

FEDERAL AVIATION ADMINISTRATION

**DRAFT**  
**Strategic Plan for**  
**Non-Directional Beacons in Alaska**

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## **NDBs**

On December 20, 2011, a team consisting of Air Traffic, Flight Standards, Flight Procedures, Technical Operations, and Regional Administrator's Staff met to discuss in detail the present state of our Non Directional Beacons (NDB) infrastructure, rules of navigation, and aircraft equipage requirements (see attached minutes). The Team's intent is to gather information and determine a strategy for reducing Alaska's dependency on the legacy NDB system and still provide the necessary services to the flying public. A noted benefit would be the tremendous monetary savings of replacing the NDB system with a space-based system.

The NDB and related infrastructure in Alaska are becoming increasingly difficult to maintain. Due to the Federal Aviation Administration's budget limitations and the current methodology that Alaska facilities are weighted against, other priorities throughout the Western Service Area are constraining factors.

There are 65 FAA owned IFR NDBs in Alaska, and hundreds of associated Low Frequency (LF) airway segments. In Alaska, the geographic distances between navigational facilities does not allow for the use of Very High Omni Range (VOR) facilities to replace NDBs. As a result, NDBs are used to support Victor airways where the use of a VOR is not feasible.

A number of NDBs remain off the air for a variety of reasons. Availability of needed parts, inaccessibility during winter months, and lack of funding are some common reasons. Some NDBs remain on aeronautical charts but are non-existent, i.e. Shemya (SYA).

Many NDBs are used to provide Transcribed Weather Broadcasts (TWEB), which is of varying importance to pilots in remote areas of Alaska. This type of weather transmission is for a broad or regional area and is not airport-centric.

Fourteen Instrument Landing System (ILS) procedures use NDBs for alternate missed approach routing and holding in the event the VOR is out of service. They will be amended to use either the Localizer and DME or GPS for alternate missed approach guidance. This can be accomplished during routine procedural amendment work.

A list of NDBs, their current operational status, and a ranking of operational and maintenance prioritization will be provided in a separate paper. This will be used as the primary reference for new routing design and facility decommissioning rankings.

## **Avionics/Airways**

The on-board avionics that utilize the NDB signal is called the Automatic Direction Finder (ADF). These systems are becoming quite rare as they are unavailable new, difficult to find used, and are hard to maintain. They are usually considered excess weight and removed from the aircraft for lighter and more reliable GPS systems installations.

There is currently the capability for TSO-129a (fundamentally any IFR GPS) equipped aircraft to fly the Low Frequency (LF, aka NDB) airway system utilizing GPS vice the LF radiated signal. The transmitted signal is not used; the GPS simply substitutes waypoints and courses for what is published. The LF airway structure, which in Alaska can be a Colored airway or Victor airway, could be redesigned with "T" routes, except the avionics requirements for the "T" routes mandate TSO-145a/146a WAAS enabled (Fault Detection Exclusion (FDE) embedded) systems. They are a substantial upgrade/investment for the operators. So, "T" Routes, under present policy, are not a viable consideration to replace the airways associated with NDBs as there are few aircraft in Alaska equipped with TSO 145/146 receivers (See SFAR 97). The fleets are predominantly equipped with TSO 129 receivers. Research is ongoing to determine what percentages of operators are capable of utilizing GPS for their enroute operations; this includes gathering empirical data from Part 135/121 operators as to how many are equipped to fly GNSS without the need for traditional navigational capabilities. And, if equipped, how many of these operators are allowed to fly T Routes as approved in their Operations Specifications (Ops Spec).

There is an effort underway in Flight Standards to relax the TSO-145a/146a requirement for "T" routes and simply mandate FDE, which many later TSO-129a systems have, or to state simply that GNSS is required. The outcome of this proposed policy change and new Ops Specs requirements are uncertain. Tom Noble, AAL AWO, will be going to FAA Headquarters in May to work with AIR and AFS on policy.

The NDB Strategic Planning Team believes that every effort should be made to properly maintain the NDB structure in Alaska until a suitable navigation capability can be determined. However, the team also acknowledged that with equipment and funding shortages, it is also very likely that more NDBs would fail and not be restored, essentially creating an "ad hoc" GNSS system in Alaska. If this becomes the case, each of these failed NDBs will need to remain a part of the NAS. If they are decommissioned, the associated airways, both Colored and Victor, will cease to exist and pilots will no longer be able to utilize GNSS to substitute for the failed NDB.