Air Ground Cooperation

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Two Major Areas of Research

- Autonomous operations
  - Aircraft autonomously choose trajectory and resolve conflicts
- Limited self-separation
  - Final approach spacing
  - Sequencing and merging
  - Extension of visual approach operations

Limited Self Separation

- Consensus: these applications are feasible
  - Simulations and analysis reflect reasonable understanding of basic phenomena
  - Some treatment of off-nominal cases
  - Applications seeking implementation opportunities
- Issues raised during discussion
  - Implementation (avionics required)
  - Details of procedures and training required
  - Operational benefits cases
  - Robustness to off-nominal cases (esp. weather)
  - Operational benefit (enough to stimulate equipage?)

Autonomous Operations

- Consensus: Feasibility has yet to be firmly established
  - Research reflects basic operational cases
  - Complex and off-nominal cases not yet covered
- Issues raised during discussion
  - Off-nominal operations
  - Safety
  - Mixed operations

Segregated vs. Mixed Operations

- US papers reflected focus on mixed operations
  - Autonomous and managed aircraft within same airspace
- European papers reflected segregated airspace
  - Autonomous operations in separate airspace
- Does this reflect a fundamental difference in approach to the problem?

Fundamental Question

- What is the correct mix of air and ground automation?
  - Research efforts must provide information to allow a system engineering assessment
    - Treatment of off-nominal cases
    - Safety analysis
- JPDO process needs this information to formulate vision with appropriate technical underpinning
- Recommendation
  - Examine the results of the recent NASA DAG-TM simulation to determine lessons learned and shape future experiments to answer the question