TRANSPORT ACCIDENT INVESTIGATION COMMISSION
TE KOMIHANA TIROTIRO AITUA WAKA

AIRCRAFT ACCIDENT REPORT

No. 90-007T

SCHEMPP-HIRTH VENTUS CM MOTOR GLIDER D-KKGP

Near Pauanui Beach

5 December 1990

Transport Accident Investigation Commission
Wellington · New Zealand

Price $11.65 (including G.S.T.)

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Transport Accident Investigation Commission
Wellington

Chief Commissioner
Transport Accident Investigation Commission

The attached report summarises the circumstances surrounding the accident involving Schempp-Hirth Ventus CM Motor Glider D-KKGP in the sea near Pauanui Beach on 5 December 1990 and includes suggested findings.

This report is submitted pursuant to Section 8(2) of the Transport Accident Investigation Commission Act 1990 for the Commission to review the facts and endorse or amend the findings as to the contributing factors and causes of the accident.

25 September 1991

R CHIPPINDALE
Acting Chief Executive

APPROVED FOR RELEASE AS A PUBLIC DOCUMENT

7 October 1991

M F DUNPHY
Chief Commissioner

AIRCRAFT:	Schempp-Hirth Ventus CM Motor Glider	**OPERATOR:**	Mr E.G. Peter
NATIONALITY:	German	**PILOT:**	Mr E.G. Peter
REGISTRATION:	D-KKGP	**OTHER CREW:**	Nil
PLACE OF ACCIDENT:	In the sea near Pauanui Beach	**PASSENGERS:**	Nil
DATE AND TIME:	5 December 1990, 1115 hours		

SYNOPSIS:
The Transport Accident Investigation Commission was advised of this accident at 1302 hours on 5 December 1990. Mr D.V. Zotov was appointed Investigator in Charge and commenced the onsite investigation the same day. Shortly after becoming airborne from Pauanui Beach Aerodrome, the aircraft's tailplane came off. The pilot abandoned the aircraft but became entangled in the parachute rigging lines and fell to the sea.

1.1 HISTORY OF THE FLIGHT:	1.2 INJURIES TO PERSONS:	1.3 DAMAGE TO AIRCRAFT:	1.4 OTHER DAMAGE
See page 4.	Pilot: 1 Fatal	Substantial	Nil

1.5 PERSONNEL INFORMATION:

The pilot, Ernst Gernot Peter, a german citizen aged 65, had 30 years flying experience and was in current flying practice on the aircraft type. A detailed breakdown of his flight times was not available.

1.6 AIRCRAFT INFORMATION:
See page 4.

1.7 METEOROLOGICAL INFORMATION:	1.8 AIDS TO NAVIGATION:	1.9 COMMUNICATIONS:
See page 4.	Not Applicable	Nil

1.10 AERODROME INFORMATION:	1.11 FLIGHT RECORDERS:	1.12 WRECKAGE AND IMPACT INFORMATION:
See page 4.	Not Applicable.	See page 5.

1.13 MEDICAL AND PATHOLOGICAL INFORMATION:	1.14 FIRE:	1.15 SURVIVAL ASPECTS:
See page 5.	Nil.	See page 5.

1.16 TESTS AND RESEARCH:	1.17 ADDITIONAL INFORMATION:	1.18 USEFUL OR EFFECTIVE INVESTIGATION TECHNIQUES:
Nil.	See page 6.	Nil

2. ANALYSIS:	3. FINDINGS:
See page 7.	See page 9.

4. SAFETY RECOMMENDATIONS:		5. APPENDICES:
Nil	Nil	

* All times in this report are NZDT (UTC + 13 hours)

1. FACTUAL INFORMATION

1.1 History of the flight

1.1.1 The pilot had rigged the aircraft shortly before take-off. He had assistance to fit the wings, but thereafter rigged the aircraft on his own. He was called to collect a message from the Post Office, some distance from the aerodrome, while he was rigging the aircraft.

1.1.2 He subsequently took off in the aircraft under its own power, turned left, downwind at low level and then began to track crosswind, to the north, parallel to the beach but some distance to seaward. The aircraft crossed the runway centreline in this process.

1.1.3 The aircraft reached a low cloud to the north-east of the beach. The engine stopped and the aircraft was seen to "porpoise" about three times in pitch and to "cartwheel". The tailplane and canopy came off. The pilot abandoned the aircraft and his parachute partially deployed, but did not significantly retard his fall.

1.1.4 Rescuers set out for the impact point without delay, but the pilot was dead when they reached him. The aircraft wreckage was retrieved.

1.1.5 The accident took place in daylight, 1.5 km offshore from Pauanui Beach. National Grid Reference 371417 NZMS 1 Sheet N44 "Whitianga". Latitude 37°00'30"S, longitude 175°52'E

1.6 Aircraft information

1.6.1 The Ventus CM was a self-launching sailplane, the pylon-mounted engine of which could be retracted when not in use. The retraction mechanism lowered the pylon by means of an electrically driven screw jack; the pylon pivoted so that it lay horizontally inside the fuselage behind the cockpit. A spring-loaded switch had to be held down to lower the pylon; it took 19 seconds to lower completely, but only 4 to 5 seconds to reach the half-way position.

1.6.2 The aircraft had a valid German Certificate of Airworthiness and had been properly maintained. Its weight and balance were within the prescribed limits. The last logbook entry showed 130 flights and 452 hours total flying time.

1.6.3 About 15 litres of fuel were aboard at take-off; this was sufficient for about 50 minutes engine running.

1.7 Meteorological information

1.7.1 A fresh south-westerly breeze was blowing at Pauanui. This was likely to be associated both with random turbulence and with rotor flow at very low levels. The conditions were suitable for standing wave formation aloft.

1.10 Aerodrome information

1.10.1 The single runway at Pauanui Beach was oriented 248/068°T. It joined the beach, at right angles, at the eastern threshold. Immediately to the west, the Coromandel Range rose to about 2500 feet amsl.

1.10.2 Pauanui Beach was straight, sandy and in excess of 2 km in length. It was suitable for an emergency landing.

1.10.3 To the south of the runway was a hill, 1200 feet high, with a western face suitable for ridge soaring.

1.12 Wreckage and impact information

1.12.1 The rescuers found the pilot's body, still tangled in the rigging lines of his parachute, some two kilometres north-east of the eastern threshold. The aircraft wreckage was floating nearby. There was a strong north-east going tidal flow, which was estimated to have moved the wreckage 500 m in the time it took the rescuers to reach it. The tailplane was a considerable distance from the other wreckage.

1.12.2 The wreckage was recovered and examined. The wings were fractured. The airbrakes were extended and had been damaged in a manner consistent with them having been open on impact. Damage to the fuselage nose was consistent with water entry while travelling forward, with a steep nose-down angle. There was little disruption of the cockpit area. The rear fuselage had broken in half. The tailplane was separate from the fin; there was no obvious sign of distress to its connections.

1.12.3 The engine had been retracted about half-way from the fully deployed position. The propeller blades were intact, as was the engine. The fuel control lever was in the "OFF" position. There was fuel in the fuel lines.

1.12.4 The pre-impact integrity of the aircraft's control systems, with the exception of the elevator control (see paragraph 1.16), was established.

1.13 Medical and pathological information

1.13.1 The pathological and toxicological examination disclosed no factor which could have impaired Mr Peter's ability to control the aircraft.

1.13.2 Localised injuries to his left neck, flank and foot, and both forearms, were consistent with him striking the aircraft structure when he bailed out. These injuries were considered insufficient to disable him.

1.13.2 His remaining injuries were consistent with him striking the surface of the sea, face downward and head downward at a 45° angle.

1.15 Survival aspects

1.15.1 Witness observation of the bale-out, in comparison with surrounding terrain, established the altitude at which the aircraft was abandoned as being about 570 feet.

1.15.2 The canopy jettison rod was still in place: it appears that the pilot used the normal opening lever, so that the canopy opened to the right, and then tore off. Some of the injuries to the pilot could have resulted from the canopy not jettisoning cleanly.

1.15.3 The aircraft may have entered an incipient spin; witnesses described it "cartwheeling" and descending one wing down in a steep nose-down attitude. If the pilot attempted to leave on the outside of the spin he would have had difficulty in doing so: he could be expected to sustain blows from the cockpit side and wing leading edge. It was necessary to leave the aircraft on the inside of a spin to avoid these problems.

1.15.4 His injuries were not consistent with striking the partially retracted engine and the tailplane did not show any indication of having been struck.

1.15.5 The evidence of witnesses indicated that the parachute deployed but did not materially retard the pilot's fall.

1.15.6 The parachute was a GQ Security Safety Parachute, model 350, operated by a manual rip-cord. Such a parachute was well able to deploy and develop properly from 500 feet at low speed and had been known to function satisfactorily below 200 feet.

1.15.7 If deployment was delayed to too low a height, or if the parachute had malfunctioned in some way that prevented full development, the resulting impact would produce lower-body injuries because the harness was attached to the shoulders.

1.15.8 The failure of the parachute to develop completely, and the pilot's head-down attitude at impact, indicated some degree of entanglement of his body with the rigging lines or canopy.

1.15.9 RNZAF pilots were taught to adopt a "bunched-up" attitude on abandoning an aircraft, rather than the spread eagled attitude adopted by sky-divers to stabilise their fall. This "company" attitude, with knees together, legs drawn up and both hands on the ripcord, was intended to permit deployment with minimum delay and minimise the risk of entanglement with the parachute.

1.15.10 The pilot's impact with the water in a slanting head-down attitude was not survivable.

1.17 Additional information

1.17.1 Close examination of the tailplane mounting system showed that:

One of the steel prongs by which the rear of the tailplane was mounted to the fin top was bent upward by 0.4 mm. (The prongs engaged in holes in the bar which joined the elevator halves and actuated the elevators as well as retaining the tailplane).

The guide which directed that prong during its engagement had been broken off.

The forward location of the tailplane was by rearward movement of a spring-loaded pin at the front of the fin, which engaged a tang protruding below the tailplane. There was no sign of distress on this tang, and the front face showed no sign of the pin having scraped down it. However, there was some hammering at the bottom of the tang.

The pin slid in a steel housing and guide tube of soft alloy. There were a series of strike marks on top of the pin housing and on the guide tube, at about 3 mm spacing, consistent with having been struck by the tailplane tang. The strike on the guide tube was so severe as to lock the pin in place, in the closed position.

The elastomeric seal, which closed the gap between fin and tailplane, also displayed cuts at similar spacing consistent with having been made by the tang.

There was distress of the glass fibre at the tailplane trailing edge, consistent with elevator overtravel in the "up elevator" sense.

1.17.2 When the tailplane was mounted on the fin, but with the tang resting on the mounting pin instead of being engaged by it, there was only a small gap between the fin and the tailplane which was barely noticeable from the cockpit. If the aircraft was parked left wing down, the pilot would be looking at the top of the tailplane as he approached the cockpit, and the misrigging would be virtually undetectable by him. The elevators would act normally because their actuating pins were engaged.

1.17.3 With the engine producing high power, a significant download on the tail would be necessary to counter the nose-down pitching moment due to the high thrustline of the pylon-mounted engine. This force would be reduced when engine power was reduced. It was normal practice to use full power for take-off, and then reduce power to 75% after reaching about 300 feet. In gliding flight there would be a slight download on the tailplane but there could be transient uploads due to gusts or manoeuvres.

1.17.4 The tailplane forward locating pin was operated, through a hole in the leading edge of the fin, by an extension pin which screwed into the locating pin. The extension pin was not found after the accident.

1.17.5 Mr Peter's normal procedure after taking off at Pauanui in a westerly wind was to climb straight ahead at first, and then turn left to use an adjacent ridge to help gain height. The immediate left turn onto a climbing downwind leg meant that he flew between the aerodrome and the hill on which the ridge was located.

2. ANALYSIS

2.1 The pilot rigged the aircraft himself and was distracted during the course of this operation. Such distraction in the course of any activity had the potential to result in a step being omitted.

2.2 It was common practice in New Zealand gliding clubs, to have someone else make an independent check after an aircraft had been rigged. This may not have been practicable when operating independently, as Mr Peter was. However, where the owner was interrupted during rigging, it would be highly advisable for him to make a check of the aircraft on completion.

2.3 There was no indication that the tailplane forward locating pin had been engaged in the tailplane locating tang. If it had been partially engaged and had then worked itself loose against the spring, distortion of the hole in the locating tang and scraping of the front face of the tang would have been expected, but neither was seen.

2.4 While some incidental marring of the forward locating pin housing and the bottom surface of the tang might be expected while the rear pins were being engaged during normal rigging, the severe strike on the guide tube could not have been such an occurrence since it locked the pin in the closed position.

2.5 The other damage (regularly spaced sequence of strike marks, rear pin bent up and, overtravel in the up elevator sense) was consistent with the leading edge of the tailplane bouncing up and down as the tailplane "walked" its way forward off the actuating pins, until finally it came free.

2.6 During take-off the download on the tail necessary to counter the effect of the high thrust line would have held the tailplane in place while full power was applied. A reduction to normal climbing power may have reduced the download sufficiently to allow the leading edge to lift and thus start the sequence leading to the tailplane coming off. It is more likely that this would happen when the engine was stopped.

2.7 It was unlikely that the pilot was aware of a problem when he turned downwind and then flew parallel to the beach but to seaward of it. The beach itself was ideal for a forced landing and he flew past the runway centreline still climbing. If he was aware of a problem and intended gaining height to bail out, he would probably have climbed over land.

2.8 The flight path was different from his normal procedure but this may have been motivated by an unusual meteorological phenomenon, giving the opportunity to make a climb in standing wave from a very low level. The cloud observed near the point at which the engine stopped was probably a roll cloud, which was a visible indication of rotor flow. While it would have been foolhardy to proceed downwind and out to sea at low level in a conventional glider, Mr Peter may have assessed the risks as acceptable with a reliable engine at his disposal. He was able to motor to the wave and assess the lift before deciding to soar, and could motor back to the aerodrome if the lift was insufficient, or proved merely transient.

2.9 It was not practicable to determine the exact sequence of events when the accident happened, since the attention of the various witnesses was drawn to different individual events and no one witness observed the whole sequence. Accordingly, it was not ascertained whether the canopy was opened before or after the tailplane came off. However, a witness noted that the initial pitch-up and the sound of the engine stopping were contemporaneous. As the sound would have taken about 5.5 seconds to reach the witness, the engine stopping must have preceded the pitch-up.

2.10 Mr Peter might have felt the movement of the tailplane through the controls, realised what was happening and shut the engine down for safety preparatory to bailing out. However this seems unlikely because by turning back to shore and continuing to gain height for as long as possible, he would improve his chances of survival. It thus seems more probable that he stopped the engine for the purpose of soaring from low level; the reduction in download on the tail then became sufficient to allow the leading edge to lift when turbulence was experienced. The partial retraction of the engine suggested that the first indication of a problem occurred a few seconds after shut-down.

2.11 Lifting of the leading edge of the tailplane would cause an immediate nose-down pitch, to which the pilot's instinctive response would be to apply up elevator. Evidently this was done and changed the airflow sufficiently to reapply a download to the tailplane, causing the leading edge to bang down and the nose of the aircraft to pitch up. Down elevator to counter the nose-up pitch would reverse the process. The tailplane worked its way forward, probably exacerbating the tendency to instability as it did so, until ultimately it came off.

2.12 If the pilot was still aboard when the tailplane came off, it was likely that the aircraft would have bunted violently. However the witness description of an incipient spin and a stable dive after Mr Peter left the aircraft, suggest that he may have bailed out immediately before the tailplane finally detached itself.

3. FINDINGS

3.1 The aircraft had a valid German Certificate of Airworthiness and had been properly maintained.

3.2 The pilot was adequately experienced to make the flight and was in current flying practice.

3.3 Weight and balance were within prescribed limits.

3.4 There was sufficient fuel aboard for the proposed flight.

3.5 No medical factor influenced the pilot's ability to control the aircraft.

3.6 While the pilot was completing the rigging of the aircraft he was distracted and omitted to connect the tailplane leading edge fitting.

3.7 The tailplane was held in place during the flight under power, by the download required to counter the nose-down pitching tendency of the pylon-mounted engine.

3.8 The pilot stopped the engine at low level over the sea, for the purpose of commencing soaring flight.

3.9 When the engine was stopped the download on the tailplane was reduced sufficiently for its leading edge to rise.

3.10 The tailplane pivoted cyclically about its rearward mounting and in the process moved forward until it came free.

3.11 The pilot abandoned the aircraft at low level, with insufficient height to stabilise his fall before deploying his parachute.

3.12 The parachute deployed but the pilot became entangled in the rigging lines and the parachute did not retard his fall significantly.

3.13 The cause of the accident was the pilot's omission to connect the tailplane leading edge fitting because he was distracted while rigging the aircraft, and not discovering the omission by a subsequent check.

7 October 1991

M F DUNPHY
Chief Commissioner