Avionics
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Next Generation of Autonomous Flight Technologies

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What is an *Unmanned Aircraft System* (UAS)?

Aircraft (h/w, s/w)

Ground Control Stattion

People

Communications

Sensors

Ground Support Equipment

And what is included in the *System*?

Sensor Inputs:
- GPS
- INS
- Air Data

Flight Control System (FCS)

GNS Outputs:
- Attitude control (servos)
- Throttle control
- Systems control

Navigation Inputs:
- Operator Commands
- Autonomous Algorithms

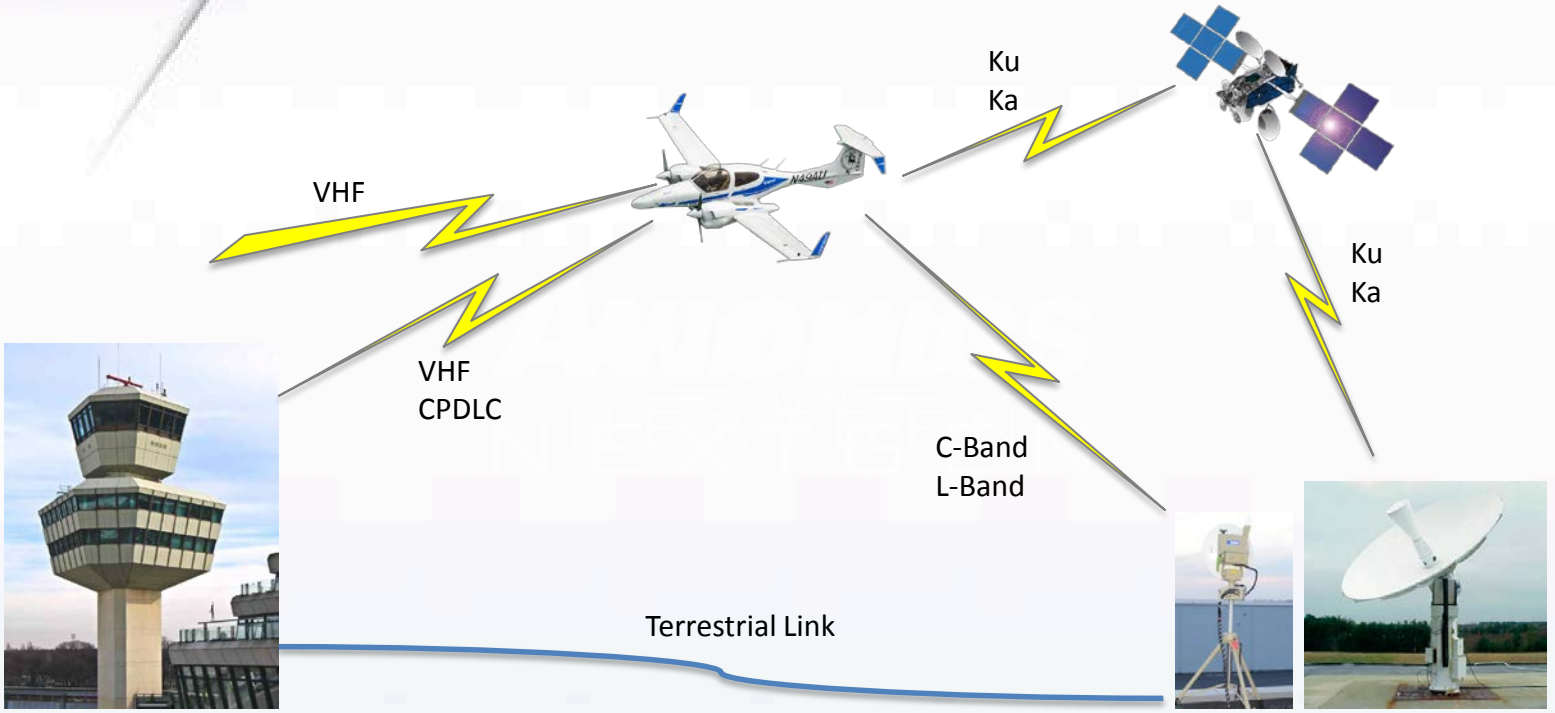
Onboard Avionics – Guidance, Navigation and Control

Vehicle Specific Module (VSM)
defines aircraft parameters
for command/control

STANAG 4586
Standard Interface for UAV to GCS

Primary operator interface:
Mission planning
High-level or remote pilotage
Systems management
Sensor operation
Contingency planning

Ground Control Station



Communications

Cooperative Traffic

- TCAS / ACAS-Xu
- ADS-B
- ATC (Class A)

Non-Cooperative Traffic

- Onboard DAA (e.g. radar)
- Ground-Based DAA / surface radar

Detect and Avoid System

TSO-C211 (DAA Systems); TSO-C212 (Air-to-air radar for traffic surveillance)

Traffic Identification
Avoidance Maneuvers

14 CFR 91.113(a): vigilance shall be maintained by each person operating an aircraft so as to see and avoid other aircraft

Communications

- TSO Development
- Validation of existing technology

Detect and Avoid

- Continued testing in operational environment
- Development of compliant products

Ground Control Station

- Alignment with NAS procedures

RTCA – Standards development

NASA – UAS in the NAS project – technology development/evaluation & procedures development

FAA – Research, policy and regulations

Industry – Research; product development & implementation

What's Next?