

International Loran Association

**35th Annual Convention and
Technical Symposium of the
International Loran Association
2006**

October 23 – 25, 2006
Groton, Connecticut, USA

Volume 1 of 2

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571
www.proceedings.com

ISBN: 978-1-60423-801-3

Some format issues inherent in the e-media version may also appear in this print version.

International Loran Association

35th Annual Convention and Technical Symposium
of the International Loran Association
2006

TABLE OF CONTENTS

Volume 1

| | |
|--|-----|
| The eLoran Evaluation and Modernization Program -- 1997-2007: A Decade of Excellence | 1 |
| <i>Mitchell J. Narins</i> | |
| The General Lighthouse Authorities' Loran Programme and Current Status in Europe | 41 |
| <i>Sally Basker, David Last</i> | |
| Update on FERNS - Current Status (<i>Presentation</i>)..... | 70 |
| <i>Seung-Gi GUG, Tamotsu IKEDA</i> | |
| Update on FERNS: Report on The Fifteenth Session of the Council of the Far East Radionavigation Service (FERNS) (<i>Paper</i>)..... | 85 |
| <i>Seung-Gi GUG</i> | |
| LORAN Modernization Program Status | 97 |
| <i>Christopher D. Nichols</i> | |
| Status of U.S. Loran Program and Policy | 117 |
| <i>John K. Merrill</i> | |
| FY06 US LORAN Performance Review | 124 |
| <i>Lt. Matthew Will</i> | |
| Test Results of the e-Tracker, a New Modular and Flexible Loran-C Based Goods Tracking System (<i>Presentation</i>) | 145 |
| <i>Marc Clerens</i> | |
| Test Results of the e-Tracker, a New Modular and Flexible Loran-C Based Goods Tracking System (<i>Paper</i>)..... | 163 |
| <i>Marc Clerens</i> | |
| Loran in the World's "Areas of Interest" (<i>Presentation</i>)..... | 181 |
| <i>Robert W. Lilley, PhD</i> | |
| Loran in the World's "Areas of Interest" (<i>Paper</i>)..... | 195 |
| <i>Robert W. Lilley, PhD</i> | |
| Genesis of Loran Augmented Satellite Navigation (<i>Presentation</i>) | 208 |
| <i>John C. Herther</i> | |
| Genesis of Loran Augmented Satellite Navigation (<i>Paper</i>)..... | 222 |
| <i>John C. Herther</i> | |
| Comparing LORAN Timing Capability to Industrial Requirements (<i>Presentation</i>)..... | 247 |
| <i>Michael Lombardi</i> | |
| Comparing LORAN Timing Capability to Industrial Requirements (<i>Paper</i>)..... | 271 |
| <i>Michael Lombardi</i> | |
| TRI NAV™: Integrating LORAN, GPS, INS, and Timing for a Total Navigation Solution (<i>Presentation</i>)..... | 285 |
| <i>Steve Smith, Gary Steimer</i> | |

| | |
|---|-----|
| TRI NAV™: Integrating LORAN, GPS, INS, and Timing for a Total Navigation Solution (Invited Paper) | 329 |
| S. F. Smith, J. A. Moore, M. Bobrek, and C. Jin | |
| Loran C Accuracy Considerations: Terminal Area and En Route (Presentation) | 346 |
| David Diggle, Ph.D., Mitchell J. Narins | |
| Loran C Accuracy Considerations: Terminal Area and En Route (Paper) | 388 |
| David Diggle, Ph.D., Mitchell J. Narins | |
| Preliminary Evaluation of Loran for RNP 1.0 (Presentation) | 405 |
| Sherman Lo | |
| Preliminary Assessment of Loran for Required Navigation Performance 1.0 (Paper) | 428 |
| Sherman Lo | |
| A Potential Role for eLoran in Aviation Surveillance | 452 |
| James Carroll, PhD | |
| The Big Picture on ASFs: The Validity of Predicted ASFs Over Long Distances (Presentation) | 467 |
| Ruslan Shalaev, Dr. Gregory Johnson, Christian Oates, Dr. Peter Swaszek, Richard Hartnett, PhD | |
| The Big Picture on ASFs: The Validity of Predicted ASFs Over Long Distances (Paper) | 494 |
| Ruslan Shalaev, Dr. Gregory Johnson, Christian Oates, Dr. Peter Swaszek, Richard Hartnett, PhD | |
| Demonstrating Integrity for Loran Cycle Selection Using Weighted Sum Squared Error (WSSE) Statistic (Presentation) | 510 |
| Sherman Lo | |
| Assessing the Loran Cycle Confidence Algorithm (Paper) | 538 |
| Sherman Lo | |
| Differential eLoran trials in Harwich Harbour | 557 |
| Gerard Offermans, Arthur Helwig, Paul Williams, Wouter Pelgrum | |
| Methods for Developing ASF Grids for Harbor Entrance and Approach (Presentation) | 578 |
| Dr. Peter Swaszek, Dr. Gregory Johnson, Richard Hartnett, PhD | |

VOLUME 2

| | |
|---|-----|
| Methods for Developing ASF Grids for Harbor Entrance and Approach (Paper) | 612 |
| Dr. Peter Swaszek, Dr. Gregory Johnson, Christian Oates, Mark Wiggins, Richard Hartnett, PhD | |
| High Precision Differential eLoran: Tampa Bay Revisited | 630 |
| Wouter J. Pelgrum | |
| Evaluation of Loran Performance as a DGPS Backup System in the HEA Domain: Using a Target Level of Safety Criterion (Presentation) | 662 |
| Peter B. Morris | |
| Evaluation of Loran Performance as a DGPS Backup System in the HEA Domain: Using a Target Level of Safety Criterion (Paper) | 687 |
| Peter B. Morris | |
| Loran Data Channel: Progress to Date and Future Plans (Presentation) | 703 |
| Ken Dykstra, Ben Peterson | |
| Loran Data Channel: Progress to Date and Future Plans (Paper) | 712 |
| Ken Dykstra, Ben Peterson | |

| | |
|--|------|
| High-Voltage: P-static Test and Evaluation Facility at the FAA Technical Center | 720 |
| <i>Robert Lilley, Robert Erikson, W. J. Hughes</i> | |
| LDaC: A Wideband Loran Data Acquisition System (<i>Presentation</i>) | 737 |
| <i>Dr. Gregory Johnson</i> | |
| LDaC: A Wideband Loran Data Acquisition System (<i>Paper</i>) | 749 |
| <i>Dr. Gregory Johnson, Ruslan Shalaev, Michael Kuhn;</i> | |
| Recent Ohio University LORAN-C Atmospheric-Noise Flight-Test Results (<i>Presentation</i>) | 764 |
| <i>Curtis A. Cutright, Janet Blazyk, Frank van Graas, David W. Diggle</i> | |
| LORAN-C Atmospheric-Noise Flight-Test Results (<i>Paper</i>)..... | 790 |
| <i>Curtis A. Cutright, Janet Blazyk, Frank van Graas, David W. Diggle</i> | |
| Analysis of Noise and Cycle Selection in a Loran Receiver (<i>Presentation</i>) | 803 |
| <i>C.O. Lee Boyce, Jr., Sherman Lo</i> | |
| Analysis of Noise and Cycle Selection in a Loran Receiver (<i>Paper</i>) | 836 |
| <i>C.O. Lee Boyce Jr., Sherman Lo, J. David Powell, Per K. Enge</i> | |
| Warping Time and Space: Spatial Correlation of Temporal Variations (<i>Presentation</i>) | 842 |
| <i>Mike Kuhn, Ruslan Shalaev, Dr. Gregory Johnson, Dr. Peter Swaszek, Richard Hartnett, PhD</i> | |
| Warping Time and Space: Spatial Correlation of Temporal Variations (<i>Paper</i>) | 869 |
| <i>Mike Kuhn, Dr. Gregory Johnson, Mark Wiggins, Dr. Peter Swaszek, Richard Hartnett, PhD</i> | |
| An Examination Of Loran Signal Propagation Temporal Variation Modeling (<i>Presentation</i>) | 882 |
| <i>Kirk Montgomery, Peter Morris, Robert Wenzel</i> | |
| An Examination Of Loran Signal Propagation Temporal Variation Modeling (<i>Paper</i>) | 915 |
| <i>Kirk Montgomery, Peter Morris, Robert Wenzel</i> | |
| Development, implementation, and verification of the Loran TOA Measurement System (<i>Presentation</i>) | 935 |
| <i>Wouter Pelgrum, Arthur Helwig & René Kellenbach, David Diggle, Mitchell Narins</i> | |
| Development, implementation, and verification of the Loran TOA Measurement System (<i>Paper</i>) | 963 |
| <i>Wouter Pelgrum, Arthur Helwig & René Kellenbach, David Diggle, Mitchell Narins</i> | |
| LSU Timing Update (State of LDC and TWSTFT) | 975 |
| <i>Lt. Kevin Shmihluk</i> | |
| LORADD UTC timing trials & Developments..... | 1006 |
| <i>Arthur Helwig, Gerard Offermans, Christian Farrow</i> | |
| Backup Strategies for Navigation and Surveillance | 1035 |
| <i>Gary Church, Mike Harrison, Bob Lilley</i> | |
| ILA Safety Panel Presentation – Some Examples | 1059 |
| <i>Sally Basker</i> | |
| Traditional Navigation in Pilot Waters. | 1069 |
| <i>Capt. Bill Brogdon</i> | |
| The Future of E-Loran..... | 1077 |
| <i>Earl M. Waesche</i> | |
| Loran GPS at the Marshall Islands | 1081 |
| <i>Capt. Brad Wheeler</i> | |
| Alternative Concept of Operations Summary Description and Analysis | 1090 |
| <i>Erik Johannessen</i> | |

| | |
|---|------|
| Integrated eLoran/GPS Receivers: An Overview of Markets and Commercialization (<i>Presentation</i>)..... | 1103 |
| <i>Zachariah Conover</i> | |
| Integrated eLoran/GPS Receivers: An Overview of Markets and Commercialization (<i>Paper</i>)..... | 1129 |
| <i>Zachariah Conover, Michael Leathem</i> | |
| Loran's Role in Future PAT | 1139 |
| <i>Erik Johannessen</i> | |
| Requirements Development for a Modernized Loran / LEMS / LICOS | 1157 |
| <i>Wayne Wawrzyniak</i> | |
| Radionavigation: The Only Way To Go? (<i>Presentation</i>)..... | 1188 |
| <i>Durk van Willigen</i> | |
| Radionavigation: The Only Way To Go? (<i>Paper</i>)..... | 1220 |
| <i>Durk van Willigen</i> | |

AUTHOR INDEX