Project Management Course (GEP)

New real-time GNSS algorithms for detection and measurement of potential geoeffective stellar flares

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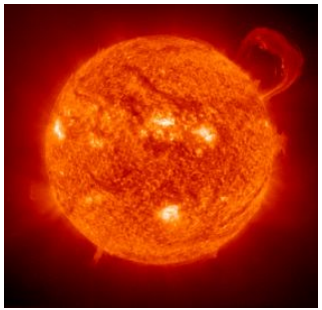
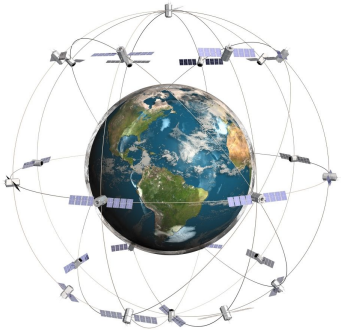
FIB

Introduction and areas of interest



Stellar flares



Global Navigation Satellite System (GNSS)

- Physics, astronomy, algorithms and the study of large sets of data
- Could be expanded to fields like AI

Main objectives

- Detecting solar flares without knowing the position of the sun
- Adapting the method to stellar flares
- Adapting the method to run in real time

State of the art

- **Far-away stars:** detected only using dedicated telescopes.
    - First study as a Bachelor Thesis conducted in 2016
- **Solar flares:** detected with currently existing algorithms

Development tools

- Version control: Git and GitHub
- Coding: GFortran, AWK, Python
- Report: LaTeX
- OS: Ubuntu 18.04.2 LTS
- Other tools: Sublime Text 3, Google Slides, teamgantt.com, etc

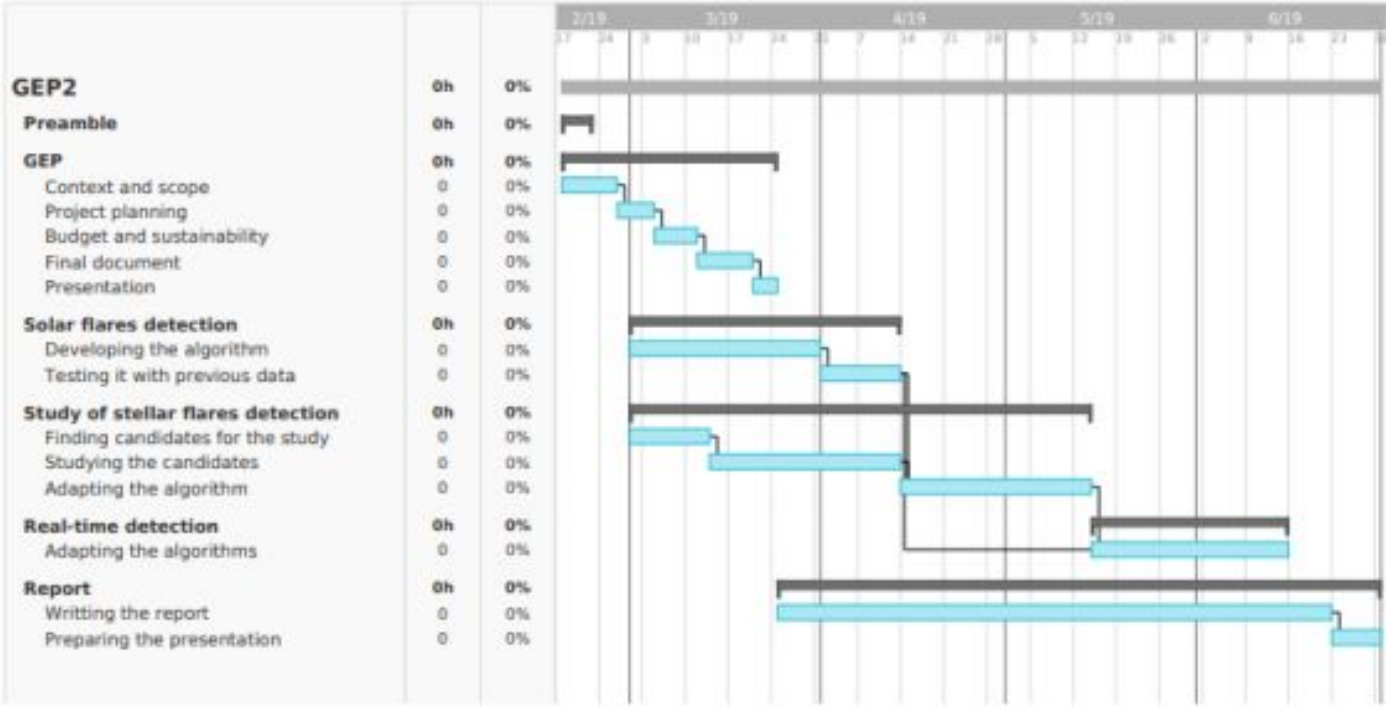
Scheduling | Task description

- Introduction: understanding the problem
- Project management (GEP)
- Study of the detection of flares from far-away stars
- Detection of solar flares with no information of the Sun’s location
- Adapting the algorithms to run in real time
- Writing the report and final presentation

Scheduling | Time Table

Task	Dedication Time (hours)
Introduction	20
GEP	90
Study of flares from far-away stars	120
Detection of solar flares	120
Detection in real-time	100
Writing report	90
Final presentation	4
Total	544

Scheduling | Gantt chart



Scheduling | Action plan

- Weekly meetings
- Email communication
- Rescheduling if any problem appears

Obstacles and risks

- Understanding the problem
- Unfeasibility of the solution
- Interferences with the Sun
- Computational power
- Bugs

Cost estimation | Hardware resources

Product	Units	Price	Useful life (years)	Amortization
Asus X555L	1	750 €	6	60 €
PC devices	1	200 €	6	20 €
Total		950 €		80 €

Cost estimation | Software resources

Common

Product	Units	Price	Useful life (years)	Amortization
Ubuntu 18.04	1	0 €	-	0 €
Google Chrome	1	0 €	-	0 €
Evince	1	0 €	-	0 €
Total		0 €		0 €

Cost estimation | Software resources

Developing the algorithms

Product	Units	Price	Useful life (years)	Amortization
Git	1	0 €	-	0 €
GitHub	1	0 €	-	0 €
Sublime Text 3	1	0 €	-	0 €
Python	1	0 €	-	0 €
GNSS Data	1	0 €	-	0 €
GFortran	1	0 €	-	0 €
Total		0 €		0 €

Cost estimation | Software resources

Writing the report

Product	Units	Price	Useful life (years)	Amortization
LibreOffice	1	0 €	-	0 €
LaTeX	1	0 €	-	0 €
TeamGantt	1	0 €	-	0 €
Total		0 €		0 €

Cost estimation | Human resources

Role	€/hour	Hours	Cost
Project manager	45	100	4500
Software developer	40	300	12000
Tester	30	150	4500
Total		550	21000

Cost estimation | Indirect costs

Product	Use	Price	Estimated cost
ADSL	4 months	40 €/month	160 €
Electricity	110 kWh	0.1067 €/kWh	11.7 €
Total			172 €

Total budget divided by task

Task	Estimated cost
Introduction to the problem	1106 €
GEP	4424 €
Feasibility of the detection of flares from far-away stars	4424 €
Detection of solar flares with no information about the location of the Sun	4424 €
Detection of stellar flares in real-time	3318 €
Writing the report and final presentation	4424 €
Total	22122 €

Sustainability

	PPP	Exploitation	Risks
Environmental	(2) Design consumption	(2) Ecological footprint	(2) Environmental risks
Economic	(4) Resources needed	(2) Cost	(7) Human resources
Social	(9) High personal impact	(5) Medium social impact	(2) Low social risks

Social sustainability

- Relevant project personally
- Experience in research
- Useful tool for astronomers

Economic sustainability

- Low cost compared to other alternatives:
  - GLAST
  - GOES

Environmental sustainability

- Low environmental impact for the setup
- Alternatives use solar energy to function

Thanks for your time