

Science: Sighting Opportunities

Student Worksheet

Viewing the Space Shuttle and ISS from the Ground

Depending on your location on the Earth's surface, the spacecraft's position in orbit and the time of day, you may be able to see either the space shuttle or the International Space Station, or both, as they orbit about 386 kilometers (240 miles) above the planet. A spacecraft will be seen as a steady white pinpoint of light moving slowly across the sky.

For each shuttle flight, the Flight Dynamics Officers in NASA's Mission Control Center use sophisticated computer software to predict when and where the shuttle will be visible to people on the ground. Now that station assembly has begun, they also will predict where the space station will be visible from the ground. For rendezvous and docking missions, both will be visible at the same time once the two vehicles have docked in orbit and only one listing will be necessary.

Interpreting the Data

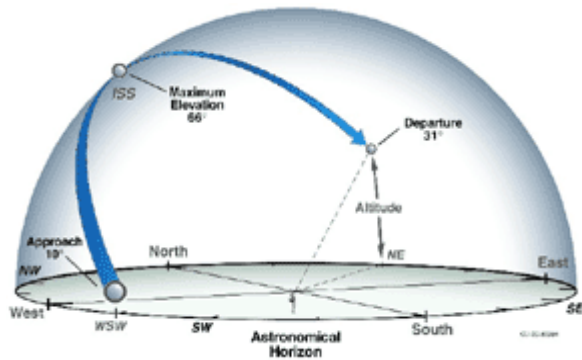
The text-based listing is in a column format, a sample of which is shown below:

SATELLITE	LOCAL DATE/TIME	DURATION (MIN)	MAX ELEV (DEG)	APPROACH (DEG-DIR)	DEPARTURE (DEG-DIR)
ISS	Tue Nov 14/06:22 AM	4	66	10 above WSW	31 above NE

The left column is the satellite. The next column is the local date and the local time. The third column gives the duration, or the length of time in minutes the spacecraft is expected to be visible, assuming a clear sky. The fourth column gives the maximum elevation the vehicle will achieve above the horizon (90 degrees is directly overhead). The fifth column tells the direction and elevation at which the spacecraft will become visible initially. The sixth column gives the direction and elevation at which the spacecraft will disappear from view.

Science: Sighting Opportunities (continued)

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This illustration is the sighting opportunity depicted in the table above.

Viewing Tips

For best results, observers should look in the direction and at the elevation shown in the appearing column at the time listed. Because of the speed of the orbiting vehicles, telescopes are not practical. However, a good pair of field binoculars may reveal some detail of the structural shape of the spacecraft.

On a regular basis, the space shuttle must get rid of excess supply and waste water by dumping them individually or simultaneously overboard through water spray nozzles. Viewing the shuttle at these times through binoculars or a telescope can reveal an even more spectacular view of the spacecraft and the ice crystals that form as the water is sprayed overboard. Although you can sometime use a flight timeline to find out when scheduled dumps occur, your best bet is to monitor [NASA TV](http://www.nasa.gov). Then, check the sightings list to see if a sighting opportunity and a water dump overlap.

Shuttle/station docking missions provide an exciting opportunity to see a double pass. On the day or two immediately before docking and after undocking, the shuttle and station will appear to be chasing each other across the night sky. They will follow the same flight path varying by only a few minutes. If the distance is close enough, they will actually appear in the sky at the same time!

Visit <http://science.nasa.gov/realtime/Jpass/25/JPass.asp> to determine the next time the International Space Station or the Space Shuttle will fly over your city.

