

WRTC 2022

M A G A Z I N E

July 2023

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VOLUME

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Castel San Pietro 4-11 July 2023



Ministero delle Imprese e del Made in Italy

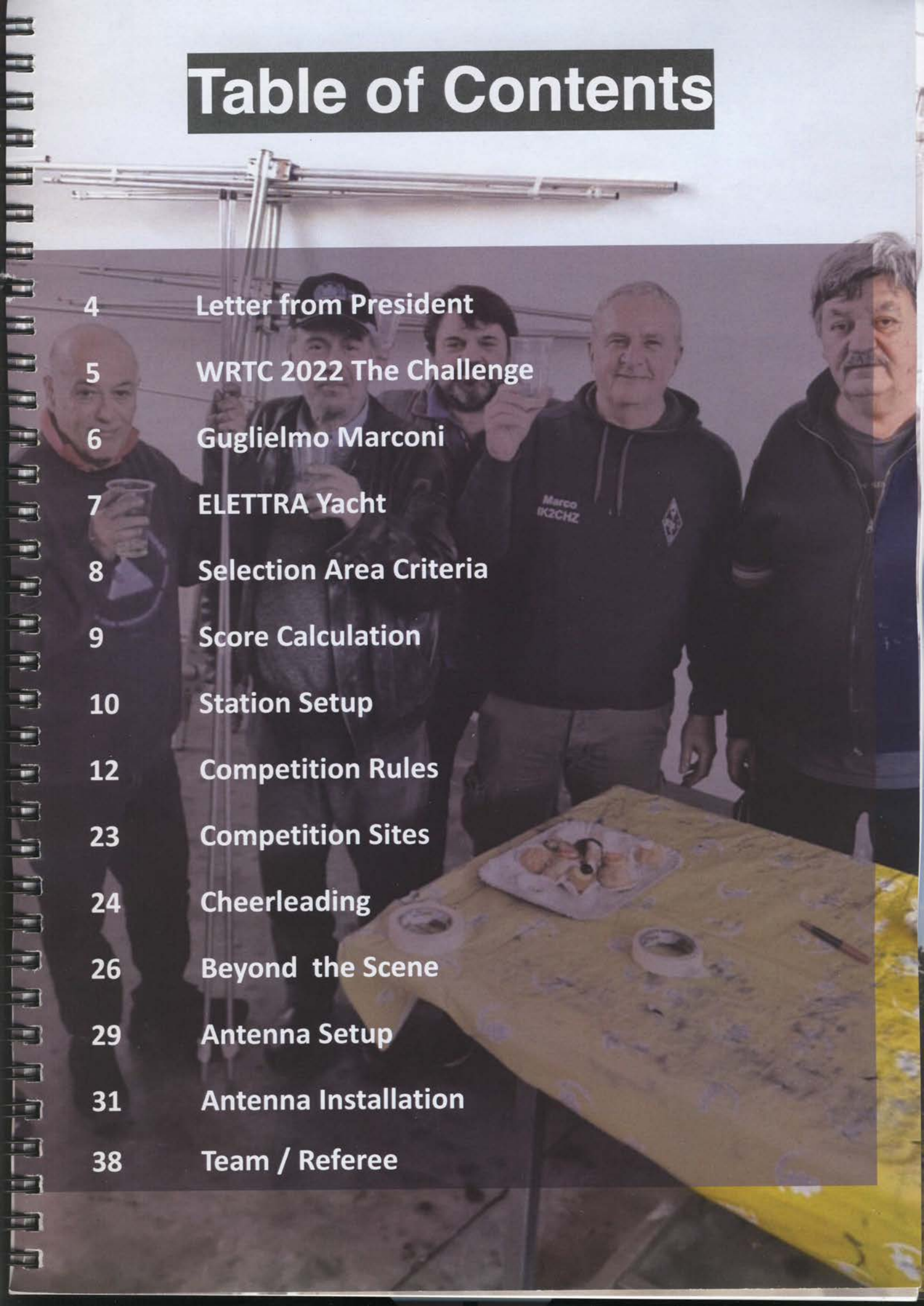
Regione Emilia-Romagna

CON IL PATROCINIO DELLA REGIONE EMILIA ROMAGNA



CON IL PATROCINIO DEL COMUNE DI CASTEL SAN PIETRO

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A Letter from President




Gianluca Mazzini IK4LZH

Welcome to the WRTC 2022 in Bologna, the birthplace of Radio. Not only does the city hold this significant distinction, but it also boasts an impressive academic legacy as the home of Bologna University, the oldest university in Europe. This region has been a hub for fostering innovative contacts, and Guglielmo Marconi, a native of Bologna and the inventor of Radio telegraphy, serves as a beacon for today's radio sport.

As radio operators, you embody the roles of both pioneers in new technology and leaders in promoting a boundless global understanding. Recognizing that words alone may not always suffice to comprehend one another, we acknowledge the importance of establishing genuine connections. In a time marked by fake news, hostility, and hurtful language, the power of short-wave communication makes a significant contribution to international friendship. It is heartening to witness how this exceptional sport of radio actively counters silence and brings people closer together.

When you arrive in Bologna and explore the surrounding county, you will discover an excellent technical environment at your disposal. The remarkable flat land provides optimal conditions for hosting the first radio World Championship in Italy, ensuring that the competition will be carried out flawlessly.

With unwavering enthusiasm, I extend my sincerest wishes for an outstanding competition and a truly unforgettable stay in Castel San Pietro Terme. May the World Radiosport Team Championship in Italy resonate as a resounding success, fostering lasting connections and celebrating the spirit of camaraderie among radio operators worldwide.



Fabio Schettino I4UFH

WRTC 2022

The Challenge

The journey of organizing the WRTC 2022 (World Radiosport Team Championship) event was an incredible five-years adventure filled with dedication, hard work, and the support of an amazing team. The selection of Castel San Pietro in the Region of Emilia Romagna as the hosting city marked the beginning of this challenge.

With the city secured, the organizing committee and a team of passionate volunteers embarked on the complex task of putting together the pieces of this international event. The OC team member Luca IK2NCJ, Antonello IT9EQO and the President Gianluca IK4LZH, had spent countless hours on planning, logistics, fundraising, and promotion to ensure that the WRTC 2022 would be an unforgettable experience for amateur radio operators from around the world.

Throughout the journey, there were moments of doubt and exhaustion, COVID 19 pandemic has slow down all the activity, but the passion for the project kept everyone going. The support from the amateur radio community, including sponsors and individuals, was overwhelming and instrumental in making the event a reality.

Of course, the road to success was not without its challenges. Setbacks, unexpected obstacles, and valuable lessons were encountered along the way. However, the team's spirit of collaboration and determination allowed them to overcome each hurdle and continue moving forward.

Finally, after years of planning and anticipation, the WRTC 2022 in Italy became a reality. Participants from over 45 countries gathered in Castel San Pietro Terme to compete in the ultimate contest of skill and strategy. We hope the event will be a resounding success, a testament to the hard work and dedication of everyone involved.

Looking back on the journey, it's remarkable how quickly time flew. As OC we expresses a mix of pride, nostalgia, and excitement for the future. The new generation of organizers is now ready to take the torch and build upon the legacy of the WRTC. They are encouraged to find inspiration in the challenges faced and create an even more extraordinary event in the future.

We need also acknowledges the invaluable contributions of the newfound companions who joined the project along the way. Their fresh perspectives, energy, and dedication were instrumental in shaping the event. The diversity of backgrounds and experiences within the team fostered innovation and creative problem-solving.

Collaboration became the cornerstone of success, with regular meetings allowing for the exchange of ideas and open discussions. Despite occasional disagreements, the shared commitment to the project's goals enabled the team to find common ground and make well-informed decisions.

The journey not only impacted the project itself but also transformed the individuals involved. Personal growth, connections made, and the belief in the power of collaboration and community were reinforced. The passing of the baton to new leaders is done with gratitude and a sense of fulfillment, as the memories and relationships formed will stay with the organizers forever.

The OC expresses deep gratitude to all the team members, a special mention to Claudio I4VEQ who dedicated the first years of his retirement to the WRTC 2022, volunteers, sponsors, and supporters who made the WRTC 2022 possible. Their dedication, support, and friendship were invaluable, and their contributions created a truly remarkable event.

In conclusion, the WRTC 2022 event was a fascinating five-years adventure that relied on the dedication, hard work, and collaboration of a passionate team. The organizers, volunteers, and supporters played crucial roles in making the event a resounding success.

Marconi ... *Radio brings the peoples of the world closer together.*

Guglielmo Marconi, born on April 25, 1874, in Bologna, Italy, was an Italian inventor and electrical engineer. He is renowned for his pioneering work in wireless telegraphy and the development of the radio. Marconi's inventions revolutionized long-distance communication and played a crucial role in the development of modern telecommunications.

Marconi came from a family of wealthy Italian landowners. His interest in science and electricity was sparked at a young age, influenced by his father's work as a physicist. In his late teenage years, Marconi began experimenting with telegraphy and wireless communication. Inspired by the work of Heinrich Hertz and James Clerk Maxwell, he sought to transmit telegraph signals without the need for wires.



In 1894, at the age of 20, Marconi successfully demonstrated his first wireless transmission over a distance of about two kilometers. Over the next few years, he continued to refine his wireless telegraphy system, increasing the range and improving its practicality. In 1899, Marconi successfully sent wireless signals across the English Channel, further validating the potential of his invention.

Marconi's most notable achievement came in 1901 when he successfully transmitted the first transatlantic radio signal. Using a high-power transmitter and a network of receiving stations, Marconi sent a signal from Poldhu, Cornwall, in England, which was received over 3,500 kilometers away in St. John's, Newfoundland, Canada. This historic achievement marked a major milestone in global communication.

Marconi's work in wireless telegraphy led to the formation of the Marconi Company, which became a leading telecommunications company during the early 20th century. In recognition of his significant contributions to science and technology,

Guglielmo Marconi received numerous accolades and honors during his lifetime. He was awarded the Nobel Prize in Physics in 1909, becoming the first Italian to receive a Nobel Prize.

Guglielmo Marconi had a significant relationship with amateur radio. Amateur radio, is a hobby that involves the use of radio communication for personal, non-commercial purposes. It allows individuals to experiment with radio equipment, communicate with other radio enthusiasts, and provide public service during emergencies.

Marconi's groundbreaking work in wireless telegraphy and the development of radio technology greatly influenced the emergence of amateur radio as a hobby. His inventions inspired countless individuals to explore and experiment with radio communication on their own.

Amateur radio operators were among the first to recognize the potential of Marconi's wireless technology and its applications beyond commercial and military use. They were eager to experiment with radio waves, build their own equipment, and establish contacts with fellow enthusiasts across different locations.

In the early 20th century, Marconi's wireless equipment and techniques were still relatively new and expensive, however, as time passed, the technology became more affordable and accessible, enabling amateur radio operators to develop their skills and contribute to the advancement of wireless communication. Radio operators played a crucial role in the early development of wireless communication infrastructure. They established networks of relay stations, experimented with antenna designs, and developed techniques for long-distance communication. Many advancements in radio technology and techniques were made by amateur radio operators, who shared their findings and collaborated with one another.

Elettra Yacht

Elettra was the ship on which Guglielmo Marconi conducted numerous radio experiments. It was built in the early 1900s and was used both as a yacht and as a military reconnaissance ship before coming under Marconi's ownership in 1921.

The ship was constructed at the Ramage & Ferguson Ltd. shipyard in Leith, near Edinburgh, according to the design by engineers Cox and King of London.

Launched on March 27, 1904, on behalf of Archduke

Carlo Stefano of Austria, it was named *Rovenska* in memory of the location on the island of Lošinj where the archduke had a luxurious villa he enjoyed staying at. The ship flew the flag of the Imperial and Royal Austro-Hungarian Navy until 1909.

In 1910, the yacht was sold to Sir Maxim Waechter, remaining under the flag of the United Kingdom and keeping the same name. In 1914, it was sold again to industrialist Gustav H.F. Pratt.

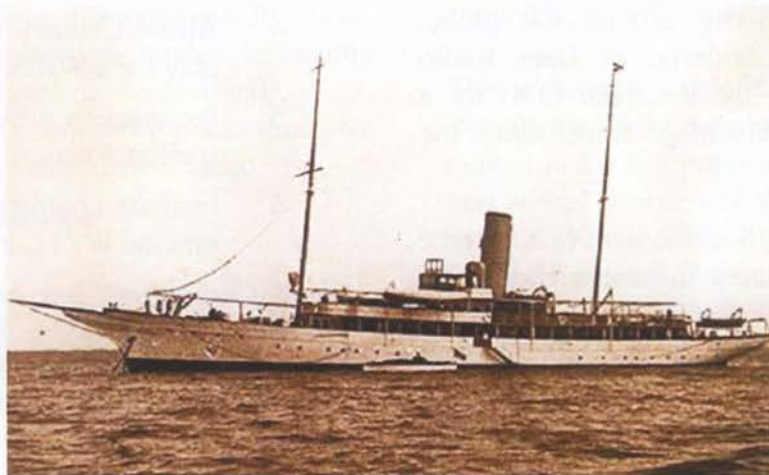
During the outbreak of the First World War, the ship was requisitioned by the British government and converted into a patrol and escort vessel for the Royal Navy in the English Channel, serving between England and the French ports of Brest and Saint-Malo. After the hostilities ended, the ship was decommissioned, taken to Southampton, and put up for auction. In 1919, it was purchased by Guglielmo Marconi for £21,000.

As a laboratory ship, Elettra sailed from London in July 1919 and arrived in Naples in August. It was then taken to La Spezia for conversion into a scientific laboratory. The ship was officially renamed Elettra and registered in the Italian Naval Registry on October 27, 1921, with its definitive

transfer to Italian ownership ratified on December 21 of the same year.

Significant experiments were conducted aboard the Elettra in the Gulf of Tigullio, in contact with the land station located at the Gualino Towers on the

Sestri Levante peninsula. In honor of this, the Gulf of Tigullio officially assumed the name "Golfo Marconi" in the official Italian navy charts. Throughout the 1920s and 1930s, the Elettra sailed the waters of all the world's seas. In 1937, after the scientist's death, the ship was purchased by the Ministry of



Communications for the sum of 820,000 lire.

At the outbreak of the Second World War, the ship was transferred to the port of Trieste. Following the events that followed the armistice of September 8, 1943, it was requisitioned by the Germans and armed with five machine guns, one 15mm gun, and four 20mm guns in two twin turrets, serving in the Kriegsmarine first with the designation G-107 and later as NA-6.

The ship Elettra departed from Trieste on December 28, 1943, for a patrol mission along the coast of Dalmatia. On January 21, 1944, the ship arrived in the waters near Diklo, close to Zadar, where it was spotted by Allied fighter-bombers and subsequently hit. Before the ship sank, the commander chose to run it aground.

With the peace treaty, the wreck of the ship became the property of Yugoslavia. Only in 1959 did the Yugoslav authorities allow technical surveys to assess the possibilities of recovering the ship. It was eventually returned thanks to the direct intervention of Tito, prompted by the then Minister of Foreign Affairs, the future President of the Republic, Segni. The ship was returned to Italy.

Selection Area Criteria

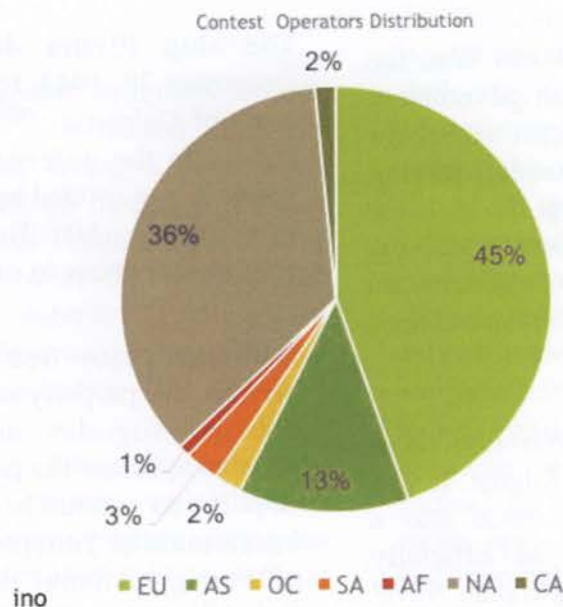
Since 2018, we had the opportunity to review some of the Selection Area criteria. In the previous WRTC Area Selection criteria was defined using simple rules, using Country border or CQ Zone borders or Callareas borders. These were totally an Arbitrary criteria. We had introduced a different way to define the WRTC Area Selection, that is based on the real activity around the globe. Without using simple criteria, as Ham Radio Population, or counting the Received LOG for a particular Contest, or advantage same areas, the Density Area criteria.

We had analyzed up to 18 millions of QSO, in the last 5 years, and extracted the most HamRadio populated areas in the globe. The analyze of these data, has kept a long time, collecting them, merging into a coherence Database, extracting the unique call, looking for the grid locators and aggregate them to identify the Areas. We have extracted more that 300.000 unique calls, and will be surprised that the 8 % of overall were JA's that participate at the Contest, but doesn't send logs, or that several operators are active for few hours without take care to sending the log .. These operators, that will never be counted into log received stats, are even more relevant to define the Density of an area.

The Density Area Criteria has several advantages:

1. Is an objective criterion.
2. Based on real data.
3. Reflect the real activity even from smaller country.
4. Allow Country with limited activity to play for a WRTC Seat. It's more fair.
5. Propagation difference are reduced due smaller Areas.
6. Increase competitiveness and more interest into the WRTC events

Some Corrections has been done, adding few modifications. Allowing more TL seats into the Continent with lower Density, as AFRICA, SOUTH AMERICA and OCEANIA. This WRTC Area Selection Criteria is the nearest criteria that match the real distribution of operators in the World that participate in the major Contest. As all the new concept, this is a first step beyond the past, a new way to allow WRTC as better than before. A lot of work has been done in the last 20 years, introducing more general rules, even in the Area Selection subject there was done very few attempts to have a fairer playfield. This should not be perfect, but is a good start for the future.

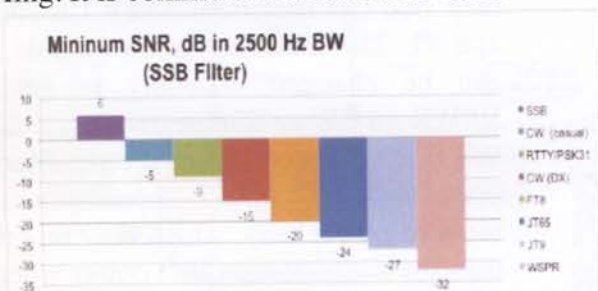


WRTC Score Calculation

All the past WRTC events were mostly a CW event. This is an old subject, older as the WRTC was born, based on a paradigm, low power, simple dipole antennas, means low signal and so the best humans communication mode is CW.

Concentrating on HF amateur communications a DXer is focused on long distance, usually weak, signals. Different modulation modes inherently have different performance on weak signals.

Let's look at some common modes used for DXing. It is common in the amateur radio



literature to express SNR performance, ie the ability to hear and decode weak signals, in dB relative to noise in a 2500 Hz bandwidth. As shown in figure 6dB SNR is required for casual SSB communications. A just barely understandable SSB signal (recognize your call and pull in a signal report) would be 0 db SNR. Note that when we do these SNR comparisons it is on a clear channel. No QRM, no static crashes, no fading. To compensate for these channel characteristics, we would need a higher SNR.

The WRTC's, historically, are held during the IARU Championship Contest, a multimode Contest where activity is very high all over the world, with the contribution of all the National HamRadio Associations that promote the event. Is a summer contest, where bands are crowded from strong signals in all bands due the extraordinary activity. CW effectively is the best mode, to operate, looking for a 250Hz channel to transmit with minimal interference. SSB activity can be penalized mostly due the wider channel with possible interference, also due the lack fast and effective way to be spotted! CW Skimmer has caused more of a furor in the contesting community than any other innovation during the last years. In a typical contest environment CW

Skimmer will deliver between 10 and 100 times more spots than a DX cluster. That's logical enough, since there is no human in the loop to decide which stations are worth spotting. CW activity from a WRTC Competitors point of view is the most effective way to collect QSO using their own capabilities to finalize the QSO and be spotted frequently in different part of the world.

This is the right side of the subject, the back side is that all the Team members has been qualified and ranked in the last previous two years, choosing the best scores between 24 Worldwide contests in both mode CW and SSB. Analyzing this overall data, that were a consistent number of operators that had proofed their capabilities in both mode, and that cannot be express their capability in the WRTC events, due lack of incentives. These means that strategies are only ruled from time, "the best time to change band". without any other stimulus to look for a better strategy, every Team will follow sunset and sunrise to move along the bands, all Team same strategy same mode.

Aware of the fact that it is necessary to improve the rules to better demonstrate one's abilities, we have added a 1.5 factor to the SSB QSO, in contrast to some regulations that favor CW QSOs, for two main reasons:

1. All Team members, including Team Mates had obtained results during qualification in Both Mode.
2. SSB QSO can add a new strategy, allowing a different way to think it.

We had discussed for almost 2 years if change these rules or not, and surely there will be more benefit, adding more thrill and allowing a plan for new strategy. The main comments were that in SSB on low band with 100w was almost impossible get a faster pileup that CW. Our WRTC 2022 answer is in our WRTC IT Team, that allowing the collecting of all the QSO's from all the Teams, insuring the generation of a spot after 3 QSO in the same Frequency!

WRTC 2022 Station Setup

Station Hosting

All sites are hosted from local rural farmhouse, two double room with bathroom and air conditioning are reserved from the OC for 2 nights. One Bedroom is for the competitor and shack (some sites have a different room to host the shack), the second one is for referee and Site Manager in a twin bed room. The check in will be Friday 7 July, check out the 9 July about 15.00 local time (13.00z). Despite previous WRTC's the competitors can spend all the Friday night in the site, familiarizing with low bands. If some Team wan't to back to the HQ, they need to managing transports with the Site Manager.

Follow meals are included :

- Friday Dinner (Spirits not included)
- Saturday Breakfast
- Saturday Light Lunch (Spirits not included)
- Saturday Light Dinner (Spirits not included)
- Sunday BreakFast
- Fruit & Water

Station Description

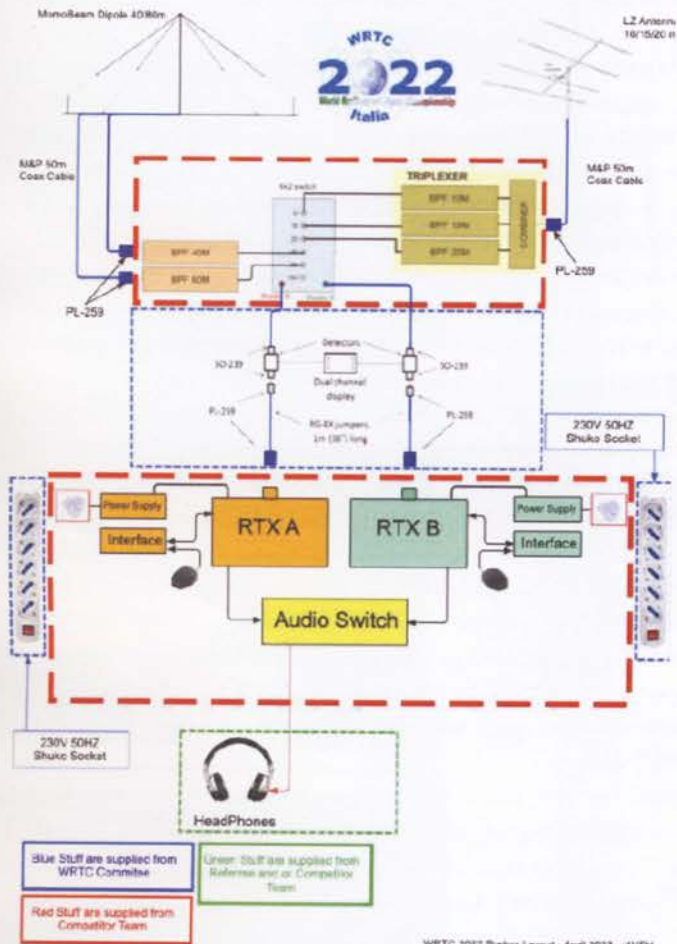
- 11m mast tower with an Yaesu antenna rotator and control unit
- LZ Antenna 20/15/10 m with one feed line (50 meters of M&P Ultraflex 7) and PL-259 male connector.
- MomoBeam 40 m Inverted-V dipole with feed line (50 meters of M&P Ultraflex 7) and PL-259 male connector
- MomoBeam 80 m Inverted-V dipole with feed line (50 meters of M&P Ultraflex 7) and PL-259 male connector (dipole ends can be changed manually to get best VSWR on CW or SSB segment)
- WRTC2022 Two-channel Power Monitor: The OUTPUT power monitor acts on forward power only, which may be greater than the actual transmitted power when the SWR > 1:1. In order to transmit 100 Watts to an antenna off the resonant frequency, an external tuner may be used to bring the SWR down and avoid premature triggering of the power monitor
- 2 x 1 meter coax jumpers, PL259 on each end for connecting Power Monitor
- 5 Port Ethernet switch incl. connection cables
- 2 x 6-outlet 230 VAC power outlet strips (see also <https://en.wikipedia.org/wiki/Schuko>) *
- 2 electric lamps (were needed)
- 2 electric fans (were needed)
- 1 larger table(supplied from host) (2.m x 0.75m each)
- 3 chairs

It is highly recommended, but not mandatory, that each team provides a "triplexer" device for the triband antenna. The function of the triplexer is to provide discrete band outputs using one coaxial feed. This allows operation of the triband antenna on two bands simultaneously.

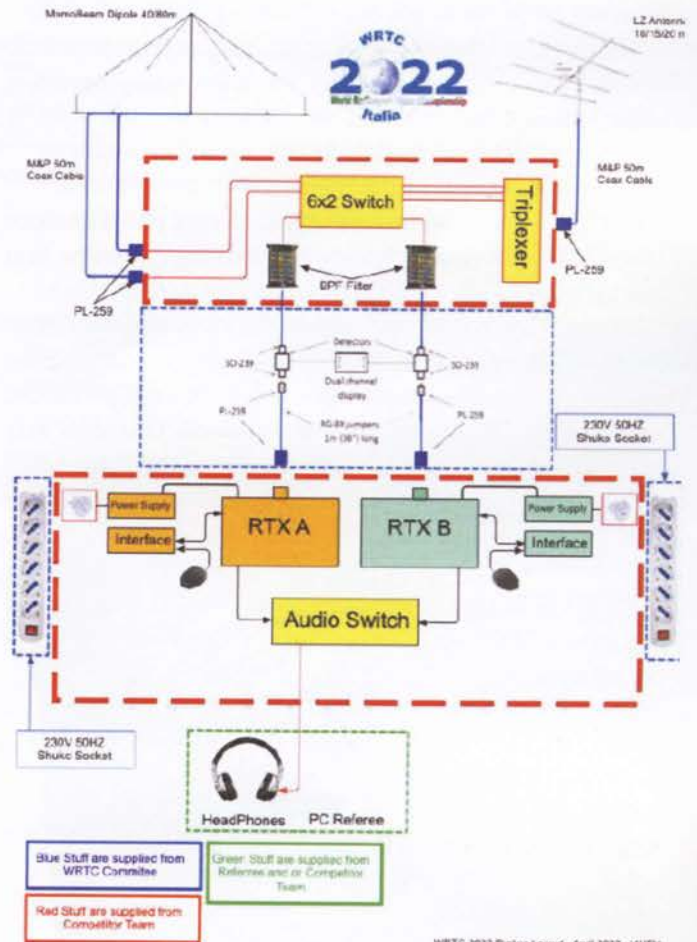
It is up to the team to provide such a device, but it must not amplify the signal in any way.

WRTC 2022 Schematic Example

A typical connection diagram of a WRTC station is shown here :



WRTC 2022 Station Layout - April 2022 - 14UFI1



WRTC 2022 Station Layout - April 2022 - 14UFI1

WRTC 2022 Competition Rules

1. Contest Period The WRTC 2022 competition will be held concurrent with the IARU 2023 HF Championship. Start: Saturday July 8th, 2023 12:00 UTC (14:00 local) End: Sunday July 9th, 2023 11:59 UTC

2. Frequencies / Bands Only the 3.5, 7, 14, 21, and 28 MHz bands may be used. All participants must comply with the frequency regulations of the Italian "Ministero delle Imprese e del Made in Italy". Contestants must not operate outside of the allocated ham-radio bands and should follow the band plans recommended for IARU region 1 (<http://www.iaru-rl.org/index.php/spectrum-and-band-plans/hf>).

3. Modes of operation CW and SSB.

4. Language Only English language and common international abbreviations may be used when operating either SSB or CW.

5. Contest Exchange

5.1 WRTC stations must send signal reports plus ITU zone (Italy is ITU Zone 28). A complete exchange must be sent and logged for each valid QSO.

5.2 Apart from 5nn no other abbreviations are allowed when sending the exchange either on SSB or CW. Operators must say 5-9 28 on SSB resp. 5nn 28 or 599 28 on CW. Further cut numbers such as enn28 are not allowed. Operators may increase the speed of the exchange up to a maximum of 50 WPM. Voice recorders are allowed to send the exchange on SSB.

6. Valid QSOs : Each callsign may be worked once on CW and once on SSB per band. Cross-band or cross-mode QSOs are not allowed.

7. QSO Points : Each valid two-way CW or SSB QSO is worth the following QSO points:

CW QSO Points Within Europe 2 Outside Europe 5

SSB QSO Points Within Europe 3 Outside Europe 6

8. Multipliers

8.1 The total number of DXCC countries plus IARU member society HQ stations on each band will count as multipliers, once per band regardless of the mode. IARU officials represent a maximum of four multipliers per band (AC, R1, R2 and R3).

8.2 IARU member society HQ stations and officials do not count for DXCC country multipliers.

9. Score : The final score will be: Score = (Total number of

multipliers) x (the sum of QSO points). After adjudication the Judging Committee will calculate the final score for all entries based on Cabrillo logs submitted.

10. Champions : The WRTC 2022 Champion will be the team with the highest score.

11. Special Awards :

- The WRTC 2022 SSB Leader will be the team with the highest QSO total on SSB.

- The WRTC 2022 CW Leader will be the team with the highest QSO total on CW.

- The WRTC 2022 Multiplier Leader will be the team with the highest total number of multipliers.

- The WRTC 2022 Accuracy Leader will be the team with the lowest percentage of callsign/exchange errors.

As WRTC is a mixed mode contest, to apply for Single mode Special Awards a minimum of 35% of the total number of QSOs must be made in another mode.

WRTC 2022 Special Rules and Disqualification

12. Special Rules and Disqualification

12.1 WRTC 2022 stations must be QRT for at least 15 minutes prior to the contest start (by 11:45 UTC). The receiver volume of both radios must be turned fully off and no monitoring or transmitting is allowed within this 15-minute timeframe. The radios may be left powered on.

12.2 The operators are not allowed to intentionally identify themselves (i.e., revealing their own callsigns) before or during the contest or reveal their team identity in any way. Any attempt to do this such as by radio, telephone, SMS, internet, email, etc., may result in immediate disqualification. Requesting QSOs (e.g., setting schedules with special identification procedures in any way) before the contest period is strictly forbidden.

12.3 Operators may request QSOs with any station on another band/mode. All requests must be made during the contest period with no other attempt to reveal the team's identity. All requests can only be made on HF CW or SSB, and by no other means.

12.4 Use of DX spotting (e.g., Packet, Web, etc.), skimmer or any other spotting and supplementary information network is not allowed. Operators are not allowed to receive any assistance to learn the callsign or exchange of any station other than by tuning the radio and listening by human ears.

12.5 The use of any callsign database or the 'Super Check Partial' tool is not allowed. If the logging software incorporates this kind of feature, it must be disabled. The logging computer(s) may display a 'Check Partial' list based only upon the callsigns already worked during the contest.

12.6 The WRTC teams should work all callers without regard to nationality or different viewpoints.

12.7 The WRTC Contest is the equivalent of the Ham Radio Olympic Games. To maintain the spirit and credibility that his name implies, it should take a high level stand about how the teams should behave on the air. The Judging Committee may disqualify a team that commits any of (but not limited to) the

following actions:

- Violation of the rules of the contest.
- Unsportsmanlike conduct.
- Taking credit for excessive unverifiable QSOs or unverifiable multipliers.

12.8 WRTC stations should not encourage "cheerleading", i.e. QSOs in which supporters make QSOs with only a favored team or exclusively spot that team on the DX-cluster. Cheerleading should be actively discouraged by the competitors and abuses through the use of cheerleading may result in QSOs being removed from logs as deemed necessary to assure a fair competition.

12.9 The decisions of the Judging Committee are final.

13. Callsign Allocation: The callsigns assigned to the competitors will be selected from special calls in a "to be determined" series. The process of assigning calls and stations will be randomly designated by lottery on Friday, July 7th, 2023 before the contest. The competition callsigns will be given to the teams by their referee at the station 15 minutes before the contest at 11:45 UTC on Saturday, July 8th, 2023. Team members are not allowed to know the callsign before this time.

14. Logging

14.1 Computer logging is required.

14.2 Each WRTC 2022 team must submit its log file in Cabrillo format to their referee until 12:30 UTC on Sunday, July 9th, 2023. In addition the log needs to be provided in the source-format of the logging-software (e.g. wt4-Files for win-test).

14.3 All competitors are allowed to use any logging programs compliant with the follow basic rules:

- Generating a Cabrillo output according to Cabrillo-standard.
- Disabling the use of any callsign DATABASE, Master.DTA or the 'Super Check Partial'.
- Broadcast Score for real time scoring :
 - (<https://contestonlinescore.com/blog/online-scoring-xml-specification/>)
- QSO UDP Broadcast for Real Time QSO Collection :
 - (http://dxlog.net/docs/index.php/Additional_Information_UDP_Broadcast_section)

WRTC 2022 Special Rules and Disqualification

• The team is solely responsible to ensure the software conforms to WRTC 2022 standards as defined in these rules. The Cabrillo log needs to assign the transmitter id "t" according to Cabrillo-standard, i.e. by two different parameters "0" and "1" to identify the radio used for the QSO. For instance Win-Test needs to be configured in M/2 with Overlay WRTC. Other logging programs need to be configured similarly to indicate the radio. Details of the Cabrillo-format can be found on:

◦ (<http://wwrof.org/cabrillo/cabrillo-qso-templates/>)

14.4 The Referee can connect his own Computer to the Ethernet Box supplied by WRTC 2022 Committee, with a designed Port that allows only to receive broadcast packet, allowing the Referee to be more effective on checking the Logged QSO, without interfering with the team members. The Team Leader is in charge of supplying to the referee the same software log version installed into the competitors computers.

14.5 In any case, it is the sole responsibility of the competing teams to create Cabrillo-compliant code with the software used in the contest. The Committee does not assume any responsibility for the conversion of log data into Cabrillo format.

14.6 Logging software must be configured to broadcast current score information for publication during the contest.

15. Recording

15.1 After the contest, each team must provide to the referee a continuous stereo audio recording of Radio A and Radio B on one of the following storage devices: • USB2 compatible device (USB flash memory, USB hard drive) • CD/DVD disk The recordings should be separated into two audio files, one for each radio. Recordings may be established in one of the following two formats: • Two (2) separate files, one for each radio. • One file with each radio on a separate channel.

15.2 The Judging Committee has the right to remove any claimed contacts not found in the recordings. Upon demand the teams must additionally provide the associated player, e.g. if non-standard audio formats are used.

16. WRTC 2022 Station Setup

16.1 Each participating WRTC team must bring everything needed for their station except items listed in Station Description.

16.2 Each WRTC 2022 station will have two radios – Radio A and Radio B.

16.2.1 Radio A and Radio B can each use only one antenna connector. This means that every transmission and reception must go through a single antenna connector of that Radio. No external receive antennas are allowed. External band-pass filters are allowed in the receive line if desired.

16.2.2 Use of any sub receiver in radios that are so equipped, is not allowed. This includes diversity receiving. Radios are not allowed to receive on two frequencies simultaneously. For a two channel (or multi-channel) radio (which has sub-receiver or parallel reception capabilities), which allows reception of signals on different frequencies simultaneously, the sub-receiver (or that parallel reception) must not be used. If the sub-receiver is technically required to operate the bandscope/waterfall, then technical means (e.g. mono headphone adapter) need to assure that no audio of the subreceiver can be utilized.

16.2.3 Operators are allowed to share audio between Radio A and Radio B. Each operator may listen to the other operator's radio and vice versa.

16.2.4 Both Radio A and Radio B are allowed to transmit. The contest is a full Two-Operator TwoTransmitter type operation. The only limitation is that each radio must transmit on a different band regardless of mode (e.g., if Radio A is on 15M SSB, Radio B is not allowed on 15M SSB or 15M CW during the same time).

16.2.5 Spectrum scopes (pan adapters) are allowed provided that they are used solely for spectrum visualization. The spectrum scope may be built-in to the radio or be a separate device. It may be connected to the radio or PC-A/B with the following limitations:

16.2.5.1 The only output from the spectrum scope can be video, i.e. it can show current or past signal strength (spectrum, peak hold or waterfall). Other demodulation, analysis or decoding, e.g. for the purpose of content analysis, CW-decode, station identification, Skimmer, etc., is not allowed.

WRTC 2022 Special Rules and Disqualification

16.2.5.2 The spectrum curve may be displayed in any suitable device, including the PC-A/B monitor screen.

16.2.5.3 Additional computers or an attached control console may be used for SDR signal processing.

16.2.5.4 The spectrum scope can be used to control frequency (e.g., tune Radio A/B).

16.2.5.5 If a remote control console or additional computer (16.2.5.5.) is used, then signal demodulation may happen in one and only one device (either the main radio or the control console). The control console must be within the provided tent and only be controlled by one – and only one – of the operators.

16.3 All radios must be commercially manufactured transceivers, meeting all manufacturer specifications.

16.4 Each team is allowed to have two backup radios. The backup radios may only be used in case of malfunction of the main stations' radios and with approval of the referee.

16.5 Radio A and Radio B are each limited to 100 watts (KEY DOWN in CW, single tone in SSB) maximum power output. The power will be measured by a peak power monitor provided by the WRTC 2022 Organizing Committee. The monitor has two detectors which must be connected directly to Radio A's and Radio B's respective antenna connectors. The power monitor acts on forward power only. Any devices connected after the detectors must not amplify the transmitted signal. All transmit- and received signals of one radio must pass the power detector of that radio. No bypassing of the detector is allowed.

16.6 Band-pass filters are allowed for both Radio A and Radio B. External antenna tuners are allowed for all antennas. These devices must be connected after the power detector. Any power losses from these devices may not be compensated for in any way.

16.7 Two networked PCs are allowed (PC-A at Radio A, PC-B at Radio B). The PCs should be named PCA and PC-B (or similar) within the team's logging software before the contest begins. No wireless connections are allowed from the PCs except for wireless keyboards resp. mice. No Wi-Fi or Bluetooth network connections are allowed. Network connections between logging computers must utilize the Ethernet switch provided by the WRTC 2022 Organizing Committee. Each team will provide two straight Ethernet cables to connect PC-A and PC-B to the Ethernet switch.

16.8 The computers of the competitors cannot use any other software other than logging software and spectrum curve software.

16.9 The teams must provide an audio output for both radios for use by the referee. This may be in parallel with the recording device described in rule.

16.10 The audio must be isolated so the referee may listen to either channel or both at the same time. The team may provide headphones for the referee or the referee may bring

his or her own. In either case, it is the team's responsibility that the referee can monitor both radios continuously. If the referee uses his or her own headphones, it must not interfere with the team's audio in any way. The audio output should be terminated in a 3.5mm headphone female jack for the referee to plug into. If desired, the referee may bring an audio switch box to choose Left/Right or Both audio channels.

16.11 The teams must provide the equipment for recording the WRTC contest operation, including both the received and transmitted audio of Radio A and Radio B. With this equipment the teams must generate the audio recording described in section 15. The recording must be uninterrupted and comprehensive for the entire period of operation. A third PC is allowed for this purpose, but may not be networked to PC-A or PC-B in any way. Operators are not allowed to review the recorded audio except for troubleshooting purposes while under the referee's supervision.

16.12 Teams may adjust the length of the 80M antenna to move its resonance from the low end of the band to the SSB portion or back. This may be done by opening or closing a connection at the ends of the 80m-dipole. The center, the length of the various sections and ends of the antenna must not be moved. This adjustment must be made while standing on the ground. No climbing of the antenna structure or other objects is permitted. In the case of a failure of the wire antenna(s), only the WRTC support staff is allowed to repair it. It is not allowed to move the antenna ends without explicit permission from the WRTC 2022 Organizing Committee.

16.13 Participants are not allowed to change or cut antenna coaxial cables provided by the organizer. All such cable lengths must remain unchanged. Any filters or other devices allowed as previously described must be connected after the entire length of cable provided.

16.14 Before the competition the Teams are allowed to use third party technical support to organize and install the station as well as to install and test software or other permitted devices and peripherals. The support team must leave the site area by 11:30 UTC on Saturday, July 8th, 2023 at the latest.

16.15 During the competition the Referee may permit repair of any equipment or antennas reported damaged during the operation. This can be done by the operators or by the WRTC support staff only. No third party is allowed in the operating area at any time during the competition.

16.16 All equipment used by any team must be located inside of the Site (except antennas and cables). Participants must stay in the Site and/or designated control area from Saturday, July 8, 2023 at 11:45 UTC, until Sunday, July 9th, 2023, 12:30 UTC.

WRTC 2022 Special Rules and Disqualification

16.13 Participants are not allowed to change or cut antenna coaxial cables provided by the organizer. All such cable lengths must remain unchanged. Any filters or other devices allowed as previously described must be connected after the entire length of cable provided.

16.14 Before the competition the Teams are allowed to use third party technical support to organize and install the station as well as to install and test software or other permitted devices and peripherals. The support team must leave the site area by 11:30 UTC on Saturday, July 8th, 2023 at the latest.

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16.16 All equipment used by any team must be located inside of the Site (except antennas and cables). Participants must stay in the Site and/or designated control area from Saturday, July 8, 2023 at 11:45 UTC, until Sunday, July 9th, 2023, 12:30 UTC.

18. Conditions of entry By submitting an entry in the WRTC Contest the competing teams confirm that:

1. The rules of the contest have been read and understood and they are bound by them;
2. They operated within the limitations of all rules stipulated;
3. They agree to make the log and the audio recording, as well as photo and video material of its operation prepared by the organizer available to the general public at the sole discretion of the WRTC Organizing Committee;
4. All actions and decisions of the WRTC Judging Committee are official and final.

Frequency allocations in Italy for the amateur radio service are assigned by the "Ministero delle Imprese e del Made in Italy" and are listed on this website: www.mise.gov.it. As Italian laws are only written in Italian language, an extract of the relevant frequency allocations is provided here: Frequency range 3,500 – 3,800 kHz 7,000 – 7,200 kHz 14,000 – 14,350 kHz 21,000 – 21,450 kHz 28,000 – 29,700 kHz II. IARU Region 1 band plan The IARU region 1 band plan is a recommendation for all radio amateurs how to use the bands, as revised at the Interim Meeting Vienna 2016, effective 01 June 2016. The latest version can be found on the website of the IARU: <http://www.iaru-rl.org/index.php/spectrum-and-band-plans/hf> III. Poor Signal Policy The transmit signal quality needs to follow standard engineering practices. The judging committee reserves all measures in case of excessive bandwidth in order to stop the interference.

Disclaimer: In the event of force major or the occurrence of an event beyond control, the WRTC2022 Organizing Committee might implement changes, deletions or additions to the event and its rules.

Additionally the WRTC 2022 Organizing Committee reserves the right to change the ruleset for technical, administrative or legislative reasons. These changes may be implemented upon short notice.

WRTC 2022 Hardware Setting

17.1 RADIO

RADIO A

1. Allowed to transmit
2. Main receiver reception
3. Sub-receiver reception is not allowed
4. VFO A and VFO B transmit
5. A triplexer should be used on the triband antenna to provide 10/15/20 meter antenna inputs. See special triplexer section in the station description.
6. Allowed to use band-decoder
7. Allowed to use audio and RF filters
8. Can share audio with Radio B
9. Must share audio with Referee
10. Can be replaced by backup Radio (in case of failure)
11. Radio A cannot transmit on the same band as Radio B. The operator may listen to the same band as Radio B at any time. After one QSO is made on a band, all QSOs for that band must be made on the same radio during that time. Either radio may use any antenna but may not share that antenna with the other radio.

RADIO B

1. Allowed to transmit
2. Main receiver reception
3. Sub-receiver reception is not allowed
4. VFO A and VFO B transmit
5. A triplexer should be used on the triband antenna to provide 10/15/20 meter antenna inputs. See special triplexer section in the station description.
6. Allowed to use band-decoder
7. Allowed to use audio and RF filters
8. Can share audio with Radio A
9. Must share audio with Referee
10. Can be replaced by backup Radio (in case of failure)
11. Radio B cannot transmit on the same band as Radio A. The operator may listen to the same band as Radio A at any time. After one QSO is made on a band, all QSOs for that band must be made on the same radio during that time. Either radio may use any antenna but may not share that antenna with the other radio

7.2 COMPUTER

COMPUTER A

1. May be interconnected with Computer B
2. Allowed to key Radio A only.
3. Can exchange messages with Computer B
4. Voice and CW keyers are allowed
5. Super Check Partial is not allowed
6. Log must be converted to Cabrillo format after the contest.

COMPUTER B

1. May be interconnected with Computer A
2. Allowed to key Radio B only
3. Can exchange messages with Computer A
4. Voice and CW keyers are allowed
5. Super Check Partial is not allowed
6. Log must be converted to Cabrillo format after the contest

WRTC 2022 Addendum Rules

The referee's computer is now totally unnecessary and not a requirement. The referee can use an "old-style" method of looking at the competitors' displays by moving their head left and right and taking notes on a simple paper notepad. Alternatively, if the competitors agree, the referee can use a networked PC, and the proper software log supplied by competitors.

Only one of the competitors' computers must install the WRTC HamConnect application, which will broadcast the QSO to the server through the local VPN. The same computer will broadcast the score every 5 minutes.

Moving the WRTC HamConnect to the competitors' PC, whether Windows or Mac, has several benefits:

1. It minimizes and simplifies the network diagram, similar to previous WRTC events.
2. The WRTC HamConnect application can be tested before leaving your QTH, using your networked PC, to show the log traffic data in your personal team account. The platform will be ready before June 15, 2023.
3. It minimizes the interaction with our IT team, who will be available for team issues from July 4th.
4. There is no need to interact with other PCs except your own.
5. Referees are free to bring their laptop, and only the team leader can authorize the referee's PC to be network-connected.

WRTC 2022 Q&A

Q: Which audio source should be provided to referee headphone ?

A: Rules 16.9: The teams must provide an audio output for both radios for use by the referee. This may be in parallel with the recording device described in rule. Audio should be provided directly from the Radios, NOT from any other sources, i.e. Recording Computer, or any other device.

Q: Is Zone Prefill allowed ?

A: Rules 12.5: The use of any callsign database or the 'Super Check Partial' tool is not allowed. If the logging software incorporates this kind of feature, it must be disabled. An exception needs to be applied for the Zone Prefill, that most of the time is intrinsically extracted from the CTY file.

Q: IS the HQ Prefill allowed ?

A: Rules 12.5: The use of any callsign database or the 'Super Check Partial' tool is not allowed. If the logging software incorporates this kind of feature, it must be disabled. HQ Database is an external file, that includes updated HQ Callsign, and as for rules cannot be used, and need to be disabled.

Q: Can be used other Software with Logging and Spectrum Scope App ?

A: Rules 16.8: The computers of the competitors cannot use any other software other than logging software and spectrum curve software. As exception of this rules, all software that any team has supplied in the Schematic Diagrams, properly listed, that the OC has verified, are allowed. The Referee will carefully check that no other applications will run other than the listed by the Team. Example of allowed software are:
AutoHotKey , DXAtlas, HamCap , Ionoprobe , QSO Recorder, Audacity, Qlock, Dimension4, World Map Simons, 4O3A Genius Software, MicroHam router, SmartSDR Software, AWS Recording

Q: Can One or Both operator run a SO2V operation mode ?

A: Rules 16.2.2: Use of any sub receiver in radios that are so equipped, is not allowed. This includes diversity receiving. Radios are not allowed to receive on two frequencies simultaneously. For a two channel (or multi-channel) radio. Technically SO2V is a technique to SWITCH between two frequencies in one receiver, that's why this technique is allowed. Remember that only one receiver should to be used, and audio from the Radio must follow the VFO changes. QSY to another unused band is allowed, simply switching the VFO of only one receiver available. In this SO2V operating mode, any way to select the Active VFO is allowed, including footswitch.

Q: Are the site grounded ?

A: No proper Ground Rod are available in any site, and cannot be installed, due agreement with hosts. The most common wall sockets in Italy are the EU standard plug type C, F. Grounding poles are there to send extra power into the ground and away from your devices. This wiring prevents power surges that could overload your device or result in electrical shock. A grounded plug is a three-pronged device.

Q: Is it possible to use light arrestor ?

A: Yes, you can install light arrestor, even ground wiring will follow previous wall sockets guideline.

WRTC 2022 Q&A

- Q: Can we install Relay to short the 80m dipole length ?
A: Rules 16.12: Teams may adjust the length of the 80M antenna to move its resonance from the low end of the band to the SSB portion or back. This may be done by following the supplied instructions. This adjustment must be made while standing on the ground. No relays are allowed to switch the length of the dipole. Check instruction at <https://youtu.be/17lganFjYs4>
- Q: Can Waterfall be populated from BandMap ?
A: Yes, the waterfall can be sync with BandMap, with AutoSpot manually added.
- Q: Can DVK be used in all the Phone needs ?
A: Yes, DVK can be used in all the activity needed, from F1 to F7, include CQ, and report message 5928.
- Q: Can DVK be used to transmit phonetic callsign ?
A: No ! Callsign need to be transmitted with the operator Voice, no exception.
- Q: How many port is the supplied Switch ?
A: The supplied Switch has 3 free ports available, for any more port number you need to supply a larger switch; a limited number of extra 5 ports switch are available upon request at OC.
- Q: How we can supply the audio files at the end of the contest ?
A: Rules 15.1: After the contest, each team must provide to the referee a continuous stereo audio recording of Radio A and Radio B on one of the following storage devices: • USB2 compatible device (USB flash memory, USB hard drive) • CD/DVD disk The recordings should be separated into two audio files, one for each radio. Recordings may be established in one of the following two formats: • Two (2) separate files, one for each radio. • One file with each radio on a separate channel. No other support is accepted, as SD Card, or different Memory Card and no other file types and numbers are allowed. Continuous audio recording of Radio A and Radio B are the only file types allowed.
- Q: Can Competitors add or remove antenna wires ?
A: No ! Competitors can only follow the rules for manual tuning the 80m dipole. Any other actions at the antenna structure are forbidden. In the case of a failure of the wire antenna(s), only the WRTC support staff is allowed to repair it. It is not allowed to move the antenna ends without explicit permission from the WRTC 2022 OC.
- Q: Can the Spectrum Scope be available in internal and external view ?
A: Rules 16.2.5: Spectrum scopes (pan adapters) are allowed provided that they are used solely for spectrum visualization. The spectrum scope may be built-in to the radio or be a separate device.
Simultaneously Spectrum Scopes are not allowed. Referee will take care about that.
- Q: Does the Setup wiring need to be compliant to the Schematic Diagram provided ?
A: YES, all the schematic diagram provided from the Team are considered as definitively; any different wiring must be avoided. The Referee will check the diagram carefully and

WRTC 2022 Q&A

- Q : Does the Setup wiring need to be compliant to the Schematic Diagram provided ?
A : YES, all the schematic diagram provided from the Team are considered as definitively; any different wiring must be avoided. The Referee will check the diagram carefully and he is authorized to ask the Team to wire the setup according to the Schematic Diagram authorized from the OC.
- Q : "DXCC countries" multipliers: are they DXCC entities or are they extended to WAE additional entities plus IG9/IH9 as in the CQWWDX ?
A : YES, only DXCC Entity are valid, no extra WAE Table as CQWW multiplier list.
- Q : What is the eventual multiplier status of /MM stations ?
A : /MM stations will not be counted as multiplier.
- Q : How do you determine the /MM stations Continent ?
A : /MM stations declare it in the exchange report .
- Q : Can Backup Radio be connected in any way ?
A : Rules : 16.4 Each team is allowed to have two backup radios. The backup radios may only be used in case of malfunction of the main stations' radios and with approval of the referee.
Backup Radios, should to be safe stored in the proper box until exchange with the broken one.
- Q : Can Spare PC Networked ?
A : Rules 16.7: Two networked PCs are allowed (PC-A at Radio A, PC-B at Radio B). The PCs should be named PC-A and PC-B (or similar) within the team's logging software before the contest begins.
Several requests have been received about the use of an additional spare PC. The Spare PC should be in the same network of PC-A & PC-B where the Log Software and HamConnect are installed and running. The spare PC should be used only in case of PC-A (or PC-B) failure. Take note that in the spare PC, if you replace the PC with HamConnect, HamConnect need to be reload with the proper login. One and only one PC can have Hamconnect active and logged to the server.
- Q : Which Format should be the supplied log files ?
A : Rules 14.2: Each WRTC 2022 team must submit its log file in Cabrillo format to their referee until 12:30 UTC on Sunday, July 9th, 2023. In addition, the log needs to be provided in the source-format of the logging-software (e.g. wt4-Files for win-test). For your convenience it's recommended to name your two Cabrillo files and the two source-format of the logging-software, with the follow syntax: WRTCCallsign-PC-A and WRTCCallsign-PC-B , i.e. I4UFH-PC-A and I4UFH-PC-B.
- Q : Which Connectors are available in the "rented monitor" ?
A : The OC rented Monitors are model HP EliteDisplay E201 LCD 20" Monitor, with 1600 x 900 resolution and VGA Cable supplied. DVI and DisplayPort are available without any proper cable supplied. Who want to rent the monitors, please supply the adapters for each needed PC.

WRTC 2022 Q&A

Q: How to configure TCP/IP Network ?

A: The provided switch has an active DHCP server; for your convenience it's recommend to set a fixed IP to any device in the network.

Automatic DHCP Server assign IP from: 10.20.23.1 to 10.20.23.25

Manual Configuration:

Assign IP From: 10.20.23.26 to 10.20.23.99

Netmask: 255.255.255.0 (CIDR: 10.20.23.0/24)

Default Gateway: 10.20.23.254

DNS server: 10.20.22.254 (WARNING: the 3th number is 22 not 23)

NTP Server: 10.20.23.254

WRTC 2022 Competition Sites

Competition Sites

The Emilia Romagna is one of the largest Italian Areas where several agricultural businesses that operate in the tourism sector, offering



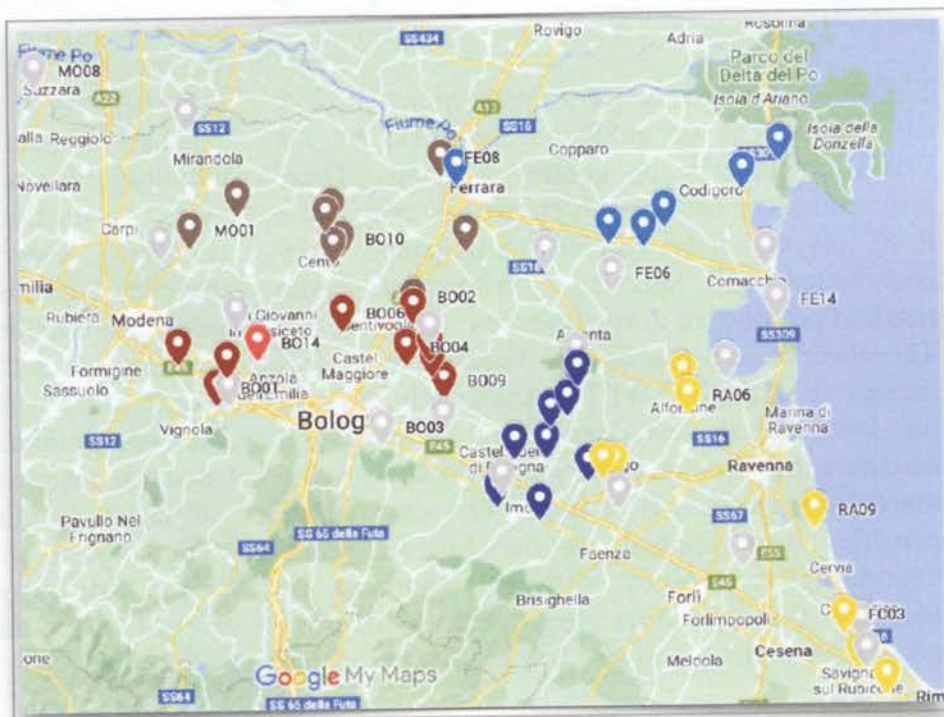
accommodation and meals on their own farm. This activity aims to support the agricultural and livestock sectors and is regulated by specific national legislation that determines how the farm should provide hospitality. The products offered should primarily be cultivated on the farm itself, which remains the main activity of the business. Thanks to this new offering, people have rediscovered the Italian countryside, typical products, ancient traditions, and charming rural villages.

In light of the significant opportunities provided by agriturismos and their potential to support the Italian economy, especially after years of the COVID-19 pandemic, we have proposed hosting each Team, Referee, and Site Manager in these accommodation facilities. These facilities are located in several provinces between Modena and Ravenna, and they have shown great interest and willingness to participate in WRTC 2022

initiative. The accommodation options include double rooms resembling traditional shacks, as well as separate rooms for referees and site managers. These rooms are equipped with air conditioning and private bathrooms, ensuring a comfortable stay for the guests. Additionally, the facilities provide various amenities, including breakfast, lunch, and dinner services, to cater to the needs of the WRTC guests.

By offering a complete on-site service, you aim to provide a convenient and enjoyable experience for all participants of the WRTC event. The agriturismos serve as a perfect base for guests to immerse themselves in the Italian countryside while enjoying the comforts of modern hospitality. This initiative not only supports the local economy but also showcases the rich cultural heritage and culinary.

Claudio Veroli I4VEQ



WRTC Cheerleading

Unsportsmanlike cheerleading or any other form of unethical behavior is strictly prohibited in WRTC and can result in severe penalties, including disqualification from the competition.

WRTC has a strict code of conduct that all participants are expected to adhere to. This includes conducting oneself in a fair, sportsmanlike, and respectful manner towards other competitors, the contest organizers, and the rules of the event. Unsportsmanlike cheerleading, from the worldwide community following an intentionally identify by competitors, selection of predefined frequencies at defined time, transmitting false or misleading information, or engaging in any other behavior that violates the rules or spirit of the contest, is considered a serious breach of the code of conduct and can result in disqualification.

Some of follow action can mitigate the cheerleading effects:

1. Operate Ethically: Maintain high ethical standards in your contest operation. Avoid using any unauthorized means or techniques to gain an unfair advantage, such as using prohibited equipment, employing unsportsmanlike tactics, or violating contest rules. Operate within the legal limits of your license and follow good operating practices.

2. Comply with Organizers' Instructions: Follow any instructions or guidelines provided by the WRTC organizers or contest officials. These instructions are designed to ensure fair play and a level playing field for all participants. Non-compliance with organizers' instructions could result in penalties or disqualification.

The cheerleading plague, has been more or less present at all the last WRTCs since early days. In the last several years ago there were several activities that prompted the judges to apply some draconian penalties. It' was the first case where penalties were applied. In the follows years, everything is evolved, different approach to identify the operators was acted, different geographical areas, and less low band activity, due

the difficult to overcome the Oceans with low power and small dipole antennas, has forcefully hidden, the cheerleading effects.

New challenge are now on the horizons, 5 band almost open over 24 Hours, European locations, a Continent with high density of different country, new communications media, RBN clusters, and smarter teach operators, are all great new challenges for look for a way to minimize cheerleading effects over the final ranking.

As Organizing Committee, we started since 2019, too deeply look at these issues, and we had started from these factors:

- 1) Humans are inherently driven by self-interest, and some may choose to cheat in order to obtain an unfair advantage or gain a benefit they believe they cannot achieve through honest means.
- 2) Lack of consequences or enforcement: If individuals perceive that the risk of getting caught and facing consequences for cheating is low, they may be more inclined to engage in such behavior. Weak or inconsistent enforcement of rules and regulations can create an environment where cheating appears to be a viable option.
- 3) Some individuals may not fully appreciate the ethical implications of cheating or may rationalize their behavior based on situational factors. They may justify cheating as a means to an end, or may not fully grasp the moral implications of dishonesty.

It's important to note that while these factors may provide insight into why some individuals choose to cheat, cheating is ultimately a personal choice and not justifiable.

WRTC Cheerleading

The WRTC 2022 Organizer Committee had taken seriously these subject in the last years, a long analyze of previous Logs available as Public Log has been taken. Crosschecking of WRTC Logs and All the more that 5000 Logs available on line, has detected, some anomalies, that obviously couldn't be found in the next 24 hours after the end of the WRTC contest, due lack of time, logs, and proper tools.

We had evaluated several solutions to minimize or reduce these effects, but all the actions applied after the contest ends, are ineffective, no one can proof any of sophisticate's methods applied to be recognized, after the event has happened, even enforcing the Referee to pay attention about that.

For that reason, that the WRTC 2022 OC with the great contribution of our IT Team, has developed a experimental, and complex tools, to identify in real time if there are some anomalies in the logs, and notify the on field referee to take care about that, during the event.

Basically, all the WRTC Stations will need to installed a small application called HamConnect that connected to a VPN that will broadcast all QSO and scores to a QSO Collector redundant server.

The Judge Committee, that have some institutional activity during the event, as visiting the Teams site to look at the competition progress, will have one more duty to take in charge, look at Check Panel that promptly show in a fair visual graphic if something is wrong. I.E.: high number of QSO's with the Countries of the 2 Operators, frequently QSY to predefined frequency, QSO Patterns between bands, or other useful indicators. These alert will allow the Judge Committee to have a real time tool that will help to identified anomalies, to notify at the on-field referee, and at the end, following, the WRTC 2022 rules, apply if needed penalties.

This network allows also to ensure that after 3 QSO logged following a band/mode change is detected a Spot is generated.

This real time QSO collectors, allow also to generate a provisional real time ranking of the **WRTC 2022 Award**, devoted to all the user that want to grab the 1st place in the several available awards. I.E. the fastest 100 QSO, WRTC Station worked all bands, the fastest Single Band WAWRTC2022 station and so on.

The QSO Collector Server technologies has been proofed and tested during the last WRTC 2022/2023 Award with up 600 QSO/min and over 2.5 Mil QSO We expect for this WRTC up to 400K QSO overall.

All this technology involved, will sure could have some glitch, and as experimental, the Organization Committee, will not use the received QSO as final QSO for a score and ranking calculation. The final logs, that will be used for final scores and ranking, are always the Cabrillo LOG supplied to the referee at the end of Contest.

We expect to have minimal failure during the event, even if for any reason the VPN has a failure, that cannot fix remotely, there will not a Real Time analyzes, but the Contest can proceed without any issue, and or penalization.

WRTC 2022 Beyond the Scene

Is fair Competition a chimera ?

World Radiosport Team Championship (WRTC) is a real and well-established competition in the field of amateur radio. The WRTC is held every four years and brings together the world's top amateur radio operators to compete against each other in a fair and challenging environment.

The competition focuses on the skill and expertise of the operators, who participate in teams representing their respective countries. The event utilizes a predetermined set of rules and operating procedures to ensure fairness and equal opportunities for all participants.

WRTC has made significant progress in ensuring a fair and level playing field for all participants over the years. Standardizing the sites and utilizing the same antenna systems is a crucial step in minimizing the impact of location variations and creating equal propagation conditions for competitors.

By eliminating the wide differences in site locations and antenna setups, the WRTC organizers have taken steps to provide a more homogeneous competition area. This helps to ensure that participants have similar opportunities for successful communication and reduces the potential for location-based advantages or disadvantages.

Moreover, the establishment of competition rules that prioritize worldwide participation and create an environment acceptable to most of the competing teams further reinforces the fairness and inclusivity of the event. These rules likely address various aspects of the competition, including log checking, frequency usage, operating procedures, and ethical conduct, to maintain a high standard of fair play.

The continuous efforts to improve the fairness and competitiveness of the WRTC demonstrate the commitment of the organizers to create an environment where participants can showcase their skills and compete on an equal footing.

The World Radiosport Team Championship (WRTC) has also witnessed advancements in log checking procedures over the years to enhance the accuracy and fairness of the competition.

In the early years of the WRTC, log checking likely involved manual review and verification of the submitted contest logs. Contest organizers would meticulously examine each log, comparing the reported contacts and exchanges with the logs of other stations. This process would have been time-consuming and relied on human expertise to identify any potential errors or inconsistencies.

As contesting technology progressed, log checking in the WRTC would have likely transitioned to more automated and efficient methods. Contest logging software with built-in log checking features would have been utilized to perform initial checks and validations. These features could include verifying the accuracy of frequencies, times, call signs, and exchanges, similar to other amateur radio contests.

To ensure consistency and fairness, the WRTC has adopted standardized log formats, such as Cabrillo, for participants to submit their contest logs. Standardized log formats streamline the log checking process by providing a structured and uniform way to exchange contest data. This simplifies the analysis and comparison of logs, allowing for more accurate and efficient log checking.

Furthermore, advancements in computing power and data analysis techniques have likely played a role in the evolution of log checking in the WRTC. The use of sophisticated log checking software, powered by algorithms and statistical analysis, would have become more prevalent. These tools can automatically detect duplicate contacts, incorrect exchanges, and other anomalies in the logs, ensuring a high level of accuracy in the scoring process.

WRTC 2022 Beyond the Scene

Cheerleading

The WRTC 2022 has introduced a real-time log checking, that can indeed be a valuable tool in detecting potential cheerleading activity and promoting fair competition. By providing immediate feedback to the local referee and notifying the teams involved, it allows for timely intervention and raises awareness about unsportsmanlike behavior.

Real-time log checking can help address instances of falsely confirming or logging contacts, pattern sequences of QSOs between bands, unauthorized identification, and other forms of cheerleading. By monitoring the logs in real-time, the referee and teams can take proactive measures to prevent and discourage such activities.

This innovation can contribute to maintaining the integrity of the contest and ensuring a level playing field for all participants. It fosters a spirit of fair competition and encourages ethical behavior among the teams. In the context of amateur radio contests, the term "cheerleading" typically refers to the practice of participants falsely confirming or logging contacts that did not actually occur, or performing pattern sequence of QSO between the Bands, or identify themselves in a same not authorized way, i.e. changing band, in a dead band at defined times soliciting "friendly unique QSO", abuse of the 3 QSO spot feature, supplied from the organizing committee, to solicit friendly QSO almost unique, from the countries of the Team operators.

Checking processes have evolved in amateur radio contests to detect and prevent cheerleading:

1. **Cross-Checking:** Log checking software compares the logs of participants with the logs of other stations to identify inconsistencies and false confirmations. This includes checking for contacts that were falsely confirmed or logged by a participant but are not present in the logs of the contacted stations. Cross-checking helps identify instances where participants have falsely claimed contacts that did not actually occur.

2. **Real Time Pattern Analysis :** Real time algorithms analyze the sequence and pattern of contacts made by a participant, particularly between different bands. This analysis helps detect any predetermined or non-natural sequences of QSOs or patterns that indicate the solicitation of "friendly unique QSOs." Unusual patterns or specific sequences of contacts can raise suspicions of cheerleading.

3. **Real Time Authorized Operations Verification:** Real Time procedures verify that participants adhere to the contest rules regarding band changes, authorized operating times, and other guidelines. Any violations, such as unauthorized band changes or operating on dead bands during defined times, can be flagged during the log checking process.

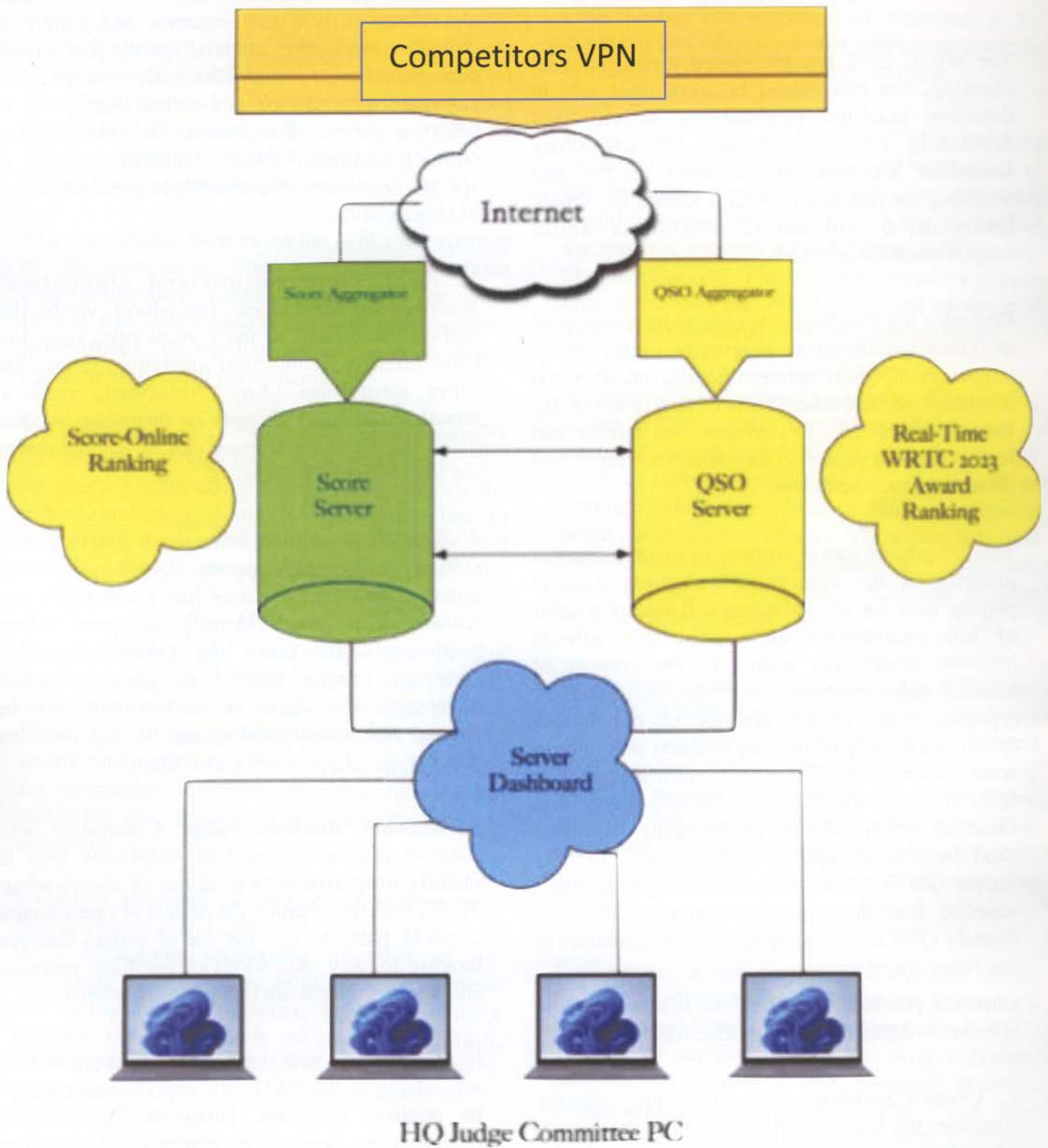
4. **Real Time Abuse Detection:** Log checking software will employ specific algorithms to detect potential abuse of features like the 3 QSO spot feature. This helps identify instances where participants are using the feature to solicit "friendly unique QSOs" or gain an unfair advantage. The abuse of such features can be flagged and investigated during the log checking process.

5. **Manual Review:** Judge Committee will conduct manual reviews of suspicious logs to identify irregularities or evidence of cheerleading. They carefully examine the details of questionable contacts, patterns, and the use of certain features, looking for any indications of unethical practices and apply proper score reductions if needed.

It's important to note that the specific log checking procedures in the WRTC or any contest may not be publicly disclosed. However, log checking processes are designed to ensure fair competition and detect any instances of cheerleading, including the practices you have described. The goal is to maintain the integrity of amateur radio contests and uphold the principles of fair play.

Fabio Schettino I4UFH

WRTC 2022 Beyond the Scene



WRTC 2022 Antenna Setup

Antenna Selection

This a very short history, in the months following the establishment of the Antenna Team, a surprising and unexpected offer came from Krassy K1LZ. He generously offered to sponsor the antennas for all 60 sites, providing an additional 10 spare antennas, resulting in a total of 70 antennas.

The antennas sponsored by Krassy K1LZ were the LZA-7-3A WRTC 2022 models. These antennas were specially designed to be lightweight, with a short boom and easy assembly. Each antenna featured a 2/2/3 element configuration, providing coverage for the 20, 15, and 10-meter amateur radio bands respectively.

Frequency, MHz	14 - 21 - 28
Elements	7
Power watts	3 kW
Active Elements	2 / 2 / 3
Forward Gain, dBd	-
Gain* dbi	12.6 / 12.4 / 13.2
F/B db	14 / 13 / 16
SWR 14,0 / 14,15 / 14,350	1,2 / 1 / 1,2
SWR 21 / 21,2 / 21,450	1,3 / 1 / 1,3
SWR 28 / 28,5 / 29	1,3 / 1 / 1,4
Boom Length	4 m
Feed lines	Coaxial 50 Ω
Max. Element Length	11,0 m
Wind load at 110 km/h	0,82 m ²
Balun	1:1 50 Ω
Turning Radius	5,09 m
Weight	26 kg

"We pride our self with our high quality and robust YAGI antennas. LZ Antenna was established to provide a quality that would apply a "leading edge technology" to the production of high frequency communication equipment. Founder Georgi Georgiev played a major role in the development of Amateur Radio in Bulgaria and have more than 20 years of experience in the field of radioamateur."

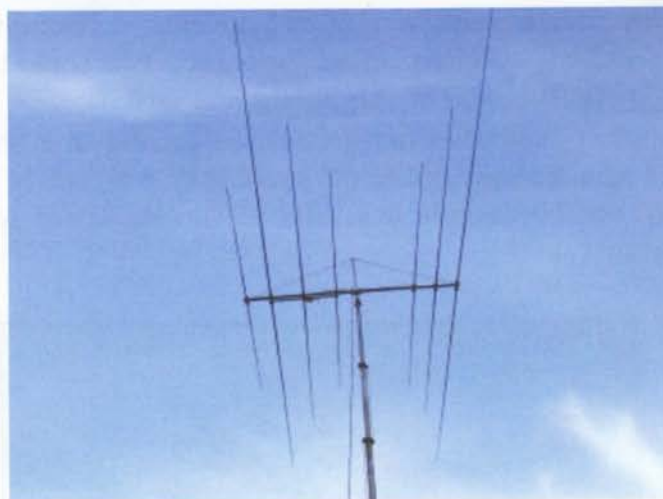


The low bands antennas, are two simple inverted V dipoles, supplied from Momobeam. The Italian manufacturer, has gained popularity among ham radio community, supplying several contest station around the world

ad we cannot miss his fabulous support in this WRTC 2022.

The Galvanized Telescopic Masts used for the antenna installations were manufactured by Antonello IT9EQO in his factory. These masts were well-developed, incorporating unique details that set them apart. Known for their durability and quality, these masts held significant value for the Antenna Team. They can be elevated easily up to 11m.

One notable advantage of these telescopic masts was their ease of installation. Designed with a two-man installation process in mind, they simplified the setup procedure, making it more efficient and convenient for the team. This feature allowed for quicker deployment and ensured that the antenna systems could be operational in a shorter amount of time.



To facilitate the rotation of the mast and directional antennas, the Antenna Team utilized the YAESU G-450 Rotator. This rotator was installed at the top of the telescopic mast and provided the ability to adjust the directionality of the antennas.

The YAESU G-450 Rotator offered precise control over the positioning of the mast and antennas, allowing operators to fine-tune their reception and transmission capabilities. By remotely controlling the rotator, operators could easily change the direction in which the antennas were pointing.

Each of the three antenna systems is connected to their respective radios and equipment using 50 meters of Ultraflex coaxial cables produced by "Messi & Paoloni."

Ultraflex coaxial cables are known for their high-quality construction and excellent electrical performance. They are designed to minimize signal loss and maintain low attenuation, ensuring efficient signal transmission between the antennas and the radios. The use of 50-meter lengths allows for flexibility in antenna placement while maintaining optimal signal integrity.

Antenna Assembly

The installation of the antennas and their support has been carried out in compliance with all safety instructions concerning the safety of people and property.

To this end, it is necessary to preliminarily ensure the absence of any interference in the area where the activities will take place, such as overhead power lines or communication lines, underground pipes or ducts beneath the anchor points.

In the unlikely event of an accidental overturning of the installation, no people or property should be affected.

Electrical connections should be derived from the main system (ensure the mandatory presence of a circuit breaker and a residual current device for safety).



To minimize installation time and facilitate transportation to the designated destination, all the antennas have been preassembled. This preassembly process involved several dedicated volunteers who generously contributed their free time to assemble the antennas.



By preassembling the antennas, the Antenna Team was able to save valuable installation time at each site. The antennas could be transported more easily and efficiently, as they were already assembled and ready for installation upon arrival.



The efforts of the volunteers played a crucial role in ensuring the smooth execution of the antenna project. Their commitment and dedication allowed for streamlined logistics and a faster deployment of the antennas across the various sites.

WRTC 2022 Antenna Installation

When performing antenna installation in a field, it is crucial to adhere to all safety instructions to ensure the well-being of individuals involved and the protection of property.



1. **Site Assessment:** Before starting any installation activities, thoroughly assess the site for potential hazards. Ensure there are no overhead power lines, communication lines, underground pipes, or ducts that could pose a safety risk during installation.
2. **Personal Protective Equipment (PPE):** Ensure that all personnel involved in the installation wear appropriate PPE, including helmets, safety glasses, gloves, and sturdy footwear.
3. **Secure the Mast/Base:** If using a mast, ensure it is securely anchored to the ground or mounted on a stable base.



4. **Secure the Antennas:** Mount the preassembled antennas onto the mast or support structure according to manufacturer instructions. Use appropriate clamps or brackets to secure the antennas and ensure they are properly aligned.
5. **Cable Routing:** Route the coaxial cables from the antennas to the designated equipment area, following safe cable management practices. Secure the cables to prevent trip hazards or damage.
6. **Electrical Connections:** Connect the coaxial cables to the radios or equipment using suitable connectors. Ensure all electrical connections are properly insulated and grounded according to safety regulations. Use appropriate extension cords with neoprene rubber insulation and IP67-rated plugs and sockets.
7. **Safety Signage:** Display appropriate safety signage and warnings in the installation area, such as "Caution: High Voltage" or "Radio Frequency Hazard." These signs should be clearly visible to alert individuals to potential risks.
8. **Safety Briefing:** Conduct a safety briefing with all personnel involved, emphasizing the importance of adhering to safety protocols and procedures. Discuss emergency procedures, including what to do in the event of severe weather or accidents.

Time schedule for the WRTC 2022 in July 2023

04.07.2023 Tuesday

06:00-22:00 participant arrival, logistic and registration

05.07.2023 Wednesday

09:00-17:00 Experience (**Radio, Marconi's House and Museum Pelagalli**)

09:00-17:00 Free Time to gathering together, meeting OC and Volunteer

10:00-12:00 Judge Committee Meeting with Tech IT Dev Department.

15:00-17:00 Organizing Committee Meeting

18:00-20:00 Opening Ceremony

- Tine Brajnik
 - *Opening and Welcome*
 - WRTC Sanctioning Committee President
- Gianluca Mazzini
 - *WRTC event presentation*
 - WRTC 2022 Organizing Committee President
- Fabio Schettino
 - *Participant Presentation*
 - WRTC 2022 Organizing Committee Vice President
- Giovanni Emanuele Corazza
 - *Marconi and Creativity*
 - Guglielmo Marconi Foundation President
- Alessio Sacchi
 - *New paths in ARI*
 - Associazione Radioamatori Italiani President
- Gianluca Tigretti
 - *Italian Callsign*
 - Authorization and Monitoring Responsible MIMIT
- Fausto Tinti
 - *View of Territories*
 - Major of Castel San Pietro Terme

20:00-21:30 Dinner Time

21:30-23:00 Social Event, live music (Ham Widows' Ball sponsored by the YASME Foundation)

06.07.2023 Thursday

09:00-11:30 Team and referee assignment

11:30-14:30 Ham Gathering

14:30-16:00 Referee / Competitor Meeting

16:30-18:00 Referee Meeting

20:00-21.30 Dinner Time

21:30-23:00 Ham radio experience sharing

Tours are available only if previously booked and only if the minimum number of participants is reached

Time schedule for the WRTC 2022 in July 2023

07.07.2023 Friday

09:00-17:00 Experience (Discover Firenze)
08:00-13:00 Site and Callsign drawing
10:00-18:00 Visitor Experience
08:00-13:00 Moving to Sites
15:00-22:00 Preliminary site tests

08.07.2023 Saturday

08:00-09:00 Enjoy Italian breakfast
09:00-13:45 Final WarmUp
13:45-14:00 Open Callsign Envelope
14:00-00:00 WRTC competition

09.07.2023 Sunday

09:00-17:00 Experience (Food Tour and Bologna town)
00:00-14:00 WRTC competition
15:00-17:00 Moving to headquarter
15:00-24:00 Log checking
20:00:24.00 Town Festival (sponsored from Castel San Pietro Terme Municipality)

10.07.2023 Monday

09:00-17:00 Experience (Motor Valley)
09:00-17:00 Experience (Discover Ravenna)
00:00-12:00 Log checking
15:00-18:00 Checking the ranking with judges
18:00-20:00 Closing Ceremony with Awards Presentation

- Gianluca Mazzini
 - *WRTC numbers and awards (with Carlo de Mari)*
 - WRTC 2022 Organizing Committee President
- Paola Salomoni
 - *Public Digital Perspective*
 - Local Ministry for Digital
- Filippo di Francesco
 - *Ham radio collaborations*
 - Emilia-Romagna Communications Authority MIMIT
- Fabio Schettino
 - *Results and awarding*
 - WRTC 2022 Organization Committee Vice President
- Gianluca Mazzini
 - *Official WRTC 2022 Close*
 - WRTC 2022 Organizing Committee President
- Tine Brajnik
 - *WRTC 2026 announcement*
 - WRTC Sanctioning Committee President

20:00-23:00 Social Dinner, Live Music and Ham radio lottery

11.07.2023 Tuesday

06:00-22:00 Participant departure logistic

The WRTC 2014 Power Monitoring

Steve Elliott – K1EL

WRTC 2014 is unique among radiosport events in that all operators are required to use identical stations. The organizers are responsible for providing equal antenna systems and locations that are as equal as possible, but the teams bring their own transceivers, filters, switching, etc. One of the requirements of the WRTC 2014 competing stations is that they must all comply with the 100 watt output power limit. However, some transceivers are capable of delivering 200 watts of output power, which would give such stations a 3dB advantage over stations running exactly 100 watts.

Measuring output power can be very subjective. Analog power meters are subject to interpretation, especially on SSB. Analog meters tempt operators to raise their average power by increasing the microphone gain or speech processing, often leading to splatter and other forms of poor transmitted signal quality.

In the interest of consistency, it is necessary for all stations to use identical power meters. The WRTC 2014 organizers reviewed the available options and chose to develop a custom system. There are two main components to the system: a detector and the indicator. Since the WRTC 2014 stations include two transmitters, the decision was made to provide two detectors and a dual channel RF status display that would be visible to both the operators and the on-site referee.

The detector must be accurate over a wide range of frequencies and should provide an output that corresponds to the forward power of the transmitter independent of the antenna's impedance and resulting system SWR. Attempts to create a scratch-designed system were unsuccessful, with significant variations over frequency and load impedance.

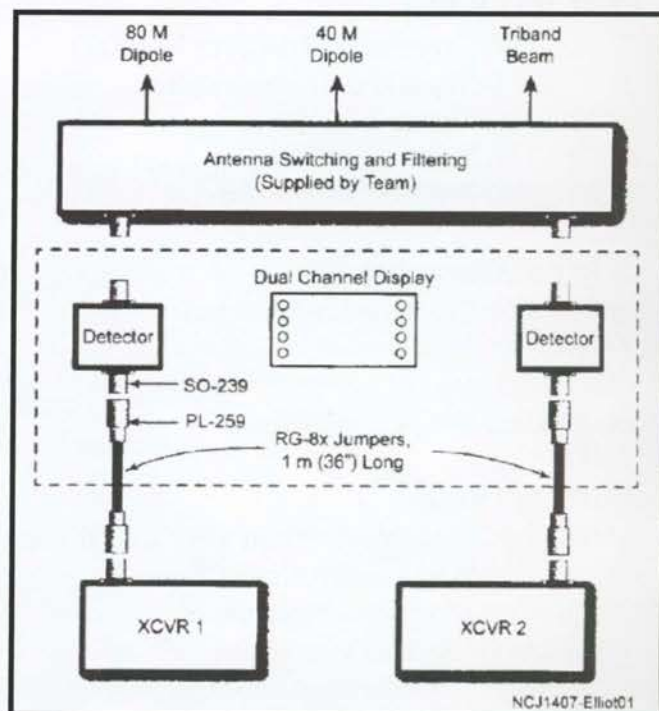


Fig. 1: "WRTC 2014 Station Block Diagram"

A discussion with engineers at MFJ/Ameritron revealed that a suitable detector was included inside many of their tuner and amplifier products and could be installed in an aluminum box with SO239 connectors.

The dual channel RF status display resides on a single printed circuit card and is implemented in two Microchip Technology PIC12F1501 microcontrollers, with one PIC for each channel. Each PIC is responsible for monitoring a channel's RF level and lighting one of three status LEDs: one red, one yellow, and one green. When no RF is present all LEDs are off; if RF is at an acceptable level the green LED is lit; if the RF is approaching violation the yellow LED is lit; and if the power level is in violation the red LED is lit. To conserve power, only one LED per station is turned on at a time.

The RF detector for each channel generates a DC voltage that is proportional to the average RF power level. This voltage is delivered to the input of the display board where it passes through a low-pass filter and is attenuated, then rectified, filtered again. This voltage is sensed by an analog-to-digital converter in the PIC that converts the sampled voltage into a stream of digital values. The converter produces a new 8-bit value every 36 μ s. with a resolution equal to the voltage reference, 2.5V, divided by 256 steps, or 9.76 mV per step.

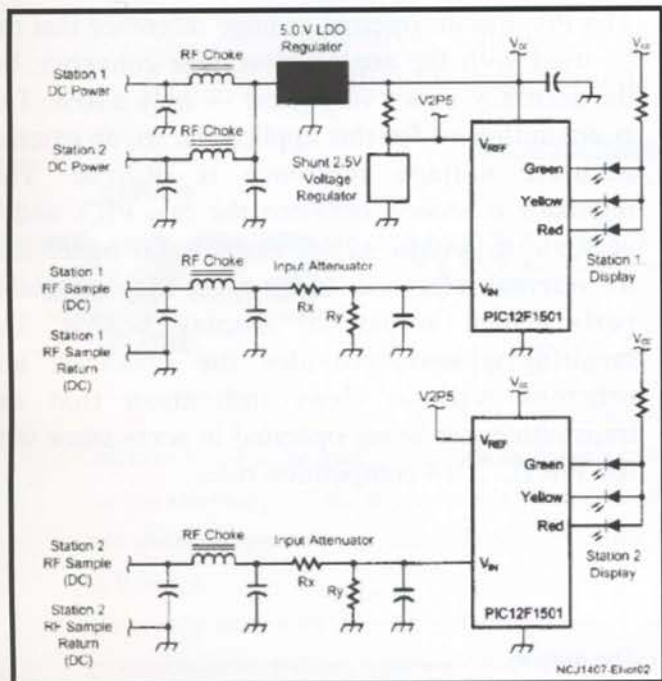


Fig. 2: "Schematic of Display Board"

The display board block diagram shows the basic design components.

An 8-pin PIC was chosen that provides three LED outputs, one analog input, a voltage reference input, a test pin, Vcc and Vss. Though it may have been slightly more cost effective to use one single PIC shared between two channels, employing two PICs is advantageous since the single analog converter in the PIC does not have to be shared, improving analog acquisition time. In addition, each transmitter has a separate signal path, which reduces cross talk and facilitates PCB layout. The PICs are well known for their miserly power consumption, and require much less current than is needed to light the LEDs.

Each PIC gets its power by scavenging a small amount directly from the RF lines they are sensing, and since only one LED per channel is lit

at a time, even this requirement is quite low, on the order of a few tens of milliwatts.

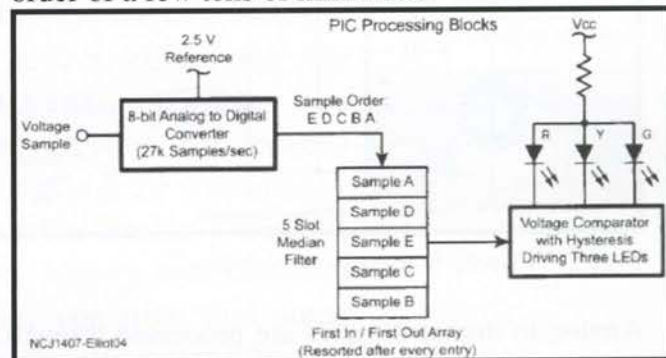


Fig. 3: "Pic Processing Block"

Each power tap provides rectified DC power which is filtered and combined to drive a single, shared 2.5 V LDO voltage regulator that powers both PICs.

The dc power derived from the RF and delivered to the PIC constantly cycles on and off, following the envelope of the transmitted CW or SSB signal. Normally a microcontroller could not tolerate this sort of operation and would exhibit very erratic behavior. The saving grace is the PIC's low-voltage reset feature. When the supply voltage drops below 2.7 volts, the PIC is automatically held in a reset state. When reset, the PIC is in a standby state, will not respond to analog input, and all LEDs are off. Latch up is not possible in this state. Once power returns to normal operating level, the PIC is released from reset, quickly reinitializes, and resumes RF sampling. Note that the PIC can still operate at a supply voltage approaching 2.7 volts since an external 2.5V reference is used by the analog to voltage converter.

This insures that the digital values produced are truly independent of the PIC's supply voltage. Once the values are digitized they are processed in the digital domain which does not depend on operating voltage.

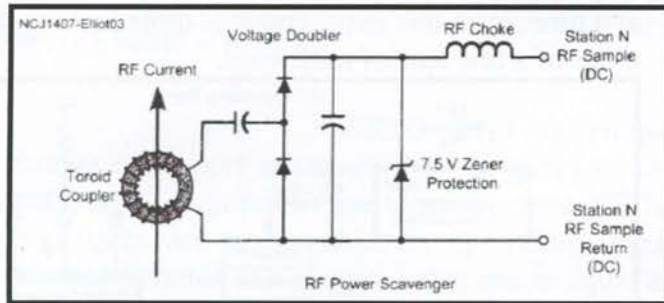
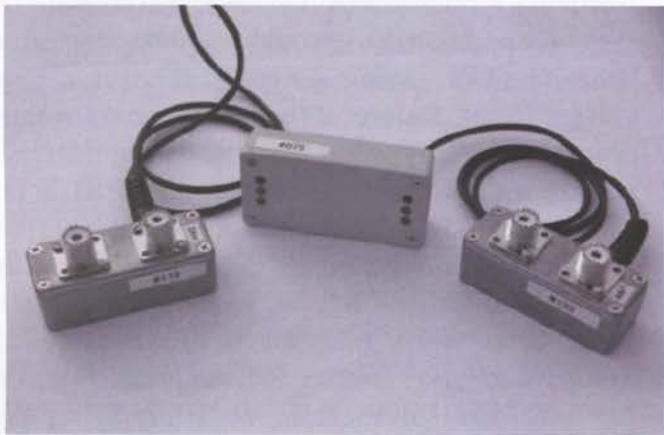


Fig. 2: "Power Scavenging Scheme"

Analog to digital samples are processed through a median filter. This filter is very effective in smoothing fast-moving input levels and is superior to averaging. In this design, successive samples are loaded into a five-sample, first-in first-out array. After a new sample is added to the array the values are sorted and the middle value is taken as the current smoothed value. This insures that unwanted transients, either high or low, go to the ends of the array and are ignored.



Valid values will fill the array so that the center value will match the value of interest. Since the sample rate is so high, it is a very accurate representation of the average RF level. Every smoothed sample is compared against predetermined thresholds to determine which LEDs, if any, should be lit. Some hysteresis is applied to hold a lit LED on to increase persistence and make it easier to see.



The PIC has an internal voltage reference that can be used with the analog-to-voltage converter, but the accuracy is not very good — only $\pm 10\%$. This is not sufficient for this application so, an external accurate voltage reference is utilized. This regulator is shared between the two PICs and is accurate to within $\pm 2\%$, which is far better than the internal reference, and it gives very repeatable performance across all display boards. The resulting system provides the operators and referees with a clear indication that the transmitters are being operated in accordance with the WRTC 2014 competition rules.

The Author

Steve Elliott, K1EL, is proprietor of K1EL Systems. He developed the Winkeyer and WKUSB series of products used by thousands of contesters around the world. He lives in Bedford, NH.

Reprint from National Contest Journal –
NCJ July/August 2014



Emilia Romagna Region and its capital city Bologna earn the chance to be a perfect destination for international events: authentic Italian life style atmosphere, in a unique scenery that extends halfway between the plain, the sea and the Apennines. Along the ancient roman road Via Emilia - with its over 2.200 years old millenary history that links the major art cities of our region, you may find some outstanding tourist attraction strictly related to our cultural heritage, such as top class gourmet treasures, Unesco Heritage Sites or the rumble of prestigious motor brands in the famous Motor Valley.



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WRTC 2022 Event Partner



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- Speaker Coordination Services
- Abstract elaboration and management
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- Development of the event website
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- Social programs and pre/post event and accompanying tours
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- Organization and production of digital and hybrid events

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AF#1

EA8RM



Team Leader

EA2W



Team Mate

AF#2

5T5PA



Team Leader

KF5EYY



Team Mate

AF#3

ZR2A



Team Leader

DL9EE



Team Mate

AS#2

RM9I



Team Leader

UN9L



Team Mate

AS#3

4X6FR



Team Leader

4X1DX



Team Mate

AS#4

BA1RB



Team Leader

BA4TB



Team Mate

AS#5

VR2XAN



Team Leader

IK2PFL



Team Mate

AS#6

E21EIC



Team Leader

E29TGW



Team Mate

AS#7

JA1BJI



Team Leader

JR2GRX



Team Mate

AS#7

JH1GHM



Team Leader

WA1Z



Team Mate

CA#1

NP4Z



Team Leader

N2NT



Team Mate

EU#1

LY4A



Team Leader

OM3RM



Team Mate

EU#2

GD4XUM



Team Leader

G3NKC



Team Mate

EU#2

OR2F



Team Leader

LZ4AX



Team Mate

EU#3

DJ4MW



Team Leader

DL1IAO



Team Mate

EU#3

DL4AXX



Team Leader

DL7FER



Team Mate

EU#3

SP7GIQ



Team Leader

SP7IVO



Team Mate

EU#4

RA3CO



Team Leader

RA3AU



Team Mate

EU#4

UA4FER



Team Leader

LZ2HM



Team Mate

EU#5

EC2DX



Team Leader

CT1ILT



Team Mate

EU#6

F8DBF



Team Leader

F1AKK



Team Mate

EU#7

9A7D



Team Leader

9A3LG



Team Mate

EU#7

IZ1LBG



Team Leader

IK3QAR



Team Mate

EU#7

S53MM



Team Leader

S57K



Team Mate

EU#8

EW6W



Team Leader

EU1A



Team Mate

EU#8

UB7K



Team Leader

RW7K



Team Mate

EU#9

E77DX



Team Leader

E70T



Team Mate

EU#10

IZ8JAI



Team Leader

IZ8FWN



Team Mate

NA#1

K5ZD



Team Leader

W2SC



Team Mate

NA#1

W1UE



Team Leader

K1XM



Team Mate

NA#2

VA2EW



Team Leader

VA2WA



Team Mate

NA#3

KD4D



Team Leader

KE3X



Team Mate

NA#3

NN3W



Team Leader

N3QE



Team Mate

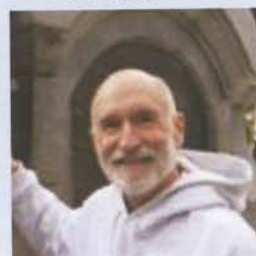
NA#4

NE9U



Team Leader

K9CT



Team Mate

NA#5

K4AB



Team Leader

NN7CW



Team Mate

NA#6

N2IC



Team Leader

HA3N



Team Mate

NA#7

KU1CW



Team Leader

EB5A



Team Mate

NA#8

VE3MX



Team Leader

VE3EJ



Team Mate

NA#9

KI6RRN



Team Leader

N5ZO



Team Mate

NA#10

NG0C



Team Leader

AC0W



Team Mate

OC#1

9M6NA



Team Leader

K5WA



Team Mate

OC#2

AD6E



Team Leader

K6XX



Team Mate

OC#3

ZL3CW



Team Leader

VK2IA



Team Mate

SA#1

W2GD



Team Leader

AA3B



Team Mate

SA#2

FY5FY



Team Leader

F4DXW



Team Mate

SA#3

CE2LR



Team Leader

CE3CT



Team Mate

SA#4

PY2NY



Team Leader

PY2SEX



Team Mate

WC#1

OM3BH



Team Leader

OM3GI



Team Mate

WC#2

SV2DSJ



Team Leader

LZ3FN



Team Mate

WC#4

LZ1NK



Team Leader

LZ4AE



Team Mate

YT#1

YL2JA



Team Leader

UR5YK



Team Mate

YT#2

M0SDV



Team Leader

DK6SP



Team Mate

YT#3

YU5EAA



Team Leader

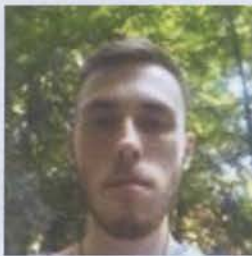
9A3SM



Team Mate

YT#4

R6KVA



Team Leader

RA9P



Team Mate

YT#5

W4IPC



Team Leader

KC1KUG



Team Mate

YT#6

DL3ON



Team Leader

EI5LA



Team Mate

DT#1

KO8SCA



Team Leader

S55M



Team Mate

DT#2

AD5A



Team Leader

AB5EB



Team Mate

DT#3

4O3A



Team Leader

9A3A



Team Mate

DT#5

UW7LL



Team Leader

VE3DZ



Team Mate

Referee



4Z4DX

Referee



4Z5LA

Referee



9A1UN

Referee



9A5X

Referee



9A6A

Referee



CE2SV(VE7SV)

Referee



CX6VM

Referee



DL5MHW

Referee



DL8DYL

Referee



DL8LAS

Referee



E72T

Referee



E74A

Referee



EA5Y

Referee



EY8MM

Referee



G0KCV

Referee



G3XTT

Referee



G4BUO

Referee



G4IRN

Referee



HA0NAR

Referee



HA5X

Referee



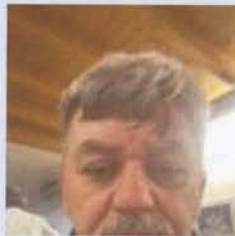
HB9CAT

Referee



HB9DHG

Referee



I2VXJ

Referee



IK2EGL

Referee



IK2QEI

Referee



IK4VET

Referee



JH4RHF

Referee



K5KG

Referee



KC7V

Referee



KU5B

Referee



M0CFW(JK3GAD)

Referee



N6AN

Referee



NF4A

Referee



NP4G

Referee



NX4N

Referee



OE2VEL

Referee



OH2KI

Referee



OK1RI

Referee



OM6NM

Referee



ON5RA

Referee



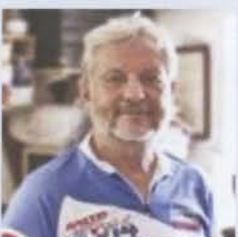
PA3AAV

Referee



PJ2X W0CG

Referee



RA0AM

Referee



RA9USU

Referee



S50R

Referee



S53ZO

Referee



S57AL

Referee



S57AW

Referee



SP4Z

Referee



SV2DCD

Referee



UW8SM

Referee



W0YK

Referee



W1VE

Referee



W4LT

Referee



W6NV

Referee



W9KKN

Referee



WC1M

Referee



YL2KL

Referee



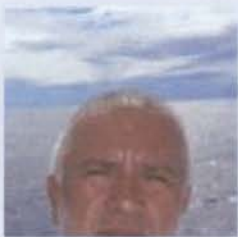
YO8TTT

Referee



YT7AW

Referee



ZL3WW

President



W6AOT

Judge



I4UFH

Judge



N6AA

Judge



N6TR

Judge



PY5EG

Judge



S50R

Judge



UA9MA

President



IK4LZH

VicePresident



I4UFH

**Organizing
Committee**



IT9EQO

**Organizing
Committee**



IK2NCJ

Site Manager



I4VEQ

Field Manager



I4IYO

WebMaster



IW1FRU

IT Manager



IW3FWZ

Volunteers play a crucial role in the success of WRTC by dedicating their time, skills, and passion to various aspects of the event. Contributing to the overall organization of WRTC by handling logistics, coordinating with sponsors and partners, managing registrations, and ensuring the smooth execution of the event. They work tirelessly behind the scenes to create an exceptional experience for participants and spectators alike.

During the contest, volunteers are responsible for setting up and maintaining the contest stations. They assemble the necessary equipment, install antennas, and ensure that all stations are in proper working order. Volunteers may also serve as station referees, monitoring the fairness of the competition and resolving any technical issues that may arise.

Volunteers provide essential support to the participants throughout the event. They assist with transportation, accommodation, and general guidance.

Media and Communication: Volunteers contribute to the media and communication aspects of WRTC. They manage social media accounts, produce content, write press releases, and handle public relations. Their efforts help promote the event, engage the amateur radio community, and attract global attention to the competition.

The dedication, expertise, and selflessness of volunteers are instrumental in the success of WRTC. Their contributions ensure that the event runs smoothly, participants have a fair competition, and spectators have a memorable experience. Without their support, the logistics, operations, and overall execution of WRTC would be significantly more challenging.

IZ4COW	Geppo
IZ4ORO	Gianluca
IW3GST	Loredana
S52KJ	Jakob
S56NE	Nejc
DJ8AK	Andreas
DK4SB	Sandra
DL1HKP	Heiko
DL1MKO	Koopsen
DL4RBV	Peter
DL7AT	Andreas
DL8AAI	Eugen
DL8OBF	Uwe
DM5AHA	Mario
DM6EE	Lutz
HA7ZB	Laszlo
HB9AAP	Peter
HB9BJL	Christian
HB9DXB	Wismer
HB9OCR	Marco
HI5GFI	Jorge Luis
I0JBL	Luciano
I2OHT	Mauro
I4KMW	Publio
I4MDK	Dante
I4OKV	Giorgio
IK1HGE	Roberto
IK1LJK	Dino
IK2JUB	Stefano
IK4DCT	Davide
IK4DCW	Claudio
IK4MGO	Marina
IK5MEL	Antonio
IT9CCU	Carmelo
IT9IUP	Daniele
IT9SDT	Vincenzo
IT9ZEO	Corrado

IU0MUZ	Francesco
IU1JRN	Pierluigi
IU4DFR	Paolo
IU4FJI	Gian Luca
IU4HFM	Daniele
IU4IBH	Alessandro
IU4JIC	Luca
IU4KET	Massimo
IU4MEP	Massimo
IU4MPA	
IU4MTX	Simone
IU4PSE	Luigi
IU4QPA	Marcello
IU5KRE	Antonio
IU8CGC	Tullio
IU8CON	Carmelo
IV3CTS	Ivan
IV3YYK	Pierino
IW0HK	Andrea
IW1GEU	Audric
IW2EAB	Sandro
IW4AOT	Piero
IW4AQX	Maurizio
IZ0ZFK	Ivo
IZ2ABI	Paolo
IZ4DLP	Moreno
IZ4FCB	Federico
IZ4IRY	Marco
IZ4REB	Lucilla
IU1NSA	Lorenzo
K1VR	Fred
K3JO	Velimir
K3ZJ	David
K4JC	Vincent
K9XV	Tom
KC3TED	Yiqing
KD0RYB	Dr. Susan
LU9ESD	Emanuel
LW6EGE	Emiliano
M3AWD	Scott
M5RIC	Richard
M7KST	Kevin
N3AD	Alan
N8DE	Don
NH7A	Albert
PA0JED	Jan
PD7JKY	Jaloul
PU2VYT	Ana
Santo	Giorlando
SP7OU	Siorek
SP7WME	Kris
SV1DAY	Manos

I4AVG	Franco	IU4FLS	Fausto	YU4EWW	Luka
I4IKW	Marco	IU4GRU			
I4TJE	Paolo	IU4JJP	Mauro		
I4YMN	Marco	IU4JRU	Enrico		
I4YRW	Paolo	IU4JZY	Antonio		
IK2CHZ	Marco	IU4LAN	Alfredo		
IK2ULM	Sandro	IU4NYV	Ugo		
IK2ULV	Marco	IU4OKB	Valerio		
IK4UPB	Gabriele	IW4CZB	Massimo		
IK4ZGO	Stefano	IZ2QEY	Alessandro		
IK4ZHU	Massimo	IZ4DPV	Max		
IK7YZI	Enrico	IZ4MPI	Laura		
IU4ASJ	Paolo	W1SJ	Mitch		

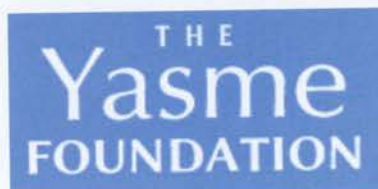
AND ALL SEVERAL LAST MINUTE

VOLUNTEER





PstRotator
Software for Antenna
Rotators



RAFDTO-line



HEIL
HAM RADIO



VIBROPLEX



Proficiency Through Competition

lepida

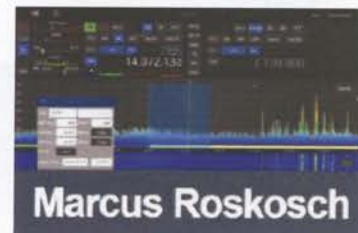




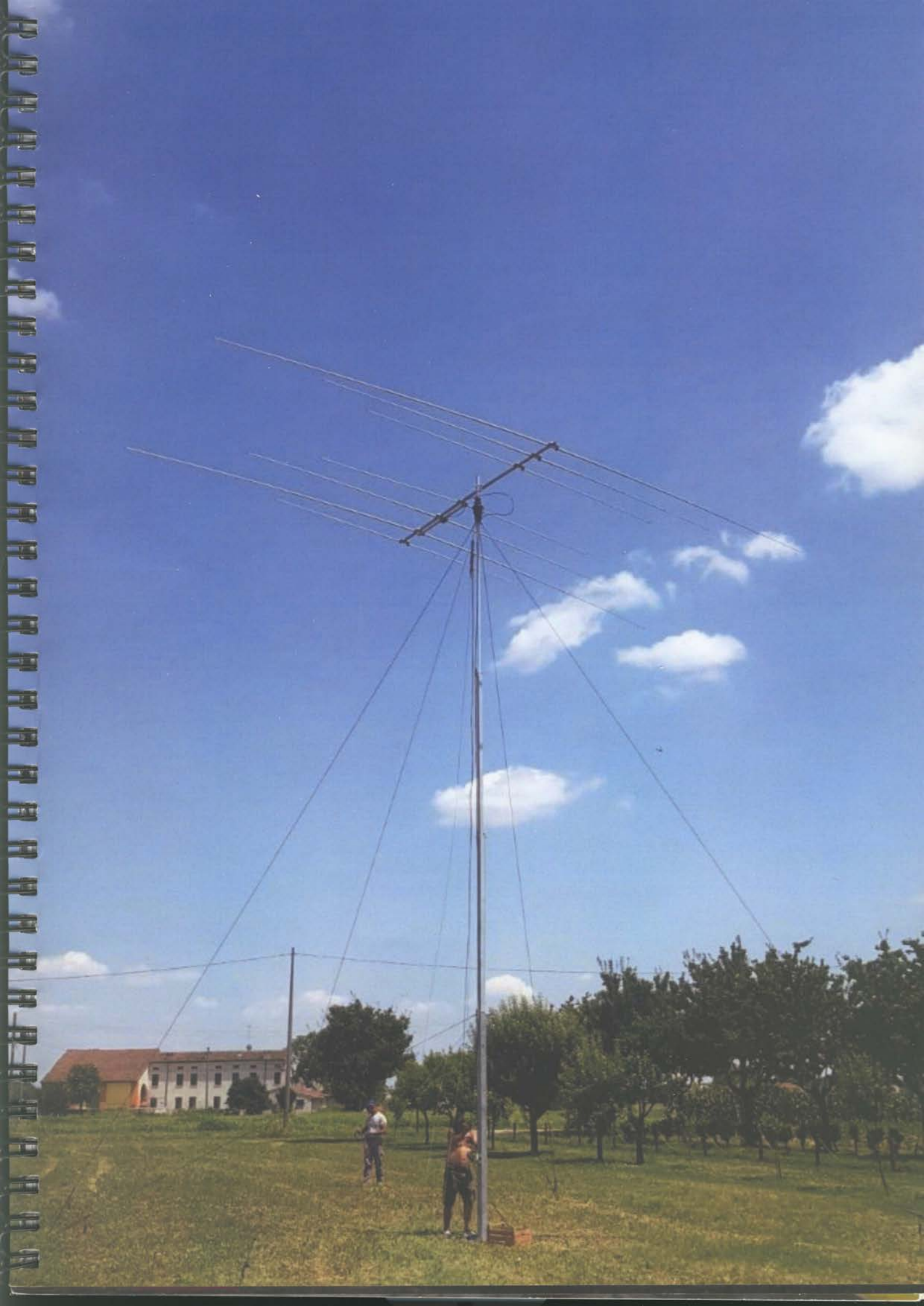
Bertoncelli



Dog Park Software Ltd.



ADVANTEC



WRTC

2022

World Radiosport Team Championship

Italia



Ministero delle Imprese e del Made in Italy

 Regione Emilia-Romagna



CON IL PATROCINIO DELLA REGIONE EMILIA ROMAGNA

CON IL PATROCINIO DEL COMUNE DI CASTEL SAN PIETRO TERME