

CQ "A07" de VU2RM or HOW I GOT TO WORK THE OSCARS

S. RAMAMOHANA RAO, VU2RM

It was December 1974, if I remember well, when Larry VU2 HQ. played a tape on a 40 meter QSO. It was that of a QSO between two European Stations, a QSO Via OSCAR. After hearing this, my interest in setting up a station for satellite work grew. But, like many other hams, not much information was available to me at that time about the Oscar 6 & 7, their orbits and frequencies. Unfortunately, the Indian Oscar coordinator VU2UV, is not operating on HF bands for me to get the dope (I am not in the habit of writing letters). However, the interest grew and I started gathering all info.

I built a 144 mhz TX with a 8007 KHZ crystal. But the Oscar uplink was 145.9 odd mhz. Since I did not have a crystal nearer to this, I sent my begging bowl around for a crystal with a frequency nearer my need. Even after 3 months, no luck. So I ground a 5900 KHZ crystal to 6080 KHZ and redesigned my transmitter with an extra stage. Took out my 1956 Vintage Xtal converter for 10 meters, souped up its sensitivity etc., and started listening for the Oscar every day. After a few days I could know the periodicity, how long the signals can be heard, etc.

In the meantime one of the issues of "73" magazine gave some information. Also, I had sent an "SWL" report to AMSAT. They quickly replied me with orbital information and complete details of frequencies of Oscar 6 & 7. Now, I heaved a sigh of relief. It was mentioned that one should use 100 watts of ERP i.e., TX output minus the losses in the cable plus the gain of the beam. I didn't have a beam for 145 mhz.

At this time my TX output was (don't laugh!) 13 watts, and all the data available suggested rotatory antennae both for elevation and azimuth.

The story was like that of the person who found a horse shoe, and tried to obtain the Horse, for he had a shoe. In my case, a satellite was free, so I had to build a beam; to turn the beam, I had to find a rotator, and for the rotator a power supply etc. So, to avoid all these complications, I decided to try a ground plane. I took the "SO 239" Antenna socket. Took 18 SWG copper wire cut the wire to length for the frequency of 146 MHz. To the four fixing holes I fixed four wires with nuts and bolts as ground radials. To the central connector, another wire was soldered vertically as the radiator. The socket was screwed to the coax cable connector and tied to a bamboo. A very simple, crude looking creature. Believe me, when all the information available suggested the use of Helical and Beam antennas, I had my doubts whether this "QUADROPUS" will suffice with my 13 watts output. With anxiety, I waited for the time when "Oscar 7" was near India around 8 P.M. The beacon on the 29.5 MHz started coming in slowly and was growing louder and louder.

I keyed my TX and tuned my RX. Yes there it is! yes it is there! my downlink signal around 29.47 MHz. A long sigh of relief at last. I made it! I made it! That day was like the day I heard VS6CJ and KR5AK on 50 MHz, my first VHF DX. The next day I tuned up my TX for better output. The next night I started calling "CQ" via Oscar 6 & 7. My surprise and joy knew no bounds. VU2UV

replied the first QSO from VU2RM via Amsat Oscar. I still did not know which was 6 and which 7. Anyway, I made the first QSO. The next day it was Oscar 6-called CQ and no one came; then suddenly a high speed CW station called me—who? QRZ? brought me "OH2RK" first DX via Oscar 6. In about a week's time OH2RK had sent his excellent "Oscalator" QSL card. This calculator is designed and made by OH2RK and is also a QSL for the contact. With this in hand, it was easy to follow the orbits.

Now, I purchased a few Aluminium tubes of $\frac{1}{4}$ " & $\frac{3}{8}$ " dia and wooden strip and made a 3 element Beam with "Gamma Match". I did not tune the elements; the only adjustment made was matching and bringing down the SWR. I had purposely not tuned the elements so that, I could get some back radiation and a Broader Beam width so that the need for frequent rotation of the Beam could be avoided. Indeed, it worked satisfactorily. (At a later date I made it into a 4 element beam: 1 radiator + 1 reflector + 2 directors). In the meantime, slowly I began to lose my 6J6 final doubler valve due to overdrive from my 5763. So, one day I removed the 6J6 and put in a 5763. And happy go lucky with the TX-it now gives about 30 watts output at full line voltage.

My present set up for Oscar 6 and 7 work-TX: as shown in block diagram. RX: Bc 348 double conversion + converter 6AK5 RF amp, 6J6 mixer cum Xtal oscillator output 3.7 MHz Antenna downlink-1) Vertical Dipole 2) Horizontal Dipole sometimes both tied together to avoid fading. Uplink Antenna-4 element vertically polarised Antenna, coax-fed.



BLOCK DIAGRAM OF TRANSMITTER

Here are some of the points for newcomers to Oscar. Both Oscar 6 and 7 come via South pole and climb up to the North pole in our evening orbits. They come via North pole and descend down towards the south pole in our morning orbits. There are almost 3 orbits in the morning and 3 orbits in the evening when we can hear the beacon and mostly work through. Sometimes due to ionospheric absorption the signals cannot be heard. Mostly, I say mostly (not as a rule) the orbits between 6.10 A.M. to about 8 A.M. are on the east of us. Between 8 A.M. to 9 A.M. it is almost over India, otherwise known as overhead pass. Passes between 9 A.M. to about 11 A.M. are west of us. So you can guess what countries you can work in the respective orbits. The orbits between 6 and 8 A.M. First, you can work a few RA 9; then Japanese and finally VS6. To the west between 9 & 11 A.M., in the morning time, initially we can work into Europe.

Likewise the evening orbits are the same country-wise, except the satellite now comes from South pole and travels towards the North pole. For us in India, in the evening passes, initially we may not hear any country for the first ten minutes. Towards the end of useful time for us, we can get

Have you heard anything like this on 26.45 MHz?

104 199 193 184 299

201 214 253 385

372 351 347 446 438

448 450 550

504 550 557 610 601

601 651 HI HI

This is the Beacon, transmitting telemetry data about the Oscar in Morse Code.

Japan, and in other orbits, Europe. As the activity goes up, this situation will change.

The most often asked question is: when can I hear the satellite? For this, one may get the orbit information from AMSAT P.O. Box 27, Washington-D.C, USA 20044, or from data published in Journals, including RADIO. Otherwise, the first day, keep tuning for almost 2 Hours on 29.5 MHz. You will note the acquisition time of the signal. Note it down. The next acquisition of signal (AOS) is after 1 H 55 Mts; Oscar 7 works on these frequencies on alternate days, that is, on odd days of the year. Do not go by the date; go by the days of the year only. For example, 31 January is odd day; 1 February though odd, is actually the 32nd day of the year, which is even. So, during February even dates will be odd days and odd dates are even days. If you acquire the signal today at 7.30 A.M., tomorrow, you will hear the signal approximately 6 minutes earlier than today (i.e., around 7.24 A.M.) Normally AMSAT publishes the EQX equatorial crossing time. For our mornings, the EQX published is, on the other side of the earth. Therefore, for AOS we have to add the time taken for the satellite to come and climb over North pole and start descending our side. This is approximately 40 minutes. So, for all our morning orbits, add up, 40 minutes + 5H 30 minutes (to convert GMT to IST) + the actual EQX as published by AMSAT. But for our evening passes, just add 5.30 only, since the satellite is crossing the equator on our side.

My 2 years of work via Oscar 6 & 7, has brought me 30 countries KG6, DL, F, G, HG, I, JA, JY, LZ, OH, OK, RA9, SM, SP, ST, SV, UA3, UB5, UC2, VK, VS6, VU2, VQ9, YB, YO, YU, ZE7, 4x4, 4W1, 5Z4) 4 continents and 670 QSO's. I have worked JA1 through JA6 (JA6 kept me nervous for almost 2 years) For those who are thinking of working through a satellite: I tell you, don't get disheartened-just 6 watts output with a ground plane is enough to work through, on the overhead passes. But one thing is for sure-you should have a good receiving

THE AUTHOR

Mr. S. Ramamohana Rao joined the State Broadcasting Department in the fifties and has served at various places in Andhra Pradesh. He is presently in charge of VHF Communications at Kakinada Port.

OM Rao was one of the earliest Indian Hams to build an SSB transmitter and was again in the lead with his SSB transceiver. He has probably built more transceivers than any other in India. He is fond of finding challenges and has a unique way of meeting them. This article is a case study in sincere interest and sheer perseverance.

set up. Less noise, more gain-or is it less luggage, more comfort?

I have only mentioned about 145.9 MHz uplink and 29.5 downlink. Oscar 7 has another mode i.e., 432 MHz uplink and 145.9 downlink. This is called Mode B. It is switched to this mode on all even days of the year. So if you have a 2 Meter converter, tune in between 145.9 to 146 MHz one hour earlier than the previous day's Mode A AOS time.

Amsat considers it as a complete "QSO", if both sides exchange reports; no need for handles, QTH etc. Most of the overhead passes are dry since not many stations operate via Oscar. So how about you? You can put in a sincere effort to operate through Oscar 7 and see the fun! HI! HI!

CAPTIONS FOR PICTURES

Opposite: OSCAR 7

Back Cover

Left hand side (Bottom to top)

BC 348 double conversion receiver; 7 Mhz: AM Tx; 7 Mhz SSB Tx Middle-(Bottom to top) 2 & 10 Meters Oscar converters; SWR Meter; L.F. & M.F. converter down to 100 KHz.

Right hand side:-Power supply unit for VHF TX. Above it with single meter is Oscar 75 watt 145.9 Mhz Tx.