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ATMOSPHERIC COUPLING AND DYNAMICS EXPLORER (ARCADE): EXPLORING THE  
TROPICS AT VERY LOW ALTITUDES**Abstract**

The Atmospheric Coupling and Dynamics Explorer (ARCADE) is a micro-satellite designed for low altitude ( below 300 km) flight in the tropical region. ARCADE is the fourth mission being built through the University Consortium of INSPIRE and is a collaboration of Nanyang Technological University in Singapore, University of Wuppertal in Germany, National Central University of Taiwan, Indian Institute of Space Science and Technology in India and University of Colorado at boulder in USA. The mission is Singapore led and launch is scheduled through Singapore on an ISRO PSLV in Q4 2020. ARCADE/IS-4 will carry an infrared spatial heterodyne interferometer developed at Forschungszentrum Julich, University of Wuppertal, to image the mesosphere lower thermosphere (MLT) region at 760 nm. MLT temperatures and gravity waves in the equatorial region are expected to be measured using the instrument. An ionospheric plasma instrument developed at National Central University in Taiwan, consisting of an RPA, a planar Langmuir probe, ion drift and ion trap meter will make high resolution measurements of the equatorial ionosphere at altitudes below 300 km to characterize ionospheric plasma disturbances and anomalies. The spacecraft is expected to be deployed into a 450 km orbit and will actively de-orbit using a hall effect thruster. Expected mission lifetime is one year with 4-6 months planned at altitudes below 350 km. In this paper we will discuss the instruments and science objectives in detail and the challenges associated with flying the spacecraft at very low altitudes. The spacecraft is almost 27U in size and deployed from a ring deployer. The development of miniature hall effect thruster with high total impulse opens up an exciting area of novel science missions. The spacecraft is currently being assembled in Singapore and will undergo flight IT and qualification testing in Q1 and Q2 of 2020.