SubOrbital Express – A rideshare concept for everyone

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Abstract

Space agencies or large organizations have in the past been the major and most often the exclusive users of suborbital rocket missions. Costs associated with experiment development, rocket integration and the launch itself have prevented organizations with small budgets and small, single experiments from utilizing suborbital rockets as a platform. There is, however, an increasing demand for flight opportunities from this user group. To meet this demand, SSC has introduced a new service we call SubOrbital Express, a ridesharing concept with frequent flight opportunities for users with different mission objectives and payload sizes, now open to everyone world-wide. The maiden mission, SubOrbital Express M14 was launched from Esrange Space Center in June 2019, carrying experiments from Europe, Japan and Korea as well as promotional items.
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The SubOrbital Express service

Through SubOrbital Express, SSC offers frequent suborbital flight services from our launch facility, Esrange Space Center, on a rideshare basis to the international scientific community, agencies, institutions, universities and commercial actors. The service is run by an experienced engineering team that works in close contact with users to provide cost-effective solutions. The team masters disciplines of mechanics, electronic and power design, advanced software engineering, experiment system engineering, mission system engineering as well as integration and acceptance testing. The 24/7on-site engineering support by the team at Esrange Space Center ensures optimal results. SSC's launch manifest includes suborbital microgravity rocket flights from Esrange Space Center every 18 months with the next launch opportunity scheduled for early 2021. The microgravity missions may also serve as a platform for drop tests, for validation of technical systems in space environment and for flight of promotional items. There are also rocket platforms available that can be launched on short notice, as low as six months for uncomplicated payloads shared ride or dedicated missions which don't require microgravity.

SubOrbital Express maiden mission – M14

The SubOrbital Express M14 mission vehicle was launched from Esrange Space Center in June 2019. It carried a 300 kg scientific payload of four major microgravity experiments and a small biological cell experiment. In addition, small items of <200 grams related to charity and promotion were flown onboard M14. The users of the major microgravity experiments were ESA for two experiments, plus Space Solutions Co. (Korea) and Hokkaido (Japan) and Braunschweig (Germany) universities for one each. The latter was financed by JAXA and DLR. The payload reached an apogee of 245 km and spent six minutes in high quality microgravity at less than 10^{-4} g. The payload was recovered by helicopter and brought back to Esrange within three hours after the launch.

Conclusions

Access to space using suborbital rocket platforms has, in the past, with few exceptions, only been available for space agencies and large organizations. The successful SubOrbital Express maiden mission shows that rideshares enable affordable and easily available flight opportunities, opening the door to space for any institute or organization regardless of size and with different mission objectives and within various disciplines.

Fig 1: Launch of SubOrbital Express M14 from Esrange Space Center, June 2019