



Degree: Aerospace Engineering

Course: Engineering Projects

Title and acronym of the project:

Cubesat Constellation

Astrea

Contents: Minutes

Group: G4 EA-T2016

Delivery date: 22-12-2016

Students:

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Customer: Pérez Llera, Luís Manuel



MINUTES OF THE MEETING 01

Project: Cubesat constellation

<u>Participants:</u>	Luís Manuel Pérez (LMP)	Projects Department
	Joan Cebrian Galan (JC)	G4/EA-T2016
	Pol Fontanes Molina (PF)	G4/EA-T2016
	Lluís Foreman Campins (LF)	G4/EA-T2016
	Roger Fraixedas Lucea (RF)	G4/EA-T2016
	Oscar Fuentes Muñoz (OF)	G4/EA-T2016
	Sílvia González García (SG)	G4/EA-T2016
	Fernando Herrán Halbelda (FH)	G4/EA-T2016
	Boyan Kaloyanov Naydenov (BK)	G4/EA-T2016
	Victor Martinez Viol (VM)	G4/EA-T2016
	David Morata Carranza (DM)	G4/EA-T2016
	Laura Pla Olea (LP)	G4/EA-T2016
	Marina Pons Daza (MP)	G4/EA-T2016
	Josep Puig Ruiz (JP)	G4/EA-T2016
	Josep Maria Serra Moncunill (JMS)	G4/EA-T2016
	Sergi Tarroc Gil (ST)	G4/EA-T2016
	Xavier Tió Malo (XT)	G4/EA-T2016
	Eva María Urbano González (EMU)	G4/EA-T2016

Date and time: 22nd september 2016, from 10:00 to 12:00

Place: SJ INTEXTER

AGENDA

1. Team structure
2. Choice of positions
3. Next meeting

ITEMS ON THE AGENDA

1. Team structure

The structure of the entire group will be defined. It has to be discussed how to work, in order to have optimum organisation.

2. Choice of positions

It has to be decided who perform every task in the previous defined structure.

3. Next meeting

It is decided when and where is going to be the next meeting, and the agenda of it.



DECISIONS MADE - ASSIGNMENTS

1. Team structure

It is decided that the group will be divided in different work teams. The work teams will develop the technical work of the project. Every work team will have a responsible of it, who will have a global view of all the work it is being done in the team.

The management task will be done by a coordinator. The coordinator is the last responsible of all the work that the team develops. Its task consist in supervise and coordinate the work of the teams in order to ensure a good develop of the project. The figure of the team responsible would make easier the task of the coordinator; he/she only have to talk with the team responsible for supervise the work of the team.

It will be a secretary, who will write the minutes. The minutes have to synthesize the ideas discussed and the decisions taken in the meetings. They have to be signed by the coordinator and the customer.

The meetings will be every Thursday at 10:00, and there will be the members of the project and the costumer. It can be also extraordinary meetings with or without the costumer. The meetings without the costumer will be only for address technical issues, and it won't be signed by the client.

2. Choice of positions

It is decided that the work teams and their responsible will be defined once the specific tasks are clear.

It is decided for consensus that for choosing the secretary and the coordinator, anyone who want this position have to present his/her candidacy. Then the candidates have to explain to the group his motivations. After that the position will be decided by vote.

There is only one candidate for secretary: ST. There is no replica, so there is no vote. ST is elected for secretary.

There are 3 candidates for coordinator: BN, OF, XT. Every one express its motivations:

-BN express that he like to manage human resources. He presents himself as a serious and rigorous.

-OF express his motivation to manage the project. He explains that he is doing a leadership course, and remarks that it would be positive for the management of the project.

-XT presents himself as a person with a good skills in human relationships and with experience in managing the UPC-SP.

There is a vote. The results are:

-BN 9 votes

-OF 6 votes

-XT 2 votes

BN is elected for coordinator of the project



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3. Next meeting

The next meeting will be at September 29th at SJ INTEXTER

The agenda will be:

1. Scheduling
2. Next meeting

SIGNATURES

Coordinator:

Customer:



MINUTES OF THE MEETING 04 o 2

Project: Cubesat constellation

<u>Participants:</u>	Luís Manuel Pérez (LMP)	Projects Department
	Joan Cebrian Galan (JC)	G4/EA-T2016
	Pol Fontanes Molina (PF)	G4/EA-T2016
	Lluis Foreman Campins (LF)	G4/EA-T2016
	Roger Fraixedas Lucea (RF)	G4/EA-T2016
	Oscar Fuentes Muñoz (OF)	G4/EA-T2016
	Sílvia González García (SG)	G4/EA-T2016
	Fernando Herrán Halbelda (FH)	G4/EA-T2016
	Boyan Kaloyanov Naydenov (BK)	G4/EA-T2016
	Victor Martinez Viol (VM)	G4/EA-T2016
	David Morata Carranza (DM)	G4/EA-T2016
	Laura Pla Olea (LP)	G4/EA-T2016
	Marina Pons Daza (MP)	G4/EA-T2016
	Josep Puig Ruiz (JP)	G4/EA-T2016
	Josep Maria Serra Moncunill (JMS)	G4/EA-T2016
	Sergi Tarroc Gil (ST)	G4/EA-T2016
	Xavier Tió Malo (XT)	G4/EA-T2016
	Eva María Urbano González (EMU)	G4/EA-T2016

Date and time: 29th sept 2016, from 10:00 to 12:00

Place: SJ INTEXTER

AGENDA

1. Minute approve
2. Client requirements
3. Project charter review
4. Gantt's diagram review
5. Budget review
6. Work teams
7. Next meeting

ITEMS ON THE AGENDA

1. Minute approve

It has to be approved the last minute

2. Client requirements



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The team want to know what is going to be the role of the client in the project

3. Project charter review

The pre-delivery of the project charter it has to be checked and discussed with the client

4. Gantt's diagram review

The Gantt's diagram has to be checked and discussed with the client.

5. Budget review

The budget has also to be checked and discussed with the client.

6. Work teams

It has to be done the work teams for developing every task.

7. Next meeting

The team has to decide when and how to meet for finishing the project charter.

DECISIONS MADE - ASSIGNMENTS

1. Minute approve

The minute is approved and signed by the client and the coordinator

2. Client requirements

Is asked to the client what role would like to develop in the project. The client want to buy the idea to commercialize it.

3. Project charter review

Scope

In general the client demand to be more concrete at the items.

- Orbit design. It has to be decided if we want to consider the gravitational pull off the moon and sun. We will do a first approximation of the influence of these bodies and then decide if it is significant.
 - Sat design. The components of hardware will be selected.
 - Launch system. It's ok at the moment. It is required to define the calendar in order to define the launch window.
 - Operation design. It has to be defined the requirements, make a market study of the ground stations and select the GS.
- The client want to notice the project to the corresponding organisations, making the project as much "legal" as we can.

Requirements

LMP demand to be more concrete and "numeric" at the requirements. It has to be quantitative.

Justification

LMP want here a historical study of the cubsats communication for foresee the trend of this sector.



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Organisation of the group

The organisation is ok for LMP. It has to be defined the work teams. It has to be defined also who takes part of every team, the responsible, the coordinator and the secretary.

It is agreed to use slack for the internal communication and to share the documents between all the project members.

4. Gantt's diagram review

We can't work without the project charter approve. It has to be included to the Gantt the reporting of the tasks.

The variable cost are defined by the number of sats (for the launching and the insurance...)

5. Budget review

LMP suggest to review the estimated work hours.

6. Work teams

The work teams defined in the last meeting are only for the project charter. The project charter has to be done at Monday 3rd oct.

7. Next meeting

It is decided that we will meet at Monday 3rd oct. for make the last review of the project charter, the Gantt's diagram and the budget

SIGNATURES

Coordinator:

Customer:



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MINUTES OF THE MEETING 03

Project: Cubesat constellation

<u>Participants:</u>	Luís Manuel Pérez (LMP)	Projects Department
	Joan Cebrian Galan (JC)	G4/EA-T2016
	Pol Fontanes Molina (PF)	G4/EA-T2016
	Lluis Foreman Campins (LF)	G4/EA-T2016
	Roger Fraixedas Lucea (RF)	G4/EA-T2016
	Oscar Fuentes Muñoz (OF)	G4/EA-T2016
	Silvia González García (SG)	G4/EA-T2016
	Fernando Herrán Albelda (FH)	G4/EA-T2016
	Boyan Kaloyanov Naydenov (BK)	G4/EA-T2016
	Victor Martinez Viol (VM)	G4/EA-T2016
	David Morata Carranza (DM)	G4/EA-T2016
	Laura Pla Olea (LP)	G4/EA-T2016
	Marina Pons Daza (MP)	G4/EA-T2016
	Josep Puig Ruiz (JP)	G4/EA-T2016
	Josep Maria Serra Moncunill (JMS)	G4/EA-T2016
	Sergi Tarroc Gil (ST)	G4/EA-T2016
	Xavier Tió Malo (XT)	G4/EA-T2016
	Eva María Urbano González (EMU)	G4/EA-T2016

Date and time: 6th of October 2016, from 10:00 to 12:00

Place: SJ INTEXTER

AGENDA

1. Minutes of the last meeting approval
2. Change of secretary
3. Project Charter delivery
4. Follow-up of the project
5. Oral presentations schedule
6. New tasks assignment
7. Next meeting



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ITEMS ON THE AGENDA

1. Minutes of the last meeting approval

The last minute has to be approved

2. Change of secretary

The client must be informed about the decision of the team referring the new secretary

3. Project Charter delivery

The project charter has to be delivered to the client

4. Follow-up of the project

The team and the costumer have to be informed of the project developments

5. Oral presentations schedule

The team has to decide the schedule of the oral presentations, at least the next meeting one

6. New tasks assignment

The weekly tasks have to be assigned to the members of the team

7. Next meeting

The place and time of the next meeting has to be decided

DECISIONS MADE - ASSIGNMENTS

1. Minutes of the last meeting approval

The minute is approved and signed by the client and the coordinator.

2. Change of secretary

The client is informed about the change of secretary. It is approved by the team and the client. It is stated than ST will provide help to SG if necessary.

3. Project Charter delivery

The project charter is delivered and approved by the client.

4. Follow-up of the project

The team decide to work during the meeting in the sub-teams of the project till 11:50.

5. Oral presentations schedule

Every member of the group has to perform a 10 min presentation about the work he/she has been doing. The team agrees to decide the member/s who do the presentations week by week.

OF and XT offer their selves to perform the first oral presentation next week. The team agrees.

6. New tasks assignment

Each sub-team decides by their own their new tasks to perform. The coordinator of each sub-group informs the team about the work they will do for the next week meeting.



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d'Enginyeria**

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7. Next meeting

It is decided that we will meet again on Thursday 13th oct. to perform a follow-up of the team work.
Every sub-team will organise themselves during the week.

SIGNATURES

Coordinator:

A handwritten signature in blue ink, appearing to read "Luis J. G." or a similar variation.

Customer:

A handwritten signature in blue ink, appearing to read "Luis J. G." or a similar variation.



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MINUTES OF THE MEETING 04

Project: Cubesat constellation

<u>Participants:</u>	Luís Manuel Pérez (LMP)	Projects Department
	Joan Cebrian Galan (JC)	G4/EA-T2016
	Pol Fontanes Molina (PF)	G4/EA-T2016
	Lluis Foreman Campins (LF)	G4/EA-T2016
	Roger Fraixedas Lucea (RF)	G4/EA-T2016
	Oscar Fuentes Muñoz (OF)	G4/EA-T2016
	Sílvia González García (SG)	G4/EA-T2016
	Fernando Herrán Halbelda (FH)	G4/EA-T2016
	Boyan Kaloyanov Naydenov (BK)	G4/EA-T2016
	Victor Martinez Viol (VM)	G4/EA-T2016
	David Morata Carranza (DM)	G4/EA-T2016
	Laura Pla Olea (LP)	G4/EA-T2016
	Marina Pons Daza (MP)	G4/EA-T2016
	Josep Puig Ruiz (JP)	G4/EA-T2016
	Josep Maria Serra Moncunill (JMS)	G4/EA-T2016
	Sergi Tarroc Gil (ST)	G4/EA-T2016
	Xavier Tió Malo (XT)	G4/EA-T2016
	Eva María Urbano González (EMU)	G4/EA-T2016

Date and time: 13th of October 2016, from 10:00 to 12:00

Place: SJ INTEXTER

AGENDA

1. Minutes of the last meeting approval
2. Oral presentations
3. Follow-up of the project
4. Next meeting

ITEMS ON THE AGENDA

1. Minutes of the last meeting approval

The last minute has to be approved

2. Oral presentations

OF and XT have to perform the oral presentation they agreed on doing last meeting.



Secció de Terrassa

3. Follow-up of the project

The team and costumer have to be informed of the project developments

4. Next meeting

The place and time of the next meeting has to be decided

DECISIONS MADE - ASSIGNMENTS

1. Minutes of the last meeting approval

The minute is approved and signed by the client and the coordinator.

2. Oral presentations

XT and OF perform their oral presentations about satellite launching and end of life strategy and orbits design respectively.

It is decided the members who will perform the next meeting orals presentations. The team agrees that it might be good that they belong to different departments to the ones OF and XT belong. Taking this into account, PF and BK are chosen to be the ones who perform next week oral presentations.

3. Follow-up of the project

It is discussed the compromise between the life time of the satellite, the costs of launches and the orbits parameters. The team agrees in take into account all the subgroups suggestions if possible when developing their subgroup work.

4. Next meeting

It is established that coordinators will have a meeting to follow-up with the project. The date of the meeting is yet to be decided.

Also, it is decided that the whole team will meet again on Thursday 20th oct. to perform a follow-up of the team work. Every sub-team will organise themselves during the week.

SIGNATURES

Coordinator:

Customer:



MINUTES OF THE MEETING 05

Project: Cubesat constellation

<u>Participants:</u>	Luís Manuel Pérez (LMP)	Projects Department
	Joan Cebrian Galan (JC)	G4/EA-T2016
	Pol Fontanes Molina (PF)	G4/EA-T2016
	Lluis Foreman Campins (LF)	G4/EA-T2016
	Roger Fraixedas Lucea (RF)	G4/EA-T2016
	Oscar Fuentes Muñoz (OF)	G4/EA-T2016
	Silvia González García (SG)	G4/EA-T2016
	Fernando Herrán Halbelda (FH)	G4/EA-T2016
	Boyan Kaloyanov Naydenov (BK)	G4/EA-T2016
	Victor Martínez Viol (VM)	G4/EA-T2016
	David Morata Carranza (DM)	G4/EA-T2016
	Laura Pla Olea (LP)	G4/EA-T2016
	Marina Pons Daza (MP)	G4/EA-T2016
	Josep Puig Ruiz (JP)	G4/EA-T2016
	Josep Maria Serra Moncunill (JMS)	G4/EA-T2016
	Sergi Tarroc Gil (ST)	G4/EA-T2016
	Xavier Tjo Malo (XTN)	G4/EA-T2016
	Eva María Urbano González (EMU)	G4/EA-T2016

(No assistió)

Date and time: 20th of October 2016, from 10:00 to 12:00

Place: SJ INTEXTER

AGENDA

1. Minutes of the last meeting approval
2. Oral presentations
3. Follow-up of the project
4. Next meeting

ITEMS ON THE AGENDA

1. Minutes of the last meeting approval

The last minute has to be approved

2. Oral presentations

BK and PF have to perform the oral presentation they agreed on doing last meeting.



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3. Follow-up of the project

The team and customer have to be informed of the project developments

4. Next meeting

The place and time of the next meeting has to be decided

DECISIONS MADE - ASSIGNMENTS

1. Minutes of the last meeting approval

The minute is approved and signed by the client and the coordinator.

2. Oral presentations

PF and BK perform their oral presentations about the preliminary satellite systems design and communications strategy respectively.

It is decided the members who will perform the next meeting orals presentations. VM and ST from orbits and communications systems respectively are chosen to be the ones who perform next week oral presentations.

3. Follow-up of the project

The client states that we have to take into account all kind of public at the time of performing the final presentations of the project.

4. Next meeting

It is decided that the whole team will meet again on Thursday 27th oct. to perform a follow-up of the team work. Every sub-team will organise themselves during the week.

SIGNATURES

Coordinator:

Customer:



MINUTES OF THE MEETING 06

Project: Cubesat constellation

<u>Participants:</u>	Luís Manuel Pérez (LMP)	Projects Department
	Joan Cebrian Galan (JC)	G4/EA-T2016
	Pol Fontanes Molina (PF)	G4/EA-T2016
	Lluis Foreman Campins (LF)	G4/EA-T2016
	Roger Fraixedas Lucea (RF)	G4/EA-T2016
	Oscar Fuentes Muñoz (OF)	G4/EA-T2016
	Sílvia González García (SG)	G4/EA-T2016
	Fernando Herrán Halbelda (FH)	G4/EA-T2016
	Boyan Kaloyanov Naydenov (BK)	G4/EA-T2016
	Victor Martinez Viol (VM)	G4/EA-T2016
	David Morata Carranza (DM)	G4/EA-T2016
	Laura Pla Olea (LP)	G4/EA-T2016
	Marina Pons Daza (MP)	G4/EA-T2016
	Josep Puig Ruiz (JP)	G4/EA-T2016
	Josep Maria Serra Moncunill (JMS)	G4/EA-T2016
	Sergi Tarroc Gil (ST)	G4/EA-T2016
	Xavier Tió Malo (XT)	G4/EA-T2016
	Eva María Urbano González (EMU)	G4/EA-T2016

Date and time: 27th of October 2016, from 10:00 to 12:00

Place: SJ INTEXTER

AGENDA

1. Minutes of the last meeting approval
2. Oral presentations
3. Follow-up of the project
4. Next meeting

ITEMS ON THE AGENDA

1. Minutes of the last meeting approval

The last minute has to be approved

2. Oral presentations

VM and ST have to perform the oral presentation they agreed on doing last meeting.



Secció de Terrassa

3. Follow-up of the project

The team and costumer have to be informed of the project developments

4. Next meeting

The place and time of the next meeting has to be decided

DECISIONS MADE - ASSIGNMENTS

1. Minutes of the last meeting approval

The minute is approved and signed by the client and the coordinator.

2. Oral presentations

VM and ST perform their oral presentations about orbit design developments and communications logistics and protocols respectively.

It is decided the members who will perform the next meeting orals presentations. LF, JC and DM from orbits, launching systems and satellites department respectively are chosen to be the ones who perform next week oral presentations.

3. Follow-up of the project

4. Next meeting

It is decided that the whole team will meet again on Thursday 10th nov. to perform a follow-up of the team work. Every sub-team will organise themselves during the week.

SIGNATURES

Coordinator:

Customer:



MEETING OF THE MEETING 07

Project: Cubesat constellation

<u>Participants:</u>	Luís Manuel Pérez (LMP)	Projects Department
	Joan Cebrian Galan (JC)	G4/EA-T2016
	Pol Fontanes Molina (PF)	G4/EA-T2016
	Lluís Foreman Campins (LF)	G4/EA-T2016
	Roger Fraixedas Lucea (RF)	G4/EA-T2016
	Oscar Fuentes Muñoz (OF)	G4/EA-T2016
	Sílvia González García (SG)	G4/EA-T2016
	Fernando Herrán Halbelda (FH)	G4/EA-T2016
	Boyan Kaloyanov Naydenov (BK)	G4/EA-T2016
	Victor Martínez Viol (VM)	G4/EA-T2016
	David Morata Carranza (DM)	G4/EA-T2016
	Laura Pla Olea (LP)	G4/EA-T2016
	Marina Pons Daza (MP)	G4/EA-T2016
	Josep Puig Ruiz (JP)	G4/EA-T2016
	Josep Maria Serra Moncunill (JMS)	G4/EA-T2016
	Sergi Tarroc Gil (ST)	G4/EA-T2016
	Xavier Tió Malo (XT)	G4/EA-T2016
	Eva María Urbano González (EMU)	G4/EA-T2016

Date and time: 10th of November 2016, from 10:00 to 12:00

Place: EDIFICI TR5 – 1.2

AGENDA

1. Minutes of the last meeting approval
2. Oral presentations
3. Follow-up of the project
4. Next meeting

ITEMS ON THE AGENDA

1. Minutes of the last meeting approval

The last minute has to be approved

2. Oral presentations

JC, LF and DM have to perform the oral presentation they agreed on doing last meeting.



Secció de Terrassa

3. Follow-up of the project

The team and costumer have to be informed of the project developments

4. Next meeting

The place and time of the next meeting has to be decided

DECISIONS MADE - ASSIGNMENTS

1. Minutes of the last meeting approval

The minute is approved and signed by the client and the coordinator.

2. Oral presentations

JC, DM and LF perform their oral presentations about launching systems, satellite design and orbit design respectively.

It is decided the members who will perform the next meeting orals presentations. EMG and MP from communications and launching systems department respectively are chosen to be the ones who perform next week oral presentations.

3. Follow-up of the project

4. Next meeting

It is decided that the whole team will meet again on Thursday 17th nov. to perform a follow-up of the team work. Every sub-team will organise themselves during the week.

SIGNATURES

Coordinator:

Customer:



MINUTES OF THE MEETING 08

Project: Cubesat constellation

<u>Participants:</u>	Luís Manuel Pérez (LMP)	Projects Department
	Joan Cebrian Galan (JC)	G4/EA-T2016
	Pol Fontanes Molina (PF)	G4/EA-T2016
	Lluis Foreman Campins (LF)	G4/EA-T2016
	Roger Fraixedas Lucea (RF)	G4/EA-T2016
	Oscar Fuentes Muñoz (OF)	G4/EA-T2016
	Sílvia González García (SG)	G4/EA-T2016
	Fernando Herrán Halbelda (FH)	G4/EA-T2016
	Boyan Kaloyanov Naydenov (BK)	G4/EA-T2016
	Victor Martinez Viol (VM)	G4/EA-T2016
	David Morata Carranza (DM)	G4/EA-T2016
	Laura Pla Olea (LP)	G4/EA-T2016
	Marina Pons Daza (MP)	G4/EA-T2016
	Josep Puig Ruiz (JP)	G4/EA-T2016
	Josep Maria Serra Moncunill (JMS)	G4/EA-T2016
	Sergi Tarroc Gil (ST)	G4/EA-T2016
	Xavier Tió Malo (XT)	G4/EA-T2016
	Eva María Urbano González (EMU)	G4/EA-T2016

Date and time: 17th of November 2016, from 10:00 to 12:00

Place: EDIFICI TR5 – 1.2

AGENDA

1. Minutes of the last meeting approval
2. Oral presentations
3. Follow-up of the project
4. Next meeting

ITEMS ON THE AGENDA

1. Minutes of the last meeting approval

The last minute has to be approved

2. Oral presentations

EMU and MP have to perform the oral presentation they agreed on doing last meeting.



Secció de Terrassa

3. Follow-up of the project

The team and costumer have to be informed of the project developments

4. Next meeting

The place and time of the next meeting has to be decided

DECISIONS MADE - ASSIGNMENTS

1. Minutes of the last meeting approval

The minute is approved and signed by the client and the coordinator.

2. Oral presentations

EMU and MP perform their oral presentations about communications protocols and launching systems respectively.

It is decided the members who will perform the next meeting orals presentations. SG and FH from orbits and satellite department respectively are chosen to be the ones who perform next week oral presentations.

3. Follow-up of the project

The members of launching and deploy systems department expose the launcher selected to deploy our satellites. The launcher decided is Electron from Rocket LAB. The team backs up the decision.

From communication department is exposed the definitive protocols systems. These chosen protocols are the followings:

- Transport Layer: Transmission Control Protocol (TCP)
- Network Layer:
 - Main Protocol: Internet Protocol version 6 (IPv6)
 - Routing Protocol: Open Shortest Path First (OSPF)
- Data Link Layer: TC Space Data Link Protocol

Orbit and Satellite department agree on changing the team in charge of mass budget calculation from orbits to satellite dpt. due to the correlation between the duration of the constellation and the satellites components lifetime.

It is establish that orbit department will provide a relation between the time the constellation will last in a certain height with the DeltaV budget and a relation between the height increment of the design orbit and the launching orbit with the extra lifetime of the constellation.

Constellation deployment department also is committed to provide a relation between the duration of the constellation and the DeltaV needed to reconfigure the constellation in case of satellite failure so Satellite department can have all the information to do a sizing of the total needed fuel mass.



Secció de Terrassa

4. Next meeting

It is decided that the whole team will meet again on Thursday 24th nov. to perform a follow-up of the team work. Every sub-team will organise themselves during the week.

SIGNATURES

Coordinator:

Customer:



MINUTES OF THE MEETING 09

Project: Cubesat constellation

<u>Participants:</u>		Projects Department
Luís Manuel Pérez (LMP)		G4/EA-T2016
Joan Cebrian Galan (JC)		G4/EA-T2016
Pol Fontanes Molina (PF)		G4/EA-T2016
Lluis Foreman Campins (LF)		G4/EA-T2016
Roger Fraixedas Lucea (RF)		G4/EA-T2016
Oscar Fuentes Muñoz (OF)		G4/EA-T2016
Sílvia González García (SG)		G4/EA-T2016
Fernando Herrán Halbelda (FH)		G4/EA-T2016
Boyan Kaloyanov Naydenov (BK)		G4/EA-T2016
Victor Martinez Viol (VM)		G4/EA-T2016
David Morata Carranza (DM)		G4/EA-T2016
Laura Pla Olea (LP)		G4/EA-T2016
Marina Pons Daza (MP)		G4/EA-T2016
Josep Puig Ruiz (JP)		G4/EA-T2016
Josep Maria Serra Moncunill (JMS)		G4/EA-T2016
Sergi Tarroc Gil (ST)		G4/EA-T2016
Xavier Tió Malo (XT)		G4/EA-T2016
Eva María Urbano González (EMU)		G4/EA-T2016

Date and time: 24th of November 2016, from 10:00 to 12:00

Place: EDIFICI TR5 – 1.2

AGENDA

1. Minutes of the last meeting approval
2. Oral presentations
3. Follow-up of the project
4. Next meeting

ITEMS ON THE AGENDA

1. Minutes of the last meeting approval

The last minute has to be approved

2. Oral presentations

SG and FH have to perform the oral presentation they agreed on doing last meeting.



Secció de Terrassa

3. Follow-up of the project

The team and customer have to be informed of the project developments

4. Next meeting

The place and time of the next meeting has to be decided

DECISIONS MADE - ASSIGNMENTS

1. Minutes of the last meeting approval

The minute is approved and signed by the client and the coordinator.

2. Oral presentations

FH and SG perform their oral presentations about satellites and orbit design respectively.

It is decided the members who will perform the next meeting orals presentations. JMS and RF from communications department and deployment systems respectively are chosen to be the ones who perform next week oral presentations.

3. Follow-up of the project

Orbit department proposes the final constellation configuration. This configuration is yet to be accepted by all the team because orbit dpt. must consider some aspects about the need of ground global coverage suggested by the client and the team.

Constellation Configuration:

Walker-Delta 210° at a 542km with 8 planes and 21 satellites per plane.

From satellite department is exposed the definitive structure type, batteries and ADCS (Attitude Determination and Control System). The propulsion system is yet to decide. These chosen systems are the following:

- Structure: 3U CubeSat Structure ISIS
- Batteries: NanoPower BP4 (77Wh) (Number of batteries = 2)
- ADCS components:
 - Cube Computer
 - Cube Sensor
 - Cube Control
 - Cube Wheel
 - Cube Torque



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4. Next meeting

It is decided that the whole team will meet again on Thursday 1st Dec. to perform a follow-up of the team work. Every sub-team will organise themselves during the week.

SIGNATURES

Coordinator:

Customer:

A handwritten signature consisting of a stylized 'L' and 'u' followed by a dash and another stylized letter, likely representing the name 'Luis'.



MINUTES OF THE MEETING 10

Project: Cubesat constellation

<u>Participants:</u>	Luís Manuel Pérez (LMP)	Projects Department
	Joan Cebrian Galan (JC)	G4/EA-T2016
	Pol Fontanes Molina (PF)	G4/EA-T2016
	Lluis Foreman Campins (LF)	G4/EA-T2016
	Roger Fraixedas Lucea (RF)	G4/EA-T2016
	Oscar Fuentes Muñoz (OF)	G4/EA-T2016
	Silvia González Garcia (SG)	G4/EA-T2016
	Fernando Herrán Halbelda (FH)	G4/EA-T2016
	Boyan Kaloyanov Naydenov (BK)	G4/EA-T2016
	Victor Martinez Viol (VM)	G4/EA-T2016
	David Morata Carranza (DM)	G4/EA-T2016
	Laura Pla Olea (LP)	G4/EA-T2016
	Marina Pons Daza (MP)	G4/EA-T2016
	Josep Puig Ruiz (JP)	G4/EA-T2016
	Josep Maria Serra Moncunill (JMS)	G4/EA-T2016
	Sergi Tarroc Gil (ST)	G4/EA-T2016
	Xavier Tió Malo (XT)	G4/EA-T2016
	Eva María Urbano González (EMU)	G4/EA-T2016

Date and time: 1st December 2016, from 10:00 to 12:00

Place: EDIFICI TR5 – 1.2

AGENDA

1. Minutes of the last meeting approval
2. Oral presentations
3. Follow-up of the project
4. Next meeting

ITEMS ON THE AGENDA

1. Minutes of the last meeting approval

The last minute has to be approved

2. Oral presentations

JMS and RF have to perform the oral presentation they agreed on doing last meeting.



Secció de Terrassa

3. Follow-up of the project

The team and customer have to approve the decisions made by the coordinators of each sub team in the last coordinator meeting. They have to be informed of the project developments.

Decisions made:

- It is considered the constellation system not to be oversize.
If the number of satellites were reduced the continuous coverage of the ground stations would be compromised.
It is suggested to keep the actual configuration because it is robust, not too complex and offers the clients the possibility of having their own ground stations.
- A critical failure is defined to be when the client cannot connect with any satellite, a ground station loses its visibility or the communication route has to be reconfigured more than once due to a two consecutive satellite failure.
(The ground stations have been design to lose coverage when two satellites of two adjacent planes that arrive at the same time over the GS fail).
- Both constellation deployment and satellite department have to choose the propulsive system that guarantees the correct performance of the demanded actuations.

4. Next meeting

The place and time of the next meeting has to be decided.

DECISIONS MADE – ASSIGNMENTS

1. Minutes of the last meeting approval

The minute is approved and signed by the client and the coordinator.

2. Oral presentations

JMS and RF perform their oral presentations about communications department and deployment systems respectively.

It is decided the members who will perform the next meeting orals presentations. LP and JP from orbit department and communication department respectively are chosen to be the ones who perform next week oral presentations.

3. Follow-up of the project

Deployment systems department decisions approved by the team:

- To perform an uncontrolled de-orbiting maneuver for the end of life strategy because a controlled one will suppose high deltaV. Simultaneously the satellite can be positioned in a certain way in order to increase its drag.
- The replacement strategy is also determined. The new planes will be set in between the existing dying ones in order to avoid collisions and to keep providing service.



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From communications department is exposed:

- The Mission Control Centre is located in Terrassa. It will be in charge of handle the data and check the constellation status.
- The Ground Stations are decided to be three and are located in:

- Canada
- Scotland
- Falkland Islands

They receive TT&C, HK and the client's data and send it to the Mission Control Centre.

The team approves the ground stations locations and their roles.

About the decisions made by the coordinators of each sub team in the last coordinator meeting:

- The definition of a critical failure is approved by the team.
- The constellation system is considered no to be oversize by the team, but the suggestion of keeping the actual configuration is rejected. The team agrees on studying some more configurations from the point of view of just ground stations total coverage besides the ones of global coverage. It is agreed to perform an OWA to make the final decision.

4. Next meeting

It is decided that the whole team will meet again on Thursday 15th Dec. to perform a follow-up of the team work. Every sub-team will organise themselves during the week.

SIGNATURES

Coordinator:

Customer:

A handwritten signature consisting of several loops and strokes, enclosed within a large, roughly drawn oval border.



MINUTES OF THE MEETING 11

Project: Cubesat constellation

<u>Participants:</u>	Luís Manuel Pérez (LMP)	Projects Department
	Joan Cebrian Galan (JC)	G4/EA-T2016
	Pol Fontanes Molina (PF)	G4/EA-T2016
	Lluis Foreman Campins (LF)	G4/EA-T2016
	Roger Fraixedas Lucea (RF)	G4/EA-T2016
	Oscar Fuentes Muñoz (OF)	G4/EA-T2016
	Sílvia González García (SG)	G4/EA-T2016
	Fernando Herrán Halbelda (FH)	G4/EA-T2016
	Boyan Kaloyanov Naydenov (BK)	G4/EA-T2016
	Victor Martinez Viol (VM)	G4/EA-T2016
	David Morata Carranza (DM)	G4/EA-T2016
	Laura Pla Olea (LP)	G4/EA-T2016
	Marina Pons Daza (MP)	G4/EA-T2016
	Josep Puig Ruiz (JP)	G4/EA-T2016
	Josep Maria Serra Moncunill (JMS)	G4/EA-T2016
	Sergi Tarroc Gil (ST)	G4/EA-T2016
	Xavier Tió Malo (XT)	G4/EA-T2016
	Eva María Urbano González (EMU)	G4/EA-T2016

Date and time: 15th December 2016, from 10:00 to 12:00

Place: EDIFICI TR5 – 1.2

AGENDA

1. Minutes of the last meeting approval
2. Oral presentations
3. Follow-up of the project
4. Next meeting

ITEMS ON THE AGENDA

1. Minutes of the last meeting approval

The last minute has to be approved

2. Oral presentations

LP and JP have to perform the oral presentation they agreed on doing last meeting.



Secció de Terrassa

3. Follow-up of the project

- a) The team and costumer have to be informed of the project developments both in final developments on the Astrea constellation and in the fulfilment of the final report.
- b) The members who will perform the final presentation have to be chosen.
- c) The remaining tasks have to be distributed.

4. Next meeting

The team has to decide the place and time of the next meeting to prepare the final project presentation.

DECISIONS MADE – ASSIGNMENTS

1. Minutes of the last meeting approval

The minute is approved and signed by the client and the coordinator.

2. Oral presentations

LP and JP perform their oral presentations about orbit and financial department and others considerations.

3. Follow-up of the project

a) Project Developments

Orbits design department informs about the decision of the final constellation. This decision has been made through the performance of an OWA. The final constellation is the following:

Walker-Delta 225° at a 542km with 9 planes and 21 satellites per plane at an inclination fo 70°.

The costumer states that in order to decide we also should take into account the accuracy of the presented numbers. Considering this and after some team explanations, the whole team and the costumer agree on the final constellation decision.

The team and costumer are informed about environment control, legislation and feasibility of Astrea project.

The costumer makes some comments:

- Environment control: The environmental effect of the materials and fuel used has to be determined.



Secció de Terrassa

• Feasibility:

- The table presented has to be improved.
- The data presented should be in GBytes instead of Mega.
- The analysis made should better be in 12 years in order to be representative.
- The calculations done should be divided in existents satellites and new satellites considering the last group will be the target of our services.

b) Election of the members who will perform the final presentation

- First the team decide how many members will perform the final presentation

In order to make a decision, the team agrees on voting. The results are the following:

1 pers: 0 votes

2 pers: 2 votes

3pers: 12 votes

4 pers: 3 votes

5 or more pers: 0 votes

According to the vote, 3 members will perform the final presentation.

- Election of the 3 members who will perform the final project presentation

A vote is made in order to take the decision. The members selected due to the vote are:

Oscar Fuentes: 13 votes

LLuis Foreman: 14 votes

Boyan Kaloyanov: 12 votes

c) Remaining tasks assignation

- Academic Poster: Assigned to XT and MP.
- Video: Assigned to RF, VM and PF.



Secció de Terrassa

4. Next meeting

It is decided that the whole team will meet again on Tuesday 20th Dec and on Wednesday 21st Dec to prepare the final project presentation.

SIGNATURES

Coordinator:

Customer: