In this file, we have organized the publications by analysis type, industry, topic, etc. Papers are duplicated that fall under several categories. The categories and organization is:

**General**

**Type of Analysis**
- Hazard Analysis (STPA)
- Accident Analysis (CAST)
- Organizational, Managerial, Social Analysis
- Leading Indicators
- Cyber Security
- Other Emergent System Properties
- Feature Interaction/Integrating Multiple Controllers

**System Engineering**

**Intent Specifications**

**Standards, Regulations, Certification**

**Software Engineering**

**Human Factors/Human-Automation Interaction**

**System Dynamics**

**Comparisons with Traditional Approaches (FMEA, FMECA, FTA, ARP 4761, HFACS, MIL-STD-882, etc.)**

**Applications**
- Aviation/Aircraft/Military Aviation
- Airlines
- UAV/UAS
- Air Traffic Control
- Defense/Military (non-aviation)
- Space/Spacecraft
- Naval
- Automotive
- Healthcare/Medical/Pharmaceutical
- Rail
- Workplace Safety
- Nuclear Power
- Petrochemical
- Climate Change
- Financial System

**GENERAL**


Table of Contents


*Extending and Automating a Systems-Theoretic Hazard Analysis for Requirements Generation and Analysis* by John Thomas, MIT Ph.D. Dissertation, June 2013

*Drawbacks in using the term "System of Systems."* by Nancy G. Leveson

[Letter to Editor: Challenging the Systems Approach: Why Adverse Event Rates Are Not Improving by Philip Levitt, M.D.

Our Response: The bad apple theory won't work: Response to 'Challenging the systems approach: why adverse event rates are not improving' by Dr. Levitt by Sidney Dekker and Nancy Leveson


TYPE OF ANALYSIS

Hazard Analysis (STPA)

STPA Handbook (English version)

STPA Handbook (Japanese version, coming soon)

Extending and Automating a Systems-Theoretic Hazard Analysis for Requirements Generation and Analysis by John Thomas, MIT Ph.D. Dissertation, June 2013

Application of Systems and Control Theory-Based Hazard Analysis to Radiation Oncology, by Todd Pawlicki, Aubrey Samost, Derek Brown, Ryan Manger, Gwe-Ya Kim, and Nancy Leveson. Journal of Medical Physics, in press, 2016


Systems-Theoretic Accident Model and Processes (STAMP) Applied to a U.S. Coast Guard Buoy Tender Integrated Control System by Paul D. Stukus, MIT SDM Masters Thesis, June 2017


Accident Analysis and Hazard Analysis for Human and Organizational Factors by Margaret Stringfellow, October 2010


STPA Analysis of NextGen Interval Management Components: Ground Interval Management (GIM) and Flight Deck Interval Management (FIM) by Cody H. Fleming, M. Seth Placke, and Nancy Leveson, FAA and Lincoln Lab, September 2013.


**Accident Analysis (CAST)**

CAST Analysis of the Shell Moerdijk Accident by Nancy G. Leveson


Learning from Accidents that are a consequence of complex systems, by John Thomas and Shem Malmquist, ISASI Conference

Applying Systems Thinking to Analyze and Learn from Events by Nancy Leveson, Safety Science, Vol. 49, No. 1, January 2010, pp. 55-64


Application of CAST to Hospital Adverse Events, by Meaghan O’Neil, MIT Master's Thesis, May 2014


A Systems Theoretic Application to Design for the Safety of Medical Diagnostic Devices, by Vincent Balgos, MIT SDM Master's Thesis, February 2012, supervised by Dr. Qi van Eikema Hommes


Accident Analysis and Hazard Analysis for Human and Organizational Factors by Margaret Stringfellow, October 2010

A System Theoretic Analysis of the "7.23" Yong-Tai-Wen Railway Accident, by Dajiang Suo from the Computer Science and Technology Dept., Tsinghua University, Beijing, China, was presented at the 1st STAMP/STPA Workshop held at MIT on April 26-28, 2012


Organizational, Managerial, Social Analysis


Accident Analysis and Hazard Analysis for Human and Organizational Factors by Margaret Stringfellow, October 2010


Risk Analysis of NASA Independent Technical Authority by Nancy Leveson and Nicolas Dulac (co-investigators include John Carroll, Joel Cutcher-Gershenfeld, Betty Barrett, David Zipkin) February 2005


Demonstration of a New Dynamic Approach to Risk Analysis for NASA's Constellation Program by Nicolas Dulac, Brandon Owens, Nancy Leveson.


Leading Indicators


Cyber Security

Systems-Theoretic Accident Model and Processes (STAMP) Applied to a U.S. Coast Guard Buoy Tender Integrated Control System by Paul D. Stukus, MIT SDM Masters Thesis, June 2017


Feature Interaction/Integrating Multiple Control Systems

Application of STPA to the Integration of Multiple Control Systems: A Case Study and New Approach, by Matthew Seth Placke, Master’s Thesis, Engineering Systems Division, MIT, June 2014


Other Emergent System Properties


SYSTEM ENGINEERING

Safety Analysis in Early Concept Development and Requirements Generation by Nancy G. Leveson


Safety-Guided Design of Crew Return Vehicle in the Concept Design Phase using STAMP/STPA by Haruka Nakao, Masa Katahira, Yuko Miyamoto, and Nancy Leveson. This paper was presented at Conference of the International Association for the Advancement of Space Safety, Versailles, France, October 2011

Demonstration of a New Dynamic Approach to Risk Analysis for NASA's Constellation Program by Nicolas Dulac, Brandon Owens, Nancy Leveson.


INTENT SPECIFICATIONS


[More details: Safety-Driven Model-Based System Engineering Methodology Part I: Methodology Description and Safety-Driven Model-Based System Engineering Methodology Part II: Application of the Methodology to an Outer Planet Exploration Mission by Brandon Owens, Margaret Stringfellow Herring, Nancy Leveson (MIT) and Mitch Ingham, Kathryn Weiss JPL). December 2007]

**Example TCAS Intent Specification** by Nancy Leveson and Jon Reese.


**Safety-Guided Spacecraft Design using Model-Based-Specifications** by Cody Fleming, Takuto Ishimatsu, Yuko Miyamoto, Haruka Nakao, Masa Katahira, Nobuyuki Hoshino, John Thomas, and Nancy Leveson, International Association for the Advancement of Space Safety Conference, Versailles, France, Oct 2011

**Analyzing Software Specifications for Mode Confusion Potential** by Nancy Leveson, L. Denise Pinnel, Sean David Sandys, Shuichi Koga, and Jon Damon Reese, First International Workshop on Human Error and System Development, Glasgow, March 1997. (An old paper and the notation for the formal specification language used in Intent Specifications, i.e., SpecTRM-RL, has changed, but the ideas are still relevant.)

### STANDARDS, REGULATION, CERTIFICATION

**Systems Theoretic Process Analysis Applied to Air Force Acquisition Technical Requirements Development** by Sarah E. Summers (Major, USAF)

**White paper on compliance of STPA with MIL-STD-882E and AMCOM 385-17** by Nancy G. Leveson

**The Use of Safety Cases in Certification and Regulation** by Nancy Leveson. An earlier version of this paper appeared in the *Journal of System Safety*, Nov/Dec 2011. The version here is updated from that version and includes more material.

**The Danger of a "Safety Case"** by Nancy G. Leveson (a short essay I wrote while frustrated)


### SOFTWARE ENGINEERING


**Engineering Spacecraft Mission Software using a Model-Based and Safety-Driven Design Methodology** by Kathryn Anne Weiss, Nicolas Dulac, Stephanie Chiesi, Mirna Daouk, David Zipkin, and Nancy Leveson, AIAA Information Systems Journal.


HUMAN FACTORS, HUMAN-AUTOMATION INTERACTION


Rasmussen’s Legacy: A Paradigm Change in Engineering for Safety. by Nancy Leveson, Applied Ergonomics, 1, Special Issue on Reflecting on the Legacy of Jens Rasmussen, 2016

Extending the Human-Controller Methodology in Systems-Theoretic Process Analysis (STPA), by Cameron L. Thornberry, Master’s Thesis, Aeronautics and Astronautics, MIT, June 2014


Analyzing Software Specifications for Mode Confusion Potential by Nancy Leveson, L. Denise Pinnel, Sean David Sandys, Shuichi Koga, and Jon Damon Reese, First International Workshop on Human Error and System Development, Glasgow, March 1997. (An old paper and the notation for the formal specification language used in Intent Specifications, i.e., SpecTRM-RL, has changed, but the ideas are still relevant.)

Engineering for Humans: A New Extension to System Theoretic Process Analysis by Megan France and John Thomas, Int. Symposium on Aviation Psychology, Dayton Ohio, May 2017

SYSTEM DYNAMICS


Demonstration of a New Dynamic Approach to Risk Analysis for NASA’s Constellation Program by Nicolas Dulac, Brandon Owens, Nancy Leveson.

COMPARISONS WITH TRADITIONAL APPROACHES

FMEA/FMECA


A Systems Theoretic Application to Design for the Safety of Medical Diagnostic Devices, by Vincent Balgos, MIT SDM Master’s Thesis, February 2012, supervised by Dr. Qi van Eikema Hommes

**FTA, ARP 4761**

Modeling and Hazard Analysis using STPA by Takuto Ishimatsu, Nancy Leveson, John Thomas, Masa Katakura, Yuko Miyamoto, Haruka Nakao. Presented at the *Conference of the International Association for the Advancement of Space Safety*, Huntsville, Alabama, May 2010


**Root Cause Analysis**

Systems-Theoretic Accident Model and Processes (STAMP) Applied to a U.S. Coast Guard Buoy Tender Integrated Control System, by Paul D. Stukus, MIT SDM Masters Thesis, June 2017

Application of CAST to Hospital Adverse Events, by Meaghan O’Neil, MIT Master’s Thesis, May 2014


**HFACS**

A CAST Analysis of a U.S. Coast Guard Aviation Mishap, by Jon Hickey, MIT Master’s Thesis, May 2012, supervised by Dr. Qi van Eikema Hommes.

Accident Analysis and Hazard Analysis for Human and Organizational Factors by Margaret Stringfellow, October 2010

**MIL-STD-882**


**Others**


Comparison of SOAM and STAMP for ATM Incident Investigation by Richard Arnold, Master’s Thesis, Lund University, Sweden, 2009, supervised by Prof. Sidney Dekker..

STPA Analysis of NextGen Interval Management Components: Ground Interval Management (GIM) and Flight Deck Interval Management (FIM) by Cody H. Fleming, M. Seth Placke, and Nancy Leveson, FAA and Lincoln Lab, September 2013.

**APPLICATIONS**

Aviation/Aircraft/Military Aviation
**Systems Theoretic Process Analysis Applied to Air Force Acquisition Technical Requirements Development** by Sarah E. Summers (Major, USAF)

**Learning from Accidents that are a consequence of complex systems** by John Thomas and Shem Malmquist, ISASI Conference

**A CAST Analysis of a U.S. Coast Guard Aviation Mishap** by Jon Hickey, MIT Master's Thesis, May 2012, supervised by Dr. Qi van Eikema Hommes.


**A STAMP Analysis of the LEX Comair 5191 Accident** by Paul S. Nelson, Master's Thesis, Lund University, Sweden, June 2008, supervised by Prof. Sidney Dekker.


**Engineering for Humans: A New Extension to System Theoretic Process Analysis** by Megan France and John Thomas, Int. Symposium on Aviation Psychology, Dayton Ohio, May 2017


**Identification of Leading Indicators for Producibility Risk in Early-Stage Aerospace Product Development** by Allen J. Ball, MIT Master's Thesis, June 2015.


**Airlines**


**Test and Evaluation**


**UAV/UAS**

**Systems Theoretic Process Analysis Applied to Air Force Acquisition Technical Requirements Development** by Sarah E. Summers (Major, USAF)

**Accident Analysis and Hazard Analysis for Human and Organizational Factors** by Margaret Stringfellow, October 2010

**Systems-Theoretic Process Analysis and Safety-Guided Design of Military Systems** by David Craig Horney, MIT Aeronautics and Astronautics Masters Thesis, June 2017


**Air Traffic Control**


**Assuring Safety of NextGen Procedures** by Cody H. Fleming, Nancy G. Leveson, M. Seth Placke. Presented at the *Tenth USA/Europe Air Traffic Management Research and Development Seminar (ATM2013)*.

**STPA Analysis of NextGen Interval Management Components: Ground Interval Management (GIM) and Flight Deck Interval Management (FIM)** by Cody H. Fleming, M. Seth Placke, and Nancy Leveson, Research Report for FAA and Lincoln Lab, September 2013.


**Comparison of SOAM and STAMP for ATM Incident Investigation** by Richard Arnold, Master's Thesis, Lund University, Sweden, 2009, supervised by Prof. Sidney Dekker.

**Safety-Driven Early Concept Analysis and Development** by Cody Harrison Fleming, MIT Ph.D. Dissertation, January 2015

**Defense/Military (non-aviation)**

**White paper on compliance of STPA with MIL-STD-882E and AMCOM 385-17** by Nancy G. Leveson


**Spacecraft/Space**


**Modeling and Hazard Analysis using STPA** by Takuto Ishimatsu, Nancy Leveson, John Thomas, Masa Katahira, Yuko Miyamoto, Haruka Nakao. Presented at the *Conference of the International Association for the Advancement of Space Safety*, Huntsville, Alabama, May 2010
Safety-Guided Design of Crew Return Vehicle in the Concept Design Phase using STAMP/STPA by Haruka Nakao, Masa Katahira, Yuko Miyamoto, and Nancy Leveson. This paper was presented at Conference of the International Association for the Advancement of Space Safety, Versailles, France, October 2011.


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Naval


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Automotive


**Healthcare/Medical/Pharmaceutical**

Application of Systems and Control Theory-Based Hazard Analysis to Radiation Oncology, by Todd Pawlicki, Aubrey Samost, Derek Brown, Ryan Manger, Gwe-Ya Kim, and Nancy Leveson. Journal of Medical Physics, in press, 2016


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**Rail**


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**Workplace Safety**


**Nuclear Power**


**Petrochemical**

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**Climate change**


**Financial System**