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NANOSATS AND SUBORBITAL FEASIBLE MISSIONS FROM A BRAZILIAN LAUNCH CENTER

**Abstract**

Analysis of possible nanosatellites missions and suborbital experiments are carried out in this paper, considering the launch from Barreira do Inferno Launch Center, the Brazilian Air Force facility dedicated to suborbital flights, high-performance unmanned aerial systems and, potentially, nanosatellites launching. Operational aspects are analyzed, such as vehicle specifications, payload requirements and recovery in the ocean, telemetry and tracking issues, weather and logistics; and scientific aspects, such as achievable orbits, revisiting time, nanosatellites lifespan, altitude and speed, among others. This paper also presents the facilities, features and opportunities of Barreira do Inferno. This Center is open to provide launch and tracking services to external users, like universities and aerospace industry, both national and international. The Center provides several resources and competitive characteristics, for instance: excellent logistics, geographic location close to the Equator line, two rocket launch pads, research facilities and world-class telemetry, tracking and control equipment. The studies carried out in this paper consider the launch from Barreira do Inferno compared to other suborbital-dedicated launch sites, namely Esrange and Andoya, which are usually preferred for these types of flights. The comparison indicates that Barreira do Inferno could be an alternative for users to operate sounding rocket missions, even for those who need payload recovery, as well as for the imminent market of nanosatellites launching using dedicated vehicles, mainly due to the geographic position of Barreira do Inferno, which provides to the researcher / designer a greater linear speed for his experiments due to the proximity to the Equator line. Moreover, this Center features greater availability for launches during the year due to tropical climate, which features well defined wet and dry seasons with minimal duration of rainy periods, around two months in a year; and the wind, which presents mostly adequate speeds and blows predominantly from southeast. The paper also analyses the safety requirements of the Center, considering the inhabited areas nearby and the geographic position of Barreira do Inferno on the east coast, without islands in the downrange, which brings many advantages in this field. The expertise accumulated by Barreira do Inferno in four decades and the cooperation with international institutions are also highlighted in the analysis.