Juhani Kakkuri

* 12.9.1933 † 6.8.2022

Professor Emeritus Juhani Kakkuri, former Director General of the Finnish Geodetic Institute, passed away in Helsinki on 6 August 2022. He was 88 years old, born in Kurikka in the Southern Ostrobothnia region of Finland on 12 September 1933.

Juhani Kakkuri lived his childhood in Kurikka. He moved to Helsinki to go to upper secondary school because such a school was not available in Kurikka at the time. He continued his studies at the University of Helsinki in geophysics and physics. During summer breaks, he was employed by the Finnish Geodetic Institute, FGI, as a clerk and assistant on fieldwork expeditions focusing on levelling and triangulation. This initiated his lifelong career at the institute. Since 1957 he worked continuously at the FGI until his retirement in 1998. In 1977 he became the Director General of the FGI.

Kakkuri's PhD dissertation in 1973 was on stellar triangulation, the principle of which academician Yrjö Väisälä, Kakkuri's teacher, had already presented in the 1940s. The method enabled the measurement of large triangular networks using flashlights lifted into the stratosphere with weather balloons. The flashes were photographed against the starry sky using Schmidt-Väisälä telescopes and timed using a quartz clock. Kakkuri and his team measured a network of five points in Southern Finland. At the same time, optical satellites for stellar triangulation became available, thus allowing the establishment of the first global geodetic network.

Measuring the distance of satellites using a laser had become possible in the 1970s. In 1974, Kakkuri received a scholarship from the French government, which allowed him to become familiar with this new technique in France. As a result of the visit, Northern Europe's first satellite laser ranging system was built at Metsähovi in 1978 in cooperation with the FGI, the Helsinki University of Technology, the Tuorla Observatory and the VTT Technical Research Centre of Finland. Precise technology to receive LORAN signals, necessary to measure time, was developed at the FGI and the Helsinki University of Technology. This development benefited the entire country, as Yleisradio, Finland's public broadcasting company, based its time signal broadcasts on the signals of the quartz clock locked to LORAN signals.

This was the beginning of the Metsähovi Geodetic Research Station, which today is one of the core stations of

the global geodetic network. Throughout his career, Kakkuri sought to develop Metsähovi's operations.

Kakkuri participated for decades in the activities of the International Association of Geodesy, IAG. In the 1990s he led the IAG Special Study Group called the Baltic Sea Level Project. It was a joint effort of all the countries around the Baltic Sea with three large GPS campaigns. The ambitious goals of the project were the unification of vertical datums to contribute to the determination of the gravity field and the geoid in the Baltic Sea region, to determine the sea level and sea surface topography of the Baltic Sea, and to monitor postglacial rebound, especially in the sea area. As the secretary of the project, Markku Poutanen prepared his PhD thesis under the supervision of Juhani Kakkuri.

Kakkuri was invited as a member of the Finnish Academy of Science and Letters in 1976. He was an honorary professor at Wuhan University and an honorary doctor at Stuttgart University, a member of the German Geodetic Commission, and member of the Finnish Academy of Technology, and he was awarded the Palmén medal of the Geophysical Society of Finland for his meritorious work. He was a Fellow of IAG, and asteroid 3597 Kakkuri is named after him.

Kakkuri held several national and international positions of trust, including representative of the International Union of Geodesy and Geophysics in New York at the meetings of the UN Cartographic Office. In addition, the cooperation between Finland and China in the field of geodesy and geosciences took place as a result of his engagement.

After retirement, Kakkuri wrote several popular science books, travelogues about his extensive and extraordinary travels, and biographies of his predecessors Veikko Heiskanen and T. J. Kukkamäki. His last work was the autobiography *Memoirs From the World of Geodesy*, published in the series of FGI in 2021.

Until the end of his life, Kakkuri was interested in science and he was a familiar sight at the Geodetic Institute, where he had his own work area for his activities. In the coffee room, he was eager to share his life wisdom from his career with the younger generation of researchers and inspired them to pursue careers in geodetic sciences with his supportive and insightful mentorship.

Before his career in the FGI, Kakkuri also considered a career as a painter. He lived for some years as a subtenant of painter Lassi Tokkola, who taught him painting. Kakkuri did not become a painter, but practiced the hobby throughout his life. In his free time, he painted several portraits of his friends and colleagues.

Markku Poutanen and Jarkko Koskinen