

Virtual Observatory Tools for Solar System

ViSiON: Preparation of ground-based observations

To follow this lecture, you will need a Web browser connected to the Internet, and PDF viewer.

Context: The preparation for observations from a ground-based telescope generally encompasses the creation of airmass charts, also called visibility plots, fish-eye sky charts, and finding charts. This preparation can thus be tedious, especially for solar system objects which coordinates are epoch-dependent.

Goals of the tutorial: Get familiar with the ViSiON tool, allowing simple generation of all these charts for multiple objects, night, and criteria on the visibility of targets.

Authors: Benoit Carry (OCA) and Jérôme Berthier (IMCCE).

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Exercise 1 Planning observations for tonight

This exercise introduces the Visibility Service for Observing Nights (ViSiON) tool. ViSiON creates charts and tables to help observers thorough the night, from a simple list of targets and an observing location.

Please refer to the online help for more details: <http://vo.imcce.fr/webservices/miriade/?vision>

We will use here ViSiON query form (<http://vo.imcce.fr/webservices/miriade/?forms>).

Advanced users may be interested to query the service by sending the request coded with the simple syntax `-parameter1=value1&...` on the following end-point URL:

http://vo.imcce.fr/webservices/miriade/vision_query.php?

1. Open a Web browser.
2. Go to ViSiON query form: <http://vo.imcce.fr> → Miriade → Query forms → ViSiON
3. Fill the **Target** box with the syntax `prefix:name=alias` (the alias is optional) for the following targets:
 - Planet Uranus, using `p:7`
 - Asteroid (6032) Nobel, using `a:nobel`
 - Comet 62P/Tsuchinshan 1, using `c:62P`
 - Star α UMi, using `e:0+90=Polaris`
 - Bode's Galaxy, also known as Messier 81, using `s:M_81`
4. Query ViSiON by clicking the "Request ViSiON" button.

ViSiON generated a PDF. The first two pages resume the query and explain the symbol and notation. The following pages display the airmass and all-sky charts, and provide a table summarizing the observing conditions of each target. The last provide links to:

- generate detailed ephemerides (SSOs only),
- get additional information on the target,
- create a finding chart with Aladin.

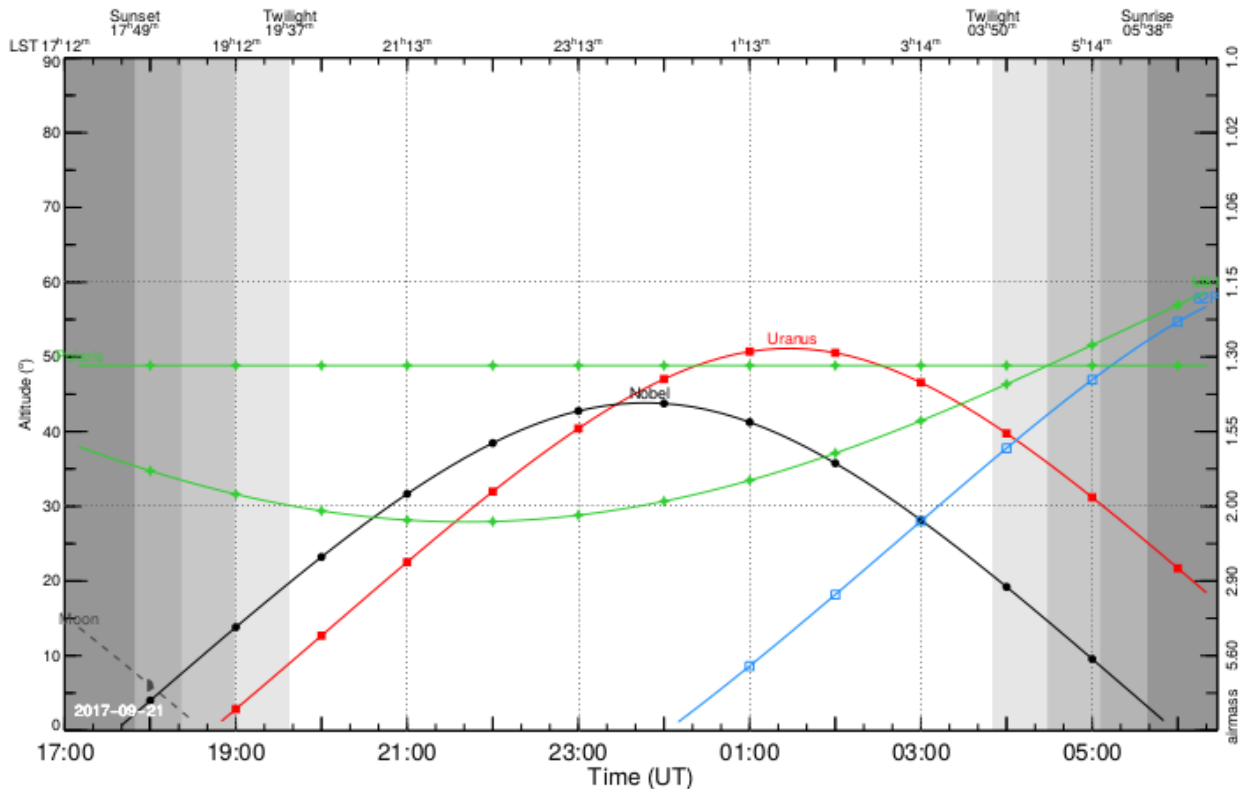


Figure 1: Airmass charts for epoch 2017-09-21.

You may have noticed ViSiON is flexible for naming targets upon input. You can either use a number or a name for planets, asteroids, and comets, using `p:`, `a:`, and `c:` prefixes. ViSiON also accepts equatorial coordinates (`e:` prefix) followed by right ascension (decimal hours) and declination (decimal degrees). Finally, ViSiON can retrieve the coordinates of any source in SIMBAD (`s:` prefix), in the form `Catalog_Number`, like `s:M_81` for Messier 81, or `s:Hip_11767` for Hipparcos star #11767. In all cases, one can override ViSiON naming by using the `=alias`, as done in the example above, or such as `s:Hip_11767=Polaris` for instance. Please refer to the online help for more details: <http://vo.imcce.fr/webservices/miriade/?documentation>

Solution to exercise #1

Exercise 2 Selecting targets based on their visibility

This exercise describes further the capabilities of ViSiON, which can select/reject targets based on a series of criteria such as apparent magnitude, elevation, or coordinates. Please refer to the online help for more details: <http://vo.imcce.fr/webservices/miriade/?vision>

Here again, we will use ViSiON query form (<http://vo.imcce.fr/webservices/miriade/?forms>).

1. Open a Web browser.
2. Go to ViSiON query form: <http://vo.imcce.fr> → Miriade → Query forms → ViSiON
3. Fill the **Target** box with the syntax `prefix:name=alias` (the alias is optional) for the following targets:
 - The planets Uranus and Neptune
 - The nebula IC 444
 - The asteroids Florence and 2017 PR25

Answer: `p:uranus`, `p:Neptune`, `s:IC_444`, `a:Florence`, `a:2017 PR25`

- Choose to compute four different dates, separated by 7 days, starting on the equinox: 2017-09-21, to cover the full lunation [in the Epoch panel].

Answer: 2017-09-21, 4, 7

- Query ViSiON by clicking the “Request ViSiON” button, and save the PDF for reference.
- We will now explore ViSiON capabilities to select targets according to the observer’s preference. In the Advanced parameters panel, Visibility criteria box, put the following: `elong:{moon:25}`, `mag:{max:14}` (then click on “validate” button), meaning we want to reject all targets within an angular distance to the Moon of 25° , and which apparent V magnitude is fainter than 14.

Answer: pdf, `elong:moon:25`, `mag:max:14`, default

- Query ViSiON by clicking the “Request ViSiON” button, and compare this new PDF with the one generated above.

- Asteroid 2017 PR25 never appears as it is too faint,
- Asteroid Florence disappear on the last date, becoming too faint,
- Uranus is not present on the third date, being too close to the Moon.

All the parameters that can be used to select targets are described in the online help:

<http://vo.imcce.fr/webservices/miriade/?documentation>

Solution to exercise #2a

Solution to exercise #2b

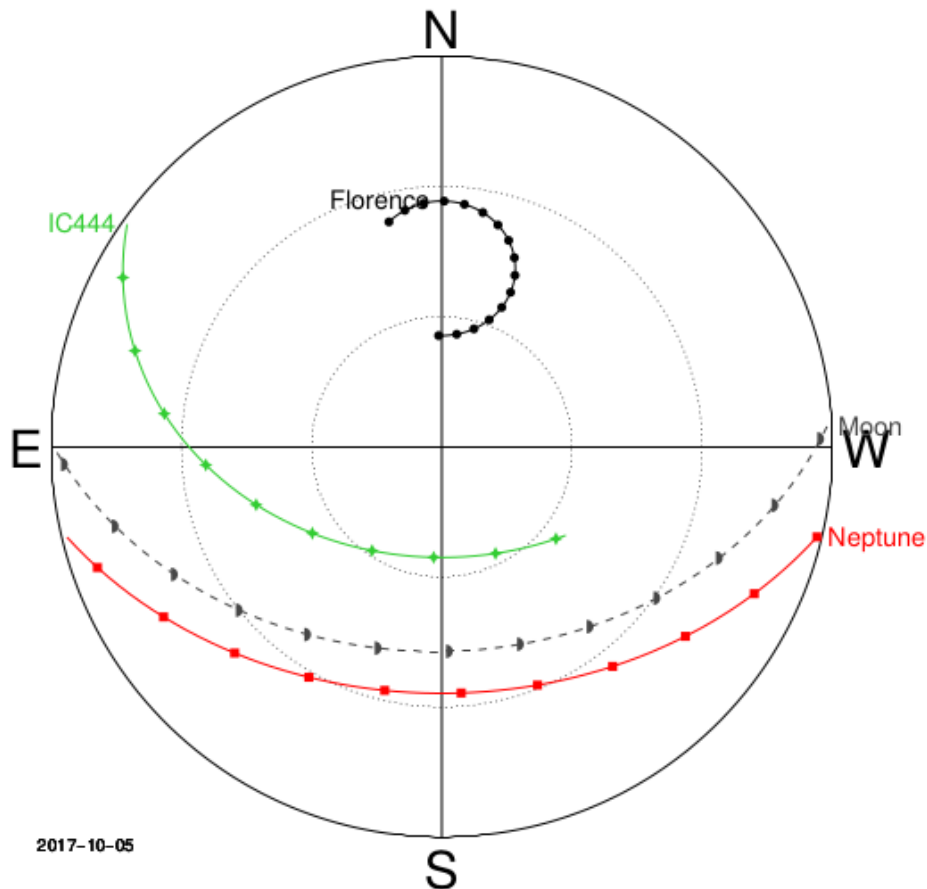


Figure 2: Airmass charts for epoch 2017-10-05.