

# On the Fate of Debris Associated with the Disappearance of Flight MH370: a Dynamical System Perspective

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The disappearance of Malaysia Airlines flight MH370 on the morning of the 8th of March 2014 is one of the great mysteries of our time. One relevant aspect of this mystery is that not a single piece of debris from the aircraft was found during the intensive surface search carried out in the months following the crash. Difficulties in the search efforts were due to the uncertainty in the plane's final impact point and the time passed since the accident and rise the question on how the debris was scattered in an always moving ocean, for which there exist multiple datasets that do not uniquely determine its state. Our approach to this problem is based on dynamical systems tools that identify dynamic barriers and coherent structures governing transport. By combining publicly available information supplied by different ocean data sources with these mathematical techniques, we are able to assess the spatio-temporal state of the ocean in the priority search area at the time of impact and the following weeks. Using this information we propose a revised search strategy by showing why one might not have expected to find debris in some large search areas targeted by the search services and determining regions where one might have expected impact debris to be located and that were not subjected to any exploration. This research has been supported by MINECO under grants MTM2014-56392-R and ICMAT Severo Ochoa project SEV-2011-0087 and ONR grant No. N00014-01-1-0769. Computational support from CESGA is acknowledged. [1] V. J. García-Garrido, A. M. Mancho, S. Wiggins, and C. Mendoza. A dynamical systems approach to the surface search for debris associated with the disappearance of flight MH370. *Nonlin. Processes Geophys* 22 (6) (2015) 701-712.