Google Lunar-X-Price – The German PST Team is Shooting for the Moon

Following the Google Lunar X Prize activities (see also "Journal of Space Operations & Communicator" articles in 2009 and 2012) a summary of the current status is provided. For more details see the Google Lunar X-Price pages.

The Google Lunar X PRIZE is a $30 million international competition to safely land a robot on the surface of the Moon, travel 500 meters over the lunar surface, and send images and data back to the Earth. Teams must be at least 90% privately funded and must be registered to compete by December 31, 2010. The first team to land on the Moon and complete the mission objectives will be awarded $20 million; the full first prize is available until December 31, 2012. After that date, the first prize will drop to $15 million. The second team to do so will be awarded $5 million. Another $5 million will be awarded in bonus prizes. The final deadline for winning the prize was originally December 31, 2014 but has been shifted now to December 2016.

Milestones

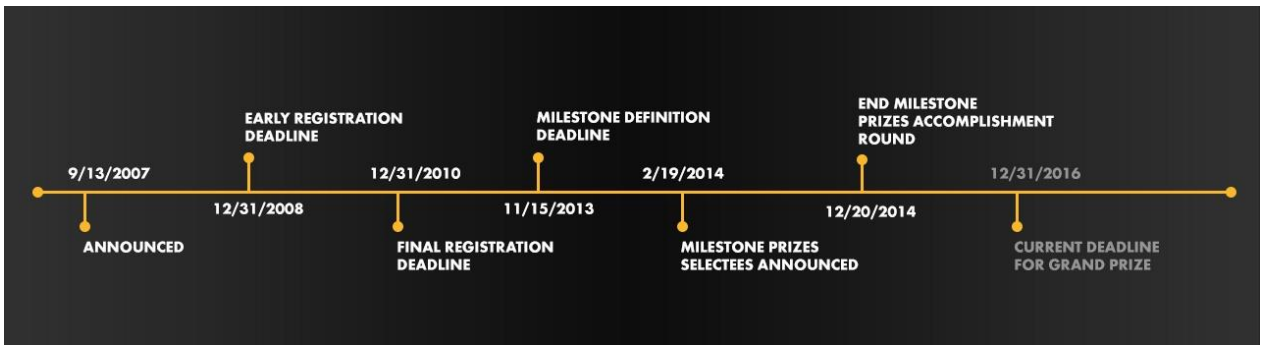

Fig. 1: Google X Prize milestone chart

In January 2015 five teams were awarded special prizes for their technological developments to date (see also milestone chart, fig 1). These milestone prizes are considered as a key measurement for the abilities of the different teams to achieve the final goal of landing on the moon, driving the rover for 500 Meters and sending back images to Earth. Milestone prizes were offered in three categories: *Landing, Mobility* and *Imaging*. A combined $5.25 million in Milestone Prizes was distributed among the winning teams.
Teams were awarded money prizes for the development of the rover (Mobility), the rover lander (Landing) and the optical systems (Imaging). The German PT Scientists team is among the five awardees and received the prizes for the rover development and the optical systems.

The four other key competitor teams that also received milestone prizes are: Astrobotics (USA), Moon Express (USA), Hakuto (Japan) and Team Indus (India).

Astrobotic, Hakuto, Moon Express, Part-Time Scientists and Team Indus have spent the past year putting their hardware and software through a series of rigorous tests and technical reviews monitored by a previously established international judging panel of leading space, science and engineering experts. The

winning teams received a combined $5.25 million in Milestone Prizes in recognition of key technological advancements toward their quest to land a private spacecraft on the surface of the moon.

Milestone Prize Award Winners

Fig. 2 X-Prize award distribution


Astrobotic (USA)

Astrobotic was selected to compete for three of the Milestone Prizes: the Landing Prize, the Mobility Prize, and the Imaging Prize. They aim to deliver affordable space robotics technology and missions for a new era of planetary exploration, science, tourism, resource utilization and mining. The company was established in 2008 as a spin-off from the Carnegie Mellon University Robotics Institute. The team's lander has a mass of more than half a metric ton and is about the size of a small SUV. It will release a rover about the size of a go-cart. The team's rover will explore a lunar skylight thought to be an entrance to a subsurface cave network.


Hakuto (Japan)

Hakuto was selected to compete for one of the Milestone Prizes: the Mobility Prize. Team Hakuto's mission is to trail-blaze non-governmental space missions, highlight Japanese robotics technology and inspire people through the dream of reaching the Moon. Hakuto's rover is small, around 20 cm tall and 30 cm wide with a mass of 2 kilograms. It will be able to carry about 100 grams of scientific

instrumentation and will use two wheels to move across the lunar surface. The micro-rover design highlights a particular strength in Japanese engineering – the miniaturization of complex machines.

 Moon Express (USA)

Moon Express was selected to compete for three of the Milestone Prizes: the Landing Prize, the Mobility Prize, and the Imaging Prize. Moon Express is a privately funded company created to develop new commercial space activities and to open up the resources of the Moon for the benefit of humanity. Headquartered in Silicon Valley, Moon Express combines lean start-up principles with expertise in aerospace engineering and planetary sciences. Moon Express plans to send a series of low-cost robotic missions to the Moon, starting with its Google Lunar XPRIZE mission. The MX-1 is expected to launch in 2015 and land in the Moon's southern hemisphere.

 Team Indus (India)

Team Indus was selected to compete for two of the Milestone Prizes, the Landing Prize, and the Imaging Prize. The team is managed by Axiom Research Labs Private Limited, an aerospace startup company, and is headquartered in India's IT industry hub, Bangalore. Through its lunar mission, Team Indus aims to showcase the creativity and capability of Indian entrepreneurs, promote higher scientific education, develop new homegrown space technologies and inspire an entire generation of young people.

 Part Time Scientists (Germany)

Part-Time Scientists was selected to compete for two of the Milestone Prizes: the Mobility Prize, and the Imaging Prize. The Part-Time Scientists team consists of dozens of scientists, engineers and entrepreneurs from countries around the world. The team's goal is to create a foundation for the future of private space exploration. Their lander, Isaac, will weigh approximately 250kg with up to 50kg of payload space (of which 25kg will be the Asimov rover). Asimov has a four-wheeled design that uses a vector control system, which means it can move easily in any direction with no 'front' or 'back' to the rover.

The final awarding of the prize money to the appropriate teams is shown in fig. 2 above. Congratulations to the winners and good luck for the next step!