UK Hydrographic Office

Admiralty Way
Taunton
Somerset
TA1 2DN

Telephone: [redacted]
E-mail: [redacted]
Website: www.gov.uk/ukho

[redacted]
REF: FOI2022/07464

27 June 2022

Dear [redacted]

Thank you for your email of 27 May 2022 requesting the following information:

"I do have some follow up questions I would like to ask, your responses highlighted below, with my follow up questions in plain text in between.

Unidentified Aerial Phenomena - Since UKHO are generally only interested in the ocean surface down to the seabed below, we have no concern with atmospheric phenomena, other than the effect it has upon our ability to make observations and measurements of the ocean from Earth Observation satellites or aircraft (LiDAR surveys and vertical aerial photography). Therefore, UKHO do not hold any information on Unidentified Aerial Phenomena
Thank you and I understand that the aerial aspect of my keywords does refer to objects outside of your jurisdiction, however I did wonder if you may have documents in your databases which refer to UAP, since there has been a history of UAP engaging in what is referred to as 'transmedium travel', the ability to move through the air and transition to travelling underwater. I thought perhaps if there were any transmedium objects detected, you may have corresponded with other organisations or military/governmental departments. Is it possible to perform a search for that anyway, just to see if there are any documents relating to that term? Also, are there any databases that you have access to from those earth observation satellites or aerial photography that may contain references to UAP? I would be interested to know if that is the case, and would like to access any documents or images that do relate to UAP or anomalous objects if possible.

Unidentified Submersed Object – Unidentified Submersed Object would be of more interest if they posed a (permanent) hazard to navigation, such as uncharted submerged seamounts, underwater volcanoes, coral reefs, shipwrecks, etc. As UKHO's interest is primarily in "foundation data" to support safe navigation, we generally do not keep any data on transient objects, whether identified or not. Multiple observations or surveys from different times generally enable us to filter out "mobile" phenomena such as whales, fish, sargassum, flotsam, pollution, algal blooms, vessels, turbidity, etc. Beyond identifying them as "transient" we rarely need to investigate or log what they are other than to be able to recognise them as transient features to be removed from survey data, and hence to ensure they don't appear as erroneous features on nautical charts or within digital seabed datasets. Therefore, UKHO do not hold any information on Unidentified Submersed Objects.
Thank you for this very interesting response. When you say you do not keep any data, are there any cases of anomalous objects being detected that you are aware of or having documents/data on? I am particularly interested in objects which display unusual characteristics, such as high speed or transmedium capabilities, since there would be an overwhelming amount of data if we're talking about any and all transient objects detected.
You mentioned that there are methods you use to filter off mobile phenomena, can you elaborate any further on what those methods are? For example, is there a computer algorithm which filters out the transient objects to allow you to focus on the ones you are interested in? Furthermore, can you elaborate on the rare cases where you have had to investigate mobile phenomena?
Most importantly though, I am interested to know if there have ever been objects detected by your observation equipment that displayed characteristics you could not explain, for example a) travelling above the speed any

known underwater vehicle could travel at or b) giving off unusual sound or RF frequencies, or displaying signature management capabilities.

Plasma –For the same reasons above, plasma phenomena hold no relevance or interest for UKHO. This may be covered by the UK Meteorological Office.

Thankyou for your recommendation, I will be sure to follow this up with the UK meteorological office."

I am treating your correspondence as a request for information under the Freedom of Information Act 2000 (FOIA).

A search for the information has now been completed within the UKHO, and I can confirm that some information in scope of your request is held.

The information you have requested can be found below in blue italics;

Unidentified Aerial Phenomena - Since UKHO are generally only interested in the ocean surface down to the seabed below, we have no concern with atmospheric phenomena, other than the effect it has upon our ability to make observations and measurements of the ocean from Earth Observation satellites or aircraft (LiDAR surveys and vertical aerial photography). Therefore, UKHO do not hold any information on Unidentified Aerial Phenomena

Thank you and I understand that the aerial aspect of my keywords does refer to objects outside of your jurisdiction, however I did wonder if you may have documents in your databases which refer to UAP, since there has been a history of UAP engaging in what is referred to as 'transmedium travel', the ability to move through the air and transition to travelling underwater. I thought perhaps if there were any transmedium objects detected, you may have corresponded with other organisations or military/governmental departments. Is it possible to perform a search for that anyway, just to see if there are any documents relating to that term?

The UKHO have found no reference to the term UAP or indeed any related terminology. The Remote Sensing, Bathymetric Survey and Oceanography teams are where any possible data would manifest, but none of the technical leads recall either formal reference to the term not experience of sufficiently unusual/unexplained phenomena to attract our attention.

Also, are there any databases that you have access to from those earth observation satellites or aerial photography that may contain references to UAP? I would be interested to know if that is the case, and would like to access any documents or images that do relate to UAP or anomalous objects if possible.

UKHO have no imagery databases or documentation that refer to contain references to UAP. Note that there is a very large quantity of open access satellite imagery that UKHO use for an increasingly significant amount of our work. Anyone can now access and research this primary data source using open source software, see note at bottom of this response.

Unidentified Submersed Object – Unidentified Submersed Object would be of more interest if they posed a (permanent) hazard to navigation, such as uncharted submerged seamounts, underwater volcanoes, coral reefs, shipwrecks, etc. As UKHO's interest is primarily in "foundation data" to support safe navigation, we generally do not keep any data on transient objects, whether identified or not. Multiple observations or surveys from different times generally enable us to filter out "mobile" phenomena such as whales, fish, sargassum, flotsam, pollution, algal blooms, vessels, turbidity, etc. Beyond identifying them as "transient" we rarely need to investigate or log what they are other than to be able to recognise them as transient features to be removed from survey data, and hence to ensure they don't appear as erroneous features on nautical charts or within digital seabed datasets. Therefore, UKHO do not hold any information on Unidentified Submersed Objects.

Thank you for this very interesting response. When you say you do not keep any data, are there any cases of anomalous objects being detected that you are aware of or having documents/data on?

For bathymetric surveys (boat mounted Multi-Beam Echo-Sounder "MBES" sensors or aircraft mounted LiDAR sensors) UKHO do archive all the original point cloud data, which for a typical single survey may be in excess of a terabyte of data. You'll therefore appreciate that with such large volumes of data we need to efficiently work through the cleaning process as much as possible. This will tag and remove much of what we consider 'noise' without necessarily flagging it up for further attention. Again, reiterating that our interest is in non-transient features and objects, so noise may include marine flora and fauna, flotsam. Occasionally system noise or error will be visible which are also identified and either corrected or removed. Some anomalous features will remain for manual intervention (i.e. removal), plus an analyst will look at the processing reports and resulting bathymetric surfaces to identify further errors, so an experienced bathymetric

analyst will accrue an almost encyclopaedic knowledge of what looks 'right' or otherwise explainable. A seriously anomalous object or phenomena would therefore likely draw attention for further investigation, however staff do not recall coming across a genuinely unexplained phenomena within any bathy data and there is nothing in the records either.

As for satellite data, any commercially purchased imagery UKHO will keep and archive, but with open-access satellite data UKHO are increasingly just accessing it on cloud servers maintained by third parties such as European Space Agency, NASA/USGS, AWS, Google, etc.

UKHO's interest in oceanographic data is all climatology, which generally comes in from third parties and as such wouldn't by definition include anything anomalous, whether readily explainable or not.

I am particularly interested in objects which display unusual characteristics, such as high speed or transmedium capabilities, since there would be an overwhelming amount of data if we're talking about any and all transient objects detected.
As above, none have been apparent in UKHOs data. However, since UKHO do not use continuous data recorders (bathymetric survey and aerial/satellite imagery are "snapshots"), it might reasonably be expected that the probability of an anomalous or rare event occurring at the precise moment and in the precise field-of-view of our data are really very small.

You mentioned that there are methods you use to filter off mobile phenomena, can you elaborate any further on what those methods are? For example, is there a computer algorithm which filters out the transient objects to allow you to focus on the ones you are interested in?
For bathymetric data, the filters and algorithms are built into the software used (you can google CARIS HIPS and Fledermaus software, plus there are many published papers on methods and means of cleaning MBES data. UKHO have also developed an advanced AI solution for further automating cleaning of bathymetric survey data (paper here: https://www.sciencedirect.com/science/article/pii/S2590197419300163)

Furthermore, can you elaborate on the rare cases where you have had to investigate mobile phenomena?
As above, no unexplainable mobile/transient phenomena have been identified or investigated.

Most importantly though, I am interested to know if there have ever been objects detected by your observation equipment that displayed characteristics you could not explain, for example a) travelling above the speed any known underwater vehicle could travel at
None detected, again emphasising that our instrumentation/sources gather "snaps shots" rather than continuous data recording.

or b) giving off unusual sound or RF frequencies,
Other than patterns of life from AIS (Automatic Identification System) or the Radio Navigation Warnings service, UKHO do not monitor or collect RF signals. There are commercial satellite companies that do have this capability, e.g. HawkEye360 and others, although this isn't a market sector that's currently relevant to us.

or displaying signature management capabilities.
UKHO would not be aware of these. Global Fishing Watch might be of interest to you, as they look specifically at detecting "dark vessels", in their case primarily to detect illegal fishing activity but the methodology could be applied to other uses. They may publish all their research and methodology on an open-source/open-access basis.

Finally, whilst not part of our FOI response, you might be interested in the ability of satellite imagery to detect airborne craft moving at high velocities. There is much global satellite data at 10m resolution available completely open-access courtesy of the Copernicus satellite programme, and massively powerful cloud computing facilities available for non-profit use for free through Google Earth Engine that are accessible to anyone. This paper https://www.mdpi.com/1424-8220/19/13/2873/htm will give you an idea of what might be possible. Similarly, there is much scientific research being made increasingly accessible on free open-access principles, you need only identify the proxies for UAP and there will likely be lines of research already being carried out that you could usefully repurpose. For underwater data collection various universities operate networks of continuously recording hydrophones primarily for marine mammal research.

If you are not satisfied with this response or you wish to complain about any aspect of the handling of your request, then you should contact me in the first instance. If informal resolution is not possible and you are still dissatisfied then you may apply for an independent internal review by contacting the Information Rights Compliance team, Ground Floor, MOD Main Building, Whitehall, SW1A 2HB (e-mail CIO-FOI-IR@mod.uk). Please note that any request for an internal review must be made

within 40 working days of the date on which the attempt to reach informal resolution has come to an end.

If you remain dissatisfied following an internal review, you may take your complaint to the Information Commissioner under the provisions of Section 50 of the Freedom of Information Act. Please note that the Information Commissioner will not investigate your case until the MOD internal review process has been completed. Further details of the role and powers of the Information Commissioner can be found on the Commissioner's website, http://www.ico.org.uk.

Yours sincerely,

UKHO Secretariat