

**AAIU Report No.** 1999/021  
**AAIU File No.** 19990037  
**Published** 3/11/1999

**Aircraft Type and Registration:** AS 355 N, Ecureuil, Air Corps No. 255

**No. and Type of Engines:** Two Turbomeca Arrius 1A turbine engines

**Aircraft Serial Number:** 5633

**Year of Manufacture:** 1997

**Date and Time (UTC):** 12 May 1999, 0025 hours

**Location:** Crusheen, North of Ennis, Co. Clare

**Type of Flight:** Military (Garda Air Support Role)  
**Persons on Board:** Crew - 3 Passengers - Nil

**Injuries:** Nil

**Nature of Damage:** None

**Commanders Licence:** Military

**Commanders Age:** 28 years

**Commanders Flying Experience:** 682 hours (including 90 hours in type)  
Last 90 days - 65 hours  
Last 28 days - 20 hours

**Commanders Duty Time** Duty commenced 1830 hours on 11 May '99,  
with previous day 10 May '99, off duty.

**Information Source:** AAIU Field Investigation

### **Synopsis**

The serious incident (Annex A) was advised to the Air Accident Investigation Unit (AAIU) by the Irish Aviation Authority Aviation Incident Report Form, No. 111/1999. Following written consultation with the Department of Defence it was agreed that the incident should be investigated under SI No. 205 of 1997 (Notification and Investigation of Accidents and Incidents) Regulations, 1997. The Chief Inspector of Accidents, Mr K Humphreys, appointed Mr. F. Russell, an Inspector of Accidents, to carry out the investigation.

The flight was tasked by Garda Operations to monitor a VIP motorcade travelling from Shannon Airport to Galway City on the night of 11th May, 1999. The crew consisted of one Air Corps pilot and two Garda observers.

The flight was to be conducted under night VFR rules, with Galway Airport as the intended destination. The normal operational height was between 800/1000 feet above ground level. Some 9 miles north of Ennis, Co. Clare the helicopter inadvertently entered cloud and, in reacting, the pilot quickly raised the collective pitch lever, the aircraft yawed and climbed and levelled off at 1700 feet in IMC. With the weather conditions worse than forecast the pilot decided to return to Shannon Airport and flew on a heading of 175° back to that airport. However, the radar operator at Shannon issued a correction to this heading of some 90° which the pilot followed. He landed back at Shannon Airport at 0040 hours.

## **1.1 History of Flight**

On Tuesday 11th May, 1999, the Garda (Irish Police) Air Support Unit (GASU) helicopter was detailed by Garda Operations to provide airborne security for a VIP motorcade which was travelling between Shannon Airport and Galway City that night.

The helicopter departed its base at Casement Aerodrome, Baldonnel, Co. Dublin, at 1900 hours. It routed initially to Galway from where it flew the reverse route of the mission along the N16 to Shannon Airport, as a daylight reconnaissance flight. The crew consisted of an Air Corps pilot and two Garda crew members who operated the on-board surveillance equipment. Prior to the mission take off from Shannon Airport at 2300 hours the pilot carried out a check on the prevailing meteorological conditions and was satisfied that they were suitable for a night VFR (Visual Flight Rules) flight to Galway Airport, his ultimate destination.

Overhead the first town en route, Newmarket-on-Fergus, the pilot observed that the motorcade was travelling slowly, in fact circa 40 mph. In order to keep station with the motorcade he was flying very slowly as he had a following tail wind of 230/14G25 kt. His airspeed was quite low as he was being blown along by the prevailing winds. Once north of the suburbs of Ennis, Co. Clare, at Barefield, and on towards Crusheen the pilot noted that his external reference points became fewer. Up to this point he was maintaining the motorcade on the port side of his aircraft, the normal operational position adopted to facilitate the two Garda observers.

As they passed north of Crusheen the pilot requested that he should change station and place the motorcade on his starboard side in order to maintain good visual contact and to further distance himself from the high ground, some 300-800 feet, that was further along the route, on the starboard or eastern side of the road. During this change of station, as one Garda observer moved from the left to the right rear hand seat behind the pilot, the aircraft inadvertently entered cloud at 1000 ft QNH. The pilot said that he then lost sight of the motorcade, as did the two observers also. The aircraft was now in IMC (Instrument Meteorological Conditions) while still at low airspeed. To increase his airspeed the pilot robustly raised the collective pitch (power) lever and the helicopter yawed violently to the left as it climbed and gained altitude. The pilot could not recollect whether this yaw or swing was through 180° or 360° or greater, as he had no external reference cues.

With the engaged AP (autopilot) providing basic horizontal stability, the pilot regained control of the aircraft as the airspeed increased and he levelled off at 1700 ft QNH . He then called Shannon Radar to request radar vectors back to Shannon. At this stage the pilot had taken up a heading of approx. 175° which he would fly back to Shannon. However, the Shannon radar operator, who was monitoring his progress on the Secondary Surveillance Radar (SSR), instructed the pilot to turn right through a further 90° in order to route directly back to Shannon on a 180° heading. The pilot carried out this instruction and also selected the Shannon VOR to independently verify his heading. Some five miles north of Shannon airport the pilot became visual with the ground again and he carried out a normal approach and landed at 0040 hours on Runway 26. Once on the ground the pilot noted that the gyro compass read 310°, an over-reading error of some 50°.

## 1.2 Meteorological Information

- (a) An aftercast was provided by the Irish Meteorological Service at Shannon Airport. The synoptic situation on 12 May 1999 showed that the Shannon area lay in a light to moderate southerly to south-westerly airstream, with bands of showers moving north-eastwards through the area. A depression of 995 hPa was slow moving off the north-west coast of Ireland.

The estimate of weather conditions in the Ennis area at 0025 UTC on 12 May 1999 was:-

Surface	:	180° 10kt
1000 ft	:	210° 15kt
2000 ft	:	220° 20kt
5000 ft	:	240° 25kt
Visibility	:	10km ocnl 6-8 km
Weather	:	showers some prolonged
Cloud	:	SCT 1000 ft BKN CU/CB 1800-2000 ft
Temperature	:	11° C
Dewpoint	:	9-10° C
Mean Sea-level pressure	:	1000 hPa
Freezing level	:	6000 ft

METAR: EINN 00302 19010kt 9999 Few 016 Sct 024  
BKN 035 11/10 1000 NOSIG

TAF: EINN 2207 22012 kt 9999 BKN 030 Tempo 2207  
- SHRA SCT 010 BKN 018 CB

No warnings or sigmets were in operation

- (b) GASU Standard Operating Procedure (SOP) No.1, Helicopter VFR Operating and Weather Minima, day and night operations states, in part:-

Minimum Weather (night):-

1500 ft cloud base          10 km Visibility

Minimum Operating Height (night):-

500 ft AGL                      500 ft above obstacles  
within 5 km

*The cloud base limits quoted are AGL (above ground level)*

### 1.3 **Aircraft Information**

#### **General Description**

The AS 355 N is a twin engined helicopter certified for single pilot operation for day VFR and night VFR flights. It is not IFR certified. The pilot occupies the front right seat. The cabin can seat five passengers with one occupying the front left seat (the camera operator). Dual controls, which are not normally fitted, can be installed also. The second observer is more usually positioned in the left hand side of the rear cabin, near the left rear sliding door. The flight controls are conventional with dual hydraulic servos for the main rotor and a single servo for the tail rotor. Hydraulic power is generated by two pumps driven from the main rotor gearbox. Electrical power is supplied by two engine driven starter-generators and a battery. There was no Cocpit Voice Recorder (CVR) or Flight Data Recorder (FDR) equipment fitted to the aircraft.

The aircraft is fitted with a SFIM 3-axis single-lane automatic flight control system (autopilot). This electrically powered autopilot has basic pitch roll and yaw modes which provide rate damping (autostabilisation) in each axis. The AP's main purpose is to permit the pilot to fly the aircraft "hands off" by coupling the autopilots servo motors to pilot selected inputs for altitude, airspeed or heading hold modes. The minimum airspeed required for AP upper modes to function is 55 kt. The heading function is coupled to a Garmin-155 GPS (Global Positioning System) and the Horizontal Situation Indicator (HSI).

The aircraft is fitted with a KCS 55A Pictorial Navigation System. The system consists of five units:-

- Pictorial Navigation Indicator
- Directional Gyro
- Magnetic Azimuth Transmitter
- Slaving Accessory
- Autopilot Adapters (for AP coupling)

The Directional Gyro (DG) is a remote mounted unit which, in conjunction with the Magnetic Azimuth Transmitter, provides a gyro-stabilised magnetic heading to the Pictorial Navigation Indicator. When power is applied to the system, and fast slaved mode is selected, the heading display will fast slave at a rate of 180 degrees/min. The system will remain in this fast slave mode until the error is reduced to zero when it will revert to its normal slaving rate of 3 degrees/min.

When the system is selected in normal mode it is capable of maintaining accurate heading information, provided the rate of turn does not exceed 30 degrees/sec. If this is exceeded then the information displayed cannot be relied upon. The system will recover at a rate of 3 degrees/min. No heading flag will be displayed, however a deflection will be indicated on the slave meter.

*Note:- The Air Corps experience with the Marchetti aircraft and the Alouette III helicopter, both of which are fitted with the same DG as the Ecureuil, is when these aircraft are subject to very tight turns and other violent manoeuvres, that the DG can lose its heading reference and give erroneous information. It is common practise for pilots of the Marchettis and Alouettes to "fast slave" their gyros following tight-turns, aerobatics, spinning etc. This capability, which is also installed in the Ecureuil, was not used by the pilot in this incident.*

#### **1.4 Personnel Information**

The pilot qualified as a helicopter pilot in the Irish Air Corps in 1995, having previously flown the Marchetti and Fouga Magister aircraft on his Wings course. His total flying hours were approximately 682 hours of which some 400 hours were on helicopters, including 90 hours on the Ecureuil. His total night flying experience was 35 hours, including some 25 hours on helicopters.

In January 1999 the pilot and another officer underwent a Type Conversion Course on the Ecureuil at PAS (Police Aviation Services Ltd), a commercial aviation company, at Gloucestershire Airport, UK. This is where all pilots assigned to GASU (Garda Air Support Unit) did their initial conversion training. This full conversion course of 10 hours includes 2 hours of revision Instrument Flying, followed by an Instrument Rating Test of 45 minutes, and one hour night flying revision. This test is carried out in VMC conditions with the student pilot "under the hood".

PAS did not issue formal course Reports other than advising Garda HQ by letter of their professional observations on the candidates put forward by the Air Corps. In this regard it is noteworthy that the then Chief Training Captain on the January '99 Course, while acknowledging the candidate's professionalism and enthusiasm, expressed his concern in forthright terms at the lack of instrument and night flying experience of these pilots.

*Note:- When GASU came into operation in September 1997, the Air Corps seconded one senior officer of Commandant rank and four senior Captains from No. 3 Support Wing (the Helicopter Wing of the Air Corps, which embraces all SAR missions, SAR training, VIP flying, Air Ambulance missions, pilot conversion courses and technician training), to fly the GASU helicopter.*

*At the same time a number of senior pilots from the Air Corps, some helicopter qualified, decided to take up employment in the civil aviation sector. The present economic climate in Ireland provides many opportunities for qualified pilots in the civilian sector. This situation is ongoing and already there are more senior pilots scheduled for retirement in 2000.*

*Consequently, since September 1997, all of the pilots originally detailed to GASU have either retired from service or have been transferred within the Air Corps on promotion to higher rank. The present complement of pilots assigned to GASU consists of a non-Écureuil rated senior officer of Commandant rank, who has been employed as a Search and Rescue commander on actual rostered duty and is also the Instrument Rating Examiner (IRE) and Type Rating Examiner (TRE) for the SAR Dauphin, and five other officers of Lieutenant rank.*

## **1.5 Damage to Aircraft**

There was no damage sustained by the aircraft as a result of this incident.

Post incident examination by Air Corps technical personnel of the aircraft Technical Log and Airframe log book showed that there were no deferred defects carried on the helicopter prior to or after the incident. A compass swing of S255 was carried out to ensure that the gyro compass and standby compass were operational. They were found to be working correctly, and within prescribed limits.

In addition, the cockpit instrument lights were checked routinely as part of the daily inspection, before and after the incident. No defects were noted.

## **1.6 Organisational and Management Information**

*This section contains pertinent information concerning the organisation and management involved in influencing the operation of the helicopter element of GASU.*

### **1.6.1 Structure and Functions**

In April 1996 the Government approved a proposal from the then Minister for Justice to establish a dedicated Garda Air Support Unit operated by the Air Corps, as recommended in an Inter-Departmental Group's Report on air support for the Garda Síochána. Two aircraft were subsequently purchased by the Minister for Justice for GASU, an AS 355 N Écureuil helicopter and a fixed wing PBN Defender 4000.

This Unit became operational in September 1997, with both aircraft based at Casement Aerodrome, Baldonnell. Prior to commencement of operations a Memorandum of Understanding (MOU) was drawn up between An Garda Síochána and the Air Corps, which the investigation found to be unsigned and undated, the stated purpose of which *"is to ensure that, in all circumstances, full co-operation at all levels between the Garda Síochána and the Army (sic) Air Corps exists"*.

In addition, a further Form of Agreement of Hand-Over of aircraft from An Garda Siochana to the Air Corps was signed as the two aircraft were to be listed on the Irish Military Register, i.e. they acquired Air Corps numbers. This agreement acknowledged, inter alia, that the Air Corps would assume responsibility for the operation, maintenance and storage of the aircraft.

Tasking of the two aircraft for the day to day missions remains the sole responsibility of the Garda Authorities at Garda HQ.

Senior pilots and technicians were seconded from No. 3 Support Wing to provide a 24 hours capability and support for GASU, but normally operating between 0900-0100 hours. All these personnel retained their existing Establishment positions in the Air Corps as no new Establishment structure was put in place for this Unit, either at the start of its operations or since. This has led to a certain amount of misunderstanding of the roles and responsibilities on all sides.

### **1.6.2 Policies and Practices**

The Garda Authority's view is that the helicopter is for operational use only, i.e. on call for tasking day and night, except when on scheduled or unscheduled maintenance. In these instances the Air Corps provides a back-up helicopter to maintain the service, usually an Alouette III. Because of this operational demand the GASU helicopter is not available for any pilot training requirements.

No. 3 Support Wing is made up of four Squadrons, with each Squadron commanded by a senior officer, usually of Commandant rank. The duties and responsibilities of Squadron Commanders are laid down in Air Corps Flying Orders (ACFO's) and Air Corps Flying Directives (ACFD's) and Unit SOP's. One of these responsibilities is to ensure that annual type and instrument ratings (and other ratings also, e.g. SAR Ratings) are completed in accordance with ACFO's. The senior officer presently assigned to GASU cannot comply with ACFO requirements as he is neither type-rated on the Ecureuil or has the use of the Ecureuil for discharging these responsibilities to his pilots and to higher authority.

This has led to the anomalous situation where Air Corps pilots assigned to GASU complete their type conversion course in the UK and are then scheduled to return there after one year for a Base or Instrument Flying check, after which they return to GASU operations. Because of the 24 hour capability of the operation, the pilots are self-detailing and, in effect, are not subject to any further flying checks or assessment by a senior Air Corps officer, contrary to ACFO's.

Considerable "cultural differences" emerged from the beginning of this operation between Garda and Air Corps personnel to the extent that many "disputes", which in fact were merely misunderstandings, had to be resolved at the highest Air Corps and Garda level. The situation has improved considerably this Spring with GASU personnel undergoing a special CRM (Crew Resource Management) Course which promotes aviation safety through intercommunications at all levels of personnel engaged in flying operations. Further such courses are envisaged.

### **1.6.3 Economic Status**

The Department of Justice provided the capital cost for the purchase of the Ecureuil and it was then assigned to the Air Corps where the cost for maintenance support comes under the Defence Forces Budgetary "Subhead H" (spares and maintenance of helicopters).

The Department of Defence negotiated a contract with an aircraft spares supplier, known as PBH (Power by the Hour), which guarantees availability of specifically named spares components at short notice to GASU. This system ensures that minimum aircraft time is spent on the ground on maintenance and maximum time is spent airborne or on standby for tasking.

In this regard the Ecureuil has averaged 1,000 flying hours per annum over the past two years which is a tribute to both Air Corps technicians and pilots, aided by the PBH back-up system of spares supply. This utilisation is in excess of twice that of any other Air Corps helicopter. This PBH system is unique to the Ecureuil and is not applied to any other Air Corps helicopter.

In 1998 and 1999 the budgetary allocation within the helicopter maintenance element of Subhead H for the maintenance of the Ecureuil was 19% of the total amount allotted for the other fourteen helicopters in No. 3 Support Wing.

This percentage figure is set to rise considerably in 2000 as the second Garda Helicopter comes into service. Purchase of a new type of helicopter is presently being considered by the Department of Justice, which suggests that there will be no spares commonality with the existing helicopter.

### **1.6.4 Regulatory Framework**

In the UK there are 43 Police Forces of which 28 have Air Support Units. Their operations are civil based under the aegis of a CAA approved Police Air Operators Certificate (PAOC). These Regulations stipulate the laid down procedures for periodic checking of pilots. The industry's "best practice" is as follows:-

- A Base check, including emergency procedures every 6 months (one check by day, the subsequent check by night, and so on).
- A Line check, every 13 months (on an actual operation).
- Both of these checks are carried out by an IRE/TRE, usually in an operational helicopter fitted with dual controls
- In addition, underwater escape training and dingy drills training is carried out periodically, where appropriate and where funded.

The GASU helicopter is subject to military control and therefore pilot training and checking should be regulated by ACFO's.



There is a Letter of Agreement between the Air Navigation Services (ANS) of the Irish Aviation Authority and the Irish Air Corps governing the operation of GASU aircraft in controlled airspace. This Letter states, inter alia, that GASU flights will be operated as military flights.

### **1.6.5 Additional Information**

Members of An Garda Síochána who are assigned to GASU undertake an initial two weeks General Purpose (GP) flying course with the Air Corps, utilising the Alouette III helicopter. This is to familiarise them with the basic crewman techniques and cockpit drills. The Course does not include a demonstration of an engine-off-landing (EOL) and dingy drills. These are useful exercises in the context of CRM and could be incorporated in the Syllabus.

On completion of this Course a further two weeks training is spent with a UK Police Force studying actual helicopter police work.

Thereafter, line checks are carried out every thirteen weeks on Garda crew members by the Sergeant-in-Charge, in accordance with the UK Police Air Operations Manual.

The Gazelle helicopter, of which there are two in the Air Corps service, is widely used, when available for pilot conversion training on Wings Courses, VIP flights and, because it has a relatively sophisticated avionics fit including an autopilot, for instrument flying training in simulated and actual weather conditions. Pilots usually progress from this training onto the Alouette III or as co-pilots on the SAR Dauphin helicopter.

With the ageing of the helicopter fleet operated by No. 3 Support Wing, the original Gazelle is 20 years, while the original Alouettes are approaching 40 years in service, the continuous availability of the Gazelle for training is more critical than ever. One Gazelle however, was grounded in September 1998 for scheduled 500 hour airframe maintenance during which a fault was found in its Main Rotor Head (MRH) necessitating its return to the manufacturer in France for repair and overhaul. This unit was not returned to the Air Corps until May 1999, after which the scheduled maintenance programme recommenced. The aircraft is due back in service in September 1999. The lengthy delay in returning the aircraft into service, which would be unacceptable in commercial aviation, is due to the absence of a PBH or a suitable support system of spare supply.

## **2. Analysis**

The nature of Garda support tasks ensures that such flying is conducted in visual conditions (VFR) by day or by night. Pilots, therefore, are not required to hold an instrument rating but the pilots assigned to GASU do maintain an instrument capability (non-procedural) under Military rules to allow for sudden and inadvertent flight into instrument only weather conditions.

As the operation is in its infancy, in aviation terms, it was intended that pilots would be checked in the UK every twelve months on their flying competence, with 30 minutes of every such check being dedicated to training for flight by sole reference to the flight instruments. This exercise is carried out in visual meteorological conditions (VMC) under supervision of an instructor, with the student wearing an instrument flying hood to cancel out any external visual references. This single annual check is not in conformity with current UK CAA regulations for Police helicopters.

The Ecureuil Flight Manual stipulates the minimum speed below which flight by sole reference to the flight instruments is prohibited is 55 kt. Below this speed the inherent instability of the helicopter is increased as a direct consequence of the decreased airflow over the aerodynamic surfaces and the tail rotor. Furthermore, at low speeds the pilots attention is directed increasingly to the cues provided outside the helicopter so that as speed decreases towards the hover (zero airspeed), reliance is placed completely on external cues.

The pilot explained that he was flying at very low airspeed due to the slowness of the motorcade and following winds. By day he would normally orbit the target and maintain a comfortable airspeed. By night, with few external references and known high ground approaching en route, orbiting was not an option. As the pilot flew north of Barefield and into the unlighted rural landscape of Co. Clare, his external references quickly diminished. In attempting to hold station with the motorcade on his left side, the pilot had to turn his head up to 80° to his left to view the motorcade through the "chin window" situated in the forward floor area. It is not the pilots responsibility to maintain a target in sight at all times but in order to hold station he must occasionally have sight of it. At night this situation is considerably more difficult as the pilot's focus and view is significantly reduced through looking left and down through the chin window only. The pilot recognised this problem just south of Crusheen and asked the rear observer to move to the right side of the cabin while he positioned the aircraft to have the motorcade on his right hand side - the safest and most natural position for the pilot.

It was during this manoeuvre that the aircraft entered cloud. The pilot recalled that he was flying at approximately 1000' QNH at this point. The AP was engaged from the beginning of the flight and, as the aircraft yawed and climbed with the application of power, this AP engagement, and the pilot's instrument flying training, gave the pilot relative horizontal stability and time to bring the aircraft under control. He levelled off at 1700' QNH.

In studying the meteorological forecast prior to undertaking a night flight in visual conditions, the pilot must ensure that the flight can be conducted safely with adequate margins for unexpected weather deterioration and obstacle or high ground clearance. The decision to go or not to go on a mission is largely influenced by the terrain over which the flight is to be conducted and the meteorological conditions prevailing. The light or glow from urban areas provides the pilot with a good indication of the ground plane and hence positive indications of pitch attitude and bank angle. In rural areas dispersed lighting can also provide horizon cues but in isolated areas where there are few if any lights, the horizon cues may be sparse or even misleading.

In such conditions clouds may not be seen. Hence, the need for a more thorough examination of the meteorological forecast when the mission is in a mainly rural area. In marginal circumstances the decision to go or not to go can sometimes be influenced by the nature of the mission. The final decision lies solely with the pilot who is the commander of the flight.

*Note:- The question of the pilot's night flying experience, and that of his fellow GASU pilots, has obviously been raised. It is a complex and important question and a partial solution will be recommended later in this Report. Two relatively recent night helicopter crashes occurred which involved fatalities. They are reported on in detail in AAIU Aircraft Accident Report No 01/98 and UK AAIB Aircraft Accident Report No 4/97, respectively. In the first crash the combined total experience of the pilots on board was approximately 24,000 hours, while in the second crash the pilot's experience was 4,500 hours. The comparison between high flying hours experienced pilots and low flying hours experienced pilots is not simply a matter of figures, as it appears at face value. Accidents and incidents can occur at any level of experience.*

*A recent UK AAIB survey shows that since 1985 they investigated some 19 accidents and incidents involving AS 355 helicopters, five of which were totally destroyed.*

### **3. Conclusions**

#### **3.1 Findings (Immediate)**

- 3.1.1** The pilot was properly authorised and qualified to carry out the flight. He had a military standard instrument rating (non-procedural).
- 3.1.2** The pilot was medically fit to carry out the flight.
- 3.1.3** The pilot was able to control the helicopter by sole reference to the flight instruments when he lost external visual cues on the ground.
- 3.1.4** Horizontal stability was maintained through the AP system as the helicopter yawed and climbed to 1700'. The presence of the AP made a significant contribution to the safety of the aircraft.
- 3.1.5** The aircraft was properly maintained in accordance with Air Corps Technical Orders (ACTO's).
- 3.1.6** The pilot did not complete the mission and flew back to his point of departure, Shannon Airport, using radar vectors in IMC. He was not aware of a problem with his compass heading, nor did he use his "fast-slave" capability, until given a substantial course correction by the Shannon Radar Controller. The incident occurred within the Shannon Control Zone. The actions of the Radar Controller contributed significantly to the successful recovery of the aircraft to Shannon.

- 3.1.7 Prior to the incident the pilot maintained station with the motorcade on his left side, as is the practice to facilitate the two Garda Observers who sit to the left side of the cabin. This practice is considered particularly unsafe at night as the pilots spatial awareness is unnecessarily compromised.
- 3.1.8 The meteorological conditions forecast for the Shannon area were general and not specific to a low level rural flight to Galway, passing near hilly terrain. The pilot made his decision to go on the general area forecast. However, the actual cloud base en route was lower than that given in the general area forecast.
- 3.1.9 The lower than forecast cloud base in the rural area of operations and the pilot's belated realisation of the incorrect positioning of his aircraft in relation to the motorcade, probably contributed to the inadvertent entry into cloud.

## **3.2 Findings (Systemic)**

- 3.2.1 The senior officer appointed by the Air Corps to oversee the GASU operation is not type-rated on the Ecureuil and is therefore not in a position to carry out annual or periodic flight checks on his pilots, as required by ACFO's.
- 3.2.2 Under existing arrangements a GASU pilot undergoes an initial conversion course in the UK with the next annual check also projected to be undertaken at the same UK training school. In between, there is no flying competency check by an Air Corps instructor pilot.
- 3.2.3 The Garda Authorities task the Ecureuil for operational missions only. It is not available for any pilot training. The aircraft is currently flying approximately 1000 hours per annum, of which almost 1/3 of these hours are over urban areas at night.
- 3.2.4 At the beginning of the GASU operation in 1997, the pilot training arrangements which were put in place, were adequate at the time. With the experience gained over the two years of operations the training procedures need to be reviewed to enhance flight safety.
- 3.2.5 The continuing retirement of the Air Corps' more senior and experienced pilots is now well documented. As a result younger and less experienced pilots are being promoted into positions of operational responsibility which, heretofore, would have taken them many more years to attain. This is not a bad thing in itself, as the younger pilots gain flying experience at a far faster rate than their predecessors. Their flying experience acquisition curve is far steeper. The amount of flying hours safely flown by GASU pilots is a testament to their professional skills. However, the system must ensure that these skills are developed and expanded under the correct supervisory control of their more experienced colleagues, the normal flight safety practice.
- 3.2.6 The PBH system of spares support for the Ecureuil has produced an almost 100% dispatch rate. However, this is achieved by the allocation of an amount equal to approximately 19% of Sub-head H provision for the maintenance of the fleet of fourteen other helicopters.

- 3.2.7 Over the past two years problem solving in areas of the GASU operations tended to be handled directly by the most senior officers in the Air Corps and An Garda Siochana. This level of input and control is considered to be inappropriate in the context of a single helicopter operation. Matters arising should be adequately dealt with between the assigned Commandant from No. 3 Support Wing and the Superintendent-in-Charge of Garda Special Services (Ops).
- 3.2.8 In the UK a Police aviation pilot is subject to three checks in a thirteen month period, two Base and one Line check, respectively. In order to carry out similar and cost-effective checks here, a number of agreed flying hours could be set aside on the GASU helicopter for this purpose. The details can be worked out at Unit level.
- 3.2.9 Such positive co-operation would be in the letter as well as the spirit of any Memorandum of Understanding agreed between the two organisations.
- 3.2.10 The present level of training and checks for Air Corps pilots involved in GASU operations is inadequate.

#### 4. **Safety Recommendations (SR)**

It is recommended that:-

- 4.1 The Air Corps should suspend GASU helicopter night operations in rural areas with immediate effect until an effective programme of extra night flying is completed by GASU pilots. **(SR 30 of 1999)**  
*(This recommendation was originally issued as an interim safety recommendation on 26 August 1999)*
- 4.2 The Air Corps should conduct an intensive course of night flying to achieve at least a minimum of 100 hours, for each GASU helicopter pilot and those earmarked for GASU in 2000. This Course should commence immediately, with a target date of completion by end of March 2000. The lease of an AS355N helicopter would be a suitable solution for all of this training.  
**(SR 31 of 1999)**
- 4.3 The Air Corps should implement Base and Line checks for GASU pilots as they come due, in line with industry best practices, utilising an agreed number of hours on the GASU helicopter for this purpose. **(SR 32 of 1999)**
- 4.4 The Department of Defence should extend the successful power by the hour (PBH) concept of specific spares support to include the Gazelle helicopters, in order to improve the availability of these helicopters for night training operations. **(SR 33 of 1999)**

*This recommendation is now withdrawn due to the age of the AS342 Gazelle and the very limited availability of spares for this type of helicopter.*

- 4.5 The Department of Justice Equality and Law Reform, the Department of Defence and the Department of Finance should jointly consider and implement an appropriate method of funding the estimated running and training costs of the GASU helicopters(s), in 2000 and beyond, in a manner that would not create an additional demand on the normal funding of Air Corps operations through Subhead H (Aircraft). **(SR 34 of 1999)**
- 4.6 In future helicopter night operations, in rural areas specifically, the pilot should keep the target on the right hand side to maximise his depth of vision. **(SR 35 of 1999)**
- 4.7 The Air Corps should extend the Syllabus of the GP Flying Course to include a demonstration of an engine-off landing, dinghy drills and underwater escape training. **(SR 36 of 1999)**
- 4.8 The Air Corps should consider retro-fitting modern light weight CVRs to all existing operational aircraft. **(SR 37 of 1999)**
- 4.9 The Air Corps should consider making the fitting of CVR and FDR equipment a standard item on all new aircraft purchases. **(SR 38 of 1999)**

## Annex A

### **ATTACHMENT D. LIST OF EXAMPLES OF SERIOUS INCIDENTS**

**I.** The term "serious incident" is defined in Chapter 1 as follows:

**Serious incident.** An incident involving circumstances indicating that an accident nearly occurred.

**2.** The incidents listed are typical examples of incidents that are likely to be serious incidents. The list is not exhaustive and only serves as guidance to the definition of serious incident.

- Near collisions requiring an avoidance manoeuvre to avoid a collision or an unsafe situation or when an avoidance action would have been appropriate.
- Controlled flight into terrain only marginally avoided.
- Aborted take-offs on a closed or engaged runway.
- Take-off from a closed or engaged runway with marginal separation from obstacle(s).
- Landings or attempted landings on a closed or engaged runway
- Gross failures to achieve predicted performance during take-off or initial climb.
- Fires and smoke in the passenger compartment, in cargo compartments or engine fires. Even though such fires were extinguished by the use of extinguishing agents.
- Events requiring the emergency use of oxygen by the flight crew.
- Aircraft structural failures or engine disintegrations not classified as an accident.
- Multiple malfunctions of one or more aircraft systems seriously affecting the operation of the aircraft.
- Flight crew incapacitation in flight.
- Fuel quantity requiring the declaration of an emergency by the pilot.
- Take-off or landing incidents. Incidents such as undershooting, overrunning or running off the side of runways.

- **System failures, weather phenomena, operations outside the approved flight envelope or other occurrences which could have caused difficulties controlling the aircraft.**
- Failures of more than one system in a redundancy system mandatory for flight guidance and navigation.

Annex 13