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Robert Hunsucker

“Brief History of Radio Science at the Geophysical Institute”

December 17, 1987

Fairbanks, Alaska

Robert Hunsucker presents a retirement seminar at the University of Alaska.

Dr. Akasofu introduces Dr. Robert Hunsucker. He talked about the special seminar series by retiring professors from the Geophysical Institute. Dr. Hunsucker is retiring after thirty years at the Institute. Hunsucker came to the Institute in 1958. He became an assistant professor in 1962. Between 1964-1971 he worked at the Institute for Telecommunications in Boulder, Colorado. He returned to Fairbanks in 1971 and became an associate professor at the Institute and a professor in 1978. Some of his different research projects are listed. Akasofu said he also came to the Institute in 1958 and met Bob Hunsucker. He remembers his first seminar with Hunsucker. He mentioned Hunsucker's wife, Phyllis and children, Eddie, Jenny and Cindy. He introduces Hunsucker's seminar.

Hunsucker thanked Akasofu. He said the Institute has been family to him. He said he would include some of the people he has worked with in his talk. He talked about the outline of his talk: introduction, historical account of radio science from his perspective, selected slides, and a summary of tentative conclusions and results. He said he has actually been at the Institute for twenty-two years. He discussed terminology including radio physics, radio propagation, ionospheric physics, radio engineering and radio science.

Hunsucker said there are different techniques to probe the ionosphere. He showed a graph showing radio frequency demonstrating the different techniques as they fit into the radio frequency spectrum. His next graph showed how the different techniques are fit into the radio spectrum and into the height regimes. Different techniques examine different portions of the atmosphere and height and occupy certain frequency bands in the spectrum. He talked about the use of acronyms such as PRO (propagation), WAVES (radio waves), IONTEL (telemetry of ionospheric information), CLUTTER (clutter echoes in radar), and SOURCE (source of gravity waves). He explained the meanings of others including SAP (Studies in Arctic Propagation), SCAT (Ionospheric scatter), ARGH (Alaska Radio Geophysical Hideout), and HAH (Hartgrievies and Hunsucker).

Hunsucker said he was going to try to divide up the epochs by various things he has named. He talked about the history of radio science including technological inventions and people involved. One of the first published works on ionospheric studies at UAF was in 1933. The regents approved land to the federal government to establish a geophysical observatory. The American Geophysical Union and the National Academy of Sciences passed a resolution for a geophysical station at UAF. He played an April 1941 excerpt of a broadcast from KFAR by Dr. Bramhold on

the ionosphere. Hunsucker said this was a talk for the general public. The U.S. Congress passed a law to establish the Geophysical Institute. The cornerstone was set in 1949 and it was completed in 1951. Stewart Seaton was the first director and lasted about six to eight months. Seaton and about sixty percent of the staff resigned. There was an argument over overhead. Hunsucker talked about his first day impressions at the Institute. He was staying in the Nordale Hotel. Glenn Stanley met him in the hotel and took him up to the GI in a battered vehicle. They entered the Chapman Building. Chris Elvey was the director. He saw Art Shaveley. He talked about various people he met that day. He met Hildy Hate. He went out to several field sites. He concluded that day, September 4, 1958, that the Institute was a unique place.

Hunsucker talked about the early years at the Geophysical Institute. He said it was an exciting time to be at the Institute. Most of the electronics was done with vacuum tubes, analog computers, and magnetic relays. He described the ionosonde. It is a radar with an antenna beam pointing upward. It scans in a frequency of 1-2 megahertz and records a plot of frequency and virtual height of the ionospheric layers. They have the longest record of ionosonde operation started in 1941. Sydney Chapman was named advisory scientific director. Chris Elvey was named full time director in the 1950s. Hunsucker described the sweep frequency backscatter. He talked about Bob Merritt. The International Physical Year (IGY) really got them going. There was an influx of people at that time. He talked about the "middle ages" at the Institute including the IQSY and STEP. Keith Mather became the director. Most of the radio physics people left in 1964-65. Communication satellites were invented, national priorities changed and funding was shifted. The "industrial evolution" was the age of the entrepreneurs and principal investigators. Funds were obtainable and there were various small groups of specialties. Communication satellite studies were started at this time. Another program was SCAT which was later changed to CHAT. He talked about various personnel in the 1970s. He hopes to prepare a report on the history of radio science at the Institute. He talked about the present times at the Institute. He said the technological force seems to be the digital signal processing. He talked about projects active at this time and researchers. He said it is important to realize that they made some good contributions in radio science and they are ready to join the digital revolution and proceed in that direction.

Slide section of the presentation. Hunsucker talked about radio sites in Alaska and in the Fairbanks area, researchers, students, studies, programs, equipment, the ionosonde, satellite antennas, the MST radar, Eldon Thompson, and Sondrestrom, Greenland.

Hunsucker showed a graph of selected results from thirty years of radio science research at the Geophysical Institute. He said since 1968 it has become harder and harder to invent radio techniques. They concentrated on using several techniques simultaneously. He talked about the products of radio science at the Institute including PhDs, masters and papers and reports. They have had symposiums at the Institute. He listed significant results including the invention of the riometer, the first descriptions of polar cap and auroral absorption morphology, measurement of height of F-layer irregularities of HF backscatter, VHF auroral radar, the first narrow-beam riometer investigation of auroral absorption, solar eclipse effects on high latitude HF and VLF propagation and transpolar VLF propagation behavior. He discussed the importance of the Chatanika radar. His last graph was the truncated frequency spectrum. He invited questions from

the audience. He thanked Dr. Akasofu and his family for their help. He talked about the advice of his father about making a living.