



DELIVERABLE

D7.5 – Data Management Plan

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Definitions, Acronyms and Abbreviations

Acronym	Title
DMP	Data Management Plan

Executive Summary

This document belongs to WP7 (Exploitation, Training, Dissemination and Standardization) of the **COMP4DRONES** project and describes the Data Management Plan (DMP). It provides the first version of the deliverable. The deliverable of the DMP gives an overview of how data are generated and collected, which standards and methodology for data generation and collection will be followed, what parts of datasets will be shared for verification or reuse and how data will be archived and preserved. The use of a DMP is required for all participating use cases. The purpose of the DMP is to provide a general view of the main elements of the data that will be used in the project. This deliverable is not a fixed document, it is a living document which will be updated over the lifetime of the project. This first version is a general overview of the DMP. All use cases from the project have provided an initial version of their DMPs according to the template structure that has been elaborated. As a result, for the time being, 60 datasets have been identified overall for the complete set. This figure may change in the future, depending on the use cases' progress.

1 Introduction

A DMP is a formal short plan that outlines what data will be generated or collected, how data will be managed (access, storage, backup...), the standards in use, the workflow to make the data accessible for use, reuse and verification and which plans for data sharing and preservation exist ensuring that data are well-managed. In addition, the purpose of this DMP is to help demonstrators to manage the data and help other potential users to use the shared data.

This deliverable outlines the initial DMP, which is in line with the H2020 guidelines for data management plan creation and identifies the initial classes of datasets of the project.

This DMP is not a fixed document and it covers the whole research data life cycle. At this early stage in the project, this document includes an overview of the datasets produced by the project. The description will be enriched in the next phases of the project. So far, all use cases from the project have provided a version of their DMPs according to the template structure that has been elaborated.

2 Guidelines

2.1 DMP General Definition

Data Management Plans (DMPs) are a key element of good data management. A DMP describes the data management life cycle for the data to be collected, processed and/or generated by a Horizon 2020 project. As part of making research data findable, accessible, interoperable and re-usable (FAIR), a DMP should include information on:

- the handling of research data during and after the end of the project
- what data will be collected, processed and/or generated
- which methodology and standards will be applied
- whether data will be shared/made open access and
- how data will be curated and preserved (including after the end of the project).

2.2 Guidelines for the descriptions of DMPs

This section describes the main guidelines that have been provided to demonstrator leaders for the provision of information on the datasets and data management strategies that they foresee for the successful delivery of the demonstrator implementations. Such guidelines have been used to collect the most relevant information at this stage for the generation of this DMP.

Each individual DMP is divided into the following sections:

Dataset Name	Public name of the dataset, this name must be univocal
Description	Concise description of the content of the dataset and, if possible, the purpose
Personal Data	Binary field (Yes/No) that indicates whether the dataset contains personal data or not
License	Terms and conditions under which the dataset is provided to the consortium
Technology	Technology adopted to expose the Data Asset / API
Standards and Metadata	Standards and metadata used to describe the data
Data sharing	Conditions under which data are shared, including how users will be able to access these data
Data volume	Expected volume of dataset
Update frequency	Period of time which the data is updated

Archiving and presentation	How data will be archived, and, if possible, why such option has been chosen.
Ethical aspects	Whether there are any ethical or legal issues than can have an impact on data sharing such as whether consent for data preservation is gained or not, whether the data is protected by database law or copyright, personal data and so on

Table 1. Dataset template

3 Data Management Plan

3.1 UC1 Transport – Demo 1

3.1.1 Context

This demonstrator will use drones as sensors for current transportation monitoring systems. It will integrate Indra’s transportation management solution (HORUS) with its own unmanned aircraft system traffic management (UTM) platform in low-altitude airspace. This demonstrator will be deployed at the Rozas Aerodrome in Lugo (Spain). In addition, this demonstrator will use Indra’s Mantis fixed-wing drone.

The integration of these systems and platforms will generate data exchange between them and incoming and outgoing data flows to and from external agents and stakeholders.

The main data sources that will be used in this demonstrator are related to the status of the road, weather conditions, air traffic management, and airspace status and telemetry and information generated by the drone systems, among others.

3.1.2 Data Sets

Dataset Name	Road Accidents
Description	Road accidents on the influence area of the use case demonstrator
Personal Data	No
License	Public Use
Technology	CSV and/or XLS
Standards and Metadata	None
Data sharing	-
Data volume	-
Update frequency	-
Archiving and presentation	Indra’s infrastructure
Ethical aspects	Access Level: Open No other ethical aspect has been reported

Dataset Name	Traffic events – Road
Description	Traffic events on the road that have an impact on the road traffic, such as roadworks, accidents, traffic congestions, etc.

Personal Data	No
License	Public Information http://infocar.dgt.es/datex2/dgt/
Technology	Web service - DATEX II
Standards and Metadata	None
Data sharing	-
Data volume	-
Update frequency	Real time
Archiving and presentation	Indra's infrastructure
Ethical aspects	Access Level: Open No other ethical aspect has been reported

Dataset Name	Climate Data
Description	National, regional and local weather inputs from the influence area of the pilot test
Personal Data	No
License	Public use
Technology	CSV and/or XLS
Standards and Metadata	None
Data sharing	-
Data volume	-
Update frequency	
Archiving and presentation	Indra's infrastructure
Ethical aspects	Access Level: Open No other ethical aspect has been reported

Dataset Name	Video streaming from Mantis
Description	No
Personal Data	Internal UC1
License	RTP streaming over Ethernet and radiofrequency
Technology	H264 codec
Standards and Metadata	Data can be shared from Ground Data Terminal through an ethernet port for users of the system
Data sharing	4 MB/s
Data volume	On demand / Real time and historical
Update frequency	Indra's infrastructure
Archiving and presentation	Access Level: Closed No other ethical aspect has been reported
Ethical aspects	Video streaming from the drone

Dataset Name	Mantis Telemetry
Description	Mantis Telemetry
Personal Data	Drone telemetry from Mantis
License	No
Technology	Internal UC1
Standards and Metadata	Udp over Ethernet and radiofrequency
Data sharing	None
Data volume	-
Update frequency	1 KB/s
Archiving and presentation	1 second
Ethical aspects	Indra's infrastructure

Dataset Name	Geographic Information Systems (GIS)
Description	System for drone positioning and flight plan management
Personal Data	No
License	Esri arcGIS 9.0
Technology	API owner of the manufacturer
Standards and Metadata	Raster, vector and Digital Elevation Model (DEM)
Data sharing	-
Data volume	-
Update frequency	-
Archiving and presentation	Indra's infrastructure
Ethical aspects	Access Level: Closed No other ethical aspect has been reported

Dataset Name	Pitot-static system
Description	System of pressure-sensitive instruments that issued to determine the drone airspeed
Personal Data	No
License	Included with sensor
Technology	Analog voltage output
Standards and Metadata	-
Data sharing	-
Data volume	-
Update frequency	50 Hz
Archiving and presentation	Indra's infrastructure
Ethical aspects	Access Level: Open No other ethical aspect has been reported

Dataset Name	Altimeter
Description	Single-Element sensor module to detect the distance from drone to ground during landing operation
Personal Data	No
License	Included with sensor
Technology	3.3v UART or RS-485
Standards and Metadata	-
Data sharing	-
Data volume	-
Update frequency	Up to 70 Hz
Archiving and presentation	Indra's infrastructure
Ethical aspects	Access Level: Open No other ethical aspect has been reported

Dataset Name	Inertial Measurement Unit (IMU)
Description	Provide outstanding orientation and position data.
Personal Data	No
License	Included with sensor
Technology	RS-232, Kalman Filter, gyroscopes, accelerometers, magnetometers, pressure sensor and GNSS
Standards and Metadata	GPS, GLONASS, QZSS, BeiDou, SBAS
Data sharing	-
Data volume	4 KB/s
Update frequency	50 Hz
Archiving and presentation	Indra's infrastructure
Ethical aspects	Access Level: Close No other ethical aspect has been reported

Dataset Name	Weather
Description	Current and forecast weather data. Data is available in JSON, XML, or HTML formats. Data can be called by city name, city ID, ZIP code, geographic coordinates, etc.
Personal Data	No
License	Public Use
Technology	API queries, json
Standards and Metadata	Open Weather
Data sharing	-
Data volume	MBs
Update frequency	Per query (max 60 queries per minute)

Archiving and presentation	Indra UTM system
Ethical aspects	Access Level: Open No other ethical aspect has been reported

Dataset Name	Maps
Description	Some services within UTM system utilize maps for drawing or representing traffic, areas, etc.
Personal Data	No
License	Public Use
Technology	API queries
Standards and Metadata	Google Maps
Data sharing	-
Data volume	MBs-
Update frequency	Map representing, each zoom in/out or HMI refresh
Archiving and presentation	Indra UTM system
Ethical aspects	Access Level: Open No other ethical aspect has been reported

Dataset Name	Ground data
Description	Digital Elevation Model (Ground + obstacles) data provider. It gives us a set of height-referenced pictures of the whole country or specific areas.
Personal Data	No
License	Public Use
Technology	.png images with height reference (lidar)
Standards and Metadata	IGN (Spanish Instituto Geográfico Nacional)
Data sharing	-
Data volume	Depending on the covered area (from hundreds of MBs to tens of GBs)
Update frequency	-
Archiving and presentation	Indra UTM system
Ethical aspects	Access Level: Open No other ethical aspect has been reported

Dataset Name	Spanish Airspace and restricted areas
Description	To query current and future Spanish airspace and restricted areas for a secure drone flights planning. It gives us the ability for providing restricted areas and NOTAM that can affect any

	drone operation. All these areas are displayed in the UTM system HMI.
Personal Data	No
License	-
Technology	Json/GeoJson
Standards and Metadata	Json/GeoJson standards
Data sharing	-
Data volume	MBs
Update frequency	Each time an update is detected in the data source, UTM system is updated
Archiving and presentation	Indra UTM system
Ethical aspects	Access Level: Open No other ethical aspect has been reported

Dataset Name	UTM Registration Service
Description	This service is in charge of maintaining the operator/pilot/drone's databases for the regulator, and other parties, enabling later flight plan filing, approval, structured data-logging and secured access to data. Information present in Registration Service
Personal Data	All data belonging to users (regardless the role)
License	Indra
Technology	C++, Mongoddb
Standards and Metadata	C++, json, API Rest
Data sharing	Via API Rest, some Registration information can be retrieved by other UTM Services and Authorities as well as 3 rd party entities. Roles and permissions are set for a proper information handling
Data volume	-
Update frequency	Each time API (get/post) is called
Archiving and presentation	Indra UTM system
Ethical aspects	Access Level: Restricted. Users and roles are configured for a proper information management. No other ethical aspect has been reported

Dataset Name	UTM Geoawareness & Geofence Management
Description	Airspace Definition & Geofencing (Drone Aeronautical Information Management), defining and maintaining drone-free zones, and coordination information (coordination with ATC, permission request procedure, etc) for the rest of the system and

	disseminating them to operators / drones (with geographic filters). Authorities can manage geofences from 3 rd party systems via API Rest.
Personal Data	-
License	Indra and Spanish geofence providers,
Technology	API Rest
Standards and Metadata	C++, json, GeoJson, API Rest
Data sharing	Via API, all Airspace Definition & Geofencing information
Data volume	-
Update frequency	Each time API (get/post) is called
Archiving and presentation	Indra UTM system
Ethical aspects	Access Level: Open for querying and restricted (Users and roles are configured) for a proper management (add/modify/delete) and management. No other ethical aspect has been reported

Dataset Name	UTM Flight Planning Support
Description	This service performs simple operations for flight planning, to serve as a basis for an HMI enabling users to define missions. Internally, this micro service completes the constraints enabling the flight plan assessment and tactical conformance monitoring. FP requests can be processed from 3 rd party systems via API Rest.
Personal Data	Yes (drone/operator/pilot information)
License	Indra
Technology	API
Standards and Metadata	C++, json, API Rest
Data sharing	Via API, all Flight Planning information
Data volume	-
Update frequency	Each time API (get/post) is called
Archiving and presentation	Indra UTM system
Ethical aspects	Access Level: Restricted. Users and roles are configured for a proper information management. No other ethical aspect has been reported

Dataset Name	UTM Flight Plan Management
Description	This service enables the management of flight plans along its whole lifespan: pre-flight, along-flight, and post-flight (up to a given time). This is a simple system where all authorised flight plans are maintained, and no update on its definition, edition or

	change is possible (at least in the initial implementation). In other words, flight plans, once approved, never change. Flight plans pending manual authorisation are also maintained here.
Personal Data	Some personal data belonging to operators, drones and pilots.
License	Indra
Technology	API
Standards and Metadata	C++, json, API Rest
Data sharing	Via API, all Flight Plan status information
Data volume	-
Update frequency	Each time API (get/post) is called for a status update
Archiving and presentation	Indra UTM system
Ethical aspects	Access Level: Restricted. Users and roles are configured for a proper information management. No other ethical aspect has been reported

Dataset Name	UTM Flight Plan Assessment
Description	This service enables service automated flight assessment, to enable automated flight plan authorization and safe strategic deconfliction. To perform the assessment, the system will need to take into account regulations, geofences and airspace structure, and potential interactions with other previously approved flight plans (to check for conflicting operations).
Personal Data	Some personal data belonging to operators, drones and pilots.
License	Indra
Technology	API
Standards and Metadata	C++, json, API Rest
Data sharing	-
Data volume	-
Update frequency	-
Archiving and presentation	Indra UTM system
Ethical aspects	Access Level: internal. No other ethical aspect has been reported

Dataset Name	UTM Flight Plan Authorization
Description	This service provides automated flight authorization. A new flight authorization process may have different results: <ul style="list-style-type: none"> - Automated (or Manual). - Automated (or Manual) Flight denegation, with: <ul style="list-style-type: none"> o Denegation reason.

	<ul style="list-style-type: none"> ○ Optionally, alternative authorizable flight plan specification. - Manual flight approval request to a human UTM operator.
Personal Data	Some personal data belonging to operators, drones and pilots.
License	Indra
Technology	API
Standards and Metadata	C++, json, API Rest
Data sharing	Via API FP status
Data volume	-
Update frequency	Each time API (get/post) is called
Archiving and presentation	Indra UTM system
Ethical aspects	Access Level: internal. No other ethical aspect has been reported

Dataset Name	UTM Strategic Deconfliction
Description	Strategic Deconfliction service will identify and resolve strategic conflicts between existing traffic and a new in-conflict flight plan, as provided by the Flight Authorization Service. To do so, it will use several alternative conflict resolution strategies, check they are able to resolve the conflict, and that they are not inducing some further conflicts.
Personal Data	-
License	Indra
Technology	API
Standards and Metadata	C++, json, API Rest
Data sharing	Via API, Flight Plan alternatives (when possible) to operator and status confirmations
Data volume	-
Update frequency	Each time API (get/post) is called (each new FP or status modification)
Archiving and presentation	Indra UTM system
Ethical aspects	Access Level: none.

Dataset Name	UTM Air Monitoring Service
Description	The Air Monitoring service supports drone tracking as well as remote e-identification of each drone currently flying. It gives a Geofencing based conformance monitoring service. Tactical conflicts are detected as well and reported for both pair of pilots (via GCS) involved in the conflict. Those conflicts are shown in

	Air Monitoring HMI as well. This service acts as a live traffic provider for 3 rd party actors and authorities if needed, etc...
Personal Data	Some personal data is shown in HMI for superusers and authorities. “Blind” drone information is shown to operators for safety purposes.
License	Indra
Technology	API Rest
Standards and Metadata	C++, json, API Rest
Data sharing	Via API Rest and MQTT to subscribe to tracking output
Data volume	-
Update frequency	Internal data is updated every 1 second Each time API (get/post) is called or each track update via MQTT subscription
Archiving and presentation	Indra UTM system
Ethical aspects	Access Level: authorities can identify all currently flying drones. No superusers can read any sensitive data. No other ethical aspect has been reported

Dataset Name	UTM ATC Interface
Description	The ATM Interface provides ATC an HMI for checking, approve or reject specific flight plans that are planned (or cross) ATC areas.
Personal Data	Some personal data is shown in HMI for ATCOs (operator, pilot and drone information).
License	Indra
Technology	HMI web
Standards and Metadata	C++, json
Data sharing	Via HMI, approval/rejections are propagated internally within the UTM system
Data volume	-
Update frequency	Each time ATCOs perform any approval/rejection of flights over ATC areas
Archiving and presentation	Indra UTM system
Ethical aspects	Access Level: authorities can see some operator, drone and pilot information. No other ethical aspect has been reported

Dataset Name	UTM GCS (Flight Android app for DJI)
Description	<p>The Ground Control Station system (GCS) is an Android application that allows the integration of DJI drones (from now) in the UTM platform.</p> <p>After login process, the app allows to visualize a list of previously generated flight plans for this pilot. These flight plans can be flown both manually and automatically. In the latter case, it is also possible to override automated behavior to deviate aircraft from flight plan.</p> <p>In the background, telemetry information is periodically sent to the UTM platform. Pilot generated alerts can also be automatically sent (attached to the telemetry messages). Mobile app is also able to receive feedback information from the platform including alerts, traffic conflicts and messages for the pilot. Finally, the app enables the visualization of UTM provided contextual information such as nearby traffic or no-flight areas location.</p>
Personal Data	-
License	Indra
Technology	Android app
Standards and Metadata	-
Data sharing	Telemetry and pilot alerts to UTM system and nearby traffic, non-drone areas and contextual information to GCS from UTM system.
Data volume	-
Update frequency	Every second
Archiving and presentation	Indra UTM system
Ethical aspects	Access Level: none.

Dataset Name	NOTAM
Description	<p>A notice to airmen (NOTAM) is a notice filed with an aviation authority to alert aircraft pilots of potential hazards along a flight route or at a location that could affect the safety of the flight. NOTAMs are unclassified notices or advisories distributed by means of telecommunication that contain information concerning the establishment, conditions or change in any aeronautical facility, service, procedure or hazard, the timely knowledge of which is essential to personnel and systems concerned with flight operations.</p>
Personal Data	-

License	-
Technology	
Standards and Metadata	ICAO Standards
Data sharing	-
Data volume	
Update frequency	
Archiving and presentation	
Ethical aspects	Access Level: No other ethical aspect has been reported

Dataset Name	Drone road images
Description	Sets of road images with vehicles tagged captured from above by UAVs.
Personal Data	No
License	Free / Commercial license
Technology	H264 codec
Standards and Metadata	None
Data sharing	-
Data volume	-
Update frequency	-
Archiving and presentation	Indra's DB
Ethical aspects	Access Level: Private

3.2 UC1 Transport - Demo 3

3.2.1 Context

Pan-European rail-way infrastructure monitoring throughout the project life cycle – phase 1 infrastructure development. Main focus within phase 1 is to establish autonomous drone inspection by GSM C2 data link. Current emphasis is on status monitoring and on demand inspection missions. A list of requirements for payload is open for partners to expand based on their capacity and engagement

3.2.2 Data Description

The project partner has identified the dataset that will be produced during different phases of the project. This list is indicative and will be adapted (addition/removal/modification of datasets) in the following versions of the DMP.

The list is provided below:

Dataset Name	Communication network statistics
Description	Network statistics (latency, availability, data volume, etc) from drones operations with public 4G/5G.
Personal Data	No
License	Private
Technology	Public 4G/5G
Standards and Metadata	Communication standard formats.
Data sharing	No
Data volume	-
Update frequency	Data coming from LMT R&D BVLOS project flights
Archiving and presentation	LMT database
Ethical aspects	

3.3 UC2 Construction - Demo 1

3.3.1 Context

The present demonstrator aims to develop the technology required to carry out any type of operation that allows the Digitalization of the State of the Constructive Process of a Civil Infrastructure. For the use case, a section of a road under construction will be analysed.

To achieve the digitalization of a civil infrastructure, the definition and study of the data will be required, to make the best use of them and try to achieve the challenge of creating a procedure to accelerate the extraction of the elements, from a cloud of points to a geometric definition.

The study of the data and the creation of different tools will allow identifying elements related to the geometry and characteristics of the terrain of the construction site, flat surfaces of structures, recognition of fix elements and alignments. The main objective is the automated creation of a database of objects of predefined types, directly out of the captured cloud points, where those objects are automatically recognized, detected and added to the database.

To achieve the final objectives, perform data study and real flights different databases listed below are going to be used.

3.3.2 Data Description

The project partner has identified the dataset that will be produced during different phases of the project. This list is indicative and will be adapted (addition/removal/modification of datasets) in the following versions of the DMP.

The list is provided below:

Dataset Name	Work units in progress
Description	Units of work in progress and mapping of the area affected by the tasks in execution for monitoring and control RPA flights.
Personal Data	No
License	Only construction staff use
Technology	CSV, KML/KMZ and pdf
Standards and Metadata	None
Data sharing	-
Data volume	-
Update frequency	Once time before flights
Archiving and presentation	Acciona Construction server
Ethical aspects	Access Level: Internal distribution list the staff concerned No other ethical aspect has been reported

Dataset Name	Traffic events – UC2 DEMO1: Road
Description	Traffic events on the road that have an impact on the road traffic, such as roadworks, accidents, traffic congestions, etc.
Personal Data	No
License	Public Information http://infocar.dgt.es/datex2/dgt/
Technology	Web service - DATEX II
Standards and Metadata	None
Data sharing	-
Data volume	-
Update frequency	Real time
Archiving and presentation	Acciona Construction server
Ethical aspects	Access Level: Open No other ethical aspect has been reported

Dataset Name	European Geodetic Network of GNSS Reference Stations
Description	The primary purpose of the EUREF is to provide access to the European Terrestrial Reference System 89 (ETRS89) which is the standard precise GNSS coordinate system throughout Europe.
Personal Data	No
License	Public Information http://gnss.be/
Technology	Web service and download
Standards and Metadata	Import file formats used by most GPS manufacturers, as well as the receiver-independent RINEX format.
Data sharing	-
Data volume	-

Update frequency	Once time per flight period
Archiving and presentation	Acciona Construction server
Ethical aspects	Access Level: Open No other ethical aspect has been reported

Dataset Name	Weather Stations – Near worksite
Description	Climate measures from one station placed nearby Highway (hourly)
Personal Data	No
License	Public, no restriction
Technology	CSV file
Standards and Metadata	None
Data sharing	-
Data volume	-
Update frequency	
Archiving and presentation	Acciona Construction server
Ethical aspects	Access Level: Open No other ethical aspect has been reported

Dataset Name	Climate Data
Description	National, regional and local weather inputs from the influence area of the pilot test
Personal Data	No
License	Public use
Technology	CSV and/or XLS
Standards and Metadata	None
Data sharing	-
Data volume	-
Update frequency	
Archiving and presentation	Acciona Construction server
Ethical aspects	Access Level: Open No other ethical aspect has been reported

Dataset Name	Aerial Images
Description	Photo and Video streaming and indirect from the drone path
Personal Data	No
License	CATEC
Technology	.mov or .mp4 format. (Video)

	.raw. and .jpg format. (Photo)
Standards and Metadata	Image/video information and GNSS signal for the path
Data sharing	>32GB
Data volume	35 MB/s
Update frequency	On demand / Real time and historical (backup for flight over)
Archiving and presentation	Acciona Construction and CATEC server
Ethical aspects	Access Level: Internal UC2 partner No other ethical aspect has been reported

Dataset Name	Air space Telemetry
Description	Drone telemetry from internal Apps
Personal Data	No
License	Internal
Technology	
Standards and Metadata	
Data sharing	
Data volume	
Update frequency	
Archiving and presentation	Acciona Construction and CATEC server
Ethical aspects	Access Level: No other ethical aspect has been reported

Dataset Name	Airspace Status
Description	Position of current drones flying in the airspace, regulation of restricted areas, interference with other airspace users...
Personal Data	NO
License	
Technology	
Standards and Metadata	Radio operator
Data sharing	-
Data volume	
Update frequency	Real time
Archiving and presentation	UTM
Ethical aspects	Access Level: No other ethical aspect has been reported

Dataset Name	NOTAM
Description	A notice to airmen (NOTAM) is a notice filed with an aviation authority to alert aircraft pilots of potential hazards along a flight route or at a location that could affect the safety of the flight. NOTAMs are unclassified notices or advisories distributed by means of telecommunication that contain information concerning the establishment, conditions or change in any aeronautical facility, service, procedure or hazard, the timely knowledge of which is essential to personnel and systems concerned with flight operations.
Personal Data	NO
License	NO
Technology	
Standards and Metadata	ICAO Standards
Data sharing	-
Data volume	
Update frequency	
Archiving and presentation	
Ethical aspects	Access Level: No other ethical aspect has been reported

Dataset Name	Navigation and Status Data – UC2 DEMO1: Road
Description	Position, attitude and status from ACORDE's positioning and attitude system operating in the drone during flight tests
Personal Data	No
License	Restricted use
Technology	Real-time: custom protocol through RS232 Historical: CSV
Standards and Metadata	Document with description of the custom protocol
Data sharing	Real time: accessible by approved partners through the serial port
Data volume	<14 KB/s (volume depends on capture time)
Update frequency	Data generated during every flight test
Archiving and presentation	ACORDE's file server
Ethical aspects	Access Level: Approved partners No other ethical aspect has been reported

Dataset Name	Raw Navigation Data – UC2 DEMO1: Road
Description	Dataset with RAW GNSS signals, inertial sensors measurements and barometer samples from ACORDE's positioning and attitude system operating in the drone during flight tests

Personal Data	No
License	Internal use
Technology	CSV
Standards and Metadata	Document with description of the log format
Data sharing	No
Data volume	10-100 MB/flight
Update frequency	Data generated during every flight test
Archiving and presentation	ACORDE's file server
Ethical aspects	Access Level: ACORDE No other ethical aspect has been reported

3.4 UC2 Construction - Demo 2

3.4.1 Context

This demonstrator will focus on the deployment of drones as new tools for the analysis of the status of the constructive process in underground constructions such as tunnels. The drone platform will be able to obtain data in real-time, keeping the distance to the wall sides and detecting any interfering obstacle inside the tunnel. During the flights, the drone platform will acquire data and, as a result, the system should give high accuracy models.

The information produced will improve the efficiency of the activities of planning, exploration, measurements of the underground environment, mapping of tunnels, generation of complete high-precision models, and production of base models for implementation in BIM. In short, it will be a helpful tool for decision making in hostile environments.

The data sources in this demonstrator are limited to the worksite information and the topographical existing surveys since no signals are expected into the tunnel.

3.4.2 Data Description

The project partner has identified the dataset that will be produced during different phases of the project. This list is indicative and will be adapted (addition/removal/modification of datasets) in the following versions of the DMP.

The list is provided below:

Dataset Name	Work units in progress
Description	Units of work in progress and mapping of the area affected by the tasks in execution for monitoring and control RPA flights.
Personal Data	No
License	Only construction staff use
Technology	CSV, KML/KMZ and pdf

Standards and Metadata	None
Data sharing	-
Data volume	-
Update frequency	Once time before flights
Archiving and presentation	Acciona Construction server
Ethical aspects	Access Level: Internal distribution list the staff concerned No other ethical aspect has been reported

Dataset Name	European Geodetic Network of GNSS Reference Stations
Description	The primary purpose of the EUREF is to provide access to the European Terrestrial Reference System 89 (ETRS89) which is the standard precise GNSS coordinate system throughout Europe.
Personal Data	No
License	Public Information http://gnss.be/
Technology	Web service and download
Standards and Metadata	Import file formats used by most GPS manufacturers, as well as the receiver-independent RINEX format.
Data sharing	-
Data volume	-
Update frequency	Once time per flight period
Archiving and presentation	Acciona Construction server
Ethical aspects	Access Level: Open No other ethical aspect has been reported

Dataset Name	Work GNSS Reference
Description	To be able to carry out the flights, the topography data is needed to locate internally antennas or other devices that allow the drone to fly in the tunnel mapping.
Personal Data	No
License	-
Technology	-
Standards and Metadata	Import file formats used by most GPS manufacturers, as well as the receiver-independent RINEX format.
Data sharing	-
Data volume	-
Update frequency	Once time per flight period
Archiving and presentation	Acciona Construction server
Ethical aspects	Access Level: Open

	No other ethical aspect has been reported
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Dataset Name	Aerial Images
Description	Photo and Video streaming and indirect from the drone path
Personal Data	No
License	CATEC
Technology	.mov or .mp4 format. (Video) .raw. and .jpg format. (Photo)
Standards and Metadata	Image/video information and GNSS signal for the path
Data sharing	>32GB
Data volume	35 MB/s
Update frequency	On demand / Real time and historical (backup for flight over)
Archiving and presentation	Acciona Construction and CATEC server
Ethical aspects	Access Level: Internal UC2 partner No other ethical aspect has been reported

Dataset Name	Air space Telemetry
Description	Drone telemetry from internal Apps
Personal Data	No
License	Internal
Technology	
Standards and Metadata	
Data sharing	
Data volume	
Update frequency	
Archiving and presentation	Acciona Construction and CATEC server
Ethical aspects	Access Level: No other ethical aspect has been reported

Dataset Name	UWB-based Range Data – UC2 DEMO2: Tunnel
Description	Range measurements between tags and anchors of ACORDE's indoor positioning system, sent in real-time to the autopilot during the flight tests.
Personal Data	No
License	Restricted use
Technology	Real-time: custom protocol through RS232 Historical: CSV
Standards and Metadata	Document with description of the custom protocol
Data sharing	Real time: accessible by CATEC through the tag serial port

Data volume	1KB/s (estimated)
Update frequency	Data generated during every flight test
Archiving and presentation	ACORDE's file server
Ethical aspects	Access Level: ACORDE, CATEC (real-time data only) No other ethical aspect has been reported

3.5 UC3 Logistics - Demo 1

3.5.1 Context

The present demonstrator will focus on the use of swarms of drones to deliver payloads on a wide area. Automation of logistics from the air will require multiple vectors management through a reliable, broad-band communication infrastructure.

To achieve the required safety level for payload delivery with a fleet of drones, the acquisition of data is mandatory for deep learning process of detection algorithms used for people/animal detection before payload drop.

The management of a fleet of drones requires a reliable communication network and a real-time monitoring of the efficiency and accessibility of the same, being these conditions considered as mandatory.

The study of the available set of data and the creation of the detection algorithms will allow identifying life forms and critical infrastructures to be avoided. Tools for communication network monitoring will help to ensure the integrity of the fleet and to react safely in case of loss of communication. Acquiring these datasets will enrich the database and enhance the detection algorithm efficiency as well as the network monitoring capabilities.

3.5.2 Data Description

The project partner has identified the dataset that will be produced during different phases of the project. This list is indicative and will be adapted (addition/removal/modification of datasets) in the following versions of the DMP.

The list is provided below:

Dataset Name	Images bank of optical camera
Description	Web-based image bank of life form/infrastructure taken from a drone with an optical camera NADIR/OBLIQUE
Personal Data	No
License	Partially Free of use
Technology	Full HD optical camera
Standards and Metadata	MP4/raw video format
Data sharing	-

Data volume	-
Update frequency	Once in advance to help detection algorithm deep learning
Archiving and presentation	Scalian database
Ethical aspects	Presence of humans in some video frames, may require permissions or blurring.

Dataset Name	Images bank of infrared camera
Description	Infrared images from FLIR camera onboard drone NADIR/OBLIQUE
Personal Data	No
License	Private
Technology	FLIR 640X480 or less
Standards and Metadata	MP4/raw video format
Data sharing	No
Data volume	-
Update frequency	Dedicated survey for Total METIS project
Archiving and presentation	Total / Scalian database
Ethical aspects	

Dataset Name	Communication network statistics
Description	Network statistics (latency, availability, data volume,etc) from drones operations with private 4G bubble.
Personal Data	No
License	Private
Technology	Private 4G bubble
Standards and Metadata	Communication standard formats.
Data sharing	No
Data volume	-
Update frequency	Data coming from Scalian and Total from the METIS R&D project
Archiving and presentation	Total/Scalian database
Ethical aspects	

Dataset Name	Weather Stations
Description	Climate measures from one station placed nearby TOTAL METIS pilot survey
Personal Data	No
License	Private

Technology	Portable weather station with wind/temperature logging
Standards and Metadata	CSV file
Data sharing	No
Data volume	-
Update frequency	Data coming from Scalian and Total from the METIS R&D project
Archiving and presentation	Total/Scalian server
Ethical aspects	

Dataset Name	Airspace Status
Description	Position of current drones flying in the airspace, regulation of restricted areas, interference with other airspace users...
Personal Data	No
License	Private
Technology	Fleet management messages
Standards and Metadata	Proprietary format
Data sharing	-
Data volume	Few Mbytes per minutes
Update frequency	Real time
Archiving and presentation	UTM
Ethical aspects	

Dataset Name	NOTAM
Description	A notice to airmen (NOTAM) is a notice filed with an aviation authority to alert aircraft pilots of potential hazards along a flight route or at a location that could affect the safety of the flight. NOTAMs are unclassified notices or advisories distributed by means of telecommunication that contain information concerning the establishment, conditions or change in any aeronautical facility, service, procedure or hazard, the timely knowledge of which is essential to personnel and systems concerned with flight operations.
Personal Data	No
License	No
Technology	N/A
Standards and Metadata	ICAO Standards
Data sharing	-
Data volume	-
Update frequency	Produced before operations

Archiving and presentation	Stored by aviation authorities
Ethical aspects	Access Level: No other ethical aspect has been reported

3.6 UC4 Surveillance and Inspection - Demo 1

3.6.1 Context

For the demonstration, a flight will be performed near an offshore wind turbine, or near similar infrastructure on land that shows corrosion problems. A flight will be performed to scan the structure and collect accurately georeferenced hyperspectral images. These images will be processed on-site on a local server and the results will be visualized as soon as they are available to show that hyperspectral imaging can detect corrosion.

A number of these images will be shared with the consortium, after approval of the asset owners.

3.6.2 Data description

Dataset Name	Hyperspectral images from corrosion damages
Description	A set of hyperspectral images, taken from representative corrosion damage on offshore or onshore structures, after approval of the asset owners
Personal Data	No
License	Public Use
Technology	-
Standards and Metadata	None
Data sharing	-
Data volume	1GB
Update frequency	-
Archiving and presentation	On Airobot servers
Ethical aspects	No other ethical aspect has been reported

3.7 UC4 Surveillance and Inspection - Demo 2

3.7.1 Context

These data-sets will contain outputs from an event-based camera embedded on-board a drone, set to fly in a cluttered, indoor environment equipped with a motion capture system (Optitrack) giving access to truthful ground measurements. The purpose here is to provide data for both training and testing navigation and collision-avoidance algorithms.

3.7.2 Data description

Dataset Name	Event-based collision avoidance and navigation
Description	Data-set comprising: * event-based camera raw output * calibration file * IMU output * ground truth (position, attitude) * RGB/Gray images (to be confirmed)
Personal Data	No
License	Public use
Technology	.AEDAT4 and/or .MAT and/or .TXT
Standards and Metadata	-
Data sharing	Data-set will be made permanently available on the following platform: https://www.4tu.nl/en/ with a DOI and potential scientific publication(s) to be cited.
Data volume	Approximately 10 Gb
Update frequency	2 years
Archiving and presentation	-
Ethical aspects	Access Level: Open No other ethical aspect has been reported

Dataset Name	Event- and radar- based collision avoidance and navigation
Description	Data-set comprising: * event-based camera raw output * calibration file * IMU output * Radar output * ground truth (position, attitude) * RGB/Gray images (to be confirmed)
Personal Data	No
License	Public use
Technology	.AEDAT4 and/or .MAT and/or .TXT
Standards and Metadata	-
Data sharing	Data-set will be made permanently available on the following platform: https://www.4tu.nl/en/ with a DOI and potential scientific publication(s) to be cited.
Data volume	Approximately 15 Gb
Update frequency	2 years
Archiving and presentation	-
Ethical aspects	Access Level: Open No other ethical aspect has been reported

These data-sets will contain outputs from a LiDAR and SLAM visual sensor.

Dataset Name	16 channel LiDAR point cloud (OUSTEROS1 sensor)
Description	Data-set comprising: * Raw output * IMU (accelerometer +3-ax gyro)
Personal Data	No
License	Public use
Technology	.BAG
Standards and Metadata	-
Data sharing	TBD
Data volume	Approximately 10 Gb ROS-bag
Update frequency	ones
Archiving and presentation	-
Ethical aspects	Access Level: Open No other ethical aspect has been reported

Dataset Name	SLAM data set (27 GB ROS-bag)
Description	Data-set comprising: * 2x infrared * RGB * IMU (accelerometer +3-ax gyro) * depthmap * Incl. channels with camera and IMU specs.
Personal Data	No
License	Public use
Technology	.BAG
Standards and Metadata	-
Data sharing	TBD
Data volume	Approximately 27 Gb ROS-bag
Update frequency	ones
Archiving and presentation	-
Ethical aspects	Access Level: Open No other ethical aspect has been reported

3.8 UC5 Agriculture – Demo 1

3.8.1 Context

This demonstrator focusses on Drone/Rover coordination. Data will be collected and used on-board to detect where the rover should operate. Other data are meant to be collected for algorithm training and post-processing purposes. At the current time, the Italian consortium hasn't decided yet if/which data will be public. Therefore, the data listed in the following section will not necessarily be open data. This decision will be taken later on in the project.

3.8.2 Data description

Dataset Name	Tree images
Description	Images to determine in post processing the crown tree volume
Personal Data	No
License	TBD
Technology	[most likely] RGB, NIR, Thermal
Standards and Metadata	[most likely] Data are collected as .tif image data
Data sharing	TBD
Data volume	Up to 300 pictures per hectare, 21-24 megapixels
Update frequency	TBD
Archiving and presentation	TBD
Ethical aspects	No ethical issues expected.

3.9 UC5 Agriculture – Demo 2

3.9.1 Context

This demonstrator will be used as a gateway to collect sensor readings of land bound sensors and visual and multispectral images of the grapevines by flying over the vineyards and send this data to a base station for offline analysis. Trustworthy and reliable communication of the drone with the sensors and the base station guarantees that only valid data is retrieved, defective sensors are detected, and only authorized partners participate in the communication.

The main data sources in this demonstrator are focusing on the status of the soil and the grapevines. In addition, secure cryptographic algorithms for drone communication will be validated and a standards-compliant workflow for the specific needs in the development lifecycle of drone applications will be developed.

3.9.2 Data Sets

Dataset Name	Multispectral Data
Description	-Multispectral Imagery indicates leave health and moisture and can be used to calculate several indices
Personal Data	no
License	-computed dataset (index map)
Technology	Multispectral camera, data stored on camera
Standards and Metadata	Data are collected as .tif image data
Data sharing	To be defined
Data volume	Each flight will provide approx. 2-5GB of raw data and 2-5GB of computed result
Update frequency	-to be defined - assumed weekly, to monthly
Archiving and presentation	Skyability server, sharing with UC5 partners
Ethical aspects	No ethical issues expected.

Dataset Name	Aerial images
Description	Photo or Video for analyses
Personal Data	no
License	
Technology	Multispectral camera, data stored on camera
Standards and Metadata	Data are collected as .tif image data including GPS Data of photo center
Data sharing	To be defined
Data volume	Each flight will provide approx. 2-5GB of raw data and 2-5GB of computed result
Update frequency	-to be defined - assumed weekly, to monthly
Archiving and presentation	Skyability server, sharing with UC5 partners
Ethical aspects	No ethical issues expected.

Dataset Name	Drone system development workflow data
Description	The data describe the workflow for a standards-conformant drone lifecycle. They comprise generic workflow data and actual status data
Personal Data	No personal data involved, only the current development status of the drone system under consideration
License	Use of the data free for consortium members during the project duration
Technology	Database
Standards and Metadata	Internal representation is proprietary
Data sharing	To be defined

Data volume	Typically << 1GB
Update frequency	Workflow definition: only for improvements Actual workflow status: continuously after each activity
Archiving and presentation	To be defined
Ethical aspects	No relevant ethical aspects.

Dataset Name	Verification Models
Description	Various models of the system or system elements or protocol definitions used to generate tests for functional or security requirements.
Personal Data	No personal data involved, only the current development status of the drone system under consideration
License	Use of the data free for consortium members during the project duration
Technology	Model-Files
Standards and Metadata	SysML/UML standard
Data sharing	To be defined
Data volume	Typically << 1GB
Update frequency	Dependent on project progress, daily during model development, weekly or less under maintenance during the project
Archiving and presentation	To be defined
Ethical aspects	No relevant ethical aspects.

Dataset Name	Generated Test Cases
Description	Tests generated for functional and security requirements
Personal Data	No personal data involved, only the current development status of the drone system under consideration
License	Use of the data free for consortium members during the project duration
Technology	Testcase Files
Standards and Metadata	Internal representation is proprietary
Data sharing	To be defined
Data volume	Typically << 1GB
Update frequency	Dependent on project progress, daily during test model development, weekly or less under maintenance during the project. Updates dependent on test model updates. Tests are automatically generated.
Archiving and presentation	To be defined

Ethical aspects	No relevant ethical aspects.
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4 Conclusions

In this deliverable, a DMP for the project has been presented, structured around the use cases and their corresponding demonstrators. A collection of datasets has been put together during the creation of this document. It provides an overview about the amount of data that will be handled in the project.

However, as aforementioned, this is a living document and, as time goes by, new datasets will appear and some existing ones may not be relevant any more, what will require this document to be constantly updated.