

## THE SURVEY CREW EXPERIENCE – PART III AERIAL MAPPING, 1971- 1972

FROM AN INTERVIEW WITH ED BUSCH, SEPTEMBER 2010

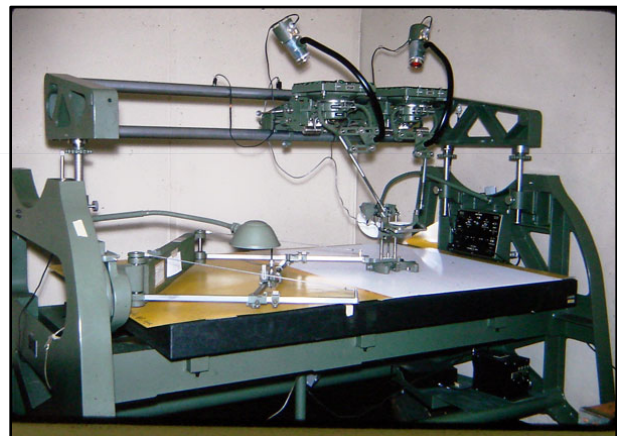
*Cross-training and job variety were part of the work tradition at the Bureau of Public Roads. Those working on survey and aerial mapping crews could look forward to learning all aspects of the operations associated with the job and to making their own decisions, independent of supervisors in the office.*

Although he would not finish out his career with the Federal Highway Administration, **Ed Busch** enjoyed the work while employed there. “We did a lot of jobs, everyone really got along well,” he said, and he noted that he appreciated the opportunity to learn new skills. “The engineers really made sure you learned your stuff before you got a promotion.”

One of his mentors was **Max Ulver**. Ed had taken a hiatus from the Bureau of Public Roads from 1965 through 1969 and had then come back to the surveying work he had been doing for the agency since he first came on board in 1959. In the spring of 1971, he said, “I went to work on the aerial mapping crew for Max Ulver.” Among the other crew members were **Paul Anderson, Ted Brenneman, and George Parson**. “There were seven guys, (and) we all knew each other, and we all got along real well.”

When he joined the crew, they were working “in Grangeville, Idaho, (doing) a 50 mile survey from Grangeville to Elk City, Idaho. I think we were in there six months,” he said. “All that surveying was done by...setting control points, (then) the planes would fly it and take pictures from (about) 3,000 foot elevation.”

While working in Grangeville, they had regular contact with a survey crew working out of LaPine, Oregon. “The radio reception at Century Drive was not good,” he explained, and the crew in the field in central Oregon had difficulty contacting their own office. “We could hear them talking on our radios” even though they were 450 miles away, because of the way radio signals skip off the different layers of the atmosphere. “We’d sit there



*The Kelsh Stereoplotter was invented by a U.S. Geological Survey employee, Harry T. Kelsh, during the 1950's.*  
[http://nationalmap.gov/ustopo/photos/j16-kelsh\\_stereoplotter.jpg](http://nationalmap.gov/ustopo/photos/j16-kelsh_stereoplotter.jpg)

and relay the messages (for) them,” he said. “We talked to them every morning; the reception was (that) good.”

They also worked out of Boise “on the main highway going up...to McCall. We did the preliminary survey on that, too. We had to leave there because of the snow...and went back the next June to finish it up.”

It was around that time that “computers became really popular,” he said. “We had a big computer section in Vancouver,” and the data they gathered “was put on what you call a Kelsh Plotter. All the design work was done off the aerial photo maps.”

Modern surveying and mapping technology methods have streamlined our work, but Ed remembered that “when I started, there were

probably 300-400 guys in the field, in the 1960's." At that time, he said, "a normal survey crew would be probably about 30-40 guys." When he went to the aerial mapping crew, there were only seven.

"When I was on aerial mapping crew, they used Electrotapes. It would measure by radio frequency...and the receiver was a 2½-foot square box." They had to pack that into the job, and "you'd have to pack in a car battery...to charge the Electrotape to run it." He described the process, where there would be one guy "at each end. You'd have a set of earphones so you could talk back and forth, (and) you'd dial in the signal and it would give you a bell sound that (would tell you when) it was right on.

"You'd measure from both directions. Sound travels so many feet per second, so then you could determine" the distance, he explained. "Hewlett Packard made an instrument that would measure by laser, (and) we would check it with the Electrotape." The instruments were accurate: "maybe a ½ inch or ¾ inch difference."



*An electrotape set up beside a BPR vehicle on a 1973 project. WFLHD Archives.*

To begin the process, "we would measure about 35 miles with the Electrotape," he said, "and then we would stack the cubes on the Hewlett Packard laser. You could get maybe 11 miles in one distance."

He added that they used "survival mirrors from WWII... (to) collect the sun (and) feed it to the mirror.... You could pick up the flash and you knew you were turning your angle." On cloudy days, he noted, they used a strobe light to turn the angle. "Then we tied it into US Geological Survey points.

"Basically, when we finished the job, we never went back," he added. "I don't remember us going back on any of those jobs to recheck anything, because we had everything all checked out before we left."

The crew worked four ten hour days, took "six days off, then four tens and four days off," he said. "When we finished the job, we'd call in" and get instructions for where to go for the next job. "We were basically a seven man crew who were responsible for everything we did," he added. The people back in the office "didn't really bother us."

The work took them deep into the wilderness, which Ed found interesting in itself. Sometimes they had to move in on foot, or "in the winter time we'd use skis." In some areas they were able to move through the back country using small tracked vehicles. "They were like caterpillars, or little tracks, I don't know what they called them." The pick-ups were equipped with ramps and "we could drive them up onto the back of the pickup (on) a ramp and strap them down, and in areas where we could use them, we could put all our gear in them." They liked the way it made it easier to "travel to different points and tie end points without carrying" the equipment on foot. "We could drive."

**Tom Hildreth** was the head of aerial survey and **Jack Kirkpatrick** "would always do the computer programs for us," Ed recalled. "He passed away at 45," he added. People on the aerial mapping crew were rotated through the jobs. "Each guy got a chance to work in the office and do the calculations. They moved you around so you had an overall picture of the whole thing so everyone could pick up someone else's job."



*During a 1973 open house, Tom Hildreth demonstrates the office's first electronic distance meter for a group of OSU students. WFLHD Archives*

During this period the office was getting a lot of survey work. “We did a lot of forest access and scenic highways, like the North Cross State Highway” in northern Washington and “I worked on Century Drive down around Davis Lake” in Central Oregon. “From there we went to...Granite Falls (out) of Seattle, and then we did some work over by Coeur d’Alene, Idaho.”

It was about 1972 when Ed left FHWA. In fact, he was just getting ready to make a rotation into the office “on the next job,” he said, but “I quit before then.”

The experiences he had at the BPR and FHWA were memorable, however. “Of course we

always had to play jokes on each other,” he said of the aerial mapping crew. “I won’t tell you all of the things we did...(but) we always had to have a chuckle.”

All horseplay aside, the job experience proved invaluable for his future work. “I used a lot of the information I learned...after I left FHWA.” At other times throughout his career, he had opportunities to put those skills to use, and he has stayed in touch, valuing the friends he made while working for the BPR and FHWA. “It’s something that will never be repeated again.”



*Ted Breneman lets his equipment do the work during a 1973 survey. WFLHD Archives.*

*Ed Busch’s career with the BPR was interrupted for a stint in the Army in the early 1960’s. He first left the agency around 1965, getting married and moving to California; then returned in 1969. When he finally left for good, he put his BPR soil testing skills to work for Carlson Testing and Geo-Pacific Engineering, inspecting compaction for fills in subdivisions and on asphalt paving jobs.*

*Stories in this series have been developed by Marili Reilly from interviews and correspondence. Retirees who would like to share their memories may email [marili.reilly@dot.gov](mailto:marili.reilly@dot.gov).*