



Next Generation of AI Robotic Rigs

A Leap in Drilling Safety & Efficiency

Company Profile

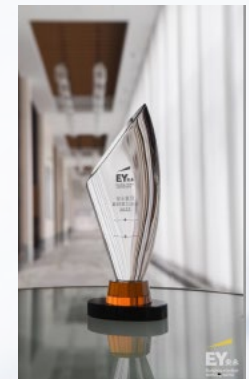
Beijing JJC Technology Co., Ltd was established in 2009, dedicated to the development of high-end intelligent equipment for oil & gas industry.

Headquartered in Beijing, accredited as:

- Nationally supported 'Little Giant' enterprise (Specialized & Innovative SME)
- National high-tech enterprise



Participated in 13th and 14th "Five-year Plan" national key R&D programs, obtained ISO9001, API Specifications, owns dozens of invention patents and software copyrights.



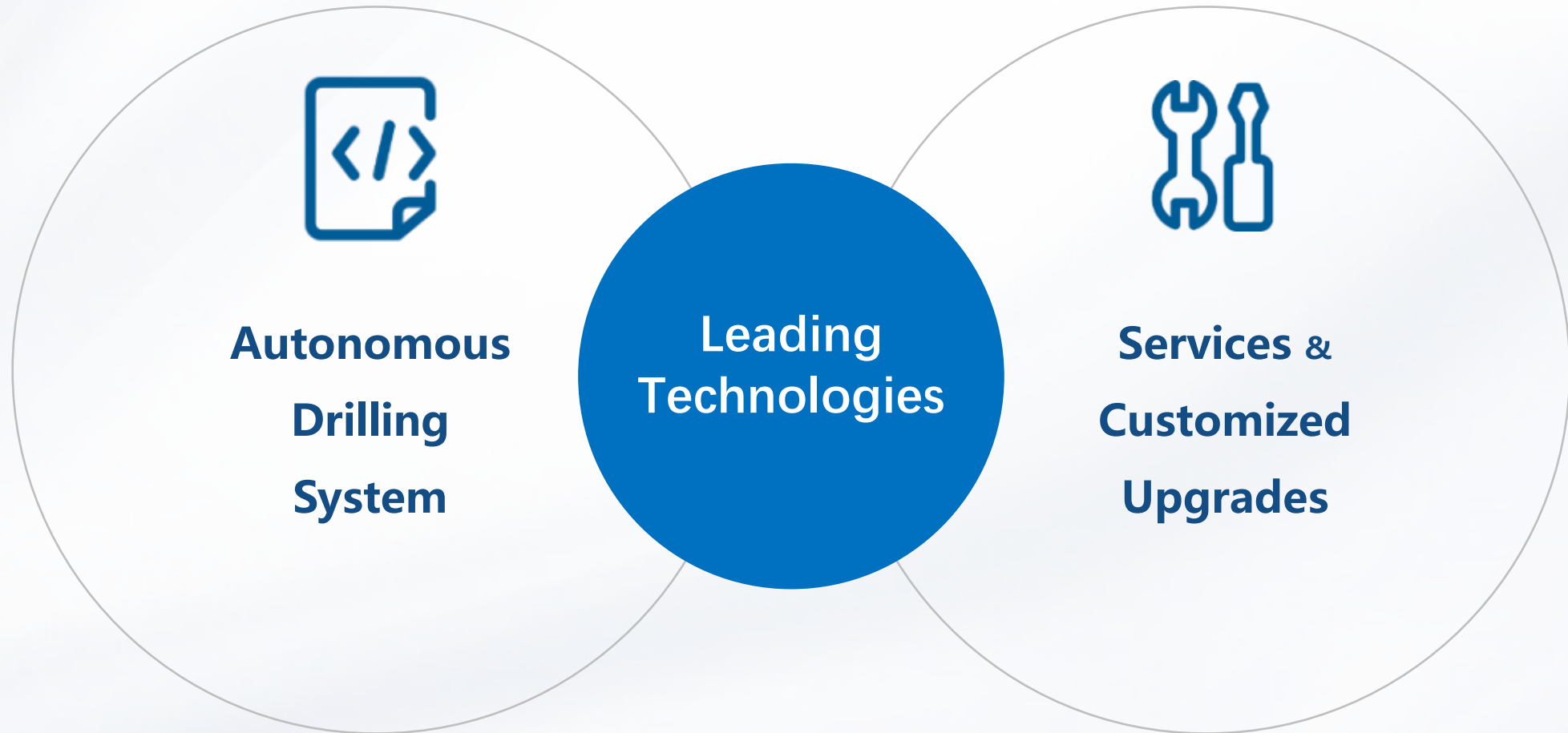
Center of Intelligent Rig Technology



China NOC Shareholders of JJC TEC

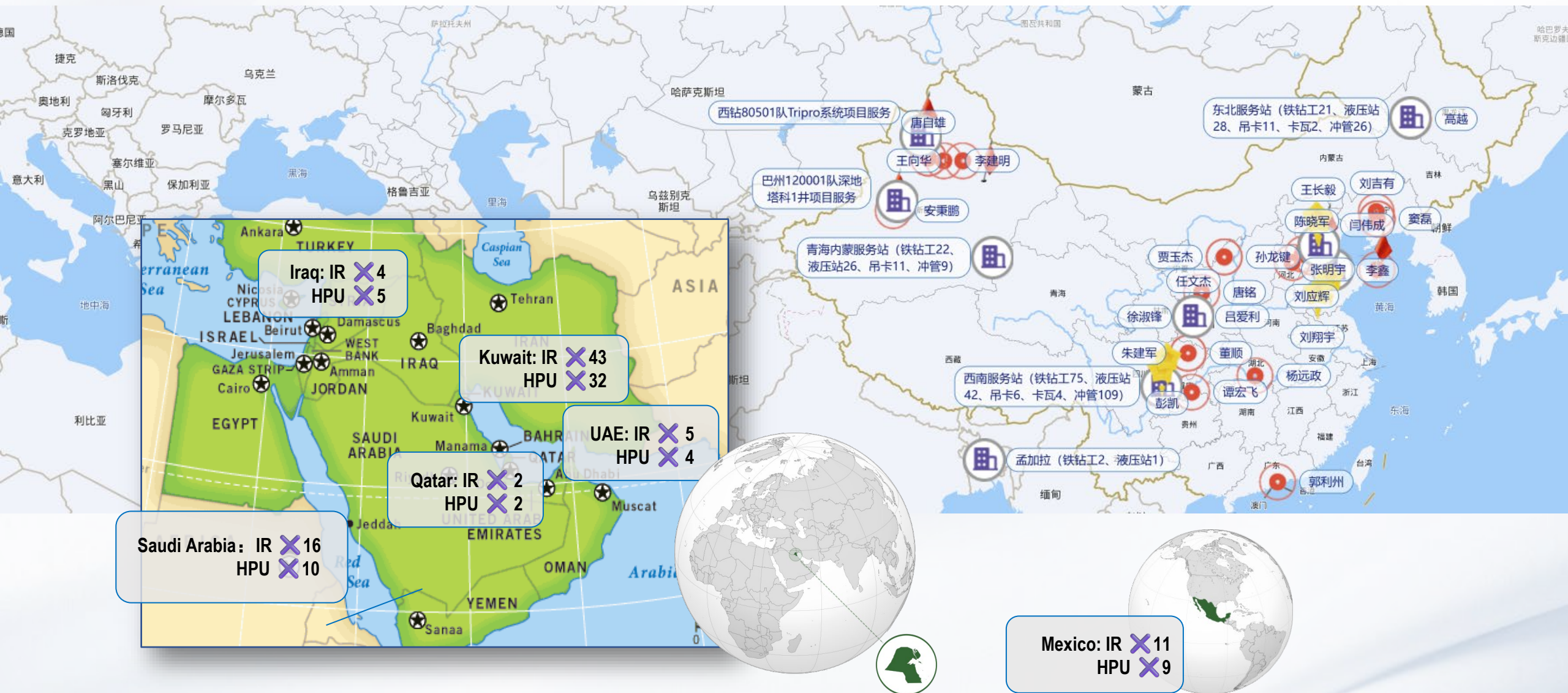


Two Business Segments



Global Footprint

JJC TEC

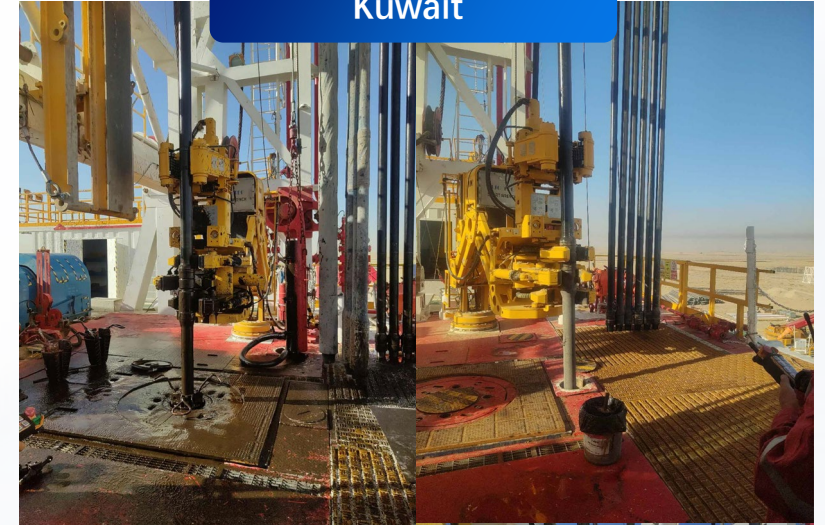


Global footprint - Middle East

Saudi Arabia



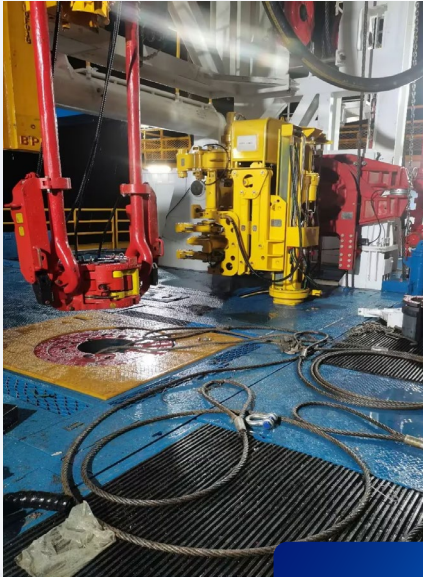
Kuwait



UAE



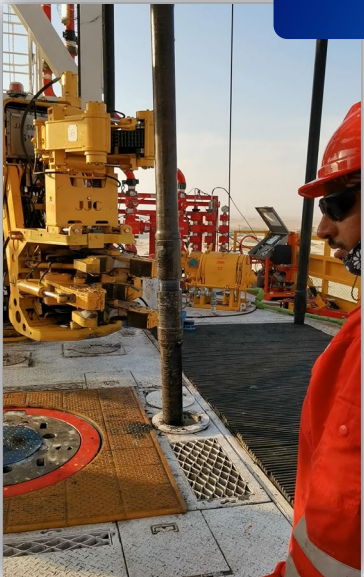
Global footprint - Other regions



Russia



Mexico



Rosneft-No.1 Drilling Engineering
Management Bureau



Kuwait Footprint

- BHDC-39
- BHDC-40
- BHDC-63
- BHDC-64
- BHDC-65
- BHDC-66
- KDC49
- KDC53
- KDC54
- KDC62
- SLB803
- SLB804
- SP8
- SP9
- SP15
- SP17
- SP18
- SP19
- SP20
- SP21
- SP137
- SP175
- SP278
- SP279
- SP280
- SP281
- SP282
- SP283
- SP284
- SP285
- SP288
- GW111
- GW171
- GW172
- GW359
- GW360
- GW361
- GW362
- GW909
- GW910
- GW912
- GW913



- Oriental Phoenix
- Oriental Dragon

Global Service Support



KDC@Kuwait



KDC@Kuwait



ADC@KSA



ADNOC@UAE



Sinopec@KSA



Sinopec@KSA

Commendatory Letter

Beijing JJC Technology Co., Ltd.:

Your company provided stable and reliable equipment of iron roughneck, namely SW10-D1 to the GW198 rig, which is working in Abu Dhabi. The service engineer, Yang Jiong had exquisite skill, delivered high quality service, and actively contributed to our safe and efficient drilling operation.

Hereby, we express our gratitude to JJC TEC and award praise to Engineer Yang Jiong. We look forward to the excellent performance of the equipment and engineers in the coming wells.

We hope we can achieve mutual benefit and win-win results in the ongoing cooperation.

DSV ADNOC:
Date:
Issam Alskan
ADNOC
29-12-2023

AI Robotic Rig Proposal by JJC TEC

An A.I.-driven,



safe & efficient,



practical,



cost-effective,



intelligent rig solution



To Build Next Generation of Intelligent Rig Fleet

Speed up



A collection of 3D models of industrial equipment, including cranes, robotic arms, and structural frames. The models are rendered in various colors like yellow, red, and blue, and are set against a plain white background. The equipment includes a large yellow crane, a red robotic arm, a blue structural frame, and several other industrial components.

SYSTEM HIGHLIGHTS

Robotics



A.I. Empower



Digital Twin

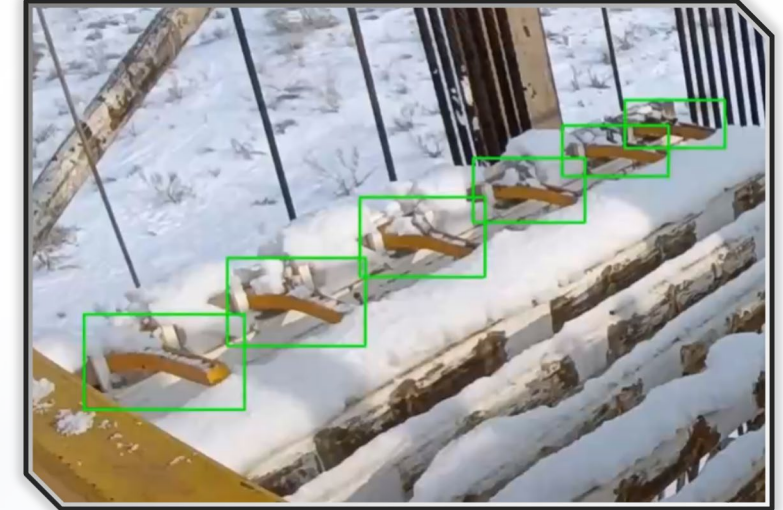
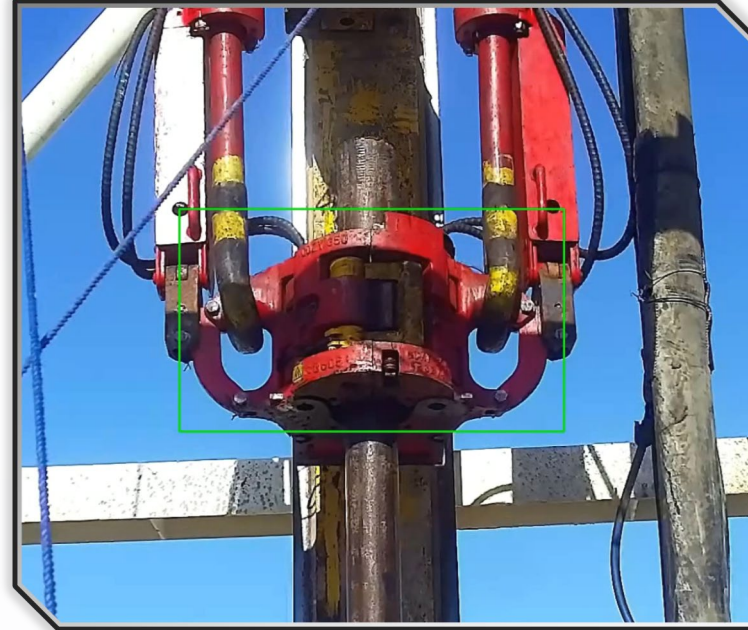
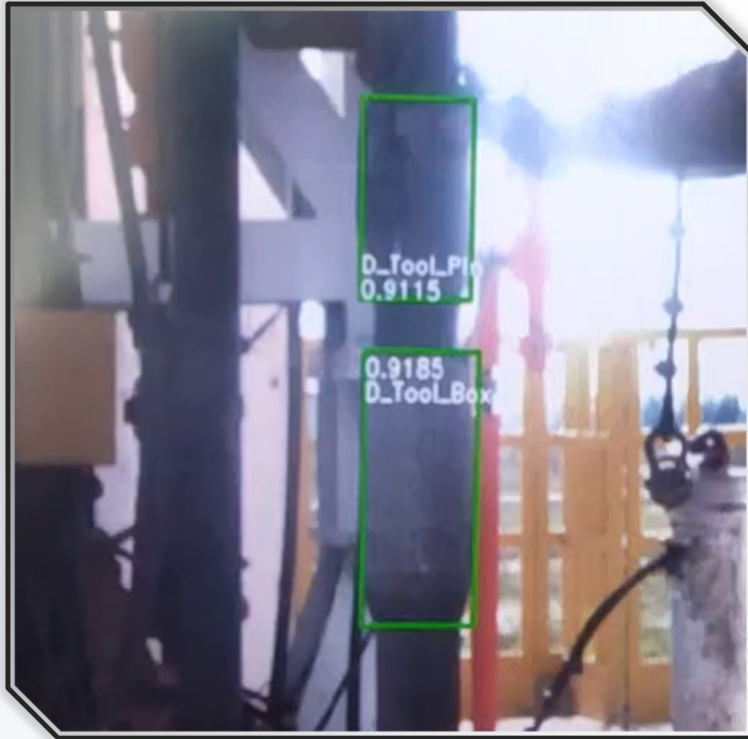


AI Technology Empowered

JJC TEC

The Tripro® Intelligent Drilling System extensively applies AI technologies, including industry-leading computer vision technology and LiDAR technology, to achieve unmanned operations on the drilling platform, significantly enhancing operational efficiency while reducing operational risks.





A.I. vision as primary method
Operator can step in anytime

A.I. vision-based method

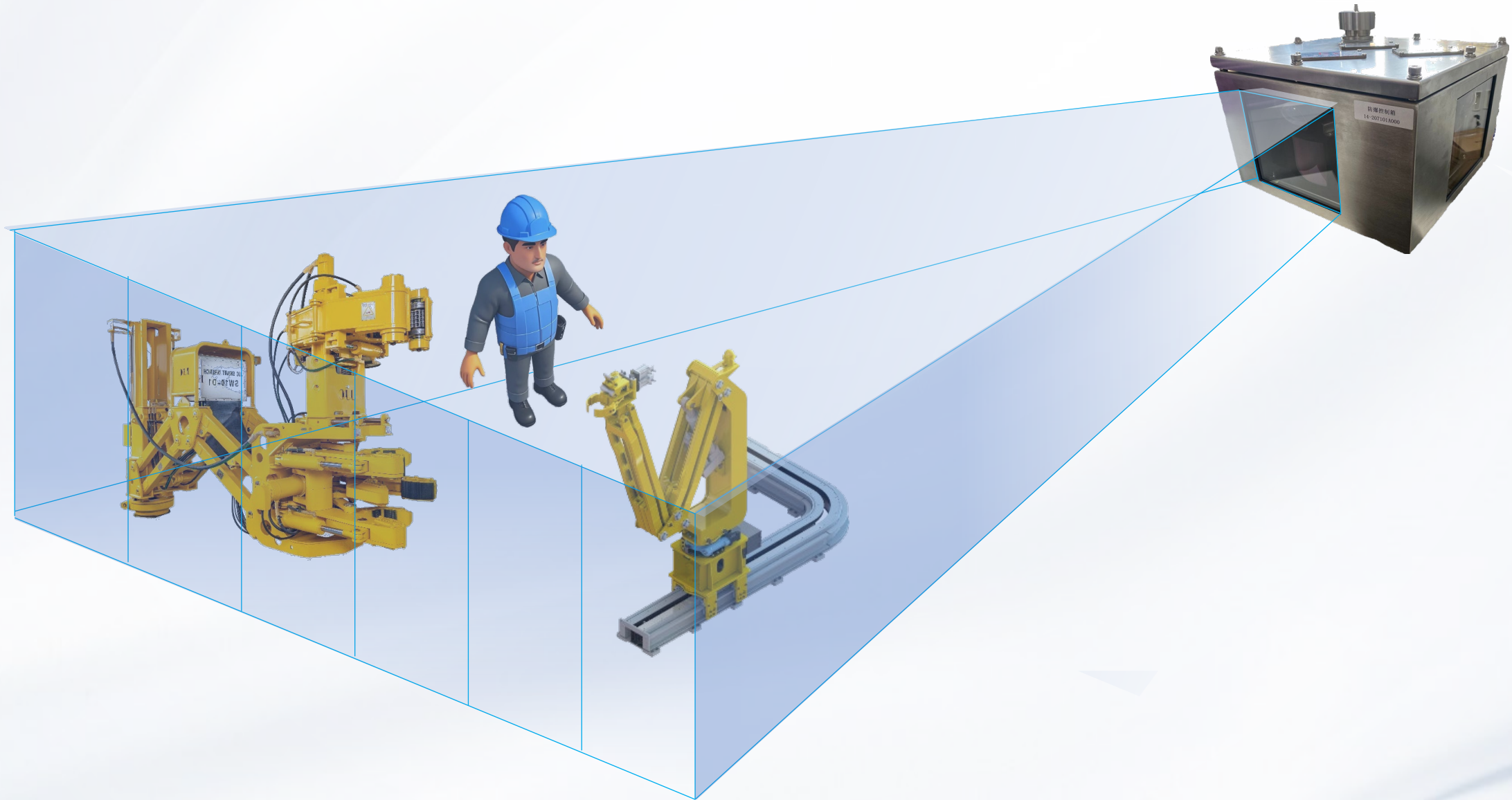
+

Sensor-based method

In addition to the traditional sensor-based system, we developed an AI vision-based system, which adopts a completely different technical approach, featuring an entirely independent feedback mechanism.

System's **redundancy** and **reliability** is greatly enhanced.

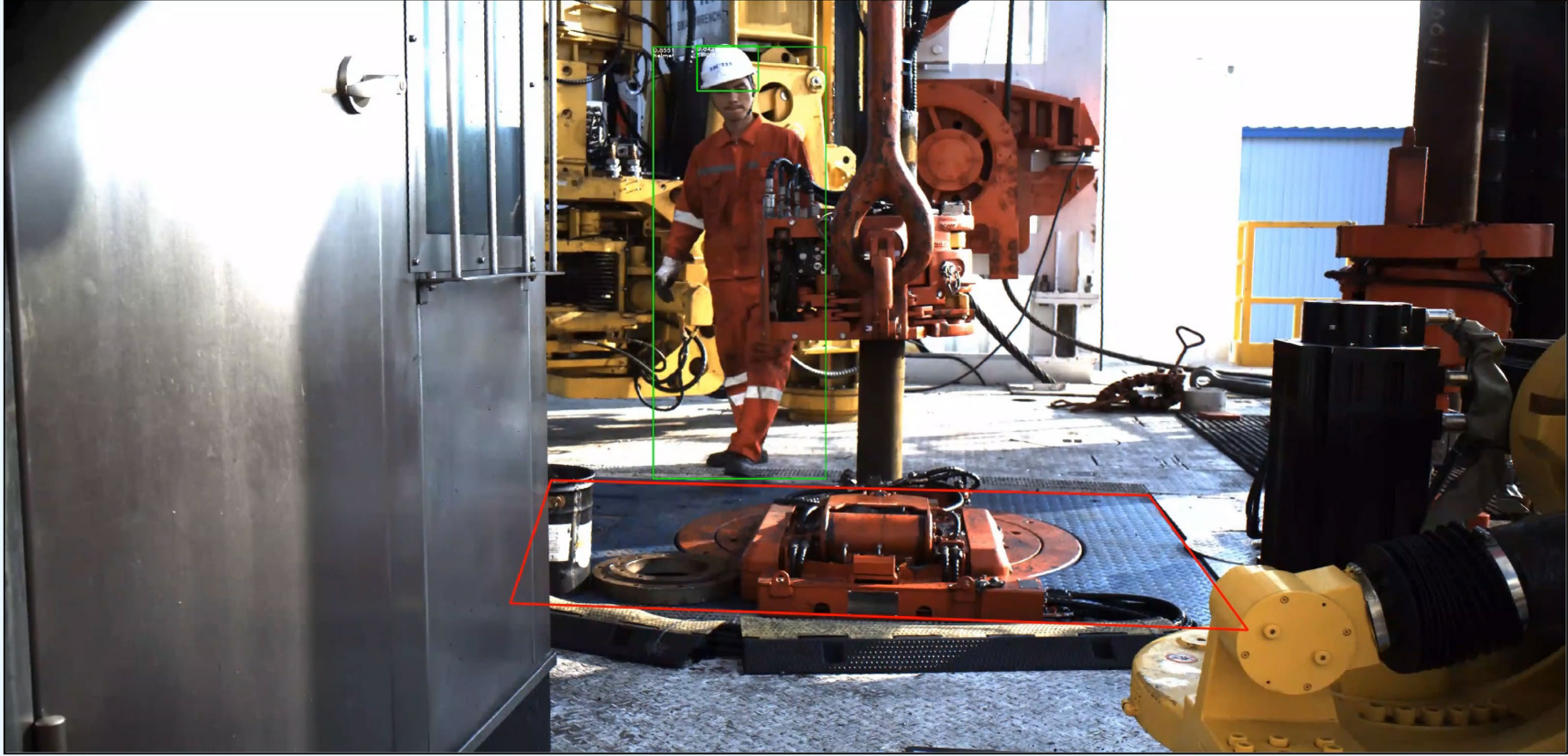
A.I.-based Zone Management System



Machine Vision based on AI algorithm

Artificial Intelligence Vision System<Local Mode>

Intelligent Drilling Safe Drilling Settings



Detection Calib Setting Factory Settings

Detection Items

- ☒ Red Zone Intrusion
- ☐ Safety Helmet

Prompt Mode:

- ☒ Voice: Minimum Interval (Seconds) 5
- ☒ Capture: Minimum Interval (Seconds) 5
- ☐ Email: Minimum Interval (Minutes) 30

Save settings

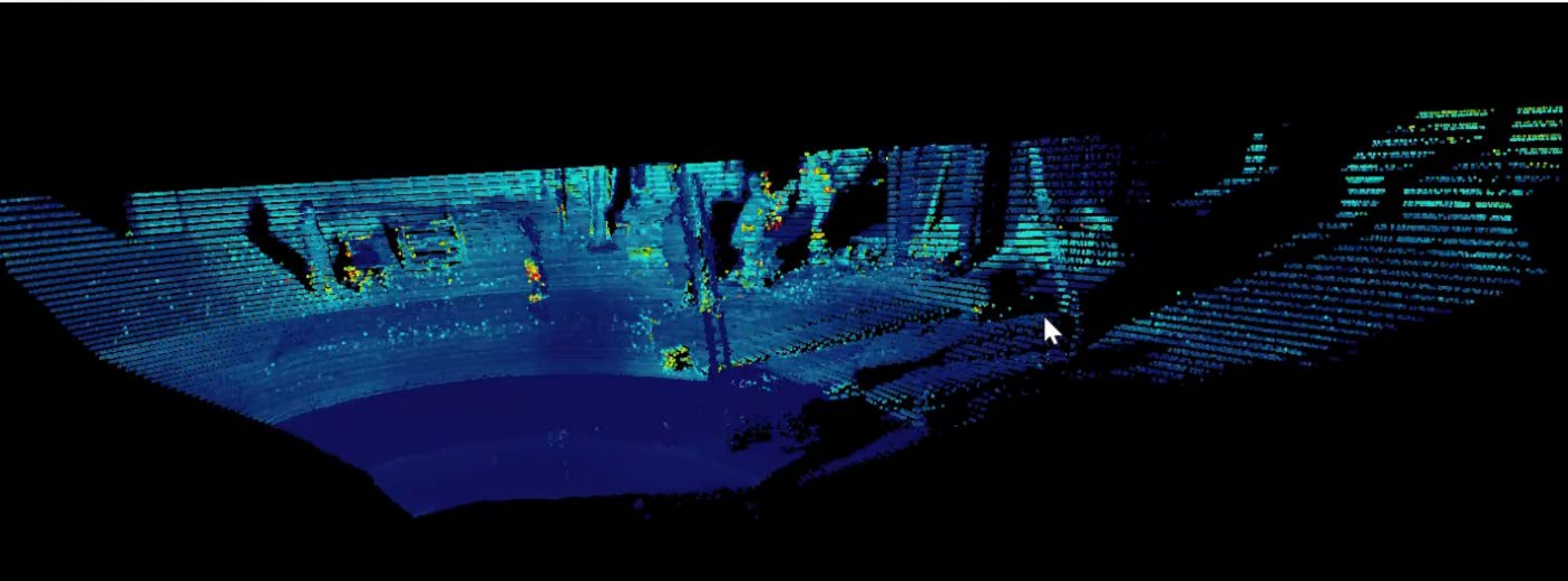
illegal capture



Detecting ☒ Show red zone

Light Detection and Ranging (LiDAR)

LiDAR offers objects' exact 3D locations



Fusion of Machine Vision and LiDAR

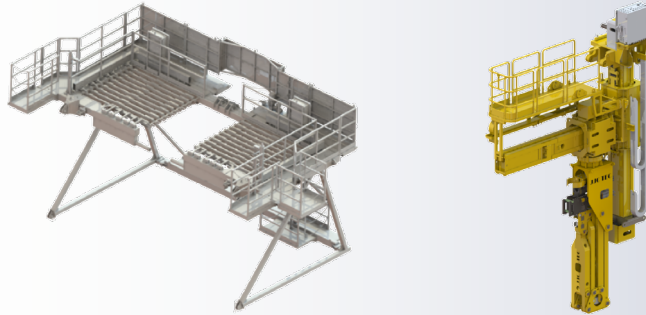
A.I. identify 3D objects from point cloud of LiDAR. Fusion of LiDAR info & machine vision info.

Pinpoint exact locations of staff and equipment.

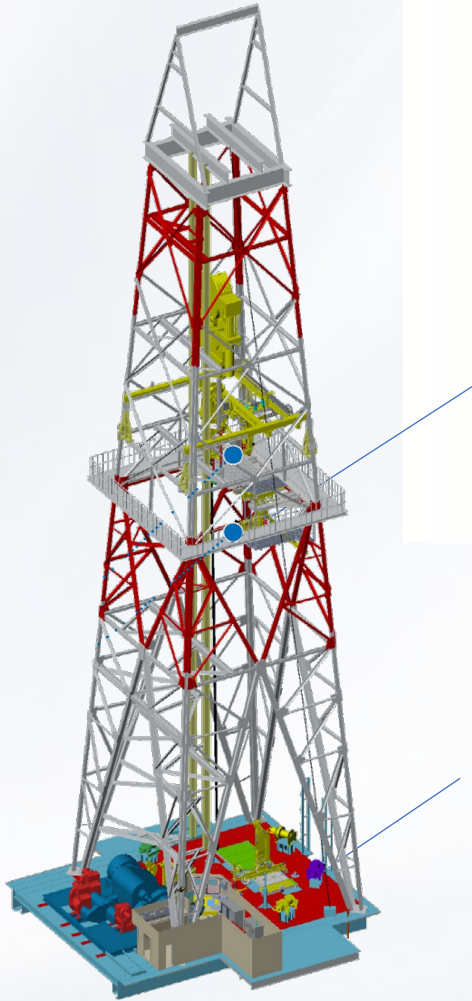
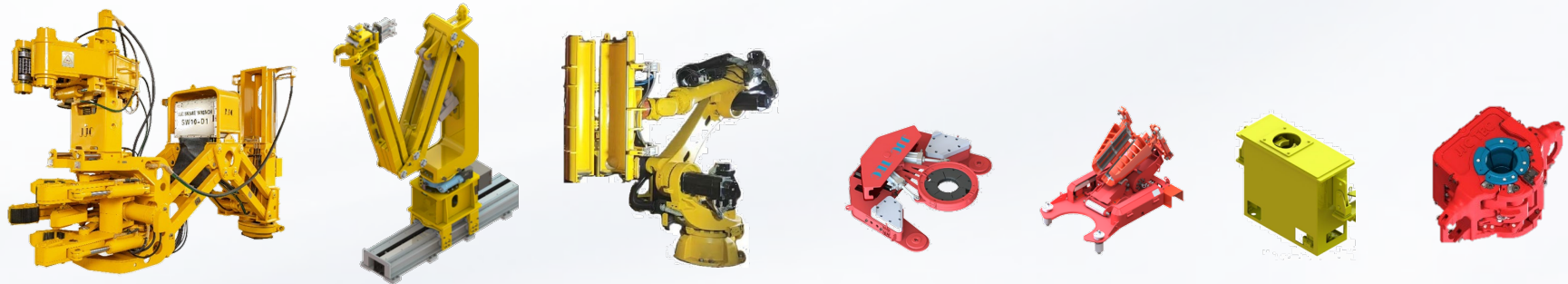


Tailored Robotics Solution

Unmanned monkey board



Unmanned drill floor



Intelligent Iron Roughneck

JJC TEC

Core Competence :

- Core IP has obtained invention patents from U.S./China
- Adaptive to various drill-pipes, w/o changing jaws or dies
- Adaptive clamping force, minimize damage to pipe
- Highly reliable and compact in size

More Over :

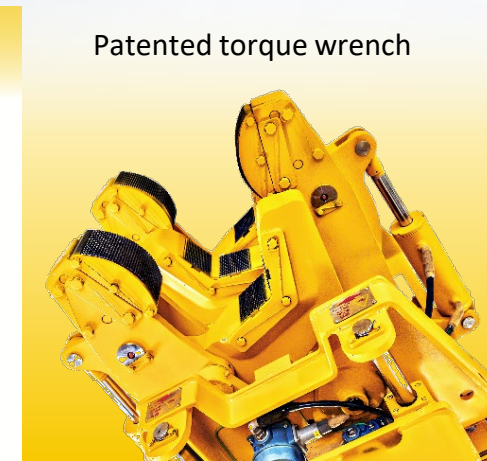
- Complete series of products are suitable for various drilling rigs
- Automatic joint detection by **A.I. machine vision** technology



 US009546526B2	
(12) United States Patent Li et al.	
(54) TORQUE WRENCH APPARATUS AND METHOD FOR MAKING AND BREAKING JOINTS	(10) Patent No.: US 9,546,526 B2 (45) Date of Patent: Jan. 17, 2017
(71) Applicants: Xuejun Li, Beijing (CN); Chen Liu, Beijing (CN); Jie Cai, Beijing (CN)	(56) References Cited U.S. PATENT DOCUMENTS 4,023,449 A * 5/1977 Beynon <i>et al.</i> E21B 19/10 81/57,16 5,080,542 A * 10/1991 Hank E21B 19/163 81/57,16 2003/0172514 A1 * 9/2003 Penman B23P 19/061 29/426.5 2014/0262329 A1 * 9/2014 Fournier E21B 19/161 166/377
(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.	* cited by examiner Primary Examiner—James G Sayre



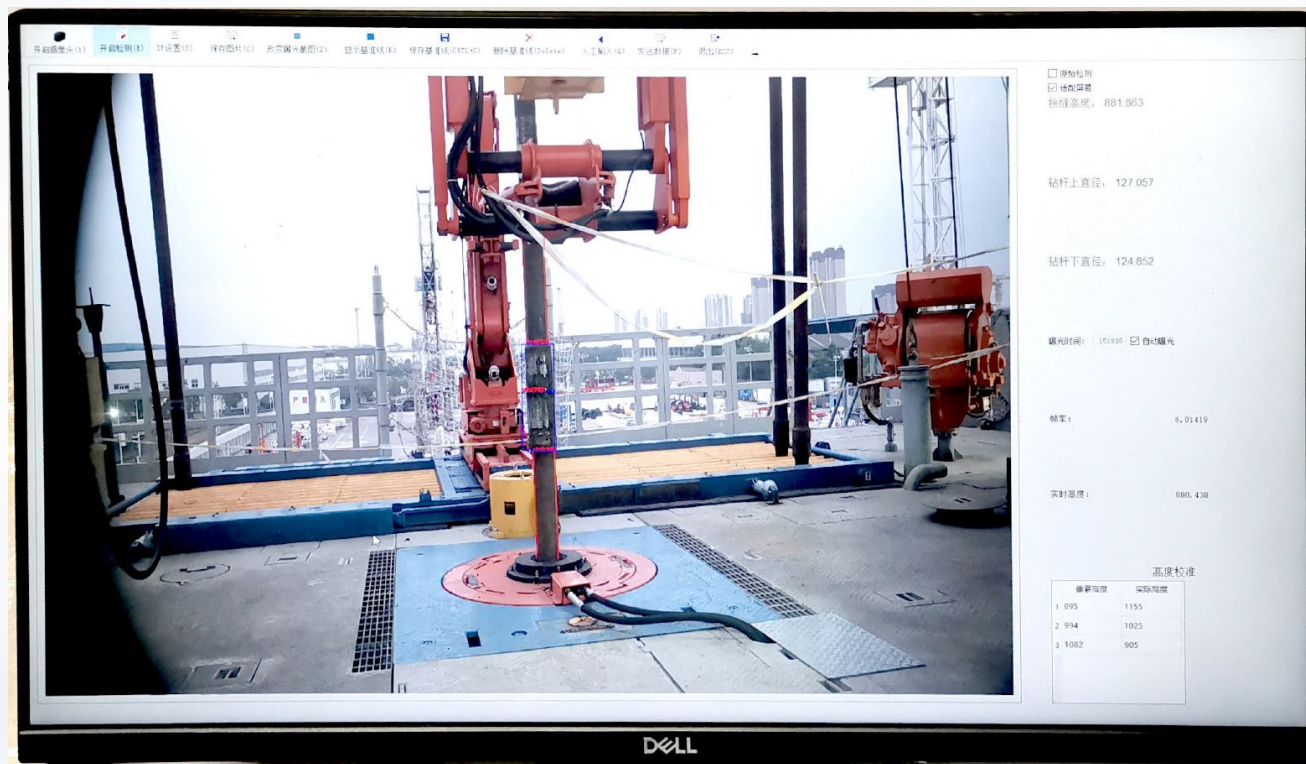
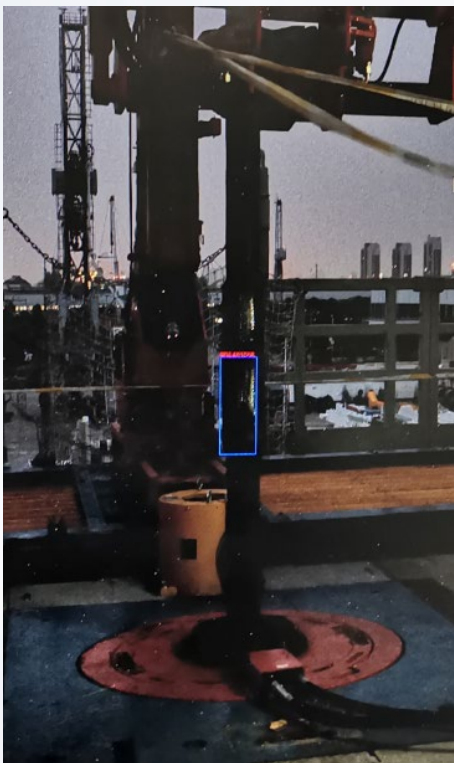
Patented continuous chain spinner

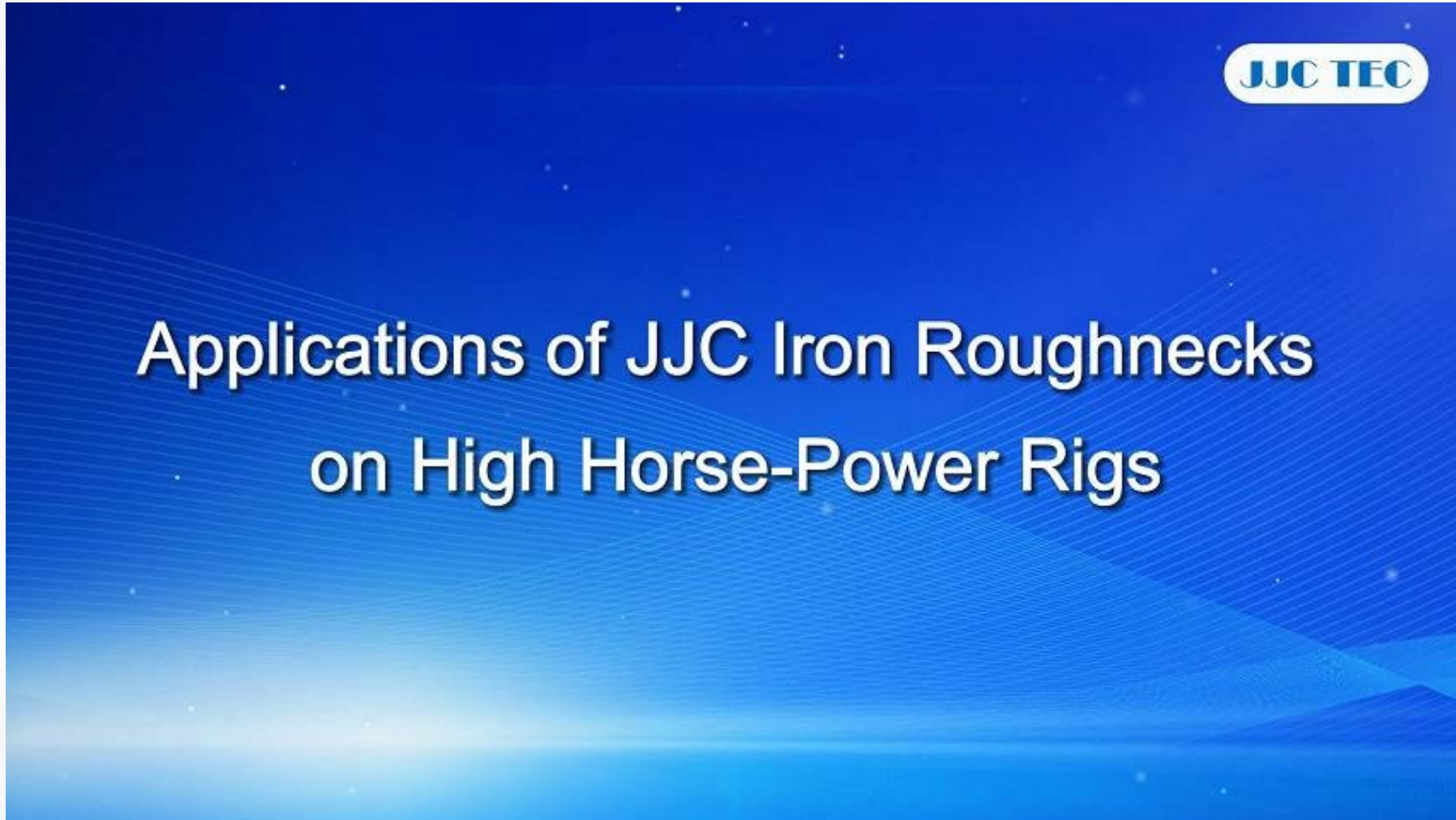


Patented torque wrench

IR based on machine vision

- Accurately and automatically identify tool joint's height
- Minimize human intervention and increase overall efficiency





Application @ Chinese deepest well

JJC Heavy Duty
Iron Roughneck SW16



Key Functions

SW-16 meets toughest onshore drilling challenges:

- equipped on 6,000 HP BOMCO automatic rig
- drilling deepest well in China (ongoing) : ~11,000 m / 36,000 ft planned TVD
- install 22.5" drill bit & 11" collar
- Centralizing pipes

Pure Electrical Pipe Handling Robotic Arms



Pure electric driven

Avoid hydraulic parts

Servo system controlled

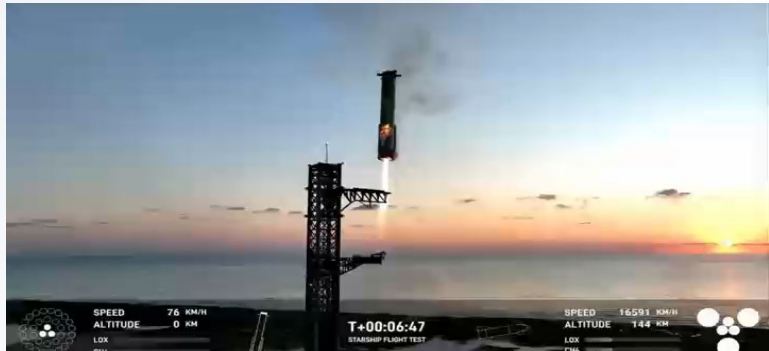
High efficiency

High precision

High stability

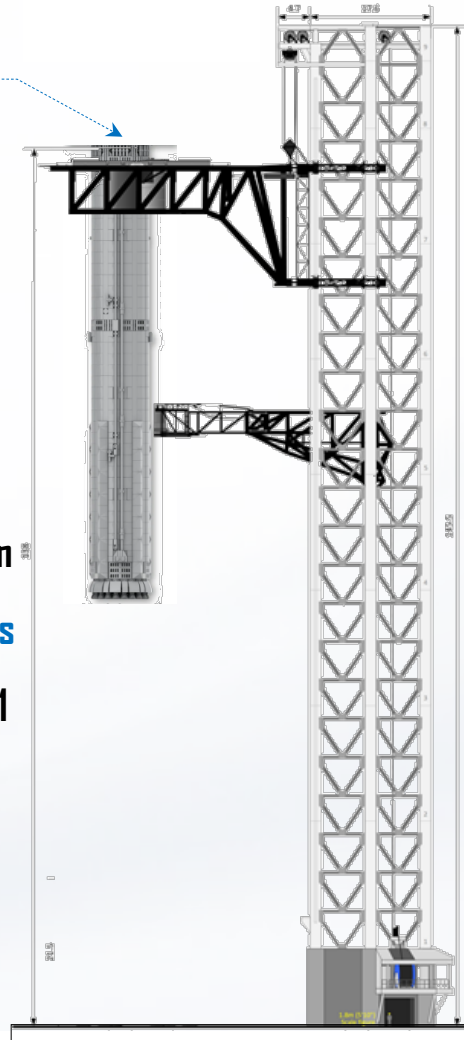
Immune to ambient temperature

First Principle: Separated Robotic Arms & Top-grip Approach



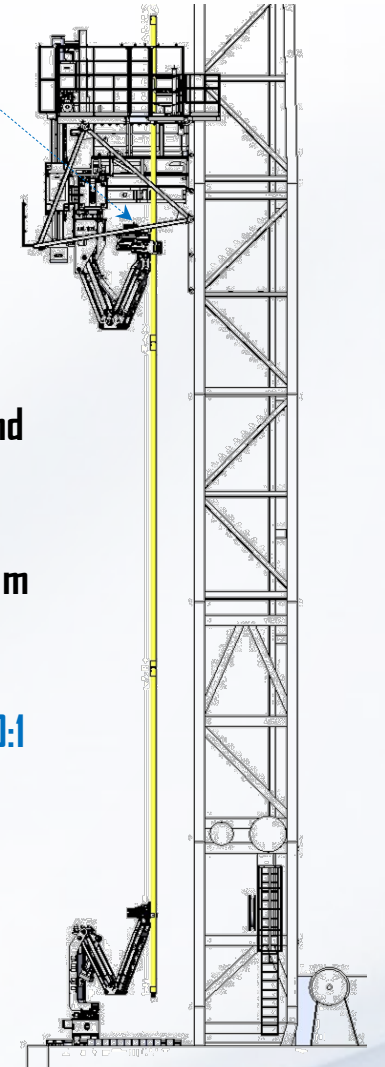
Grip Point

Super Heavy
Length ~69 m
Diameter ~9 m
Mass: 200 tons
L/D Ratio ~ 8:1

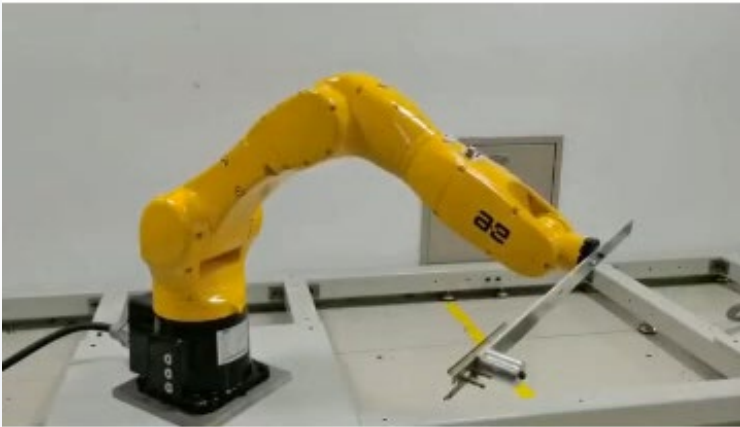


Grip Point

5 1/2" Triple Stand
Length ~28.5 m
Diameter ~0.14 m
Mass: 1.0 ton
L/D Ratio ~ 200:1



Advanced Motion Control Algorithms



Hydraulic Elevator

JJC TEC



JJC TEC hydraulic elevators
working in tough conditions

Technical Advantage

Less Top Drive Oil Pass Occupied ●

No demand for modification, time and cost saving

Load Feedback ●

No jumper cable, allows 360° rotate, "One-button" operation

Larger Opening & Closing Torque ●

Bearing harsh environment, reliable

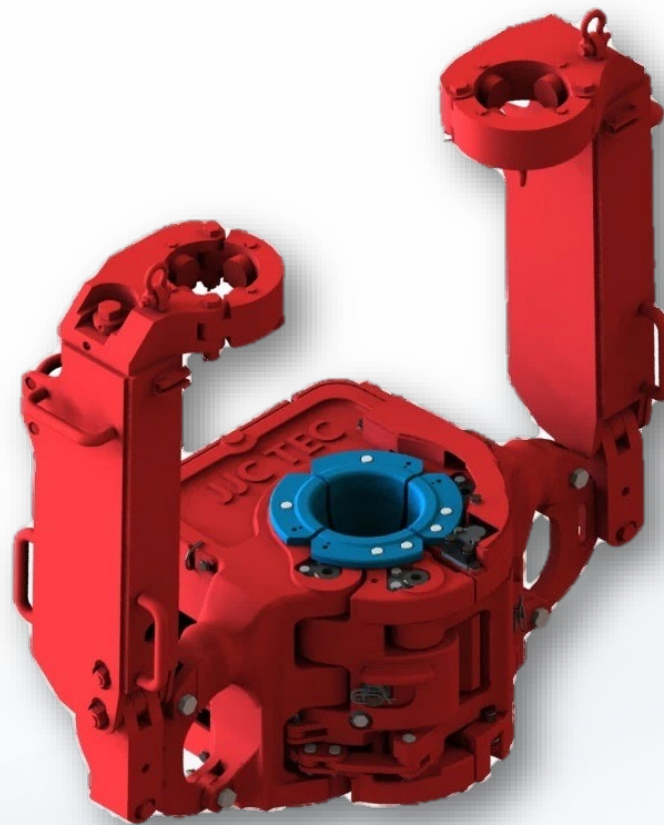
Innovative Linkage mechanism ●

Prolongs service life

Easy install and maintain

● PLC Control

Simplified interface for on-site installation and fault diagnosis



Safety design

● Quadruple Safeguard: Mechanical, Hydraulic, and Electrical

Never open when loading, reliable

● Over API safety standard

High performance steel, for low-temp environment; Load test results exceeds API 8C standard

● Using One-way Valve

Decrease environmental influence, reliable

01 Does not get stuck

- **Innovative double conical surface**

Larger load area, more reliable

- **Folio Body Design**

Hard to deform, easy to remove

02 Minimize Damage

- **Four-petal slips**

Four slips individual lifting and sitting, force even distribute, safe and reliable

- **Self-adaptive Jaw**

Jaws self-adaptive to max. clamp area angle, force even distribute



HPS-A1

03 Anti-torque

- **Double Dovetail Anti-torque**

Effective anti-torque functions

Other functions

- **Pipe Centering function**

Unaffected by wellhead deflection

- **Real-time feedback**

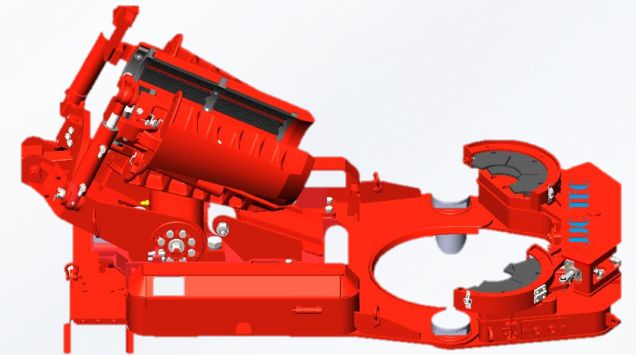
Accurate signal feed back to support on-site work

- **Auto lubrication**

Configured standard lubrication pump automatically lubricates based on usage frequency

Technical Specifications	NOV (PS-21)	JJC (HPS-A1)
Rotary Table	ZP375	ZP375
Max. Passageway (Teeth disabled)	450mm	480mm
Pipe Range	2-3/8" -14"	2-3/8" -14"
Max. Load	3,150kN	4,500kN
Max. Anti-Torque	Not Available	50,000 N•m
Hydraulic Power	16MPa 40L/min	16MPa 40L/min
Carrying Area	90,000 mm ²	140,000 mm ²
Jaw	Ordinary trapezoidal jaws	Self-adaptive jaws
Interlock	Separate programing required	Standard

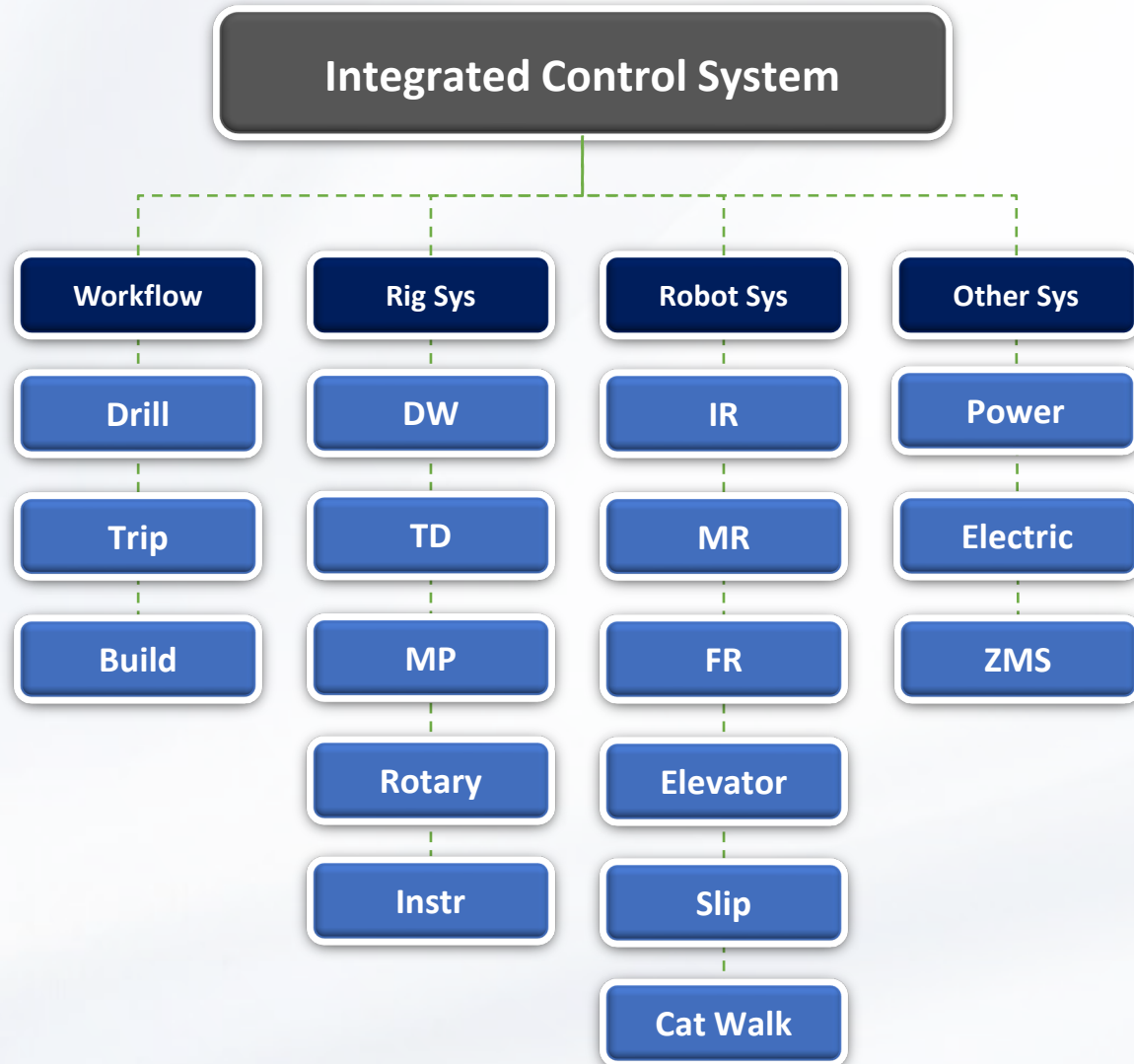
Power slip & Mud crab



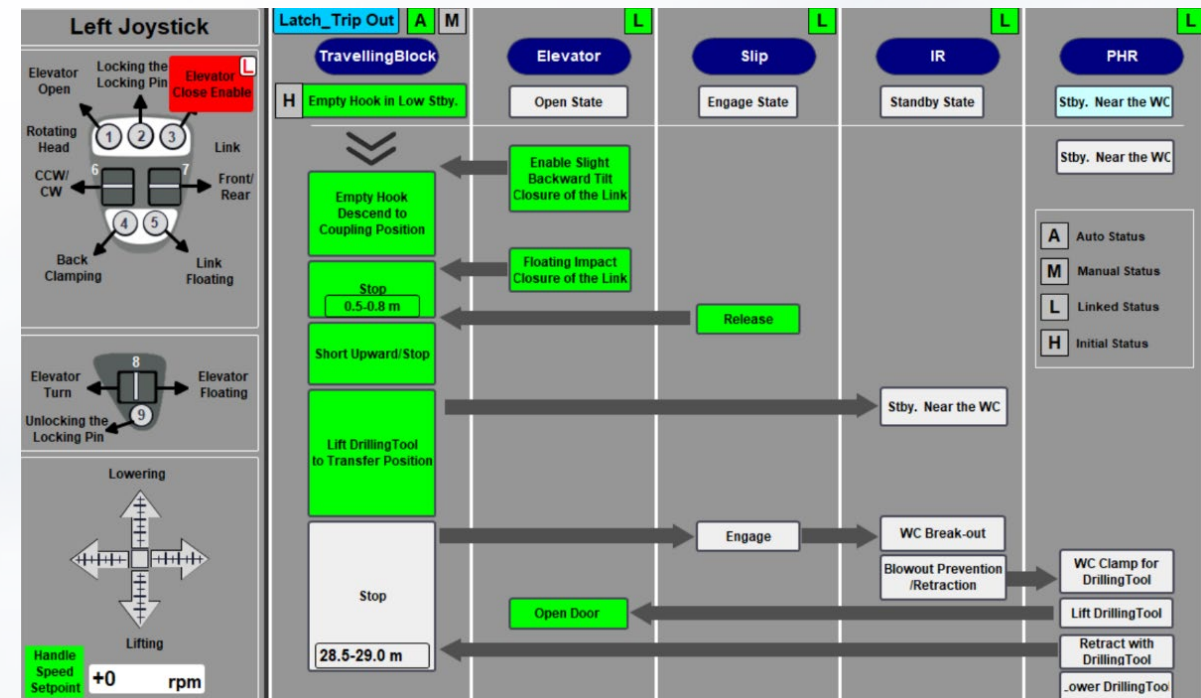
Multi-functional Drill Floor Robot



Integrated Control System - One-click Operation



- One system for all
- Intuitive design and workflow driven

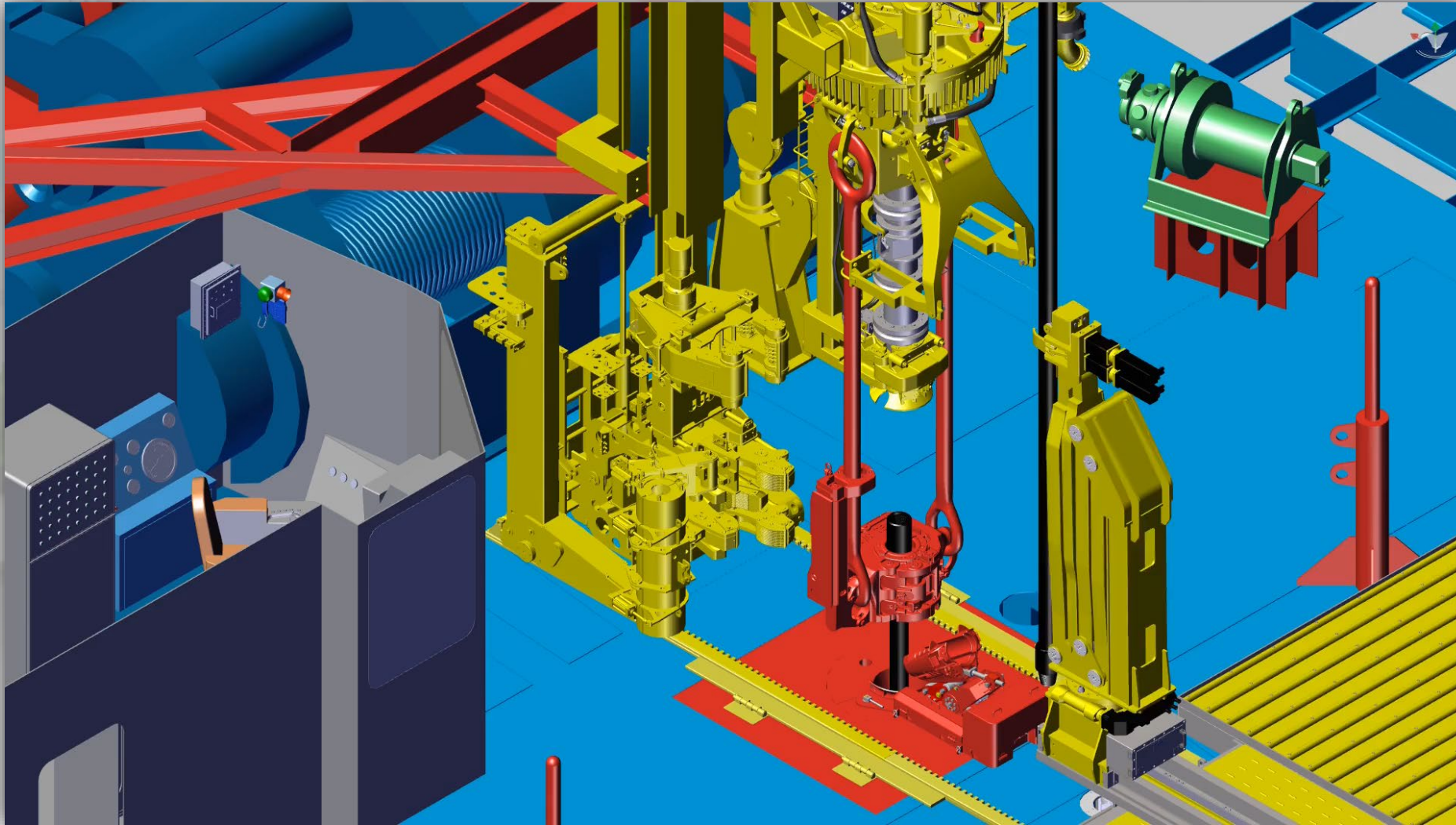


Virtual Reality & Digital Twin

JJC TEC

Digital Twin of Drilling Rig and Workflow

JJC TEC

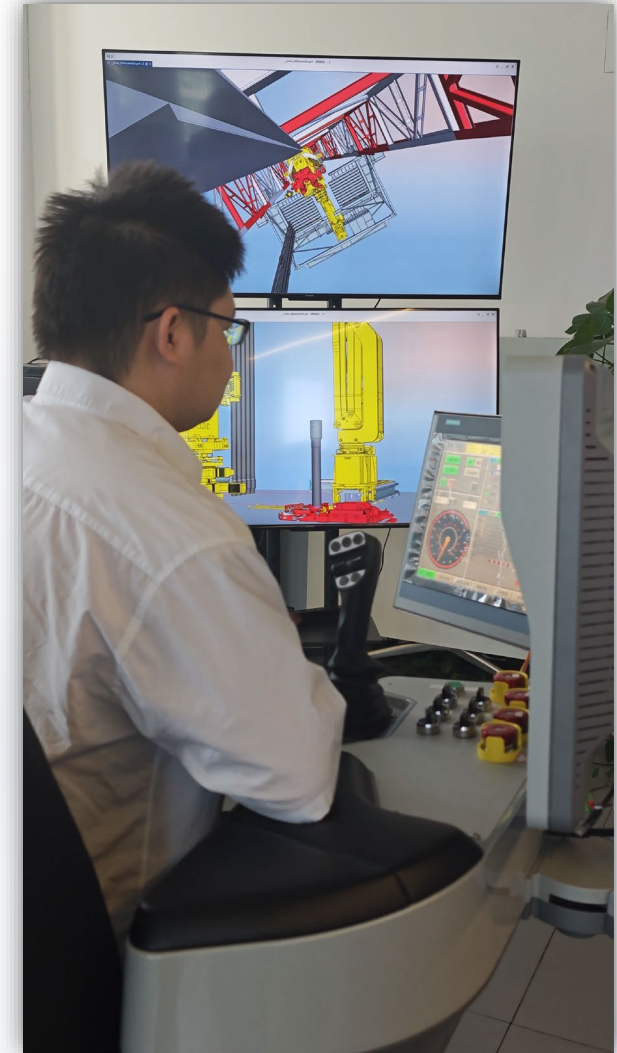


Virtual Training

Virtual
Commissioning

Interact with
Reality

Interactive Virtual Reality Platform



Remote Intelligent O&M System

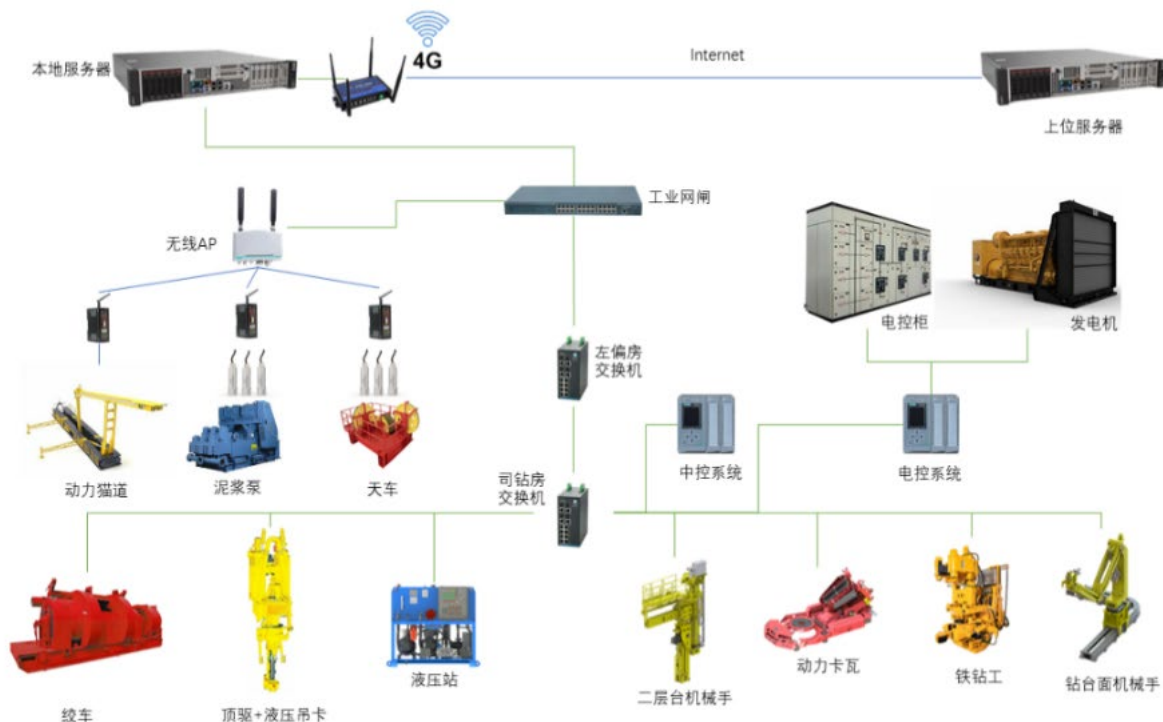


Major Functions:

- Real-time surveillance
- Fault warning and diagnosis
- Preventative maintenance

Benefits:

- Reduce downtime
- Reduce cost of ownership
- Improve operational efficiency





Safety

Unmanned Operation

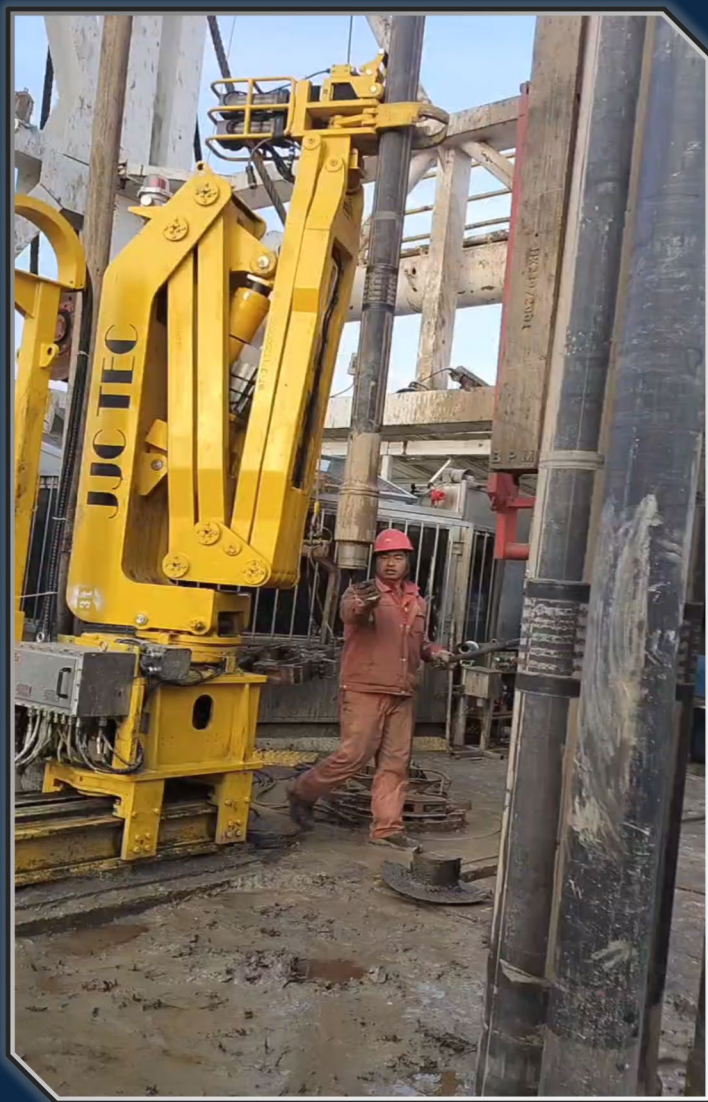
AI Protection



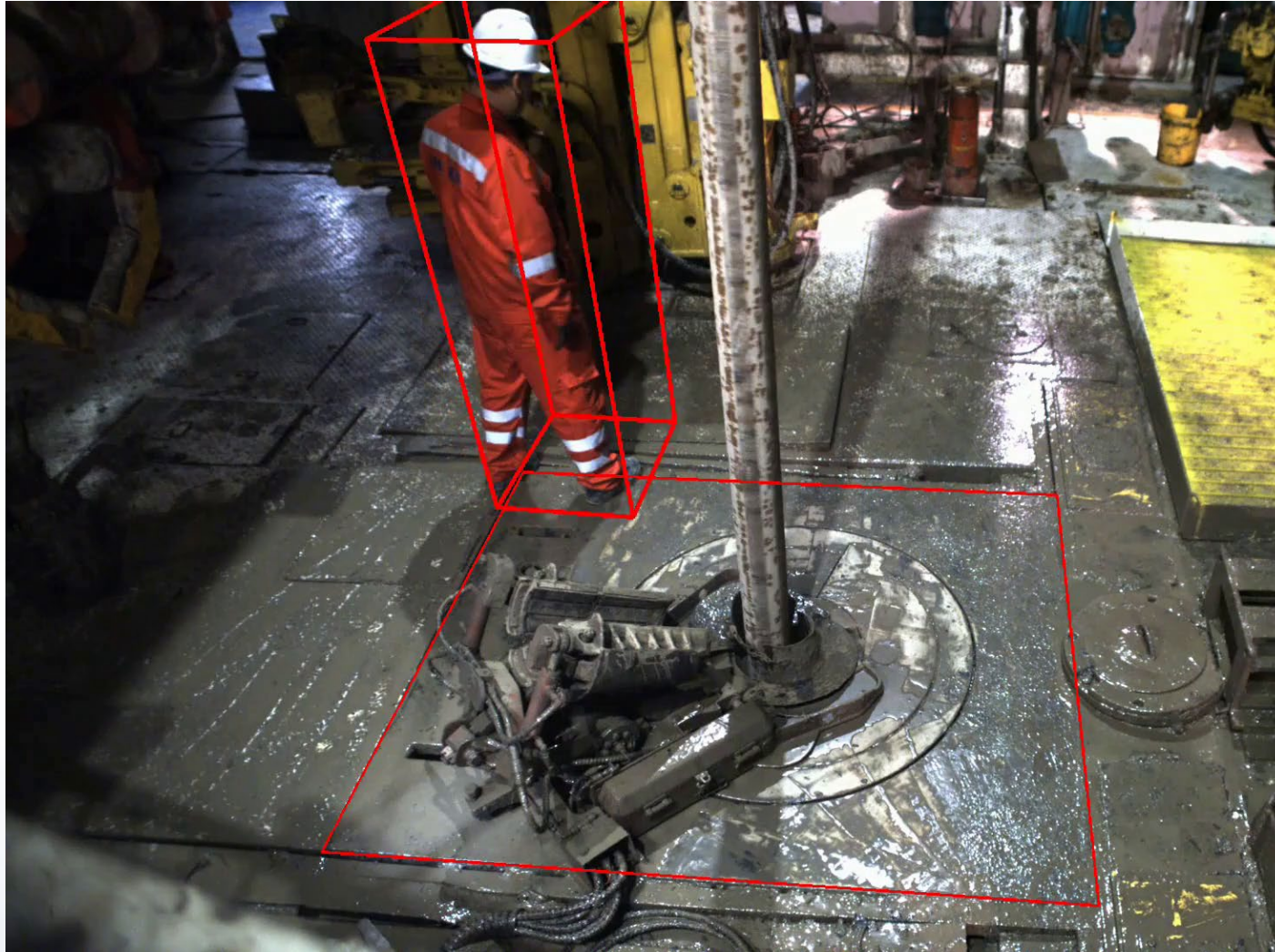






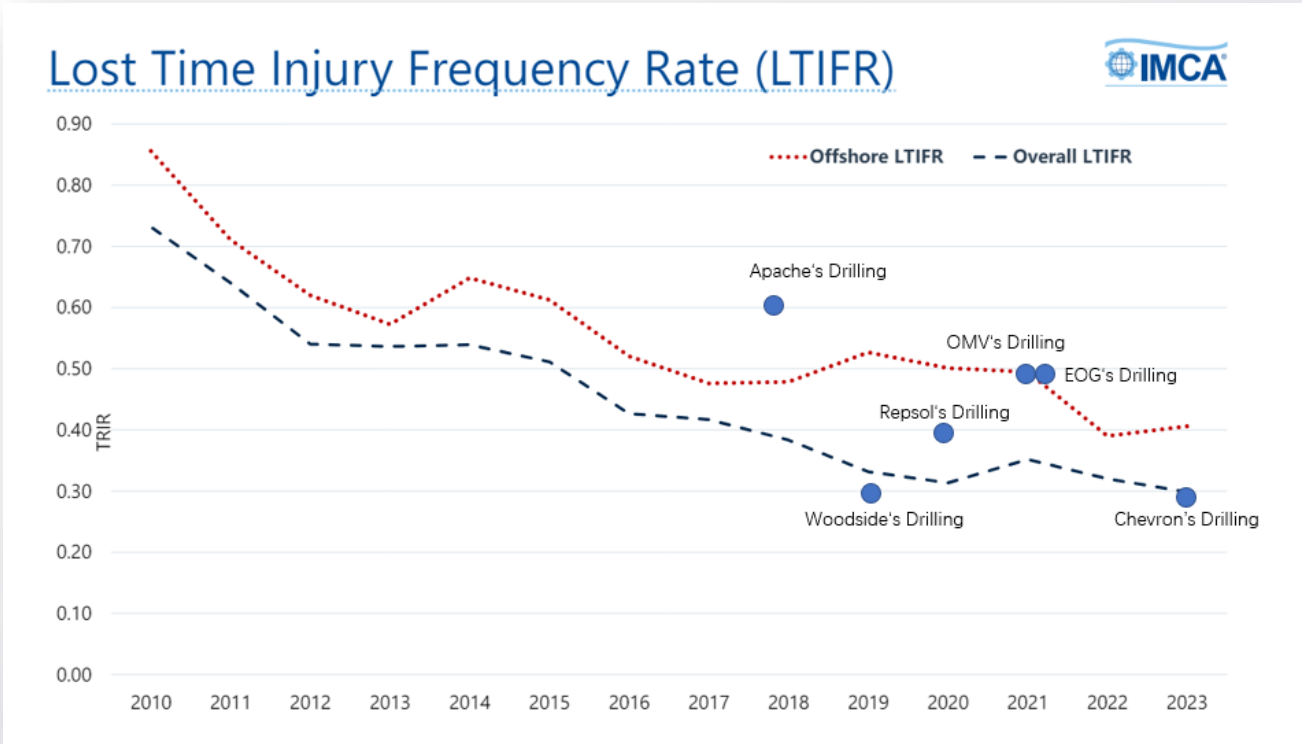
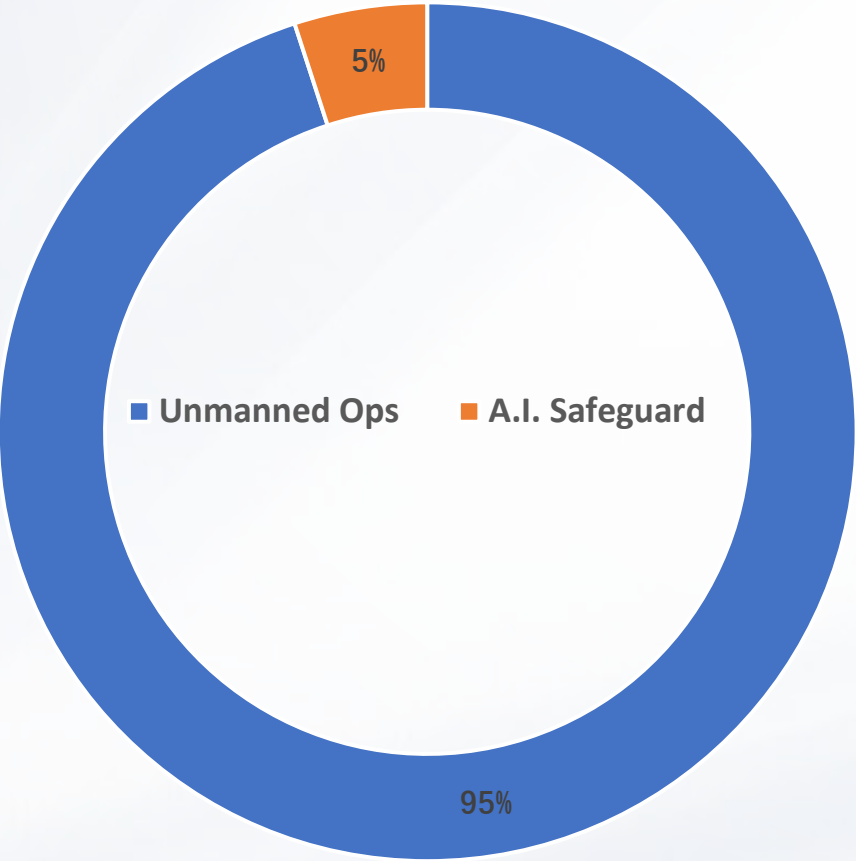


AI-based Proactive 3D Safeguard System



Tested under strict supervision and protection

Risk Exposure Elimination



Safety

Efficiency

Practicality

10x play



23~30 stands/h

JJC TEC

1 Premium Robots



2 A.I. Empower



3 First Principle



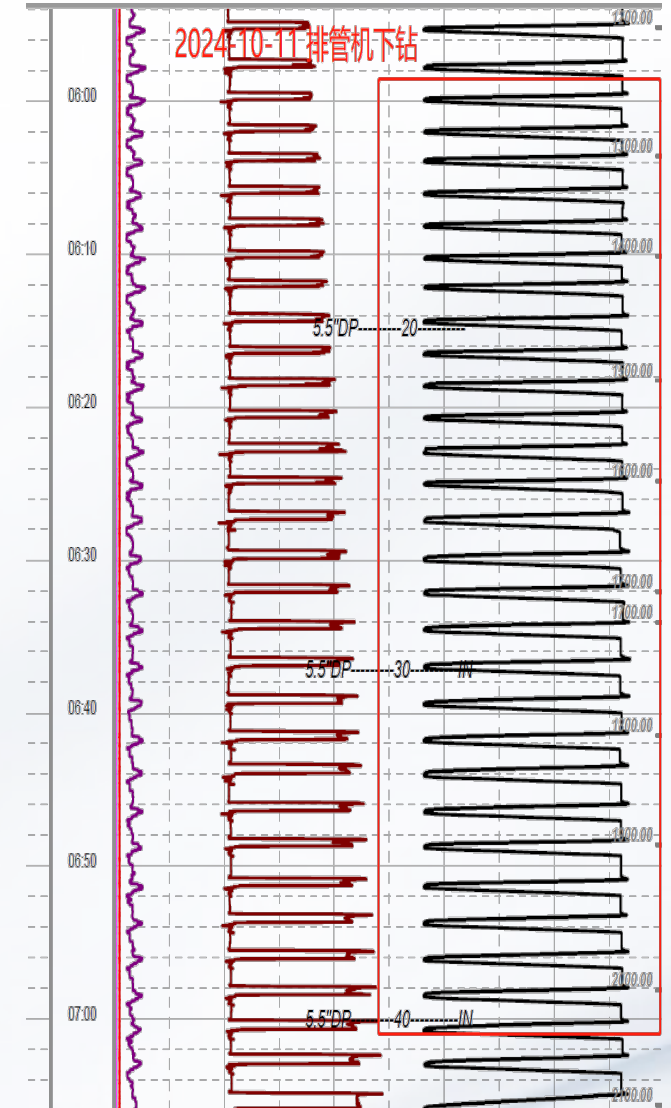
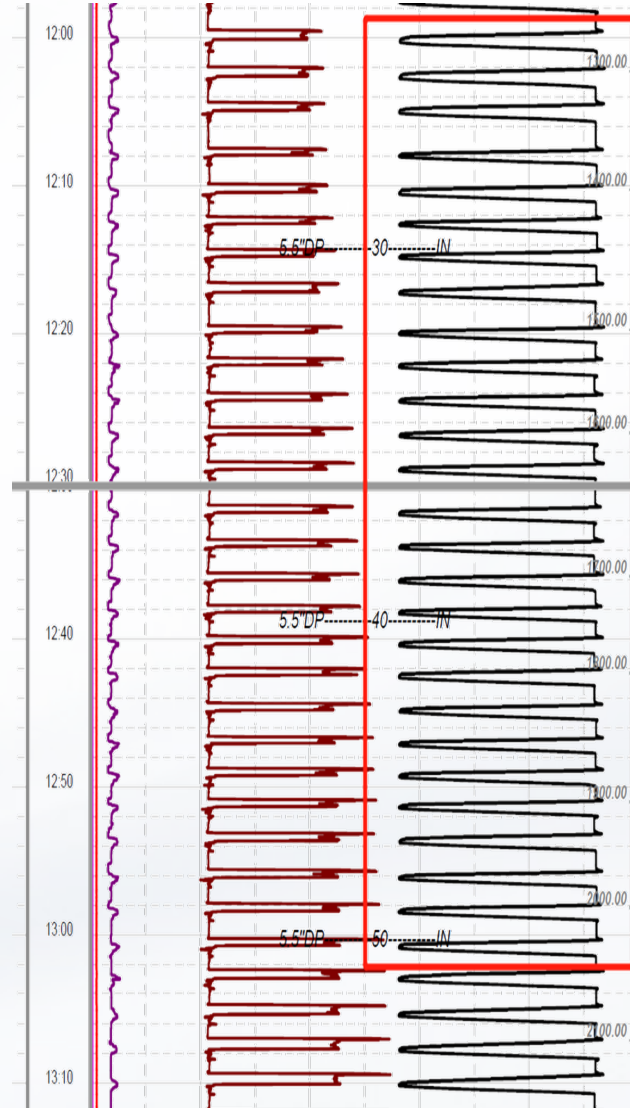
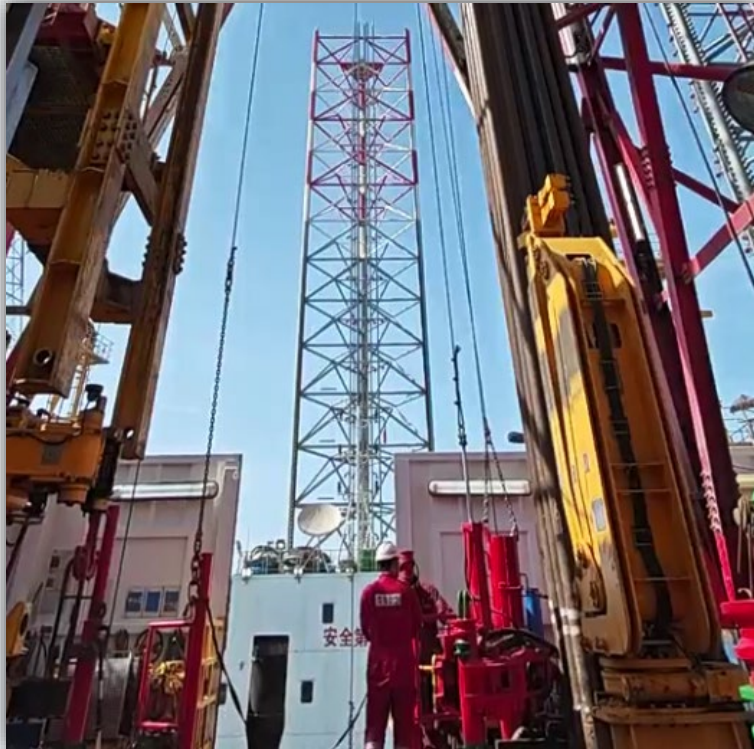
4 Motion Ctrl



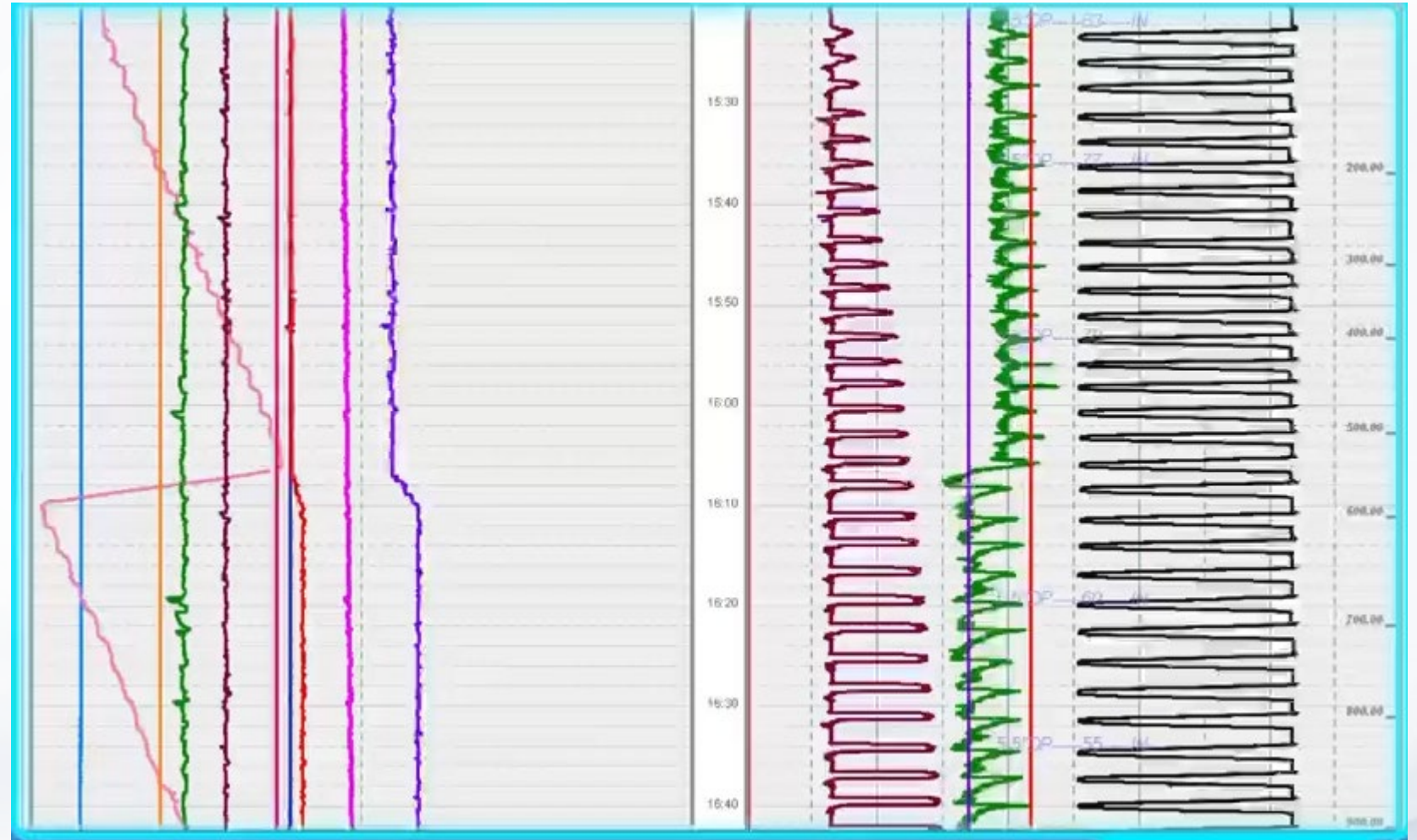
5 Operating System



Application on COSL-922 Jackup



Application on COSL-924



Simultaneous big improvements in both safety and efficiency



Unmanned operations, risk exposure reduced 95+ %



Tripping efficiency up 50%~100%

Efficiency

Safety

Practicality

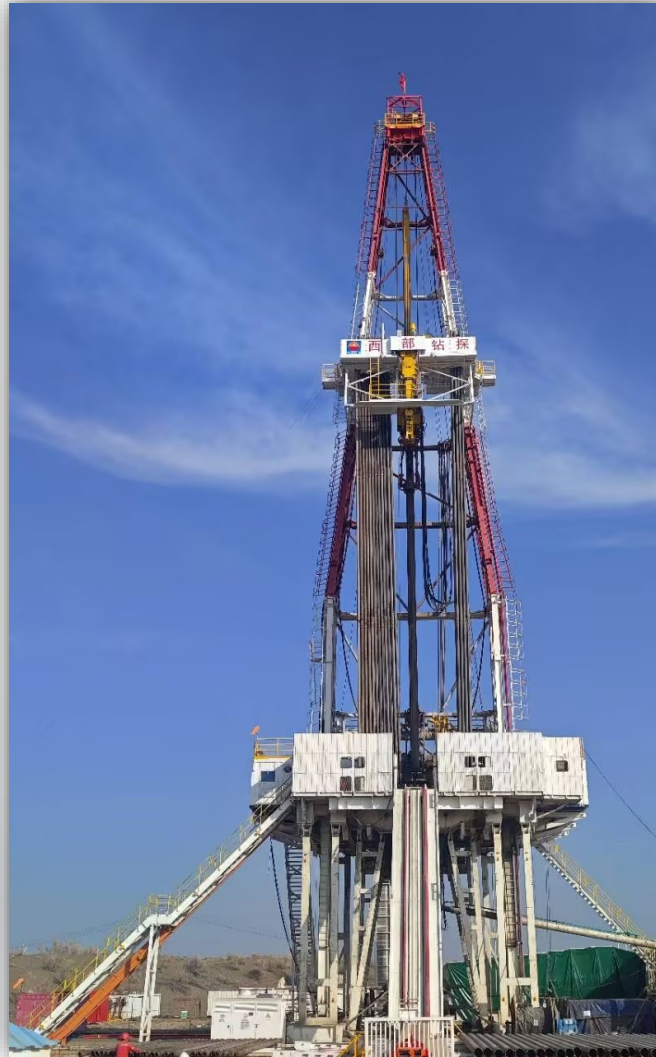


Land Rigs Upgrades

Triprio @ XD 70202 Rig



Triprio @ XD 80501 Rig



Triprio @ ZPEB 70738 Rig (Tibet highland)



Land Rigs Upgrades

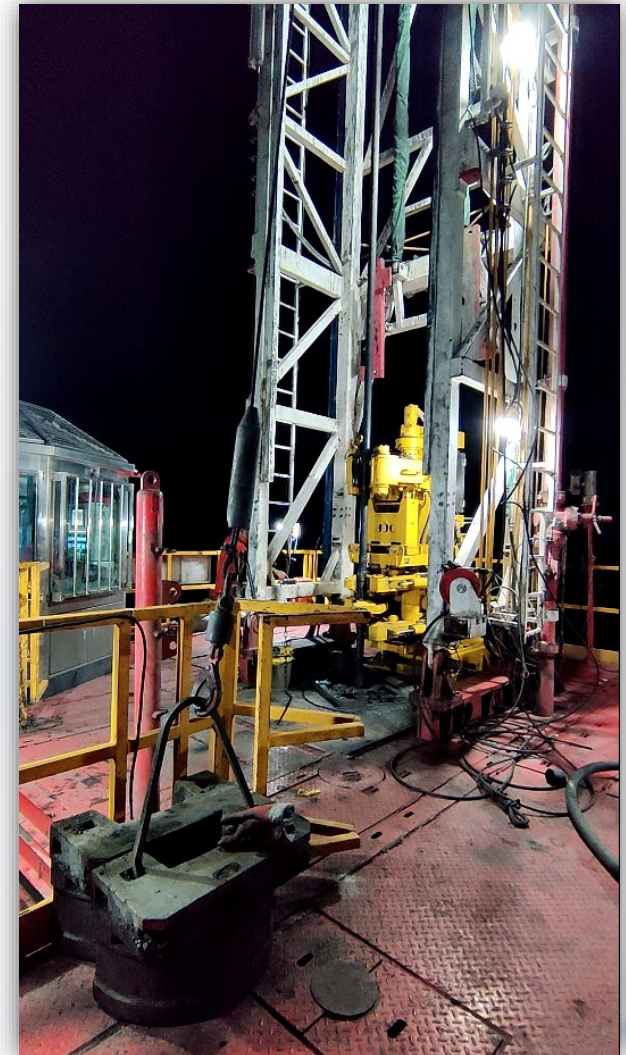
Tripo @ GW 70368 Rig (Chang Long)



Tripo @ BD 70302 Rig



Tripo @ GW 30620 Rig

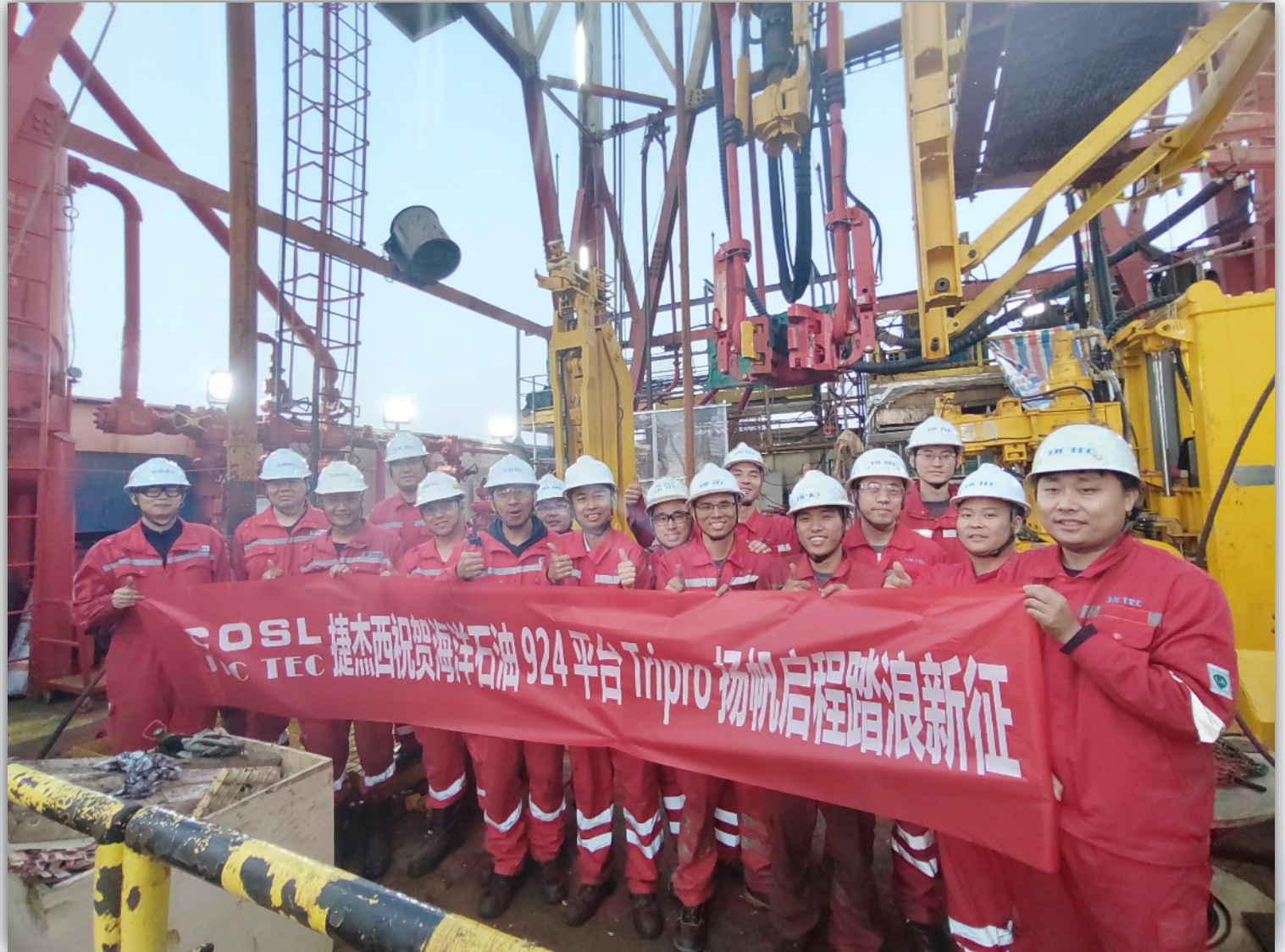
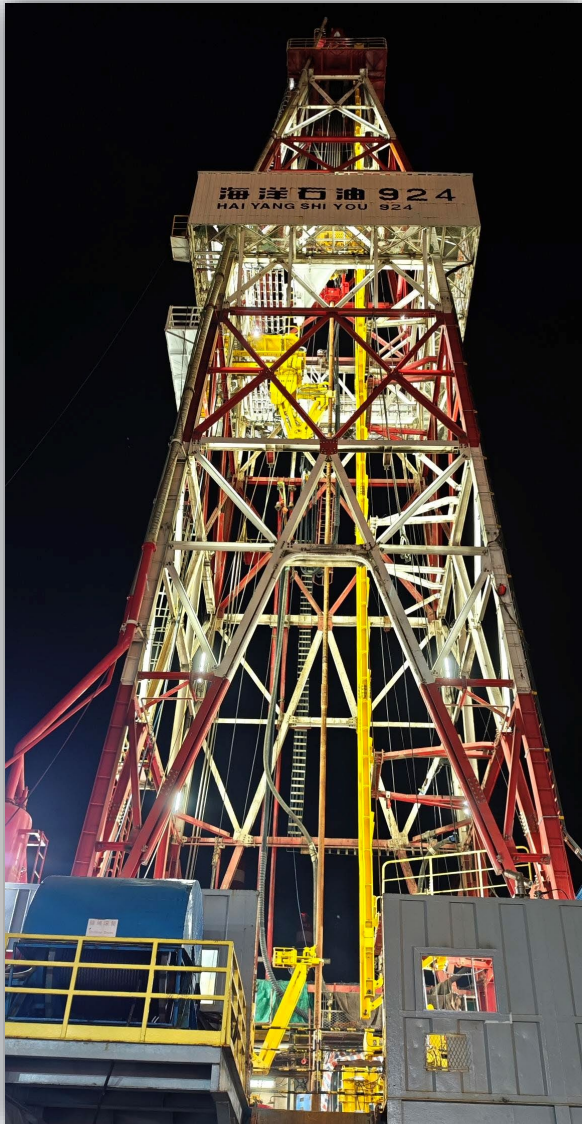


Offshore Platforms - COSL-922 Jackup

JJC TEC



Offshore Platforms - COSL-924 Jackup (Retrofitted in 30 Days)



Market Validation-Tripro® in Phases



In Operation:

1. COSL-922
2. COSL-924
3. COSL-NH2
4. XD-70202
5. XD-80501
6. GW-70368
7. BD-70302
8. ZY-70738 (Tibet)
9. SL-7K
10. GW-50_1



In Production:

1. GW-50_2
2. GW-50_3
3. SW-70288
4. HB-70861
5. COSL-921
6. **UKTS @ Russia**



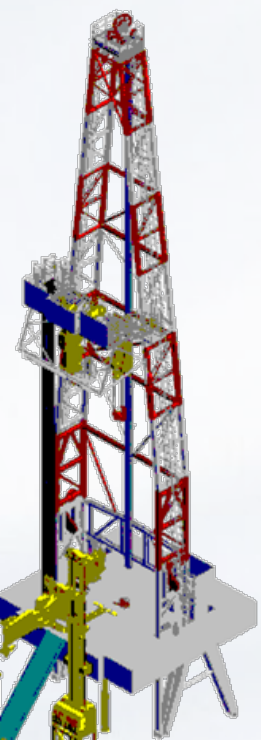
In Negotiation:

1. **AD-121 @ UAE**
2. Sinopec KT-3
3. Sinopec KT-4
4. **Arabian Drilling Co. @ KSA**
5. CPOE-18
6. CPOE-19
7. COSL-NH4



In Touch:

- i. Velesto @ SEA
- ii. Sapura @ SEA
- iii. KDC @ Kuwait
- iv. Abraj @ Oman





FURTHER EXTENSIONS

Rig-site Robots

JJC TEC

JJC TEC



北京捷杰西科技股份有限公司
——场地机器人

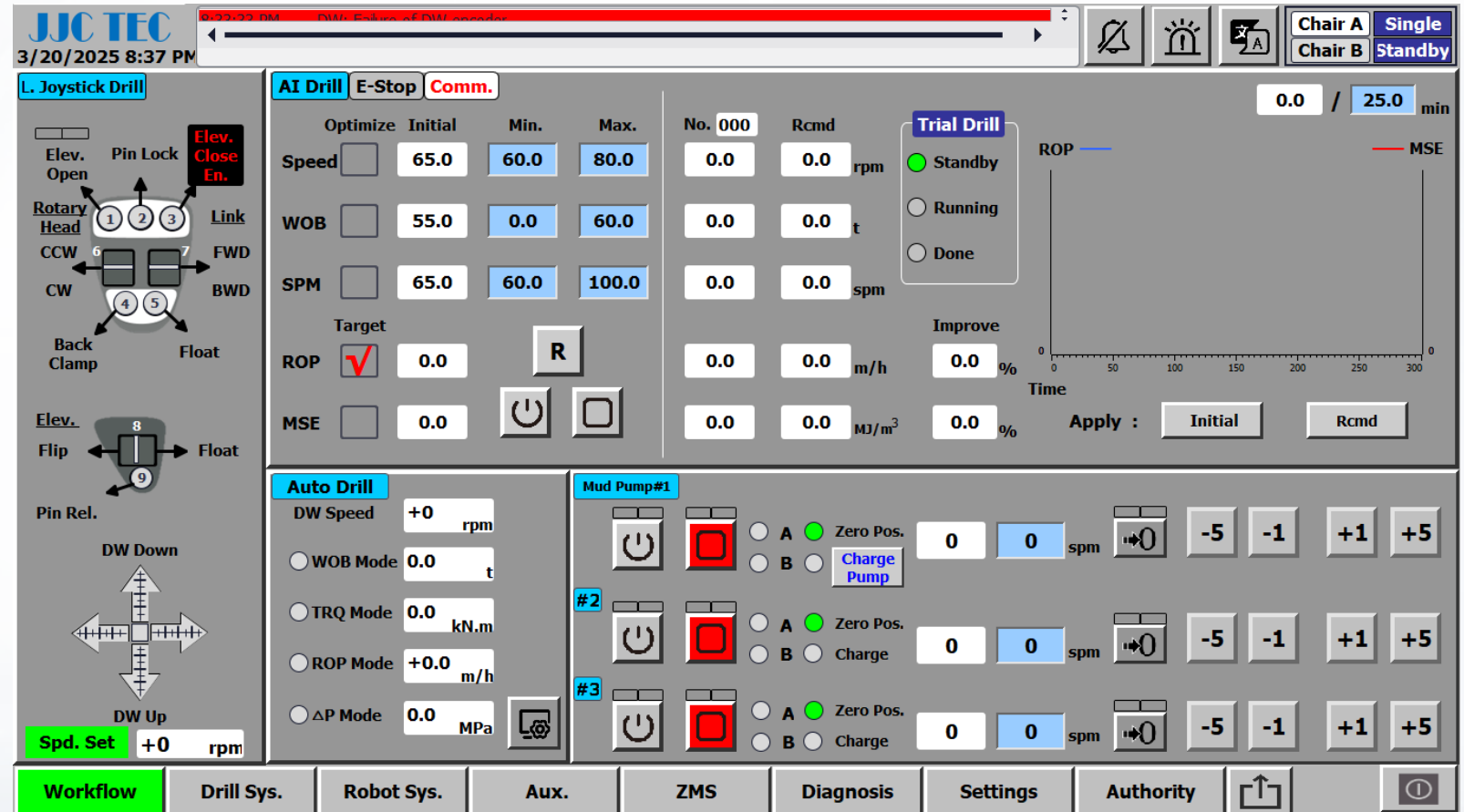
JJC TEC



北京捷杰西科技股份有限公司
——场地机器人

A.I. Drilling

- Drilling optimization software is under development
- Aim to improve ROP and minimize human mistakes in drilling





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