INSA INSTITUT NATIONAL DES SCIENCES APPLIQUÉES TOULOUSE

RTK -*You are not lost*

Presentation 2021-2022
November

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Contents

TEAM

- Network Student

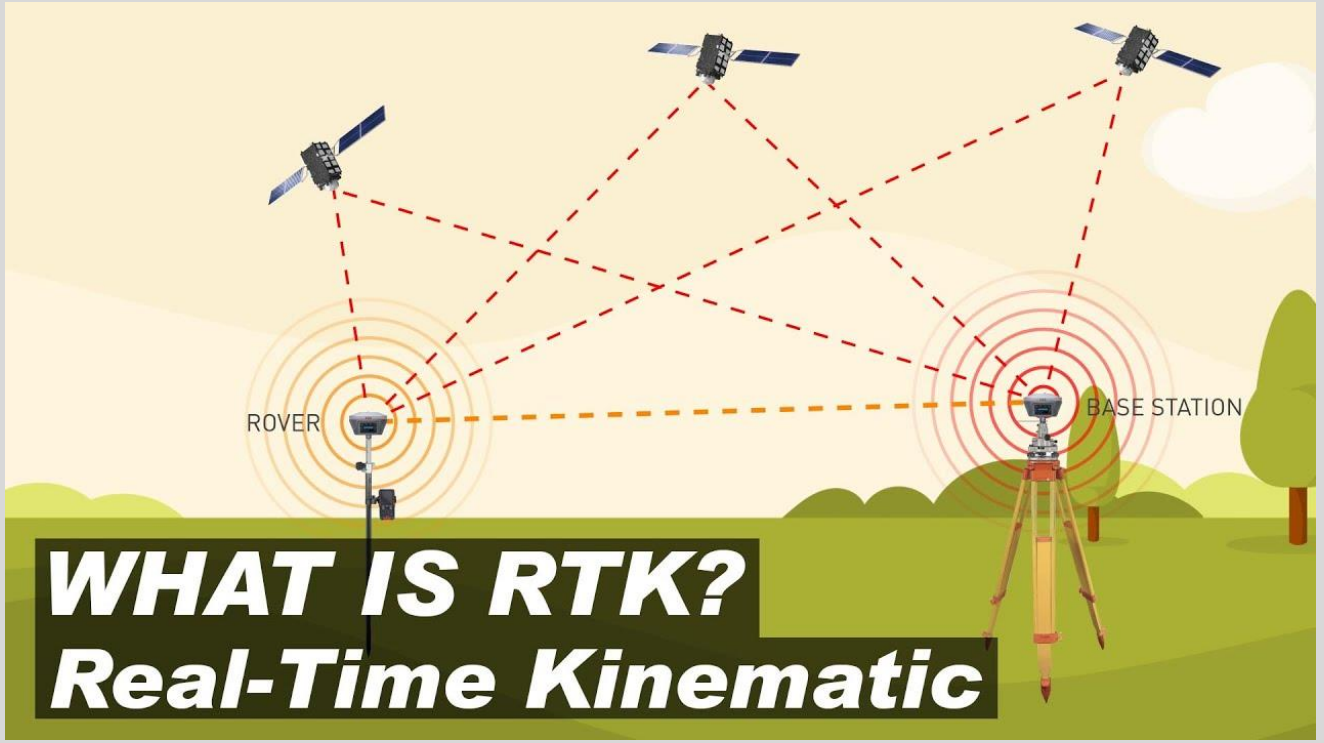
- Network Student

- Embedded systems Student

- Embedded systems Student

I- Project Context

- Send payloads in the helium balloons that are up to 30 km in altitude -> when they burst, we need to precisely track them to pick them up
- The aim of the project: assess a low-cost solution of RTK (Real-time Kinematic) modules
- More precise than GPS
- Real-time Kinematic positioning uses satellites with at least 2 GPS receivers: one base and one or more rovers.
- RTK consists of a base station, one or several rover users, and a communication channel with which the base broadcasts information to the users at real time.

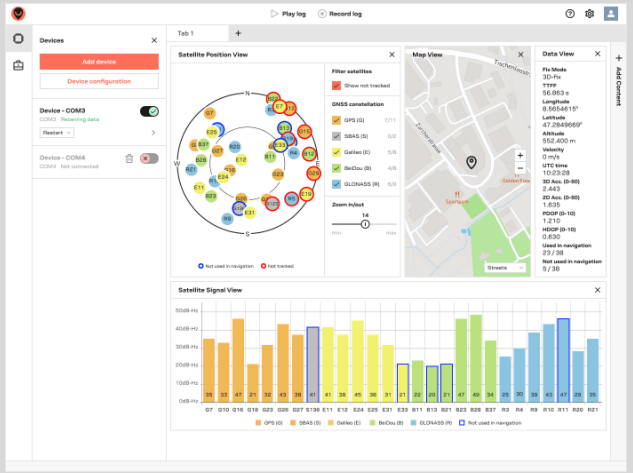


II - Stakeholder and ressources

- *Team* : 2 students from electronics and embedded systems and 2 students from nteworking and computer science
- *Tutor and client* : Mr. Guillaume AURIOL
- *In collaboration* with the University Paul Sabbatier

- *Ressources :*

Development kit RTK

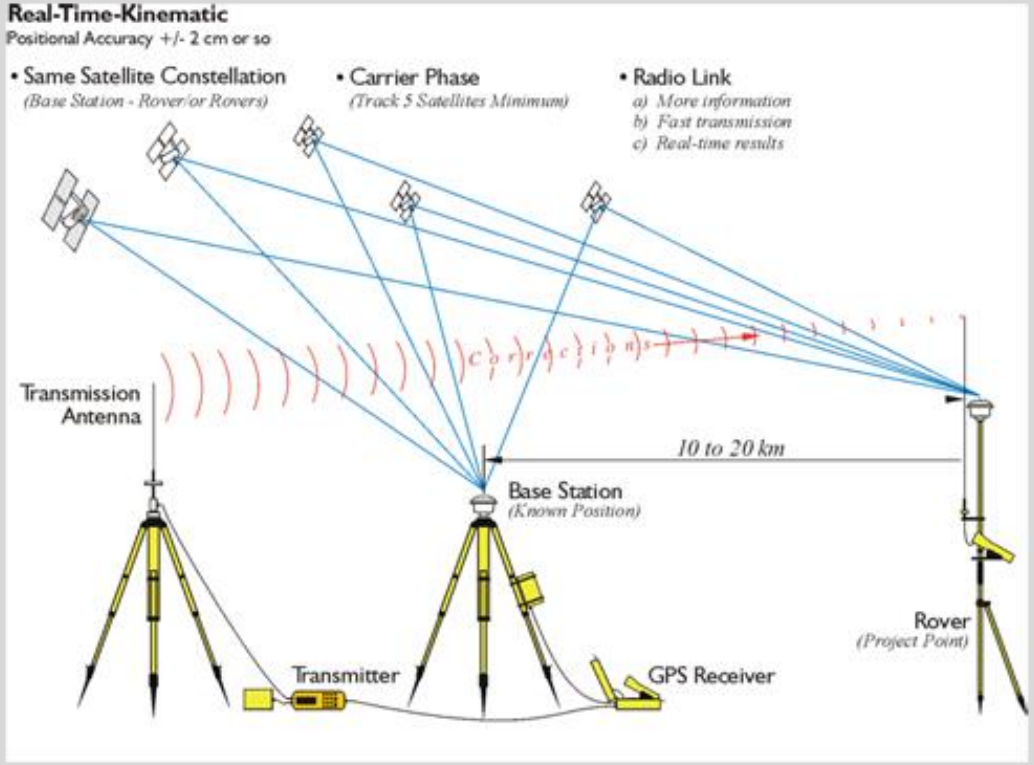


App : u-center 2 by u-blox

Documention and scientific articles online

Software : Arduino IDE

II & III- Issue / Problem – expected results



- *Problem* :

The GPS solution is not accurate enough (few meters)

- *Expected results:*

We expect a solution with accuracy of a few centimeters

- *Main tasks*:

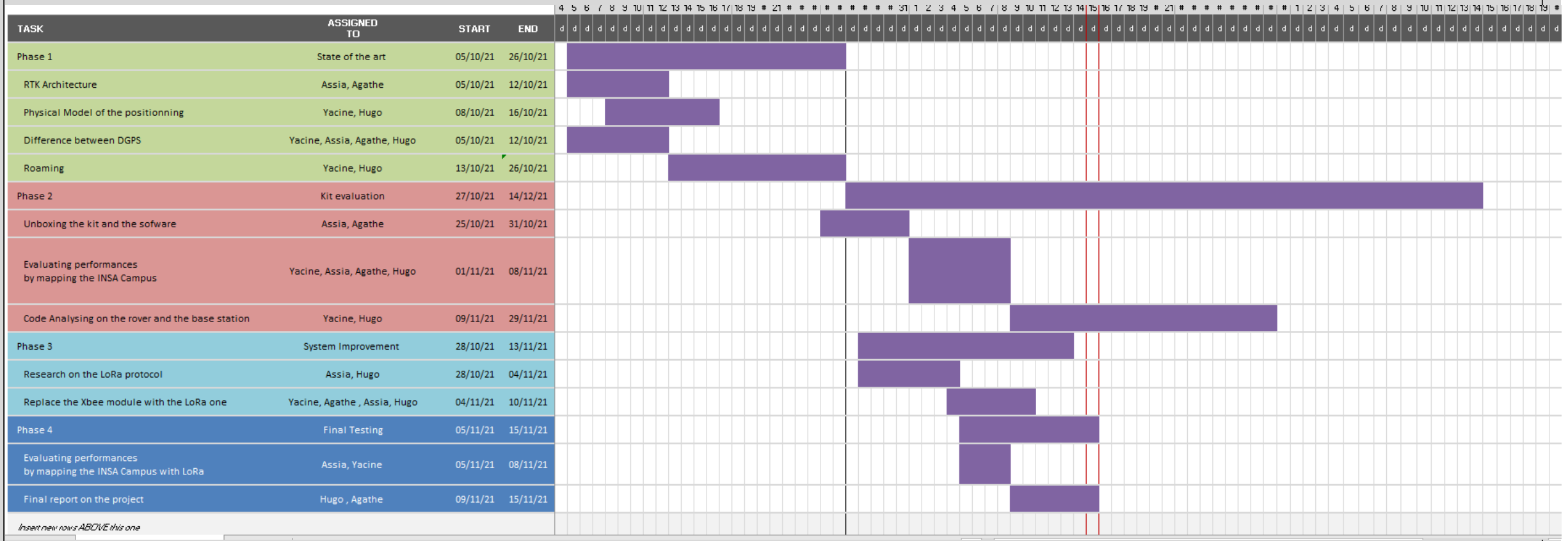
1) Evaluate the performances by mapping the INSA campus

2) Replace the xbee module with a LoRa one

3) Deploy a roaming system (one rover and several bases to cover more distance)

IV- Method Resolution & planning

Method resolution : agile method with weekly revues with the client



TASK	ASSIGNED TO	START	END
Phase 1	State of the art	05/10/21	26/10/21
RTK Architecture	Assia, Agathe	05/10/21	12/10/21
Physical Model of the positionning	Yacine, Hugo	08/10/21	16/10/21
Difference between DGPS	Yacine, Assia, Agathe, Hugo	05/10/21	12/10/21
Roaming	Yacine, Hugo	13/10/21	26/10/21
Phase 2	Kit evaluation	27/10/21	14/12/21
Unboxing the kit and the sofware	Assia, Agathe	25/10/21	31/10/21
Evaluating performances by mapping the INSA Campus	Yacine, Assia, Agathe, Hugo	01/11/21	08/11/21
Code Analysing on the rover and the base station	Yacine, Hugo	09/11/21	29/11/21
Phase 3	System Improvement	28/10/21	13/11/21
Research on the LoRa protocol	Assia, Hugo	28/10/21	04/11/21
Replace the Xbee module with the LoRa one	Yacine, Agathe , Assia, Hugo	04/11/21	10/11/21
Phase 4	Final Testing	05/11/21	15/11/21
Evaluating performances by mapping the INSA Campus with LoRa	Assia, Yacine	05/11/21	08/11/21
Final report on the project	Hugo , Agathe	09/11/21	15/11/21
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VI- Risk assesment

Risk Management Matrix		Impact				
		Negligible	Marginal	Moderate	Critical	Catastrophic
Probability	Almost Certain					
	Likely			LoRa not compatible with RTK		
	Possible			Deadline Issues	Positioning not accurate	
	Unlikely		Code Issues	Dividing the tasks		
	Rare					

THANK YOU !