Air Ground Cooperation

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Scope

This track covered:

- ground/air sharing and limited delegation of separation responsibility including station keeping applications
- autonomous operations including transition issues
- cockpit issues and CDTI requirements
- real-life trials of ADS-B applications
- tactical algorithms for airborne separation
- use of integrated FMS (RNAV) arrival routing

Background

- the requirement for a (radical) new approach to ATC is as strong as ever
- new ways of thinking were triggered by
  - the ‘free-flight’ paradigm (RTCA 1995)
  - the potential of ADS-B-type technologies
  - ...
- R&D was/is tasked to produce clear results (cost-benefit, safety etc.)



The papers (1)

- 11 papers: 7 US, 3 Europe, 1 shared
  - Airborne Use of Traffic Intent Information in a Distributed Air-Ground Traffic Management Concept. David Wing
  - Shared Separation: Empirical Results and Theoretical Implications. Karen Buondonno, Rose Ashford
  - Delegating Upstream: Mapping where it happens. Eric Hoffman
  - Transition between Free-Flight and Managed Airspace. Collin Beers (Job Bruggen)
  - Tactical Conflict Detection and Resolution in 3-D Airspace. Cesar Muñoz


4TH USA / Europe
Air Traffic Management
R&D Seminar
ATM2001

The papers (2)

- Flight Deck Simulations of Station Keeping. Michael Agelii (Billy Josefsson)
- Cargo Airline Association & Safe Flight 21 Operational Evaluation 2. Baltazar Olmos
- Analysis of an Approach Spacing Application. Ganghuai Wang
- Two Studies of Paired Approaches. Amy Pritchett
- Simulation of CTAS/FMS Air Traffic Management. Todd Callantine, Thomas Prevot
- System Performance Characteristics of Centralised and Decentralised Air Traffic Separation Strategies. Karl Bilimoria

Issues (1)

- positive benefits from traffic situational awareness
  - based on flight trials (e.g. SafeFlight 21)
- limited delegation (spacing) appears promising
  - real-time simulations have shown potential for benefits
  - controller and pilot acceptability positive
  - time-based spacing appears a better prospect than distance-based
  - quantitative data is being generated

Issues (2)

- better understanding of 'autonomous operations'
  - difficulties with mixed aircraft populations
    - controller acceptance - continues to monitor all aircraft (increase in workload)
    - discrepancy in ground and air pictures
- fast-time simulation models have started to produce results
- real-time simulations require more serious attention to be given to training if useful results are to be obtained
- the expression 'free-flight' is proving ambiguous and unhelpful

Requirements for future work

- safety is still a major issue, and must be urgently addressed (analyses, separation standards, safety nets ...)
- understanding mixed and/or segregated traffic
- ground-based support for AGC applications
- issues of transition to new operations
- still no compelling business/benefits case
- should make greater use of model-based simulation - large r-t, real life testing is expensive, inflexible

(+ requirements for intent data, roles of controller, pilot…)

IFATCA on the transfer of control to the cockpit:

"There can be no doubt the transfer of control functions to the cockpit will continue to develop over time and may well have a significant impact on the way controllers and pilots do their job in the future ..."

"… at this time the concept is at a level of immaturity that warrants further examination and discussion…