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## Cooperative air traffic structuring

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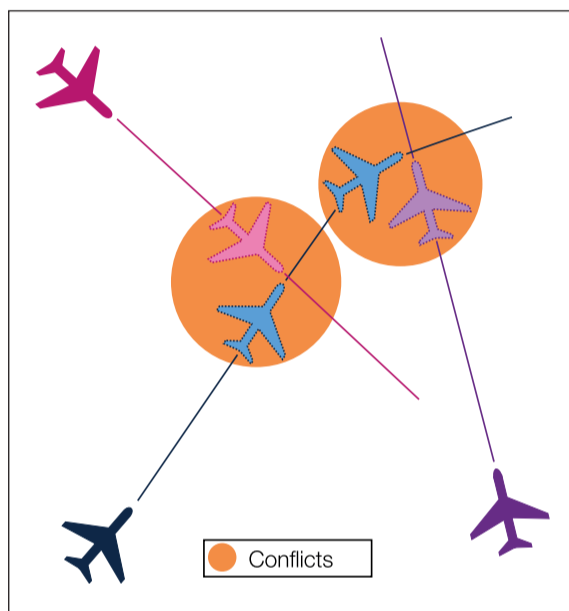
# Cooperative Air Traffic Structuring

## Multi-Agent System

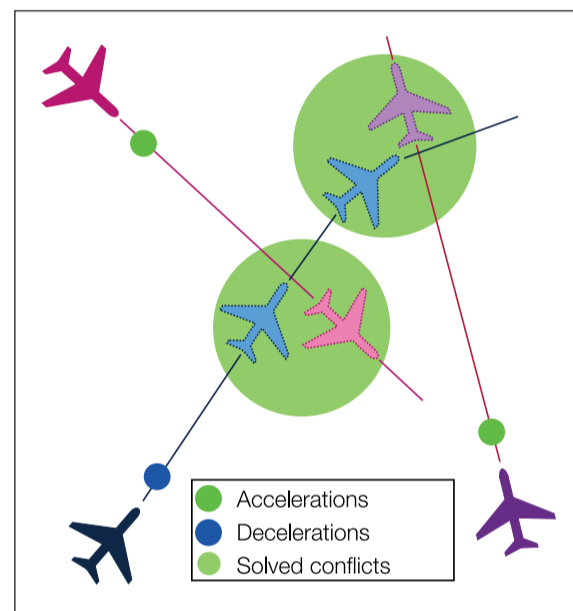
- Resilient, fast and scalable method for problem solving
- Composed of agents (aircraft) **cooperating** to elaborate their trajectories
- Decisions taken **by each aircraft**, based on knowledge of its **local environment**

### Conflict Avoidance by Speed Regulation

- Aircraft send 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



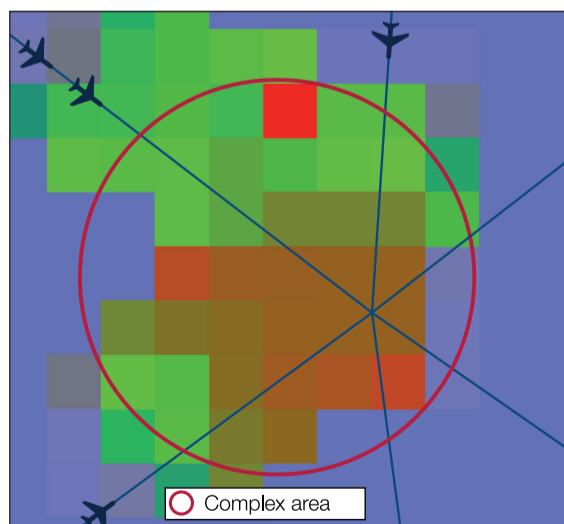
*Without regulation, conflicts occur*



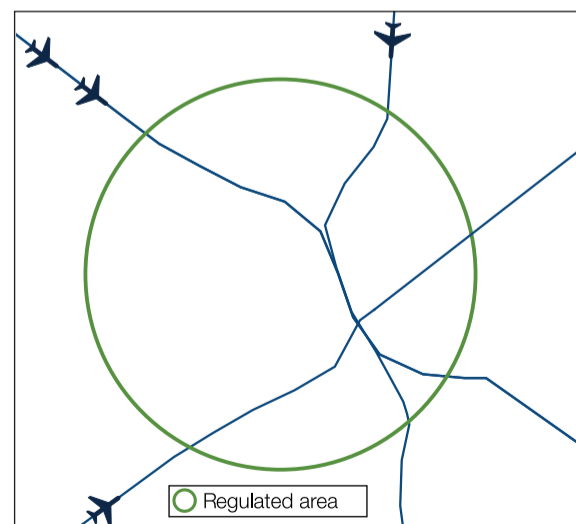
*With speed regulation, conflicts are solved*

### Macro-Structuring of Air Traffic

- The system reduces traffic complexity by structuring trajectories into flows
- The traffic complexity is **monitored in real time**
- The route network is **dynamically adapted** to fit the traffic complexity



*Unstructured traffic*



*Structured traffic*