

SATELLITI RADIOAMATORIALI

1. STORIA
2. INFORMAZIONI
3. ATTIVITÀ
4. HARDWARE
5. SOFTWARE

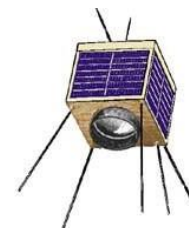
1. STORIA

<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

**AMSAT™**
The Radio Amateur Satellite Corporation

850 Sligo Ave. Suite 600
Silver Spring, MD 20910
1-888-322-6728

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 Satellite Information status, frequencies and satellite history	--> SCHEDE DEI SATELLITI E STORIA
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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

Operational OSCAR Satellites Summary

OSCAR	Altitude (km)	Speed (km/h)	Frequency (MHz)	Mode	Remarks
1058	1000	14400	144.000	FM	OSCAR-1058
1059	1000	14400	144.000	FM	OSCAR-1059
1060	1000	14400	144.000	FM	OSCAR-1060
1061	1000	14400	144.000	FM	OSCAR-1061
1062	1000	14400	144.000	FM	OSCAR-1062
1063	1000	14400	144.000	FM	OSCAR-1063
1064	1000	14400	144.000	FM	OSCAR-1064
1065	1000	14400	144.000	FM	OSCAR-1065
1066	1000	14400	144.000	FM	OSCAR-1066
1067	1000	14400	144.000	FM	OSCAR-1067
1068	1000	14400	144.000	FM	OSCAR-1068
1069	1000	14400	144.000	FM	OSCAR-1069
1070	1000	14400	144.000	FM	OSCAR-1070
1071	1000	14400	144.000	FM	OSCAR-1071
1072	1000	14400	144.000	FM	OSCAR-1072
1073	1000	14400	144.000	FM	OSCAR-1073
1074	1000	14400	144.000	FM	OSCAR-1074
1075	1000	14400	144.000	FM	OSCAR-1075
1076	1000	14400	144.000	FM	OSCAR-1076
1077	1000	14400	144.000	FM	OSCAR-1077
1078	1000	14400	144.000	FM	OSCAR-1078
1079	1000	14400	144.000	FM	OSCAR-1079
1080	1000	14400	144.000	FM	OSCAR-1080
1081	1000	14400	144.000	FM	OSCAR-1081
1082	1000	14400	144.000	FM	OSCAR-1082
1083	1000	14400	144.000	FM	OSCAR-1083
1084	1000	14400	144.000	FM	OSCAR-1084
1085	1000	14400	144.000	FM	OSCAR-1085
1086	1000	14400	144.000	FM	OSCAR-1086
1087	1000	14400	144.000	FM	OSCAR-1087
1088	1000	14400	144.000	FM	OSCAR-1088
1089	1000	14400	144.000	FM	OSCAR-1089
1090	1000	14400	144.000	FM	OSCAR-1090
1091	1000	14400	144.000	FM	OSCAR-1091
1092	1000	14400	144.000	FM	OSCAR-1092
1093	1000	14400	144.000	FM	OSCAR-1093
1094	1000	14400	144.000	FM	OSCAR-1094
1095	1000	14400	144.000	FM	OSCAR-1095
1096	1000	14400	144.000	FM	OSCAR-1096
1097	1000	14400	144.000	FM	OSCAR-1097
1098	1000	14400	144.000	FM	OSCAR-1098
1099	1000	14400	144.000	FM	OSCAR-1099
1100	1000	14400	144.000	FM	OSCAR-1100
1101	1000	14400	144.000	FM	OSCAR-1101
1102	1000	14400	144.000	FM	OSCAR-1102
1103	1000	14400	144.000	FM	OSCAR-1103
1104	1000	14400	144.000	FM	OSCAR-1104
1105	1000	14400	144.000	FM	OSCAR-1105
1106	1000	14400	144.000	FM	OSCAR-1106
1107	1000	14400	144.000	FM	OSCAR-1107
1108	1000	14400	144.000	FM	OSCAR-1108
1109	1000	14400	144.000	FM	OSCAR-1109
1110	1000	14400	144.000	FM	OSCAR-1110
1111	1000	14400	144.000	FM	OSCAR-1111
1112	1000	14400	144.000	FM	OSCAR-1112
1113	1000	14400	144.000	FM	OSCAR-1113
1114	1000	14400	144.000	FM	OSCAR-1114
1115	1000	14400	144.000	FM	OSCAR-1115
1116	1000	14400	144.000	FM	OSCAR-1116
1117	1000	14400	144.000	FM	OSCAR-1117
1118	1000	14400	144.000	FM	OSCAR-1118
1119	1000	14400	144.000	FM	OSCAR-1119
1120	1000	14400	144.000	FM	OSCAR-1120
1121	1000	14400	144.000	FM	OSCAR-1121
1122	1000	14400	144.000	FM	OSCAR-1122
1123	1000	14400	144.000	FM	OSCAR-1123
1124	1000	14400	144.000	FM	OSCAR-1124
1125	1000	14400	144.000	FM	OSCAR-1125
1126	1000	14400	144.000	FM	OSCAR-1126
1127	1000	14400	144.000	FM	OSCAR-1127
1128	1000	14400	144.000	FM	OSCAR-1128
1129	1000	14400	144.000	FM	OSCAR-1129
1130	1000	14400	144.000	FM	OSCAR-1130
1131	1000	14400	144.000	FM	OSCAR-1131
1132	1000	14400	144.000	FM	OSCAR-1132
1133	1000	14400	144.000	FM	OSCAR-1133
1134	1000	14400	144.000	FM	OSCAR-1134
1135	1000	14400	144.000	FM	OSCAR-1135
1136	1000	14400	144.000	FM	OSCAR-1136
1137	1000	14400	144.000	FM	OSCAR-1137
1138	1000	14400	144.000	FM	OSCAR-1138
1139	1000	14400	144.000	FM	OSCAR-1139
1140	1000	14400	144.000	FM	OSCAR-1140
1141	1000	14400	144.000	FM	OSCAR-1141
1142	1000	14400	144.000	FM	OSCAR-1142
1143	1000	14400	144.000	FM	OSCAR-1143
1144	1000	14400	144.000	FM	OSCAR-1144
1145	1000	14400	144.000	FM	OSCAR-1145
1146	1000	14400	144.000	FM	OSCAR-1146
1147	1000	14400	144.000	FM	OSCAR-1147
1148	1000	14400	144.000	FM	OSCAR-1148
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1150	1000	14400	144.000	FM	OSCAR-1150
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1170	1000	14400	144.000	FM	OSCAR-1170
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1187	1000	14400	144.000	FM	OSCAR-1187
1188	1000	14400	144.000	FM	OSCAR-1188
1189	1000	14400	144.000	FM	OSCAR-1189
1190	1000	14400	144.000	FM	OSCAR-1190
1191	1000	14400	144.000	FM	OSCAR-1191
1192	1000	14400	144.000	FM	OSCAR-1192
1193	1000	14400	144.000	FM	OSCAR-1193
1194	1000	14400	144.000	FM	OSCAR-1194
1195	1000	14400	144.000	FM	OSCAR-1195
1196	1000	14400	144.000	FM	OSCAR-1196
1197	1000	14400	144.000	FM	OSCAR-1197
1198	1000	14400	144.000	FM	OSCAR-1198
1199	1000	14400	144.000	FM	OSCAR-1199
1200	1000	14400	144.000	FM	OSCAR-1200

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.

A Brief Chronology of Amateur Satellites

Year	OSCAR	Altitude (km)	Speed (km/h)	Frequency (MHz)	Mode	Remarks
1961	1	1000	14400	144.000	FM	OSCAR-1
1962	2	1000	14400	144.000	FM	OSCAR-2
1963	3	1000	14400	144.000	FM	OSCAR-3
1964	4	1000	14400	144.000	FM	OSCAR-4
1965	5	1000	14400	144.000	FM	OSCAR-5
1966	6	1000	14400	144.000	FM	OSCAR-6
1967	7	1000	14400	144.000	FM	OSCAR-7
1968	8	1000	14400	144.000	FM	OSCAR-8
1969	9	1000	14400	144.000	FM	OSCAR-9
1970	10	1000	14400	144.000	FM	OSCAR-10
1971	11	1000	14400	144.000	FM	OSCAR-11
1972	12	1000	14400	144.000	FM	OSCAR-12
1973	13	1000	14400	144.000	FM	OSCAR-13
1974	14	1000	14400	144.000	FM	OSCAR-14
1975	15	1000	14400	144.000	FM	OSCAR-15
1976	16	1000	14400	144.000	FM	OSCAR-16
1977	17	1000	14400	144.000	FM	OSCAR-17
1978	18	1000	14400	144.000	FM	OSCAR-18
1979	19	1000	14400	144.000	FM	OSCAR-19
1980	20	1000	14400	144.000	FM	OSCAR-20
1981	21	1000	14400	144.000	FM	OSCAR-21
1982	22	1000	14400	144.000	FM	OSCAR-22
1983	23	1000	14400	144.000	FM	OSCAR-



Tools

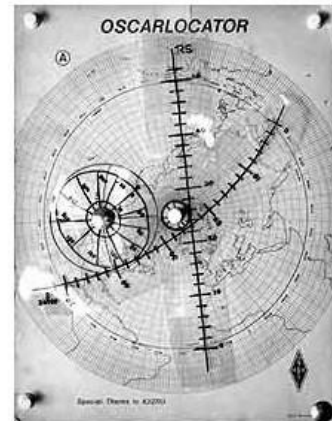
Keplerian elements, pass predictions and software

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:

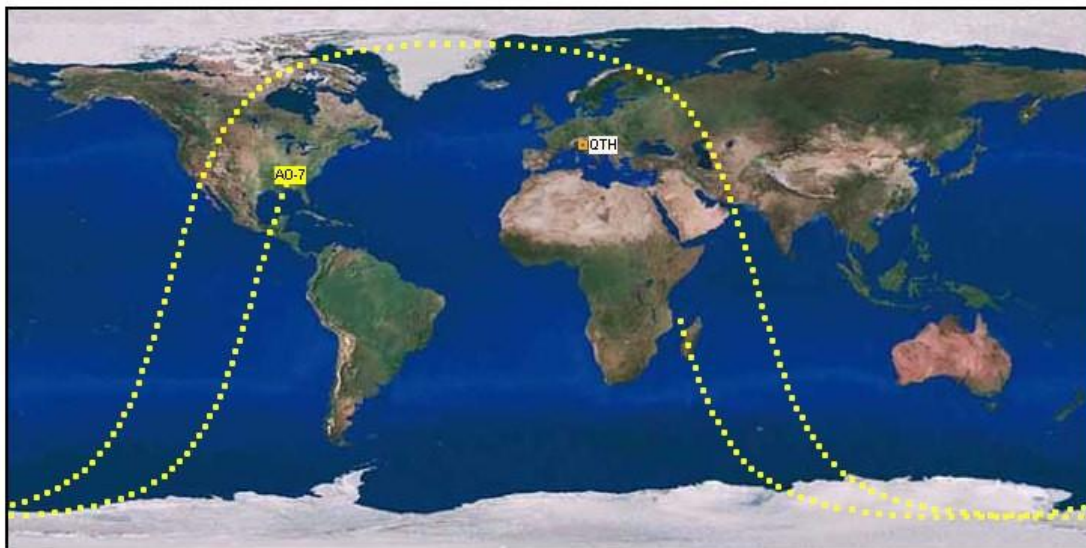
- [Online Satellite Tracking](#) (New!)
- [Online Satellite Pass Predictions](#)
- [Tracking and Station Management Software](#)
- [Keplerian Elements](#)
- [Gridsquare Calculator](#)
- [Mailing List Information](#)
- [Email Alias Information](#)

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:

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](#).

Keys in PDB Format

You can also download keys 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

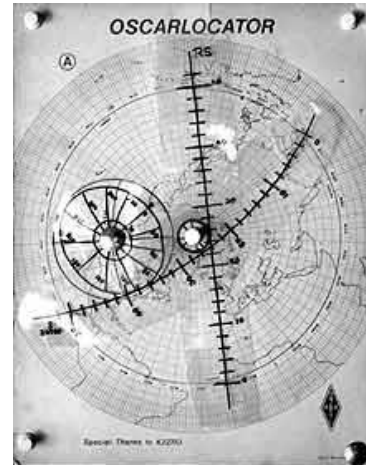
panoramica di alcune attività possibili

1. DETERMINAZIONE DELLA POSIZIONE DEL SATELLITE

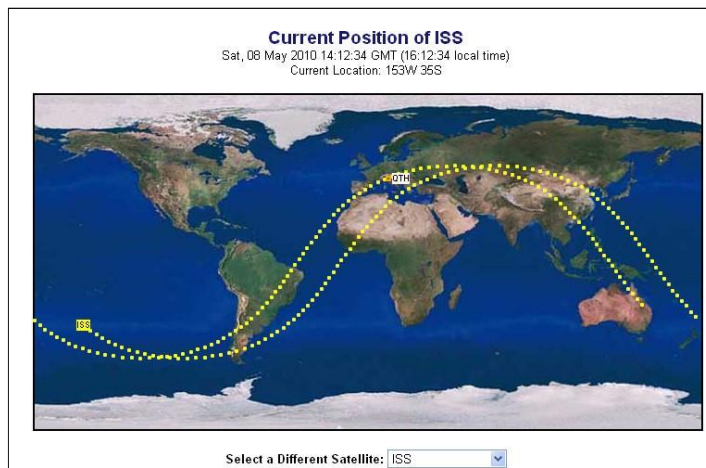
Manuale:

con OSCARLOCATOR

(... la preistoria ...)



Con PC: Applet Online - Freeware - software con licenza



Amsat:

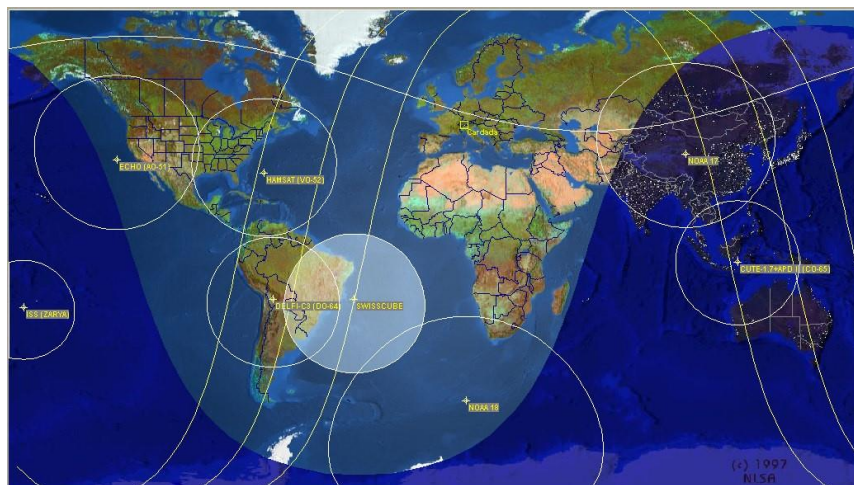
[Online Satellite Tracking](#)

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.

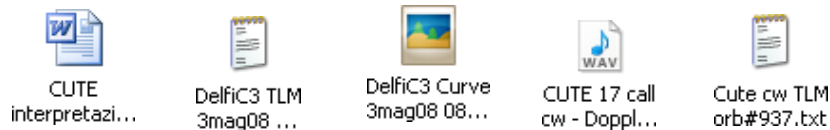
!! ATTENZIONE !!

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

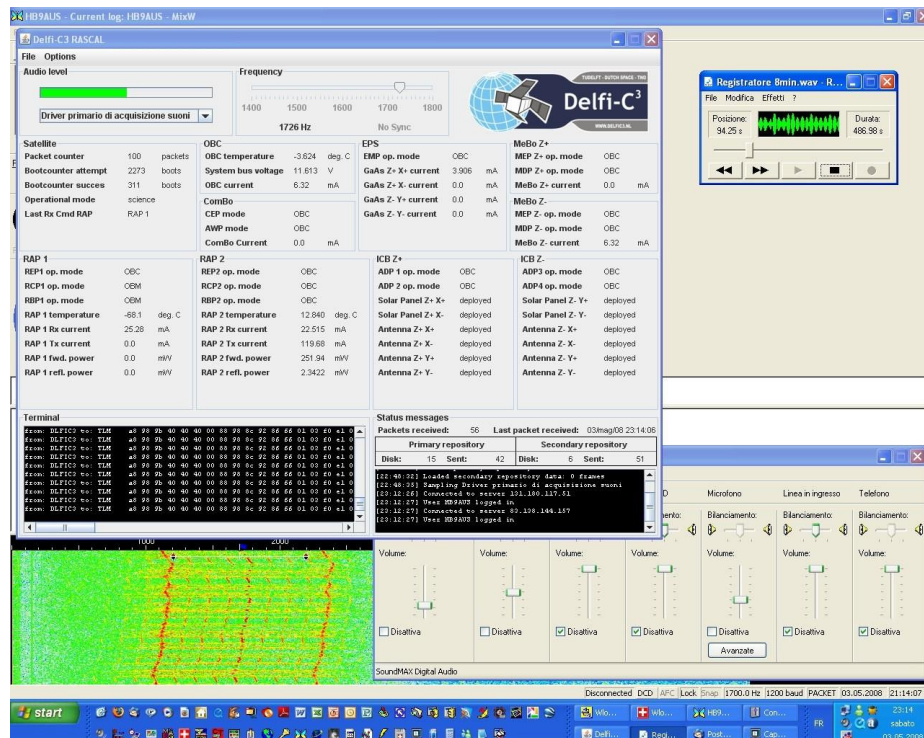


3. DECODIFICA DELLA TELEMETRIA

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.



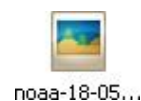
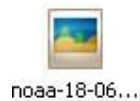
4. USO DEL TRANSPONDER PER QSO

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)
...			

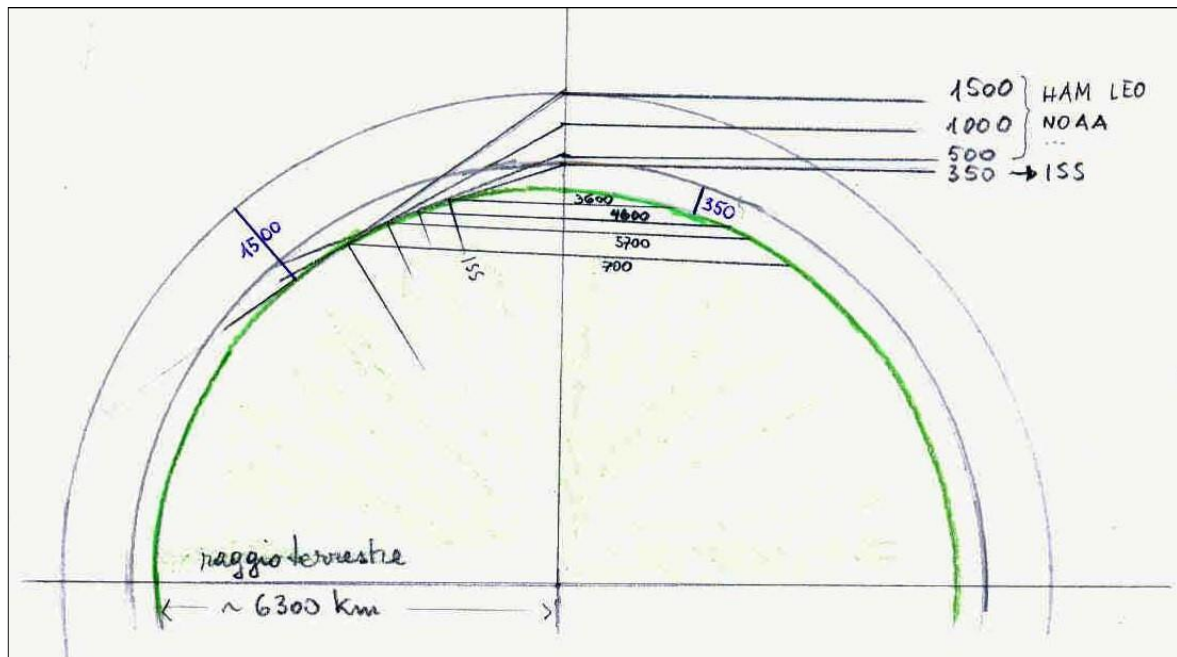
5. RICEZIONE DI IMMAGINI METEO

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.

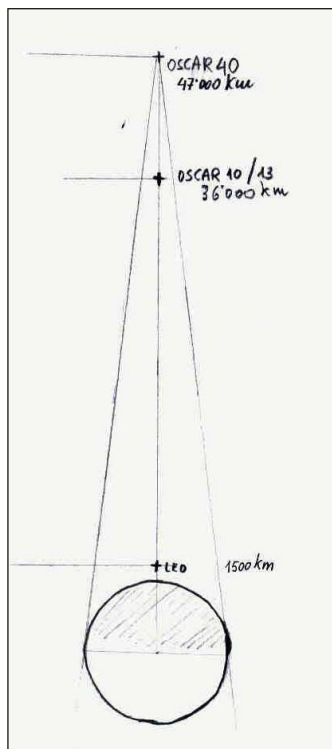


6. LE ORBITE

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	$\frac{2.\pi.r}{t}$ km/h 60		~ 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

EI control

4. PREAMPLIFICATORI



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