

# The High Desert Observer



## July 2016



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The Astronomical Society of Las Cruces (ASLC) is dedicated to expanding public awareness and understanding of the wonders of the universe. ASLC holds frequent observing sessions and star parties and provides opportunities to work on Society and public educational projects. Members receive the *High Desert Observer*, our monthly newsletter, plus membership to the Astronomical League, including their quarterly publication, *Reflector*, in digital or paper format.

Individual Dues are \$30.00 per year

Family Dues are \$36.00 per year

Student (full-time) Dues are \$24.00

Annual dues are payable in January. Prorated dues are available for new members. Dues are payable to ASLC with an application form or note to: Treasurer ASLC, PO Box 921, Las Cruces, NM 88004. Contact our Treasurer, Patricia Conley (treasurer@aslc-nm.org) for further information.

*ASLC members receive electronic delivery of the HDO and are entitled to a \$5.00 (per year) Sky and Telescope magazine discount.*

### July Meeting --

Our next meeting will be on **Friday, July 22**, at the DACC Main Campus, Room 141, Technical Studies Building, starting at 7:00 p.m.

The speaker will be Loretta Hall

Topic: Getting Men to the Moon:

Behind the Scenes Stories

### ASLC Board of Directors, 2016

[Board@aslc-nm.org](mailto:Board@aslc-nm.org)

President: Daniel Giron; [President@aslc-nm.org](mailto:President@aslc-nm.org)

Vice President: Christina Lugo; [VP@aslc-nm.org](mailto:VP@aslc-nm.org)

Treasurer: Patricia Conley; [Treasurer@aslc-nm.org](mailto:Treasurer@aslc-nm.org)

Secretary: John McCullough; [Secretary@aslc-nm.org](mailto:Secretary@aslc-nm.org)

Director-at-Large: Tracy Stuart; [Director1@aslc-nm.org](mailto:Director1@aslc-nm.org)

Director-at-Large: Ed Montes [Director2@aslc-nm.org](mailto:Director2@aslc-nm.org)

Immediate Past President: [rrichins73@comcast.net](mailto:rrichins73@comcast.net)

### Committee Chairs

ALCor: Patricia Conley; [tconley00@hotmail.com](mailto:tconley00@hotmail.com)

Apparel: Howard Brewington; [comet\\_brewington@msn.com](mailto:comet_brewington@msn.com)

Calendar: Chuck Sterling; [csterlin@zianet.com](mailto:csterlin@zianet.com)

Education: Rich Richins; [Education@aslc-nm.org](mailto:Education@aslc-nm.org)

Grants: Sidney Webb; [sidwebb@gmail.com](mailto:sidwebb@gmail.com)

Librarian: **\*\*\*OPEN\*\*\***

Loaner Telescope: Daniel Giron (Temporary) **\*\*\*OPEN\*\*\***

Membership: Judy Kile; [jkile3916@gmail.com](mailto:jkile3916@gmail.com)

Night Sky Network: **\*\*\*OPEN\*\*\***

Observatories:

Leasburg Dam: David Doctor; [astrodoc71@gmail.com](mailto:astrodoc71@gmail.com)

Tombaugh: Steve Shaffer; [sshaffer@zianet.com](mailto:sshaffer@zianet.com)

Outreach: Chuck Sterling; [csterlin@zianet.com](mailto:csterlin@zianet.com)

Web-Site: Steve Barkes; [steve.barkes@gmail.com](mailto:steve.barkes@gmail.com)

HDO Editor: Charles Turner; [turnerc@stellanova.com](mailto:turnerc@stellanova.com)

### Member Info Changes

All members need to keep the Society informed of changes to their basic information, such as name, address, phone number, or email address. Please contact [Treasurer@aslc-nm.org](mailto:Treasurer@aslc-nm.org) and [jkile3916@gmail.com](mailto:jkile3916@gmail.com) with any updates.

### Outreach

Outreach is a very important part of ASLC. We are always looking for more volunteers to help us educate the public. Even if you do not have a portable telescope to bring to the events, please consider attending our public outreach programs to help answer questions, share knowledge and point out constellations in the sky.

### Events

ASLC hosts deep-sky viewing and imaging at our dark sky location in Upham. We also have public in-town observing sessions at both the International Delights Cafe (1245 El Paseo) and at Tombaugh Observatory (on the NMSU Campus). All sessions begin at dusk.

At our Leasburg Dam State Park Observatory, we hold monthly star parties. Located just 20 miles north of Las Cruces, our 16" Meade telescope is used to observe under rather dark skies. Please see *Calendar of Events* for specific dates and times.

\* \* \*

## **Outreach Events For May 2016**

by Jerry McMahan

### **Moongaze, Saturday, June 11**

We had a very good turnout from both club members and spectators. Chuck Sterling had the 10 inch and I had the ETX 125. John McCullough, Daniel Giron and Ed Montes were there as well as Karla Zajac.

Once again, it started cloudy, but did clear up so that we had the Moon, Jupiter, Mars and Saturn. It has been a while since we have had as many as three bright planets available.

### **Leasburg, Saturday June 25**

Since school is out, there has been a real outreach slow down, so there is not much to talk about except maybe the weather. Speaking of the weather, the Leasburg observing event was clouded out again. There was a music program and the club membership was well represented at the event.

Daniel Giron, Chuck Sterling, Sid Webb, Bob Armstrong, Carol and Stan Chiocchio, and myself were in attendance.

\* \* \*

### **Calendar of Events (Mountain Time - 24 hr. clock)**

Jul	04	00:00	Independence Day - All Day
	04	05:01	New Moon
	09	20:30	OUTREACH; MoonGaze, International Delights Café
	11	18:52	First Quarter Moon
	19	16:58	Full Moon
	22	19:00	ASLC Monthly Meeting; DACC Main Campus, Room 141
	23	20:30	Dark Sky Observing at Leesburg Dam State Park
	26	17:00	Last Quarter Moon
Aug	02	02:45	New Moon
	10	12:21	First Quarter Moon
	12	07:00	Perseid meteors peak
	13	20:30	OUTREACH; MoonGaze, International Delights Café
	18	03:28	Full Moon
	24	21:41	Last Quarter Moon
	26	19:00	ASLC Monthly Meeting; Good Samaritan Society Creative Arts Room
	27	20:30	Dark Sky Observing at Leesburg Dam State Park

Be sure to visit our web site for the latest updates: [www.aslc-nm.org](http://www.aslc-nm.org)

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the roster and that visitors and guests sign the guest list. He then asked if all members had received the latest edition of the Society's newsletter, the High Desert Observer (HDO), had a chance to read the May meeting minutes and if there any were any comments, issues, or concerns. Noting none, Bob Kimball moved and Ed Montes seconded that the May minutes as published in the HDO be approved.

### ***Treasurer's Report:***

The Treasurer, Trish Conley, reported on the status of the Society's accounts with total balances of approximately \$19,000. She noted that dues payments for 2016 continue to trickle in and that the cost of liability insurance for the Society had increased approximately \$300 for this year. There was no additional Treasurer's report.

### ***Committee Reports:***

#### ***Outreach Committee:***

**Chuck** Sterling, Outreach Coordinator, reported that observing sessions will occur at Leasburg Dam State Park (LDSP) on 25 June and 23 July, weather permitting. There will be a Moon Gaze at International Delights Café (IDC) on 09 July. Chuck noted outreach activity is down during schools' summer vacation.

#### ***Tombaugh Observatory:***

Steve Shaffer, Committee Chairman, was not present at tonight's meeting, but Jerry McMahan noted no NMSU Astronomy Department open houses are planned until the start of the fall semester.

#### ***ASLC Observatory at Leasburg Dam State Park (LDSP):***

David Doctor, Committee Chairman, was not present at tonight's meeting but informs Daniel that he would like to train additional members on how to operate the observatory and telescopes. Daniel also thanked Jerry McMahan for the 2-inch moon filter for use at the observatory.

#### ***Loaner Telescope Program:***

Daniel Giron continues to fill in as acting Program Coordinator. A replacement coordinator and location for the telescopes must be determined by the end of this year. Most of the telescopes are small but two are 6" in diameter and one is a 10" Dobsonian. The coordinator should have some knowledge and skill in telescope maintenance.

#### ***2017 Officer Nominating Committee:***

Daniel noted that elections will be held in October and it is not too early to start considering candidates for 2017 officer positions. Daniel cannot and will not serve another term as President. In fact, he anticipates additional constraints on his time next year that will preclude his active participation on the ASLC Board of Directors as immediate Past President.

There were no additional committee or officer reports.

### ***Old Business:***

1. Speakers – A speaker is still needed for the September meeting. Loretta Hall will speak in July about behind the scenes of the Apollo program. Let Daniel know if you have suggestions for speakers, topics of interest, or to volunteer to make a presentation.
2. Star-B-Que – Mary Alba, Walter Haas' (Society founder) daughter, has offered to host a star-b-que at her home northeast of Las Cruces for the Society. The potential date is 15 October. Cristina Lugo continues to coordinate this with Mary.

3. Enchanted Skies Star Party – This star party based out of Socorro, NM, 26-29 October, will offer behind-the-scenes tours of the Very Large Array (VLA) and Magdalena Ridge Observatory (MRO). Daniel recommends members check the star party web site for more information.

There was no additional old business discussed.

***New Business:***

1. 2017 Budget – Daniel Giron, Trish Conley, and Howard Brewington will put together a budget for presentation at the July meeting.

There was no additional new business for discussion.

***Announcements:***

***Items for Sale:*** No items were offered for sale.

***General Announcements:***

Rich Richins asked about the Society's status with regard to the New Mexico Taxation and Revenue department. Daniel replied the Society is current with all obligations regarding non profit tax status.

Judy Kile noted the presence of several guests. Javier Ocasio recently relocated from California and works at White Sands Missile Range (WSMR). He's interested in astronomy and wants to see what he can learn to share with his family, especially his daughter who is interested in science. Grant (Bob Kimball's grandson) is on his way home to Texas after participating in several lacrosse tournaments. He is interested in astronomy.

The Society will begin holding monthly meetings in the Creative Arts room of the Good Samaritan Society beginning with the 26 August meeting.

The Society informational brochure needs to be updated. Daniel will work on the updates and getting a short run of brochures printed.

***Recognitions/Achievements:*** There were no recognitions, awards, or achievements announced at tonight's meeting.

The business portion of the meeting was adjourned at 7:46 pm.

***Presentation:***

This month's presentation was by ASLC member Steve Barkes. His topic: "Texas Star Party (TSP) 2016". Steve presented a report on TSP that was held in May. His presentation included images of members during non-viewing hours as well as astro images taken by Steve, Dave Dockery, Howard Brewington, John Kutney, Bob Kimball and Rich Richins.

Steve also had images from the recent (04 June) dedication of the Cosmic Campground as a dark sky sanctuary.

Daniel reminded members that the next meeting will be 22 July in Room 141 at DACC. The Society will start meeting at Good Samaritan beginning 26 August.

The June meeting of the Astronomical Society of Las Cruces concluded at 8:47 pm.

-Respectfully submitted by John McCullough, ASLC Secretary

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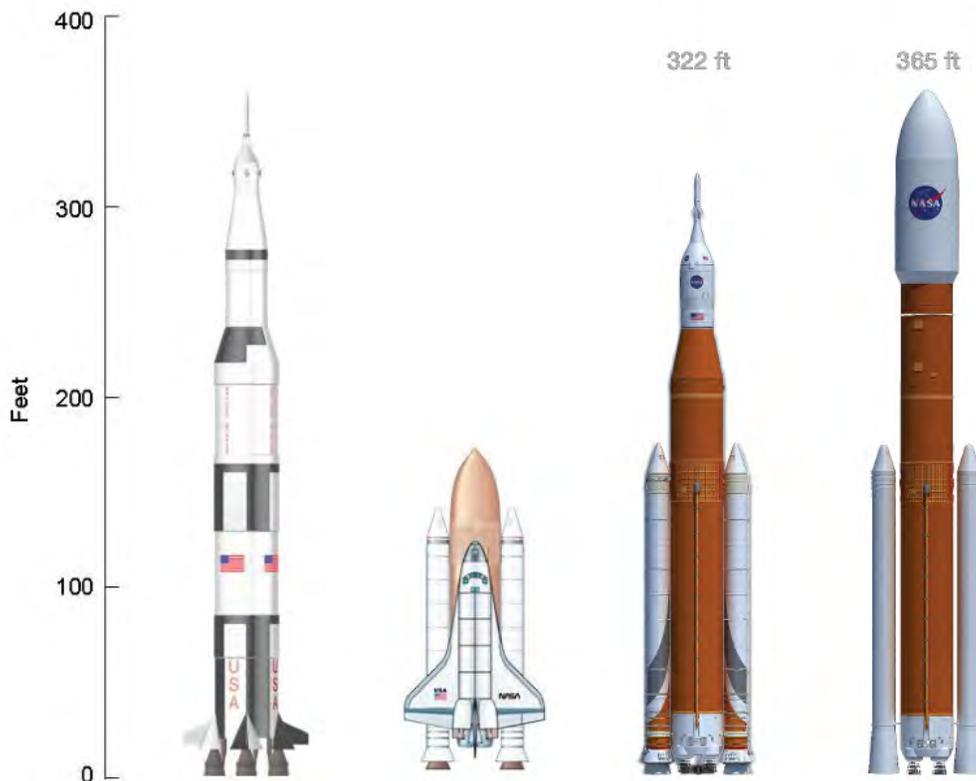


## Back at the Telescope

by Bert Stevens

Mars is frequently a destination for movie astronauts. Films like *The Martian*, *Mission to Mars*, and *Red Planet* are a few recent examples, while older films include *Flight to Mars*, *The Angry Red Planet*, and *Rocketship X-M*. Flash Gordon also famously went to Mars in his third serial. Mars is probably the only place in our Solar System that humans may be able to enjoy long-term habitation.

Today, both NASA and private space firms are building rockets that are targeting Mars as a long-term outpost for humanity. NASA's Space Launch System (SLS) can launch 287,000 pounds into low Earth orbit compared to the Saturn V that could launch 260,000 pounds into orbit. Meanwhile, Elon Musk's SpaceX is planning to land a Dragon capsule on Mars in 2018 using their Falcon Heavy rocket.



What would it be like to live on Mars? To start with, the atmosphere is very thin. "Sea level" air pressure on Mars is only 0.6 percent of that on Earth. This means that even if the Martian atmosphere was pure oxygen, we would not be able to live in it. But the atmosphere is not composed of oxygen, it is 96% carbon dioxide. Since carbon dioxide is what mammals exhale as a waste product, this would not be a good atmosphere for us to breathe.

In addition to the carbon dioxide, there is just under two percent each of argon and nitrogen as well as traces of oxygen, carbon monoxide, water and methane. All in all, it is not a breathable atmosphere even if it were compressed

### Comparison of Launch Vehicles

*A comparison of the Saturn V (Apollo rocket), Space Shuttle, Space Launch System (SLS) Block I and the larger Block II. The SLS is just a little larger than the current record holder, the Saturn V. The Saturn V had to be powerful enough to launch the Command, Service, and Lunar Modules in a single launch, due to decision to use a lunar-orbit rendezvous, rather than an Earth-orbit rendezvous.*

to sea level pressure. Plants, however, would thrive in this atmospheric composition, since they absorb carbon dioxide and release oxygen as a waste product. Long-term occupancy of the Red Planet will benefit from large greenhouses that convert the carbon dioxide into breathable oxygen and provide food for the colonists at the same time.

However, there is no magnetic field around Mars to deflect cosmic rays, so they constantly bombard the surface. The greenhouses will need to be under at least a yard of regolith, or dirt, to stop the cosmic rays. We will have to use artificial light to illuminate the plants, allowing them to grow. Power will also be needed to warm the greenhouse against the  $-75^{\circ}$  to  $-112^{\circ}$ F. temperatures on the surface.

Mars soil is devoid of organic compounds. We will need to bring organic material with us to mix with the Martian soil to provide fertilizer for the plants. Some of this material will be provided by the astronauts themselves - manure is a great fertilizer. However, the Martian soil is rife with heavy metals like lead, mercury and chrome. If the plants take up these heavy metals, the plants will be fine, but if we consume them, there can be a potentially deadly buildup of these heavy metals in our bodies.

Once the greenhouse is established, the plants will grow and eventually flower. Not only will the flowers add some beauty to the greenhouses, but they are critical to the continuation of the colony. Flowers produce seeds that will be the source of the next generation of plants after the current crop has been harvested.

To get the seeds, the flowers must be pollinated. While this could be done by hand, time-consuming work is done by insects. A good option is to import bumblebees from Earth to do the pollination for us. Bumblebees have the advantage that they can be hibernated by cooling them. This will not only be helpful during the trip to Mars, but also between crops. When the flowers start to bloom, the bumblebees can be revived to start pollinating the plants.

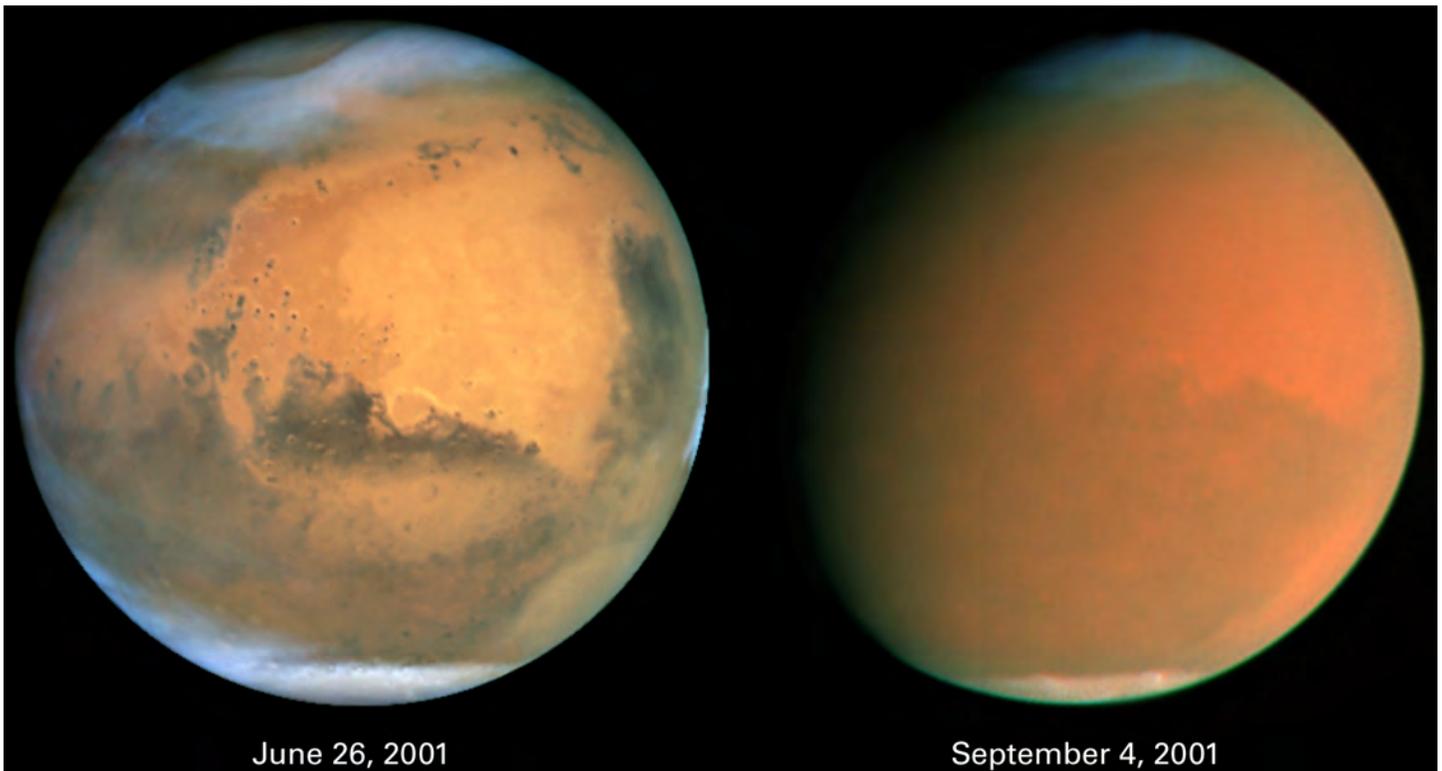


With the low pressure on Mars, humans who go outside the habitat will require full spacesuits. Some of the early movie trips to Mars just showed people using an oxygen mask, but the reality is that they would suffer explosive decompression as soon as they open the airlock. The pressure is not high enough to keep the human body together.

**Bumblebee:** *A buff-tailed worker bumblebee (Bombus terrestris) is getting nectar from a flower. At the same time, it carries pollen from flower to flower, pollinating the plants it visits. (Joaquim Alves Gaspar, Lisboa, Portugal - Own work, CC BY-SA 3.0)*

The atmosphere contains a substantial amount of dust, even when it is clear. Humans standing on the surface will see a light brown or orange-red sky thanks to the suspended dust. The atmospheric dust is typically 1.5 micrometers in diameter, more than 300 times the size of the gypsum sand grains at White Sands National Monument. The dust does settle and over time, it can cover the solar panels on remote exploration stations, reducing the ability of the solar panels to make sufficient electricity to power these explorers.

The dust sometimes becomes much thicker as the thin winds still manage to pick up the dust to create a sandstorm on the surface. In 2001, as the Mars Global Surveyor (MGS) reached the Red Planet, a dust storm started in the Hellas Basin. The Mars Odyssey spacecraft arrived a short time later. The two spacecraft provided a close-up view of the dust storm as it eventually covered the entire planet, lasting three months.



**A Martian Duststorm:**

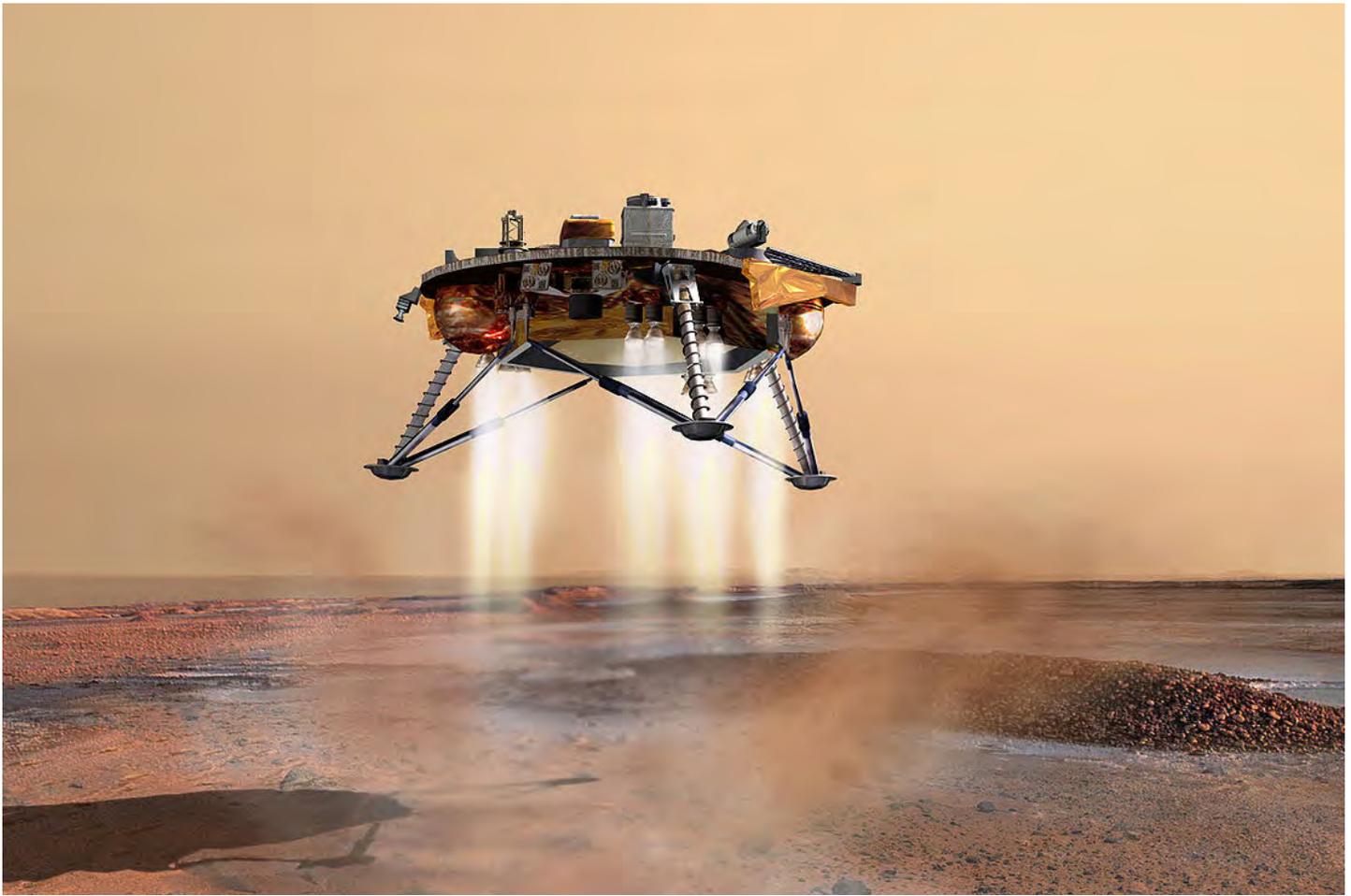
*The effects of a global dust storm on Mars in late 2001 with the onset of Martian spring in the Southern Hemisphere. The image on the left was taken in June 2001. The Hellas Basin where the dust storm began is the light area on the lower right, near the limb. By September, the dust had spread over the entire planet. Global dust storms that happen on a seasonal basis have been observed telescopically for over a century and documented by the Association of Lunar and Planetary Observers. Credit: NASA, James Bell (Cornell Univ.), Michael Wolff (Space Science Inst.), and The Hubble Heritage Team (STScI/AURA)*

Dust storms not only reduce the visibility, but also increase the temperature of the atmosphere by up to eighty degrees Fahrenheit as the dust grains are heated by the Sun. The surface cools as the sunlight absorbed by the dust no longer makes it to the ground. The warmer temperature causes the atmosphere to expand upward, increasing drag on orbiting spacecraft. The dust kicked up by a local dust storm can be caught in the jet streams and be carried around the planet. This traveling dust causes atmospheric changes that trigger local dust storms thousands of miles away. This ability to trigger other local dust storms allows a dust storm to cover the hemisphere. The storm can also propagate across the equator to make it a truly global event.

But humans do not live by oxygen alone. Another important factor is water. There is insufficient water in Mars's atmosphere to condense it into usable quantities. One of the most important results of our exploration is the discovery of vast quantities of water on the Red Planet. However, it is not in liquid form like our oceans, but frozen as ice in and under the polar caps.

Mars orbiters have contributed to our understanding of the ice deposits on the Martian surface, but it was the Phoenix Mars Lander that confirmed the existence of water-ice. In May 2008, the Phoenix lander settled on the north polar region of the Red Planet. This lander had a trenching tool that dug into the Martian soil and exposed some grains of ice that evaporated in a few days. The shallow ice layer it exposed were at depths from two to seven inches.

While the Phoenix Lander was able to tell us about the local environment, the orbiters have allowed astronomers to determine the extent of the ice. An impact on the Martian surface generates shock



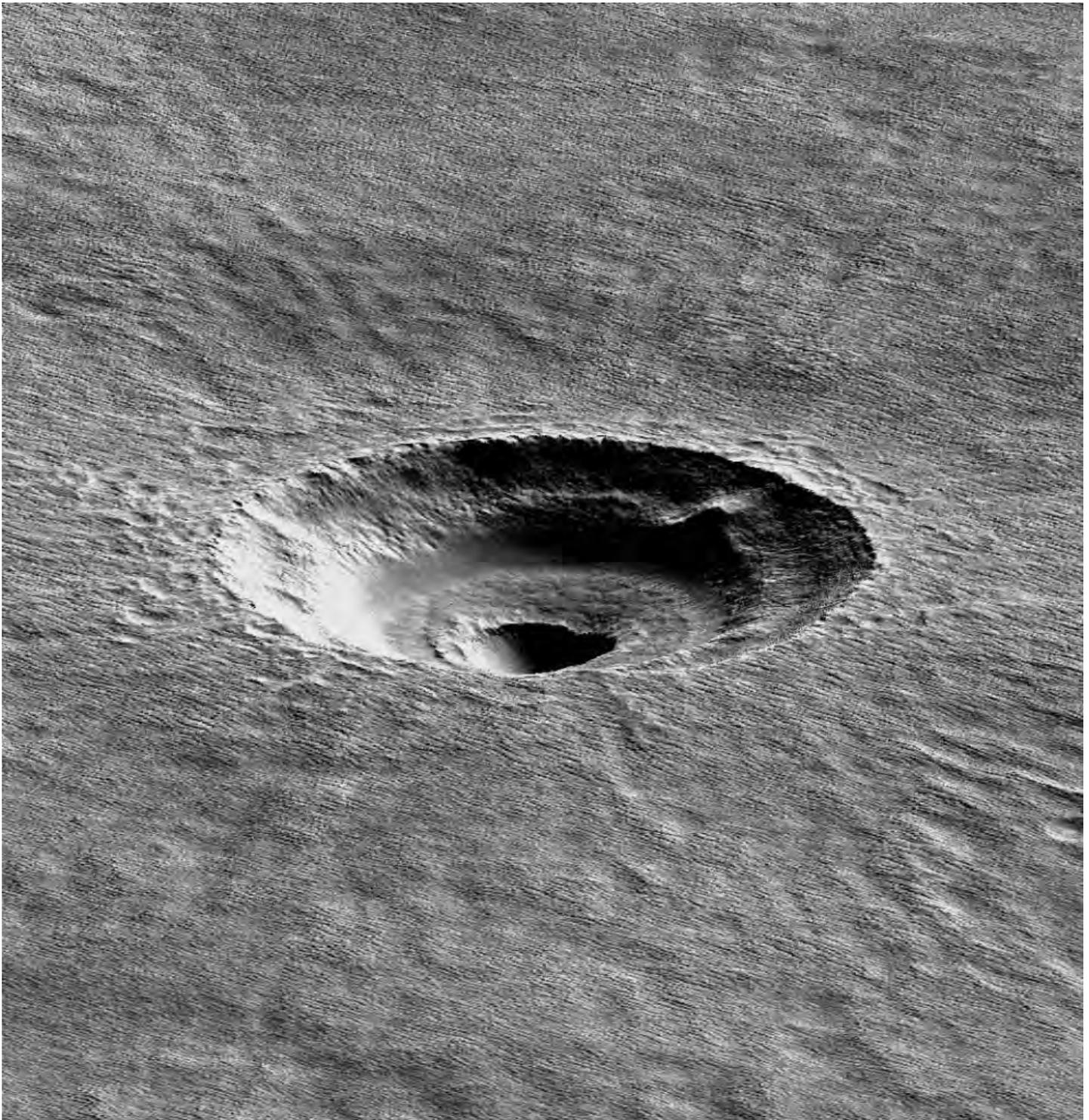
**Phoenix Mars Lander::**

*This is an artist's conception of the Phoenix Mars Lander settling in the northern polar regions of the Red Planet. After a successful landing, Phoenix used its scoop to dig a trench that exposed a layer of ice under the dirt.*

waves that push aside the weaker material, creating terraced craters. The Mars Reconnaissance Orbiter (MRO) provided the images of about 187 terraced craters in the Arcadia Planitia region in the northern part of the northern hemisphere.

MRO's Shallow Radar, or SHARAD, was used to determine the composition of the layers exposed by the terraces. The analysis revealed a layer of ice 130 feet thick just beneath the surface. The ice covers an area as big as California and Texas combined, stretching from the pole down to latitude thirty-eight degrees north.

So the critical things we need to start a colony on the Red Planet can be found there. We will need to bring many things from Earth, including seeds, bacteria, power supplies, lights and more. Once we reach the surface of Mars, it will no longer be possible to separate Earthly organics from native Martian organics. It is quite likely that over a very long period, the Earthly organics will colonize the Martian environment. Perhaps it will help make Mars a friendlier place for humans.



**Mars Crater Bramson:** *This is a digital terrain model of one of the terraced craters studied by University of Arizona astrogeologists. The terraces were generated at the boundary between the layers of different material that the shock waves from the impact pushed away from the impact site. The result of the U. of A. study was that there is a layer of water-ice just under the surface that is 130 feet thick. It is thought that this layer came from ancient snowfalls that were later covered by dirt and sand. (Credit: American Geophysical Union)*

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