What’s Your Challenge?

Solving challenges™
What’s Your Challenge?

Operational Excellence underpins business performance through price cycles. It is key to the effective exploitation of remaining oil and gas resources in challenging environments such as deepwater, unconventional, and mature assets.

Where are you on your journey?

Workflow automation provides a pragmatic, yet valuable, pathway to excellence in production operations.
The Production Challenge

Fragmentation across the production value stream

Without a way to orchestrate data and applications into an effective workflow, and workflows into an effective system, operators often reduce the problem scope and focus on local optimization—ignoring broader implications.

DecisionSpace® Production™ software is Landmark’s next-generation production technology that enables integrated solutions for the diverse challenges of realizing the full potential of production assets. The technology allows for effective collaboration, interoperability, and orchestration between people, processes, and technology in the following areas:

Total asset awareness – Visibility and consistent understanding of production performance and status fosters communication, accountability, and interdependency across the asset team.

Management by exception – Predictive analytics provide advance notice of events and opportunities for improvement; orchestration of effective decision-making and response builds a proactive culture and increases the bandwidth of critical personnel.

Sustainable optimization – System-wide, model-based optimization of the changing asset operating conditions aligns engineering, planning, forecasting, and economics to the operations and engineering realities of the asset.

The DecisionSpace® Production™ solutions range from integrated production operations to individual operational or engineering workflows that pragmatically leverage existing technology—and deliver value one workflow at a time. Landmark products are readily configurable, using drag-and-drop functionality that helps customers to orchestrate key workflows and realize demonstrable operational, organizational, and technological efficiencies.
Enabling Fast, Flawless Start-Up for FPSO

Challenge
The start-up deadline loomed, but with so many disciplines involved, each with disconnected workflows and data technologies, efficiency was virtually impossible.

Situation
- Complex FPSO in remote deepwater green field; offshore West Africa.
- Diverse cross-disciplinary technologies; disconnected workflows.
- Non-integrated data from disparate data sources.
- Needed to maintain production plateau and detect gas breakthrough.

Solution
- Develop collaborative environment with integrated data, visualization, and workflows on DecisionSpace® Production™ platform.
- Automate key production and reservoir surveillance workflows.
- Monitor fluid gradients from multiple zones.
- Enable team to understand, model, predict, and control reservoir behavior and production performance.

Results
- Well rates optimized. Increased production
- System was deployed before first oil, enabling global team to access field data remotely and support flawless startup. – Increased well and facilities uptime to 95 percent (compared to 50-65 percent projection) for first 6 months of production
- Timely access and analysis of data continually avoids lost production opportunities
- Time-intensive work processes, such as data analysis and reporting, were automated. – Reduced engineers’ associated nonproductive time by 98 percent

Reference: SPE Paper 115367
Offshore Africa – Operational Workflow Automation

**Situation**
- Deepwater, complex and remote FPSO operation
- Diverse suite of cross-disciplinary technologies and applications involved in core; 30+ operational workflows and disparate data sources and types

**Approach**
- Automation of production and reservoir surveillance workflows
- Collaborative data integration and workflow orchestration environment

**Results**
- Increased production by 50,000 BOPD
- Improved ultimate recovery
- 90-percent reduction in engineers’ nonproductive time
- Over $70 million per year saved in lost production opportunity avoidance
- System incorporates best practices and captures asset team knowledge in all areas. Company avoids loss of valuable expertise when employees leave the asset; workflows quickly introduce new employees to business processes; improves quality of work; reduces training costs.

*Reference: SPE Paper 127691-PA-P*

Optimizing Production with Real-Time Solutions

**Challenge**
A deepwater production system demanded fast, well-informed operational decisions, but team members lacked access to critical data and were separated by nonintegrated technologies.

**Situation**
- Complex, deepwater FPSO operation in Latin America
- Nonintegrated, cross-disciplinary software, applications, etc.
- Multiple types of unshared data sources
- Siloed operational workflows; no-real-time collaboration

**Solution**
- Integrate all data, software, applications and workflows on DecisionSpace® Production™ platform
- Use Digital Asset® solutions to model surface production systems
- Capture “right time” KPIs to drive better decisions
- Develop real-time decision support systems

**Results**
- Leveraged investment in existing applications and software – Avoided replacement cost, saved training time.
- Cross-disciplinary collaboration – Better management of costs, reservoir operations, production and maintenance
- Better access to real-time data – Improved production
- Integrated workflows, processes, and reporting – Improved employee efficiency

*References: SPE Paper 111990, SPE Paper 138436*
Intelligent Shale Operations

**Challenge**
Providing engineering expertise to growing number of wells and infrastructure build-out, with limited resources
- 1,000+ high-condensate gas wells over 240,000 acres
- Multiple compressor stations and stabilization plants
- 1,000+ miles of gathering system and trunk pipelines

**Situation**
A U.S. operator facing increasing pressure on production’s efficiency to generate cash when faced with the manpower and infrastructure of a large shale play.

**Solution**
- An engineering-driven solution using DecisionSpace® Production™ workflow technology.
- Integrated operations — integrated workflows and data visibility.
- Collaborative working environments for cross-functional Operational Excellence.
- Integrated production optimization, workflow automation, management by exception, and predictive analytics.

**Results**
- Increased production through improved surveillance and optimization. Reduced deferment.
- Reduced operating costs through increased capacity and availability.
- Improved HSE through reduced and optimized logistics.

Fracture Design Optimization

**Challenge**
Inaccurate prediction of well performance at candidate selection and fracture design (50-60% accuracy).

**Situation**
A U.S. operator with naturally fractured formations and a program of thousands of wells to fracture, with data for hundreds already completed.

**Solution**
A field data model was constructed from available data. A predictive proxy model operated with certainty. Candidate selection and fracture design workflow execution enabled using DecisionSpace® Production™ software.

**Results**
Potential 20% increase in MCF over 5 years.

*Reference: SPE paper 150455*
SAGD Forecast Optimization

Challenge
- Optimally utilize on-hand steam production to maximize production.
- Optimally set gas lift on a large number of wells.

Situation
A complex SAGD operation in North America with no detailed model of how gas lift affects bitumen and water production.

Solution
- Collect, validate, and filter instrument data. Utilize real-time field information and develop a model.
- Use of neural network data model to predict bitumen and water production response to steam injection. Numerically optimize model given steam constraint.
- Model can determine gas-lift rate required to achieve production requirements, run “what-if” scenarios with forecast model, and execute on dozens of wells in seconds.

Results
- Higher revenue - maximized production given steam constraints.
- Lower costs — reduced lifting costs to meet production targets, reduced steam usage, automated previously human-intensive work process. Management by exception.
- Utilize the same model in forecasting and in operations.
- React to downtime events - maintenance events can be accounted for in forecast model. Unexpected downtime (i.e., pad pump failures) can be accounted for in real time.
- Improved environmental performance utilizing steam more intelligently. System can be extended to a full “water management” system.
People, Process, and Technology

People, process, and technology are frequently cited as the essential elements of upstream transformation. Halliburton’s record in delivering solutions to diverse production challenges is unrivaled.

We have the people - domain and technology experts and a global presence. We have the solution design, delivery, and support processes necessary for complex challenges.

Our technology is unique, enabling seamless interoperability of diverse technologies, orchestration of multidisciplinary workflows and effective collaboration between operations and engineering personnel.

Water Flood Management

Challenge
Mature wells with inability to optimize long-term production with waterflood constraints.

Situation
A Middle East NOC with very little existing digital infrastructure and lacking a collaborative workflow methodology.

Solution
• A complete update of digital infrastructure, SCADA, etc.
• Operational and engineering workflows orchestrated by DecisionSpace® Production™ software including:
  – “Smart Surveillance”
  – Reservoir and Water Management
  – Production Optimization
• A state-of-the-art collaboration center

Results
• Optimizing long-term production goals versus water management
• Maximizing reservoir recovery and production
• Delivering the operator’s vision for the “Digital Oilfield”
**Offshore Gas Field Optimization**

**Challenge**
Leverage available data and infrastructure for real-time production monitoring and optimization across geographically remote operations and engineering sites.

**Situation**
A U.K. operator of a mature gas field comprising 36 offshore production facilities and 100 wells. Well instrumented with a high volume of data, largely unused. Production was heavily dependent on critical equipment, and the operator recently lost production when a compressor failed.

**Solution**
- Web-based collaboration and visualization environment with real-time KPI’s and dollar value-based production-loss reporting.
- One version of the truth via a logical-asset-hierarchy data model for production and maintenance data.
- Knowledge capture of operating envelopes, failure mode and responses in expert system for critical equipment.
- Model-based optimization
- Notification and escalation of alarms and optimization opportunities.

**Results**
- Complete production system monitored, $100 million loss avoidance opportunities identified.
- Major equipment failure detected and avoided
- Methanol optimization
- Reported as an industry leading example using real-time in a Digital Oilfield.

*Reference: SPE Paper 99807*

**PUT HALLIBURTON’S PROVEN SOLUTIONS AND UNPARALLELED EXPERTISE TO WORK FOR YOU**

Production-optimization-in-a-box simply does not exist. It is achieved through collaboration among engineers and operations personnel by bringing together the best data available and applying the most appropriate scientific knowledge. Landmark Software and Services has a proven track record of helping organizations discover and implement intelligent operations solutions to a wide variety of production challenges. Using DecisionSpace® Production™ software, you can develop a strategy that adapts to your organization, leveraging innovative tools and expertise to help enable you to realize the possibilities.

For more information on our production optimization solutions, please visit www.halliburton.com/DecisionSpaceforProduction, or talk to your local Halliburton, Landmark Software and Services representative and challenge us with your challenge.
Sales of Halliburton products and services will be in accord solely with the terms and conditions contained in the contract between Halliburton and the customer that is applicable to the sale.

06/2012 H08956

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