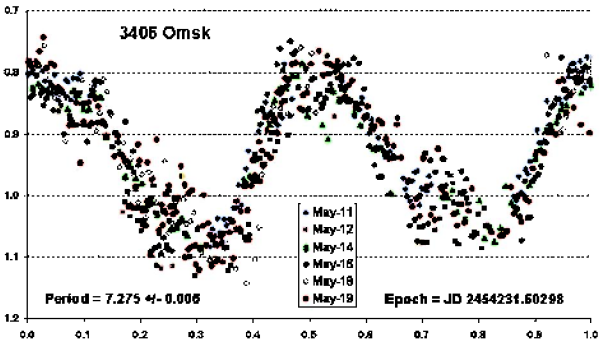

Table I. Aspect data for Omsk in 2007.

UT Date	L_{PAB}	B_{PAB}	Phase Angle	%Phase Coverage
2007 May 11	229.8	-7.3	3.8	82
2007 May 12	229.8	-7.3	3.9	66
2007 May 14	229.9	-7.2	4.1	86
2007 May 16	229.9	-7.1	4.6	89
2007 May 18	230.0	-7.0	5.2	58
2007 May 19	230.0	-6.9	5.5	124

ASTEROID LIGHTCURVE ANALYSIS FROM VOLUNTEER OBSERVATORY DURING APRIL AND MAY 2007

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Lightcurve period and amplitude results for asteroid 533 Sara are reported. The derived period is 11.654 ± 0.001hrs and the amplitude is 0.280 ± 0.015mag.

The author operates Volunteer Observatory at Knoxville, Tennessee at an elevation of 330 meters. Instrumentation used for asteroid photometry includes a 0.35m Meade SCT mounted on an Astrophysics 1200 GTO mounting and an SBIG ST10XME CCD camera. The image scale for all observations was approximately 1.21 arc-seconds per pixel with 2x2 binning. Data were acquired with a custom blue-blocking clear filter inline using 45-second exposures. The CCD operating temperature was maintained at –20°C. Image acquisition and observatory automation is accomplished with Maxim DL and Astronomer's Control Panel software. Additional details of the equipment used are located at the author's personal website: http://www.mikefleenor.com. All images were measured using MPO Canopus, which employs differential aperture photometry to determine the values used for analysis. The period determination was accomplished with Canopus incorporating the Fourier analysis algorithm developed by Harris (1989). Amplitude determination was accomplished using photometry data generated by Canopus and the author's custom MS Excel spreadsheets.

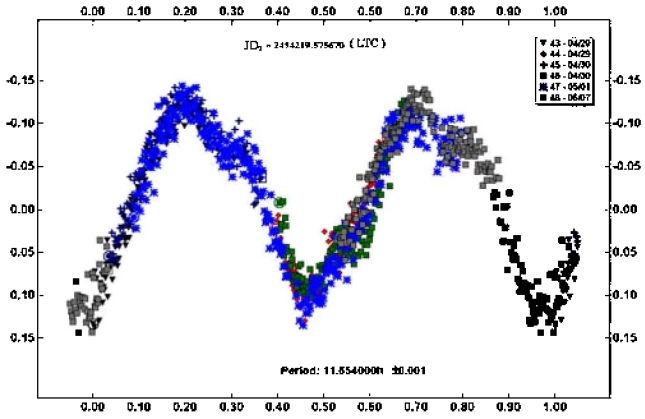
533 Sara was selected from a list of asteroid photometry opportunities published by Brian Warner and Alan Harris on the Collaborative Asteroid Lightcurve Link (CALL 2007). The asteroid was chosen principally based on its favorable declination. 533 Sara was also listed in the lightcurve opportunities table in the *Minor Planet Bulletin* (Warner 2007), where the period was given as 12 hrs with an amplitude of 0.26 mag. Analysis of observations covering four nights in April and May 2007 resulted in a synodic period determination of 11.654 ±0.001 hrs. and amplitude 0.280 ±0.015 mag. Full coverage of the asteroid's rotation was secured and found to be especially important in determining the synodic period to a high degree of precision.

References

Collaborative Asteroid Lightcurve Link (CALL) (2007). http://www.MinorPlanetObserver.com/astlc/default.htm

Warner, B.D. (2003). *A Practical Guide to Lightcurve Photometry and Analysis*. Bdw Publishing, Colorado Springs, CO.

Warner, B.D., Harris, A.W., Pravec, P., Kaasalainen, M., Benner, L.A.M., "Lightcurve Photometry Opportunities: April-June 2007." (2007). Minor Planet Bulletin 34, 50-51.



LIGHTCURVE PHOTOMETRY OPPORTUNITIES OCTOBER-DECEMBER 2007

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We present here four lists of "targets of opportunity" for the period 2007 October-December. The first list is those asteroids reaching a favorable apparition during this period, are <15m at brightest, and have either no or poorly constrained lightcurve parameters. By "favorable" we mean the asteroid is unusually brighter than at other times. In many cases, a favorable apparition may not come again for many years. The goal for these asteroids is to find a well-determined rotation rate, if at all possible. Don't hesitate to solicit help from other observers at widely spread longitudes should the initial finding for the period indicated that it will be difficult for a single station to find the period.

The Low Phase Angle list includes asteroids that reach very low phase angles. Getting accurate, calibrated measurements (usually V band) at or very near the day of opposition can provide important information for those studying the "opposition effect", which is when objects near opposition brighten more than simple geometry would predict.

The third list is of those asteroids needing only a small number of lightcurves to allow Kaasalainen and others to complete a shape model. Some of the asteroids have been on the list for some time, so work on them is strongly encouraged in order to allow models to be completed. For these objects, we encourage you to do absolute photometry, meaning that the observations are not differential but absolute values put onto a standard system, such as Johnson V. If this is not possible or practical, accurate relative photometry is also permissible. This is where all differential values are against a calibrated zero point that is not necessarily on a standard system.

When working any asteroid, keep in mind that the best results for shape and spin axis modeling are obtained when lightcurves are obtained over a range of phase angles, let alone viewing aspects at different apparitions. Higher phase angles allow shadowing effects to influence the lightcurve and help constrain the modeling solution. If at all possible, try to get lightcurves not only close to opposition when the asteroid is usually near its brightest, but before and after, e.g., when the phase angle is 15° or more. This can be difficult because of the geometry involved, especially main belt asteroids where the maximum phase angle is about 30°. However, the extra effort can and will pay off.

The fourth list gives a brief ephemeris for planned radar targets. Supporting optical observations made to determine the lightcurve's period, amplitude, and shape are needed to supplement the radar data. Reducing to standard magnitudes is not required but high precision work usually is, i.e., on the order of 0.01-0.03mag. A *geocentric* ephemeris is given for when the asteroid is brighter than 16.0 (in most cases). The date range may not always coincide with the dates of planned radar observations, which – for Arecibo – are limited to a relatively narrow band of declinations.

Those obtaining lightcurves in support of radar observations should contact Dr. Benner directly at the email given above. There are several web sites of particular interest for coordinate radar and optical observations. Future targets (up to 2010) can be found at *http://echo.jpl.nasa.gov/~lance/future.radar.nea.periods.html*. Past radar targets, for comparison to new data, can be found at *http://echo.jpl.nasa.gov/~lance/radar.nea.periods.html*. Slightly different information for Arecibo, e.g., principal investigators and the need for astrometry, is given at *http://www.naic.edu/~pradar/sched.shtml*. For Goldstone, visit *http://echo.jpl.nasa.gov/asteroids/goldstone_asteroid_schedule.html*.

Once you have data and have analyzed them, it's important that you publish your results, if not part of a pro-am collaboration, then in the *Minor Planet Bulletin*. It's also important to make the data available at least on a personal website or upon request.

Note that the lightcurve amplitude in the tables could be more, or less, than what's given. Use the listing as a guide and double-check your work.

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Lightcurve Opportunities

		Brightest				Lightcurve	Data
#	Name	Date	V	Dec	U	Period	Amp
339	Dorothea	10 01.0	12.8	+ 0	2	5.5	0.10
1475	Yalta	10 03.5	14.4	+ 5	0		
41223	1999 XD16	10 04.5	13.9	- 6	0		
493	Griseldis	10 05.9	13.7	+11	0		
11780	1942 TB	10 06.4	14.4	- 7	0		
1405	Sibelius	10 11.9	14.1	+19	0		
917	Lyka	10 13.4	12.7	+14	2	7.92	0.14
1539	Borrelly	10 14.9	13.8	+ 6	0		
1352	Wawel	10 15.1	14.3	+ 7	0		
905	Universitas	10 15.8	12.8	+ 6	2	10.	0.22
2648	Owa	10 16.5	14.4	+18	0		
102	Miriam	10 18.6	10.9	+11	2	15.789	0.08-0.16
1433	Geramtina	10 18.9	14.4	+21	0		
763	Cupido	10 21.2	13.9	+19	0		
4388	Jurgenstock	10 24.4	14.3	+15	0		
271	Penthesilea	10 25.6	13.3	+16	0		
13441	2098 P-L	10 25.7	14.5	+ 5	0		
1160	Illyria	10 25.7	13.9	+25	0		
2118	Flagstaff	10 27.7	14.1	+22	0		
4618	Shakhovskoj	10 29.7	14.6	+32	0		
3285	Ruth Wolfe	10 31.0	14.6	+32	2	3.94	0.20
7517	1989 AD	11 06.2	14.4	+24	0		
1006	Lagrangea	11 06.9	13.6	+35	1	32.8	0.18
5105	Westerhout	11 08.4	14.7	+17	0		
2140	Kemerovo	11 08.8	14.7	+24	2	5.308	0.20
13512	1989 TH1	11 10.8	14.9	+32	0		
1136	Mercedes	11 12.6	13.0	+12	0		
959	Arne	11 12.6	13.2	+17	1	8.60	0.24
5539	Limporyen	11 12.6	14.5	+21	0		