Universidad Complutense de Madrid

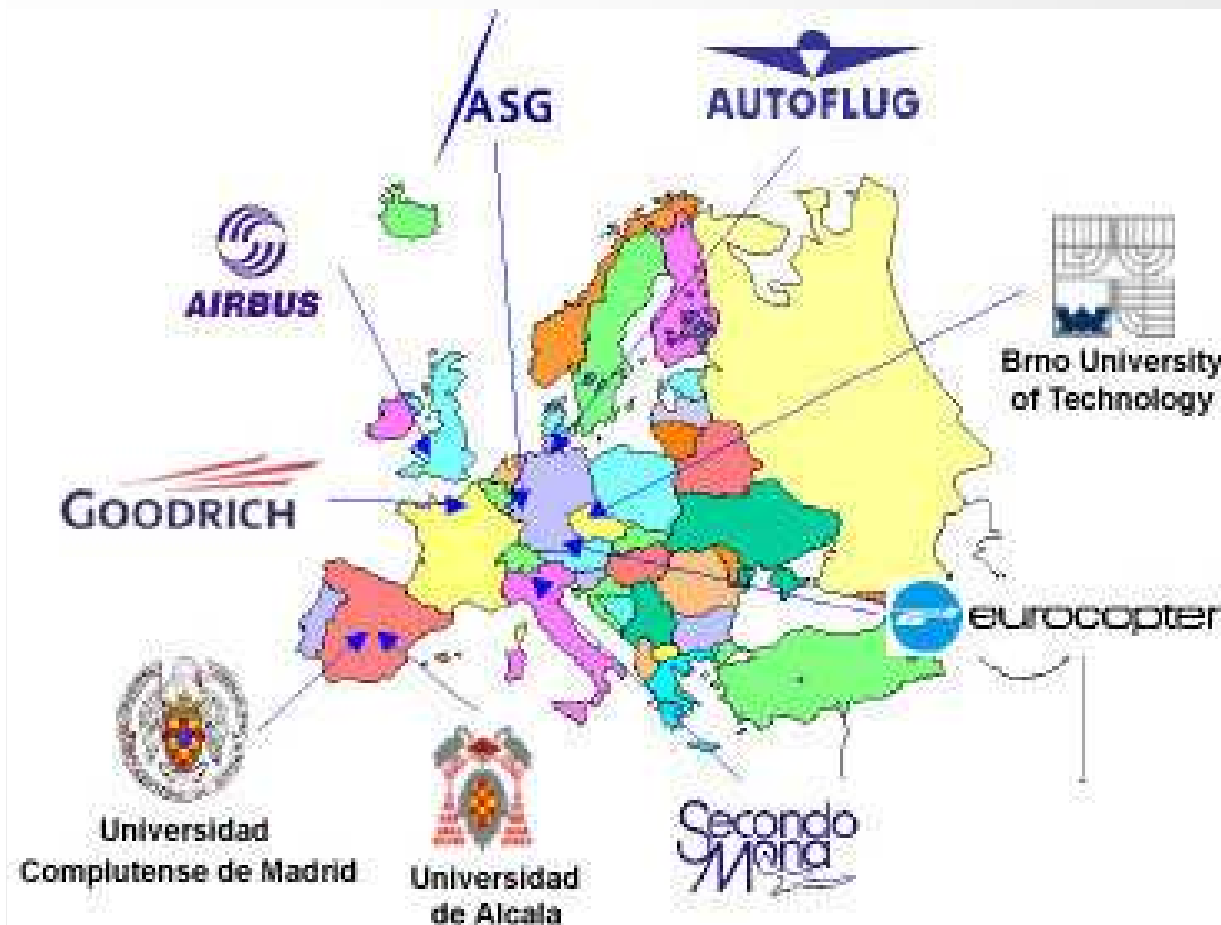# **Automatic reconfiguration in distributed avionic fuel system control**

José María Girón-Sierra

Juan Fran. Jiménez
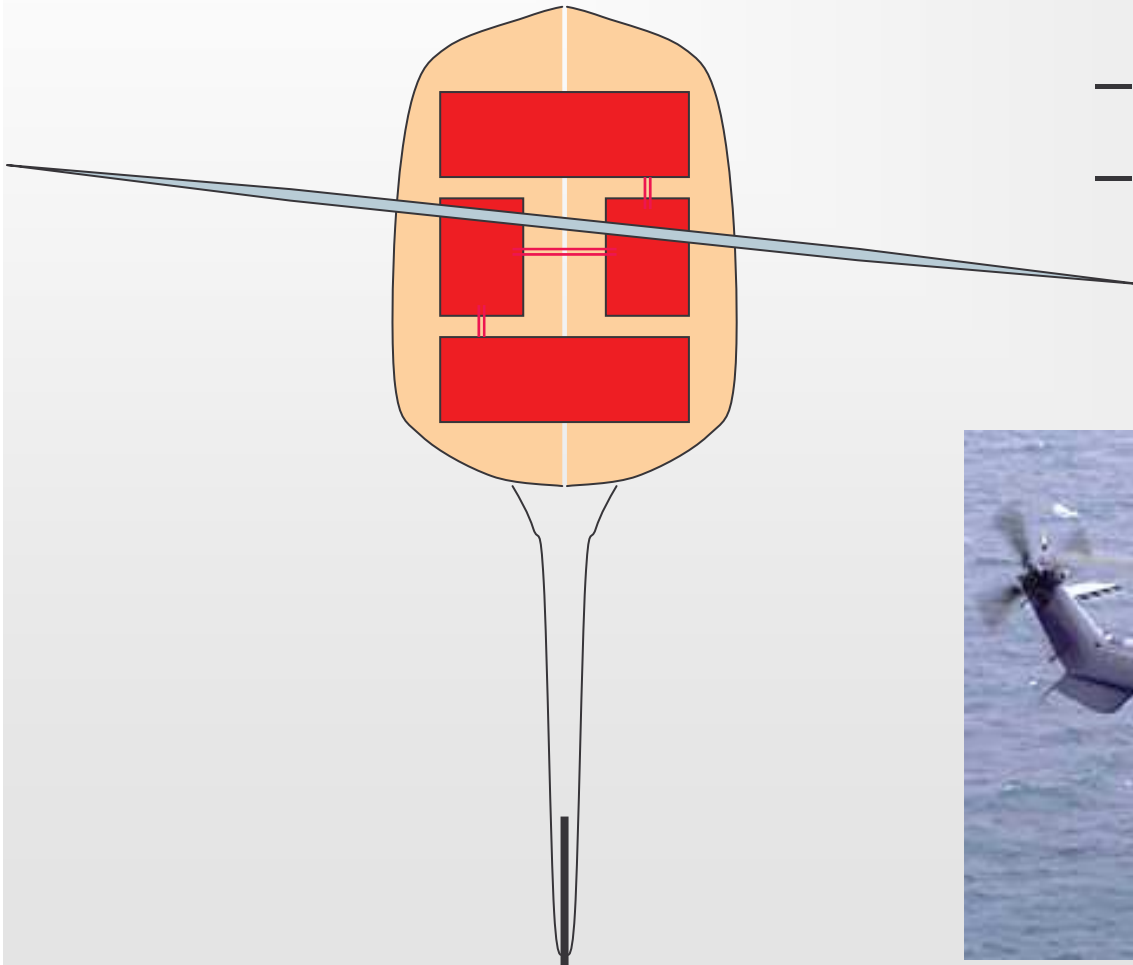
Carlos Insaurralde

Miguel Seminario

Context

- European Project SmartFuel
- A new distributed aircraft fuel system
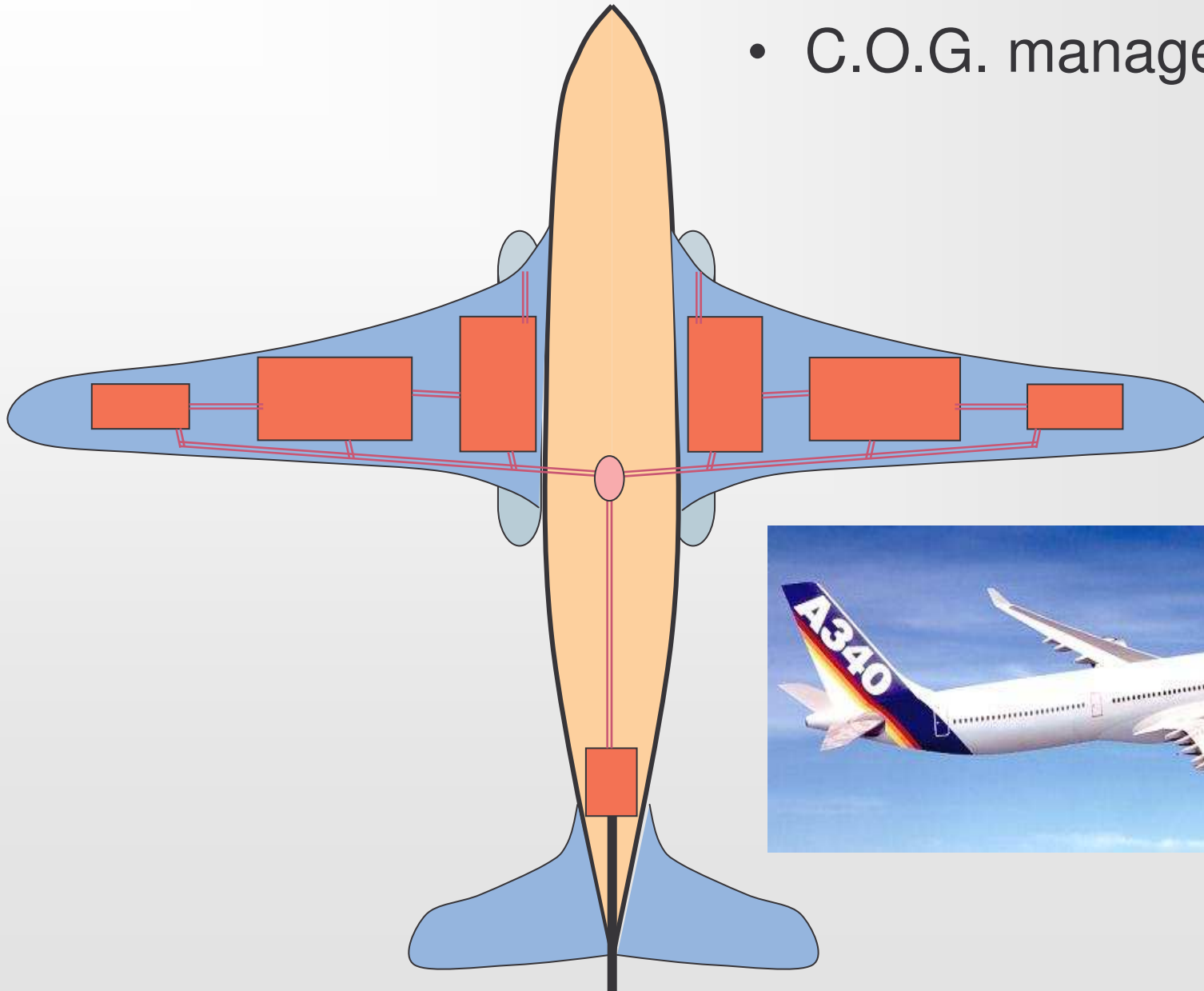- Smart components
- Reconfiguration capabilities

Helicopter Fuel System

- Refueling
- Engine supply
- Balancing

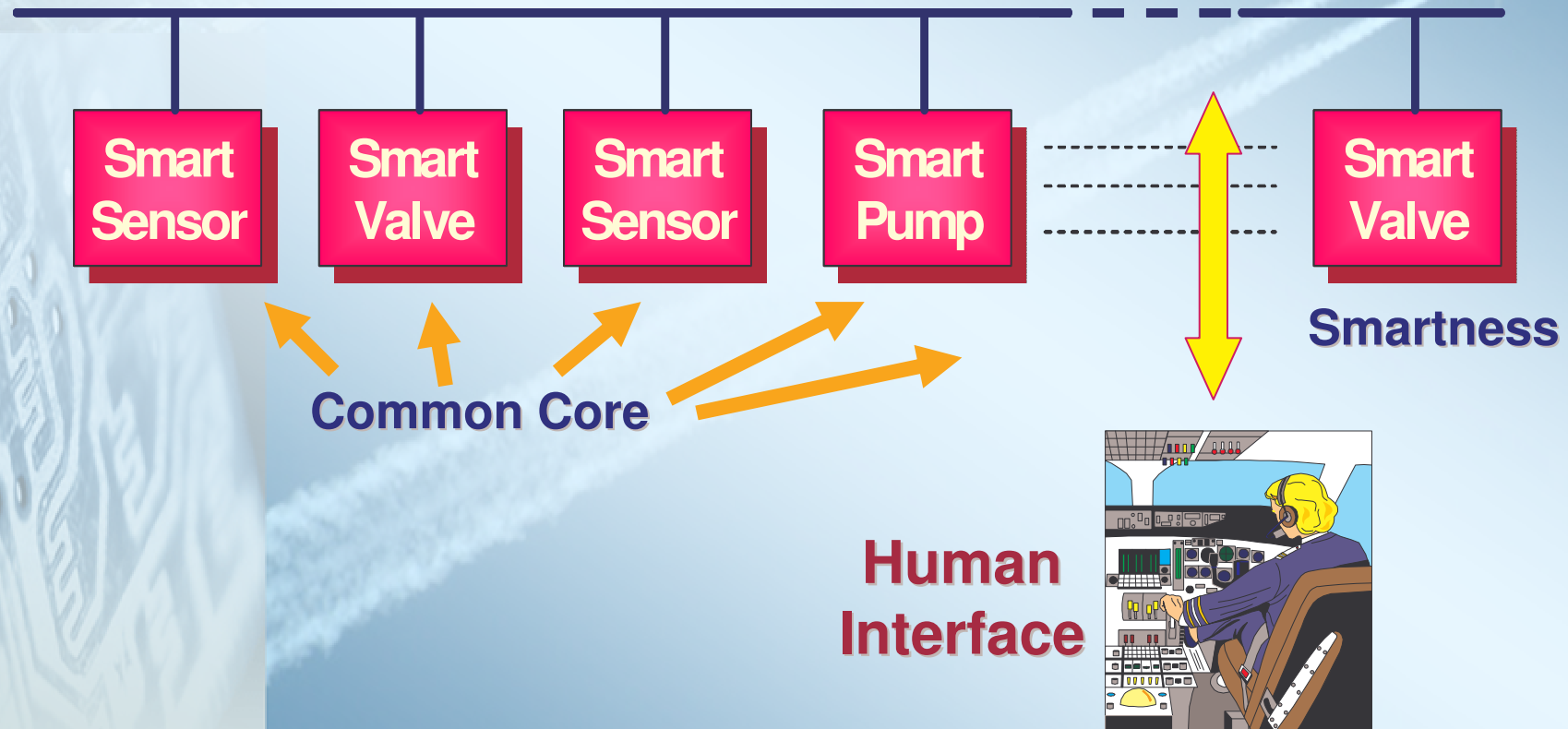# Airplane Fuel System

- C.O.G. management
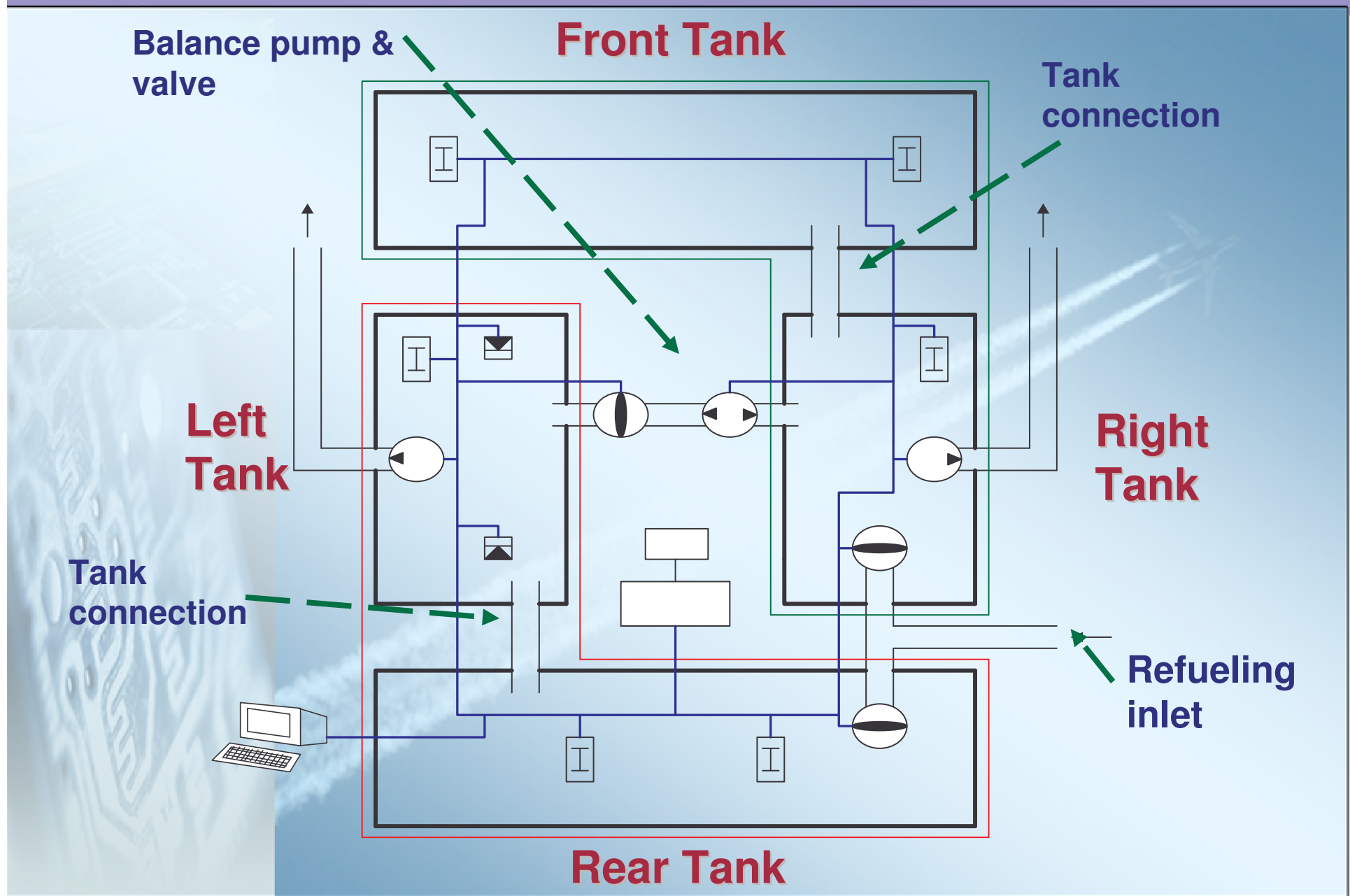
Aspects of the Develoment

State-Vector
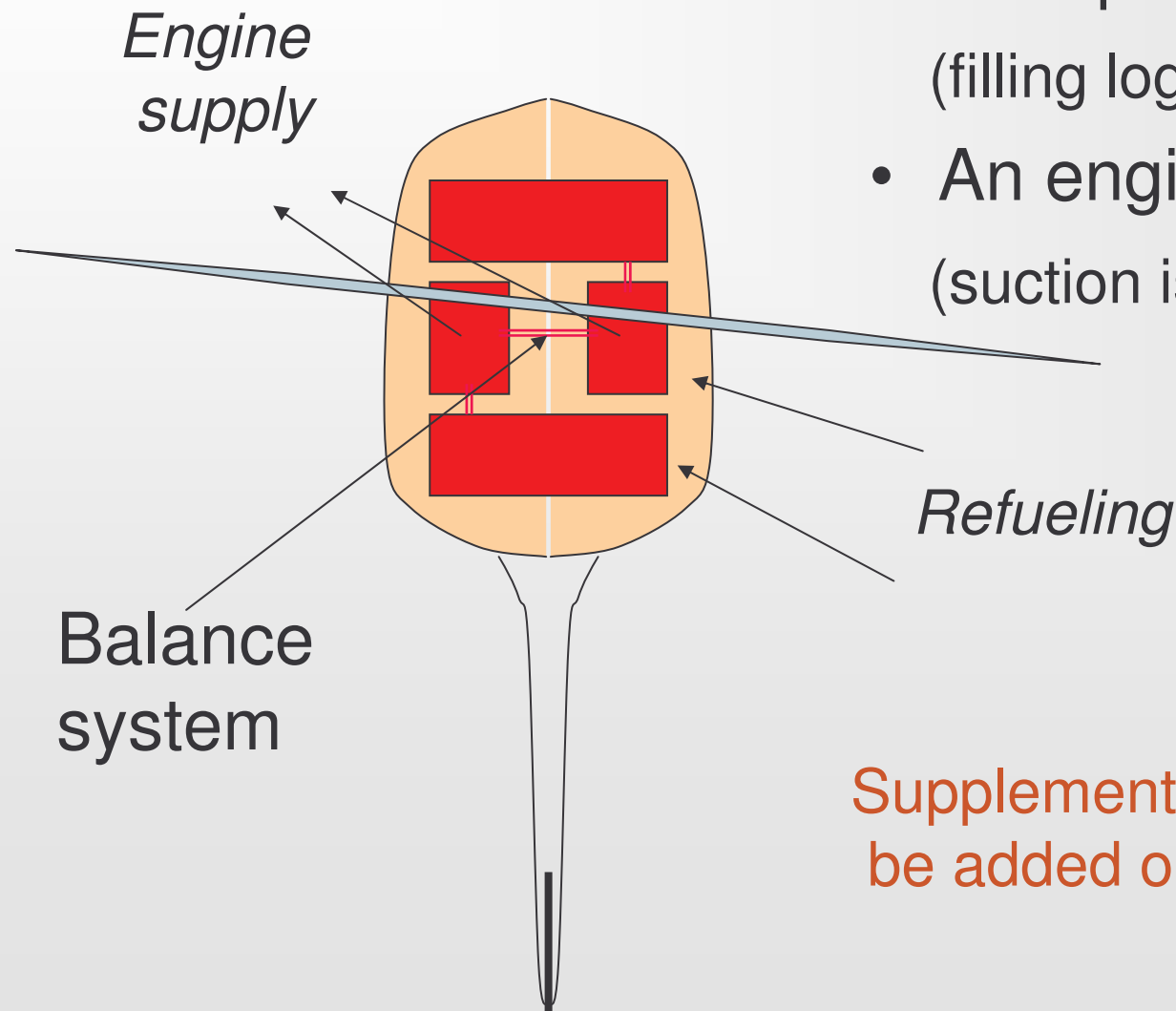
Communication Protocol

CANbus technology

Smart Sensor	Smart Valve	Smart Sensor	Smart Pump	Smart Valve

Smartness

Common Core

Human Interface

Helicopter FMS Detail

Balance pump & valve

Front Tank

Tank connection

Left Tank

Right Tank

Tank connection

Refueling inlet

Rear Tank

F

Lab. Physical Simulator (Heli)

Lab. Physical Simulator (Plane)

Helicopter FMS Reconfigurations

Engine supply

Balance system
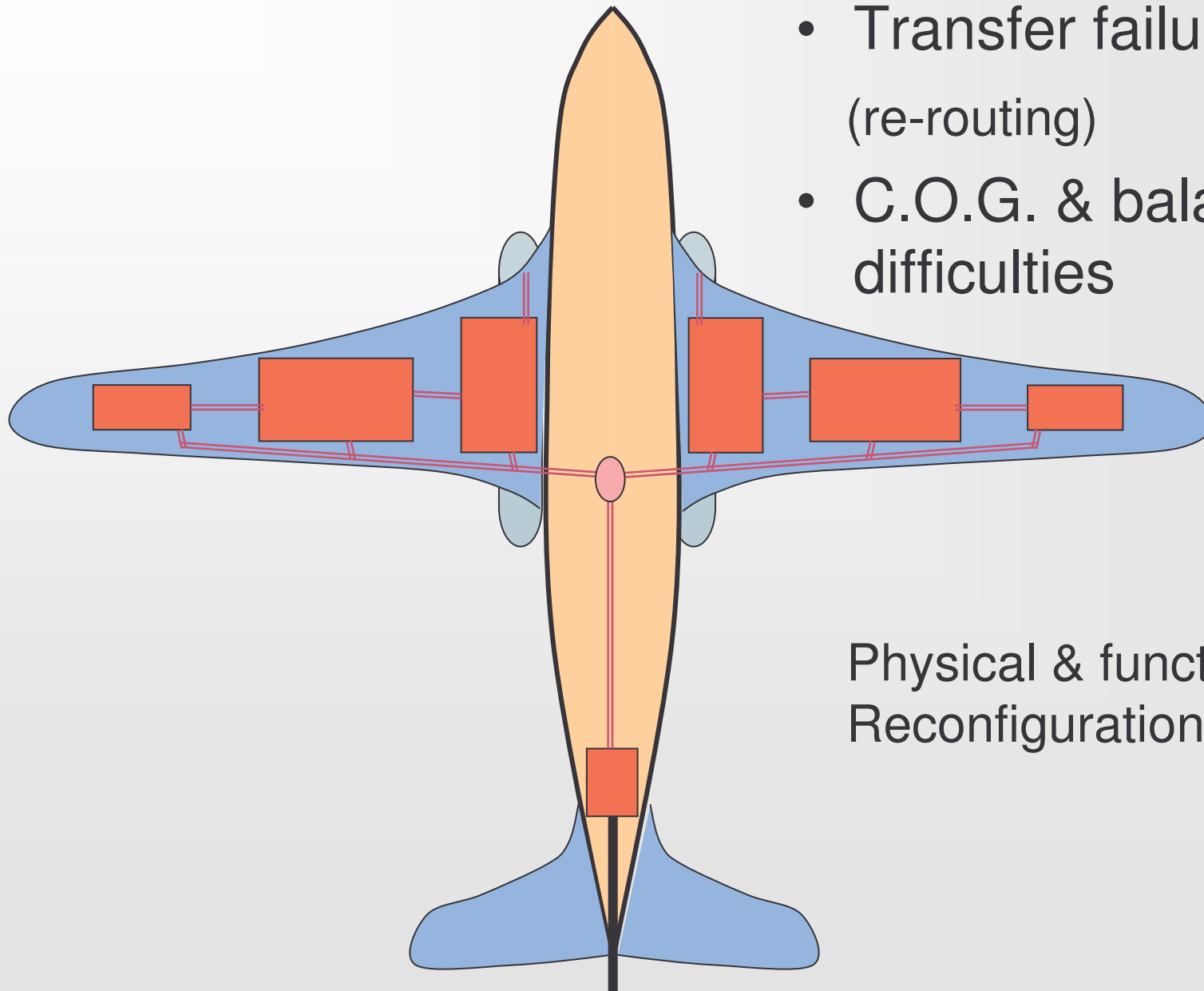
Refueling

- A refueling valve does not open

  (filling logic change)

- An engine pump fails

  (suction is promoted)

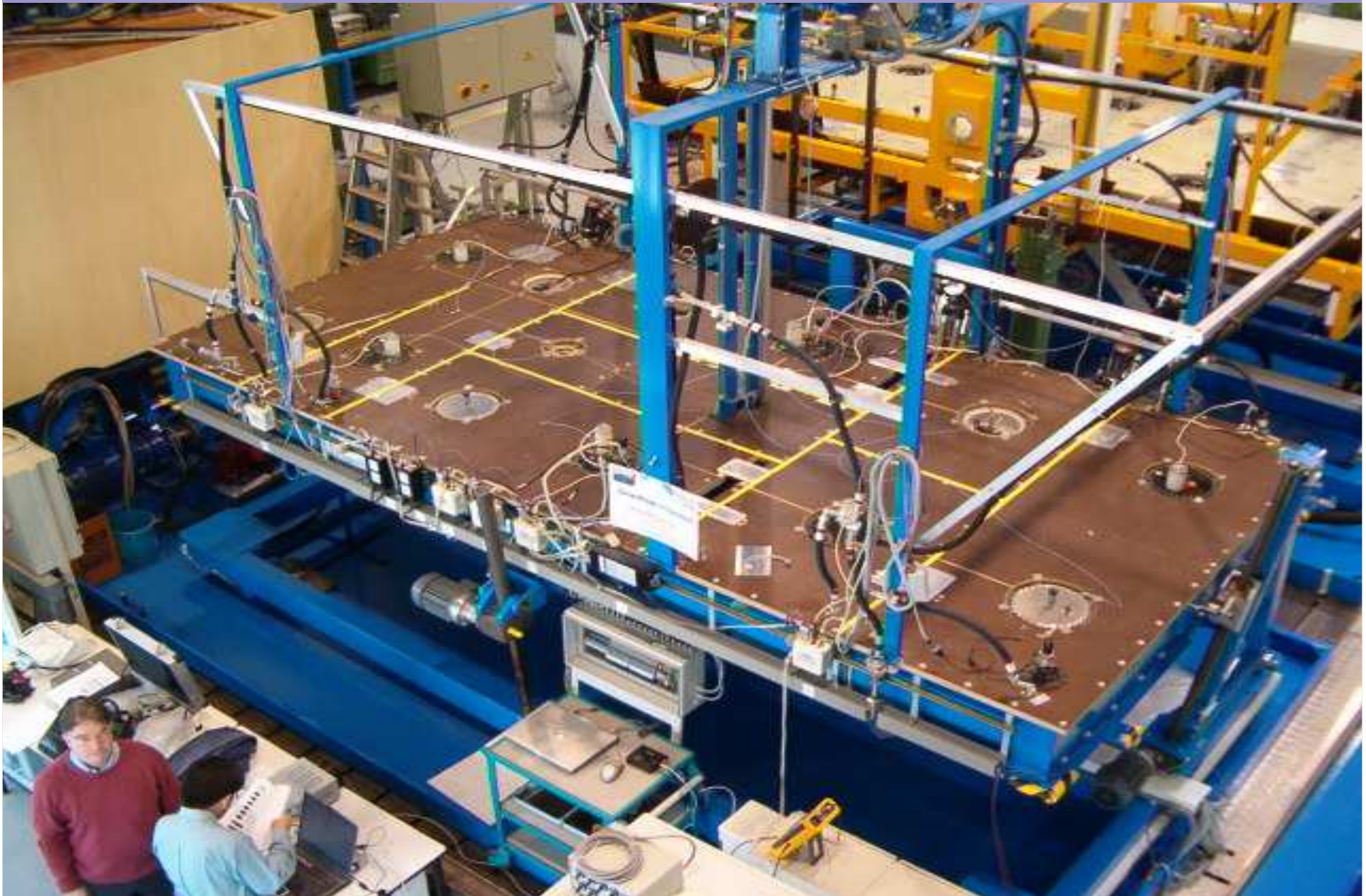Supplementary tanks could be added on the field

Airplane FMS Reconfigurations

- Transfer failures

  (re-routing)

- C.O.G. & balance difficulties

Physical & functional
Reconfigurations (80 cases)

Experimental rig (helicopter)

Experimental Rig (helicopter)