## New developments in STOL

# Destination high speed flight

*The National Aeronautical Establishment is cooperating with industry and NASA in research on a new high-speed STOL aircraft.*

Canada, a leader in short-take-off-and-landing (STOL) aircraft technology, is participating with the United States in a program of research on a new jet STOL aircraft using the aerodynamic concept called "augmentor wing". This concept, which is one means of providing STOL performance for jet aircraft, was pioneered by de Havilland Aircraft of Canada, which already has a worldwide reputation for its Beaver, Otter, Caribou, Buffalo and Twin Otter aircraft, all capable of operating from small airfields with runways well under a kilometre in length; runways at major jet airports are typically about 3 km long, sometimes more. Over 700 Twin Otters have been produced and are operating in more than 75 countries. Now, the larger, four-engined Dash 7 STOL transport aircraft is in production. Among the companies ordering the Dash 7 are six of the ten largest commuter airlines in the US; one of these is flying regularly to and from Washington National Airport, guided around other air traffic through specially designated air corridors onto segments of otherwise inactive runways. This illustrates a major attraction of the STOL aircraft —it's ability to operate without making additional demands on airport facilities which are most readily saturated.

STOL aircraft performance has always entailed a sacrifice — cruising speed. The slow flying capability required — about 70 knots — to operate from small airfields has been achieved by using large wings, developing high lift with the aid of conventional flaps. But efficient *high speed* flight requires much smaller wings.

On very short flights low cruising speeds may be acceptable. On longer flights, however, higher cruising speeds comparable to those of jet transports are of great importance to both commercial and military aviation. Fast STOL transports are particularly attractive to military planners who are becoming inceasingly concerned with the vulnerability and geographic scarcity of large, conventional air bases.

What are the prospects for designing new STOL transport aircraft which are capable of high cruising speed? During the last two decades, research has led to the technology for achieving this objective. To attain high cruising speed a smaller wing is

**The experimental augmentor wing, jet STOL — a modified Buffalo aircraft — turns to its landing approach with its special flaps and swivelling exhaust nozzles positioned down. Most of the flight experiments in California have been carried out using the facilities operated by NASA at Crow's Landing, a U.S. Navy airfield in the San Joachim valley east of San Francisco Bay. The program is jointly funded by the Department of Industry, Trade and Commerce and NASA and receives direct support from the National Research Council of Canada through the participation of staff from its National Aeronautical Establishment. De Havilland Aircraft of Canada, with assistance from Rolls Royce (Canada), has provided a major input throughout the program.** *(Photo: NASA)*

**L'avion à réaction expérimental à aile à volets trompes, version modifiée du Buffalo, vire pour entrer dans son circuit d'atterrissage avec ses tuyères et volets spéciaux braqués vers le bas. Pour la plupart des essais en vol en Californie on s'est servi des installations de la NASA, à Crow's Landing, aérodrome de la marine américaine situé dans la vallée de San Joachim, à l'est de la baie de San Francisco. Le programme est financé conjointement par le ministère de l'Industrie et du Commerce et la NASA et bénéficie d'une aide directe du Conseil national de recherches du Canada sous la forme d'une participation du personnel de son Établissement aéronautique national. La de Havilland Aircraft of Canada, avec l'assistance de Rolls Royce (Canada), a apporté une contribution majeure à l'ensemble du programme.** *(Photo: NASA)*