

SPACE PROPULSION SYMPOSIUM (C4)
Propulsion System (1) (1)

Author: Dr. Vanniyaperumal Narayanan
Indian Space Research Organization (ISRO), India, v_narayanan@lpesc.gov.in

Mr. Dathan M C
Indian Space Research Organization (ISRO), India, director@shar.gov.in

Mr. SURESH MS
LPSC, ISRO, India, ms_suresh@lpesc.gov.in

Dr. K. Sivan
Indian Space Research Organization (ISRO), India, k_sivan@vssc.gov.in

Mr. VISHNU KARTHA NR
LPSC, ISRO, India, nr_v_karhta@lpesc.gov.in

Mr. KARTHIKESAN D
LPSC, ISRO, India, d_karthikesan@lpesc.gov.in

Mr. Jose paul Jose paul
LPSC, ISRO, India, josepaul@lpesc.gov.in

FLIGHT TESTING OF INDIAN CRYOGENIC UPPER STAGE

Abstract

Indigenous Cryogenic Upper Stage (CUS) developed by Indian Space Research Organization (ISRO) is successfully flight tested in GSLV-D5 mission on 5th January 2014. This stage is powered by a cryogenic engine operating in staged combustion cycle using liquid oxygen and liquid hydrogen. The CUS has a total propellant loading of 12,808 kg. The engine unit has a fixed main engine and two vernier steering engines with a total nominal thrust of 73.55 kN and uprated thrust capability of 109.5As part of development, the CUS main engine has undergone 39 hot tests and the steering engine has undergone 77 hot firings in engine and stage configurations. The flight articles after acceptance tests have been assembled with the stage system after carrying out health checks. In GSLV-D5 flight, all the pre-flight activities went off smoothly and the required lift off conditions were achieved. The on-board propellant chilling was normal and the required conditions at the time of engine start were achieved. The engine start and the ignition were as expected. After smooth build up in the transient phase, the engine attained the nominal thrust, operated in the 109.5