



SCRAPER WINCH MODERNIZATION ROADMAP

31 JULY 2026

CREATING A BETTER FUTURE

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SCRAPER WINCH BACKGROUND

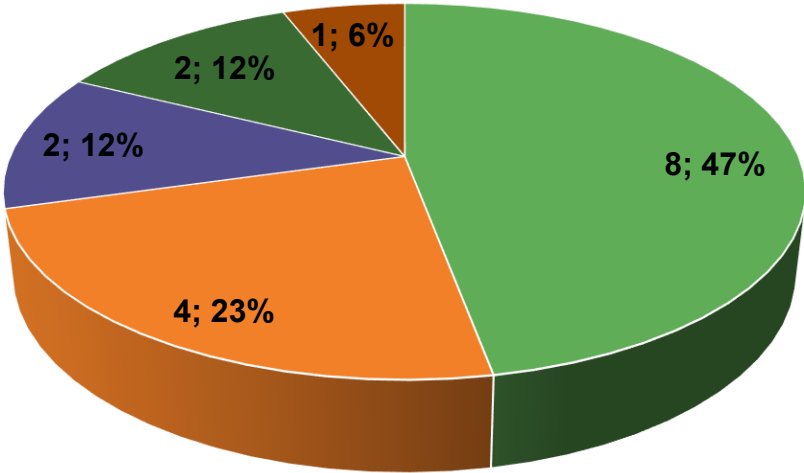
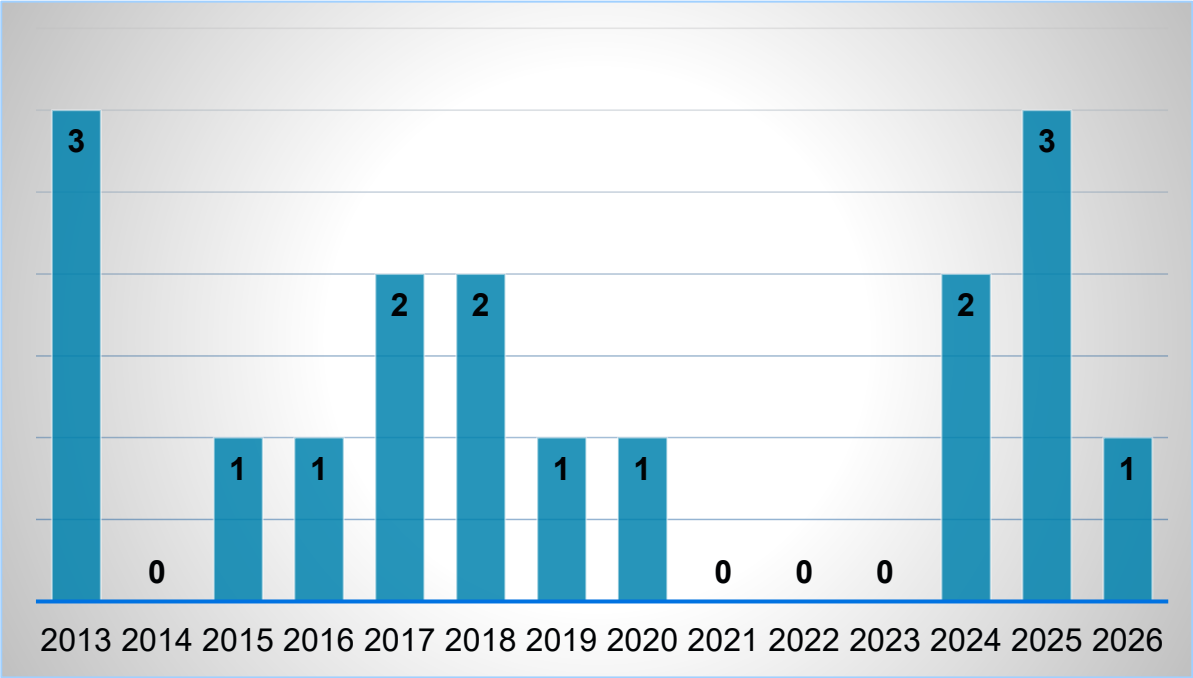
- First recorded use: 1898.
- Dominant design¹ emerged in 1920.
- Attempts at technological advances:
 - Remote control scraper winch trial² early 1960s.
 - Automated winch (Rham, 2004; Sulzer, 2017).
 - Abnormal condition detector (Janicijevic, 2008).
- Alternative cleaning tools
 - ultra low-profile dozers
 - High pressure water jets
- Estimates population ~ 8 000 units in narrow vein operations
- Generally accounts for 10% of the industry loss of life events



1. self-filling, self-dumping scrapers by means of main-and-tail rope haul and operated by double-drum type hoists. **Source: Ingersoll-Rand, 1939.**

2. no further improvement until 2003; problems encountered such as control of the free-wheeling drum of the winch, electrical control panel were sensitive to blasting & introduced unreliability. **Source: Rupprecht, 2019.**

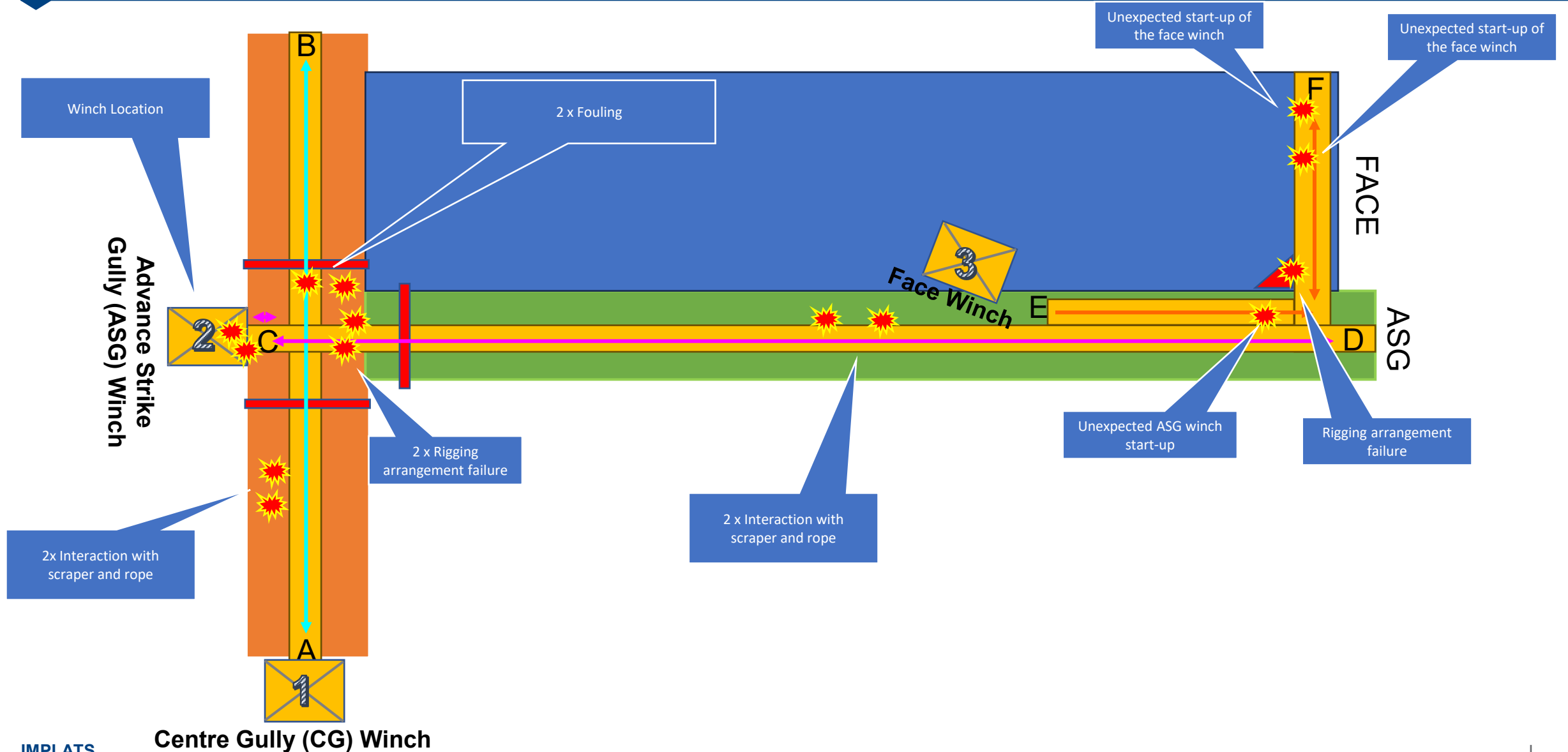
SCRAPER WINCH HIGH-LEVEL FATAL ANALYSIS



- Scraper Path
- Snatch Block
- Winch Location
- Fouling
- Rope whiplash

- Scraper winches remain a material fatal risk exposure
- Control environment remains too dependent on people, procedures, and compliance enforcement
- **Burning ambition – significantly reduce reliance on administrative control**

WINCH FATAL AGENCIES (2013 TO 2026)



STAGED HORIZON ROADMAP DEVELOPMENT

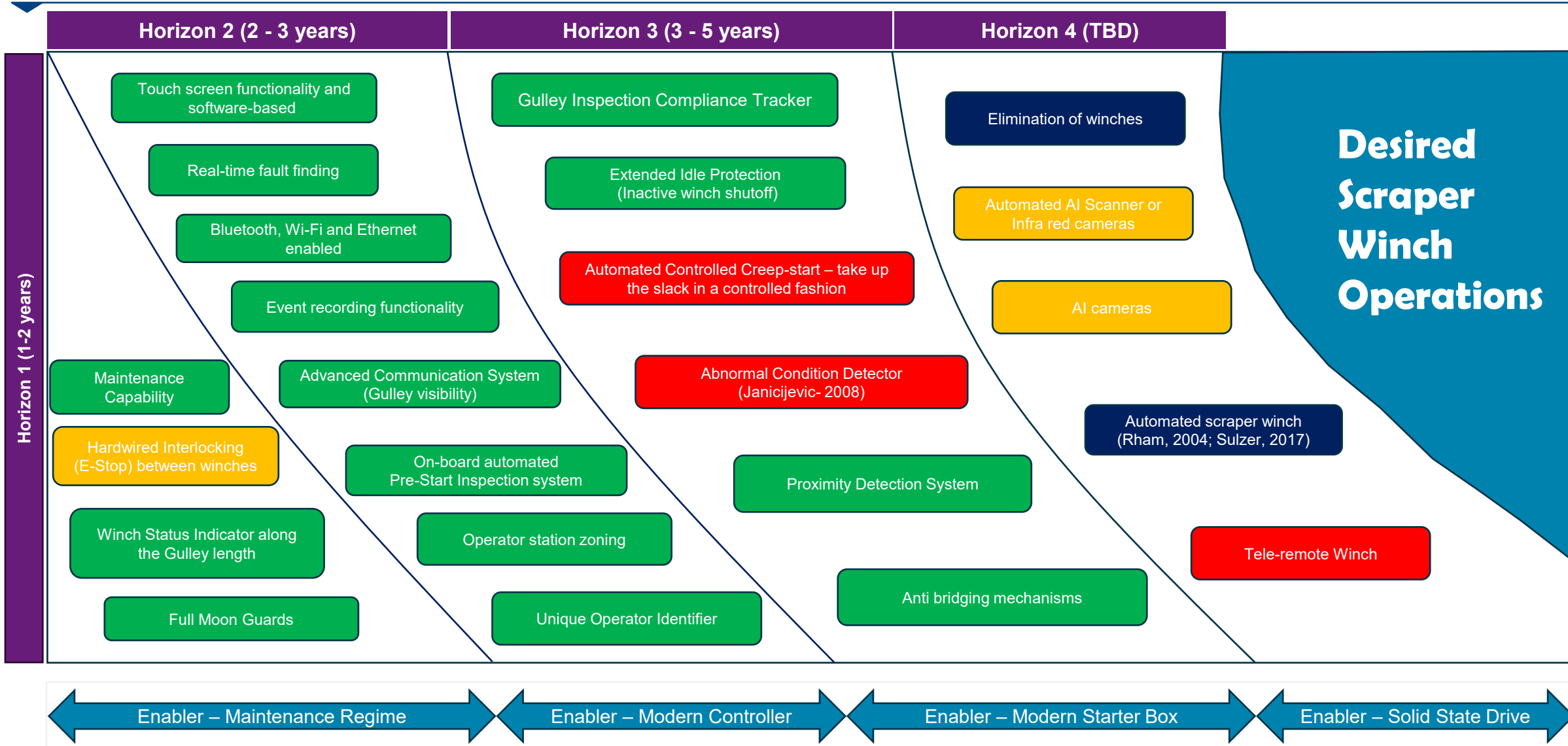
Brainstorm
Engineering
Controls



EMERT Framework		Hierarchy of Controls	Types of Innovation	Ease of Implementation	Enablers Horizon Approach
<i>Intervention Controls</i>	<i>L9</i>	Eliminate	<i>Routine</i>	<i>Easy</i>	Maintenance Regime
<i>Advisory Controls</i>	<i>L8</i>	Substitute	Radical	<i>Moderate</i>	Morden Controller
<i>Operator Awareness</i>	<i>L7</i>	<i>Isolate / Separate</i>	Disruptive	Challenging	Modern Starter
<i>Operating Compliance</i>	<i>L6</i>	<i>Engineering Control</i>	<i>Architectural</i>		Solid State Drive
Fitness to Operate	L5	Administrative Controls			
<i>Authority to Operate</i>	<i>L4</i>	PPE			
Operating Procedure	L3				
<i>Segregation Controls</i>	<i>L2</i>				
Site Requirements	L1				



SCRAPER WINCH MODERNISATION ROADMAP



REPORTING

Winch Proximity System Dashboard

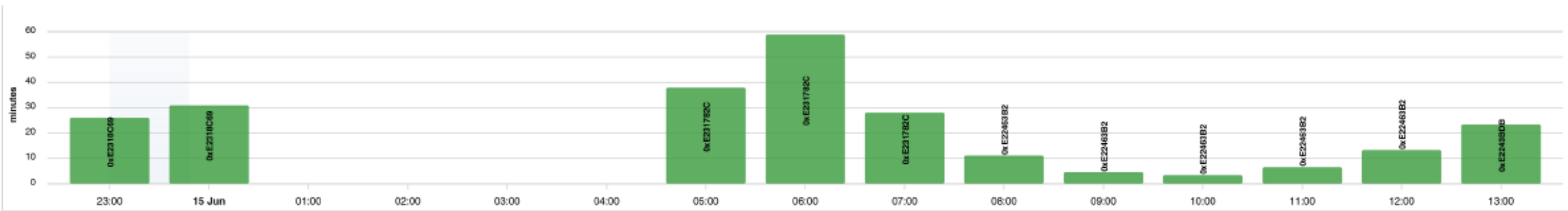
from June 14, 2026 at 18:00

to June 15, 2026 at 18:00

Summary Of System Activity



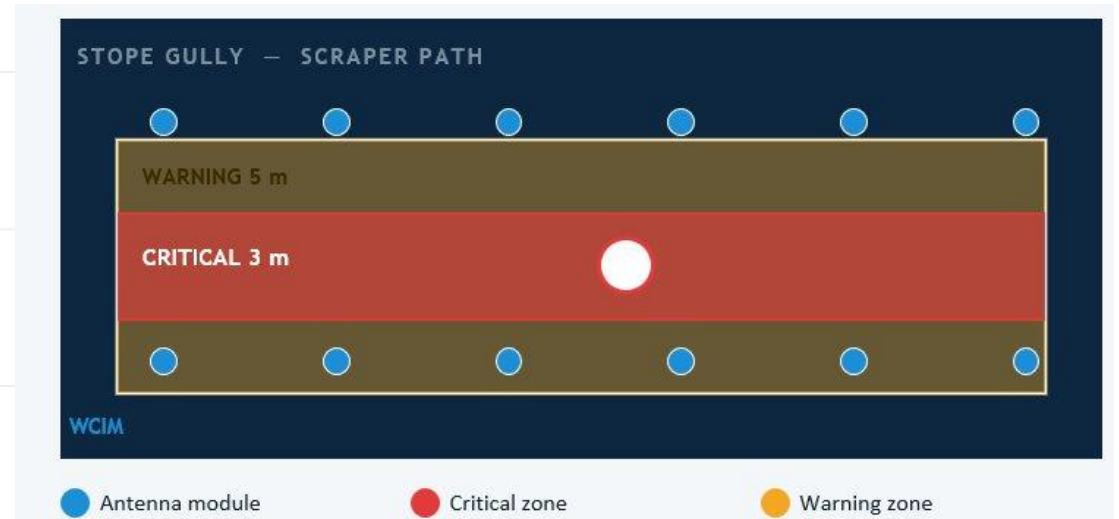
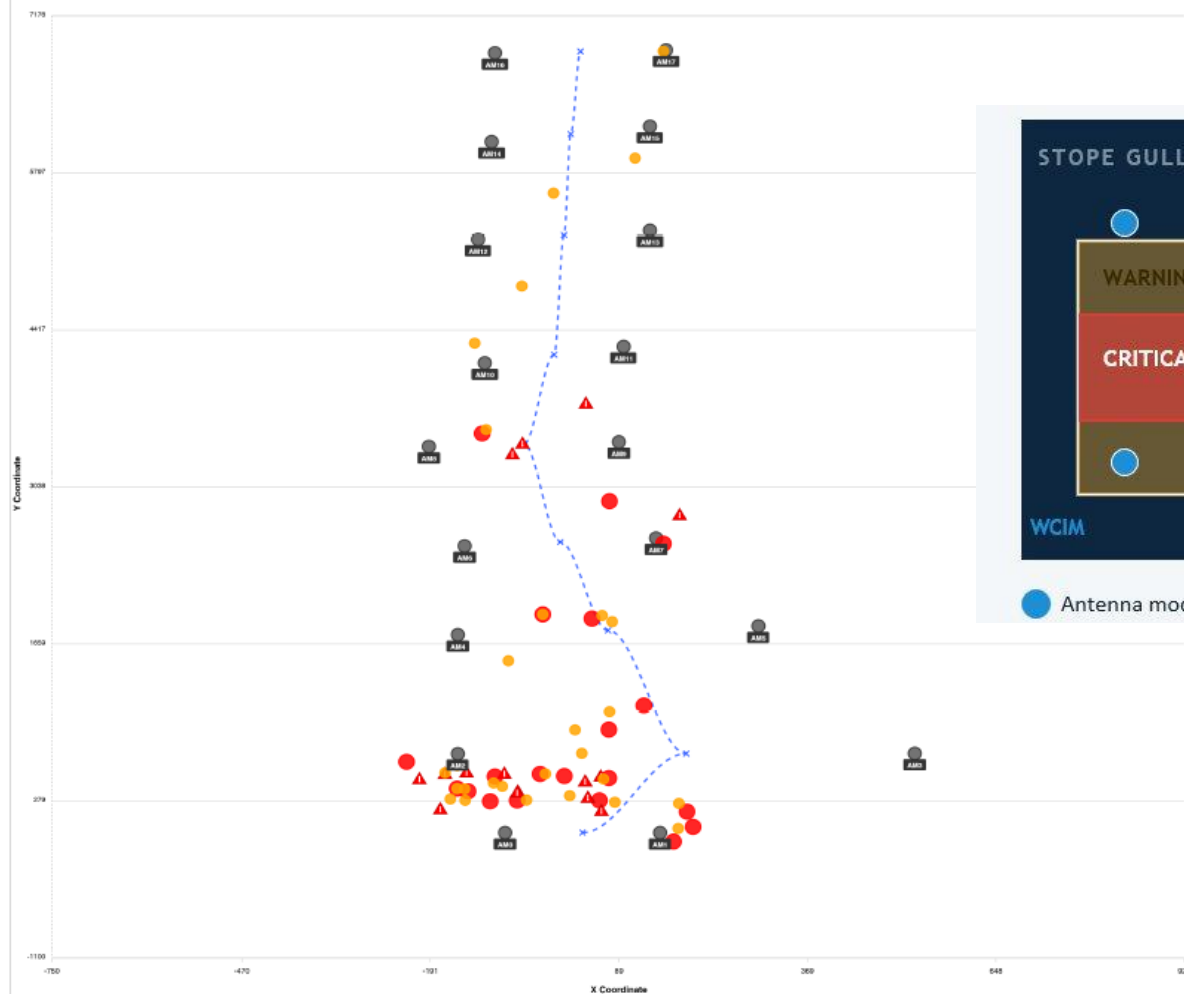
Operational Time by Hour



REPORTING

Pedestrian Critical Alarms

Triangle: Winch Trip Event (OPERATIONAL) Red: Prevent Start Events (Primary Infringers) Orange: Prevent Start Events (Secondary Infringers)



CONCLUSION

- Technology has remained **fundamentally unchanged** for over a century
- Transition from **behaviour-dependent administrative controls** to **engineered controls with traceability**
- **Singular OEM to integrate disparate components**
- **Supplier-industry collaboration for technology development**
- **Implementation journey**
 - Functional specifications
 - 3rd Party validation and verification
 - Change management



QUESTIONS