ENERGY INDUSTRY INNOVATIONS

Selected Case Study Highlights from Over 300 *U-line™* Runs Where this Market Leading Technology Has Reduced the Cost and Carbon Impact of Well-Intervention Operations

OUR CULTURE

"

I founded GA R&D in **2010** in Aberdeen, Scotland, to follow a simple ethos to tackle major energy challenges and develop ground-breaking IP. That ethos is:

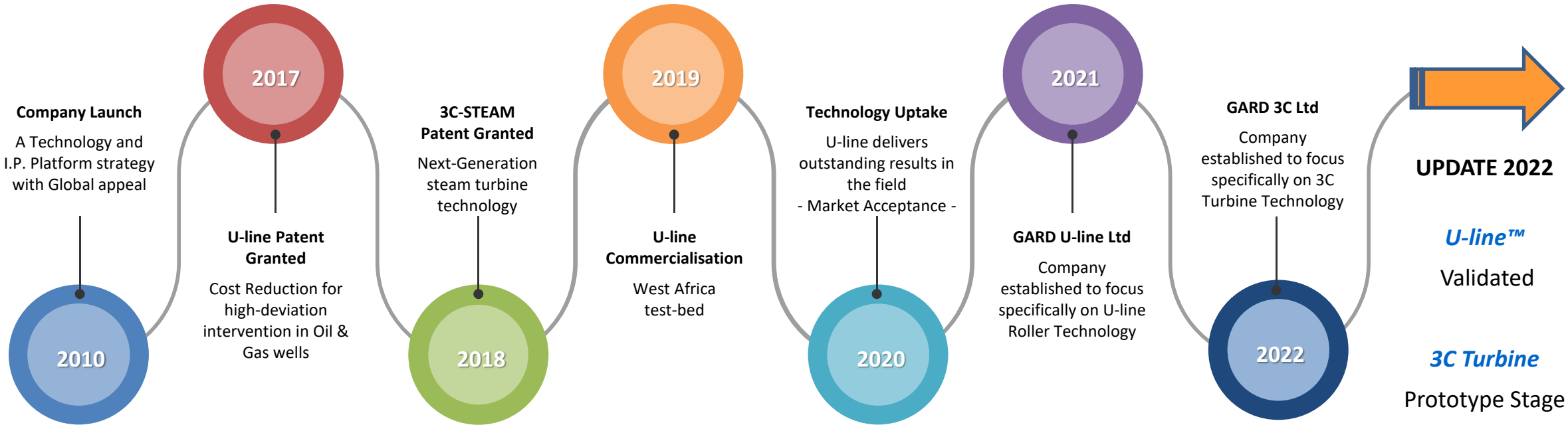
- ***Listen to the industry***
- ***Learn of its challenges***
- ***Understand the issues and then…***
- ***Define, design & supply innovative solutions***

Now, with proven results and a positive impact on industry from our first commercialised technology our plans to scale-up our *U-line* business, speed up the development of our second game changing technology line *and* bring forward the future pipeline of IP.

"

Yerasimos Angelis, Managing Director

KEY MILESTONES



GLOBAL REACH

HUBS
(6 to date)

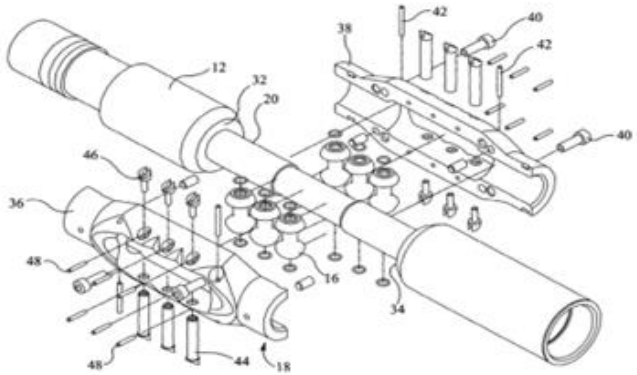
MANUFACTURING
(3 Countries)

PARTNER / AGENTS
(10 to date)

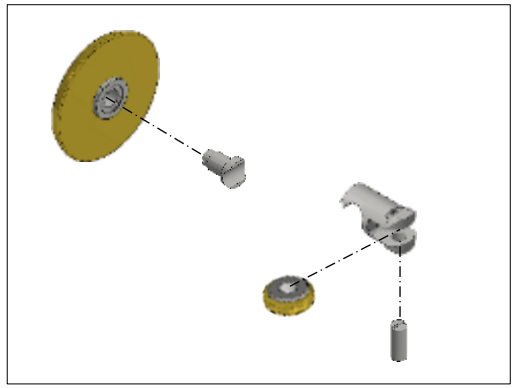
OPERATIONS
(>400 to date)

Current Industry Conveyance Limitations . . .

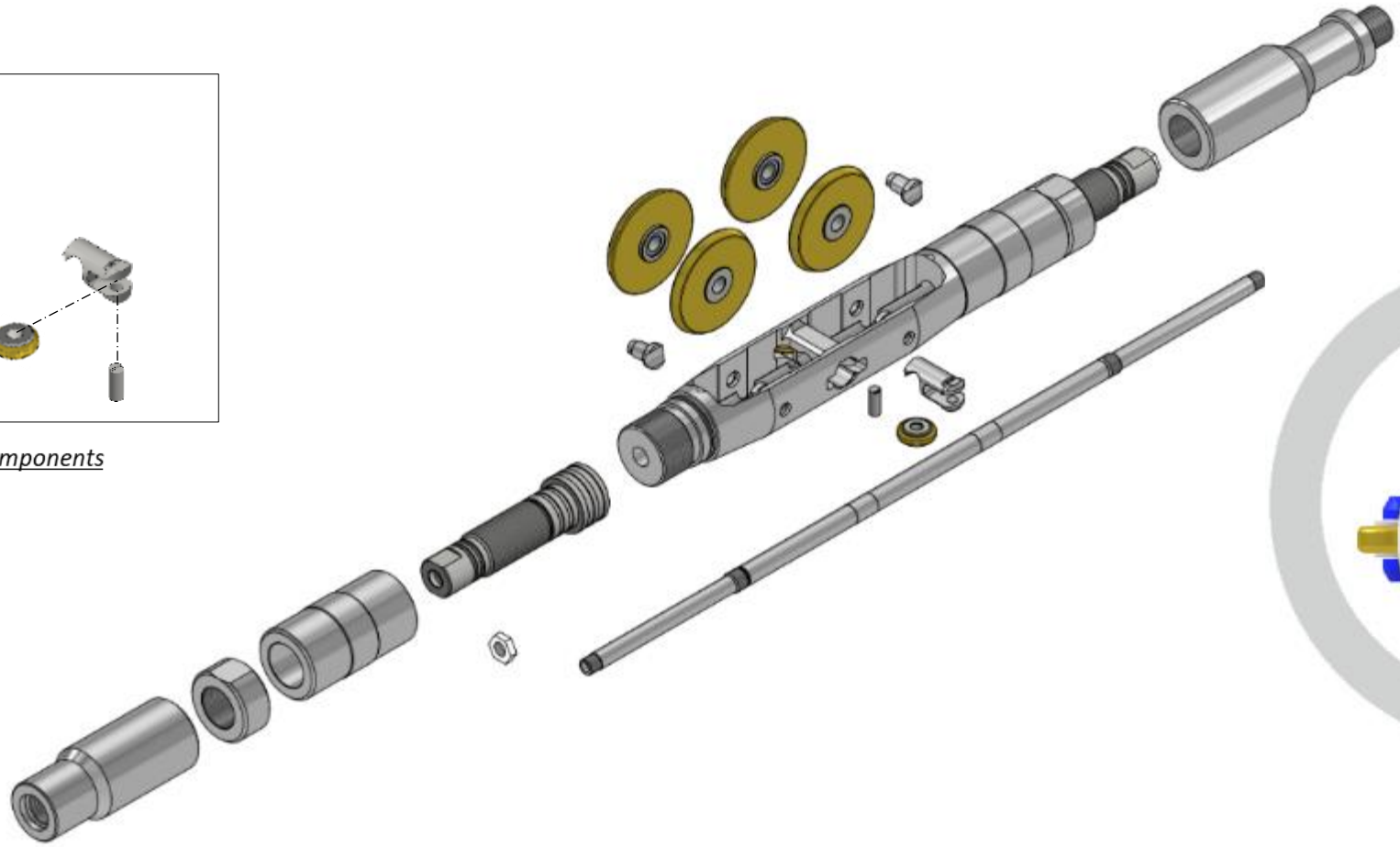
- Stability & Resistance
- Rolling inefficiency
- Fasteners / risk of dropped object in hole
- Well integrity risk
- Problematic field maintenance
- Introducing the possibility of human error
- Non-universal / separate tools per application
- Large Tool inventories & Cost to purchase and manage fleet
- Operating limitations / inability to reach Target Depth
- Possibility of Mis-Run $$

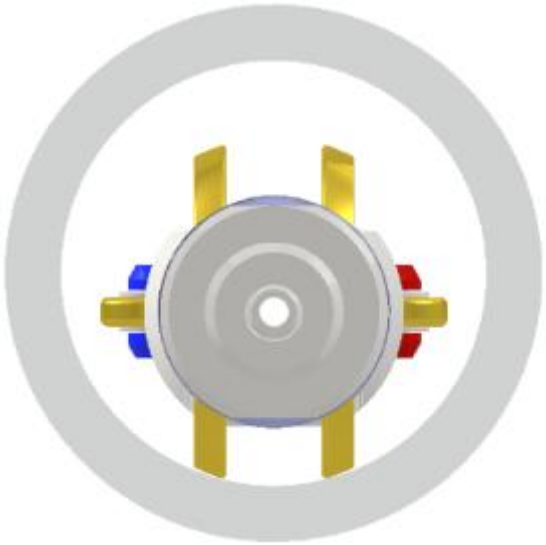


U-line™ Roller Technology
- Technical Overview -



Wheel Kit Components





Cross Section in tubing

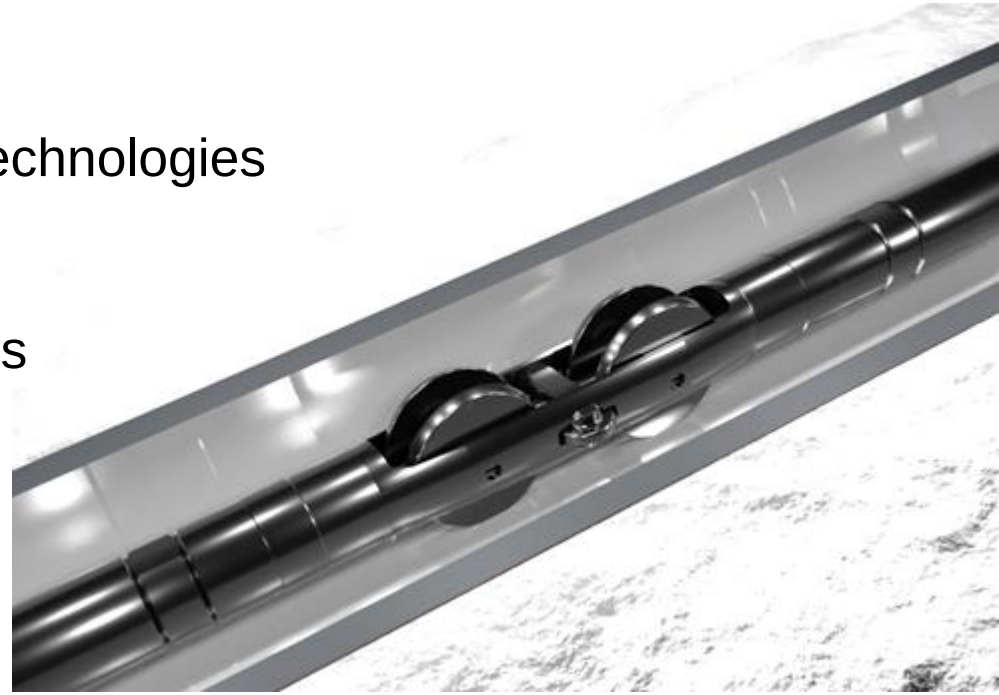
Our Solution
U-line™ Roller Technology

***U-line*™ Roller** is a novel, cost-effective, Universal System approach to Conveyance

- Modular - dual e-line & slick-line function
- Multiple Wheel sizes available per chassis
- Compatible with all existing downhole intervention technologies
- The strongest, most flexible, roller on the market
- Extending the Reach of Intervention in deviated wells

whilst also…

Reducing Risk, Cost & Complexity



U-line™ Roller Technology
'What it means for our Clients'

***U-line*™ Roller Technology** provides the following benefits:

- Mobilised in a peli-case, light transportation
- Minimises the operational footprint
- Existing well services personnel can deploy, support available remotely if needed
- Enables lighter / faster intervention
  e.g. slickline Vs tractor / coiled tubing conveyance
- Small, agile fleet, adaptable with minimal maintenance man-hour requirements

Enables our Operating Company clients to significantly reduce operating cost

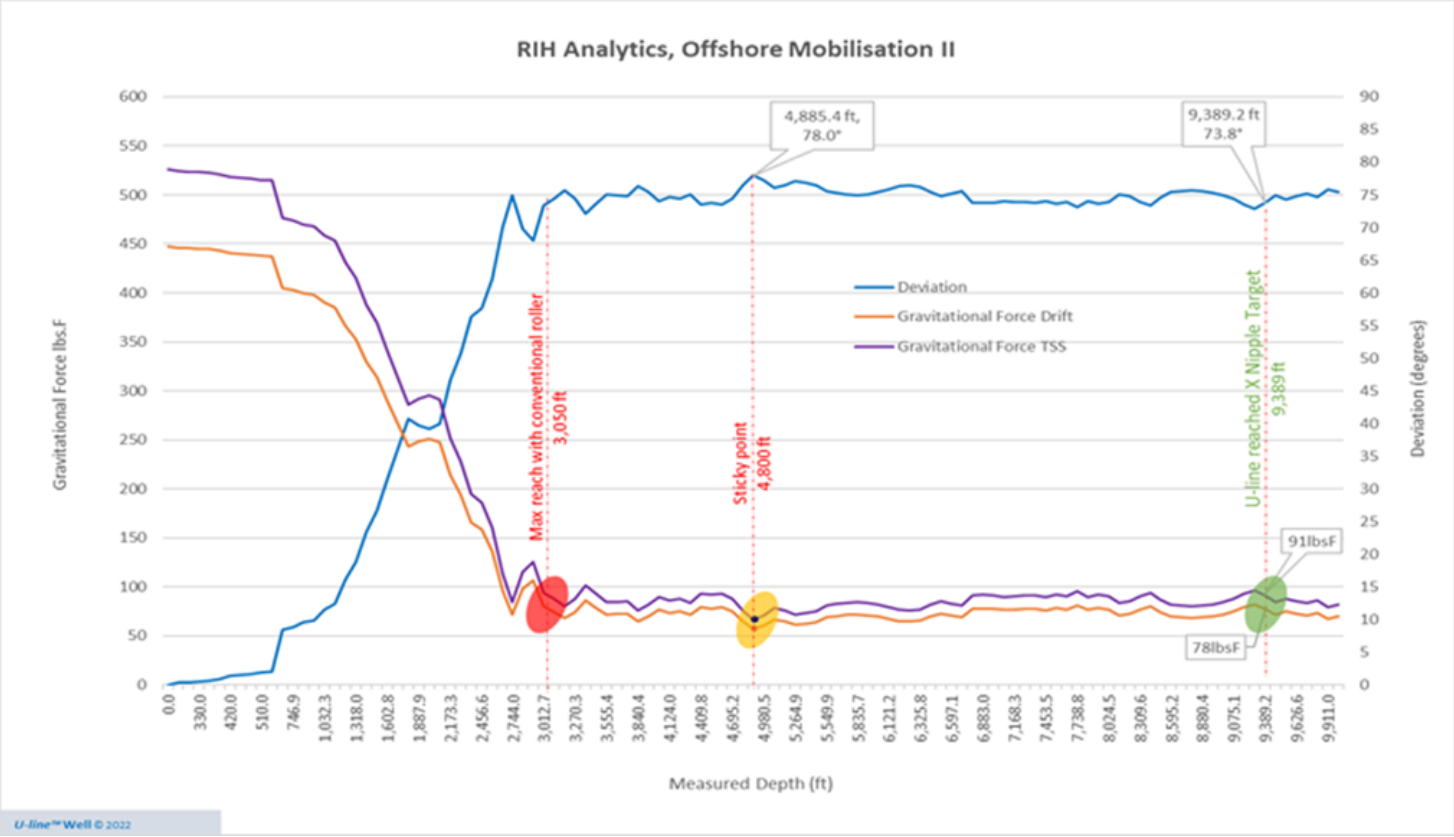
& carbon footprint, protecting the Environment!

U-line™ Roller Applications

GARD *U-line*™ Roller Technology is used for many different applications . . . .

- ✓ **Production Logging**
- ✓ **Cement Bond Logging**
- ✓ **Perforating**
- ✓ **Caliper**
- ✓ **Pipe Recovery**
- ✓ **Camera**
- ✓ **Inflatable Plugs**
- ✓ **Digital Slickline**
- ✓ **Drifting**
- ✓ **Memory Gauge**
- ✓ **Gas Lift Remediation**
- ✓ **Plugging**
- ✓ **Sliding Side Door Manipulation**
- ✓ **Micro Coil**

Conveyance Simulation



We work closely with our *U-line*™ Partners and offer the following services:

- Toolstring Design
- Well Analysis
- *U-line*™ Operational Analysis Report

Planning for Success!

U-line™ Roller Technology
Example of Achievements to-date

UKNS, offshore: Compaction & Pulsed Neutron log - HPHT, 169.4degC, 8,300psi reservoir – toolstring reaching 16,463ft (5,018m) / 44˚

W.Africa, delta: Tubing diagnostics, slickline - reduces intervention cost by 75% Vs wireline tractor 13 slickline runs in total to 10,850ft / 79˚

Malaysia, offshore: Gas lift change-out - valve changed-out successfully at 11,800ft / 72˚ – negotiating a long tangent (7,880ft holding at an average of 71˚) to reach TD, effective jarring at target

UKNS, offshore: Fibre Optic deployment - enables delivery of high-quality DTS data set from a tortuous gas condensate HPHT environment

Malaysia, offshore: Thru Tubing Sand Screen – enables access to target nipples at 9,389ft / 75˚ max. and delivers effective mechanical jar action to set 'X' lock / TTSS when there were no other intervention solutions – 2023 SPE/ICOTA conference paper

UKNS, offshore: Bridge Plug Drift - reaching 14,900ft / 81˚ in a tortuous well

India, offshore: U-line Conveyance Technology widely adopted by the National Oil Company via Expro in order to reduce field intervention$$

W.Africa, delta: Plug & Perf on e-line – WSO target perf depth 10,360ft / 74˚

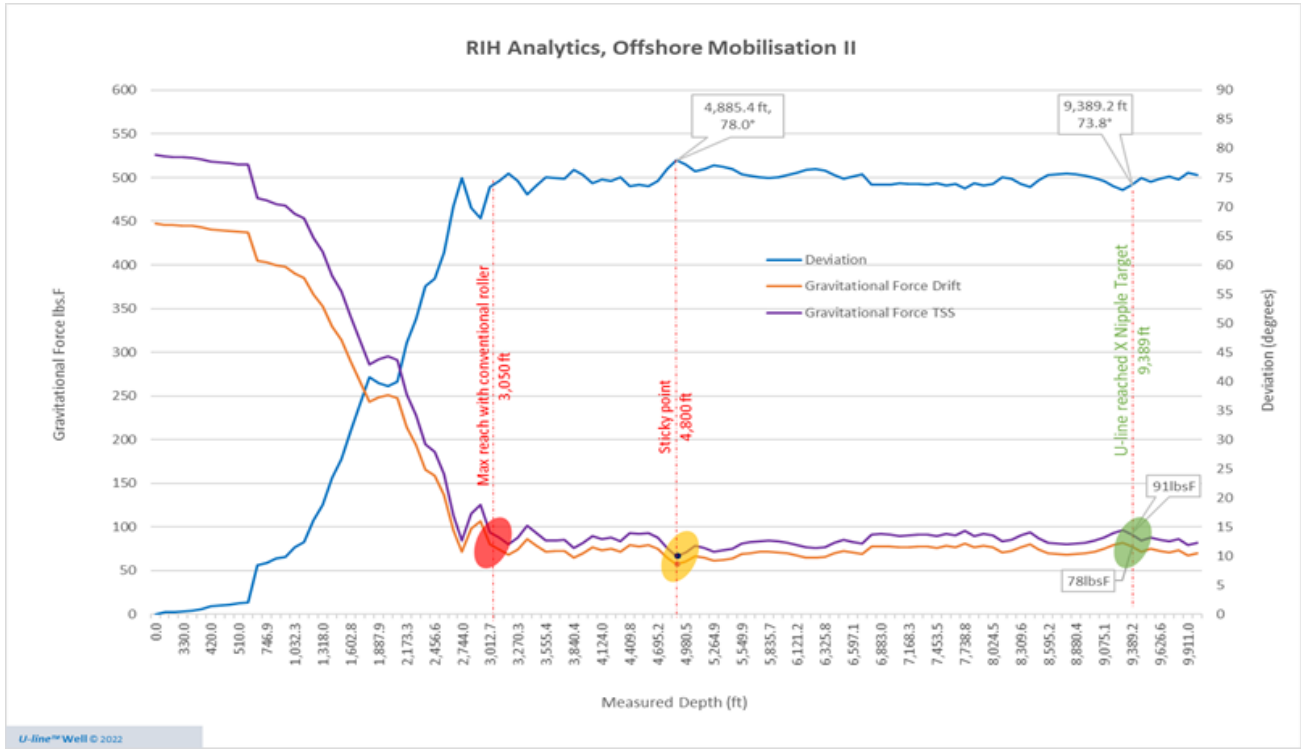
Case Study #1 - GARD U-line™ Unlocks 1.7MMbbls of reserves

The Challenge

A Malaysian NOC suffered a platform shutdown, the best-producing well was to be brought back on-line after being shut-in for 2.1/2 years

Major problems were initially encountered when undertaking remedial sand control operations, with ‘legacy’ mechanical rollers only able to travel 1/3 of the required distance!

All alternative conveyance solutions were assessed and it was decided to use slickline deployed GARD *U-line*™ Rollers to access target nipples in both long and short strings



Case Study #1 - GARD U-line™ Unlocks 1.7MMbbls of reserves

Results

- First deployment reached 1,463m (4,800ft) - An extra 533m (1,750ft) further than previous attempts using ‘conventional’ roller technology
- GARD worked with the Operator to re-configure and optimize *U-line*™ toolstring design with subsequent runs reaching targets at 9,389ft / 74deg & 8,608ft / 75 deg
- The operation was deemed a major success, thru’ tubing sand screens set successfully in target nipples – R.O.I. 3 weeks after well brought back on-line

Highlights

- 308,000ft (94Km) travelled during the intervention programme
- NO *U-line*™ Roller components replaced
- Effective mechanical jar action at setting depth
- Multiple high-deviation intervention learnings for all stakeholders
- *U-line*™ Product Validation for NOC

Case Study #2 - GARD U-line™ Eliminates wireline tractor

The Challenge

An Operator planned to perform a well intervention diagnostic programme, well modelling suggested that costly wireline tractor was the only available option in order to reach target depth (TD) of 3307.08mtrs(10,850ft) at 79deg deviation



The Results

- Multiple Tool deployments were performed successfully using *U-line*™ Roller Technology on slickline
- 50% Operational Time Saving, reducing risk to asset and personnel
- 85% Cost Reduction Vs wireline tractor
- Full Case Study Available

Case Study #3 - GARD U-line™ Enables access to problem GLM, Reduces ~~$$~~

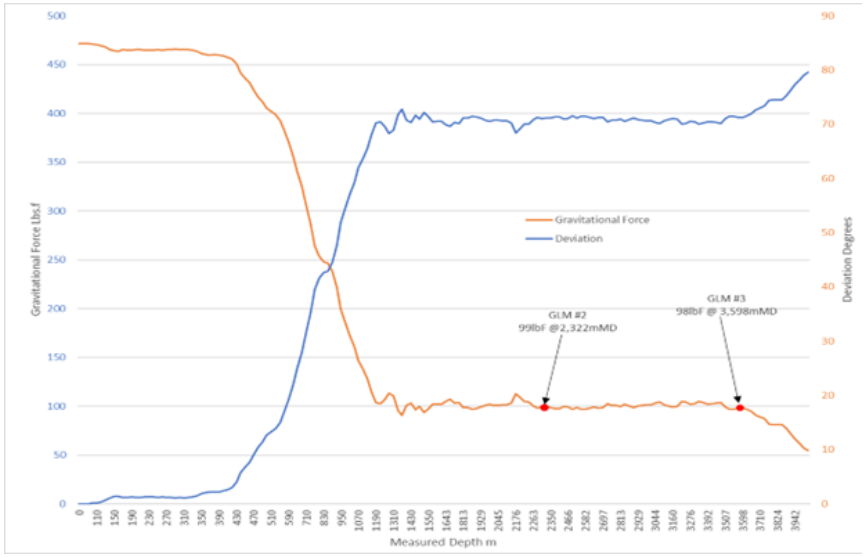
The Challenge

A Client planned to perform a gas lift remediation programme to replace dummy valves with orifice valves within a 3.1/2” completion, offshore Malaysia

The deepest gas lift mandrel (GLM) was located at 3,598mtrs (11,800ft) at 71.3deg

The Result

- *U-line*™ successfully conveyed a kickover tool to the deepest GLM, negotiating a long tangent section of 2,462mtrs en-route
- Mechanical jar action was proven effective at depth
- Slickline intervention was used instead of more costly e-line tractor/stroker
- R.O.I. 3 weeks after well brought-on-line



Case Study #4 - GARD U-line™ Ensures retrieval of valuable UKNS HPHT data

The Challenge

A North Sea Oil & Gas Operator was facing a unique challenge when attempting to log their HPHT wells, due to the presence of high-viscous residue and buckled tubing

These factors caused cable tension to increase close to cable safe working limit (SWL) – as well as ‘clogging’ critical logging tool components and rendering logs ineffective

With natural production of 120mScf per day, prior attempts to log required flow to be reduced to 1/4 rate in order to eliminate toolstring lift, leading to a sub-optimal data-set and poor R.O.I.

The Solution

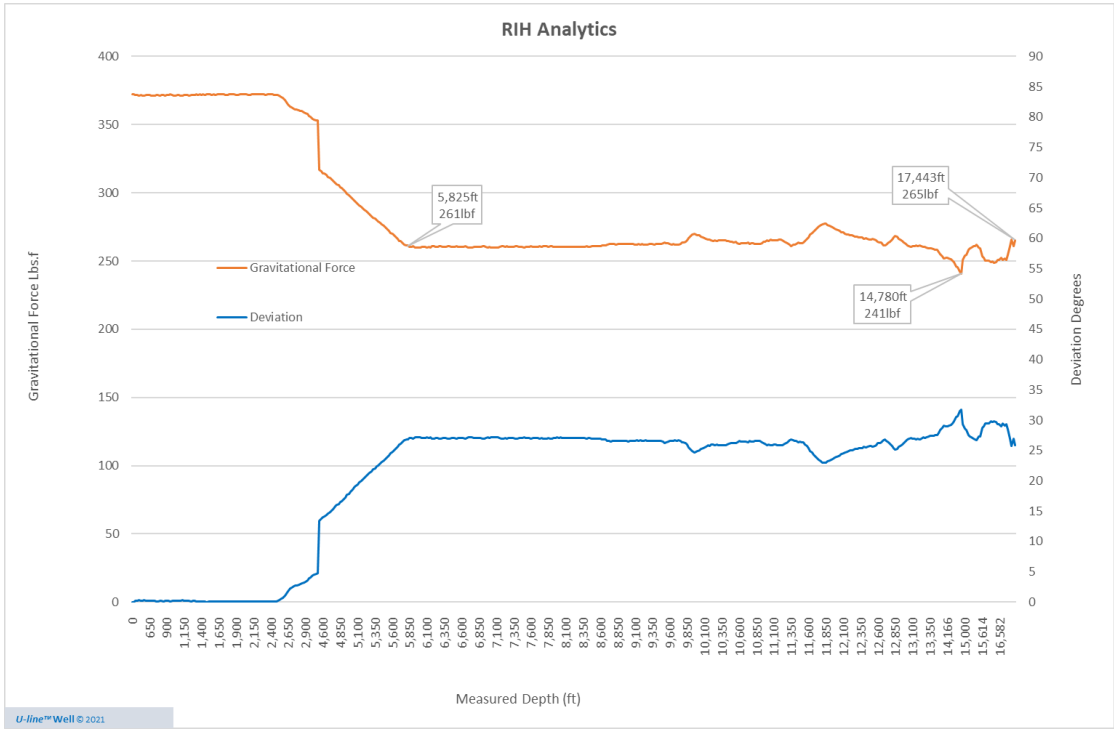
U-line™ Rollers were selected for conveyance after analysing all available products on the market, due to:

- Increased lift & clearance Capability
- Lowest rolling co-efficient on the market

Case Study #4 - GARD U-line™ Ensures retrieval of valuable UKNS HPHT data

Results

- First mobilization validated the use of *U-line*™ Rollers using slickline to deploy Drift & X-Y Caliper
- Second mobilization also involved deployment of fibre-optic cable, to undertake a DTS (temperature & acoustic) log at double flow rate Vs standard wireline logging capability
  - Bespoke size U-line™ Rollers were attached to the end of fibre optic cable and run to sump at 17,400ft in order to ensure that cable was positioned correctly across the reservoir section
  - U-line™ Rollers eliminated ‘stiction’ when pulling off-station after a 14hr static period (6 hour flow), cable tension controlled and within SWL
  - All data processed and a well-defined log delivered!



U-line™ Roller Technology Summary

Our solution delivers…

Ease of Use

- ✓ Simple & Reliable
- ✓ Modular
- ✓ Low maintenance
- ✓ Rugged
- ✓ Universal

Performance

- ✓ Slicker, Safer, Stronger
- ✓ Multifunction
- ✓ Increase Capabilities

Cost Saving

- ✓ Rig time savings
- ✓ Smaller inventory
- ✓ Agile supply chain
- ✓ Light intervention enabler

Applications

- ✓ Slick-line
- ✓ E-line
- ✓ Perforating
- ✓ P&A
- ✓ Tractor
- ✓ Coiled Tubing

…'Emission Possible'

Thank You!

Questions Please

For further information contact:

Yerasimos Angelis, UK MD
y.angelis@ga-rd.co.uk
+44 (0)1224 515980
linkedin.com/in/yerasimos-angelis-17b80870

Donald Mitchell, Director
d.mitchell@ga-rd.co.uk
+44(0)1224 518019
linkedin.com/in/donald-mitchell-8bba5325

www.ga-rd.co.uk

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