ESEIAAT

Budget for the Degree Thesis: Development of a performance simulator of solid propellant rocket motors

GRAU EN ENGINYERIA DE TECNOLOGIES AEROESPACIALS

Author:
Daniel CANTOS GÁLVEZ

Supervisor:
Dr. JAUME SOLÈ BOSQUET

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1   Introduction

As part of the structure outlined in [1], a budget is in order, as a separate file.

The development of this degree thesis does not involve using materials, physical components or manufacturing processes. It does not culminate in the production of any system. Thus, the only costs will be related to the person-hours devoted to the redaction of this report (and related materials) and the development of the simulator proper. It should be noted that most of the hours dedicated to the various project stages have not been strictly monitored. Nonetheless, a good enough approximation can be provided. The work will loosely follow the task distribution provided by the Gantt in the report, although updated, as the tasks ended up forming slightly different "groups" to those anticipated as the project was taking form.

A proper hourly wage, specially in Spain where this is not a usual method to measure wages [2] (unlike in the US for instance) is difficult to ascertain. A basic hourly value of $10 €$ for documentation and $15 €$ for programming will be used.

2   Budget

The structure is extracted from the information slides for the Degree Thesis. The thesis budget can thus be presented in table 1.

Name of the task	Duration (hours)	Hourly cost (€/hour)	Total cost (€)
Project Charter redaction	10	10	100
State of the Art	7	10	70
Fundamental equations	5	10	50
Nozzle theory	10	10	100
Chamber structural integrity	8	10	80
Grain combustion and flame mechanics	5	10	50
Heat transfer and thermal equations	20	10	200
Erosive burning model	15	10	150
Cracking model	6	10	60
Nozzle erosion model	10	10	100
Other non-ideal phenomena	15	10	150
Inner workings of the program	25	10	250
Comparison of results and verification	30	10	300
Conclusions and future plans	4	10	40
Final documentation revisions	15	10	150
Menu and data input	20	15	300
Finite volume discretization	4	15	60
Element per element calculations	15	15	225
Element switch	7	15	105
Other implementations inside Main	10	15	150
Performance results	3	15	45
Post processing program	16	15	240
Troubleshooting and changes	40	15	600
TOTAL	300	-	3575

Table 1: Thesis budget

3 Conclusions

For a full on distribution commercial distribution of PropSim as a product, calculations of the cost of a professional license (as outlined in the report of this thesis) would be necessary. Also the potential market that might be interested in the simulator.

However, since the beginning the simulator was envisioned as free and open for everyone, as the majority of other simulators for amateur rocketry are. Thus only the costs outlined on table 1 are really important for this budget.

4 Bibliography

References

[1] ESEIAAT - Seguiment TFG (course notes). https://atenea.upc.edu/course/view.php?id=64164. Accessed: 2021-01-09.

[2] Salario mínimo - España (in Spanish). https://tusalario.es/salario/minimo. Accessed: 2021-01-11.