

IAF SPACE TRANSPORTATION SOLUTIONS AND INNOVATIONS SYMPOSIUM (D2)
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Author: Dr. Meka Rajasekhar

Indian Space Research Organisation (ISRO), SDSC SHAR, Astronautical Society of India, India,
rajasekharmeka@gmail.com

Mrs. Suchitra P

Indian Space Research Organization (ISRO), India, suchitra0908@gmail.com

Mrs. Shanthi MS

Indian Space Research Organization (ISRO), India, shanthi.ms@shar.gov.in

Dr. A. K. Anil Kumar

Indian Space Research Organization (ISRO), India, akanil2007@gmail.com

WIND PROFILER UPPER AIR OBSERVATIONS FOR SPACE LAUNCH OPERATIONS

Abstract

The day of launch upper winds are concern for space launch vehicles. Particularly the high wind shears entail high aero dynamical loads on the vehicle during the flight phase. The Day of Launch Wind Biasing (DOL-WB) scheme avoids the risk of high wind loads on the launch vehicle and ensures the benign load conditions. This paper emphasizes the importance of the 49 MHz Doppler Wind Profiler at Satish Dhawan Space centre SDSC SHAR, India, a pivotal instrument for upper wind measurements for DOL-WB application.

The Doppler Wind Profiler (WP) radar is a sophisticated remote sensing instrument for overhead wind profiling. The WP radar at SDSC SHAR, Sriharikota is indigenously designed and developed radar and its is being used as the primary upper level wind instrument for ISRO Space Launch missions since 2022. The Troposphere and stratosphere upper air observations with WP radar are compared with synergistic balloon borne GPS Radio sonde observations during 2022 and 2023 space launch missions from SDSC SHAR. The RMS error observed is 1.45 m/s in Zonal component and 1.52m/s in Meridional component