

# IDC infrasound search for missing flight Malaysian Airlines MH370

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## Summary

This brief report summarizes the analysis and findings using IMS infrasound data and IDC bulletins on the search for the missing flight MH370 from Malaysian Airlines. The flight MH370 took-off from Kuala Lumpur airport, Malaysia, on Friday 7 March at 16:41 GMT and was on route for Beijing, China. It went missing within the first hour of flight (source: BBC).

Infrasound recordings from the IMS infrasound network and IDC bulletins are then searched for potentially related information. The IMS infrasound network routinely detects commercial flight taking off and landing from local airports.

However it should be noted that:

- Commercial planes in normal flight conditions are usually detected by IMS infrasound stations only at close range (within about 100km from stations).
- The only reported commercial plane that could be tracked over large distances (across the Atlantic) with an infrasound station was the Concorde as it was travelling as supersonic speed. The Concorde was discontinued 10 years ago.
- For flight MH370 to be picked up by IMS infrasound network at regional or global distances, it could mean that it crashed, exploded or disintegrated. However it would likely not be possible to draw any definitive conclusion based on remote infrasound recordings alone.

The geographical situation of Kuala Lumpur and the flight route with the infrasound network is not favourable as the closest station to Kuala Lumpur is I06AU, Cocos Island, and located 1700km away. On the northern part of the flight path, the installation of the 2 Chinese stations is still to be completed. The next closest certified stations are at ranges over 3500km.

The infrasound atmospheric propagation in regions close to the Equator is often complex given the relatively quiet upper atmospheric winds. This implies that long distance infrasound wave propagation is less favourable than at higher (and lower) latitudes. The infrasound network performance (using state-of-the-art meteorological models and background noise levels at IMS station for this specific time – Friday 7 March at 18:00 GMT) exhibits relatively fair to weak detection capabilities for the area surrounding Malaysia and Vietnam.

IDC bulletins and interactive review analysis results for all stations located within 5000km from the search area did not provide any detection or trace of signals related to the missing flight MH370.

## Background information about Malaysian Airlines MH370

MH370 flight took off from Kuala Lumpur airport on 7 March 2014 at 16:41 GMT. According to the BBC (<http://www.bbc.com/news/world-asia-26503141>), the air traffic controllers lost contact with the plane within 50mn and the last reported location is 200km north of Kuala Lumpur (source: Flight Aware).



Figure 1: BBC summary of the situation for missing flight MH370 (Source: BBC.co.uk)

The media reports that the search areas are focusing within less than 800km in the north of Kuala Lumpur as of Monday 10 March.

## IMS infrasound network

In the region around Kuala Lumpur, Malaysia the only certified station within 2000k is IS06 (Cocos Island, Australia). The 2 next stations located about 3500km are IS52 (Diego Garcia, UK) and IS39 (Palau). Other regional stations are beyond 4300km in Australia (IS04 and IS07) and beyond 5000km in Mongolia (IS34) and Japan (IS30) – see figure 2.

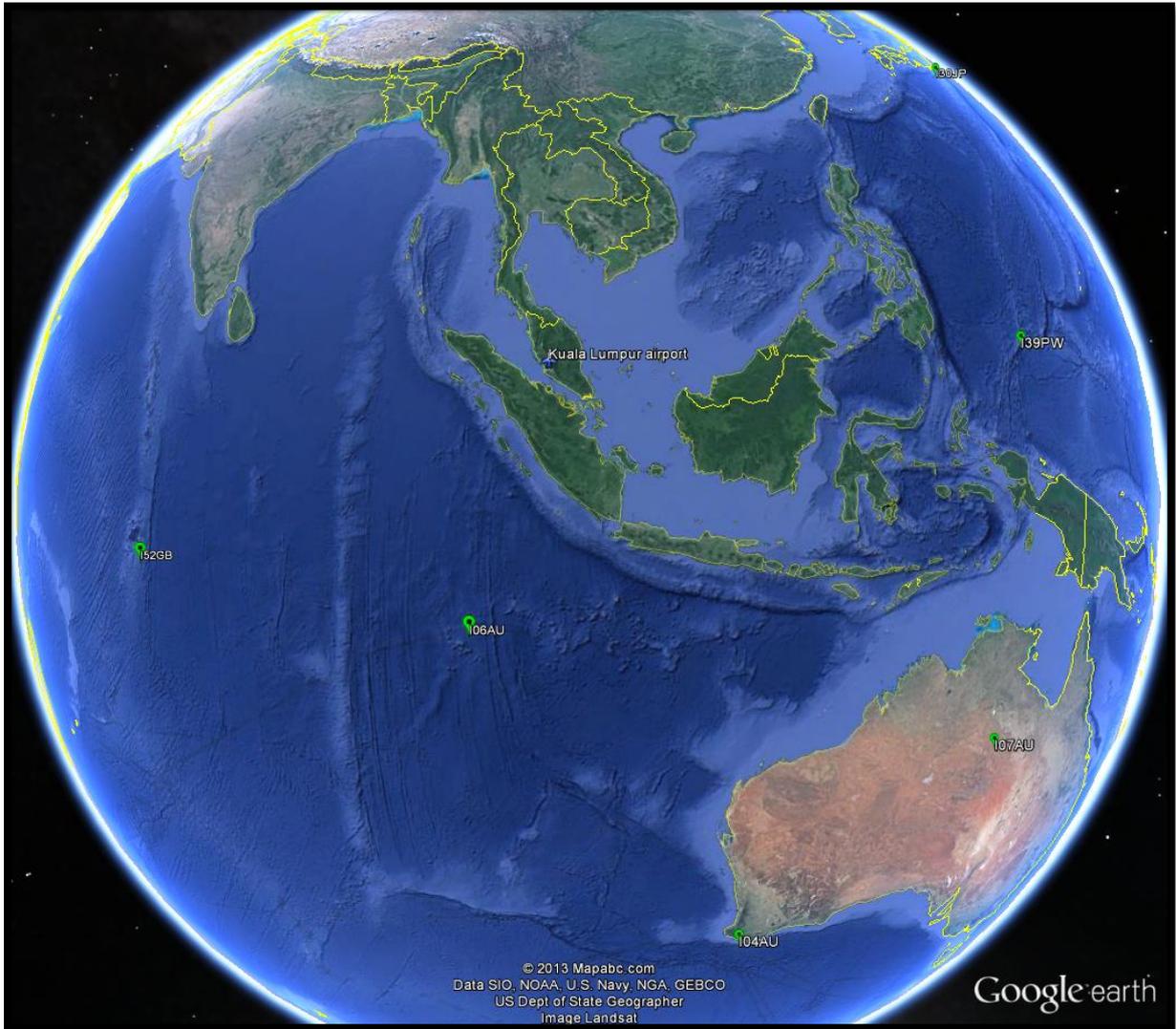


Figure 2: Situation of IMS infrasound network around Malaysia

## IDC automatic bulletin review

Looking into the IDC automatic bulletins (SEL3), no matching event is reported within the first 15mn of the flight (see figure 3 with predicted and matching detections). The bulletins for the 7 closest stations only show 1 station (IS3), Isumi, Japan) with detections potentially originating from the Malaysian and Vietnamese area, but located at over 5300km.

Looking at the daily infrasound detection bulletin for the day (figure 4), it appears that this azimuth is rather common and could either be related to volcanic activity in Kyushu and Tanegashima islands (two well-known active volcanoes: Sakura-jima and Suwanose-jima) or microbarom-like activity in the seas south-west of the station.

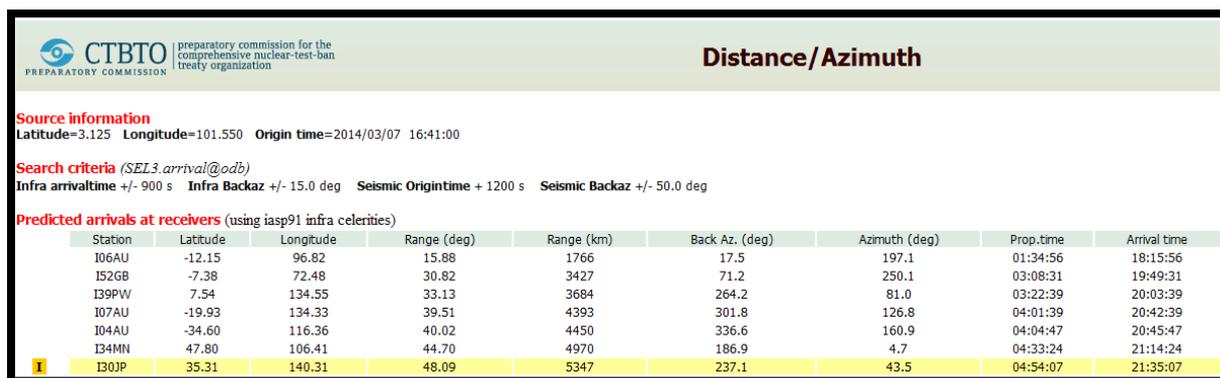


Figure 3: Infrasound tool for searching event matching arrivals in IDC bulletins. The source is Kuala Lumpur airport at the time of take-off and the receivers are all stations within 50 degrees.

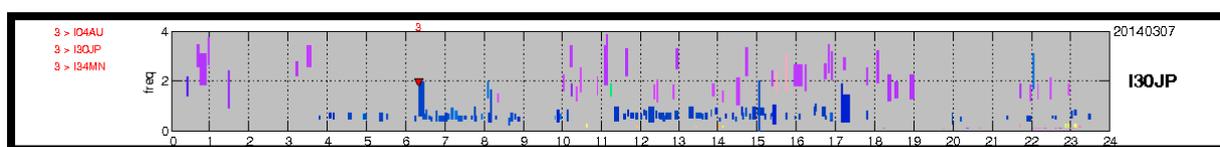


Figure 4: Daily IDC bulletins for IS30 (Japan) station showing detections from Kyushu volcanoes (dark blue) mixed with microbaroms (dark to light blue) and local activity in the bay of Tokyo (purple).

## Infrasound propagation status

Before investigating station by station if traces of signal could be found, the infrasound network performance are a useful indicator on station that have higher likelihood of recording related signals. The infrasound threshold monitoring software (DTK-NetPerf) summarizes the performances combining the station background noise computed by IDC and the atmospheric characteristics (in the stratosphere) for the specific period of time.

From the figure 5, it appears that Kuala Lumpur is at the edge of Equatorial wind shift between southern and northern hemisphere. This region is usually not favorable for long propagation of infrasound waves. The Malaysia – Vietnam region is also exhibiting rather fair to poor network performances, for this specific period, due to the distance to the closest station (IS06 at over 1600km) and the relatively high level of noise at this station (typical for station on islands).

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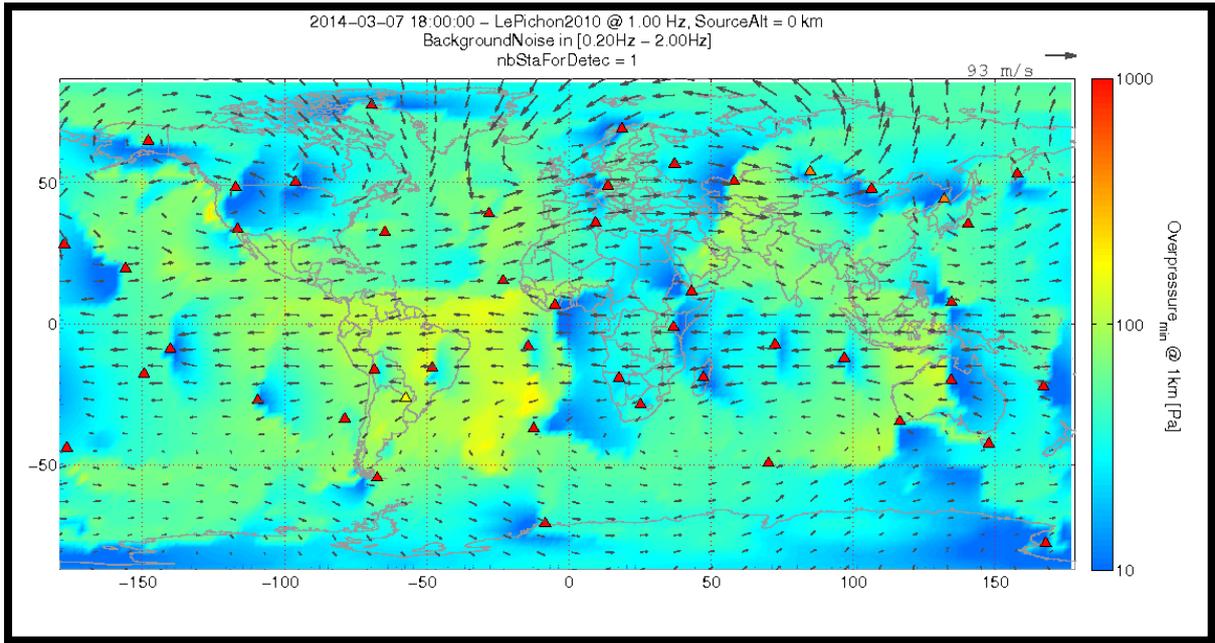


Figure 5: infrasound threshold monitoring results with DTK-Netperf for Friday