

# WHAT'S UP?

To paraphrase the Bard, “There are more things *in* heaven *from* Earth, Horatio, than are dreamt of in your philosophy.” But that’s the way Hamlet might have said it if human had been putting objects into orbit back in his day. There are all sorts of things orbiting the Earth. There are satellites, pieces of satellites, and used rockets and boosters (small rocket engines used to put satellites in their proper orbits after launch.) As of this writing, there are currently more than 23,000 objects larger than 4 inches across that orbit our planet. The estimate of the number of pieces of debris between ½-inch and 4 inches is about 500,000. That’s a lot of stuff! Most of this we don’t see when we look up into the sky at night. Have you ever seen a satellite crossing our night skies? When we see satellites overhead, it’s because they are high enough above the Earth that they are still sunlit and they reflect that sunlight. How can you see them and what do they look like? Just look up for a couple of minutes. It’s best if you’re sitting comfortably, but standing is fine, too. Look for a “star” that is moving steadily. Don’t confuse a plane for a satellite. A plane will be bright, white light, possible blinking, and with steady green and red lights. A satellite will just be a steady, not-to-bright, light moving across the sky.

Satellite	Brightness (mag)	Start			Highest point			End		
		Time	Altitude	Azimuth	Time	Altitude	Azimuth	Time	Altitude	Azimuth
Cosmos 2278	4.2	22:01:02	18°	SSE	22:04:40	40°	ESE	22:09:56	10°	NE
Cosmos 1908	3.2	22:01:09	10°	N	22:05:01	84°	W	22:07:18	24°	S
Uosat 12 SS-18 rocket	4.4	22:01:08	10°	NNW	22:05:24	56°	NE	22:07:59	24°	SE
USA 245	3.0	22:07:32	31°	SW	22:08:12	41°	E	22:10:31	10°	NNW
Meteor 2-15 Rocket	4.4	22:03:02	10°	N	22:09:11	82°	E	22:13:30	20°	S
Cosmos 2228	2.9	22:07:37	10°	N	22:11:54	88°	W	22:14:22	25°	S
Cosmos 2292 Rocket	3.9	22:12:23	13°	SSW	22:14:46	38°	WNW	22:17:45	10°	N
Cosmos 2266 Rocket	4.4	22:10:02	10°	SSW	22:15:59	61°	W	22:21:59	10°	N
Cosmos 1356 Rocket	4.4	22:13:17	10°	N	22:17:16	35°	ENE	22:18:46	27°	ESE
Spot 2 Rocket	4.1	22:13:28	16°	S	22:17:23	53°	W	22:22:21	10°	NNW
Nadezhda 2 Rocket	4.5	22:17:03	21°	S	22:21:15	66°	E	22:27:27	10°	NNE
Landsat 7	4.5	22:19:23	18°	S	22:22:45	50°	W	22:27:24	10°	NNW
USA 267	3.8	22:19:10	21°	SSE	22:23:16	47°	SW	22:29:34	10°	WNW
SL-16 R/B	4.0	22:23:52	13°	E	22:23:54	13°	E	22:26:27	10°	ENE
Cosmos 1626	2.0	22:26:15	35°	S	22:27:43	85°	E	22:31:27	10°	N
Meteor 1-24 Rocket	3.7	22:25:54	20°	S	22:29:52	86°	E	22:35:40	10°	N
Cosmos 1437	2.9	22:31:18	41°	SW	22:32:08	63°	WNW	22:35:08	10°	N
Cosmos 1626 Rocket	4.3	22:31:17	32°	ESE	22:32:14	36°	E	22:36:18	10°	NNE
SPOT 1/Viking Rocket	4.1	22:29:22	20°	S	22:32:44	52°	W	22:37:46	10°	NNW
SPOT 5	3.1	22:29:52	28°	S	22:32:49	85°	WSW	22:38:05	10°	NNW

Sometimes a satellite will be very bright. It depends on the size and altitude of the object, and what its solar panel configuration is like. How can we find out what the satellite we saw was? Well, I often get texts or calls asking, “What was that bright object we saw overhead last night around 10:15? Was it the space station?” I usually can’t answer right away, but I know how to find out that answer. I go to a website called *Heavens Above*. When I used it to answer the question about the satellite seen at 10:15, first I set the location to Plympton (by finding Plympton on the location map). Then, I went to “Daily predictions for the brighter satellites” and set the date to the date in question. After clicking “Update”, I got a list of satellites visible from Plympton that evening. This is a portion of the listing. I went down the list looking for the brightest satellite visible around 10:15 and – Shazam! (have

Shakespeare and Gomer Pyle ever been quoted in the same story before?), you can see that the satellite Cosmos 2228 went almost directly overhead (its highest altitude was 88°) at 10:11 (22:11:54, more precisely and in 24-hour time) and it was moving from north to south. What is Cosmos 2228? Well, NASA’s database says that it is a Russian spy satellite. It was used to gather electronic and signal intelligence back in the 1990’s. If my friend’s time estimate was a bit off, it might also have been Cosmos 1626, which went overhead at 10:27, moving from south to north. In addition to single satellites, we now occasionally see a string of satellites going past. These satellites are part of the Starlink program. Starlink is a network of satellites launched by SpaceX intended to provide high-speed broadband connectivity across the globe. Ultimately, the network will consist of thousands of satellites. The satellites are small, and 60 of them can be launched at a time by one of SpaceX’s Falcon 9 rockets. Because they form a web of satellites in space, when we see them, we see a string of them passing through our skies in succession. This enormous number of satellites concerns astronomers. Every satellite passing through the field of view of an Earth-bound camera negatively impacts the observation. In an attempt to address this problem, the latest set of satellites will incorporate features designed to mitigate the reflections from the satellites.

Moving from human-made celestial objects to a natural one, have you heard the news that there is a comet visible these days? The news is correct. Comet C/2020 F3 is visible in our evening sky now and for the next couple of weeks, but it will fade as time goes on and require binoculars and eventually a telescope to be seen. I can’t say for sure that by the time you read this, it will still be visible without binoculars, but it’s likely that it will be bright enough. At least the head of the comet should be easily visible, though the tail might require binoculars. This sky map shows the position of C/2020 F3 from now through August 7<sup>th</sup>. The map is a screenshot of the program *Stellarium*. I may have mentioned it before. It is a free, open-source application, for Windows, Mac, and Linux platforms. It’s a great tool. The comet is also being called comet NEOWISE. That’s because it was discovered by NASA’s satellite, the near-Earth objects Wide-field Infrared Survey Explorer. The comet’s official name, C/2020 F3, designates the object as a comet (“C”) and that it was discovered in 2020. The “F3” tells us that it is the third comet discovered in the second-half of March (“A” – 1<sup>st</sup> half of January, “B” – 2<sup>nd</sup> half of January, “C” – 1<sup>st</sup> half of February, etc.). The comet is a periodic comet (that is, it will return after a certain period of time. The red and green lights are the plane’s port and starboard (left and right) running lights, respectively.) That next trip past the Sun won’t be until around the year 9196, so get outside and see it now!



For information about some of the things I’ve discussed in this article, go to:

(Heavens Above) <https://www.heavens-above.com/main.aspx> (Stellarium) <http://stellarium.org>  
 (NASA’s satellite database) <https://nssdc.gsfc.nasa.gov/nmc/SpacecraftQuery.jsp>

You can reach me at [astroblog@comcast.net](mailto:astroblog@comcast.net) with any questions and comments you have. This is *What’s Up?* Installment #26

Until next time, Keep looking up!

*Barry*