IAAS Monthly Astronomy Newsletter
June 2022

The International Association for Astronomical Studies provides this newsletter as a service for interested persons worldwide.

This newsletter is published on the World Wide Web at The Home of KIØAR - and is received nationally and internationally. Download the PDF formatted version of the newsletter.

An Open Invitation - For amateur radio operators and scanner enthusiasts, when in the Denver metro area, please join the Colorado Astronomy Net on the Rocky Mountain Radio League's WØWYX **146.94 MHz** and **449.825 MHz** repeaters. The net meets on Tuesday nights at 7 P.M. Mountain Time (US).

Obtain your Amateur Radio (Ham) License or your General Radio Operator's License (GROL)! Visit the South Metro VE Team website for more information. The South Metro VE Team provides test sessions by appointment only. Check the website for current information.

The Colorado Astronomy Net and the IAAS are on Facebook page. Be sure to "Like" us.

Donate to the IAAS!
Shop Smile.Amazon.com, sign up or sign in to smile.amazon.com and select the **International Association for Astronomical Studies**. 0.5% of every purchase will be donated to the group. Thank you for your support!

Excerpts from JPL mission updates are provided as a public service as part of the JPL Solar System Ambassador / NASA Outreach program.

In This Newsletter...

"Noctilucent clouds (left) float in the dawn sky in this summer 2020 panorama. Visible from the left to right are Venus, Mars, Saturn, Jupiter, and the Moon will join in." Alan Dyer, Astronomy Magazine, June 2022, p. 32.

The Month At-A-Glance

The current month's calendar displaying the daily astronomical events.

The Moon

Phases:

- First Quarter Moon occurs on the 7th.
- Full Moon occurs on the 14th.
- Last Quarter Moon occurs on the 20th.
- New Moon occurs on the 28th.

- The Moon is at apogee (252,396 miles from Earth) on the 1st.
- The Moon is at perigee (222,098 miles from Earth) on the 14th.
- The Moon is at apogee (252,637 miles from Earth) on the 29th.

Moon/Planet Pairs:

- The Moon passes 0.1° north of dwarf planet Ceres on the 1st.
- Venus passes 1.6° south of Uranus on the 11th.
- 1he Moon passes 4° south of Saturn on the 18th.
- The Moon passes 0.7° south of asteroid Vesta on the 19th.
- The Moon passes 4° south of Neptune on the 20th.
- The Moon passes 3° south of Jupiter on the 21st.
- The Moon passes 0.9° south of Mars on the 22nd.
- Mercury passes 3° north of Aldebaran on the 23rd.
- The Moon passes 0.05° south of Uranus on the 24th.
- The Moon passes 3° north of Venus on the 26th.
- The Moon passes 4° north of Mercury on the 27th.

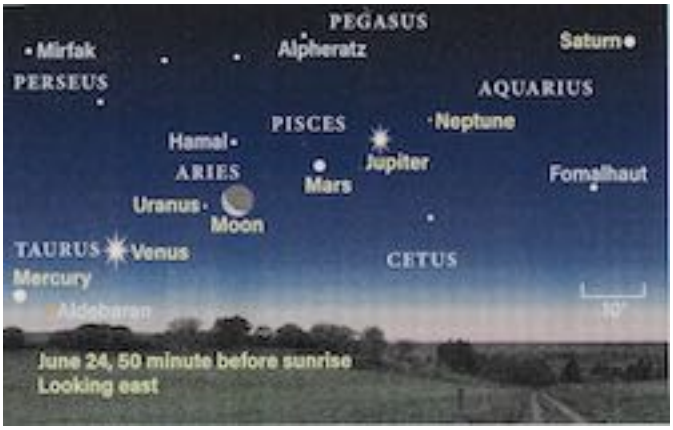
For reference: The Full Moon subtends an angle of ~0.5°.

The Planets & Dwarf Planets

Planetary Reports are generated by "TheSkyX" software. These reports provide predicted data for the planets on the first of each month for the current year. The rise and set times for the Sun and the Moon for each day of the month as well as meteor shower radiants are also included in the reports. These reports have been optimized for the Denver, Colorado location, however, the times will be approximate for other locations on Earth.

(All times are local unless otherwise noted.)

Planetary Highlights for June



"All seven major planets congregate in the morning sky — yes, all seven! The five naked-eye planets line up in order of distance from the Sun, stretched along the ecliptic. The Moon joins in later this month. The morning spectacular is perfectly situated for hours of remarkable telescopic views, beginning when Saturn rises soon before midnight in late June. Within a span of just over 90°, you can spy the rings of Saturn, the atmospheric belts and the Galilean moons of Jupiter, the rusty surface of Mars, the phase of Venus — and a fleeting glimpse of Mercury." Astronomy Magazine, June 2022, p. 32.

Mercury

Is stationary on the 2nd. Mercury is at greatest western elongation (23°) on the 16th. Mercury rises at 5:02 a.m. on the 1st and about 4:27 a.m. by month's end. Look for Mercury to the east about 30 minutes before sunrise. Mercury is in the constellation of Taurus shining at magnitude 0.5 on the 15th.

Venus

Rises at 3:52 a.m. on the 1st and about 3:39 a.m. by month's end. Look for Venus to the southeast before sunrise. Venus moves from the constellation of Aries into Taurus shining at magnitude -3.9.

Earth

Summer solstice occurs on the 21st at 5:14 A.M. EDT.

Mars

Is at perihelion (128 million miles from the Sun) on the 21st. Mars rises at 2:39 a.m. on the 1st and about 1:32 a.m. by month's end. Look for Mars to the southeast before sunrise. Mars is in the constellation of Pisces shining at magnitude 0.5.

Jupiter
Rises at 2:32 a.m. on the 1st and about 12:41 a.m. by month's end. Jupiter can be spotted to the south before sunrise. Jupiter is in the constellation of Pisces shining at magnitude -2.3.

Saturn
Is stationary on the 5th. Saturn rises at 12:58 a.m. on the 1st and about 10:56 p.m. by month's end. Look for Saturn to the south before sunrise. Saturn is in the constellation of Capricornus shining at magnitude 0.5.

Uranus
Rises at 4:17 a.m. on the 1st and about 2:21 a.m. by month's end. Look to the southeast before sunrise to spot Uranus. Uranus is in the constellation of Aries shining at magnitude 5.9.

Neptune
Is stationary on the 28th. Neptune rises at 2:12 a.m. on the 1st and about 12:12 a.m. by month's end. Look for Neptune to the south before sunrise. Neptune is in the constellation of Pisces shining at magnitude 7.8.

Dwarf Planets
Ceres
Sets at 10:32 p.m. on the 1st and about 9:29 p.m. by month's end. Look for Ceres towards the southwest in the early evening. Ceres is in the constellation of Gemini shining at magnitude 8.8.

Pluto
Rises at 11:36 p.m. on the 1st and about 19:37 p.m. by month's end. Pluto is in the constellation of Sagittarius shining at magnitude 15.1.

As always, good luck at spotting Neptune, Ceres and Pluto, a large telescope and dark skies will be needed.

Astronomical Events

Meteor Showers

- The Arietids Meteor Shower - This is the strongest daylight meteor shower of the year. The duration extends from May 22 to July 2, with maximum activity occurring on June 8. The hourly rate is near 60 at maximum.

- The June Lyrids - This shower is active during June 10 to 21, producing predominantly blue and white meteors at a maximum hourly rate of 8 per hour on June 15. The average magnitude of this shower is near 3, while 32% of the meteors leave trains.

- The Zeta Perseids - This daylight shower occurs during May 20 to July 5. Maximum occurs on June 13. Radar surveys have revealed the activity of this shower to be near 40 per hour.

- The June Boötids - This shower is currently active during June 27 to July 5 and possesses a maximum of activity that falls on the 28th... The shower is notable in that its meteors are primarily faint, with an average magnitude near 5; however, bright meteors do occur regularly.

For more information about Meteor Showers, visit Gary Kronk's Meteor Showers Online web page.

Meteor Shower Radiant Report

Meteor Scatter (or Meteor burst communications) -- "is a radio propagation mode that exploits the ionized trails of meteors during atmospheric entry to establish brief communications paths between radio stations up to 2,250 kilometres (1,400 mi) apart." Tune your shortwave or your HF amateur radio to 54.310 MHz USB CW and see if you can hear any pings. Try other frequencies as well... 6m FT8 digital - 50.313 Mhz & 50.276 Mhz, JP-65 digital mode and the carrier frequencies of the lower VHF bands for TV channels 2, 3 & 4.

Meteor Rx How-To by Terry Bullett (WØASP).

Comets

- Comet C/2017 K2 (PanSTARRS) is traveling through the constellation of Ophiuchus shining around 7th magnitude this month. A 4-6 into telescope should be able to pick this comet out among the background stars of the Milky Way from suburban back yards. From dark, country skies a good pair of binoculars will do.

For information, orbital elements and ephemerides on observable comets visit the Observable Comets

page from the Harvard-Smithsonian Center for Astrophysics.

For more information about Comets, check out Gary Kronk's 6-volume series of books on Cometography.

Eclipses

- No solar eclipse activity this month.

- No lunar eclipse activity this month.

Observational Opportunities

(from evening to morning)

- Look for Mercury, Venus, Mars, Jupiter, Saturn, Uranus and Neptune in the early morning before sunrise.

Asteroids

(From west to east)

- **Hygiea** is in the constellation of Virgo.
- **Vesta** is in the constellation of Aquarius.

Information about the Minor Planets can be found at the Minor Planet Observer web site.

Occultations

Information on various occultations can be found at the International Occultation Timing Association's (IOTA) web site.

Canada and the northeastern U.S. will see the Moon occult the star Dschubba in the constellation of Scorpius on the 12th.

Member Meteor Sightings

In this section I will post meteor, fireball, etc sightings that have been published on the American Meteor Society's web site. I want to make this an active section of the web pages and newsletter and would like to publish the links to member sightings. If you have any published sightings, please provide me with the links and I will post them here for all to enjoy.

Event ID	Date/Time	Location	Observer	Link
3871-2015	2015-11-13 01:55 MST	CO	Charles N	3871a
3587-2015	2015-11-22 17:38 MST	CO	Kevin S	3587aw
3829-2015	2015-12-05 18:06 MST	CO	Burness A	3829a
986-2020	2020-02-21 22:20 MST	CO	Lukas S	986
3716-2020	2020-07-24 23:22 MDT	CO	Lukas S	3716
4774-2021	2021-08-13 21:57 MDT	UT	Lukas S	4774
7044-2021	2021-10-28 20:37 MDT	CO	Burness A	249058

Subscriber Gallery

I have created a web page containing images taken and submitted by subscribers to the email newsletter, check-ins to the Colorado Astronomy Net and readers of the online newsletter and some of my own images. Any one wishing to submit their images to the gallery, please let me know. The images must be taken by the submitter and be astronomy related. Please include a description and your information so that I can give proper credit to your work. I will post the most recent submissions here.

StarLink Train (G4-3)
STARLINK-3200 and others

December 03, 2021

Courtesy of Burness Ansell

Taken with iPhone X @ 6:43 P.M. MST

Traveling from WSW to W passing close to the bright star Altair in Aquila.

Planetary/Lunar Exploration Missions

(Excerpts from recent mission updates)

JPL Latest News

The Latest from Space

JPL Latest News

May 27, 2022
Soil, Sutures, and Climate Modeling Among Investigations Riding SpaceX CRS-25 Dragon to International Space Station

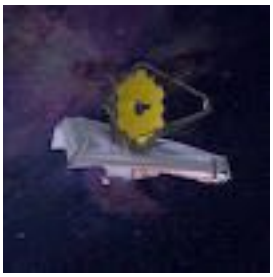
Full Article & Images

"The 25th SpaceX cargo resupply services mission (SpaceX CRS-25) carrying scientific research and technology demonstrations to the International Space Station is scheduled for launch June 9 from NASA's Kennedy Space Center in Florida. Experiments aboard the Dragon capsule include studies of the immune system, wound healing, soil communities, and cell-free biomarkers, along with mapping the composition of Earth's dust and testing an alternative to concrete."

Read the latest news and discoveries from JPL's dozens of active space missions exploring Earth, the solar system and worlds beyond.

Past, Present, Future and Proposed JPL Missions

For special JPL programs and presentations in your area visit the JPL Solar System Ambassador web site.



James Webb Space Telescope

May 26, 2022
Geology from 50 Light-Years: Webb Gets Ready to Study Rocky Worlds

Full Article & Images

"With its mirror segments beautifully aligned and its scientific instruments undergoing calibration, NASA's James Webb Space Telescope is just weeks away from full operation. Soon after the first observations are revealed this summer, Webb's in-depth science will begin.

Among the investigations planned for the first year are studies of two hot exoplanets classified as "super-Earths" for their size and rocky composition: the lava-covered 55 Cancri e and the airless LHS 3844 b. Researchers will train Webb's high-precision

spectrographs on these planets with a view to understanding the geologic diversity of planets across the galaxy, and the evolution of rocky planets like Earth."

More information on the James Webb Space Telescope mission is available at The James Webb Space Telescope website.
The public can follow the mission on Facebook, Twitter and YouTube.

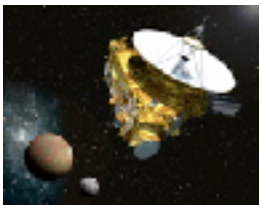
Juno

March 16, 2022
NASA'S JUNO SPACECRAFT GLIMPSES JUPITER'S MOONS IO AND EUROPA

Full Article & Images

"NASA's Juno mission captured this view of Jupiter's southern hemisphere during the spacecraft's 39th close flyby of the planet on Jan. 12, 2022. Zooming in on the right portion of the image (Figure B) reveals two more worlds in the same frame: Jupiter's intriguing moons Io (left) and Europa (right)."

Images from NASA's JunoCam.
More information on the Juno mission is available at Juno and Mission Juno.
The public can follow the mission on Facebook and Twitter.



New Horizons

March 29, 2022
Pluto's giant ice volcanos may have formed from multiple eruption events

Full Article & Images

"Scientists on NASA's New Horizons mission team have determined multiple episodes of cryovolcanism may have created some kinds of surface structures on Pluto, the likes of which are not seen anywhere else in the solar system. Material expelled from below the surface of this distant, icy planet could have created a region of large domes and rises flanked by hills, mounds and depressions. New Horizons was NASA's mission to make the first exploration of Pluto and its system of five moons."

New Horizons gallery

Find New Horizons in the iTunes App Store.

For more information on the New Horizons mission -- the first mission to the ninth planet -- visit the New Horizons home page.

TESS

January 13, 2022
Citizen Scientists Spot Jupiter-like Planet in NASA TESS Data

Full Article & Images

"Tom Jacobs of Bellevue, Washington, loves treasure hunts. Since 2010, the former U.S. naval officer has participated in online volunteer projects that allow anyone who is interested — "citizen scientists" — to look through NASA telescope data for signs of exoplanets, planets beyond our solar system.

Now, Jacobs has helped discover a giant gaseous planet about 379 light-years from Earth, orbiting a star with the same mass as the Sun. The Jupiter-size planet is special for astronomers because its 261-day year is long compared to many known gas giants outside our solar system. The result also suggests the planet is just a bit farther from its star than Venus is from the Sun. The finding was published in the Astronomical Journal and presented at an American Astronomical Society virtual press event on Jan. 13."

For more news and information on the TESS mission, visit the Latest Tess Stories page.

Past, Present, Future and Proposed JPL Missions.

Mars Missions

Be A Martian

Mars website mobile version is here!
Simply type
http://mars.jpl.nasa.gov
into your mobile browser.

MARS WEATHER
Mars Daily Weather Report

Mars on the Go! NASA Be A Martian Mobile App
If you want the latest news as it happens, try our Be A Martian app.
Download on Mobile Devices
Android | iPhone | Windows Phone

JMARS

JMARS is an acronym that stands for Java Mission-planning and Analysis for Remote Sensing. It is a geospatial information system (GIS) developed by ASU's Mars Space Flight Facility to provide mission planning and data-analysis tools to NASA's orbiters, instrument team members, students of all ages, and the general public.

Laboratory for Atmospheric and Space Physics
"The Laboratory for Atmospheric and Space Physics (LASP) at the University of Colorado Boulder (CU) began in 1948, a decade before NASA. We are the world's only research institute to have sent instruments to all eight planets and Pluto.

LASP combines all aspects of space exploration through our expertise in science, engineering, mission operations, and scientific data analysis. As part of CU, LASP also works to educate and train the next generation of space scientists, engineers and mission operators by integrating undergraduate and graduate students into working teams. Our students take their unique experiences with them into government or industry, or remain in academia to continue the cycle of exploration.

LASP is an affiliate of CU-Boulder AeroSpace Ventures, a collaboration among aerospace-related departments, institutes, centers, government labs, and industry partners."

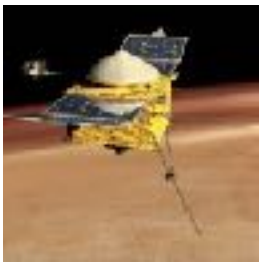
LASP
May 17, 2022

LASP planetary scientist and diversity advocate Fran Bagenal inducted into the National Academy of Sciences

Full Article & Images

"Fran Bagenal, a senior research scientist at the Laboratory for Atmospheric and Space Physics (LASP) at the University of Colorado Boulder and professor emeritus of the university's Astrophysical and Planetary Sciences Department, has been inducted into the U.S. National Academy of Sciences (NAS).

The academy, which is widely regarded as the country's most prestigious honorary scientific society, recognized Bagenal as "a leading expert on the properties of plasmas that pervade the magnetospheres of the outer planets". She was one of 120 scientists elected to the national academy this spring, and one of 59 women—the most ever elected in a single year."



MAVEN
May 9, 2022
Using MAVEN data, high school students win several awards at local science fairs

Full Article & Images

"*Two Colorado high school students competed in regional and state*

science and engineering fairs with research they conducted using MAVEN mission data.

It was in their sophomore chemistry class that Allison (Ali) Inge and Langley Nakari first heard about the science research seminar their high school offers—and immediately knew they wanted to take it. Now, two years on, the two students have completed an impressive study of Mars' atmosphere using data from the Mars Atmosphere and Volatile EvoultioN (MAVEN) mission and, in the process, won awards in both their regional and state science fairs.

"I was very nervous going into it, it was very daunting—I had never done anything like it before," said Langley, when thinking back to the day of the regional fair. Ali agreed and explained what it was like: "we weren't able to see other people's projects, so we had no conceptualization of the standards of the other projects," she said." It was a complete surprise that we placed!"

Visit LASP and MAVEN for more information.

Mars 2020 - Perseverance

May 27, 2022

NASA's Ingenuity Mars Helicopter Captures Video of Record Flight

Full Article & Images

"*Imagery has come down from Mars capturing a recent flight in which the rotorcraft flew farther and faster than ever before.*

The Ingenuity Mars Helicopter's black-and-white navigation camera has provided dramatic video of its record-breaking 25th flight, which took place on April 8. Covering a distance of 2,310 feet (704 meters) at a speed of 12 mph (5.5 meters per second), it was the Red Planet rotorcraft's longest and fastest flight to date. (Ingenuity is currently preparing for its 29th flight.)

"For our record-breaking flight, Ingenuity's downward-looking navigation camera provided us with a breathtaking sense of what it would feel like gliding 33 feet above the surface of Mars at 12 miles per hour," said Ingenuity team lead Teddy Tzanetos of NASA's Jet Propulsion Laboratory in Southern California."

Learn more about the Mars 2020 (Perseverance) mission.

Mars Science Laboratory - Curiosity

May 27, 2022
Sols 3487-3490: Up, Up and Away!

Full Article & Images

"Our intrepid rover engineers again successfully navigated Curiosity a little higher up Mount Sharp (~5 m) and ~40 m on the ground, away from our previous location. The terrain beneath the rover included striated, dusty bedrock and sand ripples with coarse lag deposits. As a member of the geology/mineralogy planning team and the APXS payload uplink lead today, I chose several interesting areas in the workspace for potential arm, contact science. The rover engineers assessed these targets before we settled on a representative bedrock area. We are planning two APXS observations on the dusty bedrock, and on a brushed area, with accompanying MAHLI images ("Pitinga"). This will help us assess the effect of the ubiquitous dust cover on APXS compositional analyses of the bedrock. The measurement of the brushed bedrock also constitutes part of our systematic monitoring of bedrock composition with APXS every 10 m of elevation gain, as we climb Mount Sharp. This is important as we are in a region identified from orbit as showing a change in mineralogy and potentially environment within Gale crater. The brushed target will be imaged with Mastcam, which will also image the two rock targets being analyzed with ChemCam LIBS: "Rio Pipi" – dusty bedrock in the ground, and "Barama" – layered bedrock face; as well as some crevices within the sand and rock in the workspace."

Check out information about NASA's partnership with Foursquare.
Visit the Mars Science Laboratory page.

Mars Reconnaissance Orbiter Mission

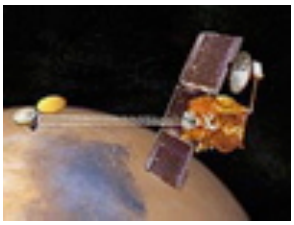
February 14, 2022
How Do Spacecraft Deal with Dust Storms on Mars?

Full Article & Images

"A large dust storm on Mars, nearly twice the size of the United States, covered the southern hemisphere of the Red Planet in early January 2022, leading to some of NASA's explorers on the surface hitting pause on their normal activities. NASA's Insight lander put itself in a "safe mode" to conserve battery power after dust prevented sunlight from reaching the solar panels. NASA's Ingenuity Mars Helicopter also had to postpone flights until conditions improved. A fleet of NASA orbiters monitor Martian dust storms like this one and serve as lifelines to Earth by relaying data from the rovers and lander on the ground back to the team. This includes the Mars Reconnaissance Orbiter, MAVEN, and Odyssey. Odyssey, while facing its technical issue, was able to recover quickly enough to come to InSight's aid during the dust storm."

MARS RECONNAISSANCE ORBITER HIRISE IMAGES

View all of the archived HiRISE images.
More information about the MRO mission is available online.



Mars Odyssey Orbiter

May 5, 2022
Science at Sunrise: Solving the Mystery of Frost Hiding on Mars

Full Article & Images

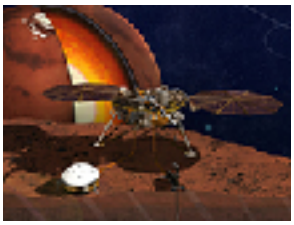
"*A new study using data from NASA's Mars Odyssey orbiter may explain why Martian frost can be invisible to the naked eye and why dust avalanches appear on some slopes.*

Scientists were baffled last year when studying images of the Martian surface taken at dawn by NASA's Mars Odyssey orbiter. When they looked at the surface using visible light – the kind that the human eye perceives – they could see ghostly, blue-white morning frost illuminated by the rising Sun. But using the orbiter's heat-sensitive camera, the frost appeared more widely, including in areas where none was visible."

DAILY MARS ODYSSEY THEMIS IMAGES
Thermal Emission Imaging System (THEMIS) web site.

The Odyssey data are available through a new online access system established by the Planetary Data System.

Visit the Mars Odyssey Mission page.



Mars InSight - Journey to Mars

InSight - Revealing the Heart of Mars
May 17, 2022
NASA's InSight Still Hunting Marsquakes as Power Levels Diminish

Full Article & Images

"*Dusty solar panels and darker skies are expected to bring the Mars lander mission to a close around the end of this year.*

NASA's InSight Mars lander is gradually losing power and is anticipated to end science operations later this summer. By December, InSight's team expects the lander to have become inoperative, concluding a mission that has thus far detected more than 1,300 marsquakes – most recently, a magnitude 5 that occurred on May 4 – and located quake-prone regions of the Red Planet.

The information gathered from those quakes has allowed scientists to measure the depth and composition of Mars' crust, mantle, and core. Additionally, InSight (short for Interior Exploration using Seismic Investigations, Geodesy and Heat Transport) has recorded invaluable weather data and studied remnants of Mars' ancient magnetic field."

Interactive selection of raw images taken by the cameras aboard InSight.

Learn more about the InSight mission.

Mars Missions Status

New Mars missions are being planned to include several new rover and sample collection missions. Check out the Mars Missions web page and the Mars Exploration page.

Astronomy Links and Other Space News

(If you have a link you would like to recommend to our readers, please feel free to submit it.)

Colorado Astronomy Links

Radio Astronomy Links

Other Astronomy Links

Acknowledgments and References

Much of the information in this newsletter is from "Astronomy Magazine" (Kalmbach Publishing), JPL mission status reports, "Meteor Showers - A Descriptive Catalog" by Gary W. Kronk and other astronomical sources that I have stashed on my book shelves.

The author will accept any suggestions, constructive criticisms, and corrections. Please feel free to send me any new links or articles to share as well. I will try to accommodate any reasonable requests. Please feel free to send questions, comments, criticisms, or donations to the email address listed below. Enjoy!

Subscription Information

- Email Newsletter archives.
- Full documentation of the online administration system.
- The latest version of the newsletter.

Keep looking UP!

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COO, Director of Aerospace Technologies, IAAS
JPL Solar System Ambassador, Colorado
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