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National Airlines Council of Canada

Conseil national des lignes aériennes du Canada

National Airlines Council of Canada

Submission to Transport Canada Civil Aviation

Potential Outcomes to Airline Operations After a Roll Out of 5G Mobile Stations Transmitting in the 3800 MHz Frequency Band

December 2023

Potential Outcomes of 5G Interference Mitigation on Airline Operations

Given that the rollout of 5G mobile ground stations, operating in the 3800 MHz frequency band may begin in Canada as soon as April 2024, and the uncertainty around what restrictions may be imposed on aircraft operators (particularly at unprotected airports), the National Airline Council of Canada has summarized some of the possible impacts to airline operations which could potentially affect regional connectivity and levels of service to certain Canadian airports. It considers the effects of some of the more restrictive requirements that could be put into place.

Background:

Of particular concern is the potential for interference from C-Band emissions from 5G telecommunication stations with radar altimeter (Rad Alt) equipped aircraft. Radar altimeters emit and receive radio signals (in a frequency band adjacent to the 5G signals) in order to precisely determine their true height above ground. This height data is then used by multiple aircraft systems, thus the potential for interference has prompted regulatory measures from the FAA in the United States. An Airworthiness Directive (AD) was published for all Rad Alt equipped aircraft that placed limitations and restrictions on low visibility operations such as CAT II/III, Autoland, HGS to Touchdown etc. The FAA also published aircraft specific ADs that place further restrictions based on how the radar altimeter interfaces with subsystem for a given type. Some relief from these limitations are available for aircraft that the FAA have deemed *tolerant* to C-Band emission at specific airports.

In Canada, Innovation, Science and Economic Development (ISED) is responsible for regulating C-Band emissions and has put into place restrictions on telecommunication emissions within the 3500 Mhz and 3800 Mhz bands with the intent to reduce the potential impact on radar altimeters but not eliminate them. This includes protection and exclusion zones around approximately 36 Canadian airports. Given this regulatory framework for C-Band emissions in Canada, Transport Canada must now determine what, if any, restrictions must be placed on aircraft operations to mitigate the residual risk of Rad Alt interference and will ultimately determine if a given aircraft is considered tolerant, or non-tolerant, to C-Band emissions in Canada. If an aircraft is deemed non-tolerant, this would restrict that aircraft from low visibility operations (CAT II/III. Autoland, HGS to Touchdown etc.) and for some aircraft types, could negatively impact their takeoff and landing performance and flight control systems. At the time of writing, it is not known what mitigating actions TC will take, which has created considerable uncertainty for aviation stakeholders in Canada.

Uncertainty Regarding Canadian Equivalence with the U.S. System:

Currently, Transport Canada has indicated that they may need to apply restrictions but has yet to confirm that they will be able to establish any level of equivalence with the U.S system for 5G interference risk mitigation. Many of the aircraft operated by Canada's airlines have had operational and performance restrictions placed on them by the aircraft manufacturer if operating with a non-tolerant radar altimeter. If Transport Canada cannot establish equivalence with the U.S. system, it is uncertain if an assessment of a given radar altimeter's tolerance can be established within Canada's existing emission regulations. Without alignment, even aircraft deemed tolerant in the U.S. might face restrictions in Canada, emphasizing the need for consistent standards to avoid potential complications.

Potential Impacts to Operations for Non-Tolerant Aircraft:

The industry is hopeful that a Canadian-U.S. equivalency can be established, which may mean certain aircraft are deemed *tolerant*, however, many uncertainties could still persist. It is unclear if aircraft deemed tolerant will enjoy unrestricted access to all Canadian airports, or only to those with designated protection and exclusion zones. If not, these aircraft would have to operate as *non-tolerant* aircraft at all Canadian airports outside the 36 protected airports.

The lack of clarity around what specific protection is afforded at an airport that has ISED designated protection and exclusion zones is problematic. As these protection measures differ from those used in the U.S, it is unclear if they protect aircraft that would be deemed *non-tolerant* by the FAA standards, or only protect those deemed *tolerant* by US standards. Many aircraft in Canada's airlines fleets require an equipment upgrade for their Rad Alts to meet the U.S. standards for tolerance to C-Band emissions and are suffering from a lack of parts due to supplier backlogs. In an attempt to mitigate what could be significant operational disruptions, NACC identified over 80 airports in a submission to Transport Canada in February 2023 and further substantiated in March of 2023, that would need to be protected to assure Canada's airlines would have full access to their primary destinations and alternate airports. Currently, ISED has only established protection and exclusion zones at 36 airports, thus *non-tolerant* aircraft, and possibly even aircraft deemed *tolerant* by U.S. standards, are at risk of having major restrictions at some, or even all, of Canada's airports.

The potential impacts on aircraft equipped *non-tolerant* radar altimeters can be broadly categorized into four sub-types, in terms of how their operations may be limited:

- **Type A: Minor Impact**
  No operational impact on low visibility operations; no impact on subsystems. These aircraft primarily use Rad Alts for pilot situational awareness of their proximity to the ground. Very few of Canada's larger airlines operate aircraft of this type. Typically, they include smaller turbo-prop aircraft, older airline and business aircraft etc.

- **Type B: Loss of Low Visibility Ops**
  Loss of low visibility operational capabilities without impacting aircraft subsystems. These aircraft will lose their CAT II/III, Autoland, HGS to Touchdown and other low visibility operations that use Rad Alt data to detect proximity to the runway surface. Typically, they include larger turbo props, some business jets, as well as some narrow and wide-body airline aircraft, primarily Airbus.

- **Type C: Performance Limitations**
  Loss of low visibility operational capabilities, as well as an operational impact on subsystems affecting takeoff and landing performance, but no impact on primary flight control systems. In addition to the loss of low vis operations noted in Type B, these aircraft must compensate for the potential loss of deceleration devices that use Rad Alt data in their operation. Examples include impact on thrust reversers, auto speed brake deployment, automatic thrust reduction, flap restrictions etc., and therefore aircraft of this type must assume longer takeoff and landing rolls. Common examples include Dash 8-400, B737NG and B737MAX, B787.

- **Type D: Flight Control Limitations**

Loss of low visibility operational capabilities with an operational impact on subsystems affecting takeoff and landing performance, as well as impacts on flight control systems. These aircraft integrate Rad Alt data into their advanced flight control systems, and thus may not be able to operate at all if considered *non-tolerant*. The B777 falls into this category.

Potential Negative Outcomes for Non-Tolerant Aircraft:

Most of Canada's airlines operate Type B, C and D aircraft. Thus, the potential outcomes, if any, of their aircraft deemed *non-tolerant* are:

- **Type B:** Inability to conduct low visibility operations (CAT II/III, Autoland, HGS to Touchdown, SVGS).
- **Type C:** Possible performance penalties limiting or even preventing operations to some airports, especially those with shorter runways or experiencing adverse weather conditions.
- **Type D:** Potentially restricted from operating altogether if deemed non-tolerant.

Impact on Canada's Airlines:

Some of the potential consequences for aircraft forced to operate as *non-tolerant* are:

- Restricted operations, or even complete inaccessibility, to some airports by affected aircraft types. This could lead to major travel disruptions for the travelling public.
- Increased greenhouse gas emissions due to need carrying additional fuel and inefficient routes, primarily due to alternate and diversion airport unavailability.
- Loss of regional connectivity with some communities losing some of their airline services.

Call to Action:

Canada's aviation industry urgently requires the following actions from the Government of Canada:

1. Clarity on Canada's 5G regulatory framework as applicable to aviation, ensuring radar altimeter tolerance standards mirror those of the U.S.
2. ISED's commitment to expanding protection to all airports used by Type C and D aircraft until airline fleets have been deemed tolerant to 5G C-Band emissions.

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