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Operator:	Aerial Advertising Ltd
Design	YAKOLAV, Russia
Manufacturer:	AEROSTAR, Romania
Model:	YAK 52 (Romanian IAK 52)
Nationality	Lithuania
Registration	LY-AHF
Location	Weston Airfield
Date/Time (UTC)	24 July '01, 15.15 hours

SYNOPSIS.

Having taken off from Abbeyshrule, 40 nm away, the pilot and his passenger joined the circuit for landing at Weston Aerodrome. During base leg the pilot called out "three greens" to his passenger in the rear seat, indicating that he had selected the undercarriage down. After touchdown, however, the undercarriage appeared to collapse. The aircraft continued along the runway and eventually ran on to the grass and stopped.

1. FACTUAL INFORMATION

1.1 History of the Flight.

The aircraft took on 50 litres of fuel at Abbeyshrule Airfield and took off at 14.45 hours to return to Weston Aerodrome. The aircraft joined the circuit overhead the airfield with an airspeed of 170 km/h (93 kt). During the approach, the pilot said that he carried out his landing checks and called out "three greens" to his passenger in the rear seat. He said he was sure the undercarriage mechanical indicator showed that the undercarriage was locked down. This signified that he had selected undercarriage down and that the three indicator lights had confirmed that the undercarriage was down. He turned left on to base leg for landing on Rwy 25. The aircraft came in at an approach airspeed of 150 km/h (82 kt) and touched down. There was a little bounce and the power was increased momentarily. The tips of the propeller blades shattered as the blades touched the runway. The aircraft continued along the runway for over 400 m (1312 ft) and finally turned left on to the grass next to the aircraft parking area. Both pilot and passenger exited the aircraft unaided. The time was 15.15 hours.

1.2 Witness Reports

The pilot said that as he was downwind overhead the airfield he extended the landing gear. On joining the final approach to RWY 25 he extended the flaps and completed the landing checks. As the aircraft flared he said that it bounced slightly and he applied a momentary increase in power and flared again. The aircraft settled on the runway in a lower than normal altitude.

As soon as he had touched down he realised that the landing gear was not down and he steered the aircraft on to the grass at the left side of the runway. When the aircraft stopped he instructed the passenger to evacuate the aircraft. He then completed the emergency drill and evacuated the aircraft himself.

The pilot said afterwards that the landing gear lever on this aircraft has three positions. When the gear is UP, the lever is normally in the top position. To lower the landing gear it is necessary to push the lever in, and move it through a centre position to the DOWN position. On the day of the incident he moved the gear lever to what he thought was the DOWN position but, in fact, it was the centre position

1.3 Injuries To Persons

Injuries	Crew	Passengers	Others
Fatal	0	0	0
Serious	0	0	0
Minor	0	0	0
None	1	1	

1.4 Damage To Aircraft

The aircraft landed with the landing gear retracted but because the main wheels do not retract fully into the wheel wells, the aircraft suffered little damage to its airframe. There was slight trailing edge damage to the flaps. The propeller was damaged beyond repair. The loads on the engine may require engine shock testing prior to being put back into service.

1.5 OTHER DAMAGE

Apart from superficial marks on the runway made by the propeller there was no other damage

1.6 Personnel Information:

1.6.1 PF (Commander)

Personal Details	
Licence	ATPL
Last Periodic Check	N/A
Medical Certificate	March 2001

Flying Experience:

Total all types	13,000	hours
Total on type	10	hours
Last 90 days, All Types	120	hours

Last 28 days, All Types	40	hours
Last 24 hours	Nil	hours

1.7 Aircraft Information

1.7.1 General

The YAK52 is a light aerobatic trainer designed by the Yakovlev Design Bureau in the former USSR and manufactured in Romania by Aerostar where it is designated as the IAK52. Aerostar is the sole producer of this aircraft and to date over 1800 aircraft have been sold. The aircraft is considered to be very safe, with excellent manoeuvrability in flight. The aircraft is a low wing, two seat, tandem cockpit type, with all-metal fuselage construction and fabric covered control surfaces. Aircraft systems such as engine start, landing gear retraction and wheel braking on the Yak 52 are operated pneumatically by compressed air. Air from an engine driven compressor is stored in two spherical bottles (one main, one for emergency in-flight engine start), which are always charged whilst the engine is running. To ensure safety during maintenance, the air system may be isolated at the output side of the tanks.

The aircraft wheels when retracted protrude below the underside of the wing and provide some protection to the underside of the aircraft in the event that the undercarriage has not been extended or fails to extend. However, the propeller can still strike the runway on landing. The landing gear selector handle has a safety pin adjacent to the handle, which slides from left to right to prevent inadvertent UP selection when the aircraft is on the ground.

Following market requirements, mainly in the West, the manufacturers produced the YAK52W modernised version and is currently developing the tail wheeled YAK52TW. The YAK52W has an increased fuel tankage, three-blade propeller, Western avionics and metal-skinned control surfaces instead of the fabric-covered originals.

1.7.2 Undercarriage and flaps systems

The YAK 52 has similarly shaped and mechanised levers for flap and gear. Both levers are operated by the left hand; the landing gear lever is mounted on the instrument panel in front of the throttle and moves up and down whereas the flap lever is located behind the throttle and moves fore and aft. The two flaps annunciator lights for flaps “up” or “down” are adjacent and to the right to the undercarriage lever (see Appendix A). The 3 green “undercarriage down” annunciator lights are to the left of this lever. There are no systems linked to throttle position or air speed on the Yak 52 to provide an audio warning to the pilot if the landing gear is not in the down position.

Aircraft type	YAK 52 (Romanian IAK52)
Manufacturer	Aerostar, Romania,
Constructor’s number	888615
Year of manufacturer	1988

Certificate of registration	11 September 1998
De-registration	8 March 2002
Certificate of airworthiness	11 September 1998
Total airframe hours	700 hours
Total cycles	N/A
Engines	Vendeneyev M –14P @820 hours

1.7.3 Servicing and Maintenance

The aircraft was manufactured in 1988 and by 1992 had accumulated 513 airframe hours. On 15 Sept 1998 the aircraft was released following overhaul and imported by YAK U.K, whilst remaining on the Lithuanian register. Following formal instruction in the UK by the importers, the first Irish owner flew the aircraft on 14 Oct 1998. It was transferred to its present owners in Feb 2001 at a total time of 688 hours. However, no formal instruction by a qualified Yak52 instructor is recorded in this case.

A 200 hour inspection was completed at 183 hours since the initial overhaul (694 since new) and a flight test conducted on Friday 20 July 2001. Between that time and the time of the incident four days later, a total of 13 successful landings were completed. At the time of the incident, the total airframe hours were almost 700 hours.

1.7.4 Certification

This aircraft was imported into the U.K. with a Lithuanian Certificate of Airworthiness (C of A) and sold on to its first Irish owner. If the importers had sought U.K. registration a UK C of A would not have been granted. This is because the aircraft had not been issued with a Type Certificate that satisfies the requirements of ICAO Annex 8. To qualify for a UK "Permit to Fly" it must be shown that the aircraft was previously an ex-military aircraft of the former USSR. Some minor modifications to the aircraft are also required.

One of the provisions of a Permit to Fly is that to fly within any other country, permission must be obtained from the Airworthiness Authority of that country. As this aircraft had a Lithuanian C of A, there was no requirement to inform the IAA of its presence and operation within the country. Likewise in the U.S.A., the YAK52 is in the "Experimental Category" with similar flight restrictions.

1.8 Meteorological Information

1.8.1 The pilot reported the weather conditions prevailing as follows:

Wind	260/10 kt
Visibility	Good
Significant Weather	Nil
Cloud	Scattered

1.9 Aids to Navigation

Not a factor

1.10 Communication

Not a factor

1.11 Aerodrome Information

Aerodrome 8 NM West of Dublin City
Runway 07/25 with Tarmac Surface

1.12 Flight Recorders

1.12.1 Cockpit Voice Recorder

The aircraft was not fitted with a CVR nor was one required.

1.12.2 Flight Data Recorder

The aircraft was not fitted with an FDR nor was one required.

1.13 Wreckage and Impact Information

Propeller blade marks were found for over 400 metres along RWY 25.

1.14 Medical Information

Nil

1.15 Fire

There was no fire.

1.16 Survival Aspects

The aircraft is fitted with a full harness at front and rear, which the pilot and passenger were wearing at the time. The pilot reported that evacuation of the aircraft took 5 seconds.

1.17 Tests and Research

The aircraft was jacked up and the undercarriage lowered. The aircraft was towed to the hangar and again mounted on jacks where full undercarriage retraction and extension checks were carried out. No defect with the extension/retraction mechanism was found.

1.18 Organizational and Management Information

Nil

1.19 Additional information

Flight Reference Cards for this aircraft indicate the following normal drills:

Pre Landing Checks (Downwind)

U/C (below 200km/h) *DOWN-3 greens and mechanical indication.*

Finals
U/C *DOWN -3 greens and mechanical indication*

2. ANALYSIS

The undercarriage operating and signalling system were found in a serviceable condition following the incident. The pilot moved the undercarriage lever to the middle (centre) position without first pushing the lever in and then moving it to the down position. It is clear therefore that the undercarriage was not down at the time of landing and that 3 green lights and the mechanical indication were not evident to either the pilot or his passenger.

In the USA and UK, there have been several previous occurrences of inadvertent operation of either the undercarriage lever or the flap lever and landing with the gear retracted. The most recent occurrence was in Yorkshire, England, in May 2002. The UK importers of the type have tried several modifications to address these problems. However, none of these have yet been approved by the UK CAA. The specification for the YAK 52W includes such a warning device but this has not been installed on this aircraft to date.

The landing gear is semi-retractable and offers greater safety in the event of a wheels up landing. However, it should not be too difficult to have approved a microprocessor based "Wheels-Up Warning Device" which has been designed in the UK and could also be retrofitted to all YAK 52 aircraft.

The investigators are also of the opinion that the two flap indicator lights adjacent to the undercarriage lever should be transferred to a more left position on the instrument panel and more in line with the flap lever, in order to avoid the possibility of the flaps "down" indication being confused with undercarriage "down" indication. It is considered that its present position may confuse the pilot during "finals checks".

This type of military aircraft is very popular with high time commercial pilots who wish to have a private aircraft with advanced aerobatic features and the looks of a WW2 aircraft. However, the YAK 52 does not have all the inherent warning devices of modern commercial aircraft. A short introductory course by a qualified YAK 52 instructor would therefore be beneficial to such pilots.

3. CONCLUSIONS

The pilot did not complete the action of lowering the undercarriage lever, confirming through the "three greens" indicator lights and the manual "undercarriage down" indicator, that the wheels were down and locked. The aircraft landed with the undercarriage in the retracted position.

3.1 Findings

3.1.1 The aircraft and crew were properly certificated for the flight.

3.1.2 The aircraft had been correctly maintained in accordance with the appropriate schedules.

3.2 Causes

The failure of the pilot to properly lower the aircraft undercarriage for landing.

4. SAFETY RECOMMENDATIONS

4.1 The manufacturers of this aircraft should review the position of the flap indicator lights in order to remove them from the vicinity of the undercarriage lever. **(SR 29 of 2002)**

4.2 The manufacturers of this aircraft should consider the installation of a "Wheels-Up" warning device on the Yak 52 aircraft. **(SR 30 of 2002)**

4.3 As the aircraft does not meet the requirements of ICAO Annex 8, the Lithuanian authorities should issue a CofA in the Experimental or Restricted Category. **(SR 31 of 2002)**

4.4 The Lituanian CAA should advocate the training of pilots through a short introductory flying course on this aircraft. **(SR 32 of 2002)**

Note: On going to print, a similar incident involving the flap and undercarriage lever operation on a Yak 52, occurred in the UK.

APPENDIX A

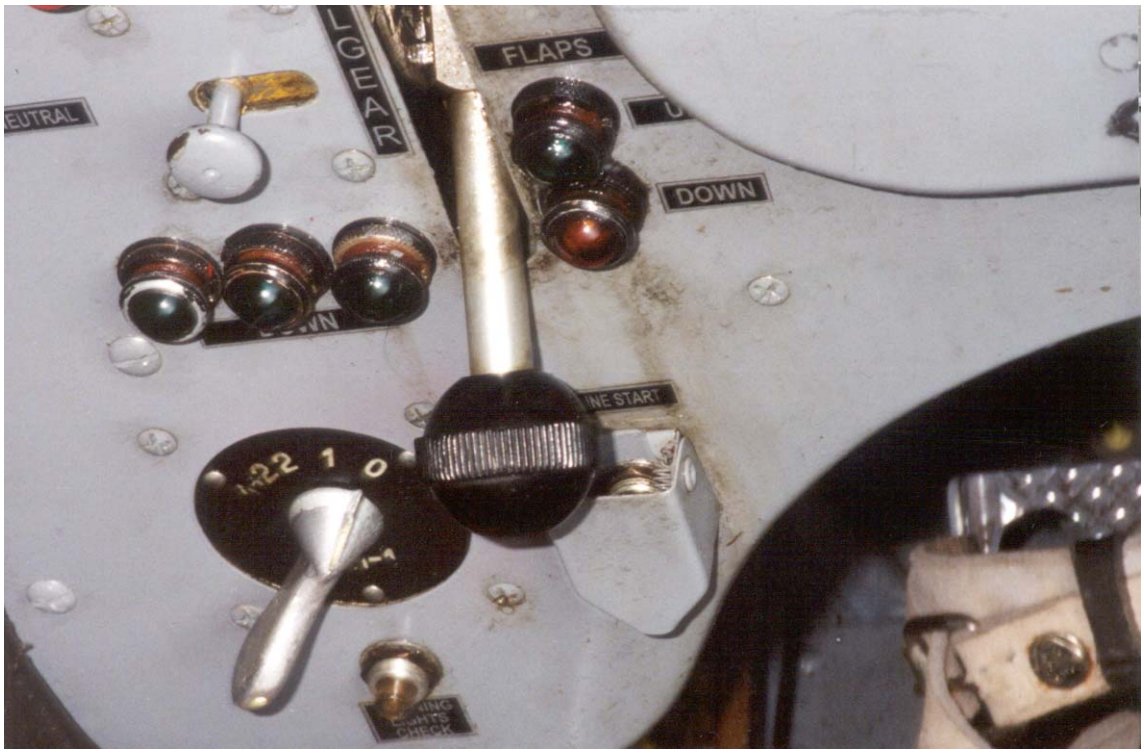

Photo of front instrument panel showing three green ("undercarriage down") lights to the left of the undercarriage lever with the flaps indicator lights to the right and adjacent to the undercarriage lever.