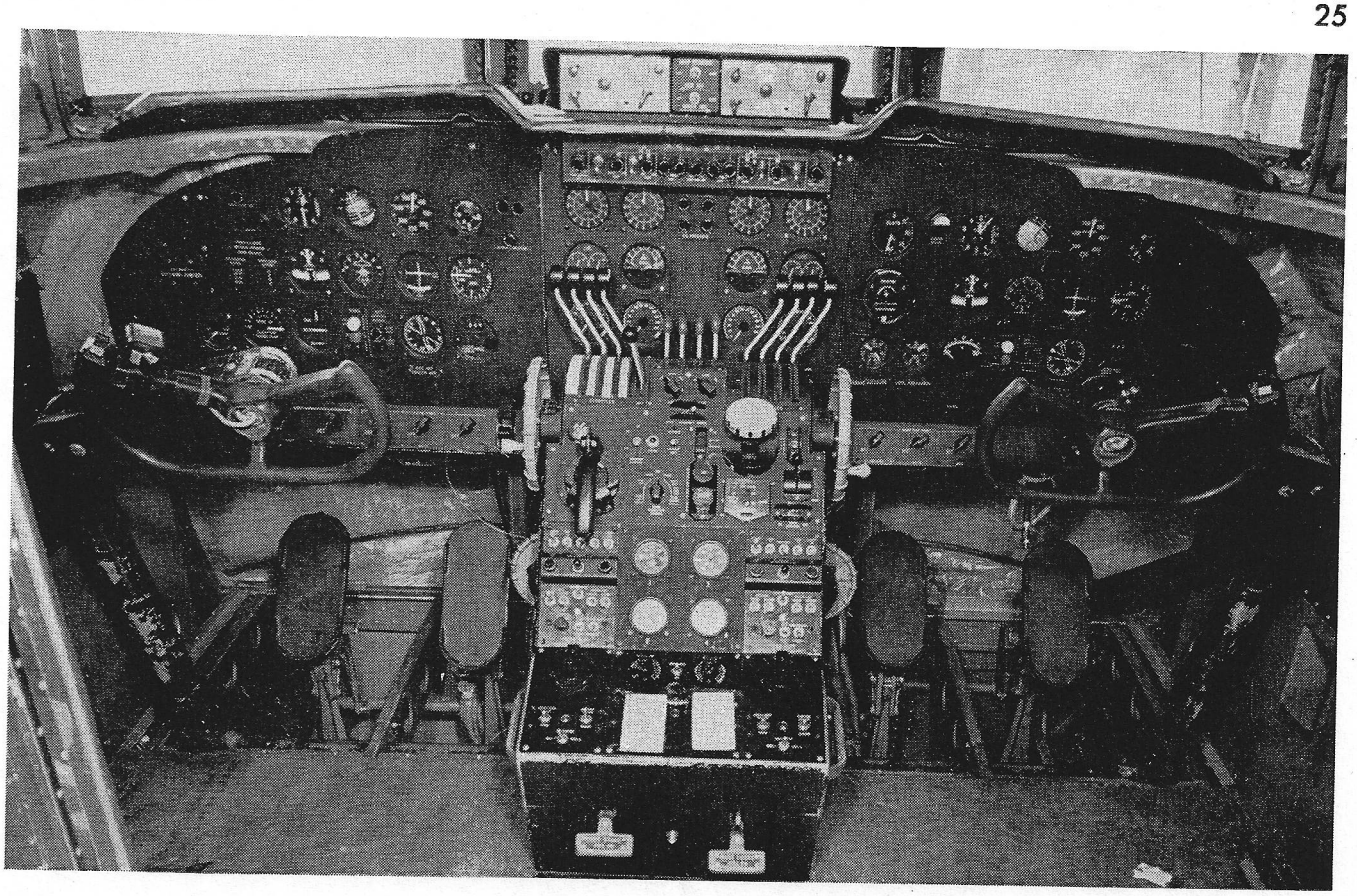

Progress Report: AVRO JETLINER

WITH more than 25 test flights in the log and a few modifications in the works, a progress report on the Avro Jetliner (C-102) prototype reveals new and interesting information about the Canadian-designed pioneer. Increased tankage will give the aircraft a range of 1,200 miles (with payload of over 10,000 lb.).

Response of the aircraft at all speeds is reported to be very good, the controls are light and co-ordination is excellent, according to the test pilots. Synchronization of the engines in flight is not the important consideration it is with piston power plants as the usual beat of unsynchronized props does not occur with the jets. Altogether, the aircraft is very easy to fly and should present no conversion problem for piston pilots.

Simplicity of the cockpit layout is apparent in the above photograph. With reference to this illustration, the following description will give the reader some idea of what is involved in flying the jet airliner.

The central pedestal is surmounted by dual sets of four throttles. Between them can be seen the fuel selectors and low-pressure controls. The trim controls, also on the pedestal, are conveniently located and operate in the logical planes. Elevator trims are the large dual wheels on either side of the pedestal just below the throttles. Rudder trim is controlled by the circular disc below the co-pilot's throttle cluster.

Automatic pilot controls, undercarriage and flap selector switches, and radio panel also occupy the pedestal. At its base are the parking brake lever and the gust lock control.

The undercarriage selector is a push-button for "up" and "down." Flap control is a pre-selector type. It is simply set to the number of degrees. The flaps lower to that position and stop automatically.

Normally the undercarriage will not retract with the weight of the aircraft on the wheels, but in an emergency the pilot could retract his wheels on the ground by operating the over-ride switch.

Also on the pedestal is an emergency hydraulic panel for undercarriage and flaps.

The flight instrument panels, for pilot and co-pilot, are standard and resemble those in the North Star. To the left of the pilot's instrument panel is the nosewheel steering knob. The operation is electro-hydraulic.

When it is switched off, the nosewheel casters and the brakes can be used for taxiing.

Across the top of the central instrument panel is a diagram of the fuel system with warning lights. Beneath this are the tachometers, jet pipe temperature gauges, burner pressure gauges, and fuel quantity indicators. The oil pressure warning lights also are on this panel.

The fuel system is remarkably simple. The diagram obviates the necessity of memorizing the fuel flow system. All selections can be made before starting and normally the only action required in flight is to turn off the transfer pumps when the outer tanks run dry. Fuel can be cross-fed in any way required.

The normal setting is: fuel selectors to inboard tanks, low-pressure

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ABOVE:—Cockpit of the Avro C-102 Jetliner.

Progress Report On the Jetliner

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cocks on, fuel boosters on for all four tanks.

At the base of the central windscreen is a panel containing the radio compass indicators and controls.

Overhead, and not visible in the picture, is the electrical, starting and fire-warning panel. The fire extinquisher warning lights are grouped diagrammatically.

The pressurization panel is in the wall to the left of the pilot, while the heating controls are in the wall to the right of the co-pilot. On the vertical wall behind the co-pilot is the main electrical panel. The radio circuit breaker panel is behind the pilot. Both are within easy reach in flight.

Starting Procedure: 1. Fuel selections; 2. Starter safety switch; 3. Booster coil switch on; 4. Engine selector; 5. Press starter button and hold for two seconds; 6. When engine starts turn on high pressure cock with throttle fully closed. Engine will pick up to idling rpm, 3,500.

Maximum take-off revs. for the jets is 14,700 rpm. Max. continuous is 14,-100 rpm. The approach usually is made with 7,500 rpm which gives good throttle response.

Taxiing requires about 8,000 to 9,000 rpm to start rolling, after which about 5,000 rpm gives a comfortable speed. No difficulty has been experienced with either heat or air blast from the engines so far as ground crew or other aircraft are concerned. Nose wheel steering is provided, and the aircraft handles very easily on the ground.

The cockpit check is very simple, and no engine run-up is required until actually in position for the take-off, at which time all four engines are opened to full power, and a quick check is made of rpm temperatures, pressures, and generators, brakes are released and the take-off is carried out.

Once in the air, the Jetliner continues to accelerate very quickly, and the speed and high rate of climb, with no vibration, and very little noise, has been an unusually pleasant experience for pilots and crew. The rate of climb at sea level is over 2,500 ft. per minute, and is still 1,000 ft. per minute at 30,000 ft. The average best climbing speed is approximately 225 IAS, so that 22 minutes after take-off the aircraft is at 30,000 ft. and has traveled 90 miles. It trims out well, and does not require unduly

close attention to hold the desired speeds.

In level flight a true airspeed of 500 mph has been exceeded, and it now appears that the estimated cruising speed will be approximately 450 TAS with an IAS of about 275 at 30,000 ft.

The aircraft structure has been designed to withstand high gust loads, and rough air feels less uncomfortable at relatively high speed than in conventional transport aircraft at normal speeds. The bumps are sharper, and can be felt in the airframe, but do not seem to disturb one physically because of their short duration, and because of the elimination of wallowing. One does not have the feeling of being lifted off the seat. The cockpit noise level is so low that conversation can be carried on quite easily between the pilots. Headphones are not required for radio contact, and a loud speaker with the volume turned well down is ample.

The effectiveness of the landing and dive flaps of the split type is greater than originally calculated. At a later date, however, double slotted flaps are being fitted for comparison tests. The rate of descent with the use of the present dive flaps is over 2,000 ft. per minute at 200 IAS. The aircraft does not assume an uncomfortable fuselage angle and with cabin pressurization, and some proposed increase in dive play area, an even higher rate of descent will be possible without passengers being aware of it.

When approaching to land a long flat "final" is not required because enough drag has been built into the flaps to make possible an entirely normal selection of approach angles. An airspeed of about 125 mph and 7,500 rpm gives a good attitude and rate of descent, and at this rpm the engine response is excellent in the event of a baulked approach. The small change of trim is very easily handled with one hand, and the absence of the sudden noise and vibration usual when opening up piston engines to make another circuit is most pleasant to the pilots.

Take-off length is comparable with conventional transports. At 57,000 lb. the take-off runs have averaged 1,500 ft. to 2,000 ft. With heavier loading the runs, of course, will be correspondingly longer. With a landing weight of 44,000 lb., a landing has been made with a run of less than 1,000 ft., indicating the performance possibilities of the aircraft.