

# DIGITAL OILFIELD 2.0: CONVERGENCE OF OT AND IT

November 5-6, 2018  
EUCI Conference Center  
Denver, CO



# OVERVIEW

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Operations Technology (OT) and Information Technology (IT) have both developed at a still increasing rate over the past several decades, each creating new ways of operating in its circle. Upstream field operations bring these two disciplines together in exciting and often challenging ways. If you work in either, it is critical that you learn how they work together so you can take full advantage of the benefits and navigate challenges.

Operations Technology (aka: Instrumentation and Control) which includes: Process Control & Field Automation (SCADA & DCS), Smart Equipment (OEM) and Plant Automation and Asset Performance Management (APM) has developed largely in a manufacturing/plant environment. Independently, corporate Information Technology has also developed in areas such as: Data Center, Networks (WAN & LAN), Desktop and Enterprise application platforms (Finance, HR, Supply Chain, Marketing). The digital oilfield has brought these two disciplines together in potentially valuable but often challenging ways. The OT world is now operating on commercial technology platforms and making operational data available to the corporate networks (finance, engineering). However, the two cultures are still learning to work together to address common issues of cybersecurity, mobile data access and many others. IT and OT professionals will get an overview about how their job roles intersect. With this understanding, IT professionals will be better able to create applications that assist with the operations they are designed for in a more direct manner. OT professionals will be better able to use analytics and data gathering tools by gaining a more in depth understanding of how they work and what they can be used for.

This course will provide a comprehensive set of introductory information about the Digital Oilfield specifically focusing on the convergence of technology, systems, practices and required skills from the two key disciplines of Operational technology and Information technology for professionals working at oil and gas operators, oilfield service companies and technology firms.

Key topics to be discussed in this course include:

- An Overview of the Digital Oilfield and what is changing with DOF 2.0
- How to bring OT and IT on the same page; technology and culture
- Improving the HMI (human machine interface) for field operators and data access for optimization/reliability engineering
- The Role of Remote decision support centers
- How to achieve Situational Awareness and the change for route-based operations minimizing the number of visit to the well pad
- Cybersecurity Concerns for field operations or How to hack an oilfield
- Emerging architectures for field I&C (mobile computing, edge and fog computing)

## LEARNING OUTCOMES

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- Discuss what is meant by the digital oilfield and what are the current areas of interest by the O&G industry
- Identify the levels of the Digital Oilfield IT stack
- Review the history, practices and challenges of traditional operational technology, field instrumentation and control and the difference between onshore and offshore operations
- Review the history, practices and challenges of traditional information technology and the difference between corporate systems and business unit and function-specific operations
- Identify the touch points between OT and IT in the digital oilfield
- Identify the vulnerabilities that open when OT and IT systems are connected for cyberattacks. What is the significance of Stuxnet
- Discuss the role and opportunities of new remote decision support centers
- Discuss the concept of situational awareness and identify the dead spots in digital surveillance of legacy assets
- Discuss the pros and cons of new digital technology and emerging architecture patterns that could dramatically change the current field automation paradigm
- Discuss the impact of automation, smart equipment and processes, advanced analytics, robotics and drones on the future of oilfield operations.

## WHO SHOULD ATTEND

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- Operations and maintenance supervisors from oil and gas producers
- I&C (instrumentation and control) specialist involved in field automation and remote decision support center operations
- Information technologists involved in support of oilfield operations (communications, data and applications)
- System architects charged with developing systems that link field and corporate information architectures
- Service company managers and product managers who are responsible for products and services that support oilfield operations
- Physical and cyber security specialists working on digital oilfield operations

# AGENDA

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MONDAY, NOVEMBER 5, 2018

**8:00 - 8:30 am****Registration & Continental Breakfast****8:30 - 9:00 am****Introduction****9:00 - 10:00 am****Overview of the Digital Oilfield**

The concept of the Digital Oilfield started about 20 years ago when increased field instrumentation, process control and advanced software and data analysis techniques were brought to the operations and engineering practices in the oil field. The first generation of the digital oilfield solutions created value to complex drilling in offshore basins and optimization workflows to production challenges. The second generation of the digital oilfield is going farther with smart equipment, automation and more statistical analysis and machine learning models.

- A brief history of the digital oilfield (DOF)
- Lessons learned from the first decade
- The digital oilfield IT stack
- What is different this time around with DOF 2.0

**10:00 - 11:00 am****The Current State of OT**

When most people think of Oilfield automation systems, they usually think of SCADA (Supervisory Control and Data Acquisition) systems and downhole sensors. Oil and gas companies regularly collect critical data from remote well sites and production locations to monitor facilities, such as wellheads, storage tanks, artificial lift units, or pipelines. Current systems essentially polls information one-way back to central servers, where field performance data is displayed in an HMI (human machine interface) which trigger alarms or alerts that are used to dispatch personnel to visit the location to investigate.

- Sensors, field instrumentation
- Field communication networks
- Monitoring by “windshield miles” by lease operators
- SCADA and DCS

**11:00 - 11:30 am****Networking Break****11:30 am - 12:30 pm****The Current State of OT versus IT**

According to Luigi De Bernardini, CEO, Autoware, in a recent blog in Automation World: “the convergence of information technology (IT) and operational technology (OT) is one of the key mantras in smart manufacturing (and the digital oilfield). This convergence has many different faces with several organizational and technical implications.” The initial digital oilfield engagement of OT and IT has surfaced a number of barriers but also points to significant potential when near-real time data can be used to update predictive models allowing operators to go beyond static alarms and “run-to-failure” maintenance practices.

- Touchpoints between OT and IT
- A culture of electrical engineering versus programmers
- A different perspective on uptime and version control
- Historians and Electronic Data Recorders

**12:30 - 1:30 pm****Group Luncheon**

# AGENDA

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MONDAY, NOVEMBER 5, 2018 (CONTINUED)

**1:30 - 2:30 pm****The Convergence of OT and IT**

Mr. Bernardin points out that there's still strong resistance to change at the organizational level between OT and IT. Most companies still have two strongly separated departments for operations and IT. They have different people, goals, policies and projects. They not only operate in a very separate way, but sometimes they even have conflicting approaches. Continuing to operate separately not only slows the adoption of solutions based on technologies that fall outside of operations' comfort zone, but also exposes companies to security risks that could significantly impact production.

- OT moves to commercial platforms
- The limitations of HMI and historians
- Manage by exception (how alarm management is changing)
- Unified governance over OT and IT

**2:30 - 3:30 pm****Managing a New Data Type**

Operational systems present a new data type to the engineering community. A time series is a series of data points indexed (or listed or graphed) in time order. Most commonly, a time series is a sequence taken at successive equally spaced points in time. Thus, it is a sequence of discrete-time data. Examples of time series for oil and gas operations includes measurement of pressure, temperature and sometimes flow rates. Incorporating time series into both physics-based and statistics-based predictive models and simulations help operators move from reactive to predictive practices.

- How to manage time series data
- Streaming analytics
- Adding context: manual inspections, work orders, periodic measurements
- Enriching relational data models with transactional data

**3:30 - 4:00 pm****Networking Break****4:00 - 5:00 pm****Cybersecurity**

System security from traditional operational systems was based on their proprietary technology and isolated networks. The digital oilfield connects the field to the office to the supply chain. The discovery of field data by engineering applications offers great promise but also brings its own set of cybersecurity challenges.

- Security through obscurity
- Situational awareness challenges
- The impact of stuxnet
- Internal firewalls

# AGENDA

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TUESDAY NOVEMBER 6, 2018

**7:30 - 8:00 am**

**Continental Breakfast**

**8:00 - 8:30 am**

**Review of Day One**

**8:30 - 9:00 am**

**Remote Decision Support Centers**

A decision support system (DSS) is an information system that supports organizational decision-making activities. DSSs serve the management, operations and planning levels of an organization and help people plan for or react to changes in field performance. One of the characteristics of the digital oilfield is the development of remote decision support centers helping to link field and office with the same view of performance data.

- A second pair of eyes
- Offshore drilling and production
- Onshore drilling and production
- Monitoring-as-a-service

**9:30 - 10:30 am**

**The Impact of Instrumentation and Automation on Field Operations**

According to a McKinsey article on "Digitization of Oil and Gas Production", "More complex operations, increasing volume and complexity in hostile, remote locations (for example, arctic, offshore, and deepwater) require reliable remote and automated or semiautomated operations, and logistics optimized for efficiency." The promise of the digital oilfield is to significantly improve the productivity of physical assets and the humans that work in these environments. Automation and data-driven workflows are at the heart of this new world.

- Smart equipment
- Use of drones and UAV for inspection
- Route management: How to avoid visiting the well site
- Safety: Removing people from harm's way

**10:30 - 11:00 am**

**Networking Break**

**11:00am - 12:00 pm**

**The Impact of Digital Technology and Advanced Analytics**

According to that same McKinsey article, "The rapid progress of technology such as big data and analytics, sensors, and control systems offers oil and gas companies the chance to automate high-cost, dangerous, or error-prone tasks." Most oil and gas operators have announced some kind of digital oilfield or digital transformation project either at corporate, functional or asset level. The objective is to turn the potential of all the data that is being collected into sustainable solutions improving field and equipment performance, holistic asset lifecycle value and better results on the bottom line.

- Reactive, scheduled, predictive and prescriptive maintenance of critical equipment
- The impact of emerging architecture patterns (Fog and Edge computing)
- Who owns the data
- Digital platforms

**12:00 - 12:30 pm**

**Summary and Questions**

**12:30 pm**

**Course Concludes**

## COURSE INSTRUCTOR

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### Jim Crompton

Jim retired from Chevron in 2013 after almost 37 years with the oil major. After moving to Colorado Springs, Colorado, Jim established the Reflections Data Consulting LLC to continue his work in the area of data management and analytics for the Oil & Gas industry.

Jim was a Distinguished Lecturer for the Society of Petroleum Engineers in 2010-2011, speaking on the topic of "Putting the Focus on Data." He is a frequent speaker at SPE conferences on Digital/Intelligent Energy. His interests lie in the full spectrum of the information value chain from data capture, data management, data visualization, data access, modeling and analytics, simulations and serious gaming.

Jim graduated from the Colorado School of Mines (BS in Geophysical Engineering in 1974 and MS in Geophysics in 1976) before joining Chevron in Denver, Colorado. He later earned an MBA degree (1996) from Our Lady of the Lake University (San Antonio, Texas).

In 1999, Crompton was elected to the position of chair of the general committee of PIDX (Petroleum Industry Data Exchange), the API electronic commerce subcommittee. Jim was able to influence the direction of the standards setting activities towards emerging technologies, such as XML, and new electronic business models in the energy industry.

In acknowledgement of his contributions in applications of information technology to business problems, Jim was named a Chevron Fellow in 2002. In 2013, Jim co-authored a book, titled 'The Future Belongs to the Digital Engineer' with Dr. Dutch Holland, focusing on the issues of the impact of emerging digital technology on oil and gas operations. He is currently working on his second book with Steve Cooper of EnergyIQ.

In 2017, Jim was named as the PNEC Cornerstone award winner. Jim was selected to be on the board of the SPE Digital Energy Technology Section (DETS), is chair of the Digital Transformation committee under DETS and is working on a subcommittee developing a digital academy curriculum for SPE. Starting January, 2018, Jim is an adjunct teaching faculty member in the Petroleum Engineering Department at the Colorado School of Mines teaching a graduate level course in "Petroleum Data Analytics".

## REQUIREMENTS FOR SUCCESSFUL COMPLETION

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Participants must sign in/out each day and be in attendance for the entirety of the course to be eligible for continuing education credit.

## INSTRUCTIONAL METHODS

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Case studies and PowerPoint presentations will be used in this course.

## EVENT LOCATION

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### **EUCI Conference Center**

4601 DTC Blvd., B-100  
Denver, CO 80237

## NEARBY HOTELS

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### **Preferred Hotel**

#### **Hyatt Place Denver Tech Center**

8300 E. Crescent Parkway, Greenwood Village, CO 80111 (0.9 miles away)

Call Central Reservations at **888-492-8847** and ask for the corporate rate of \$159 under the **Group Code: EUCI**.

or visit [https://denverttechcenter.place.hyatt.com/en/hotel/home.html?corp\\_id=102338](https://denverttechcenter.place.hyatt.com/en/hotel/home.html?corp_id=102338) for the corporate rate using the

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#### **Hyatt Regency Denver Tech Center**

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0.3 miles away

#### **Hilton Garden Inn Denver Tech Center**

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Denver, CO 80237  
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0.6 miles away

#### **Denver Marriott Tech Center**

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0.7 miles away

## IACET CREDITS

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EUCI has been accredited as an Authorized Provider by the International Association for Continuing Education and Training (IACET). In obtaining this accreditation, EUCI has demonstrated that it complies with the ANSI/IACET Standard which is recognized internationally as a standard of good practice. As a result of their Authorized Provider status, EUCI is authorized to offer IACET CEUs for its programs that qualify under the ANSI/IACET Standard.

**EUCI is authorized by IACET to offer 1.0 CEUs for the course.**

## REGISTER 3, SEND THE 4TH FREE

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Any organization wishing to send multiple attendees to this course may send 1 FREE for every 3 delegates registered. Please note that all registrations must be made at the same time to qualify.

# To Register, Click Here, or

## Mail Directly To:

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# EVENT LOCATION

## **EUCI Conference Center**

4601 DTC Blvd., B-100  
Denver, CO 80237

**See nearby hotels on page 8**

## **DIGITAL OILFIELD 2.0: CONVERGENCE OF OT AND IT COURSE**

NOVEMBER 5-6, 2018: US \$1395

EARLY BIRD on or before OCTOBER 19, 2018: US \$1195

## ENERGIZE WEEKLY

EUCI's Energize Weekly e-mail newsletter compiles and reports on the latest news and trends in the energy industry. Newsletter recipients also receive a different, complimentary course presentation every week on a relevant industry topic. The presentations are selected from a massive library of more than 1,000 current presentations that EUCI has gathered during its 30 years organizing courses.



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### CREDIT CARD INFORMATION

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### Substitutions & Cancellations

Your registration may be transferred to a member of your organization up to 24 hours in advance of the event. Cancellations must be received on or before October 5, 2018 in order to be refunded and will be subject to a US \$195.00 processing fee per registrant. No refunds will be made after this date. Cancellations received after this date will create a credit of the tuition (less processing fee) good toward any other EUCI event. This credit will be good for six months from the cancellation date. In the event of non-attendance, all registration fees will be forfeited. In case of course cancellation, EUCI's liability is limited to refund of the event registration fee only. For more information regarding administrative policies, such as complaints and refunds, please contact our offices. EUCI reserves the right to alter this program without prior notice.