

New Arrow Flies Exactly To Avro Plan

By JAMES HORNICK

The world's largest jet interceptor, closely pursued by two photographic planes, roared smoothly into a clear sky at Malton Airport yesterday on its maiden flight.

When it touched down 35 minutes later, a brake parachute streaming from its tail, the airliner-size Avro Arrow had performed as predicted.

Announced James Floyd, vice-president in charge of engineering for Avro Aircraft Ltd.: "Everything went exactly to plan."

Commented Test Pilot Jan Zurakowski, a man noted for his understatement: "It handled nicely. There was no unexpected trouble."

Said Avro Executive Vice-president John Plant of Mr. Zurakowski: "He was the only one who wasn't nervous."

The Arrow was publicly unveiled on Oct. 4, the day Russia launched Sputnik I, but a succession of technical difficulties delayed the flying program. A flight planned for Saturday was cancelled due to an oil leak.

For the 9,600-member Avro staff, the first flight was the highlight of four year's work. A tremendous cheer went up from men along the flight line as the Arrow was taxied back to its hangar.

From the moment of take-off a ripple of excitement swept through the plant, sending production and office workers stampeding to windows and doors. It was nearly an hour before calm was restored.

Development flying is now expected to continue at a gradually increasing pace until, an estimated two years hence, the design has been refined sufficiently to permit large-scale production for the RCAF.

About \$200,000,000 has been expended on the Arrow and the engine which will eventually power it, the Orenda Iroquois. Early models are equipped with less powerful engines built in the United States.

Prime Minister Diefenbaker has said that each Arrow entering squadron service will represent an investment of about \$4,000,000. The delta-wing design is projected as the successor to the Avro CF-100.

At no time yesterday was an effort made to extract high performance from the twin-engine craft, which is designed to fly in the region of 1,500 miles per hour and to climb to 12 miles'

altitude in four minutes. Those tests will come later.

Pilot Zurakowski started his take-off run from the end of Malton's 11,000-foot north-south runway. No special dispensation was granted by the civil authorities who operate the airport. The test was dovetailed into the normal pattern of landings and take-offs.

When the Arrow had attained 184 mph, its needle-sharp nose high off the ground, it began lifting. It was airborne at 9:51, black smoke from the kerosene-blend fuel pluming behind.

Almost directly above and close behind were the photographic planes, a twin-jet CF-100 and a swept-wing Sabre. They had been circling low over the runway until Mr. Zurakowski released the brakes and began his rapid acceleration.

In the CF-100 was Avro Test Pilot Spud Potocki, a fellow Pole, who had flown fighters with Mr. Zurakowski in the Battle of Britain. In the Sabre was Flt. Lt. Jack Woodman, an RCAF test pilot, who had crash-landed a CF-100 at Malton the previous evening.

The Arrow climbed on a northerly course, with its tricycle undercarriage still down, at 3,000 feet per minute. The dart-shaped, white-painted silhouette was stark against the blue sky. The wheels were retracted at 5,000 feet and the gentle climb continued to 10,000 feet. Maximum speed was 345 mph.

On the ground, Avro officials nervously paced back and forth, glancing alternately at the sky and at their watches. Engineering Vice-president Floyd busied himself taking motion pictures. As word of the flight filtered out, scores of cars began lining the airport perimeter.

Mr. Zurakowski, meanwhile, was carrying out a split-second schedule of instrument checks prescribed at a pre-flight briefing. In the Arrow's weapons bay, automatic equipment was recording every movement, every sensation and relaying it by radio to the ground.

Finally, after what seemed an interminable interval, but at precisely the time established in the briefing, the three planes reappeared from the north. One at a time, the Arrow taking precedence, they slipped into the landing circuit.

The Arrow settled on the runway at 184 mph and, as the speed decreased, Mr. Zurakowski released the brake parachute. Before losing all momentum he turned onto a taxi strip and headed for the hangar.

Later, the normally inscrutable pilot, his cheeks rosy, his sparse hair tousling in the breeze, permitted himself a smile as he posed with members of the ground crew.

To describe the Avro Arrow as a complex aircraft would be an understatement.

Fully loaded, it weighs 30 tons. It contains 33,000 parts, as compared with 13,000 in the CF-100 fighter. Its length is 77 feet, 9 inches; wingspan, 50 feet. The cockpit is 14 feet, 6 inches off the ground and the tail towers 21 feet, 3 inches.

Its twin engines generate twice as much power as is required to propel the liner Queen Mary. This is almost sufficient to lift the aircraft off the ground vertically. Fuel is consumed at the rate of more than a quarter-ton per minute.

Jet power is measured in pounds of static thrust. At 375 miles per hour, one pound equals one horsepower. Above 375 mph, thrust power becomes greater until, at 750 mph, one pound of thrust equals two

horsepower. Thus, at 750 mph, the Arrow generates 120,000 hp.

Hydraulic mechanisms required to operate the Arrow's controls at high speed are sufficiently powerful to lift the

equivalent of six elephants standing on the elevator surface.

Wiring extends for 11 miles and the various electronic systems utilize enough vacuum tubes to equip 200 standard television receivers.

At 1,200 mph, air friction raises the temperature of an aircraft's outer skin by 300 degrees Fahrenheit. Even at high altitudes, with the outside air temperature at 50 degrees below zero, the skin temperature is still 240 degrees Fahrenheit—above the boiling point of water.

At such a speed, at high altitudes, the canopy enclosing the pilot and navigator would start to blow out like bubble gum—because of high temperature caused by skin friction, plus the fact that the inside of the canopy is pressurized. For this reason the Arrow utilizes a windshield of tempered glass about an inch thick.

The air-conditioning system must be capable of handling temperature changes of 100 degrees a minute. The system's

refrigeration capacity is equivalent to 50 standard room air-conditioners and could produce as much as 23 tons of ice a day.

The Arrow's gleaming coat of white paint is not for show. It was applied as protection against atomic radiation.