

## Consultant Profile: JOHN HEEREMA

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### Experience

Mr. Heerema is a senior IT leader with over twenty years of experience. He has been involved in virtually every aspect of current practice, in both leadership and technical capacities. He is a visionary, an educator, and doesn't mind getting his hands dirty.

*In my own words* *It's been a privilege to be part of this exciting industry in so many capacities. I've had the unusually good fortune of having my projects succeed, even under difficult conditions. Much of this comes from having worked with great people, but I believe that part of it comes from paying attention to the key factors that make projects work:*

- *The core of being a leader, is service.*
- *Know what success looks like, and only do what will lead to success.*
- *Take the time to make it simple. Later on, you'll save that time many times over.*
- *Create an environment where people can do their best work.*
- *The core of every methodology, including agile methods, is the same: Think / Do / Validate. Design for test. Divide your project into stages, and prove that it works at every stage. It's so simple!*

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### Special Skills

#### Leadership

Mr. Heerema excels in the coordination of teams with several dozen members. One of his main strengths is in establishing effective communication between multiple companies, departments, and work groups within an enterprise. He strives to create an environment which lets people do their best work.

#### Fiscal responsibility

Has managed projects with total values of up to \$80M, delivering projects on budget and on time.

#### Design

The often neglected process of design focuses on creating simple and verifiable designs which can be built on time and on budget. Next to a clear understanding of what you really want, design has the biggest technical impact on a project's eventual success.

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### Education

MSc (Digital Signal Processing), University of Calgary, GPA of 4.0.

BSc (Computer Science and Pure Mathematics), University of Calgary.

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## **Application Areas**

### **ETRM**

Led projects in the Energy Trading and Risk Management area: retained as the Project Manager for an initiative to create a market for electrical reserves, select risk management tools, and create software for load forecasting, deal capture, scheduling, and settlement. Retained by another major energy company to select an ETRM system and plan the implementation process, for both regulated and unregulated trading activities.

### **Pipelines**

Project Management, design, and development of software for turbocompressor performance monitoring, vibration analysis, and leak detection.

### **Gas measurement**

Both engineering and IT aspects of gas measurement, from RTM design, to wide-area network protocols for field measurement, measurement validation and balancing systems, and gas accounting.

### **Data Modeling and Design**

Design of complex data models, such as the Public Petroleum Data Model and the WestJet Corporate Data Store. A regular speaker for the Public Petroleum Data Model Association.

### **Digital Signal Processing**

One of Canada's foremost authorities in the LabVIEW development environment, and in real-time frequency recognition. Design and development of embedded computer systems for motion control applications, and airborne LIDAR.

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## **Awards**

- Our "Booze Cruise" driving game has received national attention for its fun-filled approach to educating drivers about the effects of alcohol on driving. We received a first place award for it at the FuturePlay 2007 competition, and it was subsequently purchased by the U.S. Department of Defense.
- Queen Elizabeth scholarship for graduate research, based on academic standing
- Led a project to create the world's first commodity market for electrical reserves, 2000-2001
- APEGGA "Summit" award, 1994 (one of two senior members of the team associated with this corporate award)
- MacUser "4-mouse" rating for the commercial product, "Master Tuner"

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This group of projects involved project management and vendor management.

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## **Notable Projects (Project management)**

**ETRM Selection** Retained by a major energy company to evaluate and select a product for its regulated and unregulated Energy Trading activities, and to provide appropriate risk management tools. Coordinated vendor presentations, product evaluation, and integration paths with the existing risk management toolset.

Technologies: Commercial ETRM product selection Spring-Summer 2006

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**Commodity Trading & Risk Management** Retained by the Transmission Administrator (TA) for Alberta, as the Project Manager and Architect for an initiative to trade electrical reserves on an commodity (futures) exchange. This project was successfully completed on time, in the very dynamic business environment of electrical deregulation

The initial scope was to identify requirements, and obtain buy-in from all of the affected companies and departments. Following this, a project was raised to develop and/or acquire systems to support on-line trading, risk management, demand forecasting, compliance monitoring, financial settlement, and asset substitution.

The on-line trading component of the system tracks the TA's real-time position (volume traded compared with forecast demand), and ranks incoming bids and offers for the traders, based on price and risk (in this case the risks being managed are cost, the dynamic probability of reserve deployment, and geographical considerations). The system can communicate with multiple exchange floors via secure XML links which transmit bids, offers, and trades. The trade information is used to transmit dispatch instructions to the System Controller (located at the Power Pool), and for financial settlement.

The system forecasts demand using past history and a weather forecast feed from Environment Canada, and provides Alberta's most accurate electrical load forecasts. It also monitors the performance of reserve providers, using SCADA telemetry, and allows reserve providers to nominate assets via a secure web interface.

Technologies: Secure XML, Java, Web services, Oracle, LabVIEW

Oct 2000 - Sept 2001

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**HRIS** Retained as the Project Manger for a mission-critical and politically sensitive compensation project which had previously failed twice. Worked with an interdisciplinary team which was dispersed at locations across North America, to successfully design and implement a system which was a hybrid of packaged functionality and custom enhancements.

Technologies: PeopleSoft, web-based conferencing 2007-2008

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**PPDM** Developed data models and data content for the Public Petroleum Data Model Association. Responsible for data models and data content for the Units of Measure

module. A regular speaker at recent PPDMA conferences in the areas of data content, data modeling, and integration best practice.

Technologies: database and EAI

Fall, 2003 to present

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**Integration Coordinator** Retained as the Integration Coordinator for TransCanada Pipeline's "Best of Breed" Programme Management Office (PMO).

This \$80M programme replaced SAP with a suite of applications from various vendors, and functionally integrated them. Responsible for setting integration testing standards, identifying test team leaders, coordinating infrastructure development, resolving integration issues, establishing Change Management practices, and acting as the Change Coordinator.

Coordinated a small staff within the PMO, and several dozen test leaders and testers in seven Best of Breed projects.

Reported to the PMO and the Best of Breed steering committee. This programme was successfully implemented on time.

Technologies: Enterprise 1000 server, Java, Web, Sybase, Oracle, XML, Forte Fusion, etc.

Mid 2000 - Sept 2000

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**Integration Architect** Acted as a system architect and project manager for integration projects in a second phase of the "Best of Breed" programme for TransCanada Pipelines.

Technologies: pioneering use of XML, Java, and EAI.

Mid 1999 – Mid 2000

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Helped to develop corporate integration strategies for a fast growing airline.

**Data Integration** Technologies: XML, SOAP, JAVA, SQL Server

Spring, 2004

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Coordinated implementation activities for a provincial regulator

**Implementation Coordination** Technologies: SQL Server, RUP, vendor coordination

2004

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**Integration** Coordinated downstream system integration, integration testing, and acceptance activities for new measurement systems being implemented by a large pipeline company.

Technologies: XML, SOAP, JAVA, Web services, OaSys, Database

Spring and summer, 2003

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**Mission-Critical Testing** Acted as the Team Leader responsible for Year-2000 testing of the systems identified as "Mission Critical" for Nova Gas Transmission Ltd., focusing on the Gas Measurement & Accounting areas.

Coordinated the activities of over 60 people, to create an isolated network of computer systems, develop test plans, execute them, and resolve issues.

### **Vendor Management**

Planned an upgrade to all flow computers in the Nova/TransCanada measurement system.

Conducted a software audit of the embedded software incorporated into gas measurement computers in the Nova pipeline system.

Following this, developed software, project execution, and quality assurance standards for new flow computer software to be deployed throughout the system.

Acted as Nova's technical representative during the development project, responsible for coordinating and approving vendor activities.

Although the vendor was initially reluctant to follow the standards and procedures, they ultimately acknowledged that the system could not have been built on time without them.

Coordinated deployment activities, and resolved deployment issues during the deployment phase.

Technologies: Design validation, formal testing and acceptance, automated test tools. Early 1998 - Mid 1999 at 50%

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## **Notable Projects (development)**

This group of projects involved either pure systems development, or a mixture of systems development and systems integration.

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### **Airborne Instrumentation**

Real-time control of laser scanners, video cameras, still cameras, GPS systems, and inertial measurement systems, to produce LiDAR imagery. Motion control for airborne camera tracking.

Technologies: real-time hardware, C++, LabVIEW 2005-2009

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### **Performance Testing**

Developed a commercial software product which measure the performance of gas turbocompressors under different operating conditions, predicts the performance in varying conditions, and establishes safe operational ranges.

The Performance Testing package is used to create wheel maps and establish operating ranges, which are used for pipeline operation, and system capacity planning. This package can help a pipeline to save millions of dollars in fuel consumption.

Technologies: real-time hardware, C++, LabVIEW, Mathematica 2005

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### **Torsional Analysis**

The Torsional Analysis package uses a low-cost optical measurement technique to measure torsional vibration, torsional displacement, and transient vibrations. This package assesses operational safety and performance in applications such as turbocompressors and diesel power takeoffs.

Technologies: real-time hardware, C++, LabVIEW, Mathematica 2005

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***EFM Test Bench*** Developed an "Electronic Flow Measurement Test Bench", consisting of two components: a reference-standard gas flow measurement computer, and a gas flow run simulator. This system is used to certify flow computers, and to diagnose field measurement anomalies.

Technologies: Web, real-time hardware, LabVIEW, Mathematica

Early 1998 at 50%

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***Multi-Protocol Communications*** Developed and implemented multi-protocol support for a wide area gas measurement network, in an multi-threaded failsafe environment using multiple servers, local and wide area networks, and radio hubs.

Technologies: massive parallel operation; network snoopers

1997

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***EMC Design Education*** Co-developed a multi-media course on Electromagnetic Compatibility (EMC) design issues for electronics engineers. This course is part of Hewlett Packard's international education program.

Co-developed a multimedia-based course on Electromagnetic Compatibility standards which was delivered to Ford's 1,000 member design engineering community.

Technologies: Mathematica, Macromedia Director, Extreme 3D

~1995

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***Shutdown Planning and Scheduling*** Retained by a large plant maintenance contractor (Catalytic) to investigate the possibility of developing a tool for planning plant shutdowns using a portable computer. Following interviews with senior planning personnel, a computer system was designed to plan, schedule and manage plant shutdowns, together with an integrated maintenance work process. The system was developed and implemented by Mr. Heerema in conjunction with two of his associates.

The client's promotional literature suggests that this is the most widely used shutdown management system in Canada (it is used at over one hundred plant sites). The client feels that this computer system constitutes an important competitive advantage for them.

Technologies: This was one of the very first "large" applications developed for a PC

Mid-1980's

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***Search Engine*** Designed and co-developed a large on-line library catalogue system. This system features a flexible search request parser (based on a formal grammar), and an algorithm which reduces English words to consistent root forms. It's operation is similar to current web search engines.

Technologies: BNF grammars, Search engine

1980-81

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## ***Notable Projects (best practices)***

This group of projects predominately involved management consulting, education, and project management.

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***Policies and Procedures*** Initiated a project for the Yukon Territorial Government to develop practices, policies, and procedures for oil and gas licensing activities in the territory.

**Risk Assessment** Conducted a Risk Management assessment for Petro Canada, with regard to the upcoming inception of the Alberta Petroleum Registry.

Management Consulting. Technologies: XML; Biztalk

Spring, 2002

**Education** Developed a senior-level course for the University of Calgary (CPSC 547) which teaches both technical and project management skills to fourth year computer science students. Helped a vendor to donate their toolset to the University.

Technologies: XML, SOAP, CORBA, LabVIEW, JAVA, etc.

Winter, 2002

**Quality Assurance Audit** Retained by the Pipeline Software Division of an international concern to perform a Quality Assurance Audit for one of its major projects. The terms of the engagement were to evaluate the project management practices followed, the quality of the software and associated project deliverables, the verification and validation procedures used, and the safety of the software product.

The major recommendations of the audit have all been implemented.

Asked by the same client to develop standards and procedures for the division, including a standard methodology for managing software projects, and a Quality Assurance program.

Standards development

1992

**Strategic Planning** Co-ordinated software development activities for various clients: product line / product mix planning, project planning, proposal development, and project execution. Introduced new development methodologies and tools, such as object-oriented analysis, the use of CASE tools, and configuration management tools and techniques.

1992-1994

## **Notable Projects (R&D)**

This group of projects were undertaken in a research & development environment, and typically qualified for SR&ED tax treatment.

**Magnetic Bearing Research** Principal software architect for a variety of high speed control and data analysis systems. One of these systems was the recipient of the 1994 APEGGA "summit" award for achievement. Another was featured as the cover story for an issue of "International Turbomachinery".

One of two senior members of a mixed-discipline team developing magnetic bearing technology, from hybrid analog-digital systems to multiprocessor digital control systems. Responsible for control algorithm design, DSP-based digital control systems, and data visualization systems.

Technologies: LabVIEW, a development environment using a data-as-object metaphor, and C++). A very active LabVIEW beta tester. MatLab, Mathematica, 68332 and 56002 assembly, signal analysis, predictive control, and large turbocompressors. 1988-1994

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### **Goal-Directed Temporal Manipulation**

Carried out research into goal-directed manipulation of temporal networks, such as scheduling networks. This pure research project was undertaken in-house to develop expertise in artificial intelligence methods and techniques.

Technologies: Object LISP (CLOS), SmallTalk-80, Artificial Intelligence

Late 1980's

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### **Master Tuner™**

Developed a commercially successful real time audio-frequency digital signal processing software package (Master Tuner). This product turns a personal computer into a sophisticated electronic tuner. It has been favourably reviewed by several major computer periodicals, including a "4 mouse" rating by MacUser magazine. The product is based on Mr. Heerema's original mathematical research into extraction of fundamental pitch from a complex spectrum.

### **Visual Music™**

This research was greatly expanded as part of Mr. Heerema's graduate work, and forms the basis for a next-generation product for making musician's practice time more effective.

Technologies: wavelet analysis, software optimization

1988-2009

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## **Publications**

**The Booze Cruise: Impaired Driving in Virtual Spaces** (with J.R. Parker), *IEEE Computer Graphics and Applications*, March/April, 2009, p. 6-10.

**Musical Interaction in Computer Games** (with J.R. Parker). *Proceedings of the 2007 Conference on Future Play (Toronto, Canada, November 14 - 17, 2007)*. Future Play '07. ACM, New York, NY, 217-220..

**Audio Interaction in Computer Mediated Games** (with J.R. Parker). *International Journal of Computer Games Technology*, Vol. 2008, 1-8.

**Master Tuner**, *Andromeda Press*, Calgary, Canada. ISBN 1-895103-00-2

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## **Personal**

Mr. Heerema is an avid photographer and Photoshop expert. He enjoys reading, music, biking, cooking, and hanging out with his kids ([www.heerema.ca](http://www.heerema.ca)).

He has climbed the highest peaks in North and South America, is a high-level cross-country ski instructor, built a harpsichord, and designed and built his home.

He is a world authority on a particular aspect of digital signal processing and music. His latest project is tool for analyzing musical performances.