



PACIFIC 
NDT
NEXT LEVEL IMAGING



PACIFIC NDT

TRANSFORMING INDUSTRIES WITH SAFE & ADVANCED X-RAY TECHNOLOGIES





ABOUT THE COMPANY

Pacific NDT is an innovative & global provider of [Digital X-Ray imaging products](#) for [NDT & Security imaging](#), [inspection](#), and [evaluation](#). The company HQ is located in Seattle, Washington, U.S.A., about 20 miles from Seattle Tacoma International Airport.

We provide rugged & portable turn-key solutions for our clients in the field of [advanced NDT & Security imaging applications](#) in competitive areas. Our projects range from using [Mobile X-ray digital DR system](#), [High-Resolution CR system](#), [factory production system integration](#), [industrial image processing](#), [automatic defect recognition \(ADR\)](#), [DICONDE Compliant Software](#), among others.

At Pacific NDT, we have consistently been at the forefront of introducing advanced X-ray solutions to the market. Our dedicated team comprises highly experienced Mechanical, Electrical, and Software Engineers who collaborate harmoniously to transform tailored X-ray solutions into reality.

Over the years, Pacific NDT has garnered a solid reputation for satisfying clients across various industries, including Security, Forensics, Concrete, Pipeline, Powerline, and Aerospace imaging. We take pride in our commitment to pushing the boundaries of technology to provide innovative solutions for our customers' diverse needs.



MISSION STATEMENT



Our mission is to digitize the NDT X-Ray industry. Pacific NDT leads the way in offering advanced digital X-Ray imaging solutions for industries like Oil & Gas, Transmission Utilities, Security, Forensic and Aerospace.



INDUSTRIES WE SERVE



POWERLINE



AUTOMOTIVE



CONCRETE



OIL & GAS



SECURITY



AEROSPACE



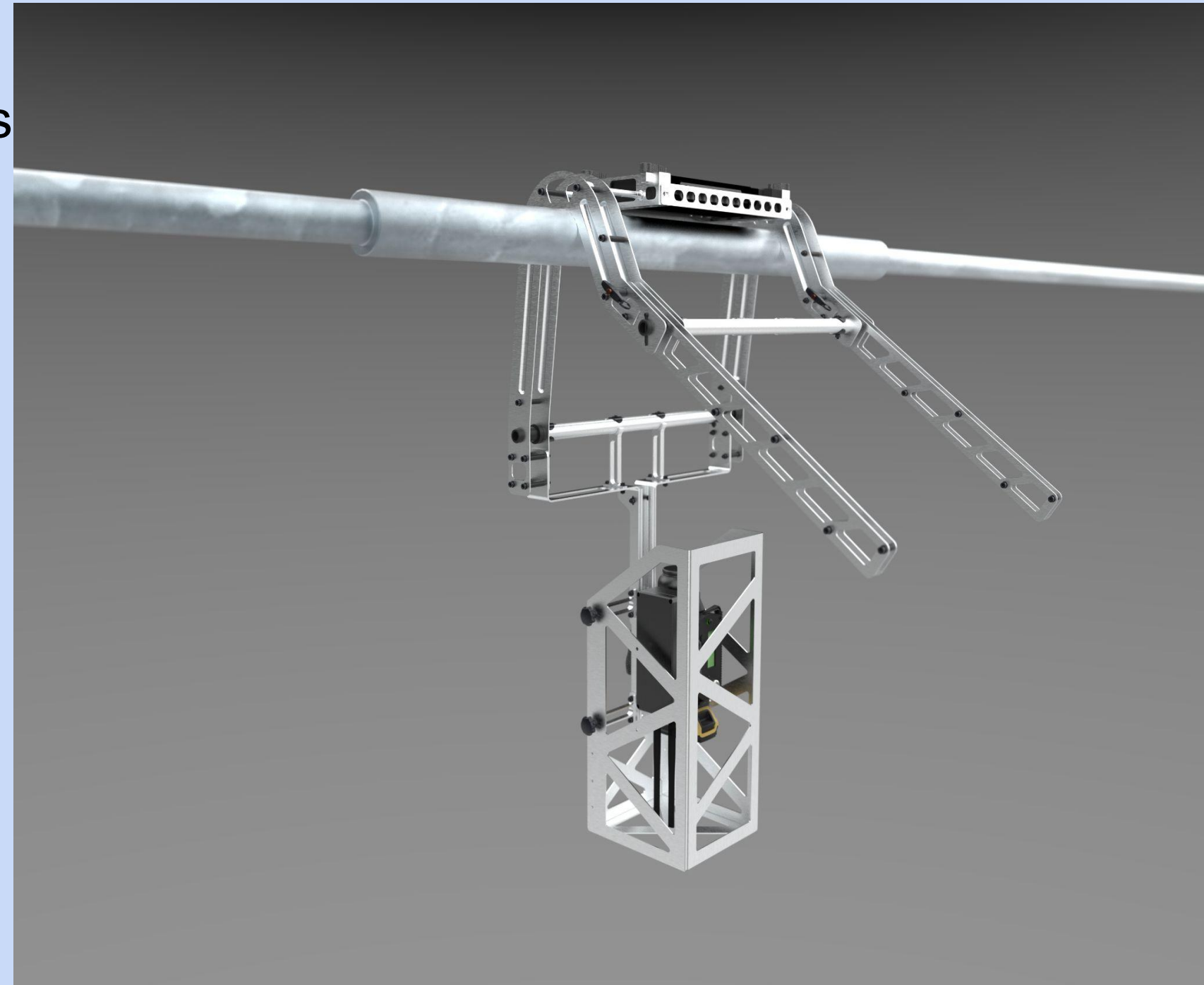
INTRODUCTION: PiX RAVEN HD (Powerline X-Ray Solution)

What does it do?

Uses X-Ray technology (constant potential) to inspect splices and dead ends.

What does it help to identify?

- a. Air Pockets
- b. Missing Grease
- c. Improper installation
- d. Cracks & Voids
- e. Implosive Splice Failure
- f. Spiral Fracture
- g. Broken Spring Fragments
- h. Detached Core



INTRODUCING: PiX RAVEN - KEY FEATURES & COMPONENTS

Uses Pulse X-Ray to inspect splices and deadends.

What are its main components?

1. High Resolution Digital Detector
2. Portable X-Ray Generator
3. Control Box
4. Lightweight frame
5. PiX Image Acquisition Software
6. Rugged laptop for field use

What are its key features?

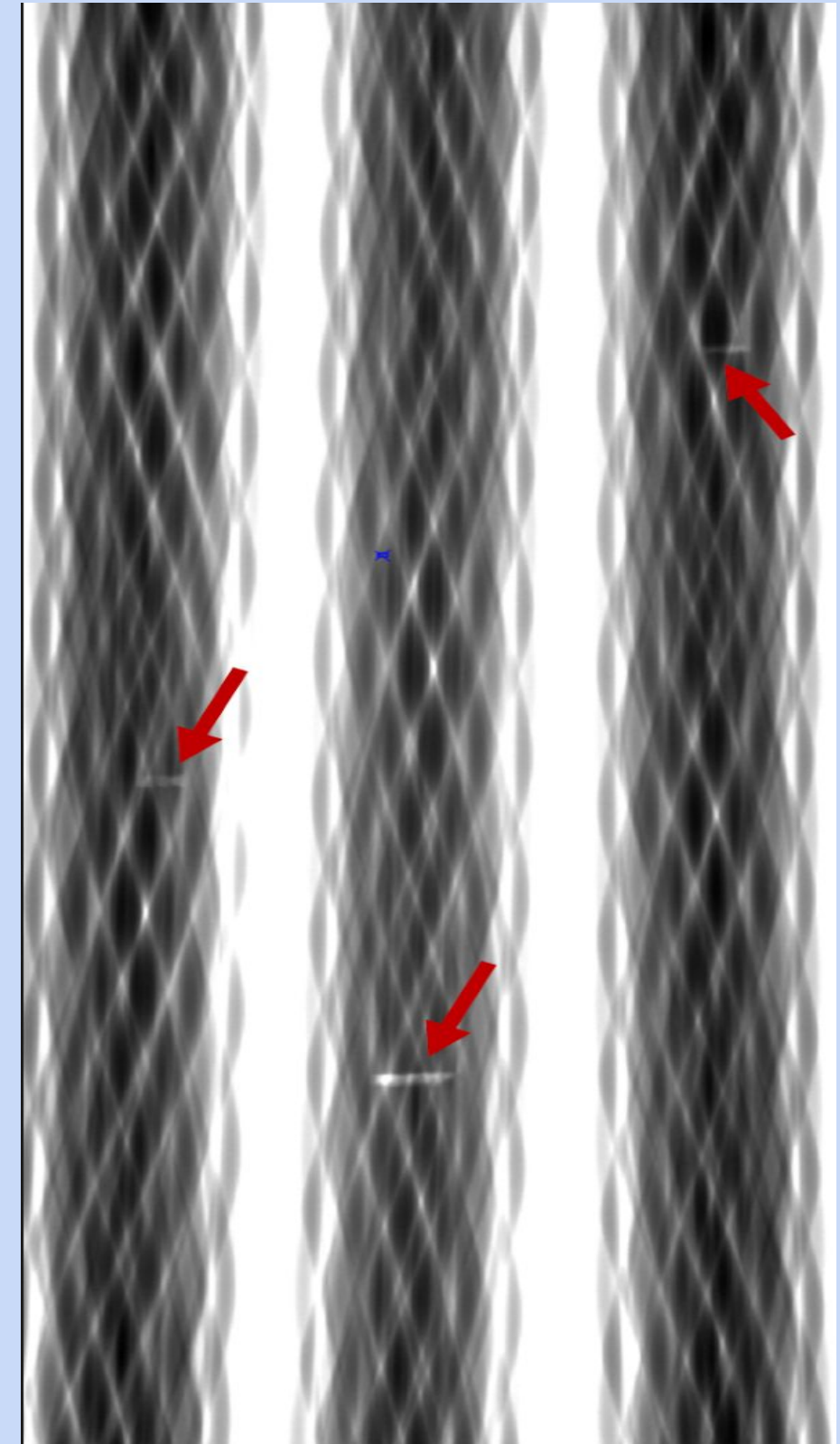
1. Portable and lightweight design for easy transport
2. Very Low radiation emissions
3. Minimal regulatory requirements
4. Delivers clear and actionable images in 30 seconds
5. Long range wireless image transfer
6. Modular design



PROBLEM STATEMENT

Current Challenges for Utility Companies

- A. Conventional inspection techniques only detect imminent failure.
- B. Current methods lack precision in powerline inspections, leading to potential safety risks and increased downtime.
- C. Traditional approach struggle to detect subtle defects in powerline components, compromising the overall reliability and longevity of the infrastructure.
- D. Reliance on visual assessment can hinder proactive risk management.



COMPARATIVE ANALYSIS

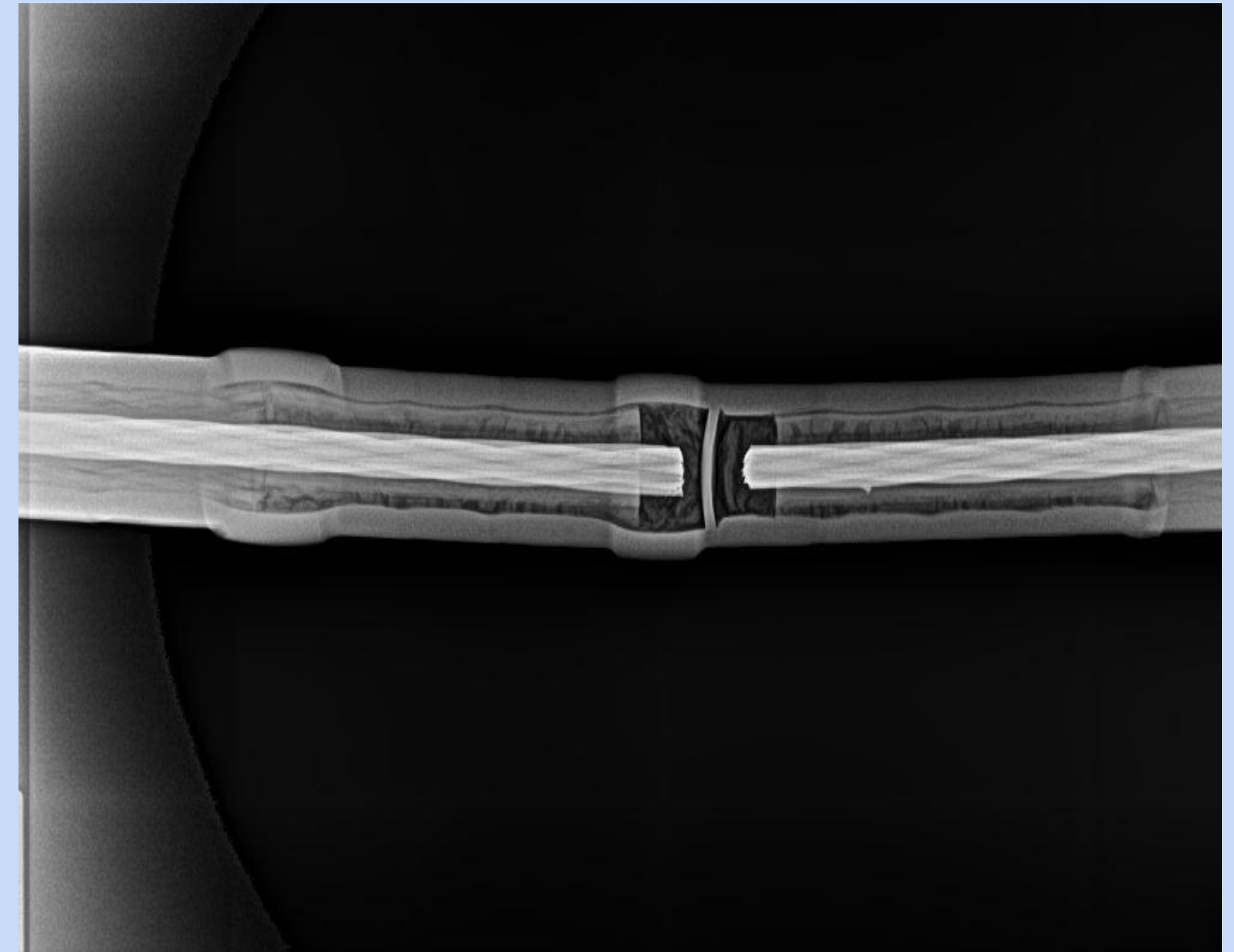
Inspection technologies include: X-Ray, Aerial Infrared Imaging, Visual Inspection, Ultrasonic Testing.

X-Ray reveals hidden flaws such as cracks, voids & corrosion.

Thermal Imaging detects heat anomalies indicative of electrical issues. Detects anomalies days to weeks before failure.

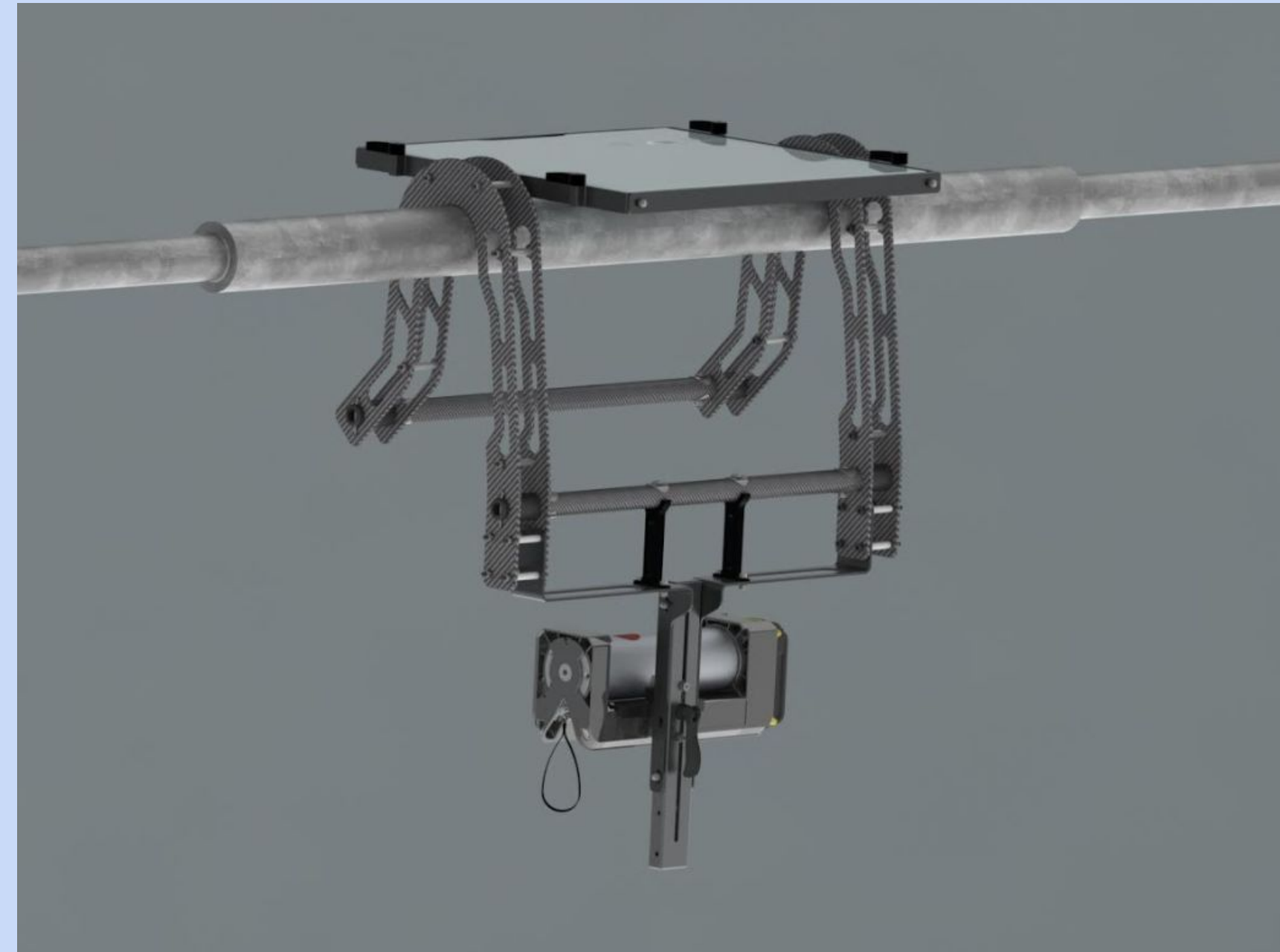
Ultrasonic Testing identifies structural defects through use of sound waves. Results are Subjective.

Choice between Digital X-Ray & other technologies depends on criticality of infrastructure being inspected. X-Ray is favorable where preventing a failure would result in significant savings or safety improvements.



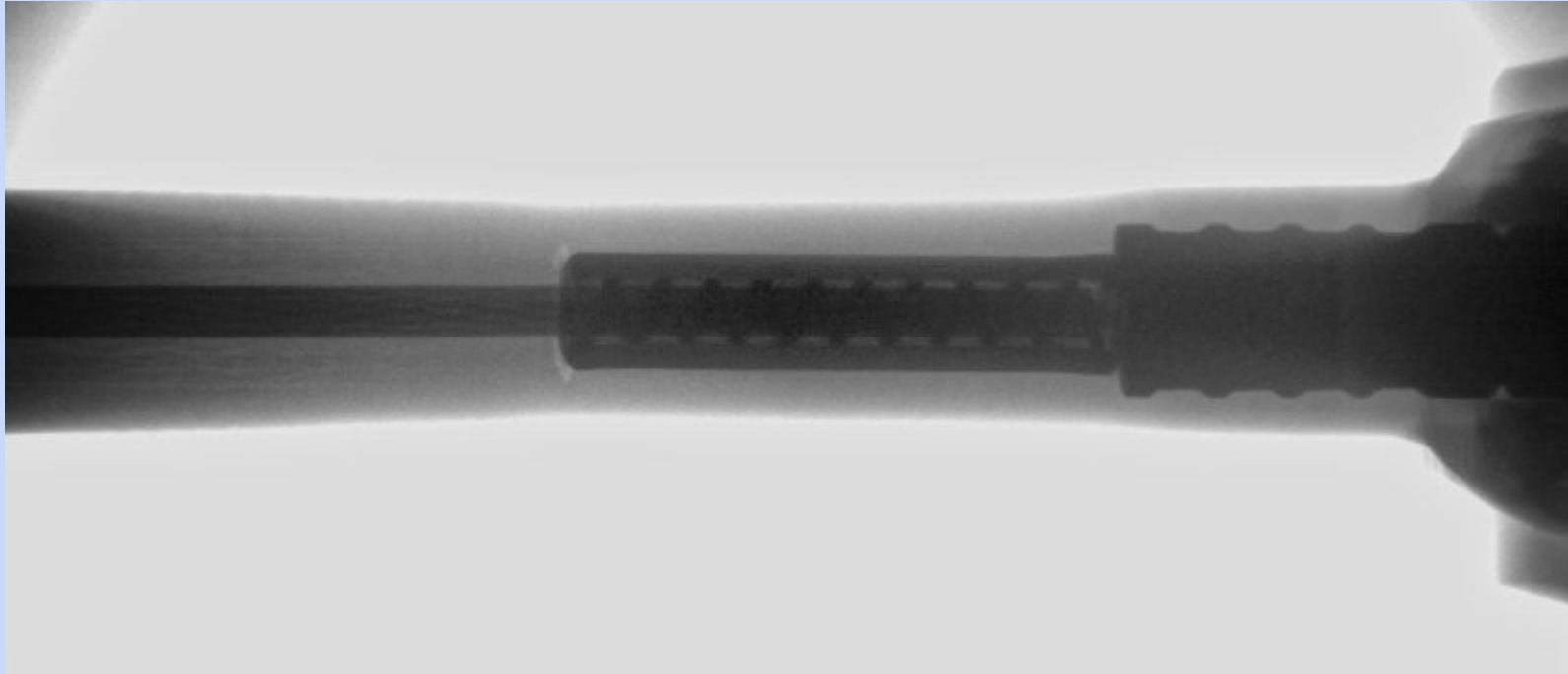
KEY BENEFITS

- Successfully find defects in ACCR, ACSR, AAC, Composite Core Conductors & other types of overhead lines.
- Exponential increase in inspection efficiency through quick and detailed image capture. (30 seconds vs 30 mins using older film or CR based X-Ray technology)
- Rapid identification of defects and imminent risks in aging powerline components.
- Accurate defect detection ensures early intervention, preventing costly failures and facilitating proactive maintenance measures.
- Enhanced safety measures by minimizing radiation levels & improving worker safety in hazardous environments.

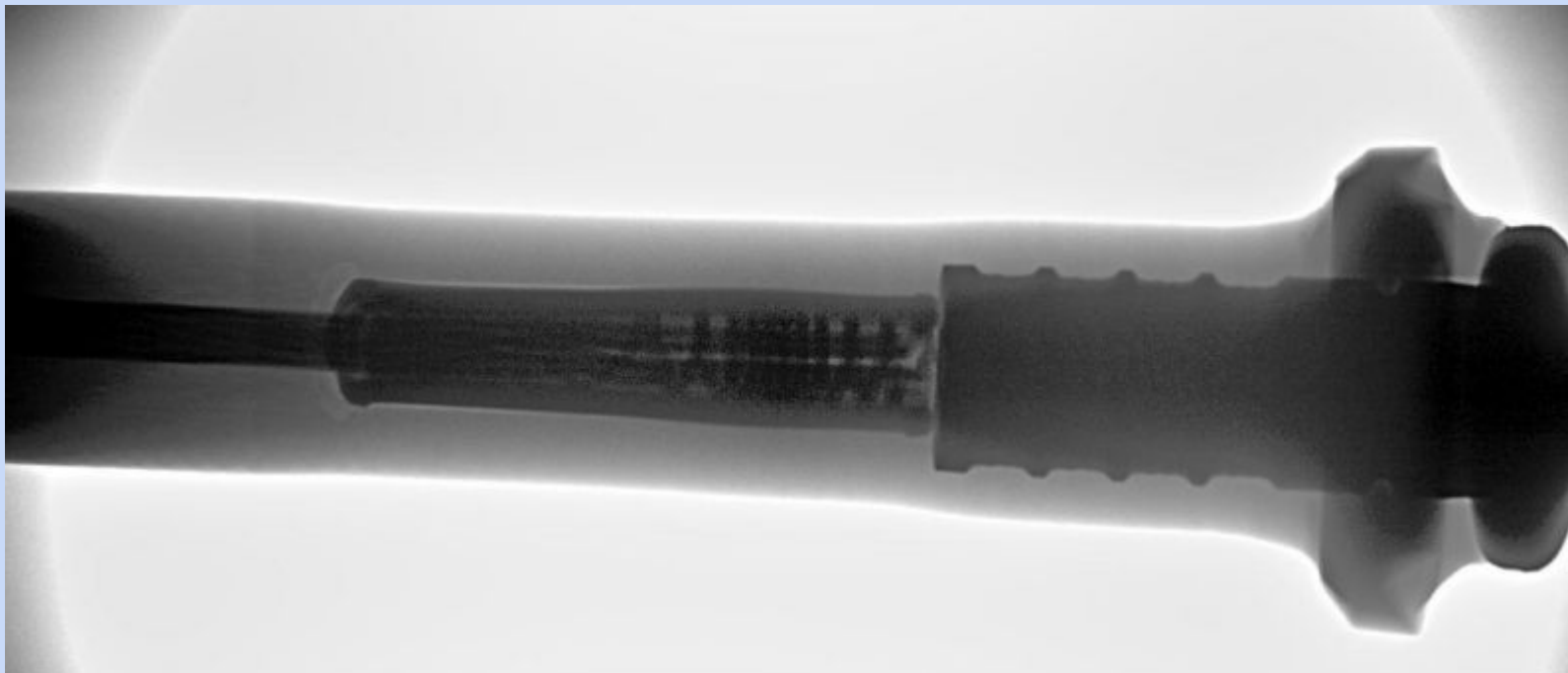


CASE STUDIES - FIELD DATA

Standard X-Ray of a Dead End



Broken Spring Fragment



Detached Core Sleeve



CASE STUDY RESULTS

Note: Pacific NDT has successful installations in more than 25 countries as of today.

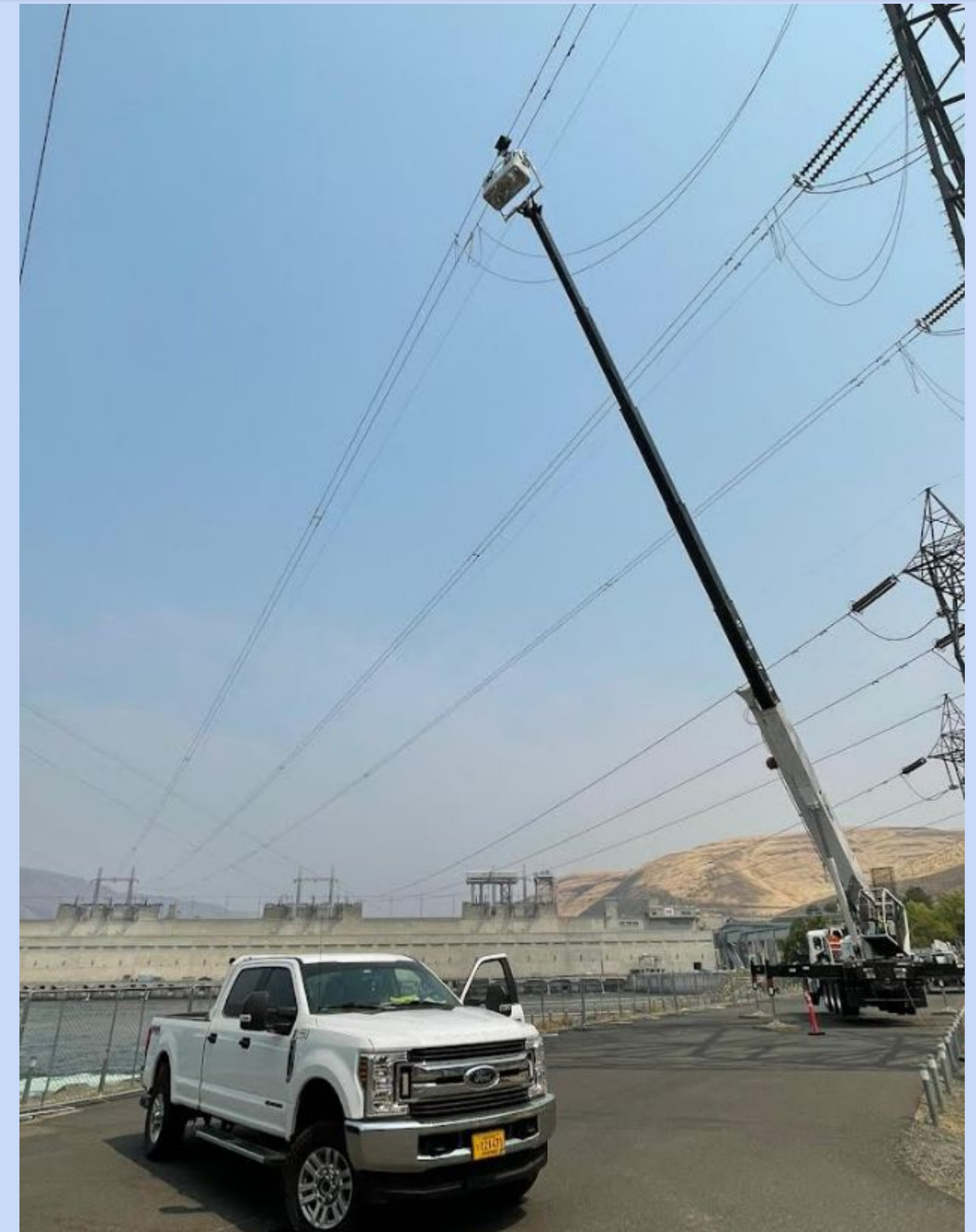
- Significant increase in defect detection rates after implementing PiX Raven
- Comparison images showcase a clear ability in identifying critical faults post-implementation of the Raven, leading to proactive maintenance and cost savings.
- Correctly captured X-Ray data eliminates subjectivity. What you see is what you get.
- Single click image capture and auto-connectivity results in quick training of users in the field
- User-friendly interface with advanced image quality results in precise defect detection.



SALES STRATEGY AND PRICING MODEL

SELL DIRECT TO UTILITIES	SELL THROUGH SERVICE PROVIDERS
Direct Relationships	Quicker Market Penetration
Higher Profit Margin	Reduced Sales & Marketing Costs
Brand Recognition	Increased focus on R&D
Longer Sales Cycle	Lower Profit Margins
Regulatory Hurdles	Less Control over branding
Difficult to Scale & resource intensive	Over dependence on partners

Currently utilizing a hybrid sales model offering both direct equipment sales & a recurring revenue model (per-project model) through service contracts.



SCALABILITY

PiX Raven is highly scalable.

Factors supporting scalability:

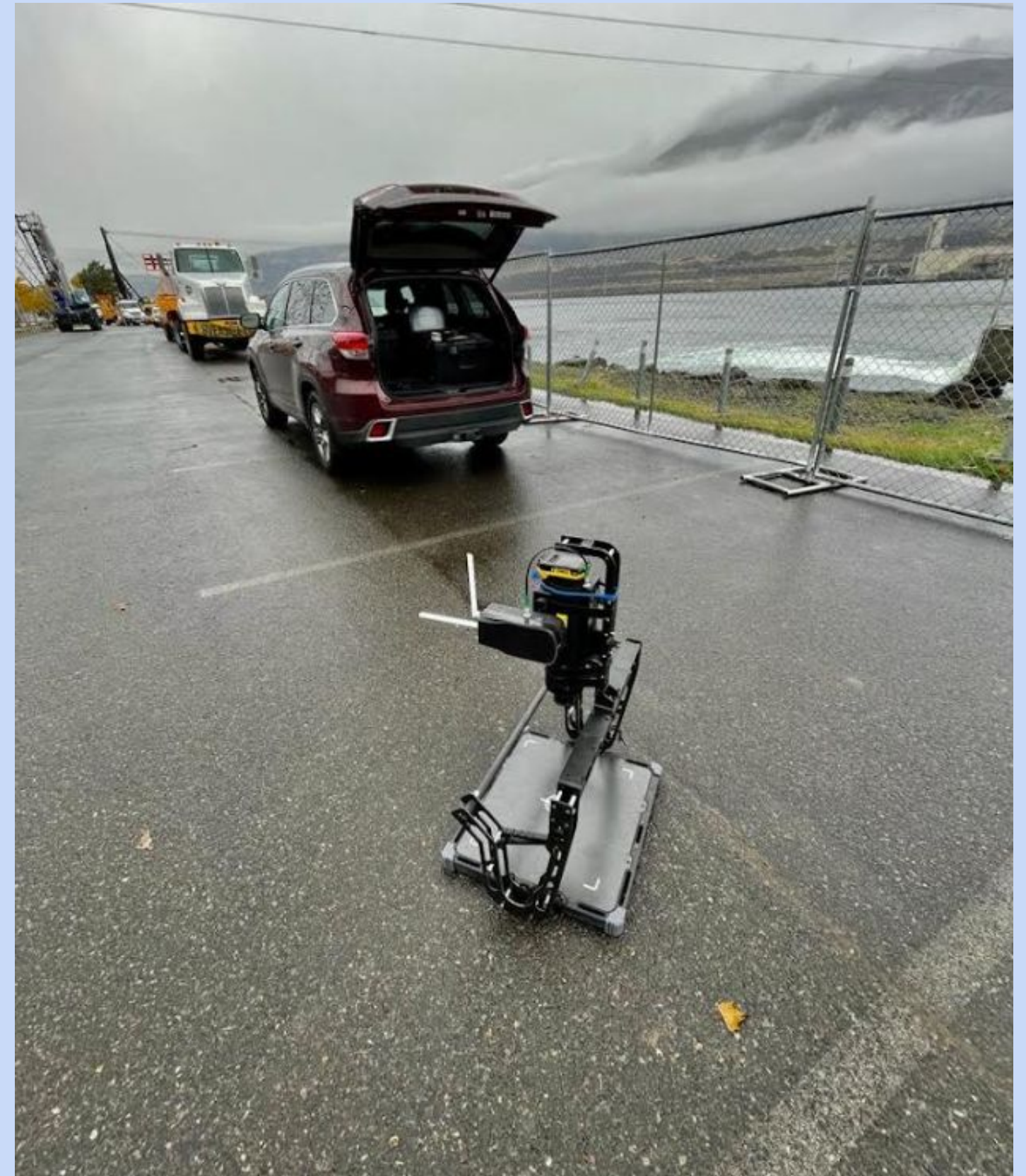
1. Portability and ease of use (single click x-ray capture)
2. Technological Advancements: Integration with Drones/Robots & using high definition detectors.
3. Adaptability to different types of power lines (ACSR, ACCR etc)
4. Increasing demand for grid reliability due to increase global energy demand & aging infrastructure.
5. Continuous update of SW remotely and HW improvements will improve product further.

Success in scaling PiX Raven requires ongoing innovation, strategic partnerships & a focus on safety & regulatory compliance.

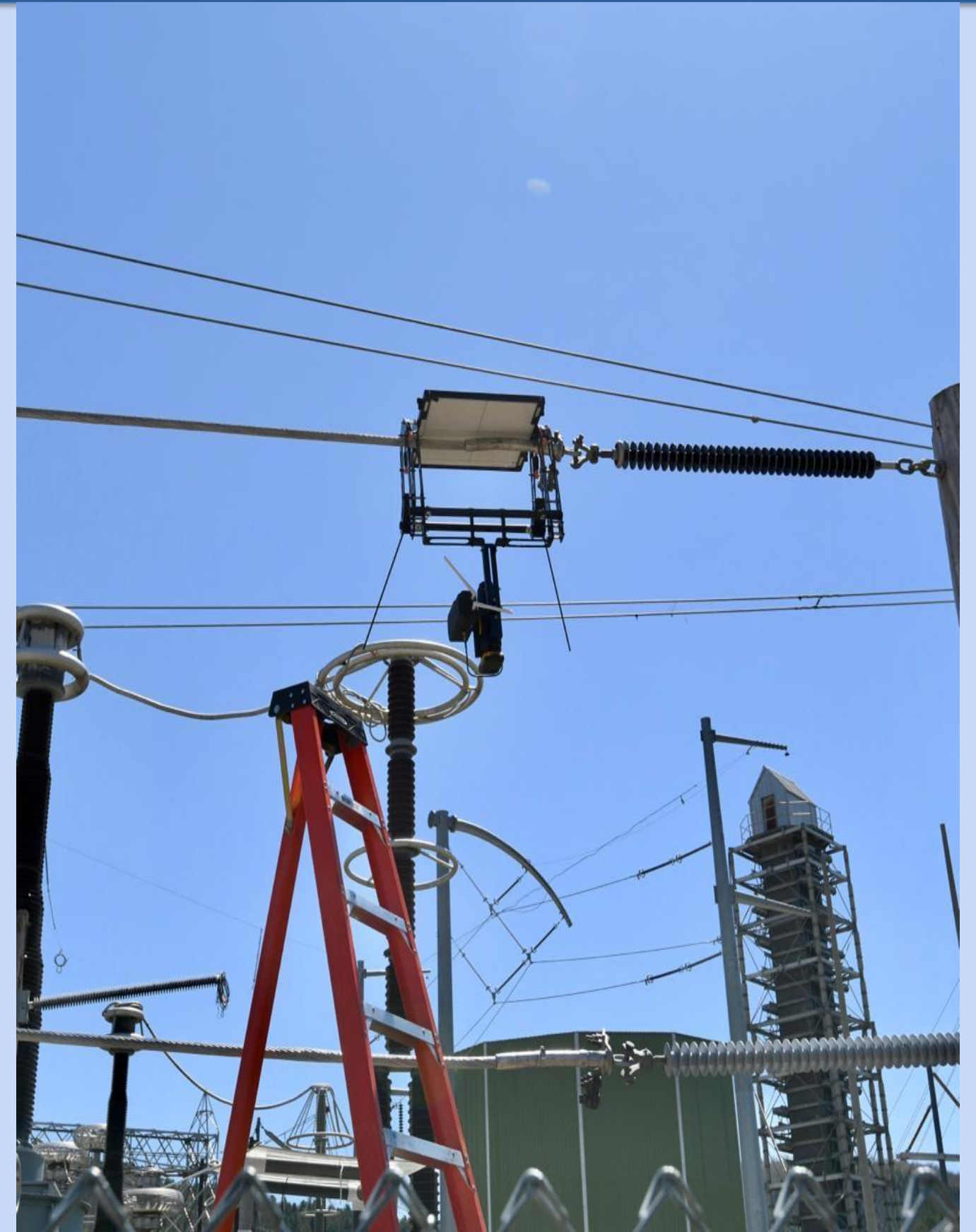


INDUSTRY IMPACT

1. Early detection of issues leading to improved reliability.
2. Prevention of catastrophic failures. Particularly crucial in densely populated or environmentally sensitive areas.
3. Extended asset lifespan.
4. Creating higher inspection standards and setting new industry benchmark.
5. Integration with other technologies (machine learning based predictive analytics)



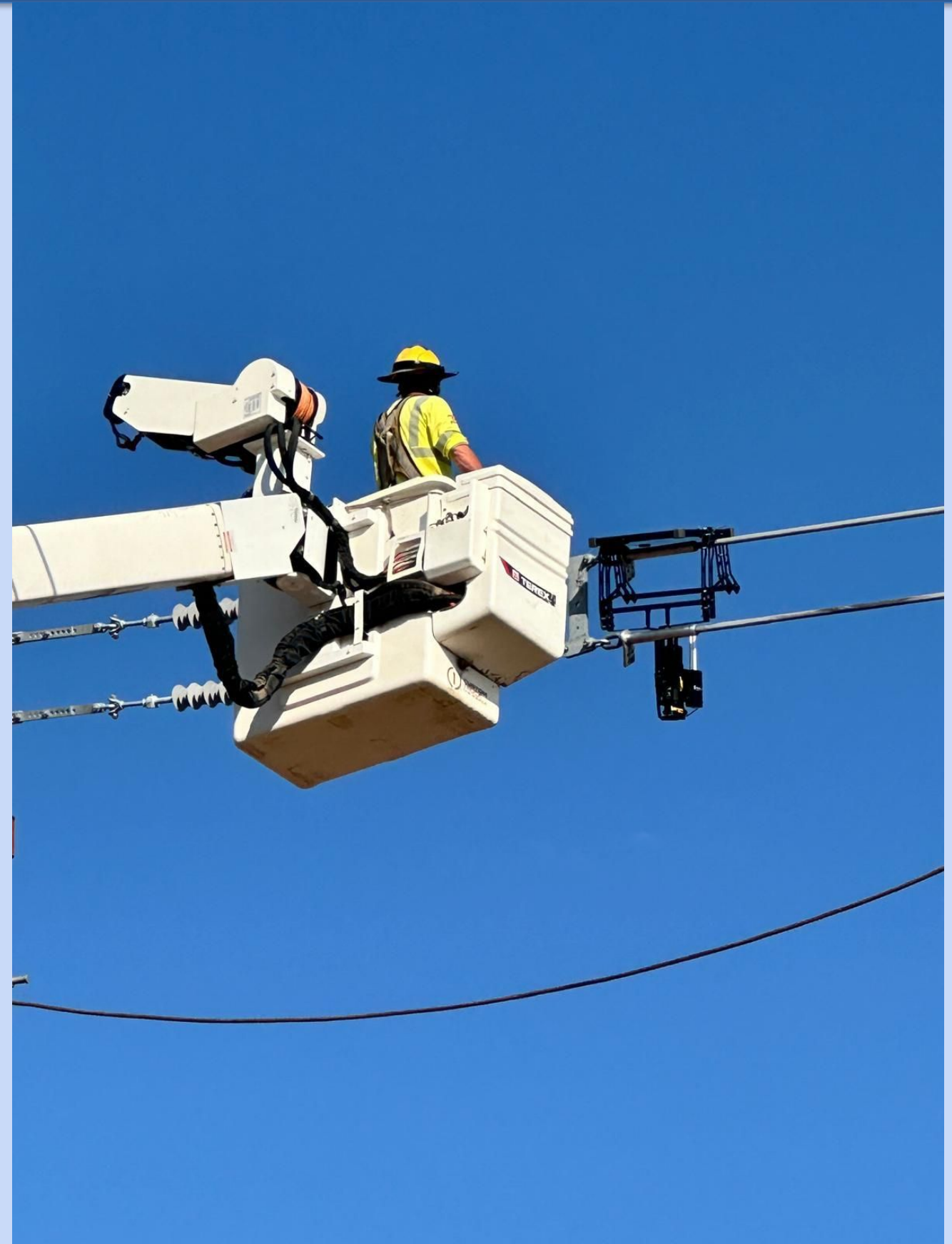
FIELD IMAGES



FIELD IMAGES



FIELD IMAGES



FIELD IMAGES



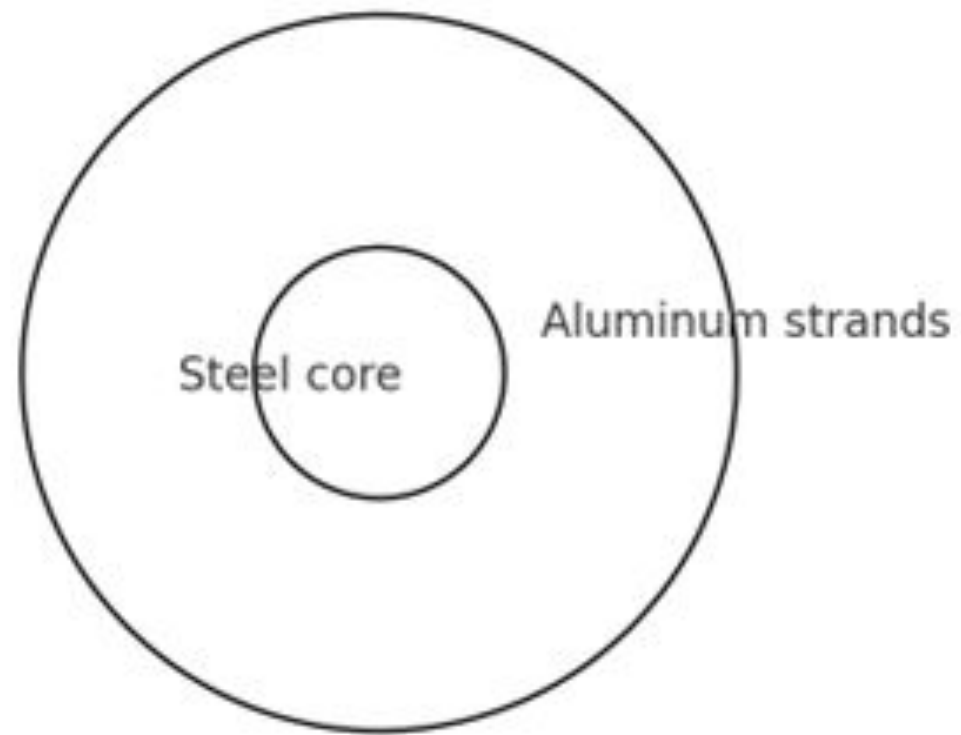
TYPES OF POWER LINES

Feature	ACSR	ACCC	ACCR
Core Material	Steel	Carbon/Glass Composite	Aluminum-Oxide Fiber Composite
Aluminum Strands	Hard-drawn Al	Fully annealed Al (often trapezoidal)	Al-Zr alloy
Max Continuous Temp	~100°C	~180–200°C	~210°C
Thermal Sag	Higher	Very low	Very low
Relative Weight	Heavier	Lighter	Similar to ACSR
Tensile Strength	High	Very high	Very high
Typical Use	Standard installs	Reconductoring/clearance-limited uprates	High-temp/harsh environments
Cost (relative)	Lowest	Higher	Highest



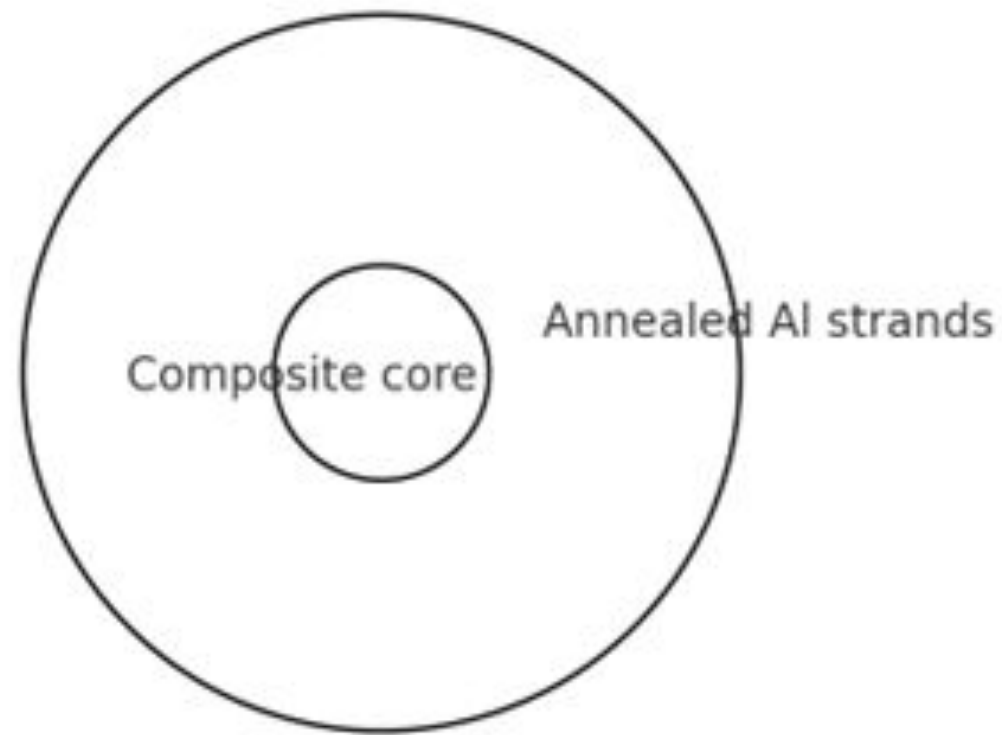
CROSS SECTION SCHEMATICS (ILLUSTRATIVE)

ACSR Cross-Section (schematic)



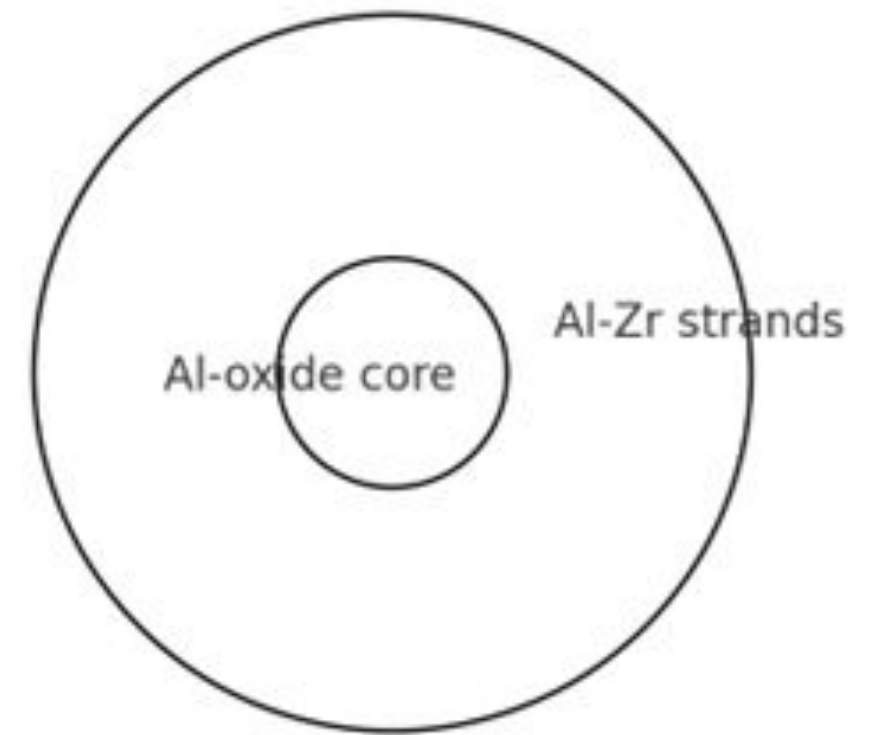
**ACSR – Aluminum Conductor
Steel-Reinforced**

ACCC Cross-Section (schematic)



**ACCC – Aluminum Conductor
Composite Core**

ACCR Cross-Section (schematic)



**ACCR – Aluminum Conductor
Composite Reinforced**

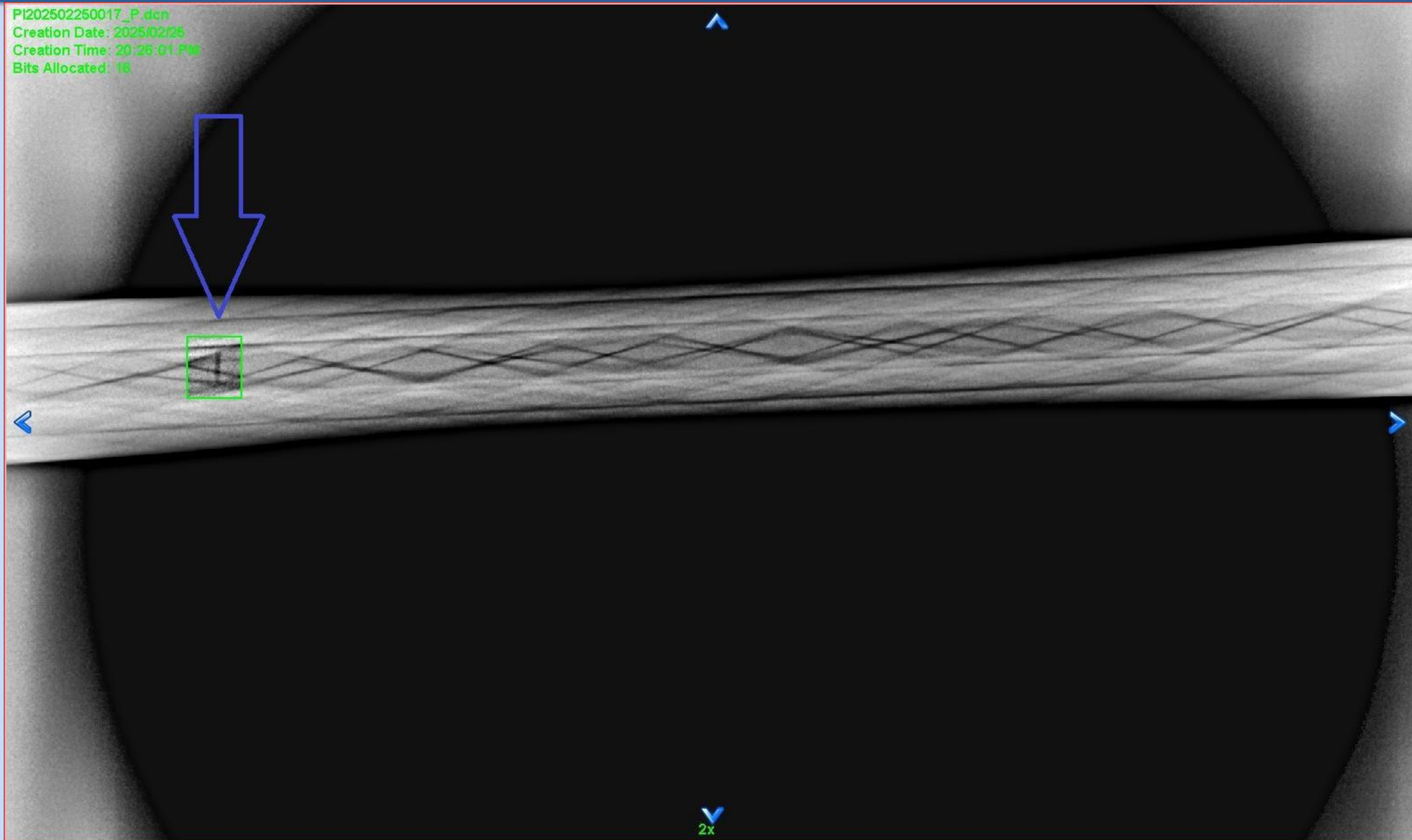


X-RAY COMPARATIVE DIFFICULTY

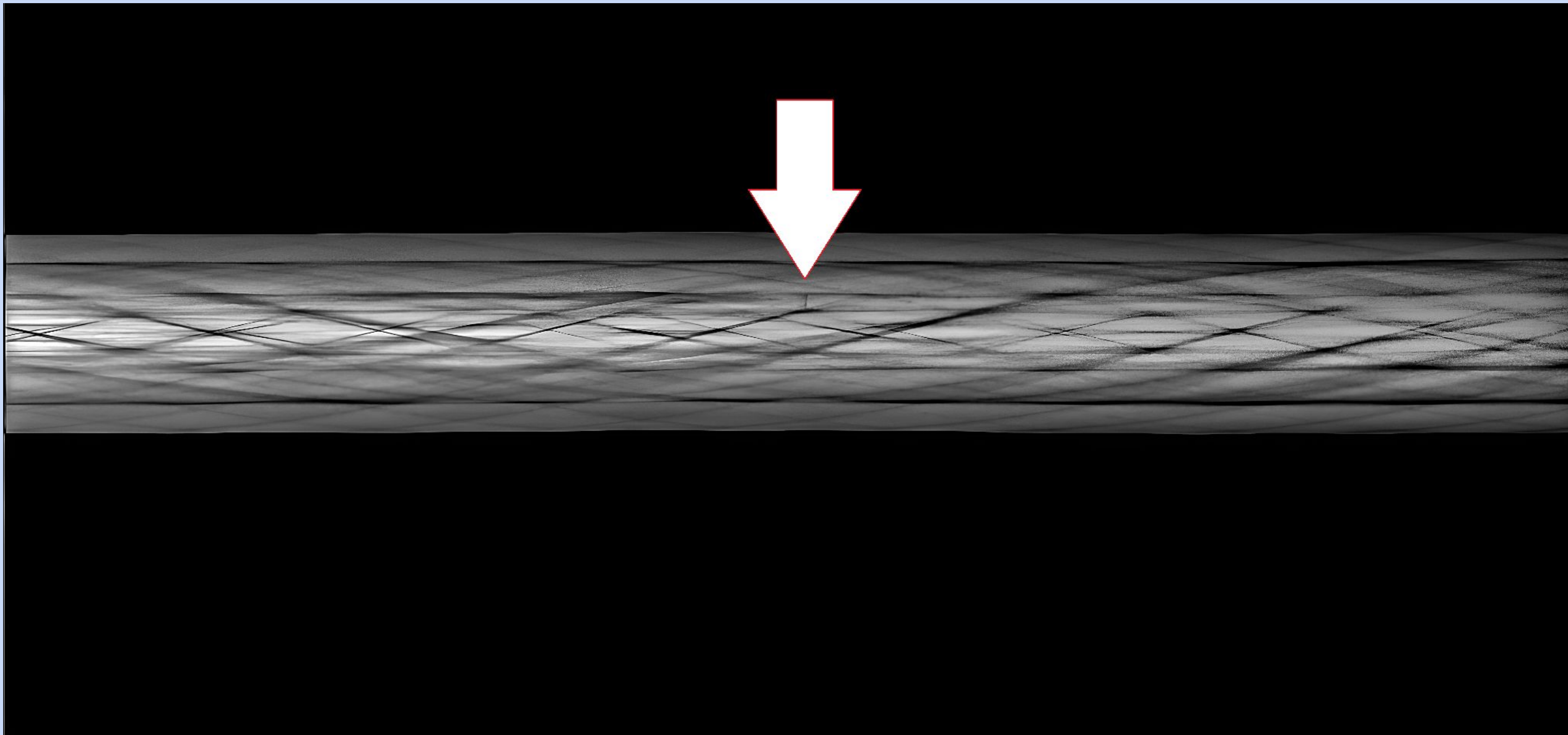
Conductor Type	X-Ray Defect Detectability	Reason
ACSR	Easier	Steel core has high attenuation, defects (broken wires, corrosion) show clearly; aluminum strands also visible.
ACCR	Moderate	Aluminum-zirconium core has more attenuation than composite, but less than steel; heat-resistant alloys may scatter differently.
ACCC	Difficult	Composite core has low attenuation; subtle defects masked by surrounding aluminum trapezoids. This requires specialized constant potential source with multiframe detectors for higher defect detection rates.



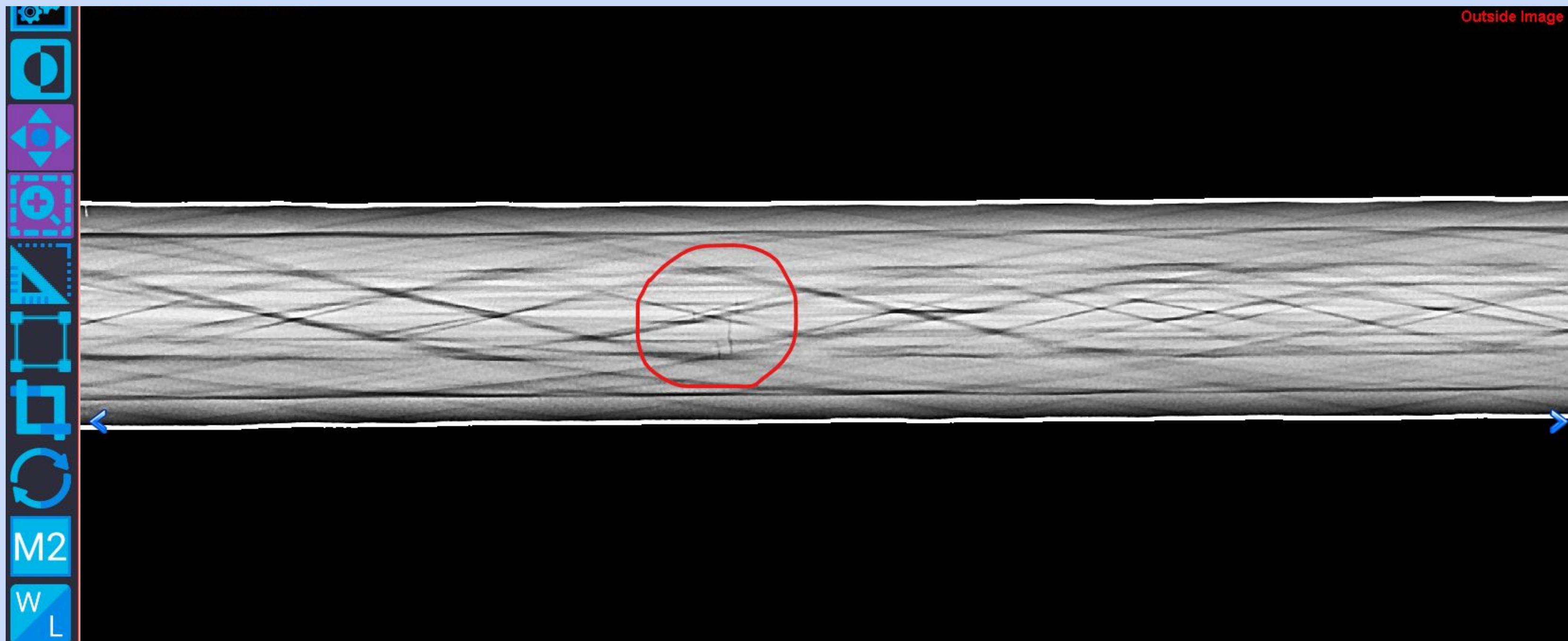
X-RAY IMAGES (ACCC)



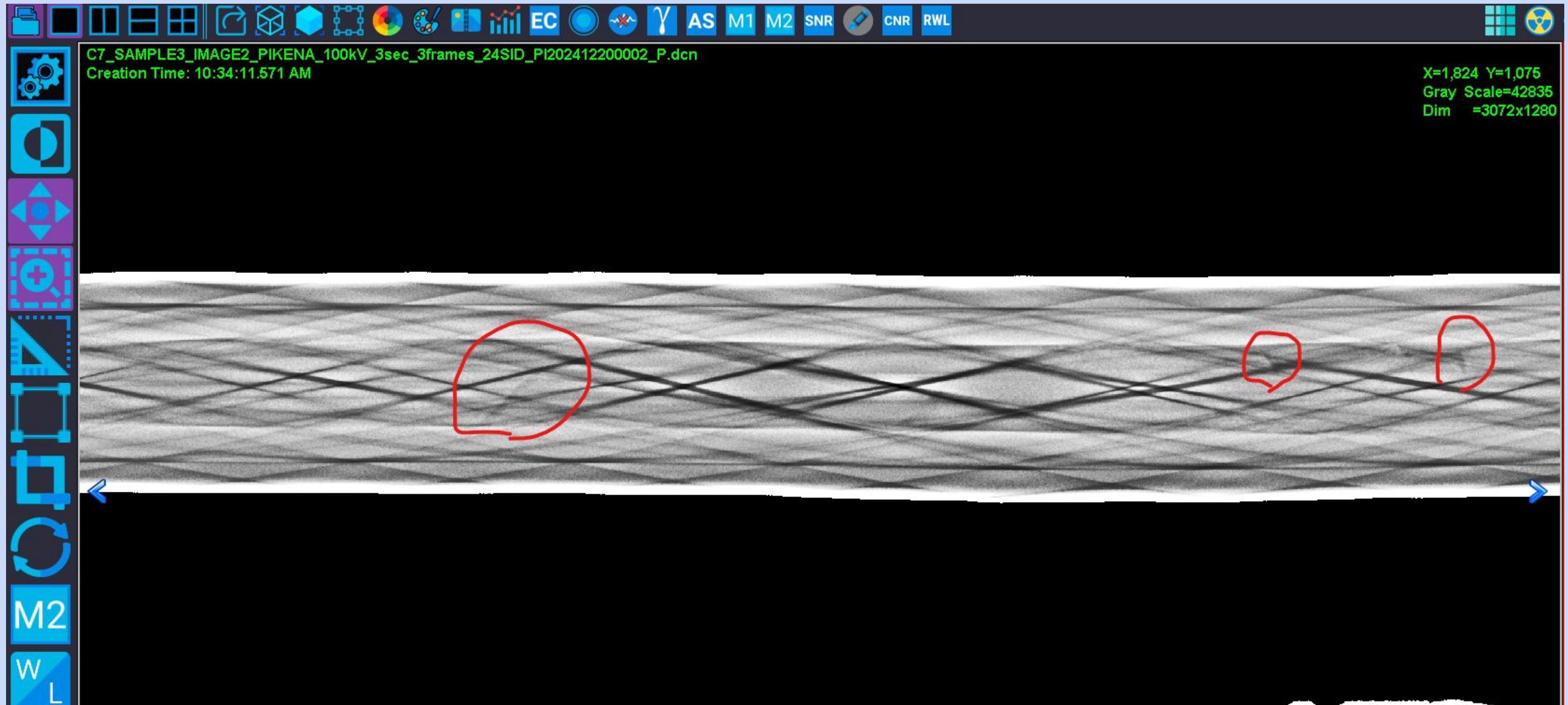
X-RAY IMAGES (ACCR)



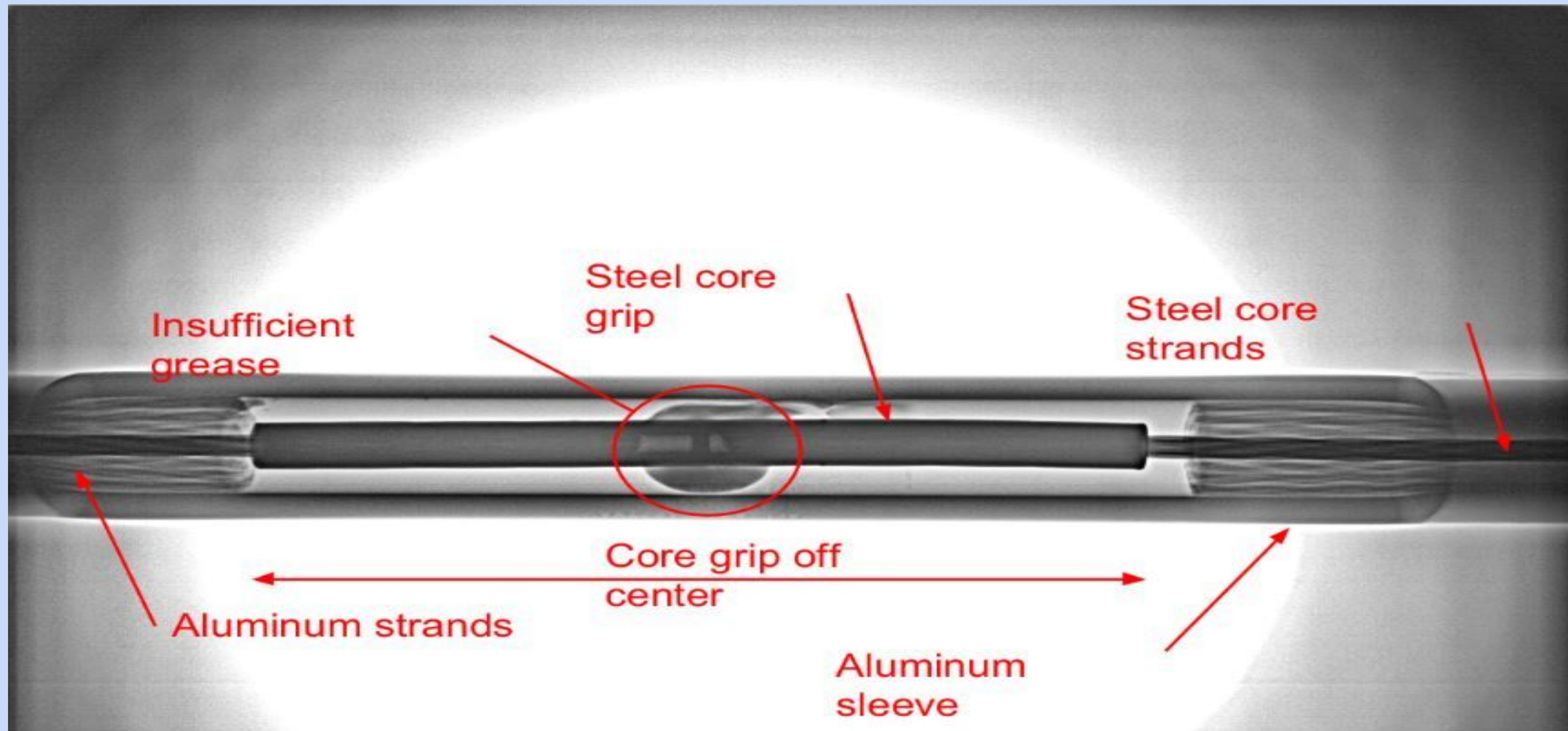
X-RAY IMAGES (ACCR)



X-RAY IMAGES (ACCR)



X-RAY IMAGES (ACSR)



Incorrectly installed 2 stage splice

X-RAY IMAGES (ACSR)



Steel core strands

Steel core grip

Steel eye

Aluminum strands

Aluminum sleeve

Normal Implosive Dead-End Fitting



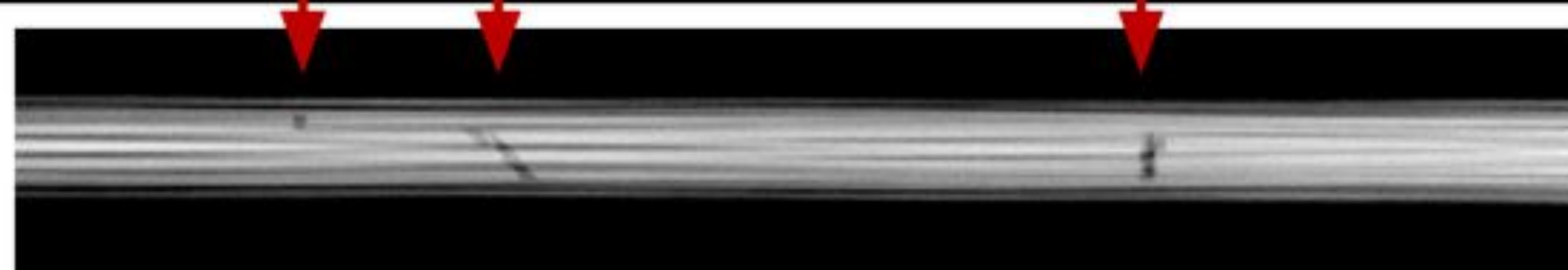
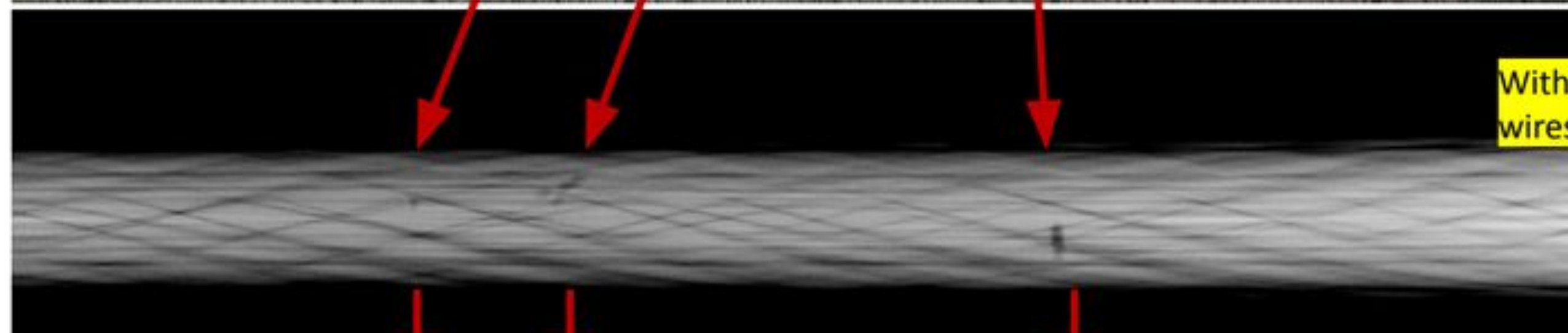
Steel core grip

Weld failure

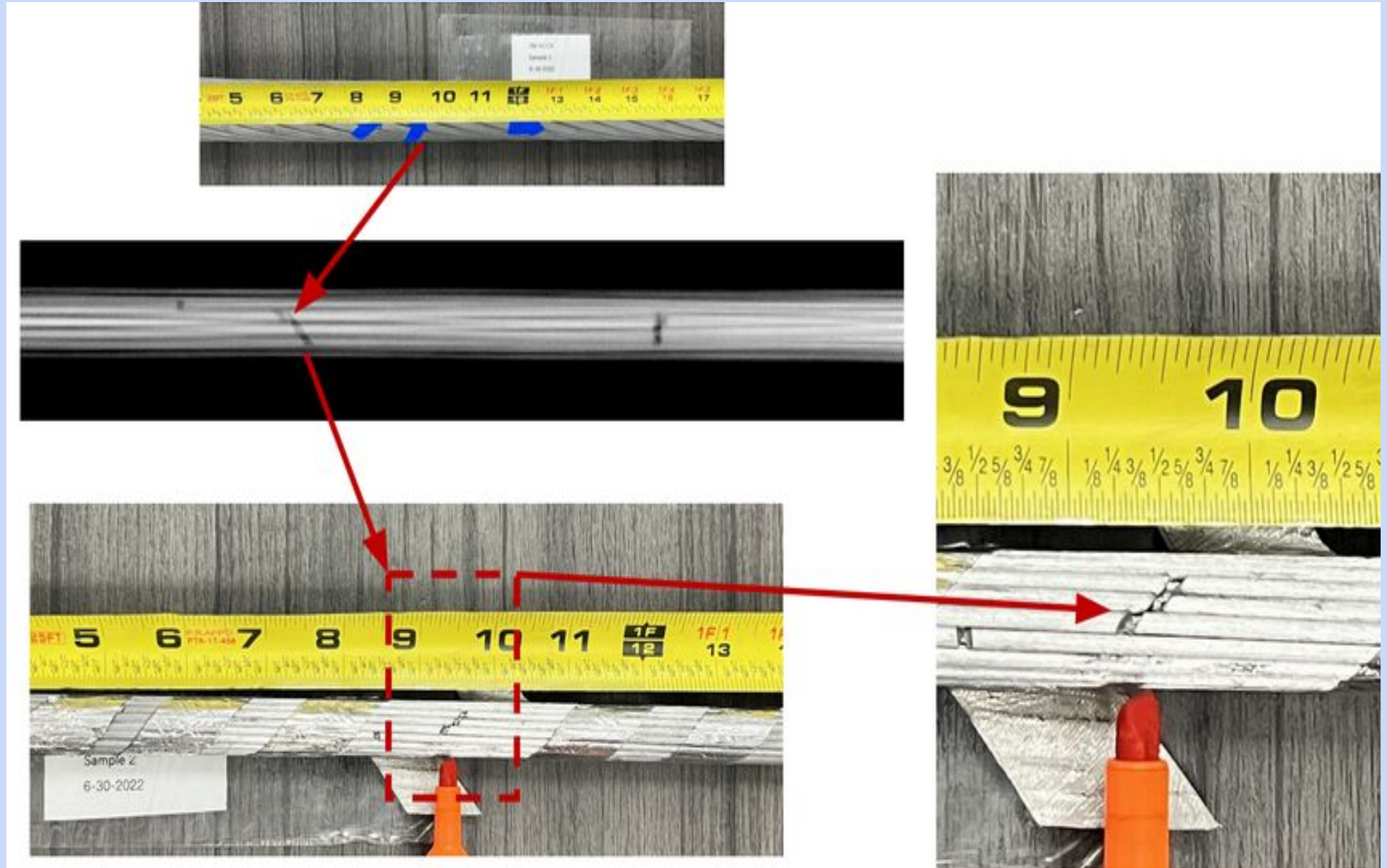
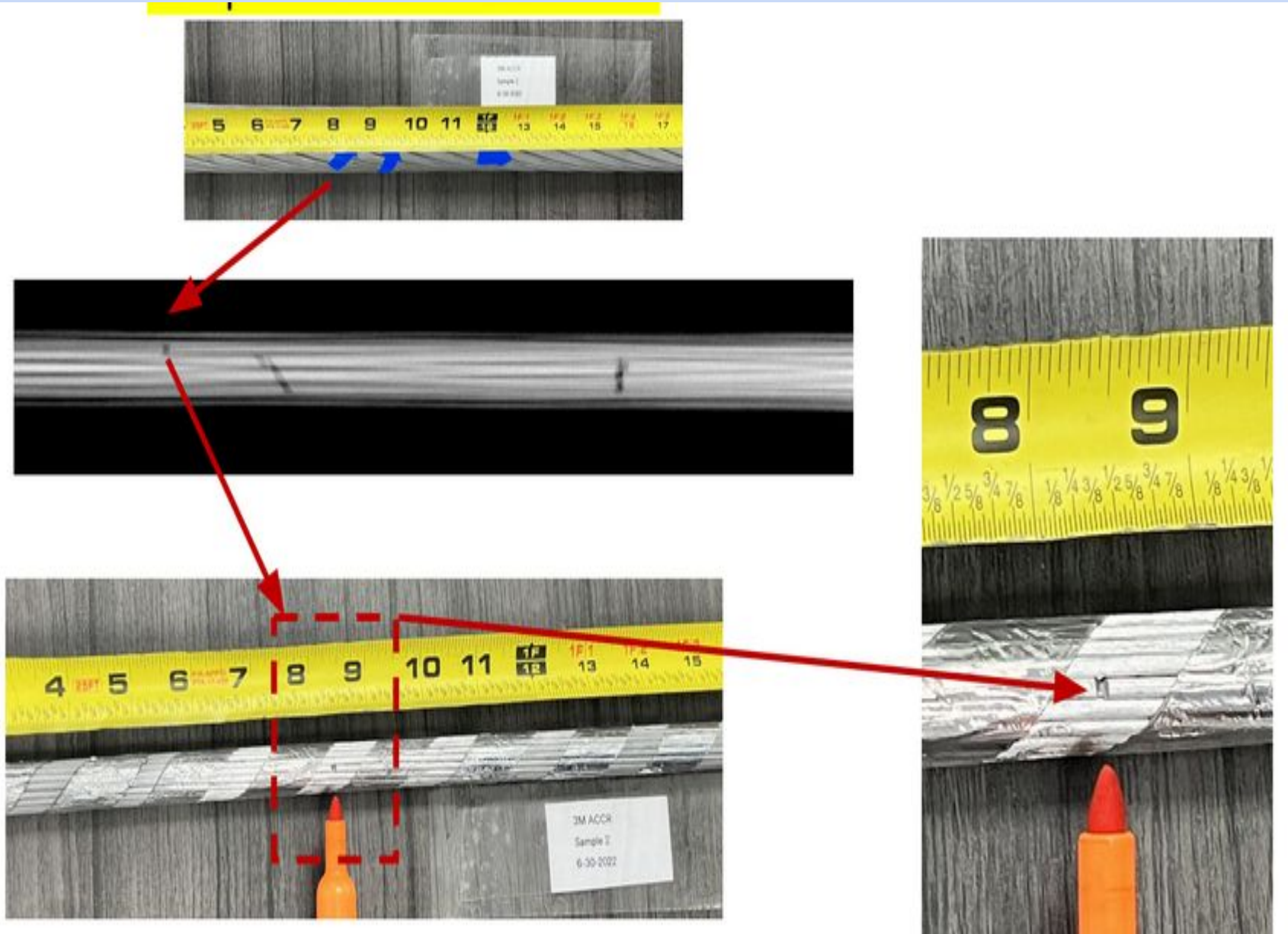
Implosive Dead-End Fitting Failure-1



X-RAY IMAGES (ACCR - LAB RESULTS)

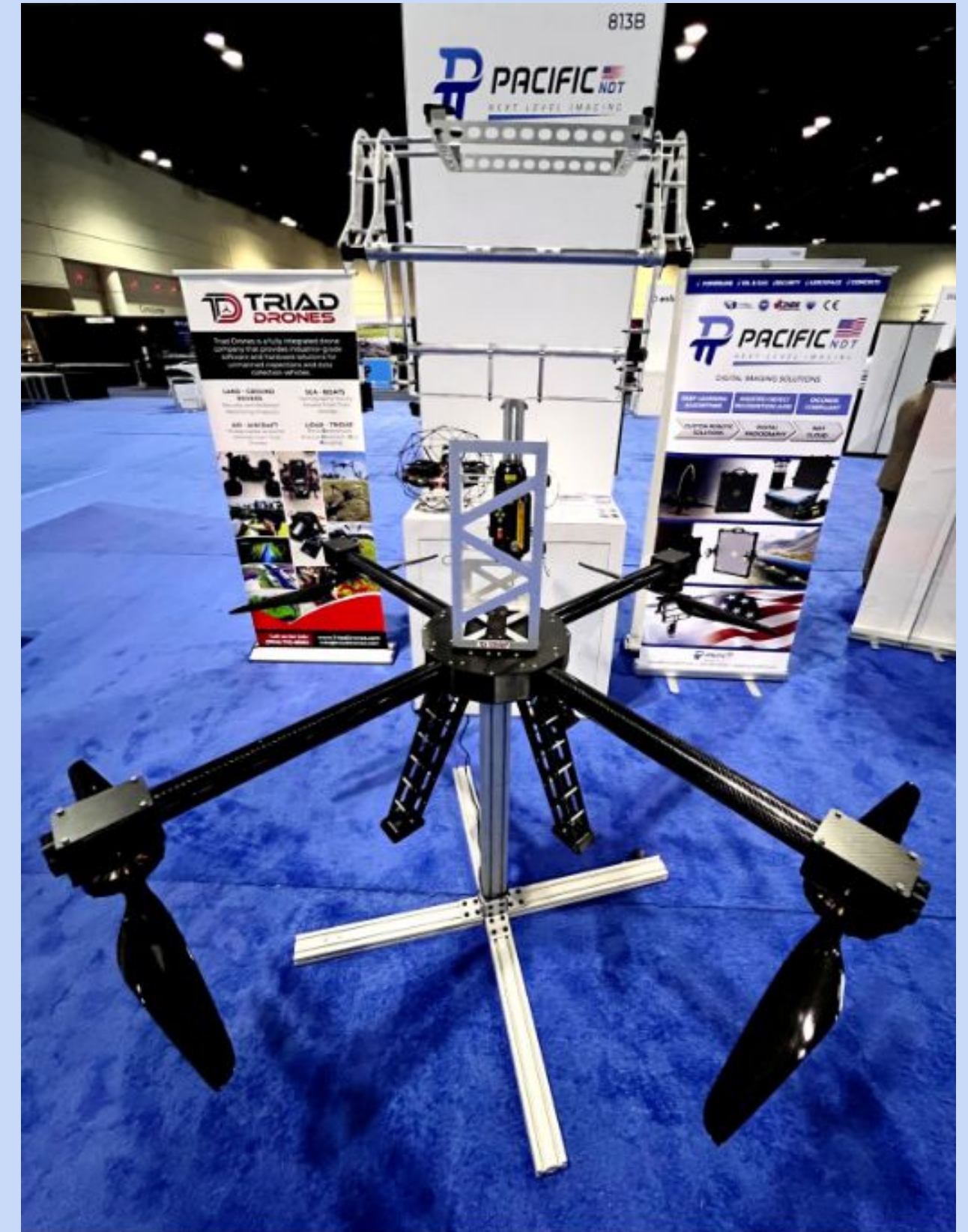


X-RAY IMAGES (ACCR - LAB RESULTS)



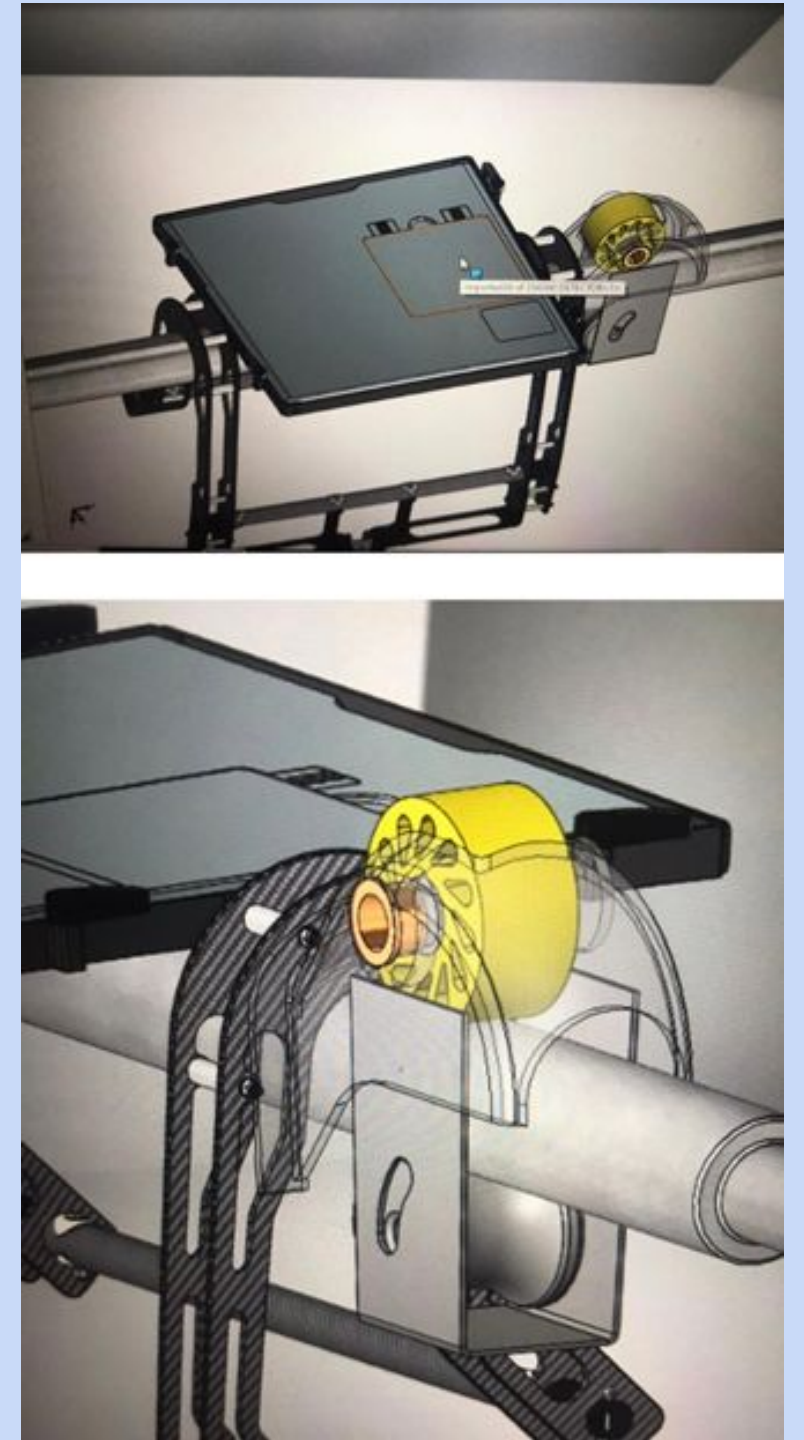
FUTURE DEVELOPMENTS

1. **Drone Integration** - currently performing pilot projects successfully. **US PATENT # 63/527,334**
2. **ADR - Assisted Defect Recognition** - utilizing deep learning algorithms to assist field technicians - already implemented for Oil and Gas (cylindrical tanks weld inspection).
3. **Energized Lines Testing** - tested on 330kV with mixed results – currently updating faraday cage before commercial product launch.
4. **Cloud based PACS** – Picture Archiving & Communication Systems to provide centralized image storage, data retrieval, image viewing, sharing, collaboration and report creation.



MARKET OPPORTUNITY

1. **Advanced diagnostic capabilities:** X-Ray reveals internal defects and deterioration that are not detectable with visual inspection or even other NDT methods like thermal imaging.
2. **Preventive Maintenance:** Avoid potential issues before they lead to failures. Avoid downtime and reduce costly repairs and replacements.
3. **Innovation & Technological Advancement:** Aging infrastructure & increasing demand of electricity requires adoption of innovative solutions for infrastructure management. Integration of ADR & other digital analytics offers could offer new service and business models (like predictive maintenance based on detailed internal diagnostics).
4. **Specialized Applications:** Certain locations (river crossing, mountainous terrain etc) present unique challenges where Drone based X-Ray imaging can provide added value.
5. **Global Infrastructure Investment:** With power infrastructure on the rise, there is a growing market for advanced diagnostic technologies to ensure reliability and longevity of new installations.



CALL TO ACTION

To Utility Companies: Invest in Innovation & embrace the Powerline X-ray system to enhance infrastructure safety & ensure long-term sustainability in utility operations.

Advocate for Technology Adoption: Collaborate & explore partnership opportunities to drive growth, & advancement in the inspection sector.

Together, let's harness the power of cutting-edge digital radiography to transform the way we inspect, maintain, and safeguard critical powerline infrastructure.



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