

THE CANADIAN AVALANCHE ASSOCIATION INFORMATION SYSTEM PROJECT

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ABSTRACT: The Canadian Avalanche Association (CAA) is in the process of developing a comprehensive system for the exchange and storage of snow avalanche related information. This system will create a common platform for professional and public information exchanges that will open doors to a wide array of possibilities for data sharing, viewing and analyzing. This article presents the principles and philosophies underlying the data system and gives a short summary of the current state of the development.

KEYWORDS: information system, XML standard, CAAML

1. BACKGROUND

The Canadian Avalanche Association (CAA) is in the process of developing a comprehensive system for the exchange and storage of snow avalanche related information in Canada. This process was begun in the spring of 2003 with the formation of an ad-hoc Information Technology (IT) committee whose initial mandate was to define standards for electronic exchange of avalanche related information. This initial committee was composed of representatives from different segments of the industry. Thanks to the initiative and efforts of this initial IT committee, the foundation has been laid for a cooperative system using new technologies to share information within the avalanche community and with the public.

The IT committee has since been made into a standing committee, which continues to represent the information requirements of different segments of the industry. The authors were contracted by the CAA to coordinate the development of an integrated information system for all avalanche related information, and several sub-contractors have been engaged to implement the different aspects of the system.

2. INFORMATION SYSTEM

In the following sections, we will briefly elaborate on the different main features of the information system.

2.1 CAAML

CAAML stands for CAA Markup Language and represents a standard for structured electronic exchange of avalanche related information. This standard is defined in a universal computer language named XML (eXtensible Markup Language), which is a cross-platform and text-based standard for representing data. One of the main advantages of XML over other data representations is that metadata is directly included in the data format, making the resulting files readable for humans.

The CAAML specifications are based on and closely tied to the Canadian Observation Guidelines and Recording Standards (CAA, 2002). Location information and references are modeled to be compatible with GML, the XML standard for geographic information (OGC, 2004). An initial version of the specifications was released in 2003/04 and we are continually working on extending and refining it.

The CAAML is at the heart of the information system as it allows different computer systems and applications to communicate with each other. While the development of the CAAML is funded and directed by the CAA, the definition files (XML schema files) are open-source and available at <http://www.avalancheinfo.net/caaml>. Developers in the avalanche community are encouraged to use CAAML for data storage and/or exchange. A documentation of the CAAML and a guide of best practices are currently in preparation.

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2.2 Database system

A set of databases maintained by the CAA, will contain all avalanche related information that reaches the CAA. The sources of this information include both professional observers and a public observer network. These databases will ultimately include public avalanche bulletins, standard observations and subjective comments from professionals, observations from a public observer network, a library of photographic images of terrain and avalanches, avalanche incident and accident data, and a Geographic Information System (GIS) based catalog of terrain information.

2.3 Web server

A web server for the exchange of avalanche information has been developed. CAAML files can be submitted and retrieved using standard http post and get requests. A list of http parameters allows definition of specific data queries. Avalanche safety programs with existing information systems, such as Canadian Mountain Holidays or and BC Ministry of Transportation, are able to directly interface with the web server using these commands.

At this point in time, a server has been developed for the professional information exchange among avalanche safety programs in Canada (InfoEx). It is intended that the existing server will be extended in the near future to also support public avalanche advisories and potentially information from the public, such as general avalanche observations or recreational incident reports.

2.4 Interface tools

Interface tools are computer programs that allow participants to input their observations, submit and retrieve CAAML files, and view and display the information. These interface tools can be developed using a wide range of different technologies. The CAA intends to provide basic tools for participants of specific services provided by the CAA (e.g., InfoEx and public bulletins). It is, however, the hope that different user groups in the avalanche community will develop their own applications that are directly tailored to their specific needs. Due to the usage of CAAML as a common platform, it will be possible to exchange and/or combine different tools seamlessly. With an open-source approach, we hope to create an innovative environment for the development of new tools for recording and presenting avalanche related information.

3. OUTLOOK

The successful history of the industry information exchange in Canada (InfoEx) has proven the benefits of information sharing. The new system will enhance the exchange and extend the benefits of information sharing beyond the confines of the confidential industry information exchange. The use of more modern technologies will also improve the security of the industrial information exchange.

Once the information system is in place, the doors will be open to provide a surprising array of options for viewing the information. Tables of numbers will be replaced with visual displays in the form of graphs and maps that show the big picture at a glance. These visual displays will be interactive, and a few mouse clicks will focus down on underlying details of interest without getting bogged down in mountains of unrelated information.

The databases at the CAA will be a boon to researchers, and both public and industry will benefit from research based on the information contained there.

We expect that it will take about five years before all of the elements of the information system are complete and functioning smoothly. Our initial focus has been on the background work required by the system. We have released an initial version of the CAAML and are continuing to refine and extent it. A data model for the CAA databases has been specified and we are starting to bring historic information into these databases. A web server and interface tools have been prototyped for the InfoEx and will be used this season, and the CAA web site is being rebuilt with plans to mesh with the information system in the near future.

So far, this project has experienced an incredible amount of cooperation and support from the entire avalanche community. We anticipate that this spirit will continue to grow and that the resulting information system will benefit all who choose to travel in the mountains.

4. ACKNOWLEDGMENTS

The initial IT committee consisted of Jeff Goodrich (committee chair, Parks Canada), Jan Bergstrom and Mark Myhre (Canadian Mountain Holidays), Pascal Haegeli (University of British Columbia), Evan Manners (Canadian Avalanche Centre), and Simon Walker (BC Ministry of Transport).

5. REFERENCES

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