SATELLITI RADIOAMATORIALI

HB9AUS - Fabio Lava - RCL Avegno 19mag2010

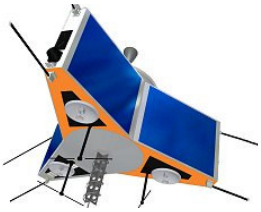
1. STORIA

http://www.amsat.org/amsat-new/satellites/history.php

ANNO	SATELLITE	MODO	FREQUENZE	DURATA
1961	Oscar 1	beacon	144	22g
1962	Oscar 2	beacon	144	18g
1965	Oscar 3	B + T	144/146	18g
	Oscar 4	B + T	144/430	85g
1970	Ocsar 5	beacon	144 + 29	46g
1972	Oscar 6	B + T	144/29	4,5a
1973->	STS MIR ISS	FM PKT	145.800	
1974	Oscar 7	B + T B + T beacon	A 144/29 B 430/144 A B U S	vivente
1978	Oscar 8	B + T	A 144/29 J 430/144	6a
1978->	RS	B + T	A	
1981->	Digi	vari	144 ->	
1980	Fase 3A			caduto
1983	Fase 3B Oscar 10	B + T	J 430/144	3a
1988	Fase 3C Oscar 13	Beacon Transponder	B - U - S B - U/S	8a
2000	Fase 3D Oscar 40	B + T combinazioni diverse	144 430 MHz 2,4 10 24 G	rotto subito
2003->	CubeSats			
??	P3 E EAGLE	diversi high orbit	144 and UP	

Oscar 1

Oscar 8



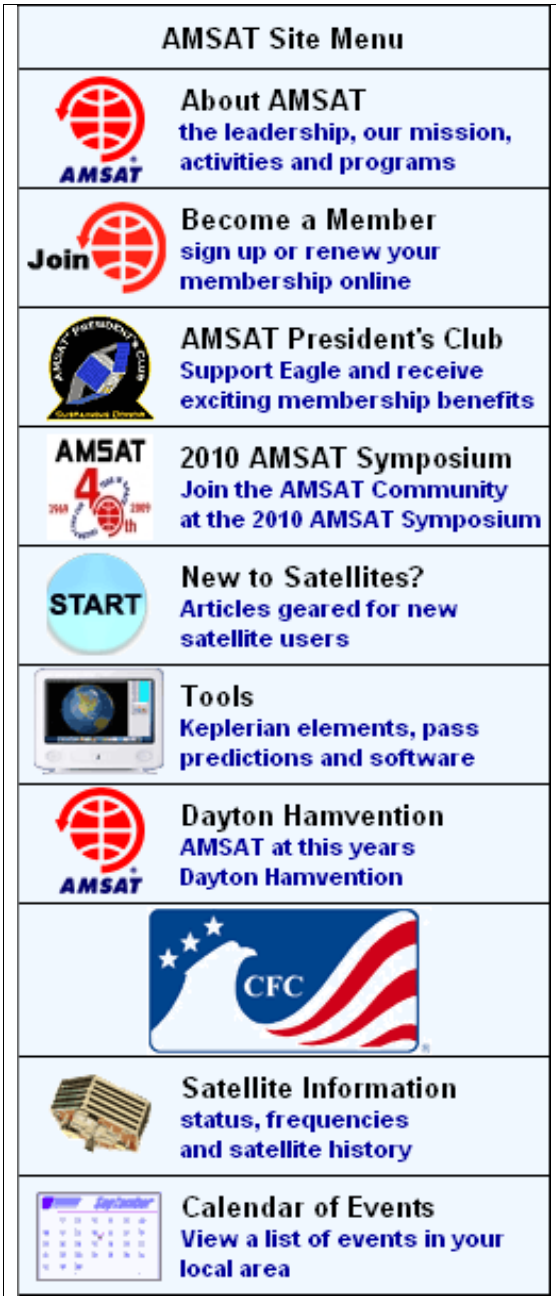
Oscar 13

Oscar 40

2. INFORMAZIONI

www.amsat.org

Launch Pad	Navigator	Sat Status	Keps	Passes	News	Store	Members	Contact Us	Return
HOME	CERCA	ATTIVI	SITI x DOWNLOAD	TRACK			...		



--> AMSAT

--> SOCI

--> COME ESSERE SPONSOR

--> ARTICOLI PER I NOVIZI

--> **KEPS - TRACKING SOFTWARE**
TRACKING TOOL
GRID SQUARE CALCULATOR

--> DAYTON 2010

--> **SCHEDE DEI SATELLITI E STORIA**

--> EVENTI (SPECIALMENTE U.S.A.)

 **AMSAT Video News** Video coverage of AMSAT events and activities  **News from ANS** the latest news from ANS, articles in the archive  **Get Answers** glossary, articles, FAQs and Area Coordinators  **Become a Volunteer** volunteer survey, and the Volunteer Reporting System  **ARISS** the latest about the International Space Station  **Mail Services** Information about AMSAT mail and list services  **Awards and Contests** rules, applications and winners  **The AMSAT Store** Look cool while showing your support for AMSAT	--> VIDEO E CONFERENZE --> NEWS E ARTICOLI --> **ISS HAM RADIO ACTIVITY** --> DIPLOMI x SATELLITE ACTIVITY
www.nasa.org	--> SITO DELLA NASA
http://www.nasa.gov/multimedia/nasatv/index.html	--> NASA TV
http://www.esa.int/esaCP/index.html	--> ESA = European Space Agency
http://www.noaanews.noaa.gov/stories2010/20100401_tiros.html	--> NOAA WEATHER SATELLITES
http://www.meteosatonline.it/ultima_meteosat_visibile.php	--> METEOSAT
http://smegordola.educanet2.ch/telecom/Telecomunicazioni.htm	--> LINK VARI

Satellite Information
status, frequencies and satellite history

Detailed Satellite Information

Amateur Satellite Status

This overview page will provide you with a quick and easy view of the amateur satellite fleet. Clicking on a satellite name provides detailed satellite information.

Chronology of Amateur Satellites

This page will provide you with a chronology of amateur satellites from the original OSCAR to the latest launches. Links are provided to detailed satellite information

A Chart of Satellite Frequencies

This page lists all satellite frequencies that have been used. There is a link to see what frequencies are in use at this time and more detail about indivual satellites

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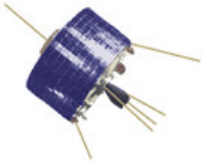
Learn about Satellite Projects

AMSAT OSCAR - Eagle

Learn more about AMSAT's newest satellite design

P3-E Express

Learn more about AMSAT-DL's high orbit satellite design

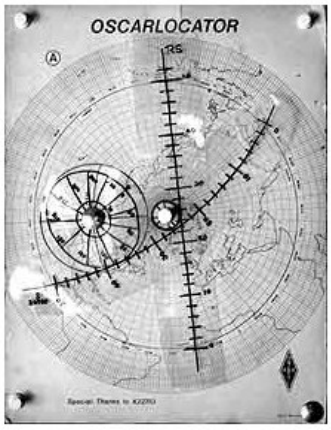


Satellite Programs in Development

Information about the latest satellites under development and/or waiting for launch. Links are provided to the sponsoring organization

Tools
Keplerian elements, pass predictions and software

Amateur satellite operators have always relied on tools to help us get the job done. From the OSCARLOCATOR shown on the right to early tracking software on the Commodore 64, amateurs have been developing ways to track, tune and locate satellites, decode their telemetry and send messages using digital messaging.



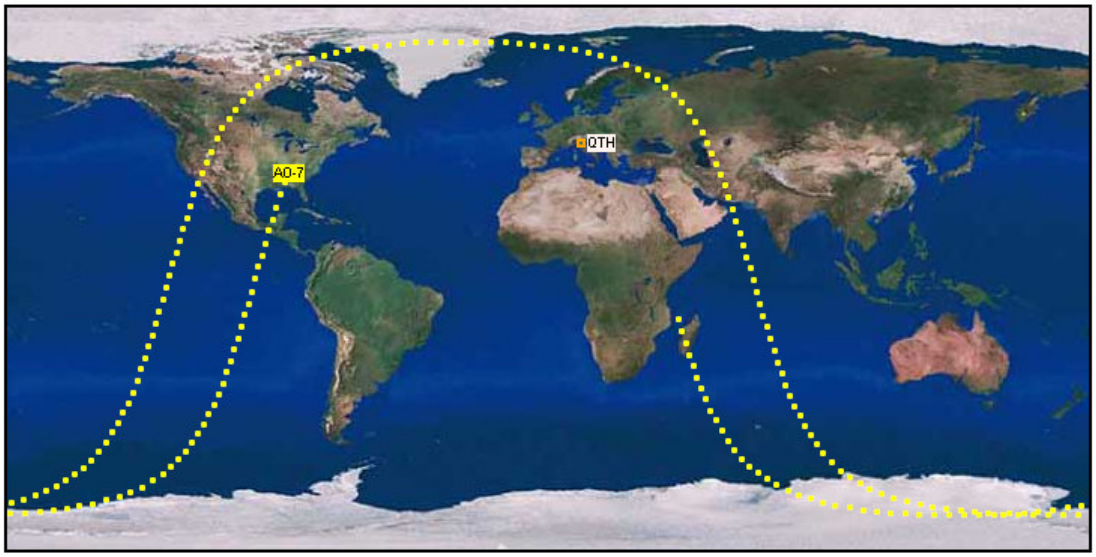
In this section you will find:

- **Online Satellite Tracking** (New!)
- **Online Satellite Pass Predictions**
- Tracking and Station Management Software
- Keplerian Elements
- Gridsquare Calculator
- Mailing List Information
- EMail Alias Information

If you can't find what you are looking for in these categories, visit the Software Archive or try using the Navigator to look through older AMSAT archives.

Current Position of AO-7

Sun, 18 Apr 2010 12:57:08 GMT (14:57:08 local time)
Current Location: 85.5W 34N



Select a Different Satellite: AO-7

Note: Position is approximate and depends on your computer's performance.

AMSAT Online Satellite Pass Predictions

Please select a satellite and provide your latitude, longitude and elevation or calculate them from your grid square. If you choose we will save your position information in a cookie on your system for future predictions.

Show Predictions for: AO-51 **for Next** 10 **Passes**	
Calculate Latitude and Longitude from Gridsquare:	JN46JE Calculate Position
Or	
Enter Decimal Latitude:*	46.1875 North
Enter Decimal Longitude:*	8.7917 East
Elevation (Metres):	1350
Predict	
Save my location for later use	

**example XX.xxxxx

Decimal Latitude	Decimal Longitude:	OR	Latitude (Deg, Min, Sec)			Longitude (Deg, Min, Sec)		
North South								
West East								

Calculate

Current Kep Downloads

AMSAT publishes Keplerian elements weekly. Here are the current bulletins:

- AMSAT (verbose) format elements for all satellites of interest to radio amateurs *(updated 08 Apr, 2010)*
- NASA (2-line) format elements for all satellites of interest to radio amateurs *(updated 08 Apr, 2010)*
- Bare NASA (2-line) format elements for all satellites of interest to radio amateurs *(updated 08 Apr, 2010)*

You can receive these bulletins regularly by e-mail by subscribing to the KEPS mailing list.

Keps in PDB Format

You can also download keps in PDB format suitable for PocketSat for PalmOS PDA.

- Download PDB Keplerian Elements *(updated 08 Apr, 2010)*

Orbital State Vectors

Orbital State Vectors describe the Position and Velocity of spacecraft at some specified Epoch time. For further information, see the State Vector tutorial.

Space Shuttle Orbital Data

Space Shuttle orbital data is available during missions. Keplerian elements are available from NASA, CelesTrak and Space-Track (see links below.) The orbital state vectors for Space Shuttle missions are also available from NASA

Other Sources

You can find lots of Keplerian elements and related information on these other sites:

- CelesTrak by T.S. Kelso
- SpaceTrack - Operated by the USAF Space Command (requires free SpaceTrack Account)
- NASA Shuttle Elements - Available during shuttle flights

3. ATTIVITÀ

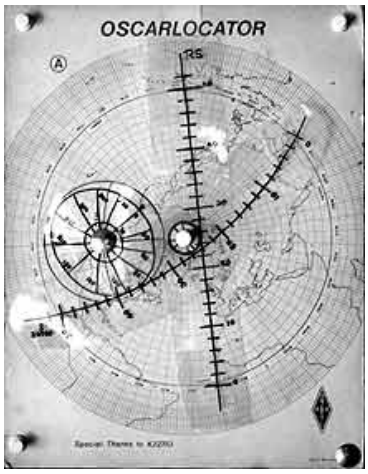
panoramica di alcune attività possibili

1. DETERMINAZIONE DELLA POSIZIONE DEL SATELLITE

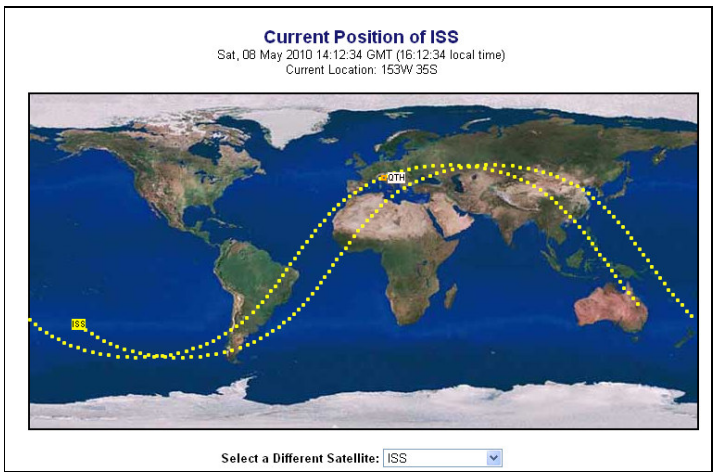
Manuale:

con OSCARLOCATOR

(... la preistoria ...)



Con PC: Applet Online – Freeware – software con licenza



Amsat:

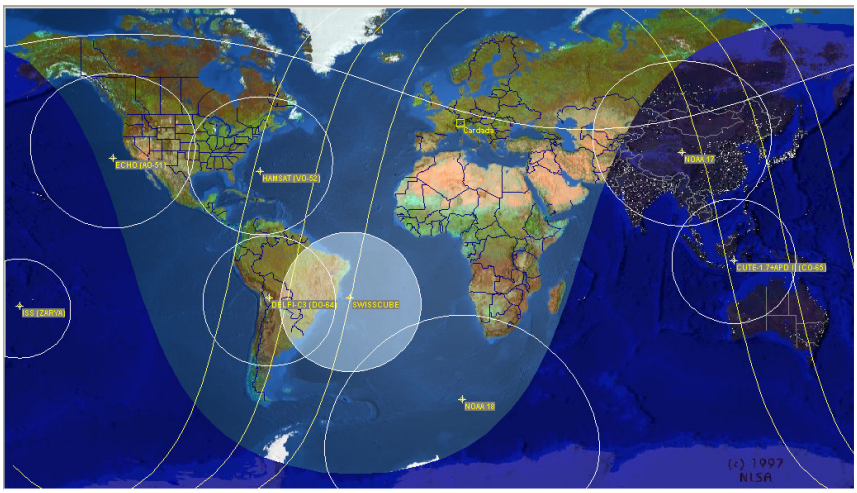
Online Satellite Tracking

Nasa:

http://science.nasa.gov/realtime/JTrack/

Software:

Nova



2. ASCOLTO DEL BEACON

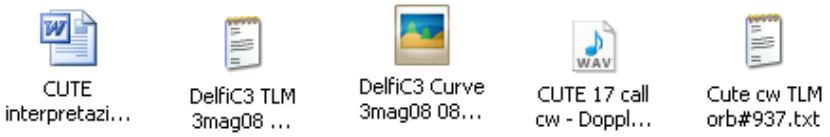
Ogni satellite artificiale ha uno o più beacon che trasmette a terra dati telemetrici (parametri sullo stato di salute del satellite) in CW o in digitale (svariati modi: PKT, AFSK, PSK, con molte varianti).

Se il satellite è attivo (v. Satellite Status), il segnale del beacon è un indicatore sicuro e affidabile della presenza del satellite.

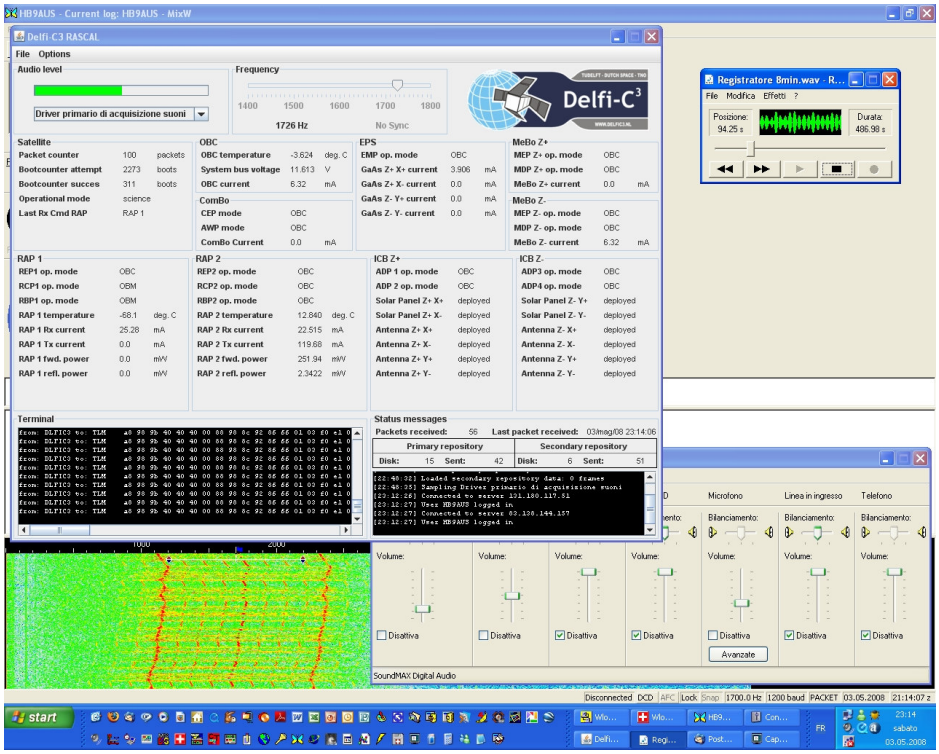
!! ATTENZIONE !!
considerare la variazione della frequenza fondamentale annunciata, causata dall'effetto Doppler (deriva che è più significativa, più la frequenza è alta).

3. DECODIFICA DELLA TELEMETRIA

I dati telemetrici forniscono informazioni sullo stato del satellite. I costruttori redigono schede tecniche con le formule per l'interpretazione dei dati.



Solitamente è disponibile anche un software per l'interpretazione dei dati telemetrici tramite PC o addirittura online.



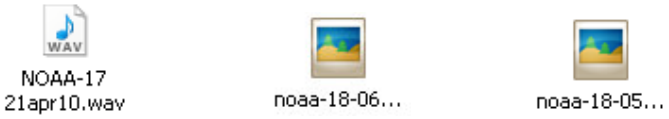
4. USO DEL TRANSPONDER PER QSO

Una buona parte dei satelliti HAM è dotata di transponder.
Ciò permette di effettuare QSO via satellite.

```
Modo V/A (A):       uplink 145 MHz        downlink 29 MHz    (AO-7/RS)
Modo U/V (B):       uplink 430 MHz        downlink 145 MHz   (AO-13)
Modo V/U (J):       uplink 145 MHz        downlink 430 MHz   (AO-10/AO-20)
...
```

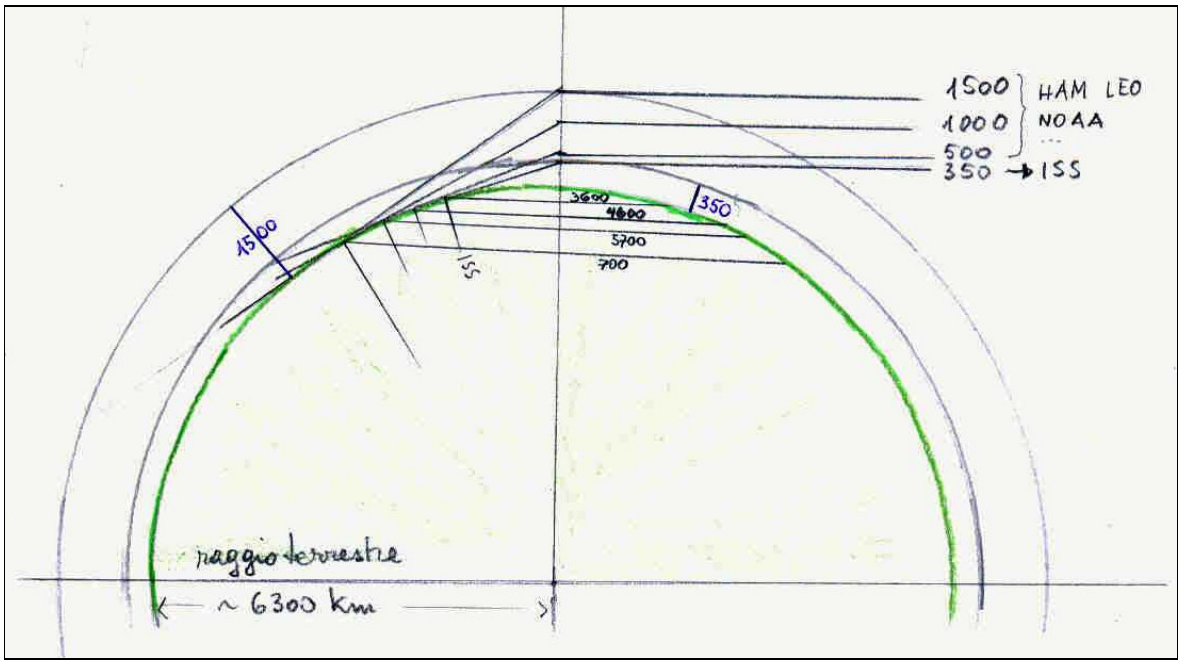
5. RICEZIONE DI IMMAGINI METEO

I satelliti NOAA trasmettono immagini meteo in APT, facili da ricevere e decodificare, su 136 MHz. È possibile utilizzare la stessa installazione usata per attività in 2 metri.

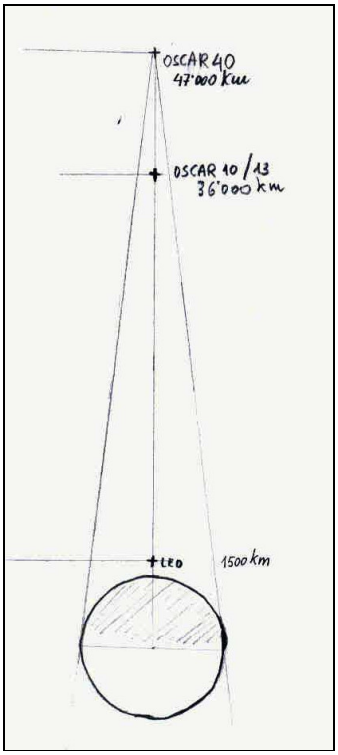


6. LE ORBITE

satellites		**LEO (Low Earth Orbit)**	**HAM LEO**
altezza:	km	~ 200 ÷ 3'000	~ 750 ÷ 1'500
periodo:	min		~ 98 ÷ 115
raggio terrestre	km	6'300	6'300
raggio medio dell'orbita	km	7'800	7'300
Spazio percorso:	$2.\pi.r$ km	~ 49'000	~ 46'000
velocità	$\frac{2.\pi.r}{\frac{t}{60}}$ km/h		~ 28'000 ÷ 24'000



LEO orbits: ISS 350 km / NOAA – HAM 500 ÷ 1500 km



rapporto fra l'altezza media dell'orbita dei satelliti

LEO (max 1500 km)

e l'apogeo delle orbite fortemente ellittiche degli

Oscar phase B (Oscar-10)
Oscar phase C (Oscar-13)
(~ 36'000 km)

e

Oscar-40 (47'000 km)

4. STAZIONE

1. APPARECCHI RADIO

RX: 136 – 144 – 430 – [1200 – 2400 – ...]

TX: 144 – 430 – ... Pout ~ 100 W è sufficiente

SWR/PWR meter
ant. circularity switch

430 MHz preamplifier control
144 MHz preamplifier control

TRX 430 **TRX HF – 144 – 430**

RX 25 – 2000 MHz

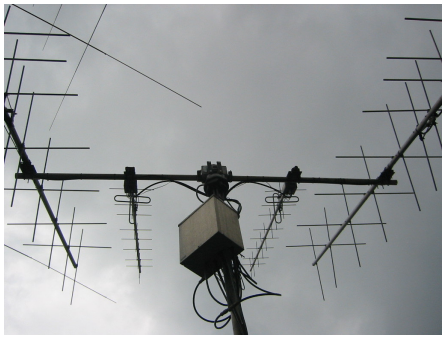
TRX 144

2. ANTENNE

Discone (25÷2000 MHz)

crossed Yagi accoppiate
144 (e 136) MHz – 430 MHz

3. ROTORI



AZ control **PC interface** **El control**

144 MHz Low noise preamplifier

430 MHz GaAsFet preamplifier

usati con la Discone

SSB electronic preamplifiers

144 MHz

430 MHz

sul palo delle antenne

5. SOFTWARE

1. PER DETERMINARE LA POSIZIONE DEL SATELLITE

Online: AMSAT ONLINE TRACKING / NASA J-TRACK / ...

Freeware: ORBITRON / FOOTPRINT / HRD / ...


Orbitron.exe


Footprint.exe


HRDSatTra...

http://www.amsat.org/amsat-new/tools/software.php#shareware

Professional Tracking Software for purchase:


NfW32.exe

http://www.amsat.org/amsat-new/tools/software.php#prosoft
http://www.dxzone.com/catalog/Software/Satellite_tracking/

l'uso di software per la determinazione della posizione dei satelliti presuppone almeno 3 passaggi di configurazione indispensabili:

- **introduzione di dati kepleriani aggiornati (TLE)**
  http://www.celestrak.com/NORAD/elements/
- **impostazione delle coordinate del proprio QTH**
  http://smegordola.educanet2.ch/telecom/Spazio/Coordinate%20Locarno.txt
- **regolazione dell'ora UTC**

2. PER IL CONTROLLO DEI ROTORI

- scelta dell'interfaccia
- scelta del software


arswin.exe


NfW32.exe


HRDSatTra...

3. PER CONTROLLARE L'EFFETTO DOPPLER


HamRadioD...

e altri ...

4. PER DECODIFICARE I DATI TELEMETRICI


RASCAL.jar


CWTeleme...


XW-1 Telemetry...


TIsat Demodulator

5. PER RICEVERE LE IMMAGINI METEO

WxtoImg (freeware) http://www.wxtoimg.com/


wxtoimg.exe