

# Oil and Gas: NOV Robotics and Automation (Part 2)

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2022 Annual Meeting Keynote Presented by Justin Kinney

# About the Speaker

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- Graduated from Texas A&M University in 2005 with a B.S in Computer Engineering, before starting his career with National Oilwell Varco as a controls Field Service Engineer.
- Worked in Oil and Gas most of professional career.
- Commissioning Manager for several major drilling contractors in South Korea shipyards from 2010 through 2016.
- From 2016 until 2018 spent time outside of oil and gas working as a Lead Controls Engineer (marine construction) and Project Manager (paper mill) on controls and automation projects.
- In 2018 returned to NOV where he is currently leading efforts in deploying NOV's ATOM RTX system on customers rigs as the Senior Technical Manager for Robotics and Automation.

# What's a ROS? (2018) – Recap

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- Started with a very small team
- Knew very little about robotics and ROS
- Very sharp learning curve
- Where do we even start?

# How Did We Do It? – Recap

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- Partnered with SwRI
- Took ROS courses and studied
- Agile learning curve
- Relied on the ROS community
- Finally...just a lot of long hours...

# What Did We Accomplish? – Recap

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**First Hands Free Tripping of a  
Stand of Drill Pipe on an AC Ideal Prime Rig  
December 19th 2019**

# We Moved Some Pipe, What's Next?

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- Overall control system was not complete, but had a solid base to build on
- Now that we could effectively plan paths, we needed end effectors
- Robot is just a transport mechanism; needed a way to have one robot do many jobs
- Key challenge set upon us was to not run any utilities through or on the robot

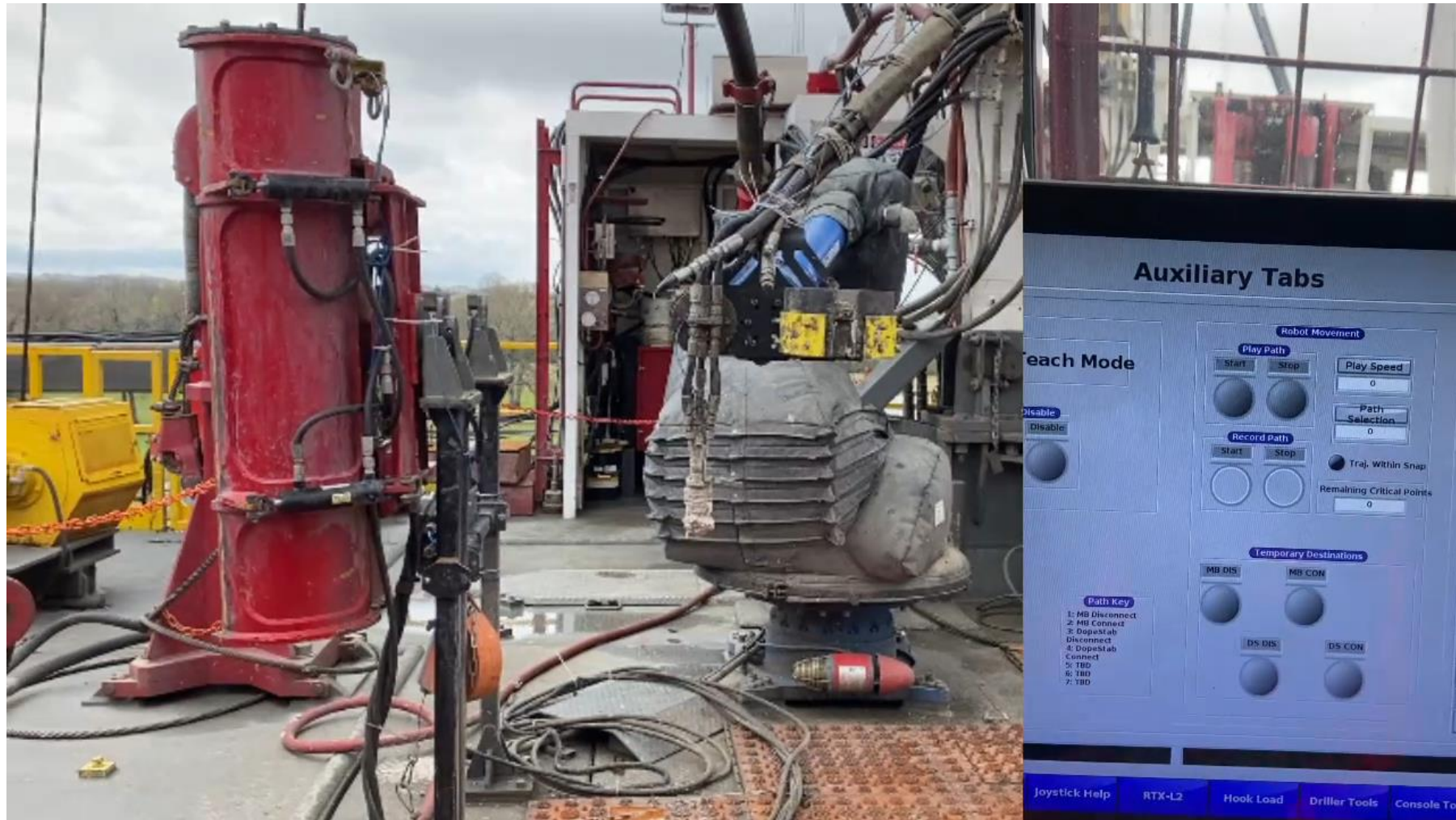
# NOV Robotics (RTX) – Ancillary Task End Effectors

- **Quick Disconnect System**
- Tailing Claw Manipulator
- Compact Doping Head
- Stabbing Assist Head
- Mud Containment Device
- Floor Mule
- Grip and Spin (Crossovers, Subs, Safety Valves)





# Quick Disconnect Technology & Teach Mode

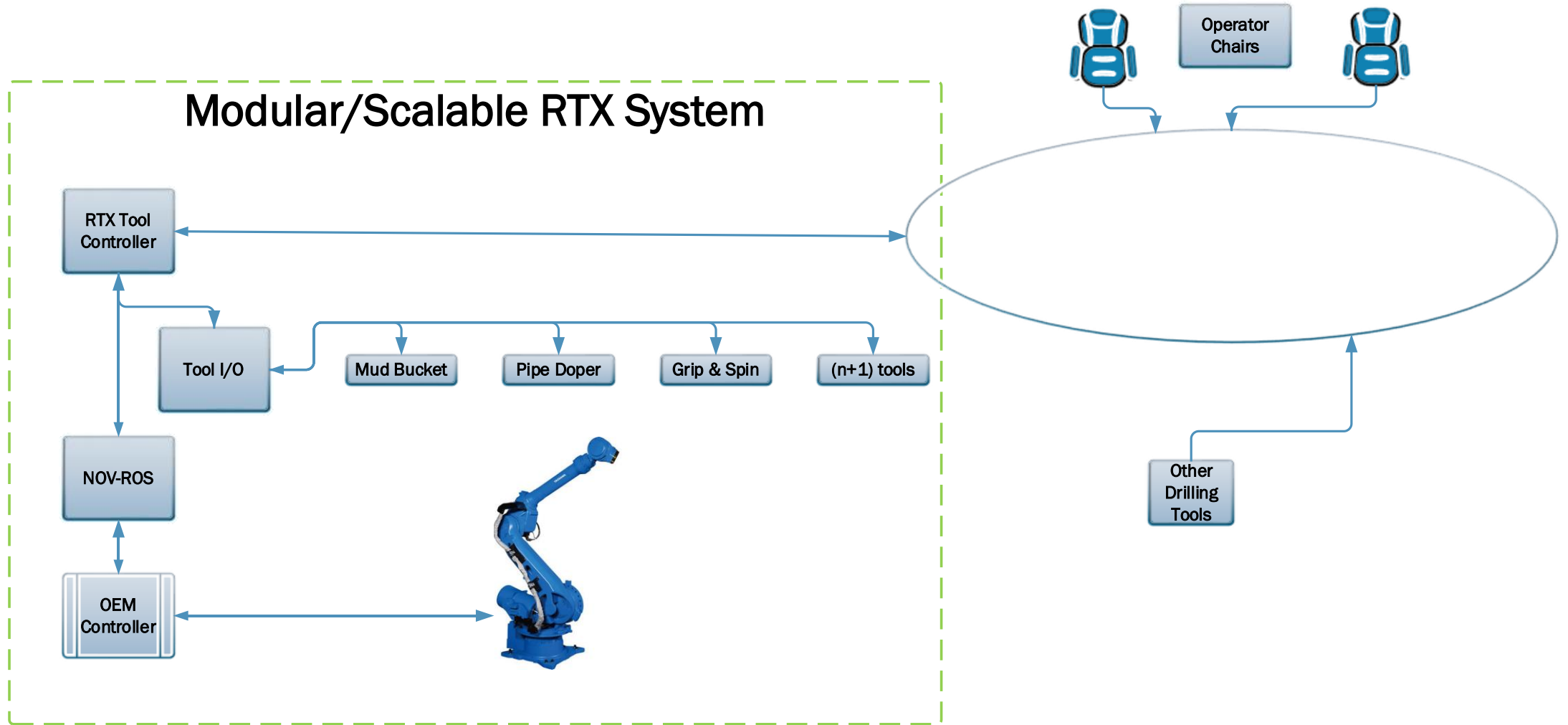




# NOV Robotics (RTX) – Tripping In Sep-2021



# Technology Stack



# RTX Productized

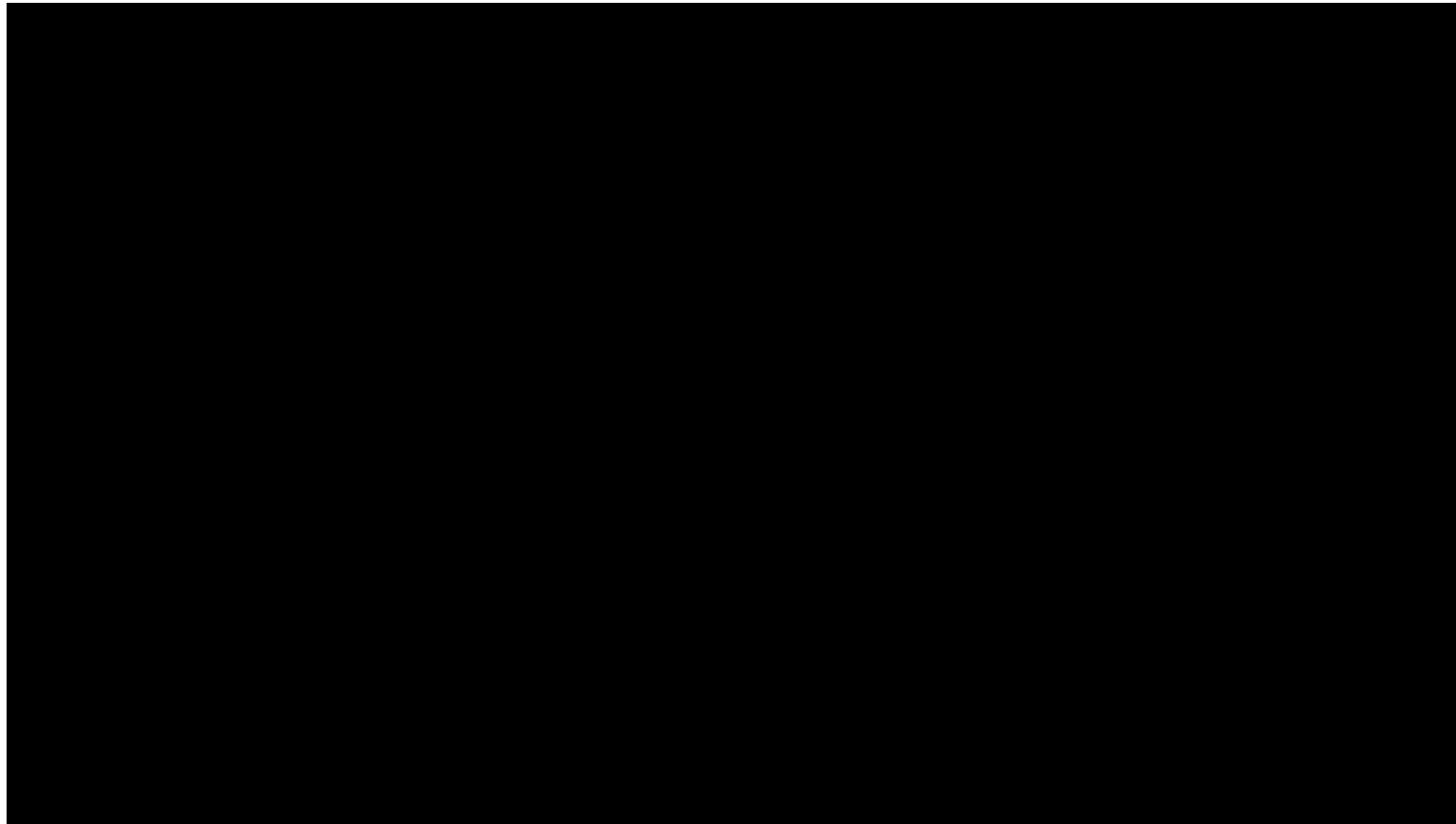
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- We now have a modular and scalable system that can be put on any rig network
- The framework for all path planning and collision avoidance is NOV-ROS
- Prototype work has begun to integrate scene awareness and people detection into RTX system (leveraging ROS and other open-source packages)
- Productization of all end effectors nearly complete
- Roadmap for other functions/end effectors ongoing

# Thank You

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Questions?



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