FORMATTING STANDARDS

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ABSTRACT

Dr. Robbins stated that formatting standards are an invaluable tool to help provide interoperability and compatibility to complex systems. There are currently many competing options for formatting which can complicate the use of the data. Storage or archive format has little or no effect on compatibility between systems, as long as the format is known. The rationale for this is computer systems can be programmed to convert the data format to whatever is requested by the user. Interoperability and compatibility between computer systems is determined by transmission and transfer format standards. Common or standard formatting of observations or products will facilitate exchange of the data, provide consistency of products, enhance the ability to reuse and maintain software code--by the producer and consumer, and allow the standard formats to be kept open for future improvements. These future enhancements can also be designed to be compatible with past technology. Most of the formatting standards now used by the meteorology community limit data use by other groups.

Dr. Robbins noted that there are many standard formats used by meteorologists. This large number invokes the question "why are there so many?" First, standards were not universally available; this resulted in formats being added incrementally as new technology was developed. In instances where new and old technologies were used side-by-side, transmission capacities were limited due to bandwidth limitations, primitive send/receive devices, and overall processing power. These limitations also required the codes to be human readable. In addition, various products had different requirements that affected a product's format. Thus, another change was required. Over the years, as the clientele for weather information has grown and diversified, Dr. Robbins noted that the technology has led to increased transmission bandwidth and improved communications systems. These improvements have, in turn, resulted in diminished need for human-readable products because sophisticated formatting schemes can now readily handle many different encoding/decoding requirements.

In the past, most information was intended for internal use, international exchange, or primarily for the aviation industry. Now, many industries, large and small, are looking for weather information for daily operations and decision–making, such as the surface transportation community. This increased need results in the requirement that data and data products are accessible to the broader spectrum of clientele. Some of the same clients exist (NOAA internal use, FAA, DOD, international organizations, etc.) but new ones are being added (highway interests, other federal agencies, media, industry, researchers, etc). Dr. Robbins suggested that this new clientele could be served through intermediaries (media, Internet providers, and other private providers), or through data provider *push* or client *pull* communications technologies.

This broader clientele interaction requires more open formatting standards for both text and digital data as well as graphic imagery. This data exchange is accomplished by using formats that are easy to adapt to currently accepted standards, by providing the source code for the format to all users, or by having a self-defining format. The multiple transfer standards can be categorized into *push* or *pull* technologies. The *push* technologies can rely on a limited number of standards, but may benefit from a variety of unique data feeds tailored to the intended audience. *Pull* technologies must support a broader range of standards to accommodate the specific requirements of individual requests. An example of Extended Markup Language (XML) is Observation Markup Format (OMF). OMF is an application of XML to describe a particular kind of documentation—in this case for weather observation reports. The format breaks into self-defined units and, thereby, makes the code easy to decipher.

Dr. Robbins noted the following impediments to change: agency resistance, significant retooling costs, compliance to international standards for data exchange (i.e., WMO), constantly evolving standards, and the complexity of a modernization effort. He summarized his remarks with the following: (1) change should be driven by clientele demands and anticipated needs, (2) modernization should adhere to accepted formatting standards, (3) technology is no longer a limiting factor in the deployment of modern data formats, and (4) data formats should be designed within a comprehensive internally consistent system.