

# OCCULTATION TIPS

(Adapted From Paul Maley's Occultation Page at <http://www.eclipsetours.com/occultationc>)

## MINIMUM OBSERVER SKILLS—NEED ABILITY TO

- **Navigate the night sky** and to use star charts to locate the star
- **Point binoculars** or polar align telescope
- **Locate a safe, dark site** from which to observe
- **Be mobile** (*optional*) which increases your odds of getting away from clouds and lights

## MINIMUM EQUIPMENT NEEDED

- **Portable cassette tape recorder** with **cassette rewound** and **fresh batteries** installed
- **Shortwave time signal receiver** capable of picking up the main frequencies of radio station **WWV = 5.0, 10.0, 15.0 MHz** (or equivalent time signal frequency in your area) for observers in North America
- **Star charts** showing the star to be occulted (available from <http://asteroidoccultation.com>) after the occultation prediction has been posted to the web
- **Topographic map or GPS** receiver or locate yourself at a physical address from which the latitude/longitude can be obtained by entering the address into <http://www.mapsonus.com>; an accurate position is important for analysis purposes
- **Extra batteries** for radio and recorder
- **Digital watch** to keep track of time; watch should be set to WWV
- **Flashlight**
- **If using a clock driven telescope be sure it can be powered in the field from 12V** and that you have packed **all necessary accessories** including multiple eyepieces, attachments, chords, light shield, etc.

## GO FOR IT!

- **Notify occultation organizer where you plan to be located** (unless you have already agreed to occupy a site assigned by the organizer) and what equipment you are using.
- **Locate the star at a few days to a week prior to the occultation** so you can familiarize yourself with the difficulty/ease in locating the star. If you don't do this you are risking failure right off the bat! *It is vital to become familiar with the field of view before the night of the occultation.*
- **Check out all of your equipment** to be sure it is working properly!!
- **Scout a location at night in the days before the occultation** if that is possible. *Never set up on someone's property without proper notification.* If you are forced to find a site in an unfamiliar area, obtain permission to use private property.
- On the day of the occultation, **watch the weather** and consider where to go in to ensure best chances of observation if clouds will threaten.
- **On the night of the occultation:**
  - a. **Notify local police** that you will be in the area and bring a companion with you and cell phone
  - b. **Be set up 2 hours before the occultation**
  - c. **At least 10 minutes before predicted time of central occultation run a test** to be sure your voice and time signals record at the same volume level
  - d. **5 minutes before: start radio and begin nonstop observing** of the target star; **look for one or more disappearances** or magnitude drops in the target star and call out 'out' when it occurs, and 'back' when it reappears or regains its normal brilliance. *Estimate your reaction time for each event as it happens.*
  - e. **5 minutes after: stop observation**

\* Next morning: notify the occultation organizer of your results *whether positive or negative*. Provide your *site coordinates* and times obtained as well as any comments on timing errors.

## TIMELINE OF AN OCCULTATION

The following is detailed information that you can use to train yourself and others in organizing for an asteroid occultation.

**O-7 days (where "O" means occultation):** Email or phone alert issued/IOTA web site is updated. This update might also come even closer to the date of the occultation.

**O-7 days to O-1 day:** Locate the target star. Practicing ahead of time is invaluable and can save the day. **PRACTICE!** If you are training others, finding the star before occultation night will be like an investment in success. There are many times when clouds are near the star on occultation night and locating it can consume lots of time. The star might be also be situated in an area of the sky devoid of other reference stars or it could be in a very rich area with confusing star patterns. Other factors such as proximity to the moon or twilight makes early detection very important.

**O-1 day: Determine where you plan to observe.** If from your house, notify the local coordinator so we will know that that part of the occultation path is covered. Send either GPS coordinates or an address. If you plan to be mobile, also notify the coordinator so you can be assigned a site area.

**O-2 hours: You should be set up at your chosen site by this time.** Polar align your mount and **be sure your clock drive is working.** If using a Schmidt-Cassegrain **watch out for dew formation.** Use a 'dew zapper' or portable hair dryer to mitigate this possibility. **Be sure you have the following: at least 2 eyepieces (wide field), bug spray, right angle finder, red flashlight, binoculars, copies of the star chart, tape recorder with fresh batteries and tape rewound to the beginning, short wave radio source of time signals.** This latter item is the key to precision timing.

**O-30 minutes: Find the target star; observe from a comfortable position** either sitting or standing that will not cramp your neck. Be sure your hands are free as possible.

**O-20 minutes: Test your voice and the radio and recorder** to be sure the time signals and your voice evenly record. Play back to verify. If one is drowned out, reposition and repeat the test until you get it right. Be prepared to comment on passage of clouds, distractions, seeing changes, stability of the target star, etc. during your 10 minute observation window. Be quick about it and be aware to quickly call out when the star disappears and reappears. Use either "D" and "R" or "OUT" and "BACK" [or "OUT" and "IN"].

**O-5 minutes: Begin continuous observing. Start radio and recorder (or video).** If the radio fades in and out, another person at your site could assist in helping get the signals back.

**O+5 minutes: End observation.** Turn off radio and recorder (or video).

**O+1 day: Within 24 hours report positive or negative observation** to your coordinator. Provide your name, exact location of site, telescope info and duration of any event(s) seen.

**O+3 days: Fill out the online IOTA reporting form** and submit to the occultation organizer or IOTA.

## PITFALLS OF POOR PLANNING

The following is a list of possible excuses as to why observers failed to see an occultation when otherwise, they should have been successful. They are based on my personal experiences:

- Did not find the star prior to the night of the occultation
- Misidentified the target star
- Used someone else's telescope with which they were unfamiliar
- Did not use a telescope with a clock drive
- Had a battery failure associated with portable short wave radio, tape recorder, or video system
- Schmidt-Cassegrain telescope dewed over because it was left out too long and too far ahead of occultation without being covered
- Eyepiece being used either had too high or too low magnification
- No finder on telescope or the finder was useless in helping to locate key stars
- Finder and telescope were not collimated
- A key screw or wrench was not present when assembling the telescope
- Polar alignment not successful because Pole not visible and no compass was available.
- Tape recorder ran out of tape
- Radio drifted off frequency and no time signals were recorded
- Lights from police car or other approaching cars blinded observer at key time
- Observer was held at bay by armed person when trespassing without permission on private property in the middle of the night
- Vibrations from passing trucks shook instrument
- Seeing conditions were so poor that image of target was not stable enough to ascertain an occultation
- Temperature so cold that observer could not concentrate for long period due to inadequate clothing
- Jacket held over observer and eyepiece to keep out nearby lights caused fogging of eyepiece due to temperature/humidity combination
- Dark adaption lost due to not using a red flash light
- Telescope tripod shifted due to being set up on unstable ground
- Observer lost concentration due to being set upon by hordes of mosquitoes and not having repellent
- Star fainter than predicted and observer confused
- \* Observer unsure of occultation because depth of drop was less than one magnitude
- Tape recording failed to record observer's voice because time signals were too loud and no test was done before hand to ascertain equal level of recording between voice and radio
- Occultation not seen because observer was talking to people at the site and not paying attention; lost track of time
- Telescope aperture inadequate to see a star that dim
- Too large a scope used and target star could not be properly confirmed
- "GO TO" telescope computer would not work and observer had no experience using the telescope to manually star hop to the target star. Excessive dependence on technology!
- Image intensifier battery failed and no spare was available
- Occultation occurred at too low an altitude and it was not possible to find the star in enough time
- Occultation occurred in too bright sky and this was not anticipated before the observer attempted the event