

## Session 2B: Interoperability, Compatibility and Accessibility Formatting the Information

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### Synopsis

#### 1. Group Discussion

Overall, the group was supportive of change in order to improve the standards for data formatting. Although the advantages of several existing formats were called to the group's attention, there was no particular reluctance to change from or to make changes to any existing format. The number of data formats being used today is growing, as is the number of weather providers. Particularly in the private sector, the number of formats is cumbersome and is continuing to grow without either limitation or standardization. As the user community grows rapidly as well, there is an increasing need for the sharing of weather information for the greater good of weather users and weather providers alike.

- *Ideal Format Characteristics.* Although it was accepted that the development of one, ideal format may not be achievable or in many cases not desirable, several ideal data format characteristics would improve both existing formats and those that may be developed in the future. The following "ideal" data format characteristics were formulated by the group:
  - Table driven (self-describing)
  - Compressible
  - Machine independent
  - Metadata should be easily available at one standard location (clearing house)
  - Flexible (extensible)
  - Multi-dimensional (the ability to add other parameters)
  - Internationally recognized
- *Constraints.* Changing or revising formats will involve dealing with a certain set of constraints. Although also listed as an ideal characteristic for new formats, decoding information (metadata) will continue to be a required consideration for future data format

development. The group emphasized that if any new format requires an extensive amount of metadata for definition and description, the value of the changes will decrease. New formats that require extensive transition costs will be less attractive, especially in the private sector where profit margin considerations drive change much more than in the public sector. Lead time for implementation will also be a constraint. Data is the lifeblood of any weather information system and is integrated into every database, numerical model, human process, and the like. The time needed for implementation and full integration into operations can be excessive. Operational and cost benefits must clearly outweigh the risks associated with change. As with any major change, success begins with an effective transition plan.

- *The Change Process.* The group also outlined key change process considerations with regard to changing data formats. They are as follows:
  - Determine transition costs
  - Determine lead time for implementation
  - Coordination with all affected agencies (including industry)
  - Use industry standards, if possible
  - Look outside of our own discipline (e.g. the Geographic Information Systems)
  - Ensure a thorough marketing plan.
  
- *Metadata.* With regard to metadata, especially in formatting data, a single point location is needed to acquire the needed information without extensive web searches. The current practice requires extensive searches often with the needed metadata at different locations.
  
- *ICAO.* Although coordinating with international groups is important, it was stated that it would be more effective to reach consensus nationally and then address those issues in the international arena.
  
- *FGDC.* A participant from the group advised us of the existence of the Federal Geographic Data Committee (FGDC). This committee coordinates the development of the National Spatial Data Infrastructure (NSDI). The NSDI encompasses policies, standards, and procedures for organizations to cooperatively produce and share geographic data. The 17 federal agencies that make up the FGDC are developing the NSDI in cooperation with organizations from state, local and tribal governments, the academic community, and the private sector. This committee deals with data issues such as metadata, clearinghouse, standards, framework, and stakeholders. Additional information can be accessed from the committee's website [www.fgdc.gov](http://www.fgdc.gov).
  
- *XML.* The XML format was frequently discussed in the context of industry standards. Although XML is not a standard per se, it allows many functions. However, definition tables and other data are required in order to make XML useful as a format to interchange weather data. In terms of industry standards, XML was considered insufficient. It may, however, be a good start and is generally agreed upon as an example of the type of direction the community should take.

- *Outside our Discipline.* It is beneficial to look outside of our own discipline to both garner and share capabilities. For example, shape files have almost become a de facto standard in describing point data and polygons in order to ensure all affected users and providers are aware of key changes. GRIB and BUFR are good meteorological formats for gridded and point data but they haven't been marketed very well. The addition of tables and identifiers from other types of data could expand these formats for uses in many other disciplines. Those outside the meteorological community, however, are largely unaware of these capabilities.
- *Marketing* is a key component to change that has been overlooked or taken too lightly. Whatever format change actions are undertaken, we must ensure that notification and information is widely disseminated. We need to ensure that the weather community effectively communicates the kinds of accomplishments we have made and the kinds of capabilities already achieved. Meteorology has traditionally been a leader among the earth sciences in the development of data formats and communications formats. For Earth sciences information, we can do a much better job in this leadership role. This includes the responsibility to provide sufficient lead time in order to give users and providers sufficient time to react to changes.
- *Multiple Formats.* A representative from the contractor community provided an example of dealing with multiple formats. In dealing daily with FAA radar data to acquire and deliver radar data into the National Weather Service, he stated that FAA radars have different formats. With regard to the federal highways, there are similar problems with the road weather information system (RWIS) and mesonets. Promoting standards to RWIS and mesonets would allow for the sharing of information for weather services and common platforms of information for public transportation.
- *Lead Time.* The private sector is also keenly concerned with the amount of lead-time required when changes are implemented. The private sector and many other segments of the weather community are not notified of impending changes until just prior to implementation. The industry must then develop and implement software changes under extremely difficult time constraints. When critical development cycles are undertaken for support products, 30 days isn't enough. The recommendation was that as soon as the contract is awarded, industry must be notified. *It must be understood that it is not just government agencies that are affected by these changes. Industry too must be given a realistic lead time for implementation.*
- *Enforcement.* With regard to enforcement of the use of any new format or standard, a DOD representative recommended that one way of enforcement would be to discontinue dissemination of data in old formats once new formats have been coordinated and agreed upon by the community. "You don't ship it in that format anymore, as long as you give someone the option to take it." Although there will inevitably be some customers who will say they are unable to transition to new formats due to system or cost constraints, it would be better to work these solutions individually and not allow these constraints to preclude needed changes for the rest of the community. Many of these customers are believed to be non-U.S. users.

- *Dominant Providers.* The process of determining formats and standards has been largely dominated by the federal agencies (federal agencies are the dominant providers). The commercial sector would benefit greatly if data providers would limit the number of standards to smaller numbers. In both the public and private sectors, if aware of changes well in advance, overall costs will be driven down improving both maintenance and development of new technologies making them quickly available to users and operators.
- *Other Disciplines.* In the process of determining new formats and standards, meteorology is only part of the community that must be included. Other disciplines such as climatology and space data collection must be included and considered.

## 2. Recommendations

- The Office of the Federal Coordinator for Meteorology (OFCM) should take the lead in coordinating format improvement changes among the stakeholders: federal agencies (e.g., DOT, NWS, DOD), Industry, the Commercial Weather Services Association, and the American Meteorological Society (AMS).
- OFCM should begin by making a call for comments at the upcoming AMS meeting (Jan 2002) to garner feedback from the meteorological community at large as to whether there is thought to be an overarching need for change.
- The change process should proceed as quickly as feasible. Of concern is the extended length of time it will take to implement change.