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Appendix 7: Ad Hoc Validation Procedure
(7 pages)

Appendix 7: Ad hoc validation procedure

TWA 800 Tags System Procedure
Tag Lat-Long Sources & QA Plan

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Purpose:

Explain the sources for latitude & longitude values for TWA wreckage, and the procedures for ensuring them to be as accurate as possible.

Position Sources:

The Tags Database exists to provide and maintain a record of where TWA debris was found on the ocean floor. To understand how these positions are arrived at requires some understanding of the recovery process.

The recovery effort is based on the target system. Briefly, a "target" is an anomaly revealed by side scan, laser line scan or ROV, and deemed worthy of investigation as possibly related to TWA 800. Targets are initially entered in the Target Database (maintained by Oceaneering / SupSalv at East Moriches). When investigated (by diver or ROV), reports are generated; the contents of these reports are summarized in the Target Database. Sometimes the target is biologic (clams), geologic (terrain), or non-related (trash, boat parts, etc.); often it is indeed a piece of wreckage from TWA 800, or even a victim. Regardless, all such information is recorded in the Target Database, and presented on Target Plots, for purposes of *recovery management.*

When TWA wreckage is recovered, it generally gets "tagged" on the ship, and a Wreckage Log is completed for the object. On this log sheet, the lat/long of the *ship position* at the time is written. While not the *exact* location of where the object was on the ocean floor (it was moved *some* distance by diver, ROV or winch to get it aboard), it is still fairly close, i.e., within ___ meters. However, the Wreckage Log often associates a target with the debris, providing a position *prior* to moving the object to the ship.

The Tags Database was developed to maintain a record of wreckage logs for tagged debris (hence the name, "tags database"). Lat/long positions are, by default, those written on the Wreckage Logs (e.g., the ship position). But when the Wreckage Log refers to a specific target for the object, the lat/long of the target is used instead, being more precise.

Debris recorded in the Tags Database is subject to Quality Assurance processes to confirm positions and descriptions and, when necessary, make corrections.

Debris recovered either before the Tags System was instituted, or recovered external to the Tags System, is inherently absent, at least initially, from the Tags Database. To incorporate such debris requires investigation of alternate lat/long sources.

As the investigation has proceeded, there has been an increasing interest in maintaining the Tags Database a) for the highest level of positional reliability possible, and b) to include, when possible, information for objects which were not tagged.

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The following table summarizes the potential sources for debris locations.

Log Type:	Description:	Lat/Long Refers To:	Used As LL Source When:	Stored As:
Diver Logs	Eye-witness report by diver of target investigation, prior to bringing object(s) to the surface. Generally a description of wreckage, often with part numbers(s).	Position of Target being investigated. These positions were primarily generated by side-scan & laser line scan sensors and computers, and chosen as worthy candidates for investigation by OTECH / SUPSALV.	Used when a definite connection exists between wreckage and a target, either by direct reference to the target on the Wreckage Log, or by unique reference (mainly part number) to the wreckage in the Diver Logs.	Hand-written log sheets in the Diver Log binders; summarized in Target Database.
ROV Logs (sub-set of Diver Logs)	Report by ROV driver of objects viewed during ROV investigation of targets, or ROV investigation of a debris area.	Same as for Diver Logs for target investigation. When investigating a debris area in general, these reports become targets themselves (for subsequent investigation by diver); lat/longs are derived from ROV range & bearing from the position of the ship at the time.	Same criteria as for Diver Logs.	Video tapes, hand-written log sheets in the Diver Log binders; summarized in Target Database.
Ship Logs	Records kept on board a ship during recovery operations.	Recorded position of ship.	Special cases when the ship records contain a definite and unique reference to a victim or piece of wreckage.	Hand-written records.
Wreckage Logs	Forms filled in when wreckage is tagged after recovery, while still on the ship.	Position of the ship at the time of recording.	Default position initially entered in the Tags database; kept if no superior source is found.	Hand-written log sheets stored in the Wreckage Log file; recorded in Tags Database.
FBI Logs	Completed for "lots" of debris, such as a cargo net filled with wreckage.	Position of the ship at the time of recording.	Used when no tag is found for the piece of wreckage.	Hand-written log sheets stored in the FBI wreckage binders.

Wreckage Latitude / Longitude Source Summary

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Position Research & Verification Procedures

Positional QA Procedure #1:
Tagged Object Having a Target Reference

1. Retrieve the Wreckage Log for the tag number.

2. In the target database, look up the target number referenced on the Wreckage Log.

3. The description on the Wreckage Log should be that entered under Actual Description in the target database, and should correlate with Initial Description as well. If this is not the case, use Procedure #2.

4. Note the lat/long for that target, and verify that this agrees with the position stored in the Tags Database.

5. Perform Procedure #5.

Positional QA Procedure #2:
Tagged Object Having No Target Reference

1. Retrieve the Wreckage Log for the tag number.

2. Verify that the lat/long on the Wreckage Log agrees with the position stored in the Tags Database, and that there is no ambiguity in format. The format should be, for latitude and longitude, degrees (integer), minutes (integer), seconds (decimal value). It may also be in degrees (integer), minutes (decimal value).

3. If the lat/long is missing, unreadable or otherwise indecipherable, use Procedure #3. Otherwise, perform Procedure #5.

Positional QA Procedure #3:
Non-Tagged Object Having an FBI Log Number Reference

1. Physically examine the object to obtain the FBI log number, and retrieve the corresponding FBI Log sheet.

2. Verify that the lat/long on the FBI Log sheet agrees with the position stored in the Tags Database, and that there is no ambiguity in format. The format should be, for latitude and longitude, degrees (integer), minutes (integer), seconds (decimal value). It may also be in degrees (integer), minutes (decimal value).

3. If the lat/long is missing, unreadable or otherwise indecipherable, use Procedure #4. Otherwise, perform Procedure #6.

Positional QA Procedure #4:
Object Having Neither Tag nor FBI Wreckage Log Reference

1. Write down any unique markings or characteristics for the object: part number(s), description, recovery date, etc.

2. The following are possible research avenues:

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- Target Database (Initial Description, Desc ID, Desc Date)
- ROV video tapes (if date and ship are known)
- Ships logs

3. If a definite correlation to a target is found, the lat/long for this target is used.

4. If a definite correlation to an object captured on video tape is found, the on-screen parameters and the ship position noted in the Video Log must be provided to Oceaneering personnel for calculation to obtain the lat/long.

5. If a lat/long is found using Steps 3 or 4, or by some other means (ship log, other documentation), perform Procedure #6, describing the means by which the lat/long was obtained.

6. If no lat/long was found, the object is NOT LOCATABLE, and therefore not entered in the Tags Database. [*Perform Procedure #7*].

Positional QA Procedure #5:
Tagged Object Position Correction

1. For individual objects requiring lat/long correction: complete an Updated Wreckage Log, with the corrected lat/long noted, along with the words POSITIONAL CORRECTION.

2. For multiple objects requiring lat/long correction: if several positional corrections are being made simultaneously, a spreadsheet of such corrections can be used as long as it is filed in the Tags Global Corrections file.

3. Choose the appropriate selection from the Lat/Long Source pick list.

4. Note any special circumstances or explanations in the Lat/Long Comments box.

Positional QA Procedure #6:
Incorporating a New Object Into The Tags Database

1. Assign a 2000-series tag to the object and complete an Updated Wreckage Log.

2. Note the lat/long on the sheet, describing the source.

3. Under Source Tag: write NONE.

4. Provide to database personnel for incorporation in the Tags Database.

Positional QA Procedure #7:
Identifying Non-Locatable Debris
Note: This is a recommended procedure, not in effect at the time of this writing.

1. Having exhausted all potential sources for lat/long with no success, an object should be so identified to preclude the need to do the research again at a later date. Ensure that all means have been attempted before using this procedure.

2. Tag the object with a _____-series number, and a _____ colored tag.

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3. Complete an Updated Wreckage Log, and include the comment NO LAT/LONG AVAILABLE.

4. Provide to database personnel for incorporation in the Tags Database. Note that this object will NOT show up on plots, but will be present in database printouts.

Projects:

In addition to Position Procedures, certain projects can be conducted to improve data for certain categories of wreckage.

Project: Seats
Completed: _____
Verified By: _____

1. Research the Target Database, Initial Description field for all references to seat row/number.

2. Verify these seat numbers against entries in the Diver Logs.

3. Correlate the above to seat references in the Tags Database.

4. Compile all Target listings which are at odds with their Tags counterparts. If, for example, a seat is listed with a Wreckage Log -generated lat/long in the Tags Database but has no target reference, this process may reveal what the target reference *should be*; in which case, the Tags Database entry should have this target number entered, and its lat/long updated accordingly.

Project: Part Numbers
Completed: _____
Verified By: _____

1. Research the Target Database, Initial Description field for all Boeing part numbers.

2. Verify these part numbers against entries in the Diver Logs.

3. Using the Boeing database, and with physical verification of the debris, write down the tag number or FBI log number for the part numbers in question.

4. Any new findings from the above should be entered into the Tags Database, using the lat/long for the target found to correlate, either as new tagged objects or as updates.

Project: Misc. Tag/Target Connection
Completed: _____
Verified By: _____

1. Make a listing from the Tags Database for objects having no target reference.

2. Make a listing from the Target Database for targets claimed as recovered but having no tag reference.

3. Combine the two in a temporary database, sorting on lat/long.

4. Using descriptions, lat/long proximity and recovery dates, review for obvious tag-to-target

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connections.

5. Any new findings from the above should be entered into the Tags Database, using the lat/long for the target found to correlate, either as new tagged objects or as updates.

Project: Grasp/Grapple Debris Locations
Completed: _____
Verified By: _____

1. Correlate the Grasp & Grapple ROV reports (using lat/long proximity, descriptions and dates) to Wreckage Logs or FBI Logs generated from them for the same time periods.

2. Any new findings from the above should be entered into the Tags Database, using the lat/long for the target found to correlate, either as new tagged objects or as updates.

Project: Ship Logs
Completed: _____
Verified By: _____

1. Review all ship logs and any similar/related documents for unique references to specific debris.

2. If any such connections can be made & verified, QA Procedure #5 or #6 should be used.

Project: Video Review
Completed: _____
Verified By: _____

1. Create an Updated Video Log

2. Review ROV video tapes for identifiable debris. Note time, ROV position, and debris identifier (tag number, FBI log number, Structures Group log number, etc.)

3. Perform QA Procedure #5 or #6 as necessary.

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