

Black Box Data from Accident Vehicles

Methods of Retrieval, Translation, and Interpretation

William Rosenbluth



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Dedication

This book, as was my first, is dedicated to my wife, Jean Joy Rosenbluth. Her continuous support, encouragement, and patience facilitated much of the work discussed herein. She is the best thing that ever happened to me.

William Rosenbluth
Reston, VA

Foreword

The objective of this publication is to build on the concepts presented in ASTM Monograph 4¹ by providing specific examples of the translation and interpretation of raw downloaded hexadecimal data into engineering units useful to the engineering investigator. This will include illustrations of specific data interpretation and scaling constructs and examples of specific spreadsheet formulations to import and translate those data into useful engineering units.

Before proceeding with specific and detailed examples, and for those not familiar with ASTM Monograph 4, the broad concepts used in the field are discussed in Chapter 1. Those well versed in the broad concepts can proceed directly to a more detailed discussion of geometric conventions and crash data nomenclature covered in Chapter 2. Lastly, those well versed in concepts, crash event geometric conventions, and crash event data nomenclature can proceed directly to the data examples in Chapter 3.

In order to enhance chapter independence and immediate clarity, certain acronyms may be repeatedly defined in succeeding chapters. This is to allow each chapter to be independently understood.

The principles and methods discussed in Chapters 2 and 3 are good engineering science, but they are only of academic value unless they can be applied for a business purpose. Analysis and improvement of system designs is one such purpose.

Another such purpose is to conduct analysis for purposes of illuminating engineering issues in litigation. In that context, the investigator is often tested as to his/her methods and their reliability, repeatability, usage by industry peers, and error rates. Chapter 4 presents a discussion of some considerations regarding those tests and methods to assure that one can pass those tests.

The reader should note that many different data retrieval and analysis situations may occur, and that, while this work is designed to present a representative set of such situations, it cannot cover every possible situation.

¹ *Investigation and Interpretation of Black Box Data in Automobiles: A Guide to the Concepts and Formats of Computer Data in Vehicle Safety and Control Systems*, jointly published by the ASTM International, West Conshohocken, PA, and the Society of Automotive Engineers (SAE), June 2001.

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William Rosenbluth has 48 years of professional experience with complex electro-mechanical, electronic and computer components and systems. He was employed by the IBM Corporation for 21 years, and for the past 23 years he has been principal engineer for Automotive Systems Analysis, Inc. (ASA), in Reston, Virginia. At ASA, he specializes in the analysis and diagnosis of computer-related vehicle control systems and in the retrieval and analysis of electronic crash-event data in accident vehicles (*black box data*).

Mr. Rosenbluth is a Diplomate of the International Institute of Forensic Engineering Sciences (D-IIFES), a Fellow of the American Academy of Forensic Sciences (AAFS), a member of the Society of Automotive Engineers (SAE), ASTM International, and a life member of the Institute of Electrical and Electronics Engineers (IEEE) and the IEEE Computer Society.

At IEEE and AAFS, he has co-authored and/or presented over 60 papers dealing with automotive engineering investigations, co-instructed a continuing education short course, and organized engineering technical sessions. His engineering achievements were recognized by the AAFS in 1999 when he was presented with the Andrew H. Payne, Jr. Special Achievement Award for Pioneering New Procedures, Outstanding Professional Performance and Outstanding Forensic Engineering Leadership.

He holds three U.S. Patents, including one for a device to measure air bag static deployment throw and velocity using digital data acquisition.

His publications include a prior book, *Investigation and Interpretation of Black Box Data in Automobiles*, co-published by ASTM and SAE in June 2001, a Chapter on air bag systems data and diagnosis in *Forensic Accident Investigation, Motor Vehicles-2*, published by Lexis Law Publishing and papers in the *Journal of Forensic Sciences* and *Sensors Magazine*.

Mr. Rosenbluth was chairman of the ASTM E30.05/WK 4150 Standards Development Group that produced E2493-07: *Standard Guide for the Collection of Non-Volatile Memory Data in Evidentiary Vehicle Electronic Control Units*. That Standard Guide, developed with participants from industry, government and private sectors, was approved and published by ASTM in April 2007.

He lives with his wife Jean in Reston, Virginia.

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