

JORGEN FRANSEN

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ELECTRONICS ENGINEER & MANAGER

EDUCATION

PhD, Electrical Engineering, University of Colorado, Boulder - in progress

Advanced Control Systems: Optimal, non-linear, adaptive, and discrete and continuous controls.

Advanced Communications channels: radio frequency, filters, adaptive, optimal, statistics, and mathematics
Courses complete. Thesis is in progress: Statistical methods for robust design.

Master of Science, Electrical Engineering, University of Colorado, Boulder, 1996, GPA 3.8

Advanced controls and communications, digital signal processing, and mathematics.

Bachelor of Science, Electrical Engineering, University of Manitoba, 1974, Honors

TECHNICAL EXPERTISE

Highly skilled electronics design engineer and excellent project lead with extensive “break-through” designs.

Control Systems:	Trajectories, non-linear, adaptive, optimal, discrete/continuous, state space
Mechanics:	Motor design, design margin for manufacturability, stress and life analysis, Weibull statistics
Operations:	First pass yield, Takt time, high volume production, statistical process design
Communications:	Digital signal processing and filters, optimal filters, adaptive, phase lock loops, automatic gain control
Analog design:	PCB, analog and digital circuits design and integrated Circuit - custom ASIC chip, HSC12 assembler
Radio Frequency:	Spread spectrum, receivers, transmitters, transmission lines, link budgets
Statistics:	Design for manufacturability, design error budgets, statistical data analysis

MANAGEMENT EXPERTISE

- Manager with a broad engineering and operations background able to manage innovative product development on-schedule.
- Expertise in new product introduction through volume production.
- VP of Research & Product Development at four companies where we designed & launched approximately twenty-five products.
- VP of Operations and New Product Introduction for Maxtor – team designed factory producing 40k units/day. ISO 9K/2K cert.

PROFESSIONAL EXPERIENCE

2005 - present

- Consulting work as an affiliate at Redgarden Engineering includes electronics design on a board with high-speed USB, eSATA, and Ethernet data.
- Active on PhD thesis work.
- Designed a four wire hybrid circuit, exceptional sensitivity passive detector, very hi Q tune-able audio band pass filters, optimized light spectrum for plant growth, high impedance passive diode double balanced mixer circuit for RF receivers.

FreeWave Technologies, 2002 – 2005, Boulder, CO

- Managed six. Improved New Product Introduction process and introduced several new radio products to production.
- Designed software algorithms to adaptively tune crystal frequency aging in existing radio networks. Designed an eight pole LC filter for 902-928 MHz Spread Spectrum radio with less than 0.3 dB ripple.

Exabyte, 1997 – 2002, Boulder, CO

- Managed 120. Delivered Mammoth2 8mm Tape Drive on schedule. Achieved 6% annual failure rate versus the competitor DLT at 12%. Manufactured in Boulder and by Hitachi in Japan. Headed engineering relations with Hitachi.
- Developed a Recording Channel Model mapping bit error rate thru ECC to system performance. Allowed setting realistic head media and channel specs. A major piece of work.

Maxtor, 1995 – 1997, Longmont, CO

- VP of the New Product Introduction group of 303 reporting to the CEO.
- Disk drive yields were 50~55% and was hired to correct this problem. Delivered a new NPI launch process. First product launched at 92% first pass yield. Delivered the Modular Production Unit to Asia producing 40,000 disk drives a day.

StorageTek, 1984 – 1995, Louisville, CO

- Director of Virtual Storage Manager reporting to the CEO managing 10. Developed the STK VSM.
- Director of Tape Automation reporting to the CEO managing 120. New and existing products.
 - Introduced TimberWolf Automation product three months ahead of schedule.
- Designed PowderHorn Automated Library, 1991-1993 ahead of schedule with a highly-productive engineering team of 14.
 - Designed time optimal controls on all eighteen axiis. Designed adaptive controls taking performance from 270 JPH (product spec) to 450 JPH using modern state space controls. All done with a floating point processor.
 - Did design margin analysis on entire robotics. Designed for margins of > 1.33 Cpk with zero adjustments.
 - Did Weibull failure prediction models for all failure modes. Design achieved 20 years service life with NO preventative maintenance. Built highly-accelerated life testers to test and validate.

- Product cost was \$46,000 vs \$65,000 product contract. Revenue of \$83 million per month at 65% margin for thirteen years. PowderHorn took 100% market share. Competitors and IBM Tucson factory were shut down.
- 8380 Disk Drive
 - Managed 120. Created plan to fix field reliability that took StorageTek into Chapter 11 bankruptcy. By Jan of 1985 had fixed issues and StorageTek came out of bankruptcy.
 - Identified and fixed a severe data loss problem. Fixed all circuit card failure modes. Upgraded entire field base.
 - Fixed design issues causing poor yields. PCBs had too many adjustments.
 - Designed a new servo demodulator PCB with zero adjustments. Tracking error was reduced from three microns to six nano-meters, a 500 times improvement. - measured!!
 - Designed a new Servo Track Writer using an air bearing slide and voice coil actuator and HP optical retro-reflector displacement detection. Accuracy was better than six nano-meters.
 - Designed a new Servo Control PCB with no adjustments.
 - Fixed Servo Control Firmware improving performance and reliability.
 - Created a thermal mis-registration error budget used to identify mechanical improvements.
- 8380 R22 and R33 - Delivered double capacity and triple capacity versions all with very high yields on schedule.

Control Data Corporation, 1981 – 1984, Minneapolis, MN

- Design Engineer on the Galileo Module Drive (GMD) and then was manager of the servo controls and mechanical group.
- Designed the new servo control system and designed circuit boards for the GMD. Included my optimal control trajectory, tracking loop, transition scheme and all associated electronics. - NO adjustments.
- Designed Servo Demodulator card with NO adjustments achieving sub micro inch tracking accuracy. Designed a "matched filter" detector, Phase Locked Loop and Automatic Gain Control loops and circuits.
- Designed the power amplifier for the GMD with NO adjustments.
- Solved statistics predicting peaks from random noise. This was critical to designing the proper transition circuitry and tracking threshold detectors for the servo control system. It is a very interesting result!
- Solved the production problem on the FMD disk drive in one week that teams were trying to fix over two years. I redesigned portions of the servo control channel and added dual threshold settling detection and activation circuits.
- Designed a new servo track writer - achieved nano-meter accuracy.
- Developed the thermal mis-registration Error Budget. Ran Monte Carlo Simulations.
- Developed extremely sensitive method for measuring residual mechanical vibrations disturbing the settling profile of the servo. It allowed mapping of extremely high Q mechanical resonances.
- My team re-designed the actuator solving resonances, bearing wear out, and thermal mis-registration.
- Debunked Dr. Dick Oswald of IBM at a three day training session for CDCs thirty servo engineers. He taught the use of "bang-bang" controls used to this day erroneously at Seagate, Western Digital and other disk drive manufacturers. I was pressured to contribute so presented the proof he was wrong and showed the correct approach.

Burroughs, 1980 – 1981, Westlake, CA

- Developed new disk drive in twelve months on schedule. Hired and managed team and designed the servo track format, data format, servo demodulator, servo profile controller, servo track writer, power amplifier - all with no adjustments.

Burroughs, 1976 – 1980, Winnipeg, Canada

- Solved the Time Optimal Profile Control problem and Optimization Methods for designing Electro-Magnetic Actuators. Developed Random Access Time model. Reduced test from four hours to one minute. Designed Multi Actuator Array.
- Developed new type of AGC loop with constant bandwidth and symmetric large signal response time. Designed servo position demodulator, PLL, AGC. Redesigned head amplifier reducing input noise. Thermal Drift Error budget.
- Had Engineering for Product Launch 206 Disk Drive. ~1,000 engineering changes in five months with no repeats.

Manitoba Telephone System, 1974 - 1976, Manitoba, Canada

- Developed complex transmission line model for telephone lines. Identified and fixed inherent test equipment issues.
- Designed remote circuits allowing in office measurements eliminating two weeks travel time per month for two engineers.

High School: was top math student. Self taught in algebra and calculus. Worked at TV & Radio repair shop - Self taught. Worked at Canada Wire & Cable in testing cables. Designed tunnel diode transmitters, audio oscillators, transmitters and receivers, SCR light dimmers, power amplifiers, light communications, Tesla coils, Van De Graph generators, uni-junction designs, FET circuits, etc.

U.S. PATENTS

4868432, filing date: Apr 13, 1987. Multi-coil actuator with end cap flux carrier

4314295, filing date: Dec 26, 1979. Linear actuator with staggered flat coils

4423448, filing date: June 4, 1981. Multi-path to data facility for disk drive transducer arms

4692999, filing date: July 25, 1986. Method of making a multi-coil/multi-magnet actuator

4318145, filing date: Dec 26, 1979. Multiple-transducer/actuator array

4331990, filing date: Dec 26, 1979. Flat coil linear actuator for multiple transducer arms

5456569, filing date: Nov 16, 1993. Balanced horizontal axis assembly for use in an automated memory cartridge

Publication: **US 2003/0225966 A1** Filing date: May 31, 2002 Server-less network data storage operation

D349695 Filing date: Dec 28, 1992. Cabinet for robotics library system for handling data storage cartridges

Hundreds more patents were filed that were fostered from the engineering teams by creating an environment for innovation.