

With Hipparcos, it will be possible to observe asteroids 100 km in diameter at a distance of 2 to 3 AU, corresponding to an apparent diameter of 0.05 arc second. A secondary component is expected to be more than 0.1 arc second from the primary. Periodic variations from a smooth orbit, or even direct observations of a faint secondary, are possible if the same asteroid is scanned several times. From the observed orbital rates and absolute distances within the binary system, masses and densities could be determined.

AGORA

Among the five proposals for new space science missions (ESA Bulletin) is AGORA, the Asteroidal Gravity, Optical and Radar Analysis mission. A description of the mission and model payload was provided by Marsden (1983). The baseline mission comprises a rendezvous with a main belt asteroid (diameter larger than 100 km, semi-major axis 2.5 AU or less), followed by at least two fly-by encounters of smaller objects. No choice of specific targets has been made, but previous studies by JPL have shown that a number of interesting missions exist for the AGORA launch time frame (1990-94).

The model payload consists of a wide-angle camera (150 mm focal length), a high-resolution camera (1500 mm focal length), an infrared spectrophotograph (0.8 - 3.4 microns), a radar altimeter/microwave radiometer, and a gamma-ray spectrometer, together with a complement of instruments for measuring the interplanetary plasma environment during the cruise phases. In addition, the spacecraft will carry a number of small ejectable test masses, one of which will be released one or two days prior to each fly-by encounter. The trajectory of the test mass will pass between the spacecraft and the asteroid, allowing the relative perturbation due to the latter to be measured and thereby enabling the asteroid's mass to be estimated. Nominal fly-by distance will be 500 km with a relative velocity of 5 km/sec.

The AGORA craft will be rather complex, requiring 3-axis stabilization, a large steerable solar array, a deployable science instrument scan platform possessing 2 degrees of freedom, and possibly a steerable high gain antenna dish. Two propulsion systems are being considered. The first involves a chemical motor plus a single Mars gravity assist. The alternative is electric propulsion based on European ion drive technology. In either case, AGORA is constrained to launch using an Ariane rocket.

AGORA is a revised version of the Asterex probe, which was rejected by the Science Program Committee of ESA in 1981 (Thomson 1982). The proposed craft had a weight of 750 kg and was also 3-axis stabilized. Designed to carry an imaging camera, infrared spectrometer, and radar altimeter, Asterex would have had a three year lifetime.

References

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ASTEROIDS TARGETED FOR ARECIBO RADAR OBSERVATIONS IN 1984

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A list of radar targets currently planned for Arecibo observations in 1984 is presented to encourage observers to obtain supporting physical observations. Photoelectric lightcurves are especially needed to fully interpret the radar data.

The table below lists asteroids for which radar observations are currently planned using the National Astronomy and Ionosphere Center's Arecibo Observatory in Puerto Rico. The number and name of each target is given along with the UT dates on which observations will be attempted. S is the expected single-night signal-to-noise ratio. The final two columns give the opposition date and the opposition B magnitude of the asteroid.

This table is presented to encourage observers to make supporting physical observations of these asteroids, especially near simultaneous photoelectric lightcurve observations. These data can greatly enhance the interpretation of the radar observations for reasons described by Ostro (1983) (MPB 10, 10-11).

1984 Arecibo Radar Targets

Target	Observation Dates	S	Opp'n Date	Opp'n B Mag
60 Echo	Feb 26-Mar 3	5	Feb 9	11.6
9 Metis	Mar 13-Mar 18	5	Mar 22	10.5
27 Euterpe		5	Mar 9	10.5
2101 Adonis	Jul 13-Jul 18	150	Jun 29	15.6
554 Peraga	Oct 29-Nov 3	7	Oct 9	11.7
144 Vibia		9	Nov 6	11.0
7 Iris	Dec 11-Dec 17	30	Dec 14	8.1

PHOTOELECTRIC PHOTOMETRY OPPORTUNITIES DECEMBER 1983 - APRIL 1984

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The table below lists asteroids which come to opposition during the months of December 1983 - April 1984 that represent useful targets for photoelectric photometry observations. Observations are needed because the asteroid has either an unknown or ambiguous rotational period or because the asteroid will be observable at a very low phase angle. Asteroids which are planned as targets of radar observations are also included in the table (see the article in this issue by Ostro.) The table gives (in order of opposition dates) the asteroid number and name, opposition date, opposition B magnitude, (the V magnitude is about 0.8 brighter), the rotational period (in hours), the estimated lightcurve amplitude (in magnitudes), and the designation PER if observations are needed to determine the rotational period. PHA indicates observations of the phase curve are desired and RAD indicates the object is a radar target. Question marks are used to denote uncertain or unknown values. Recommended observational procedures are given in MPB 10, No. 1, pages 1-2. Ephemerides for 9 Metis, 30 Urania, 230 Athamantis, and 409 Aspasia are included in this issue. Ephemerides for all other asteroids appeared in the previous issue. Several of these objects will likely be included in finder charts prepared by Dr. J. U. Gunter, 1411 N. Mangum St., Durham, NC 27701, which are free for a self-addressed stamped envelope.

Of particular note for the objects below is 230 Athamantis which appears to have a period of 24.00 hours! This determination may be ambiguous, i.e. the period could really be 12.00 hours. In any case, the commensurate period makes observations of the complete rotational phase impossible from any single observatory. Observers (especially Europeans) who would be interested in a coordinated campaign to observe Athamantis are invited to contact me.

Asteroid	Opp'n Date	Opp'n B Mag	Per	Amp	
74 Galatia	Dec 15	12.4	?	?	PER
60 Echo	Feb 10	11.4	52?	0.2?	PER*
202 Chryseis	Feb 14	12.0	?	?	PER
116 Sirona	Feb 19	11.5	13.7?	0.3	PER
27 Euterpe	Mar 9	10.3	8.50	0.15	PHA*
105 Artemis	Mar 19	11.4	>24	>0.1	PER
9 Metis	Mar 22	10.5	5.04	0.3	RAD*
64 Angelina	Mar 23	11.4	8.75	0.3	PHA
409 Aspasia	Apr 11	11.4	?	>0.05	PER
30 Urania	Apr 11	11.9	13.69	0.45	PHA
230 Athamantis	Apr 25	11.6	24.00	0.25	PER

* = also a radar target

PHOTOELECTRIC PHOTOMETRY OPPORTUNITIES

		R. A. (1950.00)			DEC.		MAG	
DATE		HR	MIN	SEC	DEG	' "	B	
Minor Planet		9 Metis						
1984 Feb	25	12	27	36.88	6	34 39.6	10.65	
Mar	6	12	20	14.22	7	33 46.2	10.46	
	16	12	11	8.14	8	32 45.7	10.26	
	26	12	1	27.04	9	23 17.2	10.35	
Apr	5	11	52	24.81	9	58 28.5	10.61	
	15	11	45	5.20	10	14 19.1	10.85	
	25	11	40	8.86	10	9 59.2	11.09	
May	5	11	37	52.71	9	46 50.4	11.33	
Minor Planet		30 Urania						
1984 Feb	25	13	39	55.60	-13	7 48.1	12.86	
Mar	6	13	37	8.12	-13	4 18.5	12.64	
	16	13	31	43.87	-12	44 43.3	12.42	
	26	13	24	7.12	-12	9 49.1	12.19	
Apr	5	13	15	2.51	-11	22 24.5	11.90	
	15	13	5	31.28	-10	27 35.1	11.87	
	25	12	56	38.08	-9	31 50.3	12.18	
May	5	12	49	18.71	-8	41 43.0	12.41	
	15	12	44	11.38	-8	2 28.2	12.64	
	25	12	41	34.03	-7	37 15.9	12.87	
Minor Planet		230 Athamantis						
Mar	6	14	26	51.52	-22	47 50.6	12.43	
	16	14	25	55.71	-22	44 16.9	12.24	
	26	14	22	8.58	-22	21 19.7	12.05	
Apr	5	14	15	47.12	-21	37 41.1	11.87	
	15	14	7	32.08	-20	34 13.5	11.65	
	25	13	58	23.91	-19	14 53.6	11.44	
May	5	13	49	32.82	-17	46 45.5	11.64	
	15	13	42	4.68	-16	18 41.5	11.83	
	25	13	36	46.72	-14	58 59.2	12.01	
Jun	4	13	34	4.33	-13	53 41.0	12.19	
	14	13	34	3.70	-13	5 59.4	12.37	
	24	13	36	37.83	-12	36 33.9	12.54	
Minor Planet		409 Aspasia						
1984 Feb	25	13	17	15.52	-22	20 59.1	12.33	
Mar	6	13	15	15.24	-22	28 51.8	12.09	
	16	13	10	37.69	-22	11 30.3	11.85	
	26	13	3	52.38	-21	27 14.5	11.62	
Apr	5	12	55	51.55	-20	17 33.5	11.42	
	15	12	47	44.10	-18	48 11.2	11.40	
	25	12	40	39.18	-17	8 20.7	11.56	
May	5	12	35	32.14	-15	28 36.8	11.77	
	15	12	32	57.26	-13	58 26.8	11.99	
	25	12	33	6.14	-12	44 15.1	12.22	
Jun	4	12	35	54.37	-11	49 13.6	12.43	

ASTEROID NEWS NOTES

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New Names

Rarely do the newly named asteroids outnumber the newly numbered ones in any given month, but such was the case in September when 26 asteroids received names. Included was (1717) Arlon, the lowest numbered object without a name, until now. The distinction now falls on (1787) 1950 SK. Three objects in the 1800's still lack names. The highest numbered object to be named is (2906) Caltech, named after... you guessed it!