Rockwell Collins' UTM Services Infrastructure Through a Network of Gateways

September 23, 2017

Presented by George Elmasry

Rockwell Collins

Building trust every day

What is Rockwell Collins' WebUAS™?

- A highly secure architecture for UTM services infrastructure

- A network of microservices and gateways
  - A gateway can be dedicated to a region, to an industry, to a large UAS operator or to a collection of small operators with the same UTM mission

- A cloud-computing-based architecture facilitating national and international growth and regulatory observance through compartmentalization of UAS services and the use of gateways

2017 ICAO UAS INDUSTRY SYMPOSIUM

Rockwell Collins

What does WebUAS™ address?

- Industry UTM-services
- Regulatory needs
- Explicit interfacing needs
  - Interfaces supported pertain to
    - Government organizations
    - Peer UTM service providers
    - Air traffic controllers
    - Other networked compartments of the Rockwell Collins UTM services cloud

Key Features of WebUAS™

- **Dedicated microservices for UAS operations**
  - Dedicate highly secure and scalable microservice for each large UAS operator
  - Secure information exchange
    - Hierarchical firewalls
  - Separate, secure interfaces to government systems
  - Separation of computational engines from services infrastructure
  - Cloud Hierarchy
  - API requirements for each computational engine
  - Dedicated and secure air traffic control interface
  - Rockwell Collins' CSOC facilitating the secure interface to the FAA systems by hosting a WebUAS™ national gateway
    - Similar OC can exist outside of the US

2017 ICAO UAS INDUSTRY SYMPOSIUM

Rockwell Collins

- **Harmonization of operations between global UTM systems**
  - Defining new interfaces
  - A foreign nation system can be an extended compartment of WebUAS^{TM} or can be built by a peer industry partner

2017 ICAO UAS INDUSTRY SYMPOSIUM

Fundamental UTM components

- Registration systems and Remote identification and tracking
  - May differ from one country to another
  - Adhere to the host nation's standardized methodology with gateways to facilitate a global view and UAS handover between different countries' airspaces
  - Database can be *global* but not *universal*
- Communications systems for control, tracking and UTM
  - UTM services may differ from one country
  - UAS must be able to handover and adhere to entry country regulations and interfaces
- Geofencing

2017 ICAO UAS INDUSTRY SYMPOSIUM

Rockwell Collins

- Creating a universal communication terminology
- Control and tracking of UASs that can travel internationally
  - Tracking and handover may require translation of records to different formats
  - We may need communications from host country to the UAS operator in the originating country
  - UTM is different from current manned aircraft control

Rockwell Collins

Challenges facing international UTM
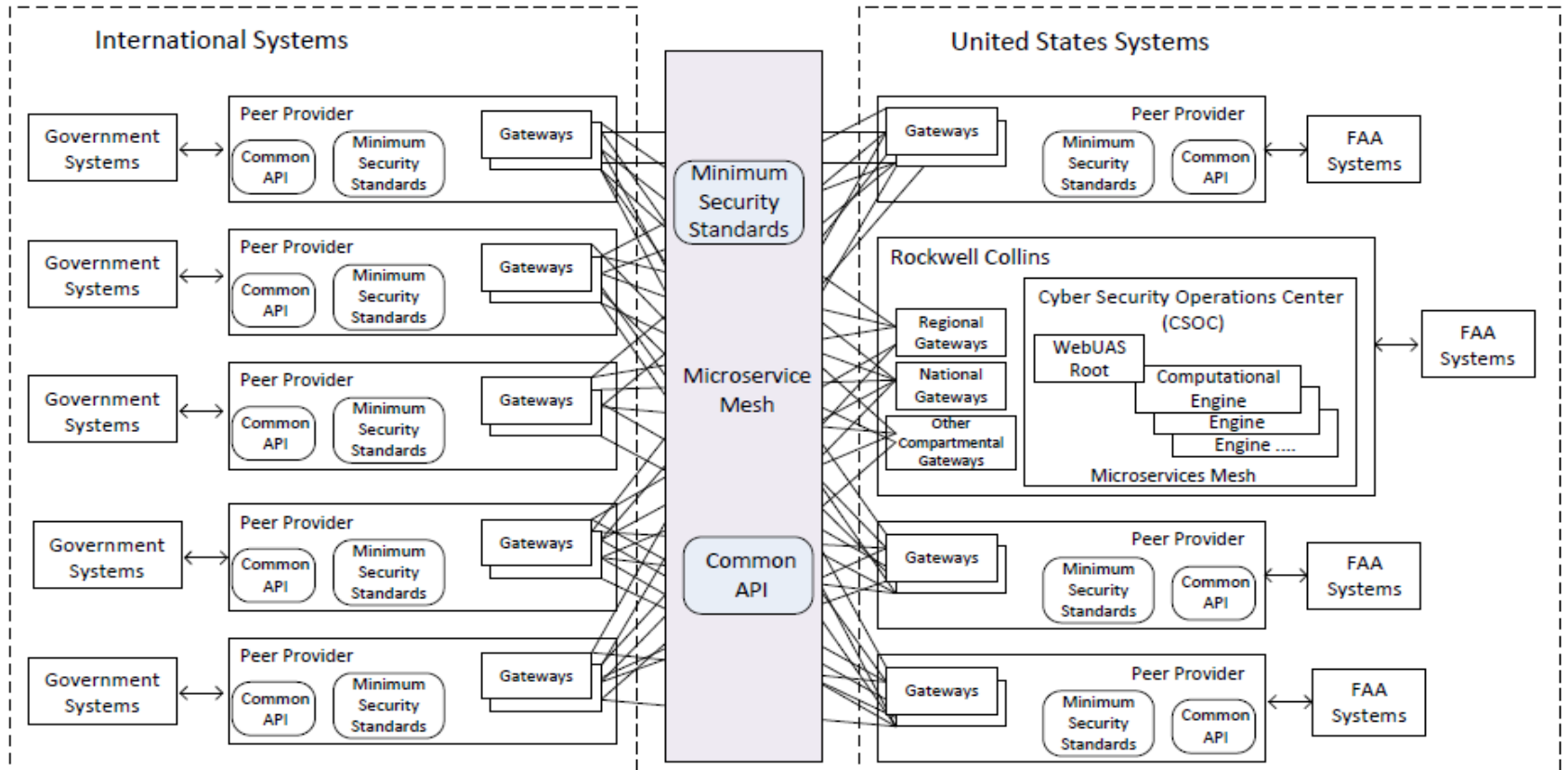

Figure 1: WebUAS^{TM} relationship to external systems