



DSATS

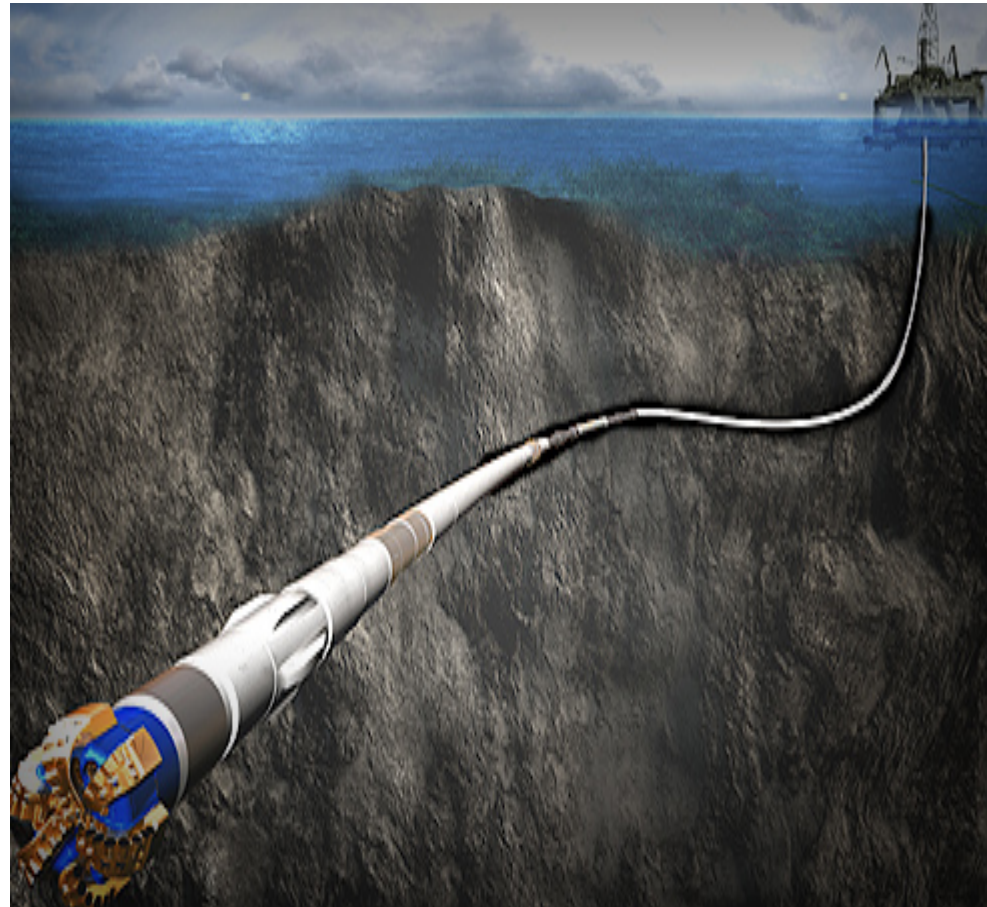
SPE Drilling Systems Automation Technical Section

Moray Laing, SAS
DSATS

Robin Macmillan, NOV
DSATS Membership Chairman
Member ISA

DSATS

- Why?
- Who?
- What?



SPE Drilling Systems Automation Technical Section (DSATS)

- **Founded 2008**
 - 1,300 members
- **All Volunteer:**
- **Sub-Committees:**
- **Affiliations:**



DSA Roadmap

Why Automation?

- Safety
- Environmental Responsibility
- Wellbore quality
- Knowledge Capture
 - Training
 - Repeatability
- Predictable Logistics
- Reliability
- Business Cycle
- Public Relations
- Economic Reality
 - Getting more wells from the same rig



DSATS Mission and Tactics

- Facilitate the development and implementation of drilling systems automation
 - Technical Sessions at Conferences
 - Advanced Technology Workshops
 - Forum Series meetings
 - Distinguished Lecturer programs
 - Webinars
 - Clay Flannigan (SWRI), Amanda DiFiore (Circadian), Kevin Wise (Boeing)
 - Liaison with other industry experts in automation - ISA
 - Publicity in journals such as JPT/Drilling Contractor
- Communicate the technology of Drilling Systems Automation
 - lessons learned and best practices
 - development of guidelines and standards
- Maintain the Momentum

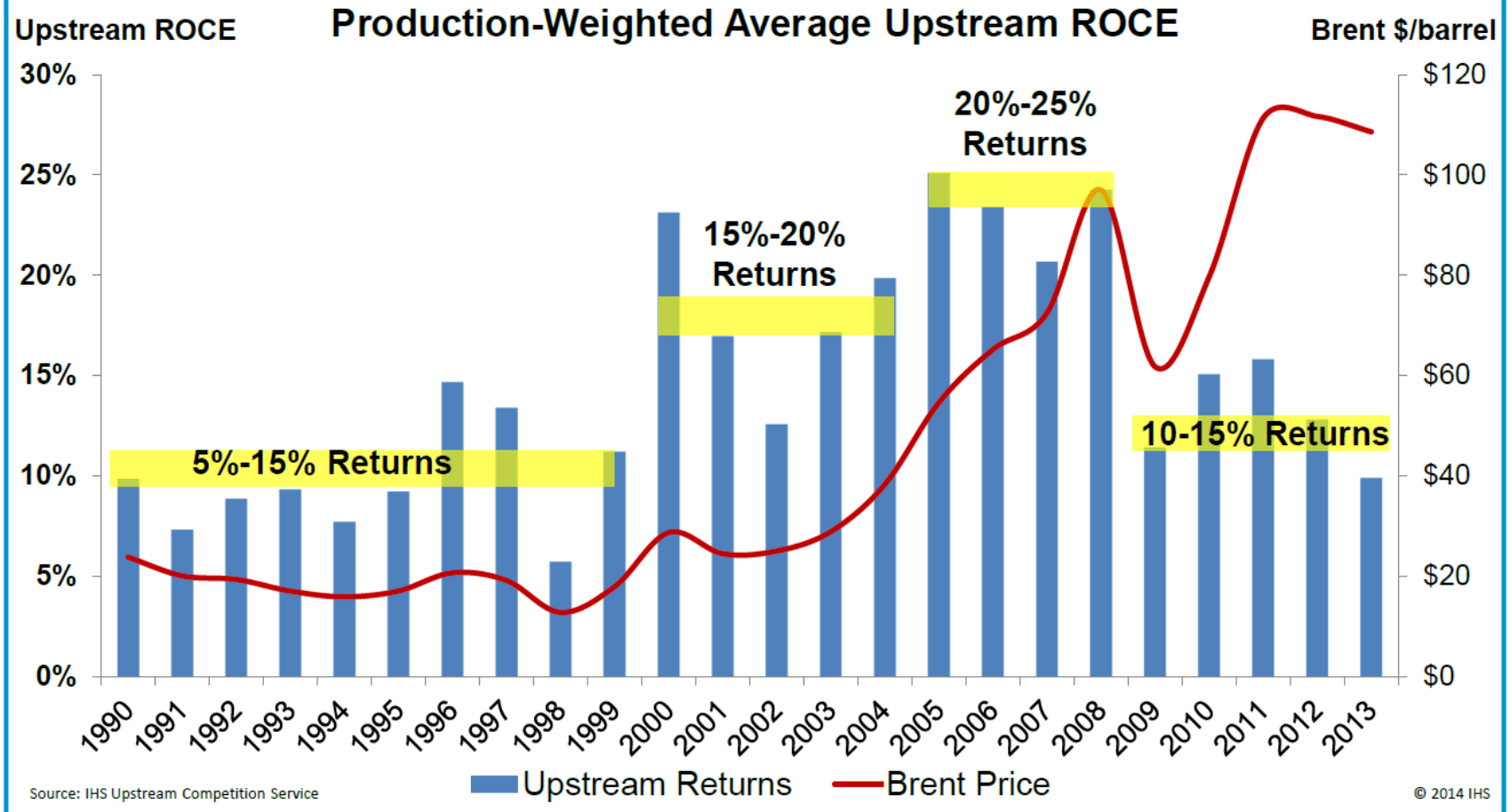
Who Drives?

- ConocoPhillips
- Hess
- Shell
- Apache
- Total
- Chevron
- Maersk
- Precision
- Nomac
- Ensign
- Schlumberger
- Halliburton
- Baker Hughes
- Weatherford
- Atlas Copco
- Canyon Oak
- Streicher
- Schramm
- NOV



Economic Reality - Remember 2013?

Oil company returns have been declining in a high price environment



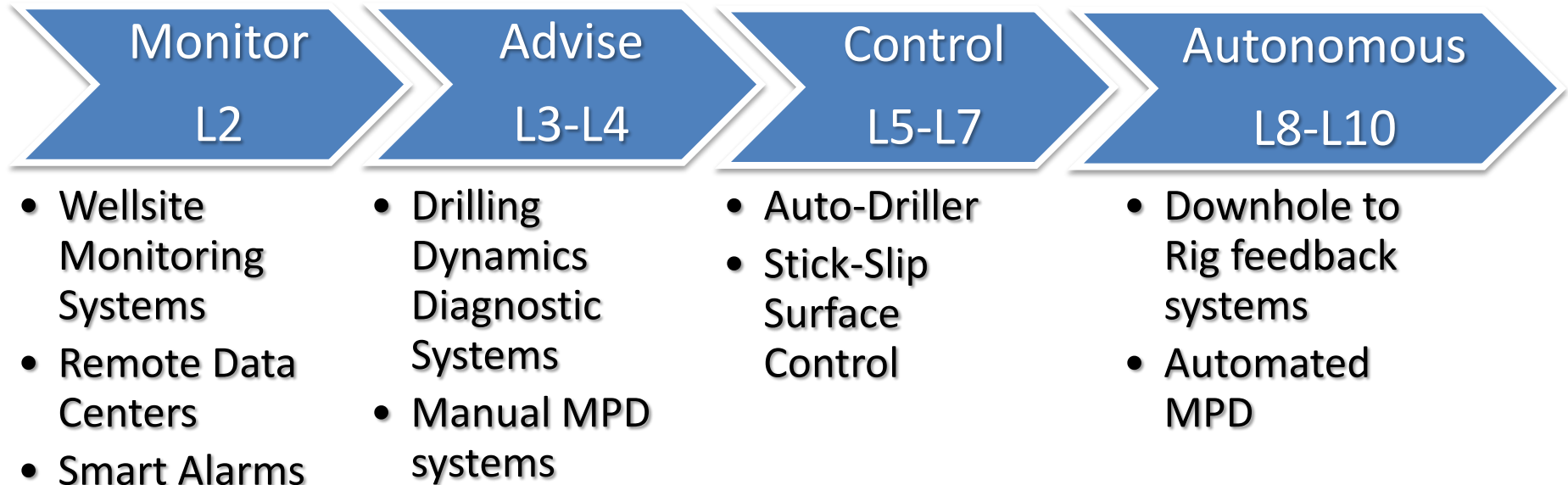
ROCE data include Anadarko, Apache, BG Group, BP, Chevron, ConocoPhillips, Eni, ExxonMobil, Hess, Marathon Oil, Occidental, Repsol, Shell, Statoil, and TOTAL.
Upstream ROCE defined as [Upstream Net Income / Upstream Year-End Net Capitalized Costs].

Drilling Systems Automation (DSA)

- Human-machine collaboration
- Information and control systems
 - Input and Output
- Focus on Process Automation:
 - All components downhole, surface and remote
- Real time – Monitor, Advise, Control
- Contextual activities
 - eg Fluid management

Levels of Drilling Systems Automation

The current level of automation in Drilling



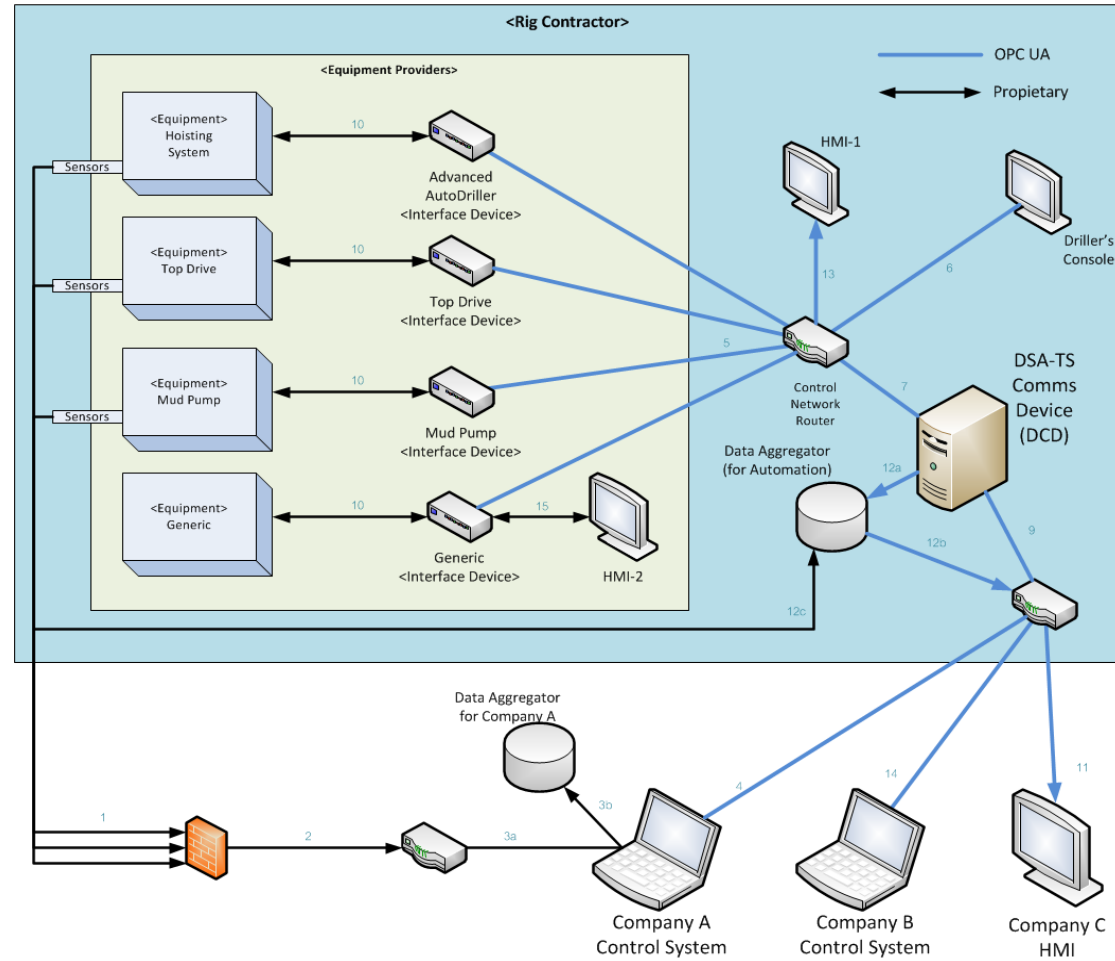
DSATS Rig Control System

Communications

- Interface to proprietary equipment and sensors
- Machine independent
 - data-to-information
 - control algorithms
- Standardized method for obtaining real-time data
- Simplified device control architecture
- OPC UA for automation

Receive real-time data from proprietary sensors and send real time instructions to proprietary equipment

Automation Architecture



DSATS Communications Group



- **Roles and Responsibilities**

- Implementation of the communication architecture (OPC UA)
- Working with Energistics (WITSML) on standards issues
- Collaborate - drilling contractors, service companies and equipment manufacturers to develop architectural guidelines

- **Security and Threat Model**

- Certificate procedure for system access
- Cooperation between IADC and DSATS needed to develop security and threat model

- **Rig Information Model**

- Data structure required to use OPC UA
- Expose WITS and WITSML specified information through a consistent method
- Take rig objects that are controlled {top drive, drawworks and pumps}
- Develop standards
- Define minimum set of information that is required to automate a task

Lead: Pradeep Annaiyappa, Canrig

Data Quality Assurance Group

Develop industry recommendations on drilling data quality for reliable drilling systems automation, which covers monitoring, advice (i.e., decision making), and control activities.

Formed in 2015;

- Surface Group (metadata for surface measurements)
- Downhole Group (metadata for downhole measurements)
- Data Enrichment Group (derived values, such as ROP)
- Contextual Data Group (specifications, environmental, etc.)

Lead: Pradeep Ashok, UT Austin

DSATS Student Contest: Drillbotics

- Students build a small, fully automated drilling rig to drill safely and efficiently.
- 2015:
 - University of Oklahoma (**First**)
 - Texas A&M University
 - University of Texas
 - University of Agder
- Sep 27: Presentation at DSATS Seminar
- Paper SPE 174920 at SPE ATCE

Lead: Fred Florence, RigOps



IADC ART Affiliation



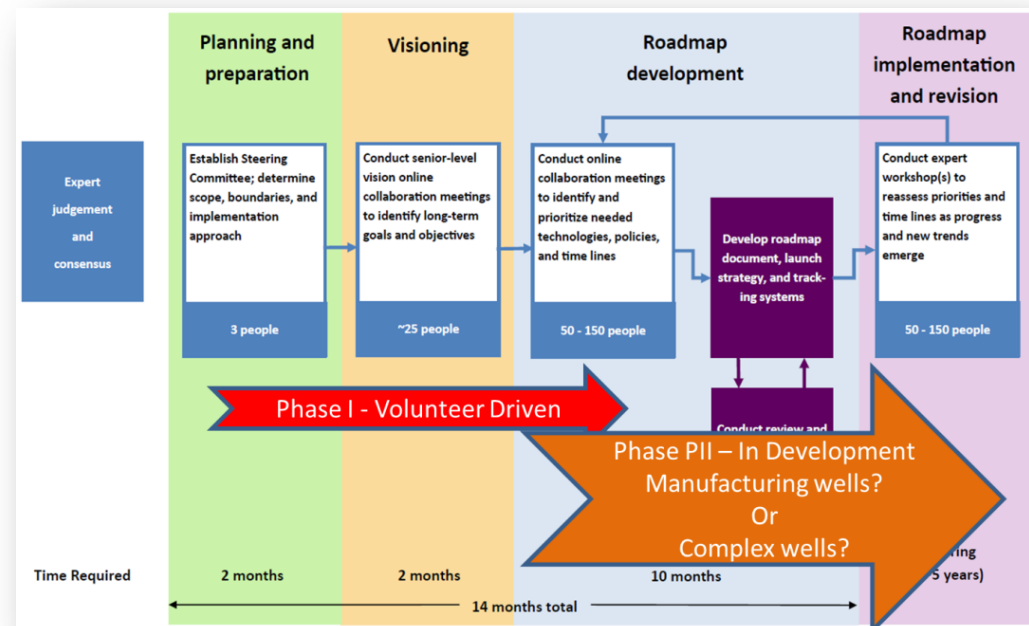
- Exploring future technology, drilling control systems and automation
- Focus on operational guidelines, assessing new technology, and identifying key deliverables
- Future Technology Subcommittee
- Drilling Control Systems Subcommittee



- **Automation for Drilling Contractors – Competitive Advantage**

Drilling Systems Automation Roadmap Industry Initiative (DSA-R)

- Development of a holistic roadmap for the development of Drilling Systems Automation
- Affiliated to SPE, IADC and AUVSI; formed mid-2013, 50 participants
- Adopted Sandia National Labs Roadmapping process
- Developing relationship with ISA
- Target year - 2025



DSATS Upcoming Events

DATE	EVENT
September 22	DSATS Webinar – Human Factors in Automation – Amanda DiFiore, Circadian Expert Services <i>Free</i>
September 27	DSATS Symposium – Training for Automation – Expert panel moderated by Tony Beebe, Blue Ocean Drilling at the SPE ATCE in Houston
December 9	DSATS Webinar – Autonomy in Non-Linear Systems – Kevin Wise, Technology Fellow at Boeing <i>Free</i>
February 29, 2016	DSATS Symposium – Human Integration with Automation and Machine Intelligence – at SPE/IADC Drilling Conference in Fort Worth. Three industry leading speakers: Tom Sheridan (Professor Emeritus MIT), Mike Withers (former VP Ride Engineering Walt Disney), Alonso Vera (Chief of HIS, NASA Ames)

Reading Material

- SPE 166263, “Drilling Systems Automation: Current State, Initiatives and Potential Impact”, SPE ATCE, October 2013
- SPE 173010, “Drilling Systems Automation Roadmap - The Means to Accelerate Adoption”, SPE/IADC Drilling Conference, London, March 2015

Links to stay in touch with Drilling Systems Automation

connect.spe.org/dsats/home/

connect.spe.org/DSARoadmap/Home/

www.iadc.org/dsaroadmap

www.iadc.org/advanced-rig-technology-committee/#access

www.drillbotics.org

The PR Challenge

Is this really us?







SPE

Drilling Systems Automation Technical Section

- A Unique Forum for Collaboration
- Publicity - Increasing awareness
- Developing Standards
- Maintaining Momentum



SPE

Drilling Systems Automation Technical Section

Please join us
Any Questions?

