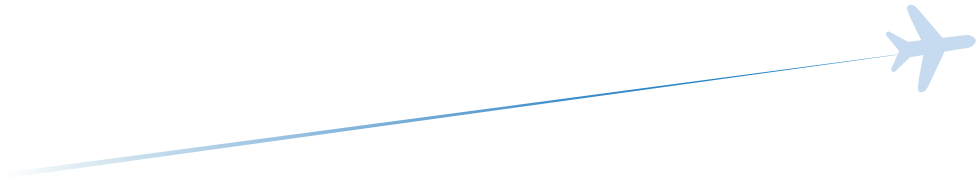

D6.1 Demonstration trials data

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Copyright Statement

Metropolis 2

A UNIFIED APPROACH TO AIRSPACE DESIGN AND SEPARATION MANAGEMENT FOR U-SPACE

This Project Management Plan is part of a project that has received funding from the SESAR Joint Undertaking under grant agreement No 892928 under European Union's Horizon 2020 research and innovation programme.

Abstract

Metropolis 2 will provide the fundamentals for concrete solutions for U-space U3/U4 services that are needed to enable high-density urban aerial operations, with a unified approach to the following U-space services: strategic deconfliction, tactical deconfliction, and dynamic capacity management. Thus far, U-space efforts have focused on developing a set of baseline services (i.e., U1 and U2 capabilities enabling services such as identification, flight planning, and tracking). When deployed, these services will enable low traffic density applications such as agricultural surveillance and infrastructure inspection. Urban, high-density operations, however, will require a different approach, and a degree of autonomy that does not yet exist in current-day air traffic management. First, in order to sustain high traffic demands, the urban airspace must be able to allow a shared use of airspace, rather than the approach used today of exclusively assigning parts of the airspace to individual flights. Secondly, at the expected extremely high traffic densities, airspace design, flight planning, and separation management become increasingly interdependent. With the traffic densities that are considered for urban applications these interdependencies necessitate a unified approach to all aspects of traffic management that determine how vehicles interact with each other. This project will develop a unified approach to airspace rules on the one hand, and flight planning and separation management approaches on the other hand. It will build upon the results of the current U-space projects, the first Metropolis project, and established separation algorithms. Several concepts, differing in how separation is performed (strategic/tactical, ground/air) will be compared using simulations, and the most promising concept will be validated in a real-world demonstration. The results of Metropolis 2 will contribute towards enabling safe and efficient U-space operations in urban environments.

Table of Contents

1 Introduction

This report gives an overview of the data package that forms the output of the demonstration trials which were held during the open day of the Metropolis 2 project.

A series of six demonstrations were performed with the use of four real drones to showcase the U-space environment platform integration, strategic vs tactical separation management and the best performing concept.

The data package described in this deliverable D6.1 “Demonstration trials data” will serve a direct input for the deliverable D6.2 “Demonstration report”, in which the data package of the demonstration will be analysed against simulated traffic scenarios.

It is the aim of the Metropolis 2 project to make all technical content, all publications, and all data publicly available. The data package described in this document is made available on the 4TU Research Data repository

Name: Simulation dataset and output data for research project Metropolis 2

Publisher: 4TU.ResearchData

License: CC BY 4.0

DOI: 10.4121/19323263.v4

1.1 Data organisation

The demonstration data is contained in the **Output_demo** folder within the greater M2Data.zip file. Within the Output_demo folder, there are two subfolders containing data recorded from Paparazzi UAV and BlueSky respectively. In the BlueSky folder, the data is organised in function of scenario, each folder being named after the simulated scenario. Finally, within each scenario folder, the log files for both the live and the simulated scenarios can be found (the latter has a _sim suffix in the file name).

1.2 Data format

The BlueSky log data is organised according to the comma-separated values (CSV) format, example of which is presented below. The first value of a row is the time stamp (in this case, 1 second). The first row represents the aircraft IDs, and the following rows represent the altitude (ft), latitude (deg), and longitude (deg) in the same order as the aircraft IDs.

```
1.00000000,D1,D2,D3,D4,D5,D6
1.00000000,30.00000000,50.00000000,30.00000000,30.00000000,30.00000000,30.00000000
1.00000000,52.17205539,52.17194524,52.17178772,52.17202732,52.17231588,52.17190500
1.00000000,4.41734554,4.41805427,4.41722394,4.41724223,4.41774107,4.41692000
```

2 Demonstration data description

The data is organised in three formats, presented below:

- **Paparazzi UAV .data files**
    - Data recorded by the Paparazzi UAV program with time stamps
    - The data is ordered in function of received time, and contains information labelled with the drone ID
- **Paparazzi UAV .log files**
    - Description of the data recorded by the Paparazzi UAV program
    - Used as a guide for .data files
- **BlueSky .log files**:
    - Logs of the time-stamped positions and altitudes of aircraft simulated/logged within BlueSky
    - Data was logged in sets of four rows, showing ACID, altitude, latitude, and longitude
    - Data frequency is 1Hz


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