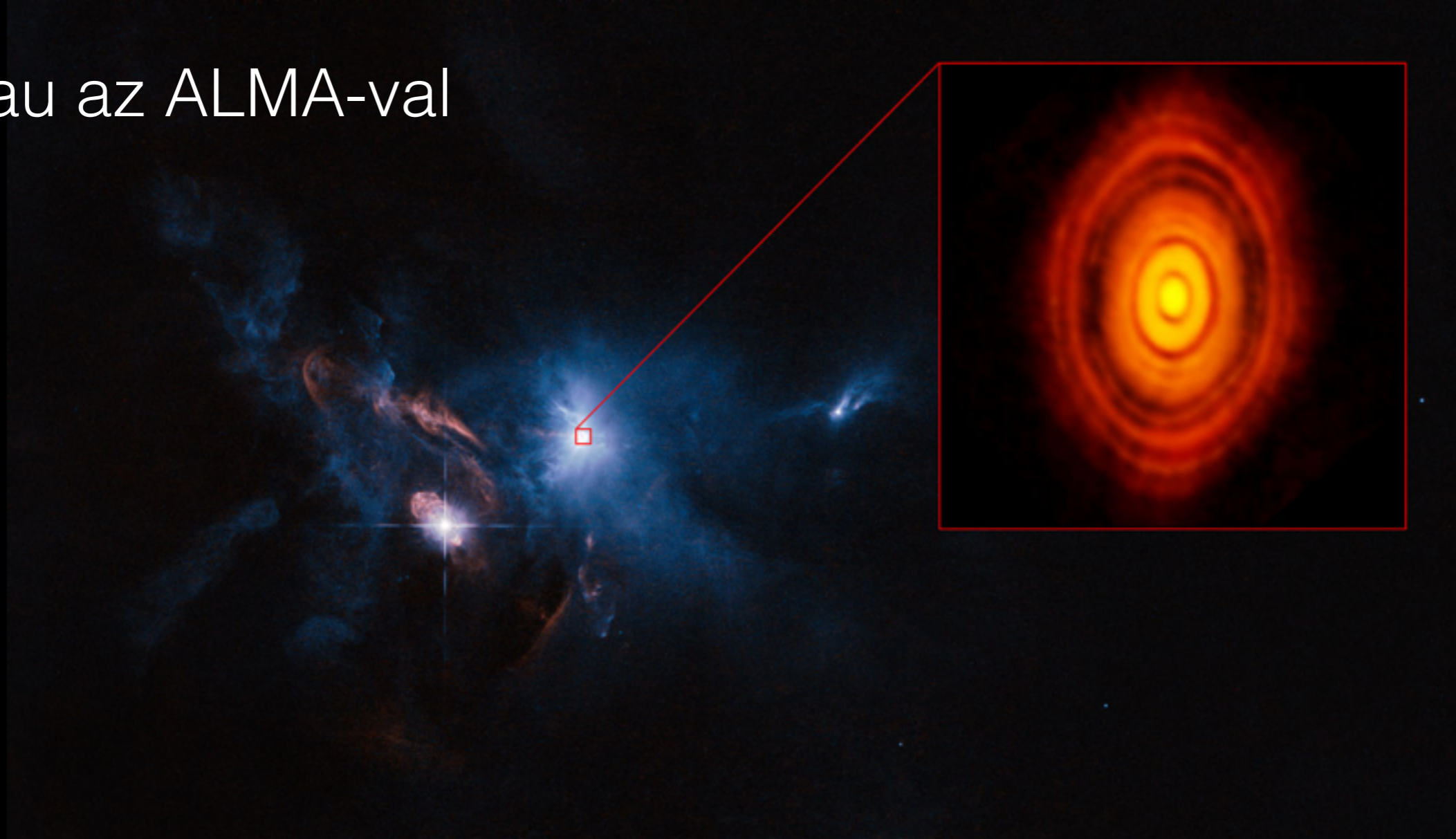
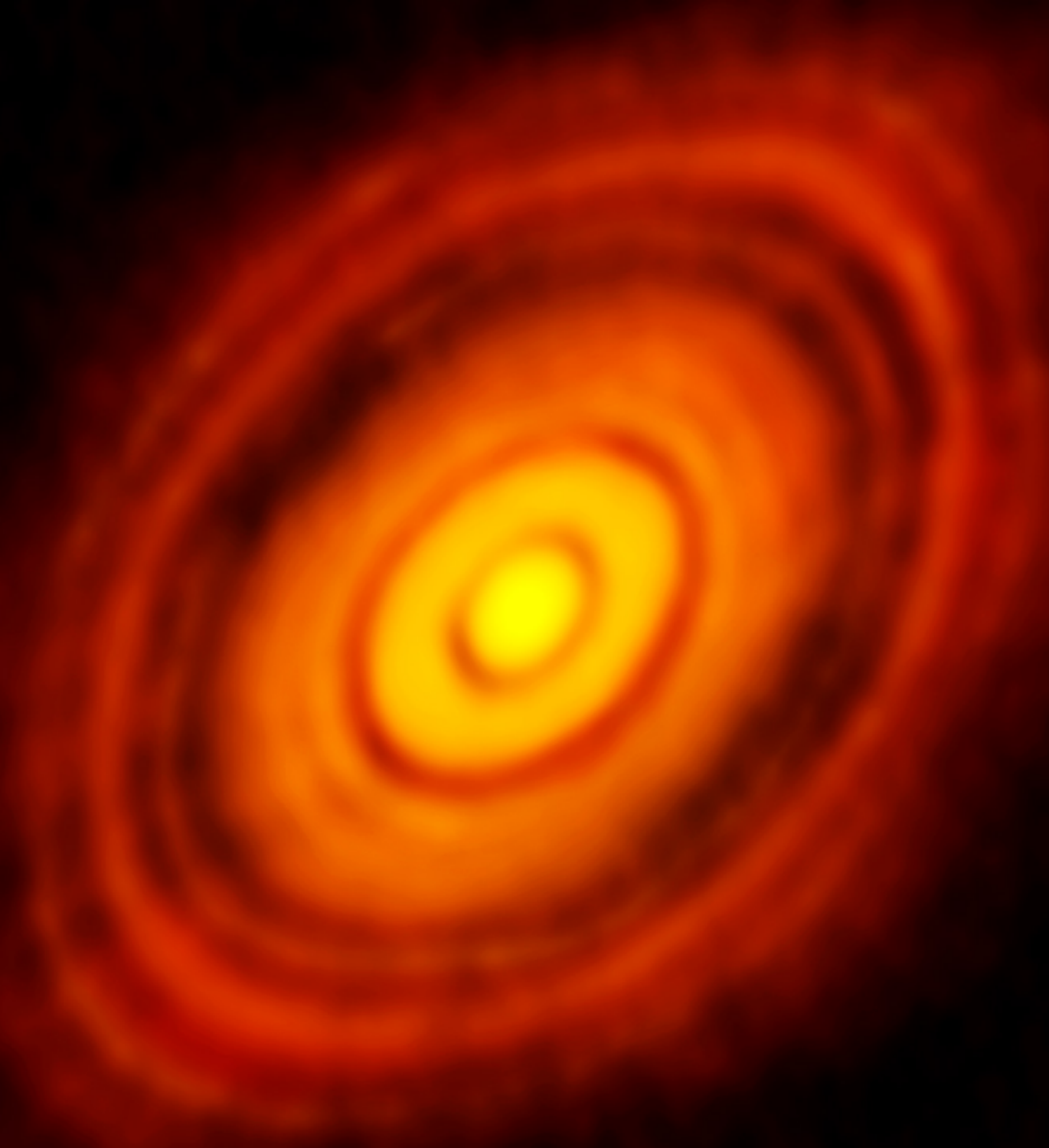
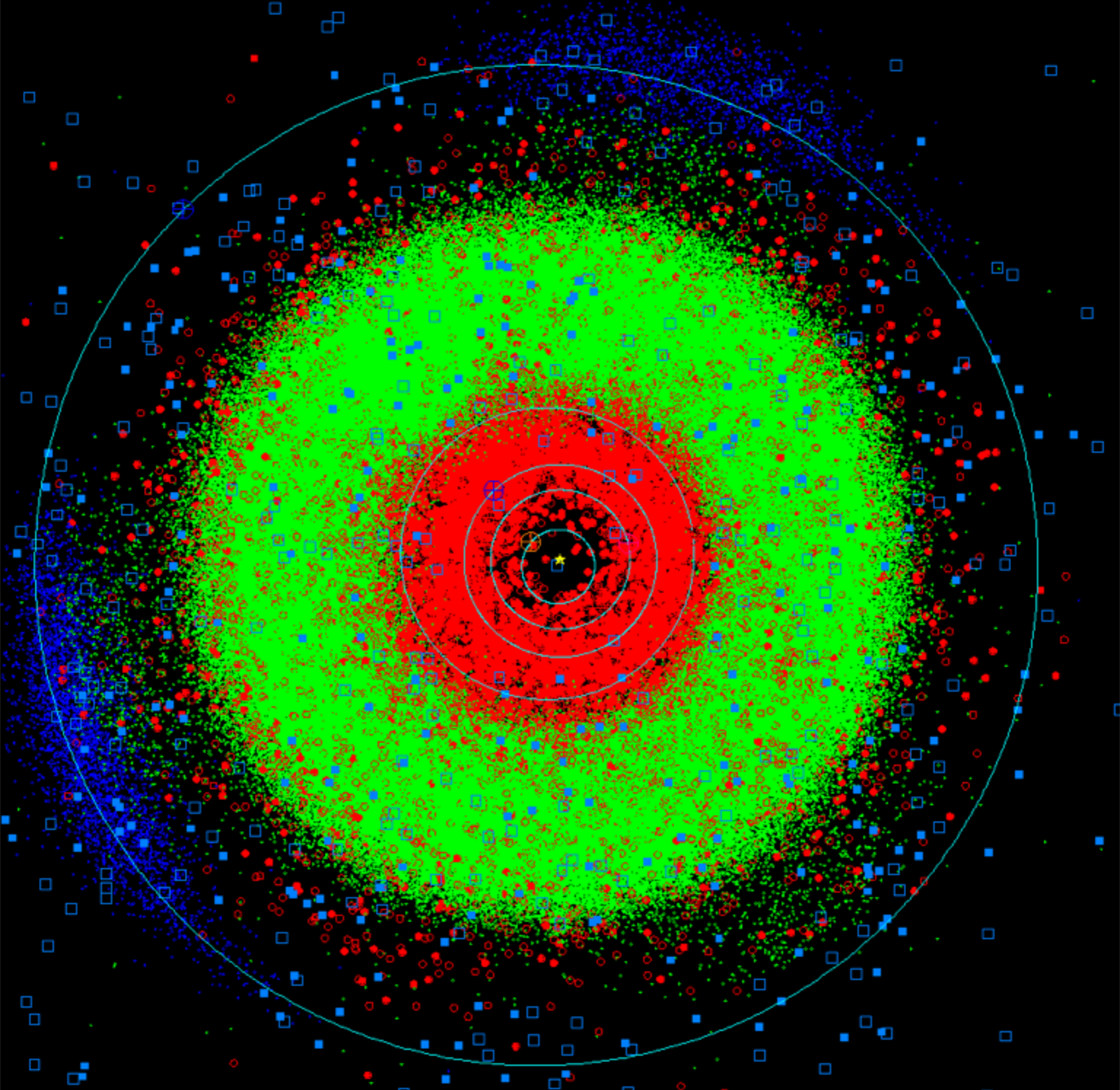


HL Tau az ALMA-val







Plot prepared by the Minor Planet Center (2015 Feb 3).

THE MIDDLE SOLAR SYSTEM

This animation shows the motion of the middle part of the solar system over a two-year time period. The sun is at the center and the orbits of the planets Mercury, Venus, Earth Mars and Jupiter are shown in light blue (the locations of each planet are shown as large crossed circles). Comets are shown as blue squares (numbered periodic comets are filled squares, other comets are outline squares). Main-belt minor planets are displayed as green circles, near-Earth minor planets are shown as red circles.

The individual frames were generated on an OpenVMS system, using the PGPLOT graphics library. The animation was put together on a RISC OS 4.03 system using !InterGif.

THE OUTER SOLAR SYSTEM

This animation shows the motion of the outer part of the solar system over a 100-year time period. The sun is at the center and the orbits of the planets Jupiter, Saturn, Uranus and Neptune are shown in light blue (the locations of each planet are shown as large crossed circles).

Comets: blue squares (filled for numbered periodic comets, outline for other comets)

High-e objects: cyan triangles

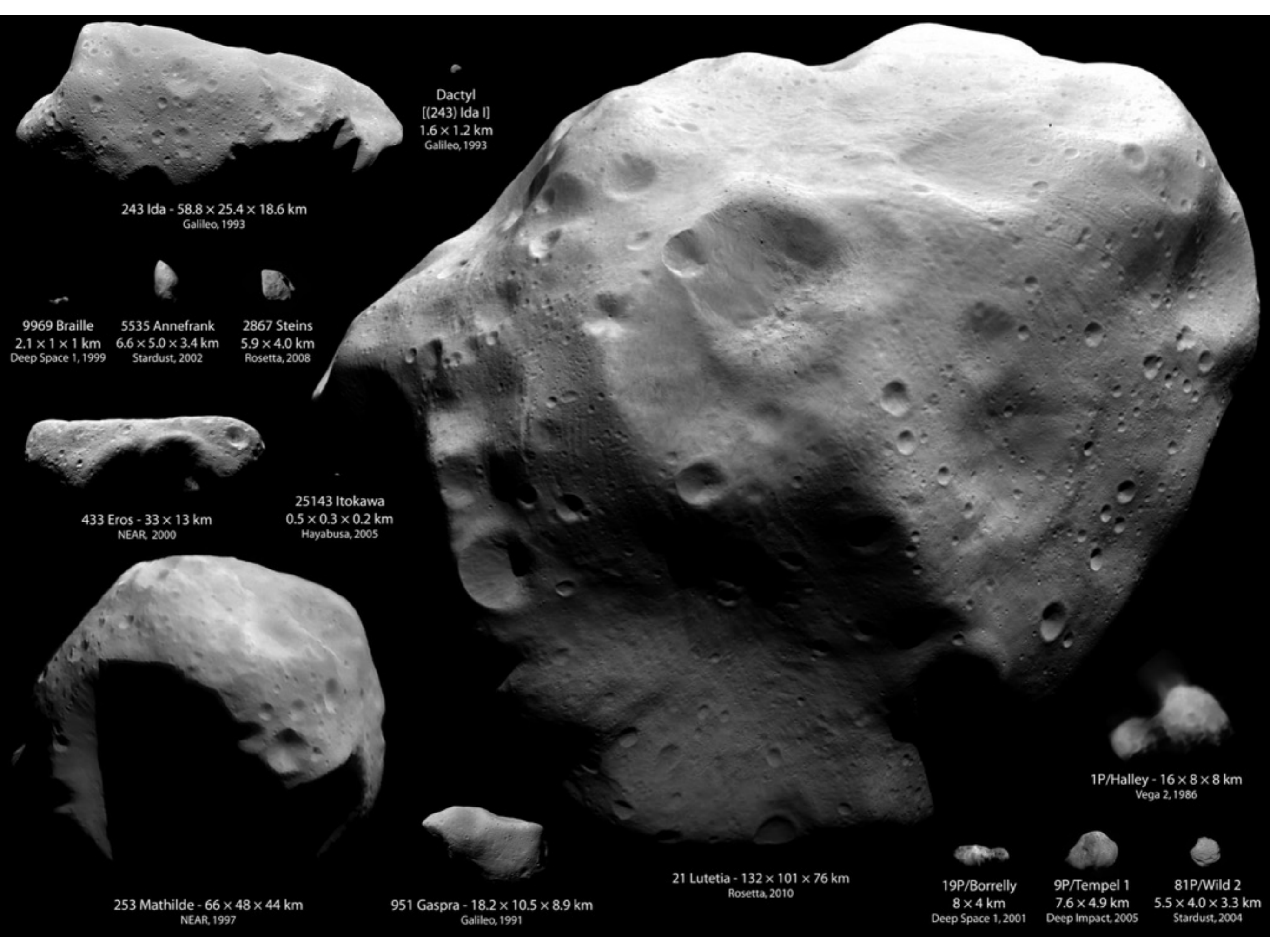
Centaur: orange triangles

Plutinos: white circles (Pluto itself is the large white crossed circle)

"Classical" TNOs: red circles

Scattered Disk Objects: magenta circles

The individual frames were generated on an OpenVMS system, using the PGPLOT graphics library. The animation was put together on a RISC OS 4.03 system using !InterGif.



Dactyl
[(243) Ida I]
1.6 × 1.2 km
Galileo, 1993

243 Ida - 58.8 × 25.4 × 18.6 km
Galileo, 1993

9969 Braille
2.1 × 1 × 1 km
Deep Space 1, 1999

5535 Annefrank
6.6 × 5.0 × 3.4 km
Stardust, 2002

2867 Steins
5.9 × 4.0 km
Rosetta, 2008

433 Eros - 33 × 13 km
NEAR, 2000

25143 Itokawa
0.5 × 0.3 × 0.2 km
Hayabusa, 2005

253 Mathilde - 66 × 48 × 44 km
NEAR, 1997

951 Gaspra - 18.2 × 10.5 × 8.9 km
Galileo, 1991

21 Lutetia - 132 × 101 × 76 km
Rosetta, 2010

19P/Borrelly
8 × 4 km
Deep Space 1, 2001

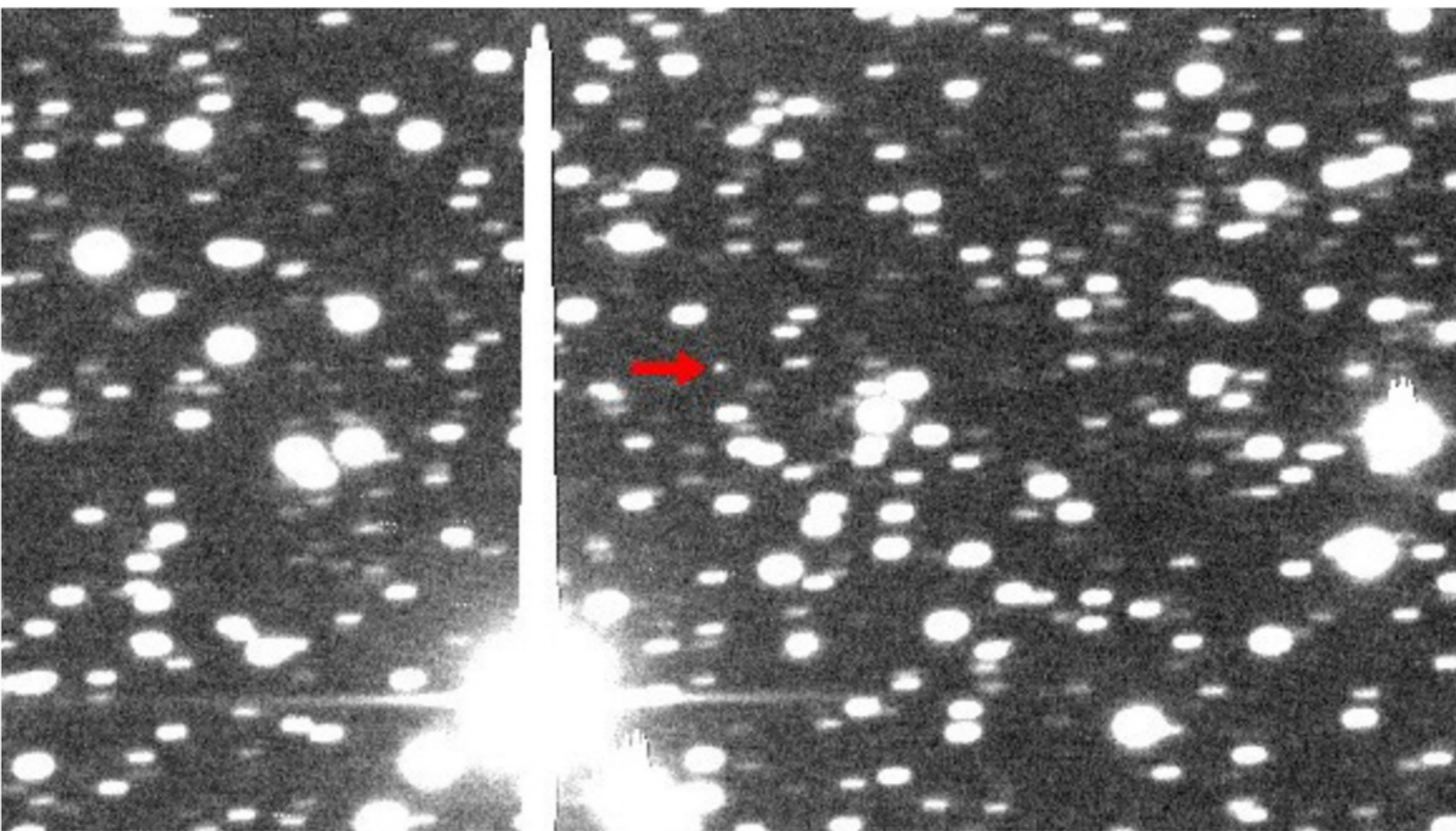
9P/Tempel 1
7.6 × 4.9 km
Deep Impact, 2005

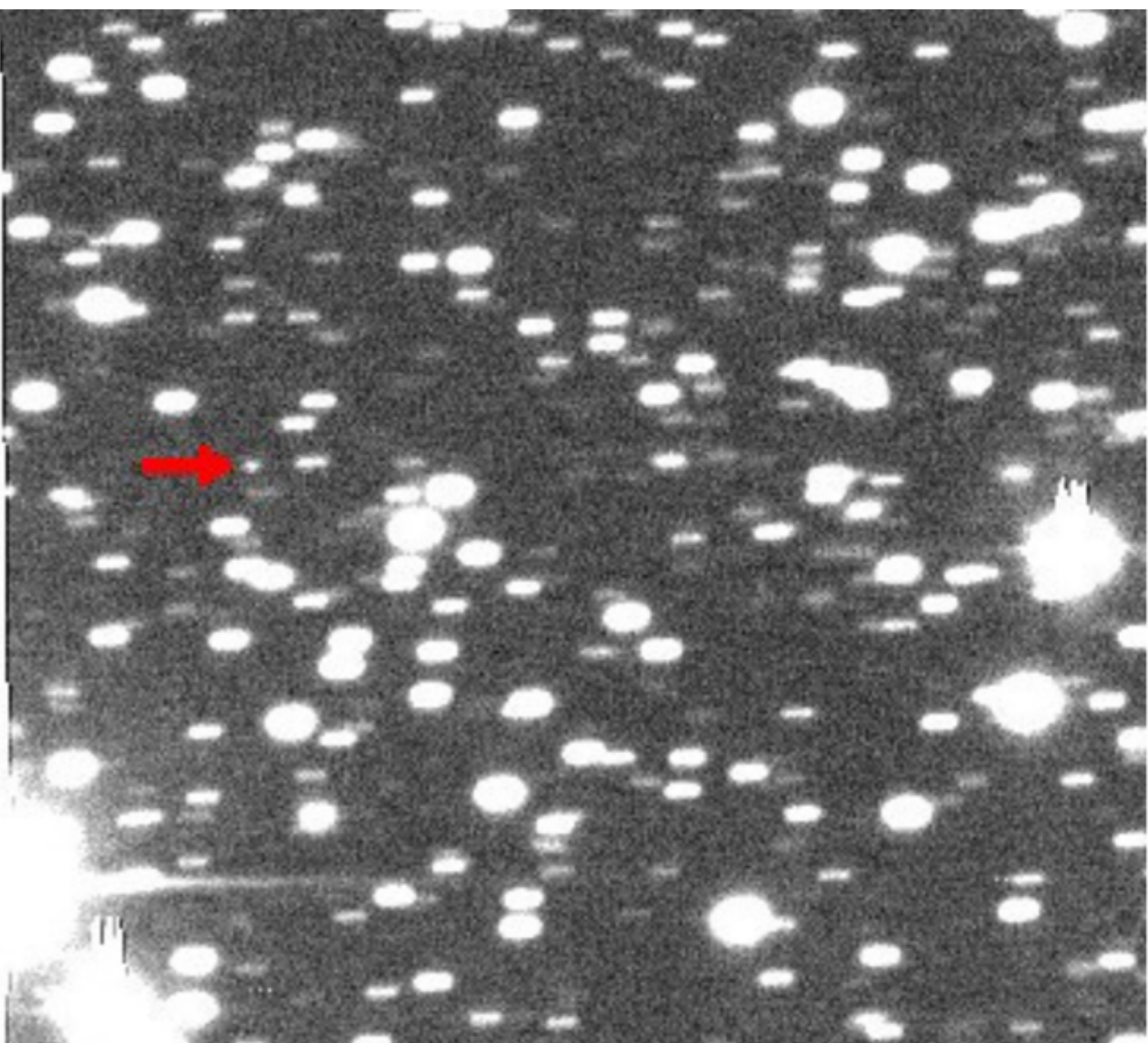
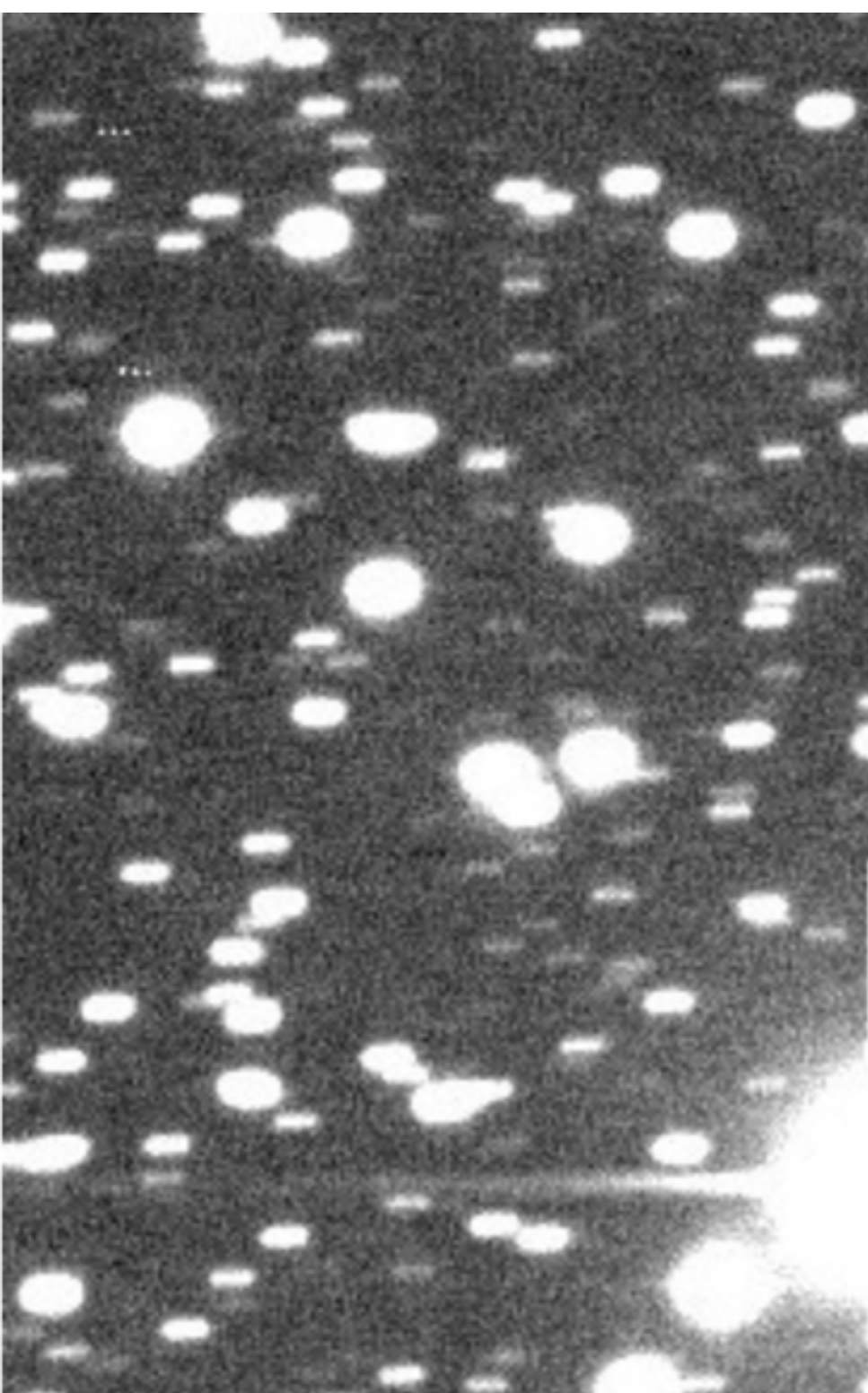
81P/Wild 2
5.5 × 4.0 × 3.3 km
Stardust, 2004

1P/Halley - 16 × 8 × 8 km
Vega 2, 1986









313116 Palvenetianer (2000 YX31)

Classification: Main-belt Asteroid **SPK-ID:** 2313116

[[Ephemeris](#) | [Orbit Diagram](#) | [Orbital Elements](#) | [Physical Parameters](#) | [Discovery Circumstances](#)]

[[show orbit diagram](#)]

Orbital Elements at Epoch 2457000.5 (2014-Dec-09.0) TDB Reference: [JPL 5](#) (heliocentric ecliptic J2000)

Element	Value	Uncertainty (1-sigma)	Units
e	.1440363147577427	9.3981e-08	
a	2.351826946926576	2.6195e-08	AU
q	2.013078460543319	2.2613e-07	AU
i	.8535674503721895	9.3818e-06	deg
node	312.1898910447292	0.000544	deg
peri	149.1537853396004	0.00054941	deg
M	309.9204369545465	6.5361e-05	deg
t _p	2457183.758657293746 (2015-Jun-10.25865729)	0.00023946	JED
period	1317.366059401714	2.2009e-05	d
	3.61	6.026e-08	yr
n	.2732725634084541	4.5656e-09	deg/d
Q	2.690575433309834	2.9968e-08	AU

Orbit Determination Parameters

# obs. used (total)	132
data-arc span	5104 days (13.97 yr)
first obs. used	2000-11-28
last obs. used	2014-11-19
planetary ephem.	DE431
SB-pert. ephem.	SB431-BIG16
condition code	0
fit RMS	.56369
data source	ORB
producer	Otto Matic
solution date	2015-Jan-08 11:38:50

Additional Information

Earth MOID = 1.02985 AU
T_{jup} = 3.543

[[show covariance matrix](#)]

[[Ephemeris](#) | [Orbit Diagram](#) | [Orbital Elements](#) | [Physical Parameters](#) | [Discovery Circumstances](#)]

Physical Parameter Table

Parameter	Symbol	Value	Units	Sigma	Reference	Notes
absolute magnitude	H	18.0	mag	n/a	MPO314909	

313116 Pálvenetianer

Discovered 2000 Dec. 31 by K. Sarneczky and L. Kiss at Piszkesteto.

Pál Venetianer (b. 1935) is a Hungarian molecular biologist and biochemist. He is a member of the Hungarian Academy of Sciences, honorary professor of University of Szeged, and winner of the 2014 annual science communication award of the Club of Hungarian Science Journalists.

NOTE: some special characters may not display properly (any characters within {} are an attempt to place the proper accent above a character)

Reference: MPC batch dated 2015-01-05

Last Updated: 2015-01-07

Alternate Designations

2000 YX31 = 2007 VJ126

[[Ephemeris](#) | [Orbit Diagram](#) | [Orbital Elements](#) | [Physical Parameters](#) | [Discovery Circumstances](#)]

313116 Palvenetianer (2000 YX31)

Classification: Main-belt Asteroid SPK-ID: 2313116

[[Ephemeris](#) | [Orbit Diagram](#) | [Orbital Elements](#) | [Physical Parameters](#) | [Discovery Circumstances](#)]

[[show orbit diagram](#)]

Orbital Elements at Epoch 2457000.5 (2014-Dec-09.0) TDB

Reference: [JPL 5](#) (heliocentric ecliptic J2000)

Element	Value	Uncertainty (1-sigma)	Units
e	.1440363147577427	9.3981e-08	
a	2.351826946926576	2.6195e-08	AU
q	2.013078460543319	2.2613e-07	AU
i	.8535674503721895	9.3818e-06	deg
node	312.1898910447292	0.000544	deg
peri	149.1537853396004	0.00054941	deg

Orbit Determination Parameters

# obs. used (total)	132
data-arc span	5104 days (13.97 yr)
first obs. used	2000-11-28
last obs. used	2014-11-19
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SB-pert. ephem.	SB431-BIG16
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Orbital Elements at Epoch 2457000.5 (2014-Dec-09.0) TDB

Reference: **JPL 5** (heliocentric ecliptic J2000)

Element	Value	Uncertainty (1-sigma)	Units
e	.1440363147577427	9.3981e-08	

Orbit Determination Parameters

# obs. used (total)	132
data-arc span	5104 days (13.97 yr)
first obs. used	2000-11-28

Orbital Elements at Epoch 2457000.5 (2014-Dec-09.0) TDB

Reference: **JPL 5** (heliocentric ecliptic J2000)

Element	Value	Uncertainty (1-sigma)	Units
e	.1440363147577427	9.3981e-08	
a	2.351826946926576	2.6195e-08	AU
q	2.013078460543319	2.2613e-07	AU
i	.8535674503721895	9.3818e-06	deg
node	312.1898910447292	0.000544	deg
peri	149.1537853396004	0.00054941	deg
M	309.9204369545465	6.5361e-05	deg
tp	2457183.758657293746 (2015-Jun-10.25865729)	0.00023946	JED
period	1317.366059401714	2.2009e-05	d
	3.61	6.026e-08	yr
n	.2732725634084541	4.5656e-09	deg/d
Q	2.690575433309834	2.9968e-08	AU

Orbit Determination Parameters

# obs. used (total)	132
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first obs. used	2000-11-28
last obs. used	2014-11-19
planetary ephem.	DE431
SB-pert. ephem.	SB431-BIG16
condition code	0
fit RMS	.56369
data source	ORB
producer	Otto Matic
solution date	2015-Jan-08 11:38:50

Additional Information

Earth MOID = 1.02985 AU

T_{jup} = 3.543

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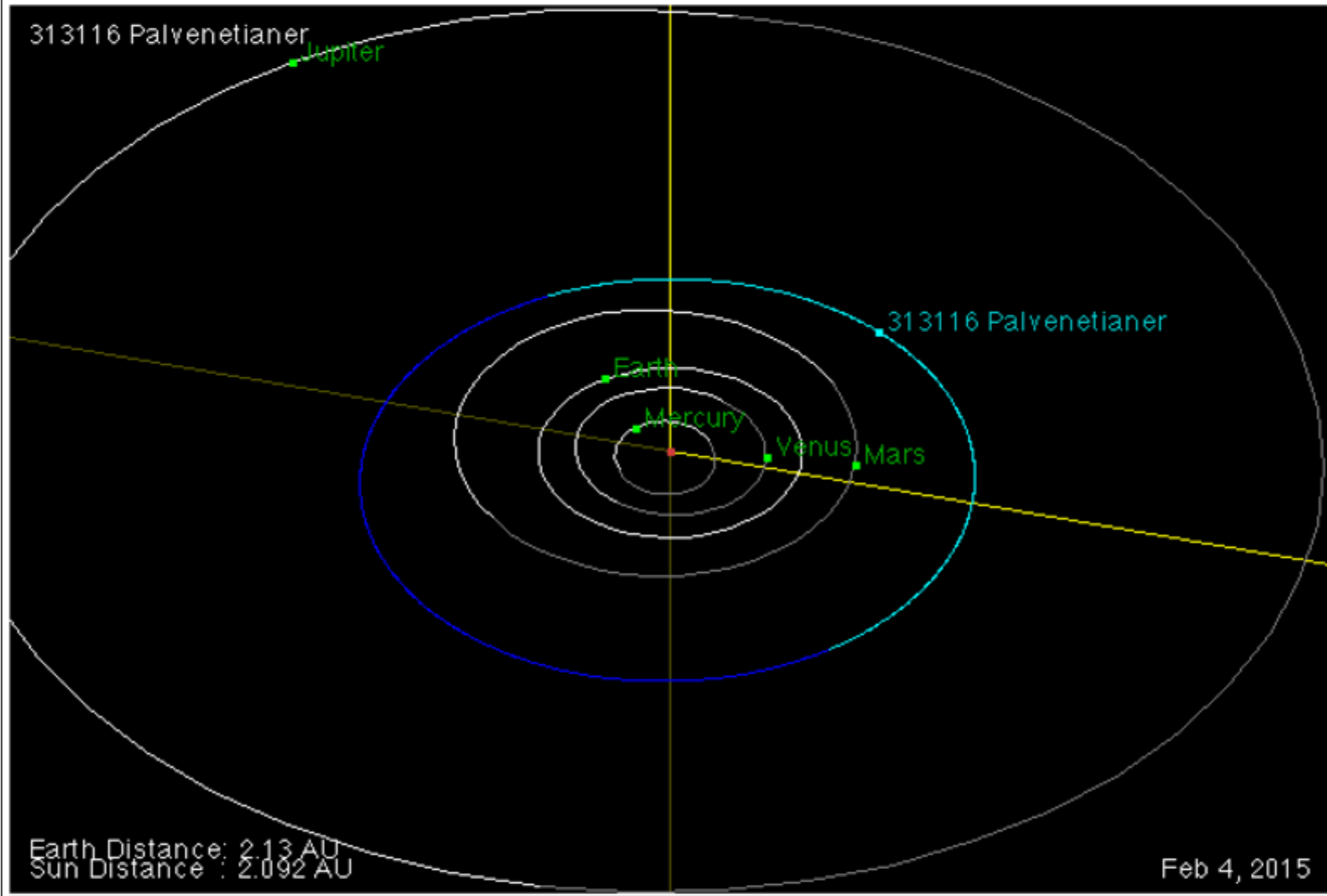
Reference: MPC batch dated 2015-01-05

Last Updated: 2015-01-07

Alternate Designations

2000 YX31 = 2007 VJ126

[[Ephemeris](#) | [Orbit Diagram](#) | [Orbital Elements](#) | [Physical Parameters](#) | [Discovery Circumstances](#)]



45300 Thewrewk (2000 AF45)

Classification: Main-belt Asteroid **SPK-ID:** 2045300

[[Ephemeris](#) | [Orbit Diagram](#) | [Orbital Elements](#) | [Physical Parameters](#) | [Discovery Circumstances](#) | [Close-Approach Data](#)]

[[show orbit diagram](#)]

Orbital Elements at Epoch 2457000.5 (2014-Dec-09.0) TDB Reference: [JPL 10](#) (heliocentric ecliptic J2000)

Element	Value	Uncertainty (1-sigma)	Units
e	.08246538733110034	6.2448e-08	
a	3.097971268491516	3.3454e-08	AU
q	2.842495867894743	1.9568e-07	AU
i	10.23606473659917	7.7385e-06	deg
node	263.6878083450384	4.0466e-05	deg
peri	62.66390279449632	6.4622e-05	deg
M	82.59956660014606	4.8436e-05	deg
t _p	2456543.527807673640 (2013-Sep-08.02780767)	0.00026814	JED
period	1991.656808974086	3.2261e-05	d
	5.45	8.833e-08	yr
n	.1807540327118095	2.9279e-09	deg/d
Q	3.35344666908829	3.6213e-08	AU

Orbit Determination Parameters

# obs. used (total)	722
data-arc span	5840 days (15.99 yr)
first obs. used	1998-12-14
last obs. used	2014-12-10
planetary ephem.	DE431
SB-pert. ephem.	SB431-BIG16
condition code	0
fit RMS	.48512
data source	ORB
producer	Otto Matic
solution date	2015-Jan-08 04:06:41

Additional Information

Earth MOID = 1.8488 AU

T_{jup} = 3.193

[[show covariance matrix](#)]

[[Ephemeris](#) | [Orbit Diagram](#) | [Orbital Elements](#) | [Physical Parameters](#) | [Discovery Circumstances](#) | [Close-Approach Data](#)]

Physical Parameter Table

Parameter	Symbol	Value	Units	Sigma	Reference	Notes
absolute magnitude	H	12.9	mag	n/a	MPO267856	

45300 Thewrewk

Discovered 2000 Jan. 1 by K. Sárneczky and L. Kiss at Piszkestető.

Aurél Ponori Thewrewk (b. 1921) was director of Urania Public Observatory and Budapest Planetarium. Currently honorary president of the Hungarian Astronomical Association, he is a recognized expert on the history of astronomy.

NOTE: some special characters may not display properly (any characters within {} are an attempt to place the proper accent above a character)

Reference: 20050125/MPCPages.arc

Last Updated: 2005-06-01

[[show close-approach data](#)]

Alternate Designations

2000 AF45 = 1998 XX37

[[Ephemeris](#) | [Orbit Diagram](#) | [Orbital Elements](#) | [Physical Parameters](#) | [Discovery Circumstances](#) | [Close-Approach Data](#)]

45300 Thewrewk (2000 AF45)

Classification: Main-belt Asteroid SPK-ID: 2045300

[[Ephemeris](#) | [Orbit Diagram](#) | [Orbital Elements](#) | [Physical Parameters](#) | [Discovery Circumstances](#) | [Close-Approach Data](#)]

[[show orbit diagram](#)]

Orbital Elements at Epoch 2457000.5 (2014-Dec-09.0) TDB
Reference: [JPL 10](#) (heliocentric ecliptic J2000)

Element	Value	Uncertainty (1-sigma)	Units
e	.08246538733110034	6.2448e-08	
a	3.097971268491516	3.3454e-08	AU
q	2.842495867894743	1.9568e-07	AU
i	10.23606473659917	7.7385e-06	deg
node	263.6878083450384	4.0466e-05	deg
peri	62.66390279449632	6.4622e-05	deg
M	92.50056660014608	4.8426e-05	deg

Orbit Determination Parameters

# obs. used (total)	722
data-arc span	5840 days (15.99 yr)
first obs. used	1998-12-14
last obs. used	2014-12-10
planetary ephem.	DE431
SB-pert. ephem.	SB431-BIG16
condition code	0
fit RMS	.48512
data source	ORB

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Reference: 20050125/MPCPages.arc

Last Updated: 2005-06-01

Parameter	Symbol	Value	Units	Sigma	Reference	Notes
absolute magnitude	H	12.9	mag	n/a	MPO267856	

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Reference: 20050125/MPCPages.arc

Last Updated: 2005-06-01

[[show close-approach data](#)]

Alternate Designations

2000 AF45 = 1998 XX37

[[Ephemeris](#) | [Orbit Diagram](#) | [Orbital Elements](#) | [Physical Parameters](#) | [Discovery Circumstances](#) | [Close-Approach Data](#)]

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Classification: Main-belt Asteroid SPK-ID: 2045300

[[Ephemeris](#) | [Orbit Diagram](#) | [Orbital Elements](#) | [Physical Parameters](#) | [Discovery Circumstances](#) | [Close-Approach Data](#)]

[[show orbit diagram](#)]

Orbital Elements at Epoch 2457000.5 (2014-Dec-09.0) TDB
Reference: **JPL 10** (heliocentric ecliptic J2000)

Element	Value	Uncertainty (1-sigma)	Units
e	.08246538733110034	6.2448e-08	

Orbit Determination Parameters

# obs. used (total)	722
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Orbital Elements at Epoch 2457000.5 (2014-Dec-09.0) TDB
Reference: **JPL 10** (heliocentric ecliptic J2000)

Element	Value	Uncertainty (1-sigma)	Units
e	.08246538733110034	6.2448e-08	
a	3.097971268491516	3.3454e-08	AU
q	2.842495867894743	1.9568e-07	AU
i	10.23606473659917	7.7385e-06	deg
node	263.6878083450384	4.0466e-05	deg
peri	62.66390279449632	6.4622e-05	deg
M	82.59956660014606	4.8436e-05	deg
t _p	2456543.527807673640 (2013-Sep-08.02780767)	0.00026814	JED
period	1991.656808974086	3.2261e-05	d
	5.45	8.833e-08	yr
n	.1807540327118095	2.9279e-09	deg/d
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first obs. used	1998-12-14
last obs. used	2014-12-10
planetary ephem.	DE431
SB-pert. ephem.	SB431-BIG16
condition code	0
fit RMS	.48512
data source	ORB
producer	Otto Matic
solution date	2015-Jan-08 04:06:41

Additional Information

Earth MOID = 1.8488 AU

T_{jup} = 3.193

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Reference: 20050125/MPCPages.arc

Last Updated: 2005-06-01

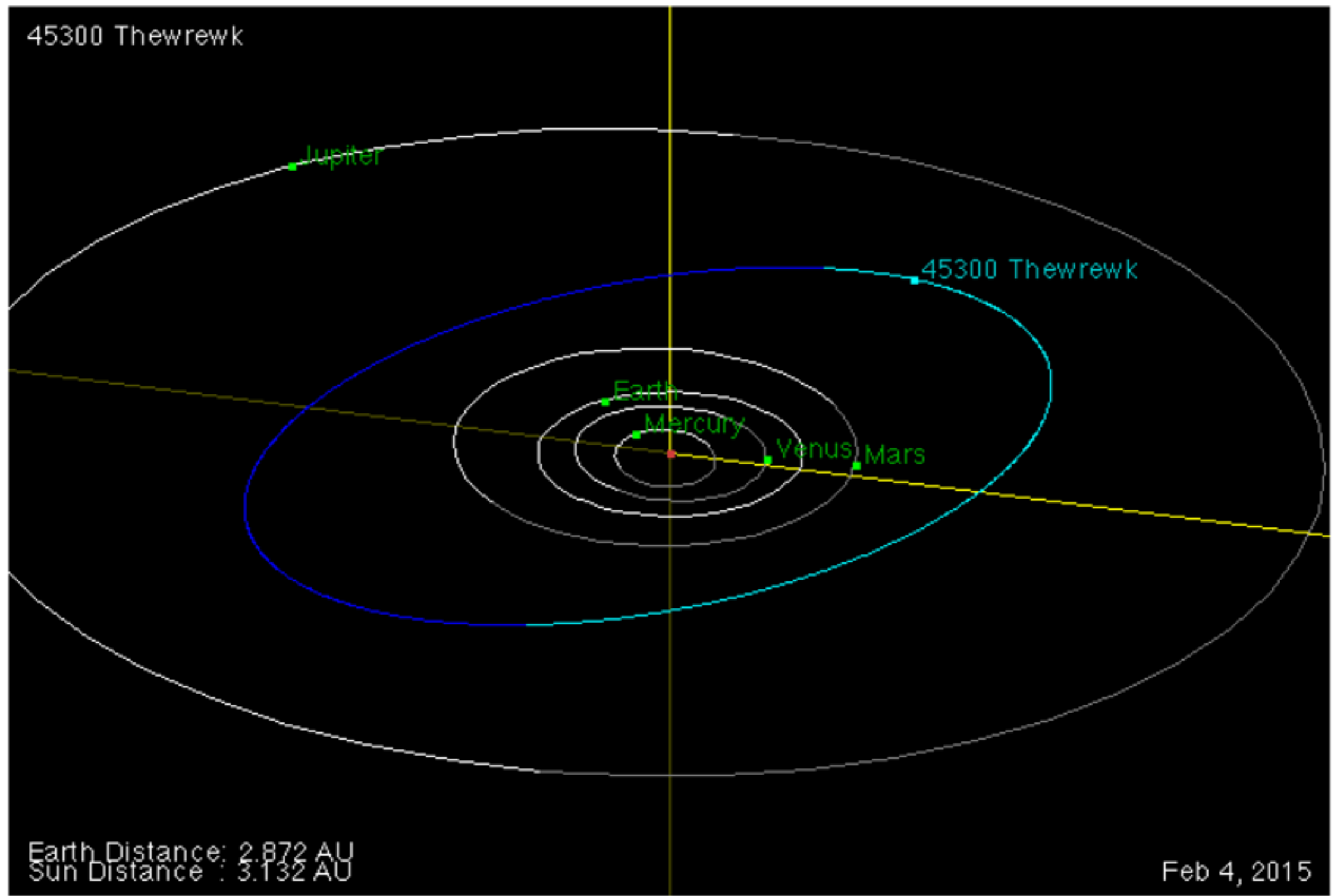
[[show close-approach data](#)]

Alternate Designations

2000 AF45 = 1998 XX37

[[Ephemeris](#) | [Orbit Diagram](#) | [Orbital Elements](#) | [Physical Parameters](#) | [Discovery Circumstances](#) | [Close-Approach Data](#)]

45300 Thewrewk



Earth Distance: 2.872 AU
Sun Distance : 3.132 AU

Feb 4, 2015