



Challenges, Lessons learned and Benefits from US Experience



Unprecedented Challenge

September 11, 2001

- Contingency plans in place
- Infrastructure in place
- THE day itself

**What would have happened
if we did not have AFTM/CDM in place?**



Challenges

Evolutionary Process

- Infrastructure
- Regulatory Issues and Concerns
- Culture: Roles and Responsibilities

Not always easy



Infrastructure

Evolutionary Process

- **Facilities**
- **Hardware/Software**
- **Airspace**
- **Procedures**
- **Military Infrastructure**
- **Contingency Plans**
- **Collaborative Decision Making (CDM)**
- **Command Center**
- **People Trained**

Not always easy

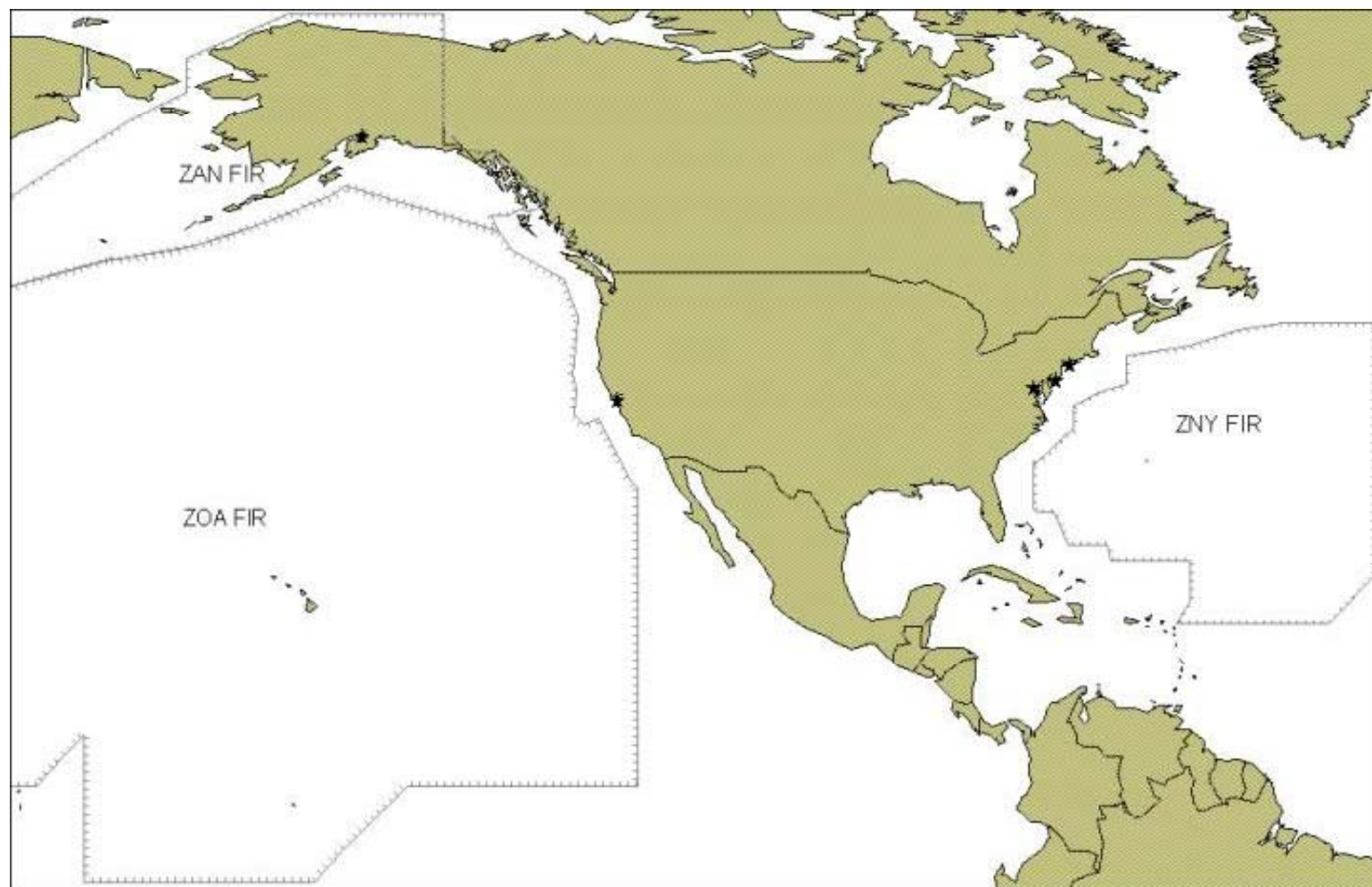


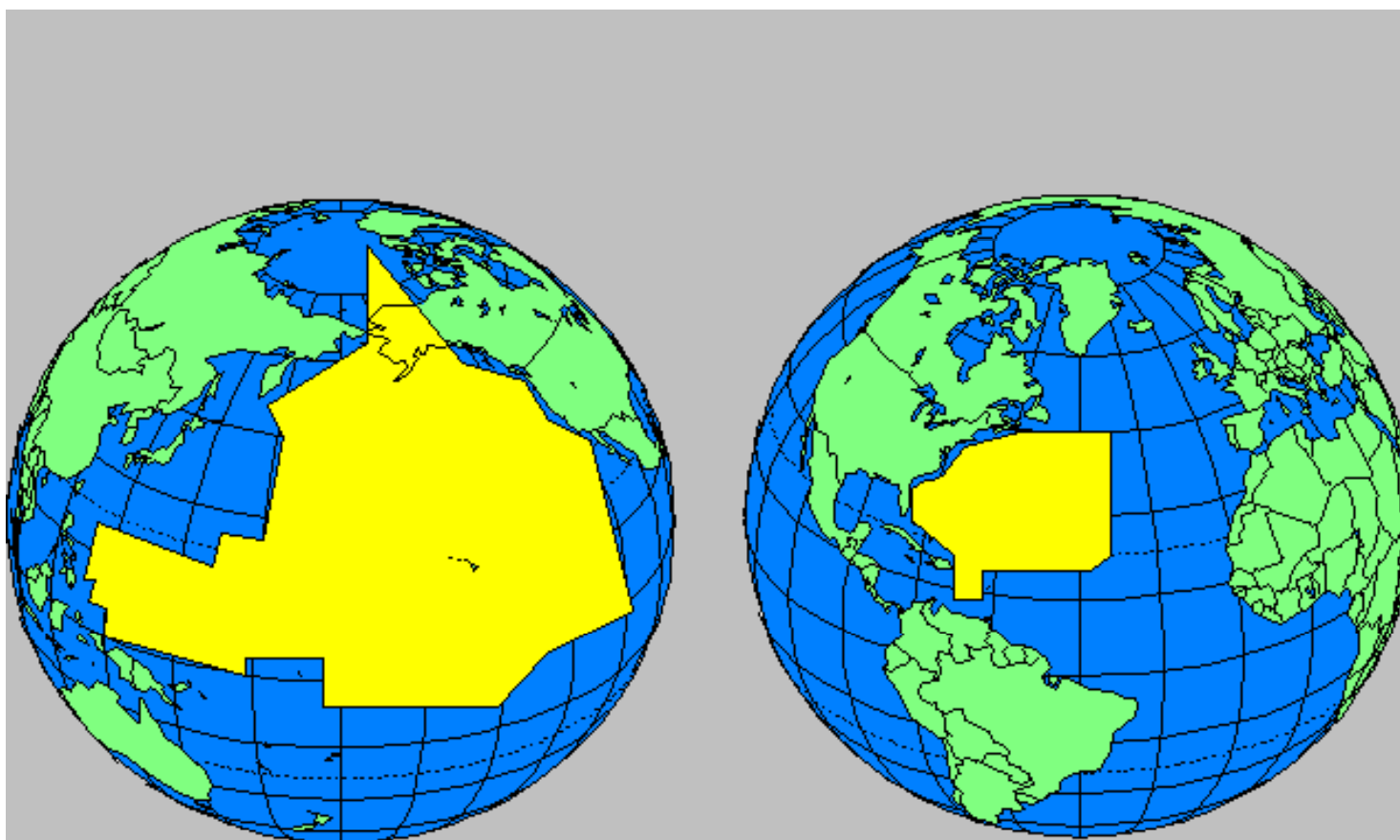
Air Traffic Control Facilities

Evolutionary Process

- **76+ Million Square Kilometers of Airspace**
 - **Domestic - 15.5+ Million Kilometers**
 - **Oceanic - 60.6+ Million Kilometers**

Not always easy







Air Traffic Control Facilities

Evolutionary Process

- 21 Air Route Traffic Control Centers
 - 6 Combined Control Facilities
- 500+ Airport Traffic Control Towers
- 25 Terminal Radar Approach Controls
 - Including 4 combined Terminal Radar and Tower
- 61 Automated Flight Service Stations
- 14 Flight Service Stations

Not always easy



Operational Facilities

Evolutionary Process

- 40,000+ Navigational Aids
- 14,000+ Communications
- 3,800+ Automation
- 6,100+ Environment
- 11,000+ Navigation
- 1,800+ Surveillance
- 3,500+ Weather

Not always easy



Hardware/Software

Evolutionary Process

- Compatible through out the airspace system
- In place to support 600+ Air Traffic Control Facilities
- Automation to manage arrivals at maximum efficiency was available

Not always easy



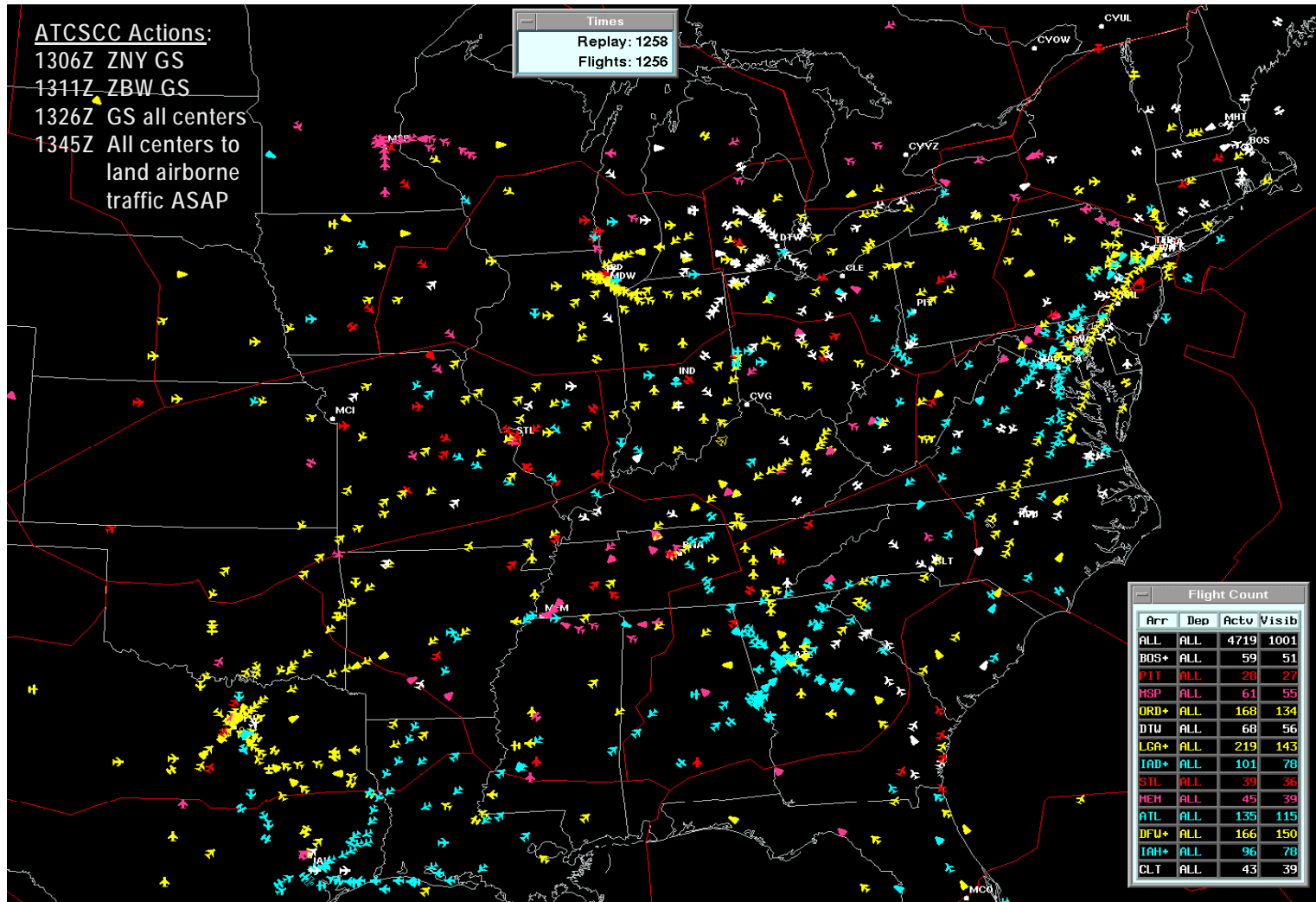
Airspace and Procedures

Evolutionary Process

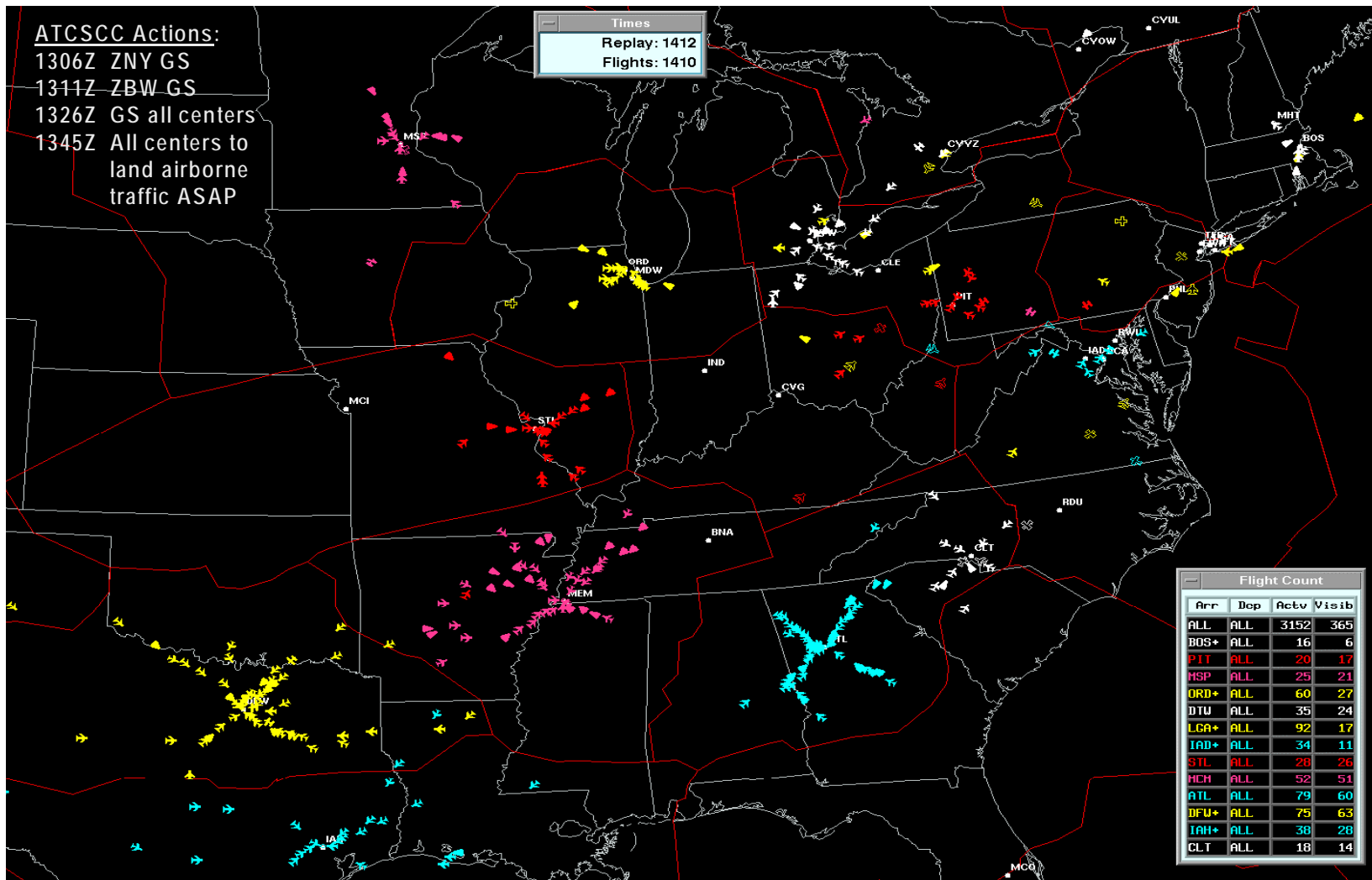
- In place to support 600+ Air Traffic Control Facilities
- Major facilities had a four-corner post system in place that facilitated maximum arrival flows
- Procedures were published and routinely used
- Visual separation was applied

Not always easy

Depiction of 4 Corner Post Operations



Depiction of 4 Corner Post Operations





Military Infrastructure

Evolutionary Process

- FAA “owns” the airspace
 - Federal Aviation Act of 1958
- Military focus was on threats coming INTO the airspace
- Fighter aircraft concentrated at coastal military sites
- Tactical fighters “ready”
- Some communication links were established
- Some FAA radar data shared with military

Not always easy



Contingency Plans

Evolutionary Process

- Contingency Plans in place
 - Typically in place for scheduled outages
 - Routine and preventive maintenance
 - Weather related
 - Hurricane, Snow, etc
- Exercises conducted in concert with military and Air Traffic Control Facilities

Not always easy



Collaborative Decision Making (CDM)

Evolutionary Process

- Information flow between Air Traffic Control (ATC) facilities
- Information flow between ATC facilities and airlines/other users
- Information flow between FAA Command Center and
 - Air Traffic Control facilities
 - Airlines/Cargo
 - Business and General Aviation users
 - Military
 - Government agencies and officials
 - International ANSPs

Not always easy



Command Center

Evolutionary Process

- Facility in place and prepared
 - Final authority on “systemic tactical” decisions
- Coordinated on a national basis
- The established culture at the Command Center took control and made unprecedented tactical decisions
- Used knowledge and experience to make on-the-spot decisions with the dynamic flow of incoming information from various sources
- Established new lines of communication with very high level government executives in numerous agencies

Not always easy



People Trained

Evolutionary Process

- 15,000+ Controllers
 - 700+ Traffic Management Controllers
 - 1,700+ Operations Supervisors
 - 2,900+ Flight Service Specialists
 - 7,500+ Technicians
- Both Air Traffic Controllers and Technicians were well trained
 - Culture is service oriented and proactive to achieve the optimum results for the user of the system
- Air Traffic Controllers make real-time decisions in an operational environment on a daily basis
- Technicians operate and maintain the equipment to be ready for all operations with sufficient redundancies in place
- Safety standards were never compromised

Not always easy



Regulatory Issues and Concerns

Evolutionary Process

- Anti-trust laws
- Data exchange with airlines
- Data exchange with the international community
- CDM Memorandums of Agreement

Not always easy



Culture: Roles and Responsibilities

Evolutionary Process

- **Who is in Charge?**
 - **Military**
 - **FAA or Airlines**
 - **Controller or Air Traffic Flow Management**
 - **Dispatcher or Pilot**

Not always easy



Lessons Learned from September 11

Evolutionary Process

- Establishment of Domestic Event Network
- Delay of surveillance data to general public
- Include security community in data exchange
- Include security community in decision making
- Establishment of Department of Homeland Security Facility
- Increased discussions/meetings with security/law enforcement agencies and organizations, international community
- Clarified and reaffirmed air traffic controller procedures
- Reinforcement of good information flow with ALL parties
- Shared technology and conformance
- Establishment of a framework for allowing medical/law enforcement back into the airspace following a national emergency

Not always easy



Benefits

Evolutionary Process

- **US has been tested**
 - **High volumes of air traffic in “normal” conditions**
 - **Security threats**
- **Safer and more efficient airspace system**
- **Increased knowledge and cooperation within the aviation and security community**
- **Increased contingency planning**
- **Consistent information flow**
- **Users of the system have more control of economic decisions impacting their operation**

Not always easy

India



Evolutionary Process

**India must create their own experience based on
India's needs**

Not always easy



Thank You