

Fifth IAA International Conference on Low-Cost Planetary Missions
24 - 26 September 2003
Noordwijk, The Netherlands

FINAL PROGRAMME

09:00 G. Winters (Director of Technical and Operational Support), R. Bonnet (Honorary Chairman), S. Krimigis (General Chairman), J.M. Contant (IAA), C. Stavrinidis (Programme Chairman)

Plenary Session - Space Technology: Low Cost Planetary Missions
Time: 09:30-10:30

09:30 Beagle 2
Pillinger, C.
The Open University, UK

09:50 MESSENGER and New Horizons
Robert Farquhar

10:10 ROSETTA Mission Updates
John Ellwood
ESA-ESTEC

Session 1 - Low Cost Planetary Missions
Time: 11:00-13:00

11:00 The Low Cost Planetary Missions of the ESA Science Programme
Coradini, M.
ESA HQ - Science Directorate

11:20 The Neptune / Triton Explorer Mission: A Concept Feasibility Study 39
Esper, J.
NASA Goddard Space Flight Center

11:40 Low Cost Developments of the Rosetta Lander French Subsystems: Lessons Learned
Debus, A.*; Moura, D.**
*CNES BPI 1411, **CNES BPI 2003

12:00 Micro-Mars: A Low Cost Mission to Planet Mars with Scientific Orbiter and Lander Applications
Kerstein, L.*; Bischof, B.*; Renken, H.*; Hoffmann, H.**; Apel, U.***
*Astrium GmbH, **Deutsches Zentrum für Luft- und Raumfahrt e.V., ***Hochschule Bremen

12:20 MUSES-C Its Launch and Early Orbit Operations
Kawaguchi, J.; Fujiwara, A.; Uesugi, T.
ISAS

12:40 SMART-1 Project: Technology, Management and Mission Planning
Racca, G.D.; Foing, B.H.; Brinkmann, J.; de Bijl, J.; di Napoli, L.; Estublier, D.; Evrard, E.; Grünagel, R.; Lumb, R.; Marini, A.; Rumler, P.; Stagnaro, L.; van Dooren, J.
ESA/ESTEC

Session 2a - Mission Categories: Moon, Comets and Asteroids

Time: 14:00-15:20

14:00 Polar Night: A Lunar Volatiles Expedition

Mosher, T.J.*; Lucey, P.**

*Utah State University, College of Engineering, **University of Hawaii

14:20 Small Spacecraft Exploration of the Moon

Bussey, B.; Spudis, P.

The Johns Hopkins University Applied Physics Labor

14:40 The Euneos Mission An European Neo Space-Based Observatory

Martinot, V.*; Morbidelli, A.**

*ALCATEL SPACE Industries, **Observatoire de la Côte d'Azur

15:00 APIES: A Mission for the Exploration of the Main Asteroid Belt Using a Swarm of Microspacecraft

Santandrea, S.*; D' Arrigo, P.**

*ESA/ESTEC, **Astrium Ltd.

Session 2b - Mission Planning and Operations: Mission Design

Time: 14:00-15:20

14:00 SIMONE: Interplanetary Microsatellites for NEO Rendezvous Missions

Wells, N.*; Walker, R.*; Green, S.**; Ball, A.**

*QinetiQ, **Open University

14:20 Venus Microsat Explorer Programme

Van den Berg, M.L.; Falkner, P.; Atzei, A.C.; Peacock, A.

European Space Agency, ESA-ESTEC

14:40 Astrod-I: Mission Concept and Venus Flybys

Ni, W.T. et al

Tsing Hua University, Chinese Academy of Sciences

15:00 Analysis and Design of a Friction Brake for Momentum Exchange Propulsion Tethers

Lennert, S.*; Cartmell, M.P.**

*University of Glasgow & Technische Universität Darmstadt, **University of Glasgow

Session 3a - Mission Categories: Robotic Missions

Time: 15:40-17:40

15:40 Mars Hopper versus Mars Rover

Shafirovich, E.; Salomon, M.; Iskender, E.; Gökalp, I.

CNRS - LCSR

16:00 ARCHIMEDES (Aerial Robot Carrying High-resolution Imaging, a Magnetometric Experiment and Direct Environmental Sensing instruments)

Griebel, H.*; Kunze, A.**; Pauly, K.*; Knuth, S.*

*Mars Society Deutschland, **University Stuttgart

16:20 Improved Inflatable Landing Systems for Planetary Landers

Northey, D.; Morgan, C.

Analyticon Limited

16:40 Earth-Mars Similarity Criteria for Exploring Martian Vehicles

Savu, G.

COMOTI

17:00 A Low-Cost Approach to the Exploration of Mars Through a Robotic Technology Demonstrator Mission

Ellery, A.*; Richter, L.**; Cockell, C.***; Parnell, J.****; Edwards, H.*****

*Kingston University, **DLR, ***British Antarctic Survey, ****University of Aberdeen, *****Department of Forensic Chemistry

17:20 Robotics Options for Low-cost planetary Missions

Visentin, G.; van Winnendael, M.

ESA/ESTEC

Session 3b - Management Approaches

Time: 15:40-17:00

15:40 System Challenges in the Development of Low-Cost Planetary Missions

Carli, R.; Giulicchi, L.; Pablos-Chueca, P.; Novara, M.; Bagnasco, G.

ESA/ESTEC

16:00 A Proposed Small-World Model for Structural Organization of Mission Teams and Tasks in Order to Optimize Efficiency and Minimize Costs

Ribeiro, A.S.*; Almeida, M.**

*Instituto Superior Técnico of Lisboa, **ESA/ESTEC

16:20 Planetary Protection: Elements for Cost Minimization

Debus, A.

CNES BPI 1411

16:40 The Effect of Schedule Constraints on the Success of Planetary Missions

Bitten, R.E.; Bearden, D.A.; Lao, N.Y.

The Aerospace Corporation

25 September 2003

Session 4a - Mission Categories: Mars and Jupiter

Time: 09:00-10:40

09:00 A Low-Cost Mission to Mars

Von Schéele, F.; Frisk, U.; Jakobsson, B.; Ringstrand, H.; Veldman, S.

Swedish Space Corporation

09:20 Outpost in Jovian System - A Stepwise Long-term Undertaking

Yasaka, T.

Kyushu University

09:40 Concepts for a Low-Cost Mars Micro Mission

Walker, R.; Wells, N.; Price, M.; Jameson, P.

QinetiQ Ltd.

10:00 Jupiter Microsat Explorer Programme

Atzei, A.C.; Falkner, P.; Van den Berg, M.L.; Peacock, A.

European Space Agency, ESA-ESTEC

10:20 Preliminary Studies on the Planetary Entry to Jupiter by Aerocapture Technique
Aso, S.; Yasaka, T.; Hirayama, H.; Eko Poetro, R.
Kyushu University

Session 4b - Space Technology: Low Cost Spacecraft Concept
Time: 09:00-10:40

09:00 OPTIS - Micro-Satellite System to Carry out Tests of Special and General Relativity on High-Elliptical Orbits or Interplanetary Trajectories
Dittus, H.*; Lämmerzahl, C.**; Peters, A.***; Schiller, S.**
*ZARM, **Heirich-Heine-University, ***Humboldt-University

09:20 Advanced Microsatellite Mission - Deep Space Applications and Constraints
Chaloner, C.*; Olivier, B.*; Howieson, J.**
*Space Systems Division Systems Engineering & Asses, **ESA/ESTEC

09:40 Concepts of a Highly Integrated Payload Suite for Use in Future Planetary Missions on the Example of the BepiColombo Mercury Planetary Orbiter
Kraft, S.*; Buis, E.J.**; Montella, J.**; Beijersbergen, M.**; Erd, C.***; Falkner, P.***; Peacock, A.***
*Consine Research B.V. ESA/ESTEC, **Consine Research B.V., ***ESA/ESTEC

10:00 Prometheus: A Low-Cost Microsatellite Flyby Mission of 4179 Toutatis
Kennedy, F.; Coxhill, I.; Imre, E.; Fielding, J.; Atek, S.; Lappas, V.; Freebody, M.
University of Surrey

10:20 The Arrow Mission Concept of the Aurora Programme
Vennemann, D.; Steinkopf, M.
ESA/ESTEC

Session 5a - Space Technology: Low Cost Spacecraft Concept
Time: 11:00-13:00

11:00 A Near Earth Object Mission Demonstrator
Phipps, A.
Surrey Satellite Technology Ltd.

11:20 Micro, Nano and Pico Satellites Launched from the Romanian Territory
Savu, G.
COMOTI

11:40 Design of a Micro-Satellite for Precise Formation Flying Demonstration
Sanchez, R.
Astrium SA

12:00 The Contribution of the Science Technology Programme to Low-Cost Planetary Missions
Bagnasco, G.; Carli, R.; Giulicchi, L.; Novara, M.; Pablos, P.; Tirabassi, C.; Airey, S.; Boscagli, G.; Mancuso, S.; Plancke, P.; Rueda-Boldo, P.; Schautz, M.; Nicolini, D.
ESA/ESTEC

12:20 The Impact of Advanced Platform and ION propulsion Technologies on Small Low-Cost Interplanetary Spacecraft
Clark, S.*; Fearn, D.**
*QinetiQ, **EP Solutions

12:40 Entry Descent and Landing Systems for Small Planetary Missions: Parametric Comparison of Parachutes and Inflatable Systems for the Proposed Vanguard Mars Mission

Allouis, E.; Ellery, A.; Welch, C.

Kingston University

Session 5b - Space Technology: Sensor and Instrumentation

Time: 11:00-13:00

11:00 Autonomous Star Tracker Development for the New Horizons Mission

Haley, D.; Strikwerda, T.E.*; Ailinger, K.A.*; Casini, R.**; Landi, A.**; Bettarini, R.**

*The Johns Hopkins University, **Galileo Avionica

11:20 The Autonomous Asteroid Mapping Mission, "Bering"

Michelsen, R.**; Andersen, A.***; Haack, A.**; Jørgensen, J.L.*; Betto, M.*; Jørgensen, P.S.*

*Technical University of Denmark, Oersted.DTU, **University of Copenhagen, ***Nordita

11:40 A Family of Space Qualified Microelectronics Technologies Developed and Flying on Spacecraft and Instrumentation Systems

Paschalidis, N.

The Johns Hopkins University

12:00 Improve Satellite Radio Navigation System Performances Using Linear Kalman Filtering

Hajiyev, C.

Istanbul Technical University

12:20 Sample Analysis at Mars

Brinckerhoff, W.B.*; Cornish, T.J.*; Mahaffy, P.R.**; Harpold, D.N.**; Niemann, H.B.**; Cabane, M.***; Israel, G.***; Atreya, S.K.****; Owen, T.+; Raulin, F.++

*The Johns Hopkins University, **NASA Goddard Space Flight Center, ***Université Pierre et Marie Curie, ****University of Michigan, +University of Hawaii at Manoa, ++LISA, Université de Paris VII et XII

12:40 Enhanced Mission Performance from Autonomous Instrument Guidance

Jørgensen, J.L.*; Betto, M.*; Denver, T.*; Jørgensen, P.S.*; Tuñón, L.J.**

*Technical University of Denmark, Oersted.DTU, **Majoring at Oersted.DTU 2002

Session 6a - Mission Categories: Solar Sail

Time: 14:00-15:40

14:00 GEOSAIL: Exploring the Magnetosphere Using a Low Cost Solar Sail

McInnes, C.*; Macdonald, M.*; Hughes, G.*; Alexander, D.**; Sandman, A.**; Angelopoulos, V.*

*University of Glasgow, **Lockheed Martin Advanced Technology Center

14:20 Multiple Rendezvous and Sample Return Missions to Near Earth Objects Using Solar Sailcraft

Dachwald, B.; Seboldt, W.; Richter, L.

German Aerospace Center (DLR)

14:40 Magneto Plasma Sail: An Engineering Satellite Concept and its Application for Outer Planet Missions

Yamakawa, H.*; Fujita, K.*; Ogawa, H.*; Nonaka, S.*; Kuninaka, H.*; Sawawi, S.*; Funaki, I.**; Otsu, H.***

*ISAS, **The University of Tsukuba, ***Shizuoka University

15:00 Heliopause Explorer - A Sailcraft Mission to the Outer Boundaries of the Solar System

Leipold, M.*; Fichtner, H.**; Heber, B.***; Groepper, P.; Lascar, S.****; Burger, F.****; Eiden, M.****;

Niederstadt, T. +; Sickinger, C.+; Herbeck, L.+; Seboldt, W.+; Dachwald, B.+; Hughes, G.++; McInnes, C.++

*Kayser-Threde GmbH, **2Ruhr University, ***University of Osnabrück, ****ESA/ESTEC, +DLR, ++University of Glasgow

15:20 Terrestrial Planet Sample Return Using Solar Sail Propulsion
McInnes, C.R.; Macdonald, M.; Hughes, G.W.
University of Glasgow

Session 6b - Space Technology: Payload
Time: 14:00-15:40

14:00 Demonstration of Comet Sample Collection by Penetrator
Lorenz, R.D.; Boynton, W.V.; Turner, C.
University of Arizona

14:20 Telescoping Sample Canister Capture Mechanism
Mukherjee, S.; Gorevan, S.; Kong, K.Y.
Honeybee Robotics

14:40 ALMA da AGUA: A space Awareness Initiative 62
Ribeiro, D.S.A.*; Clar, R.**
*Companhia Espacial Portuguesa, Lda., **Art Technologies

15:00 The Messenger Science Payload
Gold, R.E.*; Mc.Nutt, Jr., R.L.*; Solomon, S.C.**; The 'MESSENGER' Team***
*Johns Hopkins Univ. Applied Physics Lab, **Department of Terrestrial Magnetism, ***Various Institutions

15:20 Different Drill Tool Concepts
Senese, S.*; Cherubini, G.*; Magnani, P.G.*; Re, E.*; Olivieri, A.**
*Galileo Avionica, **Italian Space Agency Space Technology: Sensor and Instrumentation

Session 7a - Delivery Systems
Time: 16:00-17:00

16:00 ALMA Sounding Rocket Payloads as Precursors for a Multipurpose Service Module to Support Future ESA Low-Cost Missions
Ribeiro, D.S.A.
Companhia Espacial Portuguesa, Lda.

16:20 The Rocket Launch Vehicle - the Successful German/Russian Partnership in Space Transportation
Freeborn, P.; Viertel, J.
EUROCKOT Launch Services GmbH

16:40 Flexible Variable-Specific-Impulse Electric Propulsion Systems for Planetary Missions
Chesta, E.*; Estublier, D.*; Fallis, B.*; Gengembre, E.*; Gonzalez del Amo, J.*; Kutufa, N.*; Nicolini, D.*; Saccoccia, G.*; Casalino, L.**; Dumazert, P.***; Noci, G.****; Boeuf, J.P.+; Biagioni, L.++
*ESA-ESTEC, **Politecnico di Torino, ***SNECMA Moteurs, ****LABEN, +CNRS-CPAT, Université P. Sabatier, ++ALTA S.p.A

Session 7b - Mission Planning and Operations: Tracking/Ground Segment
Time: 16:00-17:20

16:00 File-Based Data Processing on MESSENGER
Krupiarz, C.; Calloway, A.B.; Frangos, C.M.; Heggstad, B.K.; Holland, D.B.; Stratton, W.C.
The Johns Hopkins University Applied Physics

16:20 Coordinating UHF Relay Activities at Mars
Gladden, R.; Waggoner, B.; Fieseler, P.; Hwang, P.
NASA (JPL)

16:40 Use of the Ground Support Equipment Operating System (GSEOS) Software on the MESSENGER
Mission: A Case Study
Finnigan, J.; Hanck, T.
JHU/APL

17:00 Netlander Thermal Control
Romberg, O.*; Block, J.*; Nadalini, R.**
*OHB-System, **University of Muenster

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Session 8 - Space Technology: Sensor & Instrumentation
Time: 09:00-10:20

09:00 Autonomous Optical Navigation for Interplanetary Exploration Based on Information of Earth-Moon
Pingyuan, C.*; Xiangyu, H.*; Hutao, C.*; Enjie, L.**
*Deep Space Exploration Research Center, **China National Space Administration

09:20 Advanced Stellar Compass Deep Space Navigation, Ground Testing Results
Betto, M.; Jørgensen, J.L.; Jørgensen, P.S.; Denver, T.
Technical University of Denmark, Oersted.DTU

09:40 Wide Area MicroProbe Analyser (WAMPA)
Rogoyski, A.M.*; Skidmore, B.*; Maheswaran, V.*; Zarnecki, J.**; Wright, I.**; Pillinger, C.**
*ESYS plc, **Open University

10:00 Successful Mars Remote Sensors, MGS TES to MER Mini- TES
Silverman, S.
Raytheon SBRS

Session 9 - Space Technology: Payload/Miniaturisation
Time: 10:40-11:40

10:40 Challenges and Innovative Technologies for Low-Cost Planetary Missions
Prof. Dr Roeser
Director University Stuttgart

11:00 Design and Performance of the BepiColombo Mercury Planetary Orbiter
Kraft, S.*; Buis, E.J.**; Collon, M.**; Montella, J.**; Beijersbergen, M.**; Erd, C.***; Den Hartog, R.***;
Owens, A.***; Falkner, P.***; Peacock, A.***
*ESA/ESTEC, Consine Research B.V., **Consine Research B.V., ***ESA/ESTEC

11:20 Imaging and Localisation s/w demonstrator for planetary aerobots
Woods, M.
SciSys

11:40-12:00 Closing Session & Discussions