EASA
European Union Aviation Safety Agency

Technical Workshop

Impact of Security Measures on Safety

29th and 30th April 2024

Delivered in cooperation with our consortium

UK Civil Aviation Authority International

apave Aeroservices

CASRA

Funded by the European Union

EASA
European Union Aviation Safety Agency

Welcome from the Team

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CASRA

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Agenda April 29th

1. Introduction (10’)
    1. Participants
    2. Project
        1. Task 3.1
2. Input (70’)
    1. Methodology
    2. Threat Scenario Development
        1. Bowtie
        2. Gap analysis
3. Conclusion & Farewell (10’)

Welcome

Your views and expertise are needed!

- **Subtask 3.1:** Focus on interdependencies between security landscape and aircraft design standards and best practices.

3.1.1 - Assessment report on the current **aircraft design requirements** and their **relevance for mitigating physical security threats**, including gap analysis of aircraft design standards

3.1.2 - Assessment report on the relevance of the existing detection requirements for screening equipment to mitigate threats to aircraft structure

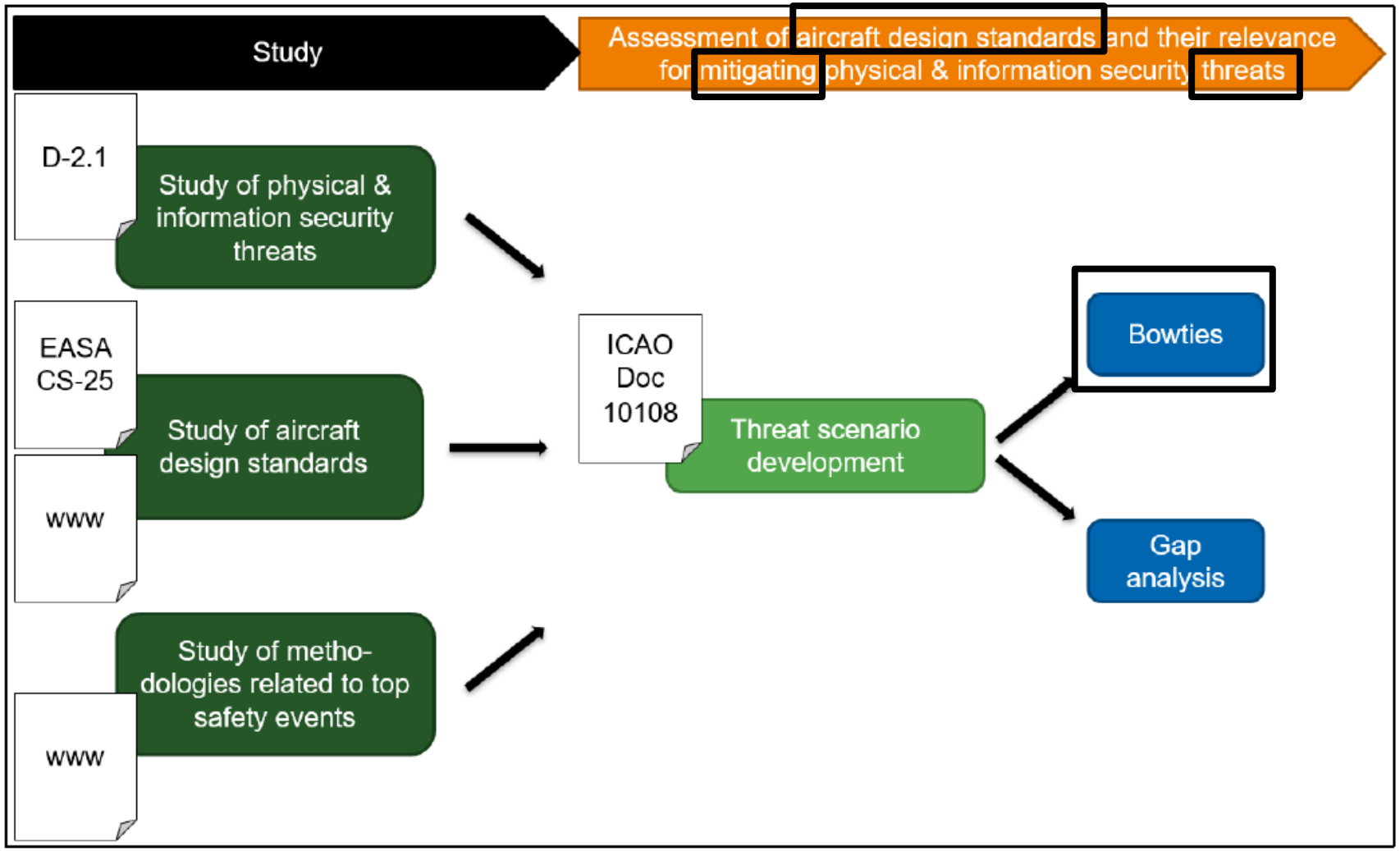
3.1.3 - Assessment report on the current **aircraft design requirements** and their **relevance for mitigating information security threats**, including gap analysis of aircraft design standards

3.1.4 - Report on the assessments performed, conclusions and recommendations

Aircraft design

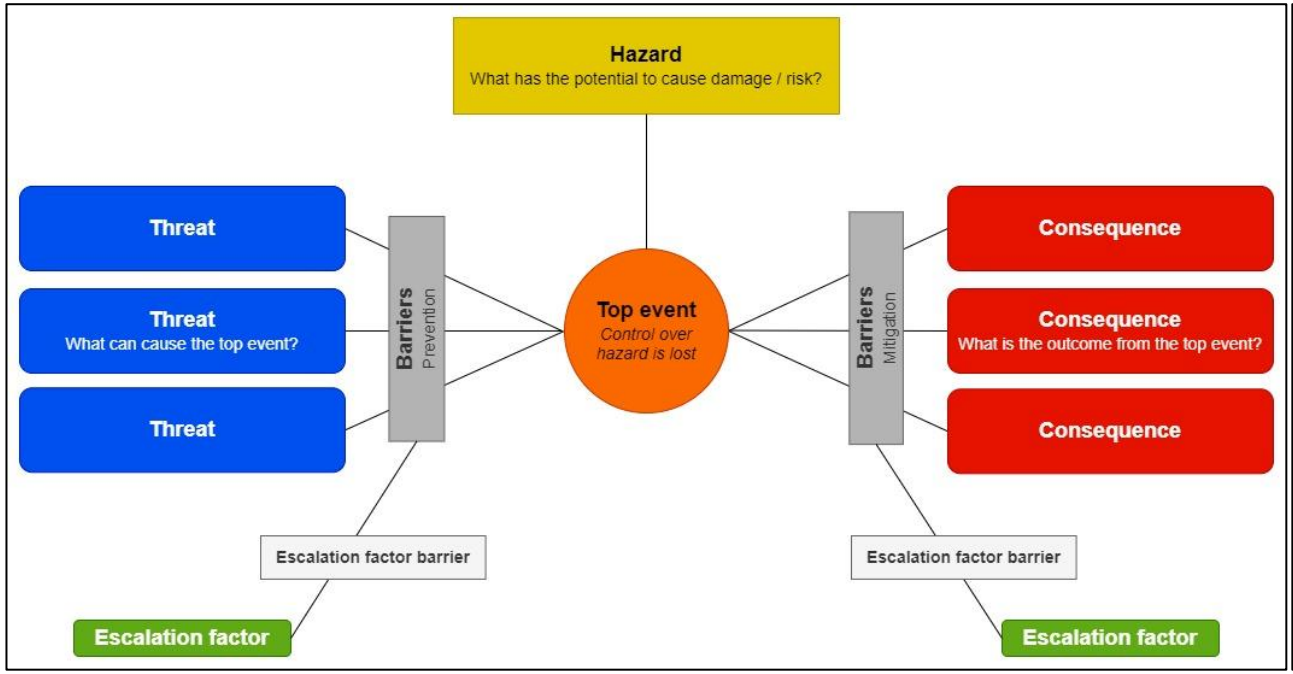
- Aircraft is not designed in the vacuum
- Its primary purpose is to fly
- Many different, sometimes contradicting, requirements need to be accounted for
- Manufacturer instructions needs to be followed by the operator
- Surrounding (environment in which it is used) needs to adapt

Methodology

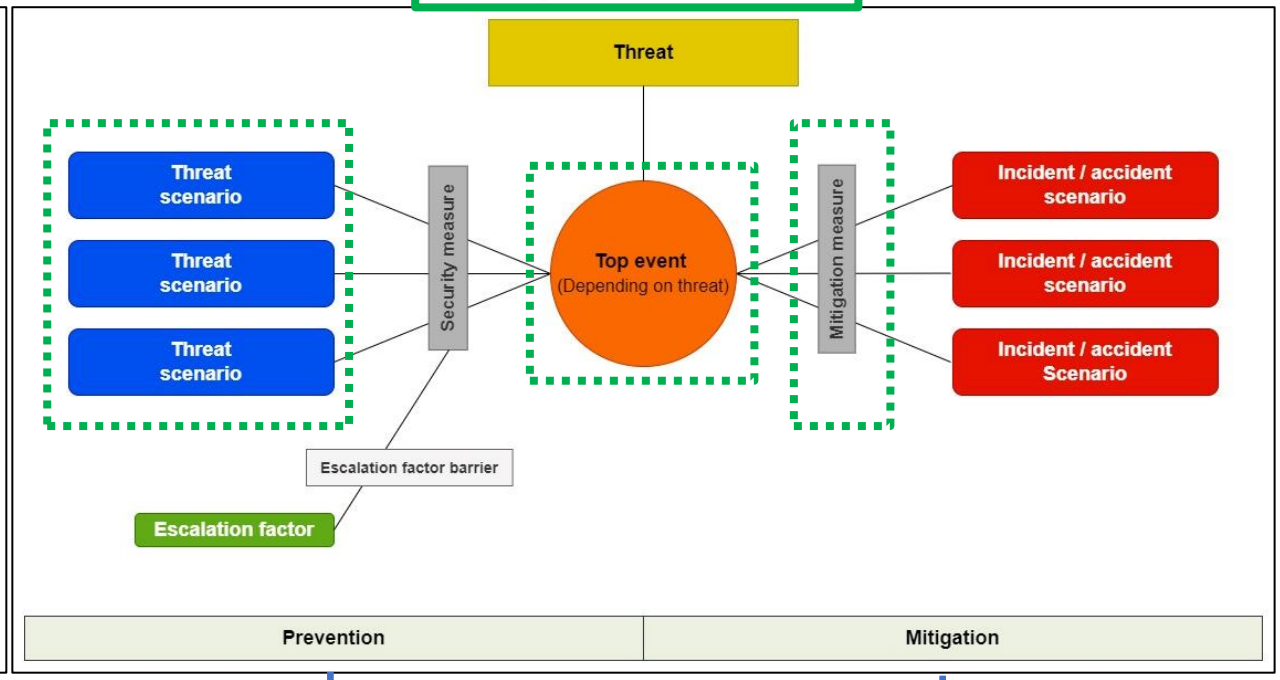


Bowtie - overview

Original



Adapted model



Stopping something from happening

Make a situation or effect of it less harmful/serious

Threats and threat scenarios

Applicable threats from previous reports (ref. Task D-2.1)

(only threats having a direct impact on aircraft are considered for assessment e.g. only airside threats)

1. IED in passenger cabin
2. IED in the hold/cargo compartment
3. Air-to-air threats
4. Ground threats against the aircraft on the ground
5. CBR threats
6. Aircraft used as a weapon
7. Conventional hijack
8. Other threat items in the cabin
9. Sabotage
10. Cyber-attacks

Top events

Adapted from EU Regulation 2020/2034

Airborne collision - a collision between aircraft while both aircraft are airborne; or between aircraft and other airborne objects (excluding birds and wildlife);
Aircraft upset - an undesired aircraft state characterized by divergences from parameters normally experienced during operations, which might ultimately lead to an uncontrolled impact with terrain;
Collision on runway - a collision between an aircraft and another object (other aircraft, vehicles, etc.) or person that occurs on a runway of an aerodrome or other predesignated landing area;
Fire, smoke and pressurization - an occurrence involving cases of fire, smoke, fumes or pressurization situations that may become incompatible with human life. This includes occurrences involving fire, smoke or fumes affecting any part of an aircraft, in flight or on the ground;
Ground damage - damage to aircraft on ground on any other ground area than a runway or predesignated landing area, as well as damage during maintenance
Obstacle collision in flight - collision between an airborne aircraft and obstacles rising from the surface of the earth. Obstacles include tall buildings, trees, power cables, telegraph wires and antennae as well as tethered objects;
Terrain collision - an occurrence where an airborne aircraft collides with terrain, without indication that the flight crew was unable to control the aircraft. It includes instances when the flight crew is affected by visual illusions or degraded visual environment
Other injuries - an occurrence where fatal or non-fatal injuries have been inflicted, which cannot be attributed to any other key risk area .

Aircraft design standards

Applicable aircraft design standards from CS-25 Amendment 28 (EASA)

(only design standards for large aeroplanes)

Specific security requirements	Requirements indirectly related to security (to be assessed)	Security non-related requirements
CS-25.795 CS-25.1319	CS-25.21 CS-25.305 and 307 CS-25.365 (e) (2)), (f), (g) CS-25.561, 562, 563 CS-25.571 CS-25.603, 605, 609, 613 CS-25.671 CS-25.783 CS-25.785 CS-25.820 CS-25.831 CS-25.841, 843 CS-25.851 CS-25.853 (Appendix F) CS-25.864 CS-25.855-869 CS-25.1309 CS-25.1322	Other general, performance, controllability and manoeuvrability, trim, stability, stalls, lightning protection, etc.

- Opening in pressurised compartment
- Protection of occupants in emergency landing
- Minimise the possibility of intentional opening
- Lavatory door unlocking mechanism
- Fire extinguishers
- Flight crew alerting

Task 3.1.1 and 3.1.3

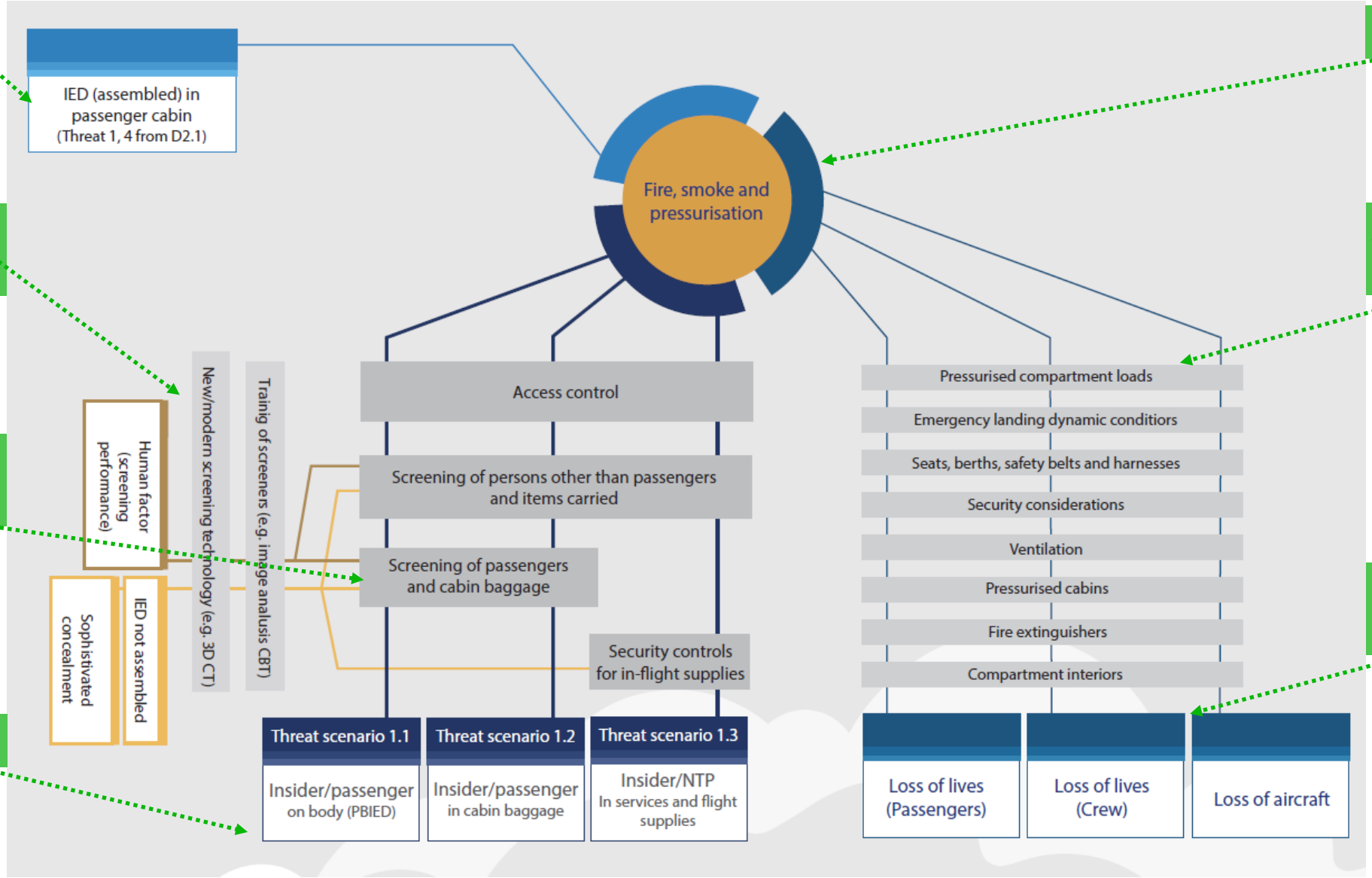
→ Prototype visualization of output

Threat

3. Escalating factors and their mitigations

2. Preventive security measures

1. Threat scenarios



Top event

Aircraft design-based mitigations

Worst case consequences

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Agenda April 30th

1. Introduction (10’)
    1. Participants
    2. Project
        1. Task 3.1.2
2. Input (70’)
    1. Methodology
3. Conclusion & Farewell (10’)

Welcome

Your views and expertise are needed!

- **Subtask 3.1:** Focus on interdependencies between security landscape and aircraft design standards and best practices.

- **Deliverable D-3.1.2**: "*Relevance of the existing detection requirements for screening equipment to mitigate threats to aircraft structure*".

Global context

Annex 17 requires that ***"Each Contracting State shall ensure the use of appropriate screening methods that are capable of detecting the presence of explosives and explosive devices carried"*** **by:**

- Persons other than passengers on them or in items carried (4.2.6) – **2020 (Amendment 17)**
- Passengers on them or in cabin baggage (4.4.2) – **2018 (Amendment 16)**
- In hold baggage (4.5.2) – **2022 (Amendment 18)**

Global context

ICAO Global Aviation Security Plan lists some priority actions which might be relevant in the context of this discussion:

- Promote **consistency of technical specifications for security equipment**
- Develop and improve the efficiency of certification processes and operational use of security equipment, including **human factors**.
- Keep global **threat picture under regular review**
- **Professionalise work force** and ensure continuous performance

Global context

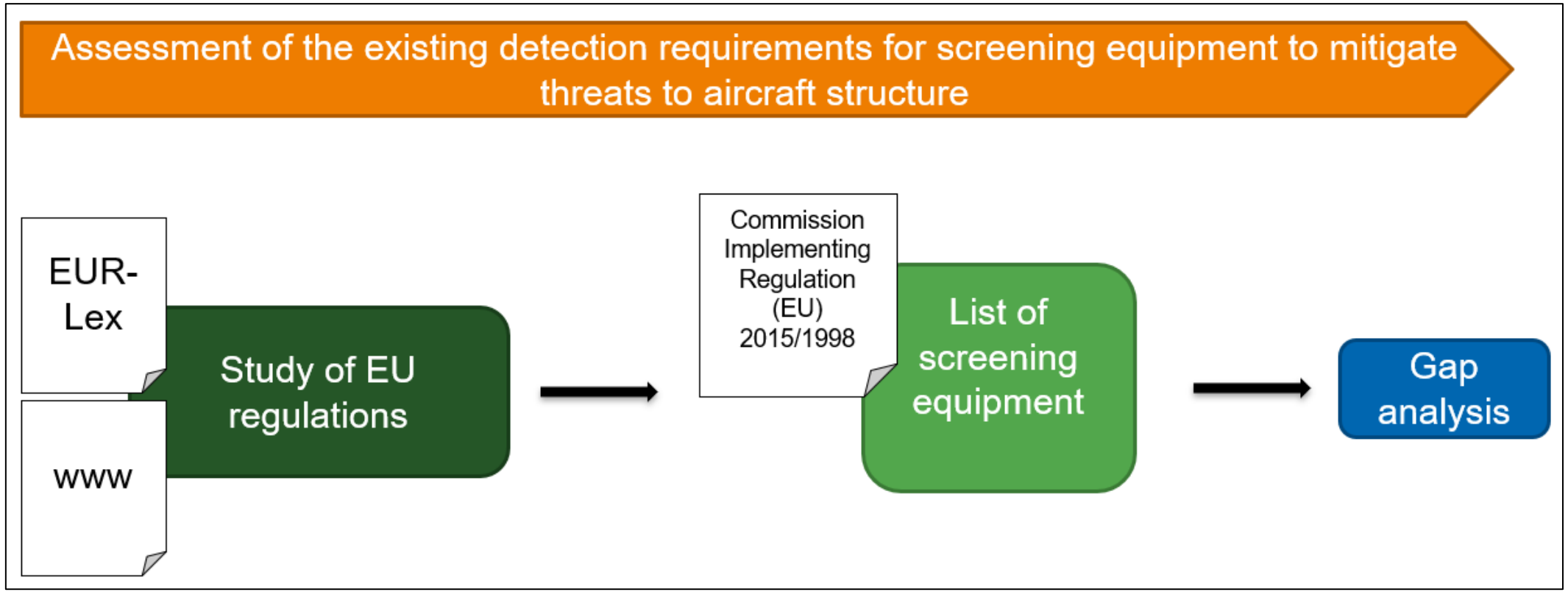
ICAO Dangerous Goods Panel (DGP/29, November 2023):

- Proposals of Amendment to Annex 18 to “clarify State’s responsibilities (…) and relationship between Annex 18 and other Annexes” (WP/04)

  4.2.5.4 Each Contracting State shall include ***preventing passengers and crew from taking dangerous goods on board an aircraft*** *which they are not permitted to carry as part of their safety risk management activities*.

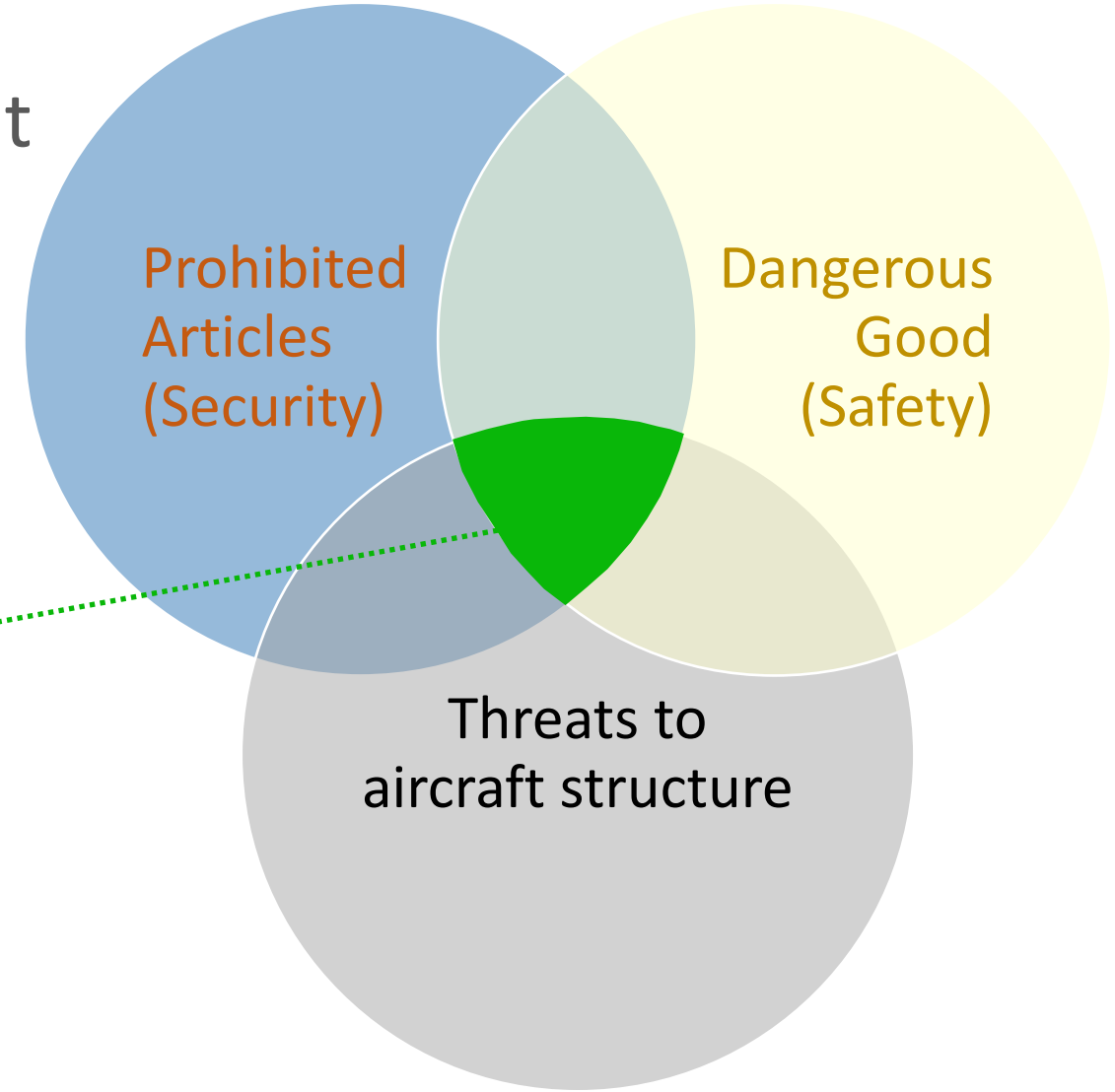
  11.3 Each Contracting State shall adopt regulations to require that ***training and assessment*** *in accordance with Chapter 9 are provided* ***to security personnel who are involved with the screening of passengers and crew and their baggage and cargo or mail***

Methodology



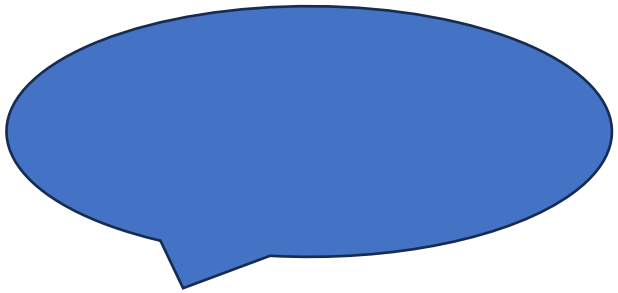
Task 3.2 – focus areas

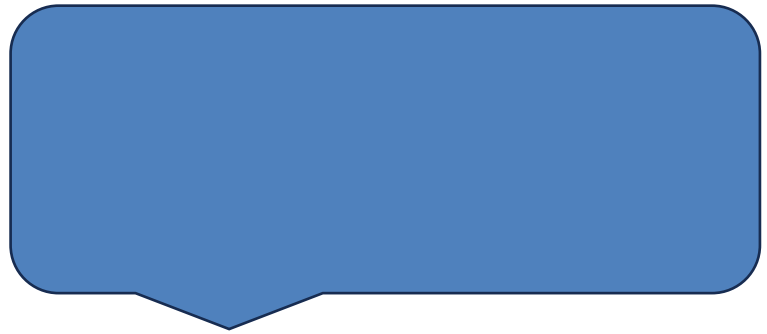
→ Visualization of output



Security – safety interdependence in the context of screening equipment

Ideas….brainstorming session





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Thank you!

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Points raised and discussed during workshop sessions

All points discussed will be thoroughly analysed and incorporated into our work

Discussion Points

29 April 2024

aircraft above a certain mass need to have interiors designed to make the hiding of threat items difficult, and to make aircraft search easier.

such threat items can be used to facilitate hijack - conventional or "aircraft as weapon"

How would you categorise sabotage in maintenance, production or design leading to "delayed" effect on the aircraft?

You miss the Surface to Air threats
There has been higher number of cases of airliners downed by surface to air defences, than aircrafts downed by other aircrafts. Thanks for taking note of it.

As a basic, aircraft are designed against the needs of aircraft operators. Do airlines require aircraft that can withstand all these kind of threats or are we talking a scenario where they will pull back from certain markets/regions/...? I feel this methodology follows more a military way of looking at these requirements then a commercial way.

do you need to consider as well "forced aircraft grounding" (no operations possible?)

I don't agree with the aircraft being first line of defence? Our mutual objective must be to prevent items going onto the aircraft via passengers, crew, staff. Recruiting the right kind of people and ensuring they are trained to the highest possible standards. The aircraft is the 2nd layer of the onion, for example the flight deck door, cameras.

Agreed "aircraft is not the first line of defence"

obstacles in flight - include windfarms! (every airport's favourite topic)

Don't you think that some security threats do not necessarily lead directly to safety risks / outcomes as presented on slide 13, for example: hijack of an aircraft...

Discussion Points

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How do you factor the operational environment, is this list applicable a to a business jet for example ?

"Security contributes to safety"

"everything (in terms of threats) begins outside of the airframe"

"aircraft cannot be in the focus of mitigating threats"

"all threats are possible but not all are probable"

All threats presented are aircraft related, however there are other indirect threats that may be as critical as the direct ones: on ATC, ground or satellite navigation/communication systems, maintenance tools/software, etc... Will this be addressed ?

1322 can be partially applicable as it is mainly flight crew alerting upon malfunctions (1309) and might be not applicable /effective for intentional threads

The Human - Technology interface (designers getting it wrong)

Threats slide: what about fires? due to lithium batteries?

I think its not helpful to think of separating safety and security.

I think we have to acknowledge that we are hoping that the airframe will protect us, but we also have to accept that the ability to successfully carry out the attack depends on practices/equipment that are outside the airframe. All of these threats can be made/introduced by humans that have a legitimate requirement to be on the aircraft. 100% success therefore is not guaranteed.

The relevance of Points 5 and 10 is obvious for aircraft design. For the other points, can you explain how do you see aircraft design mitigating the consequences of such threats.

Discussion Points

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In existing framework passenger screening for security purposes is under national security regulations. EASA has no scope on that.

From what I know is that the taxonomy specifies only "dangerous goods undeclared" or "dangerous goods forbidden", so the narratives of each report (approx. 2500 in 2023) would have to be analysed to know precisely each category... but maybe air operators have some additional data.

In hold baggage and cargo, any LAGs container is allowed. The restrictions are only in passenger /cabin baggage screening. So if a screener sees a container in hold and cargo, they will simply let it go, even if the machine gives an alarm.

We do need the regulatory input but we also need reliable EASA data on incidents - how many in hold baggage, how many in cabin baggage, how many were occurrences, how many were incidents, accidents etc.

True at the moment, the situation will change if we add a DG algorithm which has to detect some DG LAGs

liquids are a challenge - as the container can affect the ability to screen the contents (which is what Perrine was saying about packaging). Sometimes contents can only be assessed by reading a label - which means rejecting the item for it to be examined. Then we have the challenge of language, interpretation, security throughput, airline operations (OTP).

Airlines need to participate in this process - i don't hear any!

Discussion Points

30 April 2024

Why fix what is already working? On DG. Is a well regulated and enforced area of safety and along with, security. Maybe just more awareness is needed

Each IED must consist of explosives, a power source and a detonator. Currently, detection requirements focus mostly on explosives. What if the focus was also on other components, including the power source (lithium batteries)? Wouldn't that improve both safety and security at the same time?

I repeat what I said yesterday, many items in the worst case scenario will have an effect on aircraft structure - at the opposite extreme - effects on structure are limited.

The manufacturers are in a difficult position because they could introduce a new algorithm, to search for new things, but it has an effect on existing screening ability, false alarm rates. False alarm rates are bad new for everyone as it slows things down, but also removes confidence from a particular piece of equipment.

We need to think about DG as part of aircraft equipment which can cause incidents

We should remember than in most airports only about 15% of images of bags are seen by an operator. (or less!).

The question we should ask is how many categories of DG may be identified by a screeener using an x-ray machine? Because many DGs are in liquid form. So the screener would simply see a container. In passenger/ cabin bag screeing this would cause an alarm, but in hold and cargo screeing this would not cause any alarm.

Discussion Points

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Annex is mandatory on the state.

The words in ICAO, appear in EASA rules, which prevents airlines from allowing passengers and crew from taking dangerous goods on board aircraft. No regulation in EASA or EU, requires that DG is screened for.

Manufacturers can do a lot - but we need to understand the tolerance of the air carrier on what they will accept in terms of impact/cost in relation to the benefit of finding such items.

A lot of DG assessment requires reading a label - which means items have to be rejected to be assessed - x-ray machines cannot read labels and Security Officers cannot read labels using an x-ray.

And re labels, we need to accept that the label may not be in the language spoken by the security officer.

Good and sensible discussion between EC and ICAO Security people. This is what is needed.

From what I am understanding here is that to detect DGs a large amount of baggage/cargo would have to be hand searched which is definitely not operationally feasible.

Lithium batteries is a common problem, but these are so complex to assess.

dangerous good (also known as hazardous material or hazmat) is any substance or material capable of posing a risk to health, safety, environment and property when transported by air.

Discussion Points

30 April 2024

Are we happy with the current status and accept that in Aviation there is not more that we can do to limit negative effect DG has on safety.
If not, we should try to find a proactive approach and jointly reflect on what we can do to mitigate any risks that do exist.

The driving force for a manufacturer is Legislation. Developments will be made and certified. Machines will then be sold.

Need to hear from AOCs right at the start of the process as they will feel the brunt of any changes made. Airports will do what the regulation states, but airlines need to buy in as they face the consequences of any operational impact.

There will always be a Human Factor, even if the process is automated

If there is a market then we will do it. Millions will not be spent on developing something for just one machine to be sold.

There is no regulation which states that screening for DG is required. The requirement is for Security Offices (Screeners) to find/recognise prohibited items which are being carried intentionally and to deal with them appropriately if found. The screening process is focussed on this and the screeners work to a closed list. The list of DG is not a closed list but if there is a suspicion that DG is to be used to commit an intentional act, a threat risk analysis should be completed to better understand the extent of the issue and a thorough impact assessment done.