

AstOrb Browser – A quick and dirty guide

Version 1.30, 2005-apr-14

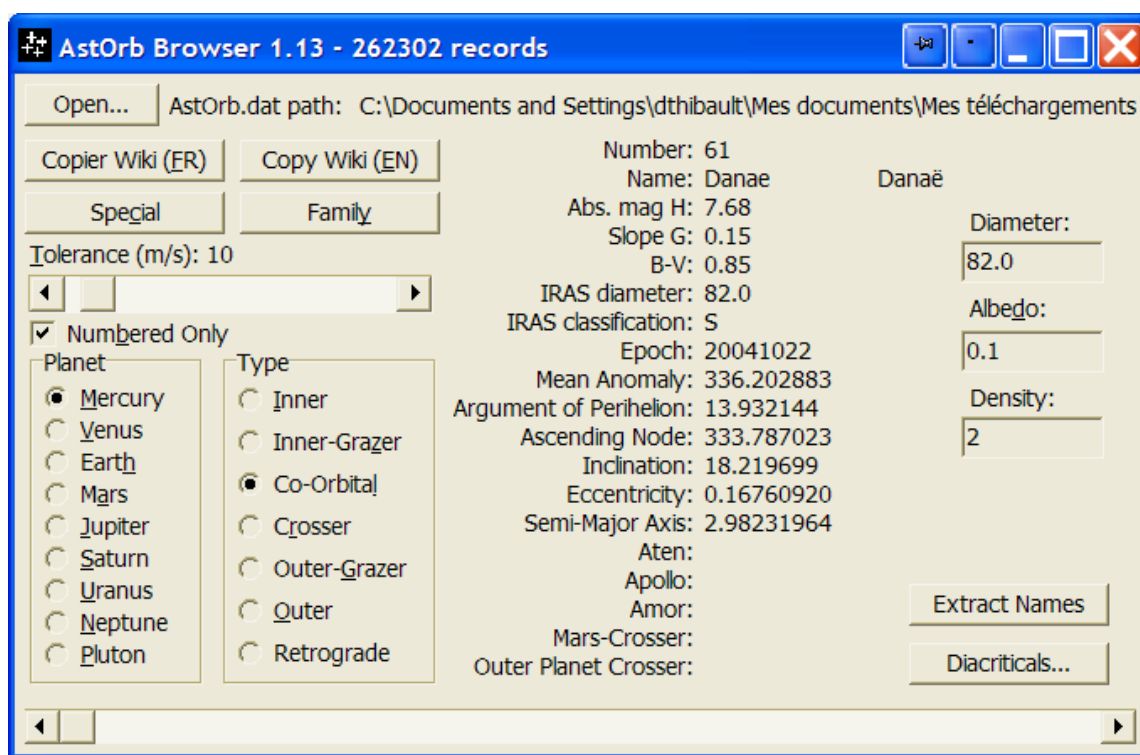
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Installation Notes

This Delphi 7 application should be able to run even under Windows 98, but you never know.

The first time you launch it, it'll prompt you to locate the AstOrb.dat file, which you should have downloaded from <ftp://ftp.lowell.edu/pub/elgb/astorb.dat.gz> (follow the supplied Internet shortcut) and unzipped previously, using WinZip or some such. This you will do again now and then to update the database.

Main Window



AstOrb Browser will display the path at the top of its window, as shown above. You can switch databases through the **Open** button. The images here show version 1.13 —the interface hasn't changed at all since.

A second, optional database is pointed at by the **Diacriticals** button. This Diacriticals.txt file (one is supplied with this installation) lists those asteroids whose official names are not ASCII (AstOrb.dat contains only ASCII names). In the image above, you can see the correct name of **61 Danaë** beside the ASCII version.

The main navigation tool is the scrollbar at the window's bottom. Because of the huge number of asteroids in the database, it is rather crude. It responds to the Right and Left arrows as expected, moving one asteroid record at a time; the Up and Down arrows do the same. Page Up/Down is the same as a click beside the thumb: it does a large jump. Home and End move you to the first and last records.

If you **right-click** on any of the data labels (on the illustration, this could be the "61" or "Danae", etc.), you'll get a menu with four choices:

Copy

Search

Next occurrence

Previous occurrence

Copy simply copies the label's text to the clipboard. This is a quick way of copying an asteroid name, for example. Since version 1.30, the full Unicode name is displayed and copied correctly. **Search** pops a dialog that asks **Find in xxx: What?** (where **xxx** is the name of the field being searched). Type or paste in the string you're looking for (it is not case-sensitive). The search will check only the field selected, so a Search through names is not the same as a search through numbers. Searching for "cer" in the names will find **1 Ceres**, then **807 Ceraskia**, then **1865 Cerberus**, and so on. When searching the Aten/Apollo/Amor/Mars-Crosser/Outer-Planet-Crosser flag fields, you should search for "Y" or "Yes" to find anything. You use the **Next occurrence** and **Previous occurrence** commands for this (the shortcuts are F3 and Shift-F3). The **Numbered Only** checkbox restricts the search to the numbered asteroids when checked. *Exception:* When searching the Unicode names, only those asteroids that bear a Unicode name will be looked at, and the search will be for a perfect match (in case and diacritics).

Once you have the asteroid you want, clicking the **Copy Wiki (EN)** button will load the clipboard with the partially filled-in template for that asteroid, ready for pasting in the Wiki page edit box. For example, 61 Danaë's Copy Wiki puts this in the clipboard:

```
{{Minor Planet |
name=61 Danaë
| discoverer=[[?]]
| discovery_date=[[mmmm d]], [[yyyy]]
| designations=&nbsp;
| category=[[Main belt]]
| epoch=[[October 22]], [[2004]] ([[Julian day|JD]] 2453300.5)
| semimajor=446.149 [[Giga|G]][[metre|m]] (2.982 [[Astronomical unit|AU]])
| perihelion=371.370 Gm (2.482 AU)
| aphelion=520.927 Gm (3.482 AU)
| eccentricity=0.168
| period=1881.177 [[day|d]] (5.15 [[Julian year|a]])
| inclination=18.220[[degree|°]]
| asc_node=333.787°
| arg_peri=13.932°
| mean_anomaly=336.203°
| speed=17.13 km/[[second|s]]
| dimensions=82.0 km
| mass=5.8×10<sup>17</sup> [[kilogram|kg]]
| density=2.0 g/[[cubic centimetre|cm³]]
| gravity=0.0229 m/s²
| escape_velocity=0.0434 km/s
| rotation=? d
| spectral_class=S
| abs_mag=7.68
| albedo=0.10
| temperature=~222 [[kelvin|K]]}}
```

All that's left to do is look up the discoverer, discovery date, alternate designations, rotation period, albedo and so on. Of course, if `AstOrb.dat` does not give an IRAS diameter, the mass, gravity and escape velocity fields will be question marks.

The **Copier Wiki (FR)** button does the same, but for the French wikipedia (<http://fr.wikipedia.org>).

Advanced Features

The **Extract Names** button extracts the set of named asteroids from the database. This is to facilitate the tracking of new names whenever `AstOrb.dat` is updated. Since an asteroid can be named only if numbered, the **Numbered Only** checkbox is treated as checked regardless of its actual setting. The extracted names (including diacriticals if `Diacriticals.txt` is set) are put on the clipboard. This takes a little while (~15 s on a good machine) and extracts nearly 12,000 names as of late september 2004.

The **Diameter**, **Albedo** and **Density** text boxes can be used to refine calculations. The Diameter is filled automatically from the `AstOrb.dat` value; the text box simply allows you to override the value. Albedo and Density are persistent and will be used to compute the asteroid's gravity, escape velocity, mass and temperature.

The **Special** button extracts special sets of asteroids from the database. It uses the **Numbered Only** checkbox and the **Planet** and **Type** radio buttons. If you ask for the Numbered Only Mercury Crossers, AstOrb Browser will scan the data file (which takes a few seconds) and report "7 results in the clipboard":

```
* [[1566 Icarus]]
* [[3200 Phaethon]]
* [[5786 Talos]]
* [[(40267) 1999 GJ4|(40267) 1999 GJ<sub>4</sub>]]
* [[(66063) 1998 RO1|(66063) 1998 RO<sub>1</sub>]]
* [[(66253) 1999 GT3|(66253) 1999 GT<sub>3</sub>]]
* [[(66391) 1999 KW4|(66391) 1999 KW<sub>4</sub>]]
```

Notice that the list is ready to paste into Wiki. Unchecking the Numbered Only checkbox will result in a full scan, which takes a little longer but nets 70 asteroids instead of just 7. The **Retrograde** option scans for asteroids with inclinations greater than 90 degrees.

The **Family** button, finally, uses the **Numbered Only** checkbox and the **Tolerance** scroll bar. It uses the Zappalà et al. distance metric to do a hierarchical clustering around the current asteroid (this is for curiosity's sake; I've got quibbles with Zappalà's metric as it currently exists). It'll scan the data set for asteroids within the specified tolerance (in m/s) of the seed asteroid. As the set of collected asteroids grows, the distance of any given asteroid to the collected set so far is the minimum distance (i.e. the least distance to the set's members). After each scan, you are appraised of the number of asteroids collected during this pass and asked if you want to scan again. If you use a large tolerance, the set will grow until it gobbles up all asteroids, which is meaningless —hence the prompt to scan again or not.

For example, the Karin family mentioned in the **Minor planet** article can be recovered by first setting the browser on **832 Karin** (using the Search contextual menu is the easiest way) and then clicking the Family button with a Tolerance of, say, 70 m/s. With Numbered Only checked, you get 15 then 6 then zero, for a total of 22 asteroids. In theory, you should get the same result (albeit in a different order) if you start with any other family member. The list in the clipboard gives the "distance" in m/s of each member from the preceding group at the time it was added to the group:

[[832 Karin family]] members; tolerance 70 m/s

- * [[(15649) 6317 P-L]] 34,8
- * [[(26987) 1997 WP1|(26987) 1997 WP₁]] 65,4
- * [[(30348) 2000 JD38|(30348) 2000 JD₃₈]] 29,9
- * [[(41159) 1999 VE161|(41159) 1999 VE₁₆₁]] 11,9
- * [[(47866) 2000 FM5|(47866) 2000 FM₅]] 32,2
- * [[(55852) 1996 TS34|(55852) 1996 TS₃₄]] 12,7
- * [[(64165) 2001 TW49|(64165) 2001 TW₄₉]] 10,4
- * [[(65383) 2002 PN129|(65383) 2002 PN₁₂₉]] 58,8
- * [[(69802) 1998 RX15|(69802) 1998 RX₁₅]] 22,4
- * [[(71049) 1999 XG88|(71049) 1999 XG₈₈]] 44,3
- * [[(75668) 2000 AW87|(75668) 2000 AW₈₇]] 19,3
- * [[(76210) 2000 ET61|(76210) 2000 ET₆₁]] 67,5
- * [[(79035) 2247 T-2]] 43,4
- * [[(79988) 1999 EK10|(79988) 1999 EK₁₀]] 67,5
- * [[(83481) 2001 SO88|(83481) 2001 SO₈₈]] 65,8
- * [[2555 Thomas]] 66,0
- * [[6839 Ozenuma]] 30,7
- * [[(16227) 2000 DY73|(16227) 2000 DY₇₃]] 42,7
- * [[(20499) 1999 RZ2]] 18,9
- * [[(40888) 1999 TW131|(40888) 1999 TW₁₃₁]] 50,6
- * [[(41075) 1999 VG43|(41075) 1999 VG₄₃]] 46,4

With Numbered Only unchecked, you get 34 then 57, 68, 28, 30, 55, 64, 52, 27, 23, 24, 23, 16, 6, 8, 4, 6, 6, 15, 25, 36...the process takes a long time to diverge (it seems). This family business is tricky and fallible.