Executive Summary: Environmental Assessment (EA) Supersonic Flight Training 5 Wing Goose Bay

Issue:

The potential impact on land below the Labrador portion of 5 Wing Goose Bay Air Range CYA 732 due to "Supersonic Flight Training" down to 5000 ft above ground level (AGL).

Background:

Military flight training activity at Goose Bay has been ongoing since the base was built in 1941-42 and in the last 10 years it has averaged 5,000 - 6,000 low-level flights per year during the April to October flying season. This is far below the total of 18,000 sorties per year of which 15,000 were low level that was proposed in the Environmental Impact Statement (EIS). These low-level flights took place in the Low Level Training Area (LLTA), which is a defined air training area, capped at 5,000 ft ASL (CYA 731). LLTA lies over the interior of the Quebec-Labrador peninsula, approximately 130,000 square kilometres (the size of England). Until recently, most training was comprised of low-level flights involving activity below 1,000 feet (and as low as 100 feet above all obstacles) within the LLTA. Activity levels have declined substantially and since 2006 military jet flight activity has ceased.

DND has in the recent past successfully completed the regulatory processes, including an environmental assessment, to introduce the use of practice Precision Guided Munitions at the Practice Target Area (PTA) (requiring a 16 Nm safety template) and the use of defensive countermeasures (chaff and flares) by the allies in the Labrador portion of the 5 Wing Goose Bay Air Ranges (Figure 1). In order to further enhance the allied training opportunities in the Goose Bay area the Department of National Defence intends to authorize "Supersonic Flight Training" in the Labrador portion of Goose Bay Air Range CYA 732 (Figure 2) down to an altitude of 5,000 ft AGL.

Discussion:

Environment Canada was consulted during the development of the EA and their position was that Supersonic Flight was not subject to an EA under Federal Legislation. However, it is a DND national policy to identify and mitigate any potential adverse impacts before any new activity is conducted and the best way to achieve this is through the EA process. Supersonic Flight is governed by 1 Canadian Air Division Orders and is approved at any altitude in response to a threat and at the pilot's discretion above 30,000 ft north of the Boom Line (Figure 3). The number of supersonic flights in Goose Bay annually is projected to be approximately 1250 sorties.

Every supersonic event generates a shock wave, but based on the atmospheric conditions and aircraft's altitude, several of these shock waves will not reach the ground. Nonetheless, when the shock waves (or sonic booms) reach the ground, the main concern is their magnitude, or peak overpressure, which is measured in pounds per square foot.

From the environmental assessment perspective, there are two separate issues related with the magnitude of the peak overpressure when they reach the ground:

(a) Whenever a shock wave impinges on the surface of an object, it may create vibrations in the object resulting in structural damage; and

(b) The loud noise that is associated with a shock wave (because of the sudden rise and fall of the peak overpressure) may cause a disturbance to wildlife and human activity. This disturbance generally takes the form of a startle reaction.

With the proposed supersonic activity, there would be very little or no visual stimuli to the animals. This is because supersonic training generally takes place at much higher altitudes (15,000 ft and above). There is almost no direct engine noise heard on the ground, as is the case with subsonic low-level flights. In the case of subsonic jet aircraft at low-level, the noise is persistent, and lasts about 15 seconds with a gradual rise time. The noise level is at its maximum when the aircraft is directly overhead, and a slow drop off follows this. On the other hand, the noise from a sonic boom is like a loud bang and lasts ~100 milliseconds (Figure 4), thus the rise time for the noise is much shorter. Further, depending on the altitude of the supersonic aircraft, the sonic boom may reach the ground 2-60 seconds after the aircraft flies overhead, consequently it is likely to elicit startle reaction.

The magnitude of the sonic boom (peak overpressure), to some extent depends on the height of the aircraft above ground. The peak pressure on the ground decreases with increase in the height of the aircraft; and this change in peak overpressure is more pronounced at lower altitudes. Due to the higher altitudes involved for supersonic flight activity, the noise from a sonic boom event is expected to be lower than the noise that would result from a subsonic jet aircraft flying low-level (i.e. less than 1,000 ft AGL). Nonetheless, the sharp noise that results from a sonic boom is expected to elicit some startle reaction from the wildlife.

The Department of National Defence as a Responsible Authority for this undertaking would be accountable for the overall Mitigation Program. For the Low-Level Training program, it uses spatial and temporal separation criteria to protect sensitive species from subsonic noise disturbance. The avoidance criteria are periodically reviewed and revised in consultation with stakeholders (i.e. Institute of Environmental Monitoring and Research (IEMR) and provincial resource managers). The IEMR will continue to monitor the impacts due to military training activity (both subsonic and supersonic) in the 5 Wing Goose Bay Air Ranges.

The IEMR has developed a model based on computer software (PCBoom) to predict the intensity of sonic booms on the ground. PCBoom has been used extensively by United States Air Force (USAF) to predict and mitigate environmental impact due to sonic booms. A number of parameters (e.g. noise level, peak overpressure, and the impacted area, etc.) can be calculated for a variety of aircraft, flying different types of flight profiles (i.e. straight and level flights to aircraft manoeuvres), under different atmospheric conditions.

If the environmental monitoring activities of the IEMR were to discover any detrimental effects on the population levels of any wildlife species due to supersonic training activity, then the DND would consult with IEMR and provincial resource managers to introduce an immediate and suitable mitigation strategy. Moreover, if adverse environmental impacts are severe and cannot be mitigated, then in consultation

with the stakeholders, DND would recommend the suspension and further investigation of supersonic activity in the associated 5 Wing Goose Bay Air Range.

Conclusion:

The Department of National Defence maintains a high standard of environmental management associated with the training activities in Goose Bay. A fully certified (ISO 14001) Environmental Management System (EMS) governs the conduct of the activity to safeguard the environment. The Department of National Defence concludes that due to a reduced flying activity and mitigation program restricting flying activities to certain areas, the impact on the ground from supersonic flight will be minimal.

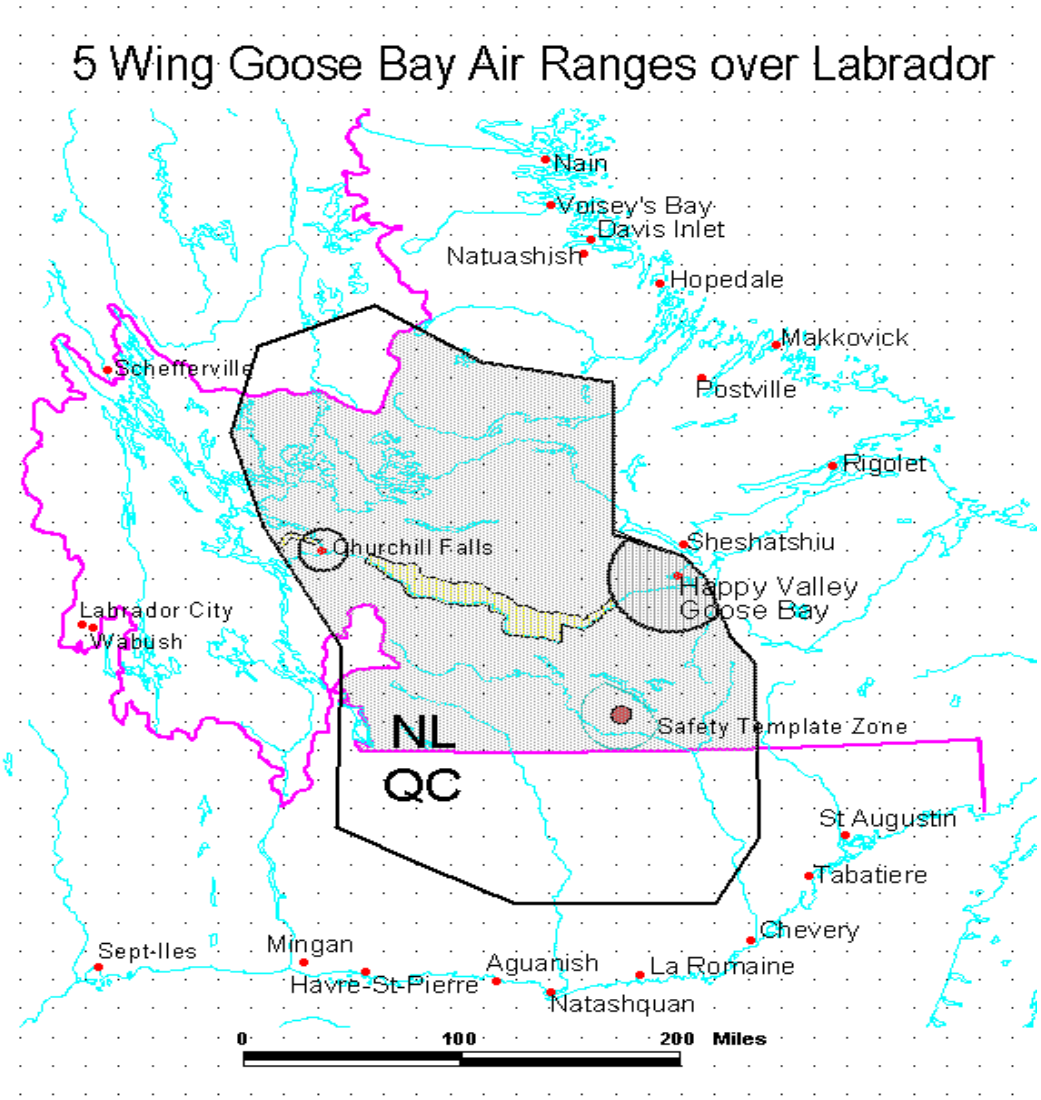

Figure 1

5 WING GOOSE BAY AIR RANGES

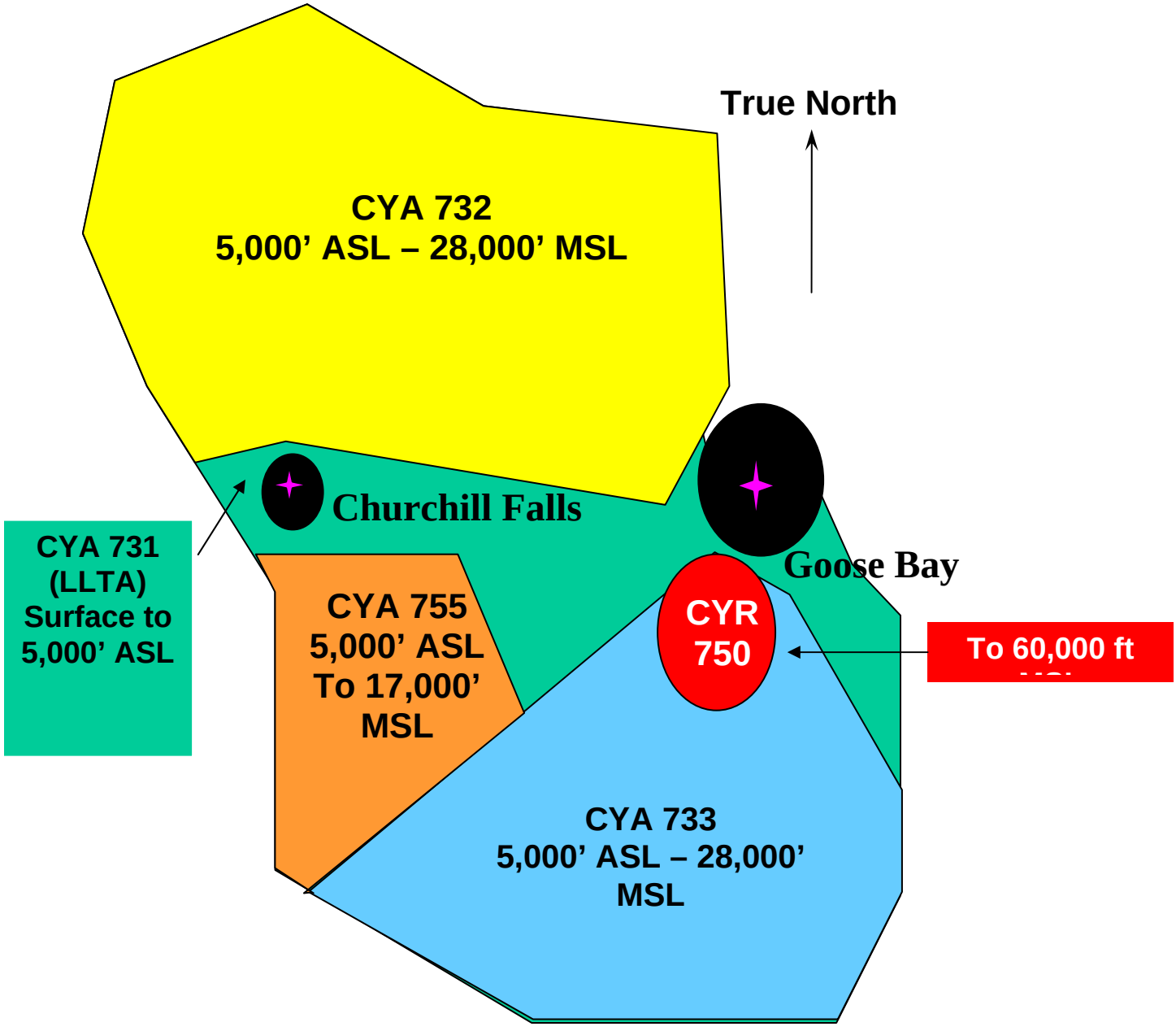

Figure 2

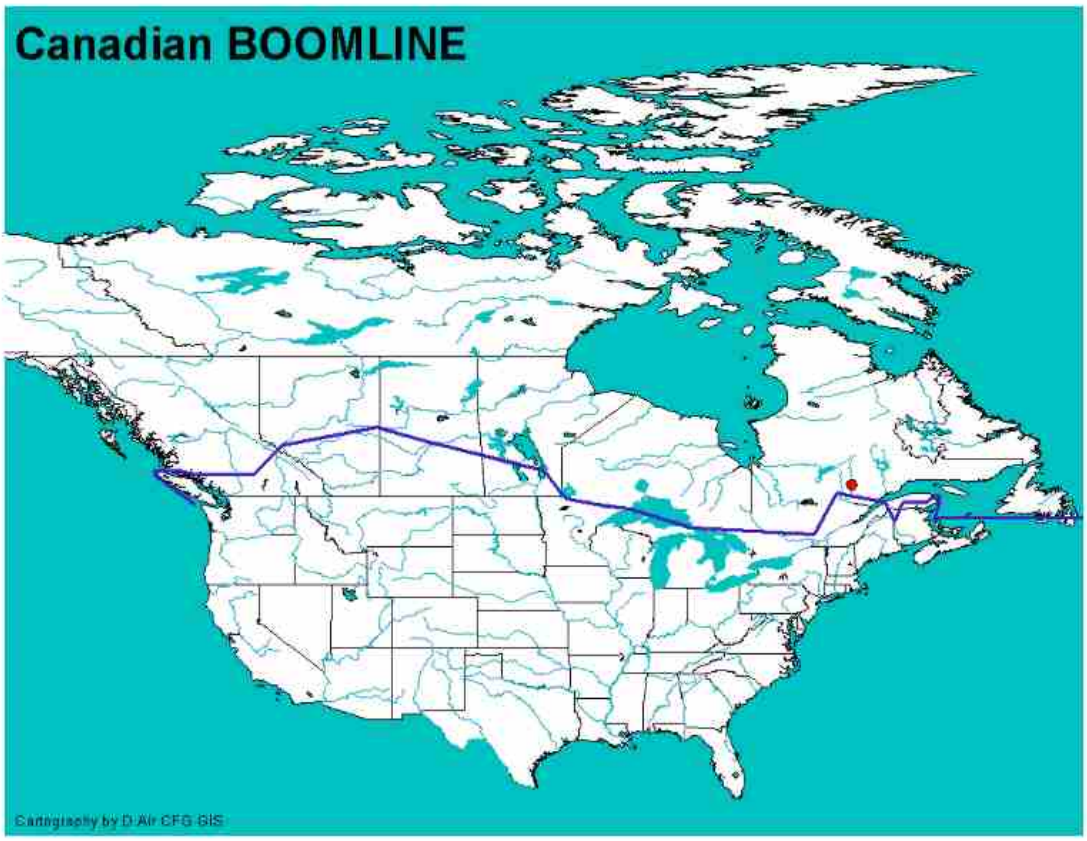

Figure 3

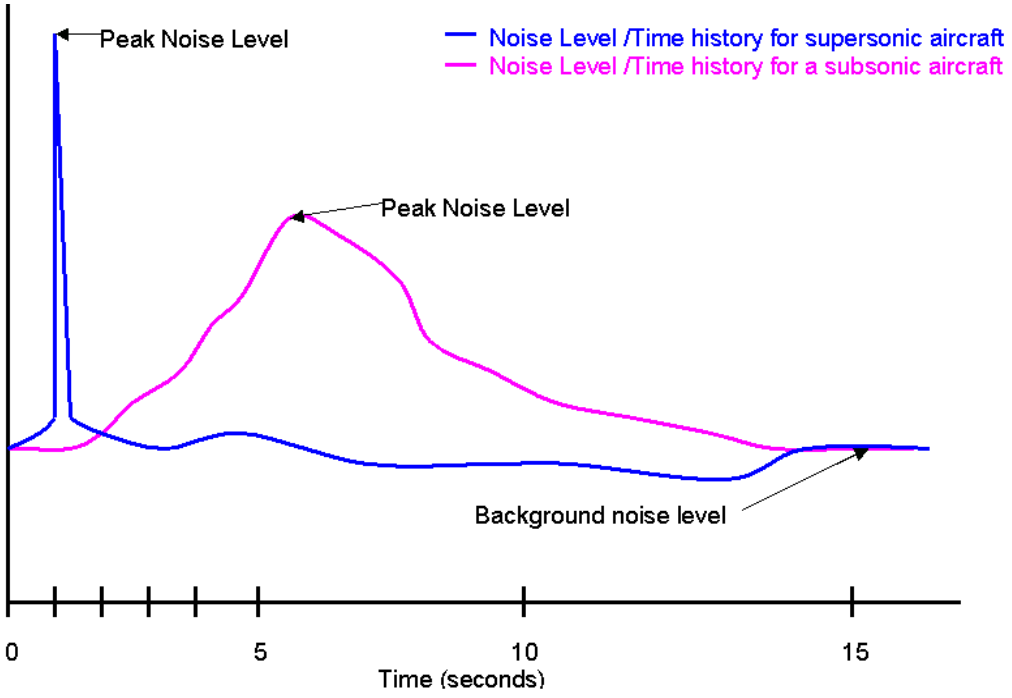

Figure 4