

# **BOOK OF ABSTRACTS – PART III**

Afternoon Session Dec 6, 2009

## **Lunar Industrialization Challenges**



**In cooperation with:**



Fonds National de la  
Recherche Luxembourg

3 <sup>rd</sup> International Conference		Luxembourg Dec 5-6, 2009
--	--	--------------------------

## Day 2: December 6, 2009

Time	Topic	Speaker
14:00	Lunar Industrialization Challenges – An introduction	<b>John Winter</b> , ESW, Luxembourg
14:15	NASA Regolith Excavation & MoonROX Challenges	<b>Matt Everingham</b> , California Space Education and Workforce Institute, USA
14:45	WHITE LABEL SPACE – Netherlands based Google Lunar X-Prize (GLXP) team	<b>Dr. Andrew Barton</b> , WLS, Netherlands
15:00	German GLXP team <i>Part-Time-Scientists</i> and their “Asimow 1” craft	<b>Robert Böhme</b> , PTS, Germany
15:30	Coffee break	
16:00	Travelling on the Moon surface: the GLXP teAM itALIA and its AMALIA lunar mission	<b>Prof. Dr. Giancarlo Genta</b> , Politecnico di Torino, Italy
16:30	German GLXP team <i>c-base Open Moon</i>	<b>Neven Dološ</b> , Open Moon, Germany
17:00	Closing address	<b>Markus Klettner</b> , ESW, Luxembourg
17:15	End of conference	

14:00 – 14:15, Mr. John Winter (EuroSpaceward): ***Lunar Industrialization Challenges – An Introduction***



**John Winter** has studied Political Science and Planetary Geology. He worked a number of years on State Dept. contracts and at the UN as a refugee expert and consultant. Currently he is coaching financial experts in the Grand Duchy and serves as Director PR of EuroSpaceward

**Abstract:** In accordance with ESA's Aurora Program and NASA's Constellation Program, several lunar industrialization challenges are examining and advancing efforts to return to the Moon and for the first time utilize and exploit its resources.

In mid-October NASA's Lunar Regolith Excavation Challenge ([www.regolith.csewi.org](http://www.regolith.csewi.org)) awarded the largest amount in the NASA Centennial Challenges to date. First place winner Paul's Robotics won half a million dollars, second place Terra Engineers \$150,000, and third place Team Braundo \$100,000. This competition advances technology that could one day assist in mining He3 and building lunar structures.

The MoonROx Challenge ([moonrox.csewi.org](http://moonrox.csewi.org)) will involve the production of 2.5 kg breathable oxygen over four hours from a sample of lunar regolith simulant. The ISRU equipment cannot weigh over 50 kg.

At the end of October the Northrup Grumman Lunar Lander Challenge ([space.xprize.org/lunar-lander-challenge](http://space.xprize.org/lunar-lander-challenge)) engaged teams from Armadillo Aerospace, which last year won \$350,000 by completing the Level 1 requirement of staying aloft 90 seconds, and Masten Space Systems.

The most ambitious challenge is the Google Lunar X-Prize ([www.googlelunarxprize.org](http://www.googlelunarxprize.org)). Of some 19 teams, a half dozen are entirely or partly from Europe.

Notes / questions:

14:15 – 14:45 Mr. Matt Everingham (California Space Authority): ***NASA Regolith Excavation & MoonROX Challenges***



**Matt Everingham** is an aerospace engineer and research analyst, working at the California Space Education and Workforce Institute (CSEWI) of the California Space Authority. He has been successfully organizing the NASA Regolith Excavation challenges since 2007.

**Abstract:** NASA will return astronauts to the moon by 2020, using the Ares and Orion spacecraft already under development. Astronauts will set up a lunar outpost – possibly near a south pole site called Shackleton Crater – where they'll conduct scientific research, as well as test technologies and techniques for possible exploration of Mars and other destinations.

This permanent outpost on the moon will be the beginning of industrial activities on the lunar surface: Oxygen production from lunar soil will be among the first processes. Mining of lunar regolith for precious Helium-3 to be used in future ecological fusion reactors may follow soon after. NASA is addressing these challenges with two engineering competitions: lunar regolith excavation and lunar oxygen production or MoonROx. The presentation describes the challenges, the status and results achieved.

Notes / questions:

14:45 – 15:00 Dr. Andrew Barton (WLS): **WHITE LABEL SPACE – The Netherlands based Google Lunar X-Prize team**



**Dr. Andrew Barton** is the lead engineer for the lander element of the White Label Space GLXP mission. Andrew is a founding member of the White Label Space team and is motivated by the technical challenges of expanding the frontiers of humanity. He previously worked at the European Space Agency (ESA) as a structures and configuration engineer, providing technical support to projects including planetary landers, scientific missions and launch vehicles.

**Abstract:** “White Label Space” is an upcoming brandless Moon 2.0 space technology start-up consisting of international space professionals who have decided to compete in the GLXP. Our Mission is to provide brandless space missions to anyone that has a viable business plan, taking the principles of Web 2.0 marketing & monetisation to the next level.

The core belief shared by all members of our team is that space exploration, and particularly lunar exploration, is on the verge of a new revolution of low cost ambitious missions. This revolution is fuelled by the frustration that humans haven't been to the moon in our lifetimes, and driven by the engine of the internet with all its possibilities for new media, communication and collaboration.

Notes / questions:

15.00 – 15.30 Mr. Robert Böhme (Part-Time-Scientists):  
***Google Lunar X-Prize team PTS and their "Asimov 1" craft***



**Robert Böhme**, ICT expert, is leader of team Part-Time-Scientists, which has been the first Germany-based team to join the Google Lunar X PRIZE. Headquartered in Berlin, Germany, the team is comprised of seven members. Averaging a 20-something age mark the team is one of the youngest in the competition. Additionally, they are the first group that is made up entirely of non-space professionals with team expertise drawing from a variety of technical fields that include physics, information technology, software development and hardware specialization.

**Abstract:** Background

In the last 40 years a lot has happened in regards of space exploration. Nowadays technology enables us to reach even further into space. So why don't we?

Our presentation will focus on showing the way how private enterprise can change on how we think about space. It is our distinct goal to display a way to ignite the same spirit that drove the original Apollo program. Our mission is not only to succeed in the X-Prize but also to inspire the youth. We want to make space more appealing to everyone.

In our presentation we are going to show what is happening right now and what is going to happen in the sector of private space exploration. We as a group of part time scientists stand out in that sector with our unique approach. Put into numbers: our current mission to the moon has a budget of less than 1% of a regular space shuttle mission. Over the course of the presentation we will show how that is made possible by distributed production, Web 2.0 applications and utilizing state of the art technology combined with an origin right outside the box.

Notes /questions:

16.00 – 16.30 Prof. Dr. Giancarlo Genta (Politecnico di Torino):  
***Travelling on the Moon surface: the teAM itALIA and its AMALIA lunar mission***



**Prof. Dr. Giancarlo Genta**, Politecnico di Torino, Italy, heads the PhD Course in Mechatronics of the PhD School of Politecnico di Torino. He is an expert in aerospace engineering and since 2006 full member of the International Academy of Astronautics. Prof. Genta assists the endeavor of the Google Lunar X-Prize team Italia.

**Abstract:** The Team Italia is a group of 4 Universities, 3 Companies and an Association that are participating in the Google Lunar X-Prize.

The paper provides an overview of the AMALIA mission dealing in some detail with both the spacecraft and the Rover.

Although the AMALIA mission is similar to a typical Exploration mission, the design of both the spacecraft and the rover is highly influenced by the specific requirements of the Google Lunar X-prize mission: the design approach is closer to the one of a commercial mission than to an institutional space exploration mission one.

Notes /questions:

16.30-17.00 Mr. Neven Dološ (c-base Open Moon): ***The Google Lunar X-Prize team 'c-base Open Moon'***



**Neven Dološ**, is Head of Open Moon, a space project organization based in Berlin that aims at winning the GLXP. Neven has a degree in theoretical physics. Currently he serves as a consultant for high-tech and innovation affairs at the Agency for Innovations and Technology Transfer of the Berlin Senate.

**Abstract:** There are not only technological problems to be solved for winning the GLXP. One of the tasks is the clear description of economic perspectives which makes it easier for decision takers in small and medium companies to invest financially as well as technologically into (parts of) the whole project. Therefore the vision of 'One satellite per User' is spread amongst all decisive people within politics and economics as well as in the whole community. Another task lies in the definition of a project which boundary conditions are permanently changing and therefore its division into manageable parts has to be updated permanently. A lot of classical problems known out of the world of project management have to be resolved. Techniques of Open Innovation are used and evaluated. A healthy balance between PR and technological engagement has to be found. A perspective beyond the GLXP is described.

Notes / questions: