





# MH370:

## A New Theory as to What Went Wrong

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There is enough information available from the MH370 Safety Investigation Report and from the work done by the “MH370 Independent Group,” to plausibly hypothesize that the disappearance of this flight was caused by a hijacking operation. The still-unknown “People in Command” (PiC) almost succeeded in making the aircraft invisible by taking advantage of the shortcomings of civil and military ATC procedures and systems and of Airlines Operational Command Centers (AOC).

In our scenario, Christmas Island near Indonesia in the Indian Ocean was the hijackers intended destination, but they then had to ditch the aircraft when the fuel ran out. On this basis, we delineated a much smaller and easier search area than what has been unsuccessfully explored so far.

### The Shortcomings of ATC

Why hijack flight MH370 at the IGARI waypoint (where the flight’s responsibility passed from Malaysia to Vietnam), 41 minutes after takeoff? First, because when a flight reaches its cruise level, the crew relaxes and may be more vulnerable to a surprise attack. Second, because the transfer of responsibility between two flight information regions (FIR) – here, Malaysia and Vietnam – controlled by two distant ATC Area Control Centers (ACC) increases the reaction time on the ground, delaying the realization that something abnormal has occurred, and therefore delaying any reaction by relevant authorities (e.g. the search and rescue operators or the air force).

Aircraft departure represents a workload peak for pilots, so after the cruise level has been reached and the aircraft is safely on autopilot, they tend to relax. A transfer point between two FIR is indeed the right time to start a hijacking operation, either for a “third party” to hijack the plane or for the captain to initiate his own “deviation plan.”

Civilian communications and surveillance systems assume that radio and transponder systems on board the aircraft are “active,” meaning tuned to the right frequency and set with the right code. When an aircraft leaves an ACC (the giving ACC) for another (the receiving ACC), the pilots bear the responsibility to contact the next ACC. The controller handing off the flight verbally transmits the frequency to the pilot, who manually inputs the frequency into the radio panel. An input error could be caused by either the controller (wrong frequency indication) or the pilot (wrong frequency input) and such events are not infrequent.

Once the MH370 captain had said “good night,” the controller in Kuala Lumpur would have paid less attention to that aircraft, since he was no longer in charge. Much criticism has been raised by the time lag—approximately 17 minutes—it took for the Vietnamese controller to react. Although according to the letter of agreement (LOA) between Kuala Lumpur ACC and Ho Chi Minh ACC, the transfer of responsibility is at the IGARI waypoint, so in practice, the transfer point is, for lack of a better phrase, a sort of space-time “grey area” where nobody is in charge.

Since no emergency had been declared, it is very likely that the Vietnamese controller assumed that the crew was recovering from the heavy workload of departure or dealing with some minor problem on board and was delaying its call. This portion of airspace is a narrow band of the Singapore FIR, sandwiched between the Kuala Lumpur FIR and the Ho Chi Minh FIR, which had been delegated to Kuala Lumpur to reduce the number of transfers. Compared with the LOAs which were in place a few years before, this specificity could add several minutes of slack in the transfer procedure. The MH370 pilot did not call the Vietnamese air traffic controller, who unsuccessfully tried to contact the MH370 flight when he felt the delay was exceeding usual practice.

However, frequency selection errors or failures of VHF radios are not uncommon and can remain undetected for a while. The ATC officer cannot call the plane if the pilot has selected an incorrect frequency. The 121.5 MHz distress frequency can be used but is not always monitored by pilots. The secondary radar four-digit code (on the transponder), transmitted in the same way as the radio frequency, and could be subject to a failure or to the same type of input error. The onboard Mode S radar system transmits the identity of the aircraft, but, if, for instance, the transponder has been replaced during a maintenance operation, the correct identity of the aircraft might not be properly input, leading to identity confusion. For VHF voice communication, it is not uncommon that the transponder would stop responding to radar interrogations.

In this case, there was no reason for the Vietnamese controller to act differently. According to procedures, he assumed that the aircraft that has disappeared on his screen was still following the filed flight plan and thus he continued to separate other aircraft from MH370's intended flight path. After a while, he called his Malaysian colleague, who, in the absence of any distress call, had no reason to be worried either. Later, the Malaysian Airlines Operation Command Center (OCC) erroneously reported that they had managed to contact MH370, which further delayed the triggering of an alert.

The OCCs of large airlines manage flights as well as their fleet and their hubs. At any time, a crew can contact its OCC via VHF or HF radio and, ever more frequently, via

the Inmarsat Satcom phone, now available on most long-haul aircraft like the MH370.

Many companies also use the ARINC Communications Addressing and Reporting System (ACARS) for exchanging airline operation communication (AOC) messages with their in-flight pilots. On board, messages are sent using the flight management computer (FMC) alphanumeric keyboard interface; received AOC messages are still printed on paper. The ACARS uses either VHF or satellite networks. It is worth noting that the ACARS system has been developed for commercial purpose independently of any International Civil Aviation Organization (ICAO) standardization process.

In addition, modern aircraft engines are equipped with sensors connected to the engine health monitoring system (EHMS). Data is transmitted in real time to the airline maintenance center which could trigger some actions, such as re-routing, next stop maintenance, or medium-term planned maintenance. This service was implemented on board MH370, but it was not tracking the aircraft precisely. At the time when the MH370 disappeared, no regulatory requirement existed for periodically transmitting the aircraft location, even though some airlines had already added it in ACARS messages.

### Could It Happen Again?

In the Spring 2019 issue of the *Journal*, in the article “MH370 After Five Years, What's Next?” Steve Winter wrote, “Nothing has fundamentally changed that could prevent an aircraft disappearing.” We fully agree with that statement. In response to the loss of flight MH370, the ICAO has mandated the Global Aeronautical Distress and Safety System (GADSS), and Aireon has implemented an ADS-B system over the Iridium Next Satellites.

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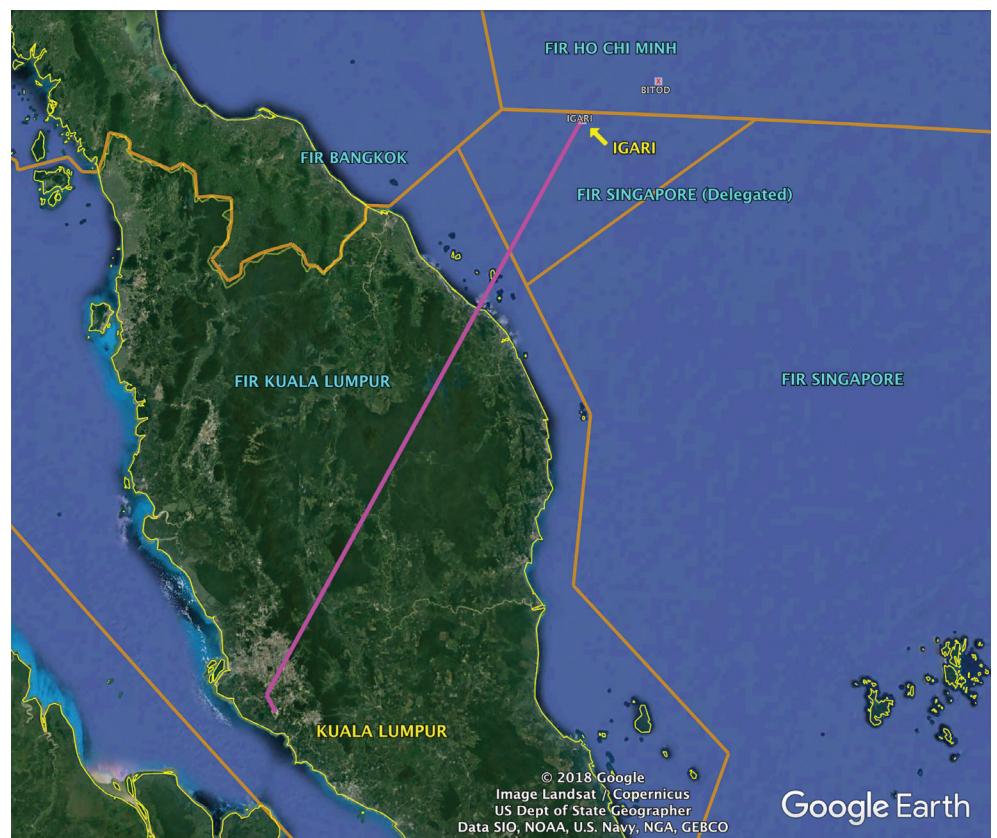


Figure 1. Nominal trajectory to IGARI waypoint.

Photo Courtesy of CAPTIO





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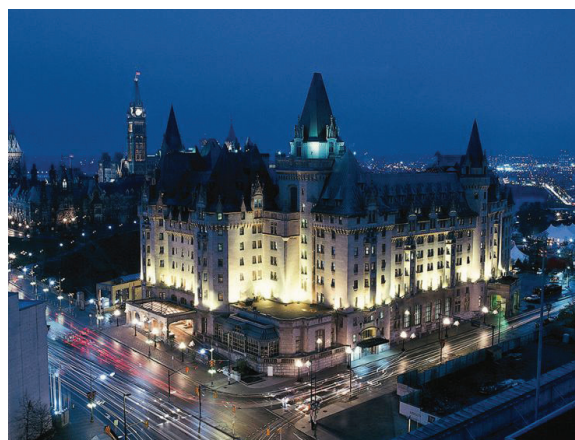
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Due to the disappearance of 153 Chinese passengers on board MH370, China is developing Sky Mirror, a “satellite system to track planes in real time,” designed by China Electronics Technology Group.

<sup>[1]</sup> They are considering that “the availability of real-time, precise ADS-B information will drastically reduce the size of the search areas and improve the speed and success of any search.” However, all these developments cannot prevent a transponder failure or a voluntary shutdown, which would result in the loss of ADS-B data transmission. So far, no improvement has been planned for the weakest link of the chain: the Secondary Surveillance Radar (SSR) transponder. The Malaysian, Thai, and Vietnamese control centers all lost track of flight MH370 precisely at the same moment, when all their surveillance systems stopped receiving both SSR radar plots and ADS-B data.

### How Secure Is ADS-B for ATC and AOC?

In the same Spring 2019 *Journal* issue, in the article “ADS-B and Mode S Security Challenges in Continually Changing Environments,” Allan Storm wrote:

“In the past, aviation agencies exchanged information using aviation-specific technology and protocols. Attacking this information required insider knowledge and specialized hardware and software. Today, with the migration to digital data communication, inexpensive tools, software, and public knowledge, the aviation ecosystem is more vulnerable to cyber attacks than ever before...all [should] acknowledge that a near-term solution to privacy and security concerns is not currently available. This solution is not simple.”

Indeed, in the past, ATC was using specialized hardware and software and, even if it has not been successful, the FAA Advanced Automation Program was visionary in being the first to try to use, as much as possible, commercial off-the-shelf (COTS) hardware and software. However, in the early 1980s, these COTS were probably not mature enough. It is no longer the case: all ATC equipment providers have now included COTS in their systems, but not in telecom systems. In Lynn Helms’s visionary 1981 NAS Plan, a full Air-Ground Datalink (AGDL) was supposed to be deployed by 1995. A quarter of a century later, the US NextGen and the European

SESAR programs are still in the process of fostering the deployment of an AGDL.

### Should Aeronautical Data Communication Migrate to Commercial Satellites Communication Services?

Passenger communication service providers already operate systems called in-flight entertainment and connectivity (IFEC). As mentioned by Winter in the Spring 2019 *Journal*, SwiftBroadBand by Inmarsat and Globalstar are already implemented, but more is to come with Starlink from SpaceX and OneWeb, which are large low Earth orbit (LEO) constellations aiming to provide worldwide mobile internet services. Thus, ATC and AOC could benefit from broadband connectivity, with added end-to-end safety and security features, to implement the following improvements for current procedures and processes:

- Resolve the intrinsic fragility of the silent transfer mechanism (blurred zone of responsibility and dependence on manual actions by pilots on their VHF radios), replacing it with a triangular datalink protocol, ensuring a complete loopback between the two controllers and the pilot.
- Share aircraft location data in real-time between all the actors in order to provide a common view of the situation, which would avoid confusion, suppress malfunctions, and accelerate the operational coordination between ATC and AOC and between civilian ATC and military authorities.
- Mandate for long-haul flights (especially transoceanic ones), an uninterruptible position reporting system (equipped with its own Global Navigation Surveillance System (GNSS) receiver, and a buffer battery that ensures several hours of autonomy) relying on any global Satcom system guaranteeing a certain quality of service (QoS) level in terms of integrity, availability, reliability, and transmission delay. ADS-B reports could be used to collect and distribute data during an interim phase. However, the non-encrypted distribution of aircraft positions and the absence of authentication and data integrity protection mechanisms create new risks with respect to security issues, as rightfully pointed out by Allan Storm.



Figure 2. U-Turn Source.

### The CAPTIO Trajectory and Hijacking Theory

Starting from this analysis of where and when it all started, the Constraints on Alternative Piloted Trajectories in the Indian Ocean (CAPTIO) team has designed a start-to-end piloted trajectory, which ends near Christmas Island.<sup>[2]</sup> Two key assumptions of our theory are:

- The flight ended in the Indian Ocean because of a fuel consumption management error.
- No claim for the hijacking was made because it failed.<sup>[3]</sup>

### How to Interpret the Initial U-Turn?

There has been a lot of speculation about the tight U-turn, imperfectly recorded by military primary radars, which took place just after the disappearance of the aircraft. The official final report released by Malaysian authorities states



that this steep U-turn was difficult to simulate. Nobody knows when and where it started. It could have been executed by an experienced pilot such as the captain, but if the hijacking was carefully planned by the MH370 captain, why would he risk stalling by undertaking such an acrobatic turn?

We assume that after the Mode S transponder was manually switched off, the aircraft took a sharp U-turn in the opposite direction of where the unavoidable search and rescue would take place to mislead ATC. The final investigation report states that: "The possibility of intervention by a third party cannot be excluded." Our hypothesis is that hijackers provoked an electric shutdown simulating a power failure, which triggered the U-turn by the pilot. Shutting down the electric power can be done either by the pilot in the cockpit or by a third party manipulating circuit breakers in the electronic equipment bay (EEB) where all the flight control systems are located. The B-777 EEB is a pressurized room located under the cockpit with three possible entry points: an external trap door near the front landing gear, an internal door communicating with the cargo hold, and another trap door in the floor of the passenger cabin just outside the cockpit.

One technical fact led us to believe that a third party was involved rather than the pilot: if the pilot had wanted to close all communication channels, including the Satcom, he could have turned off the Satcom through his FMC interface. But this would have sent a logoff message to Inmarsat, resulting in a "clean" disconnect of the system. But what happened instead was an abrupt shutdown of the Satcom connection, followed by an automatic reconnection about one hour later (when the electric power was turned on again). Why would a seasoned pilot take the risk of a complete shutdown of the main electric

power (a maneuver to be undertaken only in case of extreme emergency such as an engine fire) when a simple selection in an FMC menu would disconnect the Satcom?

How could a third party get into the aircraft? No suspect was found among the passengers, even the two persons found to have used stolen passports. Yet, some accomplices with genuine passports could have embarked, and one or more armed persons could have stealthily entered the aircraft at night before departure and hidden in the EEB, remaining there throughout the beginning of the flight. The main circuit breakers are all located there and opening them would also deactivate the electromagnets that lock the cockpit door.

We do not know exactly when the hijacking may have occurred during the U-turn, but the counter argument that "there was no sufficient time to come out of the EEB and enter the cockpit" is rather weak; taking advantage of the panic created by the electrical shutdown, popping up into the cabin through the trap door (located just outside the cockpit), and entering the cockpit would take only a few seconds.

### What Can the Trajectory Recorded by Primary Radars Reveal?

Four key issues have been raised:

1. Is the recorded trajectory actually MH370? So far, nobody has come up with an explanation of why and how another aircraft, civil or military, could have flown that trajectory.
2. Why was there no reaction from Malaysian, Thai, and Indonesian air forces when they saw an unidentified aircraft flying along the boundaries of their respective airspace? The Malaysian Minister of Defence explained that this aircraft was not perceived as a threat and that there was therefore no reason to take action.<sup>[4]</sup> This is

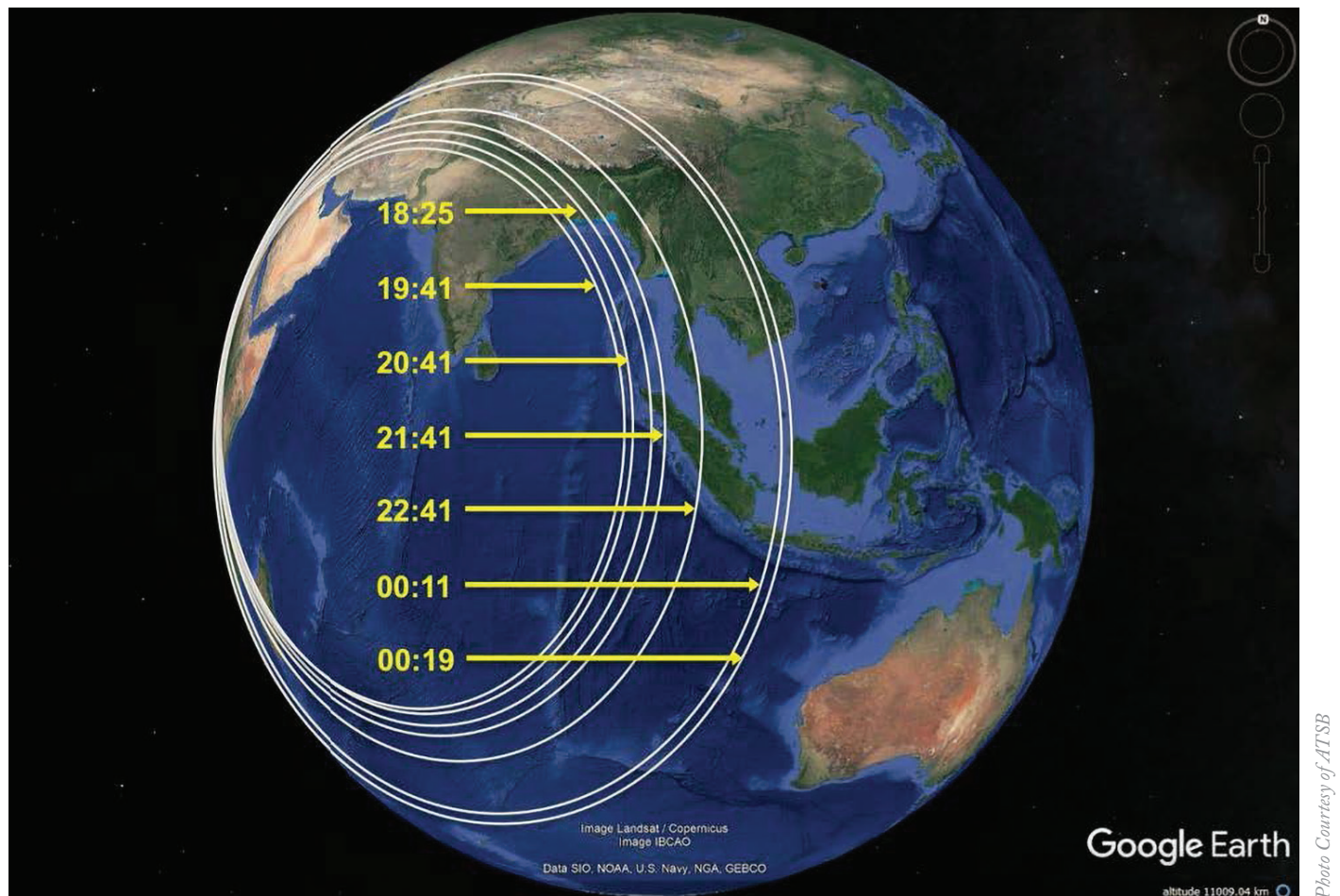


Figure 3. Inmarsat BTO rings during later stages of flight.



*There has been a lot of speculation about the tight U-turn, imperfectly recorded by military primary radars, which took place just after the disappearance of the aircraft.*

Photo Courtesy of CAPTIO

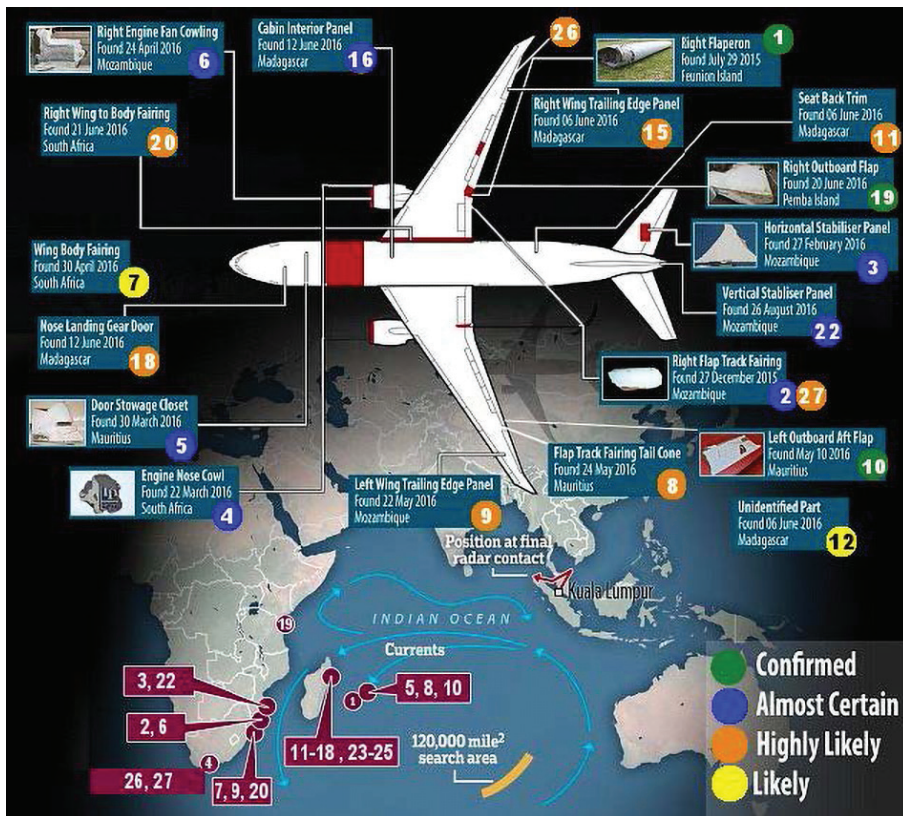


Figure 4. Debris map synopsis.

Photo Courtesy of ATSB

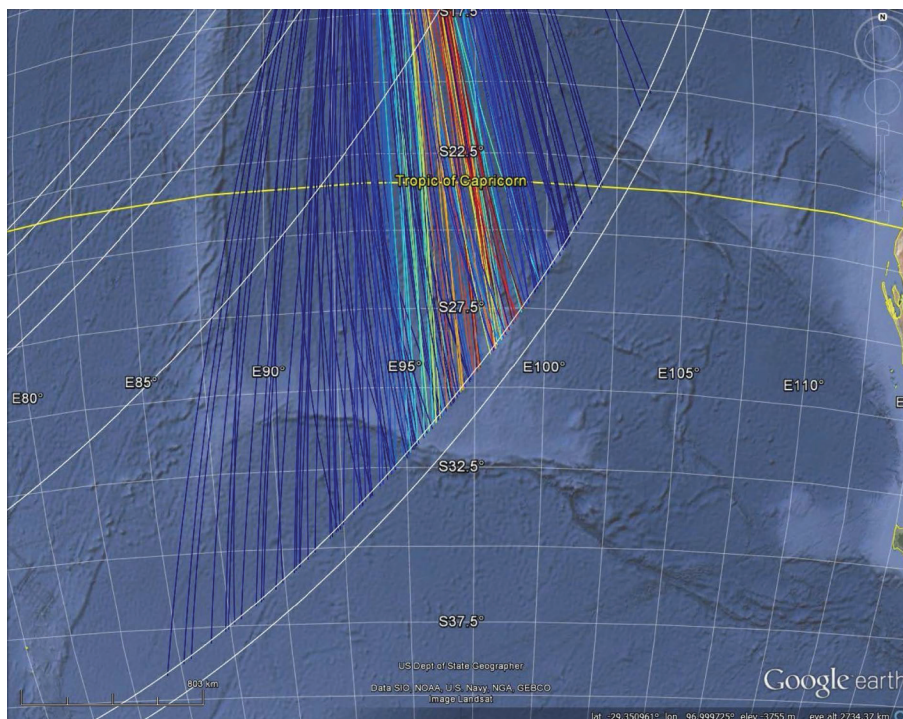


Figure 5. Five trajectories.

the standard way air defense operates all over the world (now, many countries confronted with terrorism would immediately launch an interception operation). Radars are monitored by human operators, and these operators are responsible for assessing threats represented by airspace intruders. The Malaysian military saw the plane that night, but its trajectory was not threatening as it flew exactly along the border between Malaysia and Thailand. In addition, due to its preceding U-turn, they did not realize it was the diverted MH370. The aircraft remained in Kuala Lumpur's area of responsibility until it entered the Chennai FIR in India.

Hidden in the civilian traffic and behaving like a normal civilian flight with a non-critical SSR transponder problem and crossing airways under their minimum maximum flight levels, the flight was perceived as neither a security threat nor a traffic safety risk, so the Malaysian authorities' passive attitude is understandable. MH370's unusual behavior was only discovered later, when replaying radar records. Thai authorities had a similar reaction: their radars might have detected the plane, but military operators "did not pay attention."<sup>[5]</sup> Indonesia provided no information, but one would expect the same justification.

- Why was the MH370 trajectory so convoluted? There has been a lot of debate about the compatibility of the recorded trajectory with aircraft performance. Although some additional information on Malaysian radar data has been obtained by members of the Independent Group, it remains sketchy, especially regarding the altitude. During this first leg, with all the five electric generators disconnected, the maneuvering capability would have been limited to what is allowed by the Ram Air Turbine (RAT). Therefore, either the captain, by himself or under the instructions of hijackers, or another experienced pilot, was able to navigate manually using waypoints as visual targets on the navigation display (ND) or using VOR with distance measuring equipment (DME) possibly following airways close to FIR boundaries to fool Malaysian surveillance.<sup>[6]</sup> Before leaving Malaysian airspace, it executed a contingency procedure to avoid traffic in the Malacca Strait, to hide from radars, and avoid being detected.
- Can we be sure the flight ended in the Indian Ocean? The final six hours of the



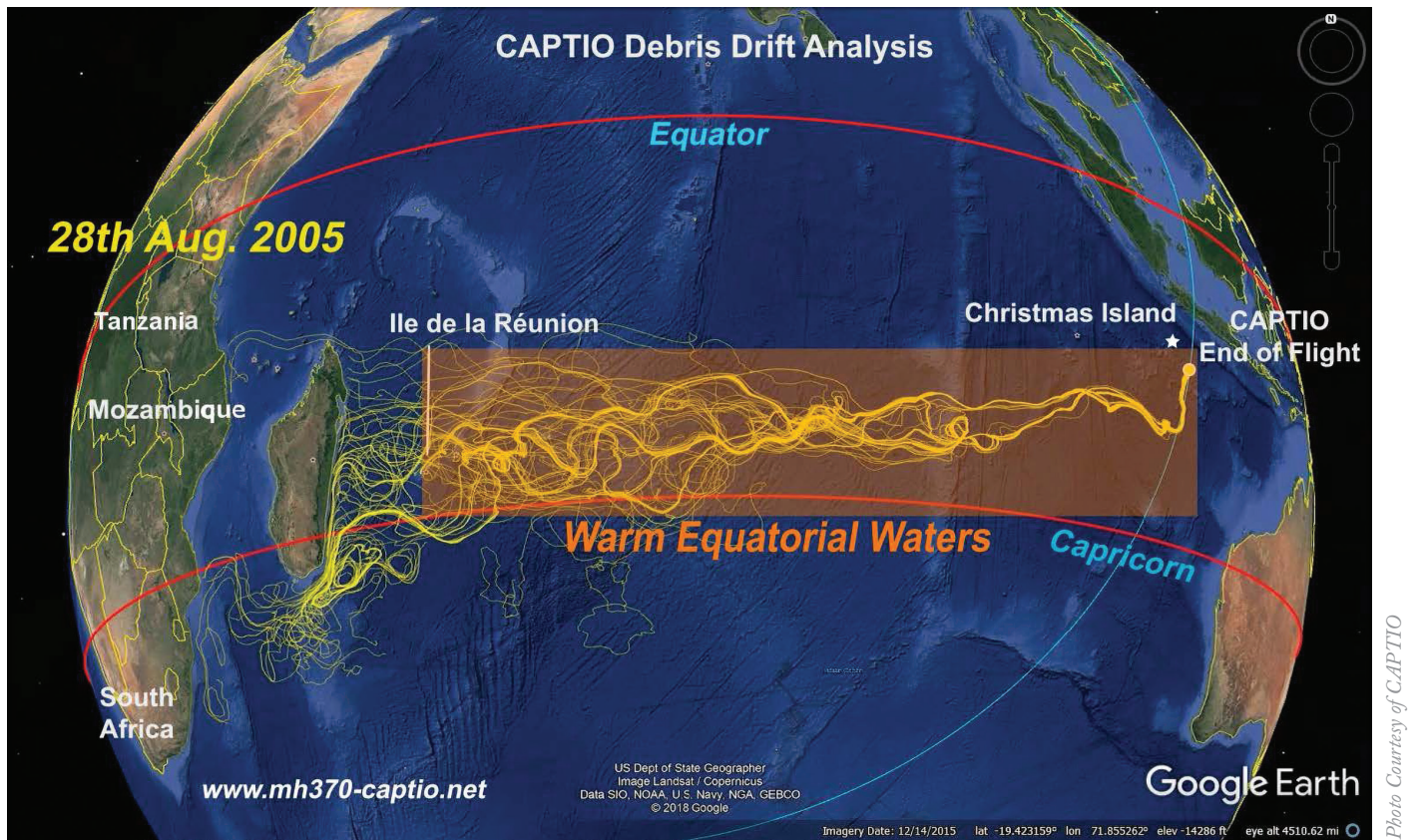


Figure 6. Drift of MH370.

trajectory and its ending in the Indian Ocean have been authenticated by Inmarsat messages and the few recovered pieces of debris. Some supporters of alternative conspiracy theories have challenged the integrity of Satcom data and the authentication of debris, some of them envisaging spoofing of Satcom messages by some mysterious passenger or an ex-post forging of identification numbers found on debris. Such suggestions reflect their ignorance of both Satcom system operations and aircraft manufacturing quality assurance processes.

We can affirm that the wreck will not be found in the China Sea nor in Kazakhstan but in the Indian Ocean, somewhere along the Seventh (and last) Arc as determined by Inmarsat experts.

The Australian Transport Safety Bureau (ATSB) assumed that nobody was in control of the aircraft after its last southward turn in the west of Sumatra. They considered it was in autopilot mode with a constant heading and a stable cruising altitude (FL350) until the end. Such trajectories fit the burst time offset (BTO) and burst frequency offset (BFO) data recorded by Inmarsat.

These possible trajectories have led to three expensive and unsuccessful search campaigns. This option also led to unsubstantiated speculations of the captain's suicidal behavior.<sup>[7]</sup>

CAPTIO took another approach to determine a trajectory matching BTO and BFO data and considered it was also piloted throughout the six last hours of the flight. Any such trajectory is as plausible as the one assumed by the ATSB considering the aircraft was carefully piloted while still in the Malaysian airspace. The CAPTIO trajectory, which ends near Christmas Island, takes stock of airspace structures, avoids risky behavior, evades radar detection, and moves near FIR boundaries in an attempt to mislead ATC. It matches Inmarsat BTO and BFO measurements and flies over published navigation waypoints. It minimizes manual interventions by setting a target altitude for each interme-

diante waypoint and lets the Flight Management System (FMS) adjust the speed to optimize fuel consumption.

Our own simulations show that the aircraft would have run out of fuel at the exact time and location of the Seventh Arc. This trajectory is the only one proposed so far that is humanly-controlled until the end while applying as few navigation constraints as possible. Many other trajectories have been proposed, but their proponents do not factor airspace structure, ATC procedures, and the performance of FMS-managed aircraft. That is the main added value of the CAPTIO trajectory.

### What Can We Learn from the Debris?

A small amount of aircraft debris can float half-immersed; therefore, its drift is sensitive to currents, winds, and waves. Several academic retro-drift studies, using mathematical tools and meteorological models, have factored these three factors. Due to the uncertainty of meteorological conditions the day of the disappearance (with Hurricane Gillian in the vicinity) and of the Indian Ocean models used, these studies are inconclusive. Instead, the CAPTIO team carried out a forward drift tracking from the estimated ditching point near Christmas Island, completed with that day's actual meteorological situation.<sup>[8]</sup> Using starting points evenly distributed over a 100 NM<sup>2</sup> square, one can see the dispersion of debris caused by the "butterfly effect," reflecting the high sensitivity of the results to initial conditions.

We can also highlight the scientific analysis conducted by marine biology experts on the barnacles found on the flaperon, which was the first authenticated piece of debris and which is still in a Ministry of Defence facility in France.

Appendix 2.6B of the final report: "Analyse de la température des eaux pendant la croissance des cirripèdes trouvés" by Dr. Dominique Blamard and Dr. Franck Bassinot, stated: "The temperature map



included in the report shows that the flaperon had most likely drifted for a few months in the middle of the Indian Ocean and in a fairly narrow band of latitudes (between 15° and 18° latitude south), before going down to La Reunion.” Owing to this study of barnacles, the search along the Seventh Arc could be narrowed to a range of more tropical latitudes. This important finding is consistent with the CAPTIO trajectory end point.

### Is the Debris Compatible with a Final Ditching?

*The Journal's* Spring 2019 MH370 article noted that “the recovery of cabin interior debris suggests the aircraft broke up, but it is not possible to determine whether this occurred in the air or on impact.”

The CAPTIO team has assessed the aircraft's physical behavior during the last minutes of the flight. The eventual reconstruction, relying on structural mechanics, is based on the very limited amount of authenticated debris, such as the right wing flaperon, the right wing outer flap, and the left wing outer flap trailing edge. For CAPTIO, the most important piece of debris is the broken right wing flaperon, as it has been extensively documented.<sup>[9]</sup> However, it was impossible to make an analytical calculation due to the lack of data.

### Calculations and Simulations

In response, CAPTIO designed some basic structural models to examine the flaperon's response to ditching. A smoothed-particle hydrodynamics (SPH) method was used to model the flaperon's pressure-time evolution in the water.<sup>[10]</sup> When analyzed in a “rigid body” mode to obtain an upper bound of the water pressure loads plus using the Theory of Simple Bending and the Bredt-Batho Theory of shear stress, the corresponding internal stresses would be far too excessive for equilibrium, hence the need for a flexible flaperon model analysis.

Using material information that is available in the report by the French Direction Générale de l'Armement (DGA), such as damaged elastic and failed finite element (FE), we constructed flaperon models

and repeated the ditching simulations. In all cases, the trailing edge of the flaperon broke at the intersection with the associated spar, in agreement with the debris discovered. A typical simulation of the elastic flaperon in guided ditching is shown in Figure 7, CAPTIO full 3D analysis of the elastic flaperon in guided ditching.

The same flaperon model was simulated for sea impact in leading-edge-first free fall from a height of 5,000 ft and a terminal speed of 137 km/hr. The simulations showed no trailing edge damage but severe fractures of the leading edge, contrary to the debris evidence.

So, it appears almost certain that hydrodynamic loading through ditching can produce, at the initial stages of the sea impact and under controlled ditching conditions, loads that will surpass the limit of the material, in the vicinity of the fasteners to the lateral spar of the flaperon trailing edge. The crack would then propagate along these fastener holes (“un-zip” around the stress concentrations) until the broken trailing edge becomes large enough to twist and tear off from the rest of the section, which is what appears to be the case from the images of the remaining flaperon debris.

The flaperon eventually broke off from its attachments. CAPTIO is currently investigating whether hydrodynamic loading on the rest of the flaperon (once the trailing edge broke off) could create the required forces to shear-off the lug connections to the wingbox. The investigation is done through adapted full aircraft ditching simulations upon a wavy sea, plus detailed flaperon lug fracture simulations. We will expand upon the results of this investigation in a subsequent article. The absence of marks on the skin of the recovered flaperon debris reinforces CAPTIO's theory that hydrodynamic loading could explain the structural failure.

### Why Christmas Island and Why the Failure to Land There?

Christmas Island, south of Java, is part of Australia. The distance between Kuala Lumpur and Christmas Island along this trajectory is the same as between Kuala Lumpur and Beijing. Crossing the

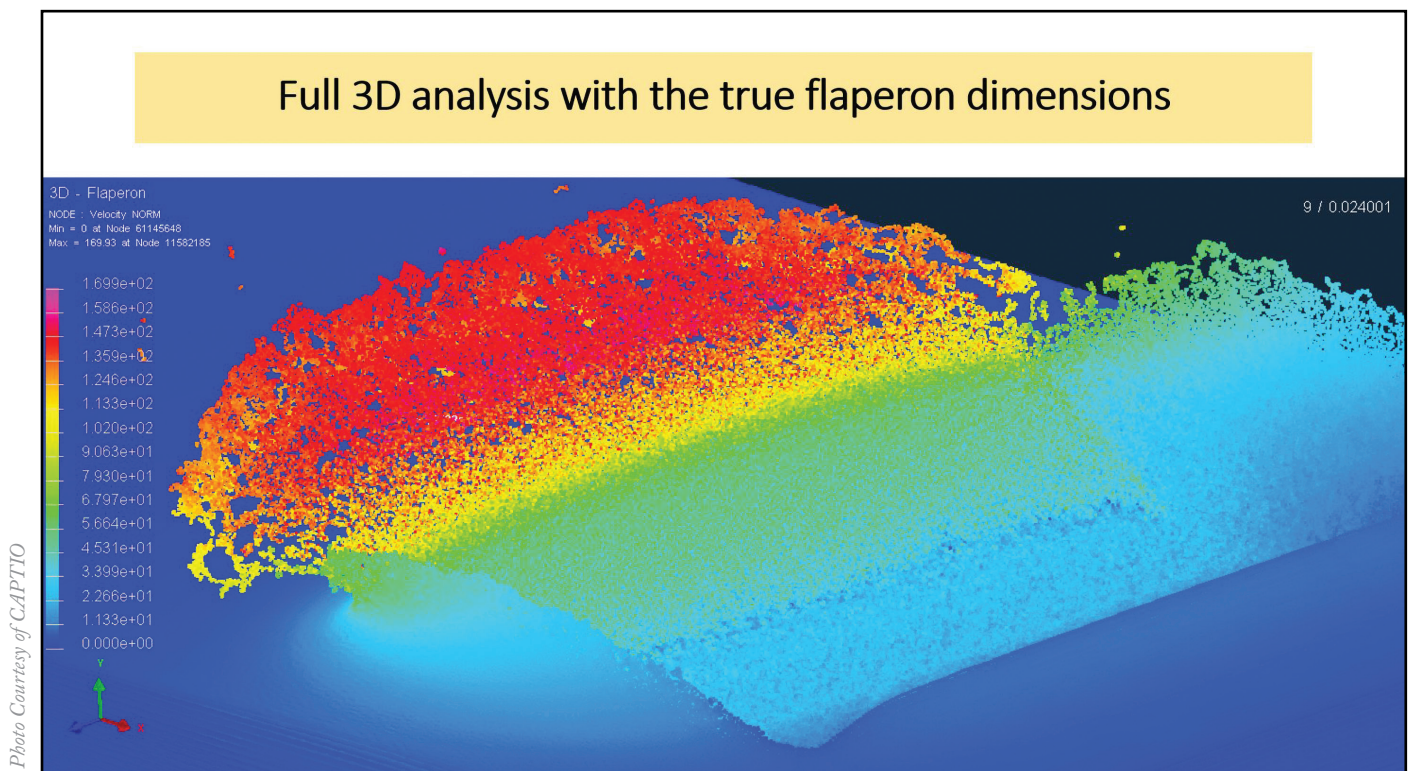


Figure 7. Details of the water velocity contours in the SPH ditching simulation.



*The eventual reconstruction, relying on structural mechanics, of the last minutes of the flight must be based on the assessment of the very limited amount of authenticated debris found.*

Indonesian airspace as an intruder flying at a high altitude because of volcanic activity at the time would not be a realistic option for the hijacker(s)<sup>[11]</sup> and the Indonesians are very sensitive about their airspace sovereignty.<sup>[12]</sup> Compared to the Straits of Malacca, in the south of Sumatra and Java, there is not enough commercial traffic to hide therein, and to minimize the risk of detection by Indonesian primary radars, it makes sense to fly at low altitudes.

But how could the pilot fail to properly manage fuel consumption? Why not fly a direct route toward Christmas Island, once the shortage became evident? Why stick to the standard approach from the south toward the Christmas Island runway, as shown by the last pair of BTO and BFO?

There are several elements that the people in the cockpit may not have known:

- The right-hand engine consumed slightly more than the left one, approximately 150 kg/h, which is more than a ton of fuel missing at the Seventh Arc.
- No information is available from the aircraft systems and/or the engine manufacturers on the actual fuel consumption at 5,000 ft.
- As no weather information could be passed on to the aircraft, no wind information was available for trajectory estimations by the FMS.

- The waypoints could have been input one by one, thus making it impossible to correctly estimate the overall fuel consumption at destination. Thus, the FMS would not have provided reliably forecasted remaining fuel at the intended (but unknown by the FMC) destination until it was too late.

The “People in Command” could have mastered aircraft piloting to a limited degree, in lateral navigation (LNAV) mode, using waypoints available on public airspace maps and input in the FMC, a way of piloting where you can train yourself using non-professional flight simulators. They may have given these waypoints one by one to the crew who would not have known the complete trajectory planned by the hijackers. On the other hand, one should not exclude the possibility that the pilot did it all without the aim of landing somewhere. The final ditching attempt should have been conducted manually by an experienced pilot.

### Conclusions

Since the key objective is still to find the wreck’s whereabouts, the CAPTIO theory has one striking advantage: from the very end of descent at 5,000 ft, the CAPTIO-defined search area (20NM x 80NM) is very small and located in a region where the weather is much milder than in the southern areas that have been unsuccessful-

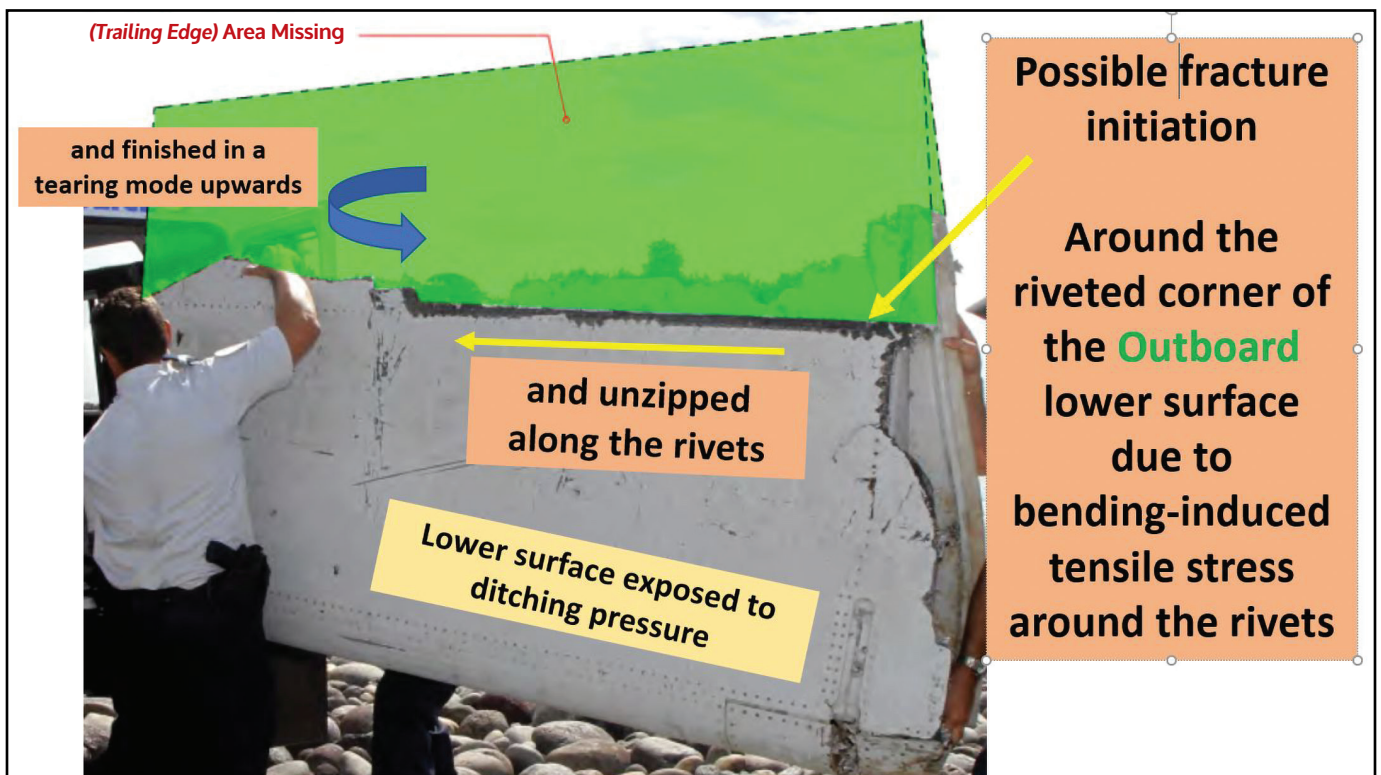


Figure 8. Comparison of flaperon scenarios with annotations.

Photo Courtesy of CAPTIO



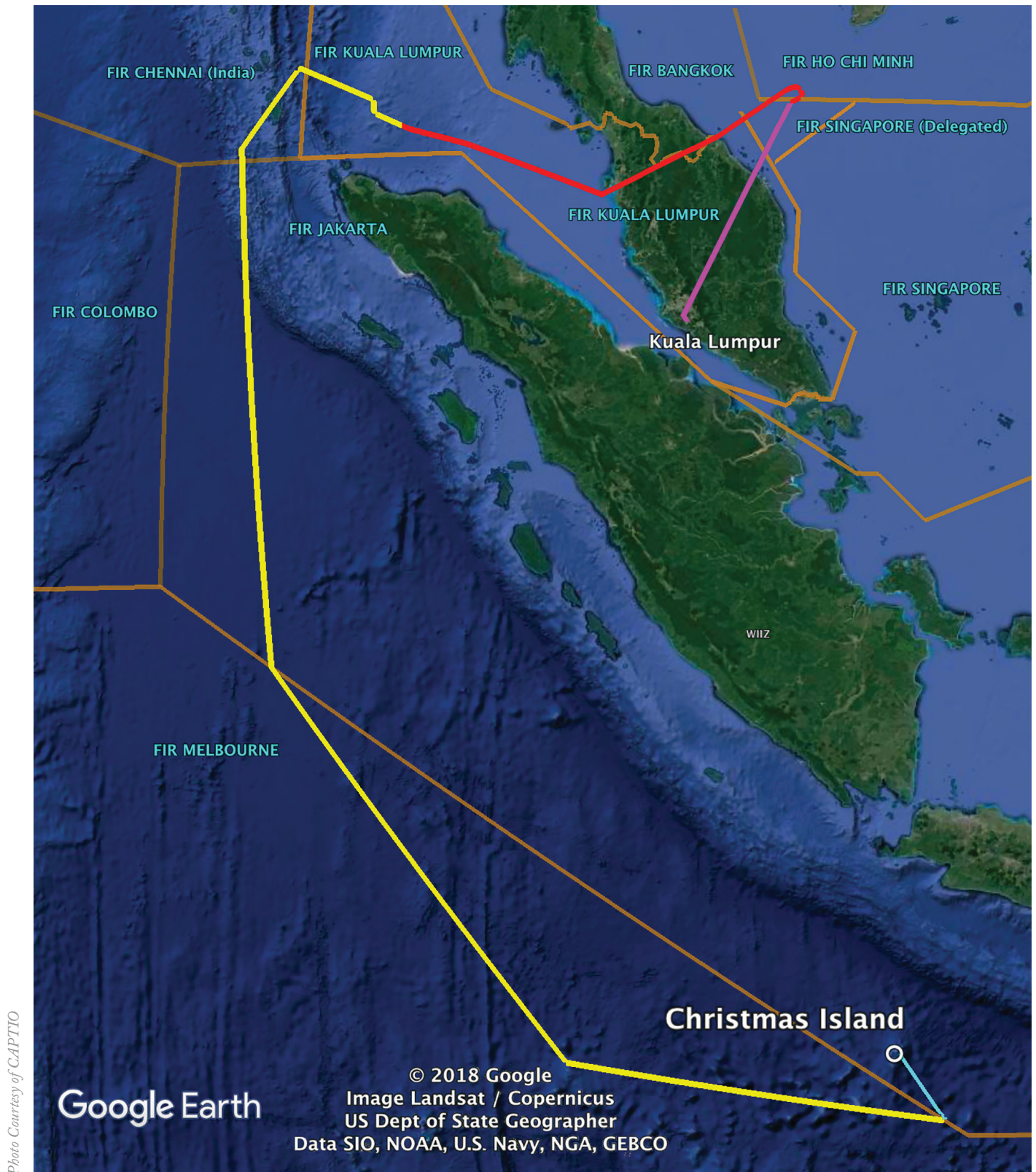


Figure 9. Full CAPTIO trajectory

fully searched in recent years. The cost of exploring the area delineated by the CAPTIO study would be less than a tenth of what has been spent so far. CAPTIO recently presented their research to EUROCONTROL.<sup>[13]</sup>

Concerning a better aircraft position monitoring, worldwide mobile internet services (e.g Starlink or OneWeb) could be an oppor-

tunity for ATC and AOC to utilize a broadband connection with added end-to-end safety and security features implementing the following improvements to current procedures and processes:

- Resolving the intrinsic fragility of the silent transfer mechanism.
- Distributing in real-time aircraft location data to all the actors.
- Mandating an uninterruptible position reporting system



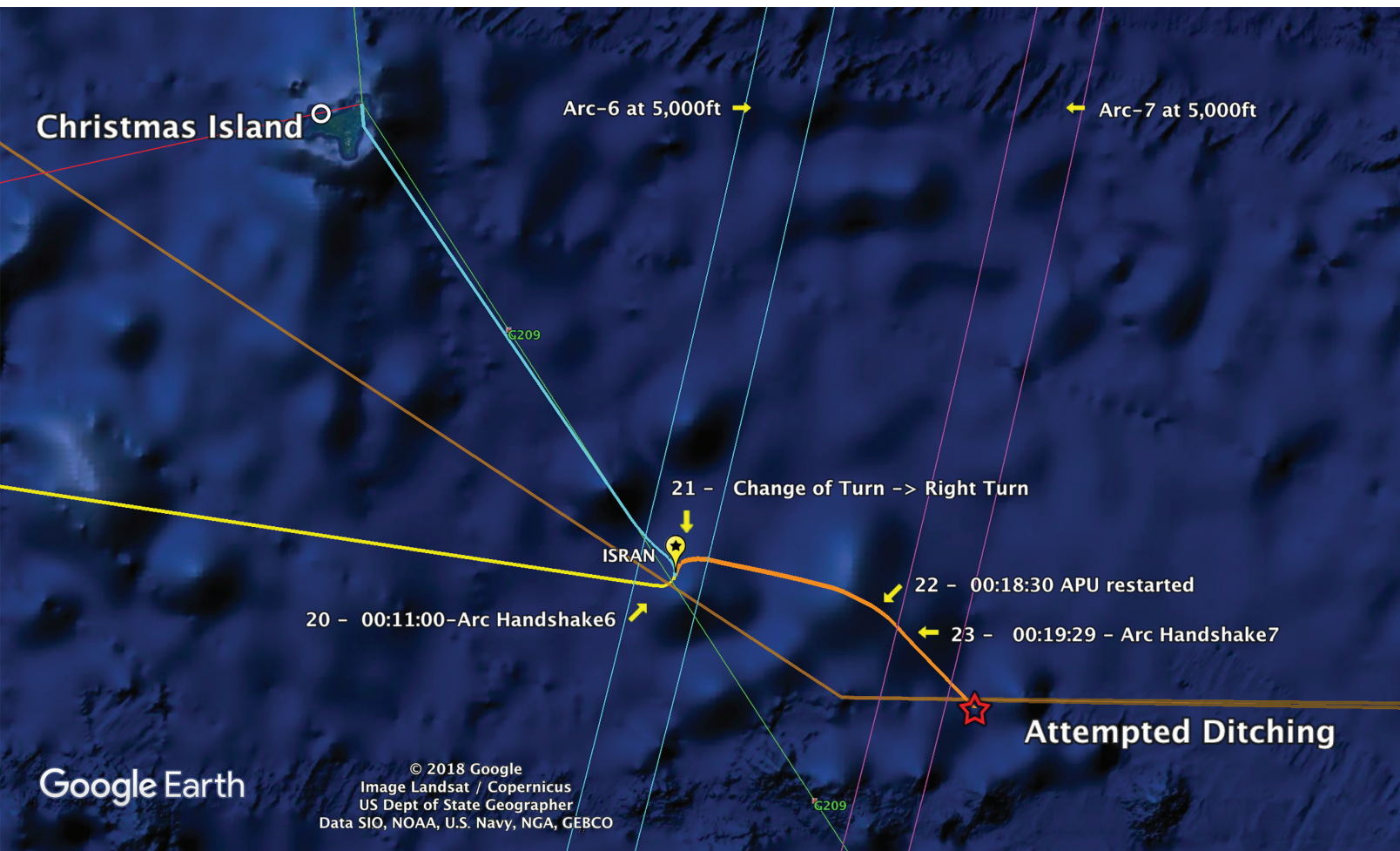


Figure 10. End of CAPTIO trajectory.

relying on any global Satcom system guaranteeing a certain quality of service in terms of integrity, availability, reliability, and transmission delay. Yet, regardless of our findings, new technologies come with new risks, especially regarding security issues. ✈️

Learn more about the CAPTIO team and their work by visiting <http://mh370-captio.net/index.php/our-team/>.

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