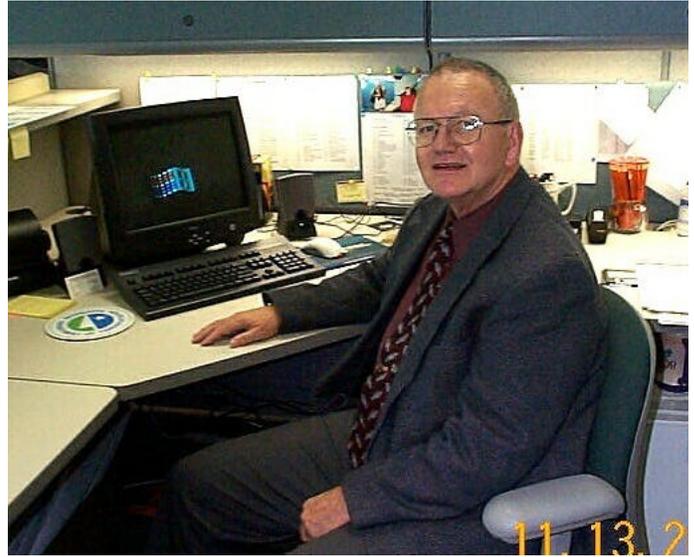




## Leading the Way: Profile of an Early ESS Deployer Ed Fleege and Minnesota DOT (MnDOT)

**Describe your ESS deployment. What data are your sensors collecting? Who uses the weather data that your sensor stations collect?**

We have 76 NTCIP-compatible ESS stations installed at various locations throughout the state. We teamed up with the University of North Dakota Regional Weather Information Center to help us determine where the sensors should be installed and what combination of sensors was appropriate at each installation. This was done to effectively augment the data from our proposed ESS sites with the current NWS/FAA ASOS and Mn/DOT AWOS\* weather sensor network. As a result, not all our sites are identical. Each site is looked at separately to determine the types of weather data we need to collect at that site and what sensors will do the job. Our stations measure all types of data—solar radiation, barometric pressure, wind speed and direction, air temperature, relative humidity, precipitation, visibility, ground temperature, and pavement and sub-pavement temperatures. Ten of our stations also have closed circuit television cameras that our maintenance facilities use to monitor road conditions and to deploy equipment and supplies when needed.



Ed Fleege has over 41 years of experience in highway research, bridge construction and maintenance, and operations with the Minnesota DOT. He retired from his position as RWIS Project Administrator for MnDOT in 1999, but is currently being retained by the agency to help complete the contract for the installation of a statewide RWIS.

Mr. Fleege received his BS in 1957 and his MSCE in 1958 from the University of Minnesota and is a Registered Professional Engineer in Civil Engineering in the State of Minnesota.

We use our RWIS (Road Weather Information Systems) primarily for maintenance operations. Our sensors provide real-time and forecasting data that can tell our maintenance crews when chemicals should be applied on pavement surfaces and in what amounts. We are also aware of many potential summer-time uses of RWIS data, especially the use of radar and weather forecasts that can help us project the best times to conduct concrete pours and other paving operations. We also disseminate weather data to the general public through our traffic management center's web site, which gives viewers real-time information about road conditions.

**Why did you decide to use NTCIP standards?**

I witnessed the problems that you can run into using proprietary technology during a trip to Europe. Each country I visited was using ITS, but each had proprietary systems, which prevented them from sharing information or integrating their systems. I decided that open systems are a better investment—that is the reason we built our ESS stations using NTCIP protocols. This was an easy sell to colleagues within my department. I should also say that within MnDOT, as a whole, people understand the benefits of standards and how they support our goal of integration and interoperability across the ITS services we deploy.

**What challenges did you encounter when you integrated sensors that use ESS/NTCIP standards with your legacy systems?**

Our agency didn't encounter any challenges because we contracted with our vendor to handle the integration. We told our vendor that we wanted our 76 ESS sites to be NTCIP compatible and we wanted to integrate our legacy weather stations into a seamless network.

**Did you hire a consultant to help your agency deploy devices and components that used ESS/NTCIP standards?**

No, we did not use a consultant. We already knew what we wanted our ESS sensors to do, where we wanted to put them, and how we wanted to design our RWIS, so we handled the deployment in-house. However, there was a lot of in-house experience with the NTCIP standards, and we also consulted with several members of the NTCIP Task Force to help us develop our RFP and guide our procurement.

\* *NWS/FAA ASOS is the National Weather Service/Federal Aviation Administration Automated Surface Observing System. MnDOT AWOS is the Minnesota Department of Transportation Automated Weather Observing System.*

***What advice can you give on how to select a consultant to help with ESS deployments?***

You should find a consultant who has a history of working with NTCIP protocols and who really understands the issues related to standards and sensor stations. I would also caution against getting too specific about which NTCIP protocols to require in your RFP. You want to refer to NTCIP protocols in your RFP, but I would focus more on describing what functionality you want from your devices and then let the vendors respond with standards that support that functionality. A vendor should also describe the methods it will use to verify that the equipment it supplies is compatible with the NTCIP protocols.

***Has the use of ESS/NTCIP standards had any impact on vendor selection and commodity price for your ESS devices? Have you found that ESS/NTCIP standards allow greater interchangeability between ESS devices from different vendors?***

We will find this out when we expand our system. We expect that our costs will drop because there will be competition between vendors. We are also hoping that interoperability between ESS devices provided by different vendors will eventually expand.

***What benefits do you expect to attain from using ESS/NTCIP standards?***

We expect our agency to have lower overall costs for our ESS devices. The open protocols make maintenance a lot easier as well. I don't know of any direct benefits to the general public, aside from the indirect benefits of MnDOT running more efficiently.

***In what ways have ESS/NTCIP standards affected the operations and maintenance of your sensors?***

Standards have made it easier for our maintenance people to troubleshoot problems at our ESS stations. We found that by having open protocols, we can isolate problems more quickly and get our sensors back on line in a shorter period of time.

***Do systems that use ESS/NTCIP standards add to your capacity to coordinate with ITS devices used by other transportation agencies in your region?***

I expect that they will, although we have not made those connections yet. But since our changeable message signs also use NTCIP standards, we may plan to integrate the two systems in the future. This is one of the advantages of using standards in ITS deployments. They create a platform upon which different ITS equipment and components can connect more easily. This will certainly help us if we decide to add sensors for traffic recording in rural areas. NTCIP will make it easier to integrate these sensors into our network.

***For your colleagues who might be on the fence about using ITS standards, what is the strongest argument you can think of for using standards sooner rather than later?***

The interchangeability of equipment is the best reason for using standards. There are many states that are saddled with a proprietary system and tied to a single vendor. We wanted to avoid this at all costs. That's why we went with NTCIP standards.

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