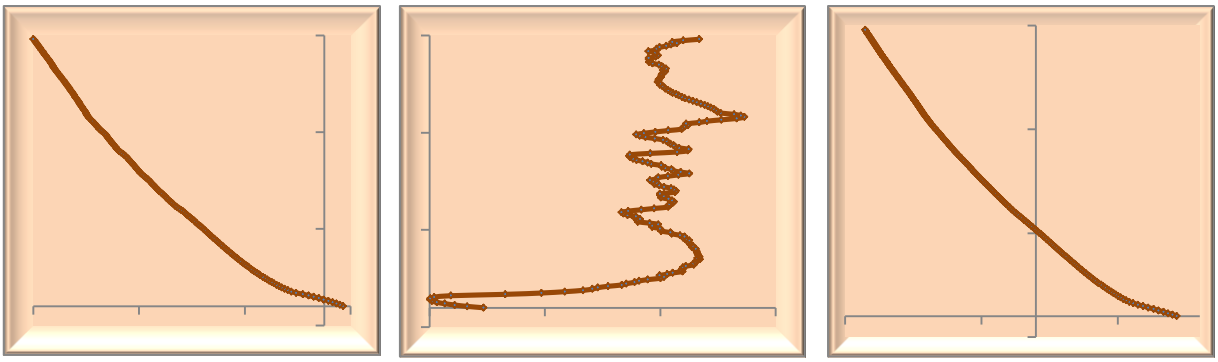

Titan atmosphere

An Orbiter add-on for the atmospheric model of Titan

Introduction

This add-on accurately reproduce the atmospheric model of Titan from an altitude of 1380 km to the ground, based on samples collected by the Huygens probe which entered Titan's atmosphere on 14-Jan-2005.

The dataset available here:
http://atmos.nmsu.edu/data_and_services/atmospheres_data/Huygens/Huygens.html
contains the engineering and scientific data derived from the measurements obtained by the HASI instrument during the entry phase and the descent phase.

Installation

Unzip the archive to the Orbiter root folder maintaining the folder structure.

Add the line: `Module_Atm = TitanAtm` to the file <Orbiter_root>\Config\Titan.cfg.

The DLL "TitanAtm.dll" included in this add-on assigns the value to the following atmospheric constants: ground level temperature, pressure and density, gas constant, ratio of specific heats and atmosphere altitude limit. The values assigned by "TitanAtm.dll" can be overridden by the lines: `AtmAltLimit`, `AtmGasConstant` and `AtmGamma` written in "Titan.cfg" which takes precedence over the DLL, while the lines: `AtmPressure0` and `AtmDensity0` are ignored by Orbiter (when this add-on is used).

This add-on assigns `AtmAltLimit` = 1380156, `AtmGasConstant` = 295.8391071 and `AtmGamma` = 1.4.

Accuracy

The following data files were used to reproduce the pressure, temperature and density profiles:
http://atmos.nmsu.edu/PDS/data/hphasi_0001/DATA/PROFILES/HASI_L4_ATMO_PROFILE_DESCEN.TAB
http://atmos.nmsu.edu/PDS/data/hphasi_0001/DATA/PROFILES/HASI_L4_ATMO_PROFILE_ENTRY.TAB
http://atmos.nmsu.edu/PDS/data/hphasi_0001/DATA/PPI/HASI_L4_PPI_PRESSURE_VEL.TAB
http://atmos.nmsu.edu/PDS/data/hphasi_0001/DATA/TEM/HASI_L4_TEM_TEMPERATURE.TAB

Since those sampled points are interpolated with a natural cubic spline, there are no interpolation errors, in other words, the values of the pressure, temperature and density reported in the data files are exactly matched by this add-on.

The following graphs show the values for the atmospheric parameters obtained from this add-on: