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Department for Transport

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# AAIB Bulletin S4/2009

## SPECIAL

<b>Aircraft Type and Registration:</b>	Eurocopter EC225 LP Super Puma, G-REDU
<b>No &amp; Type of Engines:</b>	2 Turbomeca Makila 2A turboshaft engines
<b>Year of Manufacture:</b>	2008
<b>Location:</b>	Approximately 500 metres south of the ETAP platform in the North Sea Central Area
<b>Date &amp; Time (UTC):</b>	18 February 2009 at 1835 hrs
<b>Type of Flight:</b>	Commercial Air Transport (Passenger)
<b>Persons on Board:</b>	Crew - 2                      Passengers - 16
<b>Injuries:</b>	Crew - None                      Passengers - 3 (Minor)
<b>Nature of Damage:</b>	Damaged beyond economic repair due to salt water immersion, impact and salvage damage
<b>Commander's Licence:</b>	Airline Transport Pilot's Licence
<b>Commander's Age:</b>	55 years
<b>Commander's Flying Experience:</b>	17,200 hours (of which 198 were on type) Last 90 days - 137 hours Last 28 days - 54 hours
<b>Information Source:</b>	Inspector's Investigation

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This bulletin contains facts which have been determined up to the time of issue. This information is published to inform the aviation industry and the public of the general circumstances of accidents and must necessarily be regarded as tentative and subject to alteration or correction if additional evidence becomes available.

The investigations in this bulletin have been carried out in accordance with The Civil Aviation (Investigation of Air Accidents and Incidents) Regulations 1996, Annex 13 to the ICAO Convention on International Civil Aviation and EU Directive 94/56/EC.

The sole objective of the investigation of an accident or incident under these Regulations shall be the prevention of accidents and incidents. It shall not be the purpose of such an investigation to apportion blame or liability.

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## Background

The helicopter was approaching its destination, the ETAP oil production platform located 132 nm east of Aberdeen, at night, when it was seen by observers on the platform to strike the surface of the sea. The helicopter remained afloat, all the occupants escaped into two liferafts and all were subsequently rescued. Although the accident was observed from the ETAP platform and a Search and Rescue (SAR) operation was initiated immediately, it was some time before the passengers and crew were located.

Following the arrival of the first SAR helicopter in the vicinity of the ETAP platform, 27 minutes elapsed before the occupied liferafts were identified approximately 400 m from the platform. The search was hampered by the darkness, fog and the weakness/absence of homing signals on the emergency frequencies 121.5 MHz and 243.0 MHz, although survival equipment designed to transmit on both these frequencies had been activated by the crew. The liferafts were finally located by a combination of aircraft weather radar, visual guidance from personnel on the ETAP platform and a weak signal on 121.5 MHz.

The initial details of this accident were described in AAIB Special Bulletin S3/2009.

## Aircraft equipment

The helicopter was equipped with an externally mounted, automatically deployable Crash Position Indicator (CPI). It failed to release and, hence, did not transmit a signal. The reason for this remains under investigation.

Four hand portable locator beacons were also carried in the helicopter. There was one in each of the crew's

life-jackets and one in each life-raft. The former are known as Personal Locator Beacons (PLB)s and the latter as Emergency Locator Transmitters (ELT)s. All four of these units were, however, of identical TechTest 500-12Y design and, like the CPI, approved equipment.

Once switched on, the units each transmit coded identification signals on 406.0 MHz, which interface with the international Cosmicheskaya Sistyema Poiska Avarynich Sudov / Search And Rescue Satellite (COSPAS/SARSAT) distress alerting system.

In addition to its 406 MHz function, each of the ELT/PLBs is capable of broadcasting continuous homing signals on 121.5 MHz and 243.0 MHz frequencies. The signal detection range is up to a nominal 40 nm for a search aircraft operating at 3,000 ft. For maximum effectiveness, particularly on the 121.5 MHz frequency, the antenna of each ELT/PLB must be pivoted to the vertical position and the telescopic upper section must be extended.

These ELT/PLBs also have the facility to receive signals on 121.5 MHz and 243.0 MHz. If an external signal on 121.5 MHz or 243.0 MHz is detected when one of these ELTs/PLBs is selected on, it will operate only in standby mode and not transmit on these frequencies. In the case of multiple ELTs/PLBs in the same vicinity, the first ELT/PLB to transmit becomes the 'master'. It will be the only 500-12Y unit transmitting, until it is switched off, its battery becomes depleted or it otherwise ceases to function. The other ELTs/PLBs of this type, in receipt of such signals, remain in standby mode and do not transmit on either of these frequencies whilst external signals are being received from the 'master' ELT/PLB.

This feature is designed to avoid the difficulty experienced in homing to two or more different ELT/PLBs, in close

proximity, transmitting on the same frequency. In addition, the battery life of those ELT/PLBs in standby mode is conserved. Once the transmitting ELT/PLB ceases to function, another adjacent 500-12Y ELT/PLB, switched on and in standby mode, will become active and start transmitting on 121.5 MHz and 243.0 MHz. The feature is not active if the 500-12Y ELT/PLBs are greater than around 300 m apart.

The TechTest 500-12Y ELT/PLBs have a voice broadcast facility to assist communication during the final rescue phase. Operation of the 'Press-To-Transmit' button allows the voice of a survivor to be broadcast on 121.5 MHz and 243.0 MHz and to be heard by the crew of a rescue aircraft. This function overrides the suppression of the signal by another ELT/PLB.

Although operating instructions are annotated on the bodies of the beacons, no mention is made thereon of the requirement to correctly position and extend the antenna.

The 406 MHz signal, and hence the COSPAS/SARSAT alerting system, is not affected by the signal suppression feature.

### **Passenger equipment**

Passengers on the helicopter had been provided with special wrist watches, which incorporated low power transmitters functioning on 121.5 MHz. These Wrist Watch Personal Locator Beacons (WWPLBs) are issued in an armed condition before passengers enter a helicopter and, thereafter, transmit a distress signal on that frequency whenever they come into contact with salt water. Amongst other functions, the WWPLBs are capable of operating automatic alarms in the control rooms of nearby oil and gas platforms and certain surface vessels, should a WWPLB wearer fall overboard whilst working offshore.

Tests and calculations were conducted by the ELT/PLB manufacturer, in the presence of representatives of the WWPLB manufacturer and the AAIB. These showed that one of these WWPLBs is capable of suppressing both the 121.5 MHz and 243.0 MHz signals from an operating ELT/PLB, of the TechTest 500-12Y design, when the WWPLB is positioned less than 48 metres from a TechTest 500-12Y unit. Thus, when survivors wearing transmitting WWPLBs are in close proximity to the ELT/PLBs of the type in question, such as in a liferaft, the former can cause the more powerful homing signals from the latter to be suppressed.

Although the signals from the WWPLBs are understood to be capable of receipt at up to 5 miles range in certain directions and under ideal conditions, the actual transmission range of their signal is usually reduced, especially when worn by liferaft occupants following extensive exposure to the elements. Under such circumstances, they are unlikely to be orientated and positioned optimally to maximise their broadcast signal.

It is known that a number of types of low power PLB devices, in the form of wrist watches, pendants and other items, capable of being worn on the body, are available worldwide.

### **Events following the evacuation**

Once the occupants of the helicopter entered the life rafts, a total of at least three ELT/PLB units were activated by the crew. Three of the units correctly broadcast coded identification signals on 406 MHz and these were successfully received and logged by the COSPAS/SARSAT alerting system. No signal was identified from the second liferaft stowed unit. This unit was the only one of the four TechTest 500-12Y units not recovered.

Although at least three ELT/PLB units were switched on, no emergency signal on 121.5 MHz or 243.0 MHz was detected by SAR aircraft as they approached the location of the ETAP platform.

The flight crew of G-REDU reported that voice transmission was attempted using the microphone and press to transmit facility on one ELT/PLB whilst a rescue helicopter could be heard. No voice signals were reported as having been received by any rescue vessels or aircraft. Only after a 27 minute period of searching in the vicinity of the platform was a faint signal on 121.5 MHz detected.

It has also been established that the crew were not aware that the upper section of the antenna on the beacon type is telescopic. Consequently, although each antenna was reported to have been correctly pivoted to an angle close to the vertical, the telescopic sections were not extended.

## Conclusions

It is most probable that the presence of the WWPLBs adjacent to the TechTest 500-12Y ELT/PLBs inhibited the operation of the latter's more powerful emergency signals on 121.5 MHz and 243.0 MHz. As a result, this search facility was much reduced.

The failure to extend the antenna on any of the ELT/PLBs reduced the broadcast strength and probably accounted for the non-receipt of voice signals. Had WWPLBs not been in use, the broadcast signal from the master ELT/PLB, though present, would have been reduced by the lack of extension of the antenna. This would also have handicapped the homing capability of the search aircraft.

The following Safety Recommendations are made:

### Safety Recommendation 2009-064

It is recommended that the Civil Aviation Authority review the carriage and use in commercial air transport helicopters of any radio location devices which do not form part of the aircraft's certificated equipment.

### Safety Recommendation 2009-065

It is recommended that the Civil Aviation Authority advise the European Aviation Safety Agency of the outcome of the review on the carriage and use in commercial air transport helicopters of any radio location devices which do not form part of the aircraft's certificated equipment.

### Safety Recommendation 2009-066

It is recommended that European Aviation Safety Agency require manufacturers of Emergency Locator Transmitters (ELTs)/Personal Locator Beacons (PLBs) units to add details, where absent, of the correct use of the antenna to the instructions annotated on the body of such beacons.

### Safety Recommendation 2009-067

It is recommended that the Civil Aviation Authority ensure that all aspects of Emergency Locator Transmitter (ELT)/Personal Locator Beacon (PLB) operation, particularly correct deployment of the antenna, are included and given appropriate emphasis in initial and recurrent commercial air transport flight crew training, as applicable.