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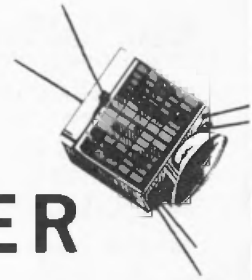

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Copy Deadline for next issue is 1 May 1978

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COVER PICTURE

Delta rocket #139 carrying the AMSAT-OSCAR 8 spacecraft rises majestically into the sky on March 5 while radio amateurs around the world wait with baited breath.
-NASA Photo-

CONTENTS

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FROM THE EDITOR

AN APOLOGY

The Area Coordinator Update in the December Newsletter showed that K6PGX was appointed as an Area Coordinator for California. Unfortunately, this was interpreted to mean that K6PGX was replacing W6CG. This was not and is not the intent of that announcement. W6CG is doing a good job and by virtue of his efforts has generated more than enough work for himself. Thus, K6PGX is serving as an additional Area Coordinator for California. As Editor of the AMSAT Newsletter, I take the responsibility and blame for the error.

AMSAT-OSCAR 8 INFORMATION

The American Radio Relay League is now handling the distribution of all QSL cards, report forms, publicity, photos and information on the new AMSAT-OSCAR 8 spacecraft. Write ARRL OSCAR Operations, 225 Main St., Newington, Conn. 06111 U.S.A., telephone (203) 666-1541. AMSAT Area Coordinators may also contact ARRL directly for AMSAT supplies and materials.

AMSAT-OSCAR 8 OPERATING NOTES

Current plans are to operate the spacecraft in Mode A during the week and Mode J during weekends. Wednesdays are reserved for pre-arranged experiments only, with scheduling handled by Bernie Glassmeyer, W9KDR at ARRL Hdq. It will take a few weeks to determine more exact orbital parameters of the spacecraft. Thus, all data published to date including that in this newsletter should be regarded as provisional.

Stay tuned to the AMSAT Nets for up-to-date information. We expect that AMSAT will publish an orbital calendar on AMSAT-OSCAR 8 to be available through Skip Reymann, W6PAJ around the end of May (see the anouncement on page 23).

PHASE III COMMUNICATIONS CHANNELS

When the first Phase III spacecraft becomes operational, a whole new world will open up to radio amateurs. For the first time, reliable communication paths will be open for point-to-point and multi-point contacts. Conventional contacts are subject to on-channel and adjacent-channel spill-over interference. The advantages of using the Phase III satellite for "nets" or "roundtables" will soon be noticed by the users, and it is expected that these types of contacts will form a common use of the satellite. One possibility might be to reserve four specific channels for SSB net use. These channels could be at the top of the SSB section of the downlink passband and spaced 5 KHz apart. Thus, stations using the channels (A, B, C, and D where A is the highest frequency channel)would be guaranteed QRM-free links (no adjacent spill-over and no on-channel) for network communications. The remainder of the SSB passband would be available for regular random frequency contacts. Channel A could also be used as a calling channel, with stations moving off frequency once contact is established. Nets would share the channels on a time of day basis, similar to current HF usage. The allocation of times and channels to nets would be handled by the operations side of AMSAT. If you have any comments on the reservation of channels on the Phase III passband, why not write in and share them.

Joe, G3ZCZ

MODIFICATION OF THE SATELLABE III
FOR USE WITH OSCAR-8

BY KAZ DESKUR, K2ZRO

The original Satellabe[1] was designed for AMSAT-OSCAR 6 and 7 and is not directly applicable for AMSAT-OSCAR-8. The device can, however, be easily modified for A-O-8 or any other satellite traveling in a virtually circular orbit by following the instructions in this article.

Although only pre-launch orbital parameters of A-O-8 were known when this was written, the expected deviation from the predicted orbit is most likely to be so slight that the accuracy of the Satellabe should not be affected to any appreciable degree. The modification of the Satellabe is a project lasting no more than one hour.

The parameters used are:

PERIOD - 102.76 min.
INCLINATION - 99 degrees
ALTITUDE (average) - 872 km; 542 miles

MODIFICATIONS

1. Scale #1, "THE MAP", and Scale #2, "THE EQUATORIAL CROSSING TIME", need no changes. They are applicable for any satellite.

2. Scale #3, "INDEX SCALE", must be modified to represent equatorial progression of (P/4) degrees which for OSCAR 8 is 102.76/4 ≈ 25.7 degrees.

Procedure:

Line up 0 degrees longitude on the equator of the map against No. 1 index mark of Scale#3 as shown on Fig. 1. Draw a new set of index marks separated 25.7 degrees apart. (For this purpose, use Table I.) Since Scale#3 is dark, it is recommended that you use a light background. Self adhesive circles work very well.

TABLE 1

INDEX#	DEGREES	INDEX#	DEGREES
1	0.0	9	205.6
2	25.7	10	231.3
3	51.4	11	257.0
4	777.1	12	282.7
5	102.8	13	308.4
6	128.5	14	334.1
7	154.2	15	359.8
8	179.9		

3. Scale #4, "PRECISION TIME SCALE", will not be used. (Precise period must be known to make this scale accurate).

4. The new earth track will be superimposed on the existing transparent slider.

Procedure:

Line up the reference line of the "old" OSCAR 7 track against 340 degrees longitude on the equator. (See Fig. 2) Starting at 0 degrees longitude and 0 degrees latitude, "eyeball" the positions of the time marks on Fig. 2 and duplicate them on the slider. Make sure that the slider doesn't move during this operation. Time marks are spaced at 2 min. intervals. If more accuracy is desired, use Table II.

[1] "Shoot OSCAR with a Satellabe", by Kaz Deskur, 73 Magazine, July 1975, pp.33-44 (reprinted in AMSAT Newsletter, March 1976.) The Satellabe III is available assembled from Ham Radio, Greenville, N.H. 03048 for $7.95 postpaid.

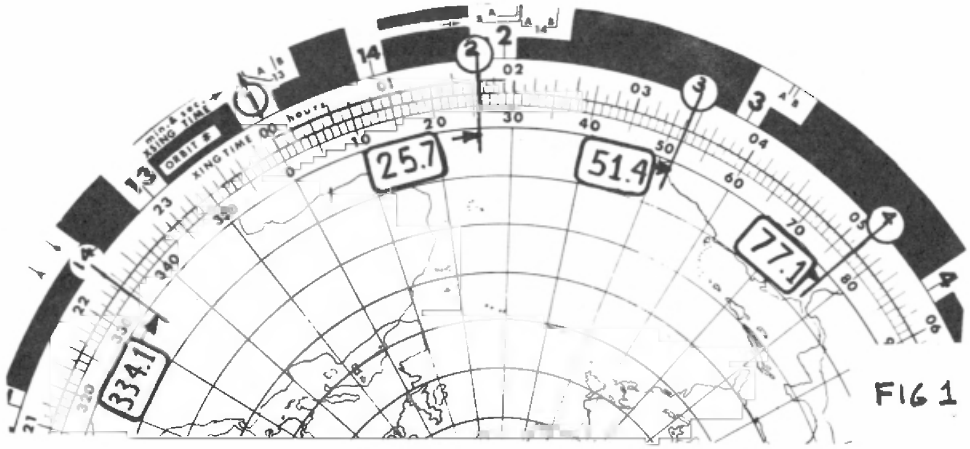


FIG 1

Add the reference line extending the 0 degrees meridian about 1/8 inch into the index scale.

Probably the best pen for this job is a popular marking pen sold in most art stores under the brand name of "SHARPIE", manufactured by Sanford's. It won't rub off, is very water-resistant, but it can be removed very easily with nail polish remover.

TABLE II

Time After EQX	LAT.	LONG.	Time After EQX	LAT.	LONG.
0	0	0	26	81.0	102.1
2	6.3	1.6	28	78.1	138.6
4	13.8	3.3	30	72.7	157.0
6	20.7	4.9	32	66.5	169.0
8	27.6	6.7	34	59.9	172.6
10	34.5	8.5	36	53.2	176.7
12	41.3	11.3	38	46.4	179.7
14	48.1	13.8	40	39.6	182.5
16	54.9	17.0	42	32.7	184.4
18	61.6	21.3	44	25.9	186.8
20	68.1	28.0	46	19.0	188.5
22	74.1	39.6	48	12.1	190.2
24	79.1	61.7	50	5.2	191.8
			52	-1.7	193.4

5. Azimuth-Elevation Overlay

The existing overlay can be used unmodified with the following exception: The elevation range must be read 10 DEGREES LOWER. Namely, the 10 degree range of OSCAR 7 will become 0 degrees elevation (limit of accessibility) of A-O-D; 20 degrees on the existing overlay will correspond to 10 degrees; 30 degrees will equal 20 degrees; etc. (See Fig.3).

Using this procedure, the error will be no greater than 1.6 degrees which is a lot less than most antenna rotators can resolve. The maximum error is at 0 degrees angle (1.6 degrees) which causes the circle of accessibility of A-O-D to be 110 miles (178 km) further out than the 10 degree circle on the existing overlay. (This corresponds to about two thicknesses of the line.)

6. To adapt the Satellabe for other satellites, use the following formulas:

a.) Equatorial progression:

Separation between index marks = P/4 degrees

Where P=Period of the satellite in minutes.

b.) Earth track time marks are normalized to start at 0 degrees longitude and 0 degrees latitude and are calculated with the following formulas:

$$\text{Latitude } \phi = \arcsin\left[(\sin i)\ \sin\frac{360T}{P}\right]$$

$$\text{Longitude } \lambda = \arccos\left[\frac{\cos\left(\frac{360T}{P}\right)}{\cos\phi}\right] \times \frac{T}{4}$$

Where: i = Inclination

P = Period in minutes

ϕ = Latitude

λ = Longitude

T = Time after equatorial crossing in minutes

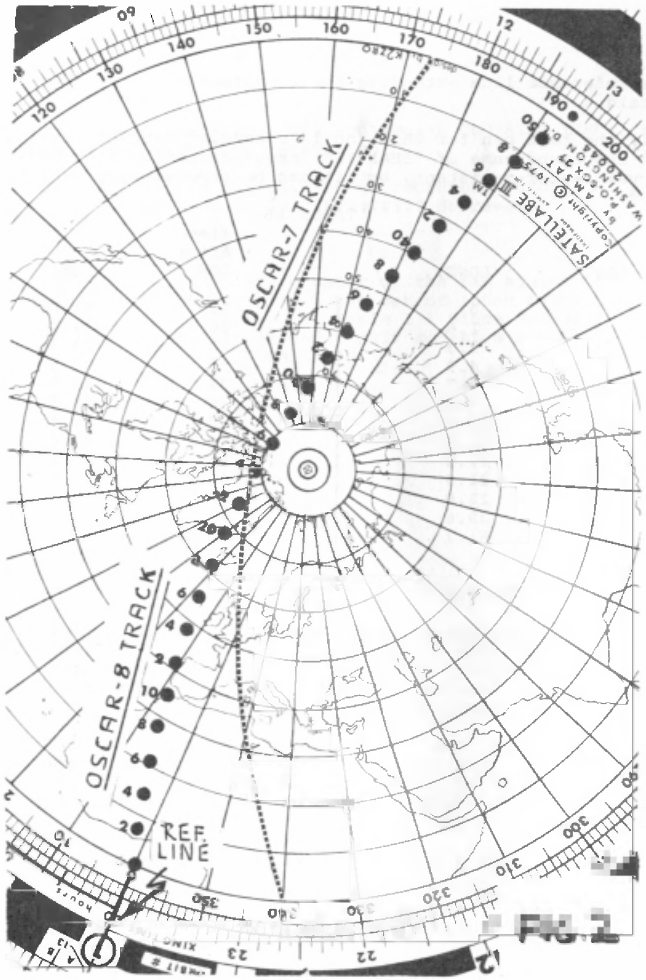


FIG. 2

c.) Elevation circles

Distance in great circle degrees from the location of the tracking station to the subsatellite point at angle of elevation E:

$$B = \arccos\left[\frac{R}{(R + h)}\ \cos E\right] - E$$

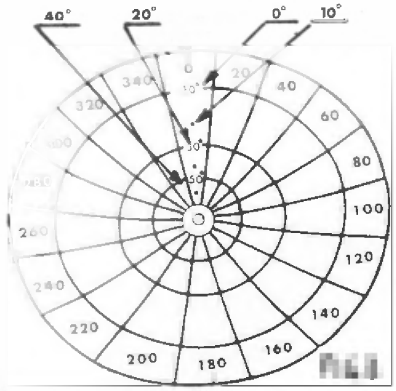
Where: B = Distance to the subsatellite point from the location of the tracking station

R = Radius of the earth (6,371 km; 3960 m)

r = Average altitude of the satellite

E = Angle of elevation

1 Great Circle degree = 111.2 km; 69.1 miles



CALL FOR PAPERS

Amateur Computing 78 Microcomputer Festival will be held July 22-23 at the Sheraton National Motor Hotel, Arlington, Virginia. Those interested in presenting a paper, participating in a panel discussion, displaying an amateur computer system or sponsoring a tutorial should submit a letter of intent along with a one page abstract or outline by April 15 to John Wall Miller, Program Chairman, 6921 Pacific Lane, Annandale, VA. 22003, telephone (703) 256-5702. Authors will be provided with instructions for preparation of camera-ready papers which are due by June 1.

Especially welcome will be topics concerning amateur radio (satellite) applications of microcomputers.

Information on Amateur Computing 78 may be obtained by writing AMRAD, Box 682, McLean, VA. 22101 or by telephoning John Wall Miller (703) 256-5702.

The 1978 ARRL Technical Symposium will be held on Saturday, September 16, 1978 at the Tysons Corner Ramada Inn, Falls Church, Virginia in conjunction with the National Capital DX Association's DXPO 78. This American Radio Relay League technical symposium is managed by the Amateur Radio Research and Development Corporation (AMRAD) and sponsored by the Northern Virginia Amateur Radio Council (NOVARC).

Previously unpublished papers are invited on all technical subjects relating to amateur radio. Prospective contributors are asked to forward informal summaries along with a photo of the author and a one-page bio sketch of the author's amateur/electronic background by July 15. Manuscripts are due by August 15. Please write or call: Paul Rinaldo, W4RI, 1524 Springvale Ave., McLean, VA. 22101, (703) 356-8918 evenings or weekends.