HAD506 - Vertical Take Off and Landing Drone
From the MS HADA (Helicopter, Aircraft and Drone Architecture)

Key elements
Period: April
Estimated duration: 30 hours
For whom: recent graduates, jobseekers and experienced employees
Location: AIRBUS HELICOPTERS, Marignane
Language: English

Highlights
- Vertical Take-off and landing UAVs
- Systems of systems as applied to drones
- Special cases: urban UAVs, shipboard landing

This module provides a thorough introduction to VTOL drones, autonomy levels, navigation in hostile environment, communication performance and shipdeck landing.

Learning objectives
After completing this course, participants will be able to:
- Analyze a full Unmanned Aerial System (UAS) in response to technical requirements;
- Understand the specificities of military and civil architectures;
- Know what an artificial-intelligence based autonomous architecture is.

Prerequisites
- Basic knowledge in Aeronautics
- System design knowledge

Information and registration
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Course content

- Introduction to VTOL Drones + Market breakdown
- Main stakes/ competitors and Missions Descriptions
- Aerial Segment & Ground Segment
- Autonomy concepts (LOS, BLOS, BVLOS)
- Air Traffic Management, Air Traffic insertion
- MUM-T description (LOI definition)

Main Functions for VTOL Drone

- Navigation function and Localization functions
- Communication functions and Datalink functions
- Cyber-Security constraints to Communication
- Optionally Piloted Vehicle (OPV)

Architecture principles and System of Systems

- System de Systems application to VTOL drones
- Safety principles and Safety Architecture
- “Autonomie“ function & complex architectures
- Deep learning application for drone
- Machine learning for Aircraft failure management

VTOL Missions

- EI/IR, Radar sensor from military application
- Automatic Take-Off and Landing functions (ATOL)
- Vehicle VMS function (Air to Ground, HMI, …)
- Automatic Start-up and Shut-down

Teaching methods

<table>
<thead>
<tr>
<th>Teaching methods</th>
<th>Yes</th>
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<tbody>
<tr>
<td>Lectures / tutorial</td>
<td>X</td>
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<tr>
<td>Collaborative learning</td>
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<td>Flipped classroom</td>
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<td>Blended learning (online and face to face)</td>
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<td>Learning by doing</td>
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<td>Simulation</td>
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<td>Case study</td>
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Assessment

- Oral exam