KIFTA
TECHNOLOGIES

MONITORING SOLUTIONS FOR

Oil & Gas

SMART MONITORING SOLUTIONS FOR INTELLIGENT WELLS

› Informed decision making using integrated monitoring at all points along the wellbore

Kifta's versatile range of fiber optic sensing solutions provide valuable information at all points along the wellbore to help you with critical decision making to improve the integrity and efficiency of your wells.

Kifta's technology includes Distributed Temperature Sensors (DTS), Distributed Acoustic Sensors (DAS) and Fiber Bragg Grating (FBG) solutions. Through our network of partners we are able to offer a full service solution to get access to all areas of the wellbore and reservoir and to operate in the harshest of conditions.

- MORE THAN 50 INSTALLATIONS WORLDWIDE
- 1,000KM OF INSTALLED FIBER BEING MONITORED
- MTBF* OF OVER 31 YEARS FOR KEY COMPONENTS

*MTBF - Mean Time Between Failures

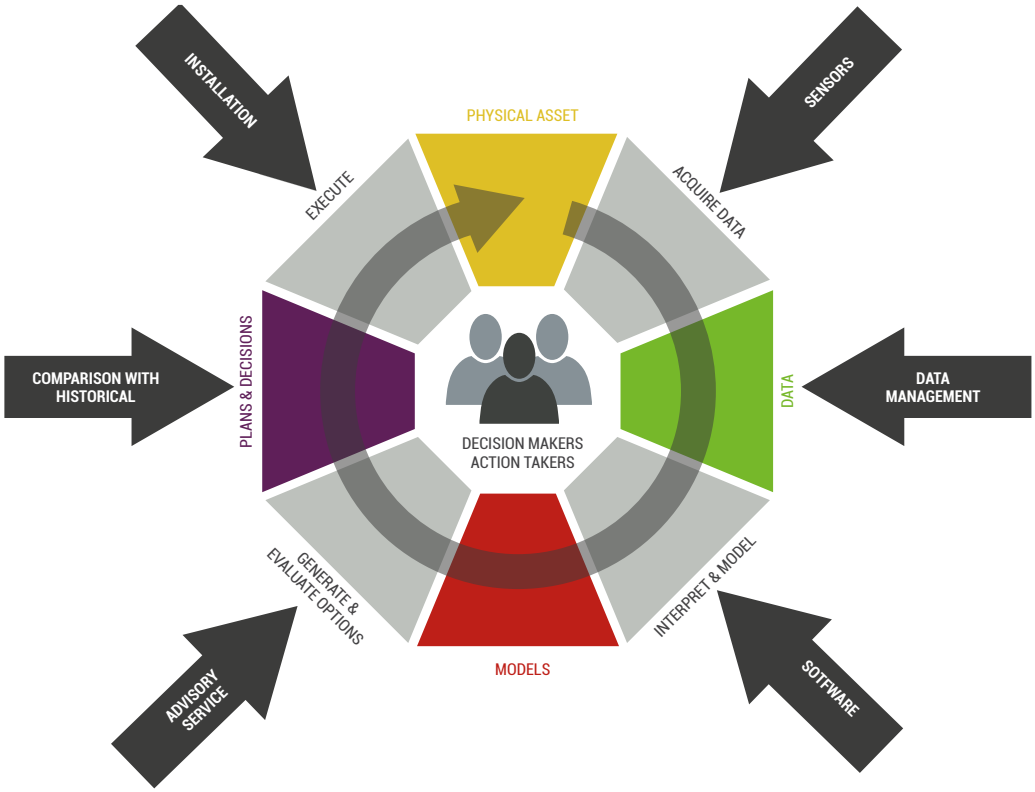
THE BENEFITS OF INTELLIGENT MONITORING

Feature	Benefits
Permanent monitoring provides non-intrusive and intervention-free production data acquizition	Less intervention for wireline equals reduced risk, reduced costs and improved decision making
Full coverage at all points along the wellbore provides information on the integrity of key components	Improved condition monitoring means less unplanned downtime and optimization of asset maintenance program
Continous distributed information during hydraulic fracturing operations	Real-time optimization of operations leading to lower material costs and improved production
Permanent in-well installation provides information throughout the lifetime of the well	Optimize future completion design, well placement and spacing based on real well information Understand depletion curves and take action to optimize
Inherently reliable downhole sensor array with non moving parts, immune to EM radiation and intrinsically safe	Increased reliability means lower downtime and lower cost of ownership

OIL & GAS MONITORING APPLICATIONS

Application areas

- **Production**
  - Reservoir characterization
  - Zone allocation
  - Steam breakthrough
  - Gas breakthrough
- **Well integrity**
  - Sand monitoring
  - Gas lift optimization
- **Hydraulic fracturing**
  - Fracturing efficiency
  - Fluid placement
  - Ball seating
- **Abandonment and decommissioning**
  - Leak detection and location
- **Vertical seismic profiling**

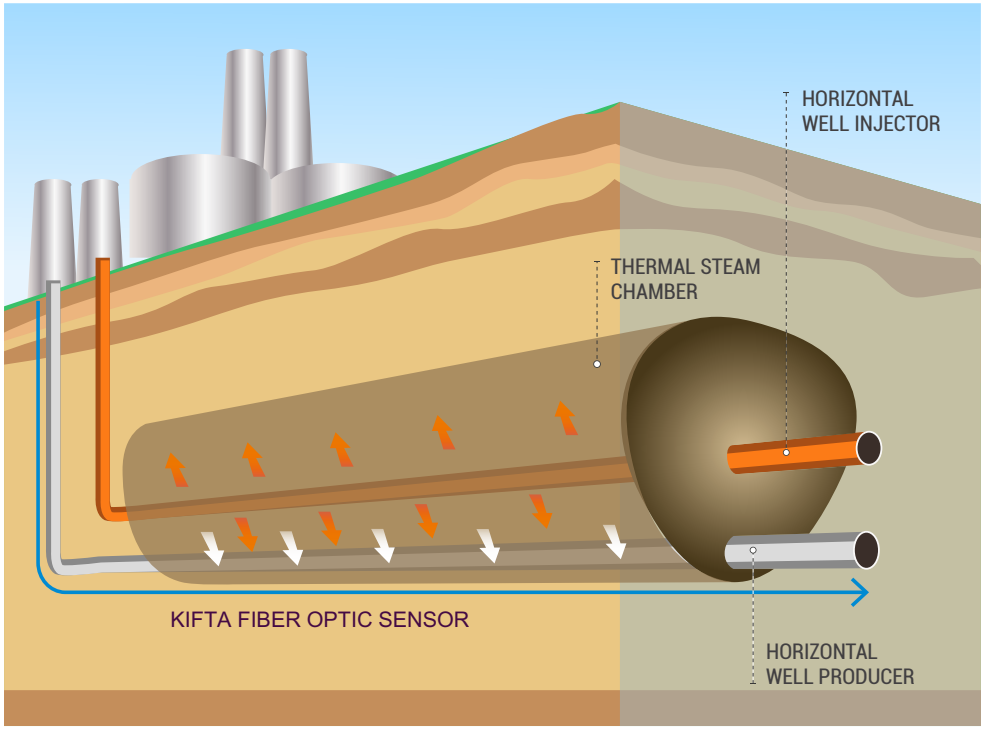


TEMPERATURE SENSORS IN ALL ENVIRONMENTS AT ALL POINTS ALONG YOUR WELLBORE

From the integrity of key wellbore components through to flow information in the reservoir, temperature data can provide critical information on your wellbore. With Distributed Temperature Sensing (DTS) you can have a complete temperature profile along the well whatever the well type and however harsh the conditions.

This helps you obtain critical information to:

- Monitor and optimize steam flood performance
- Understand integrity of casing, tubing and completion components
- Allocate in-flow distribution along the reservoir
- Understand and optimize waterflood injection strategy
- Optimize gas lift operation
- Detect and mitigate against hydrate and wax deposits
- Monitor production changes over time vs forecast depletion curves



LISTENING TO YOUR WELL PROVIDES YOU THE ANSWERS TO HELP OPTIMIZE PERFORMANCE AND IMPROVE INTEGRITY

Distributed Acoustic Sensing (DAS) is a unique technology that converts the in-well fiber optic sensing cable into a continuous series of microphones along its length.

This gives you the information to identify a number of phenomenon in your well and to either take immediate operational action or to effectively plan future strategies.

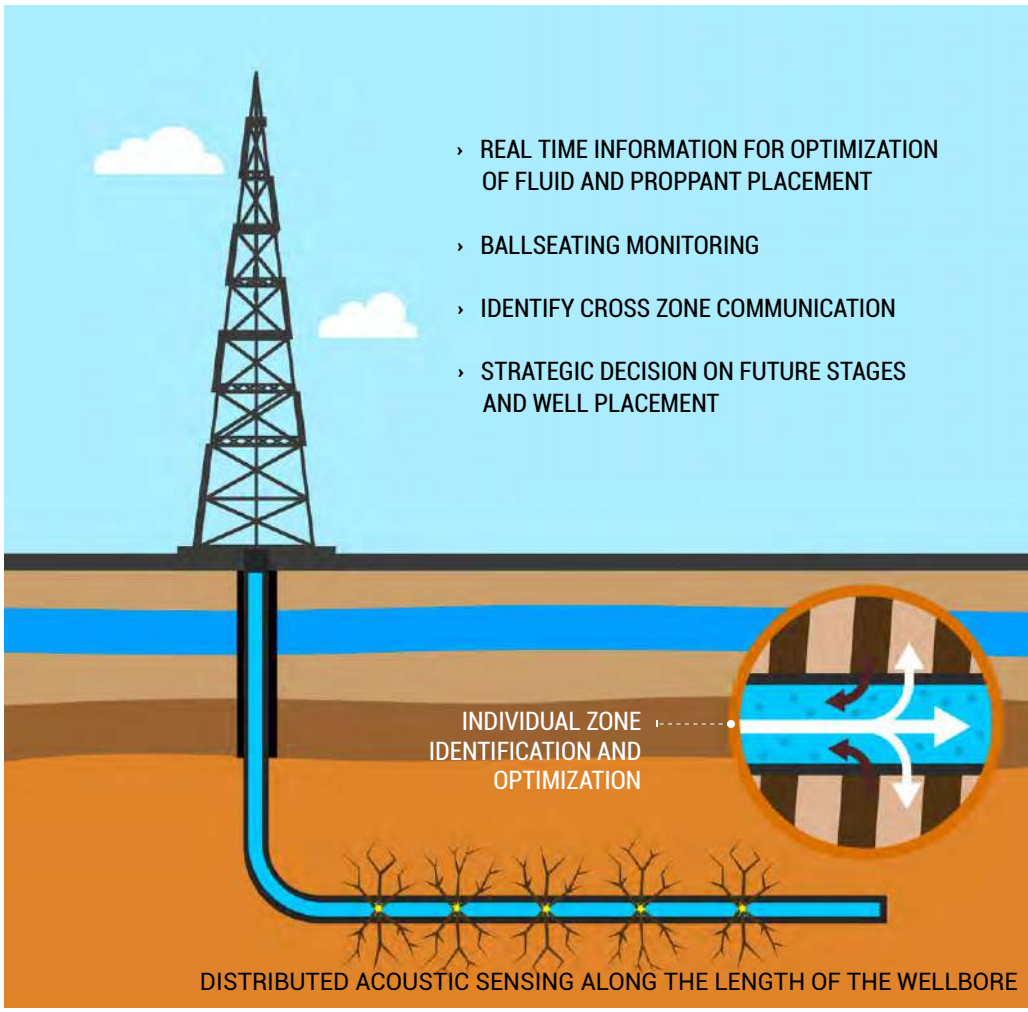
Information that can be obtained through Distributed Acoustic Sensing (DAS) includes:

- Identification of near wellbore injection and production
- Cross well monitoring
- Fluid migration and casing leaks
- Condition monitoring for early detection of equipment wear (ESP, sand monitoring and valve operation)
- Vertical seismic profiling

Oil production increased by 15% by using optimized well completion design based on DAS Data

Source: Cadwaller et al (2015) SPE-178667

Examples of redundant System Configuration



FIBER OPTIC SENSING CABLE AND DEPLOYMENT METHODS

› Kifta provides fiber optic sensing cable options that are robust, reliable and able to withstand the harshest operating conditions.

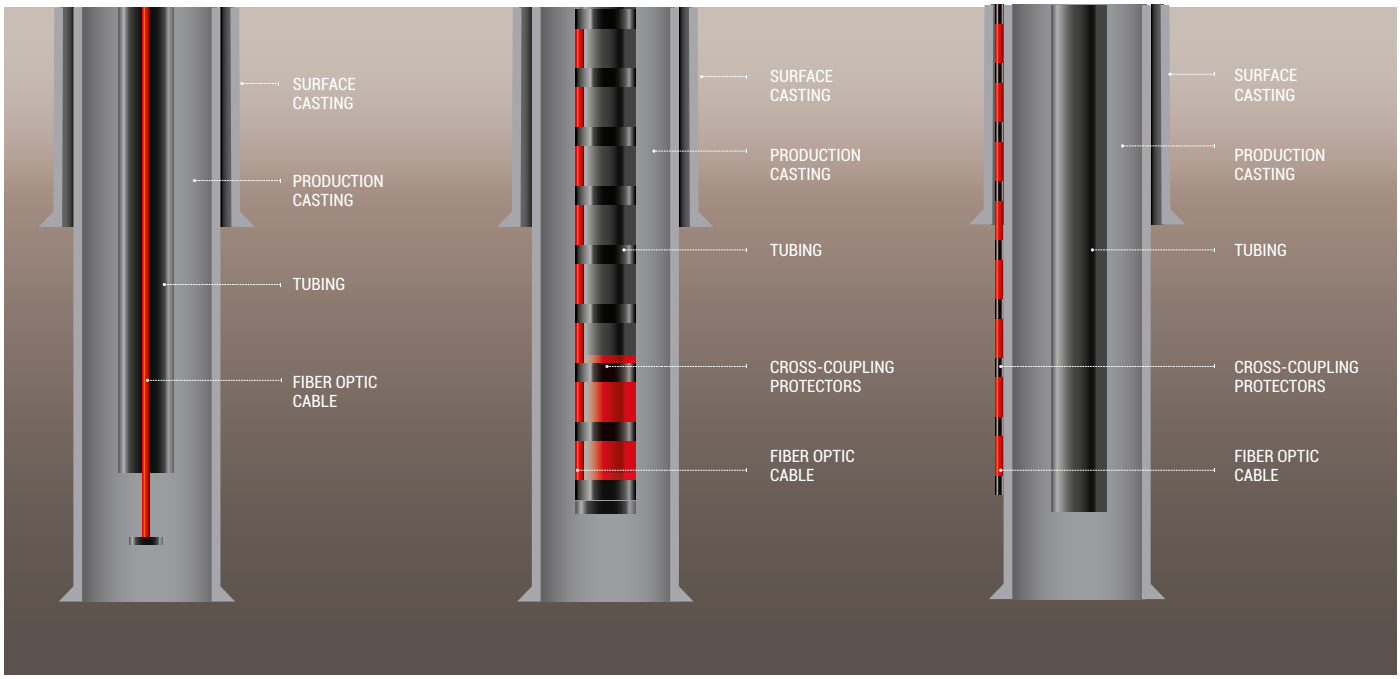
The key to getting valuable information is to ensure that you have a robust cable that is deployed accordingly. Our advanced cable designs and installation techniques are customized to the specific well types with the specific cable designs and fiber types selected according to the specific environmental conditions and Kifta instrumentation.

Deployment options

Wireline, Slickline & Coiled Tubing

Tubing Based Deployment

Behind Casing Installation



Example of downhole high temperature cable

Features:

› Hydrogen resistant

› All metal construction

› Temperature operating at 300ºC +

› Pressure rating up to 20,000 PSI

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- 10,000 SQM STATE-OF-THE-ART PRODUCTION FACILITY
- CLASS 100 CLEANROOM AND TESTING FACILITIES
- MORE THAN 30 R&D ENGINEERS