CRUISER

(CANADIAN REGIONAL AND URBAN INVESTIGATIONS SYSTEM FOR ENVIRONMENTAL RESEARCH)

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?

Environment Canada conducts mobile air quality research using a specially equipped truck fitted with advanced air pollution measuring instruments. This mobile lab is called the Canadian Regional and Urban Investigations System for Environmental Research, or more commonly referred to as CRUISER. The CRUISER will be deployed during the Pan Am Games to conduct air quality measurements of air pollutant levels near pollution sources (traffic), and between fixed monitoring stations.

The CRUISER mobile laboratory will measure multiple air pollutants at fixed locations and conduct mobile surveys within the region. The data will be used for:

- More detailed mapping of ambient air pollution levels to help predict what individuals residing in the GTA and surrounding area are typically exposed to;
- Evaluating our updated air quality prediction model (GEM-MACH) which will forecast at a 2.5 kilometer resolution;
- In-depth case studies related to the interaction between lake breezes and air pollutants; and
- Supplement information from four new air quality monitoring sites being installed by Environment Canada in partnership with Ontario Ministry of Environment and Climate Change to better understand traffic related pollution during the Games.

What's new about the technology?

CRUISER is going to be outfitted with new instruments to better measure two key pollutants associated with vehicle emissions; gaseous nitrogen dioxide and particulate black carbon. Having high quality measurements of these pollutants is important because they are components of urban air pollution created by traffic, which have been associated with negative health effects. Additionally, nitrogen dioxide levels are one of the main factors used to calculate Canada's Air Quality Health Index (AQHI) rating.

How is the new technology better?

These new instruments can measure in near real time; hence they are able to keep up with the movement of CRUISER and they are less prone to the influence of factors that impact accuracy. These improvements will provide us with the information needed to develop the most detailed maps of air pollutants created to date covering the largest area, and also with unique data to validate our recently updated air quality forecast model.

What is the legacy for Canadians?

The mapping exercise being launched with CRUISER's work during the Pan Am Games and continuing after the Games will contribute to the development of air pollutant concentration maps expanding to cover an area from Burlington to Oshawa and as far north as Newmarket. These maps help document ambient air pollutant concentrations for at least 9 different pollutants across the region, more than had ever previously been mapped, to allow for better study of the impacts of these exposures on populations and their health. The data gathered will also serve to aid in the continuous refinement of our air quality forecast model GEM-MACH.

The Games serve as a catalyst for Environment Canada to begin this mapping work, which will be published in scientific journals and be of significant benefit to Canadians by helping to improve air quality forecasting and inform collaborative efforts to enhance understanding of exposure and health impacts.