

# John L. Tolman

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## Career Summary

Mr. Tolman has over 30 years of engineering and business management experience. He has successfully managed both software and hardware engineering projects. Mr. Tolman's early work includes NASA's Skylab and Viking space projects.

## Experience

- 2006-Present Sensor Design Group, LLC., Houston, TX  
**Managing Director, Senior Design Engineer**
- 2000-2006 Terrapoint USA, Inc., The Woodlands, TX  
**Senior Electronics Design Engineer**
- 1988-1999 InfoLink Technologies, Inc., Provo, UT  
**President and Chief Technical Officer**
- 1986-1988 Unibase Systems, Inc., Park City, UT  
**Vice President of Development**
- 1978-1987 Tolman Engineering Inc., Provo, UT  
**President and Owner**
- 1976-1978 Billings Computer Corp., Provo, UT  
**Vice President of Engineering**
- 1974-1976 Brigham Young University, Provo, UT  
**Computer Engineer**
- 1972-1974 Storage Technology Corp., Boulder, CO  
**Senior Electronics Technician**
- 1971-1972 New Products International Corp., Denver, CO  
**Co-founder and Vice President of Research and Development**
- 1969-1971 Ball Brothers Research Corp., Denver, CO  
**Electronics Technician**

## Key Skills

Supervision of hardware and software development teams. Engineering strengths include electronic circuit design with particular expertise in analog circuits, hi-speed amplifiers, digital circuits, and embedded processors. Software skills include system level design and hands-on programming in 'C' and assembly language.

## Education

- 1976 Bachelor of Science in Electrical Engineering, minors in Computer Science and Physics, Brigham Young University, Provo, UT
- 1969 Associate of Science in Electronics Technology, Western Technical College, Littleton, CO

**Major Projects****Electromagnetic Inspection**

Design/Test Engineer

Ongoing development of advanced techniques and systems for electromagnetic inspection (EMI) of pipe. Hardware improvements include replacement of conventional coil pickup sensors with discrete Hall sensors providing superior detection of off-axis flaws. Designed low-noise, high-gain analog preamps for Hall effect sensors.

Contributed to the development of a real-time adaptive digital signal processing algorithm that increases signal to noise ratio and permits automated detection of smaller flaws in the presence of high background noise levels.

**Programmable Logic Controller (PLC) and Programmable Automation Controller (PAC)**

Software Engineer

Design and support code for Allen Bradley PLC to control rotation and position motion of pipe inspection equipment in heavy industrial environments. Interface with plant conveyor systems to provide seamless product flow. Design and program Human interface (HMI) touch screens. Use Rockwell Automation's RS-Logix, RS-View, and RS-Linx software tools.

Using National Instruments LabView 8.5 and Compact-RIO Programmable Automation Controller (PAC) to upgrade pipe inspection equipment. Multiple 16 bit analog channels are digitized and processed real-time in local processor and FPGA's.

**Virtual Zero Detection System**

Design/Test Engineer

Designed and implementing a "Virtual Zero" detection system for rotating pipe to track and identify with high precision, a point as the 0° index each time the pipe rotates. The challenging part of this project is that the pipe does not rotate smoothly and is submerged in water some of the time. Designed the detection system using Infrared (IR) and ultraviolet (UV) light sources and photodiodes. Designed photodiode amplifiers and implemented software Constant Fraction Discriminator (CFD) to produce a low jitter, high precision output.

**Fourier Transform Infrared (FT-IR) Spectrometer Pre-Amp**

Design/Test Engineer

Circuit design and PCB layout of MCT detector amplifier with extremely linear frequency response and exponential gain. Used for interferogram measurements for a commercial Fourier Transform Infrared (FT-IR) Spectrometer.

**Light Detection and Ranging (LiDAR) System**

Senior Electronics Design Engineer

Developed airborne LiDAR sensor systems. Specialized in design of high-speed analog circuits including high-gain detectors with temperature compensation, increased signal to noise ratio, constant fraction

discriminator (CFD) for precision pulse timing, laser pulse time-of-flight dependent amplifiers, sample and hold circuits, and high resolution digitized amplitude sampling. Enhanced laser optics path design. Provided field installation, support, and maintenance for worldwide sensor deployments.

### **InfoLink Library, A Full-Text Retrieval Developer's Tool-Kit**

Project Manager, Software Engineer

Developed a full-text retrieval developer's tool-kit for use by licensed software developers. Based on patented "bit-string" technologies, provided rapid text search and retrieval, using Boolean operators. Supported multiple computer platforms including DOS, Windows (both 16 and 32 bit), Macintosh, IBM VM/CMS, and UNIX.

### **InfoLink Scan Station**

Project Manager, Design/Test Engineer

Developed a document storage and retrieval system using integrated image scan and display, optical disk storage, optical character recognition (OCR), and full-text retrieval. Business paper documents are scanned and stored as images. The images are automatically "read" by the OCR engine and the resulting text is indexed into a full-text database. Any single page or multiple pages can later be found by searching for any word or multiple words of its content. The image of the page can be displayed and/or printed. Originally implemented as multiple workstations on a Novel network, a single station version was implemented later.

### **Billing's BC-104 Micro-computer**

Vice President of R&D, Project Manager, Design/Test Engineer

Designed and produced one of the first business oriented microcomputers. Based on the Intel 8085A processor, the S-100 bus, and the CP/M operating system, the BC-104 was one of the first micro-computers to actually have full blown business accounting software. As part of the management team, helped build the company from its inception to over 100 employees in 1½ years.

### **Ultra-Sonic Anti-Intrusion Device**

Project Manager, Design/Test Engineer

Developed an Ultra-Sonic anti-intrusion device using discrete transistor analog electronic circuits. Traveled to Japan and Korea for component procurement and to establish manufacturing operations. U.S. patent issued.

### **Remote Starting of Internal Combustion Engines**

Project Manager, Design/Test Engineer

Developed a Remote Starting device for Internal Combustion Engines using Radio Frequency circuitry. This was developed for the automotive "after-market" and was sold in a kit to add remote start capability to any vehicle. U.S. patent issued.

**Electronic Notebook**

Project Manager, Design/Test Engineer

Designed one of the first truly portable computers. Based on the Intel 8085A microprocessor and running DOS, the Electronic Notebook used the Texas Instruments "Bubble Memory" module as removable disk modules. This was developed for Brigham Young University to be used as field data collection devices.

**Software Port of Business Basic**

Project Manager, Software Engineer

Developed a fully compatible port of Point 4 Systems', Business Basic for mini-computers to micro-computers running CP/M or DOS. Business Basic was an interactive high-level programming language developed for minicomputer systems in the early 1970s. This project, in the early 1980's was the first major advancement for microcomputers in the business environment.

**FORDOS a Multi-user Operating System**

Project Manager, Software Engineer

Designed and coded a multi-user operating system fully compatible with the CP/M operating system for micro-computers. FORDOS was also the first micro-computer operating system to utilize large, high speed disk drives traditionally used only on mainframe computers.

**Parole Home Arrest System**

Project Manager, Design/Test Engineer

Designed and implemented one of the first parole home arrest systems. Offenders assigned to house arrest wore a wrist or ankle device that tracked their movement. If the offender was outside the prescribed location, the device alerted the central office of a possible violation. The system consisted of three main components; 1) the bracelet, a RF transmitting device, 2) the base station, an embedded processor unit with RF reception and telephone dialing capability, and 3) the central office computer. Security was an essential component of the design specification.

**Remote Betting System**

Project Manager, Design/Test Engineer

For use in the Nevada gaming industry, designed and implemented a remote betting system where a player could place bets on a "live" game from a remote location. The remote terminals were an embedded processor board with a user keyboard and display, magnetic credit card reader, and multi-drop serial interface. The main computer was a fault-tolerant Tandem computer with serial interface to the remote stations. Security and fault tolerance was an essential component of the design specification.

### **EasyAC Telephone Dialer**

Project Manager, Design/Test Engineer

Prior to 1+ dialing, placing a long distance phone call using one of several long distance service providers required dialing a special code of 12 to 16 digits followed by the number to be called. The EasyAC (Easy Access) dialer was a shirt pocket-sized device that, when held to the phone mouth piece, would automatically dial the special code of the long distance service provider. Project included digital and analog electronic design and the design of the plastic case.

### **NASA's Skylab Space Project**

Design/Test Engineer

Built and tested ground control equipment for the calibration rockets used during Skylab's ascent.

### **NASA's Viking Space Project**

Design/Test Engineer

Designed, assembled and tested redundant diode components used to dampen back EMF on the many solenoids and relays used on the Viking instrument.

## **Patents**

United States Patent issued for anti-intrusion device using Ultra-Sonic electronic circuitry.

United States Patent issued for Remote Starting of Internal Combustion Engines using Radio Frequency control circuitry.

United States Patent issued for concept design of hardware and software algorithms for protection of Computer Software from unlawful distribution.

Technical consultant for Brigham Young University's DSEARCH (Text Retrieval Algorithms using 'Bit strings'). United States Patent issued.

## **Publications**

Published technical article in the international magazine GIM "Elevation Mapping in Congo Requires Advanced LiDAR Technology - New Method Devised to Validate Ground Points in Dense Vegetation"

Published and presented professional paper titled "Total Distributed Processing With Micros" at 1977 National Computer Conference.

Published professional article in EDN Magazine showing how to implement a regulated DC power supply using the uA741 operational amplifier.