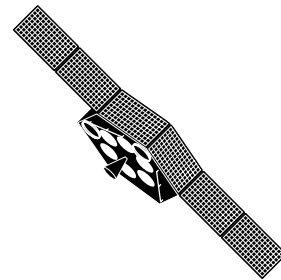


# THE AMATEUR SATELLITE RESOURCE GUIDE



Are you a new amateur satellite operator, or are you considering becoming one? If so, you probably have a thousand questions you want answered. Some people like to just dive into a hobby and learn by trial and error while others like to take their time and gather as much information as they can before taking the plunge. It is for the latter group that this list was created. Fortunately, there are many good sources of information available, many of which are gathered here. This list is by no means complete, but will serve as a starting point as you begin to learn more about this exciting aspect of Amateur Radio.

## **Books**

***The AMSAT-NA Digital Satellite Guide***, G. Gould Smith, WA4SXM, and others

Available from AMSAT HQ. An introduction to operating through the packet satellites, including the use of the DOS programs PB and PG, and the installation and setup of WiSP. Updated in 2001.

***Working the Easy Sats***, Gary Rogers, WA4YMZ

Available from AMSAT HQ. An informal introduction to the amateur satellite program plus hints on using the more easily accessed satellites including AO-27 and UO-14.

***The 2001 ARRL Handbook for Radio Amateurs***, Paul Danzer, N1II, editor, satellite section edited by Robert Diersing, N5AHD

Available from the ARRL and other sources. Although not totally devoted to satellite operations, the Handbook covers practically everything that an amateur needs to know. Filled with theory, applications and construction articles. A “must have” book. The new Handbook on CD contains actual sound files from several amateur satellites.

***The ARRL Satellite Anthology***, Rich Roznoy, KA1OF, and others

Available from the ARRL, AMSAT HQ and other sources. A compilation of articles on satellite operation previously published in QST Magazine, The AMSAT Journal and the World Wide Web.

***The Analog Satellites Operating Guide***, G. Gould Smith, WA4SXM

Available from AMSAT HQ. A guide to aid amateur operators in working the analog satellites, including the RS satellites, AO-10, AO-27, and the Fuji satellites. It takes you step by step through the process of equipping the station, finding the satellites, using the transponder, and finally making a QSO. Updated in 2001.

***The Radio Amateur’s Satellite Handbook***, Martin Davidoff, K2UBC

Available from the ARRL, AMSAT HQ and other sources. Previously titled The Satellite Experimenter’s Handbook, this is considered by many to be “the book” on operating the amateur satellites. Contains the history of the program, theory, construction articles and much more.

**Mode S: The Book**, Ed Krome, K9EK - James Miller, G3RUH and others

A comprehensive guide to setting up and operating a Mode S groundstation. Originally written for Oscar 13, the material presented is from those who, at the time, pioneered the use of the amateur satellite community's highest frequency band. This book has been updated to reflect the launch of AO-40 which has Mode S capability onboard.

## **Periodicals**

### **The AMSAT Journal**

Published by AMSAT-NA. Bimonthly magazine sent to AMSAT members.

AMSAT  
850 Sligo Avenue #600  
Silver Spring, MD 20910  
+1 (301) 589-6062  
<http://www.amsat.org>

**CQ** (monthly magazine - has a satellite column)

CQ Communications, Inc.  
25 Newbridge Road  
Hicksville, NY 11801  
+1 (516) 681-2922  
<http://www.cq-amateur-radio.com>

**OSCAR Satellite Report** (bi-weekly newsletter)

Harlan Technologies  
5931 Alma Drive  
Rockford, IL 61108-2409  
+1 (815) 398-2683  
[OSR@hampubs.com](mailto:OSR@hampubs.com)

**QST** (magazine - has a monthly satellite column)

American Radio Relay League  
225 Main St.  
Newington, CT 06111-1494  
+1 (860) 594-0200  
<http://www.arrl.org>

**Worldradio** (magazine - has a satellite column)

Worldradio  
2120 28th Street  
Sacramento, CA 95815  
1-800-366-9192  
+1 (916) 457-3655  
<http://www.wr6wr.com>

## **E-Mail Resources**

### **AMSAT mailing lists**

There are several of these, each with a specific purpose:

- ANS** official AMSAT News Service bulletins.
- AMSAT-BB** the AMSAT “bulletin board” list.
- AMSAT-DC** Items of interest to AMSAT people in the District of Columbia area.
- AMSAT-NE** Items of interest to AMSAT people in the New England area.
- KEPS** Keplerian element distribution.
- SAREX** Information on the SAREX project.
- AMSAT-EDU** AMSAT Educational Liaison mailing list.

Send E-Mail to [majordomo@amsat.org](mailto:majordomo@amsat.org) with the word “help” in the body of your message for instructions on using the automated mailing list server.

### **ARRL Mail Server**

Send an E-Mail message to [info@arrl.org](mailto:info@arrl.org). In the message body, put “send index” (new line) “quit” (both without quotes). You will receive the most recent index of all files available on the Server. Be warned that the index is large and will be sent in two parts. There are several good text files here on working the satellites, as well as information on many other topics.

### **Ham-Space Digest**

A digest of the newsgroup [rec.radio.amateur.space](mailto:rec.radio.amateur.space). Subscription requests should be sent to: [Ham-Space-Request@ucsd.edu](mailto:Ham-Space-Request@ucsd.edu).

## **FTP Resources**

A good way to access an ftp site is to use a Web browser and use a URL in the form of “ftp://sitename/”. For log in, use “anonymous” and for a password, use your email address.

### **[ftp.celestrak.com](ftp://ftp.celestrak.com)**

This site has Keplerian element sets that are updated daily. After you connect, CD to pub/elements and get tle-new.txt for the latest set.

### **[ftp.amsat.org](ftp://ftp.amsat.org)**

This site has lots of text, GIF, and program files of interest to the satellite operator. An index of software available here may be found at <http://www.amsat.org/amsat/ftpsoft.html>.

### **[ftpmail@ftp.amsat.org](mailto:ftpmail@ftp.amsat.org)**

FTP’s files and sends them back via e-mail. For instructions on its use, send e-mail to [ftpmail@amsat.org](mailto:ftpmail@amsat.org) with the word “help” in the body of the message.

### **[oak.oakland.edu](http://oak.oakland.edu)**

A huge selection of Ham radio files, including satellite related information and programs.

### [\*\*ftp.funet.fi\*\*](ftp.funet.fi)

This site is maintained by the Finnish University and Research Network with extensive files for practically every computer platform. Download the file 00index.all from the directory /pub/ham for a complete listing. Of particular interest are the selections under /pub/ham/satellite and /pub/ham/vhf-work.

### [\*\*ftp.tapr.org\*\*](ftp.tapr.org)

This site is maintained by the Tucson Amateur Packet Radio Corporation. Although not a satellite oriented organization, TAPR has played a big part in the amateur digital communications world, much of which is applicable to the packet satellites. Available at the site are several software packages of benefit to the satellite operator.

## **World Wide Web Resources**

### [\*\*http://www.amsat.org/\*\*](http://www.amsat.org/)

The World Wide Web AMSAT-NA connection. Has information on AMSAT, articles, photos, and a link to the AMSAT ftp site for downloading software. This is the best place to start when looking for amateur satellite information, especially AO-40. Also has links to other sites.

### [\*\*http://www.arrl.org/\*\*](http://www.arrl.org/)

Home page of the American Radio Relay League. Contains lots of information on becoming a radio amateur, plus links to sites for practically any amateur related activity. Also has links to ftp servers for downloading software.

### [\*\*http://users.skynet.be/on1cau/#Started\*\*](http://users.skynet.be/on1cau/#Started)

A great site supporting all aspects of satellite communication.

### [\*\*http://liftoff.msfc.nasa.gov/realtime/jtrack\*\*](http://liftoff.msfc.nasa.gov/realtime/jtrack)

Realtime satellite tracking site. Requires Java enabled browser.

### [\*\*http://www.heavens-above.com/\*\*](http://www.heavens-above.com/)

Text based satellite pass predictions.

### [\*\*http://celestrak.com\*\*](http://celestrak.com)

Has NORAD two line element sets updated daily. Documentation and software also available.

### [\*\*http://www.425dxn.org/mir/mir.html\*\*](http://www.425dxn.org/mir/mir.html)

With the deorbit of MIR, this site is included for a historical perspective. Contains summaries of frequencies, QSL collections, mission patches, picture gallery, sounds and animations plus links to other sites with information on Mir.

### [\*\*http://www.muenster.de/~welp/sb.htm\*\*](http://www.muenster.de/~welp/sb.htm)

A comprehensive site listing software available for digital modes that run on Sound Cards. Modes available include SSTV, PSK31, Hellschreiber and more.

<http://www.qsl.net/swlham/>

Web site with links to numerous domestic and international callbooks plus email addresses.

<http://www.amsat.org/amsat/fieldops/>

If you're looking for help with satellite operation in your area or perhaps looking for someone to do a presentation at a local club meeting, check this page. It has a comprehensive list of AMSAT Area Coordinators listed by state.

<http://www.tapr.org/>

The Web site for TAPR. See the discussion of ftp.tapr.org on page 4.

[http://www.tbs-satellite.com/main\\_us.html](http://www.tbs-satellite.com/main_us.html)

Looking for information on virtually any satellite in orbit? Check out the Satellite Encyclopedia online. Under Satellite, select TSE.

<http://www.seva.net/vascarg>

Sponsored by the VASC Amateur Radio Group at the Virginia Air and Space Center, the official visitor center of the NASA Langley Research Center.

<http://web.usna.navy.mil/~bruninga/satinfo.html>

Satellite tracking via APRStk. This site explains how you can have satellite tracking information and more available by monitoring APRS on 144.39 MHz.

<http://sarex.gsfc.nasa.gov>

Sarex site along with a link to the new International Space Station (ARISS) web site.

<http://www.amsat-uk.org/phase3d.htm>

This is my favorite site for the latest information on AO-40. Along with all the breaking news, various comments are included from the satellite community which makes for very interesting reading.

<http://www.amsat.org/amsat/sats/ao40/ao40-tlm.html>

With AO-40 now in orbit, it's transmitting telemetry on a regular basis. In the past dedicated hardware was required to decode the 400 baud PSK data signal. Recently various software programs have become available that can utilize the sound card in your computer to decode the data. This page has multiple links to various 400 baud PSK demodulation packages. Of special note is Stacey Mills, W4SM's P3T which will display the data you decode from AO-40 allowing you to see its current state. Also available on this page is archived AO-40 telemetry available via either ftp or http. Finally, if you have P3T, you can use it to connect to a live telemetry stream (when available) via the internet. One such stream is at NASA/Goddard at 128.183.143.104,1024.

Other WWW sites - Most of the above have links to other sites, some containing much more than information on satellites. With the content of the World Wide Web growing so quickly, there are many more sites of which I am unaware. The great thing about the World Wide Web is that you can point your browser to any Ham site and just see where it leads you!

## ***Newsgroups***

If you have a newsgroup reader, rec.radio.amateur.space is where you will find messages on amateur satellites, ARISS, SAREX/Shuttle, weather satellites, etc.

## ***On-Line Sources***

Almost all of the large on-line services have sections devoted to amateur radio and most of these have a Satellite sub-section. These are good places to find many of the shareware and freeware programs available. Some also offer "forums", "chat rooms" or "bulletin boards" for the exchange of messages.

## ***HF & VHF Voice Nets***

A complete listing of on-the-air nets is available at <http://www.amsat.org/amsat/activity.html> or by contacting AMSAT HQ. Two of particular note are:

**20m AMSAT Net                      Sunday      1800 UTC      14.282 MHz**

The "pre-Net" warm-up begins at 1800 UTC. It provides an opportunity for check-ins to ask questions and receive updates. At 1900 UTC, the latest Amsat New Service (ANS) bulletin is read. Net control stations, Keith Pugh, W5IU and Larry Brown, K7LB usually receive ANS prior to its general release via e-mail. This means the people on this 20 meter net get the latest ANS bulletin before its general release.

**Houston Area AMSAT Net      Tuesday      2000 Local      145.190 MHz      PL 123.0**

It is also available via live RealAudio feed at their web page at <http://www.amsatnet.com/> and on C Band satellite, C3, Transponder 24, 7.5 MHz wideband audio located at 131° west. There is also an IRC that is active during the net. Connect to chatnet.org,6667 and then join channel #amsat. Finally, the current and previous week's audio are stored online so you can listen to them at your convenience.

## ***Other Resources***

Practically everywhere. Don't forget your local BBS, PBBS, club, SIGs, Hamfests and various Conventions. Some of the bulletins available of interest to the satellite operator are:

### **ANS**

The official news bulletins distributed by AMSAT. These may be received by subscribing to the ANS list. (see E-Mail Resources) It may also be found on packet and land-line bbs's and is uploaded weekly to KO-25. Current and archived editions are available on the AMSAT Web site. (<http://www.amsat.org/amsat/news.html>)

## **SATGEN**

Written by John Branagan (GM4IHJ), SATGEN is not a traditional “news bulletin”, but instead each issue (sometimes a series of issues) covers a technical topic related to the amateur satellites (in particular) and non-amateur satellites (in general). SATGEN is distributed via packet and is also available from the AMSAT ftp and Web sites. There are two indexes to the SATGEN bulletins on the AMSAT Web site, one chronological by issue number and the other by subject keyword. URL <http://www.amsat.org/amsat/articles/satgen/satgen.html> has links to both indexes as well as the current issue.

## **Operating Aid**

### **AMSAT Satellite Frequency Guide**

This laminated guide, compiled by Bill Tynan, W3XO, lists the frequencies in use by various amateur satellites in orbit. It's invaluable to have in the shack next to your operating position. (<http://www.amsat.org/amsat/catalog/trinkets.html>)

## **A Word About Equipment and Software**

I have purposely not suggested equipment. I can not and will not give recommendations on what you should buy as this should be a personal choice based upon your needs, financial situation and intended modes of operation. There is a lot of good equipment, new and used, available from a variety of sources, and don't forget that building at least part of your station can be a rewarding and educational experience.

Consider doing one or more of the following: collect catalogs and fliers at Hamfests, call the manufacturers for specification sheets and talk with your friends. Read the magazines listed above; they are full of advertisements, and don't forget the For Sale section in the back. Pay attention to the postings on AMSAT-BB, Ham-Space Digest or [rec.radio.amateur.space](http://rec.radio.amateur.space); there is almost always a string of “Which radio should I buy?” messages in progress. A list of some of the manufacturers that sell new hardware of interest to the amateur satellite operator can be found at <http://www.amsat.org/amsat/suppliers.html>.

There are so many available software titles, it would be impractical to list them all, but any program needed, from tracking and terminal emulation to telemetry decoding and APT, can be found for a variety of computer platforms: DOS, Windows, OS/2, Macintosh and Unix/Linux. (see <http://www.amsat.org/amsat/catalog/software.html> and <http://www.amsat.org/amsat/ftpsoft.html>) As a starting point, though, here are a few programs available from AMSAT you may wish to consider.

### **InstantTrack 1.5**

DOS based, 8088 and up, graphics require CGA or greater, coprocessor not required but recommended. Very tight code runs on even older PC's. Shows satellite position over color world map or in sky. Updates Keplerian elements easily with NASA or AMSAT format elements. Background mode allows tracking satellites and controlling antenna rotors while other programs are running. Generates lists of passes for several satellites for one day or one satellite for several days. Recently updated with many new useful features. <http://www.amsat.org/amsat/instanttrack/>



### **QuikTrak 5.02**

For IBM-PC and compatibles. Requires DOS 3.0 or later. Will run in a DOS window under Windows 3.1, 95, 98 and NT. Comes with both CGA and EGA/VGA maps. Using the CGA maps, it will run in the simplest of PCs. Works fine in an HP palmtop PC but will run much faster in a Pentium. No math coprocessor is required but will run much faster with one. Requires 331K for CGA graphics with no math coprocessor and 772K for EGA/VGA graphics with a math coprocessor. <http://www.amsat.org/amsat/catalog/software.html>

### **NOVA for Windows**

Pentium or similar processor, 256 or higher color graphics, approximately 12MB hard disk space, Windows 95/98/2000/NT. Realtime tracking of an unlimited number of satellites. Over 150 maps of the Earth, individual continents, the sky, and a “radar display”. AutoTracking support of many available rotor controllers without need for TSRs or DLLs. A commercial product by Northern Lights Software Associates with the proceeds AMSAT receives through its distribution going to benefit the amateur satellite program. More information about the NOVA family of software may be found at the Northern Lights Software home page. <http://www.nlsa.com>

### **MacDoppler**

Satellite tracking program for the Macintosh, with emphasis on correcting for Doppler shift. Displays ground track and coverage oval on a map display. It can control several of the more popular rotor systems and radios. Requires a Macintosh II or faster, but some features are only supported on Power PC. Requires System 7.6.1 or later, but some features require MacOS 8 or 7.6.1 with Appearance Manager. Download from Dog Park Software Ltd. at <http://www.dogparksoftware.com> then register with AMSAT-NA.

### **MacDoppler Pro**

Satellite tracking program for the Macintosh. This program is a fancier version of MacDoppler, featuring a very attractive 3D projection model of the Earth (on PowerPC only). Tracks up to 16 satellites simultaneously. Download from <http://www.dogparksoftware.com> then register with AMSAT-NA.

### **WiSP**

A Windows based set of programs for the digital satellite operator that replaces the DOS programs PB and PG. Controls the TNC/modem, processes mail, tracks satellites, and can pass information to various controllers for automated tracking and tuning. Minimum system is 386DX/25, a coprocessor and 4MB of RAM. Available from AMSAT and other sources. Distributed in the shareware format. Registration is with AMSAT. <http://www.amsat.org/amsat/catalog/software.html>

### **MacPacSat**

Satellite tracking program for the Macintosh. MacPacSat is the first software package to be made available that allows a Macintosh to communicate via packet radio using a KISS TNC with the amateur packet satellites currently in operation using the “PACSAT” protocols. Requires a Macintosh II or faster, (but some features are only supported on Power PC) with 4 MB of RAM (over and above OS). Requires System 7.6.1 or later, but some features require MacOS 8 or 7.6.1 with Appearance Manager. Download from Dog Park Software Ltd. at <http://www.dogparksoftware.com> then register with AMSAT-NA.



Use your judgment when you pick something out. Many packages may be downloaded from BBS's, the World Wide Web, and FTP sites. If you have Internet access, two obvious places to start looking are <ftp://ftp.amsat.org> and <http://www.amsat.org>, the AMSAT sites. You won't find all of the above titles there, but you'll definitely find some of them. Remember, most of the programs that can be downloaded are shareware; if you use them, please register them. If they are not shareware, please do not copy them to pass along to your friends. Proceeds derived from software ordered from AMSAT HQ or picked up from an AMSAT booth at a Hamfest are funneled back into the program.

## ***One More Thing...***

It is hoped this list will be of some benefit in your quest for information about operating the amateur satellites. It would be impossible to list all of the publications in print or electronic resources that are available, but I have presented a good selection to get you started. A word of caution, though: Read all you can, but don't delay putting what you have learned into practice. There is a wonderful world out there just waiting for you to contact, so when your tracking program tells you there is a satellite coming over, put down your book or close down your Web browser, pick up your microphone, and call "CQ Satellite". You can always go back to your reading when the pass is over.

I would like to extend a special thanks to all that sent email with suggestions or URL's for their favorite sites for inclusion in this guide.

Not only are you granted permission to copy and redistribute this handout, you are highly encouraged to do so, but please pass along only unmodified copies.

Due to the changing nature of the "on-line" world, some WWW URL's and the addresses of ftp/telnet sites may change. If you find any to be in error, or discover one that you feel should be included in future editions of this handout, I would like to hear from you. Please send the site address information, including sponsoring organization and a brief synopsis of its contents, to the e-mail address below. If an address changes, please send me the updated information.

Hope to hear you on the birds soon!

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