Gottfried Konecny: the influence in the global development of the three geosciences

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1. Introduction

The three geosciences mentioned in the title of the paper are photogrammetry, remote sensing and geospatial sciences. Where did the term photogrammetry come from? Meydenbauer (1867) mentioned in his paper published in Wochenblatt des Architektenvereins zu Berlin, in April 1867, that an application of photography for architecture and terrain records had already been published. He used the word Photometriographie in the article title. His colleague, Dr. Otto Kersten, a German geographer, suggested to Meydenbauer that he use the word photogrammetry for the new branch. This new word was used in an article which was published unsigned 8 months later – on 7 December 1867. Meydenbauer’s authorship of the article was confirmed by the editor of Wochenblatt des Architektenvereins zu Berlin – Berlin Architectural Society (Grimm 2020). Joseph Nicéphore Niépce, one of the pioneers in the invention of photography, created the first image permanent record in the 1820s (Baatz 1997, as the BBC News published on its website http://news.bbc.co.uk/2/hi/europe/1885093.stm on 21 March 2002), about 40 years before the naming of the new branch, using photographs as input material. There are many scientists and non-scientists whose achievements are stones in the mosaic called photogrammetry.

Photogrammetry is the science and technology of extracting reliable three-dimensional geometric and thematic information, often over time, of objects and scenes from image and range data. Remote sensing is the science and technology of capturing, processing and analyzing imagery, in conjunction with other physical data of the Earth and the planets, from sensors in space, in the air and on the ground. Spatial Information Science is concerned with the modeling, storage, processing, retrieval, application and communication of information with a spatial reference. (https://www.isprs.org/society/default.aspx).

Another definition of remote sensing can be found on the United States Geological Service (USGS) website (https://www.usgs.gov/faqs/what-remote-sensing-and-what-it-used?qt-news_science_products=0&qt-news_science_products). Remote sensing is defined as the process of detecting and monitoring the physical characteristics of an area by measuring its reflected and emitted radiation at a distance, typically from satellite or aircraft. Evelyn Pruitt, of the U.S. Office of Naval Research,
introduced remote sensing as the name of the science in the 1950s.

The definition of Spatial Information Systems (SIS) published on the website of the Macquarie University (http://handbook.mq.edu.au/2019/Majors/UGMajor/Spatial+Information+Science) says that SIS is the science of geographic information systems and remote-sensing for data storage, visualization (mapping), and the provision of information to support decision-making.

All three of these sciences are focused on Earth data collection, their processing and evaluation, to be used for many purposes. Professor Konecny has been aware of the similar foci and goals, and therefore he was active in all branches, realizing that it is their interconnection which is needed to help bring the best to society.

2. Two professors – founder of the International Society for Photogrammetry (ISP) and he who renamed the International Society for Photogrammetry to International Society for Photogrammetry and Remote Sensing

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Professor Doležal was born in Moravské Budějovice, Moravia, part of the Austro-Hungarian Monarchy, in 1862 (as published on the Austria Forum of TU Graz website https://austria-forum.org/af/Biographien/Dolezal%2CEduard). When Professor Gottfried Konecny was born, in Troppau, Moravia, a part of Czechoslovakia, 20 years after the foundation of the International Society for Photogrammetry, Professor Doležal was 68 years of age (LUH 2020a).

Prof. Eduard Doležal studied at TU Vienna, where he founded an Institute of Photogrammetry at the Department of Geodesy in 1911 (Hánek 2020). Prof. Konecny studied Photogrammetry at the TU Munich, in Germany (LUH 2020a).

On 3 May 1907, Professor Doležal founded the Austrian, and three years later, on 4 July 1910, the International Society for Photogrammetry (Hánek 2020). Meanwhile, in Jena, participants in the holiday course for stereophotogrammetry decided to found a society for photogrammetry in October 1909 as published on website of the German Society for Photogrammetry, Remote Sensing and Geoinformation (DGPF), https://www.dgpf.de/org/hiis.html.

The activities of Prof. Doležal focused on international cooperation, and he edited Internationales Archiv für Photogrammetrie, Vol. 1 (1908–1909) of the Austrian Society of Photogrammetry (IAP1 1909), followed by Internationales Archiv für Photogrammetrie Vol. 2–5 of ISP (IAP2 1911; IAP3 1913; IAP4 1914; IAP5 1919). Vol. 6 was published under the Austrian Section of ISP (IAP6 1923). He was the author of 6 books (13 editions), 150 scientific and professional papers, 50 publications on the organization of education and geodetic services, 57 biographic articles and obituaries, and 361 reviews of professional publications – most of them before 1922 (Hánek 2020). His results were cited by many scientists in Austria and abroad (Lerner 1932).

Prof. Doležal was awarded four state awards, he became honorary chair of six, and honorary member of 13 scientific societies. He was a member of three foreign scientific academies, and he was awarded honorary doctorates from four universities (Lego 1952).

Prof. Konecny holds both, Dr. h.c., and Dr. Sc. h.c. degrees and is also Honorary Professor at four universities, he holds four Honorary Memberships and is Honorary Fellow of five professional societies, and he received two awards from photogrammetric societies, one Medal and two Orders of Merit (LUH 2020a).

3. 1945–1959: period of education

Prof. Konecny belongs to those who knew from a very early age what to do in their lives. He was employed as a draftsman, from 1945 to 1946 (at the age of 15), in the Survey Office in Troppau after attending secondary school in Czechoslovakia, and was a technical employee in the City Survey Office in Neumarkt, Opf., Germany during 1946–1948, where he finished his secondary school education from 1948 to 1950. Having experience in surveying, he studied surveying and mapping at TU Munich, F.R. Germany starting in 1950, which he continued at The Ohio State University (1954–1956), supported by the Fullbright scholarship from the U.S. Government. He received an M.Sc. degree from The Ohio State University in 1956 and an engineering degree (Dipl.-Ing.) from TU Munich in 1957 (LUH 2020a). His stay in the US was probably amongst the first of his countless international experiences in his professional and personal life. It was here that he worked as an assistant to Prof. Doyle and Prof. Heiskanen.

His first international activities, however, took place before he began his M.Sc. studies. He took part in two IASTE-exchange trainee programmes. The first one was at the City Survey Office in Helsinki, Finland, in Summer 1953, and the second at the French National Oil Co. (geophysics section) in Montpellier, France, in the autumn of the same year (LUH 2020a).

4. Canadian period 1959–1971

After his graduation, Prof. Konecny worked as a Scientific Assistant in the Institute for Photogrammetry at the TU in Munich (1957–1959). The year 1959 was a turning point in his life, when he moved to Canada, taking a position of Assistant Professor in Civil Engineering at the University of New Brunswick (UNB). Following discussions with other experts (W.
Roberts, future Director of Surveys for New Brunswick, B. Hilborn, future Professor of Photogrammetry at the Faculty of Forestry, and Ira Beattie, future Head of the Civil Engineering Department) he went on to set up a Surveying Engineering Department at UNB. The discussions, by the way, took place on a train to Ottawa. The department was founded in 1960 at a university where surveying had been taught since 1840 as part of Civil Engineering. The first distinct survey programme was opened in 1960 (UNB 2020).

Prof. Konecny was not only involved in the new study program, he also led research teams in three projects focused on glaciers and their locating, mapping, and measurement of movement – in 1963 it was Athabasca Glacier, in 1964 Northern Ellesmere Island, and five Alaskan glaciers in 1965, within which he participated in the National Geographic Expedition to Mount Kennedy (UNB 2020).

Prof. Konecny’s professional carrier in Canada rose very quickly. He became Associate Professor at UNB in 1962, Full Professor and Head of the department in 1966, and is Adjunct Professor since 1971 (LUH 2020a). In this period, his abundant activities opened the scientific and professional world to Prof. Konecny.

5. Hannover period since 1971

In 1971, Prof. Konecny moved back to Germany, to Hannover, to the position of Director of the Institute of Photogrammetry and Engineering Surveys, University of Hannover, F.R. Germany, responsible for teaching, research and consulting activities. Prof. Konecny retired as Emeritus Professor in 1998 from the Institute for Photogrammetry and Engineering Surveys, University of Hannover (LUH 2020a).

6. From academia to world networking by consultancy, teaching, and projects

Prof. Konecny’s activities paved his, and the institute’s way to a wide array of co-operations all around the world. A short overview of such examples gives an insight not only into his professional work but to how he built new mutual scientific contacts, and always combined them with hearty personal relations, offering help to all in need: he was a visiting Professor at the National University of Tucuman, in Argentina in 1971 and 1973; Consultant to the United Nations Development Project at Survey of India, Hyderabad, A.P., India, in March – April 1973 Consultant to the University of Heredia in Costa Rica in 1975; Consultant to the Mapping Center, Enugu in Nigeria in 1976, to the University of Zimbabwe and National Remote Sensing Center in Zimbabwe in 1988–1992, and to the Institute of Remote Sensing, Anna University, Madras and National Remote Sensing Facility, Department of Space in Hyderabad, India in 1990–1997; and Consultant to the Survey Department of Kuwait Municipality of the Government of Kuwait (LUH 2020a).

Prof. Konecny was active as a teacher, not only at IPI but in many countries where he was invited to teach: in Caracas, in Venezuela, he gave a course on Analytical Photogrammetry; at the College de Ingenieros, in August 1977, on Analytical and Digital Photogrammetry; at the University for Geodesy, Photogrammetry and Cartography, in Wuhan in China, in September – October 1980; on Analytical Photogrammetry at Universidad Autonoma de Mexico, in Mexico, in April 1981; and on Digital Photogrammetry at the National Geographic Survey, in Guatemala, in 2000 (LUH 2020a).

Prof. Konecny’s professional expertise has been highly acknowledged by important world organizations. He was a Consultant and Project Scientist to Deutsche Zentrum für Luft- und Raumfahrt e.V. (German Space Agency) for the Metric Camera Experiment of the First Spacelab Mission in 1977–1986, and for mapping from satellites in 1987–1998. The European Space Agency chose him as Chairman of the Metric Camera Working Group from 1977 to 1988. During this 9-day mission, the camera collected 10% of the earth landmass in stereo (LUH 2020a).

He also worked as a Consultant for Hansa Luftbild GmbH, Münster, in Germany, in 1977–1998. The World Bank appointed Prof. Konecny a consultant of its project “Photogrammetry and Geographic Information Systems”, and for the Agricultural Land Reform Office in Bangkok, Thailand, in June 1987 – June 1988. He was appointed as a consultant for the UN-Habitat Nairobi, at the Dubai Municipality Planning Dept., which focused on the preparation of control surveys, photogrammetry, digital mapping, and GIS, from 1988 to 2000. He cooperated with NASDA/Restec in Ho Chi Minh City, Vietnam, on remote sensing and GIS in 1997, and on mapping from Space in 1998, on mapping from space in Sri Lanka in 1998, and on mapping from space and GIS in Phnom Penh, Cambodia, in 2000, etc. (LUH 2020a).

There is one more important characteristic of Gottfried Konecny – his continued interest in all news, methods and results in all three geosciences and how they are applied throughout the world. The UN-GGIM & ISPRS project “Global Status of Mapping”, which he was awarded in 2012, in which he presents not only the cartographic state of maps of the individual countries but also data sources, data collection, etc., is evidence of this.

7. Membership in societies to intensify networking

All of Prof. Konecny’s activities have always been connected with cooperation, spreading and sharing knowledge, and the organization of, and participation in
and new intensive ISP approval

Photogrammetry

8. Publications as a tool for education and knowledge sharing

Prof. Konecny has been an active author of publications since the beginning of his career. He published *Aerotriangulation mit Konvergentaufnahmen* (his PhD thesis) in 1962 (Konecny 1962) and *Analytical Photogrammetry* in 1965 (Konecny 1965). *Photogrammetry* was published by Prof. Konecny, together with Prof. Lehman, in 1984 (Konecny and Lehmann 1984). The book *Geoinformation: Remote Sensing, Photogrammetry and Geographic Information Systems* (Konecny 2002) is a proof of the broad knowledge and expertise of Prof. Konecny. All of his publications reflect important topics in photogrammetry from the early period of his professional life, remote sensing already in the 1970s, and geoinformation analyzed in (Konecny 2002) at the beginning of the twenty-first century.

His publication activity since 1997 – one year before his Emeritus Professorship – covers 8 books and book chapters, 19 non-reviewed conference papers, 4 non-reviewed journal articles, 5 peer-reviewed journal papers, 2 other contributions, 4 invited conference contributions, and 2 editorials (LUH 2020b).

9. Conclusions

Professor Konecny is an exceptional figure in the science, research, and education of photogrammetry, remote sensing and geospatial sciences. His expertise began in the analogue period of photogrammetry, he later included remote sensing, then geospatial information sciences and digital photogrammetry to his portfolio. He was, and is still initiator of many international and national cooperations, relations and meetings. He has been connecting professionals from various countries with ISPRS, a society representing the whole world in the three geosciences.

His life is an example of a Renaissance man whose way of thinking begins with man and continues to analysis, research, results and applications for humanity. The term humanity really encompasses the whole world, regardless of the local political situation or nationality.

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