



INTERNATIONAL ACADEMY OF ASTRONAUTICS



10th IAA Symposium on the Future of Space Exploration: Towards the Moon Village and Beyond

Torino, Italy
Politecnico di Torino, Main Campus
Corso Duca Degli Abruzzi 24

June 27-29, 2017

PROGRAM

- June 27, 2017** The sessions of June 27 will be held at the ALTEC facility, Corso Marche 79.
Transportation between the Politecnico and ALTEC will be provided
Buses will leave The Main Entrance of Politecnico (C. Duca degli Abruzzi 24) at 8.15
- 8.30-10.00 **Registration (at ALTEC)**
9.00 **Welcome to the participants**
V. Giorgio, ALTEC CEO
Valter Cugno, ALTEC
M. Gilli, Rector of Politecnico di Torino
F. Graziani, IAA Trustee
G. Genta, Politecnico di Torino, Local Organizing committee
- Session 1. Chairperson: Les Johnson
- 9.30 **The Moon Village as a Launching Pad for SMEs**
K. Acierno; ispace Europe, Luxembourg
- 9.50 **Russian View of the Moon Village Concept**
Y. N. Razoumny, Y. N. Makarov et al., RUDN University, Keldysh Institute, Roscosmos, Russia
- 10.10 **Moon Surface Habitability Technologies for Future Human Lunar Settlements**
C. Lobascio, Thales Alenia Space
- 10.30 **The Moon Village Association**
G. Reibaldi, M. Grimard, A. Kapoglu, I. Marboe, N. Vidra, A. Barton, C. Welch
- 10.50 **Coffee break**
- 11.20 **Round Table: Towards the Moon Village**
Moderator: F. Graziani, IAA Trustee
V. Giorgio, ALTEC CEO
ISRO Representative, (TBC)
Y. N. Razoumny, RUDN University, , Russia
K. Acierno; ispace Europe, Luxembourg
G. Reibaldi, Director Human Space Flight, IAA
- 12.30 **Lunch**
- 13.45 **Visit to Thales Alenia Space and ALTEC facilities**
- Session2 International exploration, cooperation & governance. Chairperson: Giancarlo Genta
- 15.00 **Exploration and the International Space Station**
S.J. Scimemi; Director, International Space Station, NASA Headquarters
- 15.20 **From Roadmap to Launchpad – Europe in the Context of International Exploration of the Moon**
M. Landgraf, S. Hosseini, Naoki Sato, ESA/ESTEC, The Netherlands, ISAE-SUPAERO, HTV, Japan
- 15.40 **Access to Space: Capacity-building for development through experiment and payload...**
D. García Yárnoz, A. Kojima, S. Di Pippo; United Nations Office for Outer Space Affairs (UNOOSA)
- 16.00 **Living in the Moon Village - Ethical and legal questions**
I. Marboe; University of Vienna, Austria
- 16.20 **The Hague Space Resources Governance Working Group. Status Report**
G. Reibaldi, T. Masson-Zwaan, R.Lefebber, D. Stefoudi, IAA, Leiden Univ., Univ. Of Amsterdam

- 16.40 **Lunar Production and Research Base**
O. Degtyarev, O. Kashanov, O. Kushnar'ov; Yuzhnoye State Design Office, Ukraine
- 17.00 **IAA SG 3.27: Towards the utilization of the Moon, Preparing for Mars**
G. Genta, O. Ventskovsky, L. Johnson, Politecnico di Torino, Yuzhnoye State Design, NASA
- 17.20 Video **Are We Alone** by Michael Bohme
- 17.40 **Concert** by the choir of Politecnico di Torino
- 18.40 **Coffee break**
- 19.10 Return to Politecnico di Torino (by bus)

June 28, 2017

- Session 3a: Science from the Moon (In parallel with session 3b) Chairperson: Ian Crawford
- 8.30 **Science Enabled by a Moon Village**
I. A. Crawford, Birkbeck College, University of London, GB
- 8.50 **Towards a long-term lunar environment observatory**
E. Stoll, H. -U. Auster et al., TU Braunschweig, Germany
- 9.10 **Ultra-Long-Wavelength Astronomy from the Moon**
L.I. Gurvits; Delft University of Technology, The Netherlands
- 9.30 **A New View on Solar Wind - Moon Interaction from SARA aboard Chandrayaan-1**
A. Bhardwaj and SARA team; Physical Research Laboratory, Ahmedabad, India
- 9.50 **Science from the Indian Lunar Mission Chandrayaan-2**
Anil Bhardwaj and Team; Physical Research Laboratory, Ahmedabad, India
- Session 3b: Robots and rovers (In parallel with session 3a) Chairperson: Ken Roy
- 8.30 **Exploring the surface of the Moon or of Mars: what kind of ground vehicles are required?**
M. Baratta, G. Genta, D. Laurenzano, D. Misul, Politecnico di Torino, Torino, Italy
- 8.50 **Space Science and Exploration at the Moon and Mars Facilitated by Surface Telerobotics**
J. O. Burns, T. Fong et al. University of Colorado, Boulder, CO, USA, NASA Ames, CA, USA
- 9.10 **Space missions for sample return: strategies, architectures, technologies, problems and differences for the Moon, Phobos, Mars and the asteroids**
A. Ferri, F. Massobrio, A. Anselmi; Thales Alenia Space, Torino, Italy
- 9.30 **KLT for deep space communications**
N. Antoniotti
- 9.50 **Interplanetary CubeSats for Asteroid Exploration: Mission Analysis and Design**
G. Benedetti, N. Bloise et al.; Politecnico di Torino, Torino, Italy
- 10.10 **Coffee break**
- Session 4a: Near term Moon exploration (In parallel with session 4b) Chairperson: Maria Antonietta Perino
- 10.40 **CHANDRAYAAN -2 - Lunar Lander Mission**
M. Annadurai, G. Nagesh, M. Vanitha, ISAC, India
- 11.00 **A Newtonian logistic system for the Earth-ISS-Moon cargo delivery**
M. M. Khoshyaran; Economics Traffic Clinic- ETC, Paris, France.
- 11.20 **Feasible Objectives of Ukrainian Participation in Prospective Lunar Missions**
Y.G. Shkuratov, A.A. Konovalenko et al.; NASU, LESIA & USN, Observatoire de Paris, France
- 11.40 **Moon Farside Protection, Moon Village and PAC (Protected Antipode Circle)**
Claudio Maccone; IAA
- 12.00 **NASA'S Space Launch System: Progress Toward the Proving Ground**
A. Jackman, L. Johnson, NASA Marshall Space Flight Center, Alabama USA
- 12.20 **Small-scale High Acceleration Lunar Massdriver**
M. Ehresmann, G. Herdrich, R. Laufer; University of Stuttgart, Germany, University of Cape Town, South Africa
- Session 4b: Space transportation (In parallel with session 4a) Chairperson: TBD
- 10.40 **Thermal-structural analysis of a square solar sail**
L. Boni, A. A. Quarta, G. Mengali; University of Pisa, Pisa, Italy
- 11.00 **How the Lunar Space Tug can support the Cislunar Station**

- M. Mammarella, C. A. Pissoni et al., Politecnico di Torino, Italy
- 11.20 **Smart Dust Relative Motion in Circular Heliocentric Orbits**
G. Mengali, A. A. Quarta; University of Pisa, Pisa, Italy
- 11.40 **Translunar Trajectories for Electric Sail Testing**
L. Niccolai, A. A. Quarta, G. Mengali, F. Petrucciani; University of Pisa, Pisa, Italy
- 12.00 **Distributed Coordinated Control for E-Sail Formation Flying Around Heliocentric Displaced Orbit**
Wei Wang, A. A. Quarta, G. Mengali, J. Yuan; University of Pisa, Pisa, Italy
- 12.20 **Locally-Optimal Electric Sail Transfer**
M. Bassetto, A. A. Quarta, G. Mengali; University of Pisa, Pisa, Italy
- 12.40 **Lunch**
- Session 5a: Low cost Moon exploration - Moon Village technology 1 (In parallel with session 5b) Sabrina Corpino
- 14.00 **ispace & Team Hakuto's 2017 Lunar Mission**
K. Acierno, ispace Europe, Luxembourg
- 14.20 **6U CubeSats and electrospray propulsion systems to lunar orbits**
M. Benetti, C. Colombo, C. Ryan; Politecnico di Milano, Italy, University of Southampton, U. K.
- 14.40 **Orbital Space Solar Power Option for a Lunar Village**
L. Johnson; NASA Marshall Space Flight Center, Huntsville, USA
- 15.00 **The Lunarport concept, a launch and supply station for deep space missions - A comparative study of the two concepts elaborated at the 2017 Caltech Space Challenge**
- 15.20 J. Gilleron, D. DeLatte et al. ; ISAE-SUPAERO, University of Tokyo et al.
Experimental Analysis for Lunar Landing dynamic motion influenced by Regolith
Masahiro Nohmi, Koki Oshima, Shizuoka University, Japan
- Session 5b: Mars exploration (In parallel with session 5a) Chairperson: Angela Jackman
- 14.00 **Sleepwalking to Mars: A Policy Vacuum**
T. Pakulski; TU Berlin, Germany
- 14.20 **Fast Human Mars Missions: what are the actual requirements?**
G. Genta, P. F. Maffione, DIMEAS, Politecnico di Torino, Torino, Italy
- 14.40 **Some considerations for Moon and Mars manned missions**
J.-M. Salotti, Univ. Bordeaux, CNRS, Bordeaux INP, France
- 15.00 **Earth Mars Cyclers for a sustainable Human Exploration of Mars**
E. Gargioli; S. Pelle et al.; Thales Alenia Space Italia, Politecnico di Torino, Italy
- 15.20 **The Poland Mars Analogue Simulation as a stepping stone for future Mars Exploration**
I. Cinelli, S. Hettrich et al.; Space Generation Advisory Council, Vienna, Austria
- 15.40 **Mars Space Suit Safety**
J. Lousada; Space Generation Advisory Council, Vienna, Austria
- 16.00 **Coffee break**
- Session 6a: Moon Village technology 2 (In parallel with session 6b) Chairperson: TBD
- 16.30 **Closed-loop 3D printing for the Lunar Village and future planetary exploration**
S. Siarov, A. Cowley, M. Vera, M. Frateri, J. Reguette; ESA EAC, DLR, Köln, Germany
- 16.50 **Road Map to Build Civil Engineering Structures on Moon - An Over View**
M. Annadurai, I. Venugopal, ISRO., ISAC, Bengaluru, INDIA
- 17.10 **Manufacturing Of Experimental Layer Technology: Melt Project Status and Evolution In A Lunar Base Perspective**
A. Dauriskikh, A. Sgambati et al. "Sonaca Space GmbH, Berlin, Germany, et al.
- 17.30 **Japan Space Architecture Competition, Which Encourages the Next Generation for Long Range Space Exploration and Development**
M. Onuki, Space Access Corporation, Japan
- 17.50 **Using the ESA Exploration Technology Roadmaps in Support of New Mission Concepts And Technology Prioritization**
S. Cresto Aleina, R. Fusaro, N. Viola, G. Saccoccia; Politecnico di Torino, ESA- ESTEC, Noordwijk
- Session 6b: Human factors (In parallel with session 6a) Chairperson: Greg Matloff
- 16.30 **Physiological adaptation of the nervous system to space flight, Opportunity for physiotherapy?**
J. A. Gil Sucerquia; Universidad de la Sabana, Chía, Cundinamarca, Colombia
- 16.50 **Human Aspects in Extended Space Travel Design**
A. G. Faddoul; Tony Sky Design Group, New York, USA,
- 17.10 **Role Of Veganism In The Future Of The Space Exploration**

- 17.30 O. López, D. Mateus, D Mendoza; Universidad Nacional de Colombia,
Human Enactive Approach for Integrated Health and Safety for Long Duration
 S. Grès; ARTSEM, Paris, France
- 17.50 **Run, Hike, and Camp on the Moon**
 A. G. Faddoul; Tony Sky Design Group, New York, USA,
- 19.30 **Official Dinner**

June 29, 2017

- Session 7: Interstellar exploration & SETI Chairperson: Mae Jemison
- 8.30 **The Breakthrough Initiatives: A New Search For Life In The Universe**
 S. P. Worden, Breakthrough Prize Foundation, Menlo Park, USA
- 8.50 **Prospects for Terraforming Planets around M Dwarf Stars**
 K. Roy ; Tennessee Valley Interstellar Workshop
- 9.10 **Project Dragonfly: sail to the stars**
 M. Kushwaha, O. Celik, T. Häfner; Cranfield University, Cranfield, United Kingdom
- 9.30 **The Motivation and Frequency of Interstellar Migrations: A Possible Answer to Fermi's Paradox**
 G. L. Matloff, Physics Dept., New York City College of Technology, USA.
- 9.50 **Developing Predictive Models: Individual and Group Breakdowns in Long-Term Space Travel**
 A. Almon, 100 Year Starship
- 10.10 **How to be Humans in Space?**
 K. Aspelund, 100 Year Starship and University of Rhode Island
- 10.30 **The Evo-SETI unit of Evolution should be named after Darwin**
 C. Maccone; IAA
- 10.50 **Coffee break**
- 11.10 **Round Table on Interstellar Exploration**
Moderator: M Jemison, Principal, 100 Year Starship
 L. Johnson, NASA George C. Marshall Space Flight Center, USA
 G. Matloff, NYC Technical College, CUNY, USA
 G. Genta, Politecnico di Torino, Italy
 M. Millis, Tau Zero Foundation
- 12.40 **Lunch**
- 14.00 **Synthesis of the Symposium**
 L. Johnson, NASA George C. Marshall Space Flight Center, USA
 G. Reibaldi, Director Human Space Flight, IAA
- 14.30 **Closing**