Karl Rinner´s 100th Birthday – Memorial Colloquium at the Technical University of Graz, Austria

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Karl Rinner, born on October 4, 1912 in Gratkorn, near Graz would have been 100 years old this year. He dies at the age of 78. But the traces he left during his lifetime can still be felt in the present generations. This is the reason why the Austrian Geodetic Commission, the Austrian Society for Surveying and Geoinformation and the Technical University of Graz organized a Memorial Colloquium on October 27, 2012 on the occasion of Karl Rinner´s 100th anniversary of birth. About 80 participants had come from Graz, Vienna and the neighbouring countries of Austria for the event. The moderation was done by Vice Rector Bernhard Hofmann-Wellenhof of TU Graz. 4 daughters of Karl Rinner were also present.

Karl Rinner was an important photogrammetrist, but he was also considered a leading scientist in other disciplines such as satellite geodesy and engineering surveys. In Austria he is still sometimes called "a Universal Geodesist".

At the Colloquium there were 4 speakers, all covering different aspects of Karl Rinner´s rich life.

Holger Magel, Professor of Land Management at the Technical University of Munich in Germany, former FIG President, as well as his own son-in law, concentrated in his paper on the personal aspects of Karl Rinner:

Born as a son of the 8 children of his father, who was mayor in Gratkorn, he developed an early understanding for the needs of the community. Since he was mathematically gifted, he enrolled in the mathematically oriented survey curriculum of Graz Technical University, but he also pursued philosophy and ancient history on the side. He became fascinated with photogrammetry. When he graduated in 1938 it was not possible to use it in Austria at that time, so he left for Munich in Bavaria, where he was given the chance to establish a photogrammetric unit. But soon after that he was called to Berlin to form a photogrammetric facility for the German Navy. When he returned to Austria after the war, it was again not possible to utilize photogrammetry in Austria, so he became a licensed surveyor in Graz with the chance to build a family at his native house in Gratkorn. There also had its bitter side, when he lost his two sons.

Even in Germany photogrammetry could not easily be applied at that time except in research. Therefore he accepted an offer of the German Geodetic Research Institute in Munich in 1956 to become its director for the next two years, after which he would be

offered the chair of surveying, geodesy and photogrammetry at the Technical University of Graz in 1959, which he occupied until his retirement and as an Emeritus beyond.

Gottfried Konecny covered, as a second speaker, the contributions Karl Rinner made to photogrammetry, in particular analytical photogrammetry. While previous efforts have been made to reconstruct the objects of the terrain from measurements on overlapping photographs, these efforts relied entirely on calculations by hand. For example Sebastian Finsterwalder, mathematics professor in Munich made a point by point survey of the rapidly receding Vernagt Glacier in Tyrol, Austria from photos taken in the year 1889, and it took him half a year to calculate the results in form of a map. These terrestrial photos were predetermined in their direction, permitting a simplified geometrical model to be used. He tried to evaluate a general 3D geometric model for balloon images flown over Gars on the river Inn in 1899 using 3rd order equations. The point by point hand calculation to generate a map took him 3 years. Another pioneer of analytical photogrammetry was Earl Church at Syracuse University, New York, who in 1934 formulated the basic mathematical solution for space resection and the spatial orientation of photographic images using direction cosines. More modern mathematical tools were introduced by E.H.Thompson in 1950 at University College London, But Karl Rinner was one of the first to formulate the orientation solution of overlapping photographic images and the intersection of object points by modern mathematical means using vector algebra, matrix notation and the inclusion of least square adjustment into the solution. He published this in 1956.

At that time electronic computers have become a reality due to the developments of Karl Zuse in Germany in 1943 and of Howard Hatheway Aiken in the USA in 1944, who received a lot more recognition and support by his government at that time, than Zuse did. Karl Rinner´s friend Helmut Schmid, a collaborator of Wernher von Braun at the V2 base Peenemünde, who was translocated to the USA by the US Army in 1945, had by 1956 the latest computers available at his disposal for ballistic tracking purposes. Karl Rinner was in close contact with his developments in analytical photogrammetry based on the collinearity equations. Karl Rinner formulated the orientation problem in complementation by condition equations. Already at that time Rinner introduced 3D geodetic coordinates into the solution, which other authors of analytical photogrammetry ignored until the 1980´s.

At the Technical University Graz Karl Rinner produced well documented scripts for teaching. He made them available to others, so that for example teaching of analytical photogrammetry using Rinner formulations was made possible at the University of New Brunswick in Canada.

A full documentation of the mathematical concepts of analytical photogrammetry by Karl Rinner was possible, when he took the task as chief editor of the volume IIIa "Photogrammetry" of Jordan-Eggert-Kneissl "Handbuch für Vermessungskunde, prepared between 1964 and 1972 in 3 volumes with a total of 2321 printed pages. This up till today is the most voluminous book on photogrammetry in existence. Karl Rinner coordinated the many authors, but he reserved the geometric parts to himself and his elegant formulations. Moreover, he not only used perspective geometry to solve photogrammetric problems, but also projective geometry principles.

Karl Rinner, in addition to his scientific contributions in photogrammetry also was instrumental in preparing China´s entry into the photogrammetric community represented by ISPRS. After Edward H. Thompson in 1958, he was the second European photogrammetrist to be invited to China in 1972

and to Wuhan in 1976. The International Society negotiations started in 1979 with the admission of China into ISPRS at the 1980 Hamburg Congress.

The third speaker was former TU Graz Rector Hans Sünkel, who described Karl Rinner´s achievements in satellite geodesy. As a friend of Helmut Schmid, who in the USA became in charge of the US Coast and Geodetic Survey´s PAGEOS program to create a world geodetic net using sun illuminated satellites imaged against the star background and observing their transits at 46 ground stations with ballistic cameras between 1969 and 1974. To orient the bundles of observations at these stations, this was indeed a photogrammetric problem, which led to a geodetic accuracy of the PAGEOS World Net of +/- 5m. Rinner´s participation in the PAGEOS satellite program made it possible to realize his suggestion for the establishment of the Austrian Institute of Space Research and the observation station Graz-Lustbühel. When the satellite laser ranging program LAGEOS with the satellites LAGEOS 1 and 2 was launched, Graz was able to participate in the effort to create a world net by laser ranging wit an accuracy of +/- 11m.

With GPS, GLONASS and GALILEO these early efforts are now obsolete, but the preoccupation with satellite geodesy secured the TU Graz a good position in the task to establish permanent GNSS observation networks in Austria and South East Europe.

Since 1982 the preoccupation in Graz was with gravity observations for a geoid determination for Austria leading up to satellite gradiometry pursued by Helmut Moritz and now crowned with the GOCE missions. Indirectly Karl Rinner was a bridge builder for developments of satellite geodesy in Graz.

The last contribution was made by Fritz Brunner, Emeritus Professor of Engineering Geodesy at the TU Graz. In the years between 1948 and 1956, when geodesy and photogrammetry were out of reach for him, Karl Rinner was very active as a private surveyor working for a total of 7000 clients. His projects included supervision of the construction of 8 Alpine tunnels. When he became appointed as professor in Graz in 1959 he was able to introduce the new tools of electronic distance measurement by tellurometer and geodimeter into engineering and geodetic surveys and initiated many studies on the influences of the atmosphere on the propagation of electromagnetic waves.

Due to his contacts with Prof. Kneissl in Munich and Prof. Kobold in Zurich he initiated the "Internationa Course for Engineering Surveys, which since 1961 takes place every 4 years in rotation between Munich, Zurich and Graz.

Rinner´s contributions to the discipline are contained in volume VI of Jordan-Eggert-Kneissl "Handbuch für Vermessungskunde", which he edited as principal author.

Vice Rector Bernhard Hofmann-Wellenhof concluded the Colloquium citing some of Karl Rinner´s convictions: "Knowledge is the only good, which persist, if everything else is lost in life", and "It is not important how long one lives, but which traces one leaves behind". In a modification of a quote by Ortega Y Gasset he added, that "the traces become smooth, when the wind has overlaid them by sand".

It was indeed a memorable and distinguished event honouring one of the giants of our discipline, in whose footsteps we follow.