CHAPTER 6

GLIDING—VENTURE T2

The purpose of this chapter is to tell you something about Venture and to give you an idea of what it is like to fly.

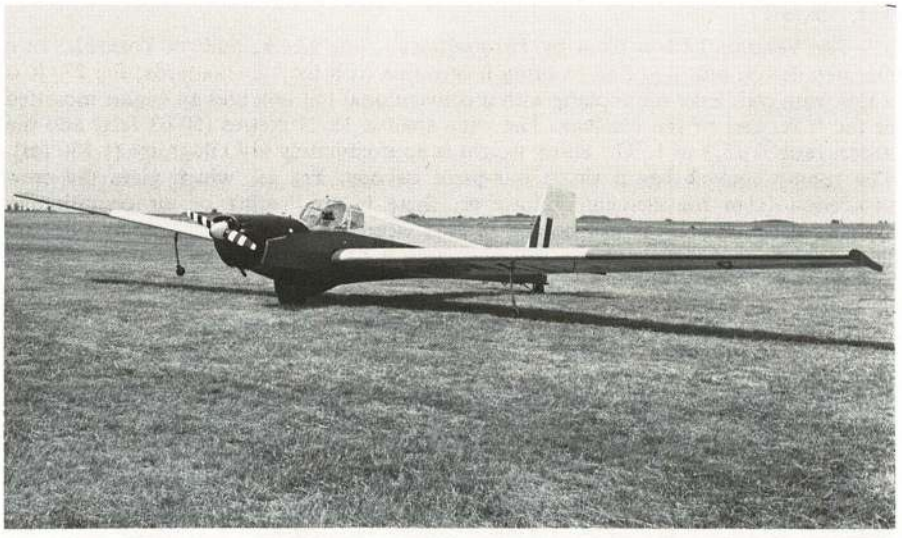

Fig 27 Venture T2

Introduction

1. Air Cadets introduced the Venture T2 to its fleet in 1977, and 11 gliding schools are equipped with three aircraft each. The remaining schools, currently 16, continue to operate winch launched Kirby Cadet, Sedbergh and ASK 21 gliders as described in Chap 5. The Air Cadets Central Gliding School at RAF Syerston operates both Venture and conventional winch launched gliders.

2. The Venture differs from other Air Cadets gliders in that it has an engine and propeller with which it can launch itself instead of using the winch launch system. The normal method of operation for the Venture is to taxi, take off and climb under its own power to a height selected by the instructor for the particular exercise and then to idle or switch off the engine and for the aircraft to become the glider that it really is—a glider in which to train cadets in the effect of controls, turning, stalling, circuit flying, approach and landing, *etc.* It is also a glider that will soar, given reasonable soaring weather. The Venture climbs slowly but although it takes some 7 minutes to reach 2,000 feet, the reduced ground handling time results in much more airborne time—which is what a glider for cadet training really needs.

(AL6, Jun 83)

3. A typical 45 minute trip entails climbing to about 3,000 feet; idling the engine to carry out exercises on the glide down to about 1,500 feet; using the engine to climb back to 3,000 feet; repeating or extending certain exercises as necessary; and finally joining the circuit for a roller or a full-stop landing.

4. As with the Sedbergh, Kirby Cadet and ASK 21 gliders, cadets who train to solo standard in the Venture must be at least 16 years of age and comply with the rest of the eligibility conditions listed in current regulations. Younger cadets may still fly in the aircraft but only for passenger familiarization purposes. To gain a Proficiency Certificate a cadet must complete a solo flight satisfactorily.

The Aircraft

5. The Venture T2 is a Slingsby T61e self-launching glider, built in Yorkshire to a German design but modified to bring it into line with British standards, Fig 27. It is a low wing cantilever monoplane with a conventional tail unit and an engine mounted at the front end of the fuselage. The wing span is 15.25 metres (50.03 feet) and the aspect ratio is 13.3 to 1. The all-up weight is approximately 614 kilograms (1,350 lbs). The roomy cockpit has a single one-piece canopy, Fig 28, which gives the crew protection from the elements. However, there is no heating or air conditioning system; warm clothing is still needed in cold weather! The crew sit side by side and both student and instructor are provided with a full set of flying controls, Figs 29 and 30.

6. Power is provided by a 45 hp Rollason RS2, horizontally opposed 4-cylinder petrol engine driving a wooden 2-blade fixed pitch propellor, Fig 31. The engine

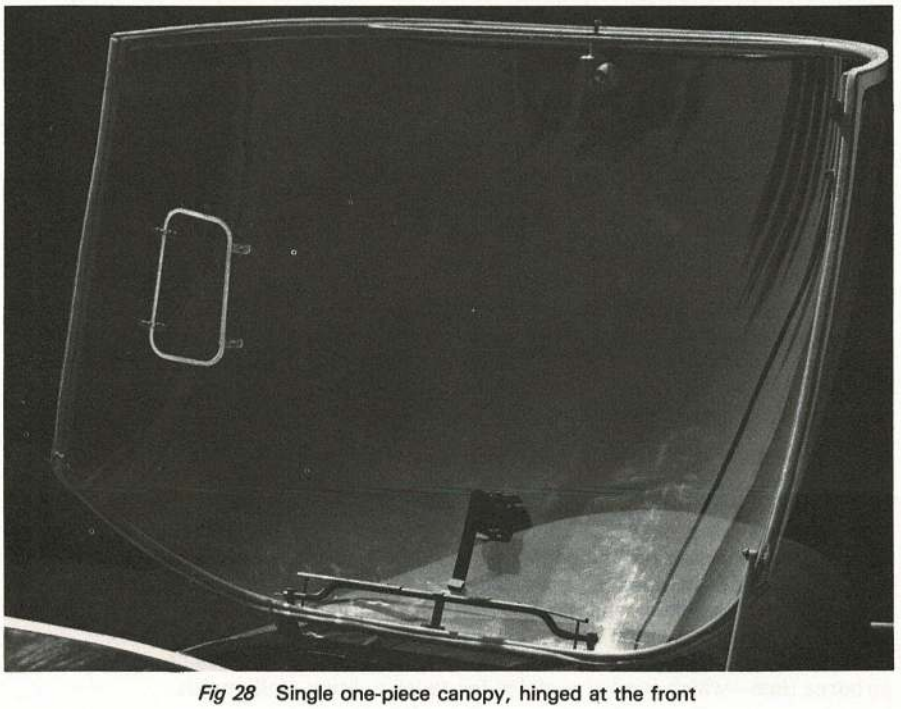

Fig 28 Single one-piece canopy, hinged at the front

Fig 29 The crew sit side by side and both have a full set of flying controls. In this picture you can see the two control columns (the one on the left has the brake operating lever) and the two spoiler operating levers. (The short lever between the seats is the elevator trimming control). Fig 30 shows the rudder pedals more fully.

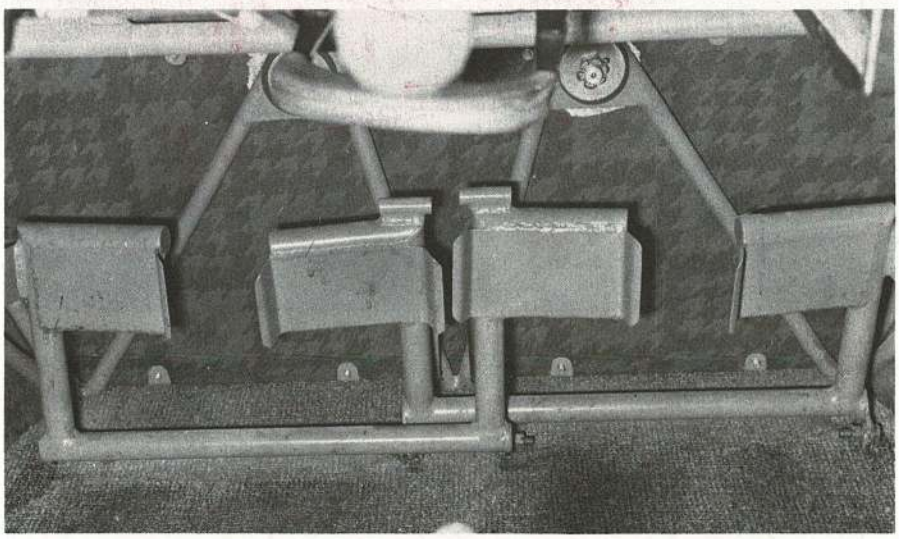

Fig 30 Rudder Pedals

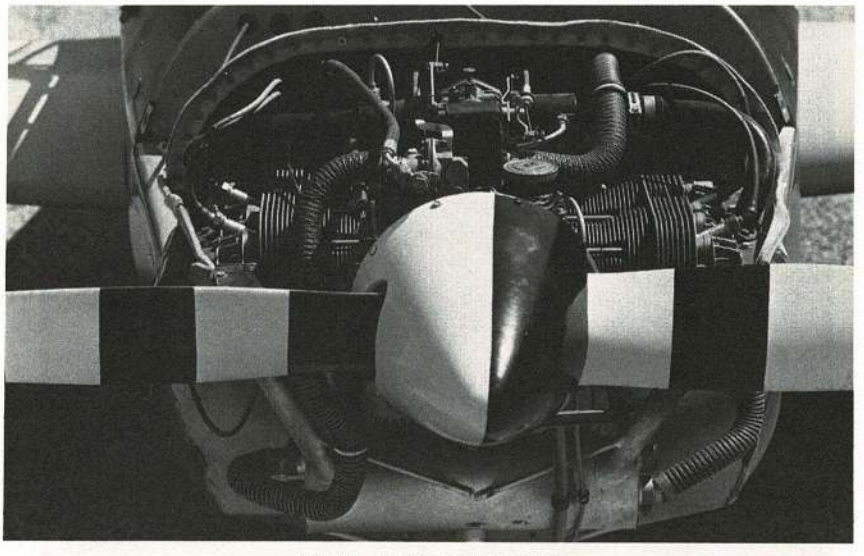

Fig 31 Engine and Propeller

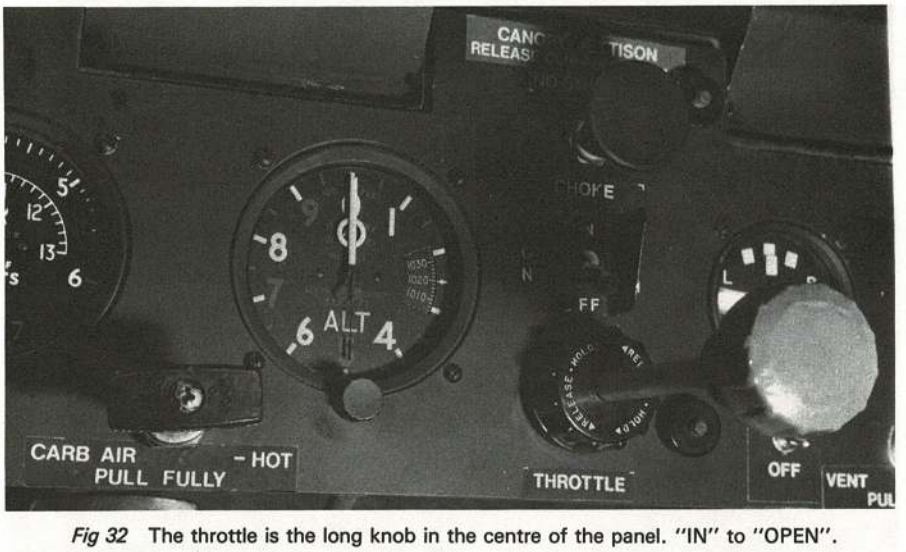

Fig 32 The throttle is the long knob in the centre of the panel. "IN" to "OPEN".

itself weighs 72 kilograms (158.4 lbs). The engine is started electrically with power being supplied from a 12V battery. An engine-driven alternator keeps the battery charged. The engine cools rapidly when switched off in the air and therefore most starts are carried out with a cold engine; there is a choke control which may be used to assist in starting as in a motor car. The hand throttle, Fig 32 in the centre of the instrument panel, is pushed forward to open, increasing the engine speed and power (max 45 bhp at 3,200 rpm). Behind the throttle control there is a throttle friction

nut to tighten the throttle friction pads so that the throttle may be left in any selected position. Hot air can be selected for the carburettor when there is a risk of carburettor icing.

Other engine controls and instruments include an ignition switch for the single magneto, an RPM gauge, an oil pressure gauge and an oil temperature gauge. There is a propeller brake to stop the propeller rotating after the engine has been switched off in flight.

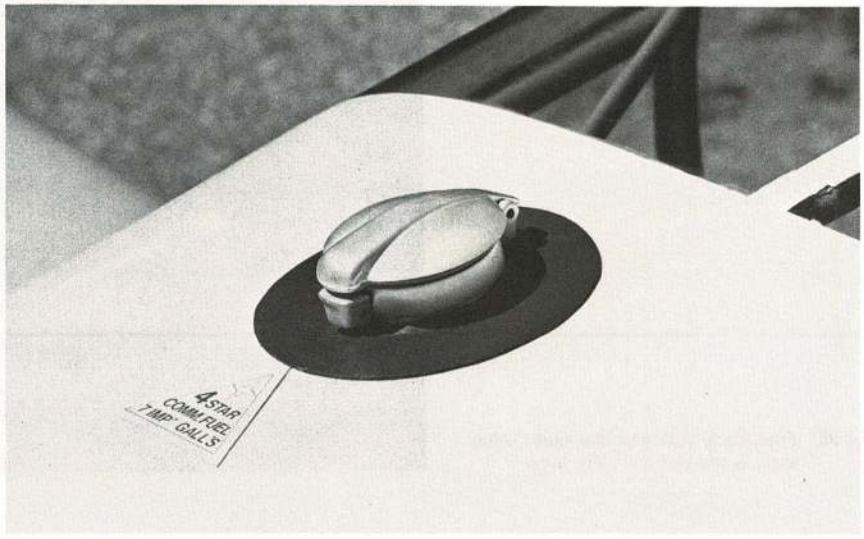

Fig 33 Tank cap of the 7 gallon fuel tank

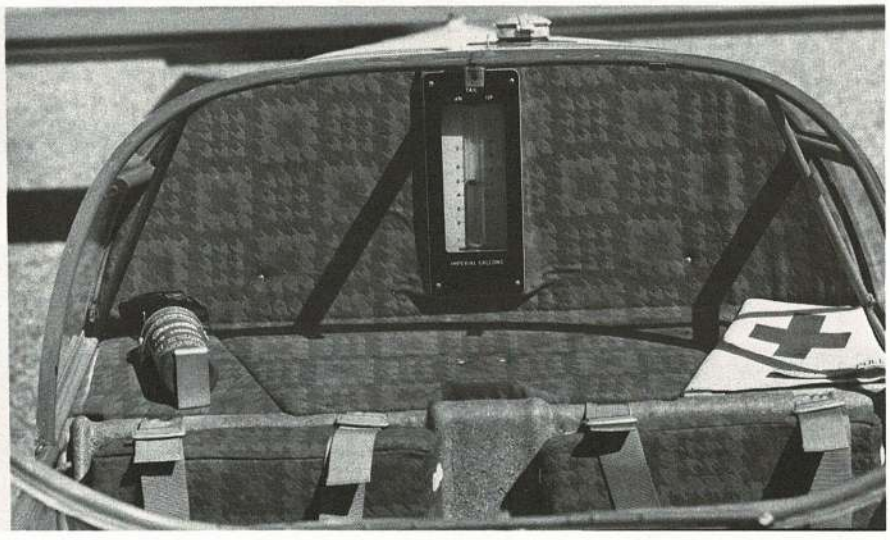

Fig 34 Fuel contents gauge

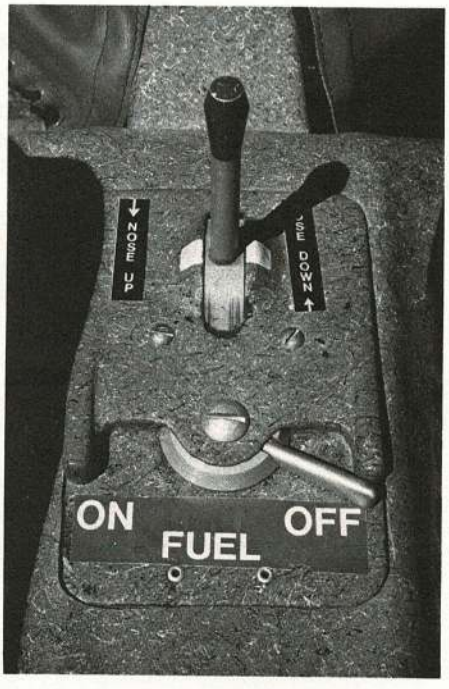

Fig 35 Fuel Cock between the seats. Also seen is the elevator trim lever

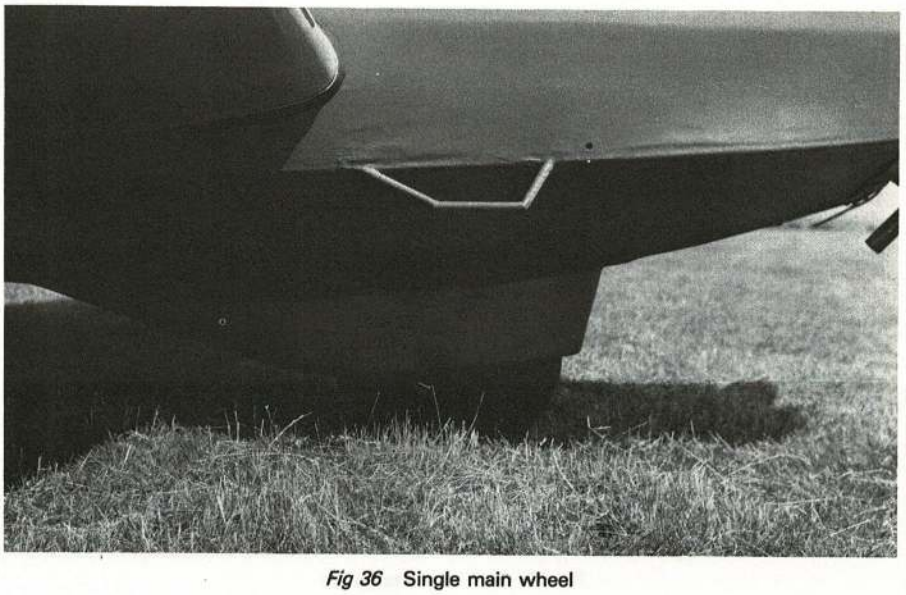

Fig 36 Single main wheel

7. The fuel system comprises a 7 gallon tank (6½ gallons is usable) mounted in the fuselage behind the pilots' seats (you can see the tank cap in Figs 33 and 34 and the fuel contents gauge in Fig 34) feeding fuel by gravity through a fuel cock between the seats (Fig 35), and a filter at the rear of the engine, to an engine-driven fuel pump; this pump supplies fuel to the single carburettor. Fuel used is 3-star Civgas or 3 or 4-star commercial fuel.

8. The aircraft has a single main wheel Fig 36, which is fitted with a manually operated brake—you can see the brake operating lever on the left hand control column in Fig 28. There is no form of shock absorber or oleo-leg. The wings are kept near level, while taxying, by 2 outrigger wheels (one under each wing) Fig 37. When the mainplanes are truly level both outrigger wheels are off the ground—thus, when taxying, one mainplane will often be lower than the other, but will be supported by its outrigger, Fig 38. Steering is achieved by a tailwheel steered by the rudder pedals.

9. Power for the electrically-driven turn indicator is provided by the aircraft's 12V battery. An intercom system with its own dry batteries, using headsets with boom microphones, provides the means of communication between the instructor and student.

10. The Venture is fitted with the following flight instruments, Fig 39:

Airspeed Indicator (ASI)

Altimeter: a three-pointer instrument. The long pointer indicates hundreds of feet, the shorter pointer thousands of feet, and the very short pointer tens of thousands of feet; all against the same scale.

Vertical Speed Indicator (VSI): calibrated to show rates of climb or descent of up to 10 knots at one knot intervals, *ie* up to approximately 1,000 feet/minute in 100 feet/minute intervals. This instrument is often referred to as a Variometer.

Turn and Slip Indicator: the turn needle is operated by an electrically-driven gyroscope. The slip indicator is simply a ball in a liquid filled tube.

E2B Compass: a magnetic compass mounted on the canopy.

11. The flying controls are conventional, but only the elevators can be trimmed in flight. This means that a little left rudder has to be held on to balance the aircraft when the engine is at full power in the climb (3,200 rpm). Balanced flight is maintained by reference to the ball in the turn and slip indicator. The ball indicates that the aircraft is being flown out of balance if it is off centre. If, for instance, the ball floats out to the right the pilot brings it back by applying and holding a little right rudder. The rudder pedals themselves Fig 30, are not adjustable and short students have to be provided with cushions so that they can apply full rudder when necessary. There are spoilers, Fig 40, but no flaps. The spoilers are operated by a lever, each pilot having his own control. These can be seen in Fig 29. The spoilers are spring loaded to the closed position and have to be held open when in use. This means that on final approach a pilot must keep one hand on the control column and the other on the spoiler operating lever.

Fig 37 One of the two outrigger wheels

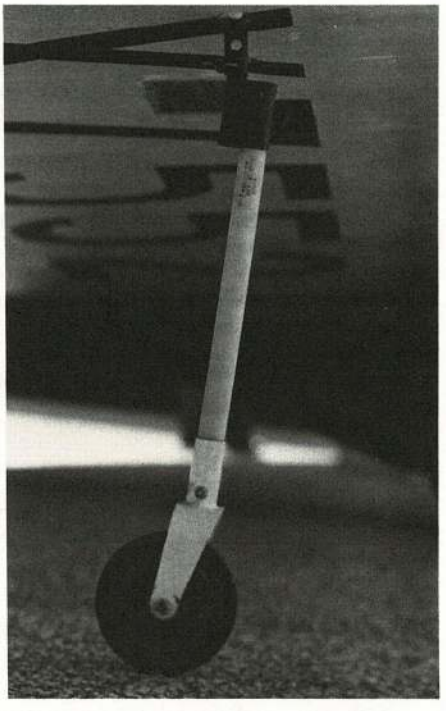

Fig 38 One outrigger wheel on the ground, one off ...

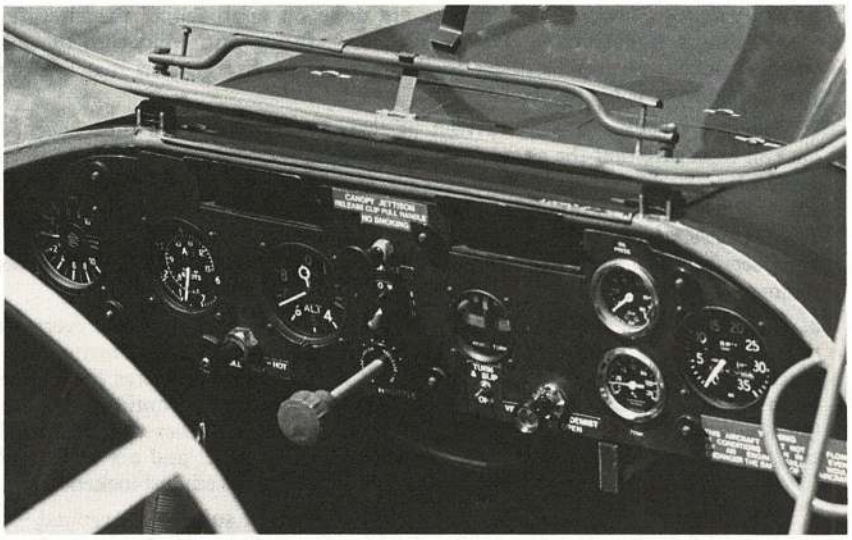

Fig 39 Instrument Panel

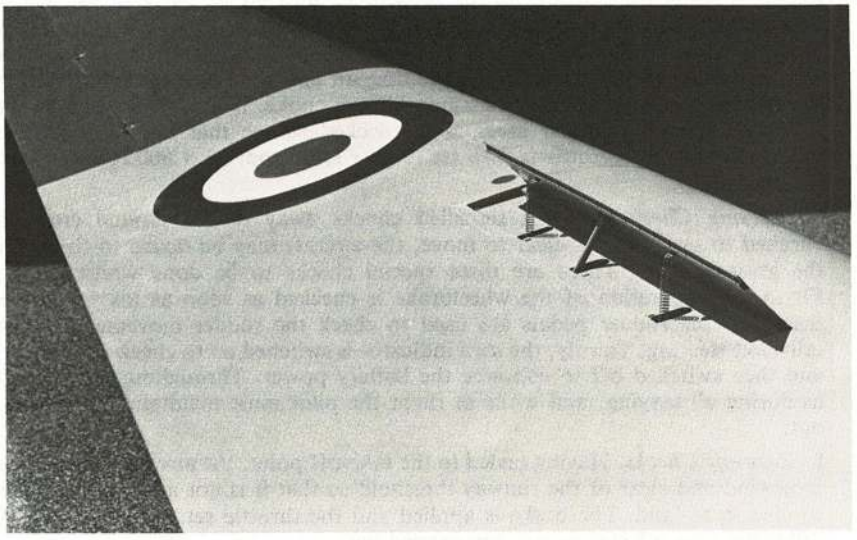

Fig 40 Spoiler open

Checks

12. The Venture is operated much like any other RAF aircraft and the crew are required to carry out checks at each stage of operation to ensure that the aircraft is serviceable and that the correct procedures are being carried out. The following is a summary of the checks currently used:

a. *Preliminary Checks.* These checks are done on approaching the aircraft to ensure that it is positioned clear of obstacles, facing into wind with the main wheel chocked, no loose articles to the rear of the aircraft and that a ground fire extinguisher is available.

b. *External Checks.* Having arrived at the aircraft, the crew must check the cockpit to ensure that the control locks have been removed and correctly stowed. They also check that the wheel brake is on, the ignition switch off, the fuel contents are sufficient and that the aircraft's fire extinguisher is stowed, Fig 34. The crew then walk right round the aircraft to check visually that everything is in a serviceable condition and that all covers and external locks have been removed.

c. *Cockpit Checks.* Having completed the external checks and found everything to be in order the crew climb into the cockpit and strap in. The instructor will check that the student can obtain full rudder movement and arrange for cushions to be supplied if they are found to be necessary. The checks continue, to ensure that the crew are correctly strapped in, that the controls other than the rudder are free to move and that the instruments are correctly set and are serviceable. Lastly the canopy is checked to see that it is properly closed and locked.

d. *Engine starting checks.* These are usually called out so that the ground crew are aware of the crew's actions. The checks are as follows: Fuel on; wheelbrake on; throttle closed; ignition off; choke selected and hot air control in or out dependent upon the outside air temperature. These having been completed, the engine is ready for starting, so the crew must do a visual check to see that the area in front of the aircraft is clear and then call "contact" to the ground crew. When a 'thumbs up" signal is received the pilot may, after a final check to see that it is clear to start, switch the ignition on and then pull the starter toggle. As soon as the engine is running smoothly the choke, if used to start, is pushed in. After starting, the oil pressure is checked to see that it is rising (12 psi minimum) and the throttle is then set to give 1,100 rpm (or 1,800 rpm for warm up from cold).

e. *Taxying Checks.* Having signalled chocks away to the ground crew and checked to see that it is clear to move, the aircraft may be taxied to the end of the grass runway. There are three special checks to be done whilst taxying. Firstly, the operation of the wheelbrake is checked as soon as taxying begins. Secondly, the rudder pedals are used to check the rudder movement and the tailwheel steering. Thirdly, the turn indicator is switched on to check its operation and then switched off to conserve the battery power. Throughout these checks as during all taxying, and while in flight the pilot must maintain a good look-out.

f. *Take-off Checks.* Having taxied to the take-off point, the aircraft is positioned crosswind and clear of the runway threshold so that it is not a hazard to gliders coming in to land. The brake is applied and the throttle set to 1,100 rpm. The following take off checks are then carried out:

FUEL: Cock ON.
Contents sufficient (2 gallons minimum).
Choke IN.
Carburettor air "IN" (cold).

THROTTLE: Friction adjusted.

(AL6, Jun 83)

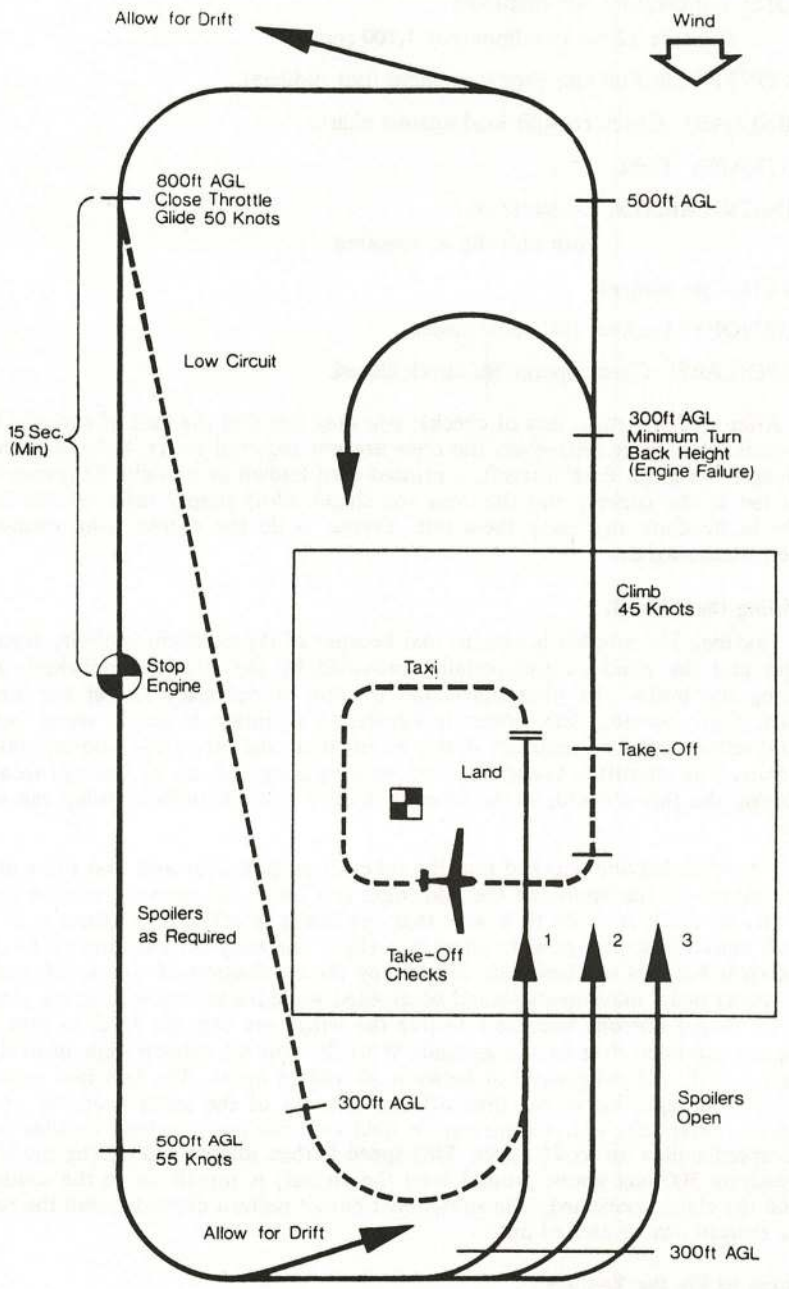

Fig 41 Diagram of Venture Circuit

(AL6, Jun 83)

OIL: Temperature 30° minimum.
Pressure 12 psi (minimum) at 1,100 rpm.

CONTROLS: Full and Free movement (not rudders).

BALLAST: Check cockpit load against chart.

STRAPS: Tight.

INSTRUMENTS: Altimeter set.
Turn and slip as required.

TRIM: Set neutral.

CANOPY: Locked. DV panel closed.

SPOILERS: Check operation, check closed.

13. After studying these lists of checks, you may feel that the task of carrying them out seems formidable. However, the crew are not required to try and remember all the details. As in all RAF aircraft, a printed card known as a Flight Reference Card is carried in the cockpit and the crew (or single pilot) simply read off the list of checks to be done and carry them out. Trying to do the checks from memory is actively discouraged.

Operating the Aircraft

14. **Taxying.** The aircraft is easy to taxi because of the excellent visibility from the cockpit and the good manoeuvrability provided by the steerable tailwheel. After releasing the brake, the pilot opens the throttle as necessary to get the aircraft moving. Once moving, less power is needed to maintain a steady speed, so the throttle setting must be reduced; if this is not done the aircraft would continue to accelerate. The aircraft is taxied at a fast walking pace and can be brought to a halt by closing the throttle and, if the aircraft is on a smooth surface, using the wheel brake.

15. **Take Off.** Having checked that the take-off path is clear and that there are no other aircraft on the approach the pilot may taxi on to the runway and line up for take off. A check is made to ensure that the brake is off and the throttle is then opened smoothly to full power. There is a slight tendency for the aircraft to swing to the right but this can easily be checked by the application of a little left rudder; large rudder pedal movements should be avoided while the tailwheel is on the ground. As soon as the ailerons become effective the wings are brought level so that both outriggers are kept clear of the ground. With the control column kept neutral, the aircraft will fly off the ground at between 30 and 35 knots. The tailwheel must not be raised too high during the take off run because of the small propeller ground clearance. After take off, the aircraft is held in a shallow climbing attitude whilst the airspeed builds up to 45 knots. This speed is then maintained during the climb. On reaching 500 feet above ground level the aircraft is turned on to the crosswind leg and the climb continued. The subsequent circuit pattern depends upon the nature of the exercises to be carried out.

Learning to Fly the Venture

16. The Venture is considered to be an easy aircraft for students to fly. The controls are light and responsive and even cadets of slight build should have no difficulty in

Fig 42 Venture T2 Final View

flying the aircraft. It may happen that you will carry out your gliding familiarization training in the Venture, and this you will thoroughly enjoy. For your gliding proficiency training to solo standard, there is a standard syllabus which you will complete before flying solo. The exercises are carried out during training sorties, each of which last for about 45 minutes. These will start with the instructor giving you a familiarization flight if you have not previously flown the Venture. On the next flight you are introduced to the effects of controls, but of course the instructor still does the take off and landing. It will not be long, however, before you have mastered the control of the aircraft and be able to attempt the take off and landing yourself. Soon you could be doing all the flying with only occasional comment and advice given from the instructor. From then on it is a matter of perfecting flying technique and learning to do the standard circuit patterns, Fig 41. During the flights, training is given to ensure that you understand the consequences of trying to fly the aircraft too slowly or of mishandling the aircraft in other ways. Likewise, you must be thoroughly familiar with the correct course of action in case of an engine failure after take off.

17. The syllabus will cover the following exercises:

Exercise	1	Introduction to the Glider	5	Engine starting and Taxying
	2	Familiarization	6	Climbing
	3	Effects of Controls	7	Gliding
	4	CO/CFI Progress check (Optional)	8	Take off and Climb

(AL6, Jun 83)

9 Approach and Landing

10 Medium Turns

11 Stalling

12 The Circuit

13 Emergency Procedures

14 Pre-solo Check

15 First solo

18. The average time to solo is eight hours' flying. Some learn quickly, others take a little longer, but are just as competent in the end. Flying solo for the first time is an experience one never forgets. It is of course exhilarating, but it is more than that. It shows that you have mastered the basic techniques of flying and have achieved the high standards demanded of a pilot who is to fly as Captain of a Royal Air Force aircraft—which is precisely what you are when piloting solo an Air Cadets glider (Fig 42).