



M100	
NGC4321	RA: 12h 22m 53.1s Dec: +15°49'43"
Other ID: UGC7450	RA: 12h 22m 55.2s Dec: +15°49'23" (Epoch 2000)
Other ID: MCG3-32-15	Azm: 71°20'28" Alt: +31°31'20"
Other ID: MESS100	Rise: 14:38 Transit: 20:40 Set: 02:45
Other ID: PGC40153	Size: 7.5' x 6.4'
Magnitude: 10.2	Position Angle: 30.0

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For subscription purposes this is the second issue of 1998.

On the cover: M100 in celebration of our one-hundredth issue!

International Occultation Timing Association, Inc. (IOTA)

What to Send to Whom

Send new and renewal memberships and subscriptions, back issue requests, address changes, email address changes, graze prediction requests, reimbursement requests, special requests, and other IOTA business, **but not observation reports**, to:

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Send anecdotal stories of lunar grazing occultations to:

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Send Total Occultation and copies of Lunar Grazing Occultation reports to:

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Membership and Subscription Information

All payments made to IOTA must be in United States funds and drawn on a US bank, or by credit card charge to VISA or MasterCard. If you use VISA or MasterCard, include your account number, expiration date, and signature. (Do not send credit card information through email. It is not secure nor safe to do so.) Make all payments to **IOTA** and send them to the Secretary & Treasurer at the address on the left. Memberships and subscriptions may be made for one or two years, only.

Occultation Newsletter subscriptions (1 year = 4 issues) are US\$20.00 per year for USA, Canada, and Mexico; and US\$25.00 per year for all others. Single issues, including back issues, are 1/4 of the subscription price.

Memberships include the *Occultation Newsletter* and annual predictions and supplements. Memberships are US\$30.00 per year for USA, Canada, and Mexico; and US\$35.00 per year for all others. Observers from Europe and the British Isles should join the European Service (IOTA/ES). See the inside back cover for more information.

IOTA Publications

Although the following are included in membership, nonmembers will be charged for:

- Local Circumstances for Appulses of Solar System Objects with Stars predictions US\$1.00
- Graze Limit and Profile predictions US\$1.50 per graze.
- Papers explaining the use of the above predictions US\$2.50
- IOTA Observer's Manual US\$5.00

Asteroidal Occultation Supplements will be available for US\$2.50 from the following regional coordinators:

- **South America**—Orlando A. Naranjo; Universidad de los Andes; Dept. de Física; Mérida, Venezuela
- **Europe**—Roland Boninsegna; Rue de Mariembourg, 33; B-6381 DOURBES; Belgium or IOTA/ES (see back cover)
- **Southern Africa**—M. D. Overbeek; Box 212; Edenvale 1610; Republic of South Africa
- **Australia and New Zealand**—Graham Blow; PO Box 2241; Wellington, New Zealand
- **Japan**—Toshiro Hirose; 1-13 Shimomaruko 1-chome; Ota-ku, Tokyo 146, Japan
- **All other areas**—Jim Stamm; (see address at left)

ON Publication Information

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IOTA News

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This is just a brief account of IOTA activities since the last *ON*; more information about some of the items will appear in future issues.

Meetings: Presentations by IOTA members were given at the following meetings; let me know if you know of other presentations that should be mentioned. This is important for spreading information about our interesting work to members of the larger amateur and professional astronomical community (and even the general public), too many of whom have little idea of what we are doing or know how they might be able to contribute. It is critical that we work to dispell the myth that occultations are "too hard!" I have video and viewgraphs that can be used by others for these presentations; they are described in the video item on IOTA's lunar occultation Web site. All of the meetings described below occurred during 1999. *NASA K-12 Education Workshop for Scientists, Engineers, & EPO Leads*, April 11-13, Boulder, Colorado: I gave a poster presentation, and brief oral description to the meeting, "Camcorder Observation of Bright Star Eclipses." I found out that space education efforts are not as well-organized and networked as I had hoped. But I made some valuable contacts during the meeting. An editor for the nationwide *Physics Teachers Journal* at the meeting asked me to prepare an article for an early 2000 issue.

Annual IOTA Meeting, April 17-18, Denver, Colorado: This meeting was as large as the one in Nashville in September 1998 (see p. 34 of the last issue), with also the draw of a good weekend grazing occultation of Aldebaran. Richard Nugent has written minutes of this graze, but I have not had time to amend what he wrote; that will be done for the next issue. The meeting was very successful, as was the graze at Kiowa, about 50 miles southeast of Denver. Bob Sandy is working on the report and reduction profile for that event (for all 7 known successful expeditions from Oregon to Oklahoma); if you have not sent your data to him, please do so for completing what will certainly be an interesting profile. A special notice about the meeting was distributed to the IOTA membership about a month before it took place.

I.A.P.P.P. Conference, May 27, Lake Arrowhead, Calif.: Derald Nye gave a presentation about IOTA's work, to which I was able to add when I arrived during his presentation.

Riverside Telescope Makers Conference, May 29, Camp Oaks, Calif.: I gave a half-hour tent presentation, a late addition to the schedule when I found out only a couple of weeks in advance that I would be in California on business just before the meeting and could work it into my schedule, as was also the case for the IAPPP conference.

Astronomical Society of the Pacific—Universe '99, Toronto, Ontario, July 3-6: I gave two presentations and two poster presentations (on video observations of lunar occultations, and asteroidal occultations), with help from Guy Nason (who provided equipment for showing video) and Brad Timerson. The ASP provided significant financial support for this meeting, whose theme was amateur—professional cooperation in astronomy, or "Partners in Astronomy."

Astronomical League annual convention, Cheney, Washington, July 10-13: Derald Nye gave a presentation about IOTA.

Asteroids, Comets, Meteors Conference, Ithaca, New York, July 26-30: My employer, Johns Hopkins Applied Physics Laboratory, supported my travel for this meeting, it being important for our work with the Near Earth Asteroid Rendezvous (NEAR) mission. I gave a talk, "Asteroidal Occultation Recent Results," describing the large, comprehensive worldwide database of observations of these events that we have placed on the <http://sorry.vse.cz/~ludek/mp/world> web site with help from Ludek Vasta and Jan Manek. The talk was an update of a similar talk that I gave at the *American Astronomical Society—Division for Planetary Sciences* meeting, Madison, Wisconsin, in October 1998. But in Ithaca, I presented mainly new work, showing how the model of Eros determined from NEAR's flyby in December 1998 must modify the published analysis of the 1975 January occultation of kappa Geminorum, and a preliminary analysis of observations of the July 2 occultation by (41) Daphne observed in the Netherlands, Belgium, France, and Spain. The asteroidal occultation work is progressing well, thanks to efforts by high school students who have worked and are working with me on this in mentor programs, Peter Lindahl and more recently, Danny Pan.

18th European Symposium on Occultation Projects, organized by the European Section of IOTA, was held in Stuttgart, Germany, August 5-11. It was the largest meeting devoted entirely to occultations ever held, with the August 11th solar eclipse bringing participants from as far away as Taiwan and Australia, as well as 12 from the U.S.A. We will publish the abstracts of talks given there soon. Unfortunately, it rained in Stuttgart during the eclipse, and most of the participants missed totality due to thick clouds in an unsuccessful attempt to find breaks in the mostly cloudy weather. A few had left for Turkey and Iran, where clear skies prevailed. Also lucky were 11 of the Americans (including myself), who found breaks in the clouds to get a good view of totality near both the northern and southern limits. Some Germans were also successful, including Reinhold Buechner at a site near the northern limit. Richard Nugent videorecorded the eclipse near the southern limit in Turkey. The next ESOP meeting will be held in Lodz, Poland, in August 2000.

Solar Eclipse Symposium, Research Amateur Astronomy in the VLT Era, Garching (near Munich), Germany, August 7-13. On August 8th, Wolfgang Beisker (IOTA/ES) gave a talk on planetary occultations, and on the 9th, I talked about observing eclipses from near the path edges, but also managed to briefly describe IOTA's work with videotaping lunar occultations with camcorders, and asteroidal occultation results in my half-hour presentation. The meeting was held at the European

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Southern Observatory headquarters in part to commemorate the first observations made with their Very Large Telescope array on Mt. Paranal in Chile.

Remote Video Graze Observations: With the difficulty in getting observers for local graze expeditions, for recent grazes, I have set up a telescope with its own camera, recorder, and clock drive, then drove to another site to time the graze either visually or with video. For two events in November and one in March, complete, or nearly complete, data were obtained at the unmanned site. At first, the separation was 200m, but for the last two events, the separation was about a mile (1.6 km), getting well-separated chords on the lunar profile. An example is shown on the videotape mentioned at the beginning of this article.

Solar eclipses: Besides the success with the August 11th eclipse described in the ESOP meeting item above, the February 16th annular eclipse was videotaped under clear skies near both limits near Geraldton, Australia, by Derald Nye and by German and Australian observers. It inspired David Herald to write PC software (to supplement Occult) that will facilitate the reduction of past solar eclipses as well as future ones.

Regulus occultation, May 21-22: As far as I know, this was the best recorded occultation, in terms of timings more accurate than visual timings, with at least 70 videorecordings obtained. Most were by amateur astronomers using the inexpensive PC23C camera at sites spread across the U.S.A., with a few also in Canada. Several direct camcorder observers were also made. But the event could have been much more extensively covered if the event had been given coverage by the mass media in areas where it was clear. I thank Steve Maran, the American Astronomical Society's press officer, for widely distributing IOTA's announcement about the occultation to media outlets. A reporter from Reuters interviewed me by phone and issued their own press release, which was widely picked up, including by CNN, which placed a good article about the event in their space news section of their Web site. CNN phoned me about the event, expressing an interest in covering the event on their broadcast, which I strongly encouraged them to do *before* the event. Unfortunately, things heated up in the war in Yugoslavia that week, and nothing about the event was broadcast. The local newspapers and TV stations in the Washington—Baltimore area also gave the event no coverage in spite of my special messages to them. A disk jockey at an FM radio station in Chicago became interested in the event, and even arranged to rebroadcast WWV to facilitate timing the event, but it rained across their listening area.

Kent Okasaki, Jim Miller (a colleague at JPL who works on NEAR navigation), and a friend drove about 700 km down the Baja California peninsula to the southern limit of this event to successfully time the last accessible graze of a 1st-magnitude star visible from North America until 2005. Jim pointed his camcorder into the eyepiece of a 4-inch telescope borrowed from coworker Bill Owen to successfully record 3 disappearances and 3 reappearances.

XZ80P: Mitsuru Sôma completed the XZ80P catalog just barely in time for the 1999 grazing occultation predictions. It promises more accurate predictions, especially for grazes, since for most of the stars, especially the bright ones, data from the accurate Hipparcos catalog have been used, with ACT data being used for most of the others of the original XZ (star numbers X00001 - X32221). Dr. Sôma also used the Hipparcos components catalog to add and update the data for dozens of close double stars, creating a modified version of the double star file (dsfile.dat) that would be compatible with XZ80P. For completeness, Dr. Sôma appended the data from XZ94F for the stars with X numbers higher than 32221, but he did not have time to correct the identification and stellar duplicity errors of XZ94F. The catalog, a thorough description of it, and the dsfile can be downloaded from the Czech Web site maintained by Ludek Vasta at <http://sorry.cse.cz/~ludek/mp> along with some other catalogs, including Edwin Goffin's combined catalog used for the 1999 and 2000 asteroidal occultation predictions.

Concurrently, Wolfgang Zimmermann has updated his version of XZ for the 2000 PC-Evans predictions, so it will be useful to compare his and Dr. Sôma's work. Also, Wayne Warren and I hope to add to XZ many thousands of stars from a Zodiacal subset of our version of Edwin Goffin's catalog that includes identifications from the PPM catalogs and many dozens of errors corrected by comparison with the Goddard Space Flight Center's Sky2000 catalog. We hope to complete this in time to incorporate into Occult for the 2000 total occultation predictions. It is of less use for grazing occultations, since few observers try to observe grazes of stars fainter than mag. 8.5, and XZ80P is virtually complete to that magnitude.

2000 Predictions: Since XZ80P is good enough as it is for graze predictions, Eberhard Riedel is generating the Grazereg datasets needed for the 2000 predictions, and we should be able to distribute that to the graze computers around November 1, about a month earlier than we did last year. So there should be less of a mad scramble to get the predictions completed before the year-end holidays than has been the case the last few years, and hopefully most of you will receive your data in good time before January 1.

The new year starts with a bang for observers in the eastern U.S.A., especially in Florida, so if you might be in the area then, let us know so that you might join the observational effort. First, on the morning of Jan. 2, an occultation of 3.9

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mag. γ Librae by the 16% sunlit Moon will be visible from the eastern half of the USA. The dark-side reappearance of this close double star will be spectacular as seen with binoculars or (better) with most camcorders. The dark-side southern-limit graze passes over the Houston, Texas area shortly after moonrise (but will be observable there if the sky is free of clouds), then crosses the Gulf of Mexico to just barely miss the southwestern tip of the Florida peninsula. At 5:10 AM EST, the path will cross the Keys, and Hal Povenmire and I will lead an expedition there (near Long Key) to record the spectacle from as many stations as possible.

At about 3:11 AM EST the next night (Monday morning, Jan. 3), the 90 km asteroid Cheruskia will occult the 6.4 mag. Star 14 Monocerotis (SAO 114085), the nominal path crossing the central Florida peninsula, as well as northern Mexico. Cheruskia will be 12 mag., so if an occultation occurs, there should be a 6 mag. drop in brightness with a predicted central duration of 8 seconds. This is the second-brightest star predicted to be covered by an asteroid in North America next year. The brightest will be the 3rd-mag. red giant star μ Geminorum on Nov. 20 along a narrow path passing from southern Manitoba to North Carolina, but more information on it will be given later.

IOTA Web site in Maryland: Ray Sterner has worked with me to set up a small Web site at <http://iota.jhuapl.edu>. It is mainly intended for giving the latest information and details about occultations and expeditions in the Mid-Atlantic States region, but we sometimes put finder charts and asteroidal occultation updates, especially for North America, there sooner than they can be put on the larger, more established IOTA Web sites listed at the back of this issue, which should remain the main source of information about occultations and IOTA.

Future Meetings: The next (2000) meeting of IOTA will probably be held in or near Kansas City; Rob Robinson would prefer to have it in June, probably along with the regional meeting of the Astronomical League. But we will soon examine the predictions for the better occultations in 2000 to see if there might be something to aim for. With no first magnitude occultations in accessible areas, it is less likely that an occultation will be a main driver for the 2000 meeting. We will probably decide by the time the next issue is distributed.

IOTA will have some presence at Astrocon 2000, which will be held in Ventura, California, July 19-22. Other participating organizations include the Astronomical League, ALPO, IDSA, and others. For more, see the Ventura Astronomical Society's Web site at <http://www.vcas.org>.

Accessories Needed to Use the PC23C Video Camera

David Dunham, Dunham@erols.com

Items needed from Radio Shack and others to use the US\$80.00 PC23C camera from Supercircuits (www.supercircuits.com) are listed below; the sum of these items is likely to match or exceed the cost of the PC23C, depending on what you buy:

Radio Shack

Item No. Description

278-254 Phono-to-BNC Adapter - allows use of ordinary RCA (phono) lines from the PC23C to your VCR or camcorder.

270-1528D Universal DC Power Cord - 12V DC power cord to use with car cigarette lighter or Portapac battery. Of the 5 Adaptaplugs included, use the blue one; IT IS VERY IMPORTANT that you connect the Adaptaplug to the Adapter Sleeve so that the Tip polarity is positive (+), as shown in item 3 of the instructions on the back of the Universal DC Power Cord box.

----- Male C-mount to 1.25-inch eyepiece adapter Sold by Adirondack Video for about \$35.00; toll-free 1-888-799-0107 (this adapter is simpler, less expensive, much smaller, and useful for more telescopes than the Celestron back to T-adapter, and T to C adaptor sold by Orion and a few others).

Also needed or useful:

?? 2 phono to phono (RCA) cables, to transmit the video and audio signals from the PC23C to your VCR. If you have a camcorder with VCR input capability, it probably was already sold with such cables, since they are needed for the camcorder output. But if you have a regular VCR (or one of the portable VCR-TV combinations) rather than a camcorder, then these cables are probably not provided and you need to buy them separately.

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270-1550A Car lighter-socket 3-outlet adapter. This allows you to provide 12-volt DC power to your PC23C, your telescope drive, and (if you're not using a separately-powered camcorder) a portable VCR from your car cigarette lighter. In order to work, you need to push the plugs in hard until they seem to snap in place and are snug. DON'T get the 1 to 2-outlet cable adapter. It is very unreliable.

----- Portapac 5 amp-hour 12V battery, available for about \$60.00 Optics, phone orders 1-800-569-4323. This can easily power your PC23C and/or your telescope drive. One of these could power the PC23C, and you could use your car battery to power your telescope drive. Since the Universal DC power chord mentioned above is not very long, it's useful to have a power source close to the camera; this makes it more convenient than using the car lighter socket 3 outlet adapter and your car battery. You might be able to find other small 12V batteries locally, such as motorcycle batteries; I have found the Portapac to be convenient and reliable for several years use, unlike the larger 12 amp-hour Portapac, two of which I bought in the past that died after only about a year's use.

[Editor's note: Our local group purchased a 90 amp-hour 12V deep-cycle marine battery for \$45.00 at a battery chain store. They are also available at most department stores that sell car batteries and automotive parts stores. Our video system uses about 3 amps giving us about 30 hours of operation. We can also power a telescope and a notebook computer and have no trouble for an entire 12 hour long winter night of observing. There are larger and smaller versions of the same battery.]

----- Portable VCR - 9-inch TV combination: These are the cheapest battery-powered VCR's that we have found; units such as those by Orion and RCA sell for \$300.00 at Walmart, and similar units by other manufacturers are available elsewhere. I have found them for \$200.00 at a local wholesale discount store. But they are too big to take on airplane trips. If you plan that, then either a camcorder with VCR input capability (cheap ones don't have that; the least expensive with it are about \$700.00), or a small portable VCR (the least expensive being about \$400.00 from Supercircuits, but then you also need a monitor).

----- Statpower Pocket Power Inverter - Model III, available from some marine supply stores and companies, cost about \$120.00. Similar power inverters might be available from local stores. They can be used for any device that needs AC power - it has a car cigarette lighter male plug for 12V DC power input, and outputs (via a standard grounded outlet) standard 120V AC power, 60 Hertz. Be careful when using inverters in the field - if they are not properly shielded (wrapping the lines with aluminum foil can help), they can create loud static on your shortwave radio.

[Editor's note: Tripp Lite makes the PowerVerter in two models: 140 Watts with one outlet for about \$45.00 and 300 Watts with two outlets for about \$65.00. They are about twice the size of the little video cameras that we all use. They are also very quiet as far as electrical interference goes. All of our local group uses Tripp Lite inverters for that reason and that they are inexpensive. <http://www.triplite.com> Also check local computer stores.]

Other items on the IOTA Web site at www.lunar-occultations.com/iota give some additional tips and information about video recording occultations. This information can change, especially prices, as new products become available.

Grazing Occultation Observations

Mitsuru Sōma
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The table is a continuation of the one given on p. 17 of *ON* Vol. 7, No. 3 (November 1998) and lists all successful or partly successful expeditions for lunar grazing occultations that I received and that have not been reported in the past *ON*.

Please send reports of all lunar grazing occultations to me, preferably in ILOC's 80-column format (as attached files when sent by email) or in IOTA's email76 format by email or on 3.5 inch floppy disk. I can also accept other reasonably well organized formats giving complete information about the station coordinates (longitude, latitude, and height above sea-level, as well as the reference geodetic datum) and timings. Shifts from the predicted profile or other values such as % S_{nl} and CA no longer need to be given in the reports since I can calculate them. Be sure to indicate to whom copies of your report have been sent. When ILOC is not included there, I will copy your report and send it to ILOC.

Lunar Grazing Occultation Observations

Date Mo Dy V	Star XZ/ZC	Numbers SAO	Star Mag	% SnI	CA	Location	Sta	# Tm	S cm	AP	Organizer	Shift "	WA o	b o
1979														
04 20	ZC 3019	163783	5.8	43-	+5S	Gum Tree, VA, USA The above line is a revision of the same graze given in Vol.2, p.68.	10	54			D.W. Dunham	0.0	187	-3.3
1987														
06 16	X 30038	164632	8.5	76-	+12N	Poltava, Ukraine	1	3	1	20	B. Sincheskul	0.2S	350	+5.6
1990														
03 15	X 20584	182852	7.6	82-	+8S	Poltava, Ukraine	1	4	1	20	B. Sincheskul	0.1N	193	+7.5
1991														
07 06	ZC 336	92873	7.4	30-	+5N	Lubny, Ukraine	5	10	1	11	Nikolay Buromsky	0.0	357	-5.6
1992														
03 10	X 5326	76445	9.4	36+	+3S	Poltava, Ukraine	1	3	1	20	B. Sincheskul	1.0S	177	-3.0
1995														
04 04	ZC 593	93721	5.9	16+	+8N	Satte, Saitama, Japan	10	35	2	7	Shigeo Uchiyama	0.2N	12	+3.3
04 04	The above line is a revision of the same graze by organizer N. Suzuki given in the last issue (p.17).													
04 04	ZC 593	93721	5.9	16+	+8N	Hanamaki, Iwate, Japan	4	21	1	8	Masayuki Yamamoto	0.1N	12	+3.3
04 23	ZC 3172	145583	7.7	32-	+3N	Shinchi, Miyagi, Japan	2	12	3	16	Masayuki Yamamoto	0.1S	0	-5.6
05 05	ZC 1091	96611	6.5	27+	+5N	Hanamaki, Iwate, Japan	11	34	1	16	Masayuki Yamamoto	0.0	9	+7.2
08 19	ZC 764	94332	4.9	32-	-2N	Ivankiv, Ukraine	5	10	1	11	Nikolay Buromsky		2	+5.7
1997														
10 19	ZC 667	93950	5.0	87-	+12N	Navarre, OH, USA	4	19	1	15	David Gill	0.0	354	+7.2
11 19	ZC 1235	97636	7.3	72-	+9N	Kogota, Miyagi, Japan	5	27	1	10	Atsushi Miyamoto	0.0	352	+5.0
1998														
01 09	V ZC 671	93957	3.4	88+	+1S	Ryugasaki, Ibaragi, Japan	3	6	1	20	Atsushi Miyamoto	0.1S	170	+7.1
02 19	ZC 2245	159461	6.3	53-	+7S	Palm Bay, FL, USA	1	10	3	41	Hal Povenmire	0.5N	187	-6.3
03 22	ZC 2773	162130	6.2	38-	+8S	Holly Hill, SC, USA	1	4	2	15	Hal Povenmire	0.0	190	-4.9
04 03	ZC 943	95397	6.6	41+	+4N	Marathon, FL, USA	1	7	1	15	Hal Povenmire	0.0	5	+6.4
06 17	X 55	128576	8.3	46-	+1S	Mangalore, Vic., Australia	1	1	1	15	Jim Blanksby		183	+2.6
07 19	V ZC 692	94027	0.9	16-	+2N	Enbetsu, Hokkaido, Japan	1	8	3	25	Yasuo Sano	0.2S	352	+7.3
08 17	ZC 943	95397	6.6	19-	+6N	Iwaki, Fukushima, Japan	1	2	2	16	Masayuki Yamamoto	0.2N	349	+6.3
09 01	ZC 2658	161376	5.8	72+	+5S	Rochester, Australia	1	5	2	15	Jim Blanksby	0.1S	177	-6.0
09 12	ZC 692	94027	0.9	58-	+9N	Mount Clare, WV, USA	1	2	1	15	Hal Povenmire	0.1S	351	+7.3
09 12	ZC 692	94027	0.9	58-	+9N	Ardel, WV, USA	2	10	1	20	David Gill	0.1S	351	+7.3
09 12	ZC 692	94027	0.9	58-	+9N	Bedford, PA, USA	2	9	2	10	Richard Taibi	0.1S	351	+7.3
09 12	ZC 692	94027	0.9	58-	+9N	Great Barrington, MA, USA	3	12	15	Phil L.Dombrowski	0.1S	351	+7.3	
09 12	ZC 692	94027	0.9	58-	+9N	Bedford, PA, USA	1	0	11	Jeff Guerber	0.1S	351	+7.3	
09 12	ZC 692	94027	0.9	58-	+9N	Nescopeck, PA, USA	1	10	20	John Kmetz	0.1S	351	+7.3	
09 12	X 6281	94187	7.2	55-	+8N	Iwanuma, Miyagi, Japan	4	34	1	13	Atsushi Miyamoto	0.1S	352	+7.3

International Occultation Timing Association, Inc. (IOTA)

Date	Star	Star	Star	%	CA	Location	Sta	#	S	Ap	Organizer	Shift	WA	b		
Mo Dy	V	XZ/ZC	SAO	Mag	Sn1	O		Sta	Im	S	cm	"	O	O		
09 12	X	6281	94187	7.2	55-	+8N	Iwanuma, Miyagi, Japan	4	34	1	13	Atsushi Miyamoto	0.1S	352	+7.3	
09 12	X	5974	94056	8.4	58-	+8N	Ardel, WV, USA	2	12	1	20	David Gill	0.1S	352	+7.1	
10 11	V	X	8698	95475	7.3	62-	+12N	Welcome, TX, USA	1	2	2	13	Wayne Hutchinson	0.4S	349	+5.9
10 24	ZC	2497	160474	6.5	17+	-0S	Bladen, GA, USA	2	10	1	15	Hal Povenmire	0.1N	177	-5.5	
10 27	X	26466	162237	8.5	35+	+4S	Mims, FL, USA	1	3	1	15	Hal Povenmire	0.1N	177	-4.0	
10 30	ZC	3206	164713	5.1	67+	+3S	Neveda, MO, USA	2	14	1	15	Robert Sandy	0.1S	178	+0.4	
11 05	ZC	671	93957	3.4	95-	-21S	Barcelona, Spain	12	36	3	10	D.Fernandez-Barba	0.1S	172	+7.1	
11 06	ZC	836	94649	5.7	88-	+14N	Barcelona, Spain	2	2	2	8	D.Fernandez-Barba	0.1S	351	+6.4	
11 11	X	14686	98730	7.1	46-	+2N	Islamorada, FL, USA	1	1	1	15	Hal Povenmire	0.2S	356	+0.5	
11 14	V	ZC	1749	119245	6.0	18-	+2N	Elmont, KS, USA	2	14	1	25	Craig McManus	0.6N	177	-3.9
11 23	V	X	26079	187444	8.8	13+	+1S	Netawaka, KS, USA	1	5	1	25	Craig McManus	0.0	182	-4.1
12 12	ZC	1821	138917	3.6	33-	+2S	Winnipeg Beach, MB, Canada	2	4	2	20	Jay Anderson	0.0	178	+0.3	
12 23	V	ZC	3177	164600	5.9	19+	+4S	Sendai, Kagoshima, Japan	1	6	1	10	Tsutomu Hayamizu	0.0	178	+0.3
12 23	ZC	3177	164600	5.9	19+	+4S	Kadogawa, Miyazaki, Japan	4	23	2	7	Atsushi Kisanuki	0.0	179	+0.3	
12 23	ZC	3177	164600	5.9	19+	+4S	Hamajima, Mie, Japan	1	5	3	20	Miyoshi Ida	0.0	179	+0.3	
12 28	ZC	364	110543	4.3	75+	+3S	Beja, Portugal	1	2	1	8	Rui Goncalves	0.0	171	+7.1	
12 29	ZC	405	110723	4.3	78+	+4S	Lake June, FL, USA	3	14	1	15	Chris Stephan	0.2N	169	+6.8	
1999																
01 26	ZC	491	93416	6.0	64+	+5S	Rincow, GA, USA	1	7	2	15	Hal Povenmire	0.0	174	+7.1	
01 26	ZC	635	93868	3.7	74+	+7S	Kingsland, GA, USA	3	16	1	15	Hal Povenmire	0.0	170	+7.0	
01 28	ZC	832	94628	4.3	86+	+7N	North Canton, OH, USA	1	7	1	20	David Gill	0.3N	2	+6.3	
02 21	V	ZC	3453	110616	7.5	30+	+4S	Naganuma, Hokkaido, Japan	1	6	2	20	Shin-ya Watanabe	0.3S	179	+7.1
02 23	V	ZC	669	93955	3.8	53+	+4S	Shizunai, Hokkaido, Japan	2	24	1	7	Shin-ya Watanabe	0.1S	175	+6.9
02 23	ZC	669	93955	3.8	53+	+4S	Taiki, Hokkaido, Japan	4	17	2	7	Shin-ya Watanabe	0.1S	176	+6.9	
02 23	V	ZC	669	93955	3.8	53+	+4S	Niikappu, Hokkaido, Japan	2	9	1	20	Shin-ya Watanabe	0.1S	175	+6.9
02 24	V	ZC	814	94554	5.4	64+	+4S	Atsuta, Hokkaido, Japan	2	13	3	20	Shin-ya Watanabe	0.0	173	+6.3

The Role of Amateurs in Astrometry

Martin Federspiel, martin@astro.unibas.ch

Astronomisches Institut

Dear David and Jan,

Below I copy you an extract from two emails which concern the role of amateurs in the astrometry business. The topic is that I clearly see that the USNO positions are of a quality that is currently not reached by amateurs or even semi-professionals. Compared to the professional standard in astrometry a few years ago the results of amateurs are amazing. On the other hand as I experience now in the occultation prediction business amateur observations have to be discarded in most cases when USNO astrometry is available. This can cause a motivation problem, unless amateurs learn to reach the USNO quality level which Ron thinks is possible. I am not so sure about that because to my opinion this requires telescopes of the 50 cm class which is above the normal amateur standard. In addition, the results of Fiona Vincent and Angel Lopez show that there currently is a one order of magnitude difference in the accuracy achieved.

Best regards, Martin

Dear Ron,

Many thanks for your recent astrometry of several asteroids and target stars. I processed most of the data and calculated updates for the respective events; the emails were also copied to you. From the analysis of the Abnoba data I could clearly see that the quality of the USNO data is unsurpassed. Even many (amateur) measurements at the 0.2"-0.3" accuracy level are rather useless if your measurements are available! This is a serious problem because amateurs could lose their motivation. People are spending their time making measurements and in the end I have to tell them that I didn't use their data to get an accurate as possible result.

Best regards, Martin

Dear Martin,

Thanks for the update. We are always pleased when our data is used. Concerning 52 Europa, we will be observing the GSC star before the event. We try to observe occultation stars which are not in the Hipparcos/Tycho catalogs, since accurate positions for these stars are certainly needed to make their occultation predictions. Thanks for sending us accurate catalog positions for occultation stars. It saves us a lot of time looking them up in the various older catalogues (e.g. PPM, SAO, GSC, TAC).

I have been following the occultation email closely hoping that more amateurs would get into the business of making observations using the ACT catalog. Unfortunately, very few professionals are interested in this line of work, and even our program could be cut back at any time. There is no reason why amateurs could not make these observations with accuracies comparable with those of the FASTT, because there are many reasonably priced CCDs on the market today that amateurs could use, and the reduction software can be purchased as well. In some ways, our program has hurt the occultation community in that our success has caused others providing astrometry to quit their efforts. Ideally, amateur astrometry could complement our efforts and give you the benefit of more high quality data, and in particular, amateurs could with equatorial telescopes observe off the meridian which is a definite advantage over our program. I hope they will upgrade efforts and eventually join in a bigger way. After all, we could go off line in the future, depending on priorities set by the higher ups at the observatory. There is no worry at this point. Somehow, amateurs need to be encouraged, a topic David, Jan, and you might bring up at occultation meetings and in newsletters.

With best regards, Ron

Martin,

I agree basically with what you say. I think the main role of amateur astrometrists is that they can provide preliminary ACT-relative observations when USNO and/or TMO data are not available (for example, due to being off the meridian or not compatible with TMO's tighter schedule), and can provide rather high-accuracy "last-second" astrometry when the objects are in the same CCD field. Gordon Garradd has had fairly good success with the latter. The astrometrists might be cautioned that non-last-second astrometry is not worthwhile as long as USNO and/or TMO data are available for the event. Most amateur astrometrists either have too small a field of view for an adequate net of ACT stars, or if their field is large enough, then their resolution and accuracy is not so good because their aperture is too small.

David

IOTA's Mission

The International Occultation Timing Association, Inc. was established to encourage and facilitate the observation of occultations and eclipses. It provides predictions for grazing occultations of stars by the Moon and predictions for occultations of stars by asteroids and planets, information on observing equipment and techniques, and reports to the members of observations made.

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IOTA European Section (IOTA/ES)

Observers from Europe and the British Isles should join IOTA/ES, sending a Eurocheck for DM 40,00 to the account IOTA/ES; Bartold-Knaust Strasse 8; D-30459 Hannover, Germany; Postgiro Hannover 555 829-303; bank-code-number (Bankleitzahl) 250 100 30. German members should give IOTA/ES an "authorization for collection" or "Einzugs-Ermaechtigung" to their bank account. Please contact the secretary for a blank form. Full membership in IOTA/ES includes the supplement for European observers (total and grazing occultations) and minor planet occultation data, including last-minute predictions, when available. The addresses for IOTA/ES are:

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International Occultation Timing Association, Inc. (IOTA)

IOTA on the World Wide Web

(IOTA maintains the following web sites for your information and rapid notification of events.)

IOTA Administrative Site

<http://www.occultations.org>

This site contains information about the organization known as IOTA and provides information about joining IOTA and IOTA/ES, topics related to the *Occultation Newsletter*, and information about the membership—including the membership directory.

IOTA Asteroidal and Planetary Occultations Site

<http://www.anomalies.com/iota/splash.htm>

This site contains information on asteroidal and planetary occultations and the latest information on upcoming events and how to report them.

IOTA Lunar Occultations and Eclipses Site

<http://www.lunar-occultations.com>

This site contains information on lunar occultations and eclipses and the latest information on upcoming events. It also includes information explaining what occultations are and how to report them.



IOTA's Telephone Network

The Occultation Information Line at 301-474-4945 is maintained by David and Joan Dunham. Messages may also be left at that number. When updates become available for asteroidal occultations in the central USA, the information can also be obtained from either 708-259-2376 (Chicago, IL) or 713-480-9878 (Houston, TX).