

BALMUN'26

ICAO STUDY GUIDE

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1. Letter From the Secretary-General

Esteemed Participants of BALMUN'26,

It is my utmost pleasure to welcome you to this year's annual session of BALMUN. It is truly an honour to host a platform where passionate minds gather to engage in a meaningful debate, diplomacy, and cooperation. BALMUN is not merely a conference; it is a created space where ideas are challenged, and perspectives are broadened.

My journey in this club began on the day that I stepped into this school. I started as a bot delegate, continued as an academic assistant, and now stand proudly as the Secretary General of this year's annual session. Our team has been working meticulously to ensure that this MUN offers not only a rigorous academic experience but also an inspiring and memorable one. We have overcome plenty of different challenges, but all of them have made us stronger than ever to mark our target. We have poured relentless effort into this conference.

With a highly dedicated academic and organizational team, we proudly present twelve committees, including two General Assembly committees, six Special committees, and four Crisis committees. Each committee is carefully designed to encourage critical thinking, creativity, and collaboration. Over the course of three days, you will be able to defend your ideas, listen to opposing views, and seek compromise in the pursuit of meaningful solutions.

I hope that BALMUN'26 serves as a reminder that true leadership lies not in dominance, but in dialogue and not in certainty, but in openness to learning. As the academic and organizational team of BALMUN, we eagerly look forward to witnessing the ideas you will bring to life and the impact you will create throughout the conference.

Your Sincerely,

Kerem Kılıç

Secretary General of BALMUN'26

2. Letter From the Under-Secretaries General

Dear Delegates,

It's our utmost pleasure to welcome you all to the committee, ICAO. We are Eylül Ulu and Beril Yaylak, studying at Kadıköy Anatolian High School as 10th grade students. We have been really excited to make this agenda come true, and we've been working ever since. We also want to express our deep gratitude to Talya Ersavaş whom we see as our older sister, for passing this committee on as a legacy to us <3.

We hope that you can read and finish the entire study guide, because it might be a bit hard to understand, but we just wanted to ensure you were given all the information you needed to know before the committee. We still encourage you to do your own research as well :)

We hope you have fun in this committee, because we had fun while preparing it for you!

Please don't hesitate to contact us if you have questions about the committee, agenda, or MUN's in general via;

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3. Introduction to the Committee

International Civil Aviation Organization (ICAO) is a United Nations agency consisting of 193 member countries. The agency's main goal is to maintain air travel safe internationally by applying some rules. Every member country must follow these rules for international order in the sky. Without this organization, international flights would be nearly impossible since every country would have their own flying rules and one would likely contradict another. ICAO was formed to prevent that and decrease the amount of accidents in the sky as much as possible so that everyone could fly safely internationally.

The Air Navigation Commission (ANC) is the technical body within ICAO. It contains 19 flying experts to discuss and create rules called "Standards and Recommended Practices" (SARPs) to ensure the air traffic moves smoothly. When the technology improves and something new comes up, those 19 experts are the ones to evaluate whether it should be utilized or not. If they decide the new technology should be used or they write a new rule, it isn't implemented immediately. They first send the draft to all 193 member countries so they

can decide if the rule should be applied or not. The rule will only be implemented if most of the countries agree.

4. Introduction to the Agenda Item

Malaysia Airlines Flight 370 (MH370) was an international passenger flight operated by Malaysia Airlines that disappeared from radar on 8 March 2014, while flying from Kuala Lumpur International Airport in Malaysia to its planned destination, Beijing Capital International Airport in China. The cause of disappearance is still unknown and a searched matter.

The aircraft type was Boeing-777 which carried 239 people. That aircraft model is actually one of the most successful and famous long distance airplanes in the world. It was first flown in the mid-1990s and was a huge deal because of its differences. For example, it only has two engines instead of four which reduces fuel use while flying nonstop for over 15 hours and still being cheaper. Also the 777 was the first Boeing to use a technology called "fly-by-wire". This technology is when the pilot moves the controls, the controls send electronic signals to a computer that moves the wings, rather than using regular cables and pulleys. This makes the plane easier to handle and much safer because the computer can help prevent the pilot from making dangerous maneuvers.

The crew of the Boeing 777-200ER, registered as 9M-MRO, was last heard from air traffic control (ATC) around 38 minutes after takeoff over the South China Sea. After several minutes it disappeared from ATC's radar, but it was tracked by the Malaysian military's primary radar system for another hour and it was seen that it deviated westward from its planned flight path with a sharp turn. The last words from the cockpit were "Good night, Malaysian three seven zero". It left radar range for about 370km west northwest of Penang Island in northwestern Peninsular Malaysia.

Relying mostly on the analysis of data from the British Inmarsat satellite, which is the last satellite the aircraft had communicated, the Australian Transport Safety Bureau (ATSB) initially proposed that a hypoxia event (an uncontrolled decompression in a pressurized aircraft, could be caused by different factors) was the most likely cause with the evidence, but it's still unknown if that was what actually happened or not since there are other theories such as hijacking.

Since the cause of disappearance was unknown, air transport industry safety recommendations and regulations regarding MH370 have been implemented to ensure something like this doesn't happen again. The regulations include increased battery life on underwater locator beacons, keeping the recording times longer on flight data recorders with cockpit voice recorders, and new standards for aircraft position reporting over open ocean.

5. Key terms

Air Traffic Control (ATC): Air Traffic Control (ATC) is a service provided by ground-based air traffic controllers who direct aircraft on the ground and through controlled airspace. The primary purpose of ATC is to prevent collisions, organise and expedite the flow of air traffic, and provide information and other support for pilots.

Satellite Data Unit (SDU): SDU's are devices inserted on planes, they help establish the communication between the air and ground via satellites.

Aircraft Communications Addressing and Reporting System (ACARS): ACARS is a digital data communication system for transmission of short messages between aircraft and ground stations via airband radio or satellite.

Extended-range Twin-engine Operational Performance Standards (ETOPS): Safety standards set by the International Civil Aviation Organization(ICA0) for twin-engine commercial passenger aircraft operations.

Burst Timing Offset (BTO): A measure of the time taken for a transmission round trip (ground station to satellite to aircraft and back) and allows a calculation of the distance between the satellite and the aircraft.

Burst Frequency Offset (BFO): A correction the aircraft transmitter applied to the frequency of the signal to compensate for the doppler shift due to the relative speed between the satellite and the aircraft.

6. Basics of the aircraft

6.1. Mechanical and technological design

Flight 370 was operated by Boeing 777-2H6ER which is a type of Boeing 777-200ER. Boeing 777-200ER is a twin-engine, wide-body passenger aircraft designed for long-range flights. The model demonstrates exceptional performance because of its strong construction and economical fuel consumption and its advanced automated technologies.

The aircraft uses a mechanical structure which combines materials that possess both strength and lightweight characteristics. The aircraft structure uses aluminum alloys for its primary airframe and wing components while critical sections use composite materials to achieve both weight reduction and strength enhancement. The flexible wing design of the aircraft uses its wing flexibility to distribute flight loads which increases its operational lifespan.

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The engine system typically operates with turbofan engines that have high bypass ratios, such as the Rolls-Royce Trent 800 and GE90 series engines. The engines produce substantial thrust while maintaining efficient fuel usage. The engines of the aircraft enable it to conduct extended transatlantic flights through their certification under extended-range twin-engine operational performance standards (ETOPS).

The Boeing 777-200ER operates through its fly-by-wire system which acts as its primary technological control. The system uses electronic signals to send pilot commands because it does not rely on mechanical cable systems. The system provides heightened control accuracy, while it reduces mechanical damage and increases security. The aircraft contains various systems which include an advanced flight management system (FMS), an autopilot system, digital cockpit displays, and diagnostic systems. The systems assist pilots by decreasing their workload while they secure safer and more efficient flights.

The aircraft uses ACARS (Aircraft Communications Addressing and Reporting System) and transponders as communication systems which maintain constant data connections with ground stations. The systems transmit flight data, position, and technical status information, facilitating operational control.

6.2. Aerodynamics

The Boeing 777-200ER's aerodynamic design enables it to achieve maximum efficiency during extended flights. The aircraft has wide wings which produces high lift.

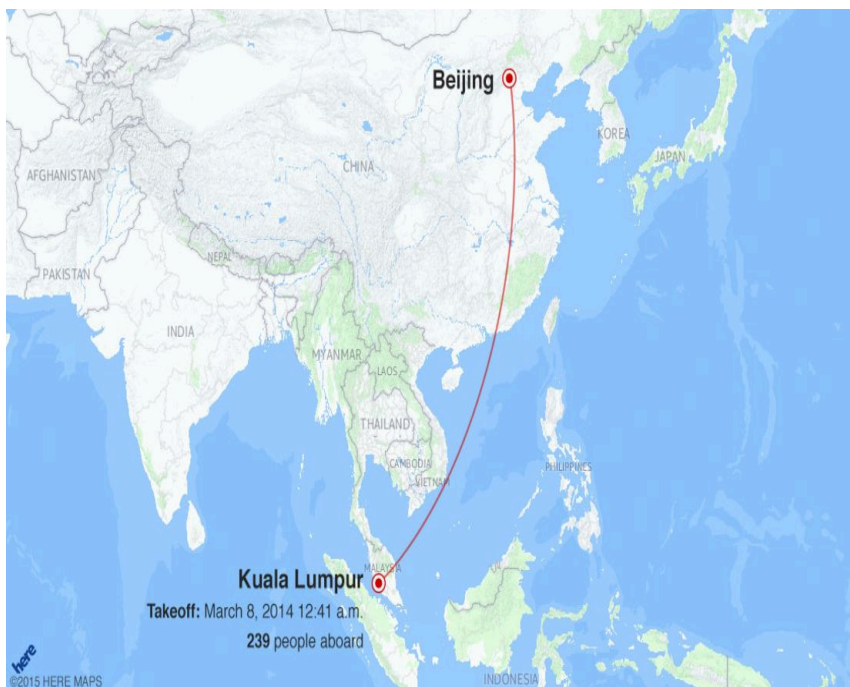
The wing profile (airfoil) creates low drag and high lift. This enables the plane to operate at extended ranges while consuming reduced amounts of fuel. The wing tips have a slight extension and a raked design which decreases vortex creation and enhances aerodynamic performance. The body of the aircraft has a cylindrical shape. The design reduces air resistance while creating conditions that allow air to flow without obstruction. The nose cone and cockpit windows have been specifically designed to create minimal disruption to airflow.

The vertical and horizontal stabilizers (tail surfaces) enable pilots to control the aircraft's flying direction while maintaining its balance. The surfaces allow the aircraft to maintain its stable flight path under turbulent weather conditions. The Boeing 777-200ER uses its wing components which can change position for different flight functions. Flaps increase lift during takeoff and landing. Slats are located at the front of the wing and help control airflow at low speeds. Spoilers function to decrease aircraft velocity while assisting with post-landing brake operations.

The aircraft achieves safe low-speed takeoffs and landings through its movable surfaces which also provide efficient high-speed cruising capabilities.

7. Disappearance

Flight 370 took off from Kuala Lumpur International Airport at 00:42 local time (Malaysian Standard Time, MYT) going to Beijing Capital International Airport, where it was expected to arrive at 6:30 local time (Chinese Standard Time, CST). Here is the planned route given below:



At 1:19, while MH370 was over the South China Sea between Malaysia and Vietnam, Malaysian air traffic control (ATC) told MH370 to contact the next ATC in Vietnam. That's when the final voice contact from the plane when the captain replied with "Good night. Malaysian Three Seven Zero". Two minutes later, the plane completely disappeared from the ATC radar. At 01.30, voice contact was

attempted by another aircraft at the request of HCM ACC; mumbling and radio static were heard in reply. The Malaysian military could manage to continue tracking the plane with their radars and saw the plane turning left, crossing the Malay Peninsula near the Malaysia-Thailand border, and traveling over the Andaman Sea. At 2:22, the aircraft disappeared from Malaysian military radar, and was last seen 370km away from the northwest side of Penang (a Malaysian state located on the northwest side of Malaysian peninsula).

Even though Thailand and Vietnam also detected Flight 370 on radar before the transponder stopped working, The radar position symbols for the transponder code used by Flight 370 vanished after the transponder is thought to have been turned off. At 2:25, the aircraft's satellite connection (operated by a British company, Inmarsat) was lost sometime between 01:07 and 02:03, but it was re-established. Later on, the aircraft's satellite data unit (SDU) replied automatically once every hour, thus 5 times in total between 03:41 and 08:10, which tells us the plane was still flying during those hours but there were also two unanswered calls at 02:39 and 07:13 from the ground to aircraft. At 08:19, the SDU sent a "log-on request" message. Eight seconds after that, a "log-on acknowledgement" message was sent, and that

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was the last sign ever from the plane. The route the plane took which was caught by the radars and Inmarsat is mapped below:



It is believed that the 08:19 messages were when the aircraft was descending into the ocean because of inadequate fuel, thus the moment of the crash. After four hours of communication and info exchange between several ATC centres, Malaysia Airlines released a press release at 07:24, stating that

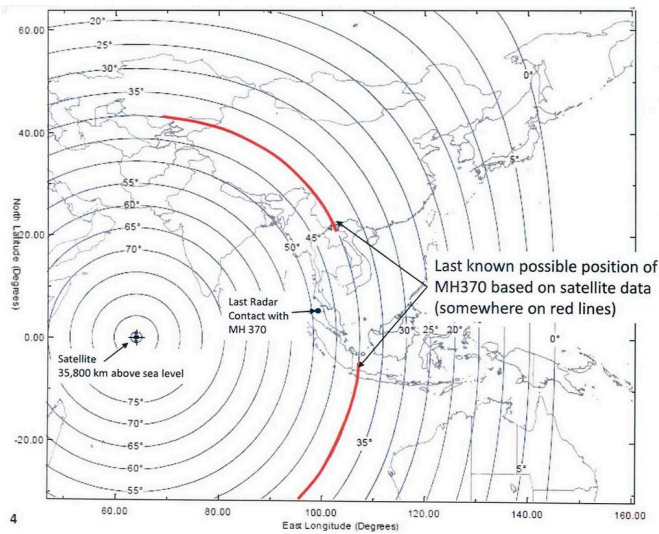
contact with Flight 370 had been lost.

MYT	UTC	EVENT
00.42	16.42	MH370 takes off from Kuala Lumpur International Airport
01.07	17.07	Last ACARS data transmission from MH370
01.07 -	17.07 -	The satellite communication link was lost sometime during this period
02.03	18.03	
01.19	17.19	Last voice connection with MH370
02.43	18.43	It's reported to Malaysian authorities that US military personnel in Thailand overheard an SOS signal and the pilot announced that the cabin might disintegrate soon, and called for emergency landing.
6.30	22.30	MH370 misses its scheduled landing on Beijing
7.24	23.24	It's announced that the plane is missing

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08.19	00.19	The aircraft sends a “log-on request” to the satellite. It’s believed that this is after the engines stopped because of fuel exhaustion and the emergency power generator starting in the plane.
08.19	00.19	The aircraft sends a “log-on acknowledgement” message, which is the last signal from the plane.

8. Timeline



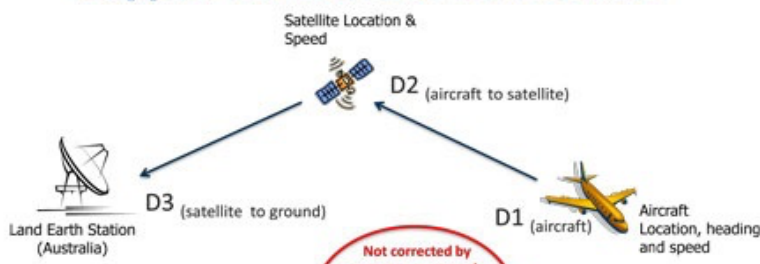
The first search operations in this area commenced shortly after Malaysian Airlines Flight 370 lost contact with air traffic control. The search efforts involved three countries which included Malaysia and Vietnam and China. The authorities deployed aircraft and naval units to search for debris or emergency signals because they continued to believe that the aircraft had crashed shortly after contact was lost. The Malaysian military radar data from the same day proved to show that the aircraft had made a turnaround to fly back to the west across the Malay Peninsula. The new information which emerged showed that the aircraft had

continued to fly for a long time after it vanished from civilian tracking systems.

After the aircraft lost radar contact at 18:22, it is assumed to have continued flying at a constant speed (Mach number) and a heading of 295T until the turn time, called the FMT. The researchers determined turn time through 30-second intervals. The two main events occurred when the plane established contact with the Inmarsat satellite system at 18:25 and the system began sending BTO/BFO pairs.

The second event happened at 18:40 when the first aircraft contact attempt produced BFO-only data exchanges. The weather data from 18:25 shows that BFO data at that time shows a southern Indian Ocean turn. The BFO data at 18:40 shows that the aircraft turned south after 18:40 because the data displays an azimuth of 192T which points slightly west of due south. The last azimuth value approaches 186T which represents the final heading. The last azimuth value approaches 186T which represents the final heading. The last heading matches an early turn after 18:25 which would place the aircraft further southwest than the current search area (well below 38S).

Doppler correction contributions



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Researchers then examined satellite communication data provided by Inmarsat. The aircraft stopped sending normal messages but kept exchanging automatic “handshake” signals with the satellite roughly every hour. These signals showed that the plane remained powered and flying for several hours after disappearing. Engineers used two key data points for their analysis:

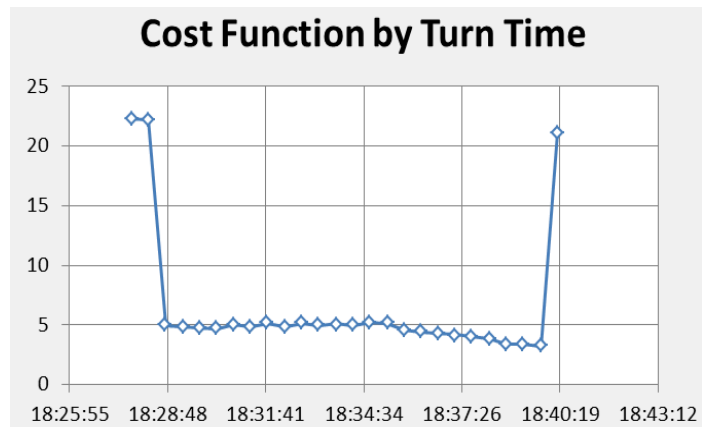
Burst Timing Offset (BTO): measures distance from the satellite.

Burst Frequency Offset (BFO): shows the aircraft’s relative motion and direction.

The results of the turn time study were shown in the graph where errors in BFO and BTO were combined into a single “cost” value.

The researchers established that the aircraft had to have flown across major terrestrial arcs which intersected all points of the Earth at the times when handshakes occurred. The investigation produced two potential flight paths which included a northern corridor and a southern corridor.

The analysis conducted two weeks later confirmed that the northern corridor was not valid because radar systems from China and Kazakhstan failed to detect the aircraft. The



search operations turned toward the southern Indian Ocean which stands as one of the world's most secluded and hard to reach areas.

The search operation grew significantly larger between March 1, 2014 and March 15, 2014. Australia took the lead in coordinating operations in the southern Indian Ocean. The search area spanned millions of square kilometers which created extreme challenges for finding any debris. The mission encountered additional difficulties because of severe weather conditions and the need to operate in deep ocean regions and the absence of accurate location information.

The search operation of April 2014 focused on finding the aircraft's black boxes which produce underwater acoustic signals. Specialized equipment was used for the search and investigators found multiple signals which matched their detection criteria. The investigators

found two signals but they could not establish these as MH370 signals because no plane wreckage appeared in those particular locations.

The operation proceeded to its next stage which involved conducting a prolonged underwater investigation. Advanced sonar equipment performed ocean floor scanning operations between 2014 and 2017 to examine extensive areas of the ocean floor. The search operation which covered 120000 square kilometers failed to locate any major wreckage. This made the search one of the most complex and expensive in aviation history. At the same time physical proof began to emerge in places that lay outside the defined search area. Debris that originated from the aircraft first appeared on western Indian Ocean islands and coastal areas after July 2015 which included Réunion Island and Madagascar and eastern African shores. Over time more than a dozen pieces were found which included multiple pieces that scientists confirmed or strongly linked to MH370. The research showed that the plane crashed into the ocean but researchers could not determine its specific crash location.

The final satellite handshake analysis showed that the aircraft used its communication system until 00:11 UTC and then stopped all contact until 01:15 UTC, which marked the final part of its operational period. The investigation found that the flight ended with a rapid descent but the investigators could not determine the precise circumstances of the accident. The official search operation for the main wreckage of the site ended in 2017 after search teams spent several years looking for the underwater wreckage.

The years that followed introduced new analytical techniques that included debris drift modeling and different methods to analyze satellite information. The different approaches to the investigation made efforts to find the crash site, yet they could not find any conclusive evidence. The search operation has received new funding because of advanced data analysis methods and fresh theories about the aircraft's final path. A new search initiative has been proposed which will concentrate on a restricted area that has higher chances of finding the aircraft which disappeared over the southern Indian Ocean.

The exact location of MH370 has not yet been found after more than ten years of research which included international collaboration and technological improvements. The disappearance stands as one of modern aviation's biggest unsolved mysteries because only partial data exists which consists of satellite handshakes and recovered debris from the aircraft's last flight.

9. Investigation

9.1. Initials search

The international search operation started immediately after Malaysia Airlines Flight MH370 disappeared on 8 March 2014. The first phase of the investigation used the last radar tracking

point of the airplane to search both Southeast Asia and the South China Sea and its adjacent waterways.

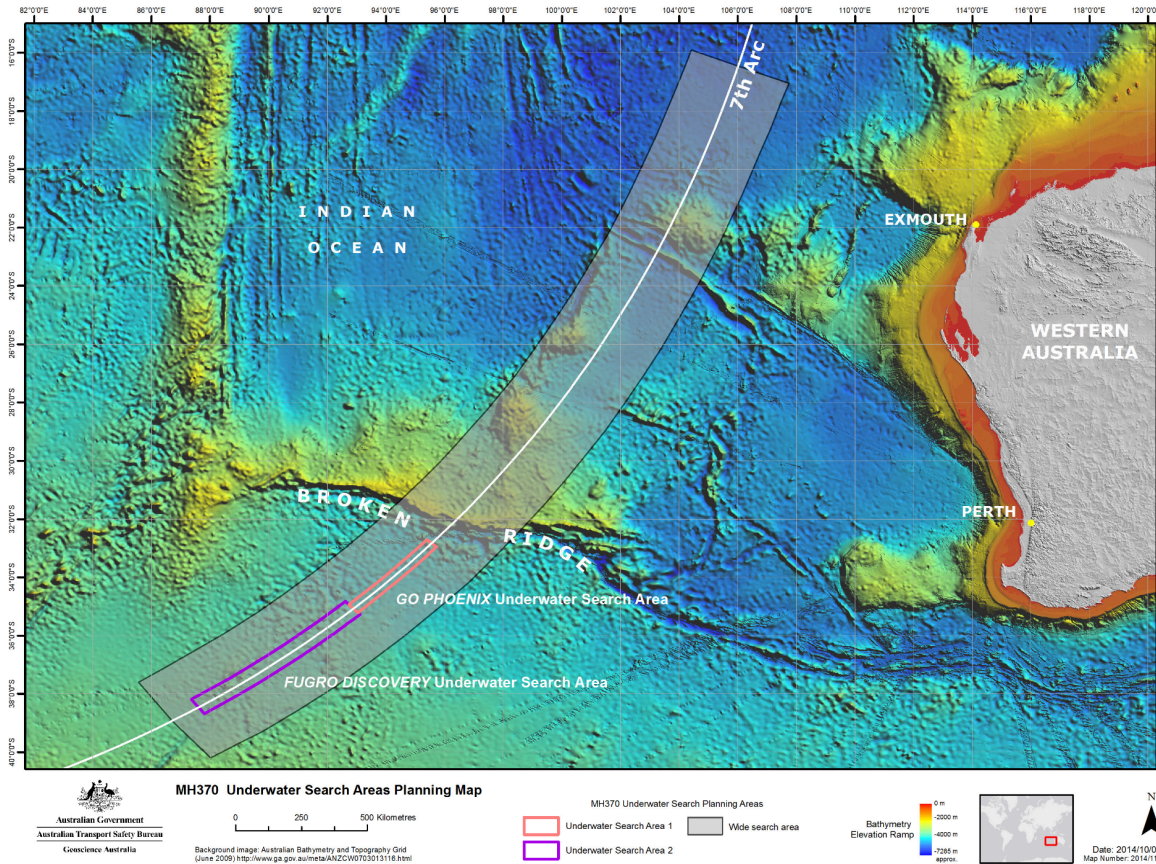
Malaysia's Aeronautical Rescue Coordination Centre (ARCC) managed the first search operation which used aircraft and ships from multiple nations including Malaysia and China and the United States and Thailand and Singapore and Vietnam. The initial search area expanded from the last radar contact point to include both the Strait of Malacca and the Andaman Sea, after military radar data indicated the aircraft had flown westward, following its disappearance from civilian radar. The initial search period did not find any MH370 aircraft pieces because satellite image analysis and debris sightings, failed to deliver verified evidence. Investigators determined that the floating objects observed at sea did not belong to the aircraft after they conducted their investigation.

Investigators started to investigate new possibilities after investigators confirmed that the aircraft had vanished from radar contact, while there were no confirmed sightings of the aircraft. The Inmarsat satellite communication data from mid-March showed that the aircraft transmitted signals for several hours, which ended with its crash into the Indian Ocean at a location far to the south. The search operation moved to a remote area southwest of Australia, which established the foundation for the upcoming extensive search operations that continued for many years.

9.2. Marine investigation

The investigation moved to the southern Indian Ocean after initial air and surface searches in Southeast Asia failed to find Malaysia Airlines Flight MH370 because Inmarsat satellite communications data and detailed flight path analysis provided evidence of its location. The region existed as an extremely distant area which required multiple ports for access because its average ocean depths reached beyond 4000 meters and it experienced strong ocean currents and severe weather conditions. The combination of these factors created substantial difficulties which made search operations exceptionally challenging to perform. The Joint Agency Coordination Centre (JACC) in Australia headed international efforts while working with Malaysia and China and the United States and other nations to deploy ships and aircraft and technical teams and satellite data analysis resources. The team conducted the search to discover any wreckage or surface debris or black box signals which would establish the aircraft's final position.

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9.2.1. Investigation process

The marine search relied on a combination of advanced technologies and systematic planning. The deployed ships used side-scan sonar and multibeam sonar to create detailed underwater maps of high-probability areas. The team used Autonomous Underwater Vehicles (AUVs) to explore extensive sections of the ocean floor while Remotely Operated Vehicles (ROVs) examined particular objects which sonar imaging had detected. The multi-layered approach enabled teams to search for potential debris fields which existed at depths that normal methods could not reach.

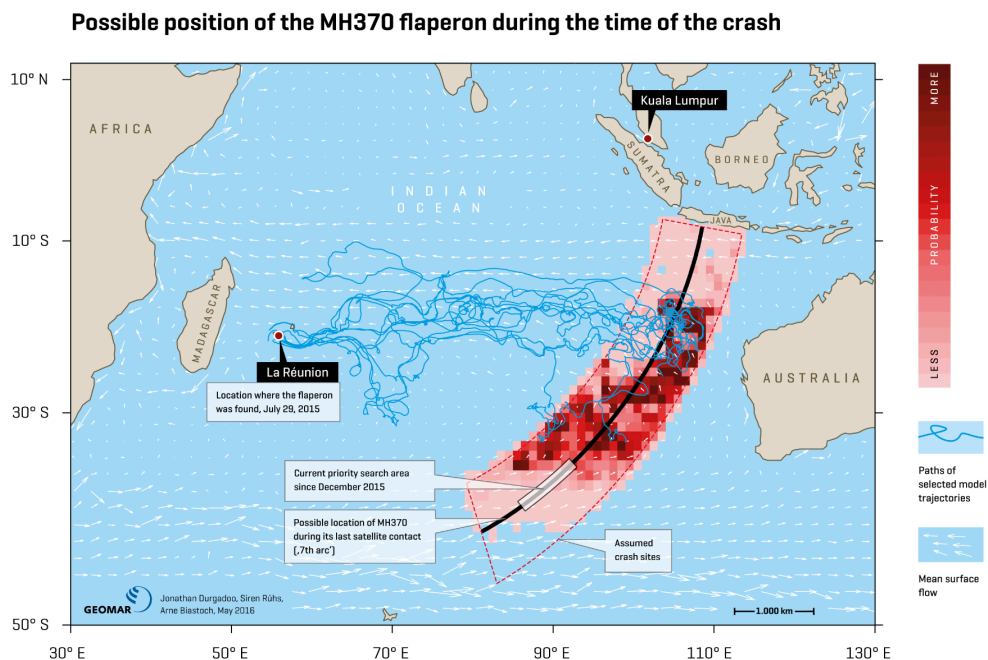
The search operation proceeded through multiple phases. The initial stage involved satellite data examination together with flight path assessment to establish the most effective search area. Ocean drift models were used to determine the possible locations of debris which would have floated following the aircraft breakup during mid-air or ocean impact. Search operations between 2014 and January 2017 failed to find any main wreckage while the signals thought to be from the aircraft black boxes turned out to be unrelated. The company Ocean Infinity conducted a "no-find, no-fee" search in 2018 which employed deep-sea drones to explore specific areas but failed to find the aircraft. The 2025 search authorization from Malaysia used high-resolution deep-sea drones and sonar technology to search high-probability debris

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areas during a 55-day operational period which had multiple breaks. The advanced operations used satellite data analysis and oceanographic studies together with flight path simulation to increase the chances of finding the wreckage.

9.2.2. Debris founded

The main wreckage of the aircraft remains hidden yet authorities have confirmed multiple debris pieces as originating from flight MH370. The first verified fragment of the missing airplane was discovered when a flaperon was found on Réunion Island in July 2015. The following period saw more debris come ashore which included engine cowling sections and interior cabin panel parts and wing structure elements that reached Mauritius and Rodrigues Island and the eastern part of Africa. Aviation experts conducted thorough investigations of these fragments which confirmed their identification as Boeing 777-200 components that matched MH370 specifications.



The discovery of these debris pieces played a crucial role in refining ocean drift models which helped investigators identify possible locations for the aircraft's final resting place. The debris did not disclose the precise crash site yet it confirmed that the aircraft crashed in the southern Indian Ocean which lay beyond the Southeast Asia search area. The debris findings also provided insight into the aircraft's breakup pattern and supported the ongoing technical and satellite investigations.

9.3. Technical and satellite investigation and reports

The investigation depended on SATCOM satellite communications from MH370 Satellite Data Unit because standard search methods had already failed. The SDU maintained automatic handshake signals with Inmarsat-3F1 satellite for multiple hours after the aircraft stopped transmitting standard messages. Handshakes produced Burst Timing Offset (BTO) and Burst Frequency Offset (BFO) data which showed the aircraft's distance to the satellite and its motion time. The data points served as the main source for calculating the aircraft's flight route and ultimate position in the southern Indian Ocean.

9.3.1. Background

The BTO values measured the elapsed time of signals traveling between the aircraft, satellite, and ground station. The measurements generated rings and arcs which mapped the earth surface to show all possible aircraft locations during the time of a handshake. The BFO values showed Doppler effect changes which helped determine the aircraft speed and direction across the flight path. The BTO and BFO measurements became the only elements which showed MH370 flight movements because the aircraft stopped sending GPS or ADS-B data after radar contact ended. The study of BTO and BFO required advanced technical expertise.

Engineers needed to enhance their system performance by correcting three different factors which included satellite oscillator drift and thermal effects and minor orbital movement. The calibration process used historical flight data together with system performance testing results. The investigators discovered through value analysis that the aircraft had flown for multiple hours before it made a turn toward the southern Indian Ocean which helped search operations at deep sea locations.

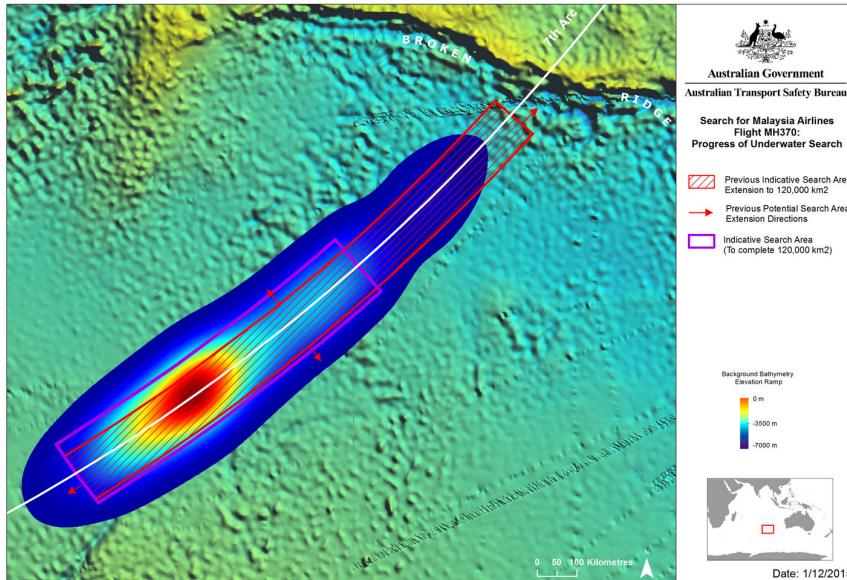
9.3.2. SUD communication

The Satellite Data Unit (SDU) aboard MH370 continued to respond automatically to Inmarsat's log-on interrogations even after normal communications had stopped. The ground station in Perth recorded handshakes which occurred at approximately one-hour intervals. Each handshake generated BTO and BFO values which showed the distance from the satellite and the aircraft's relative movement and direction. The analysis of these data together with the plane's speed and performance limits allowed analysts to determine probable flight corridors.

The SDU data showed that the aircraft continued flying for several hours after radar contact was lost which revealed approximate turn times and heading changes that guided the search area in the southern Indian Ocean. The SDU automatic communications system provided the only indirect evidence of the plane's path after disappearance because it functioned as the plane's tracking system.

9.3.3. Interferences and analysis

The process of analyzing BFO data needed correction because satellite movement and oscillator drift and thermal fluctuations created technical interferences that would disrupt heading estimation. Analysts determined that MH370 traveled a southern path because they



eliminated these effects and combined results with aircraft performance limits, which matched the debris found along predicted ocean drift paths. The technical foundation for search area definition and deep-sea operation guidance developed through the combined analysis of BTO and BFO data.

9.4. International

Participation

The MH370 search operation became the most extensive and difficult international aircraft search mission ever conducted. Multiple countries provided their expertise along with their ships and aircraft and their technical resources. Australia directed operations through the Joint Agency Coordination Centre (JACC) while Malaysia and China provided essential satellite information and flight data and search personnel for land and underwater operations. The United States, United Kingdom, New Zealand, Japan, and France provided their specialized ships and sonar technology and deep-sea mapping knowledge.

International collaboration extended to technical analysis as well. Experts from Inmarsat and Boeing together with independent researchers analyzed satellite data by using BTO and BFO data to create flight path models and determine search areas. The operation succeeded through its various teams who worked together to search a huge inaccessible section of the southern Indian Ocean which no single country could have controlled. This global effort highlights the importance of international cooperation in aviation safety and accident investigation.

9.5. Final results

The main wreckage of MH370 still remains missing after search operations which included air missions and surface searches and deep-sea missions. Satellite data shows that the aircraft continued to fly for several hours after its radar disappearance because it turned south into the southern Indian Ocean. The discovery of debris on western Indian Ocean islands and

coastlines supported this conclusion which included the confirmed flaperon on Réunion Island and additional fragments on Mauritius and Rodrigues Island and the east African coast. The combined technical and marine investigations narrowed the probable crash area, guided international search operations, and provided a better understanding of the aircraft's final trajectory. The investigation showed how satellite data and international cooperation act as essential elements for modern analysis of aviation accidents and deep-sea search operations.

10. Background

Flight 370 was operated with a Boeing 777-2H6ER which was able to carry 282 passengers. It had accumulated 53,471 hours and 7,526 cycles (takeoffs and landings) in service and had not previously been involved in any major incidents, only a minor incident had happened while taxiing which resulted in a broken wing tip. Its last aircraft maintenance check was on Feb 23 2014, and a renewal of the crew member oxygen system was on 7 March 2014, which is also a routine maintenance task, and everything was completely normal. The Boeing 777 was introduced in 1994 and has an excellent safety record. It only has 6 other major incidents besides MH370 which can be listed as:

- 1- The crash of British Airways Flight 38 in 2008
- 2- A cockpit fire in a parked EgyptAir Flight 667 at Cairo International Airport in 2011
- 3- The crash of Asiana Airlines Flight 214 in 2013 with three people dead
- 4- Malaysia Airlines Flight 17, which was shot down over Ukraine, killing all 298 people aboard in July 2014
- 5- Emirates Flight 521, which crashed and burned out while landing at Dubai International Airport in August 2016 killing one person
- 6- ASingapore Airlines 777-200ER was written off after catching fire and burning out at Singapore Changi Airport in November 2017

In MH370's case, the aircraft was carrying 12 Malaysian crew members and 227 passengers from 14 different nations, most of the passengers being Malaysian and Chinese. But all 12 crew members, including 2 pilots and 10 cabin crew, were Malaysian citizens. The pilot in command was 52 years old Captain Zaharie Ahmad Shah from Penang. He had a total of 18,365 hours of flying experience and had been a type-rating instructor and a type-rating examiner since 2007. He joined Malaysia Airlines as a cadet pilot in 1981, and after training and receiving his commercial pilot's license, he became a second officer with the airline in 1983. The co-pilot was 26 year old First Officer Fariq Abdul Hamid. He joined Malaysia Airlines as a cadet pilot in 2007 and flight 370 was his final training flight, and he was scheduled to be examined on his next flight. Fariq had accumulated 2,763 hours of flying experience.

Passenger numbers on each nationality on plane:

Nationality	Number	Nationality	Number
China	153	Canada	2
Malaysia	50*	Iran	2
Indonesia	7	New Zealand	2
Australia	6	Ukraine	2
India	5	Netherlands	1
France	4	Russia	1
United States	3	Taiwan	1

*including 12 crew members

11. Possible Causes of Disappearance

11.1 Causes by Pilot

The case could possibly be a mass murder suicide caused by pilots. The theory suggests that the signals were switched off from inside the aircraft, the pilots willingly left the calls unanswered and purposely made the plane fly in the path it followed. The path followed is likely intentional since Boeing 777 has an autopilot function, and if something happened to the pilots it would've flown within the planned path (unless tampered with, which is a different topic). The main suspect is Zaharie Ahmad Shah, who is the captain pilot, rather than the co-pilot. The reason for that is his home flight simulator records and his personal life. The Australian Transport Safety Bureau (ATSB, which is leading the search for the plane off Australia's west coast) and the Malaysian government confirmed that the record they found in Zaharie's home was extremely similar to the path MH370 followed. The record was actually deleted, but The United States' Federal Bureau of Investigation reconstructed the deleted data, which was from only one month prior to the flight. But it is not known whether the simulation was made by Zaharie even though the simulator was in his home, thus no theories were proven with this. Also media reports revealed that Captain Zaharie's wife and three children moved out of his house the day before the disappearance; and a friend claimed that Captain Shah was seeing another woman and Shah's relationship with her was also in trouble, but domestic problems were denied by his family. Besides all that, Zaharie was also a supporter of Malaysian opposition politician Anwar Ibrahim, who was sentenced to jail on March 7 and Zaharie was in the courtroom the day before the flight. Also according to investigators, Zaharie had no plans for the days after March 8th. It's also thought that since the plane flew near Penang, Zaharie was looking at his home one last time before dying.

Obviously a mass murder suicide could also be attempted by the co pilot Fariq Abdul Hamid, but there's nothing close to an evidence to support that theory.

Also it doesn't even have to be a murder-suicide case, the pilots could be just very carefree thus went through an accident caused by not flying the aircraft properly without the necessary safety checks, but that's very unlikely considering their experiences, and is not even a theory to begin with.

11.2 Possibility of Hijacking

There's a conspiracy theory that the plane was forced to land in Diego Garcia, which has been used as a joint UK–U.S. military base since the 1970s. The theory suggests that MH370 carried some Chinese computer scientists believed to be responsible for hacking attacks on the U.S. Department of Defense computer servers, collecting secret information. To bring justice to them, MH370 was either captured by U.S. Navy SEALs and then flown to Diego Garcia or the aircraft was somehow forced to fly and land there. But looking at the satellite data, it's seen that the last place the plane was detected is far away from the island, and as mentioned before the plane likely crashed of fuel exhaustion at 08.19.

Another theory is that it may have been an act of terrorism, possibly a conspiracy attack. The Russian newspaper Moskovskij Komsomolets endorsed a similar theory, claiming that "unknown terrorists" had hijacked the plane, flown it to Afghanistan, and then held the crew and passengers hostage. These are just claims with no evidence whatsoever.

One of the further theories suggests that there were 4 Chinese passengers, and each of them were employees of a company and owned %20 of a patent, and the other %20 was owned by the company they worked in which was named Freescale Semiconductor. Unlike the usual, according to their contract if the employees died, their patent rights wouldn't go to the employees' families but to the company. It is suggested that the company had the plane crash to have the employees dead, so that they can have full control on the patent. But this theory was refuted because none of those employees were in the plane to begin with, let alone have the %20 of the patent.

There are too many refutable hijacking theories, it's quite unnecessary to include all of them here.

11.3 Fire

These theories suggest that the disappearance could be caused by a fire in the landing gear cargo compartment, cockpit, or another part of the plane. In July 2011, EgyptAir Flight 667 went through an oxygen-fed cockpit fire, luckily it was still on the ground. But the fire destroyed the plane controls, and created a hole through the hull of the plane. The firefighters arrived within three minutes, but the fire still took 90mins to fully extinguish. That plane was also a Boeing 777, so it is possible MH370 caught fire in the sky and couldn't manage to land

an emergency landing. Because there was also a problem with Boeing 777's in general, there was an electrical wire going near the co-pilot's oxygen supply. The concern with this is that if a spark from the electric wire occurs that hits the oxygen supply, a huge fire could start in the cockpit. Other possibilities are that a tire caught fire while takeoff, similar to Nigeria Airways Flight 2120; or maybe there was a cockpit fire from the electrical wiring (without the oxygen involved with the start of the fire) that rapidly spread, causing control loss over the plane just like in Swissair Flight 111 from New York to Geneva. There are many possibilities on how the plane caught fire, and why it couldn't have been stopped.

11.4 Other possible causes

Cyber Attacks: It was proposed that the plane's speed, direction and altitude using radio signals to the plane's flight management system. Since this was just a passenger flight, it's not known if the security was enough to prevent such an attack, but a spokeswoman from Boeing confidently denied the possibility of it and insisted on how everything was secure enough.

Shooting: There was a theory on how the plane could have been shot down, supporting it by giving examples on how civilian planes were shot by military forces before. When this wasn't believed, people started saying it was an accidental shoot down, but then it was mentioned that a governmental action was highly not possible on this plane because of lack of evidence.

North Korea: A story was on Reddit that MH370 had enough fuel to be hijacked to North Korea just like it was done in 1969 with a Korean Air Lines YS-11.

Meteor: It was suggested that a meteor hit the plane and caused it to crash. (yes, this was an actual theory.)

Aircraft Structure: Not a possible cause of crash, but there was also another theory that the plane didn't actually crash into the ocean, if it did, it would have separated into thousands of pieces and many of those pieces would wash up to the regional shores, most of them floating. This was with advocating that a Boeing 777 doesn't have the structure to survive crashing into the ocean, and that it would be comparable to hitting a concrete wall at that certain velocity. This theory was also refuted after they found pieces of the aircraft years after disappearance.

Cell Phones: Again, not a possible cause of crash but an interesting theory. Some family members of the passengers tried calling them, and heard that the phone was ringing instead of hearing the busy or phone off signal. According to the theory, if the phones were broken or inoperative, they shouldn't have been ringing. However a wireless analyst later opposed this theory, claiming that the phone still could be ringing even if it was destroyed as if it searched for connection, and it was called ringbacks.

Entry to The Sea: It was claimed that the plane had to enter the sea vertically, otherwise it would have separated into way too many pieces which already would've been found.

MH17: On 17 July 2014, Malaysia Airlines Flight 17 was shot down over Ukraine. Since it was also a Boeing 777, some conspiracy theorists have suggested that the plane that crashed in Ukraine was actually Flight 370.

12. Aftermath

The disappearance of Malaysia Airlines Flight MH370 had a profound and lasting impact on international aviation, airline reputation, and airport security policies. The incident revealed weaknesses in aircraft tracking systems and emergency response systems and communication protocols which led to governments and airlines and international organizations implementing major reforms. The incident increased public understanding about airline safety and the need for continuous flight tracking systems.

12.1. ICAO congress on the flight

The International Civil Aviation Organization (ICAO) organized special congresses to study the disappearance of MH370 and propose methods to enhance aviation safety and tracking systems. The parties involved in the discussions reached an agreement which required aviation companies to establish permanent global aircraft monitoring systems and develop advanced satellite communication networks and standardized reporting procedures. The International Civil Aviation Organization (ICAO) proposed that countries should establish better emergency response systems which would enable faster and more effective information sharing during aviation emergencies. The recommendations which were made during this process created new international aviation safety standards which included requirements for real-time data recording and enhanced black box durability tests.

12.2. Criticisms on the flight and the airline

Malaysia Airlines faced criticism from many people because of its slow response to notify authorities during the disappearance while it failed to communicate with passengers' families and manage the crisis. Analysts identified deficiencies in both flight tracking technology and the airline's emergency response procedures. The airline experienced a major drop in public trust which resulted in fewer ticket sales and damage to its reputation. The incident led airlines across the globe to assess their security and monitoring systems while some airlines implemented improved cockpit procedures and new communication methods with air traffic control.

12.3. Airport industry

The disappearance of MH370 led airports and aviation authorities to reassess their entire security and monitoring systems together with their emergency response operations. The upgraded aircraft tracking systems at many airports included satellite and radar system

advancements together with improved collaboration between airlines and national security organizations. The industry also accelerated its implementation of ADS-B and global flight tracking systems which enable near real-time commercial aircraft monitoring across the entire globe. Airport emergency teams conducted simulations and training exercises to develop better responses for future emergencies which included protecting passenger safety and maintaining efficient information sharing during crisis situations.

12.4. Boycotts

After the disappearance, several passengers together with travel organizations refused to fly with Malaysia Airlines because they doubted the airline's operational safety and its ability to handle emergencies. The public protests together with social media campaigns which attacked both the airline and government response forced the airline to change its operational procedures and safety standards. The boycotts resulted in financial losses which pushed Malaysia Airlines to speed up its restructuring process while the airline implemented new safety measures and upgraded its communication systems together with customer support services to regain public confidence.

13. Domestic Approaches

Malaysia

The government of Malaysia follows an interesting policy where they don't fund the search teams unless they actually find something. This allows private companies to conduct underwater searches at their own expense, and they only get paid as a reward if they find a wreckage or another clue on its location. The authorities do want to keep searching, but only if they have reliable evidence or specific coordinates provided by experts. But it is safe to say the search continues mainly for the black boxes and the main body of the plane, and they try to provide the grieving families as much as they can.

China

China's approach remains more in the legal field. In December 2025, the Chaoyang District People's Court in Beijing brought a lawsuit on Malaysia Airlines to pay approximately 410,000 dollars to each of eight families whose relatives were on board. This was demanded to cover the expenses of the families on funerals, death benefits and also moral stuff like the mental pain. China also politically urges the Malaysian Government to prioritize the search. They also look up satellite data and other information to try to gather precise locations for search.

United States

America's approach is mostly within the private sector and federal investigative support. Ocean Infinity is a marine robotics company that searches for the wreckage with headquarters in the USA and UK, following Malaysia's policy. That company is searching while funding

themselves, they'll only get paid by Malaysia if they find the main body or the black boxes. On the other hand, The FBI continues to collect and investigate available data, such as Captain Zaharie's home flight simulator. While the government doesn't fund physical search, they provide satellite images and signal analysis that helps define the search areas.

Australia

They used to do a lot of searching, but they are now more of a data provider. The Australian Transport Safety Bureau (ATSB) and Geoscience Australia manage the massive amounts of mapping data collected over the last 12 years. The government stated that they won't restart a search without new and specific evidence, but they still provide logistical support for private missions or data for other search teams.

France

France still has an active judicial investigation for the 4 French passengers on board, and the French Gendarmerie of Air Transport continues to see this as a criminal matter. French investigators have spent years conducting their own forensic analysis of the debris found in the Reunion Islands and Madagascar, specifically looking for chemical traces that might indicate an explosion or fire to understand the reason for the crash.

United Kingdom

The United Kingdom's role was mostly technical but very useful. The British satellite company Inmarsat was the one MH370 connected to, and they provided with the handshake (the signal between the satellite and the aircraft) info which helped to understand the path MH370 followed in the sky. British experts from the Air Accidents Investigation Branch continue to help the Malaysian government by re-analyzing signal frequency shifts to understand where the plane ran out of fuel and when it crashed. The goal is to get more precise locations to search by following the procedure, and initially find the black boxes and the main body. Some techniques used in Ocean Infinity missions were developed through mathematical simulations conducted in the UK.

Vietnam

Vietnam played an important role in the short period after disappearance, as the aircraft disappeared; it was supposed to connect to an ATC in Vietnam which it didn't. They really helped with launching one of the largest sea and air rescue operations in their history near Thailand. They maintain the official records of the last communications and radar data from the IGARI waypoint, which helps identify the search locations.

14. Current Status

The investigation into Malaysia Airlines Flight MH370 which disappeared in 2016 has not uncovered any trace of the aircraft because search teams have not discovered either its main wreckage or its flight recorders. The southern Indian Ocean region which satellite data and

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drift analysis identified as the aircraft crash site has not yielded any confirmed aircraft discoveries after more than ten years of searching. The international search operations which lasted for many years resulted in a new underwater search operation which started in late 2025. The Malaysian government signed an agreement with the marine robotics company Ocean Infinity to search a 15,000 km² seabed area in the southern Indian Ocean thought to have the highest probability of containing the wreckage. The search operation which had been scheduled to last 55 days began on 30 December 2025 under a "no find no fee" contract which required the company to receive payment only after locating the plane.

The search efforts started to progress but from 23 January 2026 onwards the search ended because the team could not find any aircraft wreckage. The expedition used advanced autonomous underwater vehicles to search thousands of square kilometres of the ocean floor but it failed to discover any concrete proof of MH370's final resting location. The authorities have not announced the beginning date for the upcoming search phase and the authorities have not determined the actual location of the crash site.

Over the years, pieces of debris believed to be from the aircraft have washed ashore on islands and coastal areas around the Indian Ocean, but these fragments have not led to the discovery of the main wreckage or provided a complete explanation of what happened. The family members of passengers and crew members are still demanding answers while officials indicate they might expand future search operations yet MH370 remains one of the most strange incidents in contemporary aviation history.

Also we would like to put a video for our fellow delegates in order to understand the story of MH370 more closely

Even though it does not have the most recent details this pilot explained the story very well it might be useful

 [A NEW Trace! The FULL MH370 Story, so Far..](#)

15. Bibliography

Use VPN for safe research

[MH370 pilot's flight simulator plotted course over southern Indian Ocean | Malaysia Airlines flight MH370 | The Guardian](#)

[Malaysia Airlines flight 370 disappearance - Mystery, Search, Investigation | Britannica](#)

[Malaysia Airlines Flight 370 disappearance theories - Wikipedia](#)

https://www.icas.org/icas_archive/ICAS1994/ICAS-94-6.4.4.pdf

https://en.wikipedia.org/wiki/Timeline_of_Malaysia_Airlines_Flight_370

<https://www.mh370search.com/>

<https://aviation.stackexchange.com/questions/2472/how-can-a-computer-model-yield-two-possible-flight-paths-of-mh370-in-south-india>

<https://www.geomar.de/en/news/article/mh370-where-to-search>

<https://www.atsb.gov.au/mh370-pages/the-search/maps>

<https://www.atsb.gov.au/publications/2014/mh370-bathymetric-survey-fact-sheet>

<https://googleearth.com/2014/03/flight-mh370-search-data-in-google-earth/>

<https://www.atsb.gov.au/mh370>

<https://apnews.com/article/malaysia-missing-flight-mh370-seabed-search-5c564494723ae2d4ead87d7aeebcdef9>

https://www.icao.int/sites/default/files/safety/airnavigation/AIG/Documents/Safety-Recommendations-to-ICAO/Final-Reports/MOT_KIKU_9M-MRO_01-2014_preliminary_report.pdf

<https://maritime-executive.com/article/ocean-infinity-relaunches-search-for-long-lost-flight-mh370>

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<https://4orbs.com/mh370/>

https://en.wikipedia.org/wiki/Malaysia_Airlines_Flight_370

<https://www.dw.com/tr/12-y%C4%B1l-%C3%B6nce-d%C3%BC%C5%9Fm%C3%BC%C5%9Ft%C3%BC-mh370in-s%C4%B1r%C4%B1-yine-%C3%A7%C3%B6z%C3%BClemedi/a-76275817>