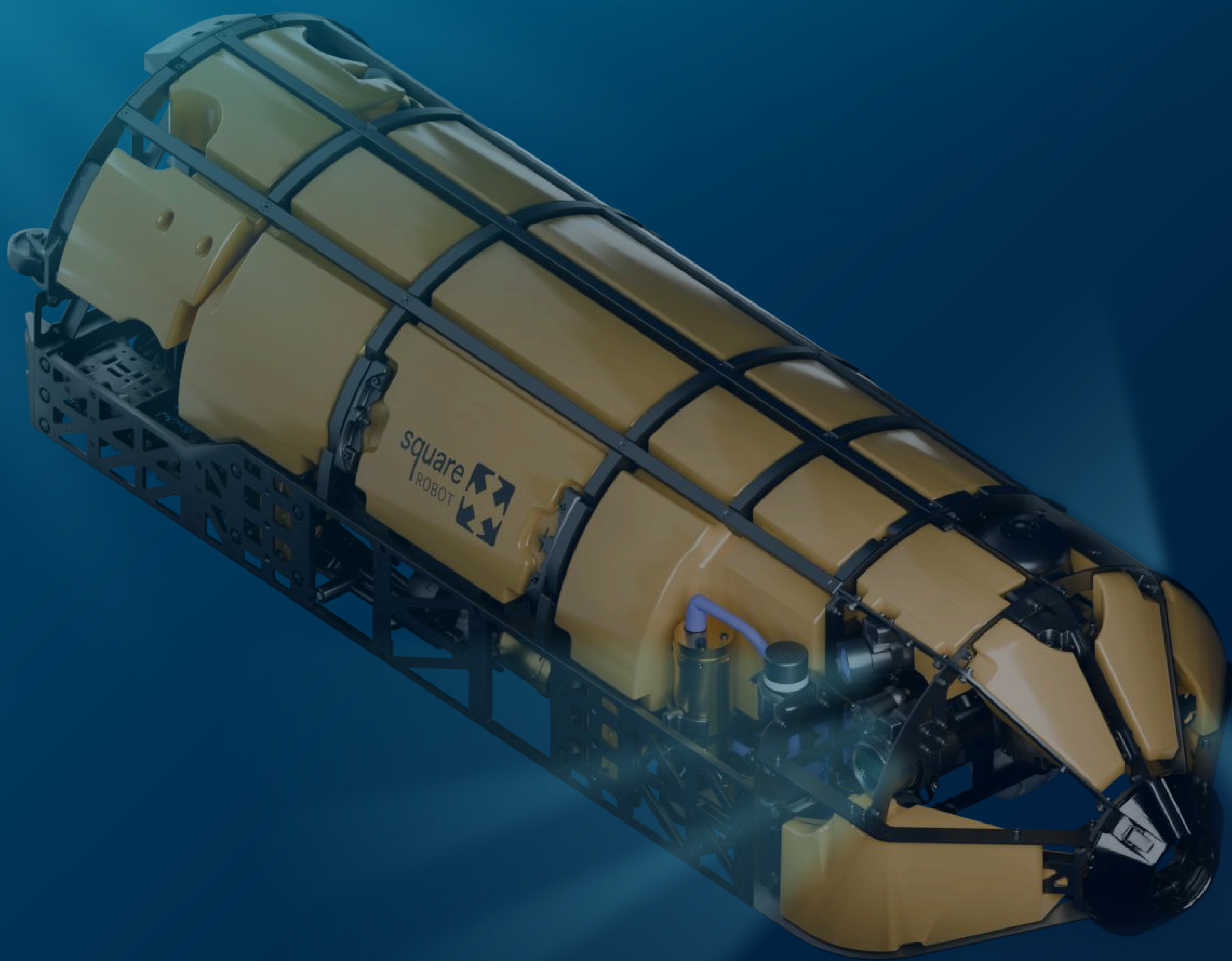


Square Robot



The **world leader** in
robotic tank inspection

Advanced Robotics

State of the Art Sensors

High Density Data Acquisition



Operational Efficiency

- Minimal tank downtime
- No alternate storage required
- Inspection data to support optimized repair turnaround
- Minimal operational disruption

Environmental, Social, Governance

- Zero confined space entry
- Reduced work at heights
- *Carbon Equivalent releases contained per tank:
 - Diesel > 5 Tons
 - Gasoline > 20 Tons

*Source - Third Party Verified for 100' diameter tank

Comprehensive Data for Predictive Repair and Maintenance

- Hi confidence / Hi resolution data
- Big data feed / Advanced processing for API 653 / API 575 / EEMUA 159 / RBI / EVA / Digital Platforms
- Multiple, State-of-the-art sensor sets

Commercial Efficiency

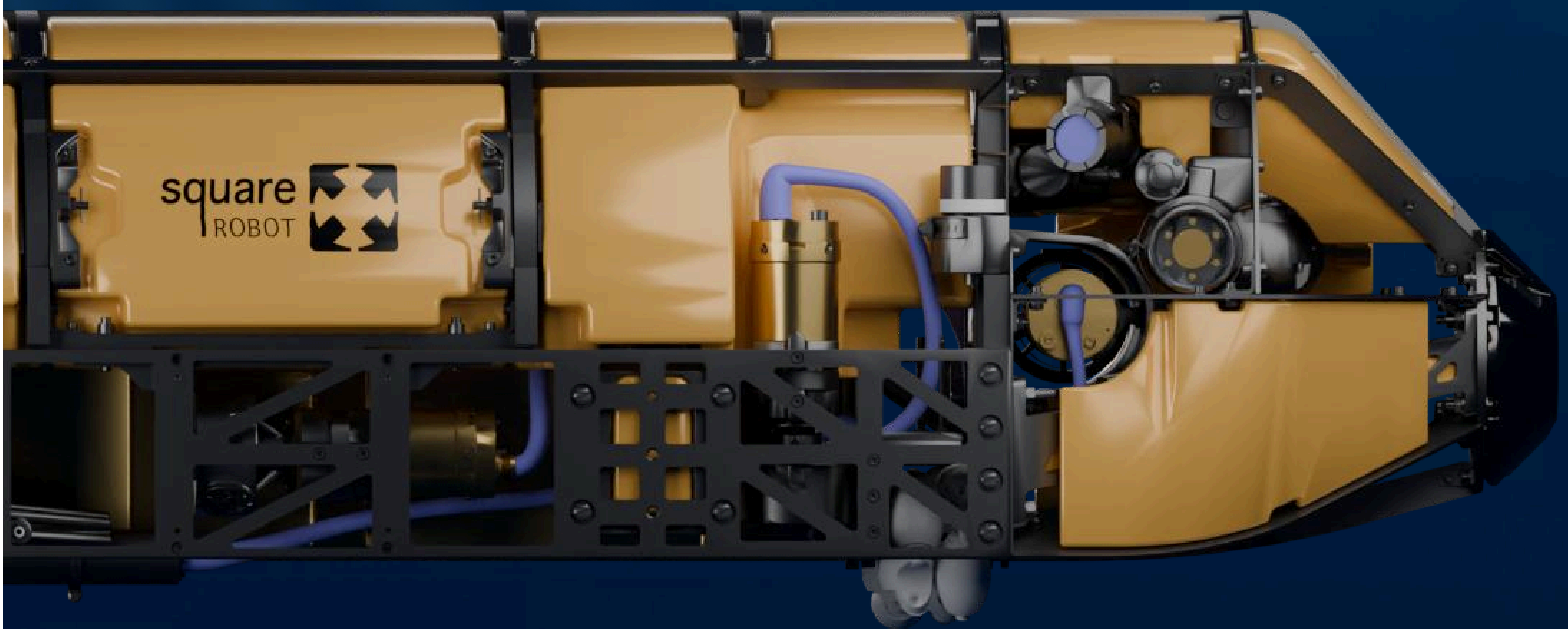
- *\$100,000 - +\$2M savings per tank operation
- Risk-based vs time-based inspections
- Tank and inspection cost level loading
- Informed resource and project planning

*Source - Solomon Associates 2018 Fuels Study

Quality & Performance

New Generation:

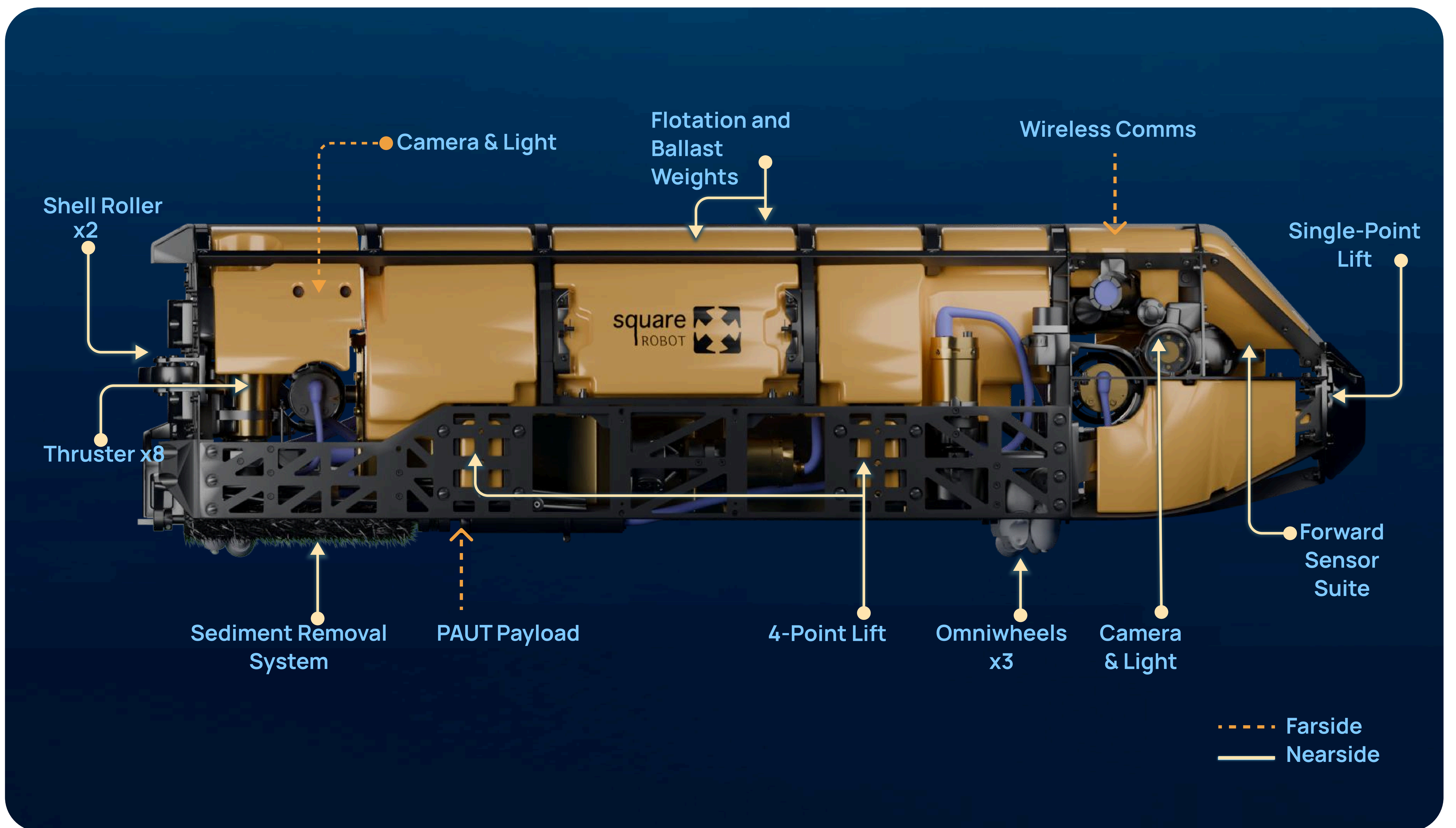
SR-3



Square Robot's autonomous, submersible robots and advanced inspection technology enable safe, informed above-ground storage tank utilization by eliminating the need to take tanks containing volatile products including diesel, jet fuel, and gasoline out of service for required internal inspection,

The inspection robots are certified safe for use in Class I, Division 2 hazardous locations by FM Approvals. Our robots combine our state-of-the-art, patent protected, autonomous navigation capability with inspection payloads including phased array ultrasonic and high definition video cameras to safely survey the critical areas inside a storage tank without taking the tank out of service.

On-Stream Above Ground Storage Tank Inspections



Designed to operate in gasoline, Diesel, Lube Oils, and more. Contact us for more product compatibility information.

Launch SR-3 into a tank through a roof or a shell manway. Designed to launch through a manway with a minimum inner diameter of 22.75" (0.58 m)

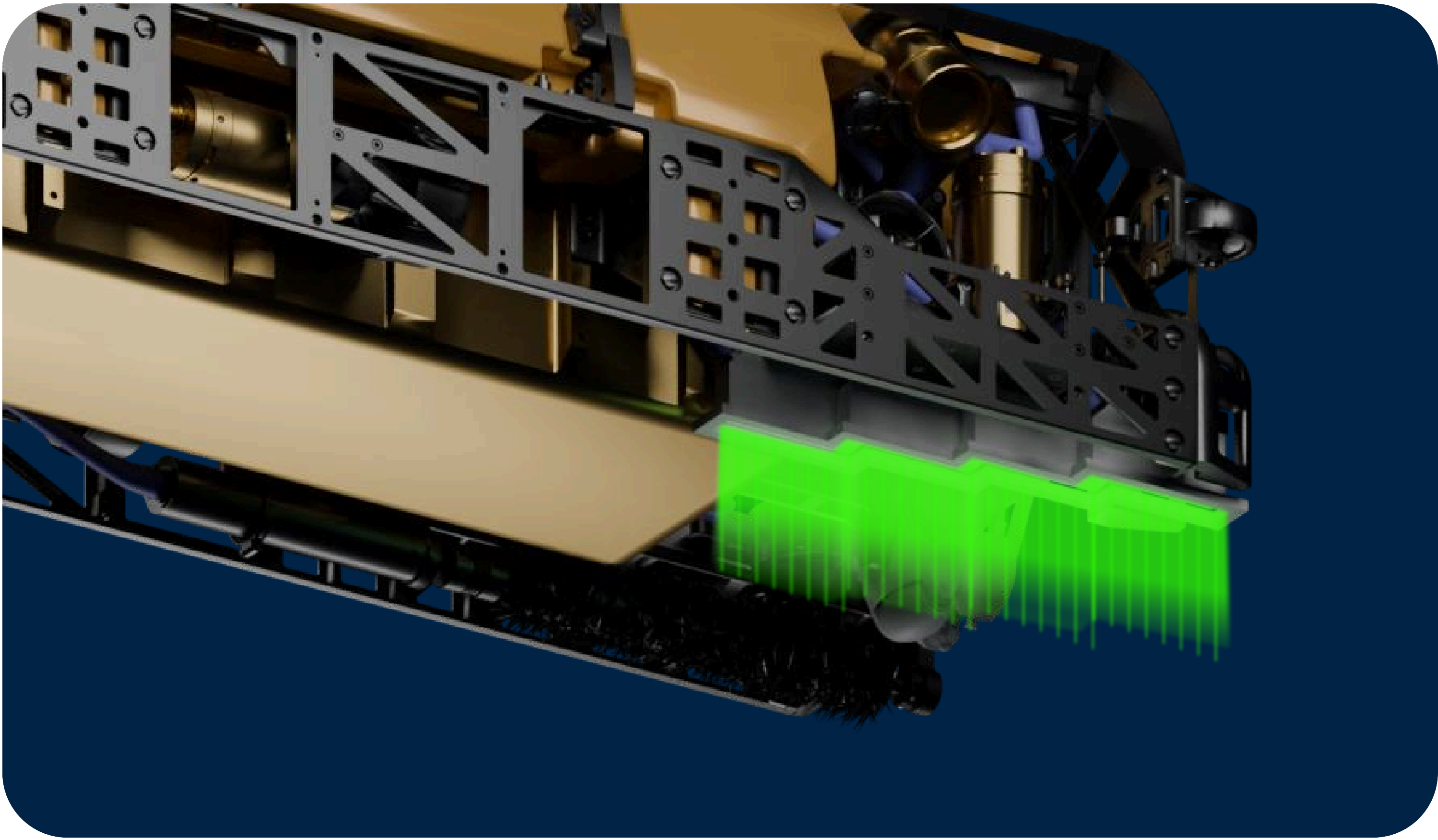
Compliance at a lower cost:

- Tank bottom volumetric wall loss inspection
- Internal, visual inspection
- On-stream tank bottom settlement characterization

Dimensions	1.70 x 0.51 x 0.45 m (67 x 20 x 18 inches)
Weight	120 kg (265 lbs)
Max Operating Pressure	275 kPa (40 psig)
Operating Temperature	-10°C to 55°C (14°F to 131°F)
Minimum Product Density	680 kg/m ³ (SG = 0.68)

SR-3 FEATURES

Phased Array Ultrasonic Testing PAUT



PAUT Specifications:

- Probes: 4 probes, 64 elements each, staggered, operating at 10MHz
- Overlap: 6-element overlap between adjacent probes
- Pitch: 1.5 mm
- Aperture: 7 elements
- Measurements: 208 measurements per sequence, spanning a 312 mm length
- Speed: 44 sequences per second

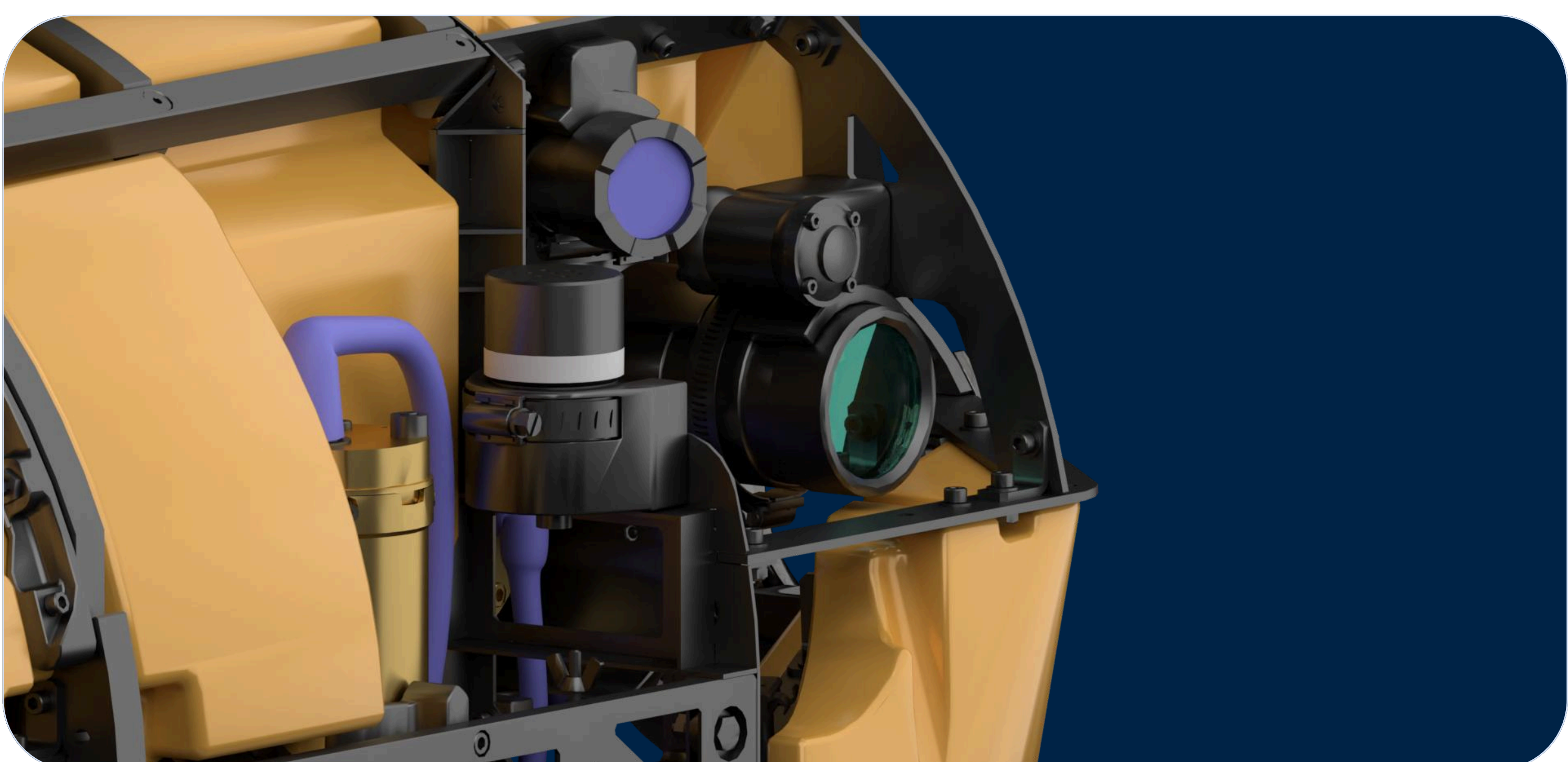
Elevation Mapping

Using its onboard pressure sensor, our robotic inspection system provides a novel and safe approach to conducting differential bottom elevation measurements and surveying aboveground storage tanks.

The system allows tanks to remain filled with product, thereby collecting bottom elevation data under fully loaded conditions. Our approach uses one data set to assess the tank shell, edge, and localized bottom settlement, providing tank owners with asset integrity information without service disruptions.



Visual - Camera Functionality



Multi-directional views from the high-resolution cameras allow the robot to record visual datasets on the condition of internal coating, structures, nozzles, and sediment accumulation levels. Our robot correlates its position in the tank with Phased Array Ultrasonic Testing and high resolution visual data of the same location.

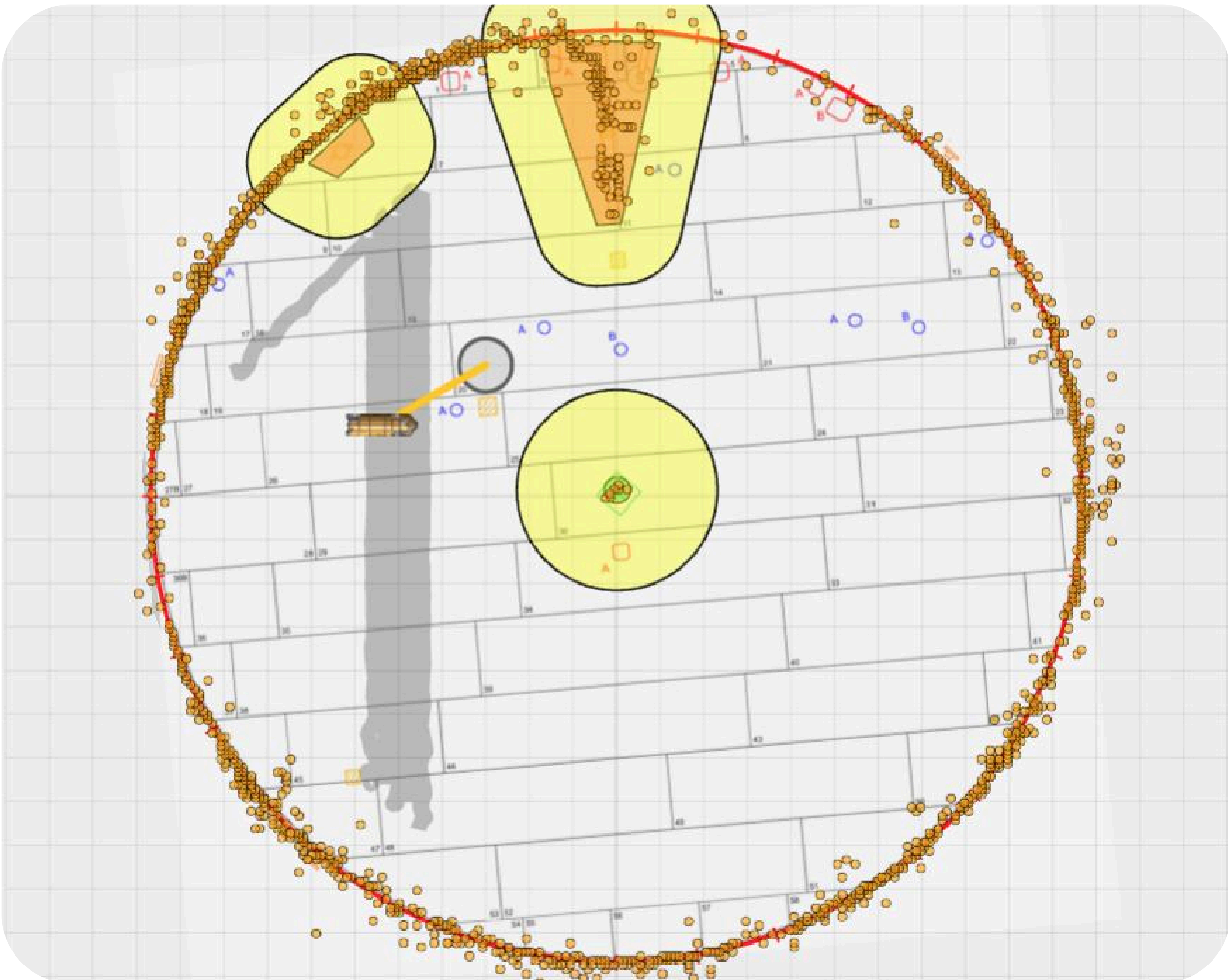
In simpler terms, when corrosion is visible, we can examine the PAUT data for that specific spot, providing information about its location, appearance, and the extent of corrosion in that area.

SR-3 FEATURES / ROBOT LAUNCH CAPABILITIES

Advanced Navigation Technology

Square Robot’s suite of tank inspection robots comes equipped with our proprietary navigation solution that allows the system to accurately and autonomously navigate inside GPS denied environments within storage tanks.

Throughout each inspection mission, the robot continuously collects valuable data that allows asset owners to make informed decisions using quantitative information.



Roof and Shell Launch and Recovery Systems

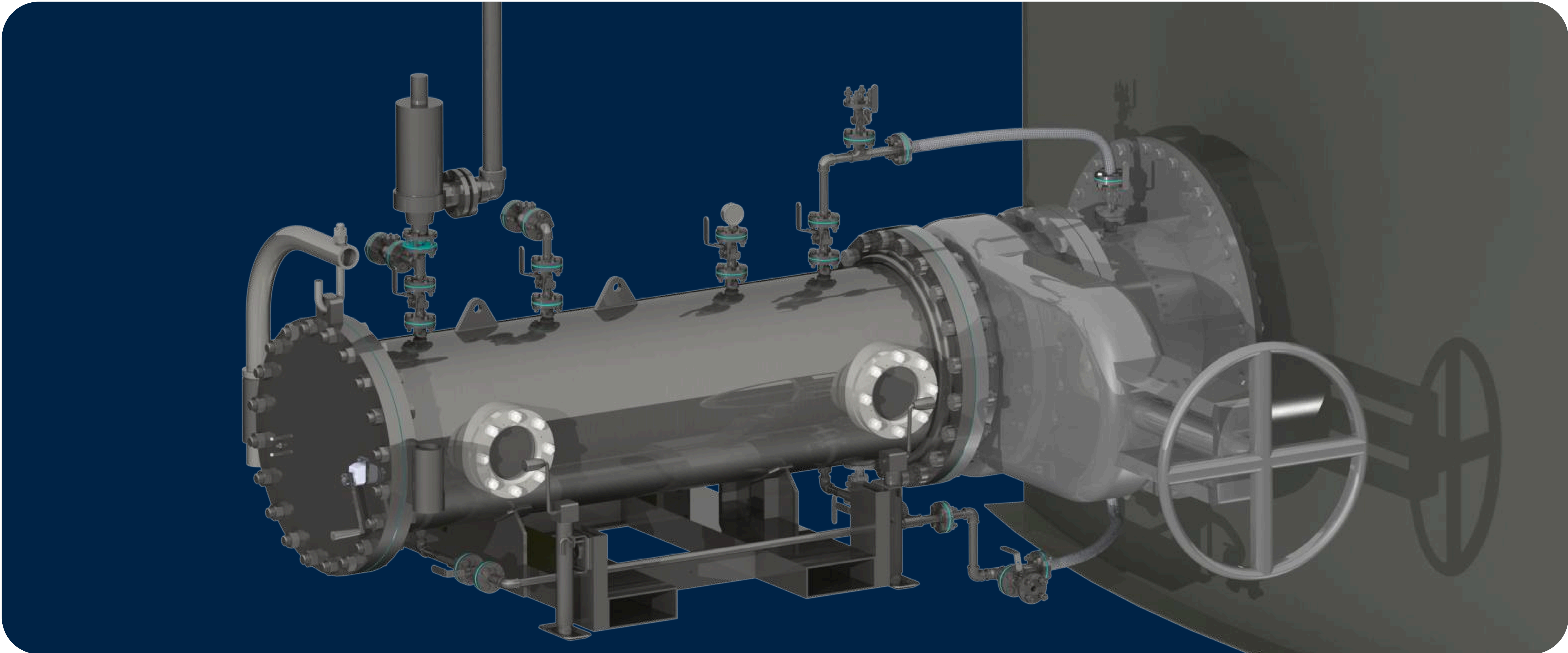
Square Robot’s SR-3 can be launched and recovered into the tank for inspection through a minimum 24-inch roof or shell manway, depending on project requirements.

SR-3 Robot Launch and Recovery Considerations

Item	Roof Launch	Shell Launch
Roof Type	Fixed, External Floating	Internal Floating
Product Type	High Flash Point including Water, Distillates, Lube Oil, Other	Low or High Flash Point including Gasoline, Naphtha, Ethanol, Methanol, Other
Manway Size	24" (610mm) Manway (22.75" ID)	24" (610mm) Manway (22.75" ID)
Manway Access	External and internal obstructions that restrict access	- External and internal obstructions that restrict access - Minimum 20' x 5' (6.1m x 1.5) work footprint near manway
Lifting Equipment	Mobile Crane (~35 Ton)	Forklift or Crane
Ancillary Equipment	Provided by Square Robot	Nitrogen, Vacuum Truck, Cribbing
Additional Considerations	- Roof and lift safety - Manway access	Install manway adaptor/valve/blind by lowering product level below manway or hot tap shell manway

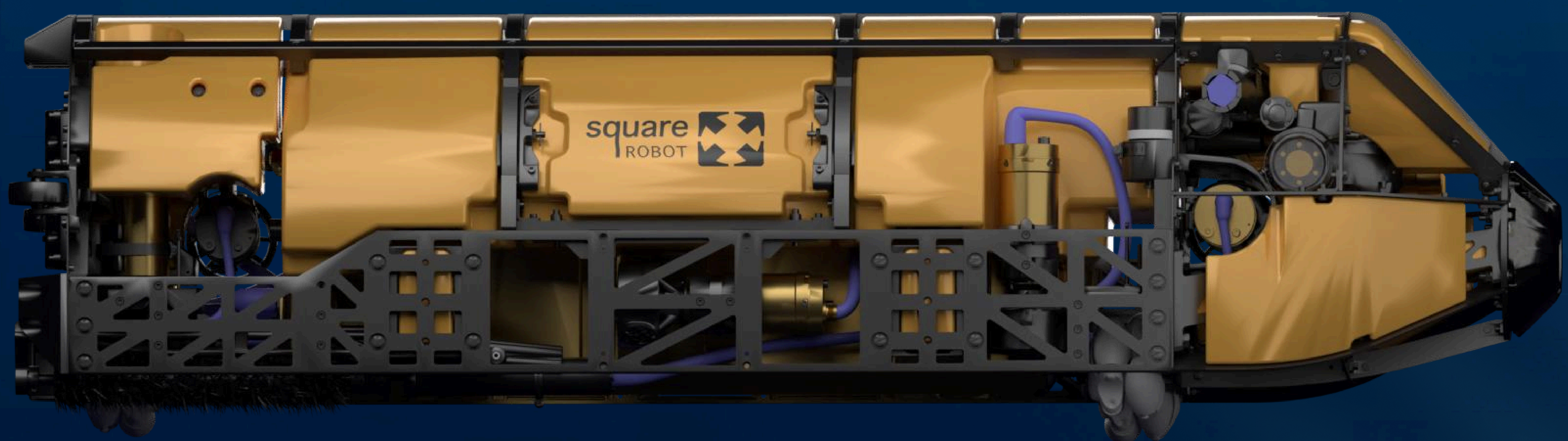
ROBOT LAUNCH CAPABILITIES

Side Launcher



Function	Enables the launch and recovery of an SR-3 robot from a AST's shell manway
Dimensions (excludes manway adapter and primary isolation valve)	7.5' L X 24" Dia
Weight (one vehicle chamber)	Empty: 2500 lbs (1130 kg) Filled: 3750 lbs (1700 kg)
Compatible Shell Manways Diameter	24" Diameter minimum
Shell Manway Ground Clearance	20.9" minimum to manway center

At Square Robot, we offer a comprehensive solution for optimizing efficiency and safety during your routine tank inspections.



To gain insight into how our industry leading above-ground storage tank inspections robots can benefit your operations, contact our team of experts: info@squarerobot.com



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