

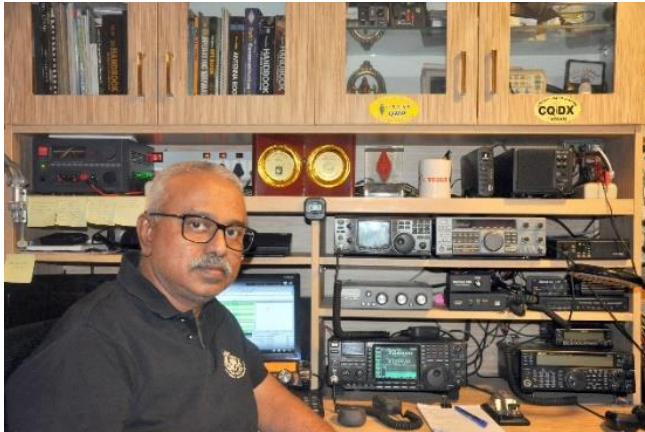


HAPPY NEW YEAR!

CONTENTS

- 3. President's message**
- 4. From the Editor's Desk**
- 5. Signals bounced off Asteroid**
- 7. Violation of the laws of Physics?**
- 8. Radio amateurs on board the ISS**
Return of the *woodpecker* QRM
- 10. Why medium-wave stations shut down at night**
- 11. VU2IIH at Science Mela**
- 12. Pune hams VU2RCP celebrate field day**
- 15 164th Birth Anniversary of Sir.J.C.Bose**
- 16. Pune hams VU2RCP celebrate World TV Day**
- 18. Building a full size tribander quad for HF**
by Gopal Madhavan VU2GMN

PRESIDENT'S MESSAGE



Greetings for the New Year 2023

May the New Year 2023 bring you all more happiness, success, love, and blessings! Plan ahead for a great year enjoying Amateur Radio, operating from home and on field days.

Hearty congratulations to Prasad VU2PTT, on earning the ARRL DXCC Honor Roll.

Looking forward to an Eyeball-QSO with you all during the **ARSI Chennai Meet** on Sunday, 12 Feb 2023. More details are sent over email and announcements on social media.

ARSI Hill Topping and Field Day on the last full weekend of February 2023 announced. So, time to plan and team-up for the great contest.

More contests and events to look out for this year in 2023

Again, wishing everyone good health and happiness.

73, de Ramesh Kumar VU2LU



FROM THE EDITOR'S DESK



Happy new year to all!

Solar activity is improving and there is fair amount of DX on the bands – 21 and 28 are open almost throughout the day. As I write this, the sunspot number is 170. I've been monitoring the *top-band* off-and-on and find that there is very poor propagation this winter.

Hearty congratulations to **Prasad VU2PTT** on being included in the ARRL's DXCC honour roll after he has confirmed contacts with over 331 countries or entities.

Hope there will be more participants in the forthcoming ARSI FIELD DAY AND HILL-TOPPING CONTEST slated for the last weekend of February 2023.

Be prepared to face the *woodpecker-QRM* of **over-the-horizon-radar** - the sensor station, known as the **Tactical Mobile Over-the-Horizon Radar**, or TACMOR, will be set up on the highly strategic island of Palau. Details included elsewhere in this issue.

Good news is - three of the four new astronauts included in February's planned launch of the **SpaceX Crew-6** mission to the International Space Station (ISS) are amateur radio operators. They are Pilot Warren "Woody" Hoburg, KB3HTZ; Commander Stephen Bowen, KI5BKB, and Mission Specialist Sultan Al Neyadi, KI5VTV.

Wishing you all lots and lots of DX through the year, 73

Ganesh VU2TS

CW NET ACTIVE 0730-0830 DAILY ON 7015

DUST YOUR KEY AND GIVE IT A TRY!

SIGNALS BOUNCED OFF ASTEROID

The **High-frequency Active Auroral Research Program**, or HAARP, is a scientific endeavour aimed at studying the properties and behaviour of the ionosphere. Amateurs are aware that the ionosphere stretches roughly 80 to about 600 kilometers above Earth's surface, right at the edge of space. Along with the neutral upper atmosphere, the ionosphere forms the boundary between Earth's lower atmosphere — where we live and breathe — and the vacuum of space.

The Air Force originally developed and owned HAARP but transferred the research instruments to the **University of Alaska, Fairbanks** in August 2015. UAF operates the site under an agreement with the Air Force.

The transmitter at HAARP can produce up to 3.6 megawatts of power.

HAARP is the world's most capable high-power, high-frequency transmitter for study of the ionosphere. The HAARP program is committed to developing a world-class ionospheric research facility consisting of:

- The Ionospheric Research Instrument, a high-power transmitter of 3.6 megawatts operating in the High Frequency range. The IRI can be used to temporarily excite a limited area of the ionosphere for scientific study using with a set of 180 antennas, disposed in an array of 12×15 units that occupy a rectangle of about 40 acres. The study of these disturbed volumes of the ionosphere yields important information for understanding natural ionospheric processes. The antenna array at HAARP:

-



- A sophisticated suite of scientific or diagnostic instruments that can be used to observe the physical processes that occur in the excited region.

IARU's latest newsletter contains information on HAARP's bouncing a signal on 9.6 MHz off an *asteroid* 2010-XC-15 which made its closest approach to Earth at a little over 700,000 kilometers (*about twice the distance to the Moon*) successfully – and was received in DL and other parts of Europe at 9600 kHz on 27th December around 11 am UTC. This is shown by some reports which reached the DARC HF department on Tuesday morning. Those interested can listen to the 30 kHz wide sweep signal as a short recording at t1p.de/orcll or <https://app.box.com/s/7cfmsz3kpiy3h2hdlw9b0whntnc5yo5p6> The diameter of the asteroid is only 150 meters!



This experiment using the HAARP facility in Gakona/Alaska is only the first preliminary stage of an attempt to investigate the interior of asteroids by means of shortwave signals from Earth,” says Tom Kamp, DF5JL, HF officer of the DARC and IARU Region 1.

(I have a serious doubt – can someone clarify? We are aware that HF signals do not penetrate the ionosphere and escape into space, so how did the 9.6 MHz signal bounce off the asteroid? Ed/)



VIOLATION OF LAWS OF PHYSICS?

Now hear this: A new ultra-low-power method of communication that appears to violate the laws of physics.

Yes, it is possible to wirelessly transmit information simply by opening and closing a switch that connects a resistor to an antenna. No need to send RF power to the antenna. The system could lead to development of devices that transmit data, including tiny sensors and implanted medical devices, without needing batteries or other power sources. These include sensors for smart agriculture, electronics implanted in the human body that never need battery changes, better contactless credit cards and maybe even new ways of satellite communication.

Apart from the energy needed to flip the switch, no other energy is needed to transmit the information. In this case, the switch is actually a transistor, with no moving parts that consumes a minuscule amount of power. In the simplest form of ordinary radio, a switch connects and disconnects a strong electrical signal source – perhaps an oscillator that produces a sine wave at around 2 GHz – to the antenna. When the signal source is connected, the antenna produces a radio wave, denoting a 1. When the switch is disconnected, there is no radio wave, indicating a 0.

A powerful signal source is not needed. Instead, random thermal noise, *present in all electrically conductive materials* because of the heat-driven motion of electrons, can take the place of the signal driving the antenna.

Several researchers have been exploring related passive communication methods, known as **backscatter**. A backscatter data transmitter looks very similar to a regular data transmitter but the difference is that in a backscatter communication system, in addition to the data transmitter and the data receiver, there is an oscillator that generates a radio wave. The switching performed by the data transmitter has the effect of reflecting that radio wave, which is then picked up at the receiver.

A backscatter device has the same energy efficiency as the regular system, but the backscatter setup is much more complex, since a signal-generating component is needed. However, the new system has lower data rate and range than either backscatter radios or conventional receivers.

This work may lead to new connections between the study of heat thermodynamics (*study of heat*) and information theory (*the study of communications*). These fields are often viewed as analogous, but this work suggests some more literal connections between them.

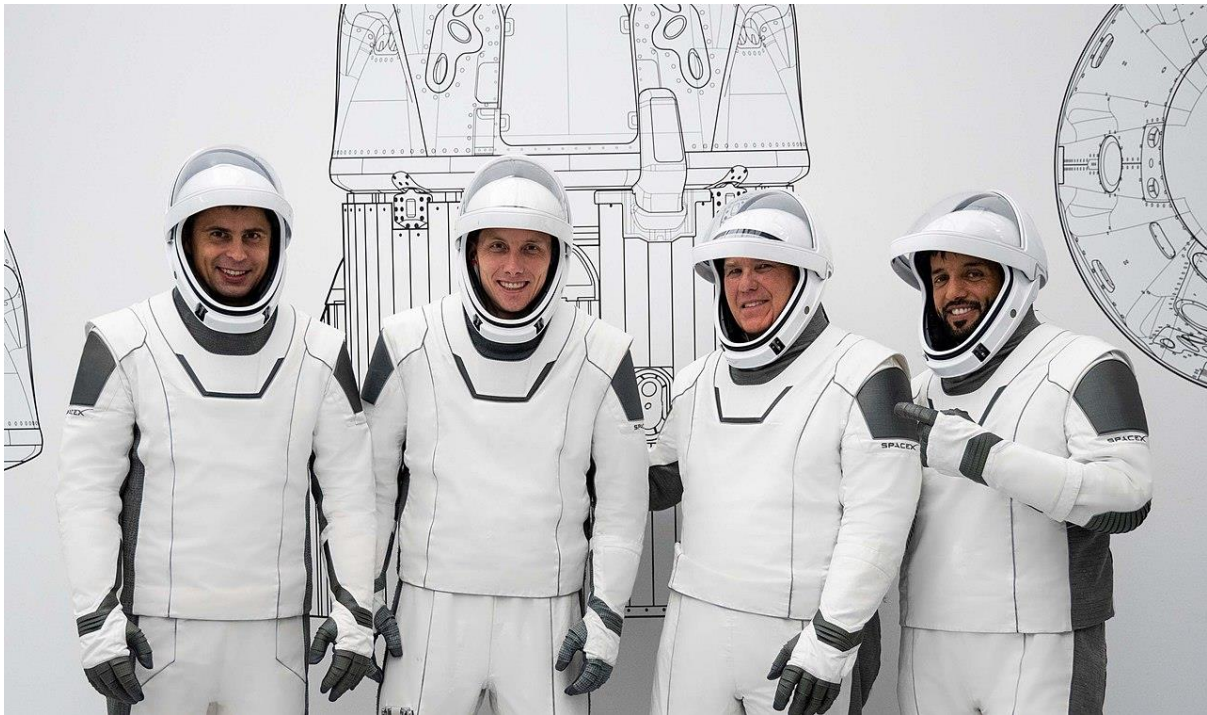
Further-reading-suggested:

<https://www.cambridge.org/core/books/abs/wirelesspowered-communication-networks/backscattering-wirelesspowered-communications/1C91AFB8BB546FC3BA6389883A4C1955>

Radio Amateurs on board the ISS

Three of the four new astronauts on February's planned launch of the SpaceX Crew-6 mission to the International Space Station (ISS) are amateur radio operators.

The four crew members that comprise the SpaceX Crew-6 mission are, Mission Specialist Andrey Fedyaev, Pilot Warren "Woody" Hoburg, Mission Specialist Sultan Al Nedayi, and Commander Stephen Bowen.



Pilot Warren "Woody" Hoburg, KB3HTZ; Commander Stephen Bowen, KI5BKB, and Mission Specialist Sultan Al Neyadi, KI5VTV, will join Mission Specialist Andrey Fedyaev on board the SpaceX Dragon spacecraft, Endeavour. Image courtesy: NASA

The spacecraft will be atop a Falcon 9 rocket and, while a launch date has not been selected, the earliest date would be mid-February 2023.

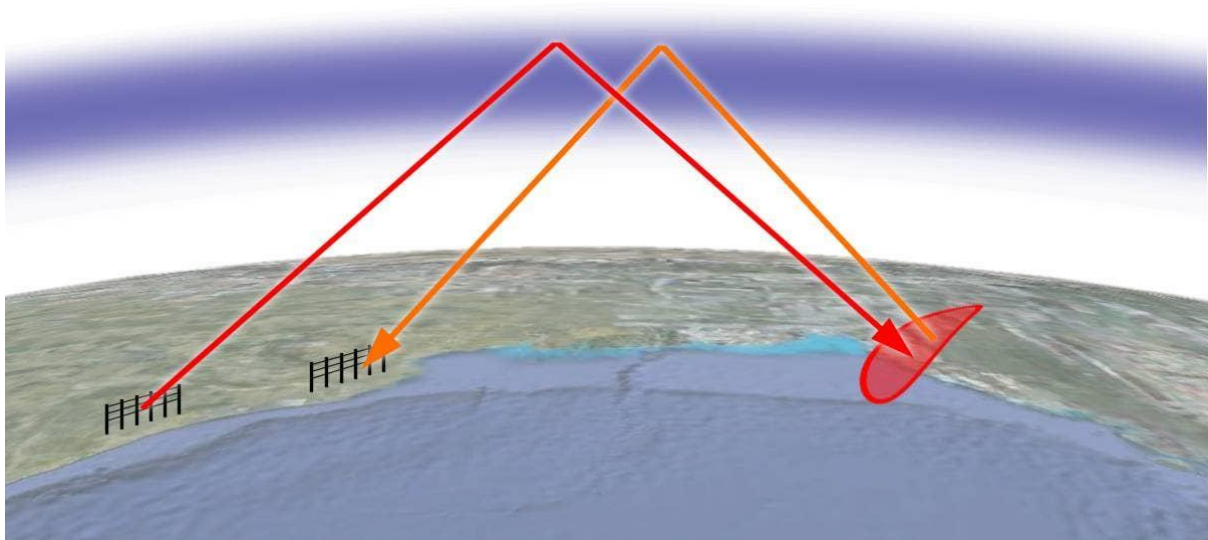
RETURN OF THE WOODPECKER QRM

The United States has begun work on the deployment of a new long-range over-the-horizon radar system for the United States Air Force, which will be placed on the Pacific island of Palau – familiar to us as T8 land.

The sensor station, known as the Tactical Mobile Over-the-Horizon Radar, or TACMOR, will be set up on the highly strategic island of Palau. This intends to

improve the situational awareness of US and allied forces operating in the region in the air and maritime domain.

Over-the-horizon (OTH) radars are radar systems that can locate highly distant targets beyond the range limit of conventional radars. Old timers may remember the familiar *machine-gun QRM more popularly known as the WOODPECKER* on all the HF bands during the 70s. They operate in the HF frequency band of 5 to 30 MHz and can detect objects hundreds to thousands of kilometers away. These radars employ powerful radio signals transmitted by a high gain array of antennas. Power output is not specified; but I guess it will be in megawatts.



How it works: A powerful shortwave signal from a large transmitting antenna (left) reaches a target beyond the horizon by refracting off the ionosphere, and the echo signal from the target (right) returns to the receiving antenna by the same route. Credit: Charly Whisky/Wikimedia Commons

Incidentally, Australia is the world leader in high-frequency, skywave over-the-horizon radar technology. This technology had its beginnings in early research into the ionosphere conducted at *Weapons Research Establishment* from the 1950s. The Jindalee Operational Radar Network in Queensland is an *over-the-horizon radar network* that can monitor air and sea movements across 37,000 square kilometres. It has a normal operating range of 1,000 kilometres to 3,000 kilometres.

WHY MEDIUM WAVE STATIONS SHUT DOWN AT NIGHT



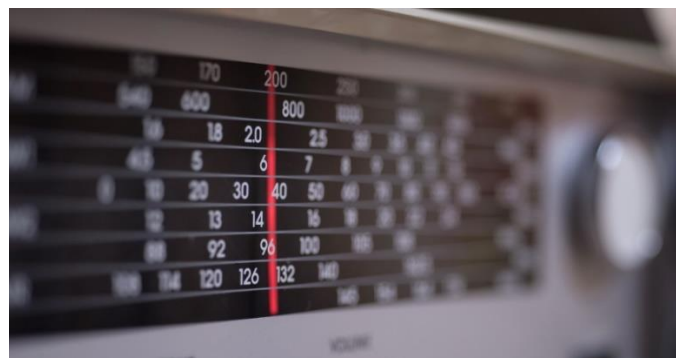
Most AM stations on the *medium wave* bands either shut down or power-down during night time while the FM stations operate through the night.

It all has to do with the ionosphere. During the daytime, AM signals primarily propagate via ground waves, and follow the curvature of the Earth. AM signals on medium waves can cover only around 200 kilometers during daylight hours. Furthermore, because of their short range, *medium wave* stations can use the same frequency if they are 500 kilometers apart.

At night, the ability of medium waves to propagate large distances actually becomes a problem. Between 100 and 600 kilometers above the Earth, particles in the Earth's atmosphere are bombarded with Ultra-violet and X-rays arriving from the Sun during the day, ***ionizing*** them. The ionosphere expands during the day and contracts during the night.

Consequently, at night, the ionosphere refracts the medium wave radio signals sending them to a much greater distance than during the day, allowing the signal to be carried for hundreds of kilometers further than during the day. While this may sound like good news, but for listeners everywhere, there would only be *cacophony* with signals interfering with one another. Moreover, in a country like ours, the local languages change every 500 kilometers or so, and so who would listen to a station using language one doesn't understand?

That's the reason why medium wave stations are licenced to operate during daytime only.



VU2IIH AT SCIENCE MELA

Indian Institute of Hams in association with Alva's Engineering College had setup Special amateur radio station under the callsign: VU2IIH at **Science Mela** coordinated by Dr. S.Sathyapal VU2FI, Mr Narasimha Achar VU2MLA, Mr R. Manjunatha, VU3CJM & Mr. Neil Bruce VU3EFZ. A brief report by Rajan VU2JXM:

IIH Special Amateur radio station was active on HF, VHF and echolink with few exhibits like walkie talkies, antennas, code practice oscillator (Morse code) with straight and paddle key, PA system, LCD projector, reference books and informative posters. We established contacts with 453 international stations covering 48 countries apart from VU contacts popularizing International Cultural Jamboree. Thousands of Scouts, Guides, Students from various institutions, educationists etc visited the amateur radio station.



We had regular briefing session for 10 – 15 minutes for groups with live demonstrations. Few Hams - Mani VU3WMY, Shridhar VU3GLS, Mohan VU3TGC, Renu VU3CQM, VU3ZNL Vaibhav, Rohit VU3RDO, Abhinav VU3VCS - visited the special event station which was active from 8.00 AM till 7.00 PM and we use to check into all HF roll call nets and conducted Silicon city net on 7088 KHz from 4.00pm to 5.15m.



A team of student volunteers from Alvas Electronics and Communication Varun Kumar. P, Yashwanth.G.T, Prasanna B.T, Amresha. M, Sandeep.M, Tej Ashok and Siddhoradh were trained and involved in conducting awareness programmes. I thank Dr. Vivek Alva, Managing Trustee, Dr. Dattareya –Dean, Dr. Yuvaraj Aralapura, Ms Karitka Devi for giving us an opportunity to popularize Amateur (Ham) Radio and for wonderful arrangements.

Special thanks to all the volunteers who have supported us.

73 - Rajan-VU2JXM

Pune Hams VU2RCP Field Day at Kasarsai Lake

29-30 Oct 2022

A report by Vilas VU2VPR

The field Day was planned at pictorious Location K Rocks Resort Kasarsai Lake Near Pune.

A Total number of 13 people including the Hams & SWLs reached to the venue around 10 AM and started preparations for Antenna installation.

Field day participants 29 & 30 Oct 2022

- 1) VU2ANM - Commodore Ashish Saxena,
- 2) VU2VPR - Vilas Rabde,
- 3) VU3YEJ - Kunal Gautam (KG)
- 4) SWL - Shirish Deshmukh,
- 5) SWL - Aniruddha Kulkarni,
- 6) SWL Shrivatsa,
- 7) VU3ZAG Sooraj Shenoy,
- 8) VU3SZO Amit Hari Gurav,
- 9) SWL Vishnu from Moze CoE,
- 10) SWL Prasanna Kher,
- 11) SWL Anuprita Kher,
- 12) SWL Onkar Kher,
- 13) SWL Aryaa Kher



The Delta Loop for 20 Mtrs & dual band Trapped Dipole Antenna were installed by SWLs under Hams supervision. OM Ashish demonstrated and explained in detail about SWR measurements using MFJ Antenna Analyser. The SWLs and new Hams took lot of interest and interacted with Kunal VU3YEJ, Sooraj.VU3ZAG.

VU3YEJ OM KG (Kunal Gautam), explained the concept of LoRA (Long Range) Communication. Difference between LoRA and LoRAWAN was explained along with various technical information like Spreading Factor (SF), Coding Rate, their trade-offs while selecting for longer distance. He showed a demo of an open-source project called TinyGS, which received LoRA signals from a satellite and sent the database back to the central server.

Various use cases of the technology were also discussed. He explained how this technology helped him to understand the construction and features of the dipole. He demonstrated the perfectly tuned JP Coax antenna, fully homebrewed with all the waste materials available at home. Overall, it was quite an interactive session with lots of interesting questions from the participants.

VU3ZAG OM Sooraj demonstrated the customised uSDX SDR transceiver. uSDX is a simple and experimental (Class-E driven) SSB and CW SDR transceiver designed by PE1NNZ OM Guido. It can be used to make QRP SSB contacts, or (in combination with a PC) used for the digital modes such as FT8, JS8, FT4.



It can be fully-continuous tuned through bands 80m-10m in the LSB/USB-modes with a 2400 Hz bandwidth has up to 5W PEP SSB output and features a software-based full Break-In VOX for fast RX/TX switching in voice and digital operations.

SWL Aniruddha Kulkarni along with his Harmonic Shrivatsa demonstrated Sonar. It is low frequency radar for Bathymetry application. The device work on 200khz frequency. It is capable to do depth analysis of shallow and deep water. Fishes can also be easily located with this technology. While demonstration, the depth of lake along with terrain at bottom was analysed, and luckily the group of fish were also located in middle of the lake. All this demonstration were enjoyed by the participants along with boat ride in the lake.

After Tea Break around 5:30 PM, 20 Mtr Operation started using Kenwood TS 480. A good demo transmission was given by VU2LB OM Lalitbhai from Bhavmagar. VU2AU OM Paran also appeared for some time. The band was very active with contest activity.

After Dinner there was a Camp Fire & DJ Music organised by Resort which was enjoyed by all.

The next morning the WX was quite chilly and everyone was wearing warm clothing. Surprisingly the Tents were warm inside.

We started 40 Mtr Operation around 7:00 AM covering Belgaum and Charminar net.VU2ACK, VU2KOC & VU2ELJ interacted with Hams and SWLs. After breakfast Antennas were dismantled and packed.

Boating at Kasarsai Lake Wind surfing at Kasarsai Lake.



Around 10:00 AM the Windsurfing demo was enjoyed by participants. -Thanks to VU2ANM. The Field Day concluded around 12:00 Noon.

73 de Vilas VU2VPR

164th BIRTH ANNIVERSARY OF SIR.J.C. BOSE, THE FATHER OF RADIO – WAS CELEBRATED BY PUNE HAMS – VU2RCP

Pune Hams - along with IEI PLC, IETE & Tech Forum celebrated the 164th birth anniversary of Sir JC Bose, Father of Radio, on Wednesday 30th November 2022 in Firodia Auditorium of Institution of Engineers (I) Pune Local Center Shivaji Nagar Pune.

The theme selected this year by Pune Hams was **“Be curious, experiment, learn and succeed”** Based on above theme, the project selected this year was **uSDX SDR QRP Transceiver**

Chief Guest and speaker Mr Vishwas Kale, MD, Vijayesh Instruments Pune gave 39th Tech Talk about Sir JC Bose's life sketch & explained in detail how he invented various things with limited resources.

So far the world was under the impression Marconi was the Inventor of Radio. Now it is proved, Sir JC Bose is the father of Radio. Please watch following Video created by **Vigyan Prasara** on *Sir JC Bose*

<https://youtu.be/BMG86iZ8wCM>

Later, Mr Vishwas Kale launched the official. Website of Pune Hams VU2RCP

www.vu2rcp.org

Thanks to OM Kunal Gautam VU3YEJ for creative website

The live demo with construction details were shared by OM Sooraj Shenoy VU3ZAD about uSDX SDR transceiver, a simple and experimental (Class-E driven) SSB and CW SDR transceiver . It can be used to make QRP SSB contacts, or (in combination with a PC) used for the digital modes such as FT8,



An introduction on Software Defined Radio (SDR) technology was presented. Discussion was carried out regarding driving factors of SDR it's basic blocks, IQ signal theory generation and digital signal processing. A demonstration was given on uSDX radio transceiver with explanation of its working principle and features. uSDX is a new open source, home brew multi band, multi mode QRP transceiver that grew out from parent QCX transceiver. Through some complex engineering it retains an efficient class E RF amplifier for SSB and digital modes. It crams impressive SDR capabilities into an Arduino.

This has an international development process conducted on <https://groups.io/g/ucx/topics> with contributions by many global Hams, including Guido Ten Dolle PE1NN, Barbaros Asuroglu WB2CBA and Manuel Klaerig DL2MAN.

The QCX was the base for the QCX-SSB which started with a QCX and modified the circuit and software to add SSB capabilities. The idea that Guido accomplished uses pulse width modulation of the PA supply voltage to control the amplifier in an Envelope Elimination and Restoration (EER) technique. To generate SSB, a DSP algorithm samples the audio input and performs a Hilbert transformation to determine the phase and amplitude of the complex signal. The phase changes are transformed into temporary frequency changes which are sent to the clock generator. This results in phase changes on the SSB carrier signal and delivers a SSB-signal with the opposite side-band components attenuated.

On the receive side, a direct conversion SDR receiver is used with the I and Q signal digitized and all further processing carried out digitally. Attenuators are included to help not overload the ADC range. The support and source page of the project is

<https://github.com/threeme3/QCX-SSB>

Pune Hams VU2RCP celebrated WORLD TELEVISION DAY with IEI PLC, IETE Pune & Tech Forum at Firodia Auditorium

This year's theme was: "Recognizing the influence television has had on decision-making by drawing attention to conflicts, dangers, peace, and security".

The session started with Mr. Anil Chaitanya providing a background of the session's speaker, *the great Head, Electronics Division (Satellite Systems), Space Science and Technology Center, Thiruvananthapuram, Project Manager, (Electronics and TV Hardware); Satellite Instructional Television Experiment (SITE), SAC, Ahmedabad Project Director; INSAT-1, Space Segment Project, Bangalore Mission Director, ISRO Payload Scientist Mission Director; Space Applications Center (SAC), Ahmedabad*

Director; Vikram Sarabhai Space Center (VSSC), Thiruvananthapuram - **Mr. Pramod Kale.**

After that, a nostalgic presentation was given by Mr. Pramod Kale on the history of Television, and its introduction in our country. This day is quite special for Mr. Pramod Kale as his daughter was also born on this day. This very day in 1963, the first *Sounding Rocket*, '**Nike Apache**', was launched from Thumba launch site in Kerala, which was just a starting point for India with the bare minimum facilities.



In his presentation he touched upon the progress made by Television since the early 1930s till today. This was quite *nostalgic* for many people. He shared the interesting stories about how satellite broadcasting was made available in India, the challenges and solutions provided by we Indians, deployment of television with Satellite dishes in remote parts of India and so on.

He also shared a quite interesting story about the T.V. Tower at Sinhagad Fort. It was initially installed to retransmit the signals from Mumbai station to Pune Area, by getting feeds from Mumbai TV Station. But during summer time and propagation it started to retransmit the signals from Karachi T.V. Station, which caused lots of trouble for authorities in India!

The presentation ended with a *Question-and-answer* session. Audiences asked questions regarding his vision for T.V. in 2030, dangers of using microwave communication and it offered security lapse and danger to country during Mumbai terrorist attack.

Mr. Sarolkar proposed a vote of thanks and professor A.N. Gedam honoured our insightful and knowledgeable speaker Mr. Pramod Kale with a token of love. With this the session was concluded and everyone had nice interaction afterwards

Television had started as an entertainment medium more than seventy years ago. It became an important medium once space communication based international services started. In our country the growth and spread of television was taken up when it was recognized as an important medium for education and instruction.

73 – Vilas Rabde VU2VPR

Building a full-size Tri-Band Quad for HF

By Gopal, VU2GMN

Ever since I got my license, I have been interested in home-brewing antennae- started with Ground Planes, J Poles and Slim Jim's for VHF and UHF, and then went on to 3-Element Mono Banders for 6, 10, 15, and 20 M HF.

Also built a couple of Quagis – *cross between a quad and a yagi* - for VHF.

I then started thinking of building a Quad for HF and looked for suitable spreaders. Bamboo was the first thought but getting thin ones that were straight was a problem. Then looked at what is called "Thosh " in Bengali, thin bamboo- like rods that fisher-folk use. Long enough ones for a 20 M Quad were not available and so gave up that idea.

I then firmed up on aluminium tubes of reducing diameters joined by cricket *bail like* wooden pieces. The lengths of each spreader section was carefully calculated to prevent any resonance at any of the three frequencies and so additional joints had to be introduced.

A four-element "Monster Quad" antenna was my choice and dimensions were available in The Radio Amateur Antenna Handbook by William I. ORR, W6SAI and Stuart D. Cowan, W2LX. Lots of information was available in the book and so the job started. (A gain of 11.5 to 12 .0 dBd was shown as possible for the four element Quad)

I made the spreader section separators with fibrous country wood, turned into the right dimensions for each section on a lathe, and then boiled them in paraffin wax for several hours to prevent any ingress of moisture while up on the roof.

The four elements were then assembled one by one on my terrace and an aluminium 3 inch diameter boom 30 feet long got ready . Each element had a square aluminium mounting plate with a steel angle and U bolts to fit onto the boom were used. I first tried aluminium angles to support he elements but they proved too fragile and so steel angles were used with the spreaders fitted with stainless Steel hose clips.

SS hose clips were also used to secure each section of spreader to each other section separated by the wooden turned pieces.

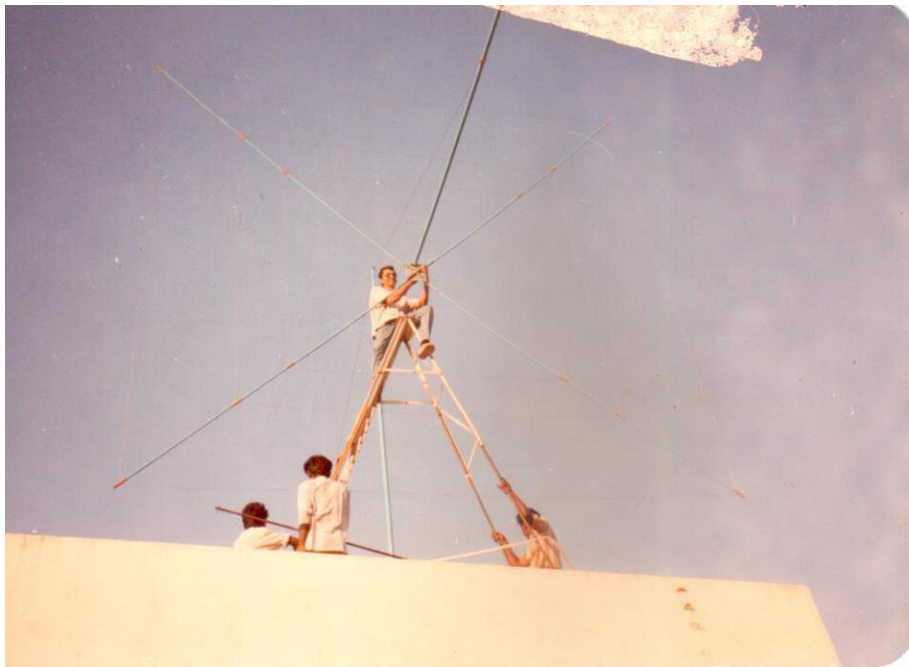
Bare copper wire was used for the elements, which was threaded through holes drilled in the wooden separators and the copper wire prevented from slipping from its intended position by a short copper tie soldered to the element wires across the wooden dowel separators at each corner where it went through the wooden separator.

Anyone visiting me during those days were “persuaded” to give me a hand doing some fabrication! I remember YL Rohini, VU2ROI, visiting me once and she was put on the job straightaway!

Then came the problem of assembling the Monster as handling the large square elements and lifting them onto the boom posed a real problem.

Finally a 7 foot step ladder was extended in height by bolting steel angles to all four legs and that got the height required.

My son Sanjay, VU2SJD, on his weekly visits to Chennai from college, became my “slave labour” and he climbed the ladder to fix the elements to the boom- see photo! In the heavy wind and at that height, it was not a job for the faint of heart!



VU2SJD Sanjay on top of extended ladder fitting the elements to the boom

The centre two elements were first fixed and then the outer two to retain some balance as the whole thing started tilting

There was considerable swinging and twisting of the boom and so after reading up, the mast was extended above the antenna boom and a 3-foot long cross piece fixed at the top.

Two steel guy wires were then fitted, each guy starting from one end of the boom, going through eyes in the ends of the cross piece and terminating at the other end of

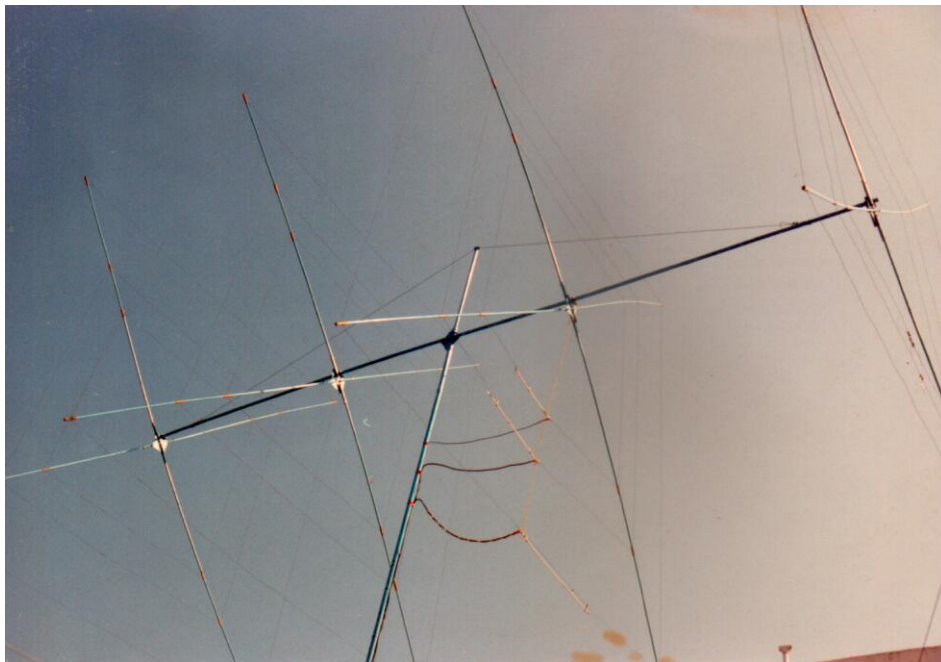
the boom with turnbuckles fitted to adjust the boom sag and bring it to a horizontal level. That solved the twisting and swaying to a great extent.

Rather than the three driven elements being tied together and a common feed coax being used, I decided on a separate coax for each band and selected by a three-way coax switch in the shack.

Matching was by Gamma match- the matches being made by stripping the outer shield and braid from suitable lengths of RG 8 coax, and slipping a snug fitting suitable diameter aluminium tube to act as the outer part of the adjustable match. Aluminium strips folded over into a cinch were used for the adjustable contact and connected by small copper wires soldered onto the driven elements.

Help from friends was essential during the tuning and adjusting process as it had to be done on top of the roof sitting on a ladder with a high-wattage soldering iron to offset the cooling winds. OM Srinu VU2VAU used to come and sit in the shack transmitting on low power and calling out the SWR etc. each time an adjustment was made by me on the roof, till the matching was done to satisfaction.

The front to back was done with OM KK VU2MKL (*now silent key*) transmitting from Anna Nagar with very low power and me adjusting the reflectors till signals from the rear of the antenna could not be heard, or minimised as much as possible, with Srinu listening in the shack.



The antenna performed brilliantly and along with a home brew valve linear, put out great signals for some years.

The QUAD was one of the quietest antennas I have used and the front to back separation was amazing.

Then came a cyclone and it demolished the antenna. The mast broke, the elements were twisted around the broken mast and with a really heavy heart, I had to remove everything using a hacksaw to separate the shambles.



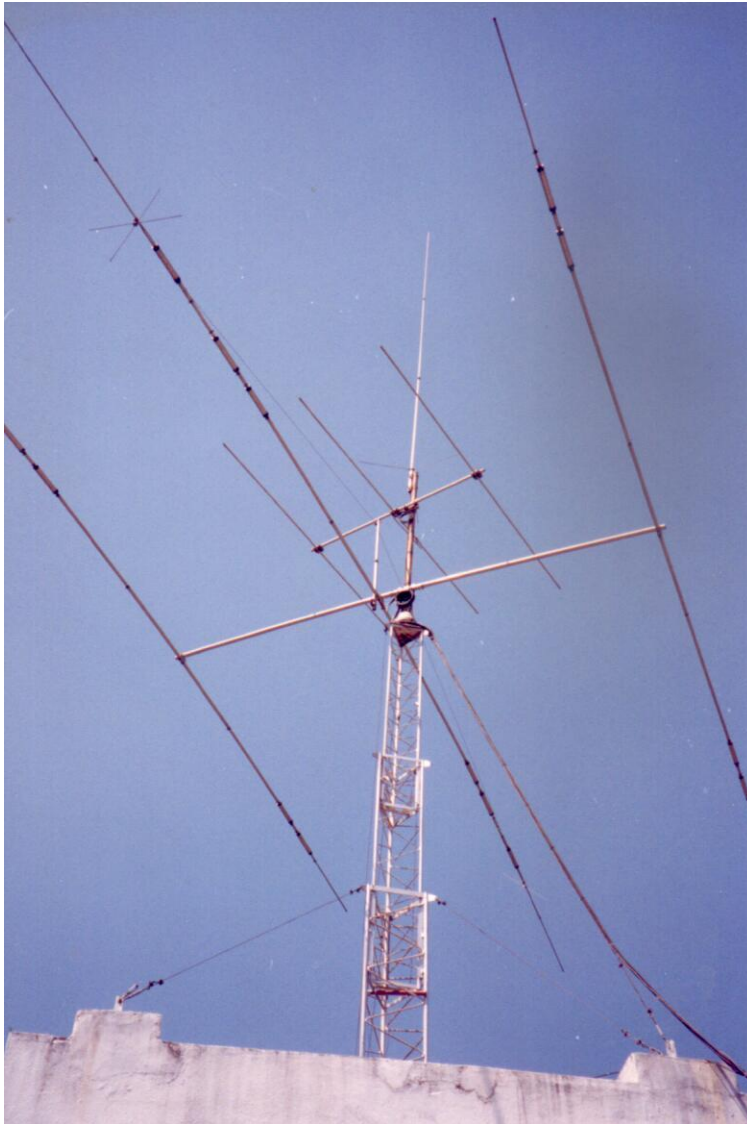
Quad demolished by cyclone

I did not have the energy to rebuild the antenna and by this time Sanjay was working overseas and so I did not have the help I needed for such projects. Sanjay also begged me NOT to try and build another QUAD because of the amount of work involved!!

I used a HAM-IV rotor fixed at the base of the mast and the whole mast was rotated along with the antenna. To provide some additional support for the mast above the roof level three steel angle stays were fixed to the roof and terminated in a pipe coupling through which the mast was placed.

The mast itself was water pipe, which in retrospect was a mistake, as water pipes will not take bending forces and so the mast bent during the cyclone and destroyed the QUAD. Should have used seamless pipes!

After this disaster a 3-section crank up tower was made for me by OM Sundararajan VU2KSJ, from Coimbatore. This made life much simpler for antenna work and survives storms well unlike pipe masts.



3 section crank-up tower with Cushcraft A3S tri-bander and homebrew 6 M 3-element Yagi- some years ago. A 3-element SteppIR is now my antenna on the tower.

73 - Gopal Madhavan VU2GMN

Meet Doreen Bogdan-Martin, KD2JTX. - Director of the International Telecommunication Union (ITU) Telecommunication Development Bureau and the first woman ever to hold this position since the founding of the ITU in 1865.

American Doreen Bogdan-Martin was elected in a secret ballot with 139 votes, her opponent Russian Rashid Ismailov received 25 votes.

All radio amateurs and women worldwide can be proud of this election.

OFFICE BEARERS

PRESIDENT

Ramesh Kumar K G VU2LU
Care of Linux Learning Centre Pvt. Ltd.
635, 6th Main, Hanumanthanagar
Bengaluru KA 560019
e-mail: president@arsi.info

VICE PRESIDENT

M.T.Kesari, VU2MTK
107, 4th Main Road
Gokulam 3rd Stage, Mysore KA 570002
e-mail : vicepresident@arsi.info

SECRETARY

Govind Girimaji VU2GGM
36, Sneha Colony
Chikkallasandra, Bengaluru KA 560061
e-mail: secretary@arsi.info

TREASURER

Krishna Kumar R VU2YUU
466, 19th Main / 36th Cross
4-T Block Jayanagar
Bengaluru KA 560041
e-mail: treasurer@arsi.info

EDITOR

Ganesh T S VU2TS
Watapi, B R Hills
Karnataka KA 561441
e-mail: editor@arsi.info

QSL MANAGER

Ramesh Kumar K G VU2LU
Care of Linux Learning Centre Pvt. Ltd.
635, 6th Main, Hanumanthanagar
Bengaluru KA 560019
e-mail: qslburo@arsi.info

Monitoring Systems Co-Ordinator

Sanil M.Deep VU2SIO
"Daylight" 23/1862, Kannanchery Road,
Kozhikode KE 673003

Contests and Awards Manager

Prakash (Kash) Srinivas VU2IBI
"Vauhini" 61, 11th Cross Indiranagar,
Bengaluru, KA 560038

The address of the Society to which all correspondence is to be mailed:

Ramesh Kumar K G VU2LU
Care of Linux Learning Centre Pvt. Ltd.
635, 6th Main, Hanumanthanagar
Bengaluru KA 560019