**AAIB Bulletin No: 5/2005** **Ref: EW/C2004/04/03** **Category: 3**

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| **Aircraft Type and Registration:** | 1) Slingsby T50 Skylark 4, BGA identification number 1116<br>2) Schempp-Hirth Ventus cT, BGA identification number 3259 |
| **No & Type of Engines:** | 1) None<br>2) 1 Solo 20.5 shp piston engine (removable) |
| **Year of Manufacture:** | 1) 1963<br>2) 1987 |
| **Date & Time (UTC):** | 26 April 2004 at 1444 hrs |
| **Location:** | Approximately 1.4 nm west of Lasham Airfield, Hampshire |
| **Type of Flight:** | 1) Private<br>2) Private |
| **Persons on Board:** | 1) Crew - 1 Passengers - None<br>2) Crew - 1 Passengers - None |
| **Injuries:** | 1) Crew - None Passengers - N/A<br>2) Crew - 1 (Fatal) Passengers - N/A |
| **Nature of Damage:** | 1) Destroyed<br>2) Destroyed |
| **Commander's Licence:** | 1) BGA Gliding Certificate<br>2) BGA Gliding Certificate |
| **Commander's Age:** | 1) 46 years<br>2) 68 years |
| **Commander's Flying Experience:** | 1) 65 hours (of which 18 hours were on type)<br>2) Approximately 10,270 hours (of which at least 1,500 hours were on type) |
| **Information Source:** | AAIB Field Investigation |

**Synopsis**

The Ventus and Skylark gliders collided while gliding at approximately 4,000 feet agl a short distance west of Lasham Airfield. Both were severely damaged. Visibility was generally in excess of 5 km, but was variable and decreased with height. The investigation concluded that the gliders had approached each other about 28° off head-on, probably while both were flying straight and level. Following the collision, the pilot of the Skylark parachuted to the ground with no injuries. The pilot

of the Ventus was injured in the collision and was still in his aircraft when the main wreckage impacted the ground.

Safety recommendations have been made regarding international co-operation and action to improve the conspicuity of gliders and light aircraft, a study to assess means of improving light aircraft conspicuity, the adoption of measures likely to be cost-effective and operational advice to glider pilots concerning flight in IMC or marginal VMC conditions.

**History of flight**

On the day of the accident, Lasham Gliding Society was operating both aerotow and winch launches. The Ventus was launched at 1130 hrs, using an aerotow. It remained continuously airborne until the collision with the Skylark. At the time of the collision, at least 11 other gliders were airborne from Lasham Airfield. No one saw the collision, although two airborne witnesses saw a descending parachute and an aircraft in an uncontrolled descent. On the ground, a witness saw one aircraft spinning towards the ground, another aircraft descending with part of one wing missing. This latter witness also saw a parachute and raised the alarm at the aerodrome.

The surviving pilot, in the Skylark, was undergoing a course to complete the requirements for a Silver Gliding Certificate and had been at Lasham since about 0800 hrs on the morning of the accident. He had received a weather briefing from one of the gliding instructors and, at about 1030 hrs, was informed that the conditions appeared suitable for an attempt at a five-hour duration flight to complete the Silver Certificate requirements. He prepared his aircraft and had an uneventful winch launch at 1233 hrs; he released his glider at about 1,200 feet agl and initially headed towards the north. Over the next two hours, he remained within about 8 nm of Lasham and was always confident that he could recover to the airfield. He considered that the weather was bright but hazy and that the wind appeared light and variable throughout his operating heights. The visibility became somewhat "murkier" as he climbed.

He then headed for the area between Alton and Lasham and, as he did so, noticed two red gliders thermalling (ie circling in a thermally induced column of rising air) in a position above and to his right. Ahead of him, he saw a cumulus cloud and, as he approached the area beneath the cloud at approximately 3,000 feet agl he saw a white glider thermalling below the cloud base but about 1,000 feet above him. The white glider in the thermal was in a left turn and, the pilot of the Skylark joined the thermal in the same direction. Once established in the thermal, the pilot looked for the glider above him but being unable to see it, he presumed that it had left the thermal. At the time, he still had visual contact with the two red gliders, which were well away from his geographical position.

After about five minutes, having achieved a height gain of about 1,000 feet, he decided to leave the thermal and head in the general direction of Basingstoke. As he levelled his wings at approximately 4,000 feet agl, with airspeed between 45 and 50 kt and on a heading of about 270°M, the pilot looked to the left for the red gliders. He could not see them and looked forward. He was then confronted with a white glider, which he later stated "seemed to fill my windscreen". He recalled that its wings appeared level and that he could see directly into a towing hook recess in the nose of the glider. The glider was slightly above him and about 10° to his left.

The surviving pilot recalled that everything happened very quickly and his immediate instinct was to push forward on the control column. He was not sure that he managed to do so before he heard a "big bang" behind his head. He had instinctively closed his eyes and when he opened them, his aircraft appeared stable but was descending and he could see green fields directly ahead. The pilot could not remember releasing his canopy but recalled releasing his harness and then being thrown forward out of the aircraft. After a few moments of tumbling, he pulled his ripcord and his parachute deployed. He then saw his own aircraft descending but with part of one wing detached and with no tail section. He also saw an aircraft canopy descending and saw the white glider. It appeared intact but not in control and it struck the ground shortly after his own aircraft. After a successful parachute landing, the pilot ran to a nearby house, where he telephoned the airfield to advise them of the collision. He then ran to the site of the crashed white glider and found that other personnel from the Gliding Society were already there.

The surviving pilot subsequently confirmed that he had not entered cloud during his flight and did not consider that the position of the sun was a factor at the time of the accident.

**Aircraft descriptions**

*Ventus*

The Schempp-Hirth Ventus cT is a single-seat motor-assisted glider with a 17.6 metre (57.7 feet) wingspan (Figure 1). It is configured with a mid wing and a T tail. The fuselage and empennage (fin and tailplane) are primarily constructed of glass-fibre reinforced plastic (GRP) and the wings of carbon-fibre reinforced plastic (CRP). A bay in the fuselage immediately behind the cockpit contains a small powerplant, consisting of a petrol reciprocating engine driving a propeller, which can be deployed into the airflow to maintain altitude. The landing gear consists of a main wheel, retractable in flight, and a tail wheel.

Records indicated that the accident glider (Aircraft Serial Number 093) had been constructed in 1987 and had accumulated 2,545 flight hours and 723 launches at 7 February 2004. The flight time subsequent to this date could not be determined. It had been owned by the pilot involved in the

accident for five years. The aircraft was designated as British Gliding Association (BGA) 3295 and had a valid BGA Certificate of Airworthiness, issued on 7 February 2004. The whole aircraft had a gloss white external finish, apart from black decals on both sides of the fin and the forward fuselage.

*Skylark*

The Slingsby T50 Skylark 4 is a single-seat glider with a 17.9 metre (58.7 feet) wingspan (Figure 1), constructed of a wooden framework covered generally with plywood and in places with fabric. It has a high wing and the tailplane is located near the base of the fin. The landing gear consists of a single non-retractable wheel fitted to the bottom of the fuselage and a tail skid.

Records indicated that the accident glider (Aircraft Serial Number 1384) had been constructed in 1963 and had accumulated 2,205 flight hours and 2,133 launches at 16 April 2004. The aircraft was designated as BGA1116 and had a valid BGA Certificate of Airworthiness, issued on 16 April 2004. The external finish was gloss cream paint on the fuselage and fin and gloss bright red paint on the wings, rudder and tailplane.

**General view from the cockpits**

As with most higher-performance gliders, the fuselages of both the Ventus and the Skylark types have relatively small cross-sections, with maximum dimensions in the order of approximately 2.1 feet wide and 2.7 feet high for both aircraft. Consequently, the pilot is semi-supine when seated in either aircraft. In both cases the cockpit, located forward of the wing, is faired with a single-piece clear transparent canopy that is unobstructed by any reinforcing frame members. For a seated pilot, the arrangements in both gliders provide a generally excellent unobstructed field of view, compared with many aircraft types, although there is inevitably some obstruction of the forward and downwards view by the nose of the glider and the instrument panel.

**Wreckage examination**

Examination of the accident sites showed that the Ventus and Skylark gliders had impacted the ground 474 metres apart and that components from both aircraft were scattered in two trails located in the area between them.

*Ventus*

The main wreckage of the Ventus was located in open country near the top of a rise, at Ordnance Survey Reference SU659423, 518 feet amsl. The terrain in the immediate area was flat, with moderately heavy soil covered with short grass interspersed with a number of saplings.

The evidence showed that the engine and the landing gear wheel had both been in the retracted position at ground impact. There was no fire.

The aircraft was generally intact but with severe damage to the forward part of the fuselage, extending over the entire cockpit area. An appreciable ground crater had been formed by the nose section, which had suffered considerable break-up and had detached. Additionally, the fuselage had completely fractured between the wing and the empennage, the fin and rudder had sustained fractures, the wing and tailplane leading edges had suffered impact damage and the outer part of the right wing had detached. Extensive spattered blood deposits were present on the external surfaces of the fuselage aft of the cockpit and on the empennage; the pattern of the deposits made it clear that these had occurred before ground impact.

Ground marking and wreckage characteristics showed that the Ventus had struck the ground while pitched about 90° nose down, travelling with high vertical speed and little or no horizontal speed. It was judged that the ground impact would not have been survivable. The damage was generally consistent with the effects of ground impact but it was clear from markings on the wreckage that some of the empennage and nose damage had occurred in the collision.

A number of items from the Ventus were found in a trail running from the main wreckage back to just north of the Skylark main wreckage position. These consisted of numerous components from the cockpit and several small pieces of GRP structure.

Detailed examination revealed multiple red paint deposits scraped onto the underside of the forward fuselage. The deposits were centred on the aircraft's centreline and extended over almost the whole length of the cockpit. They were angled 10° to the centreline, from right to left, forward to aft. There were also cream paint deposits scraped on the left side of the forward fuselage beneath the canopy coaming.

*Skylark*

The main wreckage of the Skylark was located in a field 474 metres on a bearing of 200°T from the Ventus, with severe impact damage. Components forming a significant proportion of the Skylark had been scattered in a broad trail running west for a distance of 255 metres from a point around 75 metres north of the main wreckage. The trail consisted largely of items from the cockpit and rear fuselage together with the canopy and most of the empennage and included the intact outer section of the right wing. Detailed examination indicated that the attachments for this wing section had failed in downward overload, indicative of excessive negative aerodynamic lift forces on the wing. Based on BGA information, it was judged likely that such a failure could result from the rapid aircraft nose

down pitch that would result from the sudden loss of the tailplane. The evidence indicated that the canopy had been released before ground impact.

Scrape marks and heavy gouges that were not consistent with ground impact effects were present on the upper surface of the left wing, 4.9 feet outboard of the fuselage centreline. The markings passed across the top of the heavily-built wooden wing spar. They were angled 18° to the aircraft's centreline, from left to right, forward to aft. The spacing between two deep gouges matched that between two small steel brackets protruding from the underside of the Ventus beneath the aft part of the cockpit.

**Collision evidence**

The distribution of the wreckage, with estimated allowances for likely ballistic and wind drift effects, indicated that the gliders had collided close to Ordnance Survey Reference SU657420, approximately 400 metres south-south-west of the Ventus crash site.

It was clear from the markings on the two gliders that the underside of the nose of the Ventus had made forcible contact with the top surface of the Skylark's left wing in the area of its robust spar. This was followed by collision between the forward fuselage of the Ventus and the empennage of the Skylark, as indicated by geometric considerations and by a number of items of evidence. These included wreckage distribution features, the cream paint scrape on the Ventus and the findings, when the Skylark empennage parts were laid out in order, of particularly severe damage to the inboard part of the left tailplane and of GRP fragments embedded in a control mechanism in the tailplane root.

The evidence showed that the collision resulted in severe disruption of the Ventus' cockpit area and indicated that the pilot was gravely injured at this time.

Contact between the wings of the two gliders would have been inevitable had their roll angles been only a few degrees different. The absence of any sign of such contact, together with the central location of the markings on the Ventus, indicated virtually identical roll angles at the time of the collision, consistent with both gliders having been level in roll, as reported by the Skylark pilot. The available evidence suggested that neither glider had a substantially different pitch attitude or had been climbing or descending at an appreciable rate relative to the other at the collision point, but these parameters could not be quantified.

The angles of the collision markings showed that the Ventus had been tracking 332° relative to the Skylark at the collision (ie 28° from head-on, Figure 1). The Ventus travelled around 400 metres north-north-east from the collision point but, as there was no definitive evidence as to its manoeuvres after the collision, neither the absolute heading nor track of either glider when they collided, nor their

altitude, could be established. Evidence of the speed of either glider was not available from the examination and the calculation of other collision parameters was based on an assumed Skylark airspeed of 45-50 kt, as reported by its pilot, and on the angles of the scrapes on the gliders. With this assumption, the Ventus' airspeed would have been 78-87 kt and the resultant closing speed 120-133 kt.

**Weather information**

The Meteorological Office provided an aftercast of the weather information. The synoptic situation at 1200 hrs showed a slack, slow moving area of low pressure centred over the Midlands. Relatively stable and dry conditions existed over Southern England with a light, mainly south-easterly airflow. Cloud was FEW cumulus, base at 5,000 feet amsl and BKN cirrus, base at 25,000 to 30,000 feet amsl. The wind was 060°/03 kt at the surface and 160°/03 kt at 4,000 feet amsl. The surface visibility was 15 km. There was a small inversion around 4,500 feet amsl. Just below this level, it was likely that the visibility would have been reduced, although this could not be quantified. At 1445 hrs, the sun was at 40° elevation and on a bearing of 236°T.

Other pilots airborne at the time provided information on the weather. It was generally agreed that the cloud cover had increased throughout the day but that the base was no lower than about 4,500 feet agl. The sun was high in the sky and towards the south-west. Visibility was generally greater than 5 km but was variable and decreased with height. Visibility appeared better in a horizontal direction rather than looking from air to ground. One experienced instructor was launched at 1156 hrs. He found that the cloud base was indistinct and that the soaring conditions were inconsistent. In the Alton area at around 4,700 feet, he considered that the horizontal visibility was poor and because of this he returned to the airfield, landing at 1301 hrs.

**Recorded information**

National Air Traffic Services Limited provided information on radar returns for the time and area of the collision. However, no useful information could be determined as to the manoeuvres of either glider prior to the collision.

Both gliders were carrying recording devices, which were subsequently examined to determine if any useful information could be obtained as to the flight profile of the gliders.

The Skylark had a data logger installed but investigation confirmed that the unit had not been switched on for the flight.

The Ventus had a number of items of navigation/recording equipment on board, including a GPS receiver and a small digital computer which could have recorded flight parameters. Both these items were found in the wreckage trail one to two days after the accident. Using information from the manufacturers, attempts were made to extract information from the two units. Unfortunately, the batteries from both units had depleted and no information had been retained.

**Other information**

Another glider pilot reported that he had spoken with the pilot of the Ventus by radio while they were both airborne. The pilots had spoken at about 1230 hrs when the Ventus was reportedly near Salisbury and heading west. A further contact at approximately 1315 hrs indicated that the Ventus was near Wincanton and heading north as the weather was deteriorating to the west. No further reported contact was made with the Ventus.

Lasham Aerodrome is located outside the Odiham Aerodrome Traffic Zone (ATZ) but within the associated Military ATZ. The collision occurred in Class G airspace which extends vertically from ground level to the base of the London Terminal Control Area at an altitude of 5,500 feet.

Most gliders operate under Visual Flight Rules (VFR) which in turn means they are flown in Visual Meteorological Conditions (VMC). In Class G airspace between 3000 feet amsl and FL100, VMC minima are 5 km visibility, plus separation from cloud by 1,500 metres horizontally and 1,000 feet vertically. Below 3,000 feet amsl, pilots are required to remain clear of cloud and in sight of the surface; at airspeeds less than 140 kt the minimum visibility requirement is reduced to 1,500 metres.

However, gliders may also be flown in accordance with the Instrument Flight Rules (IFR) in Class G airspace. To comply with the IFR below 3,000 feet amsl, glider pilots must either remain at least 1,000 feet above the highest obstacle within a distance of 5 nautical miles, or remain clear of cloud and in sight of the surface. Above 3,000 feet amsl or above the appropriate transition altitude, whichever is the higher, all aircraft should comply with Rule 30 regarding (quadrantal) flight levels but since gliders cannot normally transit in level flight, they are unable to comply with Rule 30. Moreover, since there is no legal requirement for a glider pilot to hold a licence, there is no legal requirement for a glider pilot to hold an instrument flying qualification. Nevertheless, almost all gliding activity in the UK is supervised by the BGA which publishes its own laws and rules. The Association has operational regulations that govern cloud flying and a training system which leads to progressive increases in privileges and achievements. In effect, the BGA's training system and awards are analogous to the licensing system for private pilots of powered aeroplanes.

The CAA and the BGA retain statistics of mid-air collisions within the UK. From 1987 to April 2004, there have been 28 collisions involving gliders; of these, 12 collisions resulted in

fatalities. Eight of the collisions involved a glider and a General Aviation (GA) aircraft, of which 6 were towing aircraft. One other involved a collision between a glider and a free fall parachutist and the other 19 were collisions between 2 gliders. The glider to glider collisions occurred predominantly while thermalling, with 13 of the collisions occurring during these manoeuvres. As a general comparison, there have been 20 collisions between two GA aircraft over the same period.

Over the past few years, trials have been conducted by various organisations in the UK and overseas to attempt to quantify the effectiveness of ways to increase the conspicuity of aircraft. The use of colour, reflecting surfaces, strobe lights and electronic surveillance devices are possible ways of achieving greater conspicuity. However, all have some inherent disadvantages.

The visual means are dependent on continuous vigilance by the pilot and are affected by the prevailing light and background conditions. Coloured surfaces produce a higher skin temperature when exposed to sunlight than would be the case with a white surface and this reduces the strength of the composite materials from which most modern gliders are constructed. Effective strobe lights require electrical power in quantities not normally available in gliders. Electronic surveillance devices set to provide adequate warning of a conflict between aircraft in transit would tend to provide frequent nuisance alerts for gliders thermalling, when a number of aircraft can knowingly be flown in close proximity, but it is the environment where most glider collisions occur.

**Medical information**

An autopsy carried out on the deceased pilot by an aviation pathologist indicated that the pilot had died from multiple injuries. The pathologist was unable to differentiate between injuries sustained during the collision and injuries resulting from the ground impact. There was no evidence of any toxicological factor which could have caused or contributed to the accident.

From 1 March 2003, the BGA aligned their medical standards with the UK National Private Pilot's Licence. These are based upon UK Driver and Vehicle Licensing Agency (DVLA) standards. Solo glider pilots are required to achieve Group 1 (private driver) standards. To instruct or to carry passengers, pilots are required to achieve Group 2 (professional driver) standards. With effect from 1 March 2003, pilots have been required to obtain a General Practitioner (GP) endorsement to their own declaration of fitness to fly. For pilots beyond the age of 65 years, this is required annually. Both pilots had complied with the applicable requirements.

**Analysis**

The collision occurred with both gliders flying in straight transit flight. Whilst the flight profile of the Ventus could not be positively determined, the assessed closing speed indicated that the pilot was

transiting rather than repositioning within a thermal. The pilot of the Skylark had just left a thermal and had initiated a visual search, primarily to re-acquire previously seen gliders that he had assessed as possible conflictions. When he looked ahead, there was insufficient time to manoeuvre clear of the approaching glider.

The pilot of the Ventus had reported near Wincanton, some 53 nm west of Lasham approximately 90 minutes before the collision. There was no evidence to confirm the movements of the glider from Wincanton but the time available meant that its pilot had the flexibility to return direct to Lasham and operate in the local area or to delay his return. Therefore, it was not certain that the Ventus was the white glider seen high in the thermal by the pilot of the Skylark.

The forecast weather conditions were suitable for gliding. However, the actual conditions encountered by at least one experienced pilot resulted in him landing early. Nevertheless, many other pilots remained airborne, indicating that they considered that the conditions were suitable for gliding. The nature of the sport is such that weather conditions can change dependent on the area and/or the time. Within the overall supervision of the Chief Flying Instructor, the decision to continue gliding remains with individual pilots. The fact that one experienced pilot landed early while others remained airborne tended to indicate that conditions were variable. The surviving pilot considered that conditions were satisfactory but he was conscious that the visibility deteriorated with height and proximity to cloud.

Gliders are particularly susceptible to airborne collision for two main reasons. Firstly, their small cross-section makes it difficult to acquire and maintain visual contact. Secondly, they tend to congregate in airspace where there are rising air currents (especially thermals). The BGA is conscious of this potential danger and attempts to ensure that pilots are inducted with good lookout techniques from initial training. Very comprehensive written material is provided to every gliding instructor as part of the BGA Instructors' Manual. However, students are dependent on their instructor for the amount of information passed on. Following the accident, and after discussion between the BGA and the AAIB, it was agreed that the BGA would provide the material on lookout techniques to every pilot member of the BGA.

Evidence from the surviving pilot was that he was in straight transit flight at approximately 45 to 50 kt when the collision occurred. He also considered that the other glider was in straight transit flight. The assessment that the Ventus' airspeed was in the order of 83 kt indicated that it was flying at around normal cruising speed, rather than the lower speed that would be used for thermalling. Although this also indicated that the Ventus was in transit, there was no available evidence to determine for how long it had been so doing. The Skylark had just been established in straight transit flight and the reported visual lookout actions of the pilot were appropriate for the situation.

There is no way of knowing the visual lookout procedures of the pilot of the Ventus but, as a very experienced glider pilot, he would have been well aware of the need to maintain a regular lookout. The collision occurred at a time when the two gliders were close to head on to each other. In that situation, it would have been difficult for each pilot to acquire the other glider because of the small cross-section of each aircraft and the fact that, on a collision course, there would have been no relative movement between the two aircraft.

It appeared that neither pilot saw the other glider in time to initiate any effective avoidance manoeuvre. When the pilot of the Skylark became aware of the Ventus, his instinctive reaction was to initiate a descent but he was not sure that he was able to take any action before the collision. The Rules of the Air include the action to be taken when aircraft are on a collision course but, to be effective they are obviously dependent on acquiring the other aircraft in time to allow recognition, decision and action. In this case the late sighting meant that there was insufficient time for effective avoiding action to be taken.

Both pilots were entitled to be in that airspace and, as such would have been relying on the principle of 'see-and-avoid'. However, that principle was not effective in this case. While the nature of gliding would preclude stringent airspace rules and regulations, it would appear sensible to evaluate further means of increasing glider conspicuity and to require effective measures to be adopted. Various organisations within the UK (and abroad) have been involved in trials looking at different aspects of this subject but it would seem to be appropriate for one organisation to take the lead with a view to evaluating the various possibilities and determining the way ahead. During this accident investigation, a review of the statistics involving collisions indicated that the problem was not confined to gliders. Last year, the AAIB investigated a collision between a light helicopter and a microlight aircraft. The resulting report, contained in AAIB Bulletin 4/2005, concluded that the limitations of the human eye and lack of aircraft conspicuity were contributory factors to that accident.

Accordingly, it is considered that the organisation best placed to lead any study would be the CAA. However, it would be necessary to include other organisations, such as the BGA, in any study. Therefore, the following recommendation has been made:

**Safety Recommendation 2005-006**

It is recommended that the Civil Aviation Authority should initiate further studies into ways of improving the conspicuity of gliders and light aircraft, to include visual and electronic surveillance means, and require the adoption of measures that are likely to be cost-effective in improving conspicuity.

**Safety Recommendation 2005-008**

It is recommended that the Civil Aviation Authority should promote international co-operation and action to improve the conspicuity of gliders and light aircraft through visual and electronic methods.

Additionally, the 'see and avoid' principle requires every glider pilot to be able to see other gliders in sufficient time to take successful avoiding action. The extant BGA rules for cloud flying and thermalling help to minimise the risk of glider to glider collisions but other legitimate users of unregulated airspace, who may be flying faster aircraft than gliders, may need more time (and hence greater visibility) to take effective avoiding action around a single glider or, indeed, even greater visibility to manoeuvre around a group of thermalling gliders using the same 'see and avoid' principle. Consequently, although glider pilots may fly legally in weather conditions that are below VMC minima, they should not depend upon their own or other pilots' abilities to 'see and avoid' each other in marginal VMC conditions. It is difficult to define 'marginal' conditions and it is not easy to measure horizontal visibility in the air, particularly when approaching the diffused boundary between clear air and cloud base. The assessment of 'marginal' conditions is a matter of airmanship and so, it has been recommended to the BGA that:

**Safety Recommendation 2005-046**

The British Gliding Association should review its operational advice to and training for glider pilots with respect to flying in IMC and marginal VMC conditions.

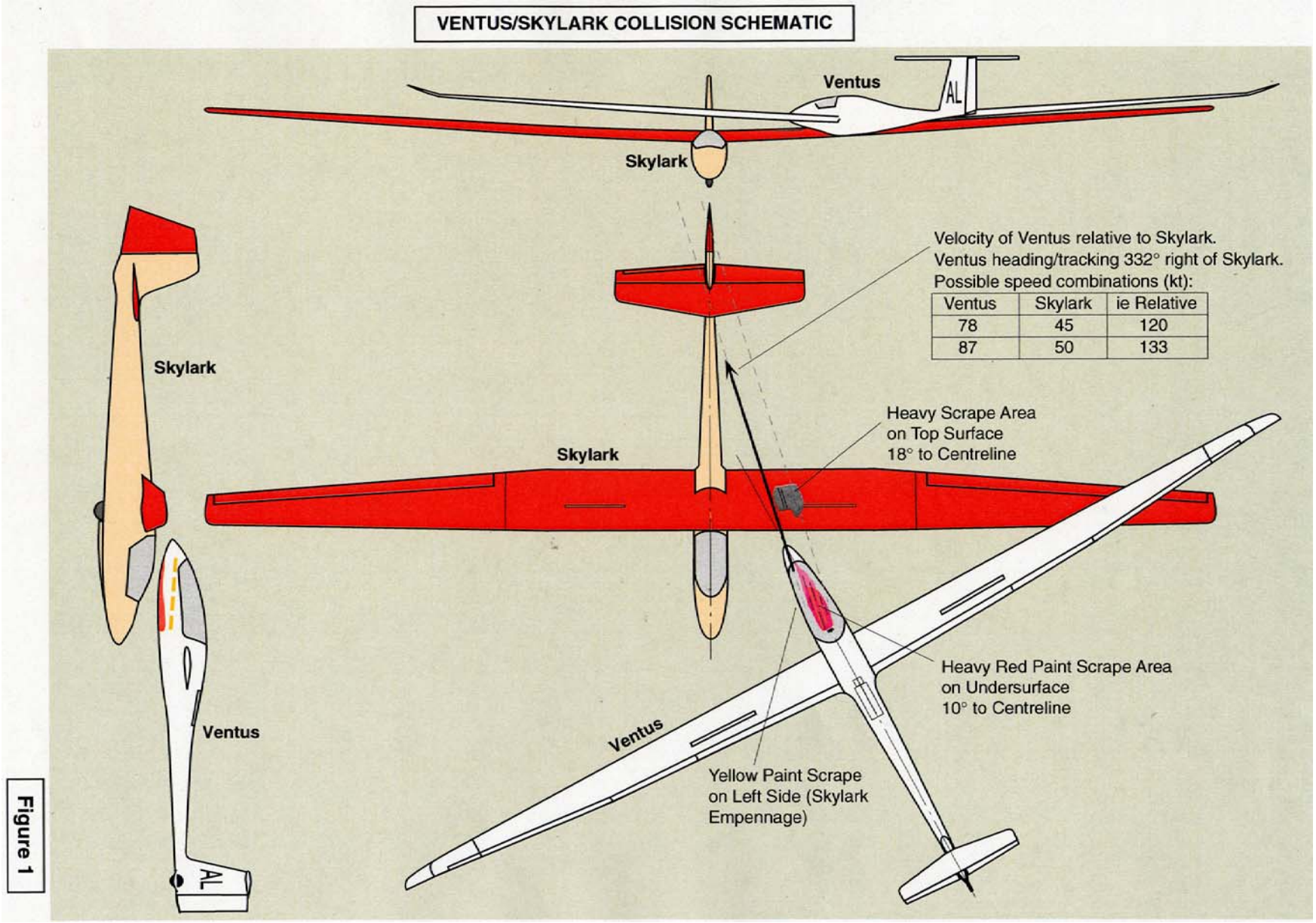
VENTUS/SKYLARK COLLISION SCHEMATIC
Ventus
AL
Skylark
Velocity of Ventus relative to Skylark.
Ventus heading/tracking 332° right of Skylark.
Possible speed combinations (kt):
Ventus | Skylark | ie Relative
78 | 45 | 120
87 | 50 | 133
Skylark
Skylark
Heavy Scrape Area
on Top Surface
18° to Centreline
Heavy Red Paint Scrape Area
on Undersurface
10° to Centreline
Ventus
Ventus
AL
Yellow Paint Scrape
on Left Side (Skylark
Empennage)

Figure 1