

Keynote 1

Centenary of URSI and the Finnish Member Committee

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Abstract: One hundred years ago, our union URSI (Union radioscop*if*ique internationale) was founded in Brussels under the name Union international de radiotélégraphie scientifi*q*ue. The first General Assembly of the Union was held in July 1922 in Brussels. Hence our radioscintific community has the opportunity to celebrate the centennial over three years 2019–2022! This presentation gives a short view on the history of both radio science in Finland and the Finnish Member Committee of URSI, founded in 1952.

Ari Sihvola received the degree of Doctor of Technology in 1987 from the Helsinki University of Technology, Finland (presently Aalto University). Besides working for TKK, Aalto, and the Academy of Finland, he was visiting engineer in the Research Laboratory of Electronics of the Massachusetts Institute of Technology, Cambridge, in 1985–1986. In 1990–1991, he worked as a visiting scientist at the Pennsylvania State University, State College. In 1996, he was visiting scientist at the Lund University, Sweden. He was visiting professor at the Electromagnetics and Acoustics Laboratory of the Swiss Federal Institute of Technology, Lausanne (academic year 2000–01), in the University of Paris 11, in Orsay (June 2008), and in the University of Rome La Sapienza (May–June 2015). His research interests include waves and fields in electromagnetics, modeling of complex media an metamaterials, remote sensing, education in phsyics, and history of electrical engineering. He is presently professor in the School of Electrical Engineering at the Aalto University. Ari Sihvola is Vice President of the International Union of Radio Science (URSI) the Chairman of the URSI Finnish Member Committee.

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Abstract

One hundred years ago, our union URSI (*Union radioscopique internationale*) was founded in Brussels under the name *Union internationale de radiotélégraphie scientifique*. The first General Assembly of the Union was held in July 1922 in Brussels. Hence our radioscientific community has the opportunity to celebrate the centennial over three years 2019–2022! This presentation gives a short view on the history of both radio science in Finland and the Finnish Member Committee of URSI, founded in 1952.

1 Introduction

Radio science has its foundations in electromagnetic theory. After Maxwell equations were confirmed experimentally by Heinrich Hertz in the end of 1880's [1, 2], it took less than ten years for the demonstration of wireless communications. Guglielmo Marconi (1874–1937) and Alexander S. Popov (1859–1905; 1859–1906 Gregorian calendar) are competing for the title of the inventor of radio. Popov's use of radio telegraphy in the marine distress of the battleship *General-Admiral Apraksin* happened in the territory of present-day Finland already 120 years ago [3, 4].

Even if the first attempts to reach a transnational organization to deal with problems and opportunities concerning the increasing use of radio waves took place in 1913–1914 (then called *Commission provisoire internationale de télégraphie sans fil scientifique*, the Wireless Telegraphy Commission), the First World War interrupted these efforts. It was only in July 1919 when the *Union internationale de radiotélégraphie scientifique* was founded in Brussels; the present name of our union (*Union RadioScientifique Internationale*, URSI) is from the year 1928 [5]. Hence it is hard to point out an unambiguous birthday of URSI. Despite that, the centenary celebrations of URSI will start with the General Assembly and Scientific Symposium in Rome, Italy, 29 August – 5 September 2020.

2 The Finnish Member Committee of URSI and its Radio Days

It is worth noting that already during the times of the birth of URSI, revolutionary radio science work had been performed in Finland. Karl Ferdinand Lindman, later professor at Åbo Academy University, was able to show experimentally in 1914 the power of artificial chiral media, in the microwave region, to rotate the plane of polarization of a propagating wave [6, 7].

However, this did not lead to international networking, nor to connections with URSI in its early years. During the first half of the 19th century, the number of countries joining URSI was gradually increasing. After Belgium, France, Austria, Great Britain, USA, and others, Sweden became a member already in 1931 [8, 9]. And Finland was not far behind: our Finnish National Committee for Scientific Radio Research (*Suomen tieteellisen radiotutkimuksen kansalliskomitea*) had its founding meeting on 13 October 1952. Hence Finland, a poor country after a recently lost war was able to enter the union of radioscientifically advanced nations as the 27th member of URSI.

Professor Viljo Ylöstalo was elected as the first President of the Finnish Member Committee, and Diploma Engineer (later Dr.) Pentti Mattila became a long-time Secretary. After Ylöstalo's term (1952–1959), the Finnish Member Committee (*Suomen Radiotieteen Kansalliskomitea*) was chaired by Jaakko Tuominen (1959–1965), Martti Tiuri (1966–1990), Ismo Lindell (1991–1996), Martti Hallikainen (1997–2005), and Ari Sihvola (2006–present).

Radiopäivien ohjelma:

Viime syksynä maamme perustetun Suomen tieteellisen Radiotutkimuksen Kansalliskomitean toimesta järjestetään esitelmätilaisuudet, Radiopäivät, joihin kaikki radioalasta kiinnostuneet ovat tervetulleita. Radiopäivät pidetään 24 - 25.4.-53. Teknillisen Korkeakoulun Sähkölaboratoriossa S:38, Radiopäivien kanslia huoneessa 37. Siellä on myös saatavissa pidettävät esitelmät monistettuina. Yhteishinta on 200:-, tähän sisältyy osanottomaksu. Esitelmät ovat saatavissa jo 20.4.-53 lähtien V.T.T./ Radiolaboratorio.

Perjantai 24.4.-53.

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| 9.15.- 9.30. | Avaussanat | : Kansalliskomitean puheenjohtaja, Prof. V. Ylöstalo |
| 9.30.-10.00. | Prof. Tuominen | : Taustakohinan eliminointi tähtien radiosäteilyä havaittaessa. |
| 10.00 -10.30. | Dipl.ins. Kajava | : Radiokuumennus teollisuudessamme. |
| 10.30 -11.00. | Dipl.ins. Laurila | : Radiotekniikka karttatieteen palveluksessa. |
| 11.00 -11.30. | Dipl.ins. Mattila | : Radarin toimintaetäisyys statistisena probleemana. |
| 11.30 -12.00. | Prof. Laasonen | : Pistesyöttöisen radarantennin peilipinnan määrääminen. |

Fig. 1: The program leaflet of the first Radio Days (*Radiopäivät*) which were held in 1953, showing some of the talk titles. Note the registration fee (which included copies of the presentations during the meeting) of 200 Finnish marks. This corresponds to 6.5€ in today's currency.



Fig. 2: Pentti Laasonen (Rector of Helsinki University of Technology) and Martti Tiuri (President of the Finnish URSI Member Committee) in the opening ceremony XIX URSI General Assembly (31 July 1978, Finlandia Hall, Helsinki).

One of the first actions of the new organization was to arrange a conference to allow Finnish community on radio science and engineering to present their most recent work. In early 1953, the first Radio Days took place in Helsinki (Fig. 1). With 26 talks and around 200 participants, this event was the beginning of a venerable series of conferences which presently carry the name Finnish URSI Conventions on Radio Science (Table 1). The present convention (2019) is 35th in this series, and the third one in Tampere.

Table 1: List of the previous Finnish URSI Conventions on Radio Science.

I	24–25.4.1953	Helsinki	Helsinki University of Technology
II	1–2.4.1955	Helsinki	Finnish Engineers' Association Building
III	12–13.4.1957	Helsinki	Finnish Engineers' Association Building
IV	19–20.4.1960	Helsinki	Helsinki University of Technology
V	26–27.10.1964	Helsinki	TFiF Building
VI	26–27.10.1967	Otaniemi	Dipoli
VII	27–28.10.1970	Otaniemi	Helsinki University of Technology
VIII	16–7.10.1973	Otaniemi	Helsinki University of Technology
IX	27–29.10.1976	Otaniemi	Helsinki University of Technology
X	9–10.10.1980	Oulu	University of Oulu
XI	19–20.10.1983	Otaniemi	Helsinki University of Technology
XII	31.10.1986	Otaniemi	Helsinki University of Technology
XIII	3.11.1987	Oulu	University of Oulu
XIV	17–18.10.1988	Otaniemi	Helsinki University of Technology
XV	20–21.11.1989	Tampere	Tampere University of Technology
XVI	5–6.11.1990	Kuopio	University of Kuopio
XVII	11.11.1991	Turku	Åbo Akademi University
XVIII	2.11.1992	Oulu	University of Oulu
XIX	25–26.10.1993	Otaniemi	Helsinki University of Technology
XX	27–28.10.1994	Sodankylä	Sodankylä Geophysical Observatory
XXI	2–3.10.1996	Otaniemi	Helsinki University of Technology
XXII	20–21.11.1997	Oulu	University of Oulu
XXIII	24–25.8.1998	Otaniemi	Helsinki University of Technology
XXIV	4–5.10.1999	Turku	University of Turku
XXV	21–22.9.2000	Helsinki	Finnish Meteorological Institute
XXVI	22–24.10.2001	Tampere	Tampere University of Technology
XXVII	17–18.10.2002	Otaniemi	Helsinki University of Technology
XXVIII	16–17.10.2003	Oulu	University of Oulu
XXIX	1–2.11.2004	Otaniemi	VTT Technical Research Centre of Finland
XXX	9–10.10.2006	Sodankylä	University of Oulu, SGO
XXXI	28.10.2008	Otaniemi	Helsinki University of Technology, RAD
XXXII	26.8.2010	Oulu	University of Oulu, CWC
XXXIII	24–25.4.2013	Otaniemi	Aalto University, RAD & SMARAD
XXXIV	7–8.9.2017	Kumpula	Helsinki University, Physics

Finnish radioscientists have maintained a very strong presence in the international community. An example of the activities is the organization of the flagship meeting of the International URSI: the XIX URSI General Assembly in August 1978. This meeting brought together 885 radio science experts and 180 accompanying persons from around the world. Figure 2 shows the opening ceremony of the conference.

3 Radio science in Finland today

Starting from Popov's telegraphic communication channel 120 years ago, the radio science and engineering endeavors in Finland have increased tremendously, resulting also in commercial successes in electronics and telecommunications. Radio scientists in various universities, research laboratories, and institutes in Finland work on electromagnetics, photonics, radio channel modeling, signal processing, wave propagation, remote sensing, ionospheric and magnetospheric geophysics, radio astronomy, bioelectromagnetics, metrology, among other fields covered by the ten commissions of URSI.

Further information about the history of radio science in Finland can be found in the forthcoming review [10].

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