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SWEDISH SUBORBITAL EXPRESS – NEW, VERSATILE AND COST-EFFICIENT SUBORBITAL CONCEPT FOR MICROGRAVITY SCIENCE, EDUCATION AND TECHNOLOGY TESTS FOR INSTITUTIONAL AND COMMERCIAL USERS

Abstract

Sweden has long traditions in suborbital research by means of sounding rockets, with the first Swedish sounding rocket launched already in 1961. Subsequently, a dedicated space centre, Esrange, was established outside the Swedish city Kiruna, known for large unpopulated surroundings and an excellent location for observing Northern lights, one of main research topics of rocket pioneers. Esrange is operated by the Swedish company SSC and its infrastructure for rocket and balloon launches is supported by the Swedish National Space Agency.

Since the establishment of Esrange in 1964, more than 570 rockets and 600 balloons have been launched with various science, technology and education experiments of scientists and users from many countries. Nowadays many suborbital rockets carry microgravity experiments within various science fields such as material sciences, biology and fluid dynamics. Several research groups continue utilising rockets for auroral and atmospheric research by means of new sensors and modern technology. A further application is the use of rockets for re-entry tests and technology demonstration.

A new Swedish sounding rocket concept, SubOrbital Express, has been recently established by SSC. It provides access to high quality microgravity environment with altitudes up 260 km as well as the unique capability of deploying drop bodies or re-entry test vehicles including land recovery. Through latest developments, SubOrbital Express is offering state of the art technology for instant monitoring of the experiment during the flight, data management and versatile service and recovery systems.

The SubOrbital Express is largely based on the New Space ideas, offering fast implementation of the experiment and cost-efficient ridesharing approach for both institutional and commercial users. Customers are offered "flight tickets" to perform their experiments in 6 minutes of microgravity and a wide range of engineering services, from launch and integration of hardware provided by the customer to full experiment module development.

The first rocket in the SubOrbital Express series was launched from Esrange in June 2019 and carried two experiment modules developed by SSC within the ESA European Exploration Envelope Programme (E3P) and two experiment modules of international customers, accommodated on commercial basis. This first flight was highly successful, from both technical and programmatic point of view, proving the new ridesharing approach timely, cost efficient and highly viable. The next mission is planned for June 2022.

The presentation will deal with the new sounding rocket concept, its technical and programmatic aspects, and the various opportunities offered for wider science and user community.