# Detection of Lithium Batteries using Security Screening Equipment
# Project Webinar – 18 October 2023
# Questions & Answers

| Question | Answer |
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| EASA mentioned the high number of incidents - can you please tell us how many incidents there have been that involve hold/cabin baggage containing lithium items. | Unfortunately, the lithium battery incidents data from FAA does not provide additional breakdown. We are, therefore, unable to distinguish between cabin and checked baggage and passenger and cargo. EASA will endeavour to get the split for the EU part.<br><br>This is why the trial at an airport is key, to enable us to accurately state the number of prohibited lithium battery instances there were in checked baggage which can be also useful to draw general conclusions on overall number of cases.<br><br>The only solid data point we currently have is from a European airport who conducted a study to ascertain the amount of prohibited lithium batteries there was in checked baggage. 1,000 bags were opened and approximately 1% contained prohibited lithium batteries. |
| Could you share figures of the number of incidents and rise of these, over time? This will help provide greater context. | |
| How does FAA data compare to EASA/ECCAIRS database? | |
| Do we have any figures on what the introduction of this would be e.g. we know at the moment 10% or 40% of pax will be carrying lithium over the limits? (the 10% - 40% figures were clarified to be an example, not an accurate figure) | |
| Rapiscan's presentation appeared to mention both cabin and HB scenarios. Can we have the data split please? Context for this project is really important as there will be operational and customer impacts to balance out. | |

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| In reference to the statistics displayed on slide 10: does this count all flights, passenger and cargo? I look at the increase of incidents during the pandemic and would draw a connection to the rising number of battery powered devices shipped all over the globe. Is this a true assumption? | |
| Slide 10 shows the number of incidents - are these just hold baggage, or a combination of hold and cabin?<br>Additionally, the European Central Repository appears to show a decline in incidents - unless I am reading it incorrectly? | |
| Who on the project team is a DG expert with an ICAO/IATA DG qualification (or equiv)? | Lia Calleja-Barcena from EASA is a technical expert in Dangerous Goods<br>Mario Ranito is the UK CAA's Dangerous Goods Policy Specialist |
| What regulatory framework do you envisage for this, once the project has given clear conclusions? | The conclusions from the market assessment and data from the airport trial will help EASA determine next steps.<br><br>Should the regulators and industry decide that lithium battery detection is required on all checked baggage, using Explosives Detection Systems (EDS), together with lithium battery detection algorithm, would provide a robust and quick solution, especially as they are operational in most European airports today. As to whether the algorithm should be regulated or non-regulated is something that would need to be carefully considered.<br><br>Time to release a regulated algorithm will likely be measured in years. The standard will need to be agreed upon, a test will need to be defined, test laboratories will need to be established, and EDS manufacturers will need to develop and pass the test.<br><br>Time to release an unregulated algorithm will likely be measured in months. However, the industry will need to be comfortable that algorithm performance will be on a 'best endeavours' basis. Perhaps a hybrid solution is best - a non-regulated algorithm to help mitigate the immediate safety risk while the regulated process is being discussed and developed?<br><br>Any and all decisions relating to Regulation would be considered through the appropriate channels, at a later stage, and is outside of the scope of this project. |

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| If detection capability is proven to exist, how do the regulators foresee the testing/certification of these algorithms taking place, and which organisation(s) would carry this out? | EASA's main objective is to assess what are technical, operational, and regulatory possibilities to detect lithium batteries carried in checked baggage against the existing requirements. Any reflection on possible testing/certification arrangements is not only premature but also out of the scope of the research. |
| Today the ownership of removed batteries is unclear. Will your recommendations include issues regarding regulations and airlines Conditions of Carriage? | No, it will not. This project looks at detection options to ensure prohibited lithium batteries do not make it on to the aircraft. The airport trial will assess how the detection algorithm performs and its impact on operations. |
| Are you expecting during trials for bags to be opened and items checked with customers present? This is a logistical challenge for most airports. | The scope of the operational testing does cover customer baggage checks. Passenger reconciliation with their bag is certainly an operational challenge and the trial will provide an understanding of the impact of this on the current (Dangerous Goods) process being followed today. |
| What levels of lithium are you looking to detect? Some of the levels that are in regulation, are v small - e.g. 0.3g (relating to battery powered luggage). One of the problems with screening is ascertaining the level of lithium contained - many labels are not in English (or in the language of the screener). Some of the limits relate to Wh ratings , and others to grammes. The Wh ratings are only able to be checked if the bag is rejected and the label examined (problems with language, damaged labels, missing labels). None of the limits we are looking for are more than 10g. | We are developing the algorithm now and will know what is possible over the coming weeks. What is clear though, is that X-ray has its limitations and detecting 1 x CR2032 type battery amongst a cluttered bag will be challenging and likely result in a high false alarm rate. Probability of detection and false alarm rate need a careful thought.<br><br>Ascertaining if a lithium battery is over the maximum power level will be challenging. Not all batteries have power ratings. The process of determining whether the lithium battery/device is prohibited or allowed needs to be accurate and quick. How this is achieved is unclear at the moment.<br><br>This is already mandated through the applicability of the provisions of the ICAO Technical Instructions (same provisions under the IATA DGR). Lithium ion batteries with a rating of more than 100Wh manufactured after 31 December 2011 must be marked with the Wh rating on the outside casing and the same applies for Lithium ion batteries with a rating of 100W or less, manufactured after 01 January 2009. |
| One of the limits for acceptance for carriage is related to the Wh rating. Nevertheless, most of the power banks or spare batteries do not have such markings clearly visible. This leads to staff having to calculate it (Volt x Ah) which adds time to the processing of detected Lithium batteries. Would you consider recommending EU to mandate Wh marking on all Lithium batteries? | |
| There is also a significant risk posed by undeclared lithium batteries in cargo. Will the trial be extended to cargo in due course? | The scope of this project is for checked baggage only. |

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| Is the software installed in the EDS material able to be used in a dual view Xray machine ? | Unfortunately this is not possible. The algorithm for EDS and Dual View is different, even though the process to develop the algorithm is the same. |
| At this point in time, according with the algorithm used, how feasible could implementation be on the current screening equipment or will this solution need other specific equipment? | The project examines whether existing EDS can be used to detect lithium batteries. They are already installed in many airports in the EU, and beyond. The airports can therefore leverage existing equipment. |
| Are the operators from the chosen aerodrome engaged in the trial? | At this stage we are still finalising the trial details with the aerodrome. Ideally the operators should be involved. |
| Can you draw the right meaning of security checks due to lithium batteries detection on air ops issue? | Unfortunately, the question is not clear. Please contact the Consortium directly to clarify. |
| I remember that the study in question concerns the detection of batteries in checked baggage, but what should we do if such a dangerous battery ends up on board the aircraft?<br>Is there anything known to EASA or others at this meeting about effective safe containers for containing batteries that have made it onto an aircraft and are in flight? These are batteries that have too large a capacity or show dangerous symptoms (raised or rising temperature, smoke, etc.).<br>Regarding containers, I am asking about those that can withstand the temperature of a burning battery and (?) stop the release of gases.<br>We must also prepare for a situation where a dangerous lithium battery is discovered at an airport. Do we have identified equipment (containers) and procedures on the ground (at airports) in such cases. | This is a really interesting question. However, this is not something covered within the scope of this project.<br><br>The only way for a battery that is forbidden for carriage to be in the hold of an aircraft would be that this was undeclared and, thus, this would be unknown by the operator. The only guarantee for a safe scenario is that such items are not allowed and not carried. If what you mean is whether fire resistant containers are used as a preventive measure for those instances where they may end up in the hold, the answer is that those containers are used as a preventive measure for cargo and that baggage is not necessarily put in them. Should an emergency happen, appropriate emergency procedures on board and at the airport would be applied. |
| Rapsican explained this project is focused on checked baggage, however Lia from EASA talked also about cabin baggage. Is this project looking at BOTH or just HB? | The scope of this project is for checked baggage only. The information provided on the other project was just as additional information for those parties interested on other ongoing projects on lithium batteries. However, as you could see, the scopes are completely different. |

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| You mention a lithium battery detection trial with one of your customers. Can you provide an overview on performance (detection/alarm rates) and what Rapiscan believe is needed to further improve the performance? | The trial is due to start in December. The end report is due by Apr 2024 and will include the performance stats from the trial. The report will be made public. |
| Will part of the project testing phase focus on the impact of any add-on regulation, on the existing (and some would say more important) EDS algorithms? | Yes. The statistics we gather from the trial will tell us the impact of the additional algorithm on the screener viewing times at all levels. Rapiscan has experience of running non-regulated and EDS algorithms together and there is no impact on the time the EDS takes to make the automated decision and, if it is a reject, deliver the image to the screener. |
| **Comments and Observations** | **Response** |
| EDS is not common in Europe in small/regional airports for screening of cabin baggage. Many smaller airports are still using single view x-ray. | The scope of this project is to examine whether existing EDS can be used to detect lithium batteries. They are already installed in many airports in the EU, and beyond, and as such a proof of concept can be proven. |
| Training - as someone who delivers DG training for security staff, the battery element is the most complicated to communicate. | Thank you for your comments and for providing this insight. |
| Airlines need to be fully onboard as the cost of this screening will be passed on to them, in full. | Thank you for your comments. We are fully committed in engaging Stakeholders in the findings of the project and invite all interested parties to participate in further engagement or provide feedback for consideration. |
| The challenge of reuniting passengers with their luggage presents its own operational and safety challenges. | Thank you for your comments and for providing this insight. |
| I think with regard to the data, more work is needed on this. You should reach out to FAA to get their data split. These incidents are less in number than those that are caused by disruptive passengers. | Unfortunately, the lithium battery incidents data from FAA does not provide additional breakdown. We are, therefore, unable to distinguish between cabin |

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| The occurrences in Europe show a decline. | and checked baggage and passenger and cargo. EASA will endeavour to get the split for the EU part.<br><br>This is why the trial at an airport is key, to enable us to accurately state the number of prohibited lithium battery instances there were in checked baggage. |
| Just a comment on the 1%. It is not based on 1000 bags but calculated based on how many detected on a EDS machine | |
| Removal and disposal of prohibited items should be the responsibility of the carrier, who own the responsibility for Annex 18. | Thank you for your comments. |
| A lot of Dean's from Rapiscan talk has talked about AA and AAA batteries. Work is needed to establish how different regulators view these compared to batteries with higher lithium content (eg TSA). | The scope of this project is to examine whether existing EDS can be used to detect lithium batteries.<br>Any and all decisions relating to Regulation, and how this is viewed in different areas, would be progressed through the appropriate channels, at a later stage, and is outside of the scope of this project. |
| This has been useful - I think an in-person session would be a better approach for the future, as the virtual nature has limited the two-way discussions and points have got lost in translation. | Thank you for your comments. This will certainly be considered for future webinars and other stakeholder engagement activities. |
| Every finder of DG is obliged to report this to EU database. The reporting of 20 000 batteries (Avinor) is an extra burden to the airport. | The operational trial will provide an accurate number of prohibited lithium battery instances there are in checked baggage at a given airport which can be useful to understand better the overall problem. The trial will also provide an understanding of the impact of this on the current operation. |
| This project should consider the liability associated with deploying algorithms. | Thank you for your comments. This will certainly be investigated further. |

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| Airlines and Airports need to understand and fully support the changes that might result from this important research. Airlines in particular need to understand the operational impact. The passenger has no contract with the airline, only with the carrier, so the carriers should be taking the lead on passenger communications and operational procedures. | The operational trial will provide an accurate number of prohibited lithium battery instances there are in checked baggage at a given airport which can be useful to understand better the overall problem. The trial will also provide an understanding of the impact of this on the current operation. |
| Without an answer to the label challenge, this project should stop and carefully think of the impacts on carrier operations. | The scope of this project is to examine whether existing EDS can be used to detect lithium batteries. Any challenges relating to practical implementation and impact on operations will be investigated by the research and considered through the appropriate channels, at a later stage, and is outside of the scope of this project. |