

Getting Started with NDB Explorer

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1. SETTING UP AND LICENSING NDB EXPLORER

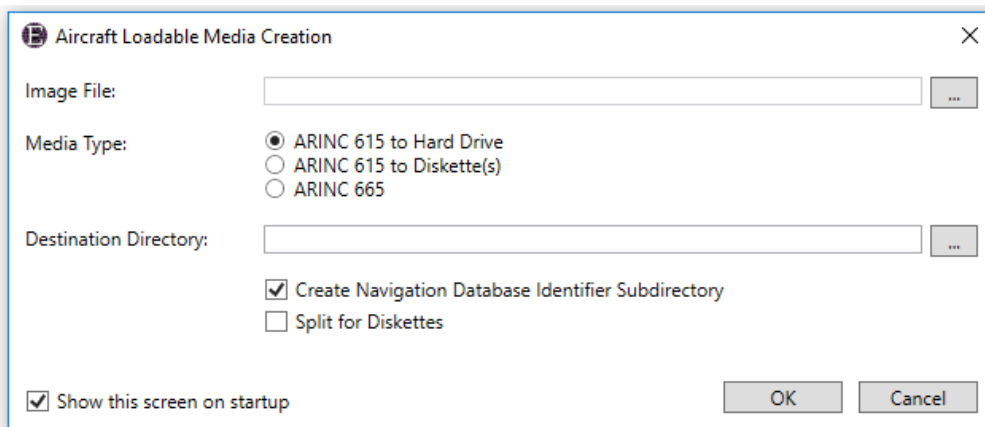
Follow the instructions in the NDB Explorer Setup Guide which is available to download from the NDB Explorer section of the Database Services website:

<https://www.geaviation.com/systems/avionics/navigation-guidance/data-services>

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2. CREATING AIRCRAFT LOADABLE MEDIA

NDB Explorer can be used to create Aircraft Loadable Media from a GE Aviation Navigation Database. This function is shown at start up, but can also be accessed in **Tools > Create Aircraft Loadable Media...**



NDB Explorer supports the generation of loadable media sets for use in ARINC 615 and ARINC 665 data loaders. The media set can be written to the hard drive or to diskettes.

ARINC 665 Target Hardware IDs can be defined in **Tools > Preferences... > Create Media**.

The **Create Navigation Database Identifier Subdirectory** option will use the database identifier to create a uniquely identifiable top-level folder within the destination directory.

The **Split for Diskettes** option will create diskette-sized folders directly to the hard drive.

For additional guidance and troubleshooting about creating loadable media on diskettes, see [Appendix A](#).

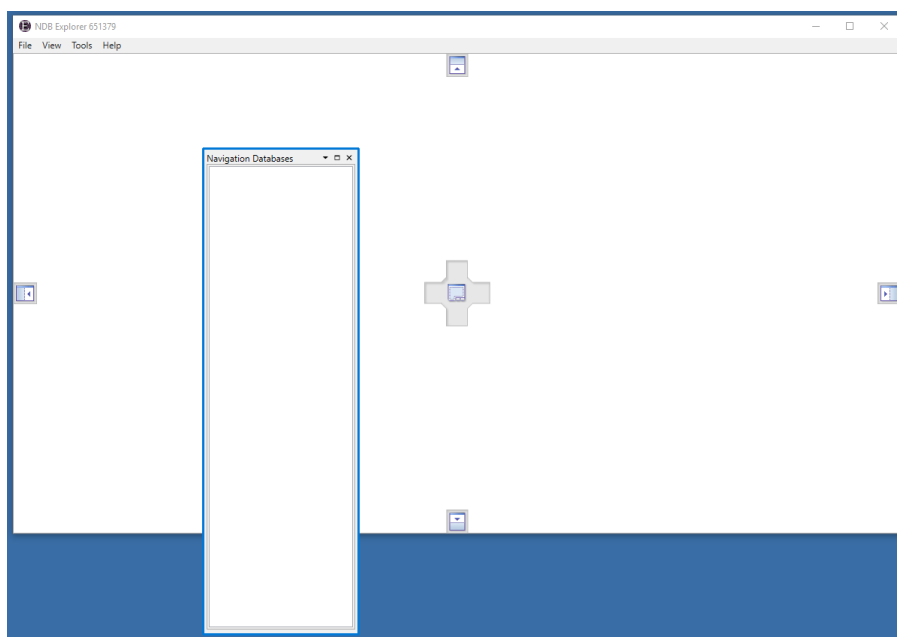
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3. OPENING A NAVIGATION DATABASE

NDB Explorer will only open files that contain valid CRCs and a valid digital signature. To validate a loadable Fileset, simply open it with NDB explorer.

- For an ARINC 615 file set on Hard Drive – Open the **1NAV_U5.ND** file.
- For an ARINC 615 file set on Diskettes – Open any of the **1NAV_U5.ND** files.
- For an ARINC 665 Platform Group A file set – Open the ***.LUH** file.
- For an ARINC 665 Platform Group B file set – Open the ***.LUH** file.
- For an ARINC 665 Platform Group C file set – Open the ***.LUH** file.

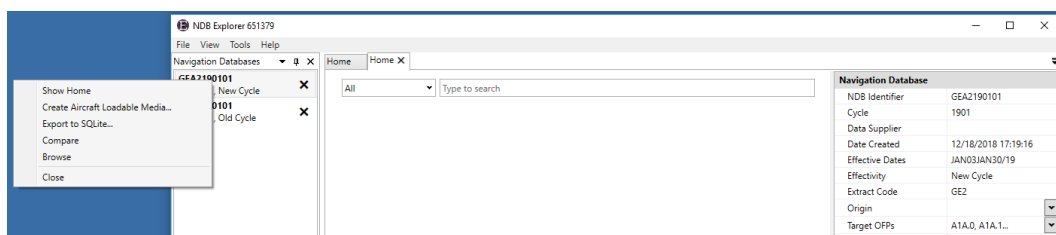
By default, NDB Explorer will present the Navigation Databases window, which is docked on the left side of the application. All windows can be moved or floated.



NDB explorer can open a GE Aviation Navigation Database, an aircraft loadable media set, a GE Aviation SQLite Export File, or a Gold Standard Database. This is accomplished either through **File > Open...**, or by dragging the file into the Navigation Databases window.

Once a database is open, each AIRAC cycle will be available in the Navigation Databases window and a property grid will be displayed on the right side of the **Home** tab that contains each database cycle's metadata.

Right-clicking on an open database cycle will display the available actions.



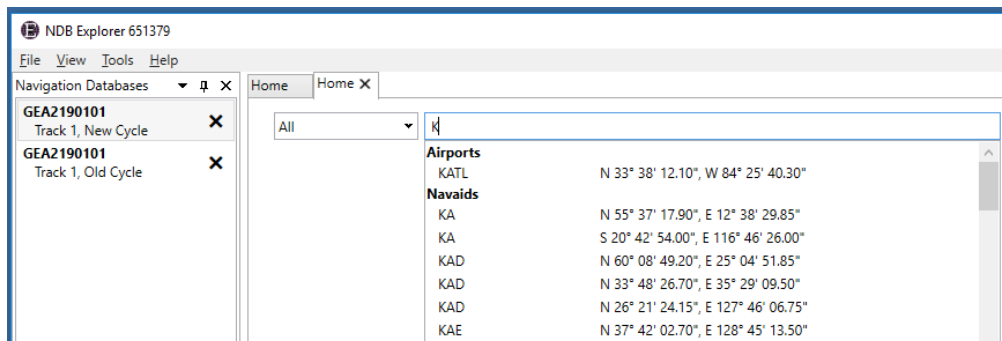
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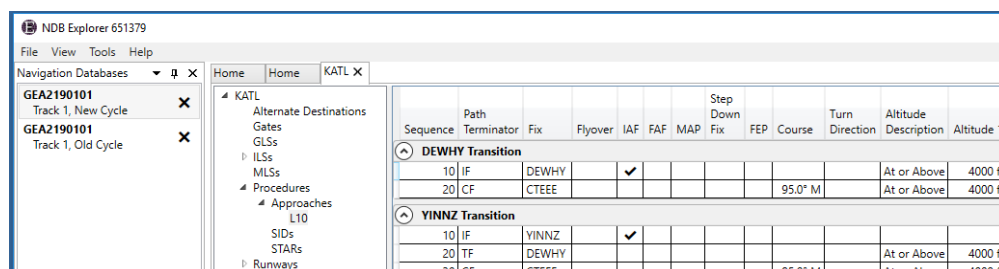
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4. EXPLORING YOUR NAVIGATION DATABASE

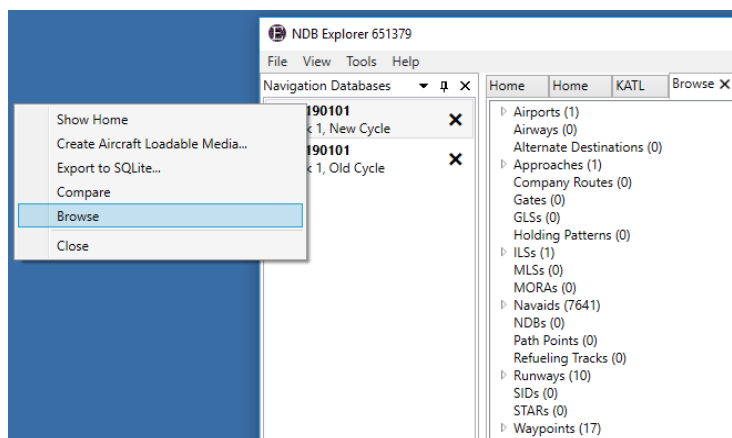
Each open database cycle has a corresponding **Home** tab. The **Home** tab contains a search box, which will auto-fill based on the entered text. The results can be filtered using the drop-down. Search for an airport to explore its terminal data.



Once found, double-click on the airport to open a new tab. All the terminal data for that airport is displayed in a new tab.



The **Browse** option will also open a new tab. While using **Browse** double-clicking will open the record in a new tab. Right-clicking will reveal the **Find all references...** feature, which identifies all data that references the record.



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5. EXPORTING YOUR NAVIGATION DATABASE

5.1 EXPORT TO SQLITE

The Navigation Database Export to SQLite File is intended to provide a machine-readable view of the data, to be ingested by custom tools and applications for things like RNP-AR procedure validation, flight planning, and simulation support.

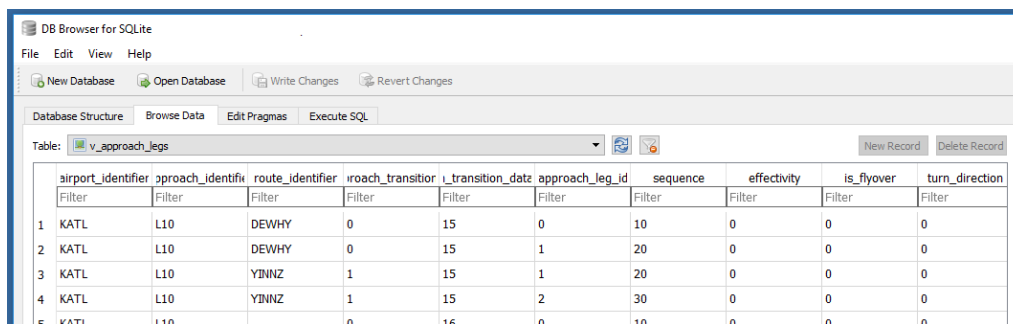
The database engine used is [SQLite](#), a small, fast, self-contained, high-reliability, full-featured, SQL database engine. There are libraries available in many languages to access the data.

Export your navigation database via **Tools > Export To > SQLite...** The **Tasks** window will appear and indicate when the export is complete.

Once exported, any database browsing application compatible with SQLite can be used to open the SQLite file.

For information on the format of the data tables, the Data Dictionary for the SQLite Navigation Database Export Format is available in **Tools > Export to > SQLite... > Get Data Dictionary**.

In addition to the data tables, there are database views available for each procedure type to promote readability (*v_procedure type_legs*).



The screenshot shows the 'DB Browser for SQLite' application window. The 'Table' dropdown menu is set to 'v_approach_legs'. The table contains the following data:

	airport_identifier	approach_identifi	route_identifier	roach_transitior	v_transition_date	approach_leg_id	sequence	effectivity	is_flyover	turn_direction
Filter	Filter	Filter	Filter	Filter	Filter	Filter	Filter	Filter	Filter	Filter
1	KATL	L10	DEWHY	0	15	0	10	0	0	0
2	KATL	L10	DEWHY	0	15	1	20	0	0	0
3	KATL	L10	YJNZ	1	15	1	20	0	0	0
4	KATL	L10	YJNZ	1	15	2	30	0	0	0
5	KATI	L10		0	16	0	10	0	0	0

5.2 EXPORT TO PDF

The Navigation Database Export to PDF file is intended to provide a human-readable view of the data contained in either the old or the new cycle of your Navigation Database.

Export your navigation database via **Tools > Export to > PDF...** Select the destination of your report and the data type(s) that you would like included in the report. The **Tasks** window will appear and indicate when the export is complete.

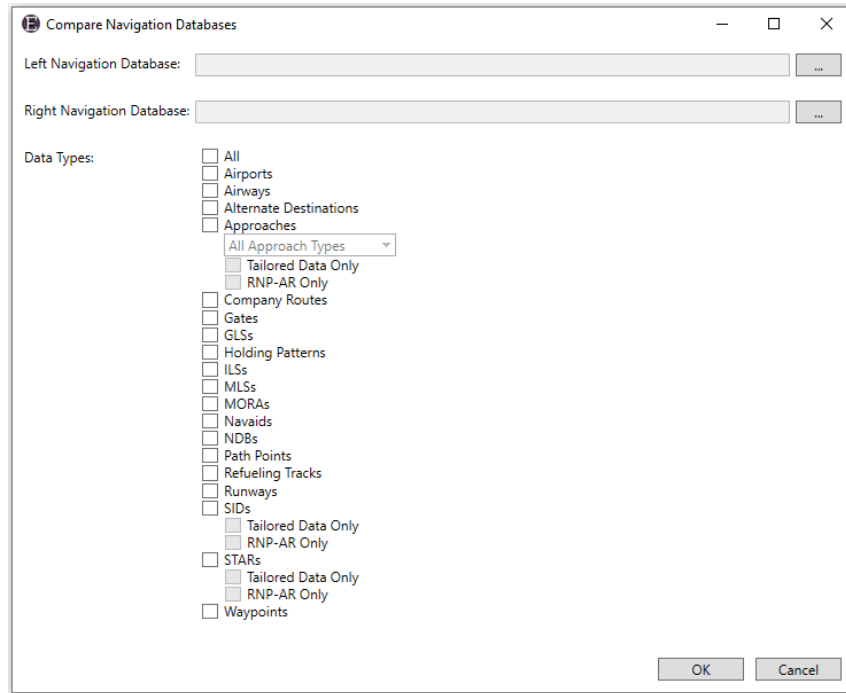
Once exported, any PDF reader application can be used to open the PDF file.

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6. COMPARING NAVIGATION DATABASES

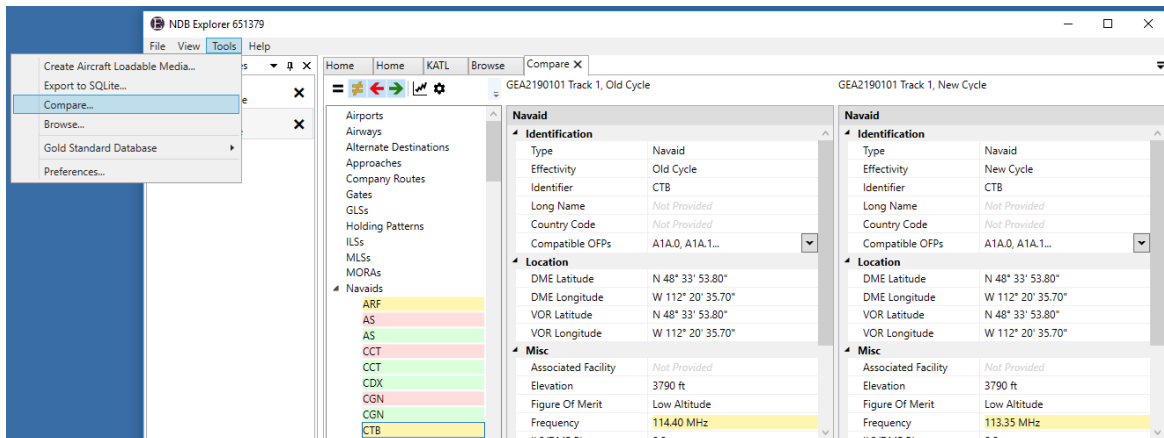
NDB Explorer can compare GE Aviation Navigation Databases, aircraft loadable media sets, GE Aviation SQLite Export Files, or Gold Standard Databases to one another. This is accomplished either through **Tools > Compare...**, or right-clicking on an open database cycle.

Add one navigation database on the left and another navigation database on the right. Select the data types to be compared and click **OK**. The **Tasks** window will appear and indicate when the **Compare** is complete. In addition to comparing the individual data types, NDB Explorer can compare on Tailored or RNP-AR procedures only.



The colored buttons at the top of the **Compare** tab allow filtering of unchanged =, changed ≠, left-side only ←, and right-side only → data.

To view the specific changes, expand a datatype and click on the record.



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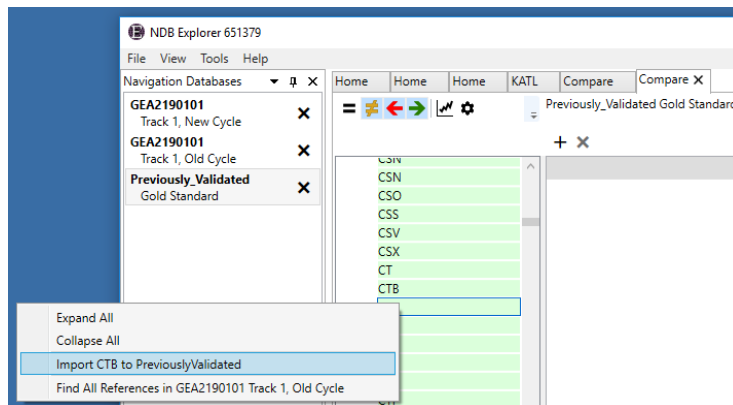
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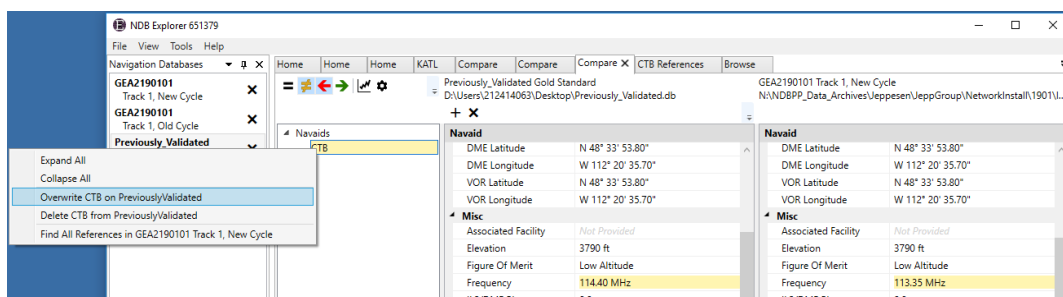
7. GOLD STANDARD DATABASES

Known good data can be imported into a separate database file, called a Gold Standard Database, for easy procedure monitoring and efficient RNP-AR validation. A Gold Standard Database can be established through **Tools > Gold Standard Database > New...**

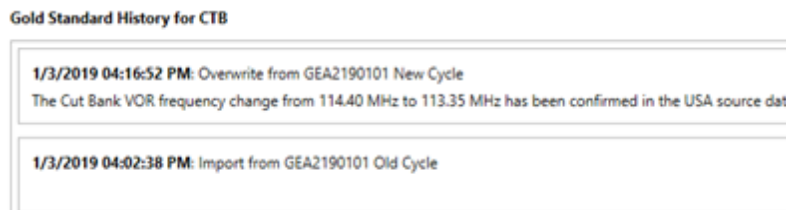
To import data into a gold standard database, compare the Gold Standard Database to a Navigation Database. Right-click on the record to be imported and select **Import data to database**.



After a Gold Standard Database is established, new databases can be compared and any changes identified. The newly validated data can then overwrite the previous obsolete data.



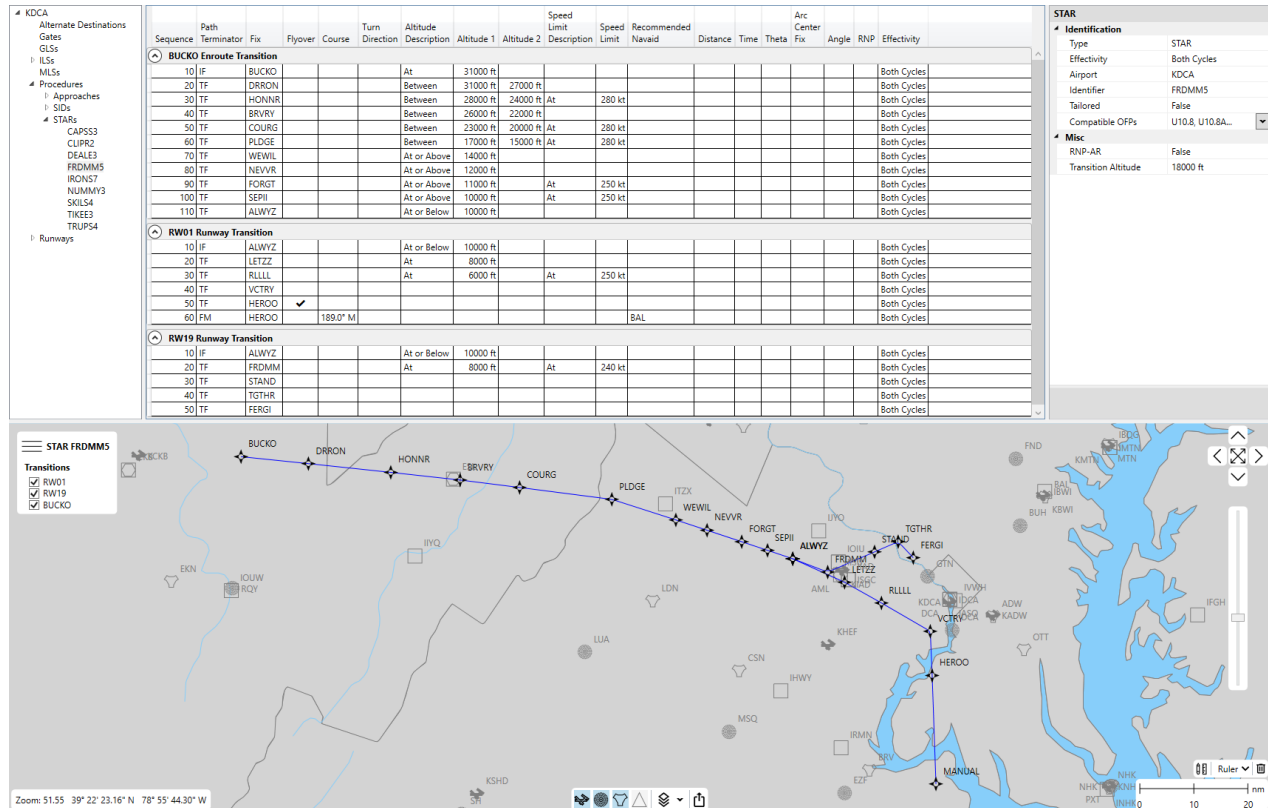
Date, time, and comment history of every change is stored in the Gold Standard Database. This history can be viewed by browsing to each record within the Gold Standard Database.



8. VIEWING THE LATERAL PATH

NDB Explorer displays a top-down graphical lateral path of the procedures, airways, and company routes in your NDB. The lateral path is overlaid on a map which is populated with background data also extracted directly from your NDB.

The background data symbols are derived from the FAA's [Aeronautical Chart User's Guide](#).



NDB Explorer can also export the displayed lateral path to a [KML](#) file, which can be viewed in [Google Earth™](#).

Google Earth™ is a trademark of Google LLC.

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9. LICENSABLE FEATURES AND SUPPORT

The following features require an additional software license:

- Viewing the Lateral Path
- Exporting to SQLite and PDF
- Comparing 2 different navigation databases
- Comparing a navigation database to a Gold Standard Database

To extend an existing software license or to request a free trial contact fmssoftware@ge.com.

For technical support please contact navdatainfo@ge.com.

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A. APPENDIX A: CREATING LOADABLE MEDIA ON DISKETTES

Floppy disks and floppy drives are an aging medium and can cause issues when loading databases. If it is at all possible, it is recommended to use alternatives to floppy disks when loading Navigation Databases. GE Aviation has tested many datasets on newly purchased floppy disks and found that the failure rate of an individual floppy disk was approximately 30%. If it is unavoidable to use floppy disks, GE Aviation recommends following manufacturer guidance for cleaning and maintaining floppy disks and floppy drives. This includes floppy drives used to generate the loadable media, the 615 data loader and the floppy disks themselves. It is recommended that you check with your aircraft manufacturer and data loader manufacturer for upgrade options.

To use NDB Explorer to generate loadable media on floppy disks, select ARINC 615 Media to Diskette(s). Select your Image File and the Destination Floppy Drive. If any disk already contains files, NDB Explorer will erase them. Follow the prompts from NDB Explorer until the media set is successfully created.

If you typically have issues with floppies, it is recommended that you confirm the floppy disks were written successfully by loading the media set written on the floppy disks back into NDB Explorer. To do this, see: [Opening a Navigation Database](#). If NDB Explorer fails to open the media set, it is likely you have a bad floppy disk. Regenerate the media set and replace the physical floppy disk that failed to load. Note that the media set being loaded by NDB Explorer verifies that database was successfully written to the diskette(s) but does not guarantee it will load on the aircraft due to the unreliability of floppy disks.

A.1 FLOPPY TROUBLESHOOTING GUIDANCE

If, after generating the media set and verifying it can load in NDB Explorer, there are still issues loading the media set to the aircraft, here are some general guidelines other users have used and have had some success with. These tips are not guaranteed to resolve all loading issues but have been helpful in the past.

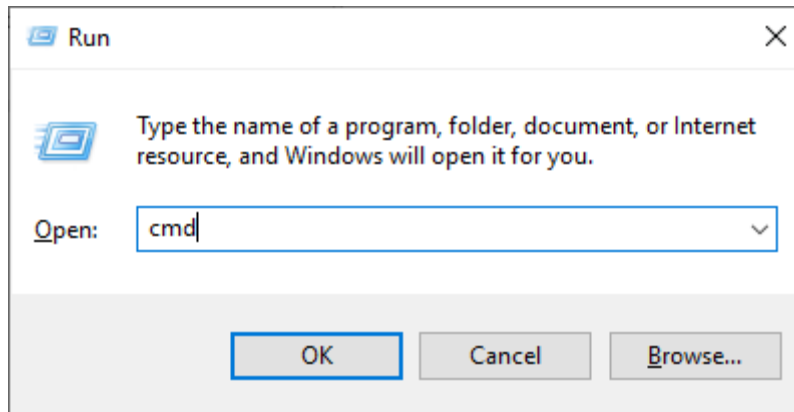
- 1.) Try reaching out to the aircraft manufacturer and determine if it is possible to use another medium other than floppy disks to load your Navigation Database. If it is not, investigate possible upgrades to your hardware that are no longer dependent on floppy disks.
- 2.) Try to clean the hardware responsible for generating and loading the media. This includes, but is not limited to, the floppy drive, the data loader and the floppy disks themselves. Contact the manufacturer and follow their guidance for cleaning any and all devices.
- 3.) Try generating multiple copies of the floppy media set to bring out to the plane. This will allow swapping out disks that may fail during loading. For instance, if disk 3 fails, you can retry by replacing disk 3 with another disk 3 from an identical media set.
- 4.) Try checking all your floppy disks for bad sectors. This can help you eliminate faulty floppy disks. See section 2.1.2 for guidance on how to check a floppy for bad sectors.
- 5.) Try formatting the floppy disks. This can be done by right clicking on the floppy drive with a floppy disk in it and clicking "Format...". Users have used Quick and Full Formats.

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A.2 CHECKING A FLOPPY FOR BAD SECTORS

This should only be done by advanced users looking to determine if their floppy disk has detectable bad sectors.

Open the “Run” dialog in Windows by pressing Windows key + R. In the dialog, type in “cmd”.



A command window will be displayed. From here, type “A:” (or the appropriate drive letter corresponding to your floppy drive). Hit enter. Next, type “chkdsk” and hit enter. The results will look like the following:

```
C:\windows\system32\cmd.exe
C:\>A:
A:\>chkdsk
The type of the file system is FAT.
The volume is in use by another process. Chkdsk
might report errors when no corruption is present.
Volume Serial Number is 021D-5C78
Windows is verifying files and folders...
File and folder verification is complete.

Windows has scanned the file system and found no problems.
No further action is required.

 1,457,664 bytes total disk space.
   512 bytes in 1 hidden files.
   512 bytes in 1 files.
1,456,640 bytes available on disk.

   512 bytes in each allocation unit.
 2,847 total allocation units on disk.
2,845 allocation units available on disk.

A:\>
```

Look for the text “bad sectors” in the chkdsk results.

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```
1 457 664 bytes total disk space.  
709 120 bytes in 2 files.  
1 536 bytes in bad sectors. ←  
747 008 bytes available on disk.  
  
512 bytes in each allocation unit.  
2 847 total allocation units on disk.  
1 459 allocation units available on disk.
```

It is recommended to replace any disk containing bad sectors.