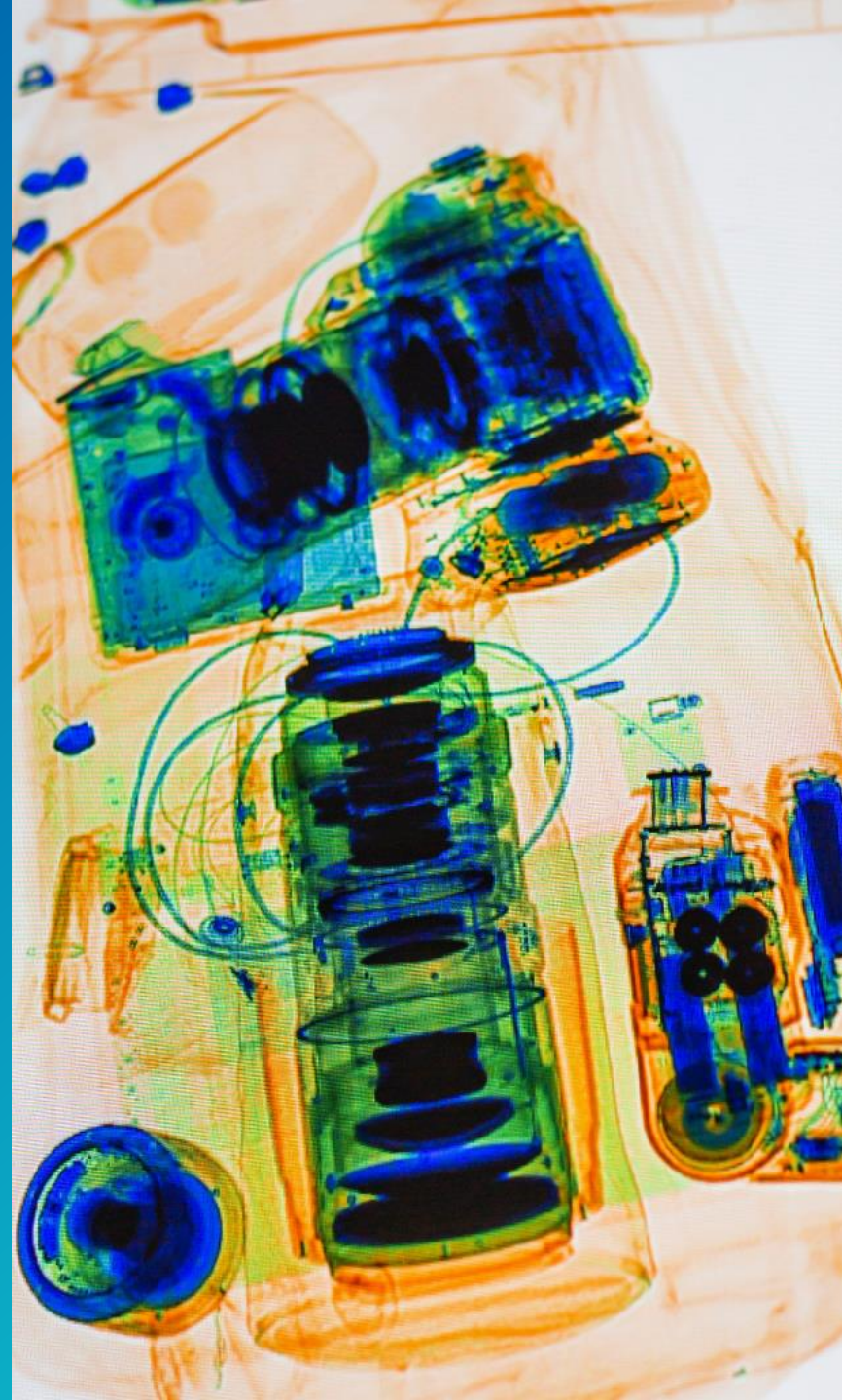
EASA
European Union Aviation Safety Agency

UK Civil Aviation Authority International

Rapiscan

Detection of Lithium Batteries Using Security Screening Equipment

Tuesday 10th September 2024



Before we start

The session is being recorded and the recording will be posted on the EASA website after the Webinar.

We have allocated an hour for a Questions and Answers session and these will be logged using Slido. How to access Slido, along with a QR code, will be shown on the screen throughout the session.

Please give a ‘thumbs up’ to questions you would most like answered so that we can prioritise these.

Following the webinar, all questions will be published.

There will be a survey at the end of the webinar which we hope you will complete .

Agenda

1. Introduction
2. Project overview
3. Results from airport trial
4. Post project considerations
5. Open-floor questions & answers
6. Summary and close

1. Introduction

- **Adam Borkowski**
  Technical Lead, EASA

Introduction

Research project:	Detection of lithium batteries using screening equipment
Focus:	Viability of hold baggage screening for Li-batteries detection
EASA objective:	Ensure and improve safety of flights
Safety concerns:	Increasing number of incidents involving lithium batteries on board the aircraft Increasing number of items containing lithium batteries by passengers Increasing power of such items Passengers not complying with the regulations – **carriage of undeclared items**
Research objectives:	Explore how to prevent Li-batteries from reaching the aircraft by screening hold baggage without creating negative impact on security performance

Risks posed by lithium batteries are mainly fire and smoke but also explosion.
The event occurs very quickly and might have catastrophic consequences due to the high temperatures reached and the amount of toxic smoke.

2. Project Overview

- **Dean Smith**
  Director, Product Management EDS

Project Team

- A leading global provider of security inspection solutions, with more than 100,000 products installed in over 170 countries
  - Dean Smith – Project & Technical Lead
  - Eric Chevalier – Technical Expert

- The consulting and training arm of the UK CAA
  - Sarah Fox - Project Manager
  - Stuart Coates - Communications Lead
  - Sophie Hibbin – Senior Technical Adviser
  - Jackie Burtenshaw – Project Support

- Regulatory advice and specialist guidance
  - Dr Ben Wong - UK Civil Aviation Authority
  - Mario Ranito – UK Civil Aviation Authority

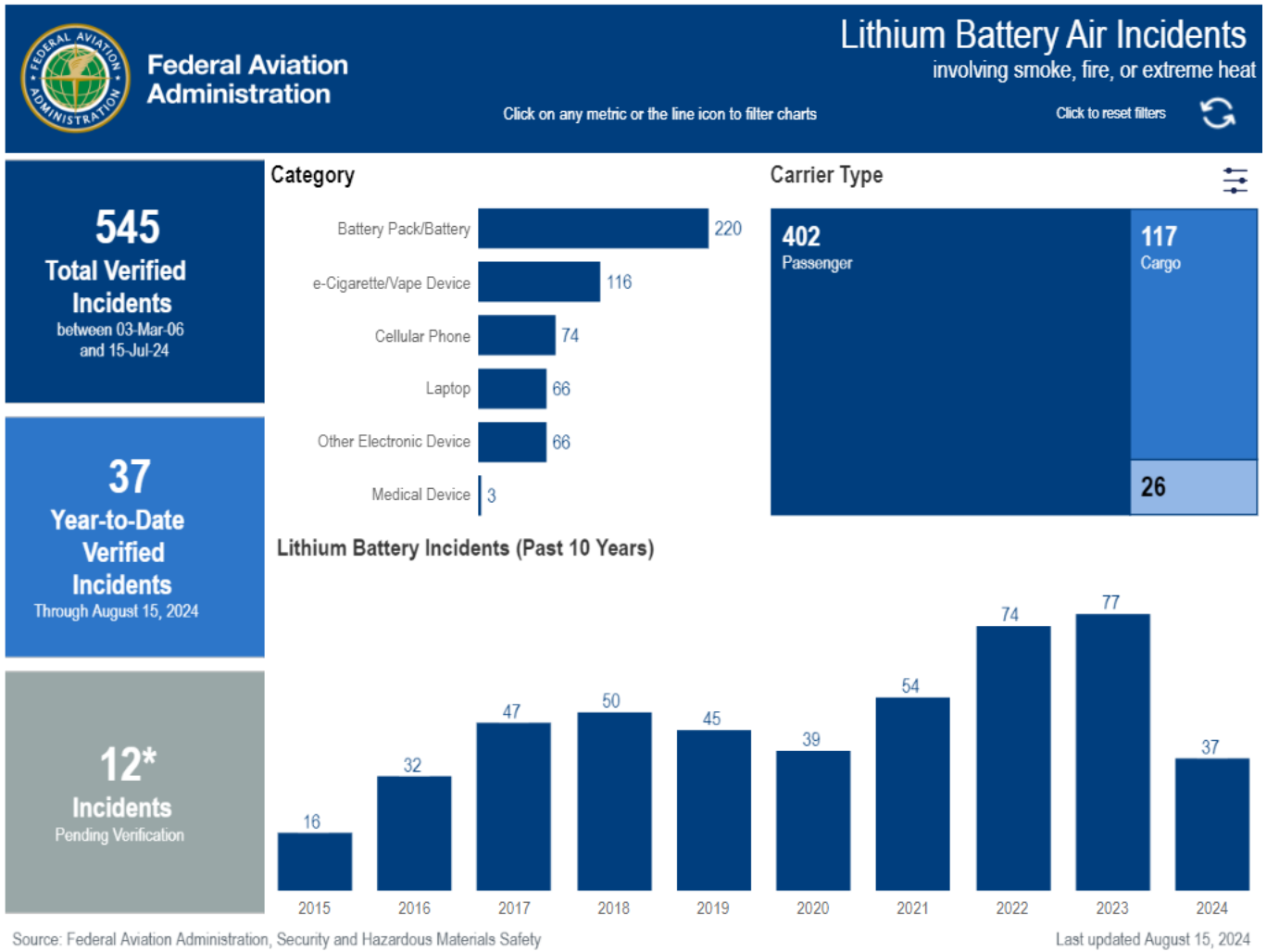
Overview

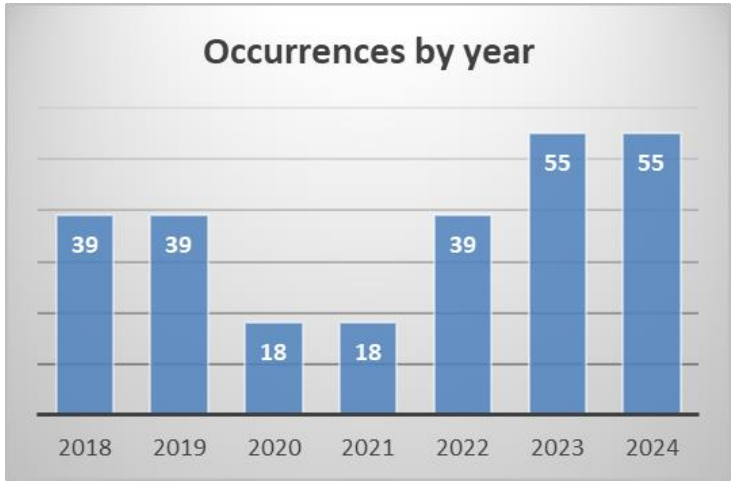
- A study that could support detection of lithium batteries in checked baggage by providing objective and reliable data on performance and impact
- A look at how lithium battery detection is performed today and current data
- Operational and performance data from an on-site test using an EDS machine + dedicated detection algorithm
- Views from across the industry
- Summary report

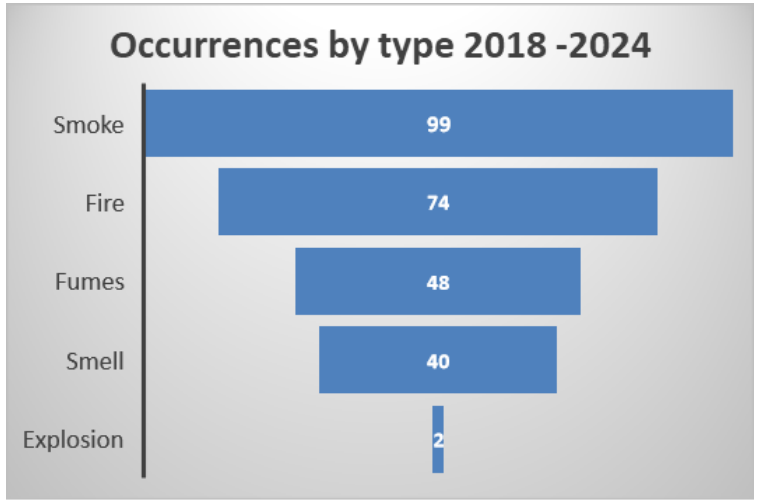
- This lithium battery detection project is focused on checked baggage
- Rapiscan has many years of experience in this application
  - >500 checked baggage explosive detection systems sold
- On-site algorithm trial at a Rapiscan customer
- Experience already with dangerous goods algorithm (incl. Lithium Batteries)




Lithium Batteries







Source: European Central Repository

Project Overview

Project is made up of 4 key tasks

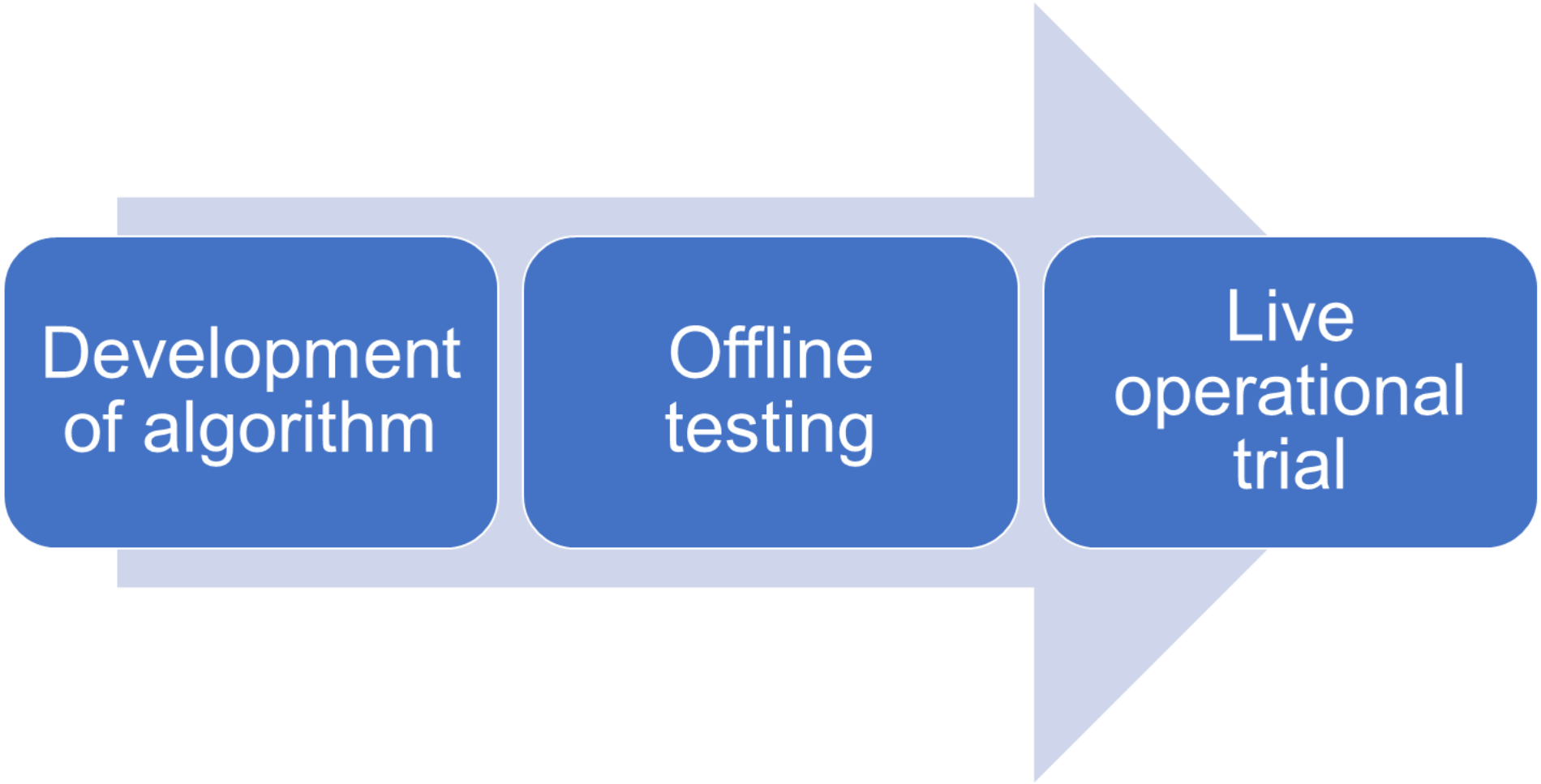
1. State-of-the-art solutions; Test Plan; Consultation with stakeholders
2. Development & on-site trial of a lithium detection algorithm
3. Analysis of the on-site test results
4. Publicly available report summarising main outcomes, conclusions and recommendations for detection of lithium batteries in checked baggage

3. Algorithm Trial Results & Key Findings

- **Dean Smith**
  Director, Product Management EDS

- **Sophie Hibbin**
  Senior Technical Adviser, CAAi

Testing Phase



Key Findings
Offline

- 200 random bags
- 15% alarm rate
- Absolute false alarm rate of 4.8%
- Detected batteries lower than the 50Wh threshold
- Did not discriminate between batteries on their own or in devices

Key Findings
Trial

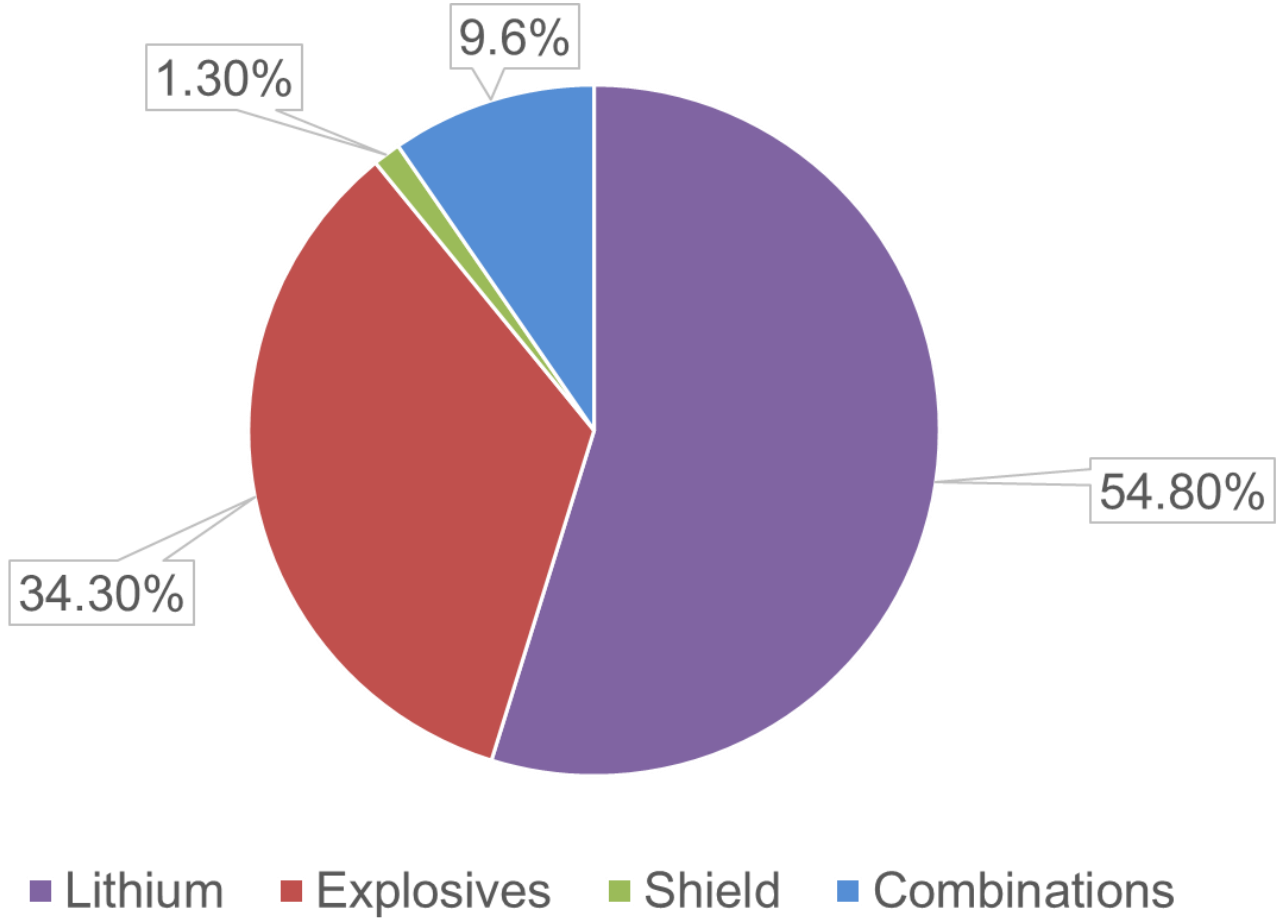
- Algorithm proved capable of detecting in-scope lithium batteries
- Screeners adapted well:
    - No negative impact on on-screen resolution process for security threats perceived
- The novel alarm increased the screeners' decision times
- The reject rate was elevated during the trial
- Any challenges with implementing such an algorithm would appear to centre on operational process
- Further research is likely necessary, if new regulations are to be put in place

Bag Data

Trial

- 748 bags were screened
- 144 (21%) of these had a lithium battery alarm
- At level 1, the reject rate was 32%
- At level 2, the reject rate was 49%
- Non-compliant lithium battery prevalence: 1.34%

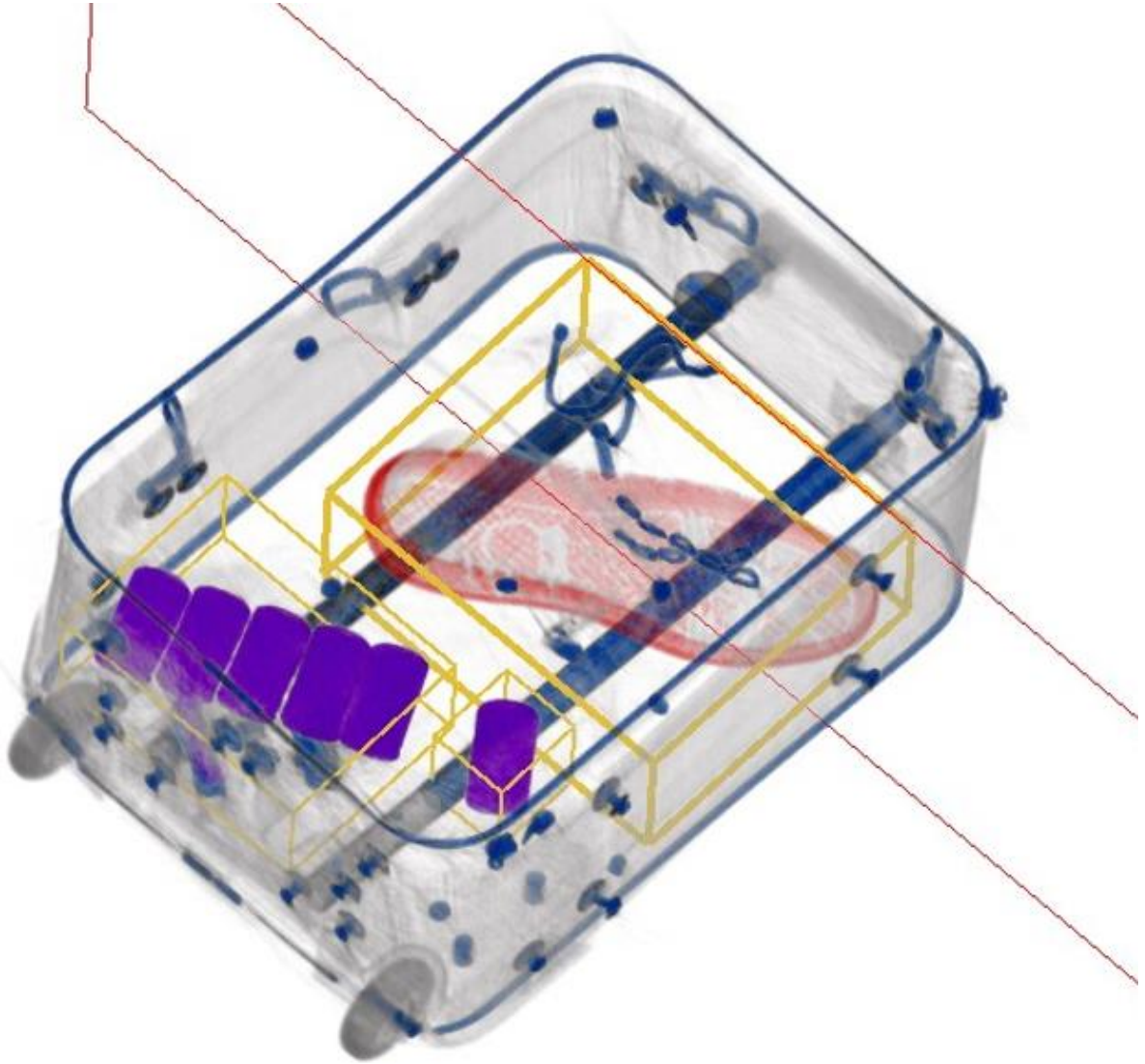
Ratio of Alarm Types



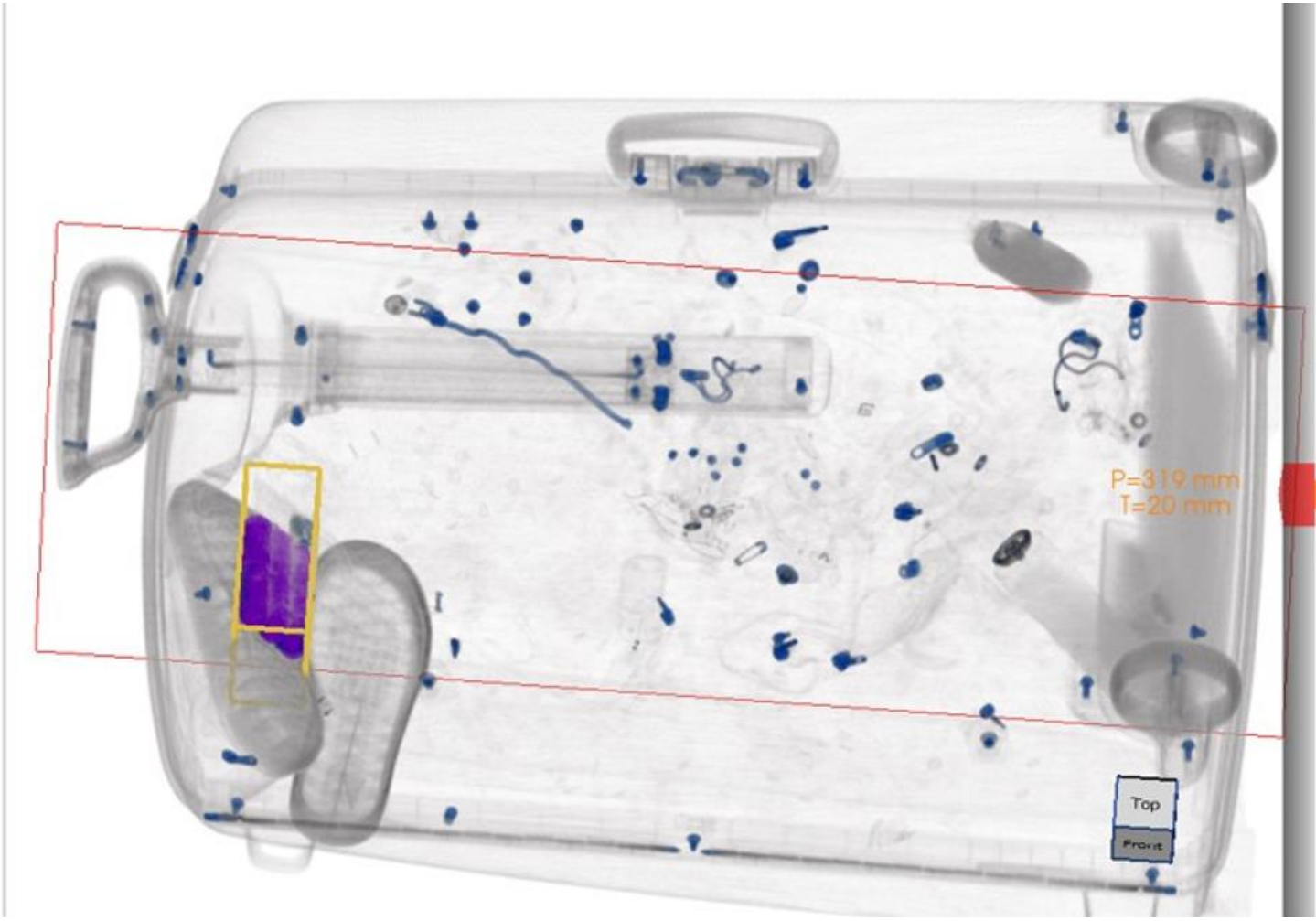
Algorithm Performance

- No issues with deployment
- Alarm appeared clear on screen
- False alarm rate was higher than expected
- The algorithm showed capability of detecting relevant lithium battery threats

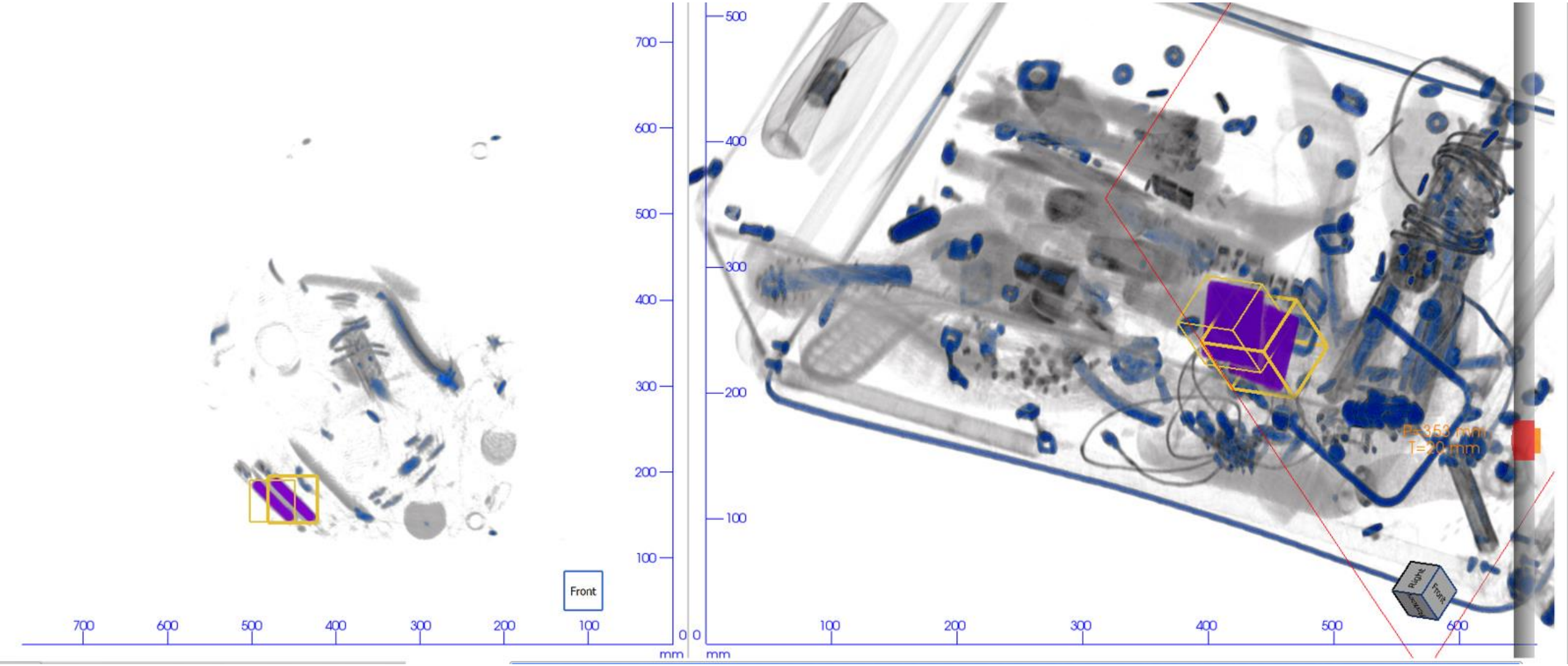
Lithium Alarms



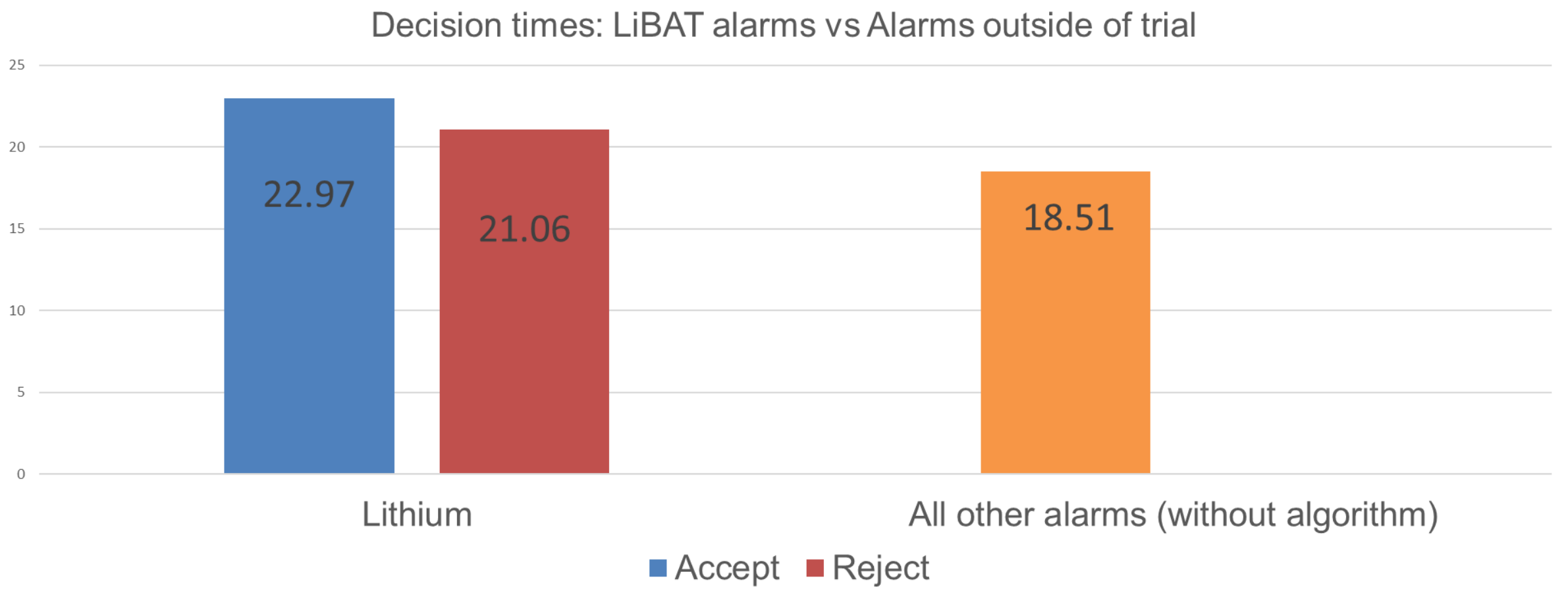
Lithium Alarms



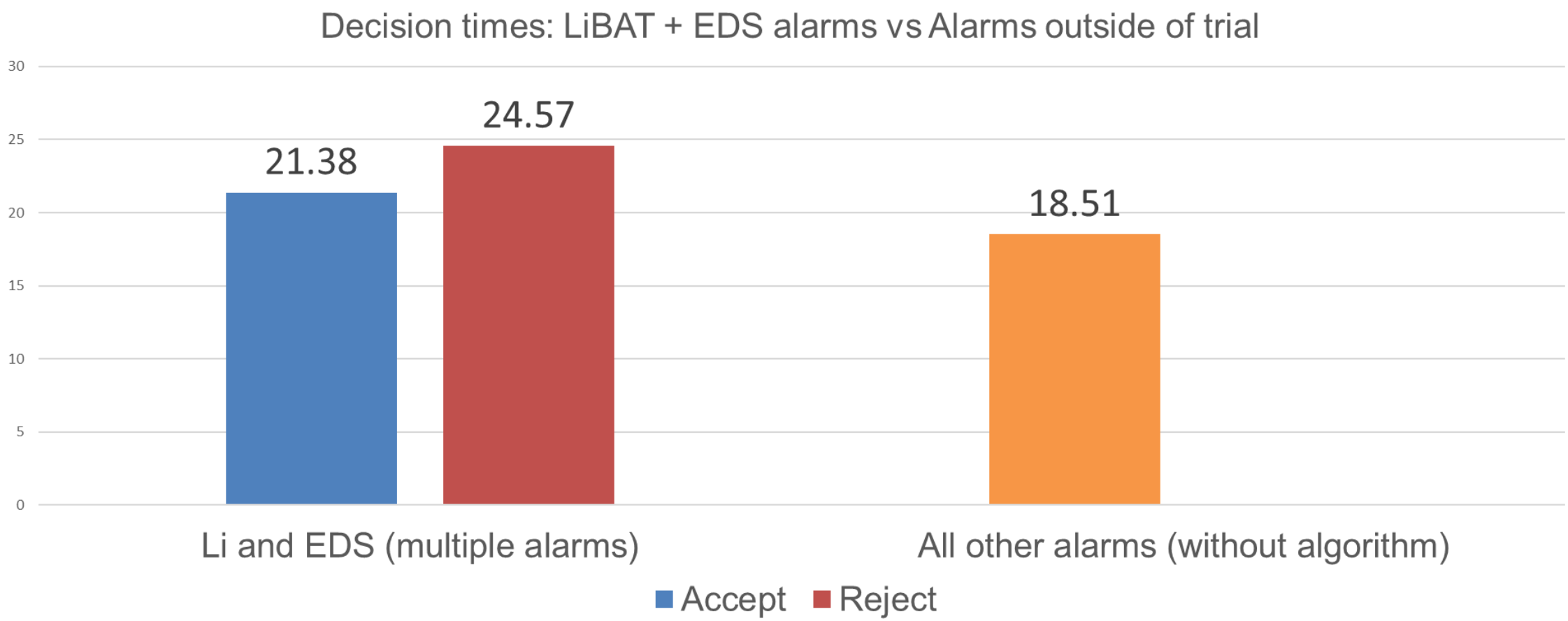
Lithium Alarms



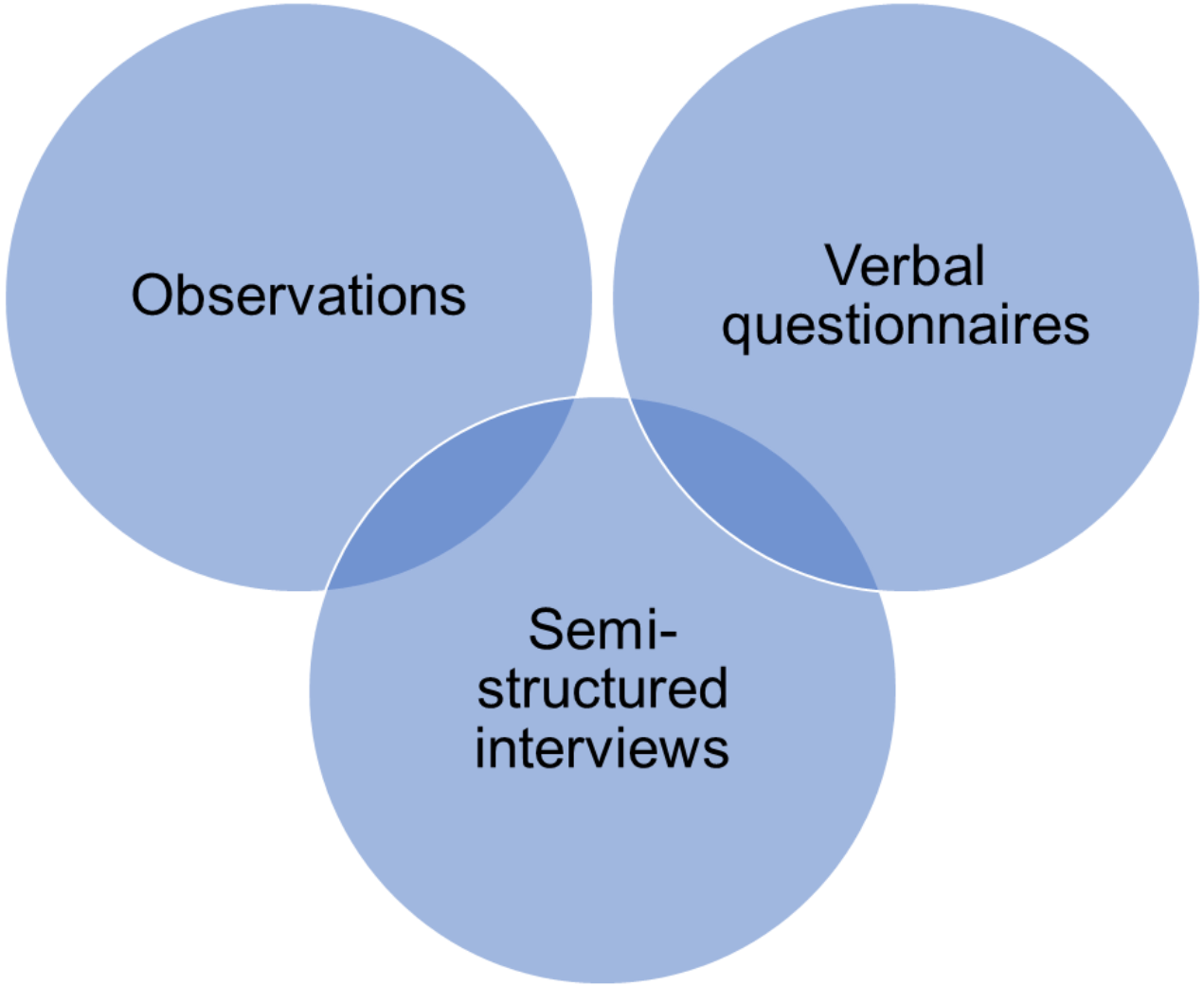
Decision Times



Decision Times



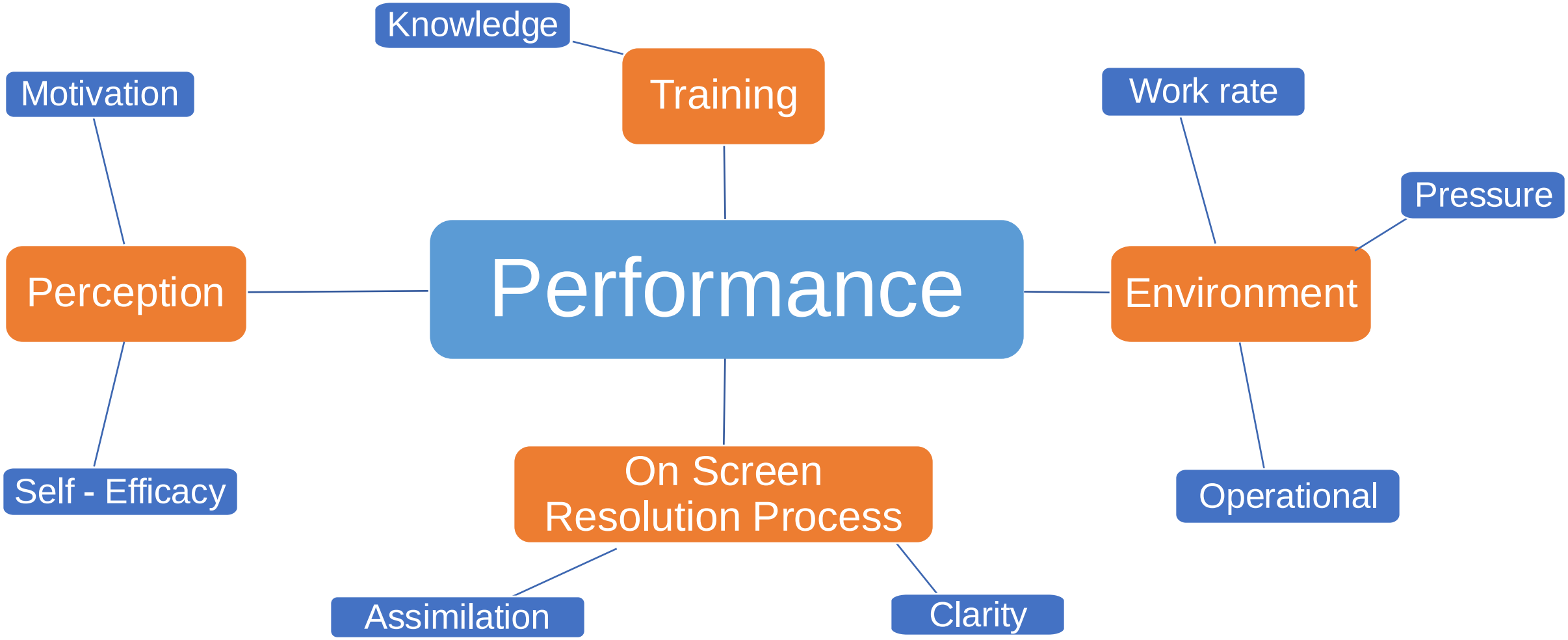
Qualitative Research



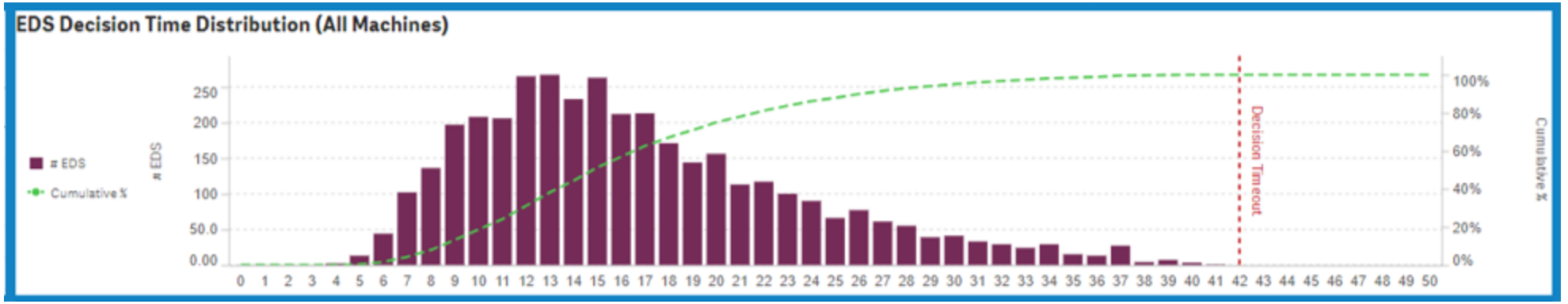
Screener Performance

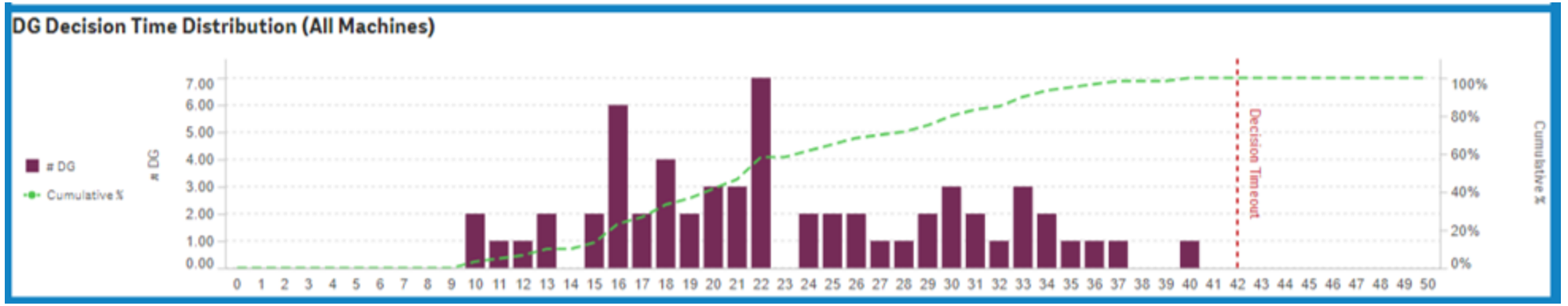
- Screeners briefed ahead of trial, set of working instructions provided
- Little perceived negative impact on performance
- Decision times for each image increased
- Work rate was increased
- EDS alarms took priority, followed by LiBAT
- Enhancements used mirrored those for EDS
- Potential for the new alarm for identifying IED components (positive security impact)

Screener Performance



Screener Performance





Trial Limitations

- Timing and resource:
  - Low bag volumes
  - Low LiBAT prevalence
- EDS resolution time change:
  - 21s during trial vs 16s under standard operation
  - The trial context was affecting the screening

Conclusions

- The algorithm as deployed can detect relevant lithium batteries in the live, operational environment

- Screeners can utilise the algorithm to perform the task of lithium battery detection

- There was an impact on airport operations

- The on-screen resolution process for security threats was not compromised by the on-screen resolution process for safety threats

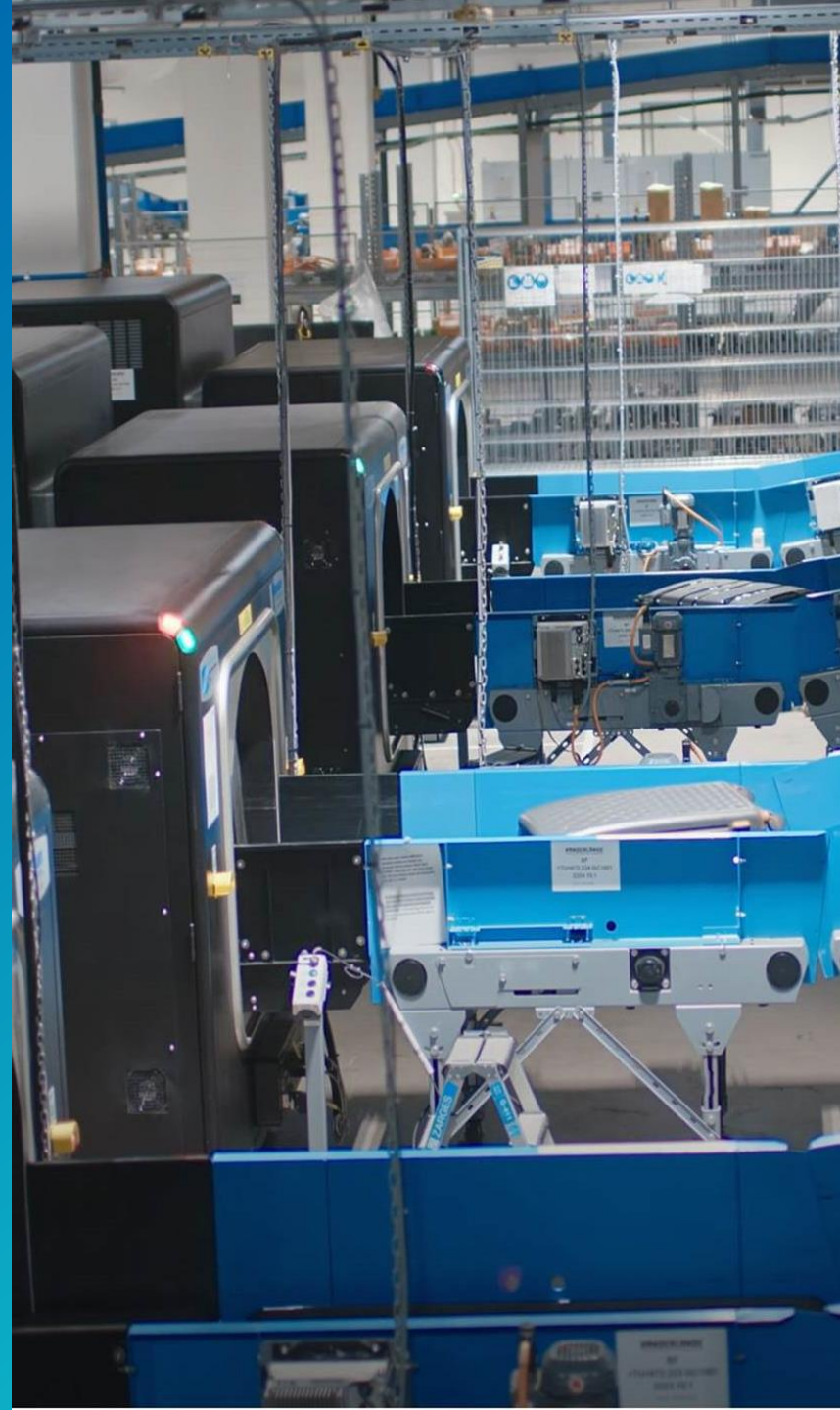
- Focusing on operational processes appears to be key to successful deployment

Conclusions

Capabilities	Limitations
Can detect relevant lithium battery threats in the operational environment	High false alarm rate of the algorithm used during the trial (algorithm will need further “tuning”)
Screeners found the algorithm easy to adapt to	Work rate and alarm rate is increased – additional training, resourcing and passenger communications required
Potential for enhancing the security screening process	Additional data required for a comprehensive evaluation of the lithium battery threat

4. Post-trial considerations

- **Adam Borkowski**
  Technical Lead, EASA



Post-trial considerations

- Evident safety benefits
- Potential security benefits
- The outcomes of the project and recorded safety incidents will be made available to the relevant authorities to explore potential improvements in the regulatory system
- The Agency welcomes the possibility of exploring any potential synergies in the areas of safety and security with all the relevant stakeholders

Questions & Answers

To participate, please use **Slido**:

- Visit: **www.slido.com**
- Event code: **3217859**
- Passcode: **iszdn6**

We are launching Slido via Webex - will appear bottom right of the screen

Alternatively, open this via your browser or smartphone

Or scan the QR code with your smartphone

6. Summary & Close

- **Sophie Hibbin**
  Senior Technical Adviser, CAAi

Close

Thank you all for attending

All questions and answers, the recording, and this presentation, will be posted on the EASA Website

A survey will be sent to you following this webinar which we hope you will complete

Our review of state-of-the-art solutions is currently published on the EASA website, as is our report on our earlier stakeholder consultation

Once full report of the trial completed will also shortly be posted, and our final report providing conclusions and recommendations will be available in the Autumn

If you wish to participate further in this project, share your thoughts with us or provide general feedback please contact a member of the Project Team

Webinar: EASA Project Update — Detection of Lithium Batteries using Security Screening Equipment - Online event | EASA (europa.eu)


EASA
European Union Aviation Safety Agency

UK
Civil Aviation
Authority
International

Rapiscan