



A NextGen Mental Shift: The role of the Flight Operations Center in a Transformative National Airspace System

By: Michael Wambsganss
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Review of Terms – FOC of Future study group and workshops

→ Airlines

- Airline Operations Center (AOC)

→ Business General Aviation

- Flight Operations Center (FOC)

→ Military

- Wing Operations Center (WOC)

→ General

- System Operations Center (SOC)
- Network Management

→ Technology providers: flight planning, following, crew scheduling, etc..

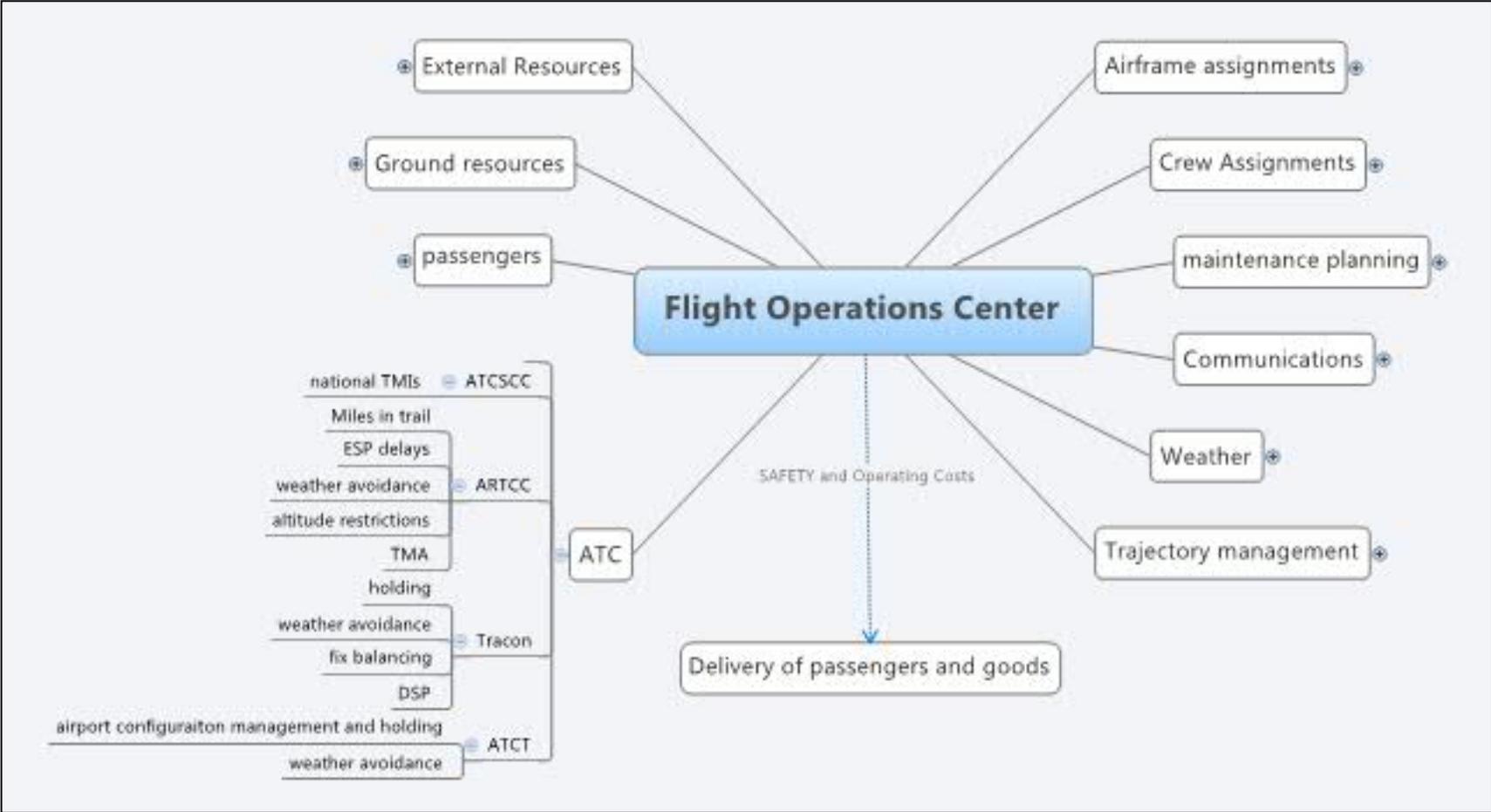
The Evolving Role of the FOC

- **Rising fuel prices have caused the evolution of the FOC role**
 - FOCs exercise centralized control and management over all assets (i.e., flights, schedules, gates, crews, etc...)
 - FOCs are responsible for total system safety, efficiency and operating costs
 - FOCs are the central communication hub for all operations
- **Evolution furthered by IT technology**

Centralized Control of Assets: De-Centralized Execution



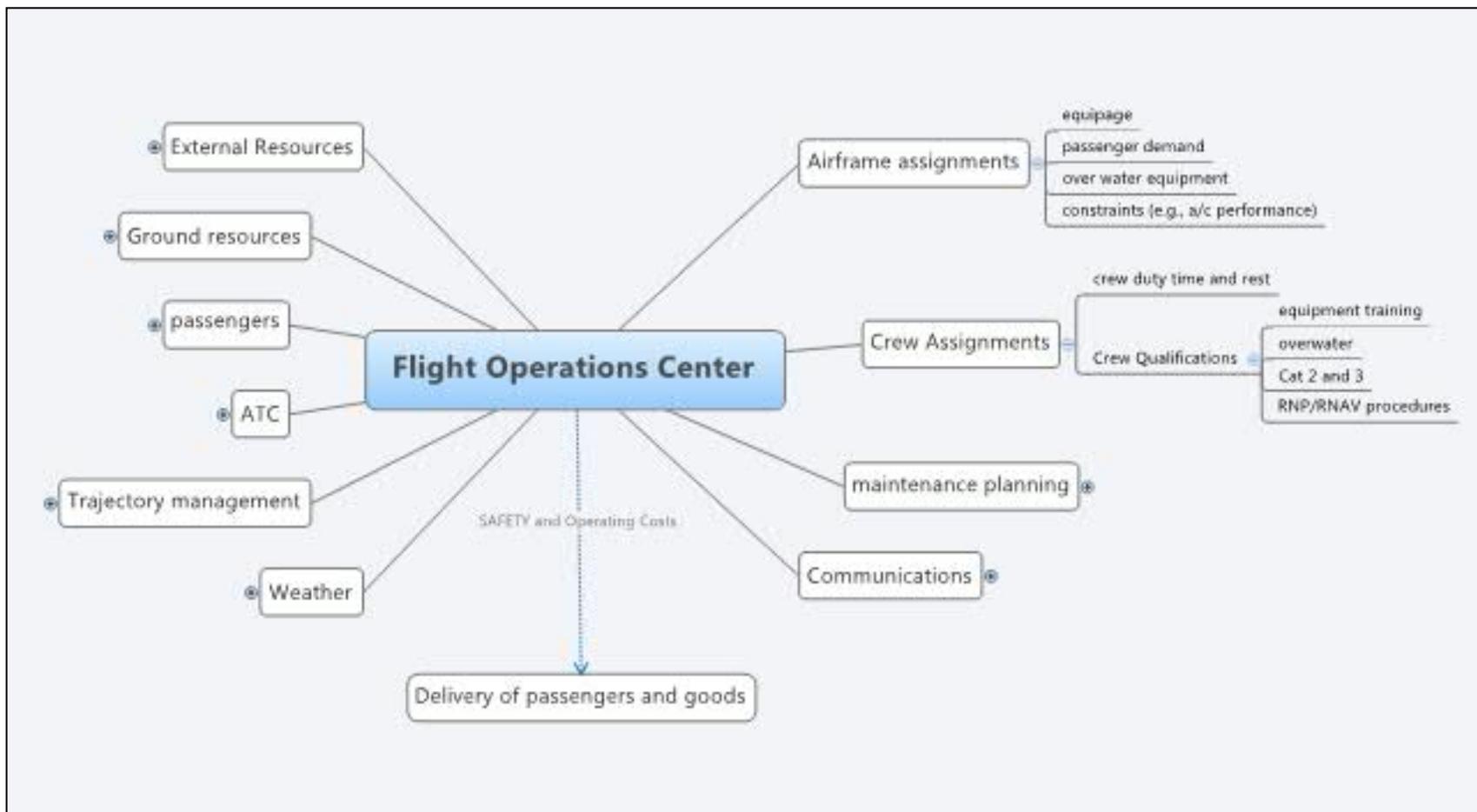
FOC – ATC Interaction



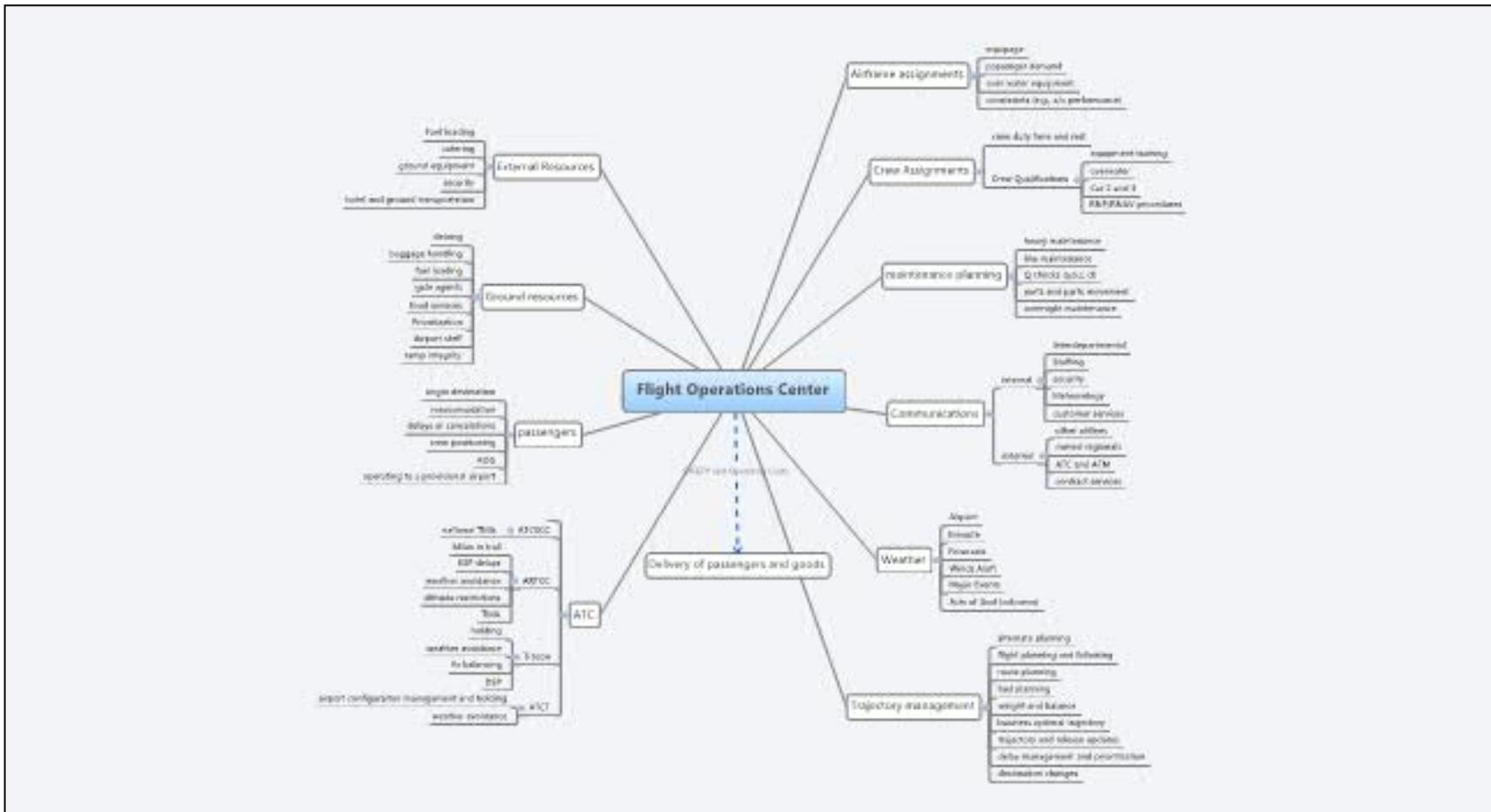
FOC – Trajectory Management



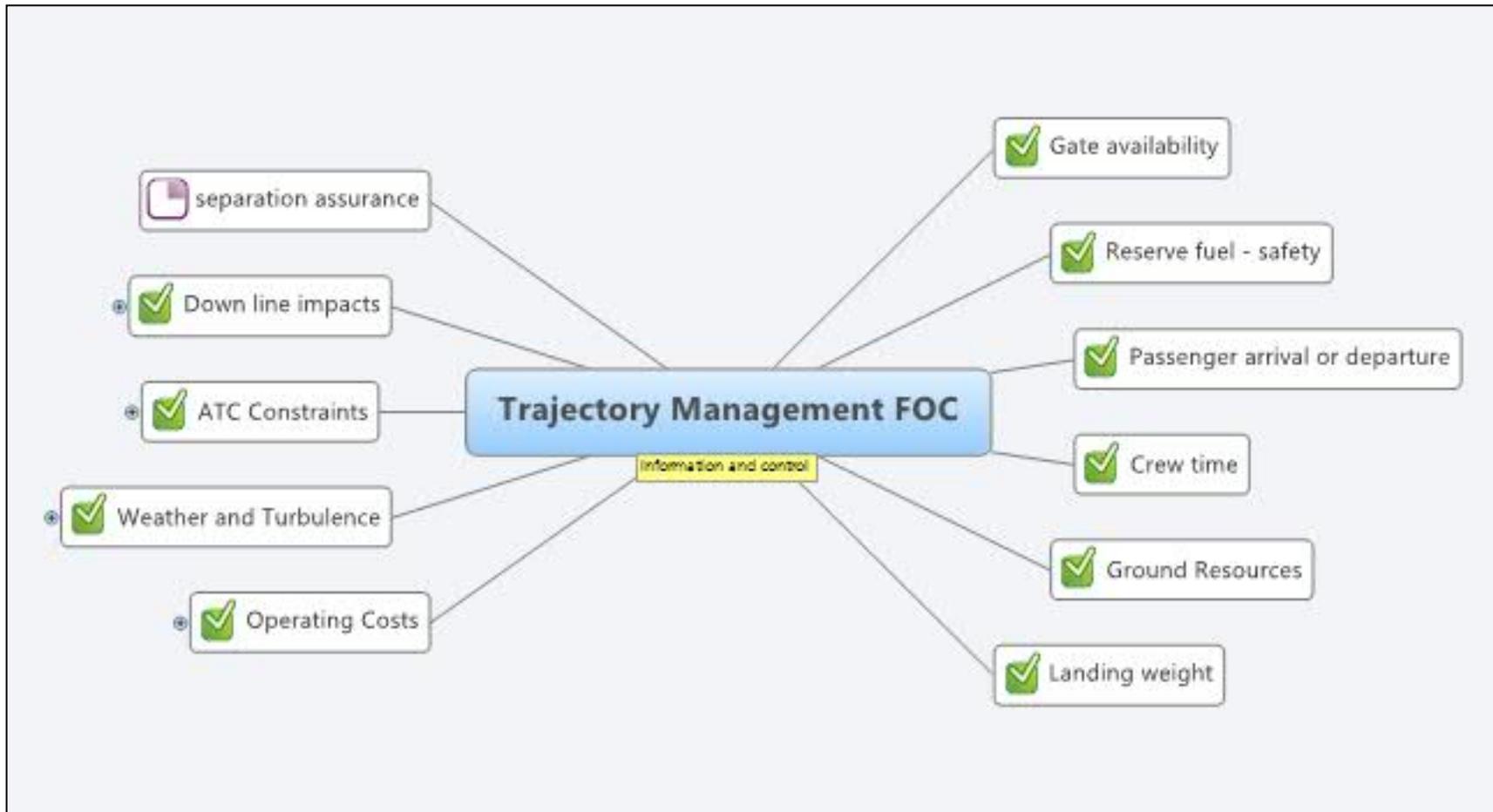
FOC – Crew and Airframe



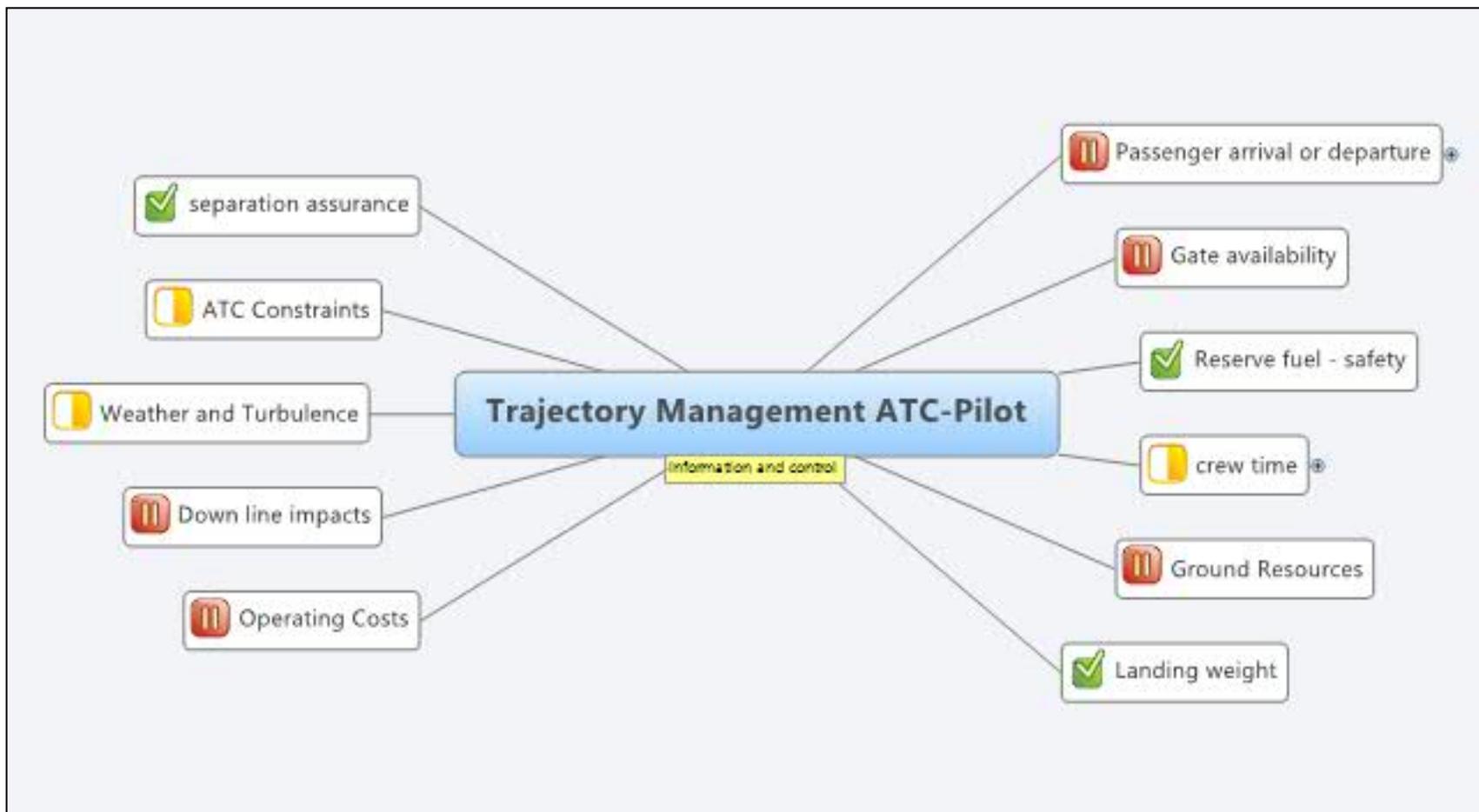
FOC – centralized control of assets



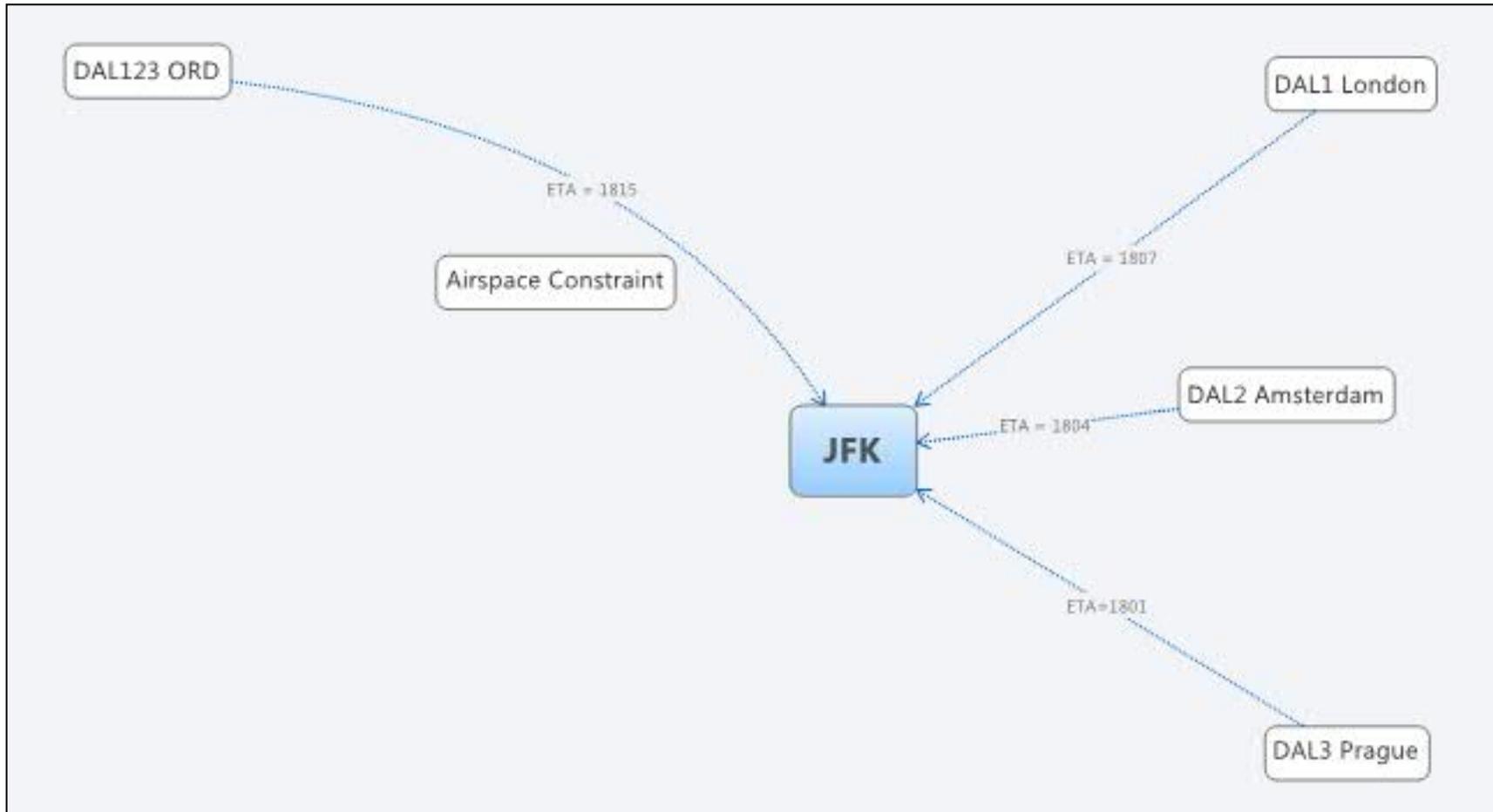
Trajectory Management FOC



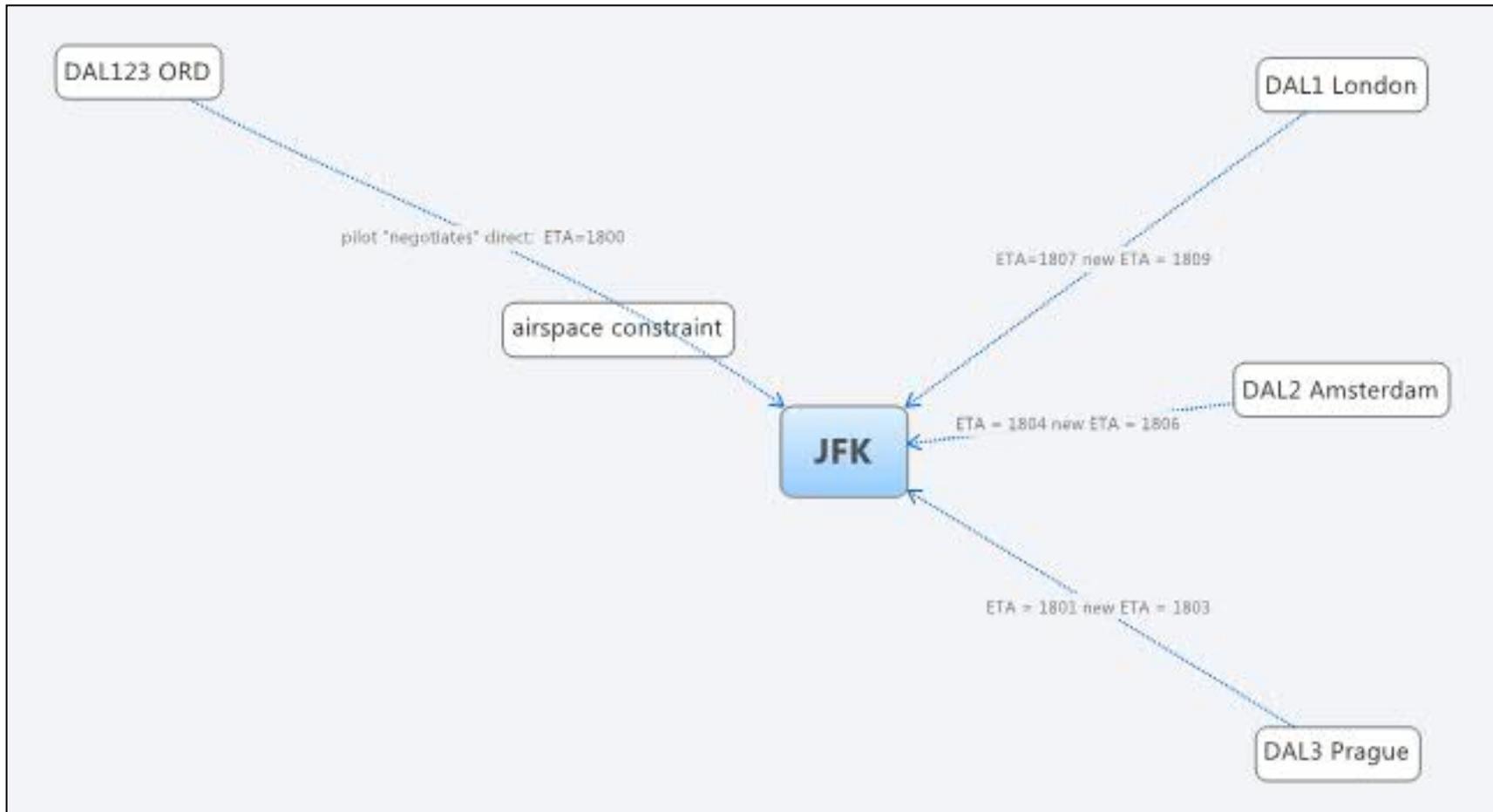
Trajectory Management ATC-Pilot



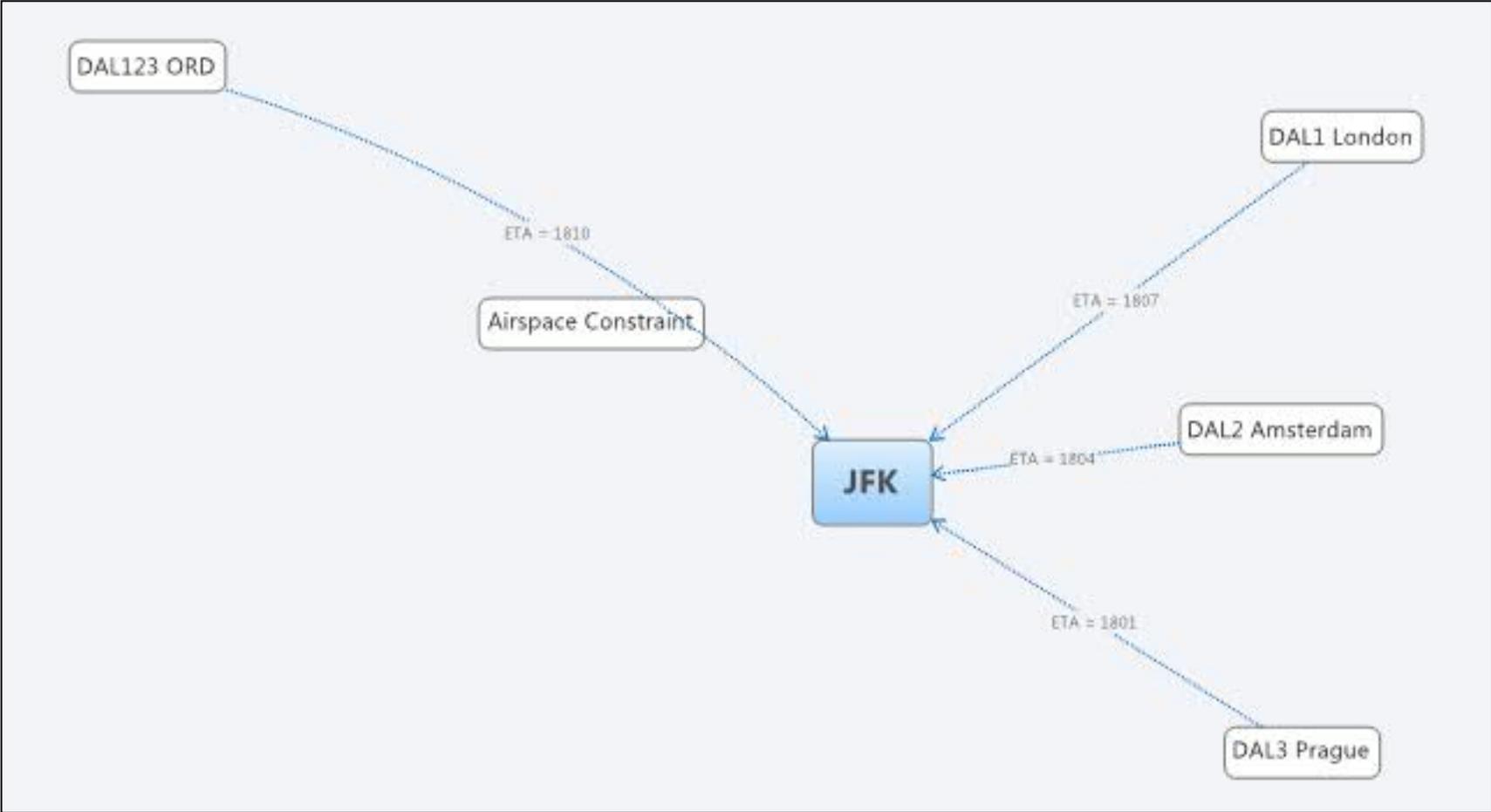
Original negotiated trajectory avoids the constraint



Constraint opens: pilot negotiates direct



Constraint Opens: FOC re-negotiates trajectory



Main FOC Study Group Findings

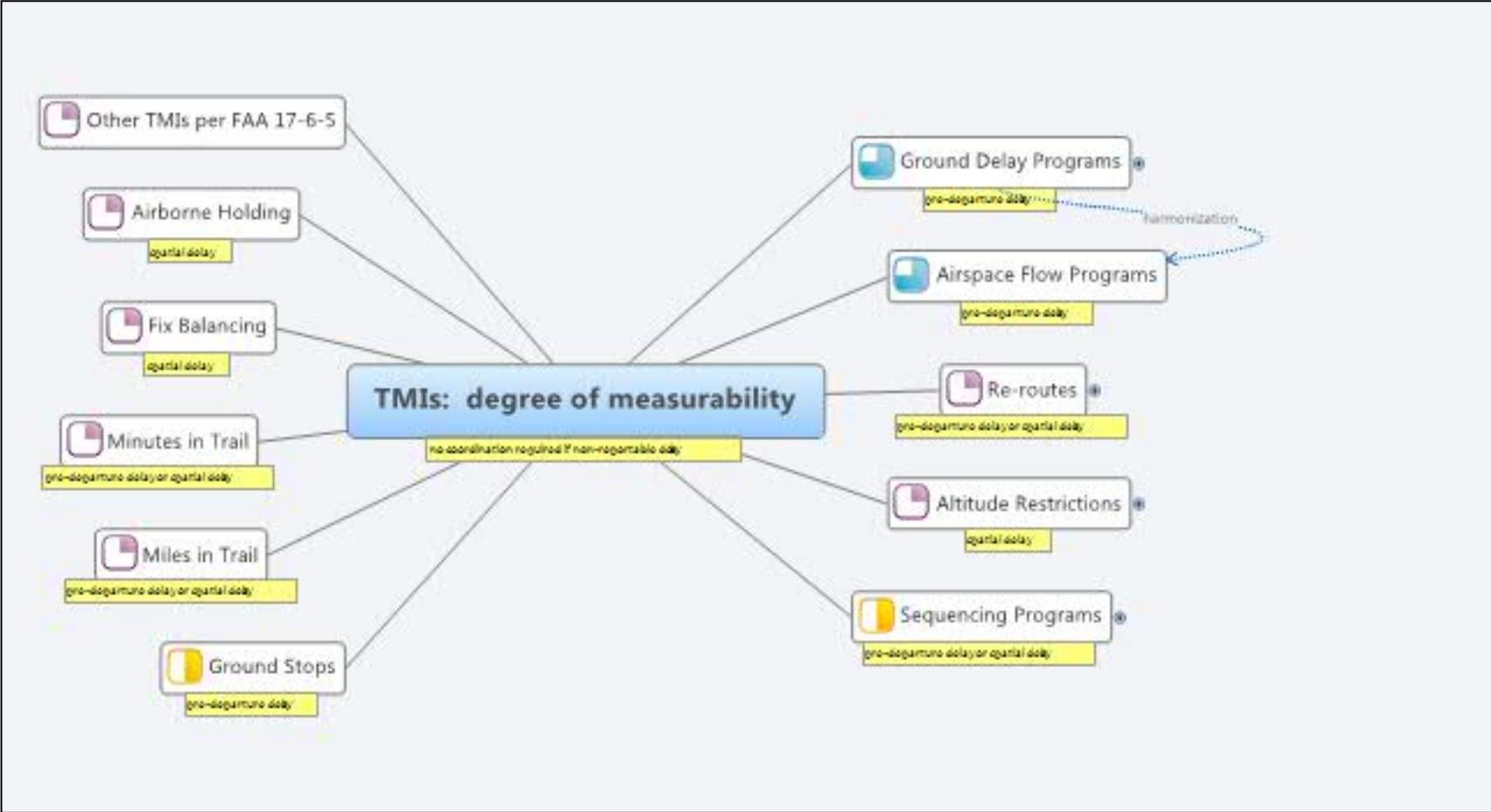
- **The current NextGen approach is focused on Air Traffic Control (ATC) modernization rather than NAS transformation**
- **Today's FAA planning horizon is not sufficiently strategic and lacks continuity across the decision making process**

Main Findings (continued)

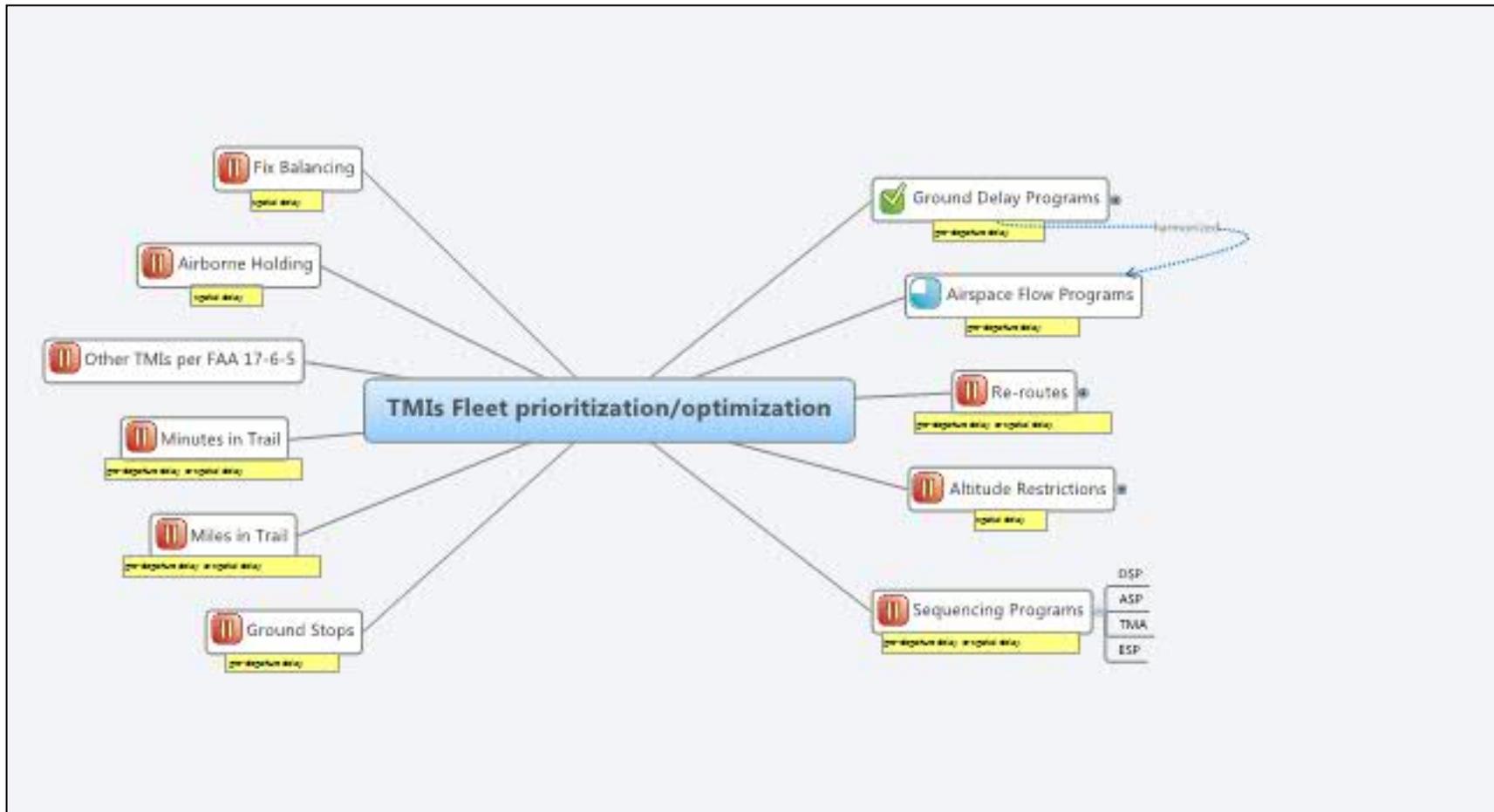
- **There is no clarity on how scarce resources will be rationed in the NextGen environment**
- **The rules and content for data sharing are not completely defined**
- **There is a lack of appreciation for and incorporation of the role of the FOC to ensure success of the FAA Data Communications program**

Recommendations	Concept Initiation	Implementation	NextGen Processes	Policy	OPR
1) Involve FOC' s in NextGen	√	√	√	√	
2) Expand FAA Planning Horizon	√	√	√	√	
3) Develop NextGen Rationing Mechanism	√	√	√	√	
4) Formalize Data Sharing	√	√	√	√	
5) Expand Data Communications	√	√	√	√	
6) Conduct Collaborative Experiments	√	√	√	√	

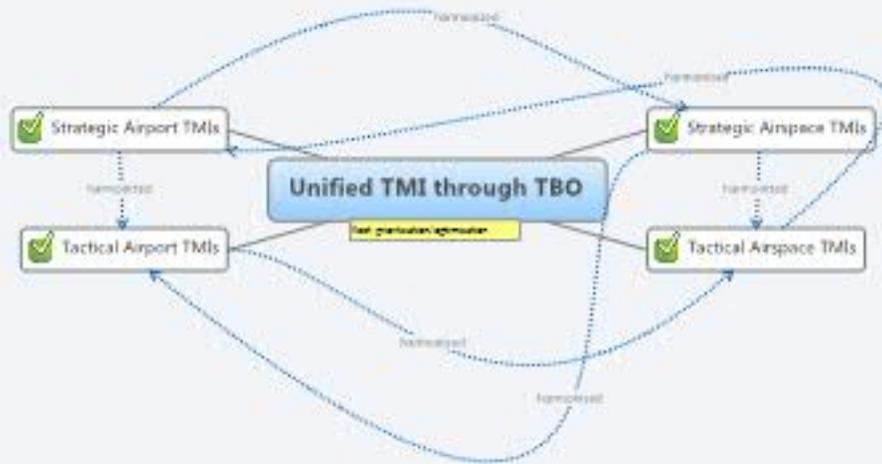
Rationing: replace the chaotic TMI universe



TMIs and Fleet Decision-Making: prioritization and/or swaps/trades



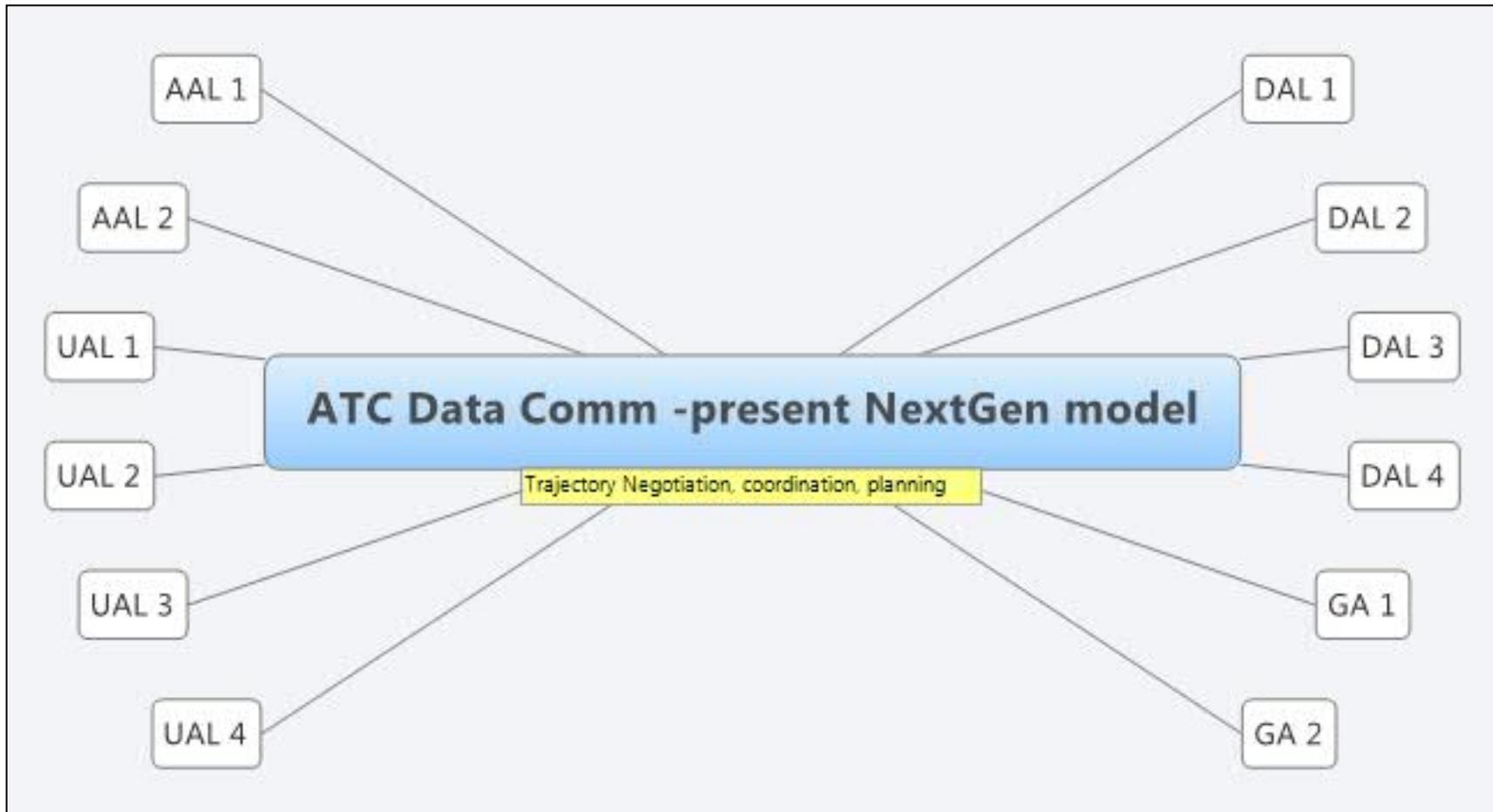
Spatial and Temporal controls are harmonized w/fleet management mechanisms



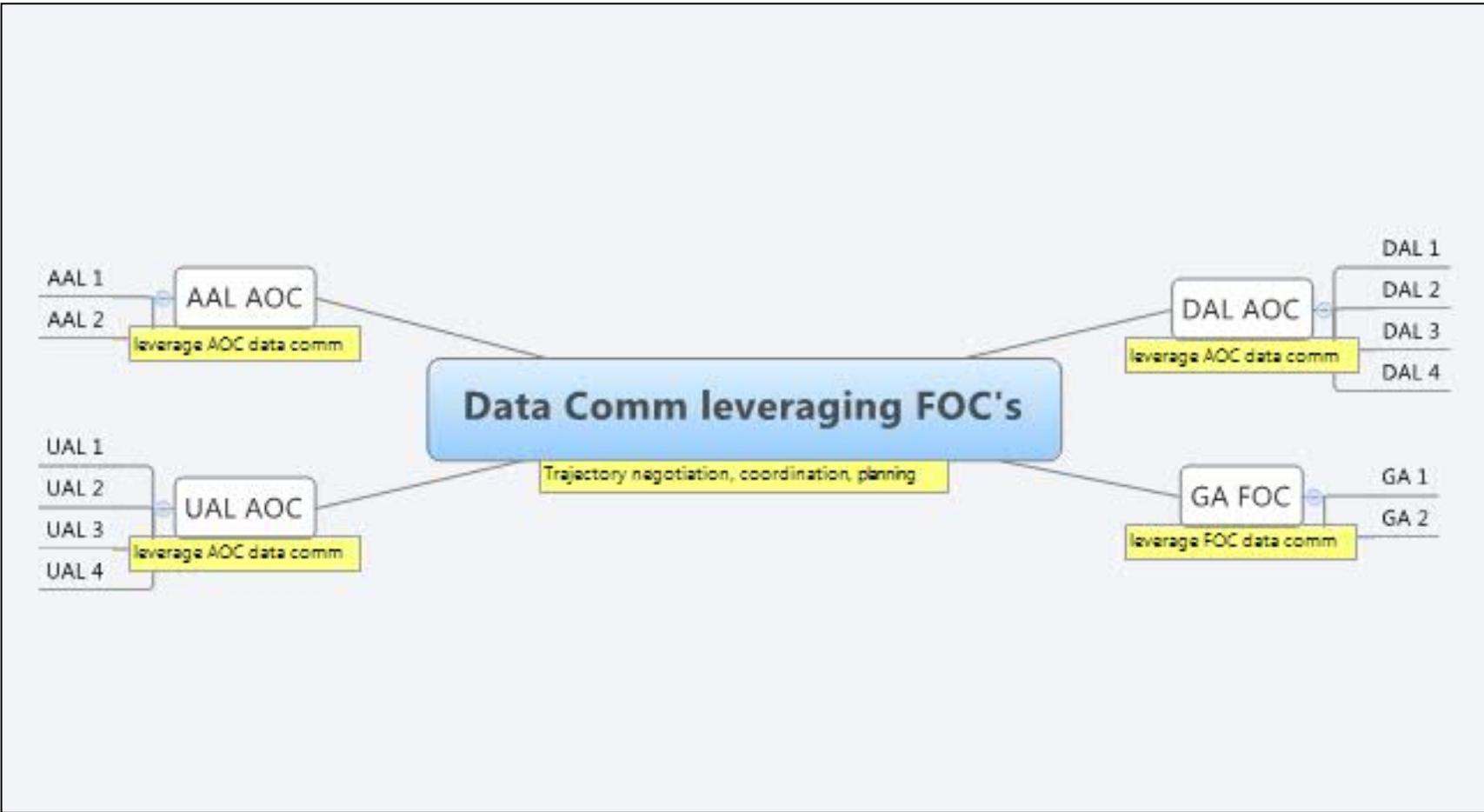
Resource Rationing: takeaway

- **Measure today's TMs**
- **Develop TBO components (tactical operations, strategic planning) to replace today's TMs**
- **Address equity, uncertainty, TMI deconfliction, predictability**
- **Attend to fleet decision-making, not just individual flight trajectories**
 - Flight prioritization
 - Slot swapping/trades

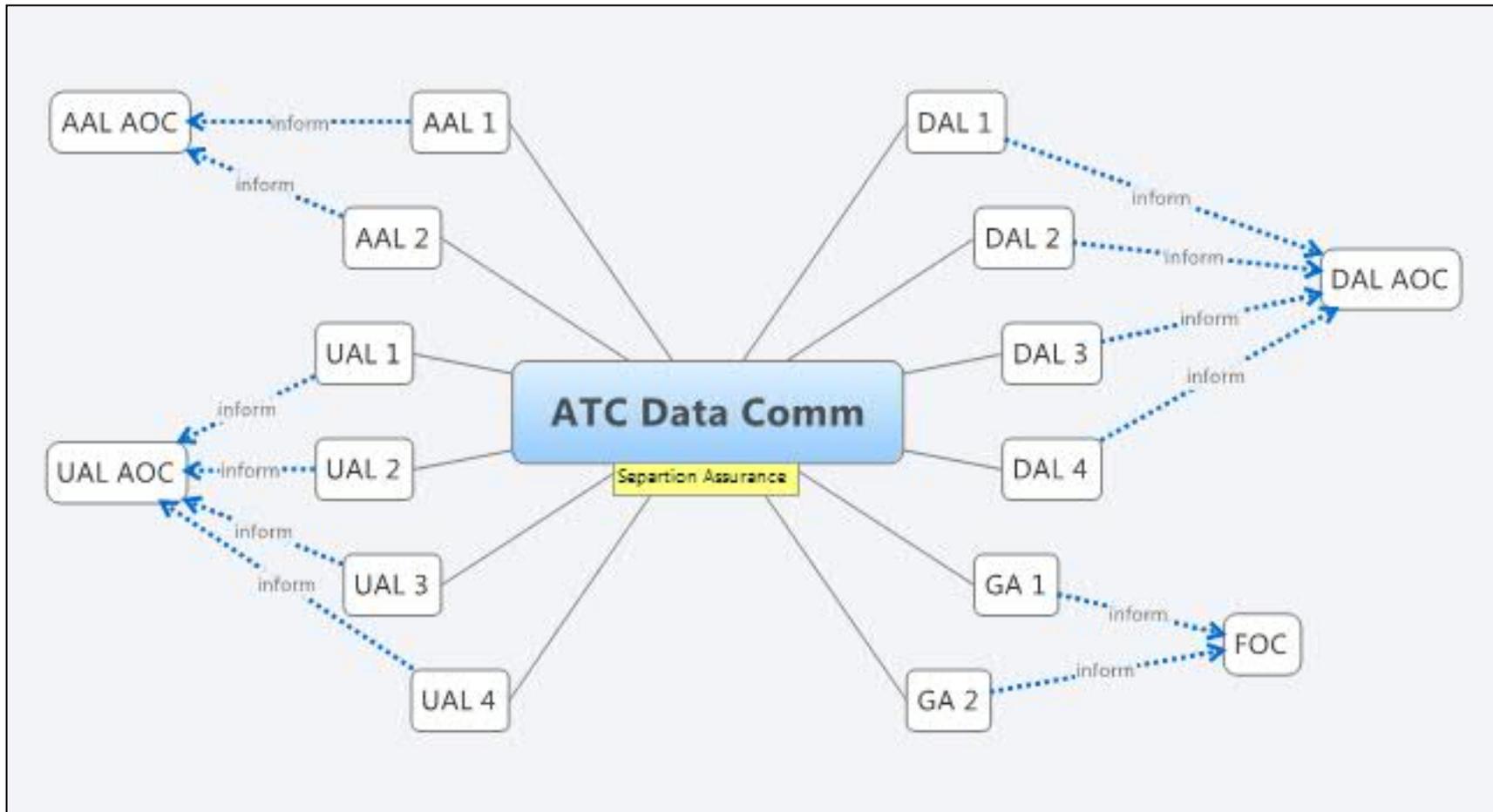
ATC Data Comm -present NextGen model: trajectory negotiation, coordination, planning



Data Comm to FOC's for trajectory negotiation, coordination, planning



ATC Data Comm: Separation Assurance





ADF Data Comm Issues

- **Cockpit information overload**
- **Security of the data being transferred**
- **Freedom of Information Act**
- **Priority of the data being transferred**
- **Will the flow of information change the dispatchers role and control of the flight**

Will the flow of information change the dispatchers role and control of the flight

→ Data Comm message flows

- Should a reroute go to:
 - ATC to Cockpit
 - ATC to FOC then the Cockpit
 - ATC to Cockpit and then the FOC
- Should a security problem go:
 - From the cockpit to ATC and the FOC
 - From the cockpit to the FOC then if necessary to ATC
- Should TMI' s
 - ATC to Cockpit
 - ATC to FOC then the Cockpit
 - ATC to Cockpit and then the FOC

Recommendation 6: Conduct Collaborative Experiments with FOCs

- **Refine and improve current data-sharing processes and data**
- **Develop enabling capabilities for expanded time horizon**
- **Rationing mechanism**
- **Collaborative System Metrics**
- **FOC Trajectory Negotiation in the TBO Environment**
 - The coupling of flight planning and service provider automation (similar to SESAR WP11)
 - Leveraging FOC data comm

Transformation vs Modernization

- **NextGen is not ATC modernization it is ATM transformation**
- **NextGen requires a Complex System approach**
- **Network optimization and management needed for Complex System approach**
 - Only FOCs optimize and manage a network
 - This is not just a flight planning issue – networks need to be managed throughout the lifecycle of the operations