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INTELLIGENT | DREDGING

MEET THE TEAM

RICHARD CROWE

- ▶ President/GM of ROHR-IDRECO Americas

- ▶ 20 Years in Aggregate Operations

- ▶ 5 Years with ROHR-IDRECO brand

- ▶ First buyer of the IDRECO Jet Suction line in the US ~10 years ago

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MEET THE TEAM

JOSH HENDON

- ▶ Engineering & Operations Manager for ROHR-IDRECO Americas

- ▶ Heavy experience in oil & gas, automotive aftermarket, and mining

- ▶ Solely responsible for maintenance and support of the existing machines

- ▶ Currently working on automation system upgrades and developments

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INTELLIGENT BEGINNINGS

BASIC MEASUREMENT

▸ Flow, Pressure, Vacuum

VARIABLE SPEED CONTROL

  ▸ Worked mostly with diesel power systems
  ▸ Pump system, winches, auxiliary components
  ▸ Lots of hydraulics
    ▸ Move to pilot valves over large high-pressure systems in the cab

CONVERSION TO ELECTRIC POWER (AC/DC)

- ▶ Primary supply power
- ▶ Started with only pumps
- ▶ Can include winches & cutter drives
- ▶ Allows for additional sensors & controlled feedback

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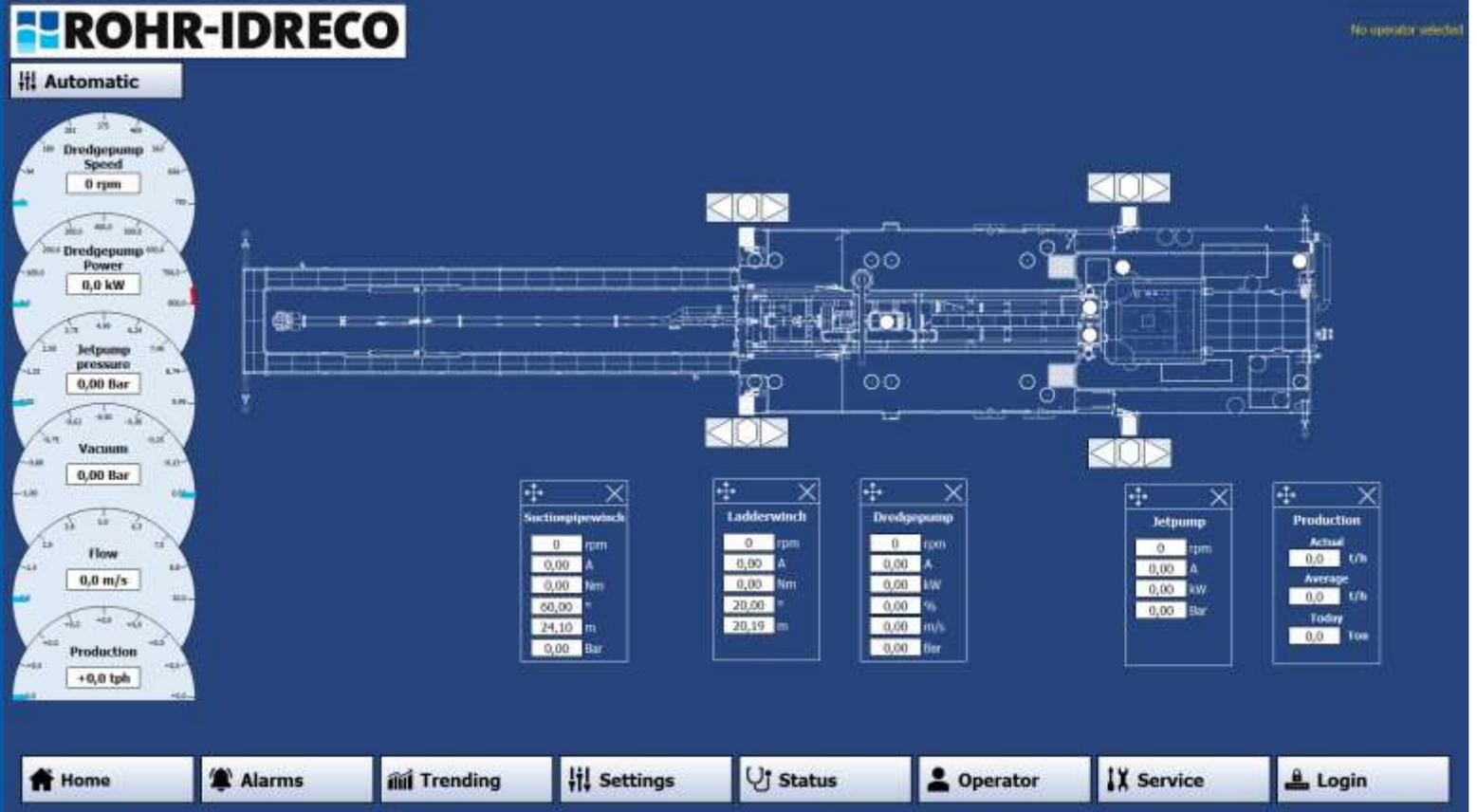# ELECTRIFICATION ALLOWS MORE EFFICIENT EQUIPMENT, REFINED CONTROL, AND SENSOR ADAPTATION.

ADDITIONAL OPTIONS

▶ Sensors for throughput efficiency control, maintenance tracking, or for mechanical variables, etc.
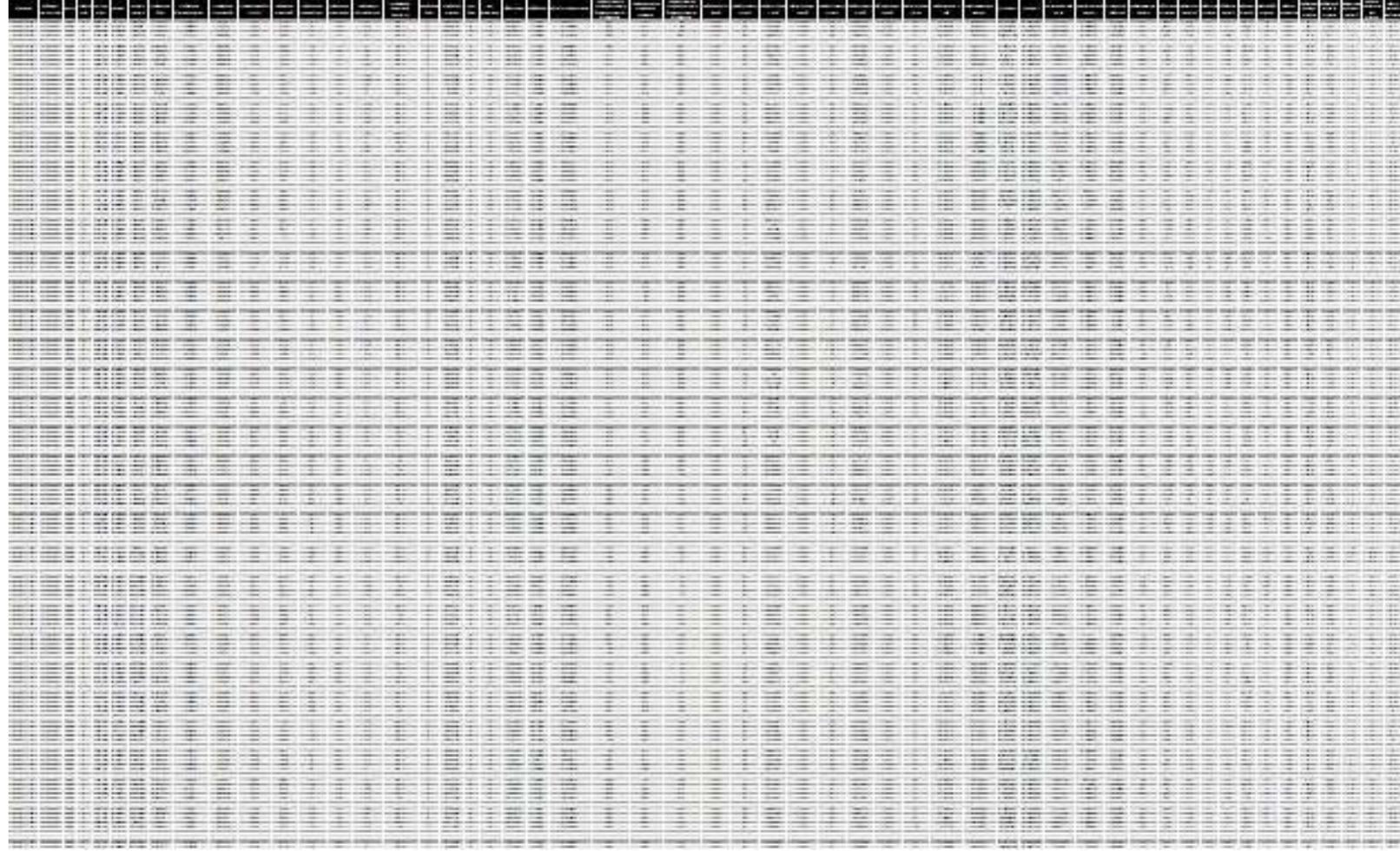
▶ Video cameras to display strategic operation points.

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FIRST STAGE CONTROL SYSTEMS

▶ Auto Digging Functionality

RAW DATA CAPTURE

▶ Image reflects **< ½** the data recorded for a single day

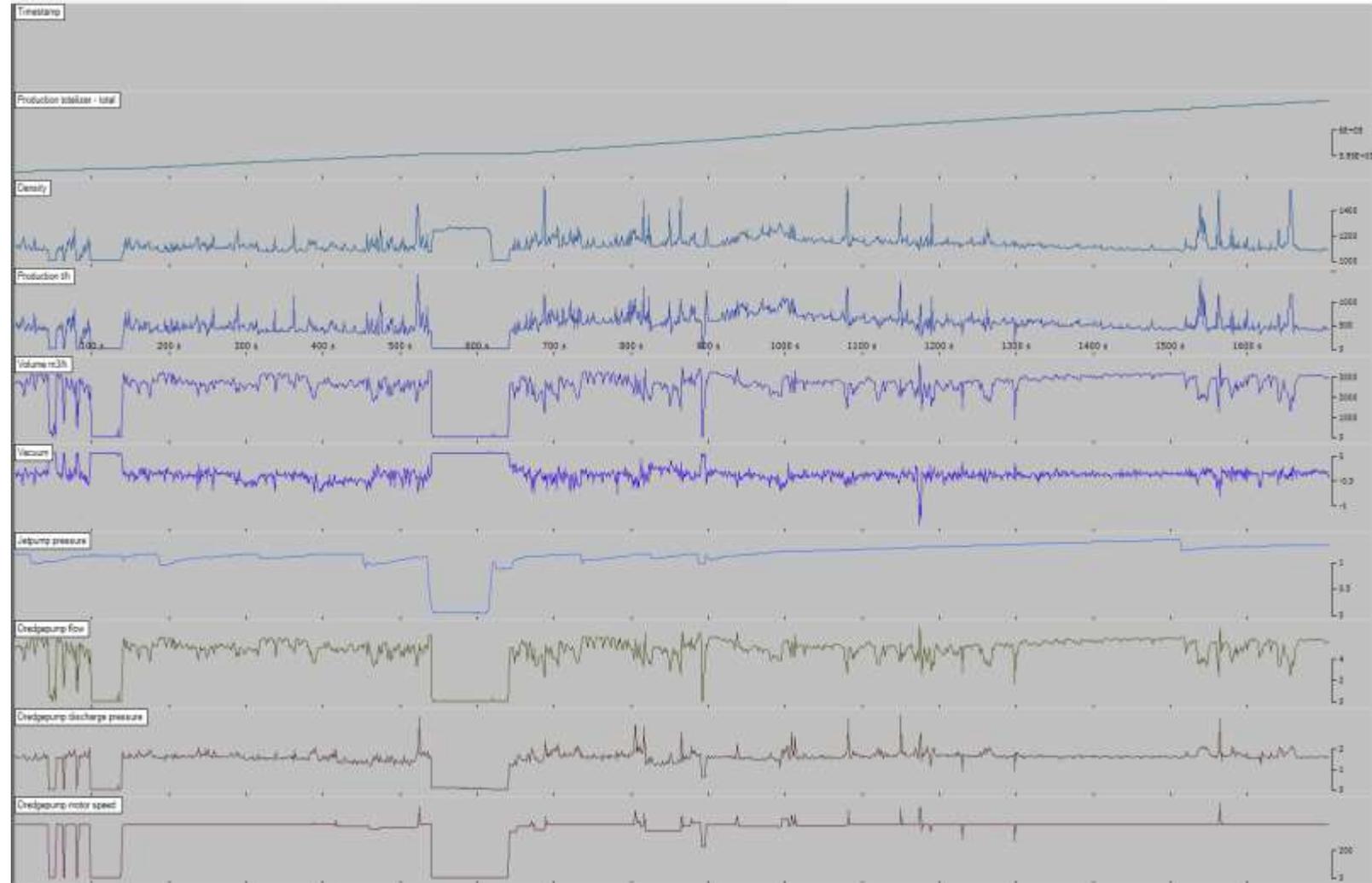# INTELLIGENT DREDGES

Less than 1 % of big data and associated analytics is currently utilized in the mining and dredging space.

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PERFORMANCE ANALYTICS
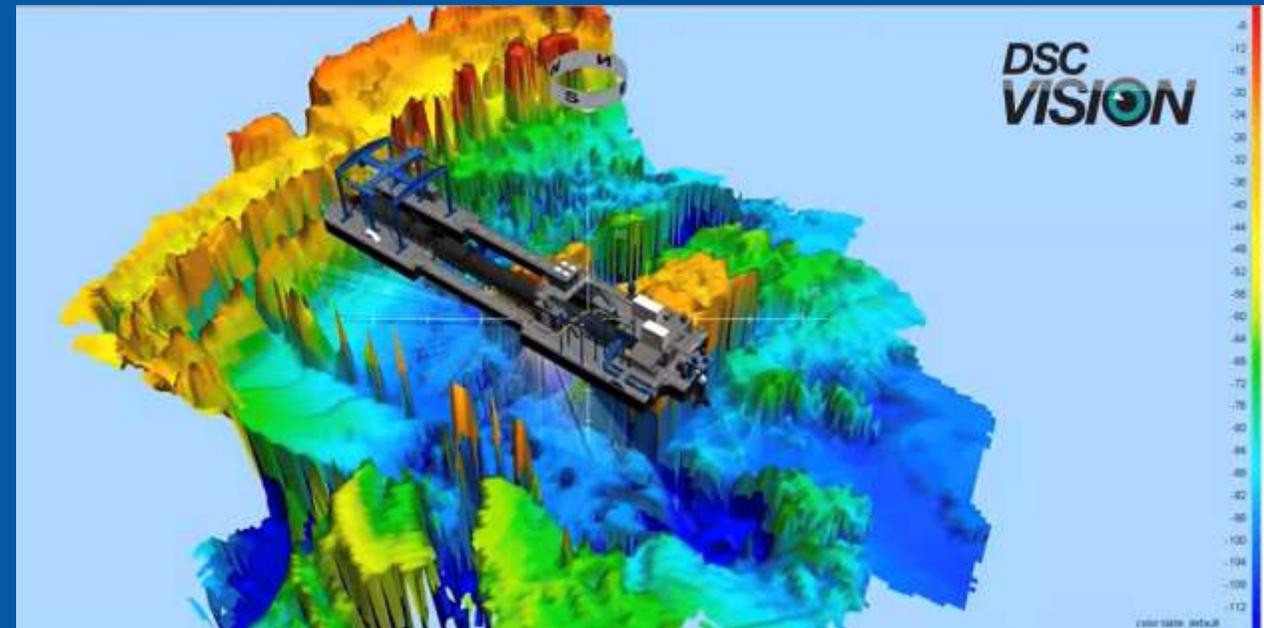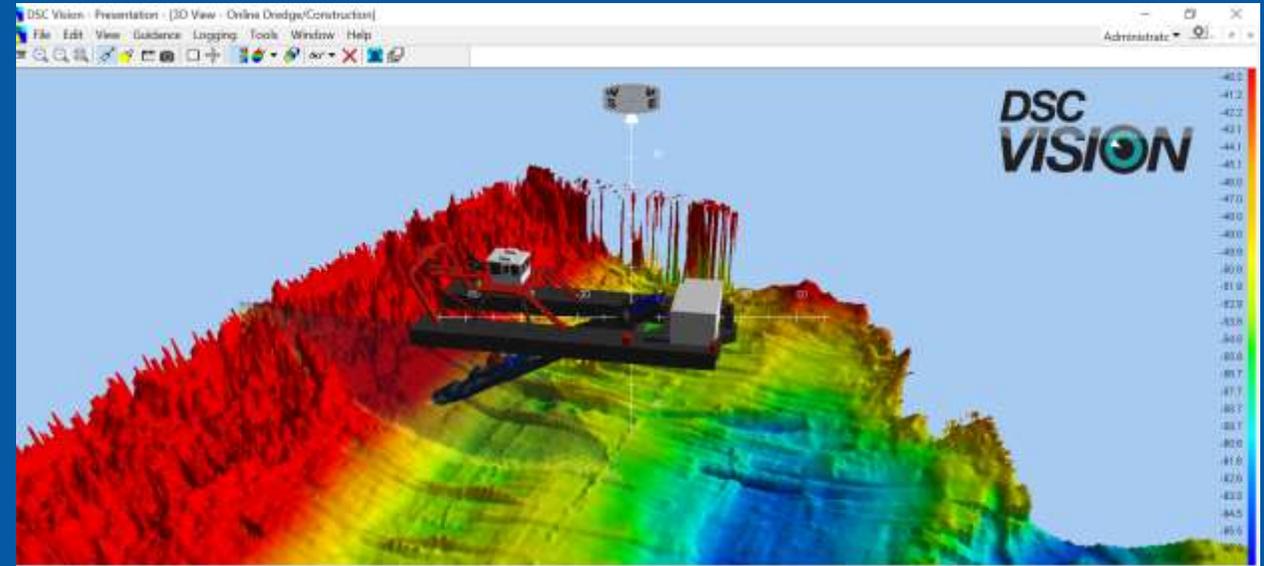
▶ Data is filtered and used for predicting trends
  ▶ Maintenance
  ▶ Performance
 ▶ Future Expectations

INTELLIGENT VISIBILITY

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MAPPING AND UNDERWATER VISIBILITY SYSTEMS

▶ ROHR-IDRECO Eyes Underwater

▶ DSC Vision - Pictured

▶ Cable Arm ClamVision

▶ Hypack Dredgepack

EYES UNDERWATER® 3D DREDGE MONITORING SYSTEM

- ▶ Real Time visualization in 3D
- ▶ Overlay aerial images (Google Earth)
- ▶ Integrate boundaries (all 3 dimensions)
- ▶ Spill material is shown
- ▶ **Accurate data grid down to 10" (upgrades to 3")**
- ▶ 3D & Section view on one screen
- ▶ Cut calculations
- ▶ Report generating capabilities
- ▶ Multiple machine integration with live updating
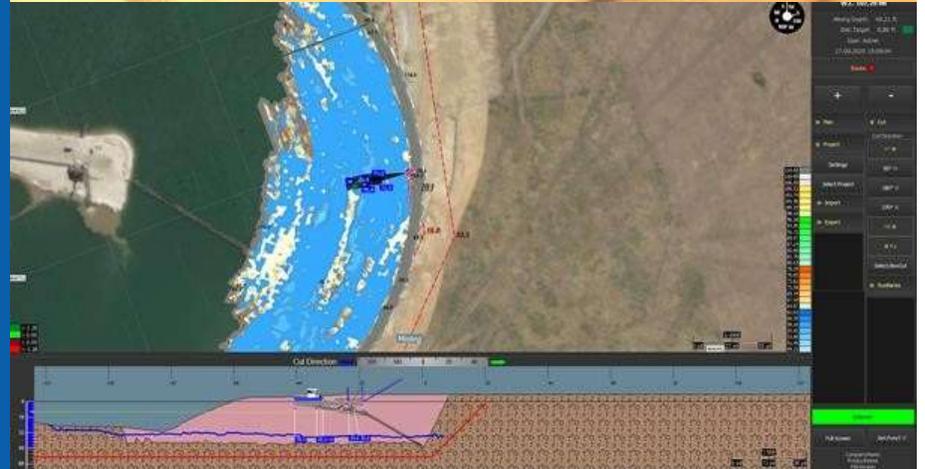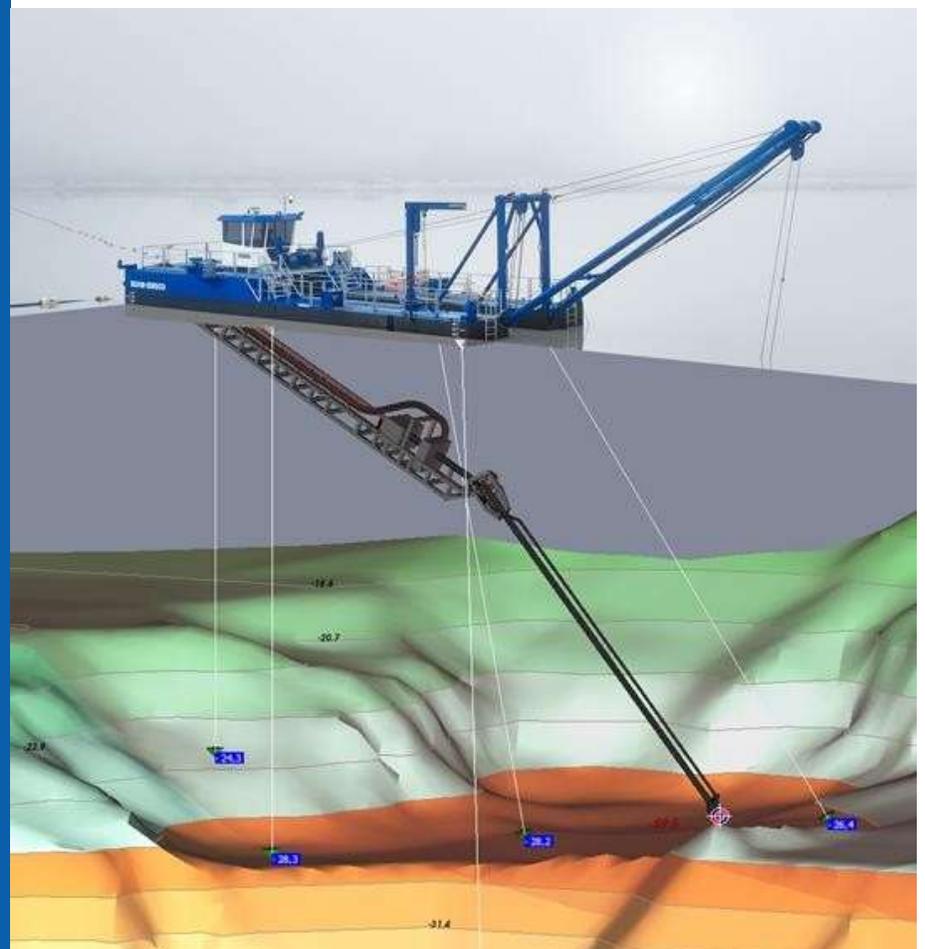
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INTELLIGENT MONITORING

REMOTE MONITORING

▶ DredgeRX from DSC

▶ iDredge package from ROHR-IDRECO

▶ Secure cloud-based data collection

INTELLIGENT SUPPORT

REMOTE SUPPORT

- Use of Smart Glasses

- Remote Login/Machine Access

  - Review Operating History

  - Review Error Codes

  - Troubleshoot While Operating

  - Real-Time Help

INTELLIGENT OPERATION

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REMOTE OPERATION

▶ Monitored and Operated from a remote location

▶ Operation in manual or in automatic mode possible

▶ Processing plant data can be included in the control system

▶ CCTV system included for visual control of the dredger

▶ Unmanned dredging of harmful toxic ponds possible
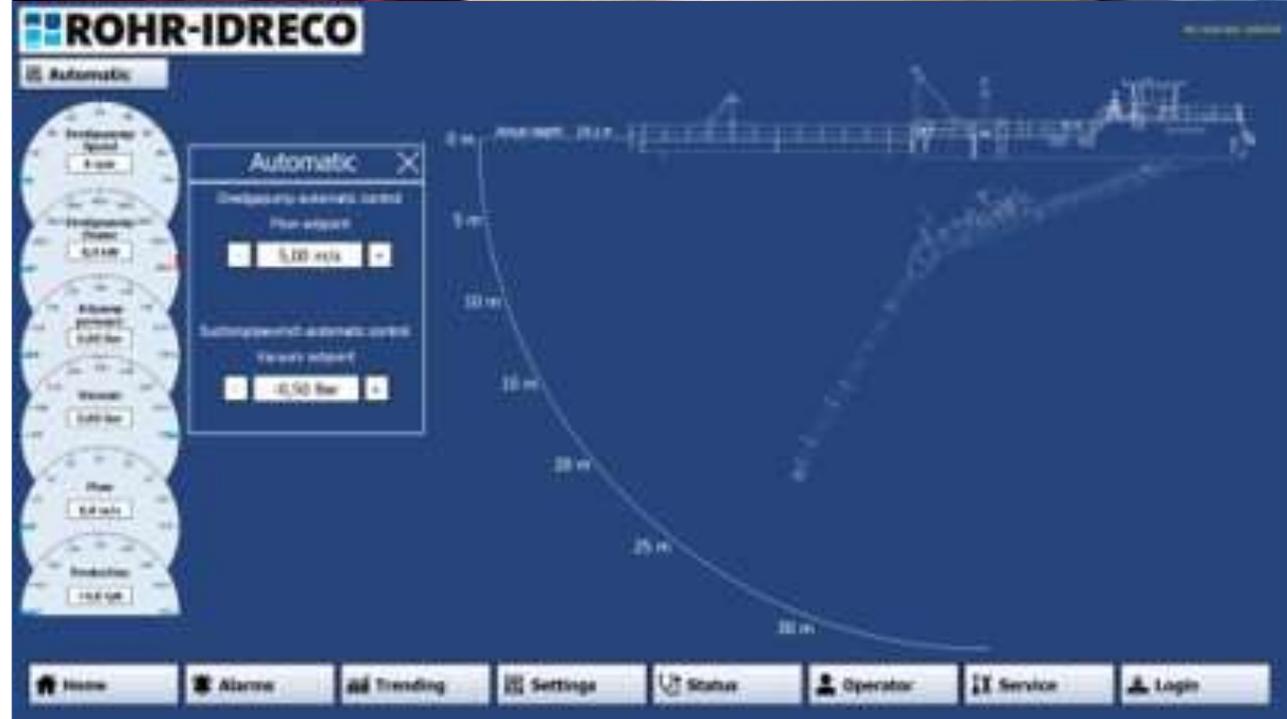
- ▶ Full Automation
  - ▶ iDredge® CONTROL SYSTEM
- ▶ Highest & most consistent solid production
- ▶ Lowest power consumption per ton
- ▶ Lowest possible pump wear
- ▶ Autonomous dredging monitored or controlled from plant office or tablet

WHAT DOES THIS MEAN FOR OPERATORS?

- ▶ Lowest Total Cost of Ownership and Maximum Up-time
- ▶ Less Dependency on availability/mobility of operators (covid-restrictions!)

INTELLIGENT MAINTENANCE
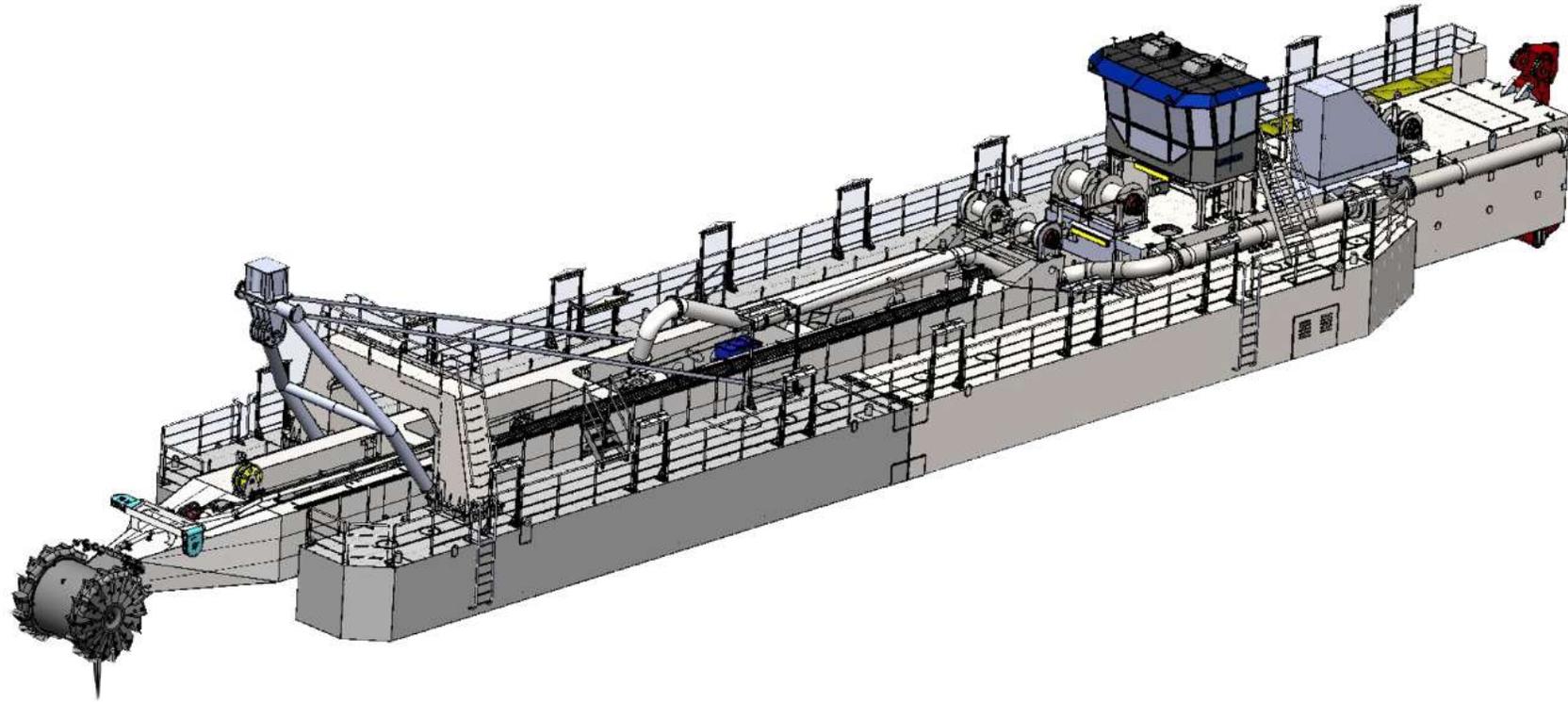
MAINTENANCE MANAGEMENT SYSTEMS

- ▸ iDredge For You
- ▸ Combines
  - ▸ Remote connectivity for troubleshooting
  - ▸ Process Optimization using data collection tools
  - ▸ Consultancy
  - ▸ Preventative and predictive maintenance planning

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BENEFITS OF INTELLIGENT DREDGING

SAFETY

- ► Reduction in staff exposure
- ► Improved reliability = less breakdown maintenance
- ► Removal of operator in hazardous applications
- ► Noise reduction for operator
- ► No hydraulics in cab
- ► Reduced stress on operator

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ENVIROMENTAL

- Load permit excavation limits and prevent over/under dig
  - Critical for slopes, depth limits, boundaries
- Noise reduction for neighbors
- Reduction of oils on the water
- Reduced energy demand
- Improved power efficiency
- Potential for fuel evolution

VOLUMETRIC MONITOING

- ▸ Track volumes removed
- ▸ Compare before & after maps to design models
- ▸ Restrict over-digging to prevent slope failures
- ▸ See remaining material before relocating
- ▸ Compare calculated cut volumes to measured volumes through pipeline
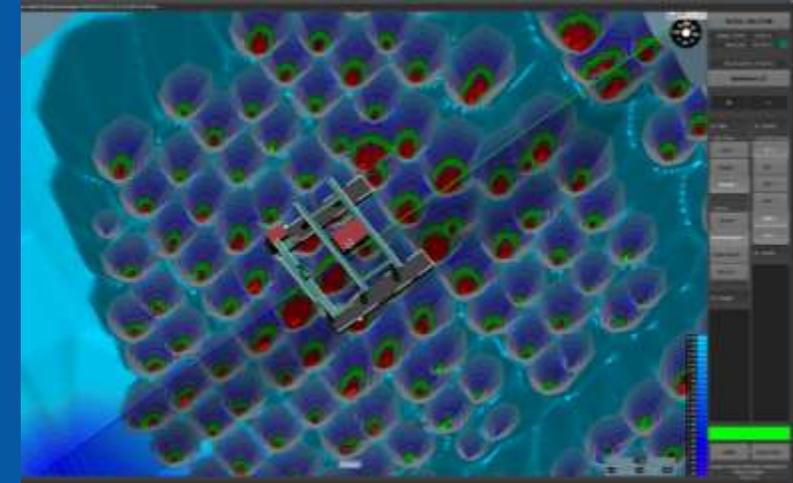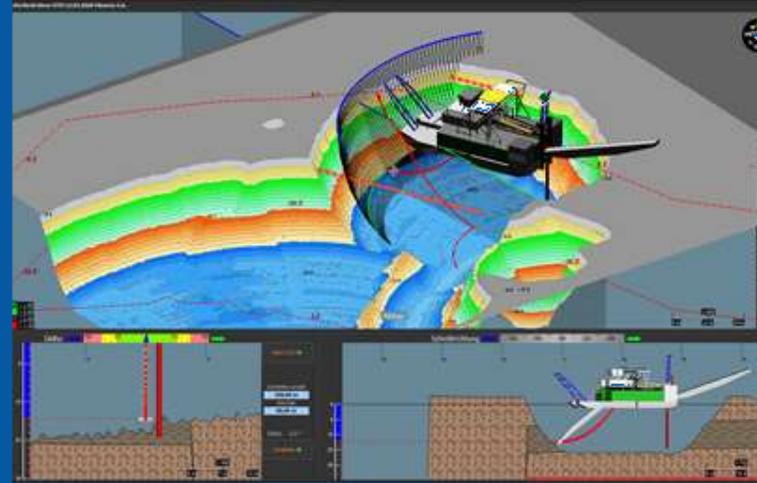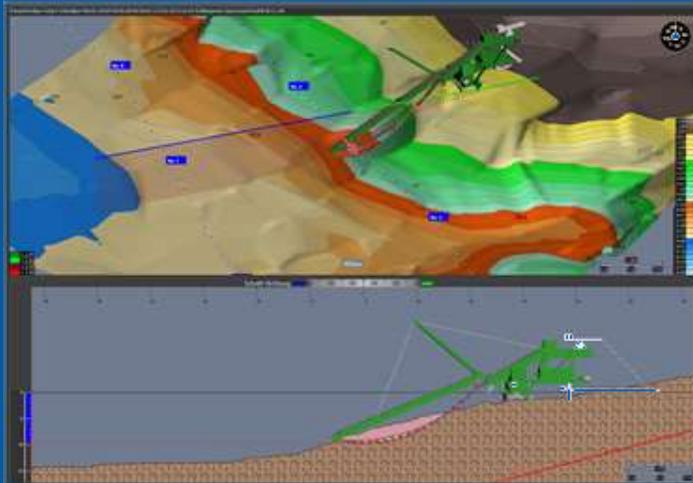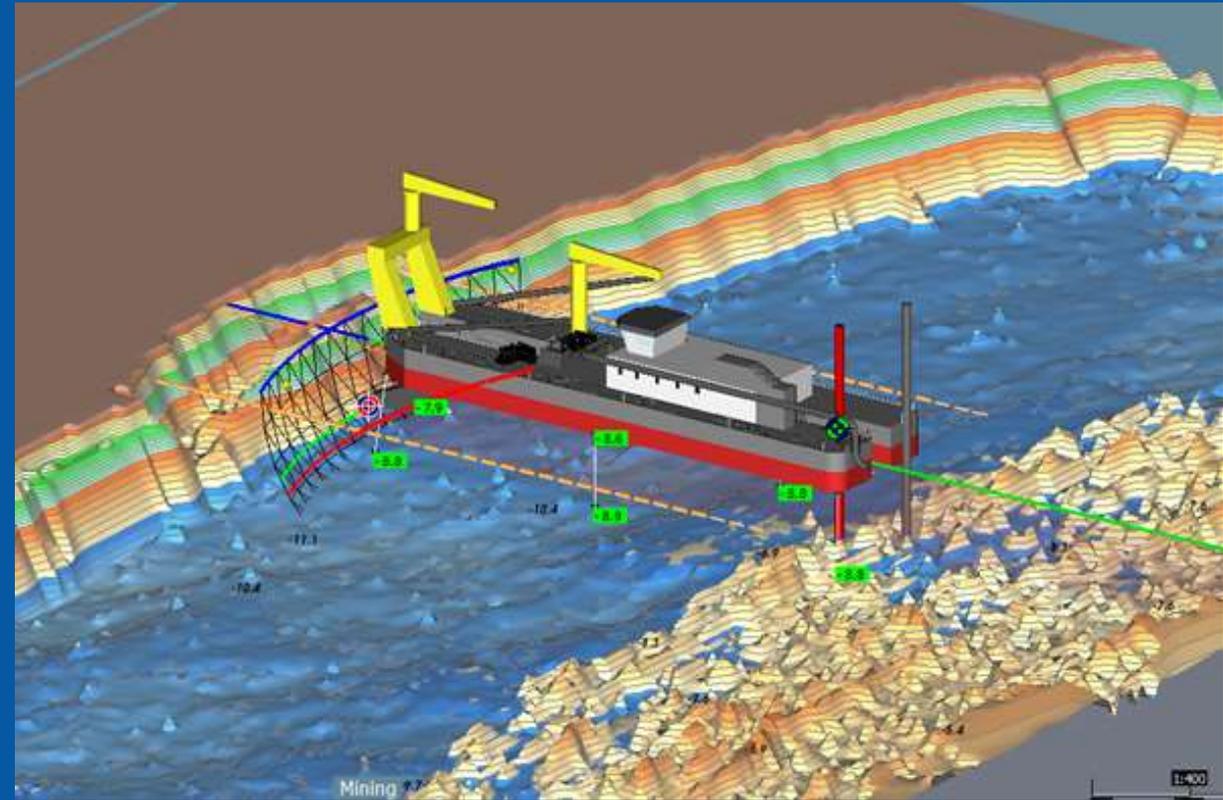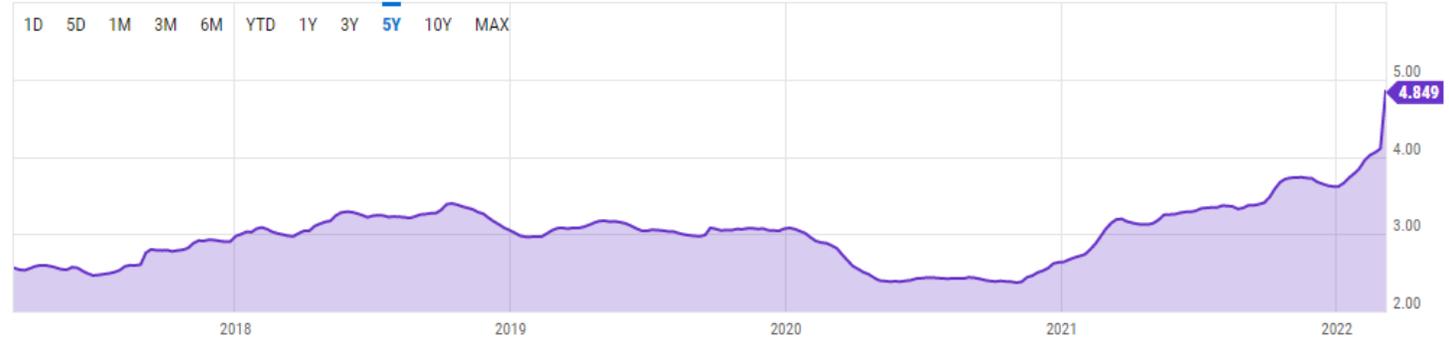
PERFORMANCE

- ▶ Accurately track KPI's
- ▶ Trend historical performance
- ▶ Identify improvement opportunities
- ▶ More consistent production
- ▶ Use of KPI's in predictive maintenance
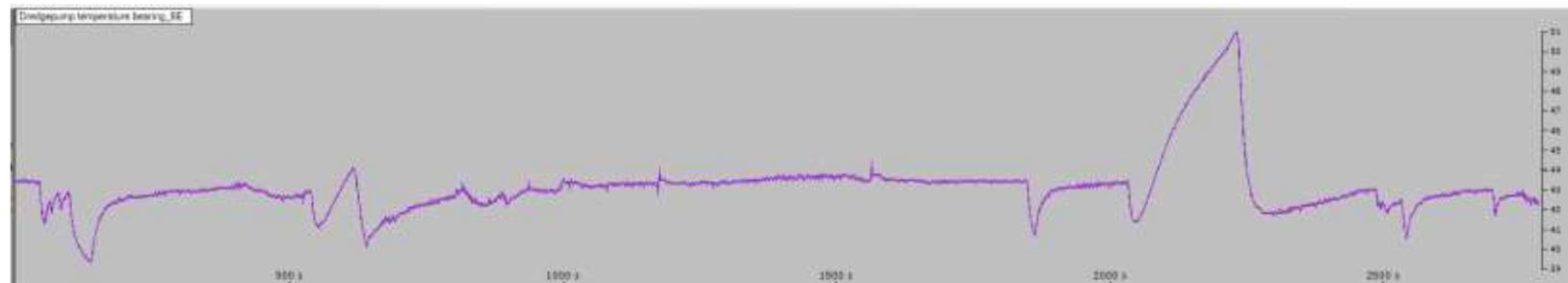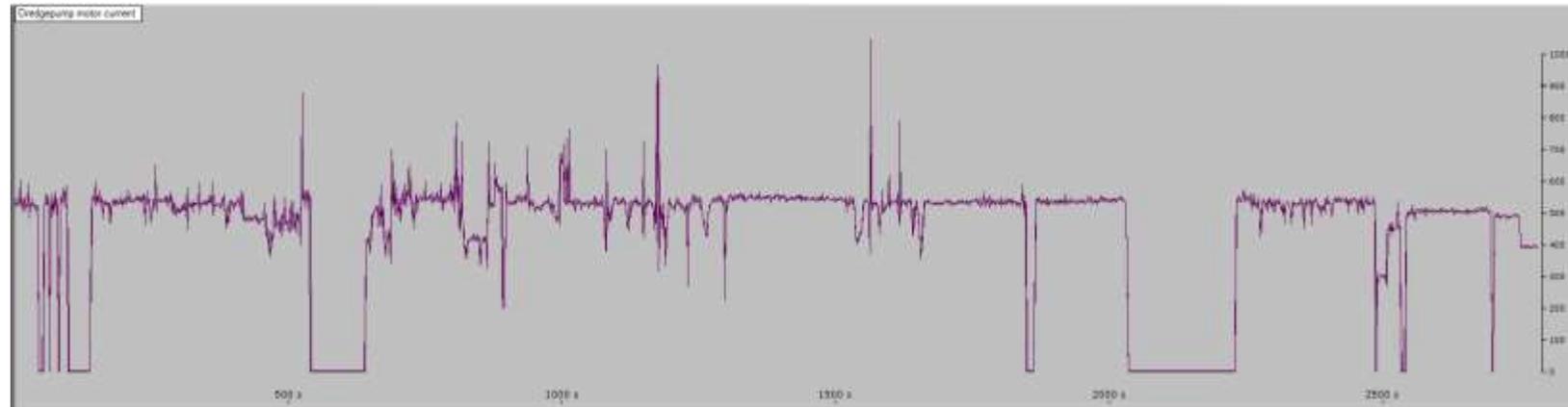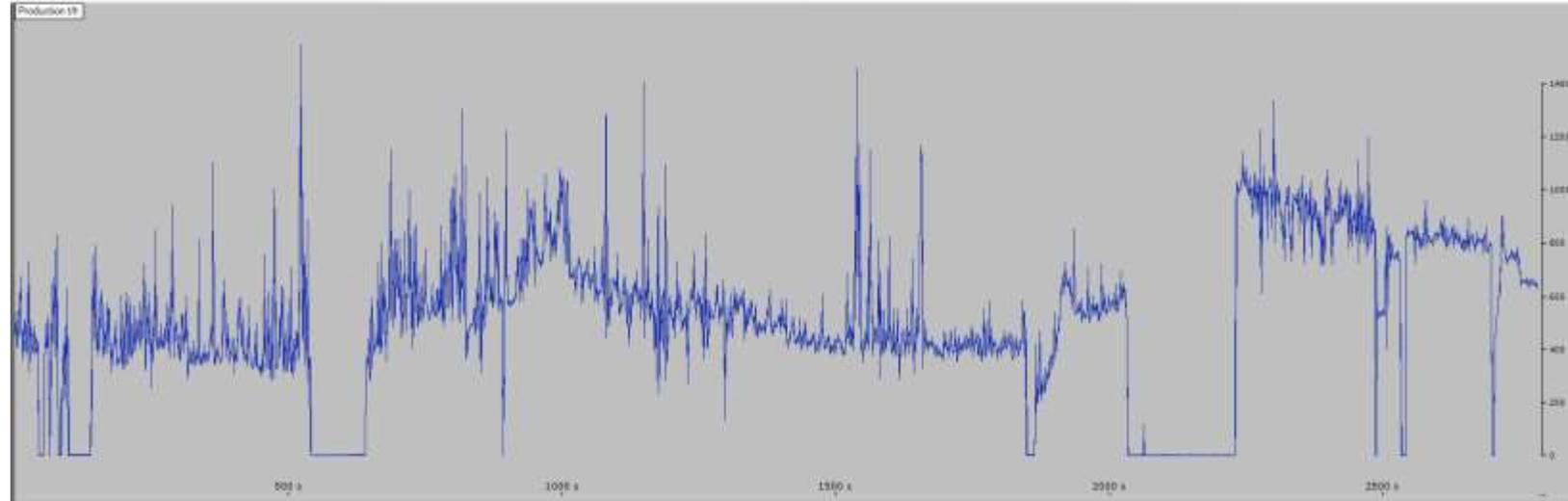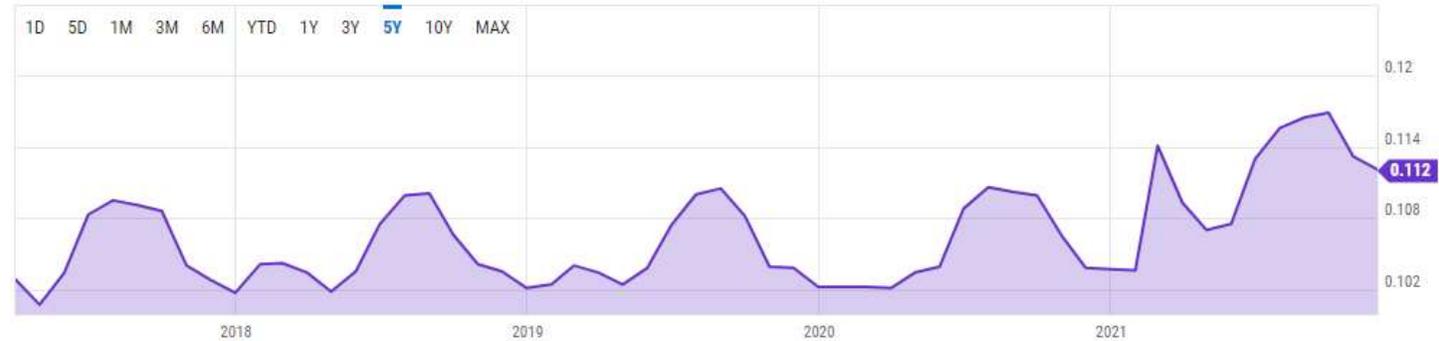
Reduced Operating Costs

- Electric versus Diesel
- Electric versus Hydraulic
- Efficiency Gains
- Higher Recovery Rate = More Volume

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Diesel Price History
https://ycharts.com/indicators/us_retail_diesel_pricec

Diesel volatility as much as 100% versus electricity of ~10%

Electricity Price History
https://ycharts.com/indicators/us_average_retail_price_of_electricity_total

IDREDGE® - INTELLIGENT DREDGES

iDredge/iBoost System®

▶ Sensors for energy efficiency control

▶ Monitoring density and flow on suction dredges

▶ Monitoring production

▶ Comfortable displaying and storing of operational data

Eyes Underwater®

▶ Real Time visualization in 3D

▶ Overlay with Google Maps

▶ Integration of maps and boundaries

▶ Spill material is shown

▶ Accurate data grid down to 25cm

▶ 3D & Section view on one screen

Making Waves®

▶ Monitored or Operated from a remote location

▶ Manual or Automatic Mode

▶ Processing plant visibility

▶ CCTV system

▶ Dredging of harmful toxic ponds possible

iDredge For You®

▶ Remote trouble shooting

▶ Process optimization using vacuum, pump RPM, slurry density, etc.

▶ Consultancy

▶ Preventive maintenance planning

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Q?