

**ACCIDENT**

<b>Aircraft Type and Registration:</b>	1) Cessna 182B, G-OMAG 2) Boeing Stearman A75N1(PT17), N68427
<b>No &amp; Type of Engines:</b>	1) 1 Continental Motors Corp O-470-R piston engine 2) 1 Continental Motors Corp W670 piston engine
<b>Year of Manufacture:</b>	1) 1959 (Serial no: 52214) 2) 1942 (Serial no: unknown)
<b>Date &amp; Time (UTC):</b>	20 August 2021 at 1332 hrs
<b>Location:</b>	Dunkeswell Aerodrome, Devon
<b>Type of Flight:</b>	1) Private 2) Private
<b>Persons on Board:</b>	1) Crew - 1                      Passengers - None 2) Crew - 1                      Passengers - None
<b>Injuries:</b>	1) Crew - 1 (Serious)      Passengers - N/A 2) Crew - None              Passengers - N/A
<b>Nature of Damage:</b>	1) Damage to wings and control surfaces, windscreen, window, cabin structure and engine cowling. Fin and rudder tops chopped off, and damage to elevators.  2) Damage to propeller and shock load to engine. Cuts in fabric of fuselage and damage to right wing root.
<b>Commander's Licence:</b>	1) Commercial Pilot's Licence 2) Private Pilot's Licence
<b>Commander's Age:</b>	1) 66 years 2) 72 years
<b>Commander's Flying Experience:</b>	1) 3,801 hours (of which 1,759 were on type) Last 90 days – 12 hours Last 28 days – 6 hours  2) 2,878 hours (of which 161 were on type) Last 90 days – 13 hours Last 28 days – 4 hours
<b>Information Source:</b>	AAIB Field Investigation

**Synopsis**

N68427 was completing a circuit at Dunkeswell Aerodrome when it landed on top of G-OMAG on the runway. G-OMAG had joined the circuit from the dead side and positioned ahead of N68427 on final for Runway 22. Neither pilot saw the other aircraft, nor were they alerted to the presence of the other by radio transmissions until late on the final approach.

Following this accident, the CAA published a Supplementary Amendment to CAP 452 to improve the situational awareness of pilots operating at aerodromes providing an Air to Ground Communication Service.

### History of the flight

At 1300 hrs on the day of the accident, the pilot of G-OMAG (the Cessna) took off from Bodmin Aerodrome en-route to Dunkeswell Aerodrome to deliver the aircraft to its owner following an annual inspection. He had obtained 'prior permission' from the aerodrome operator and was expected by their staff. At 1305 hrs, the pilot of N68427 (the Stearman) took off from Dunkeswell, his home base, for a flight in the local area. After takeoff he departed the circuit to the north, maintaining a listening watch with Dunkeswell Radio.

The weather was reported by various witnesses to be 'workable' with overcast cloud at 1,200 ft above the aerodrome and patches of lower cloud at 600 to 800 ft above surface level in the vicinity of Dunkeswell. Cloud bases were reported to be above 3,000 ft amsl to the north. Visibility was approximately 5 km and the wind was light from the south-west.

At around 1326 hrs the Cessna was north abeam Exeter and the pilot informed Exeter Radar that he was continuing with Dunkeswell Radio. He established communications with Dunkeswell Radio, requesting the airfield details. A radio operator informed him that Runway 22 was in use, with a QFE of 986 hPa.

At approximately the same time, the Stearman re-joined the Dunkeswell circuit from the east and positioned on a left base for Runway 22. The pilot reported that he made a radio call indicating his intention to join the circuit but could not recall receiving an answer. None of the aerodrome operator's staff who were present in their office could remember with any certainty either hearing, or responding to, this radio call.

At 1329 hrs, the Stearman completed a touch-and-go landing and continued into the left-hand visual circuit, achieving a downwind height of 750 ft. The Cessna was now approximately one nautical mile to the west and the pilot made a track change to the left, onto a northerly heading, to arc around the aerodrome to position to join the circuit from the dead side<sup>1</sup> onto a right base for Runway 22 (Figure 1).

### G-OMAG

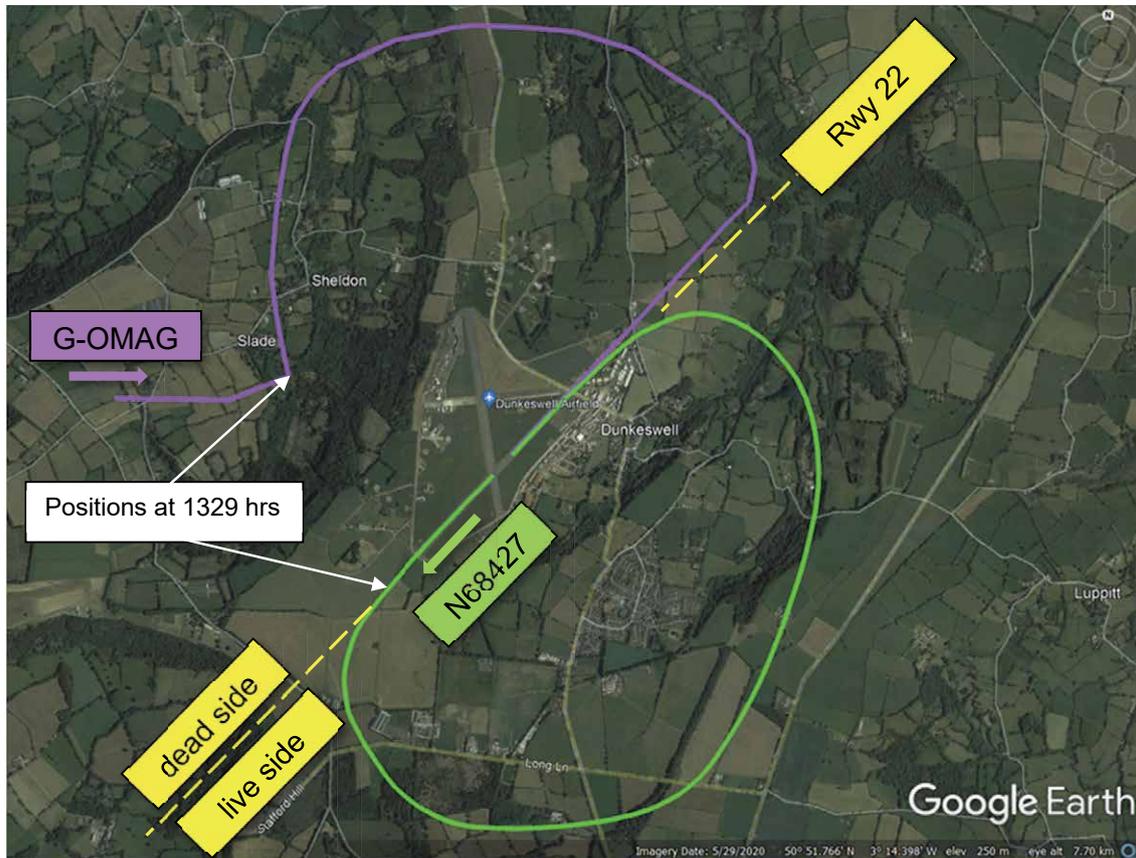
The Cessna pilot reported that he continued toward final approach at approximately 600 ft aal and when established on final transmitted "golf alpha golf final 22". He reported that no radio calls were heard after his initial contact with Dunkeswell Radio and that he believed he was joining an empty circuit. Following a normal powered approach at approximately 70 mph, the Cessna landed just beyond the displaced threshold, intending to turn off at the runway intersection. The groundspeed was allowed to decay and the flaps were retracted. With around 100 m to go to the intersection, the pilot reported that he heard and felt what seemed

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### Footnote

<sup>1</sup> The dead side is the side of an active runway away from that of the circuit pattern in use. In this case, Runway 22 with left hand circuits was in use, therefore the right side of the circuit was the dead side.

like an “explosion” and then became aware of propeller blades rotating in front of his face. He recalled that the cockpit was filled with debris from the shattered windshield, shards of metal and splintered wood.



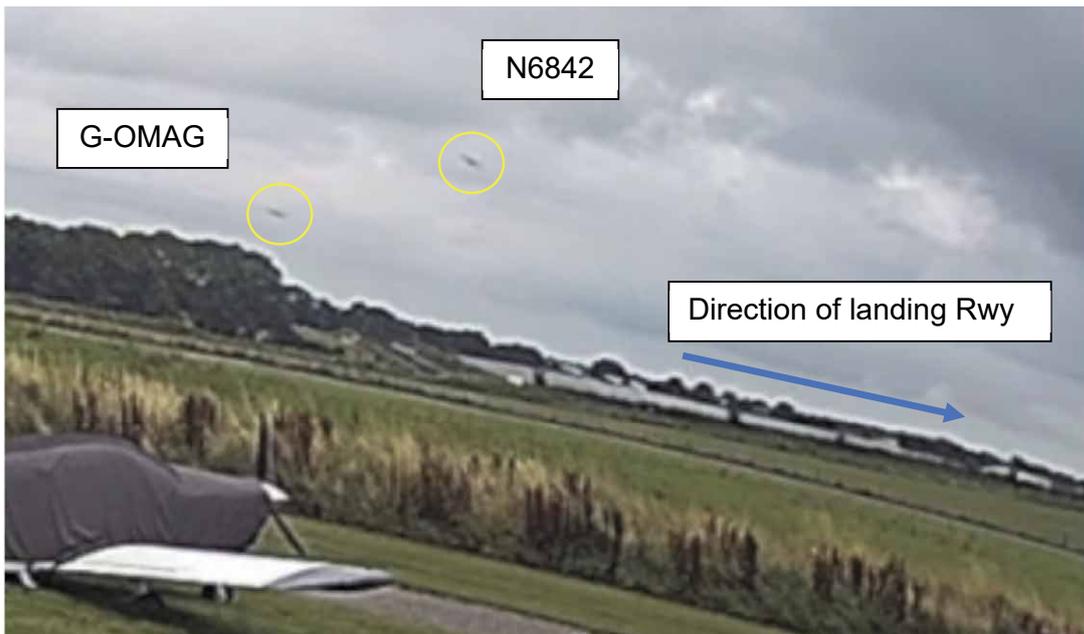
**Figure 1**

Tracks of G-OMAG joining the circuit and N68427 touch-and-go circuit sourced from recorded data

### *N68427*

At the point the Cessna was approximately one nautical mile from the runway threshold, CCTV footage (Figure 2) showed the Stearman flying a curving left base leg, descending from downwind. The pilot was not aware that the Cessna had joined the circuit and had heard no radio transmissions.

The pilot reported that he made a radio transmission as he started the base leg, then again when established on final. He then heard a final call from another aircraft and, assuming it was an aircraft positioning behind him, made an information call: “November 27 final, close to threshold”. There was no response from the other aircraft, so he continued with the approach. CCTV footage (Figure 3) showed that the Cessna had passed ahead of, and below, the Stearman before the Stearman had completed the base turn. Various witnesses reported seeing both aircraft on the final approach in very close proximity, “as though they were in formation” (Figure 4).



**Figure 2**

Still from CCTV footage of the approach to Runway 22  
(image used with permission)



**Figure 3**

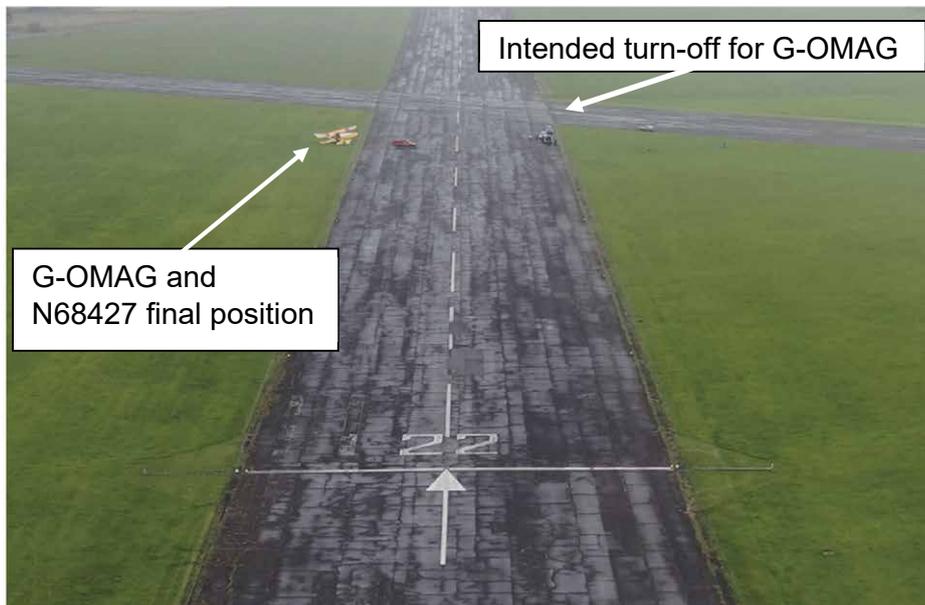
Stills from CCTV footage of the approach to Runway 22  
(image used with permission)



**Figure 4**

Aircraft on final approach  
(images used with permission)

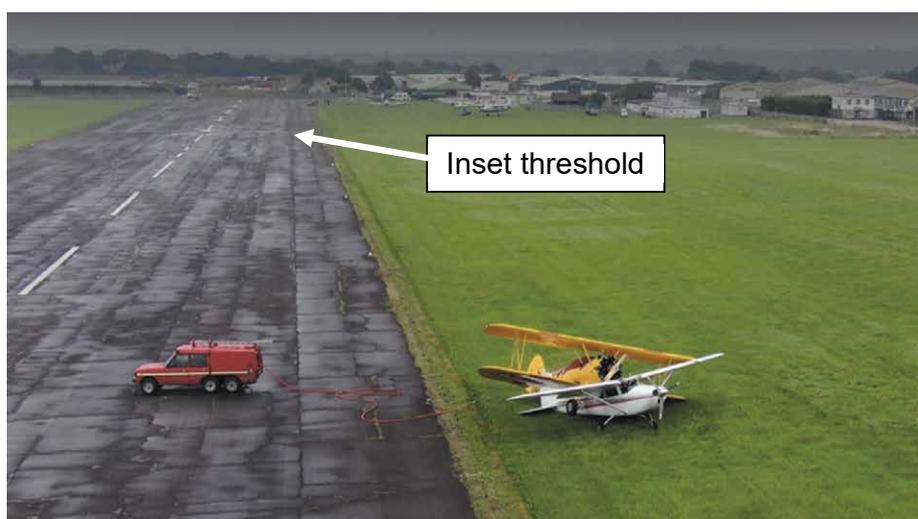
The pilot reported that the landing “didn’t feel right” and that the aircraft was not responding to control inputs. He applied power to correct what he felt was a drift to the left, then reduced power to idle. The aircraft continued to swing further to the left, off the runway and onto the grass (Figure 5).



**Figure 5**

Facing inset threshold of Runway 22  
(image used with permission)

The pilot believed that the left landing gear had failed. Once the aircraft stopped, he looked down and saw that his aircraft was straddled on top of another aircraft, the Cessna (Figure 6).



**Figure 6**

Looking back to threshold of Runway 22  
(image used with permission)

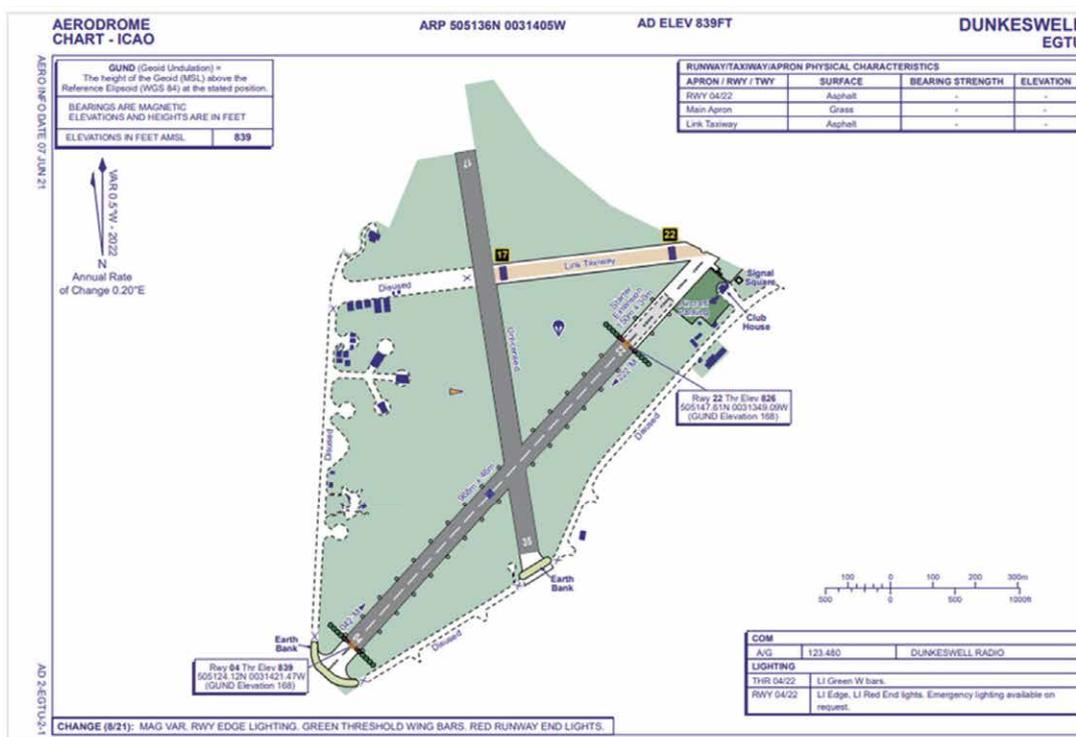
## Post-collision

The pilot of the Cessna shut down the aircraft and attempted to exit but found that he could not open the door. The pilot of the Stearman had already exited his aircraft and assisted him to egress by forcing open the door.

A member of the operator's staff who had seen the proximity of the aircraft during the final stage of their approach, and believing that a crash was imminent, activated the crash alarm. The aerodrome Rescue and Fire Fighting Service (RFFS) fire tender arrived quickly at the site of the collision and gave first aid to the pilot of the Cessna, who had sustained significant injuries to his torso, limbs and head. They also doused the aircraft with foam and water as fuel was leaking from the left wing tank of the Cessna. After a short time, emergency services arrived on site and the pilot of the Cessna was taken to hospital.

## Aerodrome information

Dunkeswell aerodrome is located on the Blackdown Hills in Devon, 14 nm north-east of Exeter, at an elevation of 839 ft amsl (Figure 7). It is owned and operated by a private company. The aerodrome is licensed by the CAA for operations for the purpose of public transport or flying training activity in accordance with the Air Navigation Order; at other times it operates as an unlicensed aerodrome.



**Figure 7**

Dunkeswell Aerodrome (from NATS AIP)

### *Aerodrome procedures*

For inbound flights not normally based at Dunkeswell, prior permission is required (PPR), which can be obtained through a dedicated page on the operator's website. The website has a page providing information to visiting crews on local operating procedures. Alternatively, a PPR can be sought over the telephone with the aerodrome operator.

The web page provides the following information:

#### *'Joining Instructions*

*Both Fixed Wing and Helicopters to join either on downwind or base leg for the runway in use. Circuit height 800ft.*

*Runway 22 Left Hand circuits...*

*Further information is available in the AIP.'*

The Cessna pilot stated that he had visited Dunkeswell approximately 30 times since 2012 and was aware of the local procedures.

The Air Information Publication (AIP)<sup>2</sup> entry for Dunkeswell contains the following information:

#### ***'EGTU AD.2.22 FLIGHT PROCEDURES***

##### ***1 CIRCUITS***

- a. Circuit directions: Runway 04 – RH; Runway 22 – LH. Circuit height: 800 FT.*
- b. No overhead joins due to parachuting.*
- c. No straight in approaches.*
- d. No orbits in the circuit or on final approach, ie extend downwind or go around.'*

The operator was not aware that the AIP entry did not contain reference to the requirement for inbound traffic to join the circuit via either the downwind or base legs of the active runway. Where the AIP entry omits key information, that omission would also be reflected in charts from commercial providers such as Pooleys, as their data for licensed airports and aerodromes is sourced from the AIP. Accordingly, the operator decided to ensure that information contained on Dunkeswell Aerodrome's website was accurately recorded in the relevant NATS AIP entry.

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#### **Footnote**

<sup>2</sup> The UK Civil Aviation Authority is responsible for the form and content of UK Aeronautical Products, and NATS, as the UK Aeronautical Information Service Provider, is responsible for the preparation and availability of the products in the AIP. Available: <https://nats-uk.ead-it.com/cms-nats/opencms/en/Publications/AIP/> [Accessed May 2022].

## **Aerodrome operator**

### *Provision of Air to Ground Communication Service*

The operator held a licence to provide an Air to Ground Communication Service (AGCS) in accordance with the Wireless Telegraphy Act 2006 and the Air Navigation Order 2016 (ANO) Article 205. The level of service an operator provides is based on factors such as the number of aircraft movements, projected movements and types of operations being conducted. The operator communicates this to the CAA through an Aerodrome Manual, which provides an exposition of their operation. The CAA considers the appropriateness of the intended level of service based on the history of the operation, safety reports and information received from users in the General Aviation community, among other factors. The safe conduct of the operation is then monitored during periodic audits by the CAA.

The operator's Aerodrome Manual stated that an AGCS was available '*on request*' and would be provided during opening hours of 0830 to 1700 hrs, as promulgated in the AIP. The operator stated that the AGCS would be manned for "98%" of the time during notified hours and that pilots could "expect to be answered if they call during operating hours". However, they acknowledged that when staff became busy with other duties this might not always be the case.

The Aerodrome Manual did not contain guidance or standard operating procedures for radio operators providing the AGCS but relied on transfer of knowledge from one to another to verbally convey operating procedures and culture. There was no process to establish who had responsibility to actively monitor the AGCS frequency, or to handover the watch if a staff member had to engage in other duties. The CAA currently provides no guidance material to the operator of an AGCS on the conduct of the service<sup>3</sup>.

### *Radio Operator's Certificate of Competence*

An individual must hold a Radio Operator's Certificate of Competence (ROCC) if they are providing an AGCS. The ROCC is a document issued by the CAA after an applicant has passed written and practical examinations that demonstrate their competence to operate an aeronautical radio station safely and correctly. The CAA publishes CAP 452, '*Aeronautical Radio Station Operator's Guide*', which contains details of the syllabus for the examination but does not cover guidance for the running of an AGCS. The CAA does not currently approve any training courses associated with the issue of a ROCC.

Two members of the operator's staff held a current ROCC; both individuals were working on the day of the accident. The radio operators did not normally pass details of traffic in the circuit, only the runway in use and pressure setting (see Footnote 3). The operator reported that it might not always be possible for the radio operators to know if aircraft were in the circuit, so they would not always be able to provide accurate information.

The AGCS frequency was not recorded and was not required to be by regulations.

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#### **Footnote**

<sup>3</sup> This subject is covered in more detail under the section 'Regulations for AGCS'.

## Radio transmissions made by the pilots

Both pilots stated that they made appropriate radio calls when joining, and while flying in the circuit. Of these calls, only the Cessna pilot's call when joining the circuit was established as being acknowledged by a radio operator on the ground. Witness evidence indicated that the following radio calls made by the pilots were heard, but it was not possible to establish the order of transmission:

- Stearman – Final call.
- Cessna – Final call.
- Stearman – second Final call with position update.

## Regulations for AGCS

CAP 452, together with CAP 413, '*Radiotelephony Manual*', are intended to provide '*the main reference documents for radio station operators*'. CAP 452 states that:

*'AGCS radio station operators provide traffic and weather information to pilots operating on and in the vicinity of the aerodrome. Such traffic information is based primarily on reports made by other pilots. Information provided by an AGCS radio station operator may be used to assist a pilot in making a decision; however, the safe conduct of the flight remains the pilot's responsibility;'*

and that:

*'AGCS is to be made available to aircraft during notified hours.'*

While not defined in CAP 452, the CAA stated that an AGCS should comprise appropriate and serviceable radio equipment with trained and qualified radio operators to operate it. For the AGCS to be considered available during notified hours, the CAA advised that the radio operator should be focused on the task of delivering the service without undue distractions, such as extra administrative duties. Also, constant service provision should be available within notified hours unless promulgated otherwise. Neither CAP 452 nor CAP 413 provides this guidance to the licence holder on the delivery of an AGCS. The CAA advised the AAIB that a review of CAP 452 was underway, including wider aspects of the conduct of AGCSs, but could not provide a timescale for the implementation of a revision.

Further information can be found in CAP 168, '*Licensing of Aerodromes*', where an operator who provides a RFFS must provide '*a method of monitoring the aircraft movement area for the purpose of instantaneously alerting and deploying*'. The operator considered this requirement satisfied by the combination of the visibility of the aerodrome from the office, monitoring of the aerodrome frequency and the provision of a crash alarm button in the office.

## Aerodrome inspections by the CAA

A periodic on-site audit was conducted at Dunkeswell by the CAA in January 2019 to verify continued compliance with national licensing requirements. There were no comments or instances of non-compliance recorded regarding the provision of an AGCS.

## Skyway Code

The CAA publishes *'The Skyway Code'*, which is intended to provide General Aviation pilots with practical guidance on all operational, safety and regulatory issues relevant to their flying. Under the section *'Aerodrome Operations'* it states that:

*'Correct understanding and use of procedures is important for safe aerodrome operations. Most GA aerodromes are 'uncontrolled', meaning pilots must operate safely amongst other airspace users, without direction from air traffic control.'*

In a later section on general circuit guidance, it provides the following advice:

- *'As a general rule, joining traffic must give way to traffic already established in the circuit.'*
- *'Keep a good look out, knowing the conflict areas for the particular join you are conducting.'*
- *'Conform to the standard pattern.'*
- *'Announce your position at the standard points and whenever you feel it will enhance the situational awareness of others.'*
- *'Even if you do not believe there to be any other traffic around, continue to announce your position and intentions as 'blind calls' – you never know when other aircraft might appear. Non-radio aircraft are also a possibility.'*
- *'If you believe the circuit is clear but are not sure, there is no harm in asking over the radio whether there is any other traffic – it is not unknown for pilots to stop making position calls if they believe they are alone in the circuit.'*
- *'When one aircraft is overtaking another, the aircraft being overtaken has right of way.'*

## The Rules of the Air Regulations

The Rules of the Air Regulations requires the following actions to be taken by pilots when flying at a national licensed aerodrome with an AGCS:

*'If there is no flight information centre at the aerodrome the commander must obtain information from the air/ground communication service to enable the flight to be conducted safely within the aerodrome traffic zone.'*

When flying within an aerodrome traffic zone, the commander must:

*‘if the aircraft is fitted with means of communication by radio with the ground, communicate the aircraft’s position and height to the air traffic control unit, the flight information centre or the air/ground communications service unit at the aerodrome (as the case may be) on entering the aerodrome traffic zone and immediately prior to leaving it.’*

### **Aircraft handling aspects**

Like other aircraft of similar configuration, the Stearman’s forward fuselage restricts the pilot’s forward and downward view during approach and landing. Due to weight and balance considerations, it is flown from the rear seat when solo. To allow sufficient vision of the landing area ahead, the pilot must sideslip towards the runway, keeping the threshold in sight until the aircraft is straightened just before the landing flare. The pilot stated that when circuit conditions allowed, he preferred to fly a curving base leg onto final to improve his visibility of the runway and to avoid having to apply sideslip during a longer, straight, final leg. This is a technique often employed by pilots in similar types.

### **Analysis**

#### *Overview*

N68427 descended onto G-OMAG on the runway at Dunkeswell Aerodrome while attempting to land. Neither pilot was aware of the presence of the other in the circuit until late in the final approach, nor their precise positions. Both pilots were qualified and current, and their respective radios were serviceable, evidenced by the fact they had both been in communication with either an ATC unit or an AGCS radio operator at times on the day of the accident.

#### *N68427*

The pilot of the Stearman was based out of Dunkeswell and was familiar with local operating procedures. When he re-joined the circuit on a left base for Runway 22, some 21 minutes after taking off, he believed the circuit was clear. The pilot could not recall his joining call being answered and of the two qualified radio operators on the ground, neither could remember either hearing the call or replying to it. His decision to fly a curving base leg on his first and second approaches was based on the well-known limitations on forward visibility in the Stearman and his belief that his was the only aircraft in the circuit. The geometry of his turn and the flightpath of the Cessna beneath him, made it unlikely that the pilot would have visually acquired the Cessna if he was not primed with the knowledge of its presence by radio. Neither would he have been expecting an aircraft to join the circuit from the dead side. While he had no reason to anticipate an aircraft landing ahead of him, at an uncontrolled aerodrome it is important for pilots to always remain vigilant to the possibility of the presence of other aircraft, as advised in the Skyway Code. Timely and accurate radio calls enhance pilot awareness of the air traffic environment and improve the probability of the ‘see-and-avoid’ principle being effective in avoiding collisions.

## G-OMAG

The pilot of the Cessna stated that he had visited Dunkeswell approximately 30 times in the previous 10 years and was familiar with the local procedures. Although the aerodrome's website stated the requirement to join the circuit on either a downwind or base leg of the active runway, the AIP and Pooleys entry for the aerodrome did not have this information. This highlights the importance for airfield operators to be diligent in sharing all relevant data with the CAA and NATS to ensure the AIP, as the definitive source of aerodrome information for pilots, correctly reflects local procedures. Pilots must also be diligent in familiarising themselves with procedures at aerodromes they intend to visit.

When the pilot contacted Dunkeswell Radio stating his intention to join the circuit, he was not informed of the presence of the Stearman joining from the east, and he did not hear other radio calls. The investigation could not determine the order that joining calls were made by the two aircraft. At the point the Cessna was approximately one nautical mile to the west of the aerodrome and changed course to the north to arc around to join from the dead side, the Stearman was established in the circuit and had just completed a touch-and-go. Guidance in the Skyway Code is clear that, as a general rule, joining traffic must give way to traffic already in the circuit, but that relies on timely position reporting by pilots and adherence to procedures.

## AGCS

The aerodrome operator was licensed to deliver an AGCS and there were two employees present on the day of the accident who held ROCCs. The operator did not have a documented process for allocating specific watch periods for the radio operators but adopted an informal practice where the radio frequency would be monitored when duties allowed. Additionally, the radio operators did not normally pass traffic information to aircraft, only the runway in use and pressure setting. The ANO states that when flying within an aerodrome traffic zone, a pilot must:

*'...communicate the aircraft's position and height to the air traffic control unit, the flight information centre or the air/ground communications service unit at the aerodrome (as the case may be) on entering the aerodrome traffic zone and immediately prior to leaving it.'*

Had a nominated and qualified member of staff been actively monitoring the AGCS frequency as their primary function, without undue distractions of other administrative duties, they would have been aware of the presence and intentions of the two aircraft. Therefore, it is likely that they would have been able to alert each aircraft to the presence of the other based on their position reports. While the Skyway Code is clear that the responsibility for safe operation at an uncontrolled aerodrome rests with individual pilots, visual acquisition of aircraft is more likely if primed with the knowledge of their presence by timely radio calls by the AGCS operator.

### *Guidance for AGCS radio operators*

The CAA informed the AAIB that it had an expectation for AGCS radio operators to be focused on the task of delivering the service without undue distractions, such as extra administrative duties. This was not an expectation shared by the aerodrome operator and is not included in CAP 452. CAP 452 states that an AGCS is to be made available during notified hours, and the CAA's expectation is that constant cover will be available within those hours unless promulgated otherwise.

The approved Aerodrome Manual contained no guidance on the delivery of the AGCS, and there had been no comments or indications of non-compliance in the most recent periodic audit by the CAA. The AAIB was informed by the CAA that work was currently in progress to review the scope of CAP 452 and the wider aspects of the AGCS, and this was expected to address the apparent gap between regulatory intention and practice. CAPs are subject to periodic revision to take account of changes to source regulatory material, feedback from industry, and recognised best practice. However, this process takes time to implement, and therefore to address the issues ahead of the revision to CAP 452, the CAA took the following Safety Action:

On 4 August 2022, the CAA published Supplementary Amendment 2022/01 to CAP 452 *Aeronautical Radio Station Operator's Guide* providing an update to requirements for holders of a Radio Operator's Certificate of Competence. The Amendment included the following provision:

- AGCS/OCS shall be provided to aircraft during the notified hours of operation. *\*Notified hours are as published in the AIP or promulgated via other means. Aerodrome operator's must be notified on occasions where AGCS/OCS cannot be provided during the hours of operation.*
- If no answer received outside of these notified hours the use of blind transmissions is required.
- It is important that the radio operator should be free from distractions and keep additional admin tasks to an essential minimum.
- Compulsory read-back of those ATS messages specified in the Radiotelephony Manual (CAP 413) paragraph 2.70 are required.
- Information reported by pilots including position reports may only be used in a retransmission as an aid to assist other pilots in their lookout and safe operation of the aircraft. They are not to be assumed correct/incorrect or to be challenged by the AGCS/OCS operator.
- Any information provided by the ROCC operator does not relieve the pilot-in-command of an aircraft of any responsibilities.

## Conclusion

N68427 collided with G-OMAG while landing at Dunkeswell Aerodrome because the pilot was not aware that G-OMAG had joined the circuit from the dead side and positioned ahead of him. The pilot of N68427 did not see G-OMAG, possibly because the relative positions of the two aircraft meant that G-OMAG was obscured from view by N68427's structure. The pilot of G-OMAG had not been passed information from the AGCS radio operator on the presence of N68427 and had not seen it in the circuit.

The CAA published a Supplementary Amendment to CAP 452 to improve the situational awareness of pilots operating at aerodromes providing an AGCS.

*Published: 25 August 2022.*