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Canadian technology extends radar's reach over Atlantic; Oceanic air traffic management will save fuel, bring huge reductions in greenhouse gas emissions

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A whopping 1.3 million square kilometres of isolated North Atlantic airspace, until recently inaccessible to ground-based air traffic control radar, has been conquered by Canadian technological know-how.

Nav Canada, the company that controls Canada's civilian airspace and the skies over the western half of the North Atlantic, recently switched on advanced new surveillance technology that allows Canadian air traffic controllers to see the precise positions of many of the big jets that carry thousands of passengers daily across the busiest oceanic airspace on the planet.

Known as Automatic Dependent Surveillance-Broadcast, or ADS-B, it gives oceanic controllers in Gander, Nfld. instantaneous information about many of the airliners they guide across the North Atlantic and the ability to give those pilots more timely conflict-resolution and other traffic and routing information.

That in turn allows airliners to fly more direct and fuel-efficient tracks, which **Nav Canada** says promises huge reductions in aviation fuel costs and greenhouse gas emissions.

The technology has been integrated with a state-of-the-art, made-in-Canada oceanic air traffic management system that went operational at Gander last year, making Canada the world leader in oceanic air traffic control advancements.

"The oceanic controller in Gander today has a much different picture than they did five years ago and the safety benefits that come with that are second to none," said Rudy Kellar, **Nav Canada**'s vice-president of operations.

Meanwhile, "the worldwide aviation industry is not only going to get a major safety benefit but economic efficiencies and a lower greenhouse gas footprint."

Air-traffic control relies on two types of navigation: positive and procedural. Positive control tracks a plane on a radar scope. When radar is not available, procedural control is used, with pilots reporting their positions to the oceanic centres at Gander or Prestwick, Scotland every several minutes, typically via high frequency radio.

But procedural control means controllers have had to put bigger "safety bubbles" - lateral and vertical separation - around planes, since their exact, real-time position can't be tracked until they reach radar-controlled airspace closer to the coasts.

ADS-B is a surveillance system that combines satellite links, onboard equipment and ground infrastructure to give air traffic controllers the same kind of information provided by radar.

It was first deployed in Canada over Hudson Bay in 2009, covering over 850,000 square kilometres, with a second phase employed in northeastern Canada in 2010, which added more than 1.9 million square kilometres.

Now, for the first time, positive control is extended over a wide piece of the western North Atlantic. Trials are underway to equip European oceanic controllers with the technology, too.

ADS-B-equipped planes can automatically broadcast their Global Position System (GPS) positions every second to four new **Nav Canada** tracking stations in southern Greenland. Oceanic controllers at the Gander Area Control Centre can then safely reduce separation standards for those aircraft from approximately 80 nautical miles (NM) to 10 NM initially and to a planned five NM later this year.

It means controllers will have greater ability to provide aircraft with more flexible, cost-effective flight profiles, including earlier climbs (through previous procedural-control airspace) to more fuel efficient altitudes, and significantly increase the capacity of the trans-Atlantic corridor.

Combined with the first two phases of ADS-B, intercontinental flights can travel through about 3,300 kilometres of safer, more fuel-efficient positive-control airspace that did not exist three years ago.