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ACTIVITIES (D5)

Knowledge management and collaboration in space activities (2)

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MATRIOCHKA SPACE PROJECT D5S2

Abstract

Matriochka is a bi-stage experimental rocket built by a student team from ESTACA, a leading French school in space engineering. Students work as volunteers in their free time. This project is a huge challenge because we design and build the rocket ourselves. Matriochka has a reusable first stage and the second stage is considered as payload which imposes flexibility and adaptability. It is the first time that the CNES has allowed this sequential order to be applied on experimental rockets in France. However, there are strict safety requirements.

Our organization is currently 23 years old. We discovered two previous rockets very close to our study case in term of structure impact, heat transfer and flight behaviour. Unfortunately, it was impossible to find any exploitable documents. The heads of project tried to help us but it was difficult for them to remember details, ten years after. This experience helped us understand that not transferring documents from one generation to the next costs time, data and skills.

Therefore, we created tools to ensure the transmission of Matriochka know-how. To make them as

accurate as possible, we imagined that the whole team would change. The idea was to convey documents that give concise and useful information to the next team. We tried to find the best compromise between technical exhaustiveness and efficiency. We drafted our specifications, design reviews, calculations, final solutions and technical notes for operations so as to convey tangible indications. Moreover, we wanted to maximize the training of each member (composite manufacturing, machining...) to guarantee innovation as well. With this method, they feel more confident, which leads to creativeness. Other tools were used to improve communication because motivation and dynamism inside the team is a key aspect.

Passing down data is necessary to anticipate. It is essential to raise awareness on the importance of technical notes, reports and feedback. This could prevent them from creating a concept that answers a need; but for which the solution already exists.

The success of one's innovative ideas rests on making use of previously accumulated technical data. An innovation could be defined as the combination of systems that aims to realize an objective never reached before. If those systems have already been tested, it makes the outcome more likely to be a success. The only way to accomplish this is to pass down all the useful information from past generations.