

Soren W. Henriksen (1916–2011)

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Soren Werner Henriksen, a pioneer in applying space technology to geodesy and mapping, died on 5 September 2011 at the age of 95. His expertise spanned the fields of applied mathematics, astronomy, surveying, and photogrammetry as well as geodesy and cartography.

Soren was born in New York City on 5 August 1916 but grew up in Chicago. He joined the Illinois National Guard in 1938 and 3 years later transferred to the U.S. Army, where he served until August 1945. During that summer he had been severely wounded in the Philippines. The following year he entered the Illinois Institute of Technology, graduating in 1949 with a bachelor's degree in mathematics. In 1950 he obtained a master's degree from the University of Illinois at Urbana-Champaign, also in math.

At that point in time, navigation across the oceans was still done with sextants, compasses, and dead reckoning. Precise geodetic datums had been created in many places, and sometimes of continental scale, but the connections among them were scarcely any better than in previous centuries. There were various commercial, scientific, and military needs for a high-precision global geodetic network, and the technologies to make this possible became available after World War II. The U.S. Department of Defense took a leading role, but NASA and other federal and foreign agencies were in on the game, with academics and contractors providing vital support.

Thus, it came to be that in 1951 Soren was hired by the Army Map Service (AMS), a component of the U.S. Army Corps of Engineers, which was recruiting mathematicians to support this global geodetic mission. He started in the Occultation Section of the Research and Analysis Branch of the Geodetic Division, where he applied his mathematical skills to analyzing lunar occultations and solar eclipses. In 1955 he was promoted to chief of the section and completed the definitive manual, AMS Technical Report 46, "The application of occultations to geodesy," in 1962.

Soren was fortunate in having his branch chief, John O'Keefe, as a mentor. O'Keefe had anticipated the enormous value of artificial satellite observations for geodesy



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and prepared AMS to utilize them. Soren directed his section to support this effort and worked to develop and deploy Mini-track II and Sequential Collation of Ranges (SECOR), mobile satellite tracking systems.

O'Keefe and several other experienced senior scientists left AMS for NASA's then new Goddard Space Flight Center. Soren replaced O'Keefe as branch chief in 1960, but recent college graduates, including myself, were recruited to fill in for the others.

Despite the many things going on at AMS, Soren developed the wanderlust of O'Keefe and the others and departed for Raytheon Autometric early in 1965. During his 7 years there, he generated reports typified by "Modes of satellite triangulation adjustment." Twice he received the firm's Outstanding Author Award.

I again encountered Soren as one of the organizers of the Third International Symposium on the Use of Artificial Satellites for Geodesy, held in Washington, D. C., on 15–17 April 1971. He also was among the three editors of its proceedings, *The Use of Artificial Satellites for Geodesy (AGU Geophysical Monograph Series, vol. 15, Washington, D. C., 1972)*. Then, in 1972, AGU hired him to edit two volumes (1030 pages) of articles on NASA's National Geodetic Satellite Project, which required 2 years.

The next stop for Soren was to join me in 1974 at the Geodetic Research and Development Laboratory in the National Oceanic and Atmospheric Administration (NOAA). There he worked on polar motion, geocenter observations, and photogrammetric applications among other things. He also helped to revise the *Manual of Photogrammetry* for a 1980 edition and wrote the entry on field surveys. But his major effort at NOAA was to update Hugh Mitchell's 1948 publication *Definition of Terms Used in Geodetic and Other Surveys*. Soren sought to expand the scope of this work, but the resulting *Geodetic Glossary*, published by NOAA in 1986, was less comprehensive than he had wished.

Soren retired in 1984 but, not surprisingly, worked harder than ever. In 1988 he submitted his manuscript for the *Glossary of the Mapping Sciences* to a joint committee of the American Society for Photogrammetry and Remote Sensing (ASPRS), the American Congress on Surveying and Mapping, and the American Society of Civil Engineers (ASCE). It finally was published in 1994 by ASCE. This, perhaps, is his most notable publication.

During his long career, Soren was active in several scientific societies. He was a member of not only AGU but also ASPRS, the Institute of Electrical and Electronics Engineers, the Royal Astronomical Society, and the American Astronomical Society. For relaxation he enjoyed competitive games, such as duplicate bridge and the ancient Chinese game of Go. In his later years he played computer games such as Myst. One of Soren's little eccentricities was not wanting to be photographed, so the accompanying picture of him was the only one available. It was cropped from a photo taken of him and his wife in February 2011 for a church directory.

Soren had permanently acquired two things at AMS: Pamela, his wife of 59 years, and the nickname "Walt." He has left a daughter, Kirsten, and two grandchildren. His son, Donn, predeceased him.

A paperback edition of the *Glossary of the Mapping Sciences* may be purchased at the ASPRS online bookstore (<http://www.asprs.org/Publications-Other/Bookstore.html>). The National Geodetic Survey of NOAA has placed the *Geodetic Glossary* online at http://www.ngs.noaa.gov/CORS-Proxy/Glossary/xml/NGS_Glossary.xml.

—FOSTER MORRISON, Turtle Hollow Associates, Inc., Gaithersburg, Md.; E-mail: turtle_hollow@sigmaxi.net