Serious Incident

Aircraft Type and Registration:	Aero L-159E, G-DKNA	
No & Type of Engines:	1 Honeywell F124-GA-100 turbofan engine	
Year of Manufacture:	2001 (Serial no: 156034)	
Date & Time (UTC):	27 October 2025 at 2135 hrs	
Location:	North Sea Danger Area (D323 D)	
Type of Flight:	Training	
Persons on Board:	Crew - 1	Passengers - None
Injuries:	Crew - None	Passengers - N/A
Nature of Damage:	None	
Commander's Licence:	Commercial Pilot's Licence	
Commander's Age:	31 years	
Commander's Flying Experience:	1,440 hours (of which 118 were on type) Last 90 days - 45 hours Last 28 days - 21 hours	
Information Source:	Aircraft Accident Report Form submitted by the pilot and operator's safety investigation report	

Synopsis

During a high-altitude sortie at night, a cracked inlet air supply pipe led to the failure of the aircraft's main oxygen system. This was compounded by a failure of the emergency oxygen system, due to a latent fault within the oxygen regulator. This resulted in the pilot being briefly exposed to a risk of hypoxia and required an emergency descent of the aircraft through controlled airspace. As a result of its internal investigation, the operator is considering a number of safety actions to address the issues identified with the aircraft oxygen supply system and its maintenance and testing.

History of the flight

The serious incident occurred on 27 October 2025 during a night exercise where the aircraft was planned to remain at 27,000 ft for the duration of the training sortie, which also involved nine other aircraft operating within the danger area. Approximately an hour and ten minutes after taking off, while in level flight, an OXY LOW – REG caption illuminated. The pilot experienced a total loss of gas flow to the mask and a feeling of suffocation. The pilot selected emergency oxygen ON, but felt no difference, so initiated an emergency descent to 10,000 ft and removed his mask. Due to the nature of the problem and a reported high level of radio transmissions at the time, the pilot could not inform military Air Traffic Control (ATC) of an emergency or obtain clearance for the rapid descent in advance of performing the manoeuvre. Though the aircraft was still within in the exercise danger area, the pilot stated that he had good situational awareness of the surrounding aircraft. The microphone for the

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radio system is located in the mask, so the pilot was unable to make radio calls while it was removed. When established at 10,000 ft, the pilot disconnected the mask's hose allowing the mask to be refitted while breathing cockpit air. The pilot then discontinued the sortie and returned to base, observing intermittent illumination of the OXY LOW – REG caption.

Problems with the oxygen system had also been experienced on this aircraft during an earlier flight on 17 October 2025. The pilot reported that 30 minutes into the flight, as the aircraft descended from 26,000 ft to 16,000 ft in an intended manoeuvre, the OXY REG warning caption illuminated. The pilot attempted to breathe in and experienced no gas flow, while also observing a NO FLOW warning. The pilot successfully operated the emergency oxygen supply and descended to 10,000 ft, before terminating the sortie and landing without further incident.

Aircraft information

The aircraft is equipped with an Onboard Oxygen Generating System (OBOGS) which supplies a 99% oxygen gas mix through the pilot's mask at altitudes above 10,000 ft. If this system fails, it results in no gas flow to the pilot's mask. The reduction in pressure allows an anti-suffocation valve in the oxygen regulator to open against spring pressure as the pilot inhales, allowing them to breathe pressurised cockpit air. It does not trigger any other response from the system. The pilot must then manually select the emergency oxygen supply, following the emergency checklist, and initiate a controlled descent to below 13,000 ft altitude.

The emergency oxygen supply is provided by a fixed volume bottle of compressed 100% oxygen. The pressure and flow rate delivered to the pilot are lower than with the OBOGS and the gas supply only lasts for approximately 10 minutes. When in use, the emergency oxygen supply is supplemented with pressurised cockpit air, drawn in through the same anti-suffocation valve on the regulator. This supply also provides oxygen in the event of an ejection above 10,000 ft.

The aircraft cockpit has a pressurisation system which reduces the altitude within the cockpit but only provides a maximum 4 psi pressure differential with the external atmosphere. This gives a cockpit altitude of 10,000 ft at an aircraft altitude of 23,000 ft. Above 10,000 ft, without supplementary oxygen, the reduction in available atmospheric oxygen can result in the pilot experiencing symptoms of hypoxia[1].

Operator's maintenance actions

Following the first flight where a problem had been experienced, the operator advised that in accordance with the maintenance manual troubleshooting, the oxygen concentrator was replaced but the fault was still present. The oxygen regulator was then replaced, with no change. The dehydrator was then replaced, which appeared to address the problem and the aircraft was released back into service.

Footnote

[1] Insufficient oxygen in body tissues and specifically the brain, can cause headaches, confusion, dizziness and drowsiness. Severe cases can lead to seizures and loss of consciousness.

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After the serious incident a more detailed disassembly and inspection of the OBOGS was carried out, which identified a pipe supplying pressurised bleed air from the engine to the OBOGS had failed around the full circumference of a weld, effectively removing the air supply into the system. The failed pipe was in a location on the engine obscured from direct line of sight and the engine had to be removed to replace the pipe. Following this maintenance activity, a post-maintenance check flight was carried out to ensure the fault had been fully rectified. A manufacturer's modification to strengthen the failed pipe was available but had not been embodied on this aircraft.

The operator stated that the regulator was changed for a serviceable spare unit as part of the troubleshooting for the original failure. This change likely inadvertently introduced an anti-suffocation valve which had seized shut during storage. The operator advised that this valve is part of the regulator assembly, but its operation was not specifically tested as part of the maintenance task covering installation of the component. The operator stated the regulator had been sent for further disassembly and investigation, but the findings were still awaited at the time of publication.

Tests and research

The operator conducted an inspection of the remaining L-159 aircraft in its fleet to check the condition of the OBOGS supply pipes and the serviceability of the regulator anti-suffocation valves. This confirmed that all the valves on the other aircraft functioned correctly, but some were harder to operate than others.

Analysis

During the first flight when a problem with the oxygen system was experienced, the OBOGS failed resulting in a loss of gas flow to the pilot's mask. However, the emergency oxygen supply and anti-suffocation valve functioned correctly allowing the pilot to safely descend and return to base. The subsequent maintenance activity appeared to address the cause but did not identify an issue with the OBOGS air inlet pipe.

This initial maintenance activity also included replacement of the oxygen regulator which housed the anti-suffocation valve. The valve on the replacement unit installed had likely seized shut during storage, but this was not identified prior to release to service of the aircraft, as the installation checks did not include a requirement to perform a function test on the valve.

When the OBOGS system failed again during the second flight due to the failed pipe, while it's likely the emergency oxygen supply provided a supply of oxygen, the seized anti-suffocation valve meant the volume of gas provided to the pilot was insufficient, resulting in a feeling of suffocation. At the altitude at which the aircraft was operating the limitations of the cockpit pressurisation system placed the pilot at risk of hypoxia, so in accordance with the emergency checklist, the pilot initiated an emergency descent to below 13,000 ft and removed his mask to be able to breathe freely. Due to other radio traffic and the urgency of the situation, the pilot did not declare an emergency or obtain clearance for the rapid descent from the military ATC controlling the danger area. While this may

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have contributed to improved situational awareness for the controller and the other aircraft operating in the vicinity, the pilot stated that he had sufficient awareness of the location of the other aircraft to be able to deconflict his descent, so in this case it made no difference to the outcome. However, he acknowledged that he would likely make a PAN or MAYDAY call, if the situation were repeated in the future.

The operator is considering a number of safety actions to address the issues identified with the OBOGS and oxygen regulator systems and the maintenance and testing of them.

Conclusion

While conducting a high-altitude, night-time sortie, a cracked inlet air supply pipe led to the failure of the aircraft's main oxygen supply system. This failure was compounded by a failure of the emergency oxygen system, due to a latent fault in the anti-suffocation valve within the oxygen regulator, resulting in the pilot being briefly exposed to a risk of hypoxia. In response, the pilot had to perform an emergency descent while still within a military danger area, where multiple other aircraft were also operating.

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