International Amateur Radio Union Region 1

Working for the future of amateur radio

VHF+ Newsletter

Edition 91
12 march 2023
Dick Harms PA2DW

Dear friends of the VHF+ Committee,

This edition of the Newsletter is my third and last one as chairman of this committee.
As written in Newsletter 90, we are looking for a good successor, but I will assist until the next General Conference if necessary. Please feel free to reflect any candidatures to either me or directly to the General Secretary at secretary@iaru-r1.org

Since it is to be expected that contesting will be part of the new Committee Radiosports, the main thing that the VHF+ Committee will be involved with is band planning and encouraging the use of our spectrum in the various classes of transmission we have available and new developed ones. In this edition we ask attention for an open-source digital voice-mode called M17. Read more about this, further up in this letter!
Other topics in this letter are a message from the Beacon Coordinator, messages form the Satellite Coordinator and from the Contest Working Group C5CWG.
Information regarding spectrum related issues towards WRC23, can be found on the website. The latest news concerning the most delicate subject, our 23cm band, can be found here:
https://www.iaru-r1.org/2023/iaru-simulations-confirm-the-low-probability-of-interference-into-rnss-receivers-in-the-23cm-band/
We refrain from commenting or adding anything to that in this Newsletter, or any other communication, as the information provided by the SRLC-manager G4SJH is complete and clear.

It has not always been easy for me to be manager of the VHF+ Committee, but I enjoyed whatever I could add to the beautiful world of the radio waves above 30 MHz. My ambition is to possibly be active in Working Groups of CEPT in the future, so we might meet again!
Wishing you all a bright, peaceful, and healthy future!

Best regards,

DW Harms (Dick)
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1. Amateur Radio Satellites

There are presently more than twenty satellites in earth orbit which are providing linear or FM transponders for amateur use. In addition, there are a large number of satellites with digital and APRS capability including the ARISS payload on the ISS. Current activity can be identified here https://www.amsat.org/status/
Every month brings a new opportunity for experimentation and technical development of hardware and software systems. Additionally, Oscar 100 in a geostationary orbit, has been active now for almost four years and continues to provide the chance for testing of new techniques, modulation schemes and QRP activities. The wideband transponder on Oscar 100 has enabled the rapid development of new DATV systems which have demonstrated vastly improved image quality in ever decreasing bandwidths. Oscar 117, also denoted as Greencube, is an Italian designed spacecraft, produced by the Sapienza University of Rome, that was launched in mid-2022 on the maiden flight of the Vega-C rocket. This 3U CubeSat is in a MEO (Medium Earth Orbit) and therefore has a wide coverage area or "footprint". This satellite has a 1k2 digipeater and it is the first time that an amateur radio satellite has operated from a near 6000 km orbit. On many passes more than 100 active stations can be seen.

The CubeSat phenomena shows no sign of abating but there are two challenges:

Firstly, the increased number of objects on space is leading to greater pressure to ensure that LEO (Low Earth Orbit) spacecraft deorbit quickly after end of life or even after a fixed period from launch. Without an on-board propulsion system this can be hard to achieve in orbits above around 450 km. It should be noted that Oscar 7, launched in 1974, is believed to be the oldest satellite in earth orbit still operational.

Secondly, there are many projects, both university and commercially driven, which try to misuse spectrum in the amateur satellite service for other purposes. The IARU Satellite Frequency Coordination Panel continues to provide frequency coordination for projects and missions which do meet the requirements of the Radio Regulations. The final decision is, of course not ours, but belongs to the national regulator concerned and it is sometimes disappointing that they do not always interpret their responsibilities as we would wish. The panel has dealt with more than 900 requests over the past 20 years and details can be found here https://www.amsat.org/status/

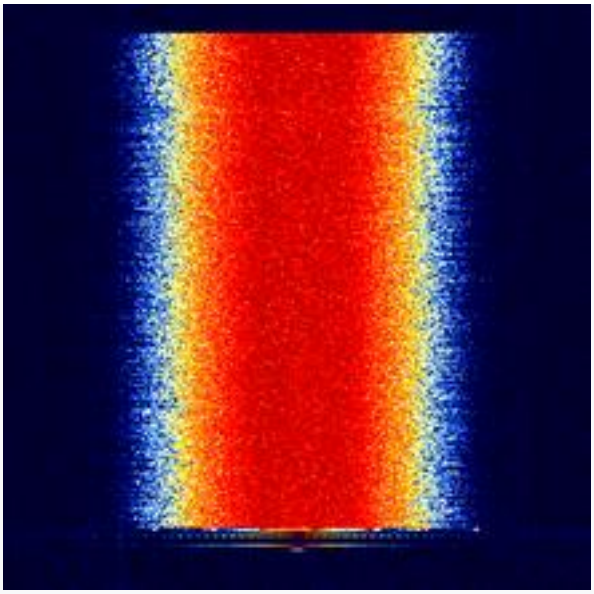
In addition to CubeSats, however, there are many other missions where amateur radio is involved , or where teams are developing amateur radio systems for the future. Exciting times indeed.

Graham Shirville G3VZV
IARU Region 1 Satellite Co-ordinator
January 2023

2. Digital voices on the air: M17

M17 is a an open-source digital-voice MGM, developed by Wojciech Kaczmarski (amateur radio call sign SP5WWP) et al. M17 is primarily designed for voice communications on VHF amateur radio bands and above. The project received a grant from the Amateur Radio Digital Communications in 2021 and 2022. The protocol has been integrated into several hardware and software projects.

Overview



Spectrogram of the M17 protocol transmission. Time is on vertical axis, advancing from bottom to top. There's a 40 milliseconds preamble visible at the beginning of the transmission.

M17 utilizes 4800 symbols per second 4FSK with a root Nyquist filter applied to the bitstream. Radio channels are 9 kHz wide, with channel spacing of 12.5 kHz. The gross data rate is 9600 bits per second, with the actual data transfer at 3200. Protocol allows for low-speed data transfer (along with voice), e.g. GNSS position data. The mode has been successfully transmitted through EchoStar XXI and QO-100 geostationary satellites. In 2021, Kaczmarski received the ARRL Technical Innovation Award for developing an open-source digital radio communication protocol, leading to further advancements in amateur radio. The protocol's specification is released under GNU General Public License.

Voice encoding

M17 uses Codec 2, a low bitrate voice codec developed by David Rowe VK5DGR et al. Codec 2 was designed to be used for amateur radio and other high compression voice applications. The protocol supports both 3200 (full-rate) and 1600 bits per second (half-rate) modes.

Bandplanning proposal

Given the characteristics of M17, we suggest that experiments should be advised to take place anywhere within the following frequency slots:

2m band: **144.900- 144.950 Center of Acitivty 144.925**
70cm band: **433.850-433-900 Center of Activity 433.875**

In case you have objections and/or alternative suggestions, you are kindly requested to react to: pa2dw@veron.nl

3. Beacon coordination

Beacons in amateur radio are present since the International Geophysical Year in 1957 and still important for the study of propagation conditions and the physics behind. Most radio amateurs interested in long distance communication on the VHF and up bands are experienced in monitoring beacons to check the actual conditions.

The IARU provides band plans to avoid interference between the different ways of using frequency spectrum. These are in place on all bands from long waves to VHF and up to the microwaves.

It is obvious, that beacon monitoring should be free from any interference. In every band plan a sub band has been reserved for beacons only. No other transmissions should happen there. That helps a lot, but there are still certain problems with beacons interfering each other. To avoid such situations, a coordination is imperative. This is carried out by the IARU Region 1 beacon coordination officer. He is a member of the VHF committee (C5) and in close contact to national coordinators, VHF mangers and beacon keepers. As beacons have to be licensed as automated stations, many national regulation authorities ask for IARU frequency coordination, before they will issue a permission.

But nevertheless, there are still beacons on air, never having been coordinated and causing problems in reception of other beacons. And there are still some beacon keepers not aware about or just ignoring the importance of beacon coordination. Especially under unusual conditions, e.g., tropospheric ducting, it can be difficult or impossible to identify a weak signal, interfered by another beacon on the same or close by frequency. This is not the intention of an efficient beacon system! It also has to be mentioned, that there are still beacons on air, outside the beacon band. Most of them operating on 50 MHz, the keepers are requested to move them to a coordinated frequency, to avoid interference with other services.

A data base has been installed at the IARU to keep the frequencies and technical data of all coordinated beacons. It is intended for administrative use and documents the situation as it should be by assigned frequencies and submitted data by the keepers. We ask all present and future beacon keepers to get in contact in time with the IARU R1 Beacon Coordinator to ask for coordinated frequencies for new beacons and to submit information of actual technical data and changes. Keeper of beacons already on air and facing interference problems should contact the coordinator for moving to a more suitable frequency.

Requests for coordination should include all technical and geographic information about the planned beacon, as

- desired frequency
- keying mode
- MGM mode
- power (ERP)
- antenna
- type
- gain
- direction
- pattern
- polarisation
- height over sea level
- height over ground
- exact location
- name of city, mountain, etc.
- coordinates or
- 8 to 10 digit Maidenhead locator
- used frequency reference
- keepers
- name
- callsign
- email address
- membership in IARU related national organisation
- description of the hardware in use

Even as it seems to be a little bureaucratically, this information is most valuable to find the most efficient frequency for a new beacon and to keep the beacon system free of interference. Requests for just a frequency are not worthwhile.

Beacon coordinator: Mathias Klug, DH4FAJ, VHFbeacons@iaru-r1.org

Website: https://www.iaru-r1.org/about-us/committees-and-working-groups/vhf-uhf-shf-committee-c5/vhf-beacon-coordination/

4. Contesting

All the IARU R1 VHF+ contests held in 2022 have been evaluated around two months after the contest time.

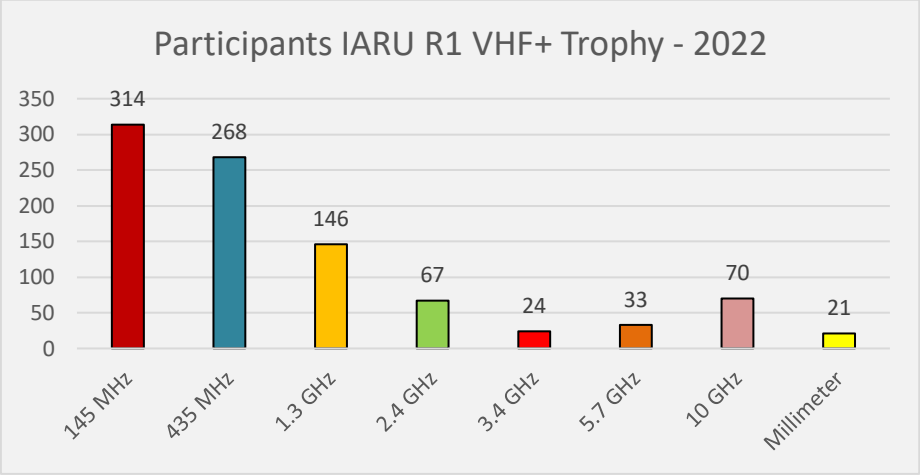
The first edition of the IARU R1 VHF+ Trophy has been evaluated and results are published on the IARU R1 VHF+ contest robot (https://iaru.oevsv.at).

The VHF+ Contest WG is working to increase the participation of all contests in all bands from VHF to µWaves; we strongly believe that any contest classification is clear evidence of activity in those bands.

Contesting provides a competitive environment that appeals to new younger entrants to Amateur Radio and stimulates technical innovation, which is another essential aspect of our activities.

Therefore, all the support from the MS is needed to collect all the logs or at least to invite participants to send their logs to the IARU R1 Contest Robot. (http://iaru.oevsv.at)

Here are some numbers for the Trophy 2022:



Year	March	May	June	July	Sept	Oct	Nov
2022	1843	2118	615	2496	2109	1804	803

	145 MHz	435 MHz	1.3 GHz	2.4 GHz	3.4 GHz	5.7 GHz	10 GHz	mm Group
Participants	314	268	146	67	24	33	70	21
Diff. Calls	3394	1456	725	205	82	94	212	87
%	9.3%	18.4%	20.1%	32.7%	29.3%	35.1%	33.0%	24.1%

Here are some numbers for the IARU R1 contests :

Year	50 MHz	50-MGM	70 MHz	70-MGM	144 MHz	UHF-MW	MMC
2014	497	-	-	-	1090	1318	706
2015	580	-	-	-	1019	1326	866
2016	564	-	-	-	1163	1302	680
2017	613	-	14	-	1734	1729	699
2018	309	-	20	-	1309	1130	501
2019	382	-	16	-	1189	1153	449
2020	537	-	36	-	1965	1921	892
2021	714	10	115	8	1999	1888	762
2022	436	14	39	13	2109	1804	803

*on VHF contest we reached the ever-highest number of participants (2109)

73s

Alessandro Carletti, IV3KKW
IARU Region 1 VHF+ Contest WG Chairman

5. Useful Information

VHF+ Committee Chairman: Dick Harms, PA2DW (till a successor is found)
VHF+ Committee Vice chairman: Jann Traschewski, DG8NGN
Contest co-ordinator and assistant to the Commmittee Chairman: Alex Carletti , IV3KKW
Beacons co-ordinator: Mathias Klug, DH4FAJ
Satellite co-ordinator: Graham Shirville, G3VZV
Spectrum specialist: Murray Niman, G6JYB
Secretary: Vacant, until then Mathias Klug, DH4FAJ

Website:	https://www.iaru-r1.org/about-us/committees-and-working-groups/vhf-uhf-shf-committee-c5/
Handbook:	Current Edition: v9.01: https://www.iaru-r1.org/wp-content/uploads/2021/03/VHF_Handbook_V9.01.pdf
Newsletters:	https://www.iaru-r1.org/about-us/committees-and-working-groups/vhf-uhf-shf-committee-c5/vhf-newsletters/
Contest robot	http://iaru.oevsv.at/

Mailing list VHF managers and liaison officers

If you are not on this mailing list and you are a VHF manager of your country please send a mail to secretary@iaru-r1.org