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DETECTING THE LOST FLIGHT AND DETERMINATION OF ITS LOCATION IN SEA USING BUOYS

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Abstract:

Flight travel has become a part of our daily life. Despite there are my ways in which a flight can be tracked and it is impossible to flights when it goes out of range and gets lost in sea then there is a great deal of economy and time wasted in the recovery of the lost flight's black box to find what happened in the flight. In this paper, we will discuss how use of buoys to track flight in case of any accident can occur when they are over sea. This method can provide so easy tracking in case of future accidents similar to that of accidents happened to flight MH370. Theoretically, it proven to be the best compared to that of conventional method of searching in sea.

Keywords: Buoys, impact of this method in crisis management.

Introduction:

Air transport has become a part of our day to day life. It is the fastest way of travel and it has become economical to a great extent. There are 50.9 million logged flight hours for commercial jets worldwide and 23.9 million departure meaning an average of 2.16hours per departure. According to IATA document, 2.8 billion passengers were carried in 2011. This means that, on average, there are 690,000 passengers in the air at any given moment. These number are lower limit and averages. They don't include the number of pilots in the air. Given that there were 23.6 million departure an every flight has two pilots, and thus the population on the sky becomes 700,000 people. This number doesn't include the number of general aviation and military flights, though their contribution isn't as large as the contribution of commercial aviation. Additionally, this number varies over the course of a day and seasonal variation in travel patterns means that this number fluctuates over the course of year. According an article by The Economics Times under the topic Airlines/ Aviation published on Dec 16, 2015 stated that according to the Cleartrip survey, average annual ticket prices for that

financial year has been ranged between Rs 5,857 and Rs 4,018. Thus Air Transport plays a vital role in supporting a

Nation economy.

The greatest concern for the passengers is about their safety. Many problem occur on flights which travel above the sea. If communication with the flight is lost due technical problem. Then there is loss of precious human life and economic downfall is faced by the company. Then countries unite together on search of lost flight on international water bodies and relative of passenger separately pay to international search team to know what happened to their beloved ones and some they even announce reward for rightful information on the flight.

Data buoys are used to track the change water current in ocean and in location of underwater earthquake and their magnitude measurement. Tsunami buoys are used to make sure that the earthquake has not caused any tsunami waves and if there is any they are used find the direction, speed and approximate height of the wave. They play an important role and help the people by giving them about the event that's about to occur.

Air traffic control- standard international practice is to monitor airspace using two radar system: primary and secondary

Primary radar-based on the earliest form of radar developed in 1930s, detect and measures the approximate position of aircraft using reflected radio signal. It does this whether or not the subject wants to be tracked. Secondary radar, which relies on targets being a transponder, also requests additional information from the aircraft – such as its identity and altitude.

All commercial aircraft are equipped with transponders (an abbreviation of “transmitter responder”), which automatically transmit a unique four- digit code when they receive a radio signal sent by radar. The code gives the plane's identity and radar stations go on to establish speed and direction by monitoring successive transmission. This flight data is then relayed to air traffic controllers.

Aircraft use GPS to show pilots their position on a map, but this data is not usually shared with air traffic control. Some of the most modern aircraft are able to “uplink” GPS data to satellite tracking services, but handling large volume of flight data is expensive and such systems are usually only used on remote areas with no radar coverage.

Over the next decade, a new system called ADS-B (Automatic Dependent Surveillance Broadcast) is expected to replace radar as the primary surveillance for air traffic control. Buoy: Afloat placed in water and usually moored, as to mark location, enable retrieval of a sunken objects, or records oceanographic data.

Existing:

A method and system used for preventing the control of an aircraft from the cockpit. In an exemplary embodiment, the system could be triggered externally. For example, an Air Traffic Control (ATC) station could determine that the aircraft has deviated from its planned flight path. If personnel at the ATC station decide that the deviation is not attributable to the actions of the authorized flight crew, the personnel can transmit a signal to the aircraft that disables all normal cockpit control to the aircraft. Once normal flight controls are disabled, the aircraft may execute a preprogrammed emergency flight plan via its autopilot system, with or without the use of Flight Management System (FSM). The emergency flight plan could cause the aircraft to fly to a sparsely populated area and enter a holding pattern, or it could cause the aircraft to land in a sparsely populated area or at an airport using an autoland system. The main disadvantage of this methods are they require on satellite updates and if the communication system is damaged due human or some technical error and outcome are loss of life and economy. If the flight fly with low altitude in cannot be detected by radar. All communication system can be manually turned off. If something like lightning or thunder storm affect or interfere with flight signal which are flying above sea then the flight can be deviate from go away the assigned path which cause lot trouble (Even these factor have less probability these are some factor which can affect the flight path).

Black box:

Any commercial airplane or corporate jet is required to be equipped with a cockpit voice recorder and a flight data recorder. It is these two items of separate equipment which is commonly referred to as black box. They do nothing to help the plane when it is in the air, both these pieces of equipment are vitally important should the plane crash, as they help crash investigators find out what happened just before the crash.

If under water, the box emits ultrasonic signals- but these signals have a limited range, and search crew may not detect them unless close to the crash site.

According aviation reporter Stephen Trimble in The Guardian as “one of the most anachronisms of modern aviation technology” – are not currently equipped with any form of GPS location transmitter.

Causes of fatal crashes:

| Causes of Fatal Airplane Crashes | Percent of Crashes |
|----------------------------------|--------------------|
| Pilot Error | 32% |
| Pilot Error (weather related) | 16% |

| | |
|----------------------------------|-----|
| Pilot Error (mechanical related) | 5% |
| Total Pilot Error | 53% |
| Other Human Error | 6% |
| Weather | 12% |
| Mechanical Failure | 20% |
| Sabotage | 8% |
| Other Cause | 1% |

Airplane crash statistics:

| Airplane Crash Statistics | Data |
|---|-------------------|
| Odds of being killed on a single airline flight | 1 in 29.4 million |
| Number of fatalities per flight hours | 12.25 |
| Survival rate of passengers on a fatal crash | 24% |

MALAYSIAN AIRLINE BOARD MEETING posted by

Kate Mayberry (Al Jazeera correspondent)

The three-hour meeting, which started with a minute's silence for the passengers and crew of the still-missing flight MH370, ended with a close vote on the re-appointment of Chief Executive Ahmad Jauhari Yahya to the board and a secret poll on whether to grant the board their directors' fees of \$123,000.

In between, the mostly elderly Malaysians chastised the board and the company's largest shareholder - sovereign fund Khazanah Nasional - for their incompetence, with one comparing the company to a "sunken ship" and another a patient in intensive care. The minority shareholders' meeting was the first since MH370 disappeared in March with 239 passengers and crew on board. Despite a multinational search effort focused on the southern Indian Ocean, the plane has yet to be found. But even before the flight disappeared from radar screens, Malaysia Airlines faced severe financial difficulties. Chief Executive Jauhari told the meeting that bookings from China had dropped 60 percent as a result of the plane's disappearance and the move to withdraw advertising for two months as a mark of respect for those on board, had a negative impact on sales. The event also, he said, hurt the airline's brand and reputation. Both analysts agree a 2,000 to 4,000 employee reduction, as well as dropping unprofitable routes is necessary. They also say Malaysia Airlines needs to stop competing on price with budget carriers such as AirAsia whose costs are lower in the first place, and try to emulate Singapore Airlines' level of productivity.

An example for money being spent by government:

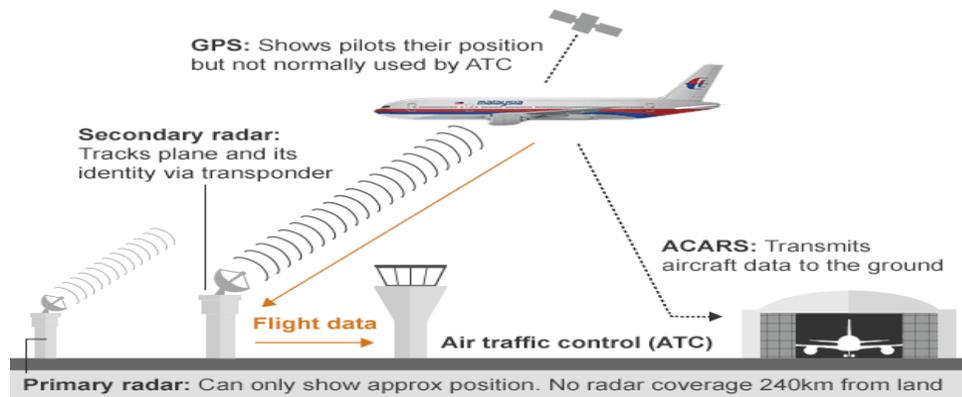
As on 09 – Jun 2014

Malaysia airlines MH370 went missing with 239 passengers and crew on board in March 2014, Australia has spent aside \$90 million to find MH370 – expected to be the most the country has spent in aviation history.

The budget papers stated the actual cost will depend on a multiple factor, including the outcome of procurement processes for specialist services, extent of contribution from other countries.

Malaysia has spent \$9.3million on the search so far and Malaysia’s Deputy Defence Minister Abdul Rahim Bakri said that cost of the next phase will be shared. Of the \$90 million, 25million for visual search and remaining for underwater search was told to ABC by former defence force Air Chief Marshal Houston. Indian Government also helped by providing technical support in search of the lost flight over Indian Ocean. The Australia Transport Safety Board last week issued a tender to continue the deep-water search for the ill-fated flight.

Innovation:

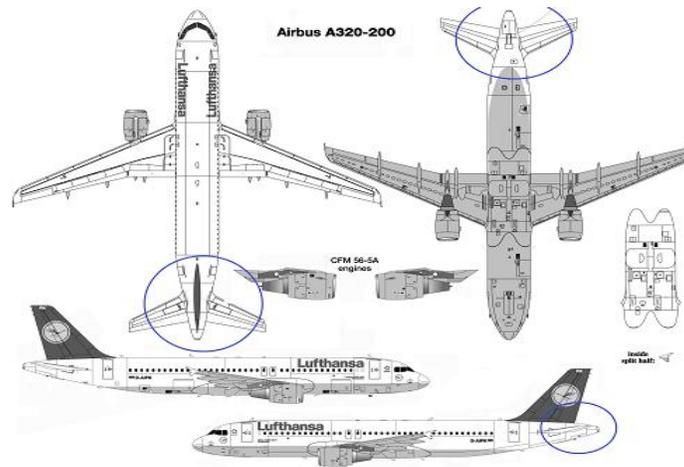


Method proposed:

Working of buoys:

Surface buoys use sensitive instruments like accelerometer to measure vertical heave, or up and down movement to measure wave height and swell periods. They also use a pitch and roll technique to determine wave direction. Other buoys are under water pressure sensor arrays that measures water pressure as the wave move over them can differentiate wave periods and directions between the underway arrays. All of these techniques will develop a “Spectral Record” of all waves at that location, which we can then use in LOLA to separate the swells to display to user. And these buoys are continuously in contact with the meteorological satellite and with the meteorological department as they indicate sea shift and tsunami warning.

Use of buoys in this project:



The flight do not simply fall in to the sea all of a sudden it travel a long distance before it hits the water. When it reach near the sea surface the altitude drop and there by fixing the signal of transmitter making sure that it gets activated by the drop in altitude under the absence of transponder. When it to contact range with buoys in the ocean and depending upon the pattern and by depending upon the signal and the time for which the contact was made an approximate speed, direction and the place where it could have hit the water can be found. The priority of the signal being transmitted by buoy must be replaced with the signal from air craft and the meteorological department must the data being received.

Requirement for this project:

The buoy must be designed in such a way in such a way that it should withstand the heavy impact which it faces when it being dropped from the certain altitude. The buoy must have a transmitter (like Go tenna) that can communicate to the nearby fixed data buoy or search ship or naval ship. The buoy must be constantly updated with the flight data for calculation of place of impact. A secondary transmitter can be fixed in plane which transmit data to data buoy in ocean. Since the altitude drop gradually takes place before the plane hit the water. Buoy must transmit the signal based on the priority and since the metrological department has 24hours surveillence over their buoys in sea the can notify the search crew about the flight travel path and thus saving time.

Cost estimation of this project:

The cost and efficiency of this project depends on the buoy. As Far as my research on internet the price of a normal buoy start from \$20(as per ebay.com), they do not have any in built communication and power generation system. Design should made in such way that buoy deploy at correct phase.

Advantage of this project: Time saving, Cost efficient.

Method of communication:

Recently a radio wave communicator known as Go Tenna because it uses does not require any signal from the cell phone tower. The similar way of communication can be incorporated in the buoy that is being deployed into the sea. Thus by enabling the communication with the crew when it reaches the place where the buoys is drifted. The Go Tenna which can fit in hand has a range of 4.3-6 Nautical Miles when there is no obstacle. Thus by improving the size the range can be improved.

Conclusion:

And doing so the precious time and money of countries and company saved. Thus it save jobs of many employees who are dependent on the company.

It is small investment for flight which travel above sea and will save millions of dollar which being spent aftermath.

Prevention is better than cure. But cure play a vital role.

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