



A Great Comet Coming?

Comet ISON may grow into a truly incredible sight. Or not.

A faint and distant comet discovered by Russian amateur astronomers Vitali Nevski and Artyom Novichonok in September is going to be big news in late 2013. But whether it will become a great comet remains unclear.

From the outset, Comet C/2012 S1 (also known as Comet ISON after the International Scientific Optical Network involved with its discovery) was wrapped in a swirl of hype and controversy. The initial orbital elements, indicating that the comet will pass just 0.01 astronomical unit (a.u.) from the Sun, generated a firestorm of wild speculation across the internet. Poor understanding of how comets typically behave led people to post early comments suggesting that Comet ISON would become 100 times brighter than the full Moon and unfurl the longest tail ever seen. One internet wag even claimed that Comet ISON would be “the brightest comet in human history!”

Comet ISON is still nearly a year from its hairpin turn around the Sun, and though it indeed carries considerable

potential for becoming a spectacular object, comets are notoriously unpredictable. Observers need only recall the dismal failure of Comet Elenin in 2011, which was also touted to become a grand spectacle.

As this is being written, only a few weeks after the discovery with Comet ISON still 6 a.u. from the Sun, it's unclear whether the comet's orbit is parabolic or very highly elliptical — an important factor for the comet's future performance. A parabolic orbit suggests that the comet is coming in from the Oort Cloud for a first-time swing by the Sun. Such objects often brighten very early, raising high hopes, but once they come within about 1½ a.u. of the Sun their brightening can radically slow. Such was the case for the notorious Comet Kohoutek in the early 1970s. Some Oort Cloud comets even disintegrate completely, as did Elenin. Conversely, a clearly elliptical orbit would imply that the comet has previously journeyed past the Sun and had its surface heated before, making



The last great comet was Comet McNaught C/2006 P1, which put on a memorable show for Southern Hemisphere observers during early 2007. Will Comet ISON match expectations in 2013?

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its current brightness likelier to indicate a very grand display in late 2013.

A reliable prediction may have to wait until next autumn, but let's be optimistic and assume that Comet ISON is a repeating comet that's been through the inner solar system in the distant past. Possible encouragement for this idea comes from the similarity between ISON's orbit and that of the Great Comet of 1680; they could be related. If Comet ISON is indeed old, here's how its apparition may play out.

Comet ISON begins 2013 at 15th magnitude in Gemini and could brighten to 13th before disappearing into the June twilight. In mid-August it will emerge from the pale azure light of dawn at magnitude 11. On October 3rd Comet ISON will pass less than 0.1 a.u. from Mars. In late October it will attain its greatest morning elongation (53° from the Sun) as a 7th-magnitude object in reach of binoculars.

From then on it will develop rapidly. It's likely to be visible to the naked eye in the morning sky as November opens, attaining 2nd magnitude with perhaps a 10° tail by the 20th as it descends toward the Sun.

Perihelion occurs on November 28th, when, using extreme caution, experienced observers might be able to spot the comet less than 2° from the Sun's blazing disk

Comet ISON discoverers Artyom Novichonok (left) and Vitali Nevski (right) with the 16-inch Santel reflector used in their discovery in Russia.

at midday, when it will appear like star of perhaps magnitude -5 to -7 with a short tail.

As grand as that sight may be, Comet ISON's greatest performance could be yet to come. During December 2013 it will race almost due northward. As it just begins to emerge from bright twilight — in both the morning and evening skies — it may shine like a star of magnitude -1 or -2 with a short tail, which will dramatically lengthen each day. The most impressive views could come just before dawn around or just after mid-December or just after. On those cold, clear mornings, the tail projecting from Comet ISON's magnitude $+2$ or $+3$ head could *potentially* span an incredible 40° to 60° !

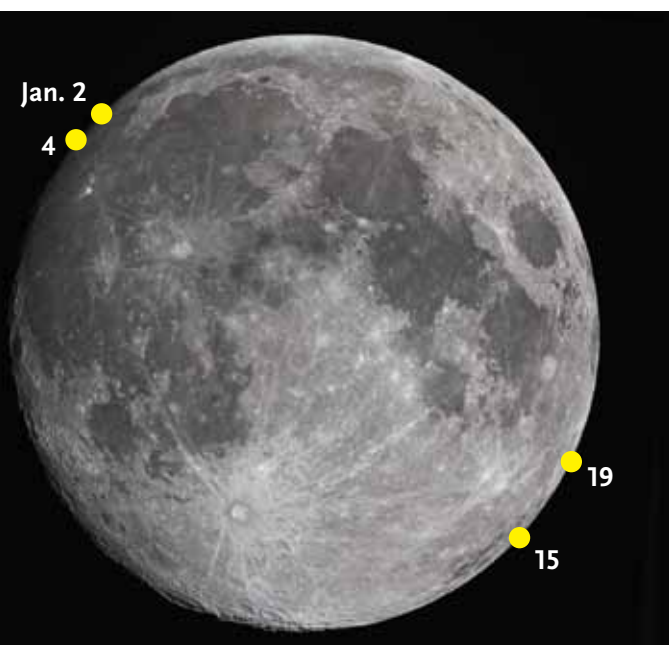
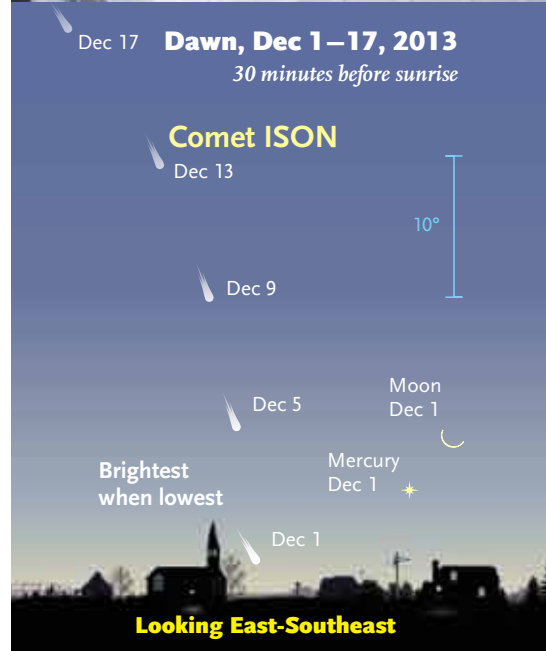
But will it? We'll just have to wait to see. ♦

Comet PANSTARRS Too!

Meanwhile, *another* bright comet could put on a grand display this March. Comet PANSTARRS (C/2011 L4) is on track to shine as bright as magnitude -2 low in the west in evening twilight when at perihelion March 10th. Its finest showing should be in the 10 days after that. More in next month's issue!







VITALI NEVSKI



S&T: DENNIS DI CICCO

The Moon • January 2013

Phases

-  **LAST QUARTER**
January 5, 3:58 UT
-  **NEW MOON**
January 11, 19:44 UT
-  **FIRST QUARTER**
January 18, 23:45 UT
-  **FULL MOON**
January 27, 4:38 UT

For key dates, yellow dots indicate which part of the Moon's limb is tipped the most toward Earth by libration under favorable illumination.

Distances

- Perigee** January 10, 10^h UT
224,299 miles diam. 33' 6"
- Apogee** January 22, 11^h UT
253,218 miles diam. 29' 19"

Librations

- Pythagoras (crater)** January 2
- Lavoisier (crater)** January 4
- Peirescius (crater)** January 15
- Humboldt (crater)** January 19