Amateur RADIO Society News

Newsletter of The Amateur Radio Society of India (Member of IARU) English / Hindi Quarterly

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President's message

Dear members

Had mentioned that ARSI was planning some very interesting contests and details are now available on the webpage. Please take a look and start working on participating in the contests. Many of them are very easy to work and should activate many new contesters

The Government of Kerala conducted an international conference on disaster mitigation- ARSI was invited to participate and we set up a stall showcasing the reason for amateur radio being very effective in providing emergency communications when other communications fail. The Minister concerned was impressed and has assured us that the Government would integrate amateur radio into their communication protocol for emergencies. A suitable letter has been handed to him also

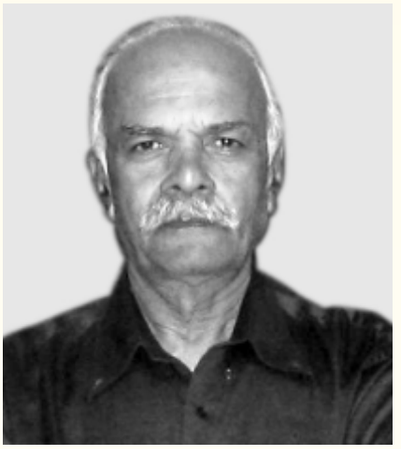
The Governing Council of ARSI met at Bangalore a few days ago and discussed plans to support Indian radio amateurs

One initiative taken over the past few months is to try and persuade the Ministry of Home Affairs to modify the security clearance processes so that the long waiting periods for new licenses will be reduced if not eliminated altogether. A letter has been delivered to The Home Minister who has promised to do what can be done. So we have to wait and see if it really happens

We had circulated on the e-group details of the IARU Region 3 triennial conference which is to take place in Ho Chi Minh City in Vietnam early November this year. It will be fairly inexpensive to attend the conference and so all are invited to look at the possibility of doing so. Many interesting places are there to see also around the country. Please see the IARU Region 3 webpage for full details

Gopal Madhavan VU2GMN

From the Editor's desk



A lot has happened since the January issue was published. The WRC-12 conference in Geneva was concluded successfully. One of the highlights of the event was the celebration of the 50th anniversary of the International Amateur Radio Club 4U1ITU. Efforts are being made to fend off the HF Radars from using spectrum near the amateur bands; I have included an article on the subject.

Our members are busy – activating Islands and Lighthouses – you will find reports in this issue. Jim/W4GFX has kindly provided another article – "Mechanically Balanced Yagi" – Jim and I invite feedback from members, so that I can continue including technical articles in future issues.

Solar Flares were the topic of discussion for Amateurs only but now it is discussed by the man on the street what with all the hype the subject is receiving in the media! "Biggest Solar Flare to hit the earth" has fizzled out but we can expect more to come. You will continue to read about it on the ARSI reflector.

73 – Ganesh VU2TS

Earthquake hits radio amateurs act

A massive earthquake struck Philippines just before noon local time on Monday Feb 06 in the heavily populated islands of Negros and Cebu in the country's central region.

Communications were set up on HF and the emergency activity of amateur radio became established in the earthquake and landslide hit areas.

According to Chief Operating Officer for IARU society Philippines Amateur Radio Association (PARA), Eddie Valdez DU1EV, Ham Emergency Radio Operations (HEROs) had activated the emergency frequencies of 144.740 MHz and 7.095 MHz. They had established their command centre on board the Philippine Coast Guard search and rescue vessel BRP Davao del Norte. HEROs were been kept busy forwarding traffic from the disaster areas to Cebu and Manila.'

The traffic handled included mainly responding to overseas inquiries for persons looking for information about their family and friends in the earthquake hit areas.

He said 'As landlines and cellular phones have been erratic, amateur radio has provided a vital link. Among the active HEROs were RJ DU7RJA, Roy DU7DDJ, DW7XKS, DW7RDX and 'Alvin DU1AJ/7.

'In Manila, HEROs operatives Butch DU1RP and Lito DU1PA had set up camp at the National Disaster Risk Reduction Management Council (NDRRMC) under the Department of Defence.'

They were active 24/7 on HF and acting as liaison between the disaster area and the NDRRMC command centre in Manila.

Call of Titanic went out again

A hundred years ago, Jimmy Myrick, a 14-year-old Newfoundland boy, was one of the first people to hear RMS Titanic's late-night distress S.O.S. signal.

Radio amateur David Myrick VO1VCE, a relative of young Myrick, participated in the re-enactment. The Chronicle Herald U.K. reported that the transmissions from the stricken vessel and the resulting bustle of activity at the Cape Race Marconi Station that occurred after Myrick alerted the station's wireless operators to the impending disaster, was re-enacted on April 14 last, as part of the 100th anniversary of the world's most fascinating marine tragedy .

This year, during the weekend of the 14th – 15th of April, Poldhu Amateur Radio Club will be operating from the Marconi Centre at Poldhu using the callsign G3MPD rather than the usual GB2GM call. MPD was the callsign of the Marconi station at the time of the Titanic disaster. They will be operational on as many of the HF bands as possible.

Titanic - GR1ØØMGY

The sinking of White Star Line's RMS Titanic on 15th April 1912 sent shock-waves around the world. In memory of this tragic event, a special event station GR1ØØMGY will be activated between 10-15th April, 2012. Some fifteen operators will man two 400 watt transmitters on the eight HF bands from 3.5 to 28 MHz, using directional antennas. Only CW will be used except on the open days, 14-15th April, when SSB will help the public to understand the operation. Activity on VHF is also planned. GR1ØØMGY will be located at 0°37'18" West, 51°11'49" North, Locator IO91QE: Godalming, Surrey, GU7 2DX, England (EU-005, WLOTA 1841). When the Titanic sank, it claimed the life of Jack Phillips, the Titanic's Senior Wireless Operator who hailed from Farncombe, Godalming.

QSL via G3SXW, direct or Bureau.

Several other countries are remembering The Titanic QRV during April:

BELGIUM - TITANIC CENTENARY - ON1ØØTT -

IRELAND - TITANIC CENTENARY - EI1ØØT -

NORTHERN IRELAND - TITANIC CENTENARY - GI1ØØMGY -

WALES - TITANIC CENTENARY - GB1ØØGGM -

NETHERLANDS - TITANIC CENTENARY - PH1ØØMGY -

SHETLAND IRELANDS - TITANIC CENTENARY - GB2WG –

Spread Spectrum Communications

Spread-spectrum technique is a method by which a signal generated in a particular bandwidth is deliberately spread in the frequency domain, resulting in a signal with a wider bandwidth. These techniques are used for a variety of reasons, including the establishment of secure communications, increasing resistance to natural interference, noise and jamming, to prevent detection, and to limit power flux density – especially in satellite downlinks.

Spread-spectrum telecommunications is a signal structuring technique that employs direct sequence, frequency hopping, or a hybrid of both, which can be used for multiple access and/or multiple functions. This technique decreases the potential interference to other receivers while achieving privacy. Spread spectrum generally makes use of a sequential noise-like signal structure to spread the normally narrowband information signal over a relatively wideband (radio) band of frequencies. The receiver correlates the received signals to retrieve the original information signal. Originally there were two motivations: either to resist enemy efforts to jam the communications (anti-jam, or AJ), or to hide the fact that communication was even taking place, sometimes called low probability of interception (LPI).

A conventional radio signal has a frequency, usually specified in megahertz (MHz) or gigahertz (GHz), that does not change with time (except for small, rapid fluctuations that occur as a result of modulation). When you listen to a signal at 103.1 MHz on an FM stereo receiver, for example, the signal stays at 103.1 MHz. It does not go up to 105.1 MHz or down to 99.1 MHz. The digits on the radio's frequency dial stay the same at all times. The frequency of a conventional wireless signal is kept as constant as the state of the art will permit, so the bandwidth can be kept within certain limits, and so the signal can be easily located by someone who wants to retrieve the information.

There are problems with conventional wireless communications that can occur under certain circumstances. First, a signal whose frequency is constant is subject to catastrophic interference. This occurs when another signal is transmitted on, or very near, the frequency of the desired signal. Catastrophic interference can be accidental (as in amateur-radio communications) or it can be deliberate (as in wartime). Second, a constant-frequency signal is easy to intercept, and is therefore not well suited to applications in which information must be kept confidential between the source and destination.

To minimize troubles that can arise from the above mentioned vulnerabilities of conventional communications circuits, the frequency of the transmitted signal can be deliberately varied over a comparatively large segment of the electromagnetic radiation spectrum. This variation is done according to a specific, but complicated mathematical function. In order to intercept the signal, a receiver must be tuned to frequencies that vary precisely according to this function. The receiver must "know" the frequency-versus-time function employed by the transmitter, and must also "know" the starting-time point at which the function begins. If someone wants to jam a spread-spectrum signal, that person must have a transmitter that "knows" this function and its starting-time point. The spread-spectrum function needs to be kept out of the hands of unauthorized people or entities.

Most spread-spectrum signals use a digital scheme called “frequency hopping”. The transmitter frequency changes abruptly, many times each second. Between "hops," the transmitter frequency is stable. The length of time that the transmitter remains on a given frequency between "hops" is known as the “dwell time”. A few spread-spectrum circuits employ continuous frequency variation, which is an analog scheme.

Recently, Phil William KA1GMN has obtained an experimental license, with the call WF9XJD, to carry out Spread Spectrum transmissions on all the amateur radio HF bands as well as 50 and 144 MHz with max power of 100W ERP.

The aim is to conduct experiments with spread spectrum, research effectiveness under weak signal conditions and compare against other digital modes such as JT65A, Olivia, MT63 and PSK31. The emission designator for Spread Spectrum is 2K50J2D and Phil has probably started experimental transmissions on all the amateur bands. As soon as I have any updates, I shall publish them. Ed.

THE FUN CUBE

[from the ZDnet.co.uk]

A group of British radio amateurs are sending send a tiny 10cm-cubed satellite into space later this year, part of a project to boost young people's nterest in science and technology. The FUNcube satellite will be launched later in the year..

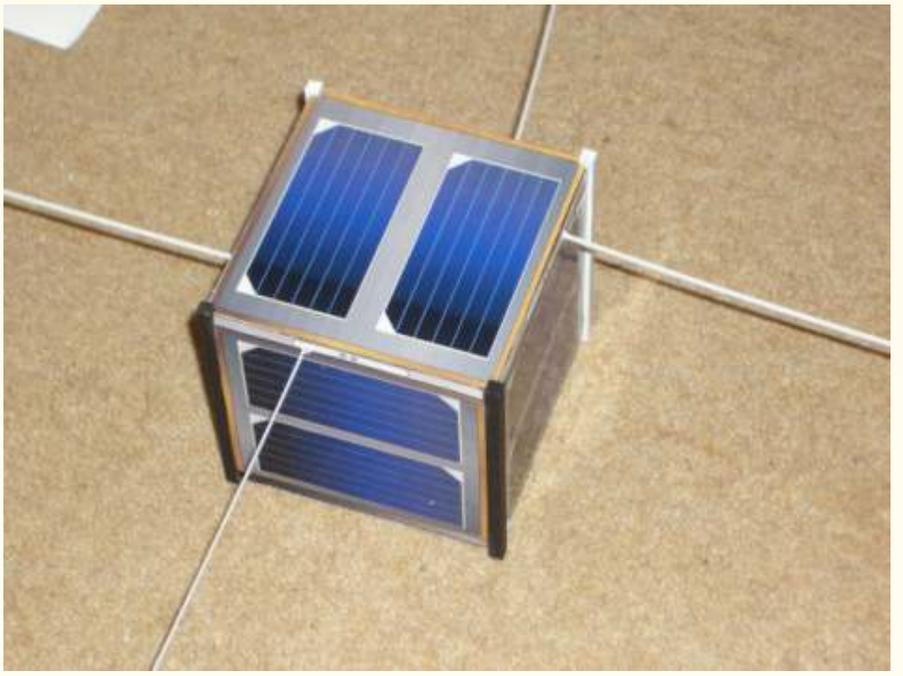
AMSAT-UK will load its FUNcube-1 CubeSat pico-satellite onto a converted intercontinental ballistic missile (ICBM) that is set for take-off in the third quarter of 2012. Once in orbit, the spacecraft will use a 145MHz telemetry beacon to transmit signals for schools and colleges to analyze.

"They will be able to receive the data stream which contains telemetry — things like battery voltages and solar panel currents — and from this they'll be able to deduce things like the spin rate of the satellite, and what happens to temperatures when it goes into or out of eclipse," FUNcube project lead Jim Heck told ZDNet UK.

The students will also be able to send, via a moderator, 'Fitter' (as in 'FUNcube Twitter') messages of 200 characters to the CubeSat. The spacecraft will then be able to broadcast these messages back to other users, according to Heck.

To receive signals from FUNcube-1, people must use a £120 software-defined radio (SDR) dongle, which acts as a ground station. Although the FUNcube scheme is UK-based, Heck pointed out that its signals will be available globally.

"In addition to providing educational outreach for schools and colleges around the world, the spacecraft will... provide a U/V linear transponder for radio amateurs during local 'night', at weekends and during holiday periods," AMSAT-UK said in a statement.



Above: a model of the 10cm cube.

FUNcube-1 will go up on a DNEPR rocket, one of a batch of old ICBMs that are being converted to take satellites into space. It will take off from the Yasny launch facility in southern Russia, in a launch organised through the Netherlands' ISIS Launch Services.

According to AMSAT-UK, the precise orbit of the spacecraft is yet to be determined. However, the group said it will be "nearly circular" and mostly sun-synchronous, so the largely solar-powered device will be illuminated almost all the time.

There are some precedents for education-oriented satellites, notably ARISSAT-1 which was in space for around three months and is now SK, having burnt up on re-entry during January 2012. However, Heck said the AMSAT-UK team hopes the FUNcube-1 will stay aloft for several years.

"We're hoping ours will have a much longer lifetime," Heck said, suggesting FUNcube-1 will last for between two and eight years. The longevity of the device is down to how long its batteries provide charge, and how severe the radiation damage to various electronic components turns out to be, he said.

The FUNcube-1 spacecraft itself is already fully funded, but AMSAT-UK is asking for donations to pay for its launch. The group has set up a page for people who want to donate money.

World Amateur Radio Day - April 18

On April 18, 2012, radio amateurs will be celebrating World Amateur Radio Day, on the 87th Anniversary of the founding of the International Amateur Radio Union, IARU.

This year´s theme for the World Amateur Radio Day is "Amateur Radio Satellites: Celebrating 50 Years in Space" in remembrance the launching of OSCAR 1 on December 12, 1961 and the launch of OSCAR 2 on June 2, 1962.

For this reason there will be several special event stations from IARU's Member Societies active on different dates during April:

6H6IARU by the Federación Mexicana de Radio Experimentadores who has commissioned this operation to Grupo DXXE. This station will be active from 13 to 18 April in all modes and bands. QSL via LoTW and N7RO, direct or bureau. Daily logs uploads will be available in ClubLog.

3G87IARU by the Radio Club de Chile. This station will be active throughout the month of April. QSL via CE3AA.

LZ1WARD by the Bulgarian Federation of Radio Amateurs also will be active throughout the month of April. QSL via bureau.

EL2RL by the Liberia Radio Amateur Association will be active on April 18, 2011 on 10, 15, 17 and 20 meters. Direct QSL to EL2BA.

HB9WARD by Union Schweizerischer Kurzwellen-Amateure to be active also on April 18, 2011. This first time callsign will be on the air by HB9JOE and a group of radio amateurs from Bern. QSL via HB9JOE.

HF87WARD by members of the SP-CFF (SP0CFF). This station will be active from April, 17 to 30. QSL via eQSL.cc and WFF LogSerach.

For those who want to send card direct, please send SASE to: Polish Club Flora & Fauna, Suchacz, Wielmozy 5b, 82-340 Tolkmicko, Poland. They will even have an award for this operation.

IARU Region 2

http://www.iaru-r2.org/

PSK2K – a new meteor-scatter mode by DJ5HG

PSK2K is a meteor scatter mode that enables multiple contacts to take place on a single frequency.

PSK2k is high speed meteor scatter software written by Klaus DJ5HG (Prof. of Computer Science at University Hamburg). It allows 2 way MS QSO's to be conducted with any suitable transceiver/PC/soundcard combination.

PSK2k is fully error correcting and call specific in operation so you will only see the QSO in progress and any non-QSO CQ or QST text. All other transmissions (other people also in QSO) are discarded. This allows multiple QSO's to take place on a single frequency.

PSK2k can be operated in fully automatic mode if required. This enables QSO's to be completed fully automatically without user intervention. Important advantages are that long term testing can be done, on QRP power for instance, without having to sit at a monitor every period.

Note: this software can run in automatic operation means no active OP next to TRX ! In automatic operation all stations will be answered who call you. Also a special contest mode is there with exchange of serial number, full locator, QTF, transmitted power, antenna gain.

Download PSK2K from

http://www.dk5ew.de/2012/01/13/psk2k-a-new-meteorscatter-mode-by-dj5hg/

PSK2K Yahoo Group

http://uk.groups.yahoo.com/group/psk2k/

A NOTE ON METEOR SCATTER

Meteor scatter communications, also referred to as meteor burst communications (MBC), is a radio propagation mode that exploits the ionized trails of meteors during atmospheric entry to establish brief communications paths between radio stations thousands of kilometers apart.

As the earth moves along its orbital path, billions of tiny particles known as 'meteors' enter the earth's atmosphere. When these meteors begin to burn up due to heat generated as they enter denser atmosphere, they create a trail of ionized particles in the E layer of the atmosphere that can persist for up to several seconds. The ionization trails can be very dense and thus used to reflect radio waves. The frequencies that can be reflected by any particular ion trail are determined by the intensity of the ionization created by the meteor, often a function of the initial size of the particle, and are generally between 30 MHz and 50 MHz

The distance over which communications can be established is determined by the altitude at which the ionization is created, the location over the surface of the Earth where the meteor is falling, the angle of entry into the atmosphere, and the relative locations of the stations attempting to establish communications. Because these ionization trails only exist for fractions of a second to as long as a few seconds in duration, they create only brief windows of opportunity for communications. Communication is on very high speed CW. [VU2TS]

Trans-Atlantic Amateur Radio on 7, 10 and 144 MHz

BALLOON MOBILE

The “Project Blue Horizon” balloon carrying amateur radio transmitters on 7, 10 and 144 MHz was launched from Owego, NY at 0300 UT, Saturday, March 24. It used the call N2XE on HF and KD2AUC on 144 MHz APRS.

The Project Blue Horizon team has broken the current Amateur Radio high-altitude balloon record for duration (57 hours 2 minutes).

The payload was carried beneath a 54,000 cubic foot capacity helium-filled balloon cruising between 85,000 and 100,000 feet.

Paulo CR8ABA in the Azores sent the command to initiate payload descent on March 27th when the balloon was at 46.947N 26.787W after a flight lasting 84 hrs 8 mins.

The payload carried the N2XE CW telemetry beacons at 7.1023 and 10.1466 MHz. The balloon was also equipped with an APRS beacon at 144.39 MHz using the call sign KD2AUD.

The amateur radio balloon flight PBH-18 has been declared a huge success.

http://www.projectbluehorizon.com

OFFICE BEARERS

Amateur RADIO Society News

The Mechanically Balanced Yagi

By Jim, W4GFX

Good Engineering Practice causes us to reduce the unnecessary forces on our mast, thrust bearings, rotor, and tower. These unnecessary forces are the result of torque imbalance and weight imbalance. Reducing these forces also reduces cost, and increases service life.

First, Torque Balance

1. Yagi Elements. No matter what the wind angle, the wind striking the yagi elements generates only forces perpendicular to the elements and in line with the boom. Thus, these forces place tension or compression forces in line with the boom (which the boom can easily withstand), but do not exert torque that will windmill the antenna.

2. The Boom. If there is more area of the boom (and other parts, such as a balun) on one side of the mast than the other, there will be a differential torque that tries to turn the antenna. The differential torque is a function of each boom side area and length.

3. Torque Forces. Think of the boom (without the elements) as 2 levers which are trying to turn the antenna in opposite directions about the mast center line. It looks like this –

Long Side (30 ft.) **Mast Short Side (25 ft.)**

_____|_____##__

Shows Wind direction (arrow) is into page. ## indicates the Sail.

If each side of the bare boom has the same length as the other, there is no net torque. Each torque force would cancel the other. We need to make our 2 torque forces equal and opposite by adding a compensating torque force on the Short Side of the boom.

4. Assumptions. Assume the Long Side of the boom is 30 ft., and the Short Side of the boom is 25 ft. The boom diameter is 3 inches, or 0.25 ft. in diameter. Our wind force is 70 lbs./ft.^{2}. The area correction coefficient for a cylinder is 0.67 (wind goes around a cylinder easier than around a square, which has a coefficient of 1.0). In the case of a force resulting from a uniform pressure, such as wind, acting over a uniform area, like a boom section, the force can be though of as acting at the center of the boom section, L, so the effective moment arm is $L_m = L/2$.

5. Long Side Torque. Boom Area = 30 ft. x 0.25 ft. x 0.67 = 5.025 ft.^{2}

Total Wind Pressure on the Long Side = 5.025 ft.^{2} x 70 lbs./ft.^{2} = 351.75 lbs.

Torque = 351.75 lbs. x 30/2 ft. = 5,276.15 ft.-lbs. (this torque tries to turn the boom clockwise). Torque equals pounds of force multiplied by the length of lever.

6. Short Side Torque. Boom Area = 25 ft. x 0.25 ft. x 0.67 = 4.1875 ft.^{2}

Total Wind Pressure on the Short Side = 4.1875 ft.^{2} x 70 lbs./ft.^{2} = 293.125 lbs.

Torque = 293.125 lbs. x 25/2 ft. = 3,664.0625 ft,-lbs. (this torque tries to turn the boom counter-clockwise).

7. Differential Torque. 5,276.15 ft.-lbs. - 3,664.0625 ft,-lbs. = 1612.1875 ft.-lbs.

This is our torque differential, and what we must compensate for.

8. Torque Compensation. We already know that if we add 5 ft. to the boom Short Side both sides would be equal, and the differential torque would be zero. We could do that, but instead we elect to install a Sail at 22 ft. on the Short Side. We pick 22 ft. as it is a convenient, vacant place on the boom to install a Sail. Here is how we calculate its size.

Boom Area = 5 ft. x 0.25 ft. x 0.67 = 0.8375 ft.^{2}

Total Wind Pressure on the 5 ft. piece = 0.8375 ft.^{2} x 70 lbs./ft.^{2} = 58.625 lbs.

Torque = 58.625 lbs. x 27.5 ft./2 = 1,612.1825 ft.-lbs. (this torque tries to turn the boom counter-clockwise).

9. Sail Dimensions. If we divide the 1,612.1825 ft.-lbs. by 22 ft. (the center point of our Sail) we have 73.2853 lbs. @ 22 ft. Then, 73.2853 lbs. / 70 lbs./ft.^{2} = 1.0469 ft.^{2}, or 151 in.^{2} We decide to make our Sail 10 in. long, and 15 in. high, for a total of 150 in.^{2}

Boom Area = 1.0464 ft.^{2}. In the line drawing in Section 3, ## represents the Sail.

Total Wind Pressure on the Sail = 1.0464 ft.^{2} x 70 lbs./ft.^{2} = 73.248 lbs.

Torque = 73.248 lbs. x 22 ft. = 1,611.4 ft,-lbs. (this torque tries to turn the boom counter-clockwise). A Rudder (instead of a sale) hung underneath the boom would do as well.

10. Close Enough! (Long Side Torque) 5,276.15 ft.-lbs. = (Short Side Torque) 3,664.0625 ft.-lbs. + (Sail Torque) 1,611.4 ft.-lbs. = 5,275.5185 ft.-lbs. ***The yagi won't windmill if unrestrained!*** There is no net rotational force transferred by the boom, to the mast, to the rotor, from the wind. We are being kind to our rotor.

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Next, Weight Balance

11. Weight Forces. In a perfect world the weight of the installed yagi will exert only axial forces down the mast. There will be no radial force on the thrust bearing and tower. If the yagi is not weight balanced the tower will behave as if there is a wind from the direction of the light end of the yagi. An unbalanced antenna is a problem up the tower as it wants to put the heavy end down, and won't stay neutral while being hoisted. We will weight balance the yagi last, so the weight of any needed torque compensator will already be part of the weight balancing effort. To weight balance we use no math.

12. The Teeter-Totter. We let the yagi do the work. Suspend the (fully assembled and ready to install on the mast) yagi about 3 feet above the ground at its mast line center. The yagi should be free to move like a balance scale (or teeter-totter). The heavy end will go down. Add weight inside the boom at the light end until the yagi is level. It is now weight balanced. Secure the balancing weight with screws (or foam, etc.) so the weight will not move. We are being kind to our thrust bearings and tower.

Software and Book

13. Where to Shop. If you don't want to do this math with a hand calculator, there are several programs that will calculate boom torque (and more) for you. These three I have used are 1) The DOS programs which come with the CD included with *ON4UN's Low-Band DXing*, cited above, 2) *Yagi Stress*, by Kurt, K7NV - you can read about it on www.k7nv.com, and purchase *Yagi Stress* from Array Solutions, www.arraysolutions.com, and 3) DX Engineering's *Yagi Mechanical Design*, at www.dxengineering.com. The most comprehensive book I found on the mechanics of antennas, masts, and rotors is an ARRL book: Leeson, *Physical Design of Yagi Antennas*. (Search, and buy on the Internet-maybe it is Out of Print). I recommend this book to you.

In the next Newsletter we will examine why masts bend, and what to do to prevent it. That will complete the trilogy of Notes for the top of the tower. Thanks for reading.

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, both from Vanderbilt University, Nashville, Tennessee. He was first licensed in 1954, and is a life member of ARRL and a new member of ARSI. His address is Lakkhotaa Lodge, Mawpun, Polo Hills, Shillong 793001, Meghalaya, India. You may contact him at elkins1936@gmail, and 0 98560 40368.

Develdore, *ON4UN's Low-Band DXing*, Fifth Edition, page 13-5 (sold by the ARRL).

LIGHTHOUSE ACTIVATION

An ARLHS (Amateur Radio Lighthouse Society) station with the special call sign VU9LHF was active from the Vypin Island Lighthouse from the 3rd to 13th of December 2011. The station made 853 HF contacts, to 62 countries, covering all the continents. It was the same group of ham radio enthusiasts which operated from another lighthouse at Alleppey - Kerala, earlier in 2011, with the call sign of VU2JHM.

[The Vypin Lighthouse is situated in the Ochanthuruth area of the island near Kochi, Kerala. It is a 46 meter high reinforced concrete structure, housing the optics, a GPRS facility and also on the top, the RACON radio beacons. The structure is painted red and white. It has four light flashes once every 20 seconds with a range of 28 nautical miles. The lighthouse serves the heavy cargo and passenger traffic from various countries and to Lakshadweep at Port Cochin. Coordinates: 9° 59.8' N; 76° 13.3' E Admiralty Number: F 0698 ARLHS WLOL Number: IND 083.]

Several members wanted to know what is “activation”? Well, most of the lighthouses around the world are not in use anymore. Once widely used, the number of operational lighthouses has declined due to the expense of maintenance and replacement by modern electronic navigational devices. The AMATEUR RADIO LIGHTHOUSE SOCIETY or ARLHS encourages amateurs to set up and operate stations from Lighthouses. [Article in an earlier issue] Once a station is set up in a certain Lighthouse and QSOs made, that Lighthouse is said to be “activated” like it's not idle anymore, Hi. [VU2TS]

OVER-THE-HORIZON RADAR - AGAIN?

(Old timers might remember the infamous "machine-gun" QRM all over the HF bands back in the late seventies when the erstwhile USSR had installed the first ever OTH)

Over-the-horizon radar, or OTH (sometimes also beyond the horizon, or BTH), is a design concept for radar systems to allow them to detect targets at very long ranges, typically up to thousands of kilometers. Several OTH radar systems were deployed starting in the 1950s and 60s as part of early warning radar systems, but these have generally been replaced by airborne early warning systems instead. OTH radars have recently been making something of a comeback, as the need for accurate long-range tracking becomes less important with the ending of the Cold War, and less-expensive ground based radars are once again being looked at for roles such as maritime reconnaissance and drug enforcement.

For example, the French system is called Nostradamus and operates from 6-30 MHz.

The Nostradamus radar system is a set of 288 bi-cone antenna elements distributed over the arms of a three-branch star, with a buried infrastructure to shelter the transmission and reception electronics.

Nostradamus detects any aircraft flying 2000 kilometers away. Indeed, this new radar concept is based on very-low-frequency waves (6 to 30 MHz) that bounce off the ionosphere, which allows it to detect targets beyond the horizon.

Whereas transhorizon radars usually require huge linear antenna networks to beam the signals, the special surface distribution of Nostradamus makes it possible to control the electronic beams both in azimuth (360°) and elevation.

Apart from being the cheapest air surveillance mean at the moment, Nostradamus might be useful to:

- carry out research on the ionosphere
- map sea weather and currents (of interest to companies involved in off-shore oil drilling)
- detect and track boats in distress

It is located in the Eure-et-Loir département of France, 18 miles (29 km) southwest of Dreux, and I am curious to know if amateurs within a 100 km range experience any QRM from the pulses? Hi

Of late I am hearing the "machine gun" on 15 meters, covering more than 100 KHz on the CW portion of the band!

The Unique Nature of HF Radar

High-frequency (HF) radio formally spans the band 3-30 MHz (with wavelengths between 10 meters at the upper end and 100 meters at the lower end). For our radars, we extend the upper limit to 50 MHz. A vertically polarized HF signal is propagated at the electrically conductive ocean water surface, and can travel well beyond the line-of-sight, beyond which point more common microwave radars become blind. Rain or fog does not affect HF signals.

The ocean is a rough surface, with water waves of many different periods. When the radar signal hits ocean waves that are 3-50 meters long, that signal scatters in many directions. In this way, the surface can act like a large diffraction grating.

But, the radar signal will return directly to its source only when the radar signal scatters off a wave that is exactly half the transmitted signal wavelength, AND that wave is traveling in a radial path either directly away from or towards the radar. The scattered radar

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electromagnetic waves add coherently resulting in a strong return of energy at a very precise wavelength. This is known as the Bragg principle, and the phenomenon 'Bragg scattering'. At the SeaSonde's HF/VHF frequencies (4-50 MHz), the periods of these Bragg scattering short ocean waves are between 1.5 and 5 seconds.

What makes HF RADAR particularly useful for current mapping is that the ocean waves associated with HF wavelengths are always present. The following chart shows three typical HF operating frequencies and the corresponding ocean wavelengths that produce Bragg scattering.

25 MHz transmission -> 12m EM wave -> 6m ocean wave

12 MHz transmission -> 25m EM wave -> 12.5m ocean wave

5 MHz transmission -> 60m EM wave -> 30m ocean wave

So far three facts about the Bragg wave are known: its wavelegnth, period, and travel direction. Because we know the wavelength of the wave, we also know it's speed very precisely from the deep water dispersion relation.

The returning signal exhibits a Doppler-frequency shift. In the absence of ocean currents, the Doppler frequency shift would always arrive at a known position in the frequency spectrum.

But the observed Doppler-frequency shift does not match up exactly with the theoretical wave speed. The Doppler-frequency shift includes the theoretical speed of the speed of the wave PLUS the influence of the underlying ocean current on the wave velocity in a radial path (away from or towards the radar).

The effective depth of the ocean current influence on these waves depends upon the wave's period or length. The current influencing the Bragg waves falls within the upper meter of the water column (or upper 2.5 meters when transmitting between 4-6 MHz). So, once the known, theoretical wave speed is subtracted from the Doppler information, a radial velocity component of surface current is determined.

By looking at the same patch of water using radars located at two or more different viewing angles, the surface current radial velocity components can be summed to determine the total surface current velocity vector.

Is it that simple?

The basic physics relating the HF radar signal to the nature of the ocean waves and currents is beautifully simplistic, but the task of mapping surface currents with a modern radar sensor is more complex.

[VU2TS]

Here n there

Tamil Nadu

Coimbatore Hams had conducted an ASOC Exam introduction programme today 26th Jan. 2012 between 9.30 am & 12.30 pm at Ashoka plaza Gandhipuram, Coimbatore.

VU2KSJ with VU2APE

About 40 Swls from Coimbatore, Salem, Palakkad and 15 Hams had attended the programme. The ASOC exam coaching class is planned to start on 5 th of feb 2012 onwards and on every Sunday at 10.am to 12.30pm.

Chief guest was our old friend OM M.K.ANANTHAKUMAR , VU2APE – who is organizing several activities with the Coimbatore Amateur Radio Club and Rotarians of Amateur Radio – ROAR.

Maharashtra

BET DWARAKA on IOTA map

The island of Bet Dwarka (a.k.a. Bet Shankhodar) was "activated" in the period 15th-24th March 2012. Sarla Sharma VU2SWS was the group leader. This island falls under the IOTA Gujarat state west group-No. AS-175 and has never been activated before. A "new one" for all island chasers!

A special call sign "AT2DW" was been allotted by the WPC for the group with the following members:

VU2SWS Sarla Sharma, VU2IZO Milind Korde, VU2NKS Nandu, VU2CDP Deepak Pathak, VU2NXM Basappa Arabole, VU2LX Laxman, and VU2JHM Lion Ajoy.

They were QRV on all modes - CW, SSB, RTTY. AT2DW logged over 10,000 QSOs .

Sarla has taken part in previous ATØBI, ATØRI, ATØAI, and VU7LD island expeditions.

Bet Dwaraka is an important religious destination for Hindus. It has the palace where Lord Shri Krishna lived with his wife Rukmini. Ancient Indian scriptures have described how the ocean rose to cover the city of Dwaraka. A whole city has been unearthed underwater a few years ago and is supposedly the ancient Dwarka.

There will be online log check facility and all logs are uploaded on LOTW.

A free QSL card to all YL station contacts will be sent if they inform the QSO details via email. VU2SWS will be the QSL manager.

LOTHAL activation

LOTHAL (Long-70.14E, Lat-30.310N) in Gujarat, India where relics of HARAPPAN City, of 2500 B.C. are found was activated by VU amateurs from 10 Feb to 13 Feb 2012.

Lothal is one of the most prominent cities of the ancient Indus valley civilization. Located in Bhal region of the modern state of Gujarat and dating from 2400 BCE. Discovered in 1954.

Participants/Operators: VU2ZNN,VU2EXP,VU2BGH,VU2RID,VU3KDG,VU2DSI,VU2JGI,VU2CPV,VU2APY,VU2DJT,VU2AGJ, VU2SEG,VU2BUT,VU2WWX,VU2XX,VU2VMJ,VU2PMU,VU2QBX.

All bands SSB and SSTV

QSL info: SASE to VU3SYB

Bhatnagar VU2SEG reports: I just returned from Lothal, Gujarat, where a special event station AU2LOH was established by HAMs from Rajkot with VU2DSI OM Dattaji's guidance.

"It was an extremely well organized event in a very remote place. The HAMs from Ahmednagar, Gandhinagar, Baroda, Surat and Bhavnagar visited Lothal and participated with great enthusiasm.

It was a great experience to see Dattaji, VU2CPV and other HAMs tackling a huge pileup on 15 meters making hundreds of contacts in a few hours time when the band remained open.

The hospitality provided was wonderful and everyone got personal attention.

Hope to see many many more such events in VU Land and wider participation by Indian HAMS at various historical sites around the country. Thanks to Archelogical Survey of India and WPC for providing Indian HAMs a learning place to manage stations in any situation with ease. Also we saw great awareness about Lothal amongst many DX stations.

Lothal is the place where the remains of the 4000 year old civilization are preserved researchers.

Congratulations to all the HAMs who made this a very memorable and enjoyable event."

VU3SEG/Bhatnagar

Madhya pradesh

A program on HAM Radio was conducted at I.P.S. College Gwalior on the occasion of TECHNOPARVA. Jayu S. Bhide VU2JAU organized a live demonstration of HAM Radio at I.P.S. College, Gwalior, from 1 March 2012 to 3 March 2012. The HAM Radio Station was operated on 7, 14, 21 and 28Mhz. The students were eager to see how Amateur Radio establishes contact with other station throughout the world using ionosphere. All the faculties of the college had shown their interest in the activity. Several local and DX contacts were made.

New license holder om Amey VU3AQI, om Aniket VU2LOL, YLl Varuni VU2VND and swl Ashutosh Sharma were helping in the operation. It was good exposure to the new HAMs as they understand to set up the HAM Station. The equipment used was ATLAS 210 X and the antenna was Inverted Vee for all bands. It was a successful event.

[In case you didn't know, Technoparva is a national level Technical Symposium, organized between 1st march 2012 to 6th March 2012 by the Departments of Computer Engineering, Electronics & Telecommunication Engineering, Electronics Engineering, Mechanical Engineering, Information Technology Engineering of Sanmarg Shikshan Sanstha's Smr. Radhikatai Pandav College of Engineering, Nagpur]

Ham Radio Presentation

AT

I.P.S. College, Gwalior

A seminar on HAM Radio was organized on 15 Feb. 2012 at I.P.S.College, Gwalior. The program was arranged by Department of Electronics and Communication and attended by all the staff and the students of the Electronics and communication along with the Principal Dr. Ashish Sharma.

The students have shown very keen interest in the activity done by the HAMs and asked many questions at the time of questionnaire session regarding security, licensing, procedure of calling and having contacts etc. Jayant S. Bhide VU2JAU answered all the questions. The Principal and staff was impressed about the working of the HAM Radio. They have given spcial invitation to have live demonstration on HAM Radio from 1 March 2012 to 4 March 2012 during “TECHNOPARV” .

Jayant S.Bhide VU2JAU was assisted by om Aniket VU2LOL, Amey VU3AQI, Arvind VU2AKE and swl Vinay and Harshita.

KARNATAKA

Congratulations to Prasad VU2PTT on his obtaining the coveted 5B DXCC. Some Of you might remember, I had published in an earlier issue that there were only THREE 5B DXCC holders in India. I have changed it to FOUR now, HI. He has confirmed 236 countries on CW, 118 on phone and 244 mixed with, of course – 100+ on the five bands.

According to Deepak VU2CDP, Prasad, who announced this, VU2PTT joins the "league of extraordinary gentlemen" who have the coveted '5 Band DXCC' against their name amongst other achievements. Apart from numerous other feathers in his cap, this certainly stands out and puts him in elite company.

[There was talk that "you need to be a Big Gun" – viz., Linear Amp, Antenna Farm etc. – to work 5 Band DXCC. I personally feel it is not necessary though it would help, Hi. Prasad says "With just 100w and dipoles, working the 3 higher bands is easy. 100 countries on 40 and 80 takes a little longer time but with patience and determination, it can certainly be achieved!!" At the end of the day, it is not the equipment that matters – it is the guy who operates it!!]

A further bit of information is that Prasad VU2PTT was accepted by the "FIRST CLASS CW OPERATORS' CLUB'. (FOC)

The club originated in the United Kingdom and is still headquartered there but has members all over the world. Membership is by invitation only and is limited to 500 worldwide. Invitees must demonstrate the ability to send and receive CW at a minimum of 25 words per minute, demonstrate regular activity on the amateur frequency bands, and show impeccable levels of courtesy on the air.

Many FOC members are prominent in the world of DXpeditions and amateur radio contesting, or are known for their skill in chasing DX. Many, too, are interested in having long conversations using CW, (rag-chewing) often at high speed. The Club has an active social programme and many members engage in extensive travel to meet other members in person.

5 MHz beacons

A number of radio propagation beacons are active on 5 MHz, some of which produce a sequence of varying power levels. Some of these transmit 24/7, but some personal beacons are activated as required.

In the United Kingdom currently three beacons transmit sequentially on the hour and each subsequent 15 minutes using CW. The 5290 kHz channel is utilized for the UK's beacon project. Call signs are, in transmission order - GB3RAL (IO91in) + *0 minutes*, GB3WES (IO84qn) + *1 minute* and GB3ORK (IO89ja) + *2 minutes* from approximately southern, central and northern locations in the UK. Further details of the British beacon network can be found on the RSGB 5 MHz page.[1]. In addition, individual WSPR beacon experiments using powers as low as 1 watt in the UK have led to reception reports from the USA and Middle East. Further research is likely in this area during the present sunspot cycle.

On the 5290 kHz channel (5289.5 kHz / USB) is the Danish personal beacon OV1BCN (JO55si), operated by OZ1FJB, particularly for NVIS observations. From Spring 2011 in operation h24 and is sequenced to transmit 2 minutes after the UK beacons, (hr+ 04/19/34/49 min.), transmitting a USB-announcement, followed by CW + MT63 identifications.

Czech beacon OK1IF (JO40hg) uses the 5260 kHz channel at 5258.6, although the current operational status of the beacon is unclear as it is not a dedicated beacon, but an experimental activity of the licensee, Milan, OK1IF and operates on a random basis. Because the Czech regulator announced that the current experiment was to conclude at the end of 2011 (see later), it would therefore appear that this beacon would cease to operate at that time, until further notice *(Info: Petr, OK1RP)*

The German Amateur Radio Club (DARC) operates a propagation information beacon, call sign DRA5 (JO44vq), on 5195 kHz, which transmits in CW (Morse code) plus

Contd.

various digital modulation systems. It is co-sited with the DK0WCY 30 and 80m beacons. Owing to considerations of rising costs, the operational schedule of DRA5/DK0WCY is in process of re-assessment and in consequence it may be found that the beacon is not operational for the full 24 hrs., as was previously the case. *(Source: Beacon keeper DK4VW e-mail)*

The Radio Amateur Association of Greece (RAAG) has set up a beacon on 5398.5 kHz under the Society's club callsign, SZ1SV (KM17ux). It transmits in carrier, CW and PSK31 formats in graded power levels between 3 and 30 Watts on a timed basis at 00, 15, 30 and 45 minutes past the hour. Time of operation is mostly between 1900 - 0600 UTC, however It may be off for some days due to other HF activities at the test site, or, of course, when the station is engaged in a 5 MHz contact with other stations outside of Greece. Further details are available from the RAAG website.

A Luxembourg beacon LX0HF had been established on 5205.25 kHz, under the aegis of the committee of the Luxembourg national amateur radio society - Réseau Luxembourgeois des Amateurs d'Ondes Courtes (RL). It is understood that the contact for the beacon is Philippe LX2A/LX7I. However, several reports indicate that it has not been heard for some time.

In addition to amateur radio beacons in the 5 MHz sector, some other non-amateur stations are used informally as propagation indicators. These include:

- **Standard Frequency & Time Stations**
  - **RWM (Moscow) on 4996 kHz**
  - **BPM (Xian), WWV (Colorado) & WWVH (Hawaii) on 5000 kHz**
- **Shortwave Broadcasters**
  - **WWCR (Nashville, Tennessee) on 4840 kHz (AM)**
  - **AFRTS - American Forces Radio & TV System (Key West, Florida) on 5446.5 kHz (USB).**
- **VOLMET - Aviation Weather Stations (all USB):**
  - **"R.A.F. VOLMET" on 5450 kHz**
  - **"South America VOLMET" on 5451 & 5475 kHz**
  - **"Africa VOLMET" on 5499 kHz**
  - **"Shannon VOLMET" (Republic of Ireland) on 5505 kHz**