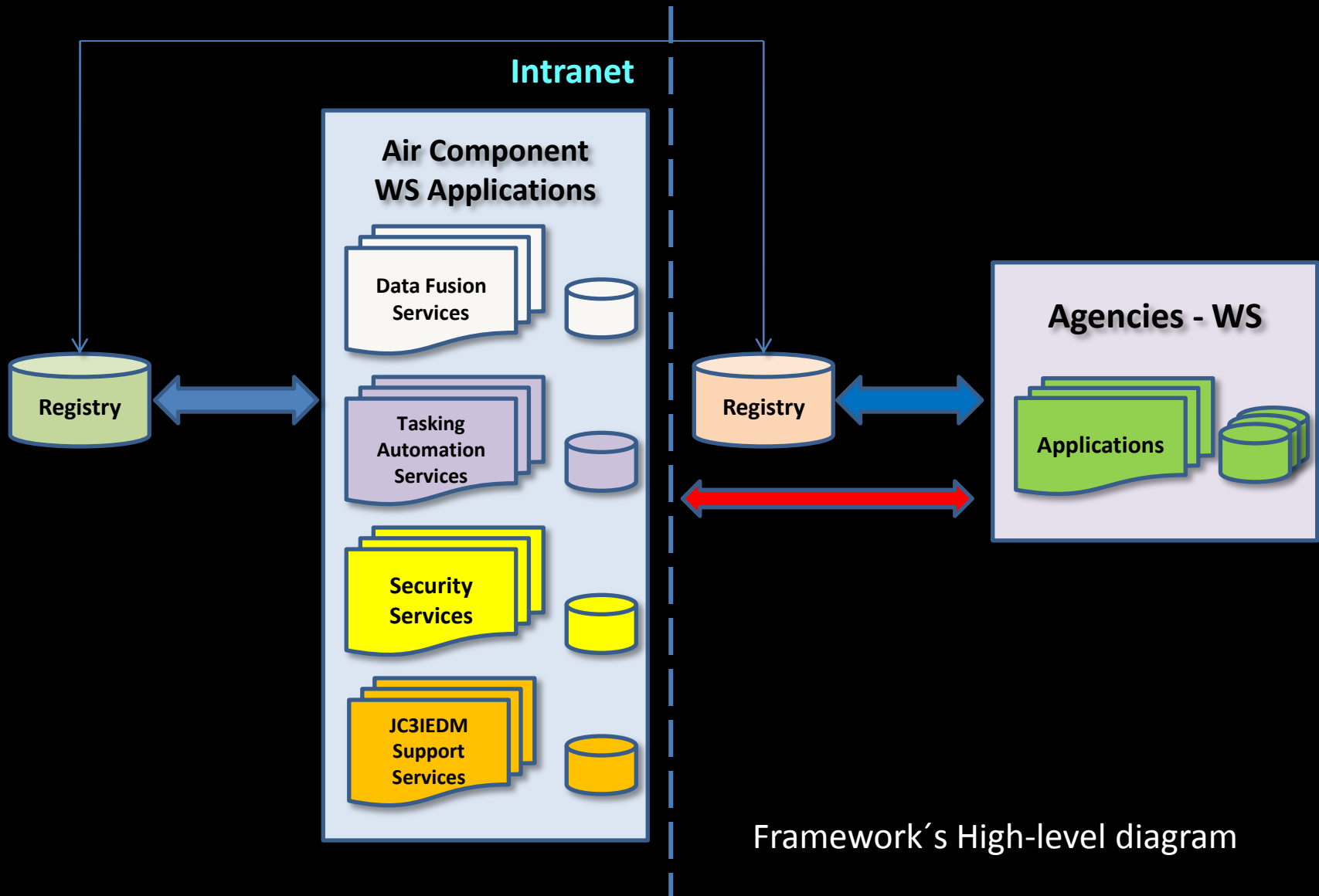


C² Framework for JFAC



- SOA architecture ;
- Semantic Services (SWS);
- JC3IEDM Exchange Data Model;
- Information providers outside the network;
- Security, bandwidth and distributed registry issues;
- Academic environment (laboratory);

C² Framework for JFAC





C² Framework for JFAC



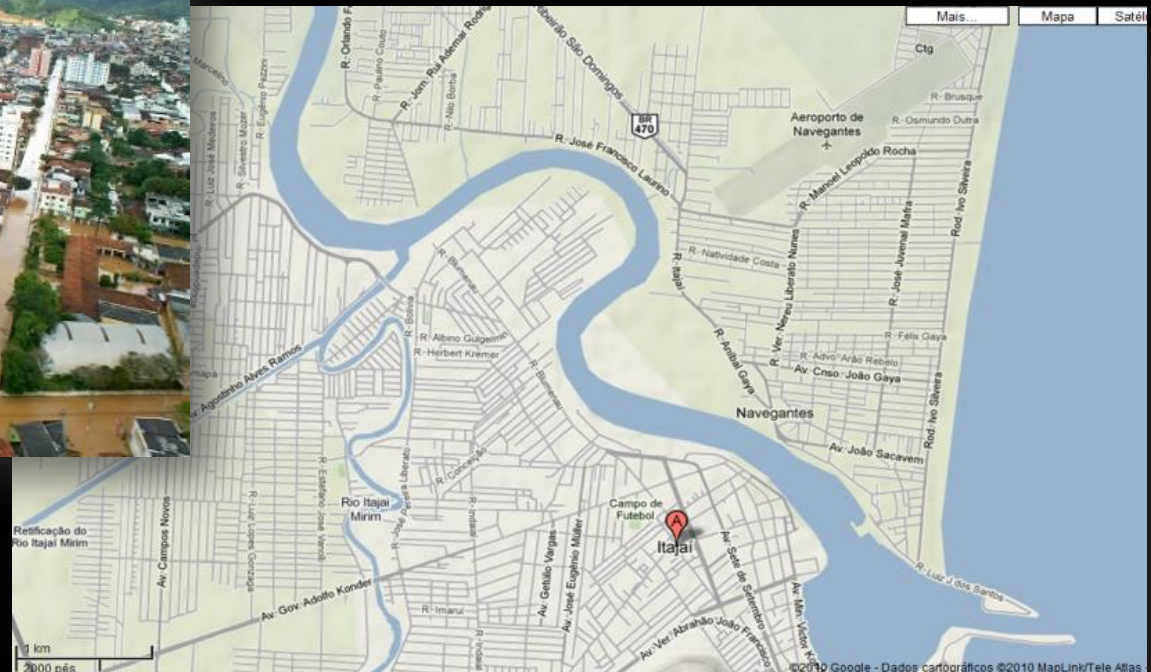
- Air component WS Applications
 - Data Fusion;
 - JC3IEDM Support;
 - Security;
 - Task automation
 - Commander's intent extraction (BML);
 - Scenario extraction (MSDL);
 - JIPTL;
 - COA's Description;
 - Simulation;
 - COA's Scored List;



Study Case



- Flood scenario
 - Itajaí's valley – Santa Catarina 2008 – Brazil;





Study Case



- Small Numbered Air Force;
- Air coordination;
 - Supply corridor;
 - Air transportation assets;
 - Routs and communication;
- Transport Request by several agencies;
- Allocation centralized in Civilian Defense;

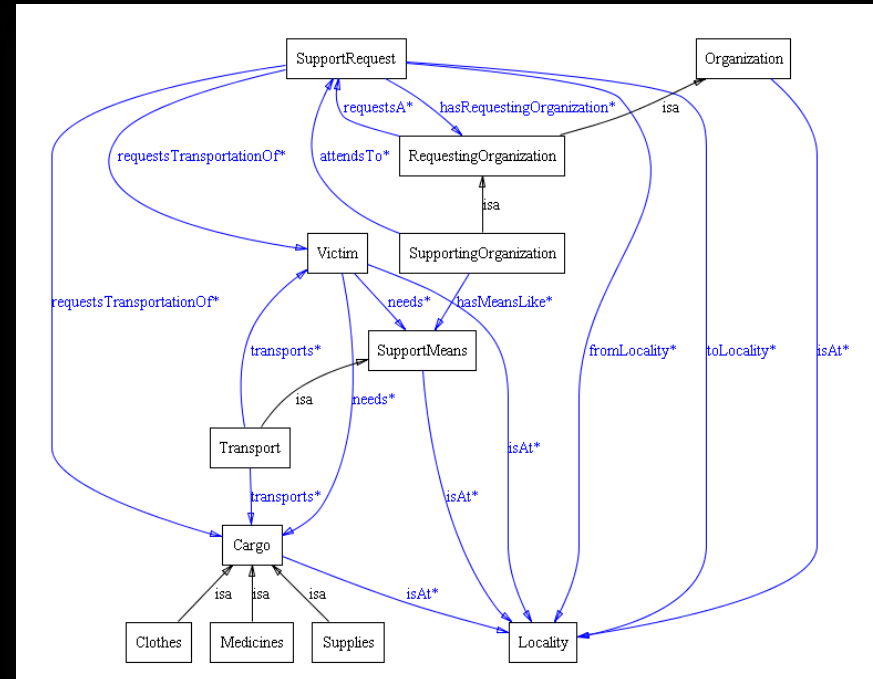




Study Case



- Web services implemented utilizing the domain ontology;
- J2EE platform;



Goal: Publish to all involved organizations the available assets, location of all support installations and schedule of the assets movement



Challenges



- Development within an academic environment
 - Ensure synergy and coherence among distinct projects;
 - The framework is under development;
- Grammar definition in Portuguese language for BML implementation
 - Doctrinal aspect instead of scientific (extra obstacle);



Challenges



- Security services being performed under a strong non-academic aspect
 - Requirement: interoperability with multi-agencies systems (Gov. and Non Gov.);
- Discovery process through a non-hierarchical topology of services
 - Research on the use of upper ontologies such as UCORE, PR-OWL ;



Conclusions



- Academic effort to aggregate state-of-the-art technologies for C4I systems interoperability;
- First results provided a positive indication to establish a common architecture for the Brazilian Ministry of Defense;
- Recommendations
 - Assignments of multi-services committees to establish the Portuguese BML's Grammar;
 - Security policies to provide access for multi-agency systems;



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