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United States Department of Energy

Hanford Double Shell Tank (DST) Tank Bottom Inspection Development

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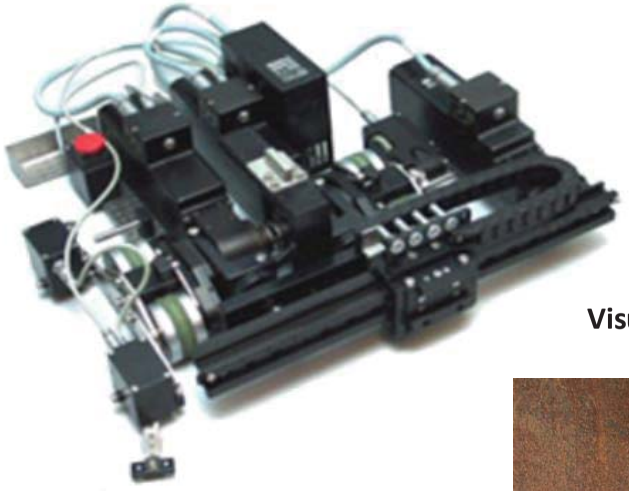
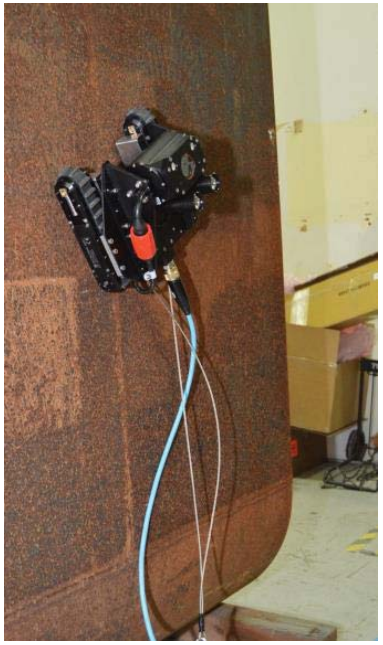
Double Shell Tank Integrity Program

- Maintain DSTs to safely store waste and support waste processing operations
- Meet RCRA requirements
- Program Elements
  - Structural analysis and studies for thermal, operating, and seismic loads
  - Waste chemistry specification and laboratory corrosion control studies
  - Waste chemistry sampling and adjustments for corrosion prevention
  - Primary tank wall and annulus floor inspections

Ultrasonic Testing Crawler



Visual Inspection Crawler



PTZ Camera Systems

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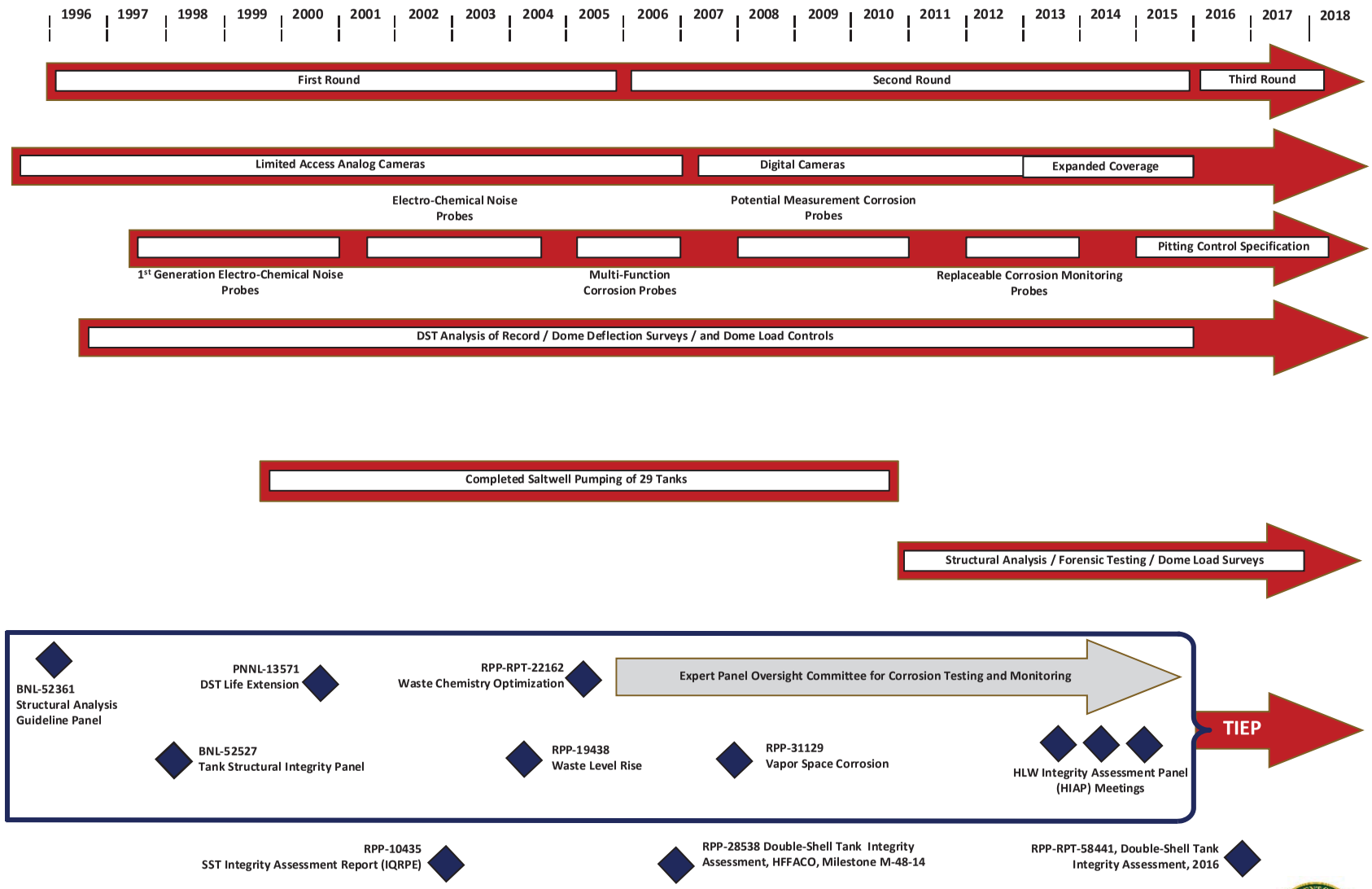
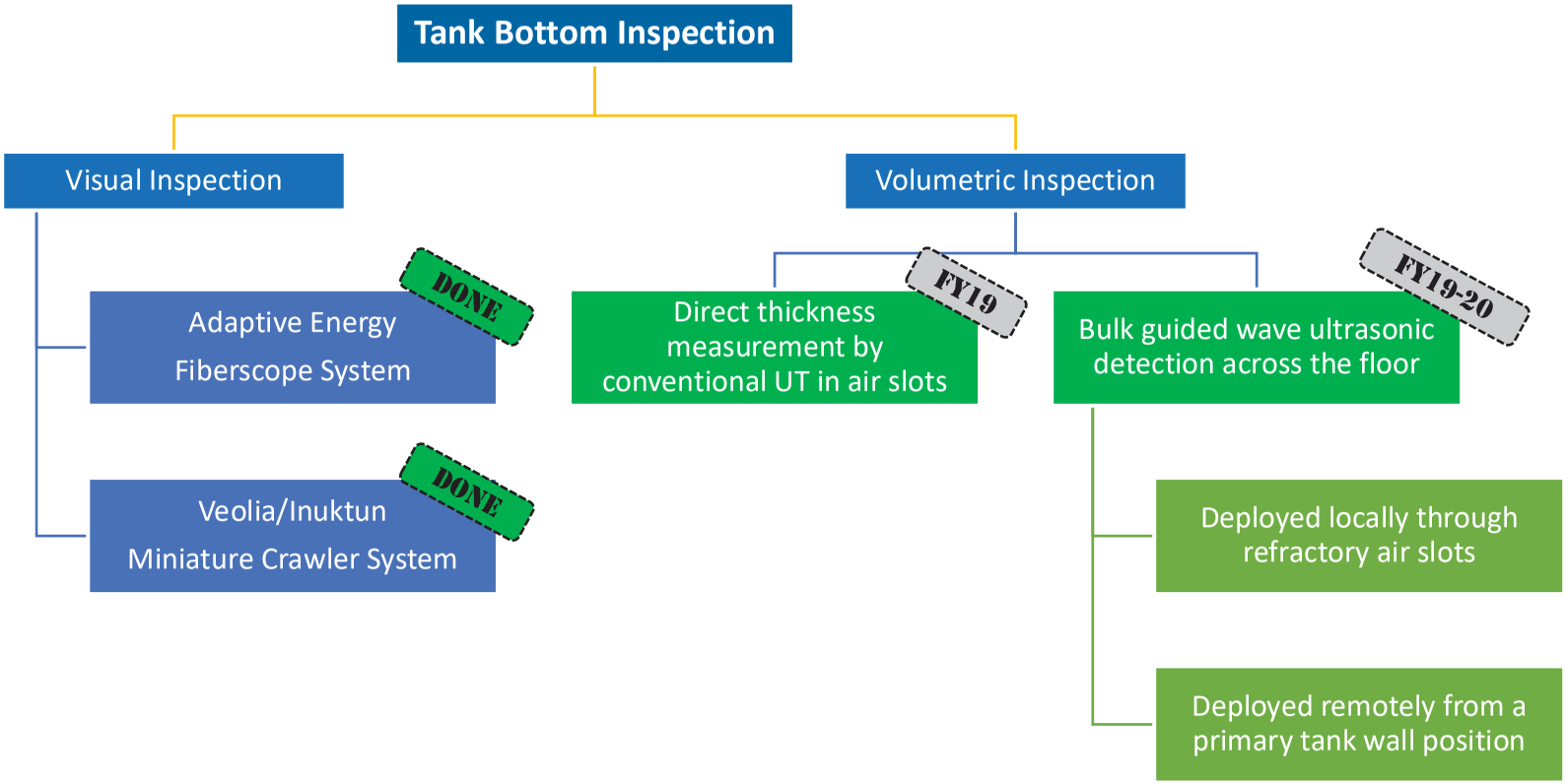
Integrity Program Evolution



Continuous Improvement

- Inspection of the tank bottom are the next steps to understand DST integrity



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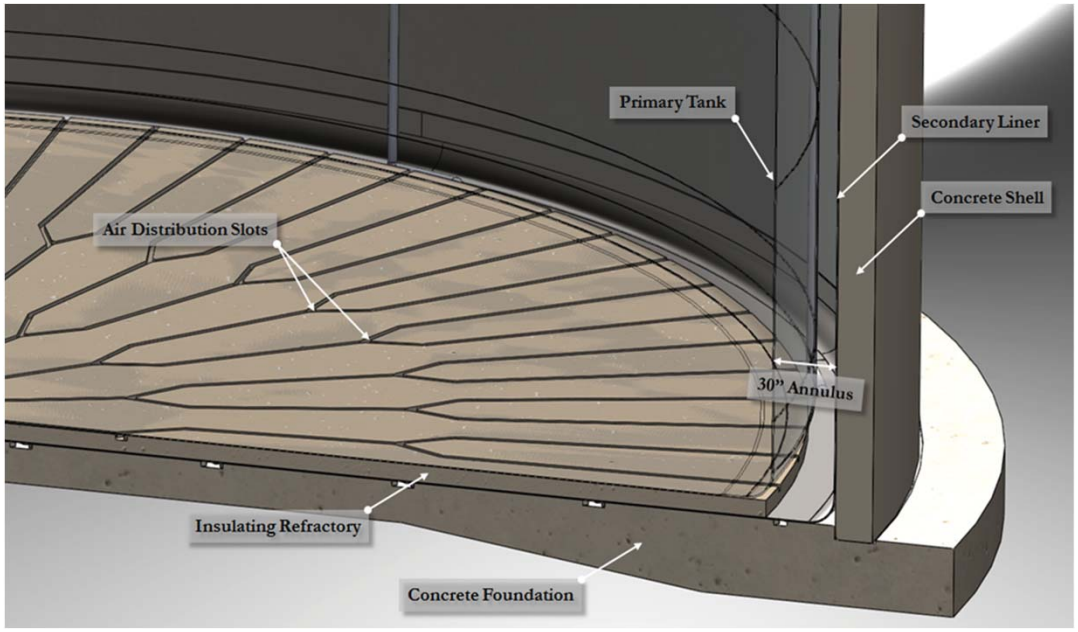
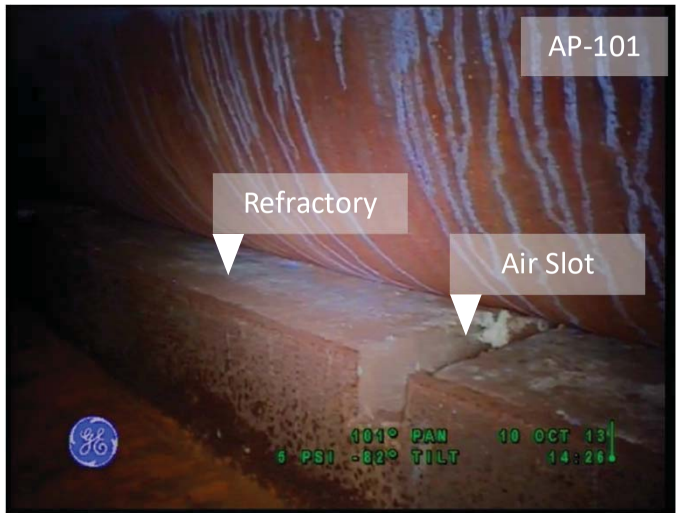
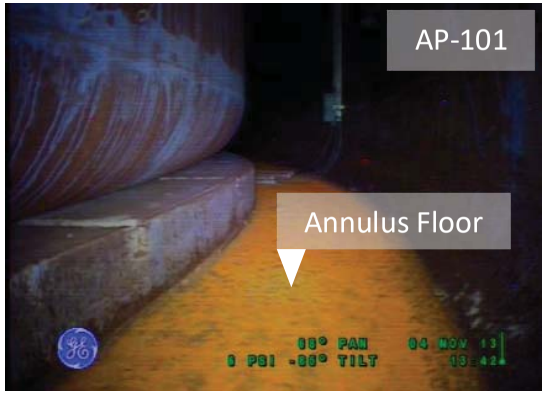
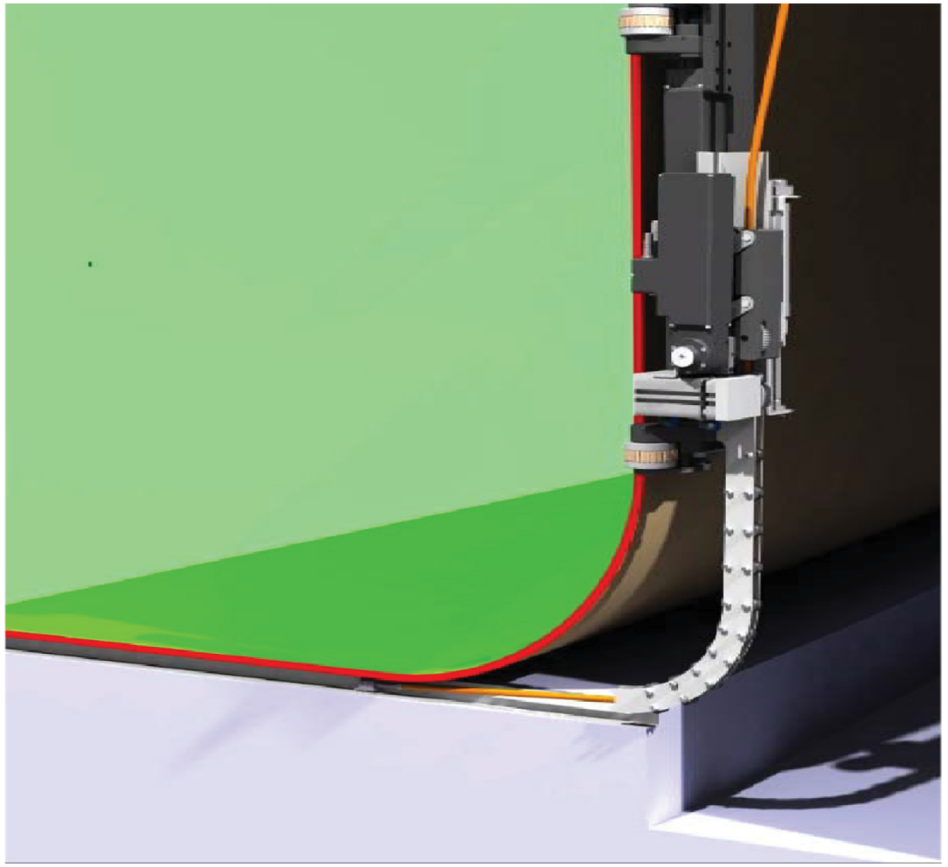
General DST Inspection Access





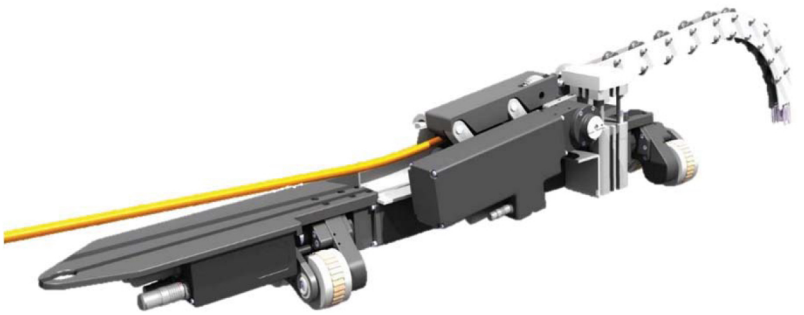


Adaptive Energy Inspection Concept



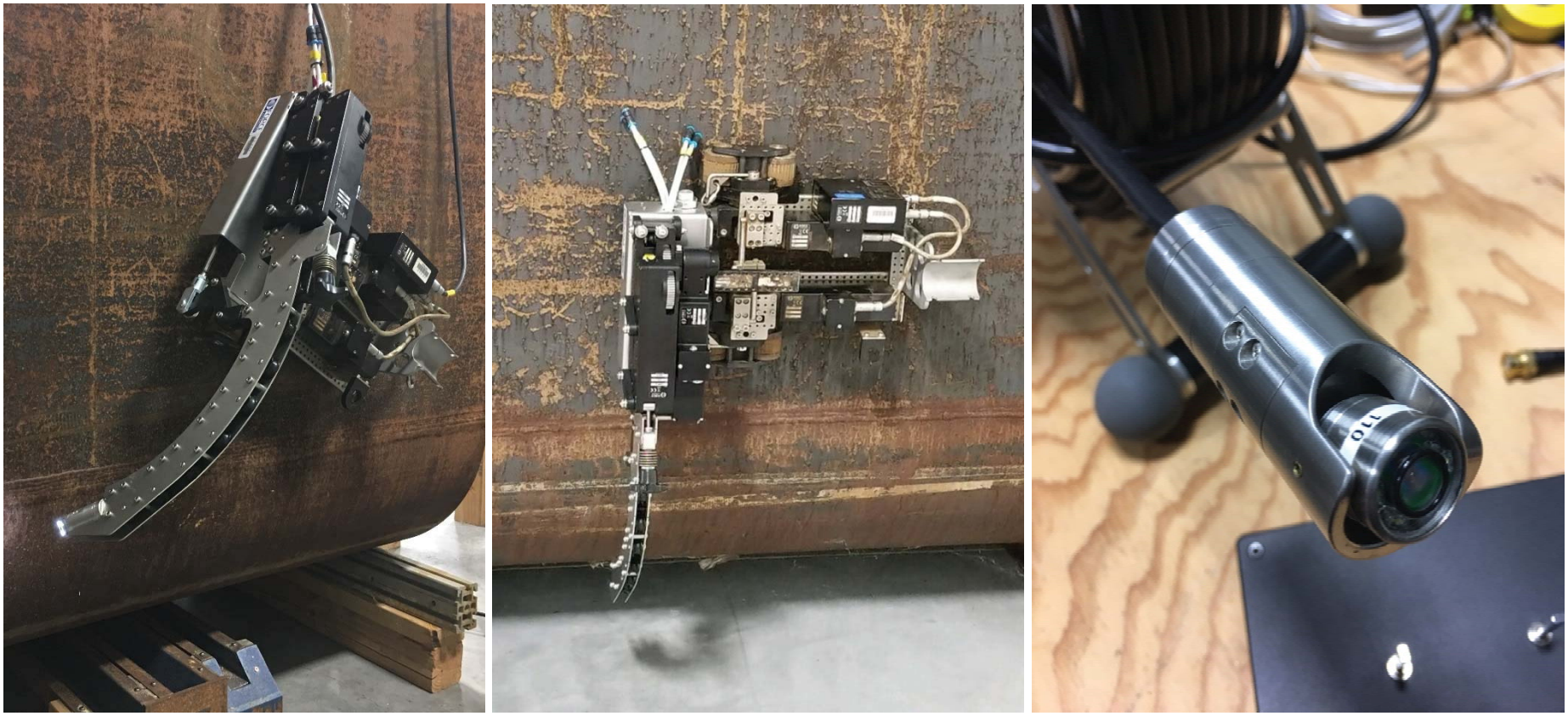
Modified FORCE Technology
AGS-2 UT Crawler

Push-Pull Tool



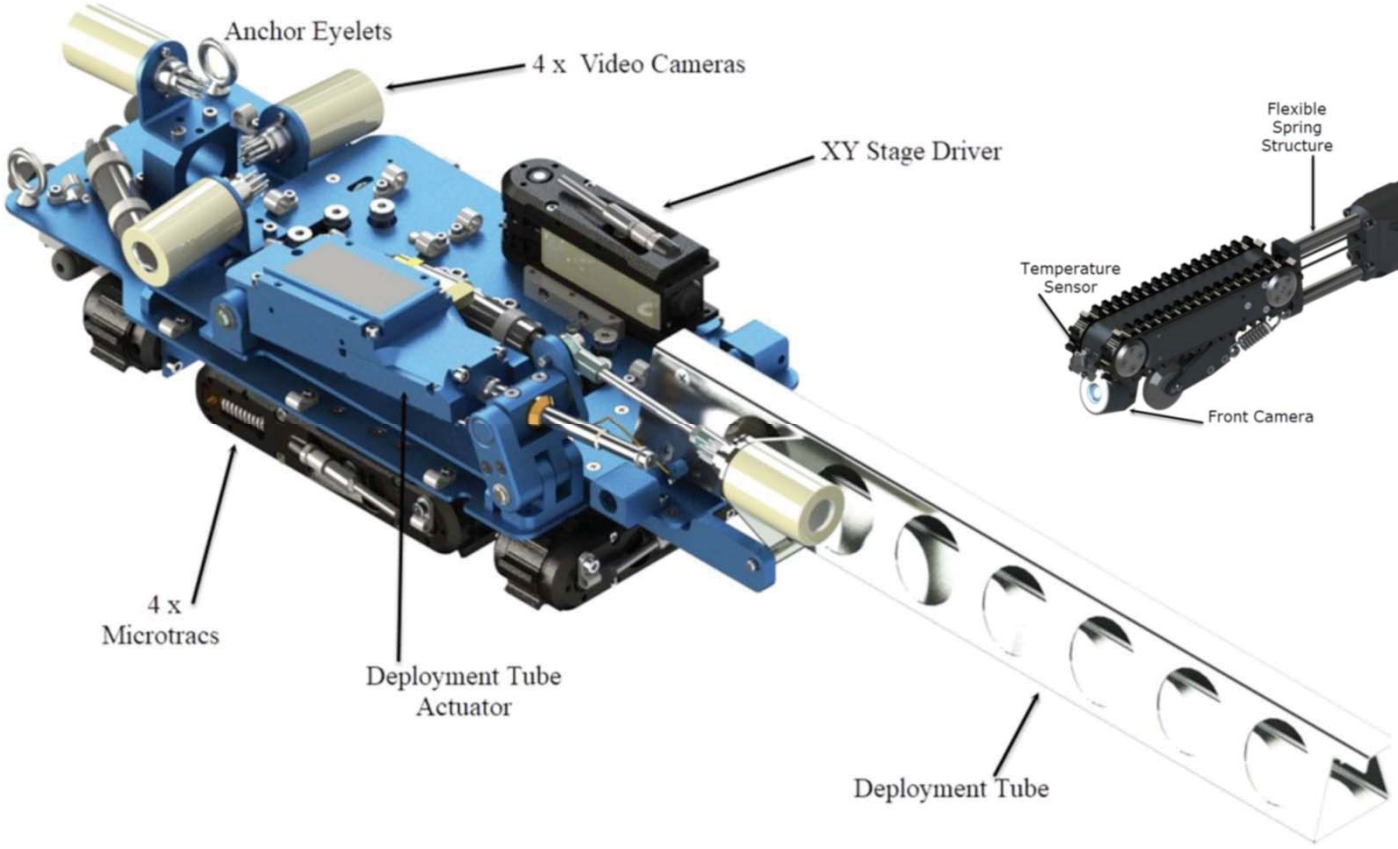
Adaptive Energy Inspection System

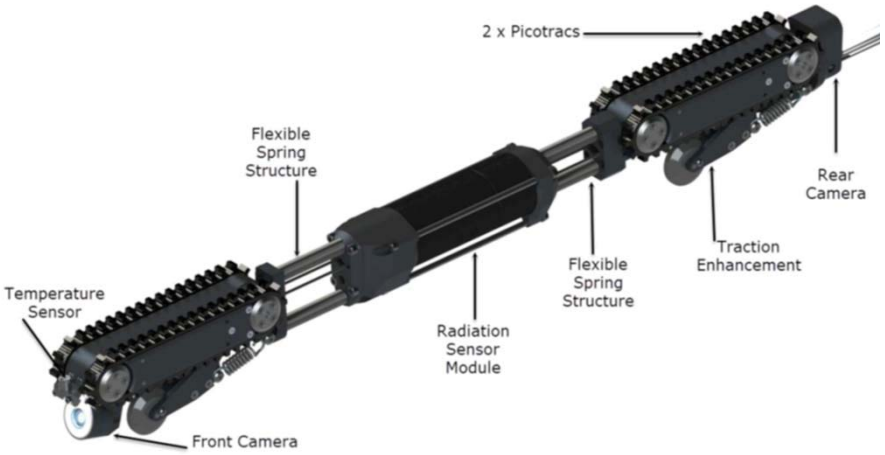
FORCE Push-Pull System attached to existing FORCE AGS-2 crawler platform and ridged fiberscope inspection camera head with pan/tilt functionality

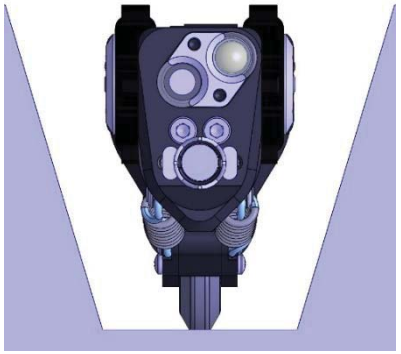


Mock-up Testing at vendor ITIVS facility in Richland, WA

Veolia/Inuktun Inspection Concept

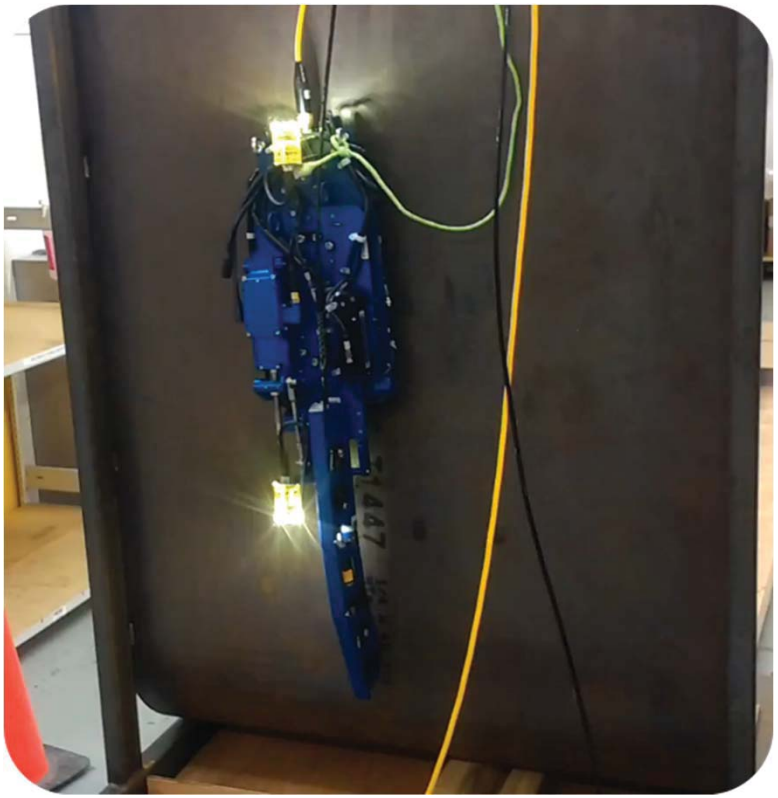






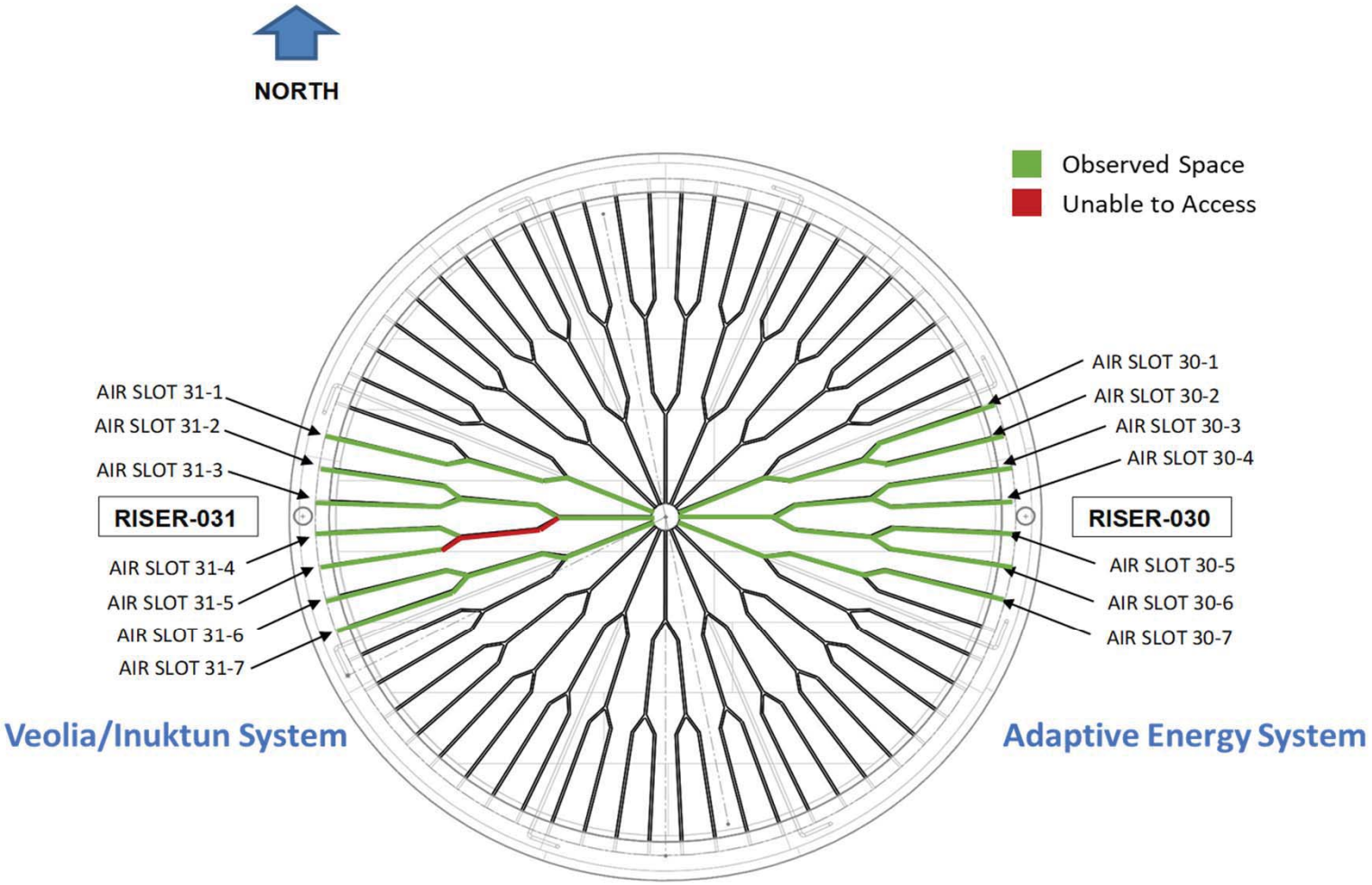
Veolia/Inuktun System Testing

Inuktun marsupial design deploys a small inspection crawler platform into the air slot to deliver cameras and other sensors



Mock-up testing at vendor Inuktun Services Ltd facility in Nanaimo, BC

AP-107 Slot Visual Inspection Plan



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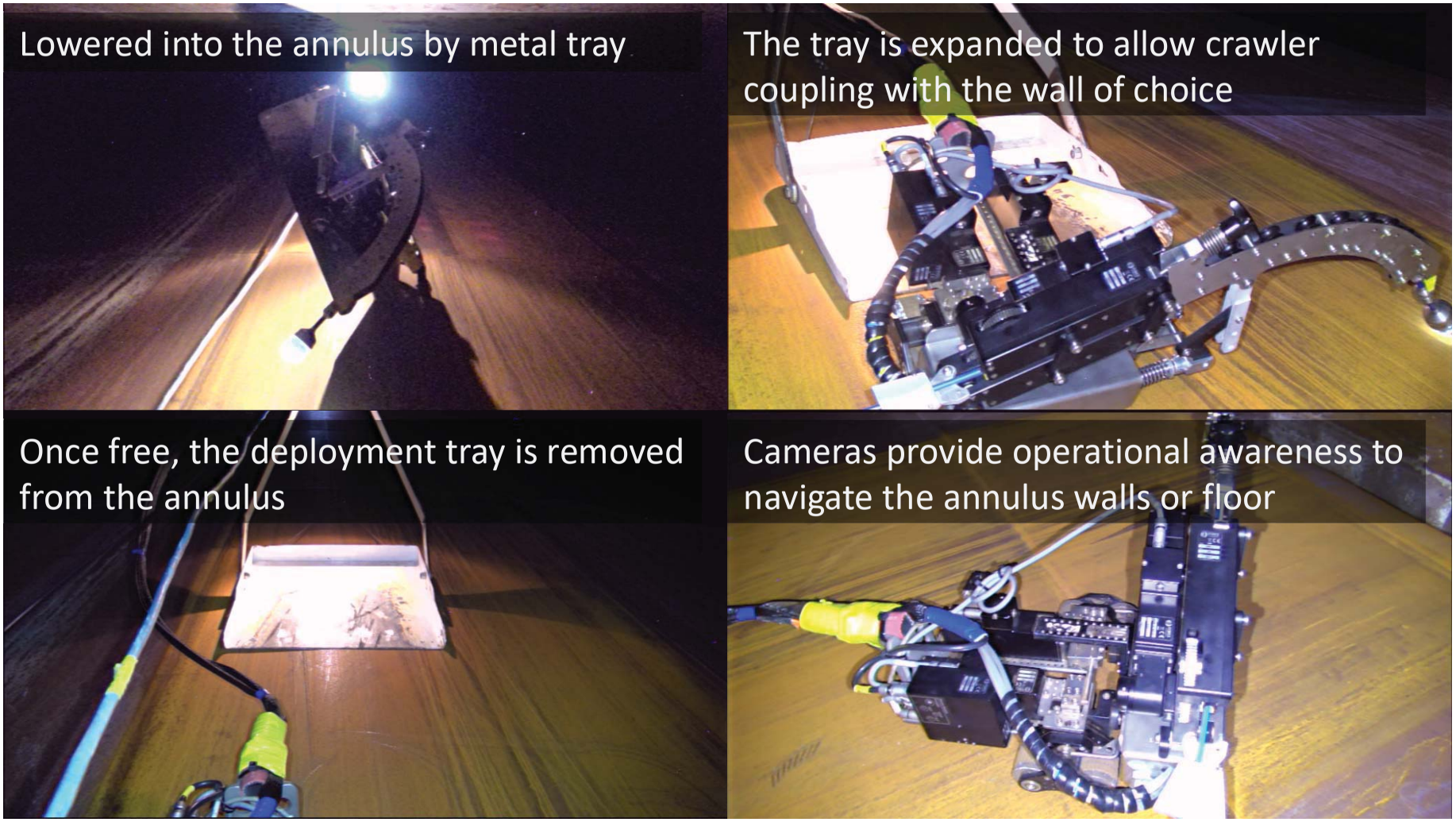
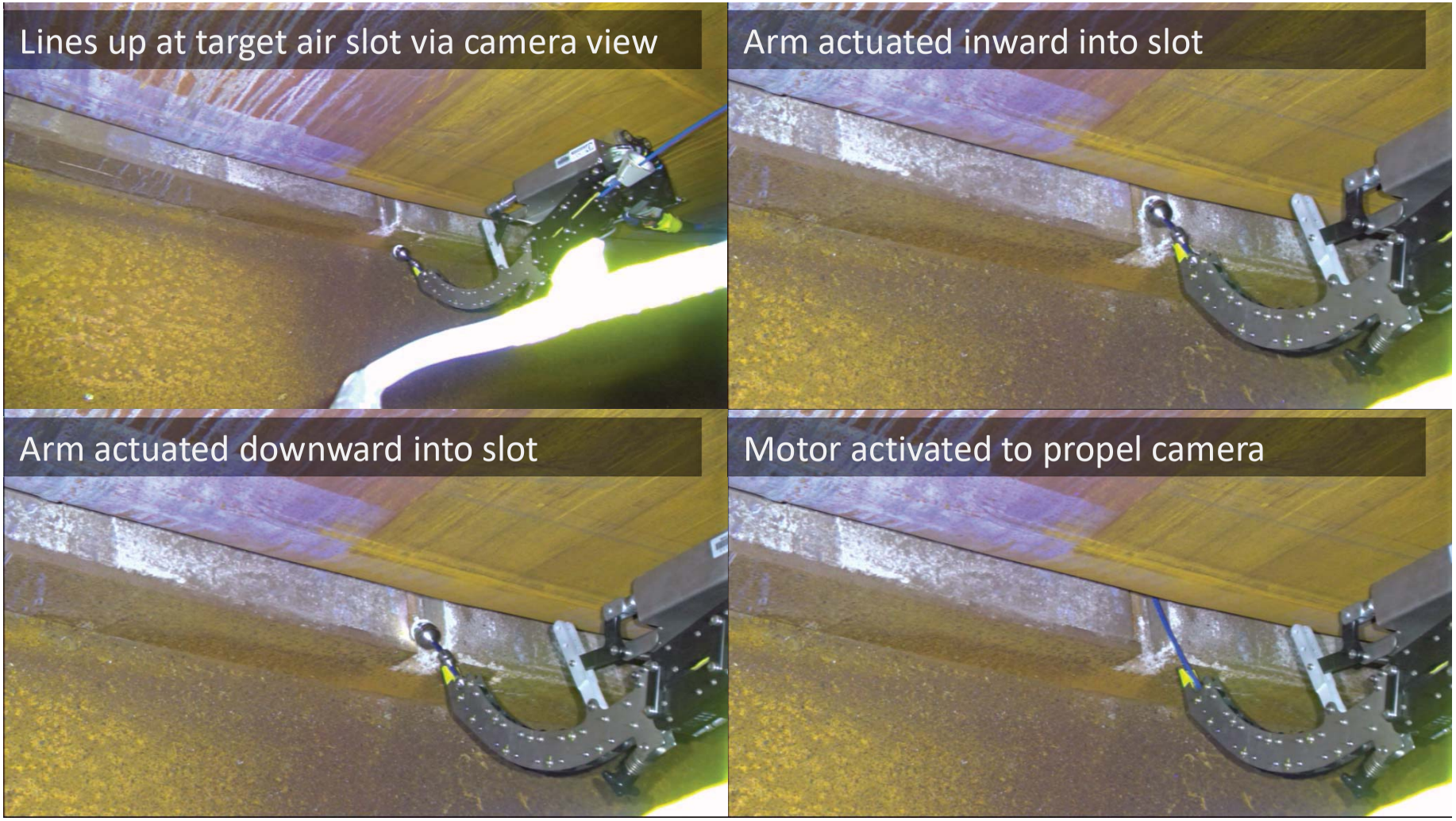
Annulus Deployment Logistics



Photos taken during first Adaptive Energy system field deployment in Tank AP-107

Slot Deployment Logistics



Photos taken during first Adaptive Energy system field deployment in Tank AP-107

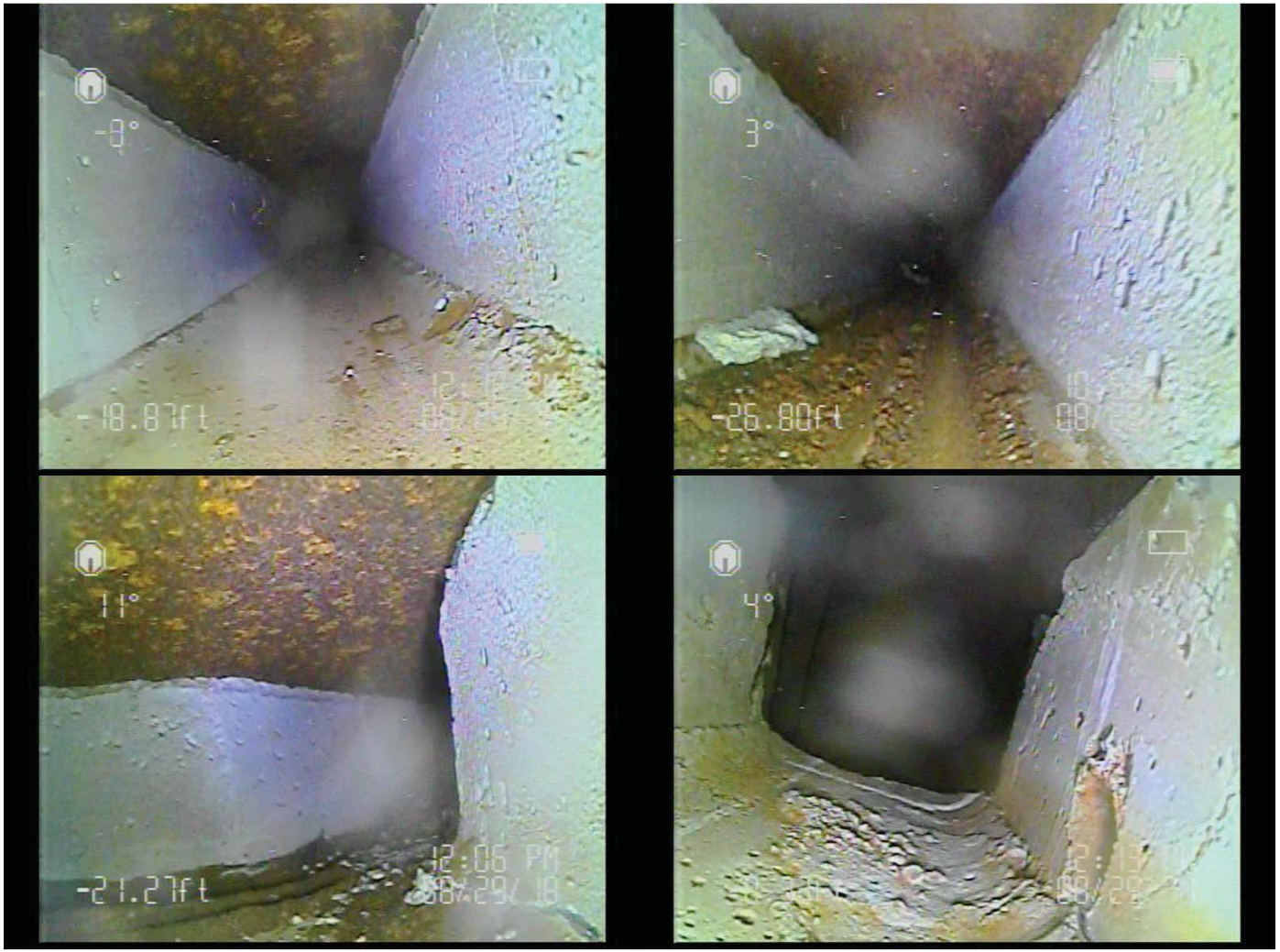
Operator Vision Tools

- On board cameras for positional awareness
- Supplementary tools to guide navigation

MaggHD crawler

MaggHD crawler in use on tank AY-101 secondary liner wall

Adaptive Energy System



Examples of Riser 30 side air slot condition under tank AP-107

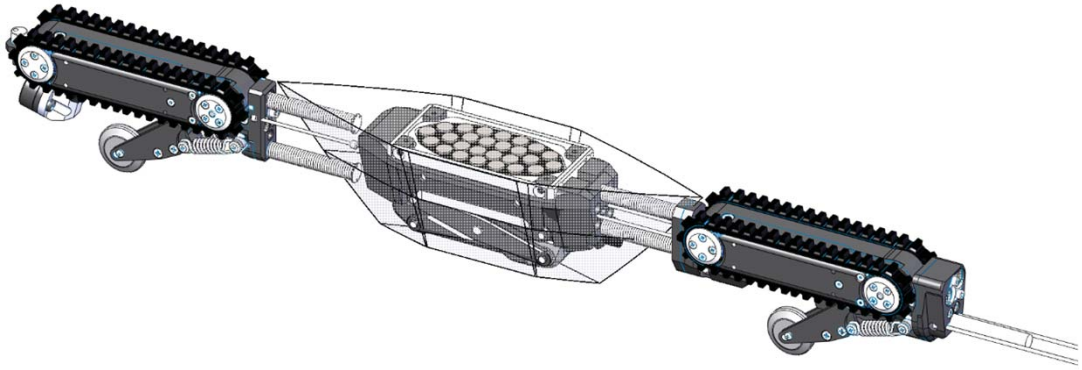
Veolia/Inuktun System

Examples of Riser 31 side air slot condition under tank AP-107

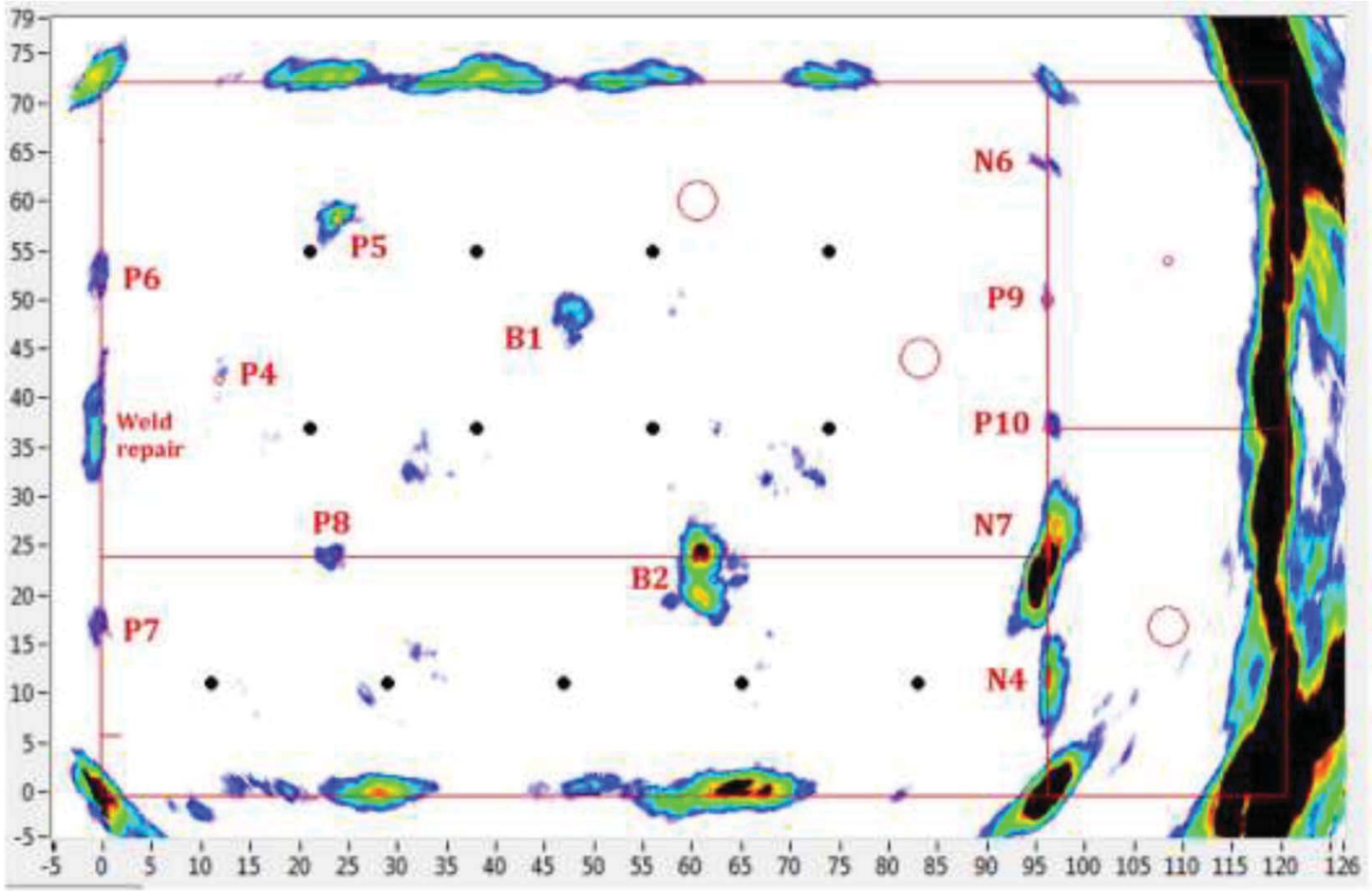
Volumetric Air Slot Inspection Development

EM, PNNL Test Novel Sensor Technology for Hanford Waste Tanks

A sensor traverses a 12-by-20-foot mock-up of a Hanford tank at the Pacific Northwest National Laboratory.



Example Data from Mockup Testing



Examples of sensor data results from PNNL mock-up testing. Multiple data acquisition positions are utilized and composited to establish an overall health understanding for the bulk plate area.

Program Vision and Next Steps

- ORP evaluates opportunities to improve DST inspection practices on an ongoing basis
- Future planned work continues to support these tool developments to gather valuable DST integrity information
- New inspection tool development targets primary tank bottom and secondary liner bottom areas
- Since DST primary tank bottom visual inspection systems' maiden voyage was successful in FY18, next steps include developing volumetric sensors to further evaluate DST integrity

QUESTIONS?