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Comet ZTF Flies High and Bright

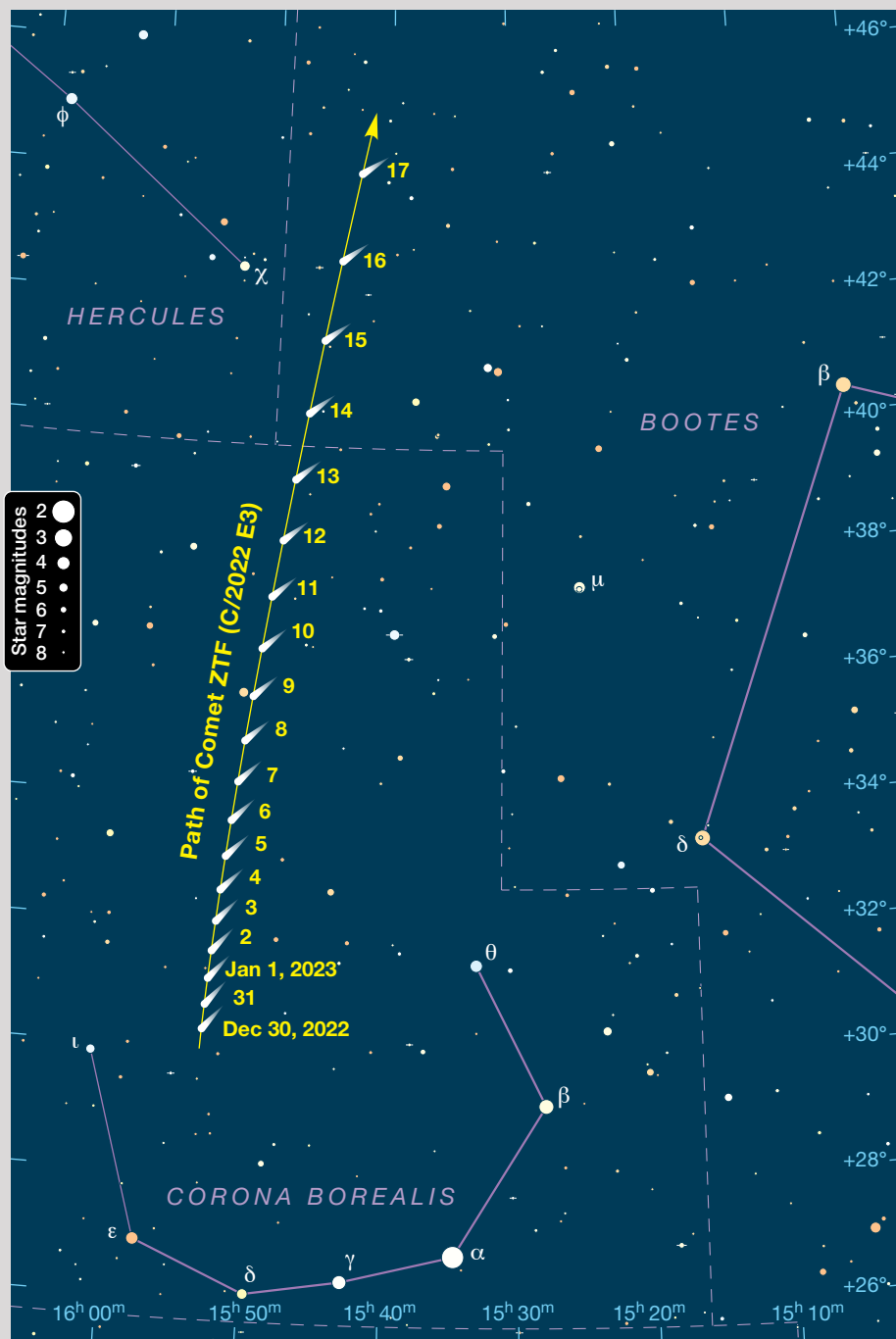
A comet with naked-eye potential dashes across the sky as it swings past Earth.

There's nothing like a bright comet to make gearing up for a night in the frigid cold seem worthwhile. Most of the time I find that once I make the commitment, conditions are never quite as inhospitable as I'd imagined. Besides, a comet that's been slogging toward the inner solar system for close to 50,000 years deserves a warm welcome.

Comet ZTF (C/2022 E3) first came into our ken on March 2, 2022, when the Zwicky Transient Facility (ZTF) discovered a 17th-magnitude asteroidal object on images taken with the 48-inch (1.2-meter) Schmidt telescope at Palomar Observatory. Subsequent observations showed it to have a small, dense coma, and astronomers identified it as a new comet.

I got my first look at ZTF in my 15-inch Dobsonian reflector on June 18th as the comet passed near Albireo, in Cygnus. Although only magnitude 13.8 at the time, its subarcminute coma appeared well-condensed — always a good sign for an incoming comet. Throughout the summer, it gradually brightened to around magnitude 12, sporting a tiny, very dense coma and a short (at most 1' long) tail extending southeast. Although faint and small, it strikingly had a classic comet form, which I took to be a good omen.

Fast-forward to 2023. Comet ZTF will reach **perihelion on January 12th** at a distance of 1.11 a.u. (166 million kilometers, 103 million miles) from the Sun. **Closest approach to Earth occurs on February 2nd**, when the comet passes within 0.28 a.u. (42 million km) of our home world. That's when ZTF could soar to magnitude 5 or 6, making it faintly visible to the naked eye (next page...)



from rural skies and an easy catch in binoculars.

The comet begins January in Corona Borealis, where it should glow around 8th magnitude and be beautifully placed at dawn, halfway up the eastern sky. While moving northeast at a little more than $\frac{1}{2}^\circ$ each day, ZTF ascends and brightens as it skirts the northeastern edge of Boötes. It may reach magnitude 6 by the third week of the month, when it slips into Draco and becomes a circumpolar object for observers at mid-northern latitudes.

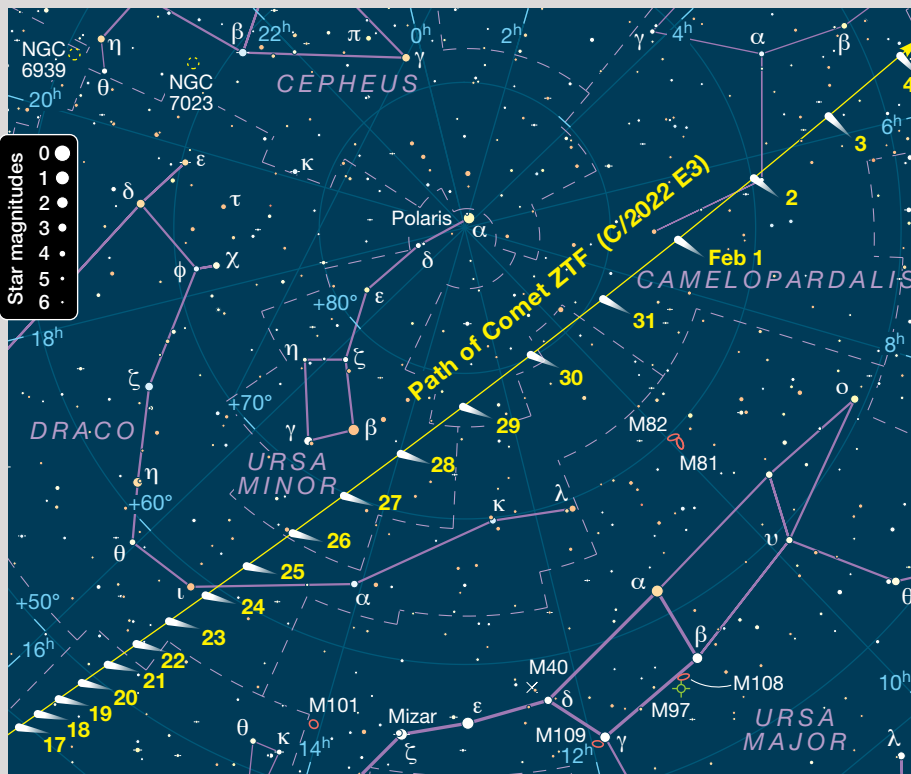
Throughout January, the comet's apparent motion increases rapidly to a pace of more than 6° per day from the 29th through February 4th. That's equivalent to nearly one full Moon diameter every two hours, or $15''$ per minute. At that speed, you might be

able to detect the comet's movement in real time, using high magnification in your telescope. **Peak brightness of around 5.5 is expected at month's end.** The Earth-Sun-comet geometry will change quickly from perihelion through early February, so we'll get to see its tail swing slowly about like a wind vane at the approach of fresh weather.

After sailing within 10° of Polaris on the 29th and 30th, ZTF shoots across Camelopardalis and then zips about 2° northwest of Capella on February 5th, before crossing into Taurus on the 9th. In the predawn hours of February 11th, it passes roughly 1° east of Mars (which shines at magnitude 0.0) for viewers in the U.S. By the time spring begins in the Northern Hemisphere, the icy visitor fades to around magnitude 10 or 11 as it wades across eastern Eridanus (the River), not far from Rigel. ***



▲ On August 30, 2022, more than four months before perihelion, Comet ZTF (C/2022 E3) exhibited a well-defined dust tail and a bright inner coma. During late January and early February, we may see the distant visitor reach naked-eye brightness.



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