

SERIOUS INCIDENT

Aircraft Type and Registration:	Beech B200 Super King Air, G-SYGA	
No & Type of Engines:	2 Pratt & Whitney Canada PT6A-42 turboprop engines	
Year of Manufacture:	1982 (Serial no: BB-1044)	
Date & Time (UTC):	15 September 2012 at 0500 hrs	
Location:	Glasgow Airport	
Type of Flight:	Commercial Air Transport (Non-Revenue)	
Persons on Board:	Crew - 2	Passengers - 3
Injuries:	Crew - None	Passengers - None
Nature of Damage:	No damage	
Commander's Licence:	Commercial Pilot's Licence	
Commander's Age:	45 years	
Commander's Flying Experience:	2,700 hours (of which 2,000 were on type) Last 90 days - 45 hours Last 28 days - 21 hours	
Information Source:	AAIB Field Investigation	

Synopsis

On approach to Glasgow Airport, the crew inadvertently activated the go-around mode as they approached a cleared altitude. The distraction of this, coupled with their lack of experience on this type of B200, caused a short breakdown in crew situational awareness and the aircraft descended below the cleared altitude.

History of the flight

The aircraft was on a medical flight from Wick Airport to Glasgow Airport. This was the second sector the crew had flown that day; the first sector was the positioning flight from Glasgow to Wick. The aircraft had a crew of two pilots and there were three passengers in the cabin, a pregnant woman, a paramedic and a medical escort. On the positioning flight to Wick, the

commander was the handling pilot and the co-pilot performed non-handling pilot duties. On the initial approach into Glasgow, the co-pilot was flying the aircraft from the right seat with the autopilot engaged in IAS (indicated airspeed) and HDG (heading) modes and with ALT SEL (altitude select) and APP (approach) modes armed.

The aircraft was vectored onto an ILS approach to Runway 23 at Glasgow and, at 18 nm from touchdown, cleared to intercept the localiser and to descend to 3,500 ft. In order to reduce speed, the co-pilot selected VS (vertical speed) mode (to maintain the current rate of decent) and reduced power.

Having established the aircraft on the ILS localiser, and as it approached the cleared altitude, to further reduce speed the co-pilot reduced power again, which caused the gear warning horn¹ to activate. The co-pilot attempted to cancel the warning horn with the GEAR HORN SILENCE button, which he thought was located on the left power lever, but accidentally pressed the GO-AROUND button instead. This caused a fly-up indication to be displayed on the flight director on the left instrument display, the autopilot to disengage and all the previously engaged flight director modes to disengage.

The commander immediately noticed that all the autopilot and flight director modes had disengaged, and informed the co-pilot that he intended to re-engage them. The co-pilot looked across at the annunciator panel, located above the left hand primary flight instruments, and observed that some of the modes had disengaged. The commander pressed the WARN HORN SILENCE button and directed his attention to the centre console to re-engage the autopilot modes (HDG, APP and ALT SEL). He looked back at the centre console when his initial attempt to re-engage ALT SEL was unsuccessful. When he looked back at the flight instruments he saw that the aircraft had descended below 3,000 ft and that the altimeter indication was decreasing rapidly. He immediately instructed the co-pilot to climb the aircraft back to 3,500 ft. The co-pilot applied full power, rotated the aircraft into a climb attitude and manually flew the aircraft back to 3,500 ft.

The co-pilot heard the commander state that the modes had disengaged and looked across the cockpit at the mode annunciator lights but, due to the angle of his

Footnote

¹ The landing gear warning horn sounds when the landing gear is not in the down and locked position with the flaps in the UP or APPROACH positions and either or both power levers are retarded below approximately 85% N_1 . The horn can be cancelled with a WARN HORN SILENCE button located on the main panel beside the landing gear control switch handle, just forward of the commander's right knee.

view, he was not able to read them with sufficient clarity to determine which modes were active. He was distracted from his instrument scan by the persistent gear warning horn, by looking across the cockpit to the annunciator panel and by the subsequent activity of the commander. Initially he was unaware that the autopilot had disengaged. When the commander alerted him to the height loss, he took immediate action to climb the aircraft to the cleared altitude.

The ATCO observed the height loss and alerted the pilots. The GPWS system generated the aural warning "TERRAIN TERRAIN PULL UP" but this occurred after the crew had started to recover the aircraft to the cleared altitude. The ATC minimum safe altitude warning (MSAW) system alert was also activated but the ATCO had already observed the height loss and alerted the crew. At 11 nm from touchdown, the ATCO instructed the crew to descend to 3,000 ft and cleared them to fly the ILS. This, and the subsequent landing proceeded without further incident. The incident took place at night and in IMC.

Recorded information

The aircraft's position was recorded by the Glasgow radar head which also recorded the aircraft's Mode S altitude to within ± 50 ft. This altitude was corrected to the Glasgow QNH of 1012 hPa. The recorded track shows the approach to Glasgow Airport which crossed over the high ground to the north-east of the airport (see Figure 1).

As the aircraft descended through 3,500 ft, the rate of descent increased to approximately 3,000 ft per minute which was maintained for around 16 seconds. The aircraft descended to 2,273 ft before climbing back to 3,500 ft over 40 seconds and then continuing its approach to Glasgow Airport. The minimum terrain clearance during this manoeuvre was 1,484 ft.

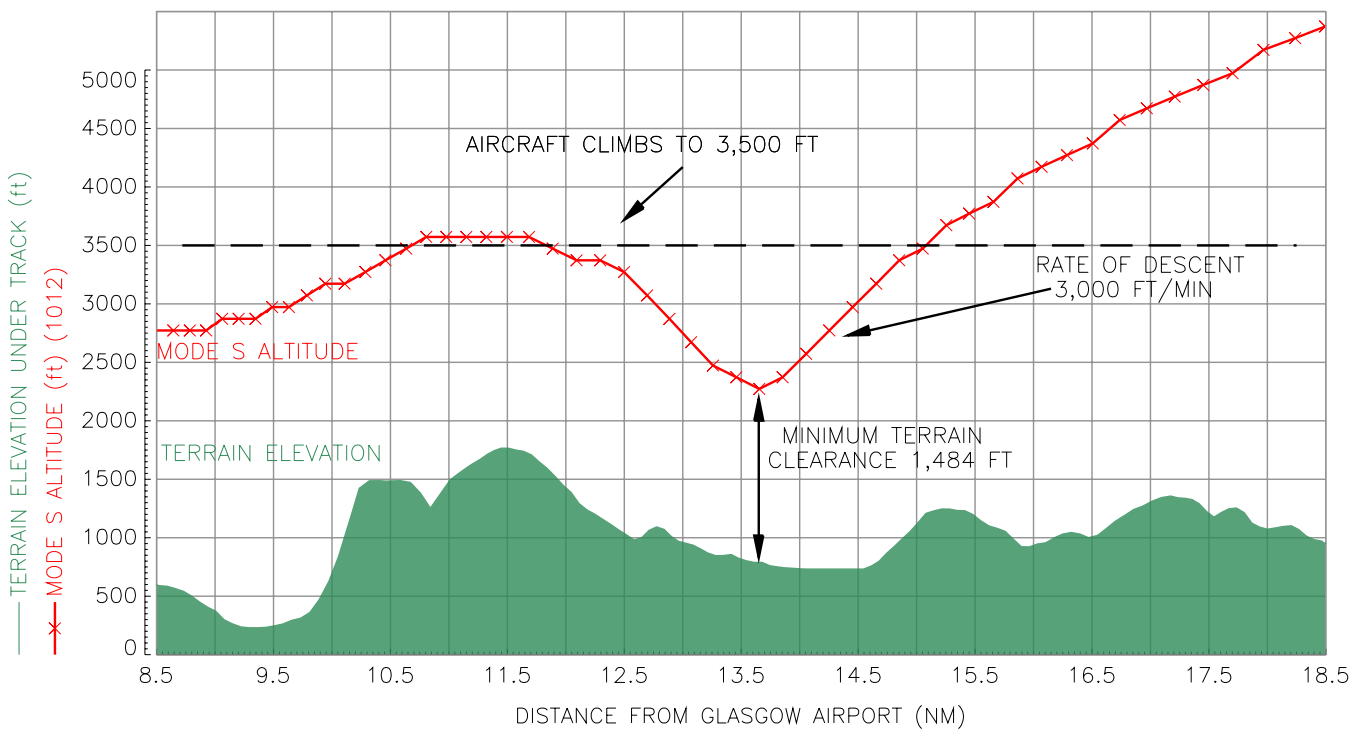


Figure 1
G-SYGA radar track and terrain under track

Beech B200 King Air cockpit differences

The pilots usually flew aircraft equipped with Pro Line 21 instrumentation. The operator leased G-SYGA when these aircraft were not available. There are several differences between the two types; only those relating to this incident are highlighted below.

Pro Line 21

The B200 cockpit with which the pilots were more familiar featured a Pro Line 21 electronic flight information system (EFIS). The autopilot and flight director mode selector panel is positioned above the centre instrument panel, just below the coaming, and is placed centrally between the two pilots. Autopilot modes are annunciated in the top section of each pilot's primary flight display.

The GEAR HORN SILENCE button is positioned on the left side of the left power lever just underneath the GO-AROUND button, which is located in a recess on the left side of the left power lever knob.

The co-pilot's main instrument display for a Pro Line 21 B200 is shown in Figure 2 and the associated power levers are shown in Figure 4.



Figure 2

Pro Line 21 - Right primary flight instrument display

G-SYGA

The cockpit of G-SYGA consists of conventional electromechanical flight instruments for both pilots. The left attitude indicator incorporates a flight director whereas the right attitude indicator has no flight director. The autopilot and flight director mode selector panel is located on the centre console to the right of the commander's right knee. The autopilot and flight director mode annunciators comprise a panel of rectangular lights positioned above the left attitude indicator. There are no mode annunciators on the co-pilot's side of the cockpit.

The WARN HORN SILENCE button is located on the lower main instrument panel just in front of the commander's left knee. The GO-AROUND button is located in a position similar to that of Pro Line 21-equipped aircraft but the button protrudes from the power lever knob rather than being recessed in it.

The co-pilot's main instrument display in G-SYGA is shown in Figure 3 and the power levers are shown in Figure 5.



Figure 3

G-SYGA - Right primary flight instrument display



Figure 4

Pro Line 21 – Power levers



Figure 5

G-SYGA – Power levers.

Co-pilot training

The co-pilot had joined the operator recently. He completed his type rating training in the USA using a simulator equipped to Pro Line 21 standard and on his return to the UK undertook line training at Aberdeen on Pro Line 21-equipped aircraft. After completing this training he flew a further five sectors, again on Pro Line 21 aircraft. A few days before the incident, before flying G-SYGA, he received a ground briefing on the aircraft from another pilot who was not an instructor. The co-pilot told the company he was content to fly an aircraft equipped with mechanical instrumentation.

Published guidance

EASA requirements

EASA publish a list of class or type ratings that details when differences training is required should a pilot extends his or her privileges to another variant of aircraft within one class or type rating. EASA do not require differences training should pilots move between different variants of B200 aircraft.

Where differences training is required, Part FCL.710 states that if a variant has not been flown for a period

of two years following differences training then further differences training or a proficiency check shall be required.

LASORS

LASORS (Licensing, Administration, Standardisation, Operating Requirements and Safety), published by the CAA, provided the following guidance for pilots converting from EFIS to mechanical instruments for the first time.

‘Converting from EFIS to Mechanical Instruments for the first time

Pilots trained in using Integrated EFIS displays but not trained on mechanical flight instruments, are likely to have established a scan pattern quite different from the techniques required by a conventional, mechanical instrument layout. These pilots are strongly advised to obtain differences training on conventional instruments, including selective radial scan techniques, before flying an aircraft with conventional mechanical instrumentation. EFIS can provide very precise information, which requires little interpretation,

as opposed to conventional instrument displays, which require considerable interpretation and different scan techniques. A key element in this type of training, on whatever system, is ensuring the pilot fully understands what information is available, what is being displayed and how to interpret the display correctly.'

CAP 804

Two days after the incident, LASORS was superseded by CAP 804 entitled '*Flight Crew Licensing: Mandatory Requirements, Policy and Guidance*'. Part H, Subpart 1 of this document sets out the requirements for class and type ratings included in EASA licences, and contains '*Acceptable Means of Compliance and Guidance Material (AMC and GM)*'. The GM details guidance on differences training which includes, amongst other material, guidance on differences training for pilots converting to aircraft equipped with EFIS. The document did not contain any guidance on the differences training for pilots converting from EFIS equipped aircraft to those fitted with conventional mechanical instrumentation such as G-SYGA.

Analysis

On the day of the incident, the co-pilot was operating G-SYGA for the first time and, on the flight from Wick to Glasgow, flew as PF for the first time in this type of B200. The flight proceeded uneventfully until approaching 3,500 ft, when the co-pilot attempted to cancel the gear warning horn that followed a power reduction. He tried to locate the button in the position relevant to a Pro Line 21 aircraft but, as the button was in a different place, this resulted in inadvertent selection of the GO-AROUND button instead. This disengaged the autopilot and all the previously engaged autopilot and flight director modes, but produced no associated indications on the co-pilot's instrument panel.

The commander saw on the mode annunciation panel that the modes had disengaged. During his attempt to re-engage the modes using the panel on the centre console his attention was drawn away from the main flight instruments, diminishing his ability to monitor the flight path.

The co-pilot was unfamiliar with the instrument presentation on this aircraft which may have diminished the effectiveness of his instrument scan and increased his workload. Actions associated with the inadvertent autopilot disengagement distracted both pilots from the primary flight instruments and caused a breakdown in situational awareness, such that the aircraft descended below its cleared altitude unnoticed by the crew.

The co-pilot had received no formal differences training on B200 aircraft with mechanical flight instruments as recommended in LASORS. A formal programme of differences training would have addressed his inexperience on this type of B200 and this could have prevented the incident occurring.

Safety actions

As a result of this incident, the operator has introduced procedures to ensure that pilots who have not flown a mechanically instrumented aircraft within 90 days receive an expanded differences briefing from a training captain before flying the aircraft.

The CAA has amended Section 4, Part H of CAP 804 to include guidance on differences training for pilots converting from EFIS to mechanical instruments.

Conclusions

The incident followed a loss of situational awareness by the crew, caused by a combination of distraction and an unfamiliar cockpit layout.