10.7 WEATHER DECISION SUPPORT SYSTEMS FOR THE TRANSPORTATION INDUSTRY

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Given the important task of managing weather-related transportation risks, a multi-tiered weather decision support system is required. Whether applying to public or private transportation, this support system must contain all of the key elements necessary for the decision making process, and must provide them in a timely fashion and ensure the accuracy of the data presented. This suite of products and services must begin with traditional National Weather Service official watches, warnings and forecasts, however with advances in technology and communication, the ability to relay this information promptly and create other value-added solutions to the transportation industry is essential.

RELIABLE DELIVERY OF DATA

While increased bandwidth and growing acceptance of the Internet as a delivery mechanism continues in the new century, a satellite delivered weather support system can deliver all of the necessary weather information quickly and securely to the end user. (Figure 1) This dedicated solution provides significant advantage to the user by ensuring an on demand source of weather information for critical decisions involving labor and safety. The high volume of data required in many operations requires significant bandwidth, and only a dedicated satellite delivery weather support system can keep up with the ever-changing needs of the transportation industry.

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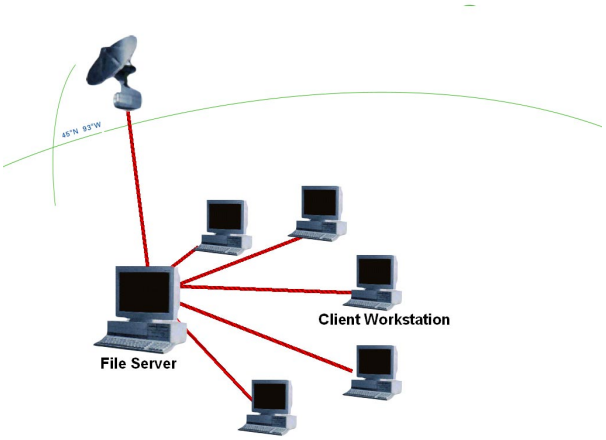

Figure 1

VALUE ADDED WEATHER SUPPORT

With the addition of many value-added products, a comprehensive weather decision support system can significantly improve upon traditional county-based warnings and advisories. For example, computer programs can interrogate surface weather observations and combine this with computer model information to create a “rain-snow” mask on top of the radar data. This allows the general public to quickly identify the heaviest areas of snow and ice without the advice of a meteorological expert. For additional value and clarity, this information can then be displayed on a high-resolution map complete with interstates or other transportation corridors. With this combination, now a user can simply glance at a radar image and get a clear idea of what type of weather is occurring over that stretch of road, rather than having to analyze three different data sets and attempt to conceptually piece them together. These value-added products are the key to any successful and innovative weather decision support system for the transportation industry.

CUSTOM FORECASTING

When a major snow or ice storm is expected, it’s critical for both public and private transportation

entities to remain on top of the developing situation. Forecasts that update every 4 to 6 hours or more are of little value in a rapidly developing and changing winter storm situation. To augment traditional information, custom value-added text and graphic forecasts are available to specifically address the needs of these industries. Forecasters at private weather companies often have the luxury of examining the client's situation in more detail than the local television meteorologist or local NWS office whose focus is the general public. The extra time spent examining the weather maps and computer models can lead to a more relevant and timely forecast for transportation officials. Whether it's keeping roads open, or diverting a critical shipment of goods to the west coast, up to date information is vital. The ability for transportation dispatchers to get clear, hour-by-hour forecasts created by a professional meteorologist ensures the decisions they are faced with can be made with confidence.

WIRELESS DELIVERY OF WEATHER

One of the realities of business today is that frequently users have many other tasks in addition to monitoring the weather, which are equally important and require just as much or more focus. Thus, a complete weather decision support system must have the ability to communicate critical information to users who are mobile. (Figure 2) As mentioned above, this communication must begin with traditional NWS warning information, but it also must extend much further and be able to transmit other critical weather information to personnel in the field. E-mail, paging and cell phone text-messaging are all excellent ways to communicate with these remote users, and essential methods given the overwhelming challenges transportation workers face. With a comprehensive weather decision support system, workers must have the ability to not only use sophisticated weather graphics systems to actively monitor critical weather parameters such as wind speed and precipitation type, but also the ability to transmit this information to today's mobile work force in a quick and secure fashion.

Figure 2

REMOTE WEATHER STATIONS

Many transportation interests have augmented the traditional primarily airport-based official weather observation network across the country, with some sort of remote weather sensor or station of their own. These weather stations have sophisticated sensors on board which can measure air temperature, wind speed and direction, precipitation intensity, amount and type. In addition, networks of pavement sensors have been installed in trouble spots around the country, such as bridges, overpasses and high-traffic areas. Pavement sensors can provide key information to help determine what chemicals to apply, whether black ice is present as well as state of the road surface. It is imperative that the modern weather decision support system not only have the ability to display this output, but also be able to combine this with other weather displays, such as current radar. Being able to visualize current, up to the minute temperature data from a network of remote weather sensors deployed in key areas, can help paint a clear and accurate picture of a rapidly evolving weather situation. The practical value of this information is increased when displayed over a map containing interstates or other transportation corridors.

GIS ENABLED WEATHER

The level of precision can be taken a step further by incorporating weather data into a GIS based decision support system. With a GIS based system, users can monitor critical weather information overlaid on their proprietary set of maps and information and alert a dispatch or operations center to initiate proactive measures. The level of monitoring with a GIS solution can extend to convective parameters such as downburst winds, and alert transportation interests

significantly in advance of their occurrence, all with no human intervention. A winter application would allow users to highlight segments of roadways currently receiving heavy snow or ice. With a satellite delivered weather decision support system, this critical information can be delivered accurately and securely, resulting in increased safety and potentially large economic benefits.

SUMMARY

Demands from the general public for safe transportation increase yearly and in today's economic environment, private companies must maximize their effective transport of goods and services. Accurate, reliable and quickly accessible weather information, which can be delivered via satellite, is vital to the transportation industry. In addition a multi-tiered weather decision support system consisting of NWS forecasts and warnings, reliable radar, custom forecasts, wireless weather and remote weather stations allows transportation officials to make educated and accurate decisions with regard to weather and transportation.