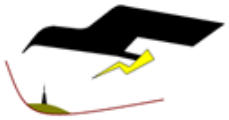

UPC - HIRO

ESEIAAT

UAV platform study for research on atmospheric electricity

Zeus UAV platform

Deliverable 1
Project Charter

Authors:

Calderón Rosario, Borja
De Benedicto Barboa, Maria Beatriz
Escartín Vivancos, Guillermo
Fontanes Molina, Pol
Franch I Ruiz, Sergi
González García, Sílvia
Herrando Moraira, Albert
Lopezbarrena Arenas, Santiago
Nachett, Hamza
Pérez Sánchez, David
Pla Olea, Laura
Pons Daza, Marina
Ramón Costa, Fernando
Sellart Combalia, Ana Maria
Sellart Combalia, Ana Maria
Urbano González, Eva María

Tutor: Pérez Llera, Luís Manuel

Group: G3-PM-P2018

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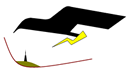

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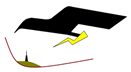

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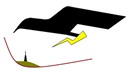


1 | DEMO CODES

1.1 Lists

- Create a specific data logging device for the given Electro Field Meter (EFM).
- Provide the required power supply to the field mill on-board the UAV.
- Integrate the EFM to the payloads bay.

Ground stations The most common procedure is to attract the lightnings to a tall tower fully monitored. When a thunderstorm is unchained near the tower, there are strong chances of lightnings hits, which can be studied. The main drawback is that the tower must be placed on a usually thunderstorms zone where attract lightnings don't represent a risk to humans lives. Used all-round the world.

Rocket triggering A rocket is launch with an electric wire attached to its bottom, when the atmosphere conditions are favourable for a lightning discharge. When te conductor hit the charged cloud a lightning falls along the wire. Then is measured by the sensors on the ground. Rocket triggering method is currently used by the *Lightning Research Group of Florida University* with great results.

1.2 Short Tables

Feature	Description
3	UAV platform must be **fail-safe**. If it lose controlling signal coverage, must be able to **perform predefined manoeuvres** and **auto-land**. If a major controlling electronics failure happens, UAV, needs to have a **safe landing mechanism** such as a parachute.
4	UAV platform must be able to carry **250g** of payload at least.
5	All payloads **sensor data** should be at least **stored** on board.

Table 1.2.1: Project Requirements

1.3 Images

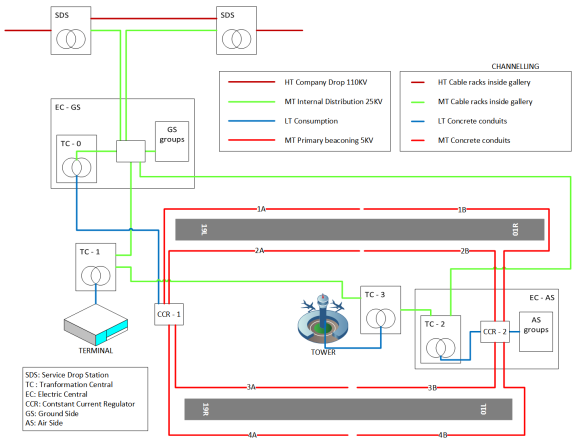
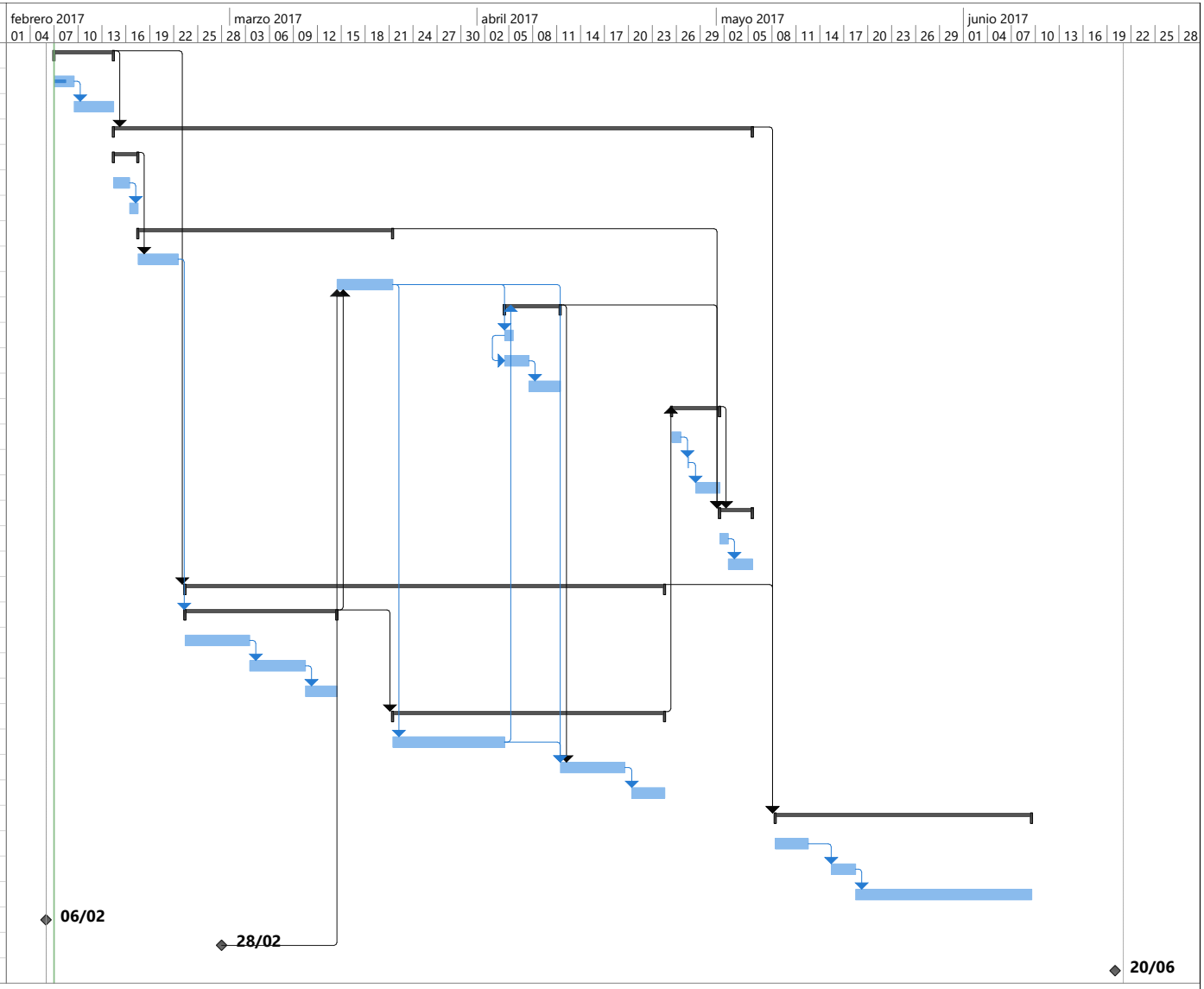


Figure 1.3.1: General electric system scheme

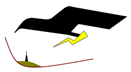
1.4 PDF HORITZONTAL

Id	EDT	Nombre de tarea	Duración	Comienzo	Fin
1	**1**	**PRELIMINARY REVIEW**	**16 horas**	**mar 07/02/17**	**mar 14/02/17**
2	1.1	Earth-Ionosphere	9 horas	mar 07/02/17	jue 09/02/17
3	1.2	Previous research	8 horas	jue 09/02/17	mar 14/02/17
4	**2**	**PLANE DEVELOPMENT**	**176 horas**	**mar 14/02/17**	**vie 05/05/17**
5	**2.1**	**Conceptual design**	**10 horas**	**mar 14/02/17**	**vie 17/02/17**
6	2.1.1	Flight conditions	6 horas	mar 14/02/17	jue 16/02/17
7	2.1.2	Functional specifications	4 horas	jue 16/02/17	vie 17/02/17
8	**2.2**	**Hardware**	**65 horas**	**vie 17/02/17**	**mar 21/03/17**
9	2.2.1	Components	10 horas	vie 17/02/17	mié 22/02/17
10	2.2.2	Assembly	15 horas	mar 14/03/17	mar 21/03/17
11	**2.3**	**Software**	**15 horas**	**mar 04/04/17**	**mar 11/04/17**
12	2.3.1	Configuration	5 horas	mar 04/04/17	mié 05/04/17
13	2.3.2	Automatization	10 horas	mar 04/04/17	vie 07/04/17
14	2.3.3	Custom modes	5 horas	vie 07/04/17	mar 11/04/17
15	**2.4**	**Launching platform**	**13 horas**	**mar 25/04/17**	**lun 01/05/17**
16	2.4.1	Design	6 horas	mar 25/04/17	mié 26/04/17
17	2.4.2	Components	3 horas	jue 27/04/17	jue 27/04/17
18	2.4.3	Assembly	4 horas	vie 28/04/17	lun 01/05/17
19	**2.5**	**Testing**	**14 horas**	**lun 01/05/17**	**vie 05/05/17**
20	2.5.1	Subsystems test	4 horas	lun 01/05/17	mar 02/05/17
21	2.5.2	Preliminary flights	10 horas	mar 02/05/17	vie 05/05/17
22	**3**	**PAYLOAD**	**129 horas**	**jue 23/02/17**	**lun 24/04/17**
23	**3.1**	**Field Mill**	**40 horas**	**jue 23/02/17**	**mar 14/03/17**
24	3.1.1	Data logger	20 horas	jue 23/02/17	vie 03/03/17
25	3.1.2	Integration	15 horas	vie 03/03/17	vie 10/03/17
26	3.1.3	Test	5 horas	vie 10/03/17	mar 14/03/17
27	**3.2**	**Wire Launcher**	**74 horas**	**mar 21/03/17**	**lun 24/04/17**
28	3.2.1	Design	30 horas	mar 21/03/17	mar 04/04/17
29	3.2.2	Construction	20 horas	mar 11/04/17	mié 19/04/17
30	3.2.3	Test	9 horas	jue 20/04/17	lun 24/04/17
31	**4**	**TESTING**	**75 horas**	**lun 08/05/17**	**vie 09/06/17**
32	4.1	Sensing flights	15 horas	lun 08/05/17	vie 12/05/17
33	4.2	Experimental flights	10 horas	lun 15/05/17	jue 18/05/17
34	4.3	Optimization	50 horas	jue 18/05/17	vie 09/06/17
35	5	START	0 horas	lun 06/02/17	lun 06/02/17
36	6	Components arrival	0 horas	mar 28/02/17	mar 28/02/17
37	7	END	0 horas	mar 20/06/17	mar 20/06/17



Proyecto: Zeus UAV platform
Fecha: mar 07/02/17

Tarea	Resumen del proyecto	Tarea manual	solo el comienzo	Fecha límite
División	Tarea inactiva	solo duración	solo fin	Progreso
Hito	Hito inactivo	Informe de resumen manual	Tareas externas	Progreso manual
Resumen	Resumen inactivo	Resumen manual	Hito externo	



2 | Project Charter

2.1 Project Purpose and Justification

State the purpose of the project. Tie the purpose to the organization's strategic goals and objectives if possible. Tell the reader why this project is being started and what need is it fulfilling. Identify if there are any specific mandates, policies or laws that are driving this change.

2.1.1 Vision

The vision for this project shall be defined considering:

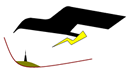
https://ec.europa.eu/research/participants/portal/desktop/en/opportunities/h2020/topics/lc-space-14-tec-2018

2.1.2 Objectives

The aim of this topic is to demonstrate, in a relevant environment, technologies, systems and sub-systems for EO. Proposals should demonstrate significant improvements in such areas as miniaturisation, power reduction, efficiency, versatility, and/or increased functionality, and should demonstrate at the viable extent complementarity to activities already funded by Member States and the European Space Agency. Proposals should also ensure system readiness for operational services and provide leverage on industry competitiveness, particularly on export markets.

The key OBJECTIVES for this project are:

1. Tal i pasqual



2.1.3 Scope

Each proposal shall address only one of the following subtopics:

a) Very high resolution optical EO for LEO and/or high resolution optical EO for GEO/HEO instrument technologies, with focus on improving payload (e.g. radiometric and spectral parameters, spatial resolution, swath), including detectors, materials and solutions for stable and large optomechanical elements and systems (e.g. lightweight telescope mirrors with metre-level diameter) focal planes, wave front error and line of sight control, high performance actuators, multispectral filters for large focal plane;.

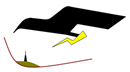
b) Competitive remote sensing instruments and space systems: innovations supporting readiness advancements for next generation systems in the optical and radio frequency domains (active/passive), technologies enabling advanced system solutions (including small satellites possibly in convoy with

existing space assets), on-board image processing and detectors for video imaging with increased swath and resolution, technologies for super- and hyperspectral imaging instruments with high performance, radio occultation sensors, low cost high resolution telescopes and radar imaging systems;

c) Disruptive technologies for remote sensing, as technology building blocks for innovative LiDAR (Light Detection And Ranging) and radar instruments (including cost-effective wide-swath altimetry and imaging systems), super-spectral and hyperspectral payloads with wide spectral and/or coverage, limb sounders and gravimetry payloads; high quantum efficiency photo detectors and high-precision optical beam scanning and pointing; advanced infrared (IR) technologies (optical filters, detectors and electronics);

d) On-board data processing: integrated multi-instrument on-board payload data processing for resource-constrained missions; solutions for high observation reactivity and real-time applications such as very high performance payload processing; on board data/image optimisation and compression for advanced video and image pre-processing as well as smart on-board data/image analysis; data flow optimisation for new missions, including impacts on the evolution of associated ground segment, for enhancement of overall processing power and speed over the full chain and for supporting massive data processing and machine learning in EO applications;

e) Advanced SAR/Radar technologies: step up maturity in new sensing concepts and technologies such as large and active antennas and reflectors, including multi-frequency concepts; enablers for digital beam-forming and beam-hopping interferometric systems, and for other concepts, such as large swath maritime surveillance radar, active sensing/processing of SAR ships, data fusion integration with new generation Automatic Identification Systems



(AIS);

Low cost solutions based on components off the shelf (COTS) are encouraged. Participation of industry, in particular SMEs, is encouraged. Activities shall be complementary and create synergy with other European activities in the same domain.

To this end, proposals shall include the following tasks:

- Analysis of relevant available roadmaps, including roadmaps developed in the context of actions for the development of Key Enabling Technologies supported by the Union;
- Commercial assessment of the supply chain technology in the space or non-space domains and, if applicable, a business plan for commercialisation with a full range (preload) of recurring products.

The Commission considers that proposals requesting a contribution from the EU of between EUR 2 and 3 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

2.2 Project Description

2.3 High-Level Requirements

2.4 Acceptance Criteria

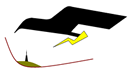
2.5 High-Level Risks

2.6 Project deliverables

TABLE MISSING

2.7 Project milestones

TABLE MISSING



2.8 Project Objectives

TABLE MISSING

2.9 Estimated Budget

2.10 Project organization

2.10.1 Customers

2.10.2 Stakeholders

The following groups and organizations are the key stakeholders in this project:

Stakeholder Name	Roles/Responsibilities
Airbus Defence and Space GmbH	Research and production of satellite sensors.
BHO Legal Rechtsanwälte Partnership	IPR management, data protection and exploitation and business plan.
Deimos Space S.L.U.	Design and develop satellite sensors.
High Innovative Remote Observation (HIRO)	Research and innovation actions towards satellite sensors. Project management.
ICUBE-SERTIT	Research in the application of data providing from EO satellites. Special interest in Sentinel satellites from the Copernicus programme.
Remote Sensing Application Center (ReSAC)	Research in the introduction of RS& GIS products into land use and urban planning
Thales Alenia Space SAS	Design, development, integration and testing of satellite sensors.
VITO nv	Research in the use of RS for land use and urban planning. Development of new RS systems.

Table 2.10.1: List of stakeholders, roles and responsibilities

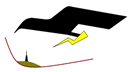
2.10.3 Roles and responsibilities

3 Stakeholder identification

3.1 Stakeholder analysis matrix

Figure 3.1.1: Stakeholder analysis matrix

3.2 Stakeholder register



4 Bibliography