Amateur RADIO Society News

Newsletter of The Amateur Radio Society of India (Member of IARU)
October 2012 Issue

President's message

Dear members

Since writing to you last time, the ARSI AGM took place at the Bowring Institute in Bangalore on Sunday the 16th September 2012

The activities of the society and its finances were discussed by all those present and several good suggestions were made on improving the efficiency in working.

Dates were finalised for the VHF hill topping exercise and also for the national field day- full details will be available on the ARSI webpage

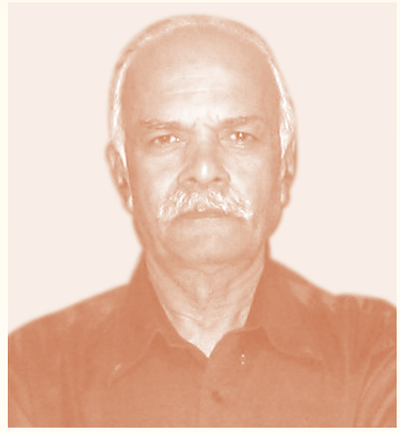
As mentioned last time the Triennial Conference of IARU Region 3 will be held in Ho Chi Minh City in Vietnam from 5th to 9th November 2012 and details are available from the IARU Region 3 webpage http://www.iaru-r3.org/15r3c/15r3c.htm.

As circulated by the region 3 secretary, the region lost the Chairman of the group of directors who administer the regions activity. Michael Owen VK3KI passed away suddenly on Saturday the 22nd September at his home due a medical condition. This is the second time that a serving Chairman of directors has been taken away suddenly. Michael who held numerous posts in IARU over the years was instrumental on a number of issues facing amateur radio being dealt with.

The Seanet convention will also take place in Kuala Lumpur between 23rd and 27th November 2012.

Gopal Madhavan VU2GMN

From the Editor's desk



Many amateurs – especially the newcomers who joined the elite group of VU amateurs in the past ten years – may not know how it all started. I am including "A brief history of amateur radio in India" in this issue. For me and for many others like me – it is nostalgic.

Satellite activity has really taken off with the advent of the "Cubesats" – with so many of them orbiting the planet already, and more to come. FitSat is an unique satellite and you may find the information interesting.

Hope you'll find this issue of HRN as interesting as ever,

73 VU2TS

A BRIEF HISTORY OF AMATEUR RADIO IN INDIA

The first ever amateur radio operator in India was A.C.Gooptu (callsign 2JK), licensed in 1921. Later that year, Mukul Bose (2HQ) became the second ham operator, thereby creating history - as the first ever two-way ham radio communication in the country.

By 1923, there were twenty British hams operating in India. In 1929, the call sign prefix VU came into effect in India, replacing the earlier three-letter call signs. I believe the "V" was for the Viceroy - though some say it was for Queen Victoria.

The first ever short-wave entertainment and public broadcasting station, "VU6AH", was set up in 1935 by E P Metcalfe, then vice-chancellor of Mysore University.

(Metcalfe was the vice chancellor and Professor of Physics, and Principal of Central College of Bangalore. He served from 1930 to 1937. Metcalfe was instrumental in establishing a residential college for women in Mysore in science and arts in the early 1930s. The Maharani's College, Mysore, and the Intermediate College For Women, Bangalore were merged was recommended to be merged by the committee headed by Metcalfe.)

There were fewer than fifty licence holders in the mid-1930s, most of them British officers in the Indian army.

With the outbreak of World War II in 1939, the British cancelled the issue of new licences. All amateur radio operators were sent written orders to surrender their transmitting equipment to the police, both for possible use in the war effort and to prevent the clandestine use of the stations by Axis collaborators and spies.

With the gaining momentum of the Indian independence movement, ham operator N.A. Printer (VU2FU) set up the Azad Hind Radio to broadcast Gandhian protest music and uncensored news; of course, he was immediately arrested and his equipment seized.

In August 1942, after Mahatma Gandhi launched the Quit India Movement, the British began clamping down on the activities of Indian independence activists and censoring the media.

To circumvent media restrictions, Indian National Congress activists, led by Usha Mehta, contacted Mumbai-based amateur radio operators, "Bob" Tanna (VU2LK) and Printer (VU2FU) to help broadcast messages to the party workers across the country.

The radio service was called the "Congress Radio", and began broadcasting from 2 September 1942 on 7.12 MHz. The station could be heard as far as Japanese-occupied Burma (now Myanmar.)

By November 1942, Tanna was betrayed by an unknown radio officer and was forced to shut down the station.

Temporary amateur radio licences were issued from 1946, after the end of World War II. By 1948, there were 50 amateur radio operators in India, although only a dozen were active.

Following India's independence in 1947, the first amateur radio organization, the Amateur Radio Club of India was inaugurated on 15 May 1948 at the School of Signals at Mhow in Madhya Pradesh.

The club headquarters was later moved to New Delhi, where it was renamed the Amateur Radio Society of India (ARSI) on 15 May 1954. As India's oldest amateur radio organization, ARSI became India's representative at the International Amateur Radio Union.

Partly due to low awareness among the general population and prohibitive equipment costs, the number of licensed amateur radio operators did not increase significantly over the next two decades, numbering fewer than a thousand by 1970.

[VU2TS was issued in April 1965, and the licence number was 350 – Hi]

CW and AM were the predominant modes at that time. The station equipment was mostly valve-based, obtained primarily from Indian army surpluses. There were no "transceivers" those days, the receivers were all WW-II surplus like BC-348, AR-88, HRO and SX-28 - the transmitters home-brewed using the most popular final tube those days, the 807. Of course, there were a hand-ful of hams who had home-brewed the entire station too. Even linear amps (813 finals) were home brewed.

During the mid-1960s, the modes of operation saw a major change from AM to SSB as the preferred communication mode. By 1980, the number of amateur radio operators had risen to 1,500.

In 1984, when Rajiv Gandhi VU2RG was prime minister, the Government waived the import duty for wireless equipment. After this, the number of operators rose steadily, and by the year 2000 there were nearly 10,000 licensed ham operators. As of 2011, there were more than 16,000 ham radio operators in India.

Amateur radio operators have played a significant part in disaster management and emergencies.

In 2005, India became one of few countries to launch an amateur radio satellite, the HAMSAT. The Indian Space Research Organisation (ISRO) launched the micro-satellite as an auxiliary payload on the PSLV-6.

VU2TS – from various sources

GWALIOR, MADHYA PRADESH

On 20 September 2012, A.S.O.C.Exam was held at Gwalior. WPC Officials from Bhopal took the Exam.

36 Candidates appeared in the Exam. Theeldest candidate was of age of 52 years and the youngest was 14 years.

All the candidates enjoyed the exam both theory and practical.

Most of the students are from Engineering colleges of different places.

One of the candidate came all the way from Chandigarh. Major support given by VU2IG omR.K.Khetan Secretary of Amateur Radio Club Gwalior and President of I.E.T.E. Gwalior sub center, VU2LOL omAniketAshtikar, VU2HRR om Harsh Chaturvedi, om Ashok Agarwal Treasurer of Amateur Radio Club Gwalior. The candidates were trained by VU2JAU JayuS.Bhide.

The Exam was organized in coordination of I.E.T.E. Gwalior sub center with Amateur Radio Club Gwalior.

Next batch will start soon under the guidance of Jayu VU2JAU.

BHAVANAGAR, GUJARAT

HAM AWARENESS MEET. The hams and swl's of Bhavnagar, Gujarat met on 16th September 2012.

Senior hams VU2LRE (MrRadhakrishnan, vice-chairman of GIAR and currently IG Police Junagadh Range), VU2JGI (Dr JG Pandya, General Secretary of GIAR, from Ahmedabad), VU2JF (MrRajenAdiecha, Rajkot), VU2EXP (Mr Rajesh Vagadia, Rajkot) blessed the meeting as invitees. Local senior Hams VU3BUT (Dr BU Tekani) and VU2FCY (Mr Rajesh Vyas) also graced the occasion.

About 150 budding hams and SWLs attended the meet.

The meeting was arranged at the Department of Physics, Maharaja Krishnakumarsinhji Bhavnagar University.

In the beginning the ham aspirants were shown a movie on Ham radio prepared by VU2JGI. Some basic information was given by VU3SEG.

The activities of MK Bhavnagar University Amateur Radio Club were presented by VU3SEG. The activities at Rajkot were presented by VU2EXP.

VU2JGI and VU2LRE answered a large number of questions from the participants.

The participants ranged from school students and teachers, Science-engineering-polytechnic college students and teachers, doctors, persons from various government departments e.g. Electricity supply, LIC, Bank, BSNL, Railways, Police, several retired officers and several individuals.

It was decided to have a club station in the university for the benefit of trainees and new hams. GIAR has shown keen interest in helping to setup the club station.

Demonstration of Homebrewed rigs and accessories by VU3SEG, Homebrewed V antenna and a receiver by VU2FCY, VHF and

UHF antenna developed by VU2JF and several equipment from his shack were center of attraction for the participants.

The meeting ended with a vote of thanks.

The very enthusiastic budding hams who are awaiting the results of the exam conducted on 29th June at Bhavnagar were dynamic in organizing the meet.

Tnx: VU3SEG /SP Bhatnagar

COIMBATORE, TAMIL NADU

Coimbatore HAMs had conducted " DISASTER MANAGEMENT AND HAM Radio Awareness Programme"at COIMBATORE INSTITUTE OF ENGINEERING & TECHNOLOGY on 29/09/2012.

Dr.T.RAJU (HEAD OF DEPT)Mr.Y.BABU VINOTHKUMAR (ASST.PROFESSOR) showed keen interest in the event.

Students were motivated to write ASOC exam and take up the amateur licence.

HAMs Participated in the event were OM VU2KSJ,VU2TKZ,VU2SEJ,VU2EPT & KJ6LRR along with several SWLs.

VU2KSJ addressing the students…

Coimbatore HAMs had also conducted HAM AWARENESS PROGRAMME in PSG COLLEGE OF TECHNOLOGY, COIMBATORE on 27/09/2012.

* ASOC EXAM to be held in the premises

* CLUB STATION at their CAMPUS mooted

Coaching class conducted regularly by VU2KSJ, VU2TKZ, VU2SEJ, VU2EPT,VU2KNQ & KJ6LRR

Coimbatore hams were invited for One DAY National Level workshop on "RADIO SPECTRUM AND UTILIZATION" on September 5,2012 at RVS COLEGE OF ENGINEERING & TECHNOLOGY, Coimbatore. "DEPARTMENT OF ELECTRONICS & COMMUNICATION".

More than Five Engineering collage students attended the workshop With the blessings of Vijayashree Sr. K.V. Kupusamy Chairman, RVS educational Trust.

Chief Guest was Ananthakumar -VU2APE with Dr.V.GunarajPrincipa,l in the chair.

There was a Power Point presentation titled "RADIO SPECTRUM AND UTILIZATION" by Raja VU2KSJ; "INTRODUCTION TO HAM RADIO"By VU2EPT and "INTRODUCTION TO AMATEUR SATELLITE and ACTIVITY OF AMSAT-INDIA"By KJ6LRR.

In addition, there was a Ham radio live demo organised byVU2TKZ , VU2SEJ & Team - and with full support of organising committee member VU3IDP .

VU2APE addressing the gathering.

The FITSAT-1 - An Unique Cubesat

(Tnx: AMSAT-UK)

FITSAT-1 (NIWAKA) is a 1U CubeSat (10x10x10cm) developed by students at the Fukuoka Institute of Technology (That's why FIT-SAT. But, *NIWAKA* in Japanese means "Abrupt" though I don't know why this name was chosen? -*Ed)*.

The primary mission is to transmit 115.2 kbps digital data on 5840.0 MHz using a transmitter capable of 4 watts output. The data rate is significantly higher than that of previous amateur radio satellites and will enable a VGA-size (640×480 pixel) JPEG image to be transmitted in only 5 to 6 seconds.

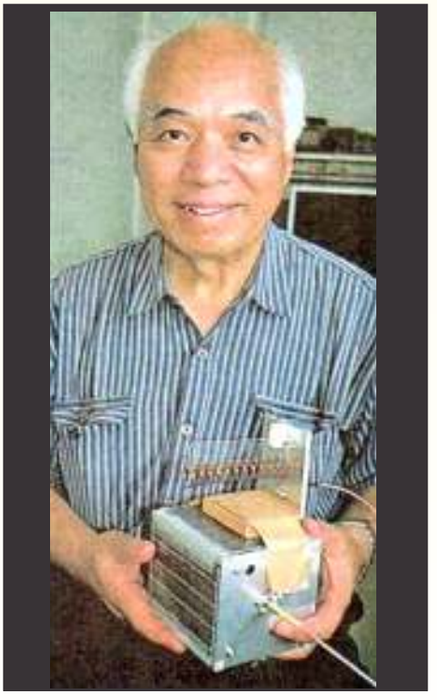
What makes it unique is the second mission - to determine if a satellite can be made to appear as an "artificial star" using high-output LEDs in flash mode. The light from this flash will be received by the ground station, which has a telescope with photo-multiplier linked to a 5.8 GHz parabola antenna. This is a basic experiment to investigate the possibility of optical communication with satellites.

FITSAT-1 was deployed from the second International Space Station (ISS) J-SSOD pod at around 15:40-45 UT on Thursday, October 4 along with F-1 and TechEdSat.

In addition to a 437.250 MHz CW beacon, the amateur radio CubeSat**FITSAT-1** (aka NIWAKA) will carry an Optical Communications experiment that aims to write Morse Code across the night sky.

The satellite is fitted with a bank of high power LEDs that will be driven with 200W pulses to produce extremely bright flashes that may be visible to the unaided eye.

Takushi Tanaka JA6AVG provides more information on this innovative satellite which can transmit on 437.250 MHz and 437.445 MHz (both +/- 10 kHz Doppler) and 5840.0 MHz (+/- 134 kHz Doppler).



Takushi Tanaka JA6AVG

Please send the signal report, telemetry data (if possible) and your postal address to fitsat1@hotmail.co.jp and also cc to tanaka@fit.ac.jp. You will receive a verification (QSL) card [presumably electronic]. Initially the orbit will be almost the same as the ISS.

In addition to the CW beacon there is an AX.25 1200 bps packet radio transceiver on 437.445 MHz for telemetry and command purposes.

The FITSAT-1 CW beacon frequency 437.250MHz is on the same frequency as the PRISM micro-satellite built by students at Tokyo University. Please confirm that the CW starts "HI DE NIWAKA JAPAN …"

Tracking FITSAT-1

Initially FITSAT-1 will be in virtually the same orbit as the International Space Station and the latest ISS Keplerian Two Line Elements can be used to determine their position.

SimpleSat Look Down satellite tracking software

http://www.uk.amsat.org/?p=8217

Gpredict free real-time satellite tracking and orbit prediction software http://gpredict.oz9aec.net/

Orbitron satellite tracking http://www.uk.amsat.org/?p=9051

The ISS Fan Club provides real-time tracking of the ISS

http://www.issfanclub.com/

HB9FFH has made a telemetry decoder for FITSAT-1 available from the site http://carpcomm.com/satellite/fitsat1

A telemetry decoder for Windows also is available at http://turing.cs.fit.ac.jp/~fitsat/CWFM/FITSAT_CW_Analyzer1.zip

Takushi Tanaka JA6AVG will announce news about FITSAT-1 such as the LED experiments at

http://www.fit.ac.jp/~tanaka/fitsat.shtml

More Satellite News

KickSat is an amateur radio CubeSat technology demonstration mission designed to demonstrate the deployment and operation of prototype Sprite 'ChipSats' (femtosatellites) developed at Cornell University, Ithaca, New York.

The Sprite is a very tiny spacecraft that includes power, sensor, and communication systems on a printed circuit board measuring 3.5 by 3.5 cm with a thickness of 2.5 mm and a mass of about 5 grams. It is intended as a general-purpose sensor platform for micro-electro-mechanical (MEMS) or other chip-scale sensors with the ability to downlink data to ground stations from LEO.

KickSat is a 3U CubeSat being built to carry and deploy 200 Sprites. A 1U avionics bus will provide power, communications, and command and data handling functions. A 2U deployer has been developed to house the Sprites. Approximately 200 will be stacked atop a spring-loaded pusher and secured by a nichrome burn wire system.

After being released from the P-POD, KickSat will perform a de-tumble maneuver and establish communication with Cornell's ground station. After check-out, the spacecraft will be put in a sun-pointing attitude and spun up to maintain that attitude. A command signal from the ground station will then trigger the deployment and the Sprites will be released as free-flying spacecraft.

After deployment, telemetry and sensor measurements from the individual Sprites will be received through Cornell's ground station in Ithaca, NY, as well as several other amateur radio ground stations throughout the world.

The Sprites are expected to reenter the atmosphere and burn up within a few days or weeks depending on atmospheric conditions. Their worst-case maximum orbital lifetime is estimated at 6 weeks.

The development team are currently investigating uses for the KickSat bus after the Sprite deployment and are seeking collaborators who could make use of its capabilities as part of an extended mission.

Proposed Downlink Frequency: 2.4-2.45 GHz RF Output Power: 1W ITU Emission Designator: 350KF1D Description: AX.25 over FSK.

Frequency Band: 435-438 MHz. Output Power: 10 mW ITU Emission Designator: 50K0G1D. Description: MSK modulated binary data with each data bit modulated as a 511 bit PRN sequence. All Sprites operate on a single frequency and use CDMA.

Several CubeSats are being launched together on ELaNa-5 / CRS-3. Besides KickSat, they are:

DragonSat-1 – USNA and Drexel Univ.Trailblazer – U. of New Mexico. **PrintSat** – Montana State University. All-Star/THEIA – University of Colorado. **UNP-6 Radar Calibration CubeSat** – U. of Hawaii.PhoneSat – NASA ARC. MisST – NASA ARC. Launch parameters are 325x315km 51.5 degree inclination on a launch from Cape Canaveral. Planned launch date is July 2013.

More information from http://www.spacecraftresearch.com/

OFFICE BEARERS

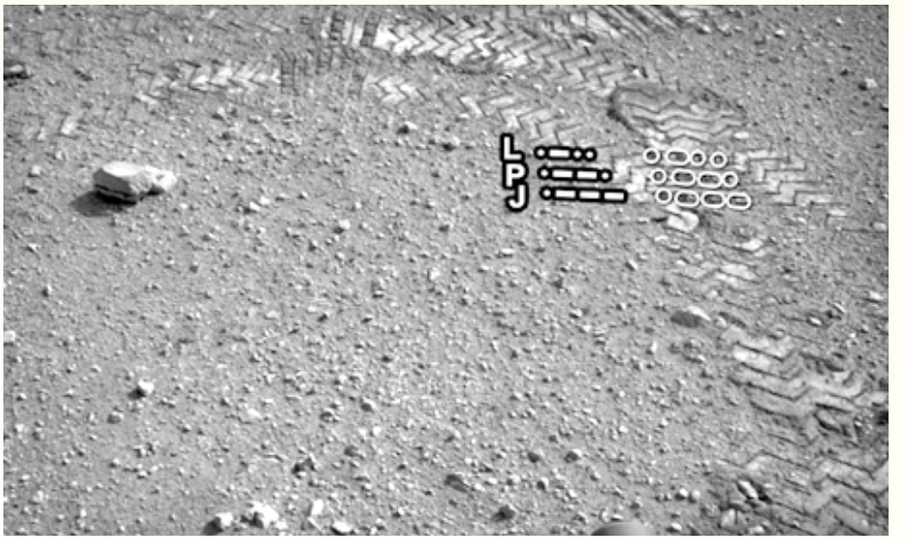
MORSE CODE ON MARS!

[Tnx: Mars Science Laboratory, NASA]

NASA's Curiosity rover took its first test stroll Wednesday Aug. 22, 2012, and beamed back pictures of its accomplishment in the form of track marks in the Martian soil.

Careful inspection of the tracks reveals a unique, repeating pattern, which the rover can use as a visual reference to drive more accurately in barren terrain. The pattern is Morse code for JPL, the abbreviation for NASA's Jet Propulsion Laboratory in Pasadena, Calif., where the rover was designed and built, and the mission is managed.

If you look carefully at the treads on the wheels of the rover vehicle, you'll notice the predominant, zigzag pattern, but you'll also see a section of tread on each wheel that's patterned with dots and dashes.



The official word is that they serve as "visual odometer markers" that tell the mission controllers how far Curiosity has roved and let them verify that the rover's wheels are indeed turning when the rover's telemetry says it is moving; but actually they're just a really, really brilliant hack that some ham on the development team at the Jet Propulsion Lab in Pasadena has thought of.

The dots and dashes spell out "JPL" in the surface dust on the Red Planet.

Only a ham could think of that!!! And who says Morse Code is dead?

Optical Beacons becoming more popular?

Students at the Ivy League Brown University (Rhode Island, USA) are developing an amateur radio satellite **EQUiSat** that has an optical beacon

It will carry a Xenon Flash Tube (XFT) subsystem to act as an Optical Beacon that should be visible to the unaided eye of observers on Earth. The Radio Beacon is planned to operate in the 435-438 MHZ band.

The goals are:

Create a baseline design for future projects.

Open space technology to non-professionals.

Demonstrate visibility as a new form of satellite tracking and communication.

They are aiming for a 2015 launch into an orbit of about 300 km which may give the satellite a life-time of a couple of months.

Amateur RADIO Society News

Many amateurs use vertical antennas on the HF bands, especially for bands 40 meters and lower, mainly due to space restrictions. Typically the verticals are mono-banders but occasionally we do come across multi-band verticals – with a loading coil at the bottom. Here are some useful tips from Jim W4GFX.

Easy HF Vertical Antenna System Improvements

The vertical portion of your antenna is only one-half the antenna system. The other one-half is a fictitious image antenna which completes the RF current path. Think of the antenna as a dipole stood on end with one-half below the surface of the earth. You can improve the performance of your vertical with a few easy modifications. In a typical configuration the center of the coax feed line connects to the vertical antenna, and the coax shield connects to a plate at the base of the vertical antenna. The base plate is also connected to ground by a ground rod. All radials connect to this base plate. Here's how to improve your system.

Cut your Ground Losses. Put down a radial system with equally spaced radial wires. Your antenna system loss is a function of the ground resistance. Ground resistance is a function of the number and length of your radials.

Efficiency = Antenna Resistance, divided by Antenna Resistance+ Ground Resistance. You can achieve efficiencies of more than 90%. I have 64 radials of 66 feet each, and my ground resistance is about 5 ohms. Do what is reasonable for your location. Radials do not have to be equally spaced or straight, but more radials are better.

Install a Static Discharge Coil. This high impedance coil is wound on a plastic ~ 1.5 inch pipe, and has more than 120 close-spaced turns. Small wire (say16 AWG) is sufficient. Mount the coil between the vertical antenna and the base plate. To RF voltage this coil has high impedance,but to DC it is a short to ground. It serves as a static charge drain, some lightning protection, and will reduce some noise on the system.

Match your antenna/transmission line at the Base of the antenna with an L-Network.

There are two initial choices:

1) match the resistance (R), or

2) reduce the reactance (jX).

If you resonate the antenna you reduce the reactance jX to < 1Ω. If the match the resistance, you are adjusting the resistance to match the 50 or 75 ohm transmission line. An antenna does not have to be resonant to radiate well. A quarter-wave vertical is about 0.24 λ and has a resistance approximating 36 Ω +jX. If you make the antenna longer its resistance will go up, but you will have to cancel the reactance with a variable series capacitor. 0.28 λ height will approximate 50 Ω resistance, and 0.31 λ height will approximate 70 Ω resistance. For an L-Network design program go to http://www.zerobeat.net/G4FGQ/, download L-NETWK.exe (this is run in DOS so don't expect your mouse to work).

Choke off Common Mode noise on the transmission line.

You cannot hear the DX if your signal to noise ratio is bad. Some receiver noise comes from current on the outside of the transmission line. The usual fix consists of toroid chokes at each end of the transmission line, and at intervals of ¼ λ. These high impedances block the flow of current on the outside of the coax. Be sure you have enough impedance-feel the toroids with your hand. If they are hot (after transmitting), you need more impedance. Two good papers are found at http://www.audiosystemsgroup.com/RFI-Ham.pdf, and at http://www.yccc.org/Articles/index.htm - find the article **Common Mode Chokes** (PDF - 2Mb) (Word - 16Mb) **, and download.**

Want to have some fun? Model your antenna system with the program found at RADIAL-3.exe on http://www.zerobeat.net/G4FGQ/. See how your design compares with good engineering practice.

73 and good DX, from Jim, W4GFX, in Shillong

James W. Elkins is an Extra Class US Amateur Radio Operator living in Shillong. He holds a BA degree in astrophysics/math, and a Jurit Doctor degree in law, bothfrom Vanderbilt University, Nashville, Tennessee. He was first licensed in 1954, and is a life member of ARRL and a member of ARSI.

His address is Lakkhotaa Lodge, Mawpun, Polo Hills, Shillong 793001, Meghalaya, India. You may contact him at <elkins1936@gmail.com>, or call 0 98560 40368.

VU7M – MINICOY ISLANDS

BANGALORE, KARNATAKA

RSB – the first ever repeater in India - has been *repeating* for twenty five years!!!How Time Flies!! Bangalore hams are celebrating the silver jubilee of VU2RSB – the Repeater Society of Bangalore with a huge get-together on the 14th October. All are invited! As of date the registration has reached 325 participants, and the organizers had to stop accepting further registrations due to lack of space in the venue!!! This is going to be a gala affair!!!

Ajoy VU2JHM has done it again! We have heard him activating light-houses and islands, but this time he led a successful multi-event dxpedition to Minicoy Islands with a special callsign VU7M.

Ops VU2UR – Arasu, VU2LX – Laxmanan, VU2GGM –Poru, VU2LU- Ramesh Kumar wereQRV between August 13-22, 2012. 5,200 QSOs were logged.

Minicoy Lighthouse – the light visible up to 28 nautical miles; beacon on 320 KHz, callsign "NY"

VU7M - SPECIAL EVENTS:

1. Golden Jubilee of Islands on the Air - IOTA AS-106,
2. World Flora and Fauna WFF-VUFF103,
3. 66th Indian Independence Day,
4. 15th Annual Lighthouse/Lightships Weekend,
5. WLOL -ARLHS LAK-009, World Lighthouse on the Air

PUTTUR (NEAR MANGALORE)

Chandra VU2RCT had organized a "Ham Awareness Programme" at the Vivekananda College, Puttur (50 kms from Mangalore) on 05 October 2012. Along with Murthy/VU2MTT, Gopal/VU2GSD, and Ashwin/VU3FDU, a live demo of ham-radio was given. About 50 boys and girls, and the teachers of the college showed keen interest in the hobby.

Using an YAESU FT-897D and the BUDDIPOLE portable antenna they made several QSOs on 40 meters; ten meters band was open and they could log a couple of DX stations as well. Chandra feels that several of these students are likely to take up the ASOC exams shortly…

VU2GMN in Tokyo

Your president attended the TOKYO HAMFAIR 2012 last month.

VU2GMN at the ribbon-cutting ceremony at the Ham fair.

Gopal used this opportunity to discuss several issues with the Region III secretary and the advisor before the triennial conference coming up in Viet Nam in December 2012.

AMSAT-India launch YouTube channel

Current videos include an update on the activities and future plans for Amateur Radio satellites from India and a presentation on telemetry decoding. Please visit:

https://www.youtube.com/user/amsatindia

You would have noticed, I am adding a line indicating the day's propagation in every mail that I am posting to ARSI group; I received a few inquiries requesting me to explain what it meant.

A typical propagation report goes like this:

Propagation

SFI:136 A:8 K:2 SSN:070

SFI - Solar Flux Index

DRAO (Dominion Radio Astrophysical Observatory, Canada) reported value from 62.5 to 300. This is the intensity of solar radiation measured at 2800MHz (10.7cm).

This is a good indication of the “F layer” ionization (layer that gives us most of our DX on HF).

The higher the number, the greater the level of ionization, and higher the frequency.

Measured three times daily, and the last received value is reported.

'A' Index

NOAA (National Oceanic & Atmospheric Administration) reported value from 0 to 400.

Provides a daily average level for geomagnetic activity. Uses the average of eight 3 hour K-Index values (magnetic value measured in nanotesla or nT) to provide the level of instability in the earth's geomagnetic field.

When used with K-Index: Both high indicates geomagnetic field is unstable, and HF signals are prone to sudden fades, and some paths may close while others open up abruptly and with little warning.

High K index/Low A indicates a sudden, abrupt disturbance in the geomagnetic field, which can cause an intense but brief disruption in HF propagation. Updated once daily.

'K' Index

NOAA (National Oceanic & Atmospheric Administration) reported value from 0 to 9. Measures disturbances in the horizontal component of earth's magnetic field. Value in nT is measured using a magnetometer during a three-hourinterval, and then converted to a factor.

Use with A-Index – see above to determine HF conditions. Updated eight times daily.

SN Sunspot Number (SSN - Smoothed sunspot number)

NOAA (National Oceanic & Atmospheric Administration) reported value from 0 to 250.

Daily Sunspot Number provided by NOAA is computed using a formula [R=k (10g+s)] by Rudolph Wolf in 1848, where R is the sunspot number; g is the number of sunspot groups on the solar disk; s is the total number of individual spots in all the groups; and k is a variable scaling factor (usually <1) that accounts for observing conditions and the type of observing device.

Higher SSN means better HF propagation. Can go up to 250 during peak of solar cycle..

Sunspots measured by different sources are smoothed out deriving the SSN or Smoothed Sunspot Number.

VU2TS