

# *COALITION AIRSPACE MANAGEMENT AND DECONFLICTION*

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# *Aim*



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**



# Outline



- 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*

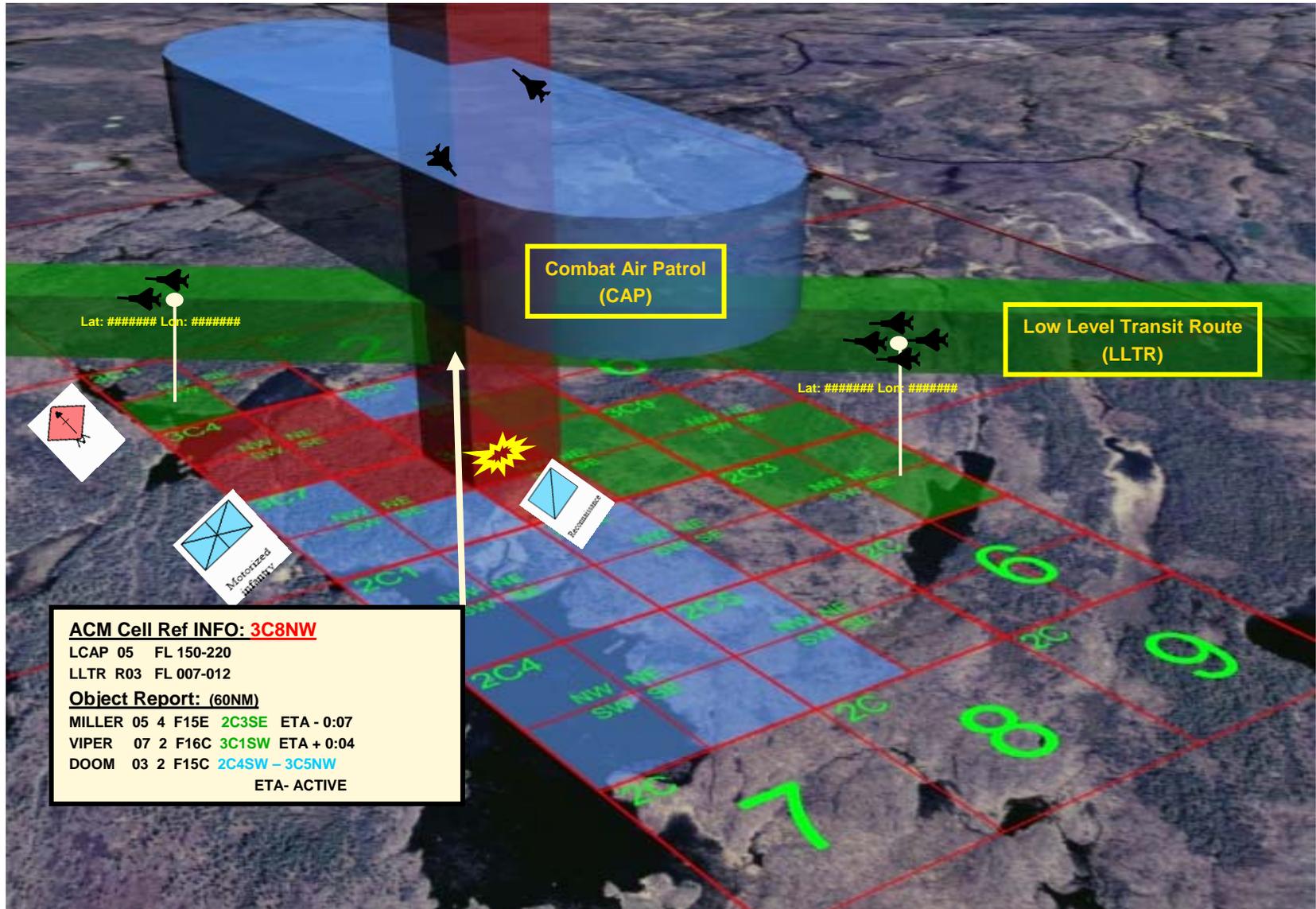


- Lack of Situational Awareness
  - No facility to monitor and police utilization of airspaces
  - Limited ability to identify and resolve potential airspace conflicts during planning.
- Near-Real-Time Airspace Reallocation
  - Inefficient utilization of airspace
  - Limited capability to conduct short-notice reallocation of airspaces





# Airspace Management Problem





# *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 

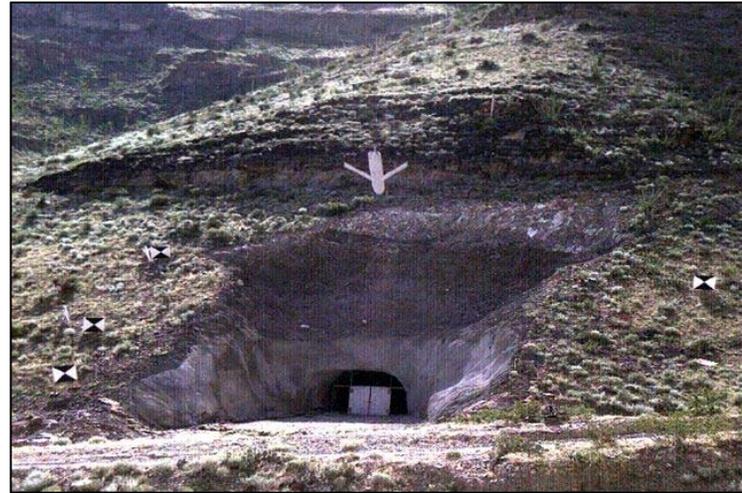


# Airspace Management Problem



- 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



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## 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 C<sup>2</sup> 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



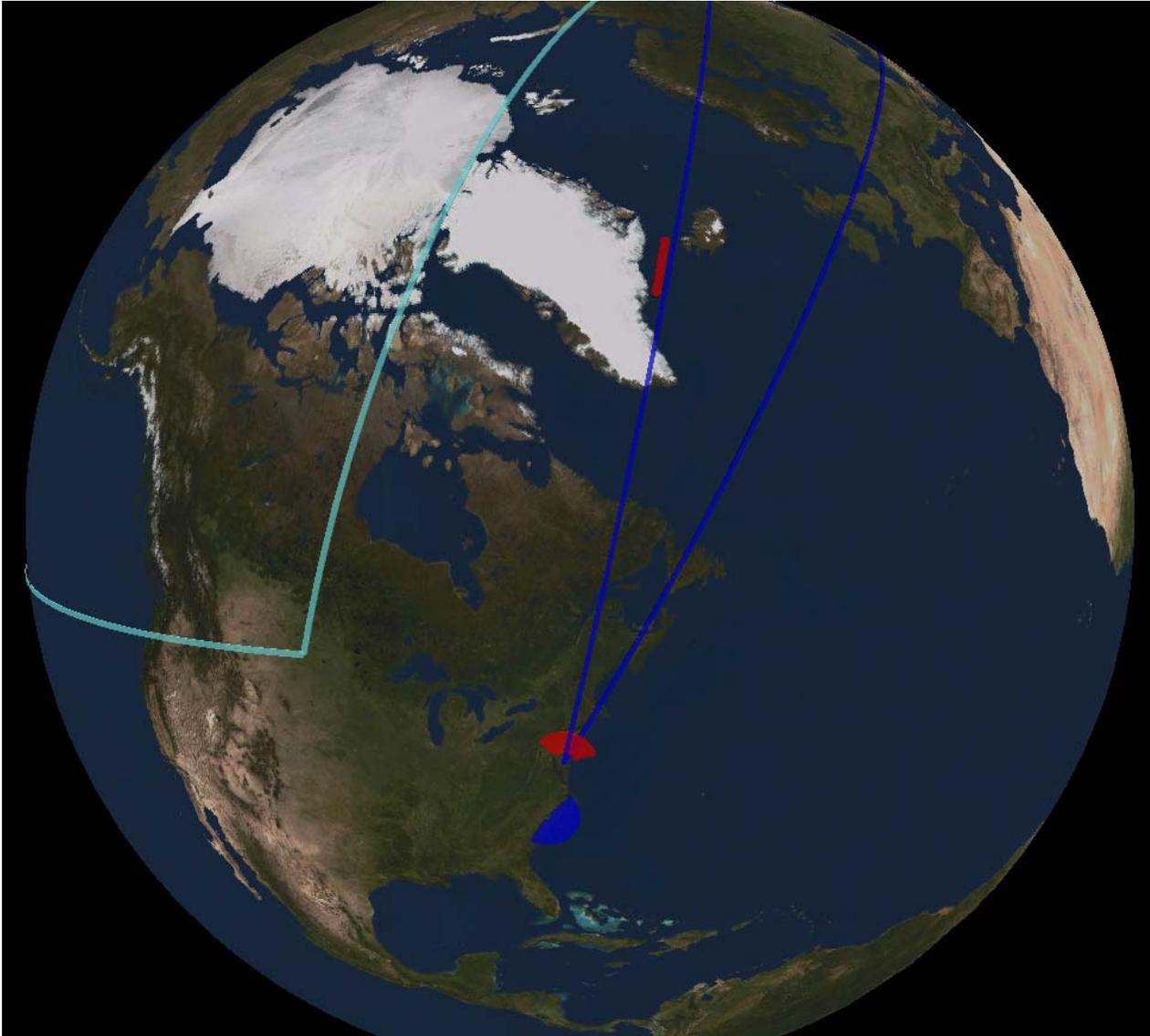
# JASMAD



- 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

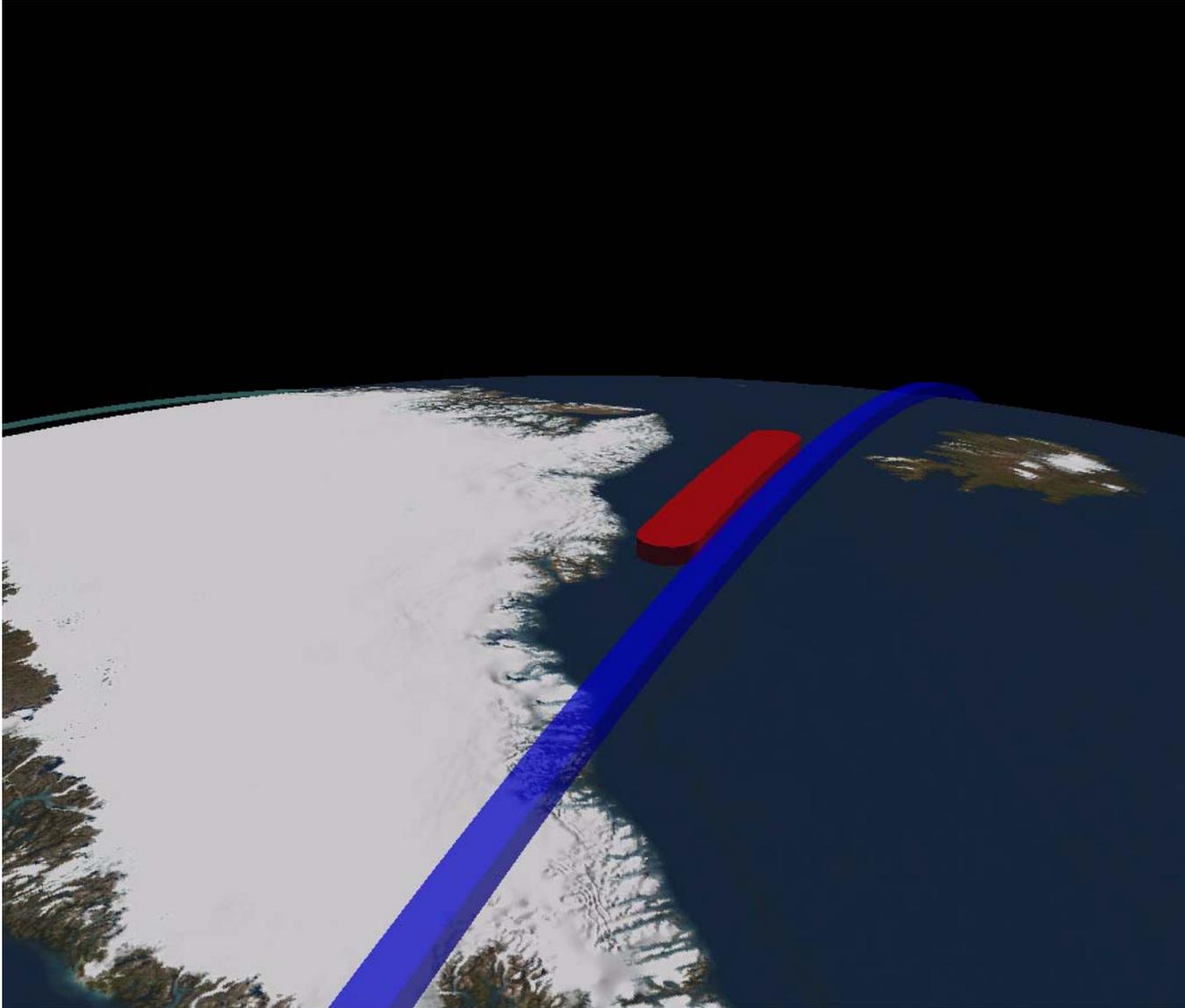


# JASMAD



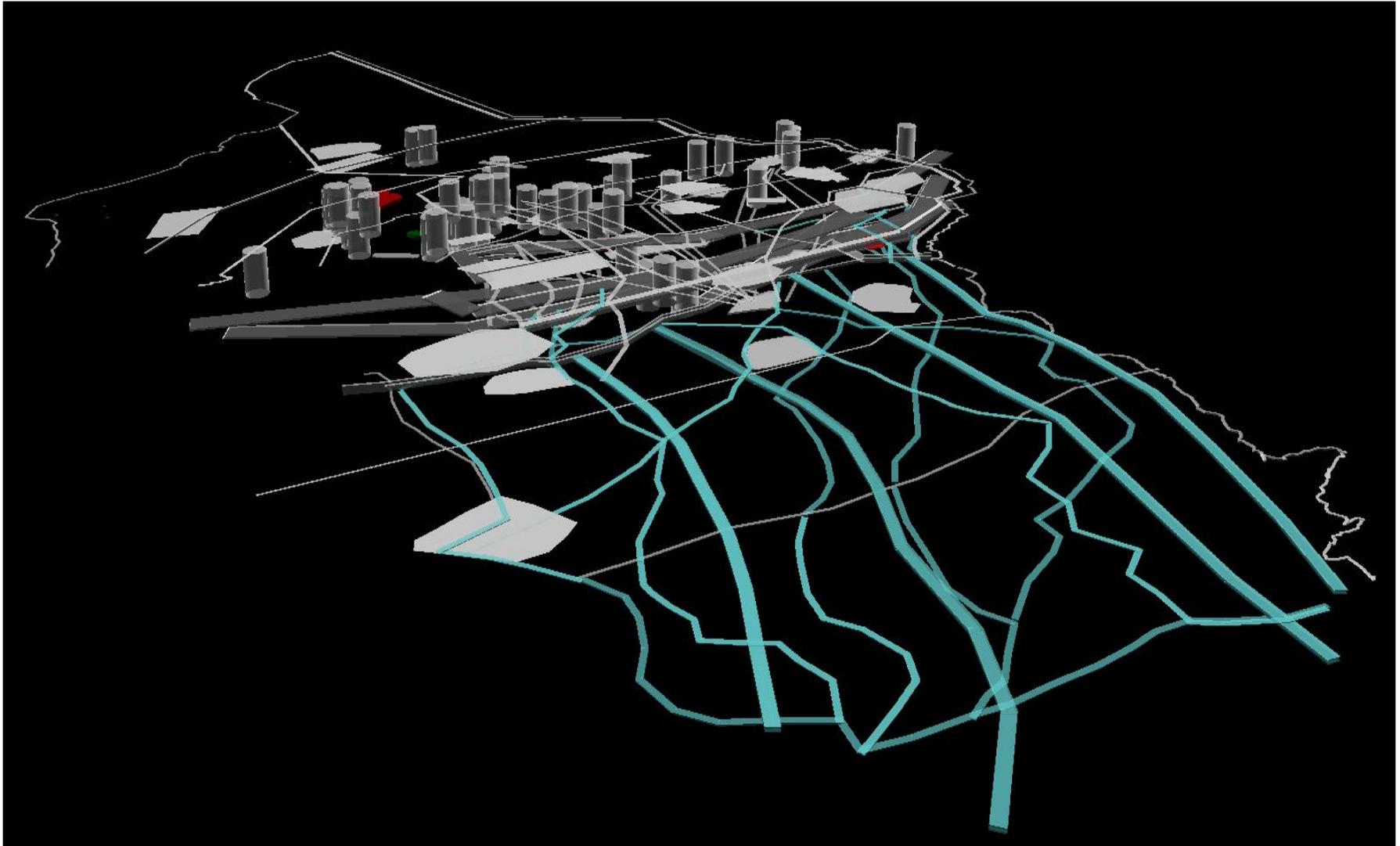


# JASMAD





# JASMAD





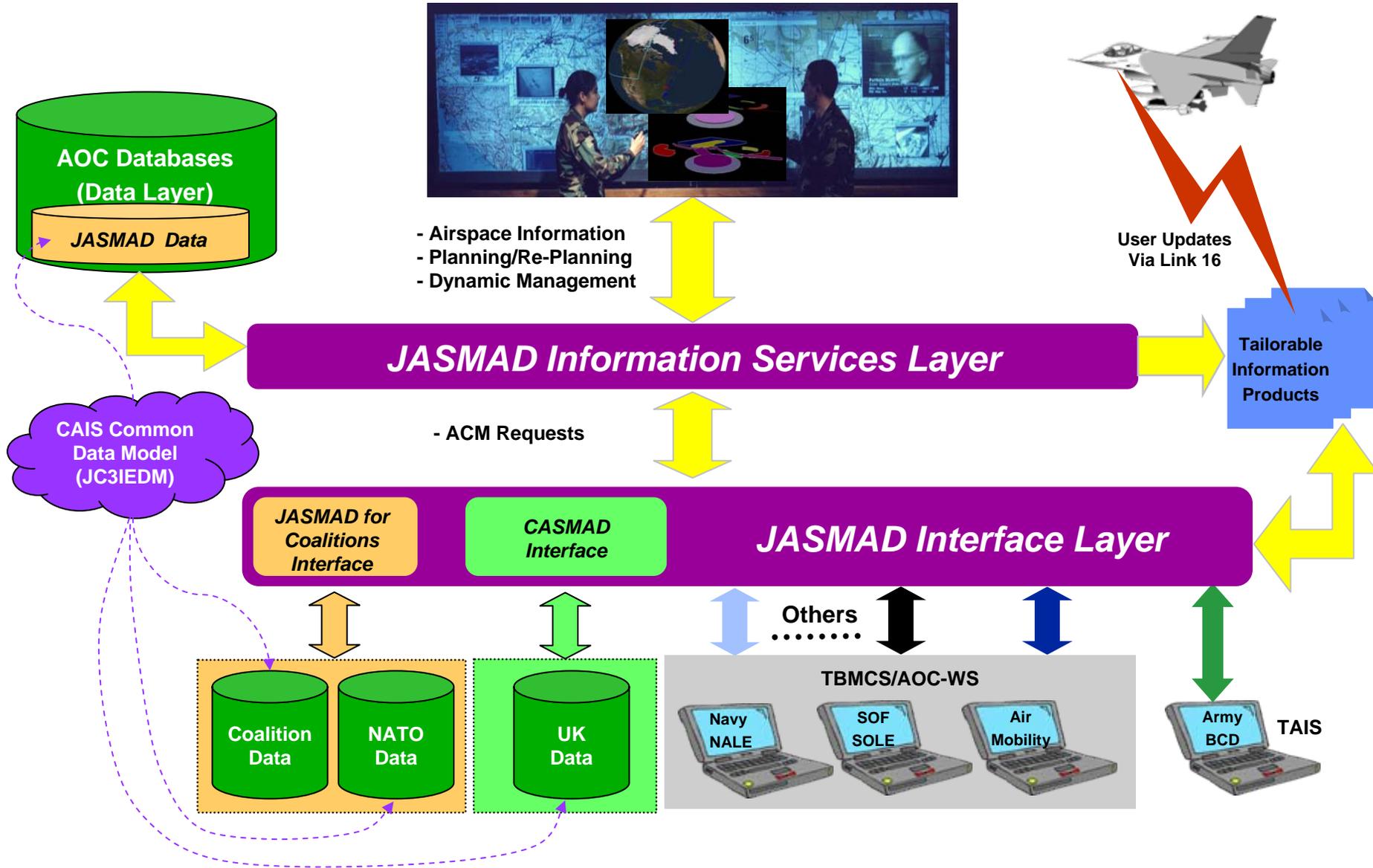
# *Coalition Interoperability*



- **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 (JC3IEDM?)
- 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





# 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?

