

Transcript: Information Session on proposed updates to Flight Safety Code 4.0

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Slide 1: Flight Safety Code Version 4.0 Rule Proposal Information Session

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Slide 2: Welcome & Session Overview

Hi everyone, and welcome. Thank you for joining us and participating in the Flight Safety Code change process. Today, I will guide you through this information session, which aims to provide additional context for the proposed changes to the Flight Safety Code version 4.0.

Slide 3: Flight Safety Code

Before we jump into the changes, it's important to understand the legal basis for the Flight Safety Code. The Flight Safety Code is incorporated under the *Space Launches and Return Act (2018)* and its associated rules. These rules ensure that space activities in Australia meet safety standards for public risk to be as low as reasonably practicable. The Office of Space Regulator is responsible for maintaining and updating the Flight Safety Code, which prescribes a means of compliance for performing risk hazard analysis.

Slide 4: Risk Hazard Analysis

A risk hazard analysis is required under the rules for a space launch permit, return authorization, and a high-powered rocket permit. As part of the risk hazard analysis, an applicant must use the Flight Safety Code to identify potential hazards during launches or returns that may cause harm to public health and safety, analyse the risks associated with these hazards, and develop measures to mitigate those risks to ensure they remain below established launch safety standards.

Slide 5: Proposed Change Background & Context

Now, some background on the proposed changes and the context for this update.

Slide 6: Background

The Flight Safety Code was last updated in 2019, shortly after the inception of the 2018 Act and associated rules. That means it hasn't been updated for six years. Since then, Australia has been busy with space activities - it has seen numerous launches and return activities authorised. However, lessons learned from the practical application of these activities have not yet been incorporated into the Flight Safety Code. Additionally, there has been a shift in international best practice, it has advanced, most notably the FAA's shift from part 417 to part 450, creating further divergence between our standards.

Slide 7: Background

With that context in mind, the proposed changes are largely based on a 2023 survey. We received detailed feedback from launch service providers and those on the support services panel. Analysis of the survey identified common themes. 38% of responses requested clarification of terminology or intent of the Flight Safety Code. The second highest category included requests for flight safety guidance, and the third was about improvements to the regulatory process with adjacent government regulators.

Version 4.0 of the Flight Safety Code focuses on the top two themes: clarification of terminology and intent, and providing additional flight safety guidance. Further changes are planned internally, and we will consult with the sector in due time. However, for this update we saw it in the public interest to get these changes out sooner.

Slide 8: Context

Two-thirds of the proposed changes have been made to enhance clarity, and the remaining third towards improve flight safety guidance.

There are some examples here of the type of changes in this slide. I'm not going to read them all out. I'm just going to roll on to the next one.

Slide 9: Critical Infrastructure Definition Proposed Changes

In terms of those proposed changes, let's start with the critical infrastructure definition proposed change.

Slide 10: Critical Infrastructure Definition Changes

Definitions

So we're proposing 'critical infrastructure asset' as a defined term and we've removed 'asset with catastrophic potential' as a defined term. So our reason for doing so was to align with an existing act that governs what is a critical infrastructure asset.

The impact of this is that it improves your clarity by removing the confusion around what was or was not an 'asset with catastrophic potential', and it's now a definitive list based on the Critical Infrastructure Act.

I will pause to note here as well that as part of this proposed update to version 4.0, we are not proposing any changes to the safety standards for critical infrastructure probability of trigger debris impact which remains at one in a million on a per launch basis. However, this is something that we are looking at providing in the future as we do note that there is a misalignment with international best practice at the moment. I just want to flag that.

Slide 11: Critical Infrastructure Definition Changes

3.2.4 Critical Infrastructure Asset Safety Standards

The second change that we've made here is proposing a change from “the *minister* has the authority to resolve trigger debris” to “the *agency* has the authority to resolve trigger debris”. So our reason for this change is we've amended it from minister to agency based on legal feedback and we do note that this isn't actually a legislative power of the minister.

The impact of this is you should see improved government efficiency as we've moved the delegation down a step, but in practice the decision making process does not change. The authority remains with the Office of the Space Regulator.

Slide 12: Flight Safety Standard Proposed Changes

That's it for critical infrastructure definition changes. I'll move on now to flight safety standard proposed changes and these are going to form the remainder of this presentation.

Slide 13: Flight Safety Standard Changes

3.4.4 Drop Zones

OK, so we're looking at drop zones standards and we're proposing a change from “individuals within the drop zone *should* receive notification during the relevant period of launch” to “individuals within the drop zone *must* receive notification during the relevant period of the launch.”

So our reason for this change is that this needs to be a *must* as evidence is required for allowing non-compliance. It's very specific in the Flight Safety Code. An example given there is drops on over the water. The impact of this is essentially nil. We believe it improves the clarity of the standard.

Applicants are already required to provide those hazard control strategies as part of the flight safety plan.

Slide 14: Flight Safety Standard Changes

3.5.1 Flight Safety System Standards

Now we're looking at the flight safety system standards. This is again about ‘should’ and ‘must’ terminology here, so we're proposing a change from “a flight safety system *should* be installed on all vehicles to be licenced under the *Space Launches and Returns Act* unless authorised by the Agency” to “a flight safety system *must* be installed on all launch and reentry vehicles to be licenced under the *Space Launches and Returns Act* unless otherwise authorised by the Agency”.

So our reason for this change is first of all to align to international best practice. Secondly, it's also to provide example of hazard control strategies that may be considered for allowing non-compliance, and I'll show you those in the next slide. So we assess the impact of this to be improved clarity on the types of vehicles that require flight safety systems. It was previously unclear. And also to provide types of considerations for allowing non-compliance of this standard.

Slide 15: Flight Safety Standard Changes

3.5.1 (Footnote) Flight Safety System Standards

Speaking of, we've added types of considerations for authorizing launch vehicles without a flight safety system. The two that we've called out here are physical containment and wind weighting - I'm not going to read through all of that there.

Slide 16: Flight Safety Standard Changes

3.5.1 Flight Safety System Standards

Still on the topic of flight safety system standards, we're proposing to add, I'll read this out, "the flight safety system must be designed and certified against an internationally recognised standard that is agreed with the Agency. Any tailoring of the standard must be agreed with the Agency having regard for the purpose and risk associated with the launch".

So our reason for this change is, again, aligning with international best practice, but it's also to provide flexibility on wavering potentially overly strict criteria that does not meaningfully contribute to the safety case. Hence the "any tailoring must be agreed with the Agency" aspect. The impact of this is still effectively nil, it's just being more transparent and providing clarity on an existing agency assessment criteria.

Slide 17: Flight Safety Standard Changes

3.5.4 Flight Safety System Standards

Again, focusing on the flight safety system standards, we're proposing a change from "the flight safety system *should* be operable throughout the entire powered flight phase and re-entry phase of the mission" to "the flight safety system *must* be operable throughout *all phases of flight where it is required to mitigate risk to public safety*".

So again, our reasoning here is to align with best practice. Similarly, it's also to provide flexibility on wavering overly strict criteria that does not contribute meaningfully to the safety case. The impact of this demonstrates that. Clearly there's lessened strictness on operability, it's only required now where it mitigates risk to public safety and thereby it's not needed during phases of power flight that does not affect public safety.

Slide 18: Flight Safety Standard Changes

3.5.4 Flight Safety System Standards

Still on the flight safety system standards, we've changed from "The flight safety system should be capable of terminating the flight when nominal flight conditions have been transgressed and be single fault tolerant", and then there's the definition of what single fault tolerant is. Now, instead, "it must be capable of terminating the flight when nominal flight conditions have been transgressed and must be single fault tolerant". So our reason for this change is we're clarifying the requirement again using standard must terminology. The impact is we believe, again, this is just improving clarity. This is not a new requirement and it's already part of the existing agency assessment criteria. We're just streamlining the process.

Slide 19: Flight Safety Standard Changes

3.5.5 Flight Safety System Standards

OK, again, still on flight safety system standards. Here we're talking about proposing a change from "if the flight safety system is for the autonomous, it should incorporate at least one level of redundancy with a reliability requirement for successful operation of .999".

And changing this to "the flight safety system must have reliability requirement for successful operation of .999 at the 95th percent confidence interval".

Our reason for this change is to align with international best practice. We're removing different reliability standards between manual and automatic, so it's just one standard now, .999, that aligns with international best practice. And we're also including a confidence interval, which was missing in the in the previous version. The impact of this is it's an improved understanding of consistent reliability requirements, they're the same now, and there's no change to the reliability standard required for autonomous system, it's still point .999.

Slide 20: Flight Safety Standard Changes

3.5.5 Flight Safety System Standards

Again, we're still on flight safety system standards. So now we've added that the applicant should use a reliability analysis methodology that is approved by the agency. Our reason for this change is it's an existing process as part of the current application process that we're just now making transparent. This enables applicants to propose a reliability analysis method early on in the process, which can then be agreed by the agency, potentially saving obviously rework occurring later down the line if it's not recognised by the agency. So the impact of that is to improve clarity. Again, this not a new requirement, this already occurs. It's just streamlining the process.

Slide 21: Flight Safety Standard Changes

3.5.6 Flight Safety System Standards

OK, this is our last one on the changes made to the flight safety system standards. So we changed from "evidence is also needed to demonstrate that all flight safety critical systems are

at least single fault tolerant” to “evidence *must* be provided to demonstrate that *all components of the flight safety system* are single fault tolerant. That is, they will cooperate *at least* one level of redundancy”.

Our reason for this change is that we want to clarify the requirement again using standard ‘must’ terminology. So we're moving away from terminology saying ‘also needed’ to now using ‘must’ to be consistent with the standard terminology that we're using. And to also clarify that the entire flight safety system requires ‘at least’ one level of redundancy.

Impact of this, again, is really about improving clarity. There's no new requirement as this already occurs. We just streamline the process.

Slide 22: Flight Safety Standard Changes

3.8.1 Collision Avoidance

OK. We're moving away now from flight safety system proposed changes and now we're looking at collision avoidance.

So we're proposing to add “for an orbital or suborbital launch or return the license applicant must establish window closures needed to ensure that the launch or re-entry vehicle, any jettison components or payloads meet the following requirements with respect to orbiting objects, not including any object being launched or returned”.

This is setting up the following slide which will detail the requirements. However, you'll note that the addition of collision avoidance is proposed into this version of the Flight Safety Code to align with international best practice and provide guidance for the sector.

The impact of this is improved clarity. There is no new requirement here as this forms part of the existing Agency assessment criteria. Collision avoidance already occurs, we're just including the standards into the Flight Safety Code, so we're streamlining the process.

Slide 23: Flight Safety Standard Changes

3.6.3 Collision Avoidance

Speaking of, now we're going into the requirements. So, for collision avoidance we have added that for inhabitable objects, one of three criteria below must be met and the criteria here is consistent with international better practice. The reason we made this change is that it's in alignment with specifically FAA part 450.169.

One of the following three criteria need to be met: the launching or rendering objects must maintain an ellipsoidal separation distance of 200 kilometres in track and 50 kilometres cross track and readily from the inhabitable object.

Secondly, the launching or re-entering objects must maintain a spherical separation distance of 200 kilometres from the inhabitable object, or the probability of collision between the launching or returning objects and any space object must not exceed 1×10^{-6} during the screening time.

So the impact of this is improved clarity. This is not a new requirement as this assessment is still required as part of an application. We're just streamlining the process here and being more transparent.

Slide 24: Flight Safety Standard Changes

3.6.6 Collision Avoidance

I do highlight a couple of things here. First of all, the text that's highlighted in orange was missing in the draft version of the Flight Safety Code, so we will add that. The three criteria are not expected to be met all at once. It's just one of the three criteria needs to be met. So I just want to make that clarification here now.

Secondly, you'll note that in the collision avoidance standards, only inhabitable objects have been provided. We are investigating proposing further collision avoidance standards in the next update for non-inhabitable objects. In the meantime, it is expected that an applicant uses international best practice for non-inhabitable objects in the interim and we may actually make an update to the current proposed version of the Flight Safety Code to include that interim requirement specifying that an international standard must be used for non-inhabitable objects.

Speaking of collision avoidance, we're just going to tie this one up. The last one here is on screening times and we're proposing to add specifically the requirements for different types of screenings for suborbital launch, orbital launch, return as well as disposal. Again, our reason for doing this is to align with international best practice and to provide clarity on when the screening times are required for different types of missions. The impact of this is effectively nil. It's just improving the clarity of existing assessment.

Slide 25: Australian Space Agency

That's it, actually. Thanks for your attention. That's the end of the presentation. I'll hand back to Pat to take us from here.