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IAF SPACE EXPLORATION SYMPOSIUM (A3)
Mars Exploration – missions current and future (3A)

Author: Dr. Frank Jansen
DLR (German Aerospace Center), Germany, frank.jansen@dlr.de

Mr. Benedikt Bergmann
CTU in Prague, Czech Republic, benedikt.bergmann@utef.cvut.cz
Dr. Tim Brandt
CTU in Prague, Czech Republic, tim.brandt@utef.cvut.cz
Mr. Friedrich Damme
Technical University of Berlin, Germany, friedrich.damme@tu-berlin.de
Dr. Emmanouil Detsis
European Science Foundation (ESF), France, edetsis@esf.org
Mrs. Simona Ferraris
Thales Alenia Space Italia, Italy, simona.ferraris@thalesaleniaspace.com
Mr. James AP Findlay
National Nuclear Laboratory, United Kingdom, james.ap.findlay@nnl.co.uk
Dr. Ikkoh Funaki
JAXA/ISAS, Japan, funaki.ikkoh@jaxa.jp
Dr. Oliver Funke
Deutsches Zentrum für Luft- und Raumfahrt e.V. (DLR), Germany, oliver.funke@dlr.de
Mr. Jan Thimo Grundmann
DLR (German Aerospace Center), Germany, jan.grundmann@dlr.de
Dr. Lamartine Nogueira Frutuoso Guimaraes
Instituto de Estudos Avancados, Brazil, guimarae@ieav.cta.br
Mr. Martin Hillebrandt
Deutsch Luft und Raumfahrt Zentrum (DLR), Germany, martin.hillebrandt@dlr.de
Prof. A.C. Koroteev
Keldych Research Centre, Russian Federation, koroteev@kerc.msk.ru
Dr. Daniel Kuehn
DFKI Robotics Innovation Center Bremen, Germany, daniel.kuehn@dfki.de
Dr. Jim C. Kuijper
The Netherlands, kuijper@nuclic.nl
Mr. Frederic Masson
Centre National d'Etudes Spatiales (CNES), France, frederic.masson@cnes.fr
Dr. Volker Maiwald
Deutsches Zentrum für Luft- und Raumfahrt e.V. (DLR), Germany, volker.maiwald@dlr.de
Prof. Jürgen Oberst
Deutsches Zentrum für Luft- und Raumfahrt e.V. (DLR), Germany, juergen.oberst@dlr.de
Mr. Stephane Oriol
Centre National d'Etudes Spatiales (CNES), France, Stephane.Oriol@cnes.fr
Prof. Stanislav Pospisil
Czech Technical University In Prague (CTU), Czech Republic, stanislav.pospisil@utef.cvut.cz
Mr. Martin Richter

DLR (German Aerospace Center), Germany, Martin.Richter@dlr.de
Dr. Lars Schanz
DLR (German Aerospace Center), Germany, lars.schanz@dlr.de
Dr. Alexander V. Semenkin
Keldych Research Centre, Russian Federation, semenkin@kerc.msk.ru
Dr. Alexander E. Solodukhin
Keldych Research Centre, Russian Federation, solodukhin@kerc.msk.ru
Prof. Ivan Stekl
CTU in Prague, Czech Republic, ivan.stekl@utef.cvut.cz
Mr. Tim Tinsley
National Nuclear Laboratory, United Kingdom, tim.tinsley@nnl.co.uk
Dr. Maria Cristina Tosi
Thales Alenia Space, Italy, mariacristina.tosi@thalesaleniaspace.com
Dr. Jean-Claude Worms
European Science Foundation, France, jcworms@esf.org

INPPS FLAGSHIP: 2020TH AND 2030TH MARS EXPLORATIONS

Abstract

The presentation summarizes INPPS (International Nuclear Power and Propulsion System) flagship non-human (2020th) and human (2030th) Mars exploration missions. The 2020th first flagship space flight is the complex, complete test mission for the second flagship towards Mars with humans (2030th). The most efficient approach is the completely tested first INPPS in the 2020th as the preparation of the second flagship with humans on board. The second INPPS (2030th) is also the regular space transportation tug Mars-Earth.

International requests for human Mars space flight is realizable by rationales for pursuing two INPPS Mars missions in the proposed period: 1) successful finalization of the European-Russian DEMOCRITOS and MEGAHIT projects with their three concepts of space, ground and nuclear demonstrators for INPPS realization (2017), 2) successful ground based test of the Russian nuclear reactor with 1MWel plus the important thermal emission solution by droplet radiators (2018), 3) reactor space qualification by Russia until 2025 and 4) the perfect celestial Earth-Mars-Earth-Jupiter/Europa trajectory in 2026-2031 to carry out maximal INPPS space flight tests. Set of issues of INPPS space system and all subsystems became identified and studied during DEMOCRITOS. Consequently critical performance will be studied by parallel realizations of the ground and nuclear demonstrators (until 2025). The INPPS space demonstrator considers directly results of ground and nuclear demonstrators tests. Realization of the space demonstrator in form of the first space qualification of INPPS with all subsystems in the middle of the 2020th plus INPPS tests for about one to two years – first in high Earth orbit and later in nearby Earth space environment means a complete concepts driven approval for all INPPS technologies for non-human/human INPPS-Mars missions.

Space subsystem results of MARS-INPPS design (with arrow wing radiators) will be described. In dependence – from a cluster with worldwide selected electric thrusters - the MARS-INPPS payload mass is up to 18 tons. This very high payload mass allows to transport three different payload - scientific, pure commercial and new media communication. The realization including tests is sketched: especially the need of non-human flagship Mars flight, the test towards Europa (including real time radiation monitoring) for maximal human Mars mission preparation for the second INPPS with humans to Mars. INPPS missions implicate Apollo and ISS comparable outcomes for science technologies, international dedication and additionnaly for space commercialization. Insofar - this MARS-INPPS presentation - convince high attendance of conference participants, commercial and new media investors.