



Cooperative Aircraft Trajectories Planning

Romarc Breil, Laurent Lapasset

► **To cite this version:**

Romarc Breil, Laurent Lapasset. Cooperative Aircraft Trajectories Planning. 4th SESAR Innovation Days, Nov 2014, Madrid, Spain. <hal-01131014>

HAL Id: hal-01131014

<https://hal-enac.archives-ouvertes.fr/hal-01131014>

Submitted on 16 Mar 2015

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

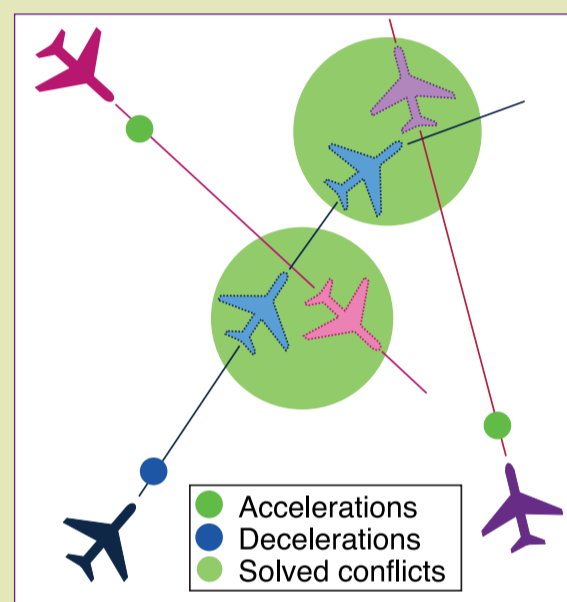
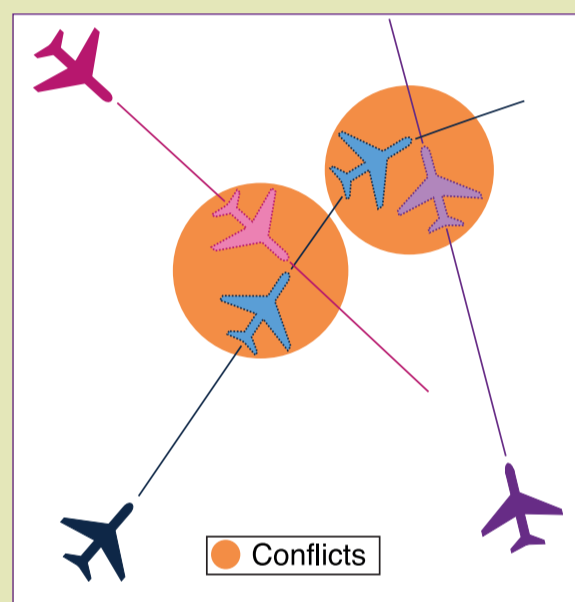
Cooperative Aircraft Trajectory Planning

Multi-agent system

- Resilient, fast and scalable method for problem solving
- Composed of agents (aircraft) cooperating to elaborate their trajectories
- Decisions are taken **by each aircraft**, based on knowledge of its **local environment**

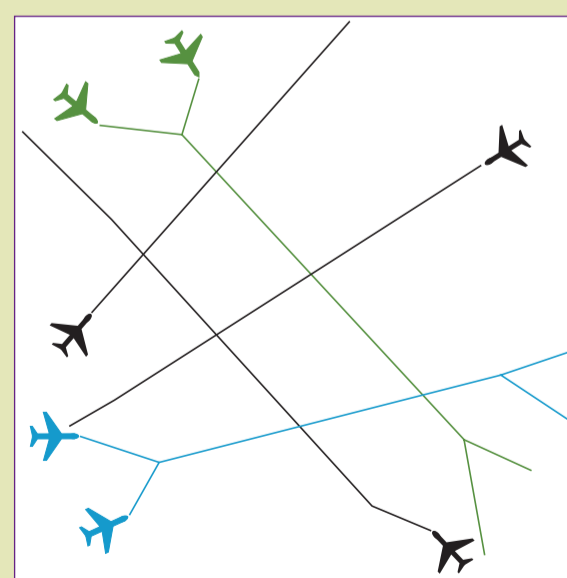
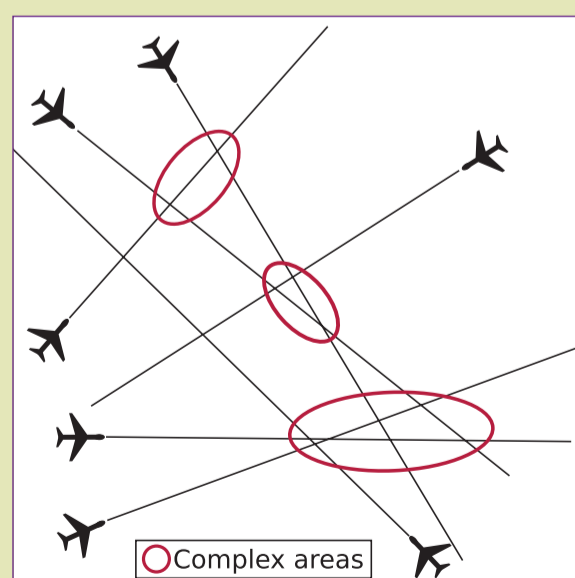
Conflict avoidance by speed regulation

- Aircraft sends messages containing their estimated trajectories
- Each aircraft selects optimal speed changes based on this shared knowledge
- Speeds are selected within $[-6\%, +3\%]$ of its optimal speed



Macro-structuration of air traffic

- The system reduces traffic complexity by structuring trajectories into flows
- A local network of routes is generated **on demand**



Contacts

Romarc Breil - PhD Student - romarc.breil@capgemini.com - Laurent Lapasset - R&D Manager - laurent.lapasset@capgemini.com