Project Overview
Mike Surridge

Semantically Enhanced Resilient and Secure Critical Infrastructure Services

Copyright © 2010 University of Southampton IT Innovation Centre and other Members of the SERSCIS Consortium
• Critical infrastructure ICT is increasingly interconnected
  – information sharing → greater operational efficiency, but also reduced slack and flexibility
  – interconnections → new risks from ICT failure cascade effects
  – overall → more vulnerable to natural, accidental or malicious disruption
• SERSCIS approach: use agile SOA to offset these threats
  – adapt ICT components and networks to meet changing security needs
  – adapt ICT connections to prevent cascades and contain security threats
SERSCIS Objectives

• To exploit agile service oriented architectures and semantic models and reasoning technology
  – to dynamically compose and manage ICT inter-connections related to critical infrastructure
  – to monitor and manage ICT components and inter-connections against well-defined dependability criteria
  – to support human designers and operators of critical infrastructure ICT components

• To validate this approach in case studies from the air traffic sector

• To disseminate outputs and best practice and enable exploitation of project outputs results
Key Technologies

• Semantic models of critical infrastructure including ICT components
• Service governance models, metrics and methods to manage ICT services and security
• Run-time service composition to manage and alter ICT interdependencies
• Decision support facilities to support ICT service designers and operators
• Application emulators and testbed to support validation studies in air traffic / airport operation
Information Service Architecture

![Diagram showing Enterprise Service Bus with consumers and suppliers, decision support, system models, management channel, SLA manager, service manager, resource manager, service access control point, system orchestrator, application services.]

Copyright © 2010 University of Southampton IT Innovation Centre and other Members of the SERSCIS Consortium
Run-Time Adaptation

Critical ICT + Infrastructure

SERSCIS-assisted operator

Control

Management by humans

Monitoring

Policy Change

Automated management

Monitoring

Agile ICT interconnections to enable cooperation while managing risks

Copyright © 2010 University of Southampton IT Innovation Centre and other Members of the SERSCIS Consortium
Validation Case Study

- **Airport Collaborative Decision Making**
  - focus on air-side aircraft turn-around
  - complex multi-actor workflow composition and management

- **Quality of information is key**
  - accuracy of service scheduling information
  - trustworthiness of information sources

- **Source of aircraft ready times needed by ATM**
Current Status (October 2010)

• Proof of concept SERSCIS framework complete
  – demonstrates architecture for combining SLA-based service management, composition and decision support
  – includes emulators services and actors for a simplified turn-around scenario

• Next steps: evaluate this framework as input to full technology implementation
Expected Outcomes

• Novel risk management capabilities based on agile, autonomic service oriented architecture
• Mechanisms to manage interdependency risks and cascading threats from interconnected ICT
• Greater awareness of risks in A-CDM especially from interdependency
• Analysis of requirements and application in other sectors