

IAF SPACE OPERATIONS SYMPOSIUM (B6)
Ground Operations - Systems and Solutions (1)

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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 will be dropped from an aircraft flying at a high altitude. The concept will provide more flexibility to its customers. 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 this evaluation. 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, while maintaining low costs for these new features. A cost analysis 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 from the Virgin Orbit launch event.