



THE MALAYSIAN ICAO ANNEX 13 SAFETY INVESTIGATION TEAM FOR MH370



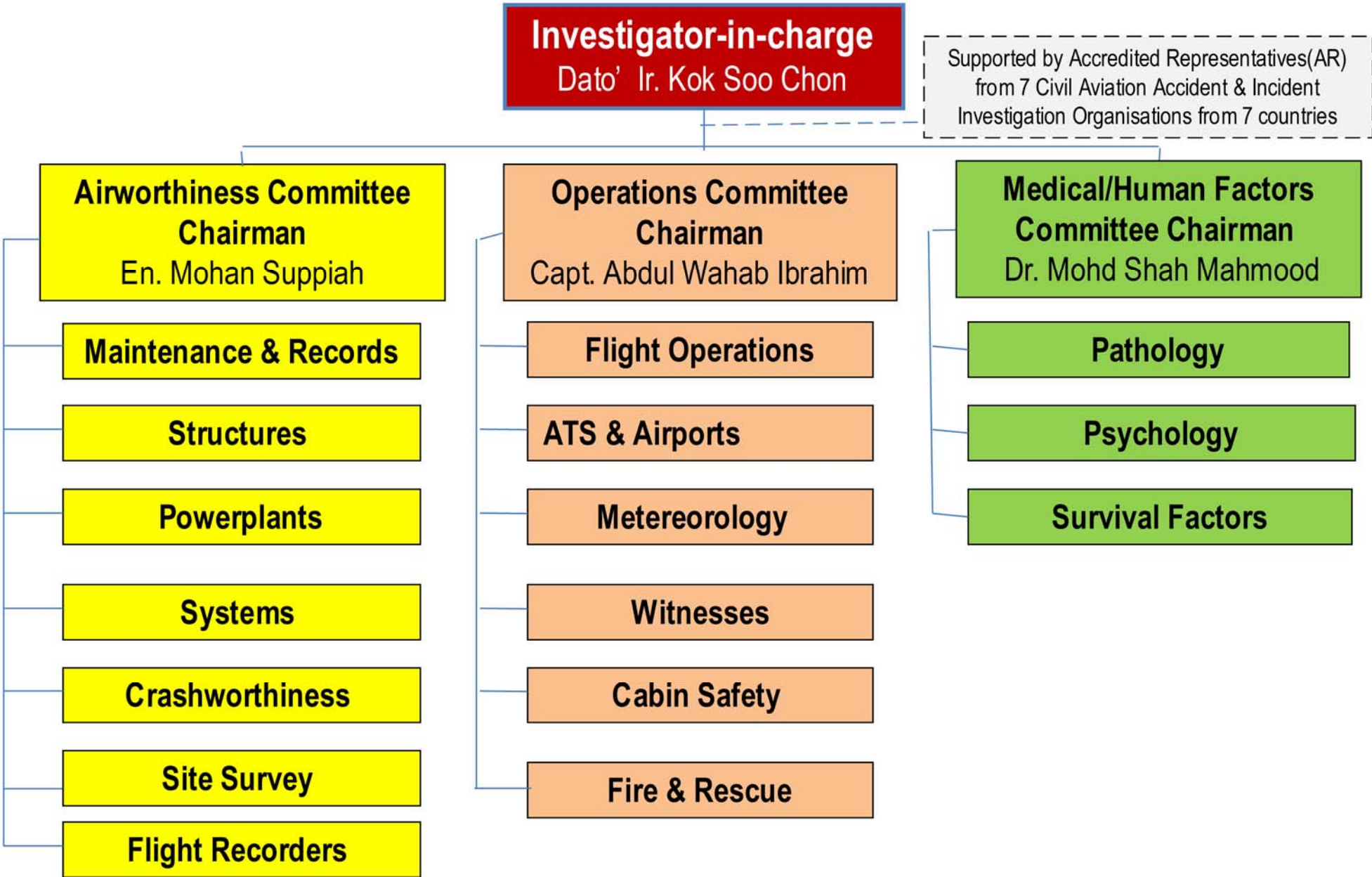


ESTABLISHMENT OF THE MALAYSIAN ICAO ANNEX 13 SAFETY INVESTIGATION TEAM FOR MH370

- 19-member team established on 25th April 2014 as a result of the disappearance of MH370 on 8th March 2014
- Appointment of members of Investigation Team by Minister of Transport Malaysia under Regulation 126(1) of the Malaysian Civil Aviation Regulations (MCAR) 1996
- Team comprises of professionals and experts in the fields of civil aviation, airlines and medical field
- Team supported by seven accredited representatives (AR) from seven international air accident investigation organisations



ORGANISATION OF THE MALAYSIAN ICAO ANNEX 13
SAFETY INVESTIGATION TEAM FOR MH370





TEAM SUPPORTED BY ACCREDITED REPRESENTATIVES (AR)
FROM 7 INTERNATIONAL CIVIL AVIATION ORGANISATIONS/BUREAUS/BOARDS
OF SEVEN COUNTRIES

No.	Country	Organisation
1.	Australia	Australian Transport Safety Bureau (ATSB)
2.	China	Civil Aviation Administration of the People’s Republic of China (CAAC)
3.	France	Bureau Enqueteet. d’Analyses pour la securite d l’aviationcivile (BEA)
4.	Indonesia	National Transportation Safety Committee (NTSC)
5.	Singapore	Transport Safety Investigation Bureau (TSIB)
6.	United Kingdom	Air Accidents Investigation Branch (AAIB)
7.	United States of America	National Transportation Safety Board (NTSB)



INVESTIGATION BY THE ANNEX 13 TEAM



1. ICAO Annex 13 Safety Investigation Team Focus is only on SAFETY INVESTIGATION
2. Search is led by ATSB of Australia
3. Criminal Investigation by the Royal Malaysian Police
4. However information is shared by all 3 parties



INVESTIGATION BY THE ANNEX 13 TEAM



- All Findings based on facts, available information and Objective Evidence
- Do not rely on Conspiracy theories, however credible evidence produced will be addressed further analysed if relevant
- Without Main Wreckage of aircraft and Flight Recorders there is significant lack of vital evidence to the Investigation
- After release of Final Report, with new credible evidence the Investigation will be re-opened as per ICAO requirements



PROGRESS OF INVESTIGATION



1. 1st Interim Statement and Factual Information released on 8th March 2015
2. 2nd Interim Statement released on 8th March 2016
3. 3rd Interim Statement released on 8th March 2017 together with updated Summary of Debris and Debris Examination Reports
4. Final Report will be ready by end of 2017
 - Will expand on Factual Information
 - Will Include Analysis, Findings/Conclusion & Recommendations



FOCUS OF ANALYSIS IN FINAL REPORT



1. Diversion from Filed Flight Plan Route
2. Air Traffic Services Operations
3. Flight Crew Profile
4. Airworthiness & Maintenance and Aircraft Systems
5. Satellite Communications
6. Wreckage and Impact Information
7. Organisation & Management Information on Department of Civil
Aviation Malaysia and Malaysia Airlines
8. Aircraft Cargo Consignment



BRIEF ON FACTUAL INFORMATION



History of Flight

On 8 March 2014, MH370, a Boeing 777-2H6ER registered as 9M-MRO operated by MAS departed KLIA at MYT 0042 to Beijing, China

Captain ordered 49,100 kilograms (kg) of fuel for the flight that gave an endurance of 07 hours and 31 minutes including reserves. The planned flight duration was 05 hours and 34 minutes.

- 0046:39 ATC transferred MH370 to Lumpur Radar
- 0050:08 ATC cleared MH370 to climb to FL 350
- 0101:17 MH370 reported maintaining FL350
- 0119:26 Lumpur Radar instructed MH370 to contact Ho Chi Minh on frequency 120.9MHz,
- 0119:30 Acknowledged with *“Good night Malaysia Three Seven Zero”*.
This was the last recorded radio transmission from MH370.
- 0120:31 KLATCC Observed MH370 passing waypoint IGARI on Radar Screen.
- 0121:13 Radar Label for MH370 disappeared from the Radar Screen and went missing



History of Flight

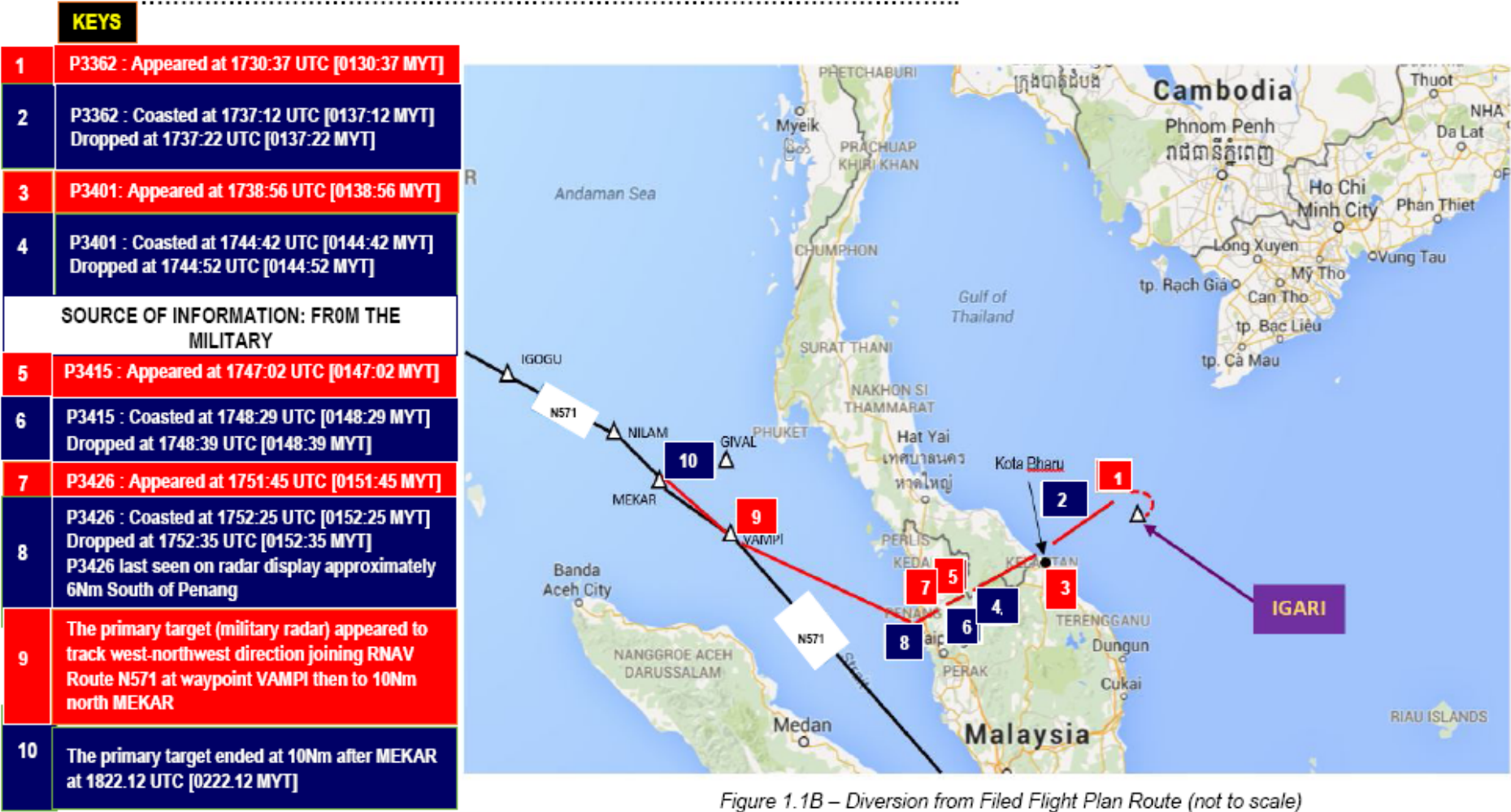


Figure 1.1A - Chronological Sequence of Events of Disappearance of MH370

Keys	
No SSR radar symbol on the Flight Plan Route	
SSR Transponder was not serviceable	
9	3.2Nm after passing IGARI at 1721:13 UTC [0121:13 MYT]. The radar position of MH370 dropped off
8	MH370 Mode S symbol dropped off at 1720:36 UTC [0120:36 MYT]
7	MH370 over waypoint IGARI at 1720:31 UTC [0120:31 MYT]
6	KL ATCC transferred MH370 to HCM ATCC at 1719:26 UTC [0119:26 MYT]. 8.6 Nm to waypoint IGARI. MH370 acknowledged KL ATCC instruction to contact HCM ATCC with 'GOOD NIGHT MALAYSIAN THREE SEVEN ZERO' at 1719:30 UTC [0119:30 MYT]
MH370 reported again maintaining FL350 at 1707:56 UTC [0107:56 MYT]	
5	MH370 maintaining FL350 at 1701:17 UTC [0101:17 MYT]
4	MH370 climbing to FL350 at 1650:11 UTC [0050:11 MYT]
3	MH370 climbing to FL250 at 1647:03 UTC [0047:03 MYT]
2	MH370 climbing to FL180 at 1643:01 UTC [0043:01 MYT]
1	Lumpur Tower cleared take-off at 1640:37 UTC [0040:37 MYT] and MH370 departed at 1642 UTC [0042 MYT]



History of Flight





History of Flight

- Extensive work done by the MH370 Search Strategy Group, coordinated by Australian Transport Safety Bureau (ATSB)
- Signals transmitted by the aircraft's SATCOM indicates aircraft continued to fly for several hours after loss of contact
- Analysis showed aircraft changed course shortly after it passed the northern tip of Sumatra (Indonesia) and travelled in a southerly direction until it ran out of fuel in the southern Indian Ocean
- Details of this work can be found in ATSB's report: AE-2014-054 dated 26 June 2014, and later updates
- Available at ATSB's website: <http://www.atsb.gov.au>



Crew Members

- No significant issues noted on flight and cabin crew based on history and CCTV recordings
- Crew Licences valid
- No Long term medication or chronic medical illness
- No significant changes in lifestyle, interpersonal conflict or family stresses
- No adverse behavioural signs



Aircraft Maintenance

- Aircraft maintenance history does not show significant defects or trend
- All scheduled checks conducted per requirements
- No significant defects prior to departure
- All Mandatory Instructions complied with
- However Flight Data Recorder – Underwater Locator Beacon (ULB) battery had expired. All other maintenance records satisfactory including Cockpit Voice Recorder ULB
 - Battery is only for the Beacon – does not affect Flight Recorder operation



Emergency Locator Transmitter (ELT)

- No ELT signals received by Search and Rescue Agencies or other aircraft
- ELT signals are not detectable when submerged in water
- ICAO accident records over the last 30 years reviewed
- Review indicates that of the 257 accidents, only 39 cases recorded effective ELT activation.
- ELTs were carried in 173 of these cases.
- Implies that of the total accidents in which ELTs were carried, only 22.5% of the ELTs operated effectively



Communications

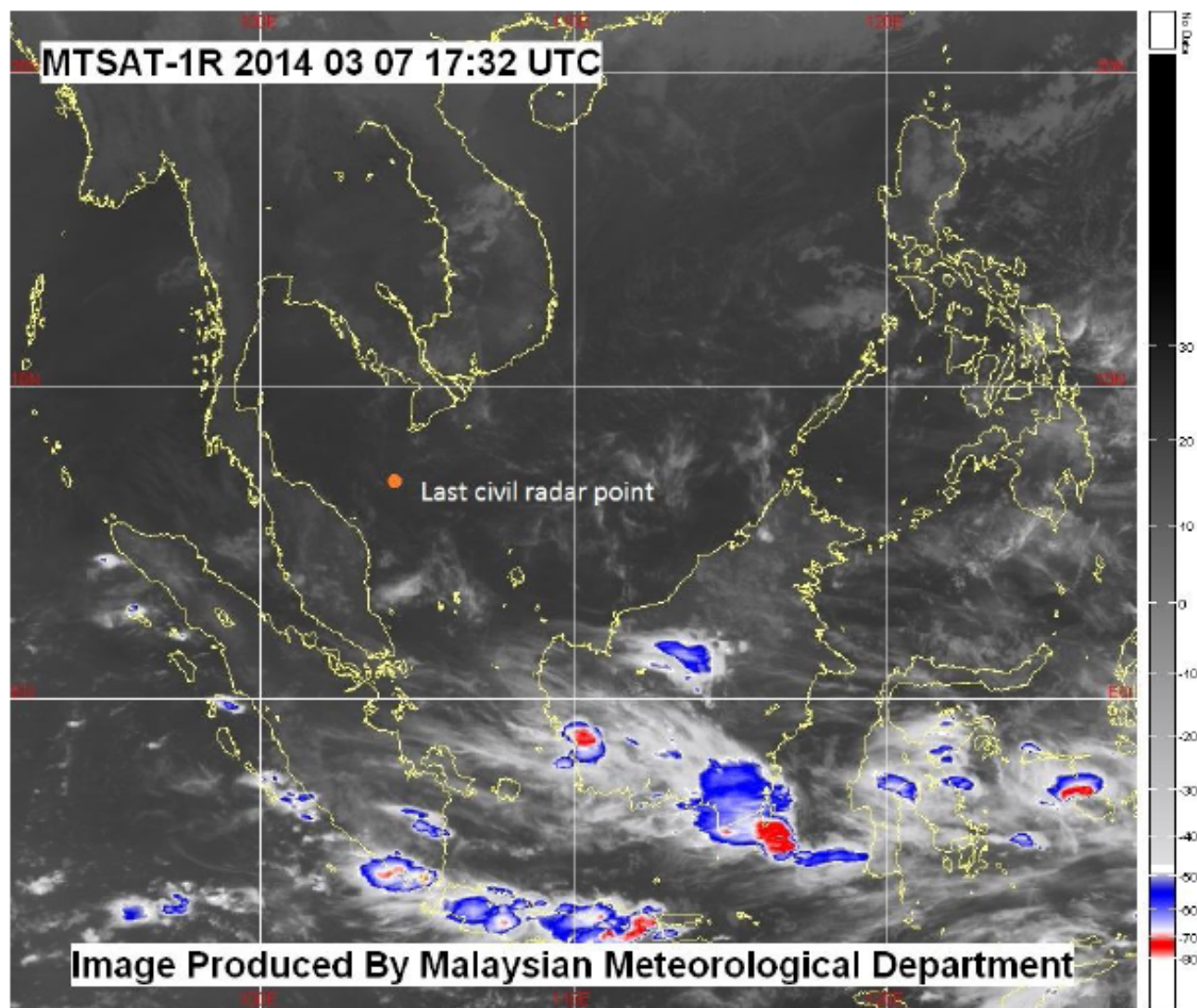
- Transponder operating satisfactorily until 0121:13 MYT
- System can be deactivated by Circuit Breakers in Cockpit or by selecting Transponder switch to 'STBY'
- ACARS position reports supposed to be transmitted every 30 minutes
- However only the 1st Position report was transmitted through SATCOM – at 0107:29
- From 0225 to 0811 SATCOM link was available but not for Voice or other data services
- There were 2 power interruptions to SATCOM – one at 0225 and the other at 0819. Reason unknown for 1st power interruption. 2nd power interruption due to both engine shutdown due to fuel exhaustion and restarting of APU



SATCOM Handshakes

SATCOM TRANSMISSIONS		TIME	
		UTC	MYT*
1	Aircraft departed KLIA	1642	0042
2	Last ACARS transmission	1707	0107
3	1 st handshake – log-on initiated by the aircraft	1825	0225
4	Unanswered ground-to-air telephone call	1839	0239
5	2 nd handshake initiated by ground station	1941	0341
6	3 rd handshake initiated by ground station	2041	0441
7	4 th handshake initiated by ground station	2141	0541
8	5 th handshake initiated by ground station	2241	0641
9	Unanswered ground-to-air telephone call	2313	0713
10	6 th handshake initiated by ground station	0010*	0810
11	7 th handshake – log-on initiated by the aircraft	0019*	0819
12	Aircraft did not respond to 'handshake' from Satellite Earth Ground Station	0115*	0915
* 08 March 2014			

Weather

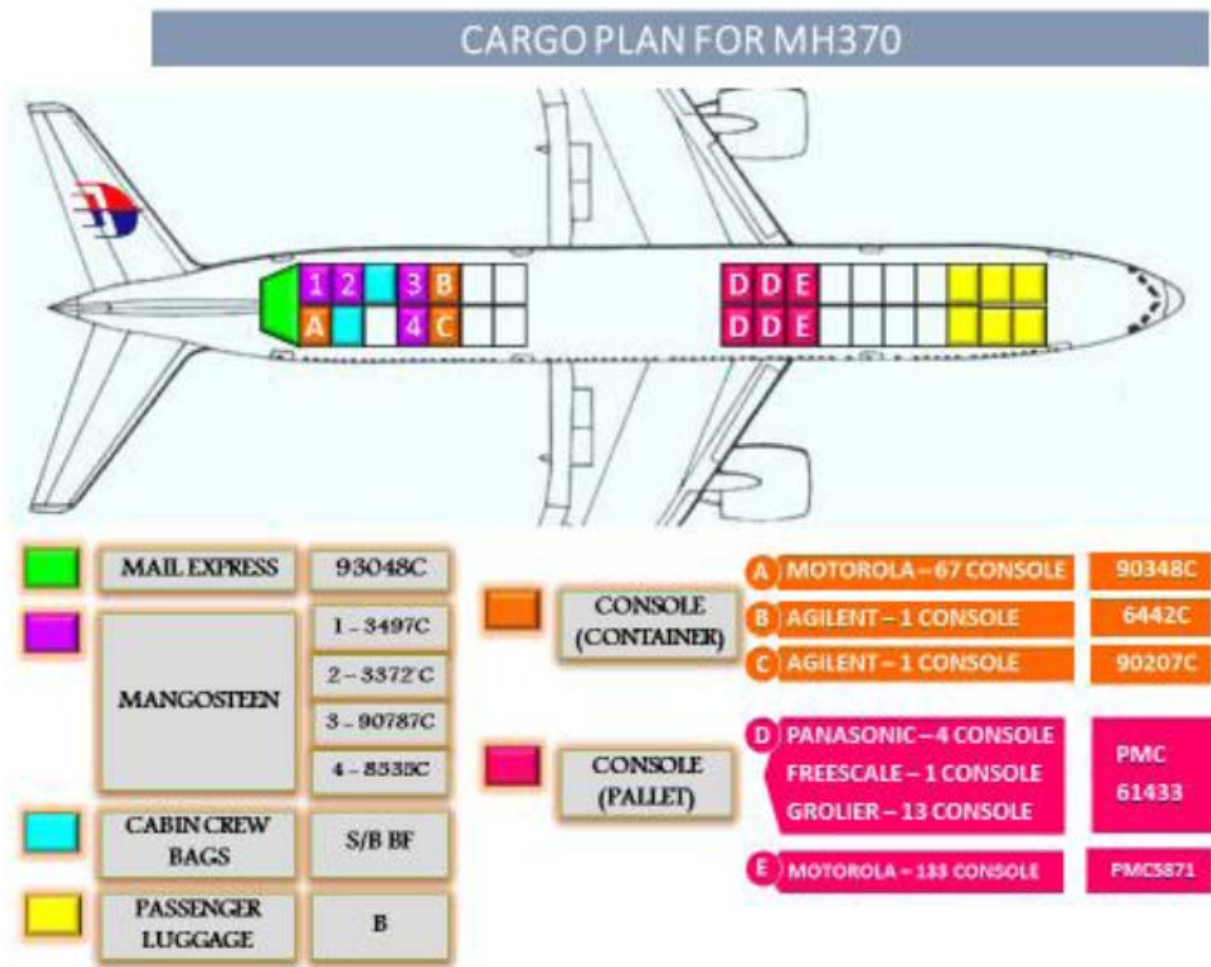


- No Significant Weather Phenomena
- No rain
- No Lightning
- No Adverse Wind

Figure 1.7A: Infrared satellite image taken by MTSAT at 1732 UTC 07 March 2014



Cargo Consignment



Cargo of Interest

- Mangosteens (4566 Kg)
- Lithium Ion (Li-Ion) Batteries & Accessories (2453 Kg)
- Li-Ion Batteries (221 Kg)
- No issues noted with the cargo



NATIONALITY OF CREW & PASSENGERS

Countries		Flight Crew	Cabin crew	Passengers
1.	China	-	-	153
2.	Malaysia	2	10	38
3.	Indonesia	-	-	7
4.	Australia	-	-	6
5.	India	-	-	5
6.	France	-	-	4
7.	United States of America	-	-	3
8.	Ukraine	-	-	2
9.	Canada	-	-	2
10.	New Zealand	-	-	2
11.	Netherland	-	-	1
12.	Russia	-	-	1
13.	Taiwan	-	-	1
14.	Italy* (Iran)	-	-	1
15.	Austria* (Iran)	-	-	1
Total		2	10	227
		239		



DEBRIS RECOVERED AND CONSIDERED FOR DETAILED EXAMINATION, ANALYSIS AND TEST



Mainly North-west corner of the Indian Ocean - La Réunion Island, Mozambique, Tanzania, South Africa, Madagascar and Mauritius.



SUMMARY OF DEBRIS RECOVERED

1. As of today:

a) 27 pieces examined:

- 3 pieces (Items 1, 10 and 19) *confirmed* to be from MH370
- 7 pieces (Items 2, 3, 4, 5, 6, 16 and 22) as *almost certain* from MH370.
- 8 pieces (Items 8, 9, 11, 15, 18 and 20, 26, 27) as *highly likely* from MH370
- 2 pieces (Items 7 and 12) as *likely* from MH370
- 7 pieces (Items 13, 14, 17, 21, 23, 24 and 25) not identifiable



SUMMARY OF DEBRIS RECOVERED

Definitions

- Confirmed – Directly linked to MH370 via unique numbers or features
- Almost Certain – Not linked directly to MH370, however have some unique features only present on MAS B777 aircraft
- Highly Likely or Likely – Features present on B777 and MAS aircraft, based on probability



DEBRIS BREAKDOWN AND STATUS

MOZAMBIQUE						TANZANIA		MADAGASCAR						
Item						Item		Item						
2	3	6	7	9	22	19		11	12	13	14	15	16	
								17	18	23	24	25	-	









SOUTH AFRICA						LA RÉUNION ISLAND		MAURITIUS		
Item						Item		Item		
4	20	21	26	27		1		5	8	10

Key		
Item	Status	Total
	Confirmed	3
	Almost Certain	7
	Highly Likely	8
	Likely	2
	Not Identifiable	7
Total		27



DEBRIS EXAMINED



REF.	DATE	DEBRIS	LOCATION	REMARKS
Item 1	29 July 2015	<div></div> <div>Right Flaperon</div>	<div></div> <div>Saint-Denis, La Réunion</div>	<ul style="list-style-type: none">Confirmed by French Judiciary Authority belonging to MH370 on 03 Sept 2015
Item 2	27 Dec 2015	<div></div> <div>Right Wing No. 7 Flap Track Fairing 676EB</div>	<div></div> <div>Daghatane Beach, Mozambique</div>	<ul style="list-style-type: none">Examination showed that part is 'almost certain' from MH370
Item 3	27 Feb 2016	<div></div> <div>Right Horizontal Stabiliser panel piece</div>	<div></div> <div>Valankulo, Paluma Sandbank, Mozambique</div>	<ul style="list-style-type: none">Examination showed part is 'almost certain' from MH370









DEBRIS EXAMINED

REF.	DATE	DEBRIS	LOCATION	REMARKS
Item 4	22 March 2016	<div></div> <p>Engine Nose Cowling</p>	<div></div> <p>Mossel Bay South Africa</p>	<ul style="list-style-type: none">Examination showed part is <i>'almost certain'</i> from MH370
Item 5	30 March 2016	<div><p>Figure 2: Comparison of recovered item with MAB Boeing 777 Door R1 panel assembly</p></div> <p>Door R1 Stowage Closet</p>	<div></div> <p>Rodrigues, Mauritius</p>	<ul style="list-style-type: none">Examination showed part is <i>'almost certain'</i> from MH370



DEBRIS EXAMINED









REF.	DATE	DEBRIS	LOCATION	REMARKS
Item 6	24 April 2016	<div><p>Right hand Engine Fan Cowling</p></div>	<div><p>South of Chidenguele Mozambique</p></div>	<ul style="list-style-type: none">Examination showed part is <i>almost certain</i> from MH370
Item 7	30 April 2016	<div><p>Wing Body Fairing</p></div>	<div><p>Anvil Bay, Chemucane, Mozambique</p></div>	<ul style="list-style-type: none">Examination showed part is <i>likely</i> from MH370
Item 8	24 May 2016	<div><p>No. 1 Flap Track Fairing Tail Cone</p></div>	<div><p>Gris Gris Beach, Mauritius</p></div>	<ul style="list-style-type: none">Examination showed part is <i>highly likely</i> from MH370



DEBRIS EXAMINED









REF.	DATE	DEBRIS	LOCATION	REMARKS
Item 9	22 May 2016	<div></div> <div>Left Wing Trailing Edge Panel</div>	<div></div> <div>Macenta Peninsular, Mozambique</div>	<ul style="list-style-type: none">Examination showed part is <i>highly likely</i> from MH370
Item 10	10 May 2016	<div></div> <div>Left Outboard Aft Flap Section</div>	<div></div> <div>Ilot Bernache, Mauritius</div>	<ul style="list-style-type: none">This part <i>is confirmed</i> from MH370
Item 11	06 June 2016	<div></div> <div>Seat Back Trim Panel encasing IFE Monitor</div>	<div></div> <div>Riake Beach, Nosy Boraha Island, Madagascar</div>	<ul style="list-style-type: none">Examination showed part is <i>highly likely</i> from MH370









DEBRIS EXAMINED



REF.	DATE	DEBRIS	LOCATION	REMARKS
Item 12	06 June 2016	<div></div> <div>Unidentified part</div>	<div></div> <div>Riake beach, Nosy Boraha Island, Madagascar</div>	<ul style="list-style-type: none">Examination showed part is <i>likely</i> from MH370
Item 13	12 June 2016	<div></div> <div>Unidentified part</div>	<div></div> <div>Riake beach, Nosy Boraha Island, Madagascar</div>	<ul style="list-style-type: none">Not identifiable
Item 14	12 June 2016	<div></div> <div>Unidentified part</div>	<div></div> <div>Riake beach, Nosy Boraha Island, Madagascar</div>	<ul style="list-style-type: none">Not identifiable









DEBRIS EXAMINED

NO.	DATE	DEBRIS	LOCATION	REMARKS
Item 15	06 June 206	 Right Wing Trailing Edge Panel	 Riake beach, Nosy Boraha Island, Madagascar	<ul style="list-style-type: none">Examination showed the part is <i>highly likely</i> from MH370
Item 16	12 June 2016	 Cabin Interior Panel	 Antsiraka beach, Madagascar	<ul style="list-style-type: none">Examination showed the part is <i>almost certain</i> from MH370
Item 17	12 June 2016	 Unidentified part	 Antsiraka beach, Madagascar	<ul style="list-style-type: none">Not unidentifiable







DEBRIS EXAMINED

NO.	DATE	DEBRIS	LOCATION	REMARKS
Item 18	12 June 2016	 Right Forward Nose Landing Gear Door	 Antsiraka beach, Madagascar	<ul style="list-style-type: none">Examination showed that part is <i>highly likely</i> from MH370
Item 19	20 June 2016	 Right Outboard Flap	 Pemba Island, East of Tanzania	<ul style="list-style-type: none">The part is <i>confirmed</i> from MH370.
Item 20	21 June 2016	 Right Aft Wing to body fairing	 Kosi Bay Mouth, Kwa Zulu Natal, South Africa	<ul style="list-style-type: none">Examination showed that part is <i>highly likely</i> from MH370








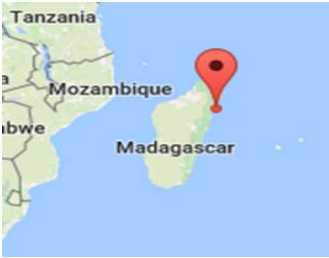
DEBRIS EXAMINED

NO.	DATE	DEBRIS	LOCATION	REMARKS
Item 21	18 July 2016	<div></div> <div>Unidentified part</div>	<div></div> <div>Northern Kwa Zulu Natal, South Africa</div>	<ul style="list-style-type: none">Not identifiable
Item 22	26 August 2016	<div></div> <div>Right Vertical Stabilizer panel</div>	<div></div> <div>Linga Linga beach Mozambique</div>	<ul style="list-style-type: none">Examination showed part is <i>almost certain</i> from MH370



DEBRIS EXAMINED







NO.	DATE	DEBRIS	LOCATION	REMARKS
Item 23	October 2016	<div></div> <div>Unidentified part</div>	<div></div> <div>Riake beach, Nosy Boraha Island, Madagascar Island</div>	<ul style="list-style-type: none">Not identifiable
Item 24	February 2016	<div></div> <div>Unidentified part</div>	<div></div> <div>Saint Luce, Madagascar</div>	<ul style="list-style-type: none">Not identifiable
Item 25	July 2016	<div></div> <div>Unidentified part</div>	<div></div> <div>Riake beach, Nosy Boraha Island, Madagascar</div>	<ul style="list-style-type: none">Not identifiable

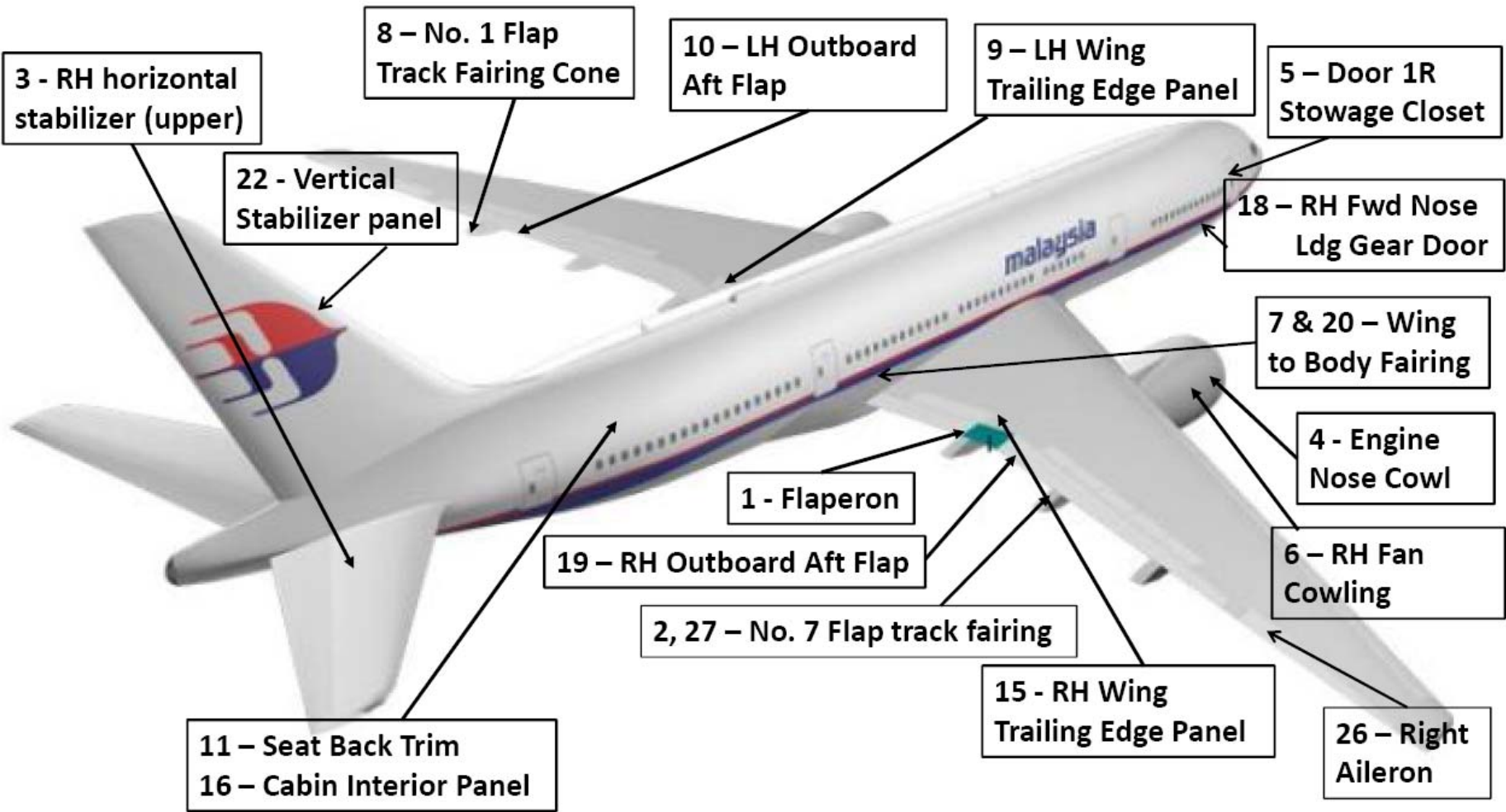


DEBRIS EXAMINED



NO.	DATE	DEBRIS	LOCATION	REMARKS
Item 26	23 December 2016	 Right Aileron	 Nautilus Bay, South Africa	<ul style="list-style-type: none">Examination showed item is <i>highly likely</i> from MH370
Item 27	27 January 2017	 No. 7 Flap Track Fairing	 Mpame Beach, South Africa	<ul style="list-style-type: none">Examination showed item is <i>highly likely</i> from MH370

Location of the Debris on the Aircraft





THANK YOU

