AAIB Bulletin No: 4/2005 **Ref: EW/G2004/12/04** **Category: 1.2**

Aircraft Type and Registration:	Aero L-39C Albatros, G-OALB
No & Type of Engines:	1 Ivchenko AI-25TL turbofan engine
Year of Manufacture:	1979
Date & Time (UTC):	10 December 2004 at 1444 hrs
Location:	Manston Airfield, Kent
Type of Flight:	Private
Persons on Board:	Crew - 1 Passengers - None
Injuries:	Crew - None Passengers - N/A
Nature of Damage:	Rear canopy damaged
Commander's Licence:	Commercial Pilot's Licence
Commander's Age:	61 years
Commander's Flying Experience:	11,600 hours (of which 7 were on type) Last 90 days - 18 hours Last 28 days - 12 hours
Information Source:	Aircraft Accident Report Form submitted by the pilot

Synopsis

The pilot shut both canopies before takeoff but the canopy "unlocked" light remained illuminated. Visual inspection confirmed that, the external locking handles appeared to be stowed correctly and the pilot believed that the micro switch that operated the "unlocked" light was incorrectly adjusted. During the takeoff, the rear canopy detached and came to rest beside the runway. The aircraft returned to the airfield safely, having sustained no further damage. An investigation revealed that the locking handle can be stowed without first locking the canopy, and that correct operation of the lever is the only means of ensuring that the canopy is secure.

History of flight

The aircraft was being delivered from Manston to North Weald for an engine change and annual servicing. The pilot carried out a thorough pre-flight inspection, which included checking that the rear cockpit canopy was closed and locked. He then attempted to start the aircraft auxiliary power unit (APU) but was unable to do so because the aircraft battery and external ground power unit

(GPU) provided insufficient power. The battery operated GPU was then charged for an hour, the pilot carried out a brief external inspection and then attempted another start. It is not known if the rear cockpit was opened during the intervening period. During this attempt, although the APU was started successfully, it ran down before the main engine could be started. The ground crew checked the GPU connection, and a further attempt resulted in successful APU and main engine start.

When the pilot closed the front canopy and attempted to lock it, the canopy 'unlocked' light remained illuminated. It remained illuminated despite subsequent attempts to lock the canopy, so the ground crew inspected the external handles to confirm that they were stowed. The pilot was satisfied that the 'unlocked' light was illuminated only because the micro switch which operated it was incorrectly adjusted; on a previous flight the light had been extinguished by twisting and pushing the internal front canopy lock vigorously. He therefore completed the engine run-up and before take-off checks and carried out an apparently normal departure.

At approximately 100 ft agl, as the landing gear was retracted, the pilot noticed an increase in the general noise level, which he likened to a pressurisation failure. Looking rearwards, he noticed that the rear canopy was missing. He throttled back to maintain between 120 kt and 130 kt and informed ATC that he intended to return and land. He passed the canopy on the runway during the subsequent uneventful landing. Fortunately, it appeared that the canopy had not come into contact with the aircraft after becoming detached and a post-flight inspection revealed no obvious damage or defects. A replacement canopy was fitted and the aircraft continued to North Weald as planned.

Aircraft description

The L-39C Albatros is a tandem two seat jet trainer of Czech origin. The front and rear cockpits are divided by an internal windshield and each has a separate canopy, hinged along its right hand edge as shown in Figure 1. The hinges are designed to disengage when the canopies are shut, to enable them to be jettisoned. The result is that, when closed, the canopy is not attached to the aircraft unless it is also locked. Accordingly, each canopy is locked by rotating a handle that engages two pairs of hooks with two pairs of corresponding pins recessed into the lower edges of the canopy.

Each canopy is locked independently, either using an internal handle on the left hand side of each cockpit, or using an external handle mounted below the shut line of each canopy again on the left hand side of the fuselage. If the rear cockpit is occupied, it is normal to secure the internal handle using a bungee cord which restrains it in the forward, locked position, and for the external handle to be stowed separately. However, the rear internal handle cannot be reached from the front cockpit due to the presence of the internal windshield. Therefore, if the rear cockpit is unoccupied, the rear canopy can only be locked from the outside.

When the canopy is unlocked, the external handle will appear as shown in Figure 2. In order to lock the canopy from outside, the handle must be rotated anti-clockwise, beyond the stowed position. When released it should appear as shown in Figure 3. However, the handle can be stowed, as shown in Figure 4, regardless of whether or not the canopy has been locked. Consequently, visual confirmation that the handle is stowed does not guarantee that the canopy is locked.

The pilot conceded that he may not have operated the handle correctly to ensure that the canopy was locked prior to takeoff.

Figure 1

Figure 2

Figure 3

Figure 4