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Abstract #XXX (to be filled by the organizers)

Preferred Topics: REUSSA (8 papers for ReFEx are handed in – a dedicated session would be great)

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Title

ReFEx: Reusability Flight Experiment – Planning a MORABA Campaign in South Australia

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Abstract

In July 2024 DLR's ReFEx mission is planned to be launched from Koonibba Test Range (KTR) near Ceduna in South Australia. DLR's Mobile Rocket Base MORABA will conduct the campaign in close cooperation with the company Southern Launch which is located in Adelaide. Southern Launch operates KTR as well as a second launch site in South Australia at Whalers Way.

In the past MORABA had several campaigns in Australia but all these missions were launched from Woomera Test Range which was used to conduct sounding rocket mission for a long time. KTR however is a quite new launch site and ReFEx will in all likelihood be the first mission launching a two-stage rocket with an apogee above 100 km from this site.

This also implies that Mobile Rocket Base has to live up to its name and bring a lot of its mobile infrastructure to South Australia.

MORABA will bring its 5m telemetry dish together with the station containers. The same holds for MORABA's RIR 774 C-band radar station. In addition, MORABA's 1.5-m antenna will be placed at Mobella station together with a small telemetry rack. Mobella is a small pastoral station in the outback relatively close to the desired impact point of the ReFEx vehicle. According to this, MORABA has also to establish together with Southern Launch a ground infrastructure, including the implementation of data distribution networks for flight safety relevant position data and scientific data.

The necessity for all this stations and infrastructure results from the highly sophisticated mission profile of ReFEx. On-board data handling and flight safety is a huge part of MORABA's contribution to the mission. For the missions' success it is necessary to ensure that all relevant data will be processed on-board and transmitted to the ground in a safe, secure and reliable way. This includes several components developed by MORABA dedicated to data handling and telemetry as well as the usage and integration of commercial components, like the Flight-Termination-System-transmitter and receiver systems into the overall architecture.

The ground infrastructure has to be designed in a way that the interplay of all this data and components operates in an efficient way. This paper describes the data handling architecture, the planning of the ground infrastructure and the current status of the campaign planning.

References

[1] Bauer, W., Rickmers, P., Kallenbach, A., Stappert, S., Wartemann, V., Merrem, C. H.-J., Schwarz, R., Sagliano, M., Grundmann, J. T., Flock, A., Thiele, T., Kiehn, D., Bierig, A., Windelberg, J., Ksenik, E., Bruns, T., Ruhe, T., Elsässer, H.: DLR Reusability Flight Experiment ReFEx, *Acta Astronautica* 168 (2020) 57–68, <https://doi.org/10.1016/j.actaastro.2019.11.034>