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SUPPORTING LAUNCHERS WITH CONVENTIONAL SATELLITE GROUND STATIONS:
A NEW FUNCTIONALITY FOR THE ANTARCTIC STATION GARS O'HIGGINS**Abstract**

The German Aerospace Centre (DLR) operates the “German Antarctic Research Station (GARS) O’Higgins” since 1991. The station is located on the Antarctic Peninsula and used as a satellite ground station, as well as a radio telescope for providing VLBI (Very Long Baseline Interferometry) measurements. DLR provides the classical portfolio of satellite services to polar orbiting spacecrafts: Telemetry, Tracking, and Command (TTC) services, LEOP supports and payload data reception services.

Virgin Orbit develops the unique “LauncherOne” small satellite launch vehicle. LauncherOne is dropped from an aircraft flying at a high altitude. The concept aims to provide more flexibility to its customers. After a first launch attempt on May 20th 2020, it proved successful with the launch of January 17th 2021.

Virgin Orbit approached DLR in 2019 to evaluate the capabilities of O’Higgins to support their maiden flight. This paper describes the tasks undertaken for supporting Launcher One.

Tasks encompass verification of the antenna constraints, RF (Radio Frequency) compatibility tests, station and mission control configuration, strategy development for increasing station systems reactivity, and tailoring of telemetry recording for launcher events. A cost analysis of these new features will be presented. In addition, the station auto-tracking capability was upgraded. It adapts to high variations of signal strengths. Another key change was the introduction of CCSDS OEM (orbit ephemeris message) tracking capability. In contrast to conventional TLE (Two Line Element) based tracking the new data format allows to describe manoeuvres. An overview highlighting interests of OEM based and TLE based tracking for various scenarios is included.

Finally, we will present the results and insights gained as launcher support station during the two Virgin Orbit launch events.