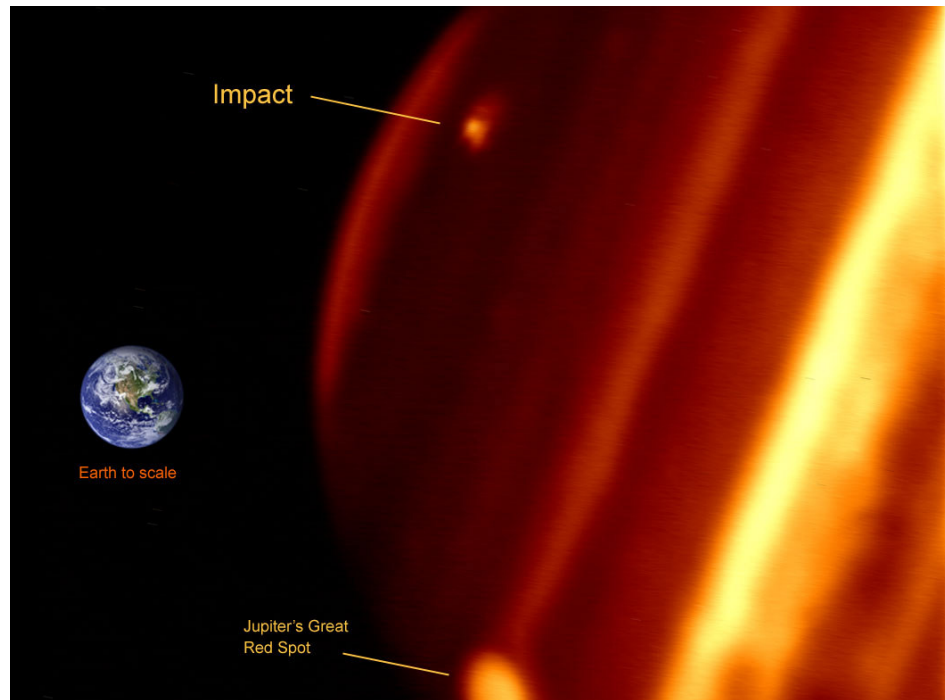


The impact scar has since been imaged by the Hubble Space Telescope (above). "This July 23<sup>rd</sup> Hubble photo shows a lumpiness to the debris plume caused by turbulence in Jupiter's atmosphere," says Amy Simon-Miller of NASA's Goddard Space Flight Center. Based on the appearance of the impact zone, she estimates that the diameter of the impacting object was several hundred meters - i.e., several football fields wide. The force of the explosion was likely thousands of times greater than the Tunguska impact of 1908.

It now appears as a backward letter L near Jupiter's south pole," reports Mike Hood of Georgia, USA. The cloud is located near Jupiter's System II longitude 210°. New pictures of Jupiter and its recent impact site keep pouring in, showing the rapidly growing atmospheric aftermath in increasingly greater detail. First discovered by Australian amateur astronomer Anthony Wesley on July 19, the Pacific Ocean-sized black spot is likely the result of a collision with an asteroid or comet. The impact scar remains an easy target for mid-sized backyard telescopes,

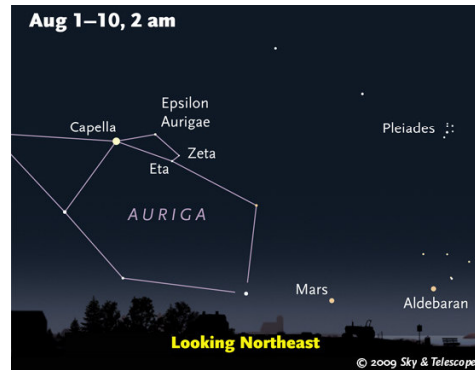


It's getting bigger. Polar winds are spreading debris from the impact that created a cindery cloud in Jupiter's upper atmosphere. "The debris cloud has enlarged and faded somewhat,

and amateur astronomers can contribute to its study by monitoring Jupiter in the nights ahead. - [Spaceweather.com](http://Spaceweather.com) and [Space Telescope Science Institute](http://SpaceTelescopeScienceInstitute)

### Epsilon Aurigae Eclipse

Robin Leadbeater of Wigton, UK, has reported spectroscopic signs that the long-awaited eclipse of Epsilon Aurigae is beginning.



Epsilon Aurigae is one of the most remarkable eclipsing variable stars in the sky. With most eclipsing variables, two orbiting stars periodically block each other's light as one star passes in front of the other. But in the case of Epsilon Aurigae, the eclipsing object appears to be a huge, elongated opaque disk. Presumably, there must be one or more stars in the disk's center to provide the known mass and keep the disk from flying apart. But then why are they invisible? In any case, Epsilon Aurigae is one of astronomy's great mysteries — and arguably the strangest star that's readily visible to the unaided eye. Astronomers are in urgent need of fresh detailed observations to help them characterize this extraordinary star system. The eclipses come only every 27.1 years. Epsilon is predicted to fade from its current magnitude of 3.0 to 3.8 by the end of 2009, then remain near its minimum brightness until March 2011. - [Tony Flanders, SkyandTelescope.com](http://TonyFlanders.com)

### Green Peas

Armchair astronomers have helped discover a batch of tiny galaxies that may help professional astronomers understand how galaxies formed stars in the early universe. Dubbed "Green Peas," the galaxies are forming stars 10 times faster than the Milky Way despite being 10 times smaller and 100 times less massive. They are between 1.5 billion and 5 billion light years away

"These are among the most extremely active star-forming galaxies we've ever found," said Carolin Cardamone, lead author of a paper on the discoveries to be published in an upcoming issue of the Monthly Notices of the Royal Astronomical Society.

The discoveries were made as part of a project called Galaxy Zoo, where Internet users volunteer their spare time to help classify galaxies for an online image database (⇒ p.90).



The Green Peas stuck out because of their small size and green color compared to the more common galaxies -- such as the one on the bottom right -- that Galaxy Zoo users were used to seeing. © *Carolin Cardamone and Sloan Digital Sky Survey*

Murmurs of a potential discovery began when a group of volunteers who called themselves the "Peas Corps" and the "Peas Brigade" started a discussion in an online forum about a group of strange bright green objects. The original forum thread was called "Give peas a chance."

The volunteers -- many of whom had no previous astronomy background or experience -- were asked to refine their image samples and submit them to a lab for color analysis. Once the findings were verified, researchers analyzed the light emanating from the galaxies to determine the degree of star formation taking place within them.

"No one person could have done this on their own," Cardamone said. "Even if we had managed to look through 10,000 of these images, we would have only come across a few Green Peas and wouldn't have recognized them as a unique class of galaxies."

Of the one million galaxies that make up the image bank, the researchers found only 250 Green Peas.

"These galaxies would have been normal in the early universe, but we just don't see such active galaxies today," said Kevin Schawinski, co-founder of Galaxy Zoo. "Understanding the Green Peas may tell us something about how stars were formed in the early universe and how galaxies evolve." -- [Astronomy.com](http://Astronomy.com)

## Reports

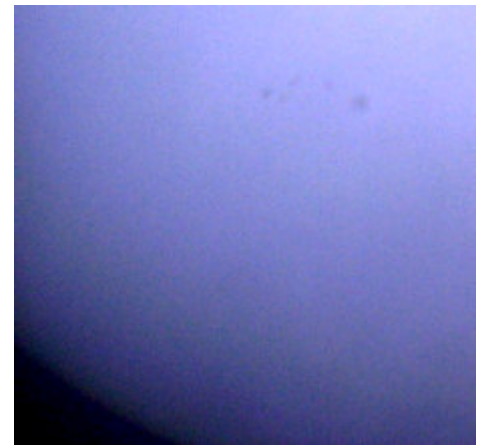
### Moon



This (*middle, bottom*) is my latest quarter moon shot. This is a single shot photo taken afocal through my OS4.5 (no, not an operating system - Orion Stablast 4.5"), handheld at ISO 100 and 1/200 sec exposure. I was too lazy to wait for the clouds to completely clear up. When I got a small opening... Click! In the middle of the moon, there is still a bit of dark clouds (which I didn't notice until I uploaded the picture to my PC). - [Vincent Lao](#)

### Sun

Ahead of the total solar eclipse, the Sun decided to prepare itself by providing a rapidly changing complex sunspot group belonging to the new sunspot cycle.



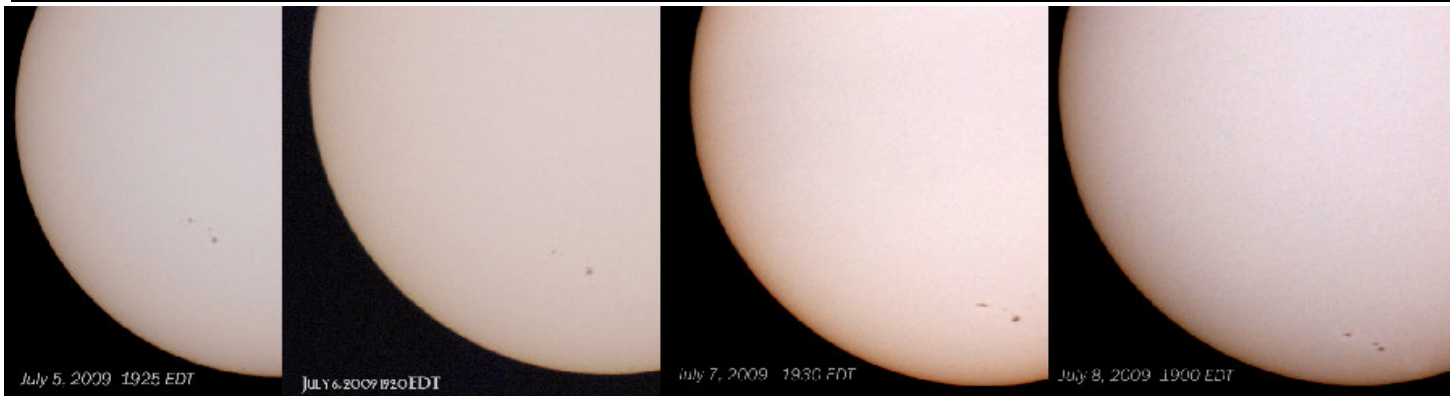
**July 5.** It was clear since noon, but when I arrived home in the afternoon and tried to photograph the sunspot, it was already cloudy. So far this is the only "better" shot I made (*above*). - [Ted Gonzaga, Iloilo](#)

**July 5.** We got some sun later this afternoon after a day of rain and clouds, and I was able to get my Meade ETX-125 (5" Maksutov-Cassegrain) out and my Orion glass solar filter for some solar viewing and imaging.

This is a nice group - somewhat complex and not just a single spot - with penumbra.

**July 6.** Looks like the sunspot group is starting to fall apart. The sunspots that formed a "bridge" between the two ends are no more - now, it looks essentially like two separate clusters - the bigger one still sports a binary umbra surrounded by a penumbra.

I was able to subsequently observe and image the Sun for two more days. The composite on the next page, shows the interesting and rapid evolution of the sunspot group over four successive days -- July 5-8. Imaged with a Nikon D80 at prime focus on a Meade ETX-125 equipped with an Orion glass solar filter. - [Jun Lao, Mason, Ohio](#)



Sunspot AR1024 is probably the first significant sunspot after an unusually long solar minimum. It hopefully heralds more and larger sunspots to come. These images were taken through a hydrogen alpha filter to reveal the outer layer of the chromosphere, and through a white light filter which reveals the lower and cooler solar photosphere.

Below, AR 1024 through a hydrogen alpha filter showing the sunspot on the outer solar chromosphere. This image was featured in Spaceweather.com. - [John Nassr, Baguio](#)

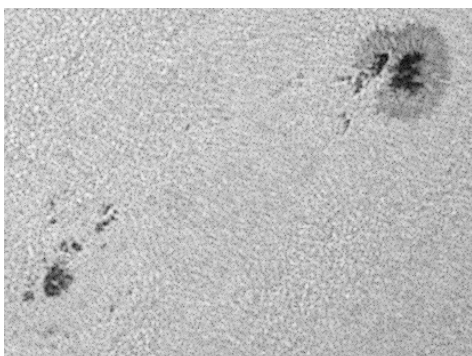
My histogram reading was only 40% at 1/15s exposure time and 100% gain.

**Jupiter**

July 4. Through the haze last night I was able to get some good shots. I was really surprised actually on how well they turned out (*below*).



Because of good seeing, the images (*below*) still came out well. The Great Red Spot (GRS) is at the Central Meridian (CM) (⇒ p. 92).

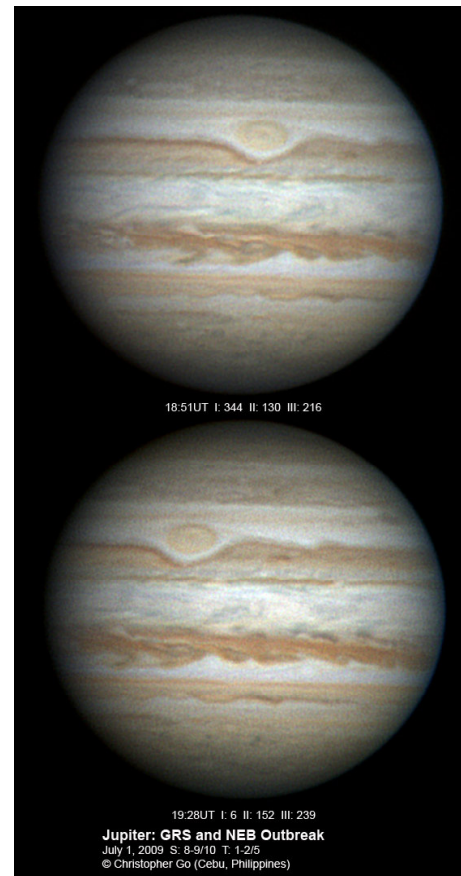


Above is AR 1024 in white light taken through a Herschel wedge showing the sunspot in the lower solar photosphere region. This was imaged July 6 - 7, 2009 with an Astrophysics 5" f/8 Starfire and H $\alpha$  Baader Herschel Wedge filter and Dragonfly 2 camera with 15 second exposure.

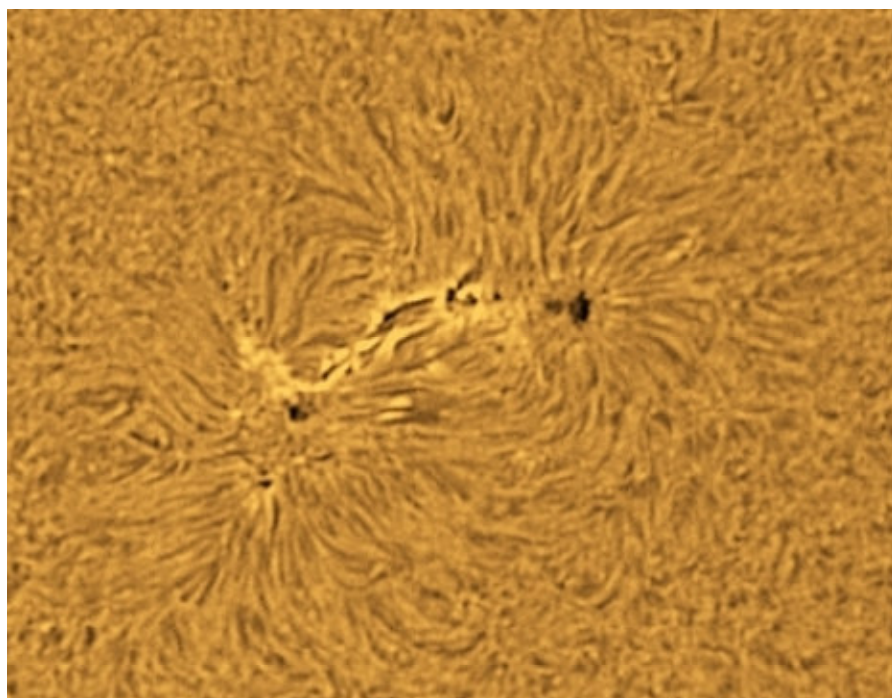


I added 2 shots, each about 2,000 frames via my C8 at f/40 using Ernie's WO SCT focuser, which really helps (*right*). - [Brian Davis](#)

July 1. Seeing was very good this morning, but transparency was very poor.

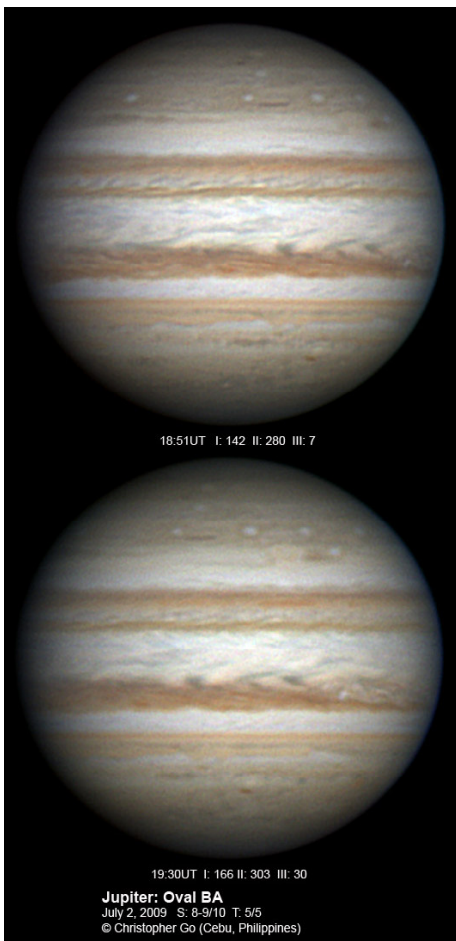


Jupiter: GRS and NEB Outbreak  
July 1, 2009 S: 8-9/10 T: 1-2/6  
© Christopher Go (Cebu, Philippines)



It is still very pale. Note what seems to be a South Tropical Disturbance (STRD) forming, following the GRS. Note the bright white oval preceding the disturbance, and a dark cyclonic oval between the GRS and the STRD. The South Equatorial Band (SEB) in this region is fading. The Equatorial Zone (EZ) looks complex. Note the dark features on the EZn/North Equatorial Belt (NEBs) region and the dark feature on the NEB, especially the protrusions into the North Tropical Zone (NTrZ), which was the outbreak region before. This area is very complex! The white oval on the NEBn are beginning to get prominent. The region at the North Temperate Belt (NTBn) is very complex.

July 2. Condition was good this morning, although it deteriorated towards the end of the imaging session.



Oval BA is rising in this image. The South Equatorial Belt (SEB) is fading. The EZ is very complex, especially at its northern edge. The NEB has a lot of activity. It seems like the EZ is pushing into the NEB. Note the rising outbreak on the NEB. Note the dark red oval at the NNTB. – *Chris Go, Cebu*

I borrowed Joel's VMC200L and was able to get an image (*middle, top*) of the recent impact scar on Jupiter under poor seeing. July 23 at 16:05UT, 3,500 frames @ 30fps via VMC at f/40.



Joel was kind enough to let me borrow the OTA for some test shots. It does very well and gives a different appearance in the images. Hoping for a night of good seeing soon! – *Brian Davis*

Jupiter reaches opposition on Aug. 14, when it becomes visible all night long.

On Aug. 10, the Sun passes through Saturn's ring plane, leaving the face of the rings that is very slightly tilted toward the Earth dark. The rings are so nearly edgewise to Earth that they appear as a line, and now the line goes dark, until after Earth passes through the ring-plane very low in dusk on Sept. 4. Unfortunately, it will be very difficult to observe Saturn low in the sky at dusk.

Aug. 10-13 marks the peak of the Perseid meteor shower. While the waning quarter Moon will spoil the early morning observation of the meteor shower, it is predicted that there will be the chance of a doubling of the rate of the Perseids – based on the proposition that a sliver of meteoroids will be intersecting the Earth's plane.

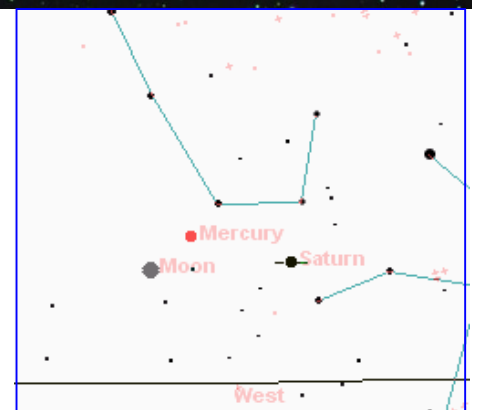


### Galaxies

I could not find images of NGC 5084 and therefore decided to photograph it out of curiosity and see what it looks like. The edge-on galaxy in Virgo near the border of Hydra and Corvus, glows at magnitude 12, and is accompanied by fainter background galaxies, the two brightest of which are ESO576-31 and ESO576-40, at magnitudes 14 and 14.6 respectively. Here is what 3.8 hours worth of exposures revealed. – *John Nassr, Baguio*

### The Sky

August is an iffy month – it is still smack dab in the middle of the rainy season, and thus is quite unpredictable in terms of being able to know whether the night (or day) will be cloudy or rainy or clear. In any event, there are still some things to look forward to if the skies happen to clear.



On August 22, if you have a clear western horizon, try to see if you can spot the thin crescent Moon, Mercury, and Saturn, bundled together a few degrees above the western horizon (⇒ p. 93).

As mentioned in the News, be on the lookout and observe Epsilon Aurigae, which is expected to dim during its long eclipse, until May 2011. It is believed that a thick cloud of dust which is in orbit around the star will block our direct view of the star.

Sky Calendar

| DAY HR             | EVENT  |
|--------------------|--|
| <b>August 2009</b> |  |
| 01 01:19           | Moon 0.2° N of Antares                               |
| 03 03:12           | Mercury 0.6° N of Regulus                            |
| 06 08:39           | Penumbral Lunar Eclipse (not visible in Philippines) |
| 06 08:54           | FULL MOON  |
| 12 13:38           | Perseids Meteor Shower                               |
| 14 01:54           | Jupiter at Opposition                                |
| 14 02:55           | LAST QUARTER   |
| 14 18:30           | Moon 0.1° S of Pleiades                              |
| 16 12:47           | Mars 3.0° S of Moon                                  |
| 18 03:00           | Venus 1.7° S of Moon                                 |
| 19 10:33           | Moon 2.3° S of Beehive cluster                       |
| 20 18:01           | NEW MOON   |
| 25 00:05           | Mercury Greatest Elongation 27° East                 |
| 27 19:41           | FIRST QUARTER  |
| 28 06:17           | Moon 0.8° N of Antares                               |

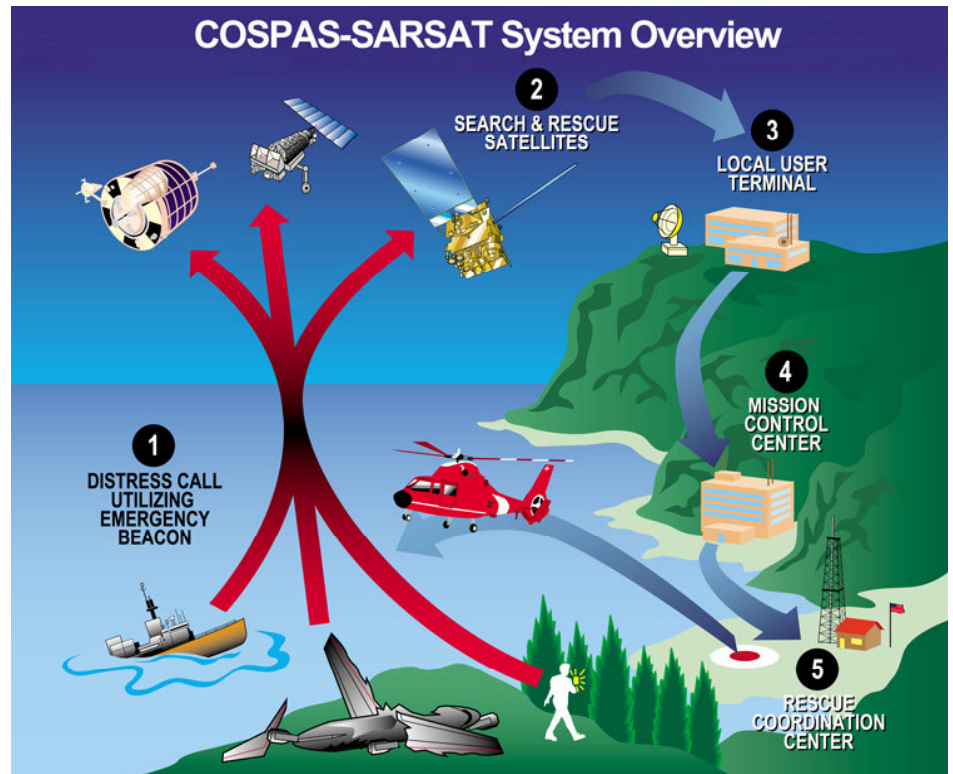


SARSAT to the Rescue

by Dr. Tony Phillips

If a plane crashes in the woods and nobody hears it, does it make a sound? Never mind contemplating this scenario as a philosophical riddle. This can be a real life or death question. And the answer most of the time is that, even if no people are nearby, something is indeed listening high above.

That something is a network of satellites orbiting about 720 km. (450 miles) overhead. The “sound” they hear isn’t the crash itself, but a distress signal from a radio beacon carried by many modern ships, aircraft, and even individual people venturing into remote wildernesses.



NOAA’s polar-orbiting and geostationary satellites, along with Russia’s Cospas spacecraft, are part of the sophisticated, international Search and Rescue Satellite-Aided Tracking System.

In the last 25 years, more than 25,000 lives have been saved using the satellite response system called Search and Rescue Satellite-aided Tracking (SARSAT). So what are these life-saving superhero satellites?

Why, they are mild-mannered weather satellites. “These satellites do double duty,” says Mickey Fitzmaurice, a National Oceanic and Atmospheric Administration (NOAA) systems engineer for SARSAT. “Their primary purpose is to gather continuous weather data, of course. But while they’re up there, they might as well be listening for distress signals too.”

In February, NASA launched the newest of these Polar-orbiting Operational Environmental Satellites (or POES) into orbit. This new satellite, called N-Prime at launch and now dubbed NOAA-19, prevents a gap in this satellite network as another, aging NOAA satellite reached the end of its operational life.

“The launch of N-Prime was a big deal for us,” Fitzmaurice says. With N-Prime/NOAA-19 in place, there are now six satellites in this network. Amongst them, they pass over every place on Earth, on average, about once an hour.

To pinpoint the location of an injured explorer, a sinking ship, or a downed plane, POES use the same Doppler effect that causes a car horn to sound higher-pitched when the car is moving toward you than it sounds after it passes by.

In a similar way, POES “hear” a higher frequency when they’re moving toward the source of the distress signal, and a lower frequency when they’ve already passed overhead. It takes only three distress-signal bursts — each about 50 seconds apart — to determine the source’s location.

Complementing the POES are the Geostationary Operational Environmental Satellites (GOES), which, besides providing weather data, continuously monitor the Western Hemisphere for distress signals. Since their geostationary orbit leaves them motionless with respect to Earth below, there is no Doppler effect to pinpoint location. However, they do provide near instantaneous notification of distress signals.

In the future, the network will be expanded by putting receivers on new Global Positioning System (GPS) satellites, Fitzmaurice says. “We want to be able to locate you after just one burst.” With GPS, GOES will also be able to provide the location of the transmitter. Philosophers beware: SARSAT is making “silent crashes” a thing of the past (⇒ p. 94).

Download a two-page summary of NOAA-19 at [www.osd.noaa.gov/POES/NOAA-NP\\_Fact\\_Sheet.pdf](http://www.osd.noaa.gov/POES/NOAA-NP_Fact_Sheet.pdf). The Space Place gives kids a chance to rescue stranded skiers using their emergency rescue beacons. The Wild Weather Adventure game awaits them at [spaceplace.nasa.gov/en/kids/goes/wwa](http://spaceplace.nasa.gov/en/kids/goes/wwa).

This article was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.

### Solar Eclipse Parting Shots



Sun about to go into first round of Baily's Beads, which unfortunately got covered by thick clouds. Image by Andrew Ian Chan



First front page Wuhan local newspaper coverage of the ALP eclipse expedition team - R-L: Zed, Jett, Jun (above). Subsequent newspaper images would show James or

Andrew in front, so team members got their share of the "limelight".



ALP Wuhan Eclipse Expedition Team in gear (Canon became a sponsor and provided vests and lent digital and video cameras for documenting the eclipse), together with our guide, and Wuhan locals above.



Surroundings during totality, showing twilight glow (left) and collage of images (below) showing the diminishing light before, during, and after the eclipse, with a Canon 300D camera set at 1/250 second at ISO 200. Images by Jun Lao (and with Jamie Quinto on diminishing light).

