

Forecasts for Flying

A short history of
aviation weather services

by Morley Thomas

The needs of aviation have played a large and significant role in the development of meteorology. More than a century ago, before the advent of modern aviation, meteorological services were launched by governments largely in response to public demands that they do something about the great losses of life and property from severe storms at sea and on inland waters. But, the science and practice of meteorology would not be financially supported to any great extent until much later when demands for aviation meteorology were loudly made.

1920s, the advent of wireless radio made possible the collection of observations in real time from northern and isolated coastal locations. This allowed meteorologists to improve their storm warnings, marine forecasts and public weather forecasts.

During the Great War, meteorology was not considered to be essential, and the service suffered. But some meteorological instruction and weather forecasts were provided for pilot training by the Royal Flying Corps and for operational flying by the U.S. Naval Flying Corps in Nova Scotia. After the war, forecasts containing little more information than could be found in the daily newspapers were provided to some air force bases. At the end of one flying season, the officer responsible for flying operations wrote to the director of meteorology advising that, "from the pilot's point of view the weather reports are not quite satisfactory."

But at the time, the Meteorological Service had no mandate for aviation meteorology and certainly no resources. Even if these had been available, the meteorologists of the day lacked the observations, the meteorological theory and the methods of preparing meaningful aviation forecasts. However, the situation began to change in the late 1920s as the aviation industry expanded rapidly and the demands for meteorological services grew louder.

The first \$30,000 allocation for aviation meteorology was made in 1927-28. However, for political reasons arising from an Empire-bonding airship program, the money was largely spent in preparing services for the flight of the airship R-100 from Britain to Canada. After this highly successful flight took place in the summer of 1930 the Meteorological Service then began a major effort to serve the air mail flights on the prairies and in eastern Canada.

In the air mail weather service, a dozen or so new airport observing stations were opened, and two meteorologists began training to staff a proposed aviation forecast office at Winnipeg. The air mail pilots were given weather observations gathered by teletype but no real aviation forecasts. For example, on one specific day, the public forecast for the three prairie provinces read, "Mostly fair



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Pat Ryan, an aviation weather observer at Vancouver's Sea Island airport prepares to take a pilot balloon observation, circa 1936.

The primary purpose of the new Meteorological Service, launched in 1871 with a grant of \$5,000, was to provide storm warnings along the Atlantic coast and on the inland waters. Since weather knows no national borders, a necessary data exchange by telegraph was commenced in 1872 with the Americans. Four years later, the Toronto central office began to issue both storm warnings and general public weather forecasts for the populated areas of eastern Canada.

Over the next five decades, the service expanded across the country with the westward spread of the telegraph, railways and settlement. By the early

today and Tuesday; not much change in temperature." Then, within a year or two, the Great Depression began to bite deeply into the Canadian economy and the post office found it necessary to cancel most air mail contracts. Funding for aviation meteorology was eliminated and the air mail weather service offices were closed.

The Director of Meteorology realized that demands for service from the aviation sector would continue to increase, and that he had better be ready when the economy began to turn around and money became available for aviation meteorology. With the University of Toronto, a graduate course in meteorology was commenced in 1933 using the new scientific meteorological theories and methods of analysis and forecasting. Then, when the Meteorological Service became part of the new Air Services Branch of Transport in 1936, resources were available to hire the graduates and establish district aviation forecast offices at Vancouver, Winnipeg, Toronto and Montreal to serve Trans Canada Airlines (TCA) as the airline commenced service across Canada within a year or two. By 1939, there was not only a string of several dozen weather observing stations at airports and radio range stations across the country, but there were also three-dimensional aviation forecasts giving weather, winds at different levels, cloud and ceiling, the chances of icing and thunderstorms and terminal temperatures, winds and visibility.

There was another aviation development in the 1930s that called for new meteorological techniques and skills. This was the experimental trans-Atlantic flying boat program which required forecasts over the north Atlantic, an area from where few if any observations were available. Flights by British and American craft began in the summer of 1937 with meteorological services provided by Canada at Botwood, Nfld, and Montreal.

Meteorological expansion to serve aviation had been rapid; in Sept 1939, there were 30 or so meteorologists working full time in this sector. Then, with the advent of the British Commonwealth Air Training Plan, the RCAF asked for 27 meteorologists. But, flying training increased so rapidly that, by 1944 more than 370 new meteorologists had been hired and trained for military aviation services. These men were posted as civilians to the scores of RCAF training bases, to home war operational units on the coasts and the north west staging route. The main aviation forecast centres (which grew in number from five to 16 in wartime) provided forecasts for TCA and RCAF operations on

the coasts. At the RCAF flying training bases the meteorologist provided short term forecasts and gave courses in meteorology to aircrew in training.

After the war the RCAF needs were drastically reduced and no longer were individual forecasts issued for each TCA flight. In 1950, a central analysis office was set up and shortly, facsimile



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maps were transmitted across the country. With the availability of computers, numerical weather prediction methods were developed and used. Upper air observations were improved and then automated. In the 1960s, satellite pictures became available to assist in analysis and forecasting. High-speed communications were introduced for the transmission of observations and forecasts. Computer-generated forecasts of winds and temperatures aloft became available to assist in selecting optimum routes and loads. Weather radar had been continually improved and now Doppler radar techniques would greatly assist in forecasting storm movements.

Just 60 years ago, both Canadian meteorology and aviation were entering a period that was to see major expansions. Aviation meteorology became the dominant sector in the Meteorological Service and a most valuable aid to aviation. Now, to some, the relationship between aviation and meteorology may not seem as important as it once was. But as long as flying takes place within the atmosphere and meteorology remains the science of the atmosphere, the relationship must remain close. ☉

(Ed note: Morley Thomas of Toronto is a former meteorologist with the Atmospheric Environmental Service, and the author of the book "Forecasts for Flying," ISBN 1-55022-303-8.)

The airship R-100 moored at St. Hubert airport near Montreal, Aug 1930. Note the mail plane leaving the airport for Rimouski.