



UPC - HIRO



UNIVERSITAT POLITÈCNICA DE CATALUNYA
BARCELONATECH

Departament d'Enginyeria de Projectes
i de la Construcció

ESEIAAT

UAV platform study for research on atmospheric electricity

Zeus UAV platform

Deliverable 1 Project Charter

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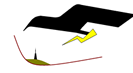
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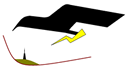
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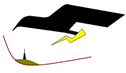
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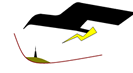
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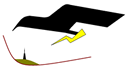
1 | DEMO CODES

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
	UAV platform must be fail-safe .
3	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

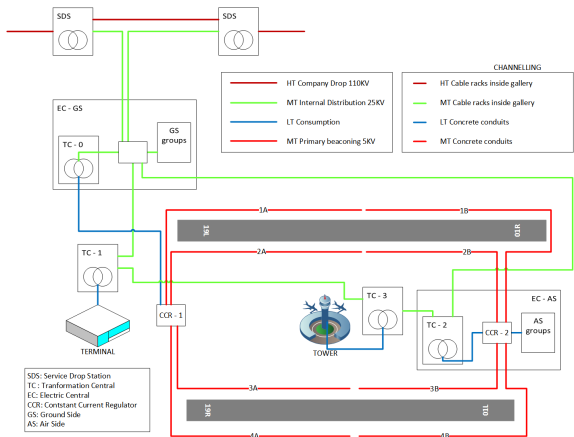
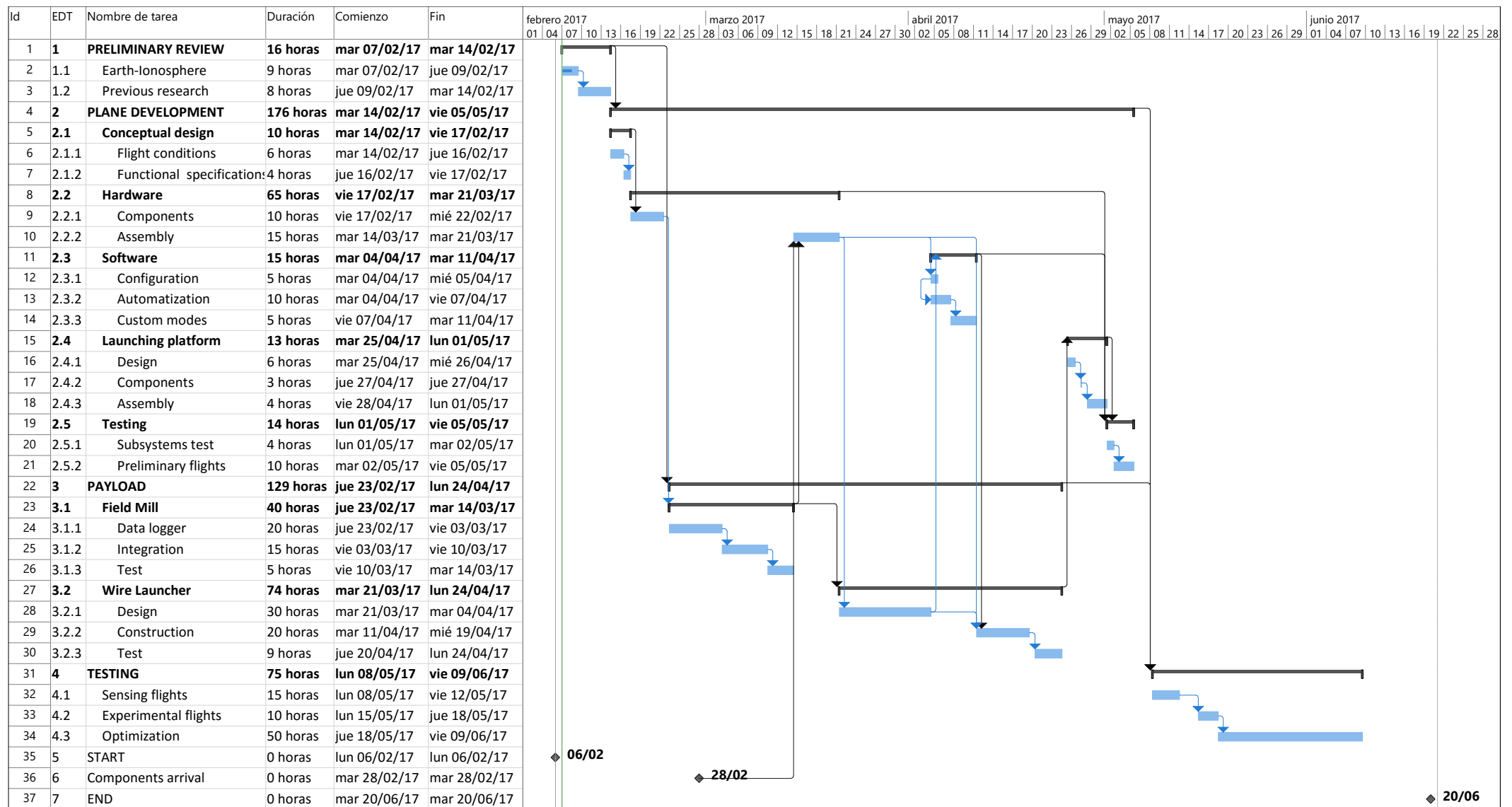


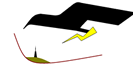
Figure 1.3.1: General electric system scheme

1.4 PDF HORIZTONTAL



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:

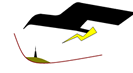
<https://ec.europa.eu/research/participants/portal/desktop/en/opportunities/h2020/topics/lc-space-14-tec-2018>

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;

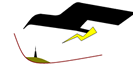
b) Competitive remote sensing instruments and space systems: innovations supporting readiness advancements for next generation systems in the optical and radio frequency domains (active/passive), technologies enabling advanced system solutions (including small satellites possibly in convoy with

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

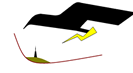
2.5 High-Level Risks

2.6 Project deliverables

TABLE MISSING

2.7 Project milestones

TABLE MISSING



2.8 Project Objectives

TABLE MISSING

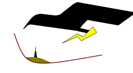
2.9 Estimated Budget

2.10 Project organization

2.10.1 Customers

2.10.2 Stakeholders

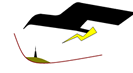
2.10.3 Roles and responsibilities



3 | Stakeholder identification

3.1 Stakeholder analysis matrix

3.2 Stakeholder register



4 | Bibliography

- [1] Joan Montanyà Puig. La investigación en rayos. pages 8–38.
- [2] Ramon Roger Gutiérrez. Study of altitude electric atmospheric potential sensing. 2014.