



INCOSE Panel Discussion

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*This lecture is based on content originally prepared by Linda Laird, and includes updates by Jim Rowland and Rich Kempinski



Agenda

- Background
- Today's Curriculum
- Learning vs Outsourcing
- "Half Life" of Systems Engineering
- Conclusion



Background

- Undergraduate in Mathematics and Electrical Engineering
 - University of Washington, Seattle, WA. 1996
- Masters and Ph.D. in Electrical and Computer Engineering
 - Image and Signal Processing with Data Acquisition Boards
 - Cornell University, Ithaca, NY. 2002
- Hardware Design Engineer @ HP – before Agilent and Keysight Split
 - Designed data acquisition sub-components for the HP 8560 E Spectrum Analyzer
- PI for Terrestrial and Aerial 3D Scanning and Mapping Systems @ SAIC
 - Patent for DARPA developed 3D Terrestrial Scanning System
- Multitude of Startups
- Pivoted to Teaching in the Spring of 2022

(12) **United States Patent**
Muresan et al.

(10) Patent No.: **US 7,752,483 B1**
(45) Date of Patent: **Jul. 6, 2010**

(54) **PROCESS AND SYSTEM FOR THREE-DIMENSIONAL URBAN MODELING**

(75) Inventors: **David Darian Muresan**, Arlington, VA (US); **Andrew Charles Weitz**, Redlands, CA (US)

(73) Assignor: **Science Applications International Corporation**, San Diego, CA (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 874 days.

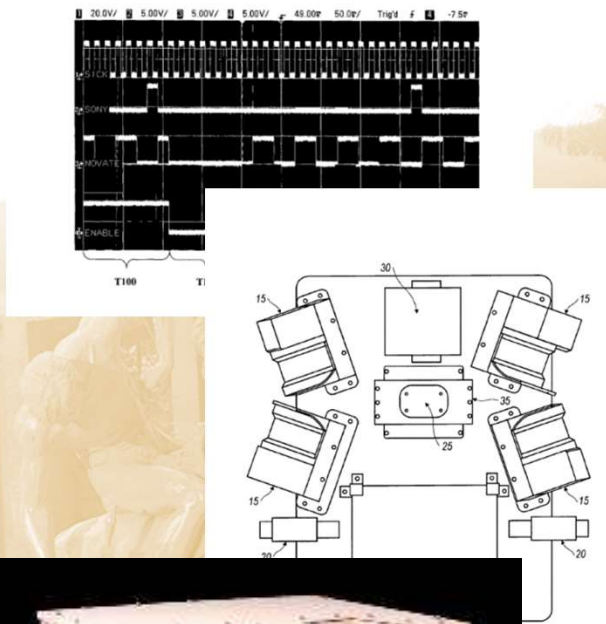
(21) Appl. No.: **11/637,783**
(22) Filed: **Dec. 13, 2006**

(51) Int. Cl. **G01V 5/08** (2006.01)
(52) U.S. Cl. **713/600**; **713/400**; **713/600**; **702/5**; **386/66**

(58) **Field of Classification Search** **713/600**; **601**; **702/5**; **386/66**
See application file for complete search history.

(56) **References Cited**
U.S. PATENT DOCUMENTS
4,439,788 A 3/1984 Frame 348/262
6,541,790 B1 5/2004 Burgess 386/46

26 Claims, 6 Drawing Sheets





Today's Curriculum

- **Yesterday:** COVID impacted hands-on experiences
- A lot of experience using simulation tools
 - pSpice
 - Virtual oscilloscopes and logic analyzers
- **Today:** a strong desire for hands-on experiences
- ChaptGPT and AI has huge class penetration
 - Use carefully in industrial environments, but OK in classes
- Started a Computer Club due to strong student interest in hands on experiences
 - Build PCBs
 - Integrate FPGAs and programmable hardware





Learning versus Outsourcing

- Careful, but required, adaptation of AI tools
 - IP concerns
 - AI is an enhanced search tool
- Learning is a priceless asset
 - Cannot be stripped away
 - Provides better control of processes and final product quality
 - Requires active engagement
 - Provides control over IP
- Outsource mundane tasks
 - Mass production, such as PCBs





“Half Life” of Systems Engineering

- Swinging pendulum is a better analogy
- Early computers were servers with terminals
- PC Revolution democratized and distributed computing power
- Present: back to central servers
 - AWS, Google Cloud, Azure
 - Close to instant configuration
 - Expensive for large amounts of data or bandwidth
 - Privacy concerns
- Early trends towards wrestling back privacy and data ownership
 - Students build their own servers
 - A design group is designing a data-sharable-social-media site



Conclusion

- Today's curriculum changes
 - Strong desire to return to basics and hands on
- Learning vs outsourcing
 - Learn for IP
 - Outsource mass production
- Half life of Systems Engineering is a pendulum
 - Strong desire to wrestle back privacy and data control