

# Implications from the Reunion Debris found July 29, 2015

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## First the facts:

1. The debris was found July 29, 2015 on the NE shore of Reunion Is., ~1975 NM from the ATSB and IG 7<sup>th</sup> ARC crossing points.
2. A number reported to have been found on the debris (657BB) is consistent with a Boeing B777 aircraft wing part.
3. Public photos and video of the debris are consistent with drawings for the right Flaperon.
4. The leading edge of the Flaperon as very little damage.
5. The trailing edge of the Flaperon has significant damage. Part of the flaperon along the trailing edge is missing and the edge is ragged (looks to be “torn”, not broken off due to bending)

## Discussion:

As of today, it has not been reported that the serial number on the debris matches the log book. The aircraft S/N has been reported to be 28240 for MH370. However, only 5 B777s have ever crashed, and none except MH370 crashed in the Indian Ocean. Therefore, it is reasonable to assume (for now) that the debris is from MH370, and that this will be confirmed by serial number match within the next 24-48 hrs.

Various ocean current drift models provide some confirmation that it is possible for debris from a range of starting locations along the 7<sup>th</sup> ARC to have ended up at Reunion Is. 16-17 months later. However, the accuracy of reverse ocean drift models limits what can be inferred about the exact starting location. Starting locations along several hundred miles of the 7<sup>th</sup> ARC could be consistent with the end location at Reunion Is. Thus, these drift models may eliminate some general areas of the Indian Ocean as starting points (i.e., far northern locations), but they cannot provide a precise starting point. The Inmarsat data continues to provide the best evidence for that. Further drift modelling may help reduce the uncertainty.

OTOH, the condition of the Flaperon evident in photos and videos made public provide valuable clues about what might have happened in the final minutes of the flight, regardless of where the plane crossed the 7<sup>th</sup> ARC before impact. This in turn provides valuable information about the post-fuel-exhaustion flight path, and distance from the 7<sup>th</sup> ARC to POI.

The trailing edge damage (#5 above) could *conceivably* be the result of two possibilities:

- Separation of the trailing edge due to contacting the water with the Flaperon in a down position, consistent with slow flight configuration for landing, or banking at the time of impact
- Separation of the trailing edge due to high speed flutter at some unknown altitude above the ocean, followed within seconds by separation to the Flaperon from the wing, both prior to the main aircraft impact.

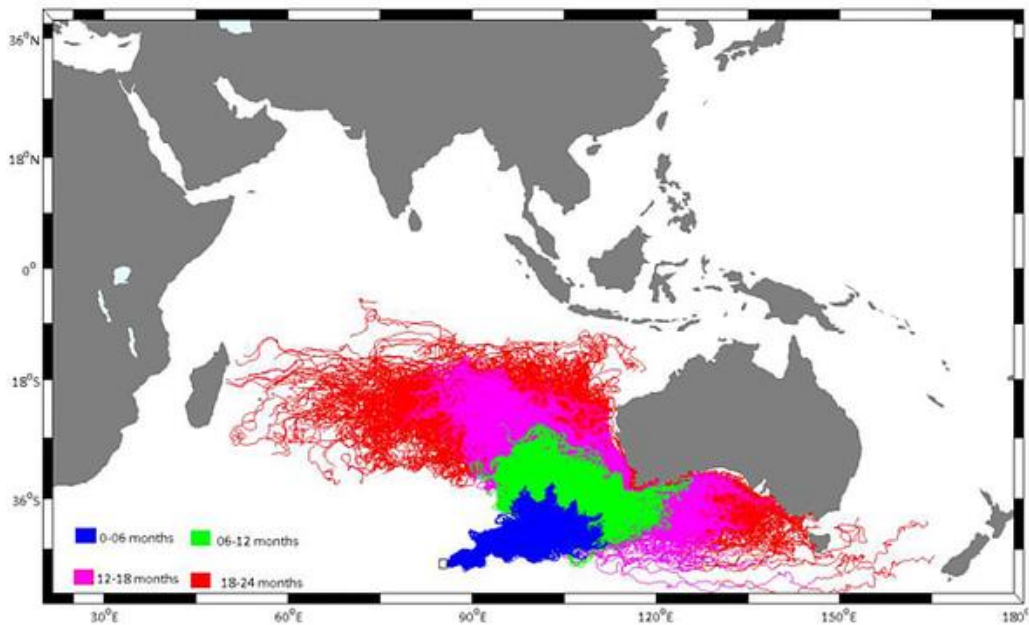
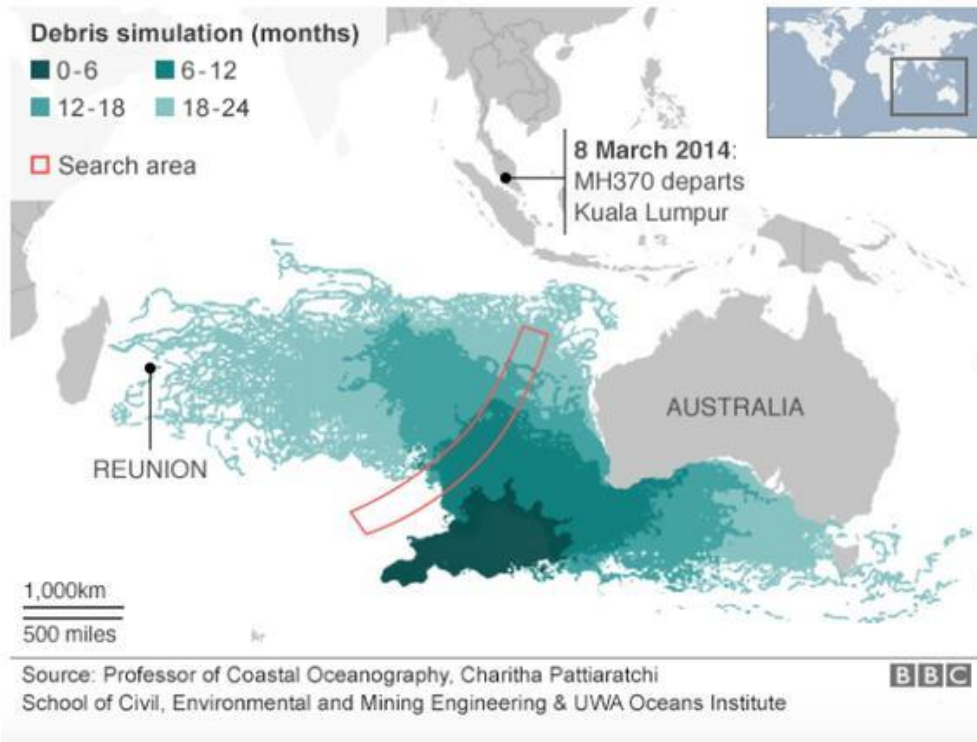
However, the lack of leading edge damage points to the second scenario only. If the Flaperon was on the aircraft when the aircraft contacted the water, it is very likely that there would be some compression damage on the leading edge. But there is virtually no apparent compression damage. This is much more consistent with the Flaperon being “torn” from the wing while in high speed flight (forced rearward by the airflow). In addition, the ragged tear along the trailing edge is indicative of flutter induced stress and ultimate fatigue failure, not a break off due to high bending moments at impact.

If the Flaperon separated from the aircraft while still in flight, it indicates an in-flight breakup, most likely due to very high speeds, flutter and perhaps loss of hydraulic/electrical power to the Flaperon actuator post fuel exhaustion. This scenario is consistent with the steep, spiral descent observed in the B777-200 simulator. If the in-flight separation is confirmed, it would reduce the likelihood that the plane flew on any significant distance past the 7<sup>th</sup> ARC as some have speculated, and reinforce the theory that the POI is relatively close to the 7<sup>th</sup> ARC.



Debris found on Reunion Is. The shape, dimensions and P/Ns found on debris are consistent with a wing component from a B777 airplane, most likely the right “Flaperon” from MH370.

## Simulation of where debris in search area could end up



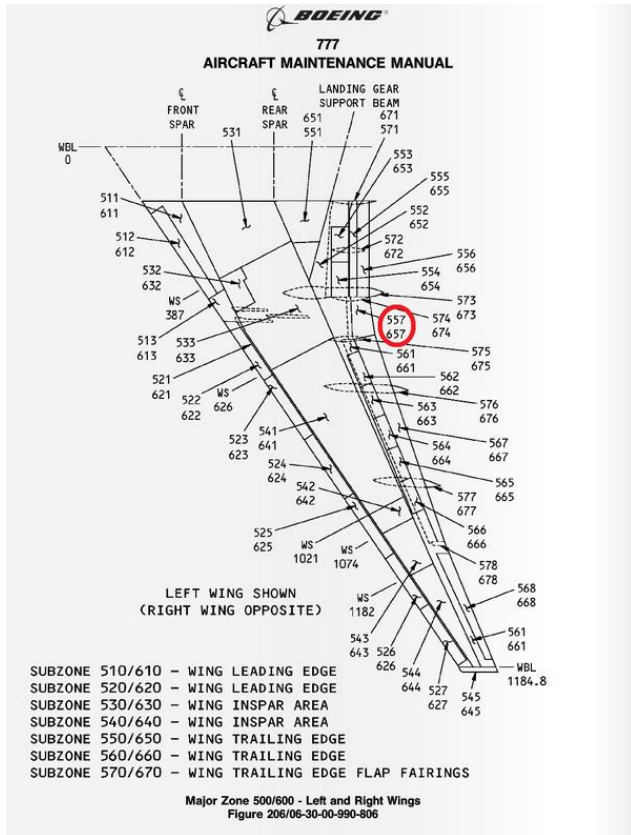
Various drift models (there have been many) tend to suggest that debris from a crash site along the 7<sup>th</sup> ARC could have reached Reunion in ~16-18 months.



Left end of Right Flaperon (to be verified by serial number). Note lack of damage to leading edge.



Right end of Right Flaperon (to be verified by serial number). Note actuator control horn has been torn away from the Flaperon.



**777 AIRCRAFT MAINTENANCE MANUAL**

(Continued)

SubZone	Zone	Zone Name
650		Wing Trailing Edge - Aft of Rear Spar - Inboard of Outboard Trailing Edge Flap
	651	Rear Spar to Landing Gear Support Beam - Right Wing
	652	Landing Gear Support Beam and Rear Spar to Wing Trailing Edge - Right Wing
	653	Spoiler No. 8
	654	Spoiler No. 9
	655	Right Wing Inboard Main Flap
	656	Right Wing Inboard Aft Flap
	657	Right Wing Flaperon
660		Wing Trailing Edge - Aft of Rear Spar - Outboard of Flaperon
	661	Rear Spar to Trailing Edge - Outboard of Flaperon - Right Wing
	662	Spoiler No. 10
	663	Spoiler No. 11
	664	Spoiler No. 12
	665	Spoiler No. 13
	666	Spoiler No. 14
	667	Right Wing Outboard Flap
	668	Right Wing Aileron
670		Wing Trailing Edge Flap Fairings
	671	Flap Support Fairing No. 5
	672	Inboard Flap Center Track Fairing - Right Wing
	673	Flap Support Fairing No. 6
	674	Inboard Flaperon Support Fairing - Right Wing
	675	Outboard Flaperon Support Fairing - Right Wing
	676	Flap Support Fairing No. 7
	677	Flap Support Fairing No. 8
	678	Outboard Auxiliary Support Fairing - Right Wing

Boeing drawings and PN table indicate the number BB670 and 657BB (both have been reported) are consistent with the B777 wing.

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