Transponder on rockets

Project owner: Valentin Polishchuk

Project Background

Higher airspace operations (HAO), including flights to and from space, are picking up, with various types of vehicles straddling through the conventional airspace, on their way up and down. Currently each such HAO flight is surrounded by a hazard zone that the conventional air traffic should avoid. Such an approach does not scale to large volumes of HAO traffic because then large chunks of the conventional airspace will have to be blocked for prolonged times. The solution is to be able to track and monitor each HAO vehicle, eventually integrating them into conventional air traffic management (ATM).

This project focuses on monitoring sounding rockets, answering the question "What kind of transponder may be installed on a rocket?". The Swedish Space Corporation launches sounding rockets and plans to install a transponder on one of them (during an EU project, together with LiU and LFV); the question is which.

Aim and purpose

The project should address the following questions:

- What are the technical parameters of the various technologies for tracking and monitoring the rockets? Which specifications would an ideal technology have?
- Which technologies exist to track and monitor the rockets? What are their technical specifications and how do they match the ideal solution from above? What are the advantages and disadvantages of the different technologies? Which technology is best?
- What available data should be processed to quantitatively verify the answers to the questions above? What about HAO vehicles other than sounding rockets -- how the answers to your questions apply to them?

Project tasks and requirements

Analysed the related literature to answer the questions above in a report; download a sample of data.

Project group

The project should be conducted by a group of at least three and at most five students.

Contact

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Usage

The results will be a contribution to the research projects “T4HAO (Traffic Monitoring for High Altitude Operations)” and "Reviewing, Adapting and Developing CNS Infrastructure and Services to Ensure the Safe Integration of HAO And STO Vehicles" funded by Trafikverket and the European Union resp.

Grading

Except for the common requirements related to course grading specified in the course information, project-specific grading is given according to the scale Fail, 3,4, or 5 (or the corresponding ECTS grade).

Furthermore

- For 3, the technical parameters of at least one technology should be specified, and the requirements for the ideal technology should be listed
- Fur 4, several technologies should be compared quantitatively (with numbers)
- For 5, a sample of the data should be downloaded and processed (small sample is okay, this is just for the proof of concept), and a description of how the results apply to other vehicles should be given.

Details on request, after the project is considered by the students.