THE MARS QUARTERLY

PUBLISHED QUARTERLY (EARTH TIME) BY THE MARS SOCIETY

VOLUME 4, ISSUE 2 - FALL 2012

In This Issue:

IN THIS ISSUE

On the Cover - MSL self poitrait - NASA-JPL-Caltech-MSSS

FROM THE FLIGHT DECK

I want to welcome you all to the fall 2012 issue of The Mars Quarterly (TMQ), the flagship publication of the Mars Society, the world's largest space advocacy group dedicated to the human exploration and settlement of the Red Planet.

This is the first issue of The Mars Quarterly that I am managing as editor-in-chief. I was glad to be appointed to this role by Susan Holden Martin, who served brilliantly for many years as head of TMQ and is now leading our organization as executive director.

This issue comes at a critical time in the exploration of Mars, following the landing of NASA's Curiosity rover on the Red Planet in August and ongoing decision-making by NASA, the Obama administration and Congress regarding the future of America's Mars program.

Please continue to follow the news closely and advocate with friends, journalists, members of Congress, anyone you can in support of a strong and sustainable program to help move us in the direction of a humans-to-Mars mission in the near future.

Thank you, and On to Mars!

Michael Stoltz
Editor-in-Chief

THE MARS QUARTERLY

Fall 2012 - Volume 4, Issue 2

Publisher
The Mars Society
Headquarters
11111 W. 8th Ave., Unit A
Lakewood, CO 80215 USA
www.MarsSociety.org

Mars The Hard Way

Robert Zubrin

SpaceNews, 12.03.12

In recent weeks, NASA has put forth two remarkable new plans for its proposed next major initiatives. Both bear careful examination.

As the centerpiece for its future human spaceflight program, NASA proposes to build another space station, this one located not in low Earth orbit but at the L2 Lagrange point just above the far side of the Moon. This plan is indeed remarkable in as much as an L2 space station would serve no useful purpose whatsoever. We don't need an L2 space station to go back to the Moon. We don't need an L2 space station to go to near-Earth asteroids. We don't need an L2 space station to go to Mars. We don't need an L2 space station for anything.

The other initiative is a new plan for Mars sample return, which is now held to be the primary mission of the robotic Mars exploration program. This plan is remarkable for its unprecedented and utterly unnecessary complexity.

It may well be asked whether a sample return is the best way to pursue the robotic scientific exploration of Mars, within the budget of the Mars exploration program run by NASA's planetary exploration directorate. That is an issue over which reasonable people may and do differ. It is certainly possible to propose alternative robotic mission sets consisting of assortments of orbiters, rovers, aircraft, surface networks, etc., that might produce a greater science return than the Mars sample return mission, much sooner, especially in view of the fact that human explorers could return hundreds of times the amount of samples, selected far more wisely, from thousands of times the candidate rocks, than a sample return mission. However, that said, if members of the scientific community really believe that a robotic Mars sample return is so valuable that it is worth sacrificing all the other kinds of science they could do with their cash, then it is imperative that NASA develop the most efficient Mars sample return plan, to allow the sample to be obtained as quickly as

possible and with the least possible expenditure of funds that could be used for other types of Mars exploration missions.

Unfortunately, however, rather than propose the most cost-effective plan for a Mars sample return mission, NASA has now set forth the most convoluted, riskiest, costliest approach ever conceived. The Curiosity mission just demonstrated a system that can soft land 900 kilograms on the Martian surface. With a 900-kilogram payload, it is possible to land a complete two-stage Mars ascent vehicle capable of flying a capsule with a 1-kilogram sample directly back to Earth, as well as a Mars Exploration Rover class vehicle to gather the samples for it. But instead of proposing such a straightforward plan, NASA has now baselined a mission conducted in eight parts: a) land a large rover to collect and cache samples; b) dispatch a Mars ascent vehicle to Mars and perform a surface rendezvous with the rover or its cache; c) fly the Mars ascent vehicle to Mars orbit to rendezvous with a solar electric propulsion spacecraft; d) fly the solar electric propulsion spacecraft back to near-Earth interplanetary space; e) build a LaGrange point space station; f) fly astronauts to the LaGrange point space station; g) dispatch astronauts from a LaGrange point space station to take the sample from the solar electric propulsion spacecraft and return to the LaGrange point space station; h) conduct extended studies of the sample in the LaGrange point space station.

The kindest thing that can be said about this quintuple rendezvous plan is that it is probably the unplanned product of the pathology of bureaucracy, rather than the willful madness of any individual. For a fifth of its cost, NASA could fly five simple direct sample return missions, each of which would have (at least) five times its chance of mission success. So it's hard to imagine any sane person inventing it on purpose.

Clearly, though, the group that drifted into it was attempting to make the Mars sample return mission provide an apparent excuse for the existence for an assortment of other NASA hobbyhorses. For example, we note that it makes use of the LaGrange point space station. But this does not help the Mars sample return mission, which could much more simply just return the samples to Earth, where far better lab facilities are available than could ever be installed at L2. Rather, by invoking the L2 station as a critical element of the mission plan, NASA is inserting a toll both blocking the way to the accomplishment of the sample return, while radically increasing mission and program cost, schedule

and risk and decreasing science return. The same can be said for requiring the use of electric propulsion, a technology program that was inserted into the human Mars mission critical path based on an unsupportable claim by a well-placed advocate that it could speed up interplanetary transits, and that now needs some alternative rationale.

This planning methodology is equivalent to that of a shopaholic couple who ask an architect to design their dream house but insist that he include in his design as critical components every whimsical piece of random junk they have ever bought in the past and piled up in their back yard, in order to make those purchases appear rational after the fact. By capitulating to this kind of thinking, the NASA leadership has transformed Mars sample return from a mission into a "vision."

Illustration: Joe Bergeron

NASA is facing an oncoming fiscal tsunami. There could never be a worse time for the agency to seek to inflate the cost, stretch the schedule and minimize the return of its missions. If the space program is to survive, it needs to really deliver the goods. Now, more than ever, if we actually want to get a sample from Mars, we need to employ a plan that does that in the simplest, cheapest, fastest and most direct fashion possible. Under no circumstances should the mission be made into a Christmas tree on which to hang all the ornaments in the bureaucracy's narcissistic wish box of useless and costly multi-decade delays. And the same can be said of the human Mars exploration mission as well. If we want to go to Mars, we need to go to Mars, not to L2.

Dr. Robert Zubrin is Founder and President of the Mars Society, author of "The Case for Mars" and President of Pioneer Astronautics.

"Three Percent for the Future" Campaign to Save Mars Exploration

America is rightly thrilled by the recent success of the Curiosity landing on Mars and its ongoing discoveries. Yet even as the administration is taking a bow for this great achievement, they are moving to kill the program that created it.

The figures speak for themselves. This year's NASA Mars exploration budget is $587 million. The administration is proposing to cut that to $360.8 million in fiscal year 2013, $227.7 million in 2014 and $188.7 million in 2015, a level that would effectively put the nation out of the Mars exploration business.

These cuts need to be reversed. NASA's budget is the responsibility of Congress. If America is to continue to be a nation of explorers and pioneers, the people's representatives must take this matter in hand.


NASA

In an effort to reverse this dire situation, the Mars Society launched a nation-wide campaign in September 2012 calling upon its chapters and members, as well as the general public, to arrange meetings with their senators and representatives to explain to them the challenges facing Mars exploration and to call upon them to act to save the program.

The Mars Society's demand is simple and justifiable: That NASA's Mars exploration program should be placed on a solid financial footing of no less than three percent of the space agency's overall budget.

Editorial note: The recent NASA announcement to build and send to Mars a second MSL-type rover in 2020 is a step in the right direction, but much more needs to be done.

A sample return mission, while important scientifically, could actually serve as an impediment to human exploration. A Martian sample return is best done as part of a human mission to the Red Planet.

Mars: Present & Future

Q&A with NASA's Michael A. Meyer Interviewed by Matt Camara

With the Curiosity rover expected to roll into the deepest recesses of the Gale crater soon enough, The Mars Quarterly caught up with NASA's Mars Exploration Program lead scientist Dr. Michael A. Meyer in early October for an interview about himself, what the Red Planet's explorers plan to do next and what, if anything, the future holds for collaborative efforts between the U.S. and Europeans.

NASA

...I'm in awe of where we are in terms of Mars exploration right now. The best part of this, for me is that I get to participate, I get to see Mars…

An oceanographer by training, Meyer previously worked as NASA's senior scientist for astrobiology and program scientist for the Mars Odyssey mission in 2001, according to his official biography. He holds a doctorate in oceanography from Texas A&M University, College Station and has conducted extensive research on microorganisms living in extreme environments.

TMQ: How does an oceanographer end up not only working on, but leading a program to explore Mars?

Meyer: It just happened. My first job as a post-doc was researching deserts. I said, wait a minute, I'm an oceanographer, I don't get it … (But over time) I've learned that life is a planetary phenomenon. You get a very global view of how life works on the planet (by studying its extreme environments).

TMQ: How does that carry over into astrobiology?

Meyer: Well, astrobiology is the study of life in extreme environments writ large, and Mars, right now, is the practical place to apply that research.

TMQ: So where is Curiosity now and what are you guys finding?

Meyer: Right now we're coming to the Gale Crater and the (rocky) shelf we're on is showing more signs of water than we expected.

TMQ: Than you expected? What do you mean?

Meyer: In the lowest part of the crater itself it looks like there's an alluvial wall and then a high thermal intertia. There's a suspicion that this would have been a flowing riverbed, but we're not there yet. So to find evidence of water as high up as we are is a surprise.

TMQ: I'd read the temperature was a bit of a surprise too, is that true?

Meyer: Yes, it is little warmer than we thought. This could be great news.

TMQ: Could be or is?

Meyer: Well, maybe what we're seeing is the rock absorbing more sunlight. We already knew there were parts of Mars where the temperature goes above freezing.

TMQ: Eventually we might find a more definitive answer though?

Meyer: Yes, we'll be using Curiosity for another two years or more. As long as we don't drive it off a cliff (this research) will continue for some time.

TMQ: Speaking of further research, what's next for Mars exploration considering the sample return mission is mired in funding issues?

Meyer: Yes, there's no funding for the sample return mission right now.

TMQ: Is cooperation with another space-faring nation an option?

Meyer: That's an internal debate within NASA. Certainly we're in favor of (cooperating with the European Space Agency) but the Europeans might be a little gun shy about another collaboration with us. We still work with them but it's nothing compared to what they're doing with Russia.

TMQ: How do you feel about the public's response to what you guys are doing on Mars?

Meyer: That's an interesting question. Of course I'm a little biased when it comes to answering it. I take the view that this is one of the great things the United States is doing. The U.S. is doing really fantastic things. I think it's gotten a lot of people excited.

TMQ: Any examples of how?

Meyer: Well, I've gotten tons of messages from people across the country. The Curiosity landing broke records in terms of viewership. I think we're seeing a change in how we can approach (the public).

TMQ: Closing thoughts?

Meyer: Just that I'm in awe of where we are in terms of Mars exploration right now. The best part of this, for me is that I get to participate, I get to see Mars… Mars has water in ways that we see as having made it livable for some time. Coming from an oceanography background to this, I'm kind of in awe.

Mars Society Expands Educational Outreach

As part the Mars Society's effort to expand its educational outreach program, the organization announced in September 2012 the appointment of Nicole Willett as the group's new Education Coordinator. Nicole will work to build relations with teachers, students and the general public and help communicate the Mars Society's goal of expanded Mars exploration and a humans-to-Mars mission in the coming decade.

Nicole is a veteran Astronomy and Environmental Science teacher at a secondary school in Savannah, Georgia. She received her degree in Biology (with a concentration in astronomy and astrobiology) from Armstrong Atlantic State University in Savannah.

In addition, Nicole is an experienced volunteer for public educational awareness in the areas of astronomy and Mars research in her local community and has been involved in volunteer work with Dr. James Nieow of Valdosta State University and Dr. Chris McKay of NASA Ames Research Center.

As part of her work as Education Coordinator, Nicole and the Mars Society's Internet staff, led by James Burk, have created a new Education page on the organization's web site to help encourage Mars educational programming, including design of classroom-based curriculum, recommended reading for students, suggested links for educators and a new bi-weekly blog called "Red Planet Pen."

"We are very excited to have Nicole on board as our educational outreach representative. Her work is vital to the overall mission of the Mars Society - to teach the current and next generation of students about the importance of a future on the Red Planet," said Mars Society Executive Director Susan Holden Martin.

http://education.marssociety.org/

News Brief

Date & Location of 2013 International Convention Announced

UC Bolder

The Mars Society is pleased to announce that the 16th Annual International Mars Society Convention will be held next year on the campus of the University of Colorado in Boulder from August 15-18, 2013.

Details regarding the special four day conference, including speaker list, schedule and registration information, will be published online early next year.

The 2012 convention in Pasadena set a new record for number of attendees. Let's make next year's event a great success too.

Please join us!

Next in Line - NASA's InSight

Jason Rhian

NASA is preparing its next mission to the dusty plains of Mars. The mission has been dubbed "InSight" (Interior Exploration using Seismic Investigations, Geodesy and Heat Transport), and it is currently slated to launch in 2016. InSight's primary objective seeks to explain why Mars is the desiccated, flash-frozen wasteland it is today.

It has been hypothesized that Mars was once like Earth. It is hoped that InSight will unlock the mysteries of the planet's geological past and provide the answers to the Red Planet's dramatic transformation. The lander will also seek out clues to the formation of the terrestrial planets.

NASA

NASA, to date, has followed a strategy of "follow the water." Unlike most of its more-recent Martian missions, InSight will take a different path, one that could be dubbed, "follow the stones." To learn what forces determined Mars' fate, the stationary lander will conduct a variety of experiments that involve seismology, heat dissipation and key factors involved in planetary formation.

InSight will utilize a suite of scientific instruments to determine what has shaped the rocky planets of the inner solar system since their formation some four billion years ago.

The experiments will gauge the size, thickness, density and overall structure of Mars' core, mantle and crust. It will also study how quickly heat escapes from the Martian interior. This will serve to not just provide a window into how the Red Planet formed – but to all of the terrestrial planets that also include Mercury, Venus and Earth.

InSight's Deputy Principal Investigator Sue Smrekar confirmed this objective: "InSight's primary objective is to understand the very early history of the inner rocky planets, including accretion, differentiation and magma ocean history. To do this, we will constrain the interior structure (including crustal thickness, mantle thickness and composition, core size, density and state-liquid and/or solid- and interior heat flow). For future missions it would provide a better understanding of the early history, composition, and thermal evolution of Mars. This could influence the most scientifically interesting regions to investigate for future missions."

The InSight mission will use a lander modeled on 2008's Mars Phoenix Lander which arrived on the Red Planet in 2008 (which in turn was based on the Mars Polar Lander). A proven design allows the space agency to reduce mission costs of planetary exploration. InSight is currently scheduled to launch atop a United Launch Alliance Atlas V rocket in March of 2016. It will arrive at the Red Planet in September of that same year.

InSight is a cost-capped mission with a fixed price of $425 million (not including the launch vehicle). The mission will be managed by NASA's Jet Propulsion Laboratory in California and was one of three Discovery mission options that were selected in May 2011. The other two included a mission floating on a methane-ethane sea on Titan and a spacecraft traveling with a comet as it journeys through the solar system.

Editorial note: Commenting on NASA's approval of the InSight mission, Mars Society President Dr. Robert Zubrin said: "This is a major victory for Mars exploration. Not only is InSight an excellent mission that will teach us much about the history and internal structure of the Red Planet, it saves the Mars exploration program. A few months ago, we were presented with the dismal spectacle of a NASA administrator justifying the administration's decision to cancel the 2016 and 2018 Mars exploration missions of the basis that 'the Mars program has been successful.' Now we have a mission for 2016, and it shouldn't be too hard to figure out how to get an orbiter or rover for 2018, thereby restoring to health the ongoing program of every opportunity launch that Administrator Goldin put in place in 1994. That program has taught us an immense amount about Mars, and developed a team whose excellence was just demonstrated for allthe world to see in the landing of Curiosity."

Jason Rhian is Editor of AmericaSpace.com

'White Mars' on Earth

A new research project capable of greatly expanding mankind's knowledge and understanding of Mars analog studies and possible implications for a humans-to-Mars mission was announced recently in the United Kingdom. The project, to be known as 'White Mars', will use a historic 2,000 mile trans-Antarctic winter expedition as an outdoor laboratory to test how extreme and remote environments affect human physiology, providing important insight into the challenge of sending humans to the Red Planet.

Alex Kumar

The Standard Chartered Trans-Antarctic Winter Traverse (TAWT) is scheduled to take place between December 2012 and March 2014. Consisting of a six person international crew, the expedition will carry out human science testing across the southern continent during the harsh winter months. TAWT would represent not only the first research of its kind in using a polar trek as a Mars analogue environment, but also provide one of the most reliable space analog studies to date.

The two year mission will focus on a variety of analog research, including:

Prolonged periods of complete isolation (7-9 months in duration)

Experiencing altered day-night cycles (including 3-4 months of complete darkness)

Exposure to extreme cold and weather (in the coldest desert with extremely low humidity)

Encountering chronic hypobaric hypoxia (including altitudes of up to 3,200 meters)

The Mars Society and 'White Mars' organizers, including British doctor Alexander Kumar (a recent participant at the International Mars Society Convention in Pasadena), will partner in disseminating the details from the TAWT expedition, including ongoing progress reports, important research related to space studies and educational programming that will help bring the Mars analog mission to educators and students in the U.S. and around the world.

Commenting on the new project, Mars Society President Dr. Robert Zubrin said, "The 'White Mars' expedition is a bold move that will add significantly to our understanding of how to deal with the challenges of human exploration of the Red Planet. The Mars Society is delighted to part of this terrific project."

Valued Partner
GUIDESTAR Exchange
PARTNERS IN TRUST

News Brief

Trust Us! Mars Society Receives Guidestar Rating

The Mars Society is pleased to announce that the organization has earned a Guidestar Exchange Seal, demonstrating our strong commitment to non-profit transparency.

Guidestar is a comprehensive informational service specializing in reporting on U.S. non-profit companies and organizations.

http://www.guidestar.org/organizations/31-1585646/mars-society.aspx.

More than a Fresh Coat of Paint - Upgrading MDRS

The Mars Desert Research Station (MDRS) will begin its 12th season of Mars analog research in the desert of southern Utah with some welcome improvements and innovative changes. A few of the upgrades include a new roof, septic system, furnace, appliances, tile floor in the living quarters, paint, computer hardware and software and Internet upgrades.

Most welcome of all, certainly by past crew members, is a completely remodeled bathroom and shower room that includes a new sink, shower and cubbies on the wall. The cubbies will allow crew members to store their toiletries in the bathroom, rather than carrying them back and forth from their staterooms.

One major innovation this past summer involved moving the Musk Observatory from the ridge behind the Hab, where it has stood since it was first installed, down to a concrete pad on the plain behind the Hab. This move will allow crews easier access to the telescope and smoother operation of the dome. And while the observatory may look the same, the dome is now fully automated, and the electronics have been upgraded.

Another innovative change is the modification of the Fisher GreenHab, originally a grey water recycling system, into a functional greenhouse for growing crops and conducting new types of plant research.

Another innovative change is the modification of the Fisher GreenHab, originally a grey water recycling system, into a functional greenhouse for growing crops and conducting new types of plant research. While much has been learned over the years regarding the water recycling with the original system, it was not large enough to support growing operations at the station and had not been used in the past few years. The original system has been removed, and a new team of volunteers, led by Jesse Clark, will be working on creating a fully-functioning Martian greenhouse. This is fitting, as one of the original goals was to develop a program of growing food crops for the crews at MDRS.

Finally, the Mars Society would like to thank the many volunteers who made these station upgrades possible. A very special thanks to Peter Detterline and the astronomy team, John Barianca, Shannon Rupert , Judd Reed, Jesse Clark, Steve Foss, and Daniel Valerio for their enormous gifts of time, resources and hard work as part of the 2012 MDRS work crew.

Moving Musk (Observatory)

Peter Detterline

It was late afternoon on Day 12 at the Mars Desert Research Station (MDRS) in the Utah desert when the wind storm hit. I looked on as the right corner of the lower shutter began to visibly shake. Suddenly, a huge gust of wind rattled the entire building so fiercely I was certain it would come off its foundation. Apparently, so did one of my colleagues who automatically grabbed a wall to stabilize the structure as if he could hold it down with his sheer strength and force of will.

"Don't!" I said, "We need to see if it can withstand this. It has to be able to hold up on its own." And indeed, in its new location, the Musk Observatory shutters survived that 50-60mph wind storm.

My crew and I had just spent 15 days moving the observatory from a top the rocky ridge overlooking MDRS down to the flat plains of analog Mars. It was an absolutely necessary task, but to fully understand why, we need to go back to 2006.

Back then, crew astronomers were having problems at the observatory. The mount needed constant readjustment to achieve and maintain polar alignment. The dome motor was malfunctioning and would not properly rotate the dome to the point that it was disconnected. These things should not have been happening. I went to MDRS to investigate.

It wasn't the mount. It had been bolted into the concrete and properly aligned in 2002. Therefore, it had to be the concrete. That would explain the constant adjustments to the telescope and dome. Sure enough, tests showed that the pad had been built on a rocky slope that was slowly shifting.

Six years later, thanks to a substantial donation, the Musk Observatory underwent a major refit to make it functional again. By the time we arrived in July 2012, a new concrete pad had already been poured and was set on the carefully chosen location on the greenhouse side of the Hab. Our job was to disassemble the observatory and reconstruct it at the new site.

I had the privilege of working with a dedicated and skilled crew. We all left our watches at home and put in some very long hours. It paid off - the end result is amazing. Let me take you on a tour.

The observatory is now fitted with a new electric shutter system and dome rotation function that can be operated either manually or remotely by computer. Two new wall panels with cubby holes provide additional space in the facility. There is, of course, the new mount: It is advanced, highly accurate, easy to use and polar aligned. A new computer system is dedicated to the observatory along with a high resolution color CCD camera. There is even an additional wide field telescope piggybacked onto the main instrument to provide more versatility in viewing.

Dr. Robert Zubrin and Susan Holden Martin were instrumental to this success as they dealt with everything from dome issues to late shipments to customs documents. A great debt of thanks is owed to the refit crew consisting of John Barainca, Gary Becker, Ginger Fiore and Judd Reed.

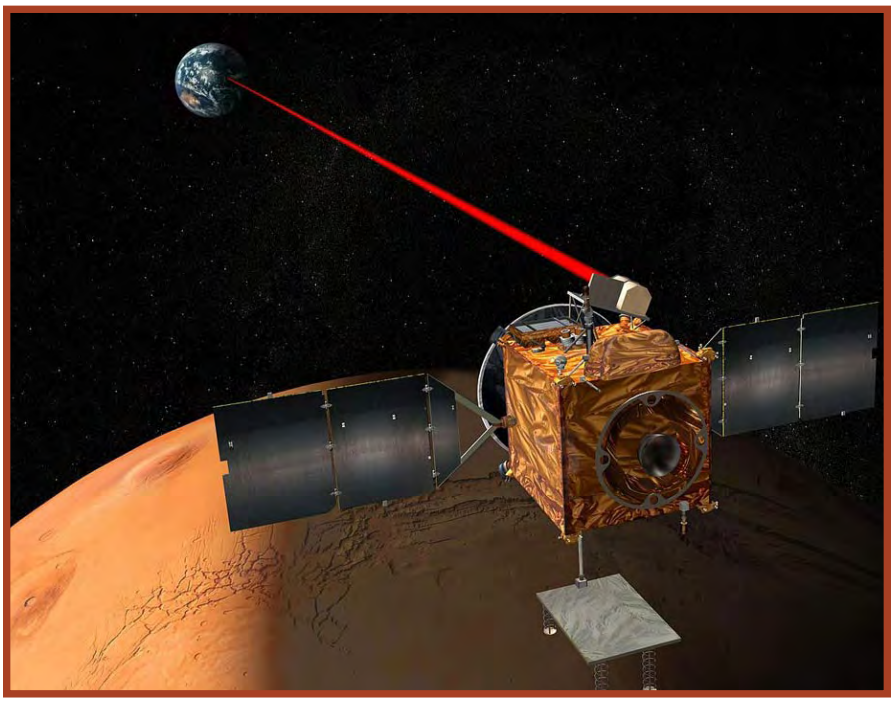
I don't think I've ever laughed as much at MDRS as I did this summer while we solved multiple problems and gazed in wonder at the night sky. It would not be possible to sufficiently thank Elon Musk for his original donation which first brought me to Mars. And to the anonymous donor whose generous contribution made this incredible refit possible, we offer our unending gratitude.

There and Back Again - An Orbiter's Tale

Jason Rhian

When NASA's Curiosity entered into the "seven minutes of terror" that comprised the most dangerous phase of its mission, much emphasis was placed on the fact that Entry-Descent and Landing or "EDL" lasted for seven minutes, while it took 14 minutes for the signals from the rover to reach Earth. Little attention however, was paid to the complex system employed by NASA to communicate with Curiosity.

Over the first 40 sols on Mars, Curiosity is averaging return of more than 450 Megabits of data every sol



NASA

Curiosity relies on several different elements to transmit the stunning imagery and vital data that comprise the updates Curiosity transmits back to Earth twice a day.

NASA currently has two spacecraft in orbit around the Red Planet, Mars Odyssey and the Mars Reconnaissance Orbiter (MRO). The space agency also has a backup, the European Space Agency's Mars Express Orbiter.

Later in Curiosity's planned life, NASA's Mars Atmosphere and Volatile EvolutioN (MAVEN) spacecraft will assist Curiosity in transmitting the rover's findings back to the home world when it is launched in late 2013. The time when this spacecraft will be able to assist the plutonium-powered rover in its mission to find life on Mars is limited to just one year, with possible extensions.

Odyssey was the first of NASA's two orbiting spacecraft to arrive at Mars, slipping into orbit above the Red Planet in 2001. Five years later MRO and its high resolution imaging equipment began its mission. While Odyssey has been used to relay information to controllers back on Earth, MRO has been crucial in the selection of landing sites.

"Curiosity will typically relay data through each orbiter twice per sol, once in the Martian afternoon (between 3 and 4 p.m. PM) and again early in the Martian morning (between 3 and 4 a.m.). Over the first 40 sols on Mars, Curiosity is averaging return of more than 450 Megabits of data every sol," said Chad Edwards the chief telecommunications engineer for the Mars exploration program.

With the trio of orbiting satellites above Mars, NASA has redundant abundant relay services in place that pick up the signals that Curiosity (as well as the Mars Exploration Rover Opportunity) transmits up from the Martian surface.

The small fleet of rovers and satellites are some 13.5 million miles away from Earth. Odyssey utilizes older, but still highly-reliable technology enabling it to transmit data at either 128K or 256K bits per second. The smaller number is approximately twice the speed of an Internet dialup connection.

MRO is far more powerful with the ability to send data hurtling back to Earth at 2048K bits per second. It is able to accomplish this thanks in large part to more powerful radios, advanced compression schemes and other more-modern equipment.

NASA's Deep Space Network (DSN) is the primary source of data collection for Curiosity and Opportunity. DSN's massive dish antennas collect the 2GB worth of data that streams from Mars. They also transmit the roughly 250MB of instructions that are forwarded to the rovers operating on the Martian surface. The DSN employs antennas in California, Spain and Australia to accomplish this task.

Jason Rhian is Editor of AmericaSpace.com

Kevin Sloan

News Brief

Calling All Rovers!

Join Us at the 2013 URC in Utah

Calling all rovers! Registration has officially begun for the 2013 University Rover Challenge (URC). The seventh annual rendition of the international competition for college students is organized by the Mars Society and will be held May 30 - June 1, 2013 at the Mars Desert Research Station (MDRS) near Hanksville, Utah.

Registration details are now online. This unique and renowned competition has hosted dozens of college teams since 2007 in a barren landscape that is an ideal analog of the planet Mars. The MDRS site is also home to human crews conducting mission simulations that test a broad range of Mars exploration topics. URC rovers are designed and built to one day assist astronauts on the Red Planet.

Elon Musk Receives Mars Pioneer Award

In August, the 15th Annual International Mars Society Convention was held in Pasadena, California. The occasion saw Mars Society President Dr. Robert Zubrin present SpaceX Founder and CEO Elon Musk with the first annual "Mars Pioneer Award." Considered one of the world's leading space pioneers and entrepreneurs, Mr. Musk received the award in recognition of his strong dedication to the goal of human exploration and settlement of the Red Planet.

At SpaceX, Mr. Musk is the CEO and chief designer, overseeing development of rockets and spacecraft for missions to Earth orbit and ultimately to other planets. The SpaceX Falcon 1 was the first privately developed liquid fuel rocket to reach orbit. In 2010, SpaceX became the first commercial company to recover a spacecraft successfully from Earth orbit, with its Dragon capsule. And this year, SpaceX´s Dragon became the first commercial vehicle to successfully attach to the International Space Station and return cargo to Earth.

My Journey to the Mars Society Convention

Nicole Willett

As a lifelong Mars enthusiast, I was thrilled when the opportunity arose to volunteer at the 15th Annual International Mars Society Convention. I am an astronomy teacher at Benedictine Military School in Savannah, Georgia. I have been following Dr. Robert Zubrin's work for over a decade. Thus, it was a pleasure to travel to the West Coast for such an extraordinary event, which took place at the Pasadena Convention Center from August 3rd thru 5th, 2012.

The convention was scheduled to coincide with the landing of NASA's Mars Science Laboratory, Curiosity, on the Red Planet. I arrived at the convention center on August 3rd and headed straight toward Volunteer Coordinator Tom Szumilla from the Dallas Chapter of the Mars Society. He introduced me to Executive Director Susan Holden Martin, and they immediately began my volunteer instruction. Events were moving quickly, and there were lots of new names and faces to learn. Once I familiarized myself with my surroundings, new workload and the other volunteers, the thrill of the event started to set in.

There were dozens of speakers scheduled, and they included many amazing scientists and entrepreneurs with a passion for all things Mars. I met many people I have admired for years, including Dr. Zubrin, NASA's Dr. Carol Stoker and retired astronauts Dr. Buzz Aldrin and Dr. Story Musgrave.

Dr. Zubrin opened the Friday morning plenaries with a talk entitled, "Humans to Mars in Our Time," where he demonstrated the unmistakable passion for this quest, which has always drawn me to follow his work. The speakers kept going, one after another, and offered more and more Mars-related information to feed the hungry audience. Some of Friday's other notable speakers were Dr. Jim Bell from the Planetary Society, Dr. Richard Cook from NASA/JPL and General Simon "Pete" Worden Director of the NASA Ames Research Center. I was also happy to meet Bill Nye the Science Guy, who offered greetings from the Planetary Society to all of us at the Mars Society.

Saturday began with a wonderful talk by George Whitesides from Virgin Galactic, who spoke about the advances his company is taking in commercial space tourism. At midday, Dr. Lori Garver, the Deputy Administrator at NASA, spoke about the importance of space exploration to the future of humankind. We were also excited to hear Dr. Ashwin Vasavada of NASA/JPL speak about the Curiosity rover.

At midday on Saturday, we were treated to a very motivational talk by Dr. Adam Steltzner, the EDL (entry descent and landing) lead engineer for the Curiosity rover. On Sunday, when we watched the landing's live feed, there was a roar of applause when Dr. Steltzner came on the screen. Later in the afternoon, Dr. Peter Diamandis from the X-Prize Foundation gave an inspirational talk about abundance and the future; the speech had such an impact on me that I have shown it to all of my students.

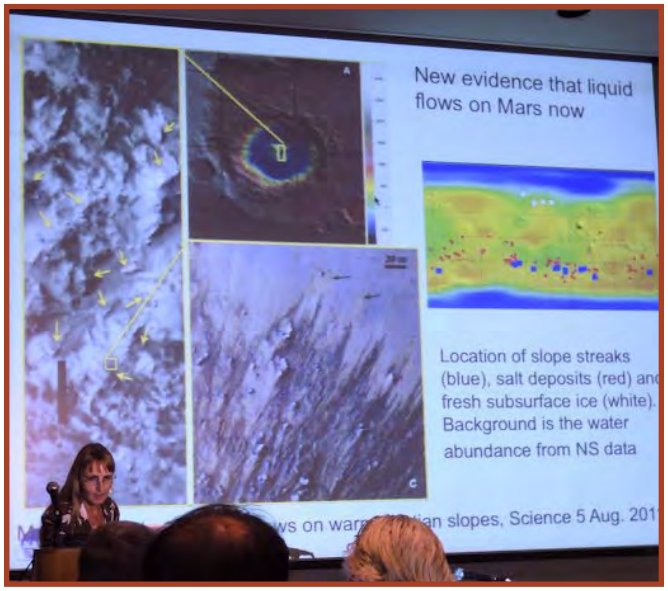
Saturday evening culminated in an extraordinary event: A banquet was held to honor Elon Musk, the founder and CEO of SpaceX, for his achievements involving commercial spaceflight and his desire to put humans on Mars. Dr. Zubrin also presented him with the first Mars Pioneer Award. The banquet hall was filled, and the excitement of being in the presence of a man who has no fear of achievement was palpable. Everyone was anxiously anticipating his acceptance speech, and Elon Musk did not disappoint. His words were inspiring - and the energy was raised to a new level.

Sunday started off with a morning plenary session from Dr. Stoker, an astrobiologist from NASA. I was particularly interested in her speech since my background is in astrobiology. Then, I remember speaking with Dr. Stoker (and Dr. Zubrin) about the proposed Mars sample-return mission - and the controversy surrounding that idea - and gently suggesting that J. Craig Venter was making amazing advances in DNA sequencing technology and maybe we should just send a mini DNA sequencer to Mars. Soon after I got home, there was a news story about that very idea. I like to think that was a great coincidence.

Sunday evening started with a wonderful talk by famed shuttle astronaut Dr. Story Musgrave, who then joined Dr. Zubrin for a special panel session titled, "Our Future in Space." This panel was the lead-up to the main event - the landing of NASA's MSL Curiosity rover. There was standing room only in the convention hall and the anticipation was overwhelming. All eyes were on the live feed from NASA/JPL that was up on the big screen as the time for entry, descent and landing drew near. The clock kept ticking, but it was as if time slowed down while everyone in the room shared the wait, the worry and the hope. Counting down… the 'seven minutes of terror' began with the announcement by the team at JPL that Curiosity had entered the Martian atmosphere. Next, JPL described every preprogrammed maneuver and accomplishment during what seemed to be the longest seven minutes any of us could remember.

Finally, at approximately 10:31 p.m. PDT, confirmation of a successful landing was announced, and cheers roared through the hall, along with hugs and high-fives. Almost immediately, the rover sent images that popped up on the big screen for all to see, and a wave of relief went through the hall and around the world. Finally, Dr. Zubrin made a few statements to close out the convention. The thrill of sharing such an event surely will be permanently embedded in the memory of everyone involved with the Mars Society convention - I know it will be in mine.

Highlights from the 2012 Mars Society Convention



Dr. Carol Stoker, NASA

Exhibit hall at convention

Dallas chapter t-shirt sale

Mars panel discussion

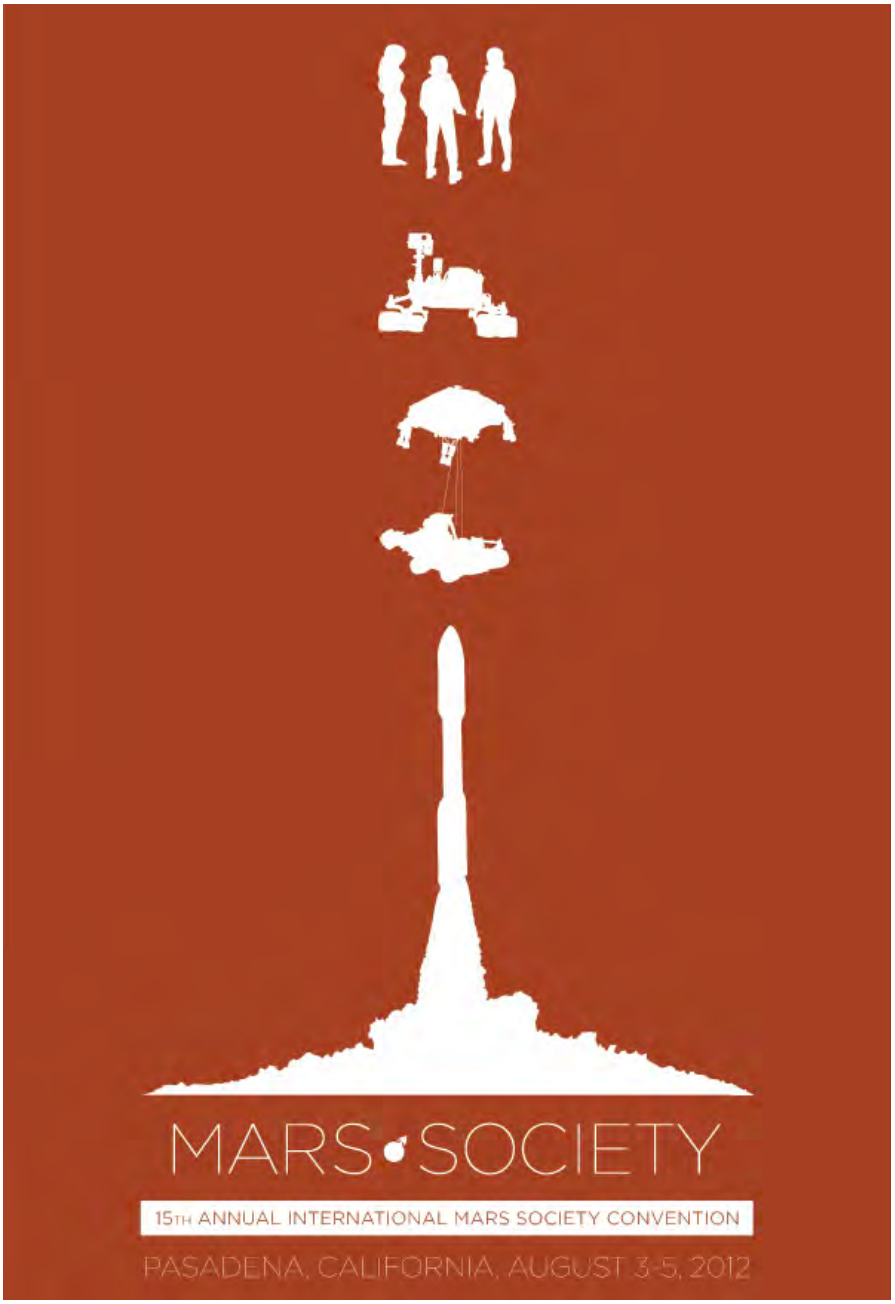
Audience at plenary talk

Dr. Ashwin Vasavada, NASA

Peter Diamandis, X Prize Foundation

Dr. Adam Steltzner, JPL

Lori Garver, NASA Deputy Administrtator



2012 Poster by Caitlin Folchman-Wagner

Convention volunteers

THE MARS SOCIETY

THE MARS SOCIETY is a 501(c)3 tax-exempt non-profit organization with headquarters in Colorado, USA, committed to furthering the goal of the exploration and settlement of the Red Planet, via broad public outreach to instill the vision of pioneering Mars, support of ever more aggressive government funded Mars exploration programs around the world, and conducting Mars exploration on a private basis.

THE MARS SOCIETY

OFFICIAL MEMBERSHIP AND DONATION FORM

Contact Information

Name _____

Address _____

City _____

State/Province _____ Zip _____

Country _____

Email _____

Contribution Information

Please check the amount of your contribution.
All donations of $1000 or more pay your dues for life!

__ Visionary..... $5000 __ Explorer $2000
__ Benefactor ..... $1000 __ Enthusiast $500
__ Friend..... $200 __ Donor..... $100
__ Other donation .....$_____

I'm donating $100 or more, please send an autographed copy of:

__ The Case for Mars __ Entering Space
__ Mars on Earth __ First Landing (a novel)
__ The Holy Land (satire) __ Energy Victory
__ On to Mars 1 __ On to Mars 2
__ Mars Songs CD __ How to Live on Mars

Membership Information

Please add to or upgrade my membership as follows:
(Please check the appropriate membership level)

__ Regular Membership: __ 1 year..... $50 __ 3 years ... $100
__ Senior Membership: __ 1 year..... $25 __ 3 years $50
__ Student Membership: __ 1 year..... $25 __ 3 years $50
__ Family Membership: __ 1 year..... $100 __ 3 years ... $200

Payment Information

Total Amount (Membership + Donation) ..... $ _____

__ Personal Check or Credit Card __ Visa __ M/C __ Amex

Credit Card # _____

Expiration Date _____

Name on Card _____

Signature _____

Mail with the enclosed envelope, Fax this form to 303-980-0753, or Donate online at **www.MarsSociety.org**