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Near-miss Between an Australia Airplane and an “Unknown Object” Near Perth, Western Australia on 19 March 2014

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1. Background

In Australia, according to the website of the Australian Transport Safety Bureau (ATSB) the bureau "...is Australia's national transport safety investigator... The ATSB is Australia's prime agency for the independent investigation of civil aviation, rail and maritime accidents, incidents and safety deficiencies."

On the ATSB website is a listing of "Aviation Safety Investigations & Reports." This listing provides details of incidents such as near collisions between aircraft. One of the authors (PD) noted that one of these near collision reports involved an "unknown object."

ATSB report number AO-2014-052 reads as follows:

"The ATSB has commenced an investigation into a near collision with an unknown object involving a De Havilland DHC-8, VH-XFX near Perth Airport, Western Australia on 19 March 2014. Whilst passing 4,000ft on descent the crew observed an unknown object tracking directly towards the aircraft. The crew manoeuvred the aircraft to maintain separation. As part of the investigation the ATSB will interview the aircrew. A report will be released within several months."

This ATSB preliminary report goes on to provide general details as follows:

Date: 19 Mar 2014
Time: 0913 WST (local)
Location: Perth Airport, NNE 23 km
Investigation type: occurrence investigation
Occurrence class: Operational
Occurrence category: Serious incident

Report status: Pending
Expected completion: June 2014
Aircraft details: de Havilland Canada
Model: DHC-8-314
Registration: VH-XFX
Serial number: 313
Type of operation: Charter
Sector: Turbo prop
Damage to aircraft: Nil
Departure point: Kambalda, WA
Destination: Perth, WA.

On 26 May 2014 the ATSB released their four page report on the incident. The first page was simply a cover sheet; page two was ATSB information; page three was headed "Near collision between an unknown object and a De Havilland DHC-8." It read:

"What happened

On 19 March 2014, at about 0913 Western Standard Time (WST) a de Havilland DHC-8, registered VH-XFX was on approach to Perth Airport from Kambalda, Western Australia. When about 23km north-north-east of Perth, at about 3,800ft above mean sea level (AMSL), the crew sighted a bright strobe light in front of the aircraft. The light appeared to track toward the aircraft and the crew realised that the light was on an unknown object, possibly an unmanned aerial vehicle (UAV.) The pilot took evasive action turning towards the west to avoid a collision with the object. The object passed about 20m horizontally and 100ft vertically from the aircraft.

The pilot reported that the object was cylindrical in shape and grey in colour. It was at about 3,700ft AMSL and in controlled airspace. The crew did not receive a traffic collision avoidance system (TCAS) alert. The airspace below 3,500ft AMSL was military restricted airspace and the Australian Defence Force was not operating UAVs and was not aware of any UAV operations in the area at the time of the incident. The ATSB was not able to confirm the details of the object or identify any UAV operator in the area at that time."

2. General Sighting Details

Occurrence details:

Date and time: 19 March 2014 - 0913WST

Occurrence category: Serious incident

Primary occurrence type: Interference from the ground

Location: 23km NNE Perth Airport, Western Australia

Latitude 31 deg 44.62min S

Longitude approx. 116 deg 4.7min E

Aircraft details:

Manufacturer and model: De Havilland Canada DHC-8-314

Registration: VH-XFX

Serial number: 313

Type of operation: Charter-passenger
Persons on board: Crew-4 Passengers-unknown
Injuries: Crew - nil. Passengers – nil
Damage: Nil.

3. Details about the ATSB

The Australian Transport Safety Bureau (ATSB) is an independent Commonwealth Government Statutory Agency. The ATSB is governed by a Commission and is entirely separate from transport regulatory, policy makers and service providers. The ATSB's function is to improve safety and public confidence in the aviation, maritime and rail modes of transport through excellence in independent investigations of transport accidents and other safety occurrences; safety data recording, analysis and research, and fostering safety awareness, knowledge and action.

The ATSB is responsible for investigating accidents and other transport safety matters involving civil aviation, marine and rail operations in Australia that fall within Commonwealth jurisdiction, as well as participating in overseas investigations involving Australia registered aircraft and ships. A primary concern is the safety of commercial transport, with particular regard to fare-paying passenger operations.

The ATSB performs its functions in accordance with the provision of the Transport Safety Investigation Act 2003 and regulations and, where appropriate, relevant international agreements.

The object of a safety investigation is to identify and reduce safety-related risk. ATSB investigations determine and communicate the safety factors related to the transport safety matter being investigated.

It is not a function of the ATSB to apportion blame or determine liability. At the same time, an investigation report must include factual material of sufficient weight to support the analysis and findings. At all times the ATSB endeavours to balance the use of material that could imply adverse comment with the need to properly explain what happened, and why, in a fair and unbiased manner.

About This Report:

Decisions regarding whether to conduct an investigation, and the scope of an investigation, are based on many factors, including the level of safety benefit likely to be obtained from an investigation. For this occurrence, a limited-scope, fact-gathering investigation was conducted in order to produce a short summary report, and allow for greater industry awareness of potential safety issues and possible safety actions." This is the end of the ATSB report.

Figure 1 shows a Skippers DHC-8 aircraft, similar to the one involved in the event (photo courtesy of FlightAware.)



Figure 1

DHC-8 Model Airplane

4. Our investigation

The authors:

1. Secured secondary radar data on the event.
2. Secured primary radar data on the event.
3. Obtained weather details.
4. Interviewed the command pilot.
5. Located similar events of this type in this area.
6. Obtained additional information from the ATSB.
7. Checked previous ATSB reports involving UAV.

1. Secondary radar data:

The "Webtrak" website¹ is run by Air Services Australia and displays secondary radar data superimposed over a ground map. It shows the location of aircraft near Australian airports. One can view an area up to 50 kilometres from selected airports. Only aircraft

¹ <http://www.airservicesaustralia.com/aircraftnoise/webtrak/>

carrying transponders are displayed. For each aircraft one can find details such as its flight number; originating and destination airports; an aircraft's moment to moment height (AMSL); plus the type of plane. Time wise, one can check from 40 minutes to three months into the past.

One of the authors (KB) went to the "Webtrak" website and set the system for 19 March 2014 beginning at 0904WST. At 0909WST a DHC-8 aircraft, shown as flying from Kambalda Airport (YKBL) appears on the radar replay, near the locality of Chidlow. This was the aircraft described in the ATSB report.

The following screen capture (Figure 2) is from Webtrak at about 0913WST on 19 March 2014. The DHC-8 aircraft is the smaller red aircraft seen in the middle top of the screen.

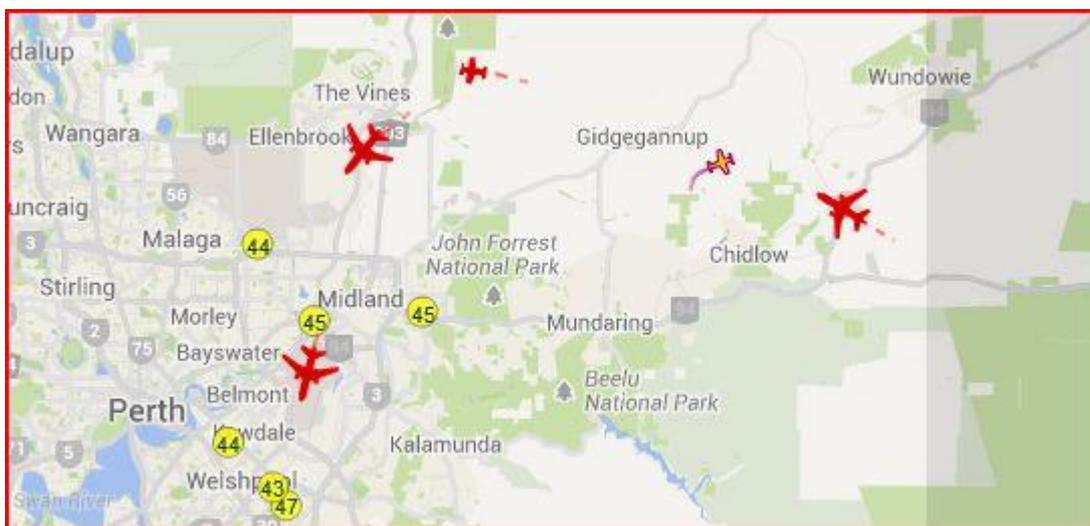


Figure 2

Webtrak Screen Capture

The DHC-8 aircraft is shown following flight VOZ1432, registration VH-YIU, a B738 flying from Darwin to Perth. Some 20 kilometres behind the DHC-8 airplane (flight QFA485) travelling from Melbourne to Perth, an A332 at 6,243 feet altitude. The crew of this aircraft would have had the DHC-8 in front of them. Close to QFA485 was a general aviation aircraft, a C82R at 8,186 feet altitude. However, the direction of flight of this aircraft was facing away from the DHC-8 plane.

The radar replay shows VOZ1432 landing at 0916 WST, the DHC-8 landed at 0919WST and the QFA485 at 0920WST.

Zooming in on the secondary radar image reveals that at about 0913WST, the DHC-8 aircraft was shown at a height of 4,124 ft. Looking at the track of this aircraft as displayed, there does indeed seem to be a slight direction change at the reported time of the near collision with the "unknown" object.

There are absolutely no other aircraft shown near the DHC-8 on the radar replay. However, it should be remembered that secondary radar only shows returns on the display when an aircraft is equipped with a transponder which provides identification to air traffic controllers. If the object was an aircraft not using a transponder, then it would not show up on this type of radar.

Further comment is called for in regard to the airplane's flight path deviation. If the object was coming from a direction of 285 degrees, and the pilot turned to 270 degrees heading, then the object should have passed the aircraft on its right hand side. However, the pilot and the ATSB report both reported that the object passed on the aircraft's left hand side. How can this difference be reconciled? We believe that the answer lies in the wording of the ATSB report. It states that the aircraft had commenced turning at waypoint Woorra, turning from a heading of 285 degrees to one of 234 degrees. However, in order to avoid a collision the pilot turned not to 234 but to 270 degrees. Therefore, geometrically, the object may have been approaching from between 234 and 270 degrees, probably closer to 270 degrees, thus passing on the left of the aircraft. Figure 3 shows the navigation waypoints discussed above.

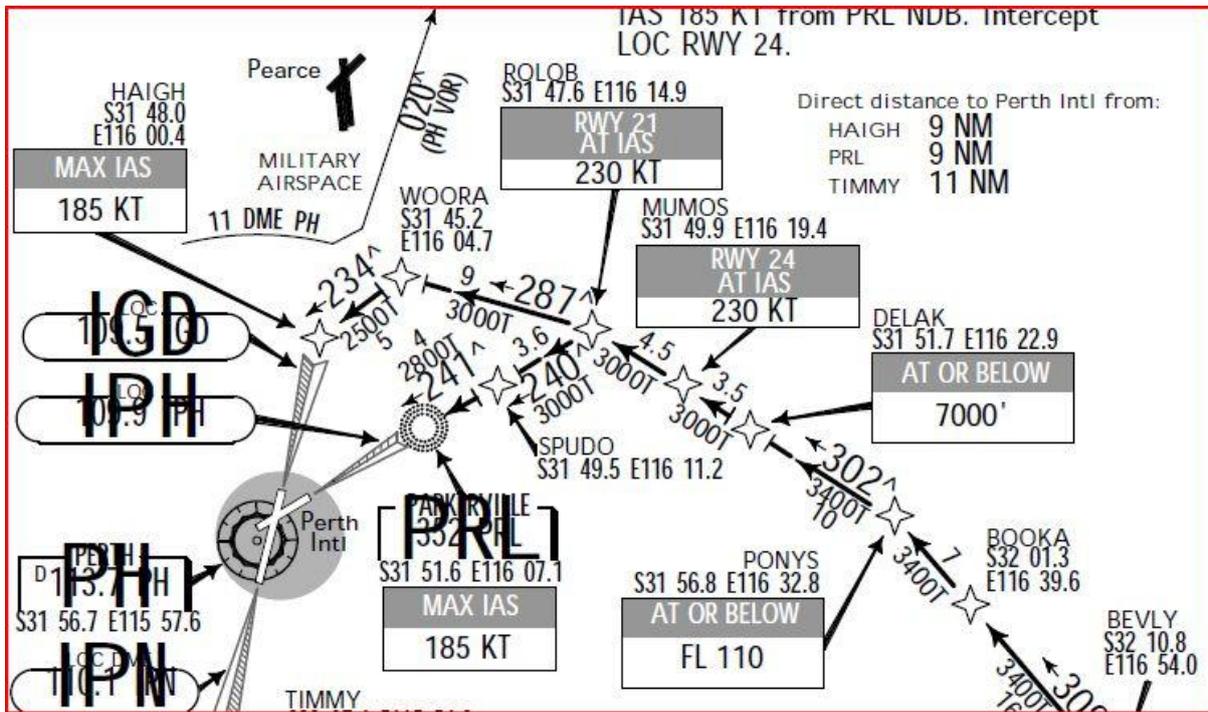


Figure 3

Navigation Waypoints Involved in this Case

2. Primary radar data:

Primary radar shows returns of any kind. In theory it should show any objects reflecting the generated radar waves with sufficient strength. Perth international airport shares a primary radar system with the RAAF (located at RAAF Base Pearce located about 35 km

north of Perth.) The authors therefore sought copies of primary radar data from both the Department of Defence (KB) (DOD) and Air Services Australia (PD) (ASA), using the Freedom of Information Act (FOIA).

The length of the DOD FOI process exceeded the length of time that the RAAF holds its radar data for (viz., apparently 30 days) and thus this was unsuccessful. However, ASA did provide us with a DVD with a replay of radar data for that location, date and time. An air traffic controller, who looked at this DVD for us, confirmed that it showed both primary and secondary radar data. What did it show? It showed all the aircraft which Webtrak had shown, but absolutely nothing near the DHC-8. Whatever, was seen visually by the pilot, did not appear on radar.

3. Weather:

The Bureau of Meteorology's website provided the following weather information for Perth international airport. Daily minimum temperature 18deg C; daily maximum 32.4deg C. Nil rain. Evaporation 6.6mm. Sun 11.0hrs. Maximum wind gust south-west 37km/hr at 1445hrs. At 9am temperature was 24.5deg C; relative humidity 51; nil cloud; wind from the north-east at 13km/hr. MSLP 1021.0.

4. Interview with pilot in command:

Both authors independently communicated with Skippers Aviation, the company who owned VH-XFX and sought their permission to interview the main pilot. One of the authors (PD) also spoke by telephone to a number of Skippers' employees to achieve the same aim. After several months, one of the authors (PD) was advised that he had permission to speak to the pilot, and did so on 2 and 3 July 2014. The following dot points were recorded, from the conversation:

- * The pilot, male, age 26, utterly ruled out the possibility of the object being a weather balloon
- * The object was travelling in the opposite direction to him, not merely hovering or floating
- * He and the co-pilot registered "complete shock"
- * Air Services Australia confirmed that no other flight crew reported seeing the object (via ground radio after he landed)
- * When he thought the object might collide with his plane, he sought a heading change from ATC, but this was denied. He therefore changed course himself
- * The object was still going "up" as well as travelling horizontally when it passed his aircraft
- * He estimated it was only 100m from his aircraft at most, he said it could have been as close as 30m

- * It had the ratio dimension wise of a cigarette, i.e. long and thin
- * He said it was green in colour, military green actually, even though the ATSB report cites the colour as grey
- * The strobe light on front had a flash frequency of a second interval at most. It was whitish in colour, and not red, blue, or any other colour
- * The total duration of the event did not exceed 15 seconds
- * A very rough estimate of the speed of the aircraft at the time was perhaps 450km/hr, despite being on a landing approach
- * There was no radar image of the object. ASA staff saw nothing on radar
- * It definitely went past the aircraft on the left hand side
- * The pilot undertook a voluntary drug, urine test upon landing
- * He has no idea what it was, and didn't want it to happen again
- *The plane was full of passengers (capacity of 53 people)
- * No one told him, not to discuss the incident.

Perhaps the single most important difference between the pilot's account and the ATSB report is that the ATSB said the object was grey in colour, whereas the pilot said it was green, military green, in colour.

5. Similar events in the area:

A check was made for similar events from this area. Two were found:

- a. In 1998, as part of a response to an FOI request to the ATSB, one of the authors (KB) received the details of a 1998 incident. At 1515hrs on 8 November 1998, an aircraft was 28kms NW of Perth airport. The pilot reported that an unidentified flying object, bright red/orange in colour, passed 30 meters below his aircraft. It was travelling very fast, as the aircraft passed 9,000 feet. The object was estimated to be approximately 2 metres across. The pilot said he believed that the object might have been a model aircraft.
- b. The "*West Australian*" newspaper of Saturday, 18 April 2009, on page 7, ran the headline "Toy plane crashes into jet." The story was that a radio controlled model aircraft had collided with a jet, either a Virgin Blue or Qantas aircraft. Two young men had been observed operating the model some 500 metres from the runway threshold. A more detailed account appeared on page 9 of the Tuesday 21 April 2009 issue of the same paper. At 0800hrs on 17 April 2009 a model aircraft "...came within seconds of colliding with the 160 seat 737 aircraft..." The model plane was said to be 88cm long with a one metre wingspan and

weighed 850g.

6. Possible ground witnesses. Our investigation was hampered by the fact that there are currently no known UAP researchers in Perth who might have assisted with an on-the-spot investigation. The authors therefore conducted the investigation remotely (from Adelaide some 2,133 km from Perth and from Melbourne, 2,700 km away). An internet-based search for possible sighting reports by ground witnesses failed to locate any. As of 9 January 2015, no one has come forward claiming to have seen either this aerial encounter or an object of this description. No ground witnesses were mentioned in the ATSB's report, the pilot's interview, various media outlets who covered the incident, or any other sources searched by the authors. It should also be noted that although the event occurred only 23 km from Perth International airport, satellite photographs of the area reveal it is not a closely built-up suburban area but scattered bushland.

7. Additional information from the ATSB:

One of the authors (PD) communicated with the ATSB seeking additional information. Part of the ATSB's email response read:

"In this incident, the primary source of factual information was the flight crew of the aircraft involved. The aircraft had tracked from IFR waypoint ROLOB to WOORA, a heading of about 285 degrees, or WNW. After the aircraft passed WOORA, the next intended waypoint was HAIGH, a track of about 234 degrees (south-west). As the pilot in command commenced the turn, the crew sighted a strobe light tracking directly towards the aircraft. The pilot elected to turn onto a heading of 270 (or west), rather than continue the turn to the SW, to avoid the object which was on a reciprocal track. The object then passed down the left side of the aircraft.

The ATSB attempted to identify the object and its operator. However, as stated in the report, was unable to verify what the object was, where it had been launched from, or the identity of the operator. The incident was reported to the Civil Aviation Safety Authority and the Australian Defence Force."

8. ATSB Unmanned Aerial Vehicle reports:

A check of the ATSB's database located two previous reports involving UAV.

a. AO-2014-056. Near collision between an unmanned aerial vehicle and a Bell 412 helicopter, VH-WSB, near Newcastle Westpac base (HLS) NSW on 22 March 2014. 2200hrs and climbing to 1,200 feet, observed a steady white light. Helicopter then descended. Pilot noted the light made an abrupt right turn and tracked towards the helicopter. The object's rate and radius of turn indicated it was not an aircraft. "...more likely to be a small unmanned aerial vehicle..." The UAV was seen as close as 100m away and level with the helicopter.

b. AO-2013-167. Aircraft separation issue involving an Ayres S2B VH-WBK and an unmanned aerial vehicle 37km SSW of Horsham aerodrome, Victoria on 12 September 2013. At about 0930hrs EST aerial agricultural operation was occurring on a property. An operator of a UAV [sensefly eBee-178] was conducting aerial photography. The operator radioed his intention to launch a UAV. Flight of UAV was at 390 feet AGL. The UAV came near to the aircraft.

Readers interested in a review of various UAV physical and operational characteristics are referred to NARCAP Topical Review 05, 2013 by Haines and Reed (www.narcap.org).

9. Internet search results. An internet search revealed a number of reported observations of anomalous aerial objects or phenomena in early 2014 from this region NE of Perth. Collections such as MUFON, UFOIN, NUFORC and others were searched. An examination of these generally uninvestigated raw reports failed to locate any reports in the vicinity of Perth possessing the visual characteristics of the UAP reported by these witnesses. In addition, since 19 March 2014 until now (mid January 2015), despite the authors' discussion of this incident on numerous internet-based sites, no one has come forward claiming to have seen this or a similar object.

5. Discussion and Analysis

1. The "unknown" object was not picked up on primary or secondary radar from the ground. It also did not activate the aircraft's TCAS. This all suggests that the object was not a "normal" aircraft. The pilot's visual observation confirms this.

2. Was it an unmanned aerial vehicle (UAV) as suggested in the ATSB report? Civil Aviation Safety Authority (CASA) Australia Advisory circular AC101-1 provides that UAVs are permitted only up to a height not exceeding 400 feet AGL, and there are tight controls if flown in controlled airspace. Recall that the aircraft at the time was near 4,000 feet. Recall also that the Department of Defence is cited as saying that it was not operating UAVs at the time and was not aware of any UAV operations at that time. In addition, the ATSB was not able to identify any UAV operator in the area. Thus if it was a UAV, it was an illegal operation.

One of the authors (PD) telephoned two drone companies in Perth, i.e. "Coptercam" and "Altitude Imaging." Both responded in the negative when asked if current UAV are pencil shaped?

In addition, one should also note the pilot's description of the object. It was not that of a multi- rotor, circular UAV, nor of a fixed wing model aircraft, but of a military green coloured, cylindrical object with dimensions' ratio similar to a cigarette, i.e. long and thin. Note also, that the pilot did not report seeing any wings, tail, or propulsion system on the object, even though he had a close visual observation. In the opinion of the authors, the probability of the unknown object being a conventional UAV, is extremely low.

3. So, what was it? By any definition it was an "unknown object," an unidentified flying object if you will, or an example of unidentified aerial phenomena (UAP.)

Could there still be a conventional explanation, if it was not an aircraft or a UAV? Perhaps the colour and ratio of its dimensions provide a clue? Could it have been a rocket or a missile, of some kind? If so, why would such a thing have a strobe light on it? Apparent lack of wings, tail or a propulsion system would all fit this conjecture. If it was a rocket or missile, where did it come from and who launched it?

6. Conclusion

At this point, with no definite explanation, the authors consider the incident should be regarded as an example of an unidentified aerial object.

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