Ham RADIO News

Newsletter of the Amateur Radio Society of India (Indian Affiliate of IARU)
April 2015 Issue

Presidents Message

The very popular “hill topping” day was conducted very successfully with a large number of participants taking “to the hills” literally!

The logs are still being received and analyzed and the winners will be announced shortly. Certificates for the winners and also for the winners of the 2013 event, which were not sent, will be sent out as soon as possible.

As mentioned last time, we continue to try and change the archaic regulations that govern our hobby. A visit to WPC was made in March and submissions also made.

ARSI is also working with WPC to submit proposals for the WRC 2015 to be held later this year where IARU is working on obtaining a segment in the 5 MHz band.

We gather that planning for the next Hamfest to be held in Rajkot is well under way and should be a very enjoyable and useful event

The Seanet Conference is being organized in Kerala later this year where a number of foreign visitors are expected. More information is available on their webpage.

Gopal Madhavan VU2GMN

From the Editor’s Desk

Non-amateur friends keep asking me if general interest in ham radio is waning because of the availability of several other means of fast and easy communications.

I take time to explain to them that ham radio is not only about communications; it is the experimenting, learning, and involving in radio electronics personally that matters.

You see, if I want to communicate with someone in USA, I will use the telephone; but if I want to know whether my antenna is working alright, I need to communicate with someone – of course, the farther the better.

ARRL reports that Amateur Radio is showing steady growth in the U.S. and the FCC database showed 717,201 licences at the beginning of 2014.

We have reports from Gwalior and Pune where amateur radio is regularly showcased in schools – we need to arrange such talks in Rotary Clubs and Lions Clubs, and in as many schools and colleges as possible.

There is no need for a group - even a single amateur can organize such a talk and demo in a neighbourhood school or college!

Ganesh VU2TS

STAND-BY FOR 60 METERS!!

The President, ARSI has made a presentation for an allocation of a portion of the 60 meters band (5275 to 5450 KHz) for VU, in line with what IARU is doing worldwide to bridge the gap between 80 and 40 meters so that we could use the bands seamlessly without too big a gap. This is an agenda item for the next WRC.

Several letters he has written to the Prime Minister and the Telecom Minister, has had effect and the matter of relaxation of the regulations on issue of licenses is being considered seriously.

Apparently three high level meetings have already taken place and while the Ministry of Home Affairs is still insisting on security clearances, they are trying to find a way to sort out the issues. So let's hope for something concrete soon!

ILLW reaches 100 milestone

A prompt on the social media Facebook on New Year's Eve about the then vacant 100th registration in the International Lighthouse and Lightship Weekend received an almost instant reply from Germany.

Quick off the mark was Gerhard Impekoven DJ9QE, who will activate the Oland Light, Germany's smallest lighthouse standing 7.4 metres (24 feet) tall, built with brick and the country's only one with a thatched roof.

The cross light in the tricky waterways off the small North Frisian Island has continuous white, red and green sectors. Gerhard will be sent a certificate acknowledging his 100th registration.

So far 17 countries have registered with the leaders being Australia 34, Germany 22, and England 10 and 8 from USA. It's no surprise that the leaders have 70% of all registrations to date.

Other made come from Argentina, Canada, Finland, Ireland, Malaysia, Northern Ireland, Netherlands, New Zealand, Puerto Rico, Scotland, Sweden and Wales.

The 18th International Lighthouse and Lightship Weekend is on the 15th and 16th of August. For the easy guidelines and to register please check out the website illw.net

Jim Linton VK3PC

10th anniversary of EURAO (2005-2015)

QSP from EURAO – (European Association of Radio Amateurs) A *long path has been travelled and an intense experience lived since **F5RCS** proposed in mid-2005, the creation of a European association of radio amateurs.*

*In just ten years, **EURAO** has achieved: real members in more than 50 countries, in and outside Europe; setting up a global QSL service; recognition by: EU, UN, CEPT and ITU; economic stability; attendance to HAM RADIO exhibitions; performing projects and activities, such as awards, parties, emergency communications exercises or youth meetings; etc.*

With your support, all of you, from readers to members, have contributed to an Amateur Radio more plural and diverse than ever, more free and with more options to choose, but not necessarily more divided in front of real problems and threats of our hobby.

*A common front is possible for these issues and **EURAO** is open to collaborate with anyone, individual or organization, who shares the same aim. We will go ahead!*

*Thanks a lot for your trust and hope to keep your priceless collaboration for a long time. Happy birthday **EURAO**!!!*

Attention Movie Buffs:

An English dubbed version of the 1988 Italian movie 'High Frequency' is available on YouTube

The MilliWatter Extreme

SOTABEAMS has announced an unusual new product.

The **MilliWatter Extreme** is an RF-switched power attenuator that is designed to allow the user to explore the communication possibilities of extreme low power - power levels lower than most transceivers can achieve. It will work with any transceiver with an output of 10 watts or less.

The MilliWatter Extreme gives two different levels of attenuation, 1/10th and 1/50th of the input power (10dB and 17dB).

Because it is RF-switched, it is ideal for use on the higher HF bands where the additional attenuation given by standard fixed attenuators would severely reduce the receiver sensitivity. The attenuators in the MilliWatter Extreme have been designed to be very accurate so that the output power is precise; this is a great help in experimenting.

The MilliWatter Extreme will work on any mode including data modes.

The MilliWatter Extreme is available fully-built or in kit form. It is powered by a standard USB socket.

http://www.sotabeams.co.uk/boxa-mwextreme/

New world record claimed on 10 GHz

The ARRL reports a 10 GHz contact by **Rex Moncur VK7MO** and **Derek Zeck VK6DZ** over an astounding distance of 2,732 km.

The contact took place on January 5, 2015 during a tropo opening across the Great Australian Bight using the **JT4f** data mode as well-as-SSB.

VK6DZ was portable at Torbay Hill, 24 km west of Albany, Western Australia. He was running 10 W to a 60 cm dish. VK7MO was portable Cape Portland in north-eastern Tasmania, running 50 W to a 77 cm dish.

'HT of the Future'

During mid-February, Bruce Perens - K6BP demonstrated the HANDHELD TRANSCEIVER OF THE FUTURE at the Orlando (Florida, USA) Hamcation.

Known as the **Whitebox Charley** (third generation) which is about to go to a prototype manufacturing run. He hopes to start selling this version soon.

Here are the target features of this version, most of which are already tested and working:

• Developer version. Suitable for portable, mobile, or base use.

• 50-1000 MHz transceiver.

• Narrow bandwidth mode: 15 or 30 kHz channel.

• Wide bandwidth mode: Up to 1 MHz digital channel or spread-spectrum.

• On board FLASH based gate-array.

• FM, SSB, DSB, AM, any digital mode you program including GMSK, C4FM, etc.• 100 mW output.• Works with Down East Microwave single-band amplifiers to boost to 30W.

• On-board ARM-based Linux system.

• USB on-the-go works as USB host or target.

• USB Wi-Fi base station tested and working.

• USB sound devices tested and working.

• 100 Megabit Ethernet.

• Can use your Smartphone as the user interface and application platform, no wires.

• Interface for CW paddle.

• Hosts Raspberry Pi daughter cards, including version 2.

• Runs on 12 Volts.

• Protected from ESD and automotive voltage spikes, meeting applicable standards.

• Battery efficient enough for handheld use.

• Mostly Open Hardware and Open Source, slight restriction to protect our non-Amateur markets.

• Supports either Open Source or proprietary applications.

• This version is marketed as test equipment (for regulatory purposes).

• Fits in a Hammond box. Punched end panels available. *(These are standard die-cast aluminium enclosures 115 x 65 x 30 mm)*

No Amateur would has never seen anything like this!

Future milestones:

• Multi-band amplifiers for both handheld and base/mobile use.

• Package for HT use, integrate with lithium battery and charger.

• Comply with U.S. cellular lockout without handicapping the rest of the platform.

In essence, it is a cross between a smart phone and a software defined radio with an Open Hardware & Software license. Built to set the Internet totally FREE from its bondage to wires.

https://www.facebook.com/whiteboxradio

https://github.com/testaco/whitebox

RETRO SUN

Keeping track of the sunspots constantly helps in knowing the activity of our star but the two indices used by scientists disagree on dates prior to 1885.

The first index is the 'International Sunspot Number' or Wolf number, thought up by the Swiss astronomer Rudolf Wolf in 1849. It is currently the method followed by the Royal Observatory of Belgium, aided by a network of more than a hundred other astronomical observatories, the majority by amateur volunteers.

The second version is the 'Group Sunspot Number' that was created by US scientists Douglas V. Hoyt and K.H. Schatten in 1998.

Since the invention of the telescope in the 1600s, observers have recorded variations in the numbers of dark spots, or sunspots, on the sun's surface. Observations have shown that the sun exhibits a periodic change in the number of sunspots that normally follow a regular cycle with peaks 11 years apart.

03 Feb. 2014 - Photo credit: VU2TS

The more spots that appear, the more luminous the surrounding areas are, and our star shines brighter. (And the ionosphere is charged)

The eleven-year cycles do not always have the same intensity. The more intense peaks of the Sun's luminosity were produced in the 20th century, which experts have called the 'modern maximum'.

However, an international team of scientists has reviewed the historical data and has verified that there were also elevated values in other periods.

"It has been a huge surprise to observe that the present level of the Sun's activity is practically the same as it was in the 18th Century" points out Jose M. Vaquero, researcher at the University of Extremadura (Spain) and co-author of the research, a review of the number of sunspots recorded in the last 400 years.

The results, published in the journal Space Science Reviews, also reveals that in other periods the opposite occurred, such as the Maunder minimum (1645-1715), when the

sunspots practically disappeared and solar activity was drastically reduced.

"A proper estimate of the past and present activity of the Sun, our main source of light and heat, is crucial in understanding the numerous phenomena that occur on Earth, especially to rule out the role of the Sun in global warming.

TROPOSCATTER & DUCTING

Troposcatter or tropospheric scatter is a form of radio signal propagation for radio communications links on VHF and UHF bands up to distances of about 1000 km using the troposphere.

On frequencies above 30 MHz, it is found that the troposphere has an increasing effect on radio signals and radio communications systems. The radio signals are able to travel over greater distances than would be suggested by line of sight calculations.

At times conditions change and radio signals may be detected over distances of 500 or even 1000 km and more. This is normally by a form of tropospheric enhancement, often called "tropo" for short. At times signals may even be trapped in an elevated duct in a form of radio signal propagation known as tropospheric ducting. This can disrupt many radio communications links (including two way radio communications links) because interference may be encountered that is not normally there.

*[The **troposphere** is the lowest layer of Earth's atmosphere and site of all weather on Earth. The **troposphere** is bonded on the top by a layer of air called the tropopause, which separates the **troposphere** from the stratosphere, and on bottom by the surface of the Earth.]*

We all know that radio communications links at VHF and above follow a line-of-sight path. This is not strictly true and it is found that even under normal conditions radio signals are able to travel or propagate over distances that are greater than the line-of-sight.

The reason for the increase in distance travelled by the radio signals is that they are refracted by small changes that exist in the Earth's atmosphere close to the ground. It is found that the refractive index of the air close to the ground is slightly higher than that higher up. As a result the radio signals are bent towards the area of higher refractive index, which is closer to the ground. It thereby extends the range of the VHF/UHF radio signals.

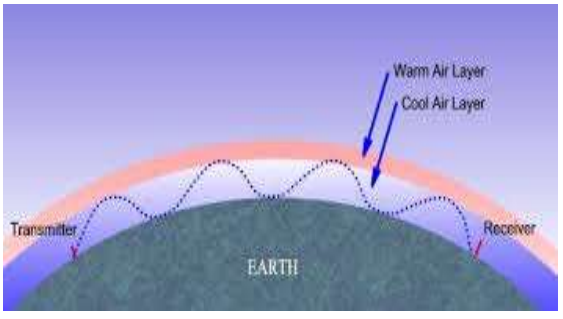
The refractive index of the atmosphere varies according to a variety of factors. Temperature, atmospheric pressure and water vapour pressure all influence the value. Even small changes in these variables can make a significant difference because radio signals can be refracted over whole of the signal path and this may extend for many kilometres.

Under certain conditions the radio propagation conditions provided by the troposphere are such that signals travel over even greater distances. This form of "lift" in conditions is less pronounced on the lower portions of the VHF spectrum, but is more apparent on some of the higher frequencies. Under some conditions radio signals may be heard over distances of 2000 or more kilometres with distances of 3000 kilometres being possible on rare occasions. This can give rise to significant levels of interference for periods of time.

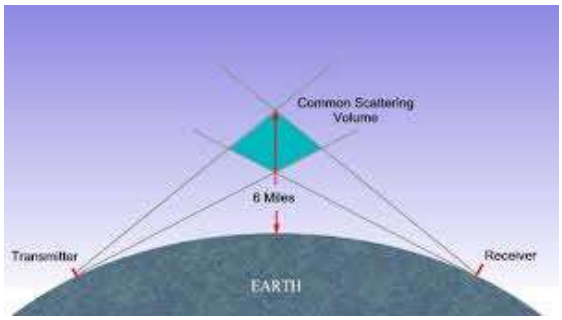
These extended distances result from much greater changes in the values of refractive index over the signal path. This enables the signal to achieve a greater degree of bending and as a result follow the curvature of the Earth over greater distances.

Under some circumstances the change in refractive index may be sufficiently high to bend the signals back to the Earth's surface at which point they are reflected upwards again by the Earth's surface. In this way the signals may travel around the curvature of the Earth, being reflected by its surface. This is one form of "tropospheric duct" that can occur.

It is also possible for tropospheric ducts to occur above the Earth's surface. These elevated tropospheric ducts occur when a mass of air with a high refractive index has a mass of air with a lower refractive index underneath and above it as a result of the movement of air that can occur under some conditions.



When these conditions occur the signals may be confined within the elevated area of air with the high refractive index and they cannot escape and return to earth.



As a result they may travel for several hundred miles, and receive comparatively low levels of attenuation. They may also not audible to stations underneath the duct and in this way create a skip or dead zone similar to that experienced with HF ionospheric propagation.

Under normal conditions a there is a steady gradient of the refractive index with height, the air being closest to the Earth's surface having the highest refractive index. This is caused by several factors.

Any VHF/UHF signal received will be subject to the prevailing propagation conditions caused by the troposphere. Under normal conditions it should be expected that signals will be able to be received beyond the normal line of sight distance. However under some circumstances these distances will be considerably increased and significant levels of interference may be experienced.

Air having a higher density and that containing a higher concentration of water vapour both lead to an increase in refractive index. As the air closest to the Earth's surface is both denser (as a result of the pressure exerted by the gases above it) and has a higher concentration of water vapour than that higher up mean that the refractive index of the air closest to the earth's surface is the highest.

Normally the temperature of the air closest to the Earth's surface is higher than that at a greater altitude. This effect tends to reduce the air density gradient (and hence the refractive index gradient) as air with a higher temperature is less dense.

However, under some circumstances, what is termed a temperature inversion occurs. This happens when the hot air close to the earth rises allowing colder denser air to come in close to the Earth. When this occurs it gives rise to a greater change in refractive index with height and this results in a more significant change in refractive index.

Temperature inversions can arises in several ways. One of the most useful inversion occurs when an area of high pressure is present. A high pressure area means that stable weather conditions will be present, and during the summer they are associated with warm weather. The conditions mean that air close to the ground heats up and rises. As this happens colder air flows in underneath it causing the temperature inversion. Additionally it is found that the greatest improvements tend to occur as the high-pressure area is moving away and the pressure is just starting to fall.

A temperature inversion may also occur during the passage of a cold front. A cold front occurs when an area of cold air meets an area of warm air. Under these conditions the warm air rises above the cold air creating a temperature inversion. Cold fronts tend to move relatively quickly and as a result the improvement in propagation conditions tends to be short lived.

Troposcatter uses the troposphere as the region that affects the radio signals being transmitted, returning them to Earth so that they can be received by the distant receiver. Troposcatter relies on the fact that there are areas of slightly different dielectric constant in the atmosphere at an altitude of between 2 and 5 kilometres. Even dust in the atmosphere at these heights adds to the reflection of the signal. A transmitter launches a high power signal, most of which passes through the atmosphere into outer space. However a small amount is scattered when is passes through this area of the troposphere, and passes back to earth at a distant point. As might be expected, little of the signal is "scattered" back to Earth and as a result, path losses are very high. Additionally the angles through which signals can be reflected are normally small.

Usually Troposcatter requires high power transmitters, sensitive receivers and high gain antennas, but it provides a very convenient data transmission system for many radio communications applications. Although there are limitations, it nevertheless provides a cost effective data communications system, cheaper than using satellites, for many medium distance applications.

Troposcatter was used widely before satellites came into availability. It used decimeter wavelengths (approximately 2 GHz) and lots of power with very high gain antennas. Basically the earth and the troposphere were used as reflectors, creating a type of duct. It

is noted the the SEVER and the GOREEZONT (HORIZONT) systems used both space and frequency diversity as a part of their system. Frequency diversity means that there were as many as five identical signals transmitted on different frequencies at the same time. Space diversity means that two or more transmit and receive antennas were used, as can be seen in the picture. This site was run by the military, but would have likely carried civilian communications as well.

Basically it was a way to maintain communications across vast distances when wired or microwave systems were not practical or possible. The US used such systems on the DISTANT EARLY WARNING line and across the Pacific Ocean between Hawaii and Okinawa. These systems were massive and expensive to build, operate and maintain. From the looks of the pictures, site 6/60 generated all of it's electricity with diesel generator sets. Fiber optic cable is an improvement of several orders of magnitude over this technology.

It is always interesting to see how things used to be done and give thanks to those who went along before us.

de/VU2TS

SOLAR FLARE WARNING SYSTEM

The DEEP SPACE CLIMATE OBSRVATORY known as **DSCOVR** that acts as an Early-Warning-System for incoming Solar Flares, was launched in January last.

As we are aware, the *Coronal Mass Ejections – bursts of energy and magnetism* can cause havoc on the ground, disrupting communications and GPS. I post information on CMEs regularly on the ARSI reflector.

The new observatory will provide a warning time of 15 t 60 minutes, allowing the Space Weather Prediction Centre of NOAA to predict precisely when the storms will arrive and to determine whether they are likely to cause a major disturbance.

The satellite will be positioned between the Sun and the Earth at a distance of 1.5 million kilometers in a spot known as "**Lagrange point**". At this point, the gravity of the Sun and Earth are in balance, allowing the craft to maintain a constant view of the surface of the Earth.

It will measure the intensity of the incoming magnetic fields and track energetic particles of the Solar Wind, using data to reveal the velocity, density, and temperature of the incoming storm.

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G8HUH Spots VK5CV on 477 KHz

Using the new **'OPERA DYNAMIC'** MF/LF beacon mode,

VK5CV TX - 16:30z 477 KHz
G8HUH Rx - 16:39z at -37dB

VK5CV reported using 50 watts carrier power to 160m inverted L with a base loaded variometer.

NB: This may have been one of the 'Flash' propagation events linked to the MF band, to date UK/EU to VK has yet to be achieved.

A distance of 15,660 kilometers!

Propagation Tool for Android

WSPR World Watch is a free Android app that plots real-time HF band propagation conditions on a map of the world.

See https://play.google.com/store/apps/details?id=xxx.wspr.g4swy for pics and more information.

DX SOUND BITES OF 2014

Tom, K8CX, has provided DXers with 152 memorable rare DX sound clips (now in MP3 format) of major activities during 2014.

Visit Tom's famous "HAM GALLERY" Web site at:-http://hamgallery.com/dx2014

While there I urge you to check out some of the other features on his Web page, such as: 17 years of "Rare DX Sound Clips" of the past (as well as some clips from the 1960's and 1970's), QSL Card Museum, Dayton Photo Galleries and Tribute to Silent Key Ham Operators.

Tom states, *"If anyone has any old HF recordings, I would be interested in hearing from them."* His E-mail address is: k8cx@hamgallery.com

/Ed

PUNE, MAHARASHTRA

The College of Engineering Pune (COEP) Ham Club is more than 20 years old and many past students have contributed its growth with various additions and activities. I have witnessed their transformation.

However, the current initiative of Micro satellite creation with the support from ISRO is most ambitious under the guidance of able staff members. The Mission under the title ***Swayam*** is divided into five sub systems and different teams are active on the project. The state of the art FAB LAB is created to facilitate the students

1: Structure
2: Communication
3: Power
4: On board computer
5: Attitude control system

The Dimensions of the Micro Satellite are 10 x 10 x 11.5 cm and weight 1Kg

The mission objective: Technological demonstration of passive attitude stabilization in the polar orbit

The Satellite Utility - Point to point message transfer. It will operate in Ham Band

At present the COEP's ground station is fully operational using home-brew directional and Potato mesh antennas

The team has cleared PDR and signed MoU with ISRO and the flight model will be created by ISRO and launched shortly.

I visited and witnessed this activity with W5SPK OM Sean Kelly from Amphenol USA on 15th Jan 2015 and interacted with students.

I must thank Dr. S. P. Mohani, Associate Professor, Department of Electronics and Telecommunication, College of Engineering, Pune. (COEP) making excellent arrangements for my friend OM Sean Kellys's visit. Student members Girish Baj and Rupesh Lad and their team took special efforts for making arrangements.

43rd SEANET Convention India 2015

W5SPK AT ST.MARY'S SCHOOL, PUNE

OM Sean Kelly, W5SPK, supply chain Director at **Amphenol USA** was on his business visit to Pune this week. You know Amphenol is very popular for various types of connectors used in Electronics. OM Sean is a certified fire-fighter and has extended his service in many emergencies in Texas State.

On Tue 20th Jan 15 morning he addressed young boys from St Mary School Pune on fascinating hobby of Ham Radio. This was his second address. The first address he gave in July 2013 and created interest in students about Ham Radio. St Many school ranks 7th in India and will be completing 150 years shortly.

W5SPK talking to the students

During the talk this week students were well aware about Ham Radio and were very interactive. They asked lot of questions and showed keen interest in pursuing the hobby.

OM Sean W5SPK assured all the support for upcoming Ham activity in the school as he will be regular visitor to Pune. The school Principal assured Sean Kelly that there will be some progress in Ham Radio activity in the school by his next visit.

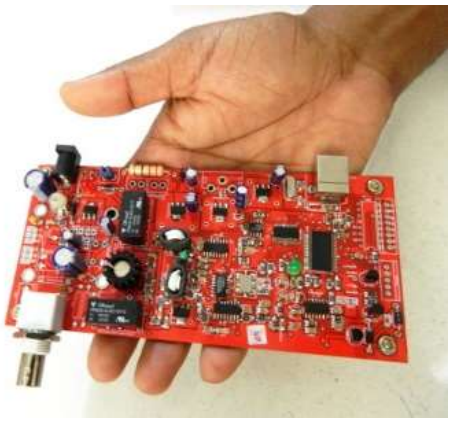
OM Sean Kelly was kind enough to gift some CQ Magazines and Ham gear for the proposed Ham Radio club in the school.
73,

de - Vilas Rabde
VU2VPR-145.5 MHz, Skype: vilasrabde

[Gopal/VU2GMN set up the AMPHENOL plant In Pune during 1970-1974, Sean/W5SPK had visited VU at the time! /Ed]

CHENNAI, TAMIL NADU

A DO-IT-YOURSELF workshop on **SOFTWARE DEFINED RADIO** was held in Chennai on 14th & 15th March 2015.



This was jointly organized by *LAMAKAAN AMATEUR RADIO CLUB, HYDERABAD AND THE SOUTH INDIA AMATEUR RADIO SOCIETY CHENNAI,*

The SDR is an amateur radio transceiver that operates on all the HF amateur bands. It uses a computer to control the radio, to demodulate the signals received, and to modulate the signal transmitted.

The computer control and signals in and out go through the USB connection, the antenna connects to the hardware, the microphone and headphones/speakers are connected to the computer, and a Morse key or iambic paddle to the hardware for sending Morse code.

This multiband SD radio named as VUSDR ZAZ is developed by Dr B.N.A.M Naidu, VU2ZAZ, Hyderabad based on a proven design of a single band SDR transceiver called Peaberry designed by AE9RB.

The workshop began with a brief demo of the transceiver followed by some soldering and construction advice from OM Naidu and OM Sasi VU3ELR. Then the participants began the assembly. OM Sasi was at the hot air station, fixing shorts and slivers, winding coils and guiding participants in the assembly, while OM Naidu was at the helm of the Oscilloscope, constantly testing modules as and when they were completed, offering valuable advice and encouraging builders as they proceeded in a modular-assembly manner.

The first transceiver to be completed came to life by about noon on the second day, with OM Naidu having a QSO with a few stations to test the transceiver. Post lunch, OM Naidu was kept extremely busy, testing the built boards, one-by-one. After a brief explanation of the theory behind the circuit, and a run through of the software installation, the last transceiver was tested. The workshop ended with a valedictory note by OM Suresh and a quick photo session by OM Sinosh.

Dr.Naidu VU2ZAZ

A special mention to YL Madhumathi for breezing through her first project without running into even a single problem!

Tnx Aravind VU2ABS

MYSTERY OF UVB-76

SWLs were busy, excited. Volume dials were turned up, computers began recording, and forum posts were hastily typed. Something big was happening.

For the first time in a history that stretches back nearly 40 years, the mysterious Russian radio signal popularly known as **UVB-76** had issued an order. On Jan. 24, 2013, it was heard clearly by its legion of fans:

O B Y a VLENIYA KOMANDA 135

Which means "*Command 135 initiated"* The radio signal that occupies 4625 kHz has reportedly been broadcasting since the late 1970s. The earliest known recording of it is dated 1982. Ever since curious owners of shortwave radios first discovered the signal, it has broadcast a repeating buzzing noise. Every few years, the buzzer stops, and a Russian voice reads a mixture of numbers and Russian names.

A typical message came hours before Christmas day, 1997:

"Ya UVB-76, Ya UVB-76. 180 08 BROMAL 74 27 99 14. Boris, Roman, Olga, Mikhail, Anna, Larisa. 7 4 2 7 9 9 1 4"

Instead of shutting down with the fall of communism in Russia, UVB-76 became even more active. Since the millennium, voice messages have become more and more frequent.

It's easy to dismiss the signal as pre-recorded, or a looping tone. But what listeners quickly realized was that UVB-76 is not a recording. The buzzer noise is generated manually. The reason for hearing telephone conversations and banging noises in the background of the signal is that a speaker creating the buzzer is constantly placed next to the microphone, giving the world an eerie insight into whatever cavern the signal originates from.

The modern popularity of UVB-76 can be traced to ***/x/***, 4chan's non-archiving message board devoted to discussion of paranormal activity and unexplained mysteries. Just as 4chan created memes like Pedobear and Rickrolling, the online image board served to bring UVB-76 before the eyes of a host of Internet users.

Online chatter about the signal increased in 2010 as bizarre broadcasts were issued on an almost monthly basis. Snippets of *Swan Lake* were played, a female voiced counted from one to nine, a question mark was transmitted in Morse code, and strange telephone conversations were overheard by the receiver.

See if any of you can hear UVB-76!

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I personally think this is one of those "NUMBERS STATIONS" which is a type of shortwave radio station characterized by unusual broadcasts, reading out lists of numbers or incomprehensible Morse code messages. The voices are often created by speech synthesis and are transmitted in a wide variety of languages. The voices are usually female, although sometimes men's or children's voices are used. Some voices are synthesized and created by machines; however, some stations used to have live readers.

It is widely assumed that these broadcasts transmit covert messages to spies because the communication is always one-way. Sometimes there are coded instructions to the secret agent who is QRX on the frequency elsewhere in the world.

*A movie was made in 2013 – **"NUMBERS STATION"** – a thriller in which a black-ops agent is dispatched to a remote CIA underground broadcast station to protect a code operator.*

Link: http://www.imdb.com/title/tt1659338/

Watch it if you can – you will like it! /Ed.

Why am I including as many images as possible in the HRN?

According to the Pew Research Center, Wash. DC , a reader is 7.4 times more likely to read the full article if an image is attached to it.

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HAM RADIO assists MAHADEV MELA Traffic in Madhya Pradesh

How HAMs assisted in Pachamarhi Mahadev Mela during Maha Shivaratri in Madhya Pradesh. Pachamarhi is known as a Hill Station of M.P. and it comes under Hoshangabad District. Pachamarhi is covered from all sides by Satapura Hills one of the best place for HAM activities. ***Report from Jayu VU2JAU Gwalior.***

Following 8 HAMs took part in the activity

1 Jayu	VU2JAU	Gwalior
2 Aniket	VU2LOL	Gwalior
3 Kamal Raj	VU3RAE	Gwalior
4 Vivek Joshi	VU3JOS	Gwalior
5 Narendra	SWL	Gwalior
6 Kishor Naidu	VU2KKD	Ratalam
7 Rishabh Sood	VU2AXD	Bhopal
8 Shubham	VU3SXN	Indore

The activity went under way after D.M. Hoshangabad requested the amateurs to assist during Maha Shivratri Mela.

It was a very different experience to everyone using HAM Radio for the first time to support parallel communication. It was a system to support other communication which failed occasionally and it was realized by all officials. The amateurs proved their mettle with minimum manpower and resources.

We setup a main HAM Radio station at TAHASIL KARYALAYA controlled by OM Kishor Naidu VU2KKD and OM Kamal Raj VU3RAE on 15 and 16 Feb. Both of them handled the traffic quite efficiently and kept the station active. At night OM Vivek Joshi VU3JOS took the control. OM Aniket VU2LOL and OM Shubham VU3SXN took the control on 17 and 18 Feb. This HAM Radio station was under observation of CEO Shri Abhijit Agrawal and Deputy Collector Madame Tina Yadav OM Aniket Ashtikar VU2LOL, OM Rishab Sood VU2AXD with OM Shubham VU3SXN sent to CHORA GARH on 15 Feb. which was one of the most difficult parts of the Mela.

The team at the Tashildar's Office

All of them faced some difficult time after reaching to Chora Garh. The proposed place of the station was occupied by the devotees and the antenna erected there was lying on the ground. It was decided to take care of the situation by using only VHF Handies. All of them operated without break in spite heavy crowd and cold weather condition. They were equally supported and helped by Shri Nitin Tale, Shri Rajendra Pawar and other officials. It was a good example of co-ordination and co-operation among HAMs and officials. OM Kamal Raj VU3RAE alone was sent to Choragarh and on way, near Nandia junction, he also controlled the crowd as the condition was very critical. OM Kamal Raj VU3RAE stayed at Choragarh till 18 evening. On 18 Feb. morning OM Vivek Joshi VU3JOS and OM Narendra Tunia SWL went to Chora Garh and on way again they both controlled the crowd at Nandia junction.

Another HAM Radio station was installed on 15 Feb at Bade Mahadev under control of OM Jayant Bhide VU2JAU and OM Narendra Tunia SWL. OM Rishabh Sood VU2AXD and OM Kishor Naidu VU2KKD came to Bade Mahadev on 17 Feb.

The stations were in contact with each other round the clock, conveying the necessary information to officials.

The types of massages conveyed covered Medical facilities, water, food, cleaning condition of the different places, number of people on the move, Lighting facility and such subjects.

Make-shift shack! VU2JAU at the mike

We are thankful to all the officials for such a nice coordination and cooperation extended with our HAMs. We are sure in future we will do the activities in better way. We have supported with our minimum HAMs and minimum equipment but we have requested them to purchase ham-radio equipment to be used for such events in future; they will be kept under the custody of a duly licensed amateur. A future plan was submitted.

We took this opportunity to convince the officials of the advantage of amateur radio, and suggested that some of them get HAM Radio license so they can operate on their own during national emergencies and natural disasters; making Hoshangabad district the first district to have HAMs who are ready to assist during any disaster or natural calamity.

73,

de Jayant S. Bhide VU2JAU ARSI
National Coordinator for Disaster Communication in India IARU Region 3

43rd SEANET Convention India 2015

Why CW?

A column from The "Key Note"*, the newsletter of the American chapter of FISTS. By Dan KB6NU*

If you're like me, you take a lot of ribbing about being a CW operator. I don't let that bother me, though. Instead, I encourage the no-code guys to at least think about learning the code, and am prepared with a list of reasons why they should do so:

1. It's FUN! When I list the reasons that I operate Morse code, this is usually the last reason on the list. It's really the most important reason, though. If it wasn't fun, I wouldn't work CW, and I wouldn't expect anyone else to do it either.

2. You'll gain the adulation of your fellow hams. Many, if not most of the guys who give you a hard time about being a CW op are really jealous of your abilities. They're giving you a hard time because they really look up to you. Enjoy that and be gracious. Instead of giving them the business in return, offer to help them learn the code and enjoy working CW just like you do.

3. CW is more efficient than SSB. Without a doubt, CW is more efficient than phone. The bandwidth needed for a CW contact is on the order of a couple hundred Hz versus a couple of kHz for a SSB contact. Be careful when using this argument, though. Digital modes, such as PSK 31 actually require less bandwidth than CW.

4. CW is more effective than SSB. It's generally agreed that CW has about a 12 dB, or 2 S-unit, advantage over phone. That means that you can make CW contacts when it would be impossible to make SSB contacts.

5. You get more points in some contests. I don't understand contesters who don't operate CW. Many contests award more points for a CW contact than they do for a phone contact. Doesn't it make sense, then, for contesters to know and operate Morse code?

6. You'll work more DX. I think it's easier to work DX on CW than it is on phone. The pileups are generally smaller—although I'm not so sure that this was the case for the recent K1N DXpedition—and it's easier to get through.

These are my reasons for working CW. What are yours? E-mail me at ***cwgeek@kb6nu.com*** *and let me know. I'll run some of your replies in upcoming issues of The Keynote.*

INTERNET + RADIO = WEBSDR

A WebSDR is a Software-Defined Radio receiver connected to the internet, allowing many listeners to listen and tune it simultaneously. SDR technology makes it possible that all listeners tune independently, and thus listen to different signals; this is in contrast to the many classical receivers that are already available via the internet.

WebSDR was first conceived as a means to make the 25 m radio telescope at Dwingeloo in Netherlands available to many radio amateurs for EME reception. In order to test a preliminary version of the software without using the 25m dish, a shortwave WebSDR was set up on Christmas Eve 2007 at the radio club of the University of Twente, Netherlands. After further development, its existence was publicly announced in April 2008. Interest for the project has been large since then, and many amateurs worldwide have expressed an interest in setting up their own WebSDR server. In November 2008, a beta testing phase has started with a few selected stations.

Now, the software is made available to anyone serious about setting up a server.

A WebSDR server consists of a PC running Linux and the WebSDR server software, a fast internet connection (at least about a hundred kbit/s uplink bandwidth per listener), and some radio hardware to feed antenna signals into the PC. This radio hardware is typically a quadrature mixer connected to the PC's soundcard, like the popular SoftRock kits.

http://fivedash.com/

There are more than 120 WebSDRs covering the entire frequency spectrum, around the world as can be seen from the map below.

A list of currently active WebSDR servers is available on

http://www.websdr.org/.

SUWS WEBSDR

Those who do not have the equipment to listen to The ISS, other satellites and the high altitude balloons, may like to try the **Microwave WebSDR** *operated by the Southampton University Wireless Society -/Ed*

The SUWS WebSDR is operated by the Southampton University Wireless Society, in collaboration with Phil M0DNY, Martin G8JNJ and Noel G8GTZ.

The web based receiver covers multiple VHF and UHF amateur radio bands – 2m, 70 cm, and 3 cm - and can be used by anyone anywhere in the world.

The WEB SDR can be viewed with most popular Web Browsers. The earlier versions of software used JAVA which limited the ability to use anything other than a browser with JAVA plugin. The most recent version of WEB SDR software also runs HTML5 which means that the SDR can now be used on a variety of additional mobile devices and tablet PC's.

The receiver site is located near the town of Farnham in the South Eastern part of the United Kingdom at Latitude: 51.23, Longitude: -0.82 - Grid: IO91OF

http://www.dxzone.com/dx29253/suws-microwave-websdr.html

If you like what you hear – and see – it is possible you might rush to get the equipment needed to set up your own station!!! Hi

Antenna setup at SUWS

Tweeting via the ISS

Harold Giddings KRØSIV describes how he tweeted using amateur radio and the International Space Station.

He says: *I sent a message to the International Space Station, it transmits it back down to ground stations in its view and those stations send the message to the APRS-IS network. My server then takes the message parses out useful data and posts it to twitter as a tweet.*

HOW TO LISTEN TO THE ISS

The amateur radio station on the ISS can be received using very simple equipment. *(Rajesh VU2EXP of Rajkot did it with a Handie, read report elsewhere in the issue!)*

History

The first Amateur Radio equipment was delivered to the International Space Station (ISS) in September 2000 and an Amateur Radio station was established on board for use by Astronauts who are licenced Radio Amateurs. Commander William Shepherd, KD5GS, made the first Amateur contacts in November of that year.

Most of the astronauts on the International Space Station are licenced Radio Amateurs and sometimes during their spare time they talk to other Radio Amateurs back on earth. There is a special thrill in talking to an astronaut out in space!

What equipment do you need to listen to The ISS?

Almost any 144 MHz FM rig will receive the ISS, you can even use a general coverage VHF scanner with an external antenna. As far as the antenna is concerned the simpler the better. My favourite is a ¼ wave ground plane as it has a high angle of radiation. I've found large 2m collinears don't work quite as well since the radiation pattern is concentrated at the horizon.

You can receive the ISS outdoors using a 2 metre hand-held with its helical antenna but a 1/4 wave whip will give far better results.

In the UK they use narrow 2.5 kHz deviation FM but the ISS transmits using the wider 5 kHz deviation used in much of the world.

Most rigs can be switched been wide and narrow deviation filters so select the wider deviation. Hand-held rigs all seem to have a single wide filter fitted as standard.

Much of the time the Space Station equipment operates in "automatic mode". It can act as an AX.25 packet repeater, voice repeater or transmit Slow Scan Television (SSTV) pictures.

Voice and SSTV transmissions take place on 145.800 MHz FM, when they are not active AX.25 packet may be heard on 145.825 MHz.

The aim to start with is simply to listen to the sounds from the satellite. You can check the current mode of operation on the ISS Fan Club website.

Astronaut Susan Helms KC7NHZ making a contact

The ISS amateur radio station is used for school contacts. These educational contacts enable students to communicate directly via Amateur Radio with the Astronauts and ask them questions. In recent years a number of UK schools have made contact with the space station thanks to GB4FUN and volunteers from AMSAT-UK.

When the astronauts put out a CQ call they also use 145.800 MHz FM but operate "split" listening for replies 600 kHz lower on 145.200 MHz. If you are lucky and hear them calling CQ just remember to activate your rigs repeater shift to ensure you reply on the correct frequency. You should never transmit on 145.800 MHz.

When to listen

The ISS is in a very low orbit and so is only in range 5 or 6 times each day and then only for a maximum of 10 minutes on the best orbit. This means you need to make sure you're listening at the right time to hear it. There are a number of websites that tell you when to listen. I use the orbital predictions on the ISS Fan Club site.

Astronaut Sunita Williams KD5PLB on the ISS

The International Space Station is traveling around the Earth at over 28,000 Km/h. This high speed makes radio signals appear to shift in frequency, a phenomenon called Doppler Shift.

This Doppler shift will cause the ISS transmit frequency of 145.800 MHz to look as if it is 3.5 kHz higher in frequency, 145.8035, when ISS is approaching your location. During the 10 minute pass the frequency will move lower shifting a total of 7 kHz down to 145.7965 as the ISS goes out of range. To get maximum signal you ideally need a radio that tunes in 1 kHz or smaller steps to follow the shift but in practice acceptable results are obtained with the radio left on 145.800 MHz.

See the location and latest status of the space station at the ISS Fan Club http://www.issfanclub.com/

Satellite Tracking http://amsat-uk.org/beginners/satellite-tracking/

Listen to the ISS and amateur radio satellites online using the SUWS VHF/UHF/Microwave WebSDR http://amsat-uk.org/2014/08/15/suws-websdr-moves-to-new-site/

The IZ8BLY Vox Recoder enables you to record the ISS on 145.800 MHz FM while you're away from home http://antoninoporcino.xoom.it/VoxRecorder/

How to work the ISS on APRS Packet Radio
http://amsat-uk.org/beginners/how-to-work-the-iss-on-aprs-packet-radio/

Amateur Radio on the International Space Station (ARISS)
http://www.rac.ca/ariss/oindex.htm

John Heath G7HIA's article 'Getting started on amateur radio satellites' can be downloaded from http://amsat-uk.org/beginners/radcom-getting-started-on-satellites/

ISS SSTV RECEPTION BY VU2EXP

SSTV image transmission from ISS was sheduled for 3 days on 21st to 23rd feb 2015, but I experienced one day delay & actually transmission carried out on 22nd to 24th feb 2015. Russian Cosmonaut Images were being transmitted from ISS with it's Russian Callsign RS0ISS.

I was very much pleased to receive 2 SSTV images on dt 22/02/2015 during two different ISS pass over Rajkot-Gujarat.

1st image was received at 20:06:19 IST, due to very low elevation initial part was bit distorted. 2nd image received partly on very next pass at 21:41:57 IST

But my best catch was on 24th feb 2015, at 19:55:19 IST, when I received a very neat & full SSTV picture from ISS, which was my 3rd successful attempt!!!

I had opted for very simple setup for my SSTV experiment.

I was comfortable with my Wouxun HT (KG-699E) to receive SSTV signals from my qth terrace. I have portable dual band Yagi for satcom too, but to track & aim to ISS in non visible pass is not easy task, as simultaneously we need to record Rx audio. I recorded SSTV audio on my cellphone by simply keeping the HT speaker nearby.

For precautions, I kept cellphone in flight mode, & started recording well before ISS pass start time. Also kept HT's squelch fully open all the time. The frequency was set in both vfo (if supported) to 145.800. Battery was fully charged & set vfo step to 5k (if need to change for Doppler shift at last moment).

During this ISS pass complete SSTV signals with starting & ending VIS tone were received. Signal strength was S9++ and no major Doppler shift noticed (due to strong signals). Only thing I considered was to continuously tilt HT to get better signals all the time while ISS was moving.

After receiving & recording strong SSTV signals of around 187 seconds, first important task was done successfully.

Thereafter SSTV image was decoded with 'Robot360' Android app on my smartphone (mode PD180), and a very neat & full SSTV image got decoded & appeared on cell phone screen!!! :-). It was awesome!

At this stage we could also use MMSSTV PC software for image decoding.

Such simple arrangements works for me very well :-)

It was first instance from Gujarat to receive SSTV Pictures from ISS. *(maybe elsewhere in India too – Ed/)* The Leading newspaper Divyabhakshar (all Gujarat edition) & DNA Ahmedabad edition highlighted this news.

Attach herewith my SSTV pictures & newspaper articles copy.

I found many VU friend tips useful in my experiment, thanks to all.

Best 73

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New 10m Beacon GB3TEN

Kevin Wall GØLRK reports at 1500 UT on Thursday, February 26, the QRP beacon GB3TEN was activated on 28.244 MHz from Fleetwood, Lancashire, Grid: IO83LV
Kevin says if anyone hears it please email him at:

g0lrk@hotmail.com

Tnx: Southgate ARC

Let's Build A Field Strength Meter!

In this video **Randy Hall K7AGE** shows how to build a field strength meter in a Digital Volt Meter (DVM) case .

The video is based on the article by **Richard Russo KB3VZL** which appeared on page 71 of the February 2015 edition of QST. Watch the video:

https://www.youtube.com/watch?v=y-x2tVGPiE0

FreeDV: Digital Voice for HF

Amateur Radio is transitioning from analog to digital, much as it transitioned from AM to SSB in the 1950's and 1960's.

FreeDV is a GUI application for Windows, Linux and MacOS (BSD and Android in development) that allows any SSB radio to be used for low bit rate digital voice.

Speech is compressed down to 1600 bit/s then modulated onto a 1.25 kHz wide 16QPSK signal which is sent to the Mic input of a SSB radio. On receive, the signal is received by the SSB radio, then demodulated and decoded by FreeDV. Communications should be readable down to 2 dB S/N, and long-distance contacts are reported using 1-2 watts power.

FreeDV was built by an international team of Radio Amateurs working together on coding, design, user interface and testing. FreeDV is open source software, released under the GNU Public License version 2.1. The FDMDV modem and Codec 2 Speech codec used in FreeDV are also open source.

Watch this video of a FreeDV QSO:

http://freedv.org/tiki-index.php?page=video

FreeDV is unique as it uses 100% Open Source Software, including the audio codec. FreeDV represents a path for 21st century Amateur Radio where Hams are free to experiment and innovate, rather than a future locked into a single manufacturers closed technology.

http://freedv.org/tiki-index.php

New Scientist: Race to put internet into orbit

The next-generation internet could come from above, with fleets of satellites delivering broadband to under-served areas of the world.

New Scientist **magazine interviews radio amateur James Cutler KF6RFX as part of their story on plans to launch hundreds of Internet satellites into a 1200 km orbit**

THE race is on to build a new kind of internet. A host of companies and billions of dollars are in play, with the ultimate goal of ringing the planet with satellites that will allow anyone, anywhere, to get online at broadband speeds.

Presently, satellite internet relies on satellites that are in geosynchronous orbit, travelling at the same speed as Earth rotates. But while this ensures the satellites are always in the same spot above Earth, it means there is a large time lag in the service, as radio waves take a quarter of a second to make the round trip up to a geosynchronous satellite and back. Added to the time for the other trips your data must take across the rest of the internet, the lag becomes unworkable for real-time applications like video or voice chat.

To speed up the service, firms are looking at using satellites closer to Earth. This month, Virgin Galactic and chip-maker Qualcomm announced their backing of a venture called OneWeb.

This plans to put 648 satellites in orbit about 1200 kilometres above Earth's surface, where the round trip time for radio waves is just a few thousands of a second, fine for any online application. SpaceX immediately announced its own plan to do the same, building and launching 4000 satellites to a similar altitude. That would more than double the number of satellites in orbit.

Will the space around Earth become crowded with all these satellites vying to route our data?

"Space is big," says Kerri Cahoy, an aerospace engineer at M.I.T. "I'm not worried about the physical interaction of the satellites as much as what they're using for the transmission. If they're using radio waves, those beams will have areas of overlap and interference."

Radio transmission is the most common way to communicate between satellites and Earth. However, as anyone who has had trouble with their wireless router knows, working with radio waves is finicky. So Cahoy and colleagues are working on using **light** to transfer data instead.

Easier to focus and send over long distances, laser signals could make it possible to build smaller, lower powered satellites that can still talk to the ground easily. "Radio has been the de facto," says Cahoy, "but there are links in the infrastructure that could easily be optical."

Cutler, KF6RFX says satellite internet will really take off if companies make their equipment small enough to fit in Cubesats – small, lightweight satellites that can piggyback on the launches of other vehicles. "That way every rocket that goes up is kicking off Cubesats," he says, with each small orbiter perhaps holding only a fraction of a functional communications rig.

"What you want to do is start to self-assemble," he says. Instead of building large satellites on Earth and then fighting gravity to get them in orbit, the components themselves would be launched, then come together in space to form a light, powerful satellite. A network of such orbiters should be able to provide coverage that is similar to the signals terrestrial cellular towers already pump out.

It's a new space race but instead of being fuelled from a defence perspective, it's being fuelled by an internet perspective.

FROM HOW FAR AWAY HAVE YOU RECEIVED A QSL CARD?

Remember, in the January issue I had asked "*from how far have you heard a signal*?" This is an update on that info, Hi

On 9 December 2014, at 9:50:23 p.m. UTC the team received signals from the ARTSAT 2: DESPATCH space probe, which was at this time at distance of 2,715,228 km from Earth.

Michal/SQ5KTM said*:" the last signals received by us from ARTSAT 2: DESPATCH were very weak, but clearly stood out on the waterfall diagram of the monitoring program.*

To avoid misinterpretation we asked for confirmation directly from the creators of the space probe: Tama Art University and The University of Tokyo. The data reported by us were analyzed, compared with the model and successfully authenticated – we have received confirmation with thanks."

Hearty congratulations to the Polish team!

Successful CubeSat launch

On Saturday, January 31 the CubeSats FIREBIRD-2, GRIFEX and ExoCube carrying amateur radio payloads were successfully launched on a Delta 2 rocket from Vandenberg AirForceBase.

The GEO-CAPE ROIC In-Flight Performance Experiment (GRIFEX) is a 3U CubeSat developed by MXL that will perform engineering assessment of a JPL-developed all digital in-pixel high frame rate Read-Out Integrated Circuit (ROIC).

The GRIFEX team at the University of Michigan received the first reception report of the spacecraft's 437.485 MHz 9600 bps AX.25 GMSK signal from **Jan van Gils PEØSAT** in the Netherlands.

FIREBIRD (Focused Investigations of Relativistic Electron Burst Intensity, Range, and Dynamics) is a CubeSat dual satellite mission examining the spatial scale and spatial temporal ambiguity of magnetospheric microbursts. The project is a collaboration between researchers at the University of New Hampshire and Montana State University. Among the radio amateurs involved were **Steve Longworth KR1C** and **David Klumpar KD7MFJ**.

In Germany **Mike Rupprecht DK3WN** received the 19.2k bps GMSK AX.25 signals on 437.405 and 437.230 MHz from the two FIREBIRD-2 1.5U CubeSats.

The primary payload for the Delta II launcher was the Soil Moisture Active Passive (SMAP) satellite. SMAP's on board radar will share Amateur Radio spectrum at 1.26 GHz. Amateur Radio is secondary on the 23 centimetre band, which covers 1240 to 1300 MHz.

"This is a good example of a compatible sharing partner," ARRL CEO **David Sumner, K1ZZ**, observed. "Any interference to amateur communication in the band will be brief as the satellite passes overhead." The satellite is at approximately 425 miles up in a near-polar, sun-synchronous orbit. SMAP also includes a radiometer operating at 1.41 GHz to measure naturally occurring RF energy given off by Earth's surface.[Tnx: ARRL]

Basics of Radio Frequencies for FPV Quadcopter Drones

Unmanned aerial vehicles (UAVS), also known as drones or quadcopters are aircraft either controlled by 'pilots' from the ground or increasingly, autonomously following a pre-programmed mission. While there are dozens of different types of drones, they basically fall into two categories: those that are used for reconnaissance and surveillance purposes and those armed with missiles and bombs.

The use of drones has grown quickly in recent years because unlike manned aircraft they can stay aloft for many hours *(Zephyr - a British drone under development has just broken the world record by flying for over 82 hours nonstop)*; they are much cheaper than military aircraft and they are flown remotely so there is no danger to the flight crew.

Multicopters, especially quadcopters, have fast been gaining popularity as agile camera platforms capable of filming high quality video while hovering and manoeuvring in tight spaces. This increase in popularity has come about mainly due to new manufacturing techniques and a reduction in component costs, making this side of the FPV hobby more accessible to a wider audience.

2.4 GHZ – is the radio frequency that most quadcopters use for the connection between the ground transmitter and the aerial vehicle. You may remember that this is is also the frequency that computer wireless networks operate on. This can cause some problems when an area (dense housing, office buildings, etc.) has many wireless signals. Loss of control and flyways are just some of the reported problems. Another concern is the quadcopter interfering with its own on-board systems. This is due to two separate systems being on many modern quadcopters – one for control of the craft and one for transmitting the video (FPV).

5.8GHZ is another radio frequency used in quadcopters, including certain DJI Phantom models, to avoid two frequencies on the same "band" (in the same realm which may entangle each other).

The most common frequencies used for video transmission are: 900 MHz, 1.2 GHz, 2.4 GHz, and 5.8 GHz. Specialized long-range UHF control systems operate at 433 MHz (for amateur radio licensees only — especially with two European nations having exclusive allocations for them, and secondary usage in much of North America) or 869 MHz and are commonly used to achieve greater control range, while the use of directional, high-gain antennas increases video range. Sophisticated setups are capable of achieving a range of 20–30 miles or more. In addition to the standard video frequencies, 1.3 GHz and 2.3 GHz have emerged as the common frequencies get more crowded.

Quadcopters are available on line in India.

On 11 May 2014 ***Francescos' Pizza*** of Mumbai made a test delivery from a branch in Lower Parel to the roof of a building in Worli. Police in Mumbai began an investigation on the grounds that security clearances had not been sought. Hi Many police departments have procured drones for law and order and aerial surveillance.

UK 434 MHz CanSat Competition

On Friday, March 13 eight school teams from across the UK competed in the **National CanSat Competition** held at the National STEM-Centre-in-York

CREST is a UK award scheme that recognises success, and enables students to build their skills and demonstrate personal achievement in project work. It offers educators an easy-to-run framework for curriculum enhancement and is student-led, which means that young people take ownership of their projects and choose to undertake them in areas they enjoy or see as relevant.

They catch them young!

Each year, over 32,000 CREST Awards are undertaken by 11-to-19-year-olds, giving them opportunities to explore real-world science, technology, engineering and maths projects in an exciting way.

The CREST Gold Award accredited coon, now in its second year, involves students building a miniature simulation satellite, known as a CanSat, and launching it from 300 metres above an airfield.

The students had to build their own space experiments, fitting all the major subsystems including radio communications on 433/434 MHz and power into a 350 ml soda can.

They needed to write code to measure temperature, pressure and other chosen parameters on its journey parachuting to the ground. The winners of the competition will go on to the European finals, held in Portugal, in June. Around 50 students and their teachers took part.

Iran's Fajr satellite uses Ham Radio bands

Iranian **Fajr** satellite has an amateur radio band downlink on 437.538 MHz

On the AMSAT Bulletin Board, **Nico Janssen PAØDLO** says that it carries a camera for Earth observations and should have a telemetry downlink on 437.538 MHz and a command uplink in the 144-146 MHz amateur radio-band.

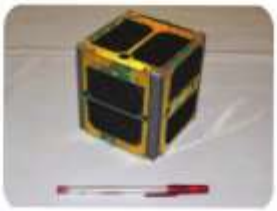
The Iranian satellite Fajr or 'Dawn' was launched on February 2, 2015 at 0850 UT from the Imam Khomeini Space Center which is south of Semnan in the northern part of the Dasht-e-Kavir-desert.

The 50 kg satellite was carried on a Safir launcher into an initial orbit of 223 km by 470 km with an inclination of 55.5° and has been given an object ID of 2015-006A 40387.

It is Iran's fourth satellite and has propulsion in the form of a cold gas thruster. Presumably the thruster will be used to circularize the orbit at around 470 km which may give it a lifetime of-over-a-year. **Fajr real-time tracking map and-predictions:**

http://n2yo.com/?s=40387

AMSAT Fox-1 Cubesats Launching in 2015



AMSAT pioneered the concept of small satellites in low orbits. AMSAT's next satellite effort, called Project "Fox", consists a series of small CubeSats that will provide FM transponders with a 70 cm uplink with a 2 meter downlinkt that will match the ground performance of previous FM satellites.

A dual-band radio capable of full-duplex operation with an external antenna is enough to get started:

- 435 MHz FM Uplink
- 145 MHz FM Downlink

You may also consider using one radio to receive and another radio to transmit for full-duplex operation.

- **Fox-1A** will launch on a NASA ELaNa flight during the 3rd quarter of 2015 from Vandenberg AFB.
- **Fox-1B** will fly with the Vanderbilt University radiation experiments expected in 2016.
- **Fox-1C** will launch on Spaceflight's maiden mission of the SHERPA multi-cubesat deployer during the 3rd quarter of 2015.
- **Fox-1D** is a flight spare for Fox-1C. If not needed as a spare it will become available to launch on any open launch slot which becomes available and be submitted in a Cubesat Launch Initiative (CSLI) proposal in 2015.
- **Fox-1E** is built as a flight spare for Fox-1B but has been included in a student science proposal as part of the November, 2014 CSLI for an ELaNa flight slot. If selected the Fox-1B spare will fly as Fox-1E.

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