Agent, Adaptive self-Governed aerial Ecosystem by Negotiated Traffic

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AGENT Objective:
To define a tool aimed to perform a flight efficient, safe collaborative and supervised separation management, operationally integrated to trajectory management and collision avoidance.

A proactive SM management including:
• Multi-agent task allocation.
• “Separator’s” function will be performed by the ATC.
• A/Cs involved will have an active role in the decision making process.
• Monitored and supported by ground ATC and SWIM.
Problem Addressed (1)

Automation

Analysis of Existing ATM System

Academic Research

Analysis of Existing ATM System
Problem Addressed (2)

European ATM Roadmap

CM-0806-B — Improved Compatibility between STCA and ACAS in a Step 2 environment
ACAS and STCA are and need to stay independent at functional level. There is however a need for better procedures in order to avoid inconsistent collision detection and solution. Also, information sharing is to be considered cautiously to avoid common mode of failure.

CM-0806-C — Improved Compatibility between Ground and Airborne Safety Nets in a Step 3 environment
Ground and Airborne Safety nets are and need to stay independent at functional level. There is however a need for better procedures in order to avoid inconsistent collision detection and solution. Uplink of alerts generated by ground safety nets is an option. Also, information sharing is to be considered cautiously to avoid common mode of failure.

ER APP ATC 137 — Enhance Safety Nets to use ADS-B information
Upgrade En-route and Approach safety-net functionality to accept additional information from ADS-B and to implement additional rules for its use to: a. provide additional conflict warnings; and b. reduce false conflict warnings. However, the independence of STCA and ACAS is to be maintained.
Solution proposed to facilitate human-automation integration problem (1)

AGENT envisaged active and passive surveillance framework
Solution proposed to facilitate human-automation integration problem (2)

Key Ideas for the Separation Management function:

1. Cluster detection, tracking and resolution have to be managed based on complexity criteria.
2. Seamless transition between two contiguous management levels is from the operational point of view for the aircraft, by providing coherent resolution actions.
3. Aircraft are part of the decision making process, until a deadlock state is reached.
4. Therefore, two type of solutions:
   1. Negotiated resolutions, aiming at a balance between efficiency, capacity and safety of the system.
   2. Mandatory resolutions, aiming at reducing to a maximum the complexity of the scenario.
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Thank you very much for your attention!

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