



Transforming Field Operations

Aligning Asset, People, and Process Through Technology

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ESRI PETROLEUM GIS CONFERENCE

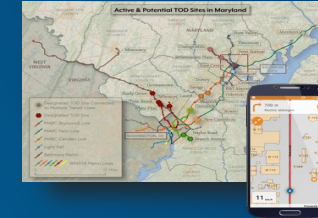


Esri's Field Operations portfolio....a platform to enable better execution

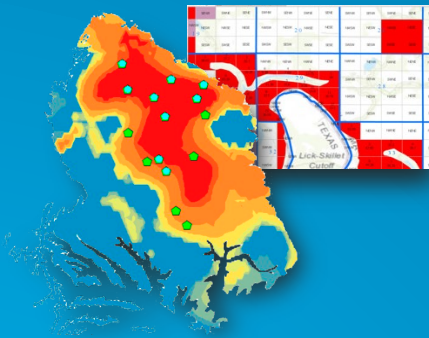
Field Mobility



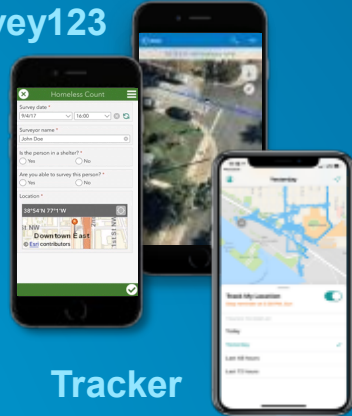
Optimized Routes



Accurate & Accessible Maps



Survey123

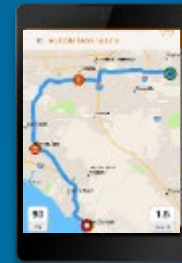


Collector

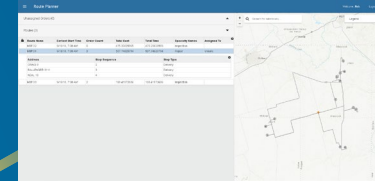
Workforce



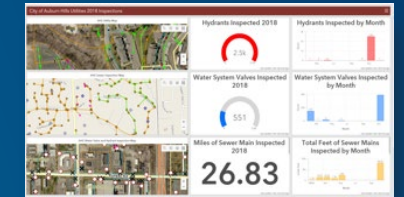
Navigator



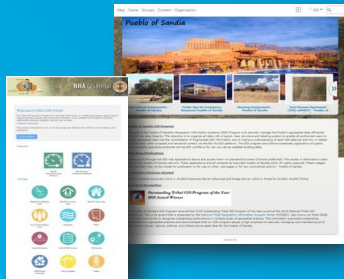
Enterprise Route Management



EHS Reporting & Compliance



Planning & Collaboration



Tracker



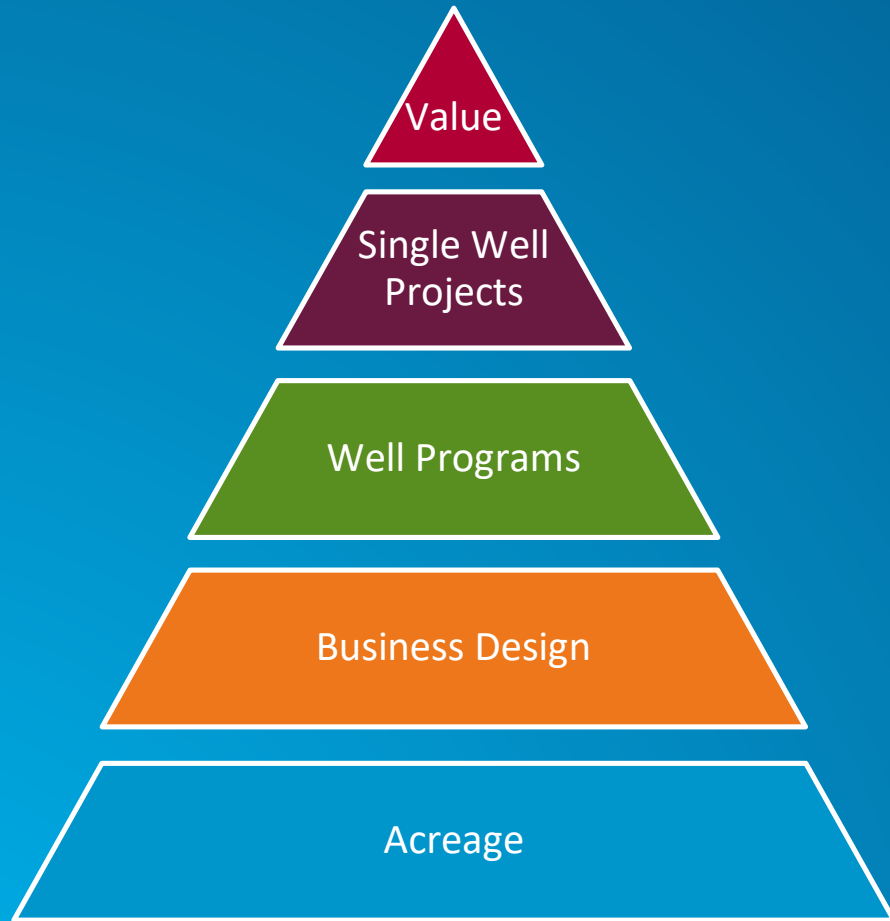
Operations Dashboard



Real-Time Collaboration & Decision Support



Esri's framework for enabling tangible business outcomes is grounded in each client's acreage position



✓ Competitive AARR (Value Creation)

- ✓ Integration (strategic configuration for competitive leadership)
- ✓ Competitive value metrics
- ✓ Integrated schedules and learning curves

- ✓ Well inventories for each play
- ✓ Well design for each play
- ✓ Work flow efficiencies and learning curves
- ✓ Competitive value metrics

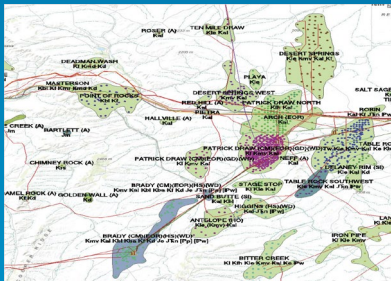
- ✓ Design for achieving and sustaining competitive advantage
- ✓ Integration (strategic configuration for competitive leadership) for strategy through execution, infrastructure and management systems
- ✓ Competitive value metrics

- ✓ Competitive position
- ✓ Scale (absolute acreage net position)
- ✓ EUR potential
- ✓ Working interest

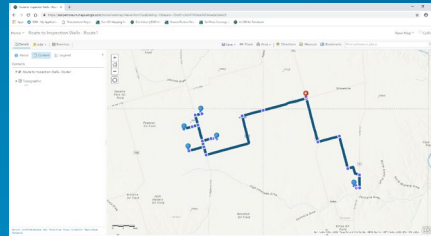
Acreage is the obvious imperative and the key limit on performance. Business design, enabled by technology, is the most overlooked

Field based operations are complex...

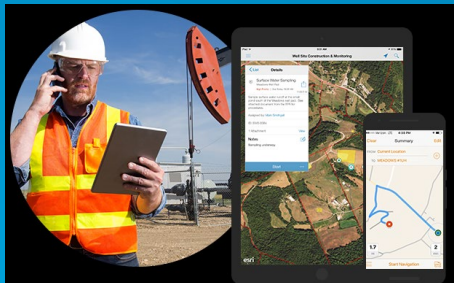
Accurate Maps



Optimized Routes



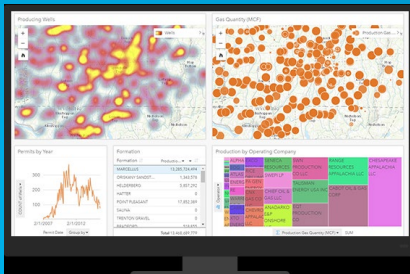
Mobility Solutions



Field Based Workforce



Real-Time Visualization



HSE



HSE Goals

Downtime Reduction

Production Goals

LOE Targets

Cycle Times

Reduced Drive Time

Optimized Maintenance

ROI

CAGR

Business Results

Planning & Collaboration



Field Operations can leverage technology and data to move their execution to a more competitive, productive model

Obtaining timely, accurate, and complete information where and when needed

Yesterday

Paper-intensive, disjointed processes, more errors, lower productivity



Paper-based

- Work Packets
- Completion forms
- Records of materials
- Limited to what's on the truck
- Print-out maps & updated on paper
- Paper timecards

- Paper and Telephone Work Orders
- Emergency Response Gaps
- Isolated Work Groups



"In the Truck"



"Out of the Truck"

- Optimized Routes
- Reduced Well Downtime
- Real Time Field Level Intelligence
- Field Level Sensors Interface
- Enhanced Regulatory Compliance
- Predictive Analytics
- Metrics Reporting and Tracking



Tomorrow

Enablement, automation and higher productivity



Fully electronic

- Vehicle tracked via telematics
- Right materials stocked
- Work time data tracked
- All relevant job data in hand, details available



More productive

- Higher job completion rate
- Reduced drive time
- Customer call aheads
- No need to return to office
- Safer work practices
- Job procedure can be reviewed on site, if required

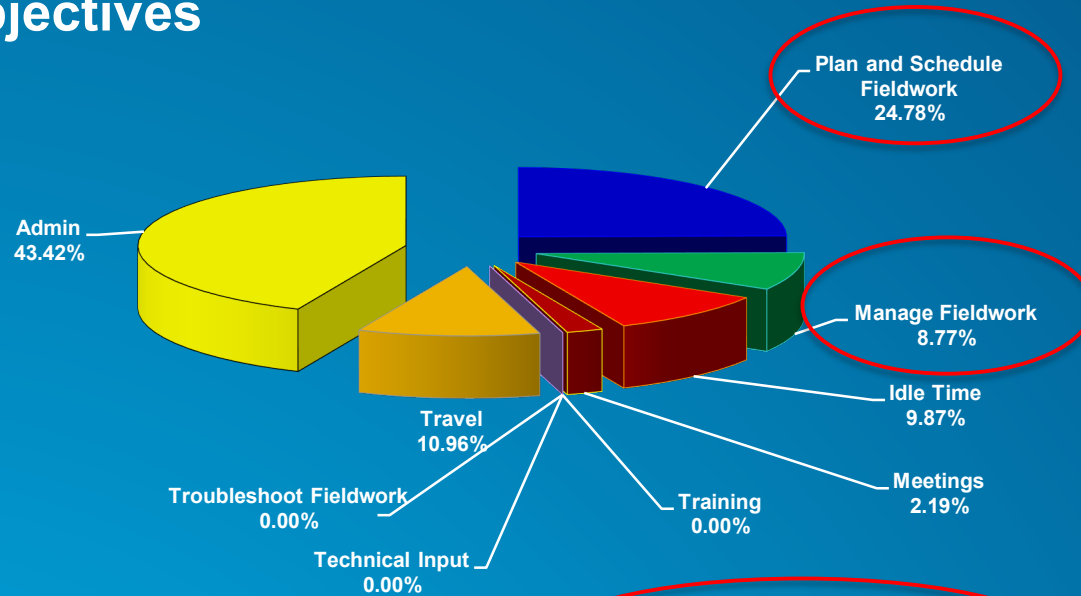


More drive time

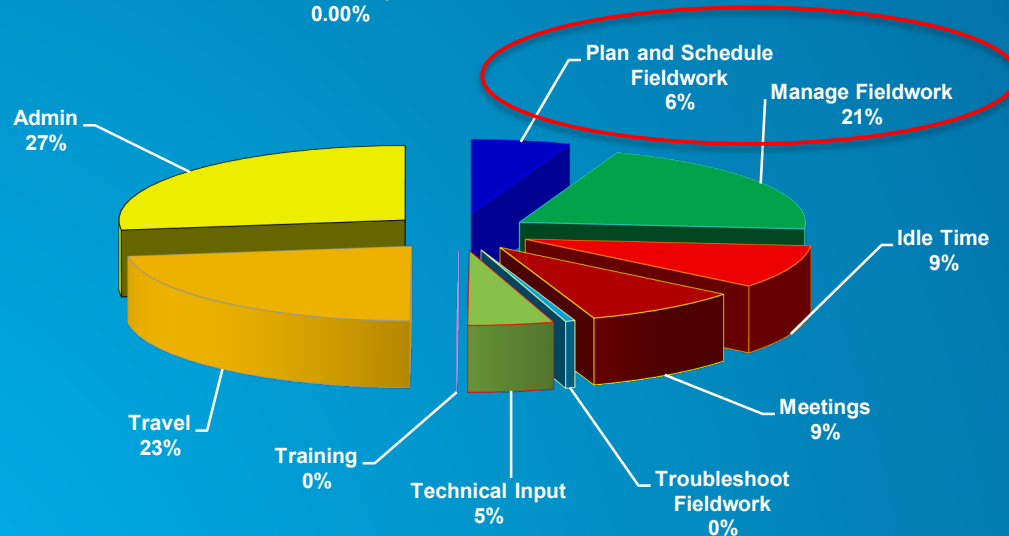
- Vehicle location unknown
- Self-stocking truck
- Non-optimized route
- Return to office for additional data and data entry

The question becomes how to enable people and processes to focus on key business objectives

East Texas Operations*



West Texas Operations*



- Both operations characterized by disparate data systems, paper based ticketing, and lack of a clear operational picture
- +/- 30% of the day is spent on field based related activities
- Significant time reporting / admin activities
- Large amounts of idle time

• “Data is being created from hundreds of thousands of sensors providing plenty of opportunities to evolve, improve, and make better decisions” - Midstream VP of IT

• “Investors expect companies to stay within cash flow regardless of the price of oil” - Energy Industry Portfolio Manager

• “We are only one tweet away from a deal with Iran and the price of oil going to \$40” - Independent E&P CEO

* DILO Analysis of Two Different Lease Operators

Priorities, physical asset requirements and spatial technology are blended to align with business goals and objectives

Inputs

Business Goals

- Cost
- HSE
- Production
- Other

Asset Locations

Decline Curves

Vehicle Locations

Public and Private Roads

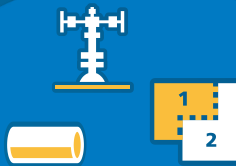
Employee Schedules

Weather

Well Maintenance



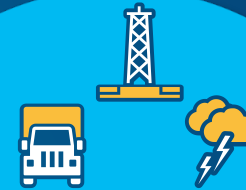
- Asset wide common operating picture
- Employee and Contractor locations
- Public and private roads
- Equipment, boundaries, and infrastructure



VISUALIZE

- Centralized planning / scheduling
- EHS alignment from planning through execution
- Cost reductions
- Reduced downtime
- Waste reduction
- Rationalized operator mileage requirements
- Improved vendor oversight

OPERATIONALIZE



MONITOR

- Production levels, downtime, pressure, other well centric metrics
- EHS related events
- Drive times and well site visits
- Weather and traffic patterns
- Real time data
- Executive dashboards with KPIs, execution results

COORDINATE



- Planning / Scheduling based on real time field based data
- Client priorities (goals) drive execution
- Operator mobile devices linked to centralized platform for directions, tasks, and data
- Optimized routes pushed to field
- Sharing / collaboration across organization
- Completed work orders pushed immediately to internal business systems

For Operations - Scaling geospatially creates the ability to start simply and build to more complex solutions



Spatial Analytics, Machine Learning & AI

Imagery & Remote Sensing

Field Worker Mobility Solutions

Applications – Configurable & “Out of the Box”

Functionally specific dashboards

Mapping & Visualization

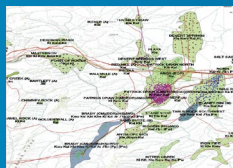
Gather / View Data

Quick Win

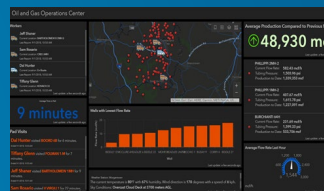
Digital Maps

Metrics / KPIs tracking

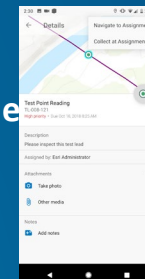
Incident Reporting



Compliance Monitoring



Workforce / Contractor Management



Alarm Management

Modeling & Extrapolation

Analysis - Query / Drill Down

Optimization

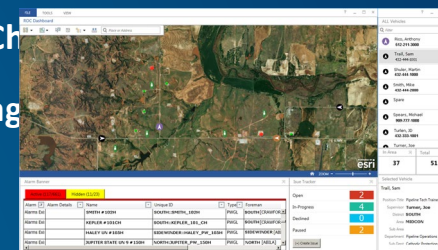
Route Optimization

Wastewater Management

End to End Solution

Centralized Operations Center

Supply Chain



Complexity

Just as every asset has unique characteristics, every operator requires the right solution configured to priorities, project lifecycle, issue / opportunity, and IT capability



Broad Solution Capability to Address Specific Objectives

Range Resources



- **Data for Asset Mgmt** – Updated legacy well locations and roads to provide an updated asset profile to enable better planning
- Lease operators enabled with mobile technology cataloged casing size, well head condition, and equipment quality to provide accurate data set for decision making and execution
- Accurate equipment, location, and asset data reduced waste and costs for current field demands and future well planning

BP



- **Common Data Platform** – Design and creation of BP's One Map platform to provide a common foundation for BP to access company wide
- GIS enabled data analysis to examine and plan for different HSE and operational conditions throughout BP's portfolio
- Enables the optimization of people and processes by leveraging asset (location) anchored data through ArcGIS tools

Apache

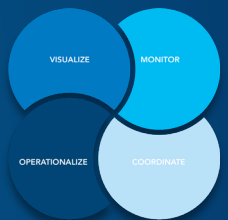


- **Enabling Remote Operations Center** – Worked to provide a solution that would pull together existing and real time data to allow manage field based workforce including:
 - Route Optimization
 - Optimize HSE prevention and reporting
 - Manage Contractor workforce
- Efficiencies and Improvements reduced LOE and maximized production in operating areas

Marathon



- **Operationalizing Real Time Field Based Data**– To support ongoing production in the Eagle Ford asset, Marathon needed a solution to enable extraction and analysis of sensor enabled GPS data
- Marathon and Esri designed a way to pull collected data into GIS for analysis and then push the outcomes to the field
- Outcomes have enabled optimized routes, reduced downtime, and enhanced HSE responsiveness



Our approach creates the linkage from business priority to technology solution

Planning Discussion Framework

Business Strategy

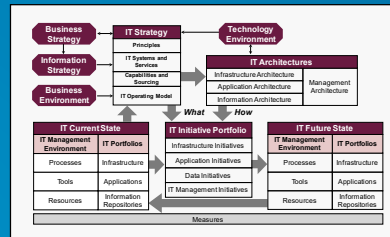
Confirm the business priorities



- Identify the implications for technology and organization based on current and future business priorities
 - Operational objectives
 - Financial targets
 - Growth implications

IT Strategy & Assessment

Confirm the IT direction



- Identify capability requirements to support design and execution of strategic objectives
- Evaluate current operating model elements and identify future requirements (Data, processes, tools/services, sourcing strategy, etc)

Esri Solution Planning

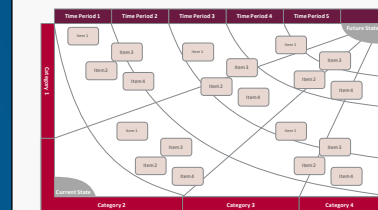
Create a solution portfolio plan



- Define the specific solutions against the business framework
- Link plans to business direction and current IT capability
- Identify Success Criteria and Validate Expectations

Implementation Roadmap

Define a roadmap to implement the plan



- Identify implementation schedule
- Determine appropriate timelines, resources, deliverables
- Plan immediate needs and ID / map additional opportunities to scale

Our process is designed to help align your business priorities, IT capabilities, and actionable initiatives to support execution of the broader operations strategy

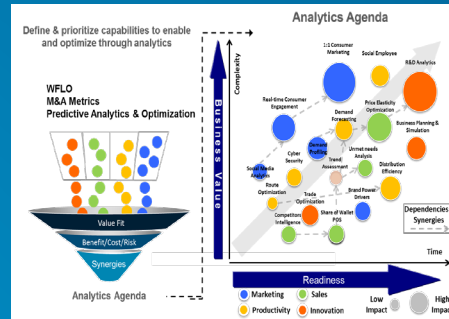


Planning discussion outcomes will set the framework for successful execution

Outcomes

Opportunity Prioritization

Documented opportunity candidates (one or many) that are aligned with needed business capabilities and prioritized by operational and business value



Enables business leaders to see the linkages between technology, process enablers and business outcomes. A mechanism to document and track how business benefits will be captured.

Technology Solution Value Map

Ability to be Successful	<ol style="list-style-type: none"> How well defined is the problem/opportunity? <ol style="list-style-type: none"> Problem/Opportunity needs executive support Scope of initial phase Definition of success Business owners willingness to be leader of innovation Business experience with Data and Analytics <ol style="list-style-type: none"> Existing data driven decisions Existing internal problem focused projects Getting access to data to answer questions Existing user and service enabled tools
Resource Availability	<ol style="list-style-type: none"> Executive Sponsorship Involvement Availability of SME's to participate <ol style="list-style-type: none"> Program Management Business Process Owners System of Record App Owners Architecture Management Availability of technology environment and architecture to execute Ability to access required data
Business Value	<ol style="list-style-type: none"> Value/ROI for business <ol style="list-style-type: none"> Increased revenue Cost reduction Increased capacity without cost increase Source of ROI Phasing Timeline <ol style="list-style-type: none"> Initial phase length Time to implementation Timeline to Realization of ROI Funding method and capability <ol style="list-style-type: none"> Phase 1/2/3 Phase 2 Long term <p>The Prioritization Scoring Methodology involves defining and measuring the "readiness" to succeed in each case under consideration for three major areas:</p> <ol style="list-style-type: none"> 1) Ability to be Successful, 2) Resource Availability, and 3) Business Value

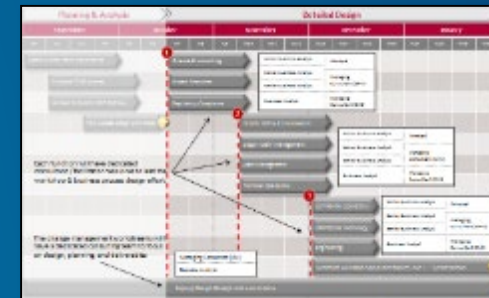
Resource Alignment

Descriptions of the roles, resources, and utilization workstreams to plan, design and implement the technology driver. Provides alignment on internal and external resource needs.

Benefits	Challenges	Analytics Insights	Data Inputs
<ul style="list-style-type: none"> Fewer and shorter outages Optimize equipment life Optimize field resources Optimize loading and configuration Improve feedback for planning/engineering Planned outages instead of forced outages for repairs Improve product with manufacturer collaboration Reduced reactive and load generation costs Know impacts of distributed generation 	<ul style="list-style-type: none"> Acquiring historical asset information Identifying the proper correlations Access to measurements Will require more sensor field points (S) Accuracy of current distribution asset mapping 	<ul style="list-style-type: none"> What is the current and historical loading on each tower and turbine? Are the average performance reads within bounds? Are the sensor reads within bounds? What is the baseline for expected equipment? Is a piece of equipment approaching failure? When do we balance loads? What is the most cost effective action to mitigate asset issues? What are the impacts of distributed generation on the generation network? 	<ul style="list-style-type: none"> Tower and turbine asset mapping Asset characteristics Performance interval data Other instantaneous data reads Outage information Events Sensor measurements and attributes Historical information on equipment failure Distributed and other generation installations and capacities.

Detailed Solution Implementation Plans

A fully vetted execution plan that describes the timelines, the milestones and the criteria for measuring the progress and confirming the speed to value





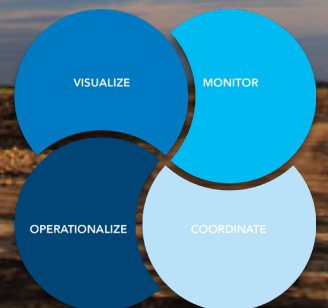
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