



METAL THEFT

WEBINAR

# UIC LARA SECURITY TASKFORCE

19 March 2025

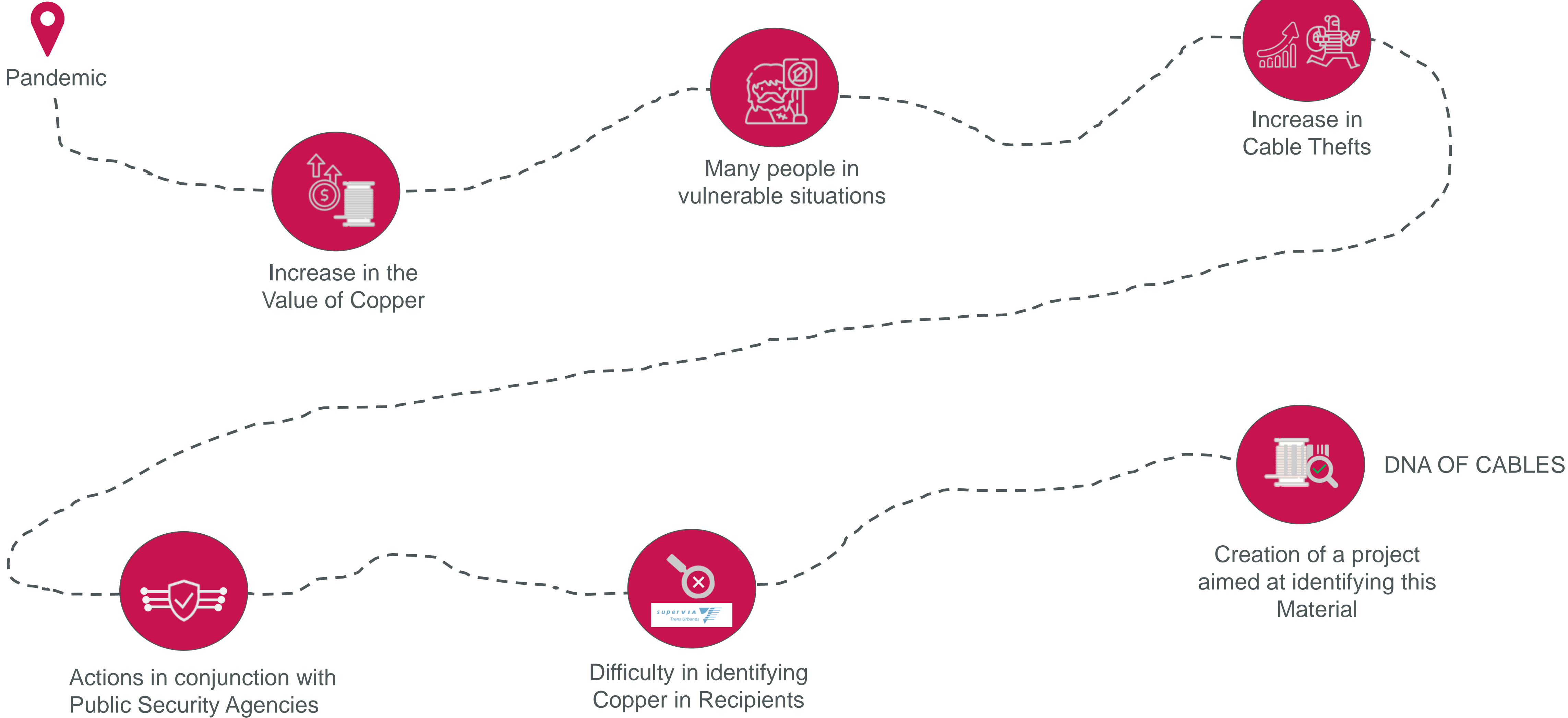
Held online

Marcus Glauco de Araújo Almeida

*DNA OF CABLES*

# JUSTIFICATIONS

STARTING POINT





# OBJECTIVES



## **Theft Prevention**

- Discourage Theft

## **Traceability and Identification**

- Accurate Tracking and Proof of Authenticity

## **Support of Investigations**

- Facilitation of Evidence Collection and Recovery

## **Reduction of the Illegal Market**

- Control of Receiving and Regulation of Trade

## **Critical Asset and Infrastructure Protection**

- Infrastructure Preservation and Cost Reduction

## **Security and Compliance**

- Standards Compliance and Quality Assurance

# ACTIONS

- ✓ Marking and Identification with Nanoparticles
- ✓ Traceability
- ✓ Evidence and Investigation
- ✓ Registration at a Notary's Office
- ✓ Training of organic staff
- ✓ Training of the Technical Staff (Experts) of the Civil Police of Rio de Janeiro



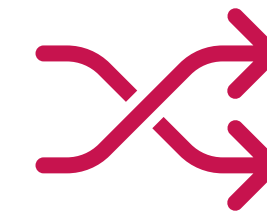
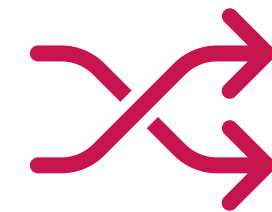


# TEST OF CONCEPT

Material preparation



Application in copper cables



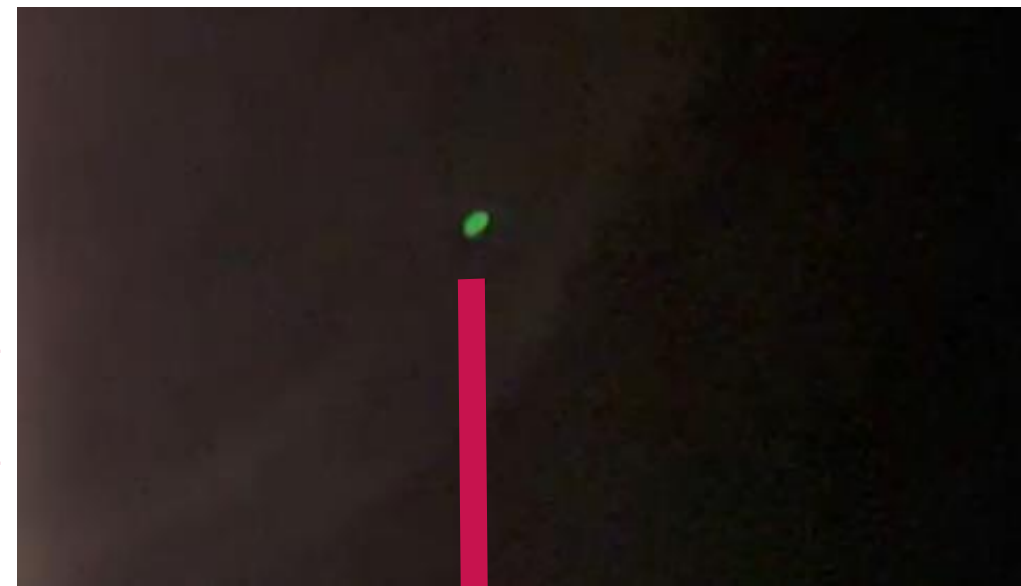
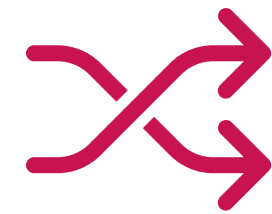
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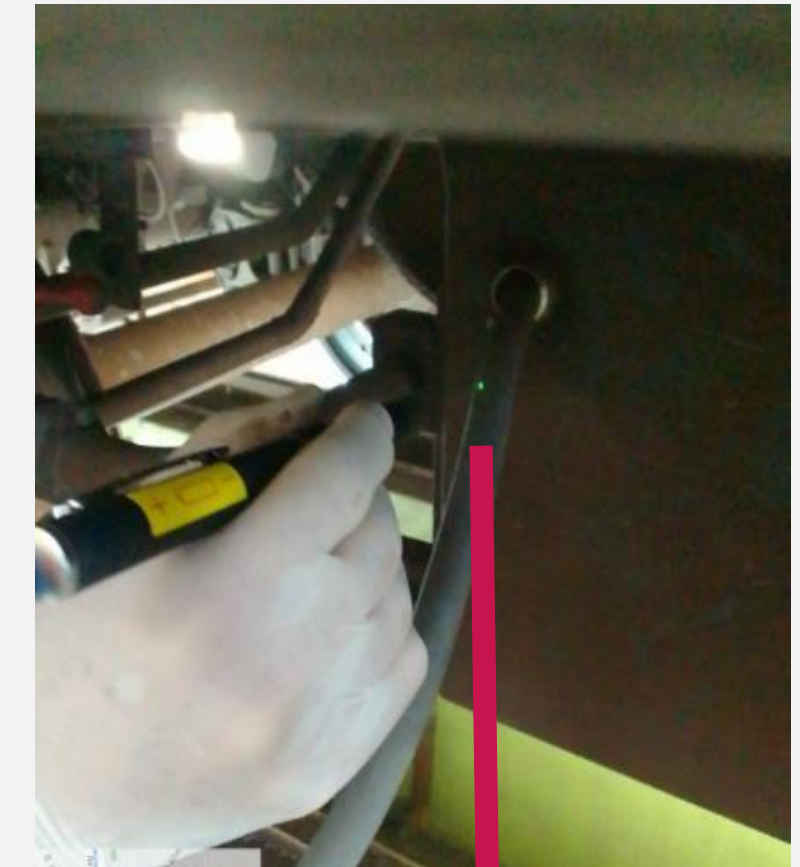
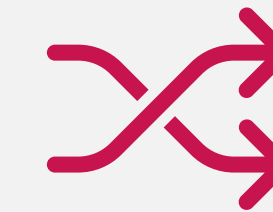
# TEST OF CONCEPT

Testing of cables being subjected to high temperature



APPROVED

Application of technology in cables



APPROVED



# Expected Results/Obtained



Accurate and  
Efficient  
Tracking



Loss Reduction  
and Theft  
Prevention



Guaranteed  
Authenticity  
and Quality



Ease of Legal  
Actions



# Potential Impacts

## Security and Traceability

Reference Indicators:

Number of Thefts/Recoveries  
(incidents/year)

## Maintenance/Replacement Costs

Reference Indicators:

Production  
Cost  
(USD/m)

Maintenance  
Cost

Return on  
Investment  
(ROI)

Maintenance  
Time  
(hours/year)

## Sustainability and Environmental Impact

Benchmarks:

Waste Reduction  
(tons/year)

Carbon Footprint  
(CO2  
equivalent/year)

## Operational Performance

Reference Indicators:

Traffic  
Stoppages/  
Interruptions

Increase in  
Passengers

Return on  
Investment



# Ongoing Actions



Disclosure  
and  
Marketing



Grounding  
cable  
marking



Incident  
analysis



Identification  
of the  
criminal  
hotspot



Police  
Operations



Applications of  
nanotechnology  
in other company  
assets



INTERNATIONAL UNION  
OF RAILWAYS

# Thank you for your attention

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