

**Amsat-VK and working the low earth  
orbiting satellites. “LEO Sats.”  
Bob Hudson VK2AOR**



- 1. What is Amsat -VK and how do you join?**
- 2. What are low earth orbiting satellites?**
- 3. Where did I catch the bug to try satellites?**
- 4. But could I really do it?**
- 5. What antennas would I use?**
- 6. What Program would I use?**
- 7. What was my first contact?**
- 8. What Satellites are working now?**

# What is Amsat-VK and How do I join?

## What is AMSAT-VK?

AMSAT is a worldwide group of Amateur Radio Operators who share a common interest in building, launching and communicating with each other through non-commercial Amateur Radio satellites.

AMSAT-VK is a group of Australian Amateur Radio Operators who also share the same common interest in building, launching and communicating with each other through non-commercial Amateur Radio satellites.

Many of our members also have an interest in other space based communications, including listening to and communicating with the International Space Station, Earth-Moon-Earth (EME), monitoring weather (WX) satellites and other spacecraft.

AMSAT-VK is the primary point of contact for those interested in becoming involved in amateur radio satellite operations. If you are interested in learning more about satellite operations or just wish to become a member of AMSAT-VK, click on the membership link on the sidebar to the left.

The members of AMSAT-VK participate in a national net, which utilises a network of repeaters, HF, Echolink and IRLP nodes located throughout Australia, New Zealand and the US. For further information see the National Net link on the sidebar.

AMSAT-VK also organises face-to-face meetings of our members from time-to-time. We are also active in promoting the use of the amateur satellites and encourage our members to become involved in the development, launch and operations of amateur satellites.

AMSAT-VK operates entirely via a Yahoo Group and this pointer website.

Paul Paradigm - VK2TXT is the national coordinator of AMSAT-VK & AMSAT coordinator of the WIA.

Judy Williams - VK2TJU is the AMSAT-VK Secretary & Group moderator.

Mal Pizzey - VK2MAL is the AMSAT-VK Project Officer & Group moderator.

**Contact list**

# How do I join Amsat-VK ?

## Contact list

General inquiries – [info@amsat-vk.org](mailto:info@amsat-vk.org)

Website inquiries – [webmaster@amsat-vk.org](mailto:webmaster@amsat-vk.org)

AMSAT-VK Coordinator – [coordinator@amsat-vk.org](mailto:coordinator@amsat-vk.org)

AMSAT-VK Secretary – [secretary@amsat-vk.org](mailto:secretary@amsat-vk.org)

If you need to get in contact with an AMSAT-VK Group moderator, please email Jude, AMSAT-VK secretary,

Mailing Address.

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C/O Ms Judy Williams  
1 Ennis Place  
LALOR PARK NSW 2147  
AUSTRALIA

# What are low earth orbiting satellites?

**1. A low earth orbiting satellite operates typically from 400 to 2000 kilometres above the earth, commonly abbreviated to LEO.**

A High Earth Orbiting satellite operates above 20,000 Km and a Geosynchronous orbit at 35,680Km.

The only ones we have at this time are LEO and rotate over the poles and typically have a pass duration of 90 to 120 minutes . Of this there are 3 types of orbit. Sun Synchronous, passes near the poles. Spends time in the sun and eclipse depending on altitude and works on batteries when in eclipse. The Japanese sat FO-29 is a great SSB sample and is still working at a height of about 850Km. All LEO's usually have 3 passes in the morning and 3 passes in the evening that are accessible from Sydney.

## **2. Special Sun Synchronous or Dawn to Dusk that follow the line between daylight and darkness.**

Our best example of this satellite is AO-07 and passes near the poles. Spends most of its time in the sun and very little in eclipse. AO-07 is a special satellite as it was launched in 1974 and ceased working June 1981. Born again June 2002 thanks to solar panels and is still working today 2017 and is currently around 1460 Km above the earth and so has the largest footprint of any of our current satellites. It does not work when in eclipse as the batteries no longer are operational and is mostly exposed to sun due to its orbit and height. VK2ZIO Ian reported to me that when it was working between 74 and 81 you could hear the CW HF beacon 2 or 3 passes before it was in a useable orbit on vhf/uhf near Sydney. In this type of orbit most parts of the planet receive equal access.

### **3. The Inclined orbit is equally inclined in the northern and southern hemispheres. Such as SO-50 and ISS.**

They spend most of their time in the sun at some times and most in eclipse at other times. Batteries are required to operate when in eclipse. All parts the planet receive equal access. They do not passover the poles.

**Where did I catch the bug to work  
satellites?**

**Right here in 2009.**

**Using the IOIO antenna and 2 handheld  
radio's**

**Video**

**Geoff VK2ZAZ**

## **But could I really do it?**

**70cm Cushcraft 6 el Yagi, 2m Homebrew 5 el Yagi**

**Started vertical, proved that I could receive the satellites moved to Horizontal. Pointed to a clear spot where I knew the sat would pass and waited and listened and heard a conversation. Then I caught the bug and mounted the antennas on a rotator with a boom and angled the antennas up about 30 degrees. Here is a photo of my first attempt.**



**Here is the setup I worked for 2 years and was missing about 25% of the the available passes or parts off.**

Photo

## What antennas would I use?

**22 el Crossed Yagi 70cm, 14 el crossed Yagi 2m both circular polarised M2 ( M Squared). Trying out microwave LNB's and grid pack antennas to receive TV from the ISS. Further experimentation required. Before I moved from Sydney.**



## What Do I use Now ?

The same antennas and have added a 21 El Yagi 23cm, TV to add.



## **What program would I use? SatPC32.**

**Why ? Because it was the one that suited my radio Yaesu FT736R and I was able to get working with some help from others interested in satellites and joined Amsat-VK yahoo group. I started working SSB satellites and they are a lot of fun having generally a 100hz transponder whereas the FM birds are a bent pipe repeater. Most people I have spoken to use SATPC32 and there is always someone about who can help.**

**When operating portable with a hand held antenna there are a number of programs for smart phones. I used one when in Glenelg visiting relatives and one you recognise where north is it is fairly easy. I used my antenna you see out the front with a duplex or and a VX7 to work into Perth and into Sydney. SO-50 footprint does not extend from Sydney to Perth and it could have been on SO-52 which is now silent. If there is enough time I will give you a quick run around SATPC32.**

**What was my first Contact ?**  
**My first contact was SSB with ZL2BX**  
**Alan in Wellington**  
**on AO-7 20-03-2009 9.36am**  
**and FO-29 the same day at 9.58 am**

I was lucky enough to have have purchased an FT-736R during some time away from AR. This is duplex radio in that it will transmit on 2m while listening on 70cm and combinations of 2 different bands as mine had 2m,70cm and 23cm. This gives you the ability to hear your own signal if it hits satellite and no one else is on it. This confirms to you that everything is working. There are a number of radios that have this capability and you should check it out before purchasing.

**What satellites are working now  
and how do I find out about them?**

**AMSAT.org**

**Status Page**

**On internet**

**How-to's**

**Go to AMSAT.org website**

**AMSAT-UK.org**

## **Hand Held operations**

The one you see here is from a an article written by Rob Greaves, VK2GOM and is available on the Amsat-VK Yahoo group under "files".

Another home-brew antenna is the IOIO which is very simple and easy to make also on the Amsat-VK group.

Commercial antennas are Arrow made from arrow shafts, comes dismantle into a neat canvas pack relatively light, just depends how long you want stand holding the antenna.

### **Operating**

When operating portable work out the path of the sat from Satpc32 or a number of apps for smartphones. You need to point to the angle of AOS and now approximately where the LOS is, also pick your max elevation point which will be the half way point and half the elapsed time of the pass.

The path will form an arc and while following the arc you need to twist the antenna through approx 90 deg, and swing it around looking for the signal . Once you find the signal continue on the arc with gentle swings looking for the loudest signal. If you can't hear the signal you may need to swing it further.

The other challenge is doppler shift. There is an article in AR mag by Paul Paradigm VK2TXT which has a table showing the frequencies to set in your hand held with 5 kHz spacing so start about 10 kHz high of the nominated frequency and say 6 memories dropping 5khz each memory position. Set the transmit frequency the same for each memory position. If operating SO-50 then you need to also program the CTCSS tone frequency into the transmit settings.

# What satellites are working now?

The Satellites I currently have in my program are listed below.

AO-07

FO-29

SO-50

AO-73

AO-85

XW-2A

XW-2B

XW-2C

WX-2D

WX-2F

ISS

Slow Scan TV picture from the ISS received on 2m around the 50th anniversary of Yuri Gagarin first man in space flight.

