

"ITALIAN PIONEERS IN RADIO ENGINEERING" Award

A.R.I. Fidenza (Italian Amateur Radio Club, www.arifidenza.it) and the **Marconi Museum** (Guglielmo Marconi Foundation – Bologna- www.fgm.it) are pleased to present this initiative, unique in its kind and unpublished in Italy, which aims to disseminate the knowledge of the **major Italian pioneers in wireless and radio technology**, or the main artifices of those fundamental discoveries and practical achievements (devices and methodologies) that have made possible the birth of wireless communications and subsequent progress in radio technology.

As mentioned, the event is organized in collaboration with the **Marconi Museum** which oversaw the part of counseling and historical - biographical research, identifying the first twelve scientists (or entities) that will be celebrated during 2019.

Operationally, the initiative aims at the international activation, during the entire 2019, of twelve commemorative radio stations with special ham radio callsigns, which will alternate in turn throughout the year: each month is dedicated to a specific scientist.

JANUARY 2019 – Special Callsign II4CAL

TEMISTOCLE CALZECCHI ONESTI

Was an Italian physicist and inventor. In his experiments in 1884 through 1886 Calzecchi Onesti that iron filings contained in an insulating tube will conduct an electric current under the action of an electromagnetic wave. This discovery was the operating principle behind an early radio wave detector device called the coherer, developed about 6–10 years later by Oliver Lodge, Edouard Branly, and Guglielmo Marconi, which was influential in the development of radio.

FEBRUARY 2019 – Special Callsign II4RGH

AUGUSTO RIGHI

Was an Italian physicist, inventor and Physics teacher. Righi's early research, conducted in Bologna between 1872 and 1880, was primarily in electrostatics. He invented an induction electrometer, with the help of Dr. Matthew Van Schaeick of the Humboldt University of Berlin, in 1872, capable of detecting and amplifying small electrostatic charges, he formulated mathematical descriptions of vibrational motion, and discovered magnetic hysteresis in 1880. Whilst ordinary professor in physics at the University of Palermo,

he studied the conduction of heat and electricity in bismuth. From 1885 to 1889 in Padua, he studied the photoelectric effect. Towards the end of 1889 he was called to the University of Bologna, his home city, where he worked for the rest of his life on subjects such as the Zeeman Effect, 'Roentgen rays', magnetism and the results of Michelson's experiments. Righi was the first person to generate microwaves, and opened a whole new area of the electromagnetic spectrum to research and subsequent applications. His work *L'ottica delle oscillazioni elettriche* (1897), which summarised his results, is considered a classic of experimental electromagnetism. By 1900 he had begun to work on X-rays and the Zeeman Effect. In 1903 he wrote the first paper on wireless telegraphy. He also studied gas under various conditions of pressure and ionization, and worked on improvements to the Michelson–Morley experiment from 1918. One of Righi's famous pupils was Guglielmo Marconi. Marconi studied under Righi at his lab in Bologna.

MARCH 2019 – Special Callsign II4MRC

GUGLIELMO MARCONI

Was an Italian inventor and electrical engineer, known for his pioneering work on long-distance radio transmission, development of Marconi's law, and a radio telegraph system. He is credited as the inventor of radio, and he shared the 1909 Nobel Prize in Physics with Karl Ferdinand Braun "in recognition of their contributions to the development of wireless telegraphy". Marconi was also an entrepreneur, businessman, and founder of The Wireless Telegraph & Signal Company in the United Kingdom in 1897 (which became the Marconi Company). He succeeded in making an engineering and commercial success of radio by innovating and building on the work of previous experimenters and physicists. At Marconi's time, Physicists generally looked on radio waves as an invisible form of light that could only travel along a line of sight path, limiting its range to the visual horizon like existing forms of visual signaling. Hertz's death in 1894 brought published reviews of his earlier discoveries including a demonstration on the transmission and detection of radio waves by the British physicist Oliver Lodge and an article about Hertz's work by Augusto Righi. Righi's article renewed Marconi's interest in developing a wireless telegraphy system based on radio waves, a line of inquiry that Marconi noted that other inventors did not seem to be pursuing. At the age of 20, Marconi began to conduct experiments in radio waves, building much of his own equipment in the attic of his home at the Villa Griffone in Italy with the help of his butler Mignani. Marconi built on Hertz's original experiments and, at the suggestion of Righi, began using a coherer, an early detector based on the 1890 findings of French physicist Edouard Branly and used in Lodge's experiments, that changed resistance when exposed to radio waves. In the summer of 1894, he built a storm alarm made up of a battery, a coherer, and an electric bell, which went off when it picked up the radio waves generated by lightning. Late one night, in December 1894, Marconi demonstrated a radio transmitter and receiver to his mother, a set-up that made a bell ring on the other side of the room by pushing a telegraphic button on a bench. Supported by his father, Marconi continued to read through the literature and picked up on the ideas of physicists who were experimenting with radio waves. He developed devices, such as portable transmitters and receiver systems, that could work over long distances, turning what was essentially a laboratory experiment into a useful communication system. Marconi came up with a functional system with many components. On 17 December 1902, a transmission from the Marconi station in Glace Bay, Nova Scotia, Canada became the world's first radio message to cross the Atlantic from North America. In 1901, Marconi built a station near South Wellfleet, Massachusetts, that sent a message of greetings on 18 January 1903 from United States President Theodore Roosevelt to King Edward VII of the United Kingdom.

APRIL 2019 – Special Callsign II4SLR

LUIGI SOLARI

Solari was born in Turin in 1873. He became interested in electrical phenomena and became a naval officer

.In July 1897 he witnessed the first demonstrations made by Marconi for Italy, which took place in the Gulf of La Spezia. The following year, Solari was alongside Marconi on board of the cruiser Carlo Alberto, co-participant and witness of a successful experimental season. From then on, the collaboration of Solari became more and more important, so much so that Marconi, when the circumstances required it, sent Solari to speak and to deal in his place. Already in 1903, Solari represented Italy at the first international radio-telegraphic conference in Berlin. In a climate clearly hostile to Marconi, Solari publicly intervened in his defense, as he did not fail to do on numerous other occasions. Marconi followed the development of telegraph systems on Italian soil, in particular the large station of Coltano, near Pisa, inaugurated in 1911. His work of mediation was also decisive in the agreements between the Marconi Company and some Mediterranean States, including in particular Portugal and Spain. Solari then covered, over more than three decades, the role of attorney, advisor, spokesman, emissary of Marconi.

MAY 2019 – Special Callsign II4TSB

ETTORE BELLINI and ALESSANDRO TOSI

ETTORE BELLINI

After completing his engineering studies at the University of Naples , in 1901 he was hired as an electrical engineer by the Italian Navy and in 1906 he became head of the "Naval electrical laboratory" in Venice where he was responsible for research on the applications of radio waves to warships. and submarines. He then became a pupil and assistant to Guglielmo Marconi and subsequently his collaborator in the first practical applications of radiotelegraphy. this is why he follows the great scientist in France and England . In 1906, he was sent to France alongside Alessandro Tosi to carry out research on the directionality of the Hertzian waves. The project was sponsored by Giovanni Agnelli and FIAT. Completing the provisions of Alessandro Artom , he invented the radiogoniometer together with the captain Alessandro Tosi of the Regia Marina , a revolutionary instrument for the radionavigation made up of a chain of antennas and stations distributed throughout the territory that continuously emit electromagnetic signals translated from aircraft instruments and ships to give a position and a direction with respect to in 1910 the Bellini-Tosi system was installed at the French post office in Boulogne-sur-Mer or, for other sources, in 1906 in that of Dieppe.

ALESSANDRO TOSI

Was an Italian military and engineer , captain of the Royal Navy . He collaborated with Guglielmo Marconi in the field of radiogoniometry and in 1907 he invented the Tosi - Bellini frame with Ettore Bellini , perfected in 1910 with the indications of Alessandro Artom [3] . The radiogoniometer of Marconi-Bellini-Tosi also takes its name from him, an improvement based on the first patent of 1908 , which was bought by Marconi in 1912. This tool proved to be very useful during the war in the areas of air navigation and allied navy.

JUNE 2019 – Special Callsign II4ART

ALESSANDRO ARTOM

Was an Italian scientist, inventor of the directional radio antenna and the radiogoniometer . Since 1901 he had laid the theoretical basis for radio broadcasts in one direction (unidirectional) and for this purpose he built the first triangular closed antennas in 1907. After a study on a system of airship radiotelegraphy, which transmitted and received electromagnetic waves in a unidirectional way through an antenna closed by any geometric shape , in 1907 he built the first closed triangular antennas. From these studies on the dirigibility of the waves he laid the foundations of radiogoniometry : he created the radioiodereometer , so he called the direct reading radiogoniometer (one of the last inventions of the scientist) who identified the position of distant transmitting stations with circular emission). He then gave to the Italian Navy , during the First World War, the possibility to identify the position of ships in case of fog and above all to control the enemy

invasion at sea contributing to the radiotelegraphic defense in the Adriatic .

JULY 2019 – Special Callsign II4MJR

QUIRINO MAJORANA

Was an Italian experimental physicist who investigated a wide range of phenomena during his long career as professor of physics at the Universities of Rome, Turin (1916–1921), and Bologna (1921–1934), Italy. He gave significant contributions in various fields of physics , experimental and applied . In particular, some of his research will be the basis of the development of telephony and will contribute to the emergence of television . His experimental research in physics began as early as 1893. The results of some of these researches, collected in the work "The problem of remote viewing by means of electricity" (telefoto are to be considered forerunners of what will be the radio and television technique). After that, he turned to the study of the nature and properties of X-rays , until the early 1900s, when he switched to electrostatics and the magneto-optics of the material means, with attention to the Faraday effect , the Zeeman effect and the Stark-Lo Surdo effect . In this context, in 1902 Majorana succeeded, first, in observing new effects of magnetic birefringence - the latter, a long-term theoretically predictable magneto-optical property but, until then, never experimentally detected - on colloidal mixtures, giving way, so, to the physics of colloids . This new effect observed by Majorana in colloids, known today as the Majorana effect , is the analogue of the Cotton-Mouton effect observed in liquids. Following the discoveries of Guglielmo Marconi, he oriented himself towards radiocommunication , succeeding in making some first experiences of radiotelephony starting from 1903, with the creation and realization of new electronic devices, some of which were forerunners of those that were then designed by Walter Schottky . He continued his experimental research in the field of radio- telecommunications and the related technology, with new devices; in particular, he invented, in 1912, the first four- electrode ionic valve , which he called "electronic diverter ". Other, innovative inventions in radio communications and optical telecasts, carried out for the Italian Ministry of War and Navy and remained secret for many years, preceded radiocommunication systems that came only later. The last period of his research activity concerned photoelectricity , with fundamental results for the subsequent development of photoelectron spectroscopy . Finally, he also took care of the movement of electric charges inside the conductors , as well as the study of the Kerr effect in non- ferromagnetic materials.

AUGUST 2019 – Special Callsign II4BRD

CESARE BARDELONI

Was an Italian military engineer, among the very first officers who devoted themselves to the study of military applications of radio engineering. In 1909 he devised an antenna arrangement to reduce interference, at that time the worst enemy of radiotelegraphy. The secondary circuit was part of the antenna structure so as to tune without loss of power and the antennas were arranged so that the selective effect was supported by directivity. Bardeloni continued in the search for the elimination of interference and applied a rectifier to the carborundum with variable polarization parallel to the audion tube grid. This device, depending on the polarization, could be used to reinforce the signal or as a limiter to eliminate the noise by saturation. Bardeloni published several treatises on the military use of radiotelegraphy and in 1917 and the passage of Halley's comet, he made observations on the effects observed on the radio communications.

SEPTEMBER 2019 – Special Callsign II4GRM

MILAN RADIOTECHNICAL GROUP

On 10 May 1925, the first organized radio station in Milan, "Posto Zero", was activated, by means of the amateur radio operators Boschetti, Gnesutta, De Angelis, Pagliari and Pugliese. Eugenio Gnesutta, an engineer and pioneer of the Italian radio, founded the "Milan Radiotecnic Group" in 1923. In the same year, Gnesutta and some Milanese radioamateurs founded the ADRI-Amateur Italian Radiotechnics Association, pending the entry into service of the URI. In order to stimulate bureaucratic slowness, Gnesutta and others, had begun, almost for mockery, in the spring of 1925, regular evening broadcasts from a private station called "zero place", behind this acronym they kept the unknown, to avoid problems with the Authorities.

OCTOBER 2019 – Special Callsign I14MNU

ERNESTO MONTU'

Was an Italian engineer, inventor and radio amateur. From May 1921 he was co-director of the company Industrie Telefoniche Italiane of engineer Doglio with the role of head of radio production started by this company. In April 1924 he moved to Ansaldo Lorenz. Ernesto Montù joined the board of directors of the Italian Agency for Radio Auditions. He patented several industrial machinery including a primitive radar model that was not understood by the authorities. With the appointment of Guglielmo Marconi, he became a member of the CNR. He was the founder of the Italian Radiotechnics Association, which later became the Italian Amateur Radio Association (ARI), of which he was also secretary from 1927 to 1947 and honorary president from 1964 to his death in 1981.

NOVEMBER 2019 – Special Callsign I14VAL

GIANCARLO VALLAURI

Was an Italian scientist and admiral. In Livorno he was the promoter of the birth of the Electro-technical and Radiotelegraphic Institute of the Navy (Mariteleradar) of which, between 1916 and 1926, he was the first director. With great foresight, he began research on radio communications, following which, in the period between 1920 and 1923, the Institute designed and built in Coltano with the collaboration of Marconi the first major radio station in Italy and one of the first in the world. This radio-telegraph center was one of the most modern of the time and was also intended to provide radio links with Eritrea and Somalia, then Italian colonies. In 1926 he was called to Turin to teach electrotechnics at the Polytechnic, of which he became rector in 1935. In Turin he also created the premises for the establishment of a research institute named after Galileo Ferraris: the IEN (National Electrotechnical Institute), launched in 1934. He was promoted to Captain of Vascello in 1936, Rear Admiral in 1938 in the reserve for exceptional merits and in 1943 Admiral of Division. Vallauri was a talented scholar and researcher. His studies on ferromagnetism are very important, which confirmed the existence of the phenomenon of rotating magnetic hysteresis. He invented the magnetic duplicator of magnetic subtraction frequency. The Vallauri equation is famous: $D_i = (D_{Va} + mDV_g) / r_a$, which allowed the analytical definition of the properties of vacuum electronic tubes, until then constructed with empirical criteria.

DECEMBER 2019 – Special Callsign I14TIB

UGO TIBERIO

Was an Italian engineer. Lecturer at the Naval Academy of Livorno from 1941 and at the University of Pisa from 1954 to 1974, he was a notable innovator in the field of radiometry. With the creation of the EC3 / ter "Owl" is considered the father of Italian radar. In particular it should be noted as Professor Tiberio was

involved in the design of radar, with funds laughable and very few employees, since 1935, but the Italian armed forces (and in particular the Navy, the only one who had vaguely understood the importance of this genre of equipment) did not consider it appropriate to assign employees to the development of this apparatus until 1938, while, until 1941, all the personnel employed in radio-telescope research (as the radars were defined by the Italian research group), did so " second job ", after having done the regular teaching and office work at the university or in the naval academy.

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WWW.ARIFIDENZA.IT

