



Status of Outer Planet Global Reference Atmospheric Model (GRAM) Upgrades

Introduction

- One of the most widely used engineering models of the atmosphere is the Global Reference Atmospheric Model (GRAM) developed and maintained by the NASA Marshall Space Flight Center (MSFC)
- GRAMs are engineering-oriented atmospheric models that estimate mean values and statistical variations of atmospheric properties for numerous planetary destinations
- NASA Science Mission Directorate (SMD) has provided funding support to upgrade the GRAMs
- This poster summarizes the upgrades that have been made to the outer planet GRAMs, the release status of the upgraded outer planet GRAMs, the new outer planet GRAMs that are under development, and future GRAM upgrade plans

Status

- Developed the GRAM Suite, a common C++ framework that simplifies model updates, integration, testing, and maintenance
- GRAM ephemeris has been upgraded to the NASA Navigation and Ancillary Information Facility (NAIF) Spacecraft Planet Instrument C-matrix Events (SPICE) toolkit
- Updates to the existing planetary GRAMs and development of new planetary GRAMs are ongoing
- Neptune-GRAM will be the first upgraded planetary GRAM released in the GRAM Suite C++ format
- New GRAMs are being developed for Uranus, Jupiter, and Saturn
- Funding the development of empirical global models for Venus, Jupiter, Saturn, Uranus, Neptune, and Titan that will be used in future GRAM updates

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