Aerospace Research in Alaska with the Geophysical Institute

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Abstract

Because of its vast size and Arctic location, the State of Alaska provides many advantages for aerospace research including: suborbital and orbital access to space; extensive training and operational areas for Uncrewed Aircraft Systems (UAS); and opportunities for upper atmospheric and ionospheric research. The Geophysical Institute (GI) at the University of Alaska Fairbanks owns and operates the Poker Flat Research Range (PFRR) 35 miles from campus. For almost 54 years the GI has been helping NASA and the DoD launch sounding rocket payloads north towards the pole for upper atmospheric and auroral research. The PFRR range offers numerous advantages over other land-based sounding rocket ranges including: high apogee (up to 1700 km); extended hold times (hours, days, weeks); multiple rocket launches (up to 5 in a few seconds); payload recovery ; and extensive ground-based science support for launches. PFRR is home to the NSF-sponsored Poker Flat Incoherent Scatter Radar (PFISR), and the GI operates a number of optical and RF sensors to support launches from the range northward to the Arctic Ocean. Additionally, space is made available to other researchers to install and operate ground-based instruments. At additional locations around the state, the NSF-sponsored SuperDARN radars and optical and RF sites are used to give wide area observations of ionospheric, thermospheric and auroral phenomena. In Gakona, AK, the GI operates the High-frequency Active Auroral Research Program (HAARP) with NSF support for active ionospheric research. HAARP is the cornerstone of a Sub-Auroral Research Observatory (SAGO). The Alaska Center for Unmanned Aircraft System Integration (ACUASI) has a 20+ year history of UAS test and evaluation and is expanding operations across the state and in cooperation with other states in the Lower 48. The Alaska Satellite Facility (ASF) operates four 11-m class antennas (S, X and Ka Band) for NASA to downlink data from polar orbiting satellite. To the south, the Alaska Aerospace Corporation (AAC) operates the Pacific Spaceport Complex Alaska (PSCA) with six launch pads and a 174-foot launch tower to launch suborbital and orbital vehicles southward from Kodiak Is. AK.