



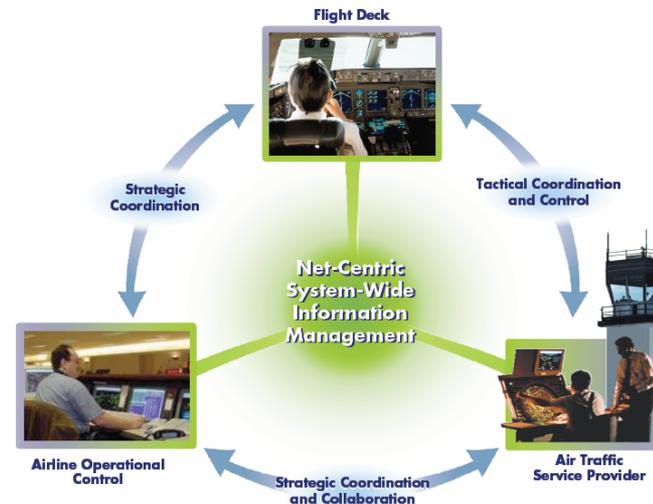
Transportation Cyber Physical Systems (CPS) Workshop

CPS for Aviation: Looking Forward

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19 November 2008

Net-Centric Aviation Ecosystem

- The Need for a Net-Centric Aviation is well established
 - System Wide Information Management (SWIM) central to NextGen & SESAR
- Network Centric Operations Industry Consortium (NCOIC™) Aviation IPT “Vision for a Net-Centric Aviation Ecosystem” defines benefits to users/consumers, producers
 - Capacity
 - Safety
 - Efficiency
 - Agility
 - Security
 - Sustainability



Graphic courtesy of NASA Ames Research Center
Virtual Airspace Modeling and Simulation Project

An Aviation Intranet?

- Intranet:

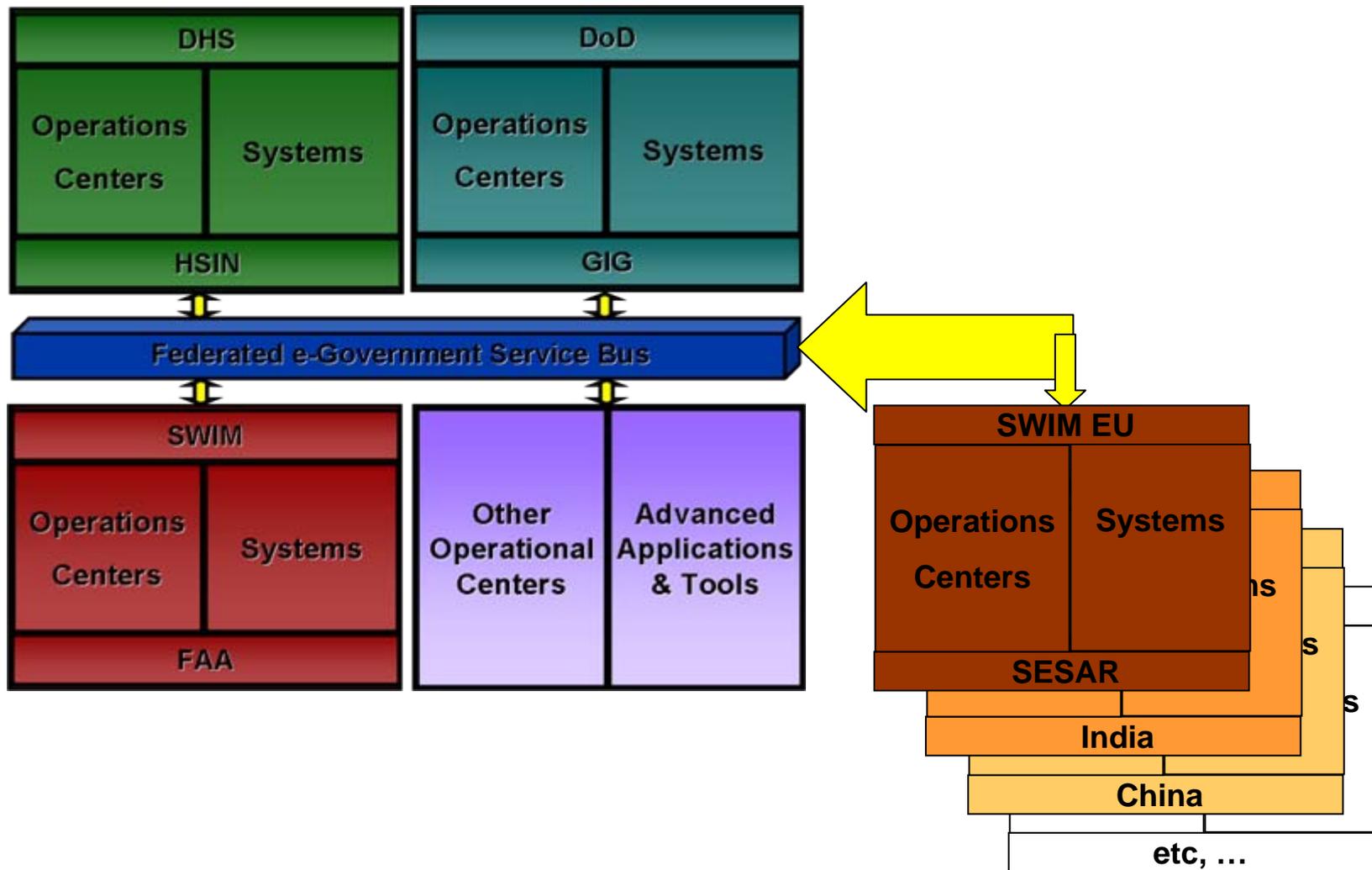
- “*private* computer network that uses Internet protocols and network connectivity to **securely share** any part of an organization's information or operational systems with its *employees*. Sometimes the term refers only to the organization's internal website, but **often it is a more extensive part of the organization's computer infrastructure** and private websites are an important component and focal point of **internal communication and collaboration.**”

Source: Wikipedia, October 2008

- Replace “*employees*” with “*stakeholders*” but...
- Can “*private*” apply to a Global System?

The solution must be Global to meet user business needs...

A Global Enterprise of Enterprises



Security Is Fundamental for Global Interoperability

Goal: *Safe and Secure*

- Safety is the paramount requirement for Aviation

- Net-Centric Ecosystem can increase safety and security
 - “...protects users from having their private information exposed to unauthorized personnel...Computer Systems and Physical security contributes to the Safety and Efficiency ...an effective net enabled ecosystem supports National Security, Border Security and Public Safety and Security”
 - Source: NCOIC Aviation IPT “Vision for a Net-Centric Aviation Ecosystem”, October 2008, available at https://www.ncoic.org/apps/group_public/download.php/10905/Vision_for_a_Net_Centric_Aviation_Ecosystem_CRs%20included.pdf



Aviation Cyber Security Requires State and Global Coordination

- Net Centric security protects, detects, and responds to cyber attacks against the aviation IT assets
 - Protection authenticates critical data sources, provides information integrity, and ensures confidentiality when needed
 - Detection monitors for symptoms of malware and anomalous behavior and alerts network security operations personnel
 - Response provides both a real-time response and planned preventative measures to proactively and automatically scan and patch IT vulnerabilities

- Sounds easy, but significant challenges remain
 - “Light as Possible” versus Multi-Level Security
 - More challenging than DoD/GIG due to connecting non-govt and Int’l systems

- Cyber Security architecture, standards, policy must be addressed by NextGen and SESAR and coordinated for global interoperability