Rural & Regional Affairs and Transport Legislation Committee

ANSWERS TO QUESTIONS ON NOTICE

Additional Estimates 2017–2018

Infrastructure, Regional Development and Cities

Committee Question Number: 35
Departmental Question Number: SQ18-000027

Program: n/a
Division/Agency: Australian Transport Safety Bureau
Topic: Drone identification
Proof Hansard Page: 59 (26 February 2018)

Senator Alex Gallacher asked:

Senator GALLACHER: In respect of these reports that you've got, how do you identify a drone, per se? Has it got an identification number?
Mr Hood: At this stage, there's no requirement under the Civil Aviation Safety Regulations for the aircraft to have a number. In fact, in the majority of encounters it's almost impossible to identify the drone, as the aircraft takes it down the left or the right side or above or below the aircraft.
Senator GALLACHER: The drone itself is not registered with ATSB or CASA, but it's possible to identify a drone, though, isn't it, through the internet connection? You can track that back to a SIM card and, therefore, to a mobile phone, and you can track that back to an operator. Is that correct?
Mr Hood: Not really. The sequence of events for us for, let's say, an Australian commercial aircraft on descent into Sydney, which is the most likely scenario that we seem to encounter, is that the pilots may see something—and I think Senator Sterle's son or nephew—
Senator STERLE: Nephew—frightened the crap out of him!
Mr Hood: had one of these incidents where it went past so fast that it was impossible to identify, from the pilot's perspective, who the encounter was with.
Senator GALLACHER: But if it fell out of the sky and you had it in your hand you'd be able to reconstruct who was flying it?
Mr Hood: I'm sorry. Can you say that again?
Senator GALLACHER: You'd be able to reconstruct—
CHAIR: If you had the drone as an artefact in your hand—you've located it; it's landed. I think the burden of Senator Gallacher's question is: is there anything you can then do, technically, to trace back the ownership of it, or the operator at the time?
Mr Hood: I'll have to take it on notice. I'm not sure. I went to buy one myself and bought a DJI Mavic Pro, specifically for the purpose of learning a little more about the technology. We've said in our reports that it's an emerging risk, but we're having difficulty quantifying the likelihood and consequences. I've done three flights myself and, yes, it's a software application. And, obviously, your mobile phone is talking to the network, but whether you can identify that down to a person I'd have to take on notice.

Answer:

It depends largely on the Remotely Piloted Aircraft (RPA) that was recovered. Some RPAs will have details which enable us to contact the manufacturer and identify whether the product was purchased directly from them or which department store it was purchased through. Other RPA will not have any specific identification markings. There is currently no legislation that requires an RPA to be individually identifiable.

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Committee Question Number: 36
Departmental Question Number: SQ18–000028

Program: n/a
Division/Agency: Australian Transport Safety Bureau
Topic: Drones
Proof Hansard Page: 60 (26 February 2018)

Senator Slade Brockman asked:

CHAIR: I promised myself today that I wouldn't start on drones. I'm not going to express the 'drone' word. I'm all droned out for the minute. We've got to get to the end of these inquiries.
Senator BROCKMAN: It's hard to tell from the dots, but is that one at Perth Airport and one at Pearce, or—
Mr Hood: The Mallard accident in WA?
Senator STERLE: They are the RPAS models—
CHAIR: RPAS.
Senator BROCKMAN: Near encounters.
Mr Hood: I can provide you that specific detail on notice, if you like.
Senator BROCKMAN: Thank you.

Answer:

There have been 20 near encounters with Remotely Piloted Aircraft Systems (RPAS) in Western Australia since 2014. The nearest airports, which were within 25km of a near encounter, are below.

- One nearest Broome International Airport
- Two nearest Pearce Royal Australian Air Force Base
- Four nearest Perth International Airport
- 10 nearest Jandakot Airport
- Two equidistant Perth International and Jandakot Airports
- One not within 25km of an airport

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Committee Question Number: 37
Departmental Question Number: SQ18–000029

Program: n/a
Division/Agency: Australian Transport Safety Bureau
Topic: Identification of drone owners
Proof Hansard Page: 61 (26 February 2018)

Senator Barry O'Sullivan asked:

Mr Hood: We wrote back to the Civil Aviation Safety Authority in response to their discussion paper and said that markings or personal identification, of some sort, on the remote piloted aircraft system would assist the ATSB, greatly, in the conduct of its investigations.
CHAIR: I know all of my cattle have a chip in their ear.
Senator GALLACHER: It's called IMEI.
CHAIR: It worries me when you know these things, Senator Gallacher!
Senator GALLACHER: It's International Mobile Equipment Number. Are you going as far as to say that it should have that?
Mr Hood: I don't think we were specific, in relation to that. We just said identification would be very useful for the ATSB to do its job, were there to be a collision between a drone and a remotely piloted, a fixed wing aircraft.
CHAIR: Coming back to my question, my cattle have a small chip in their ear and it tells me everything I need to know, whatever volume of data I want to put in about that particular beast. Did your recommendation go as far as to suggest what technology may exist today that, in a perfect world, you'd like to see in the wreckage or the artefact of a drone if an event occurred?
Mr Hood: Not specifically. We stay at a high level, in terms of providing the solution. Technology changes every day, so what we said we want to see is an outcome which is a marking or identification of the RPAS. I suppose there are many different ways you could do that.
CHAIR: But if something is particularly damaged, that may challenge your ability to use a form of marked registration. Would you consider working up a small submission for us with respect to the latest cutting-edge technology? I know now in police surveillance you can put a little pad the size of a pinhead on a car and follow it up to 30 kilometres away. The technology's there.
Mr Hood: As an action on notice, we'll look at that for the committee.
CHAIR: I think we'd appreciate that.
Senator GALLACHER: Right on that point, you say technology changes all the time but every mobile phone in the world has an IMEI number. Most of these drones will be operated by some sort of technology like that chip or the chip that's in here. Why wouldn't you, by extension, issue these drones with an International Mobile Equipment Identity number? They're buzzing around planes, for goodness sake.
Mr Hood: That's not an issue for us but for the regulator. But if that's a solution and if that's the best solution—
CHAIR: Mr Hood, when you get involved in one of these you get a mop in one hand and a bucket in the other. What we're trying to anticipate is, if there is to be some root-and-branch regulatory change around this or a whole-of-policy adjustment about what might happen, I know that we would find it useful if you and your investigator said, 'Look, in the perfect world, it would be great if you would consider any one of these options as way of anticipation that we'll have an event.'
Mr Hood: Thank you. I'm not a technologist but I do have an organisation that has a number of technologists with it—
CHAIR: I was hoping you did.
Mr Hood: and I will undertake to provide the committee, on notice, with a response to that.

Answer:

To maintain the ATSB's independence from the regulatory process, the ATSB only provides commentary on regulatory issues that relate to its ability to perform its functions in accordance with the *Transport Safety Investigation ACT 2003.* In this capacity, the ATSB provided comment to CASA's discussion paper – *review of RPAS operations*, commenting that the display of registration details would assist the ATSB in identifying the owner of Remotely Piloted Aircraft (RPA) involved in accidents.

While the ATSB will not recommend a specific method for identification of RPA, the Unmanned Aircraft Systems (UAS) Identification and Tracking Aviation Rulemaking Committee (ARC), established by the United States Federal Aviation Administration published a recommendations final report[1] on 30 September 2017, which identified various technologies to assist in the identification of UAS:

1. Automatic Dependent Surveillance Broadcast (ADS-B): Two alternatives are discussed related to a rule-compliant version (i.e. adheres to current ADS-B rules/standards on licensed ADS spectrum) and a lower-power alternative that leverages the message, protocols, and frequency but uses a significantly lower transmit power to address concerns about potentially overwhelming existing ADS-B services.
2. Low-Power Direct Radio Frequency (RF): Includes a variety of RF based protocols leveraging unlicensed spectrum including Bluetooth, WiFi, RFID, and others.
3. Networked Cellular: Leverages the existing cellular network and network-connected devices on licensed spectrum.
4. Satellite: Leverages existing satellite tracking services.
5. SW-based Flight Notification with Telemetry: Leverages existing and developing UAS services that enable UAS operators to exchange operational information during flight. Depends upon a network connected device coupled with a ground control station that many small UAS operators use today.
6. Unlicensed Integrated C2: Modulates ID and tracking packets on existing C2 communication channels on unlicensed spectrum.
7. Physical Indicator: Consists of unique and categorical physical markings (e.g. etched numbers, streamers) that will need to be visually observed. Some concepts do not provide remote identification.
8. Visual Light Encoding: Leverages software controlled LEDs to digitally encode information that can be decoded by a device connected to a visual sensor.

The ARC made several lengthy recommendations in relation to evaluating the feasibility and affordability of available technical solutions, and determining how well those technologies address the needs of the law enforcement and air traffic control communities. They can be found in the recommendations section of the report. It is important to note that consensus was not reached in relation to the applicability threshold for ID and tracking requirements.

While the cellular technologies mentioned above may be able to track devices equipped with this technology, DJI unmanned aircraft (UA), which are a popular brand of UA in Australia, do not contain cellular hardware and therefore do not have an IMEI[2] number. The portable devices (iPads and tablets) used to operate the UAS often do not have cellular hardware (WiFi only) either. DJI estimates that 40 per cent of small UAS operators are not connected to the internet during flight.

DJI have instead, developed a device capable of localized identification of airborne DJI UA. The equipment is currently in-use at two major fixed sites (airports). A portable version of this equipment also exists. This technology leverages the C2[3]/Video radio transmission signal, operating in the ISM[4] band. DJI have also proposed that industry should reach a consensus on an open protocol that would allow localized identification of all drones.

In regards to the identification of the wreckage of a UA, physical markings and electronic identification are both susceptible to damage associated with impact velocity, post-impact fire, and water damage.

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[1] https://www.faa.gov/regulations_policies/rulemaking/committees/documents/index.cfm/document/information/documentID/3302
[2] International Mobile Equipment Identity (IMEI) is a unique number used to identify devices on cellular (GSM) networks
[3] Command and Control
[4] Industrial, Scientific, and Medical

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Infrastructure, Regional Development and Cities

Committee Question Number: 38
Departmental Question Number: SQ18–000030

Program: n/a
Division/Agency: Australian Transport Safety Bureau
Topic: Pel-Air report
Proof Hansard Page: 62–63 (26 February 2018)

Senator Rex Patrick asked:

Senator PATRICK: Or ever on that vessel? Thank you very much, that's very helpful. I'd like to move to the Pel-Air report that came out in November, quite a voluminous report. In reading that report—and obviously this is a second attempt at that report—there were some things that struck me. I've got a PPL licence, but I won't call myself an expert. A lot of the report focused on fuel management. It's my understanding that when the pilot in command left the east coast of Australia to fly to Samoa, to Apia, he had enough fuel onboard to divert if Norfolk weather had closed in. On the way back, because of the distances involved, he only had 87 per cent fuel. But had he had 100 per cent, it would have made no difference in terms of his ability to divert once he'd arrived on the scene in Norfolk. Would you agree with that assessment?

…

Senator PATRICK: Sure. Where I'm going with this, just to be completely transparent with you, is that I understand that there have been a whole range of different changes that have resulted from this report; however, weather didn't seem to get a lot of focus in the report. And yet we've seen situations in 2013 where we had a Virgin aircraft and a Qantas aircraft land at Mildura with basically no opportunity for go-round because they'd run out of fuel. We had a situation on Lord Howe where someone on the ground wanted or was able to provide weather information to inbound aircraft but was prohibited because CASA wanted them to do a $20,000 training course—and this is just someone who's a volunteer. Where I'm going to with this—and we have talked with the committee on this—is that weather didn't seem to feature prominently in the report. In fact, it's my understanding that the title of the draft report that came out talks about fuel management and weather, but in the first report weather wasn't mentioned in the title. Just going back to my original question, it's my understanding that, had the pilot in command had 100 per cent fuel in the tanks, it would have made no difference to the outcome other than that he perhaps could have had a few more attempts at landing before he ditched. Would that be fair?

Mr Hornby: We're happy to take any questions on notice in relation to the technical elements of the report. As Chief Commissioner Hood mentioned, the investigator in charge is based in Brisbane, but we can take that on notice. But in the report itself it said that, if there had been maximum fuel on board and he had reached Norfolk Island, there would have been opportunities to make other decisions and spend more time.

Answer:

The analysis on page 298–299 of the ATSB report 'Fuel planning event, weather-related event and ditching involving Israel Aircraft Industries Westwind 1124A, VH-NGA, 6.4km WSW of Norfolk Island Airport, on 18 November 2009 (AO-2009-072)' addresses the question:

"…if the flight had departed with full fuel on this occasion, this would not have provided for alternate fuel given the upper-level wind conditions that existed on the night of the accident.

…

Nevertheless, departing with full fuel would have significantly reduced the risk associated with the flight. In general terms, extra fuel will:

- allow a flight to proceed closer to the destination aerodrome before the flight crew need to make a decision regarding a diversion, reducing the time and therefore the risk of weather or other conditions changing between the point of no return (PNR) and arriving at the aerodrome
- if the flight is continued to the destination aerodrome, allow the flight crew to have more time at or overhead the aerodrome to hold and consider the available options and/or wait for weather conditions to improve.

On this occasion, if the crew had departed Apia with full fuel, it is likely they would have arrived at the top of descent point with at least 2,400 lb, which is 1,040 lb more fuel than on the accident flight (see also *Considerations regarding access to RVSM flight levels*). This was sufficient fuel to divert to Noumea, New Caledonia or Auckland, New Zealand at that point. Given the weather reports at that time were consistently stating cloud was below the landing minima at Norfolk Island, it is very likely the crew would have diverted. Alternatively, arriving at the top of descent with about 2,400 lb would have allowed the crew to descend, conduct an instrument approach, hold at about 2,300 ft for about 60 minutes and then conduct another approach."

Further information related to this topic is also provided on pages 155–156 and the last paragraph on page 296 of the ATSB report.

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Infrastructure, Regional Development and Cities

Committee Question Number: 39
Departmental Question Number: SQ18–000031

Program: n/a
Division/Agency: Australian Transport Safety Bureau
Topic: Safety action taken by BOM
Proof Hansard Page: 64 (26 February 2018)

Senator Rex Patrick asked:

Senator PATRICK: There was a recommendation made, I believe in 2001, in an ATSB report that weather forecasting be improved at Norfolk. My understanding is that that wasn't actioned, and there's still no action in relation to that. Is something happening on that?
Mr Hornby: There was some safety action at Norfolk Island that the BOM did take, I understand, after the Senate inquiry—I think it was in 2012—regarding this investigation. The BOM did take some safety action to put in place new infrastructure there. So there was some safety action taken.
Senator PATRICK: Could you provide me with that, perhaps on notice?
Mr Hornby: It's in the report. Safety action is towards the back.
Mr Hood: We're still happy to provide that on notice.

Answer:

Safety action was taken by the Bureau of Meteorology (BoM) following the ATSB's February 2000 safety recommendation and further action has been taken since that time.

Page 303 of the ATSB Report 'Fuel planning event, weather related event and ditching involving Israel Aircraft Industries Westwind 1124A, VH-NGA, 6.4km WSW of Norfolk Island Airport 18 November 2009 (AO 2009-072), provides a summary of some of the action following the recommendation made in the February 2000 report:

> *"Unforecast low cloud had previously been identified as an issue for aircraft arriving at Norfolk Island in 1999. BoM subsequently initiated several activities to improve its forecasting ability, including the installation of a weather radar, ceilometer and visibility meter, access to minute-by minute data, and the introduction of processes to ensure forecasters were provided with more timely information on discrepancies between observations and forecasts.*
>
> *These changes improved BoM's capabilities for forecasting at Norfolk Island. Data from BoM's TAF verification system indicated forecasting reliability improved from 2003 to 2009. Data from ATSB's predictive weather analysis algorithm indicated that in 2009 there were 296 hours of conditions below the landing minima for a Category C aircraft (such as a Westwind), which equated to 3.4 per cent of the total time. However, unforecast weather below the landing minima (that is, where the TAF was forecasting conditions above the alternate minima) was rare, occurring for a total of 10.5 hours or 0.12 per cent of the time. Overall, the amount of unforecast weather below the landing minima was comparable to the average for remote islands and capital city airports (average of 0.13 per cent per year).*
>
> *This relatively low level of unforecast weather appeared to be due at least in part to BoM using a more conservative approach to forecasting at remote islands compared to capital city airports, consistent with the difficulties in forecasting at such locations. Such an approach is also compatible with the inherent risk of operations to remote locations."*

Detailed information is at:

- Pages 80–86 which address the reliability of forecasting at Norfolk Island, including action taken by by BoM during 2000–2004 (see page 82).
- Pages 381–383 which provide details of the changes associated with forecasting at Norfolk Island for the period from 2010 to the release of the ATSB re-opened investigation report.