



THE SOUTHERN ONTARIO LIGHTNING MAPPING ARRAY

The 2015 Pan American and Parapan American Games will take place this year in Toronto and surrounding areas from July 10-26 and August 7-15, respectively. The Toronto 2015 Games is the largest multi-sport event Canada has ever hosted, involving 7,600 athletes competing in 51 sports (36 Pan Am and 15 Parapan) in 30 different venues located in the Greater Golden Horseshoe Area. Environment Canada is providing state-of-the-art, 24/7 dedicated, venue-specific weather alerting services and environmental emergency support for the Toronto 2015 Games. The TO2015 Games are also a catalyst for enhancing existing weather services through research and demonstration projects that will benefit future generations of Canadians.

What does the technology do?

Lightning Mapping Array technology allows for high-resolution 3D detection of “total lightning,” meaning both cloud-to-ground and in-cloud flashes. This cutting-edge technology was first implemented in the United States for lightning detection across areas with a high risk of severe thunderstorms.

What's new about the technology?

Our Southern Ontario Lightning Mapping Array (SOLMA), the first application of this system in Canada, consists of 14 ground stations in the Greater Golden Horseshoe Area tied to a central computer that processes and integrates the data. SOLMA has a detection efficiency of 100% within the array and has very fine

temporal and spatial resolutions (on the order of nanoseconds and tens of metres, respectively). During the Games, these data will be available to Environment Canada Research Support Desks, Ontario Storm Prediction Centre forecasters, and the two briefing teams.

How is the new technology better?

SOLMA excels at the detection of total lightning, which will assist forecasters and researchers in improving their understanding of the spatial extent and the evolution of a storm. It is anticipated that SOLMA data will benefit weather forecast operations given that recent studies have shown that a rapid increase in total lightning activity, termed a lightning jump, often precedes the occurrence of severe weather.



What is the legacy for Canadians?

Environment Canada will develop methods based on SOLMA information to improve the accuracy and lead time of severe thunderstorm and tornado warnings. This system will also permit Environment Canada research scientists and meteorologists to gain experience with an understanding of total lightning. An increased amount of total lightning data will soon be arriving via upgraded Canadian Lightning Detection network sensors and the Geostationary Lightning Mapper aboard the soon-to-be-launched GOES-R satellite.

