Centre for Air Power Studies (CAPS)
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THE VANISHING AIRLINERS

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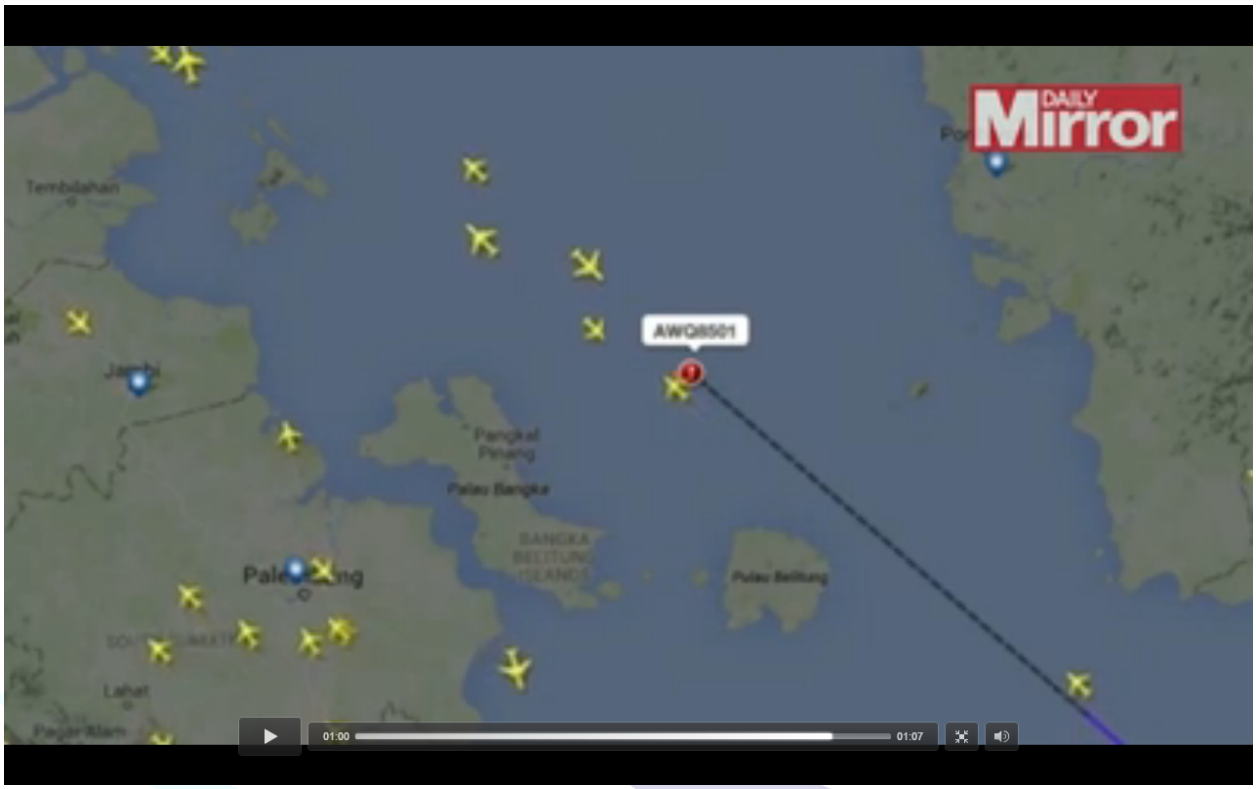
Another civil airliner, Flight QZ8501 of Air Asia, vanished and the world was none the wiser even after 48 hours of its disappearance; it seemed to have been swallowed up somewhere! Coming on the heels of the disappearance of another Malaysian international flight MH 370 this year, questions were obviously being raised about airline safety. But another murmur that was heard loud and clear in the media was that in the modern day, when one can track one's small cell phone with technology, why was it that an aircraft could just disappear and remain untraceable for so long? The answer to this genuine doubt would flow from knowing about the systems and procedures in place in the civil aviation industry to ensure tracking of aircraft. Well, to put it plainly, there is a system, but events have proven that though reliable, it is not fool-proof. The technique by which an aircraft is tracked in flight is covered in subsequent paragraphs.

Automatic Dependent Surveillance - Broadcast

The ADS-B automatically transmits the height, speed, location and other vital parameters of an aircraft's flight in a broadcast mode. This is relayed via satellite to a ground station and displayed on screens in the air traffic control centre. Many websites take this feed and webcast this information on a continuous basis; an example is www.flightradar24.com . A screenshot of the ADS-B picture when AirAsia flt QZ8501 stopped painting on the screen is given below: -



http://www.mirror.co.uk/news/world-news/missing-airasia-plane-qz8501-watch-4888367

An ADS-B capable aircraft is equipped with an accurate GPS whose data is taken by a Mode S transponder and transmitted in a broadcast mode. This implies that a ground station equipped to receive this data can process the information and keep a continuous watch on the aircraft. When another aircraft (suitably equipped) gets this information, it is able to see the transmitting aircraft's position and vital flight information, which enhances the situational awareness of the aircrew. AirAsia flight was also being tracked in a similar manner, as the radar snapshot above shows. Notice the large number of aircraft in the air at that time. So what happened next?

It is known now that the aircrew was encountering bad weather and the pilot had requested a deviation in track and a climb to 38,000 feet from its cruising altitude. While the deviation was accepted immediately by the ground control, climb authorization could not be given due other traffic in the vicinity. When the traffic cleared, ground control authorised a climb to 34,000 feet, a call that was not acknowledged by the aircraft.

As this is being written, aircraft debris and some bodies have been found around 10 miles away from the last radar position of the aircraft. It can be assumed that bad weather could have a contribution in this accident. Was the aircraft hit by lightening resulting in a catastrophic break-up? But all aircraft are constructed, and tested, to withstand a lightening strike. Or did the pilot reduce his speed seeing the

weather in front in an attempt to gain time, while waiting for clearance to climb? Some press reports indicate that the aircraft speed was indeed very slow - - 125 mph, as reported in an article in Time magazine, which hints that possibly at that low speed a downdraft could have stalled the aircraft![i] But can such a modern aircraft, with a multitude of warnings and safety features, get into a stall? These are all questions that the board of enquiry would look into. Since the aircraft crash site has been located one hopes that the Flight Data Recorder (which records hundreds of vital flight and system parameters) and Cockpit Voice Recorders would also be found. These would give answers to two other vital questions: -

(a) Why was there no May Day call from the crew even though the aircraft crashed from an altitude of 34,000 feet? Surely, there was enough time available; however, one must remember that pilots of Air France Flight 447 also could not give a radio call when their A-330 aircraft (another very modern and sophisticated one) crashed into the Atlantic on 31 May 2009 from an altitude of 38,000 feet. In their case, as subsequent investigations showed, the aircraft had stalled and the crew was basically engrossed in recovering the aircraft. In an eerie similarity, the French aircraft was also in a bad weather zone and the accident was due to icing over of the pitot tubes that measure air speed. The blocking of the tubes gave a false reading of zero speed to the computers, which then automatically disengaged the auto-pilots and transferred the aircraft into a manual mode of flying - - which the crew were not accustomed to.[ii]

(b) Why did the FDR and CVR beacons of the AirAsia flight not get activated on hitting the water? Each of these vital equipment carry g-activated and sea water activated switches which should have made known their position almost in real time. Unfortunately, a similar situation was also encountered in the Air France flight and the crash site was found only after two days, with the FDRs and CVRs being recovered after two years from a depth of 13,060 feet![iii]

Post the disappearance of MH370, IATA had set up an Aircraft Tracking Board to come up with ideas so that no other aircraft would ever vanish, akin the Malaysian airliner. That Board has yet to give its recommendations, but one idea doing the rounds (and this had come up post the Air France crash too) is to have deployable FDRs and CVRs.[iv] Deployable FDRs have an aerofoil that is released on a crash and makes the recording device 'fly away' from the crash site by hundreds of feet to save it from being crushed or getting burnt in a post-crash fire; if the crash is on water, the aerofoil can float indefinitely – in both cases, an integral emergency locator transmitter starts transmitting on the distress frequency for recovery.[v]

It is too early to conjecture the reasons for the Air Asia crash, the clues to which lie in the FDR and CVR. All that can be said at present is that a perfectly serviceable aircraft, with aircrew who were alive to the presence of bad weather, has been lost. What is equally bad is that it has taken more than two days to spot the wreckage, despite knowing very accurately where contact was lost. And lastly, as per last reports, the FDR and CVR have yet to be traced; one hopes that this time, unlike in the Air France case, they are found speedily.

(Disclaimer: The views and opinions expressed in this article are those of the author and do not necessarily reflect the position of the Centre for Air Power Studies (CAPS)

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[i] http://time.com/3648954/airasia-flight-8501-air-france-flight-447/
[ii] A fascinating, but very poignant, re-construction of the final moments of that Air France Flt 447 is available at http://www.vanityfair.com/business/2014/10/air-france-flight-447-crash
[iii] http://en.wikipedia.org/wiki/Air_France_Flight_447
[iv] https://www.iata.org/pressroom/Documents/aircraft-tracking-task-force-faqs.pdf
[v] http://www.iasa.com.au/folders/Publications/pdf_library/austin.pdf