COALITION AIRSPACE MANAGEMENT AND DECONFlictION

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The aim of this presentation is to:

Highlight the work being undertaken within the USAF to enhance airspace management and deconfliction and information sharing for coalition operations
• Airspace Management

• Lessons Learnt

• Problems within Airspace Management

• Capability Solution
  – Joint AirSpace Management And Deconfliction (JASMAD)
  – Coalition AirSpace Management And Deconfliction (CASMAD)
  – Coalition Airspace Information Sharing (CAIS)
  – JASMAD for Coalitions

• Questions
Airspace Management

• Airspace is a resource that must be carefully managed

• Airspace management is undertaken to minimize the risk of unintentional conflicts while maximizing freedom of action of airborne objects

  – **Airspace Planning** is the efficient organization of airspace volumes

  – **Airspace Control** is the effective management of the objects using the volumes

    • Positive: Control based on positive identification, tracking, and direction of aircraft within an airspace using electronic means (radar) by air controllers

    • Procedural: Control based on a combination of previously agreed and promulgated orders and procedures (pilots are responsible for staying within their airspace and for avoiding other aircraft)
Airspace Management

The purposes of airspace management are to:

- Expedite airborne missions to/from their objectives
- Eliminate fratricide to airborne systems from surface based resources
- Eliminate fratricide to surface based resources from airborne systems
- Avoid harmful interaction between airborne objects (fratricide or collision)
- Enhance the monitoring/controlling of current and projected airborne objects
- Coordinate the interaction of civil and military airspace
Lessons Learnt

• Op Desert Storm (1991):
  – Collaborative planning was problematic
  – Poor communications hampered situational awareness
  – Extremely limited interoperability of coalition information systems
  – Airspace management failures resulted in 11 ‘friendly fire’ casualties

• Op Iraqi Freedom (2003):
  – Significant problems in disseminating airspace information
  – Poor communications hampered situational awareness
  – Inadequate coalition information sharing hampered operations
  – Airspace management failures resulted in 13 ‘friendly fire’ casualties
Airspace Management Problem

• Lack of Situational Awareness
  – No facility to monitor and police utilization of airspaces
  – Limited ability to identify and resolve potential airspace conflicts during planning.

• Near-Real-Time Airspace Reallocation
  – Inefficient utilization of airspace
  – Limited capability to conduct short-notice reallocation of airspaces
Airspace Management Problem

**ACM Cell Ref INFO:** 3C8NW

**LCAP 05** FL 150-220  
**LLTR R03** FL 007-012

**Object Report:** (60NM)

- **MILLER 05** 4 F15E 2C3SE ETA - 0:07
- **VIPER 07** 2 F16C 3C1SW ETA + 0:04
- **DOOM 03** 2 F15C 2C4SW - 3C5NW  
  ETA- ACTIVE

**Combat Air Patrol (CAP)**

**Low Level Transit Route (LLTR)**
Airspace Management Problem

• Coordination of Air and Ground Operations
  – Need to minimize risk of blue-on-blue engagement
    • Ground to Air and Air to Ground
  – Lack of situational awareness to coordinate air and ground operations (including weapons control status)
Airspace Management Problem

- Unmanned Aerial Systems
  - Unprecedented proliferation in recent years
  - Uncontrolled operation at the tactical level
  - UAS ‘Swarms’
  - Dramatic Increase in potential for air-to-air collision

- Afghanistan, 30 Aug 04, a Bundeswehr Luna UAS passed within 170 feet of an Afghan Airlines Airbus A300B4 with over 100 people onboard
Airspace Management Problem

• Stand-off and Loitering Munitions
  – Airspace managers must consider airborne munitions
    • Artillery, mortars and ground-based air defense systems
  – Difficult to deconflict accurate weapons profiles
  – Stand-off and loitering munitions add a significant level of complexity
    • Joint Air-to-Surface Standoff Missile (JASSM)
    • Low-Cost Autonomous Attack System (LOCAAS)
Airspace Management Problem

• Coordination with Civil Aviation
  – Civil aircraft will fly into and out of combat zones
  – Military aircraft may use civil airspace
    • Inter-theatre air transport
    • Strategic long-range missions
  – Limited coordination of civil and military airspaces

• Training and Experience
  – Airspace Management is a highly specialized task
  – Considerable training burden
  – Staff augmentees are often untrained and inexperienced
Airspace Management Problem

• Lack of Automated Airspace Management Systems
  – Airspace management is disconnected from mission planning
  – Correlation of available airspaces to tasks is highly labor intensive
  – Automated planning support is extremely limited
  – Improvements in planning support would reduce the training burden

• Communications and Dissemination
  – Airspace management remains a largely manual process
  – Communications between AOC and external units and coalition partners is often unreliable
  – Reliance on communications ‘lowest common denominator’
    • Formal messaging, telegraph
  – Interoperability between coalition information systems is extremely limited
USAF Approach

To develop a robust airspace management system.

• Joint AirSpace Management And Deconfliction (JASMAD)
  – Joint Service
  – Net-centric Information Service for **Planning and Execution** Operations
  – Application of New Technologies to Airspace Management
  – Satisfies Warfighter Capability needs
  – JAOC-Centric with extended information service to US forces during execution

• Coalition AirSpace Management and Deconfliction (CASMAD)
  – Develop Interface between **JASMAD and UK C² systems only**

• Coalition Information Sharing (CAIS) (proposed program)
  – Consider data standardization framework to support coalition interoperability
  – Work cooperatively with NACMA and NC3A

• JASMAD for Coalitions (future program)
  – Implement M2M interface to provide interoperability between JASMAD and coalition airspace management systems
JASMAD

- Single distributed joint airspace management and dynamic deconfliction capability
  - Near-real-time planning and execution coordination
  - Airspace conflict detection
  - Airspace utilization optimization
  - Import facility for FAA and ICAO routes and airspaces
  - Automated collaborative environment
    - Create, import, modify, deconflict and disseminate the ACO and ACMs
    - Airspace inputs into the ATO
  - Enhanced 4D visualization
    - Based on a geocentric terrain model
Coalition Interoperability

• **JASMAD does not address coalition interoperability, however**

• Coalition AirSpace Management & Deconfliction (CASMAD) program
  – Demonstrate interoperability between JASMAD and airspace planning tools within UK Air Command and Control Systems (ACCS)
  – Facilitates automated data exchange to support collaborative airspace planning and deconfliction within a US/UK coalition environment.

• Coalition Information Sharing (CAIS)
  – Develop prototype machine-to-machine (M2M) interface based on a net-centric information service oriented architecture
  – Data standardization framework (JC3I EDM?)

• **JASMAD for Coalitions**
  – Implement M2M interface for JASMAD based on the CAIS data standards
  – Initial intended to support interoperability with selected NATO member nations
  – Will provide multi-national collaborative planning and deconfliction in near-real-time
Coalition Interoperability

AOC Databases (Data Layer)

- JASMAD Data

CAIS Common Data Model (JC3IEDM)

JASMAD Information Services Layer

- Airspace Information
- Planning/Re-Planning
- Dynamic Management

JASMAD Interface Layer

- ACM Requests

JASMAD for Coalitions Interface

CASMAD Interface

Coalition Data
NATO Data
UK Data

TBMCS/AOC-WS

Others

Navy NALE
SOF SOLE
Air Mobility

Army BCD
TAIS

User Updates Via Link 16

Tailorable Information Products
Summary

• JASMAD (supported by CASMAD, CAIS and JASMAD for Coalitions) will:
  – Improve situational awareness
  – Provide more efficient use of the airspace through accurate definition of airspaces
  – Enhance to coalition airspace information sharing
  – Support coordination between air and ground operations
  – Facilitate airspaces modification and reallocation during execution in near real time
  – Incorporate UASs and standoff and loitering munitions into airspace planning
  – Integrate civil aviation requirements
  – Reduce training burden

• JASMAD will facilitate much greater integration of air mission planning and airspace management
  – Facilitate a move to a dynamic planning continuum
    • plans continuously fed into execution
    • replanning during execution fed back into future missions development
  – constant feedback provided significant increase in planning tempo

• Coalition collaboration designed into the system early in development
  – Maximize potential to support wide range of possible future operational contexts
Questions?