**IDP /Master Thesis**

**Design and Implementation of a Deployment Model and Data Pipeline for ADS-B Data Processing**

**Background:**
The Institute for Flight System Dynamics (FSD) operates an ADS-B Antenna, which receives broadcasted data from aircraft (a/c); see Figure 1 and Figure 3. We use an [open-source ADS-B decoder](#) to decode the received radio signals.

To make our ADS-B data accessible for batch and real-time analyses regarding Munich Airport (EDDM), we need a deployment model and data pipeline to be designed and implemented on the FSD's cluster computer.

**Task Description:**
From a previous [EU-Project SafeOPS](#), we have a data pipeline built for ADS-B data, retrieved as batch data from external providers. With our ADS-B antenna installed, we would like to develop the investigated use case further toward online risk assessment. Therefore, the following work packages are identified as next steps:

WP1: **Familiarize with ADS-B Data**, [ADS-B decoder software](#), and possible deployment models (data warehouse/data lake/lambda/delta architecture...).

WP2: Design a deployment model suitable for the needs of the use case and the provided resources of our cluster. Also, deploying additional data (e.g. weather → [METAR, DWD API](#)) should be considered.

WP3: Implementation of the data deployment on the cluster

WP4: Implementation of a data pipeline on the cluster

WP5: Documentation

**Required Profile of Qualifications & Interests:**
- General interest in aviation and data science
- Basic knowledge of Docker
- Basic knowledge of Linux OS
- Proficient Coding Skills in Matlab or Python; JS and C basics would be beneficial.

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**Figure 1:** FSD ADS-B Antenna Range

**Figure 2:** A/C Tracks from 03.11. recorded by FSD's Antenna at EDDM, showing approach and departure patterns.

**Figure 3:** JSON data, received from our ADS-B Antenna every second.

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08.11.2023
Potential Related Lectures (only IDP):

- **Operational Flight Safety (3 ECTS)** provides fundamental knowledge about today’s methods in risk management of airlines, important safety organizations and aircraft systems aimed for providing safe flight operation.
- In combination with: **Flight Guidance 2 (3 ECTS)** which covers topics like e.g. aviation stakeholders, air traffic management, and meteorology.

OR:

- **Flight Guidance 1 (5 ECTS)**: More in depth content about cockpit instruments, navigation, aviation law than Flight Guidance 2