CLM CLAIMS & LITIGATION MANAGEMENT ALLIANCE™
ADVANCING ETHICS, COOPERATION AND EDUCATION

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# Shipwrecked –The Use of Modern Technology in Maritime Losses

## I. Tattletale Technology - "Black Box" Data

The devices on vessels are getting smarter. The equipment use to navigate and to propel a vessel frequently also stores information that can be useful to accident reconstruction investigators.

### Global Positioning Systems (GPS)

Nearly every modern GPS stores historical track line information that can be used to tell where a vessel was at a specific point in time, how fast it was going and the direction it was headed. Some also record information such as bottom depth and water temperature. These devices typically provide very accurate position data, usually within 10 feet, but can occasionally be affected by environmental conditions. The speed data from these devices is generally very accurate, but is typically based on an average speed between two recorded points, not some instantaneous speed at a given time. Sharp turns or changes in speed sometimes result in erratic track lines and potentially confusing information. Thus it is important to understand how the information is stored by the GPS when reviewing the results to avoid reaching erroneous conclusions.

The GPS data itself may be stored in one of many proprietary or open source formats in files located in various places within the GPS or a navigation system. The means for retrieving the data also varies from simple downloading of track lines to a memory card to using proprietary hardware and software to tie into a navigation system network. Because GPS units typically begin recording as soon as they are turned on and gain a good satellite signal, care must be taken to retrieve the information without adding or overwriting data. Care and handling of the GPS after an accident is critical and should include efforts to prevent the system from being powered until data collection can be completed.

### Engine Control Modules (ECM)

Most modern marine engines, from mid-sized outboards to large diesel information use electronic fuel injection and therefore have an ECM to control this process. In addition to controlling and monitoring the engine's operation, these devices also record information. Some only record a few fault codes, such as low oil pressure or high coolant temperature. Others hold hundreds of parameters, many of which may be useful to

investigators. Care must be used when evaluating and interpreting the data. For example, the last ten seconds of RPM data for an outboard may not represent the engine speed during the collision, particularly if the propeller is striking some object or out of the water.

## II. 3-D Laser Scanning

Equipment to measure objects in three dimensions using laser light has become more accessible and affordable in recent years. This highly accurate measurement technology allows for relatively quick, detailed documentation of vessels of all sizes, from small recreational boats to large ships.

### Documenting Damage

After a collision, fiberglass vessels tend either to have severely shattered hulls or small gouges and cuts. The complex, curved shapes of a hull make hand measurement time consuming and difficult to do with any accuracy. Metal hulls tend to have complex damage that is equally difficult to measure with any detail. Laser scanning technology can be used to capture details of a vessel's damaged hull. The point-cloud data from the scan can be used to build electronic models for various types of analysis, such as for intact or damaged stability, or used to compare and match data. This technology is also useful for documenting damage from other events, such as a fire. The unobtrusive nature of the scan helps document a scene before

### Reconstructing the Puzzle

Investigators reconstructing vessel accidents can use this technology to compare and match the damage between two vessels or a vessel and an object. By using the point cloud from the laser scan or an electronic model developed from the point cloud, the investigator can explore a number of possible scenarios to identify the ones (or one) that are consistent with all of the damage.

## III. Factors to Weigh When Considering the Use of Technology

### Costs; Initial and Downstream

Somewhat more expensive initially… can be much more expensive if you go to the extent of full animation..

### Rapid Data Collection and Preservation of Evidence

Allows for quick documentation of a vessel's condition that can be preserved for later use if needed…

**Potential Usefulness of Information to Handling the Loss**

Is the information collected likely to lead to a meaningful determination?

May not be worth doing for smaller losses due to cost…

## IV. Reliability and Use of the Information Gathered

**Proven Collection Methodology (Daubert standard)**

Is the method used to gather the information using this technology well founded? Has it been tested? Peer reviewed publication of methodology? Concensus standards? Widespread acceptance?

**Accuracy and Precision of Results (Daubert standard)**

Is there a known or potential error rate? How accurate is laser scanning? (typically 2 mm or less)

How accurate is the information from a GPS? (Depends on conditions but usually 10' or less for position)

**Ownership of "Black Box" Data (5th Amendment/Privacy Concerns)**

Who owns the information? What permissions do you need if the data is not yours?

**Storage and Distribution of the Data (size/volatility/format/media)**

Could information be lost if you do not take steps to retrieve the data?

Raw laser scan data generally has a very large file size and is written in proprietary formats. Expensive, licensed software is needed to access and manipulate it. How do you share this raw data. How do you store the data to prevent it from being lost? How do you disclose it?

What responsibility do you have to safeguard GPS or ECM data (even if you don't retrieve it)

## V. Using Technology at Trial

Raw GPS and ECM data are typically tables with arcane labels. But GPS data can be put on charts for display. Simple ECM data can be translated and critical information

highlighted. Complex ECM data can be put in graphs. Laser scans can be made part of diagrams or animations.

**Admissibility of Information**

What issues come up when entering a graphic image or animation based on a computer model, which is based on a laser scan admitted into evidence?

**Presentation of the Information**

Data can be combined to create animations or graphical images.