Federal Public Service
Mobility and Transport
Air Accident Investigation Unit

Air Accident Investigation Unit - (Belgium)
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Safety Investigation Report

ACCIDENT TO
RANS S-6ES COYOTE II
AT EBBZ
ON 21 OCTOBER 2012

Ref. AAIU-2012-ULM-08
Issue date: 21 May 2013
Status: Final

FOREWORD

This report is a technical document that reflects the views of the investigation team on the circumstances that led to the accident.

In accordance with Annex 13 of the Convention on International Civil Aviation and EU Regulation 996/2010, it is not the purpose of aircraft accident investigation to apportion blame or liability. The sole objective of the investigation and the Final Report is the determination of the causes, and define recommendations in order to prevent future accidents and incidents.

In particular, Article 17-3 of the EU regulation EU 996/2010 stipulates that the safety recommendations made in this report do not constitute any suspicion of guilt or responsibility in the accident.

EU 996/2010 Art.5 Par.4 states that a Safety Investigation Authority may decide to investigate accident to Annex II aircraft when it expects to draw safety lessons from the investigation.

Unless otherwise indicated, recommendations in this report are addressed to the Regulatory Authorities of the State having responsibility for the matters with which the recommendation is concerned. It is for those Authorities to decide what action is taken.

The investigation was conducted by Henri Metillon, Sam Laureys and Luc Blendeman with the support of the manufacturer of the GPS AvMap.

The report was compiled by Henri Metillon and was published under the authority of the Chief Investigator.

NOTES:

1. For the purpose of this report, time will be indicated in UTC, unless otherwise specified.

2. ICAO document 9859 “Safety Management Manual” was used to identify the hazard and the consequences related to the accident.

SYMBOLS AND ABBREVIATIONS

’	Minute
°	Degree
°C	Degrees centigrade
‘	Feet
“	Inch
AAIU(Be)	Air Accident Investigation Unit (Belgium)
ACREP	Accredited Representative of an Investigation Unit
AFIS	Aerodrome Flight Information Service
AGL	Above Ground Level
ASL	Above mean sea level
ATC	Air Traffic Control
BCAA	Belgian Civil Aviation Authority
BHP	Brake horsepower
BRS	Ballistic Recovery System (Parachute)
EASA	European Aviation Safety Agency
EBBZ	Airfield of Buzet
EBCF	Airfield of Cerfontaine
EBCI	Brussels South Charleroi airport
EFIS	Electronic Flight Information System
FAA	Federal Aviation Administration
ft	Foot (Feet)
KIAS	Knots Indicated Airspeed
KTS	Knots
l	litre
lbs	Pounds
m	Meter(s)
METAR	Meteorological Aerodrome Report
nm	Nautical mile(s)
O/H	Overhaul
PIC	Pilot In Command
POH	Pilot’s Operating Handbook
QFU	Magnetic bearing of the runway
QNH	Pressure setting to indicate elevation above mean sea level
RPM	Revolutions per Minute
RWY	Runway
SEP	Single Engine Piston rating
SL	Sea Level
ULM	Ultra-light aircraft
UTC	Universal Time Coordinated
V	Volt

SYNOPSIS

Date and hour of the accident:	21 October 2012 at 15:55
Aircraft:	Rans S-6ES Coyotte II Wing116-R912.
Accident location:	Near EBBZ airfield, at 640m north of the threshold of runway 34.
Aircraft owner:	The pilot was the aircraft owner
Type of flight:	Private flight
Persons on board:	2

Abstract:

At the end of a flight from EBCF airfield to his home base EBBZ, the pilot announced his intention to land. He also informed another ultra-light pilot on his intention to land exactly when the Hobbs meter of his aircraft was indicating 1000 hours and asked him to delay his take-off.

The pilot accepted to wait and observed the airplane passing in front of him and continuing his right hand downwind leg, he then saw the airplane making a 180° right hand turn in order to directly align in final leg.

Suddenly he saw the airplane stalling, entering into a right hand spin and colliding with the ground almost vertically.

Cause(s):
The cause of the accident is a loss of control of the airplane during the last turn in a landing circuit. The loss of control probably occurred due to the combination of a speed close to the stall speed and an uncoordinated skidding turn.

Hazard identified during the investigation[1]:
"Mission-itis" mind-set making the pilot want to accomplish the mission even in situations when aborting the mission is more appropriate. This mind-set makes also the pilot less focused on the actual flying.

Consequence[2]:
Loss of control inflight (LOC-I) followed by a ground collision (GCOL)

[1] Hazard – Condition or object with the potential of causing injuries to personnel, damage to equipment or structures, loss of material, or reduction of ability to perform a prescribed function.
[2] Consequence – Potential outcome(s) of the hazard

1 Factual information.

1.1 History of flight.

This day the pilot and his passenger intended to fly to Luxemburg together with two other ultra-light airplanes. This plan was cancelled due to the poor meteorological conditions in the morning.

In the afternoon, seeing that the meteorological conditions were acceptable, the pilots of the three ultra-lights performed a flight to EBCF airfield, where they landed. About one hour later the three airplanes took off in order to return to their home base EBBZ, the “Rans Coyote” being the last one to leave the airfield.

At the end of the flight, the “Rans Coyote” arrived in the circuit of EBBZ when both the other airplanes had already landed.

The pilot radioed at the beginning of downwind of runway 34 and announced his intention to land. At this moment another ultra-light was almost ready to align for take-off, however the pilot of the “Rans Coyote” asked him not to align and to leave the runway free because he intended to land exactly when the Hobbs meter of his aircraft was indicating 1000 hours.

Therefore the pilot stopped his engine and observed the “Rans Coyote” in circuit. The witness saw the airplane passing in front of him and then continuing downwind leg. He then saw the airplane making a 180° right hand turn in order to directly align in final. Suddenly, he observed the airplane stalling and entering in a right hand spin before colliding the ground almost vertically.

1.2 Injuries persons.

Injuries	Pilot	Passenger	Others	Total
Fatal	1	1	0	2
Serious	0	0	0	0
Minor	0	0	0	0
None	0	0	0	0
Total	1	1	0	2

1.3 Damage to aircraft.

The aircraft was totally destroyed by impact forces.

1.4 Other damage.

Contamination of the ground with engine oil and coolant fluid. Possible ground contamination by Mogaz (automotive fuel).

1.5 Personnel information.

Pilot:

- Sex: Male
- Age: 38 years old
- Nationality: Belgian
- License : French DGAC “Brevet et Licence de Pilote d’ULM” for multiple axis delivered on 24 October 2007.
- Experience: The pilot began to fly on Pioneer 200 and Polaris FK14B from June 2005. When the accident occurred, he had a total experience of around 500h from which around 250h on the “Rans Coyote”. The experience flying on “Rans Coyote” was gained since he purchased the airplane in January 2011, proving that the pilot flown regularly.

1.6 Aircraft information.

Generalities.

The RANS S-6ES Coyote II is an American constructed two-seat single engine ultra-light airplane featuring a tractor configuration and a high-wing monoplane.

Airplanes are designed and produced as a kit by the company “Rans Design, Inc”

All models of the S-6 feature a welded 4130 steel tube cockpit, with a bolted aluminum tube rear fuselage, wing and tail surfaces all covered in fabric.

The S-6ES went into production in April 1990. It is the second generation of the original S-6 design. The ES denotes "extended span" which was obtained through a fuselage re-design and resulted in improved performance and appearance.

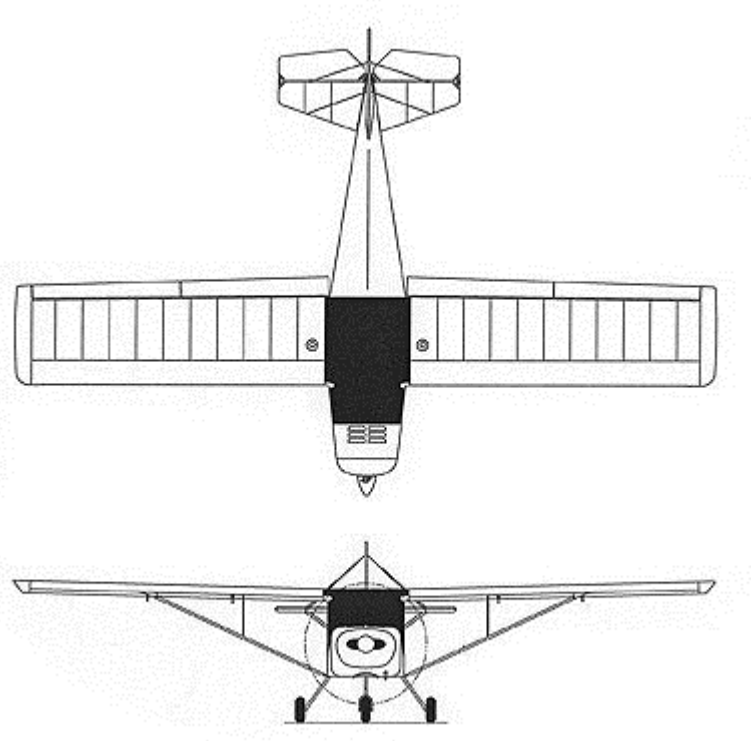
RANS offers two different wing sizes for the Coyote II.

The standard rectangular wing (Area 155,25 sq ft) is a constant chord and 34.5 feet in span with constant chord ailerons and flaps. This configuration offers best take off and climb performance.

The other trapezoidal “116” wing (Area 116 sq ft)) allows for 10 to 15 MPH higher cruise but stall speed is increased by 5 to 8 mph and take off roll is 60 to 100 feet more.

The Coyote II kit can be ordered with tricycle or conventional landing gear.

The standard engine is the 80 hp Rotax 912UL, with the 100 hp Rotax 912ULS being optional.



Crashed airplane description:

Airframe:

- Manufacturer: Rans Designs, Inc
- Type: Rans S-6ES Coyotte II Wing 116-R912
- Serial number: 10051669
- Built year: 2007
- Certificate of registration: French DGAC “Carte d’identification ULM” valid 21/01/2011 to 20 January 2013.
- Certificate of airworthiness: Not applicable
- Airplane total time: 1000h

Engine:

- Manufacturer: BRP Rotax Aircraft Engines
- Type: 912 ULS-FR
- Total flight hours: 1000h
- Serial number: 4430406

Weight & Balance:

No weight & balance data was found. However, taking into account that the rear fuel tank was almost empty and there was almost no personal objects found in the wreckage, it is likely that the W&B was within the airplane's manufacturer limits.

Flight Manual:

"Rans Design, Inc" does not provide any Flight manual for the "Rans Coyote".

However, the Belgian and the French aviation authorities request ultra-light airplanes to be provided with a Flight manual before delivering a flight authorization.

Therefore, the company "Confluence" which is importer of the "Rans Coyote" for Belgium, developed its own Flight Manual called "Manuel de vol et d'entretien" reference S6ES-MVE-W116-912 dated 13 April 2006.

This manual was delivered by the owner to the French aviation authority (DGAC) during the acceptation process of the airplane as being the flight manual of the airplane.

The chapter 5.7. of the "Manuel de vol et d'entretien" about the stalls is composed of 8 paragraphs with a total of 38 lines. This chapter obviously covers only stalls in straight flight.
The chapter 5.8. about the turns is limited to one paragraph composed of 3 lines. There is no information about stall in turn.

A copy of the above chapters is included at the end of this report.

1.7 Meteorological conditions.

The pilots who landed immediately before the accident reported a wind coming from East rendering the landing pattern less easy to follow.

This wind direction was confirmed by the following METAR originating from the EBCI airport (EBCI airport being located around 10 km South East of the crash site).

```
METAR EBCI 211450Z 05006KT CAVOK 19/16 Q1015 NOSIG=
METAR EBCI 211520Z 04006KT 8000 NSC 18/16 Q1015 NOSIG=
METAR EBCI 211550Z 04006KT 7000 NSC 17/16 Q1015 TEMPO 6000=
METAR EBCI 211620Z 05006KT 5000 BR NSC 17/15 Q1015 TEMPO 4000=
METAR EBCI 211650Z 06005KT 4200 BR NSC 16/15 Q1016 NOSIG=
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The meteorological conditions were adequate for VMC flights.
Wind direction was 40°, Wind speed 6 KTS, Ceiling at 7000ft, Temperature 17° and Dew point 16°.

1.8 Aids to navigation.

Not applicable.

1.9 Communication.

The aerodrome is not provided with a Flight Information Service (AFIS). However it is current practice that some pilots use their radio set on a common used frequency to communicate when flying in circuit or in the vicinity of the airfield. The communication between the airplane, the airfield and other airplanes are not recorded.

However, the content of the communication of the “Rans Coyote” was reported by a witness. An ultra-light pilot was taxiing in order to take-off when he heard the “Rans Coyote” pilot announcing his entering in the airfield circuit. The latter reported his position and asked the taxiing pilot to wait before taking off because he wanted to land exactly at “1000 hours”.

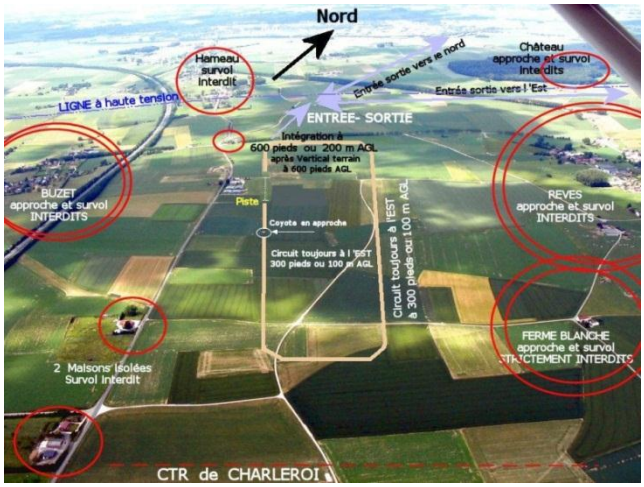
1.10 Aerodrome information.

EBBZ airfield is an airfield for ultra-light located Chaussée de Nivelles, 629 B-6230 Buzet at 15 km north of the city Charleroi (503230N - 0042252E).

The airfield is operated by the company “Confluence” and is subject to prior permission from the operator.

The airfield is provided with a bi-directional grass surface runway. Dimensions are 212m x 30m with an orientation 155° / 335° (QFU: 16/34). The elevation of the airfield is 522 ft.

Both circuits are East of the runways (Left hand circuit for 16 runway and right hand for 34 runway) at a height of 300ft (100m) AGL.



1.11 Flight recorders.

There was no flight recorder on board, nor was it required.

However the airplane was equipped with:

- A GPS AVMAP, model EKP5.
- A DYNON AVIONICS EFIS-D100 multi-function display.

The GPS features an internal memory located on a SD card which could be downloaded despite the GPS being destroyed. The downloaded parameters were not directly readable by AAIU(Be) and the read out was performed with the support of the manufacturer in Italy.

The DYNON AVIONICS EFIS-D100 multi-function display is an electronic device used in ultra-light airplanes to replace different navigation and/or engine instruments. For example: Attitude Indicator, Airspeed, Altitude, Heading, Turn Coordinator, Time, Engine Timer etc …
It does not incorporate a memory but a few pictures of the dashboard were taken by the passenger showing clearly the screen of the DYNON.

1.12 Wreckage and impact information.

The airplane collided with the ground vertically and remained in vertical position after the crash until the rescue services cut the wing rear attachment in order to gain access to the victims.

When the investigators arrived on the crash scene, the fuselage had been moved down but the engine and the wings were left in the original position of the crash.

The rescue services indicated which components were cut to allow lowering of the fuselage and gaining access to the victims.

The wreckage was located in a ploughed field located 640 meters South South-East of the threshold of runway 34 in the runway prolongation (Axis) at a place where the airplanes in circuit are turning from base to final leg when runway 34 is in use.

After removal of the fire extinguishing foam surrounding the wreckage, it could be determined that there was only one impact area in the ground, proving that the airplane collided with the ground almost vertically.

The wreckage was oriented with the nose pointing south and the tail pointing north, toward the threshold of runway 34. Both wing chords made an angle of

around 80° with the ground and the leading edges were in contact with the ground. The engine was partially buried in the soft ground and partially pushed inside the lower front part of the fuselage. The propeller showed two undamaged blades while the third blade was broken at the root and was buried in the ground.

The BRS parachute had not been activated and its control cable had been deactivated by the rescue services for safety.
First investigation on the crash site showed that the wreckage was complete and did not reveal any obvious pre impact structural failure.
Both fuel tanks were filled up to their filler cap, taking into account the position of the wings as seen on the above picture.

After verifying that no part was missing and no obvious anomaly was found in the airplane remains, the wreckage was brought to a secure hangar.

Afterwards, the wreckage was carefully investigated a few days after the accident.
The continuity of the flight controls was verified and no pre-impact mechanical interruption was found. The flaps position could be determined as being extended on position 2 of 3 (position 0 being flapless). The speed indicator needle was blocked at 170km/h.

The dashboard was found to be equipped with a slip indicator.

The GPS AVMAP and the DYNON AVIONICS multi-function display were retrieved severely damaged on the floor of the fuselage. This equipment was taken for possible download of the memory.

The engine was also carefully examined. The spark plugs were removed, the carburettors were inspected and the mechanical integrity of the turning parts and valves was controlled.

1.13 Medical and pathological information.

Not applicable.

1.14 Fire.

The fuel tanks were damaged by impact forces but remained fuel-tight. However, there were possible limited leaks at the stops due to the almost vertical position of the wings. There was no fire.

1.15 Survival aspects.

The impact forces were not survivable.

1.16 Tests and research.

Not applicable.

1.17 Organizational and management information.

Not applicable.

1.18 Additional information.

Not applicable.

1.19 Useful or effective investigation techniques.

Not applicable.

2 Analysis.

2.1 Detailed examination of the wreckage

The detailed examination of the wreckage did not identify any pre-impact anomaly on both the engine and the airframe.

2.2 Loss of control

The witnesses declared they saw the airplane turning directly from downwind to final leg instead of making two 90° turns. Reportedly, this procedure was regularly applied at EBBZ airfield and also by the pilot.

The aircraft was seen at the end of the 180° right turn, almost aligned with the runway, when suddenly the right hand wing and the nose dropped. The airplane entered in a right spin. A few seconds later, the airplane struck the ground in a nose-down attitude.

There was no indication that the airplane turned with too much bank. Therefore, this last turn was probably a medium turn in which the bank angle was between 20 and 45 degrees.

Some witnesses also declared they had the impression the airplane was flying too slow.

At the end of the 180° turn, the pilot had probably a tendency to increase the rate of turn by applying additional bottom rudder whilst maintaining the bank angle with opposite aileron, because of the need to align with the runway.

A tailwind component on base leg to a crosswind landing probably increased the tendency to hurry the turn with the rudder.

If an excess of bottom rudder (pressing too much the rudder pedal on the same side as the lowered wing) is applied the aircraft will be skidding. If skidding, the excess bottom rudder is yawing the nose down and the tendency is to use elevator to keep it up, which is going to bring the angle of attack towards critical causing the wing on the side to which the rudder is deflected to stall before the other.

However, the pilot will only realise the inner wing is stalling when he finds that applying corrective aileron increases the roll rather than reducing the bank.

Finally, taking into account the reasonable bank angle and the sudden right wing drop, we can deduct that the last turn was probably an improperly coordinated descending skid turn, performed at a minimal airspeed.

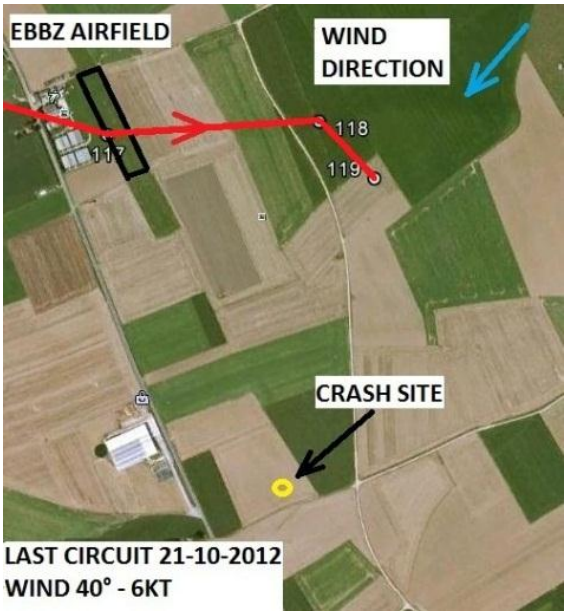
2.3 Loss of control height

The airplane flight manual state an average loss of height between 200ft and 400ft for each turn during a spin.

As the airplane made a half turn before colliding with the ground, it is likely that the height of the airplane was around 150ft when the loss of control occurred.

This estimated height is consistent with the distance between the crash site and the threshold of runway 34 and is obviously insufficient to recover from a spin.

2.4 GPS analysis of previous landings at EBBZ



The GPS data of the last flight was found incomplete, ending in the middle of the downwind landing pattern.

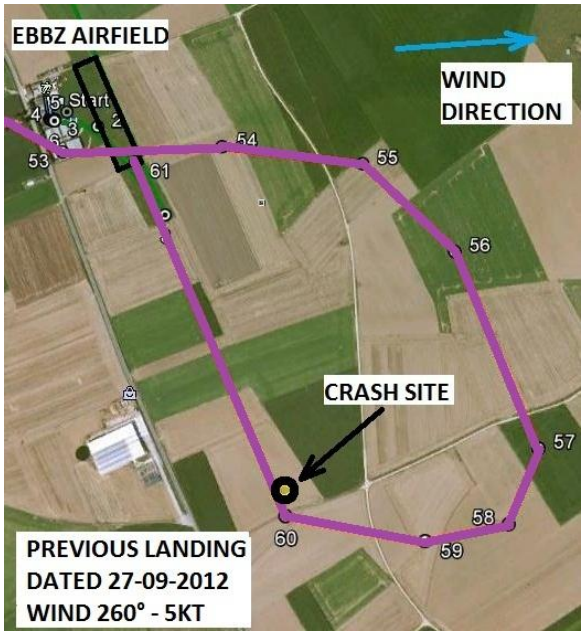
The last missing part of the flight could have been caused by the buffering that occurs within the application software combined with the time required to write the data to the SD card.

The crash occurred 640 meters South South-East of the threshold of runway 34 in the runway prolongation (Axis).

The airspeed of the airplane when the loss of control occurred could not be determined, as said above, due to the missing GPS data.

However, from all the GPS records of previous flight, we selected two interesting landing patterns made at EBBZ by the same pilot.

The selected landing circuits and the last landing pattern were all performed with a 180° turn at the end of the downwind.



The hereby enclosed picture shows a turn made when a 5KTS wind was coming from 260°.

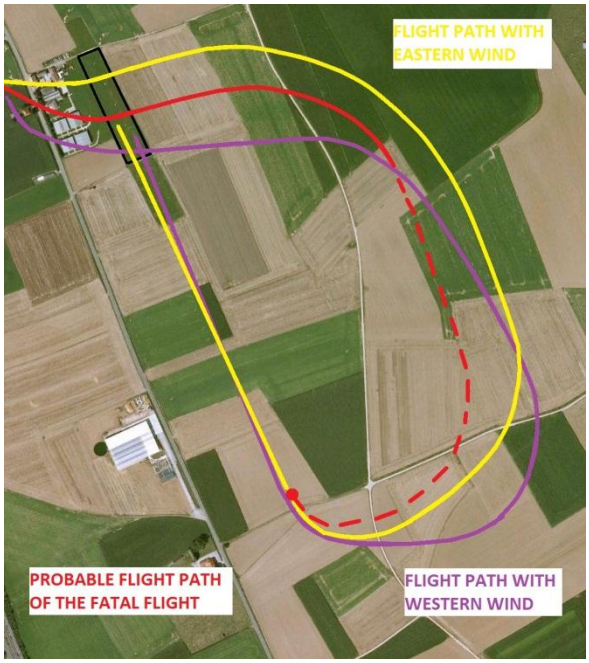
The GPS picture shows a relatively constant 180° turn.

The pilot had obviously no difficulty to align the airplane on the final leg.

A landing performed on 7 October 2012, a few days before the accident, gives an idea of what could have been the fatal last turn.

The wind speed and direction on the day of the accident (40°-6KTS) and the 60°- 9KTS wind speed and direction of 7 October 2012 would have caused almost the same difficulty to align on the final leg.

Reportedly, the last turn to align in final is more difficult to handle when the wind is coming from east. However, a 9 KTS wind coming from 60° would be acceptable for a properly trained pilot.



The pink flight path shows a landing circuit performed with a western wind having as consequence a large radius of the last turn to align on final leg.

By contrast, the yellow flight path of a landing circuit in an eastern wind shows a smaller radius of the last turn.

The red flight pattern is a simulation of the probable flight path of the fatal flight, illustrating the difficulties the pilot likely encountered to align the airplane on the runway axis.

2.5 Flight Manual

AAIU(Be) found it worthwhile to investigate what kind of information related to the airplane behaviour in turn and stall was available to the pilot.
Therefore AAIU(Be) examined thoroughly the chapters of the “Manuel de vol et d’entretien” covering the “Stall” and the “Turns”.

The information contained in chapter 5.7. about stalls is a mixture of:

- Objective information about the stall characteristics of the airplane
- General information about the stall, as it could be found in a pilot training handbook.
- Messages tranquilizing the reader and minimizing the danger of stall with this type of airplane.
- Inadequate information, as for example the performance applicable to another type of “Rans Coyote”, equipped with a 47hp engine.

By contrast, the chapter 5.8. about the turns doesn’t give any information about stall in turn.
This chapter is also a mixture of :

- Objective information
- General information about the turns, as it could be found in a pilot training handbook.

Finally, we can say that the “Flight manual” describes the “Rans Coyote” as being extremely safe regarding the stall characteristics in straight flight and does not give any indication regarding the stall behavior of the airplane in turn.

2.6 Pilot's experience

In January 2011, when he bought the "Rans Coyote", the pilot had accumulated around 250h flight experience beginning in June 2005. At that time, his experience was limited to tricycle landing gear airplane.

Witnesses describe the pilot as being less self-confident when he bought the "Rans Coyote" and began to fly at EBBZ airfield.

After purchasing the "Rans Coyote", he made a few instructional flights essentially around the airfield in order to learn landing with a tail dragger airplane.

From that moment, he flew regularly from and to EBBZ Buzet airfield and progressively acquired more flight experience.

During the last summer time he made a lot of long flights to neighbouring countries and reportedly gained a lot of self-confidence. From July 2012 to 21 October 2012 (date of the crash), the pilot accumulated around 52 flight hours.

Reportedly, the pilot performed refresher flights with an instructor during the last 250h, since the conversion training to a tail dragger airplane.

2.7 Mission-itis

The pilot had announced to friends, as if it was a challenge, that he would land exactly with the Hobbs meter of his aircraft indicating 1000 hours.

This was confirmed by a radio conversation between the pilot and another ultralight pilot which was taxiing for take-off at EBBZ.
Pictures of the "Dynon Avionics" taken by the passenger before the crash show also 999,9h Hobbs indication.

It is likely that the pilot was so focused to land at 1000h that he was in a tunnel vision which prevented realizing his last turn was inappropriate and/or to consider cancelling the landing and performing an additional circuit.

3 Conclusions.

3.1 Findings.

- The pilot held a valid French DGAC “Brevet et Licence de Pilote d’ULM”
- The airplane was in airworthy condition.
- No pre-impact anomaly was found in the wreckage.
- The pilot had regularly flown since he purchased the airplane in January 2011 and had gained a lot of self-confidence.
- The pilot was focused to land with the Hobbs meter indicating 1000h.
- A Eastern wind was present (tailwind in base-leg), rendering the alignment with the runway axis more difficult during the turn in final.
- The airplane designer does not provide any “Fight Manual”, therefore the Belgian importer of “Rans Coyote” created its own “Fight Manual”.
- The “Flight Manual” of the Belgian importer does not adequately inform the users about the stall characteristics of the airplane. The general impression being after reading the chapter “Stalls” is that the “Rans Coyote” airplane is extremely safe, rendering a loss of control almost impossible to a moderately trained pilot.

3.2 Causes.

The cause of the accident is a loss of control of the airplane during the last turn in a landing circuit. The loss of control probably occurred due to the execution by the pilot of a 180° turn with an inappropriate monitoring of the speed and slip indications.

Contributing factors:

- At the end of the last flight, the pilot focused to land at 1000h “Hobbs”. This probably prevented him considering a go-around.
- The description of the stall characteristics found in the flight manual could have reduced the pilot awareness about the danger of stall with a “Rans Coyote” airplane.

4 Safety recommendations.

AAIU(Be) is of the opinion that safety promotion is a key element to improve pilot's awareness.

Therefore, AAIU(Be) supported the "Belgian ULM Federation" initiative of an "ULM Safety Day" organised on Saturday 16 March 2013.
AAIU(Be) participated to the "ULM Safety Day" with a presentation of recent ultralight accidents and incidents.

The AAIU presentation focused among others on the promotion of regular flights with an instructor in order to improve the pilot's proficiency and/or to rectify possible weak points in the flying skills of the pilot.

Additionally, AAIU(Be) believes that the comforting description of the stall characteristics found in the "Confluence" flight manual could have somewhat reduced the pilot's awareness of the stall behavior of his airplane.

Therefore, the following recommendation:

Recommendation 2013-U-2 to "Confluence" about the "Flight Manuals"
AAIU(Be) recommends the company "Confluence" to asses and to rework their "Flight manuals" in cooperation with Rans Designs in order to improve the awareness of the reader.
AAIU(Be) believes that Flight Manuals should only contain objective information and warnings related to the particular airplane.

5 Enclosure:

5.1 Selection of "Confluence" Flight Manual chapters about Stalls and Turns

5.7 Décrochages

Vous êtes avertis d'un décrochage par des vibrations causées par de l'air turbulent passant de la base de l'aile au dessus de la gouverne de profondeur. Le décrochage arrive nettement. On peut avoir besoin du gouvernail de direction pour garder les ailes à niveau et contrer les effets du couple moteur. Vous rattrapez immédiatement un décrochage en rendant le manche. En jouant avec les gaz vous pouvez tester les décrochages qui vous démontreront le léger tremblement et le redressement rapide.

Le décrochage est précédé de vibrations évidentes causées par les turbulences du décrochage de l'aile interne sur le stabilisateur horizontal. Pendant ce décrochage, il y a encore suffisamment de portance et de contrôle pour maintenir l'avion en vol. Quand l'aile entière décroche, le nez tombe très doucement et le taux de chute augmente (de 1000 à 1500 ft/min). L'avion peut être tenu, les ailes à niveau, avec le gouvernail. (Note: Pendant cette "feuille morte" on suppose que la profondeur est complètement vers le haut). L'avion peut prendre quelques légers auto-cabrages de 10° dans le cas où un super-décrochage est provoqué suite à une position exceptionnellement très cabrée. Cependant, il va rapidement présenter un cabré léger jusqu'à ce que l'action du manche vers l'arrière soit relâchée.

Si pendant un super-décrochage (feuille morte), le pilote enlève ses pieds des palonniers, l'appareil va présenter un mouvement de roulis jusqu'à ce qu'il engage une gentille spirale vers la gauche ou la droite.
Note: ceci n'est pas une vrille, bien qu'on pourrait le prétendre! En effet, la rotation ne se fait pas autour du centre de masse de l'avion. Elle s'effectue plutôt comme le long des parois d'un cylindre vertical. Donc, nous maintenons qu'il s'agit d'une spirale. D'autant plus que les caractéristiques de la vrille sont très conventionnelles. La mise en vrille demande un braquage complet et maintenu de la gouverne de profondeur et de la gouverne de direction.

La rotation en vrille présente une inclinaison du nez vers le bas de approximativement 80° avec une rotation à travers le centre de masse, pratiquement à travers la ligne centrale de l'appareil (à 100 près). La vitesse de rotation est de 3 sec/tour. Cette vitesse est atteinte après la seconde rotation et n'augmentera pas. Les tests montrent qu'il n'y a pas d'augmentation de la vitesse de rotation même après 10 tours de vrille. Le taux de chute moyen est de 1500 à 2000 ft/min, avec une perte de 200 à 400 feet par tour en fonction de la densité de l'air à cette altitude.

La différence entre la spirale et la vrille est facilement reconnaissable et contrôlable. Les décrochages et vrilles ont été testés dans toutes les configurations et n'ont pas révélé de caractéristiques anormales.

En conclusion, la machine partira en vrille que s'il décroche complètement et si on enfonce le palonnier à fond. On en sort en effectuant 1/4 de tour en contrant du côté opposé ou en 1/4 de tour en neutralisant. Étant donné que l'appareil prévient bien quand il va décrocher et qu'il se sort facilement du décrochage et de la vrille, il peut être piloté en sécurité par un pilote peu expérimenté.

Comme il annonce bien le décrochage et qu'il se contrôle facilement, l'appareil est considéré comme un avion S.T.O.L. (Short Take off Landing = avion à atterrissage et décollage courts). Avec un moteur de 47 cv, on peut décoller sans vent en 150 feet. L'angle de montée peut être de 25° à 35° à une vitesse de 40 mph, 600 feet/min et avec les volets complètements sortis (le taux de montée augmente avec le retrait des volets).

Les tests ont démontré que l'on peut maintenir un contrôle complet pendant des décollages et atterrissages S.T.O.L. (extra courts) même aux grands angles et moteur à fond. Dans ce cas, une panne moteur peut entraîner un décrochage puisque la vitesse air est de l'ordre des 30 mph. En conséquent, cette manœuvre devrait uniquement être effectuée par des pilotes expérimentés et seulement si c'est nécessaire, par exemple, s'il faut atterrir sur une piste exceptionnellement courte (par exemple de 250 m avec des obstacles de 15 m ou davantage à chaque bout).

5.8 Virages

L'appareil s'incline assez facilement avec un minimum de lacet inverse. Mettez-le en virage en utilisant un peu de pied. Evitez de faire des virages serrés avant d'être accoutumé à l'appareil. Des 360° ou des 720° serrés peuvent vous désorienter parce que la cadence est rapide. Faites ceci après vous être familiarisé avec l'appareil.

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