

**State Letter AN 11/57-22/87 Supporting Document 4**  
**Instructions for FLY TRUE NORTH .xlsm Assessment Tool**

The Fly True North Assessment tool is designed to help States and ANSPs determine the overall effect and magnitude of the change affecting their area of operation. The tool only contains data current to AIRAC Cycle 21-12 that is available to international operations. The tool provides assessment data for VOR rotations and Runway Alignments. The Tool is EXCEL based. With such an extensive database, some delay in processing times and the change of fields is expected.

The .xlsm file contains hidden and locked data tabs containing international AIP data from November 2021 AIRAC Cycle 21-12.

The remaining four visible tool use tabs are:

1. Country Nav Aid Sheet
2. Country Statistics
3. Runway Type
4. Nav Aid Magnetic Variation

### **Country Nav Aid Sheet**

The Country Nav Aid Sheet is meant to provide a selectable view of how many navigation aids are located with 0-3 degrees of the 0° Isogonal Line, 3-5 degrees, 5-10 degrees, and 10 degrees or more. The Navigation Aids included in the dataset are VOR, TACAN, VOR-DME, and VORTAC, which all require a periodic rotation for alignment. NDBs are omitted as they do not require a rotation for alignment. NDB tracks are heading driven from procedure design and the heading source in the aircraft. The aircraft fly's the charted NDB track off the chart.

The following describes each of the sheets' field selections:

PROCESS	After you have made your data selections as described below, select the PROCESS button, and that will run the data selected
NAV AID TYPE	Select the type of NAV AID you would like to assess. Selections are ALL, VOR, TACAN, VOR-DME, VORTAC
MAG var Reference Year	Select a year between 2022 and 2030. If you want to see the impact in 2025, that is what you would select. If you want to see the impact at the proposed change date of 2030, select 2030. You can then compare today's 2022 values with 2030 and estimate

how much change natural mag var shift will affect your navigation aids between now and 2030

Columns B-E

Each of the columns are arranged to be filtered. You can filter data rows by Country Three Letter Ident, Country Name, ICAO Region, or ICAO Sub-Region.

Column F

Lists the number of Navigation Aids in the country

Columns G-J

Lists the number of Navigation Aids within four variation buckets from the 0-degree isogonal line. This is useful when planning your implementation plan of how many and which navigation aids to rotate first based on your current or transition plan error budget.

Column K-L

Lists the number of Navigation Aids requiring rotation in the magnetic north system over a 5-10 year timeline (rate or change)

Country 3 letter Ident	Country Name	World Region	Sub region	Total # of ALL NAVAID types in the country	Locations between 0 and 3 degrees	Locations between 3 and 5 degree	Locations between 5 and 10 degrees	Locations 10 degrees and greater	# of sites where 5 year Mag var change in excess of 1 degree	# of sites where 10 year Mag var change in excess of 1 degree
USA	United States of America	Americas	Northern America	1154	252	150	380	372	37	216
CAN	Canada	Americas	Northern America	120	6	7	24	83	13	61
BRA	Brazil	Americas	Latin America and the Caribbean	84	0	0	1	83	2	40
AUS	Australia	Oceania	Australia and New Zealand	98	22	4	25	47	0	0
NZL	New Zealand	Oceania	Australia and New Zealand	20	0	0	0	20	0	10
ARG	Argentina	Americas	Latin America and the Caribbean	57	7	6	17	27	11	54
RUS	Russian Federation	Europe	Eastern Europe	30	3	2	4	21	0	19
ZAF	South Africa	Africa	Sub-Saharan Africa	46	0	0	0	46	0	44
JPN	Japan	Asia	Eastern Asia	158	1	1	144	12	0	0
FIN	Finland	Americas	Latin America and the Caribbean	18	10	4	10	4	0	14

## Country Stats

The Country Stats Sheet is meant to provide a selectable view of how many runways in each country would require renumbering if, when switching, the state decides to be 100% compliant with Annex 14 on runway numbering. This spreadsheet includes all runways in the ARINC Cycle 21-12 database (36, 980 runways analyzed) and counts the changes based on the projected 2030 magnetic variation values. The Runway Type Sheet (next tab) allows you to break down runways by type. This spreadsheet also gives a quick view of whether a state will have more runways to change by 2030 if staying in magnetic than if they switched to True. For example, Germany will have to change 170 runway numbers if switching to True but will have to change 403 runways if it stays in magnetic.

The following describes each of the sheets' field selections:

GET COUNTRY STATS	After you have made your data selections as described below, select the GET COUNTRY STATS button, and that will run the data selected
ALL Columns	Each of the columns are arranged to be filtered. In columns B-E, you can filter data rows by Country Three Letter Ident, Country Name, ICAO Region, and ICAO Sub-Region. Columns F-L may be filtered by runway count.
Column F	Lists the total number of runways analyzed in the country
Columns G-H	Lists the number of runways for which the data had coordinates in the 21-12 database supplemented by runways ends without coordinates (Airport Reference Point used).
Column I	Lists the number of runways that would require change by 2030 if changing to True
Column J	Lists the number of runways that would require change by 2030 if staying in magnetic
Column K	Lists the number of runways that would require change today to meet the requirements of Annex 14 (current alignment out of date)
Column L	Indicates YES if staying in Magnetic requires more runway changes by 203 than converting to True.

Country 3 letter Ident	Country Name	World Region	Sub region	Total# of runways in country	Runways with coordinates	Runways without coordinates	20805	11949	8570	0
USA	United States of America	Americas	Northern America	15270	14800	470	9815	6005	4466	
CAN	Canada	Americas	Northern America	2949	2831	118	2588	818	651	
BRA	Brazil	Americas	Latin America and the Caribbean	1646	1616	30	1640	252	217	
AUS	Australia	Oceania	Australia and New Zealand	1366	1328	38	936	317	285	
NZL	New Zealand	Oceania	Australia and New Zealand	446	408	38	446	107	89	
ARG	Argentina	Americas	Latin America and the Caribbean	578	502	76	346	196	152	

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AUS	Australia	Oceania	Australia and New Zealand	1366
NZL	New Zealand	Oceania	Australia and New Zealand	446
ARG	Argentina	Americas	Latin America and the Caribbean	578
RUS	Russian Federation	Europe	Eastern Europe	362
ZAF	South Africa	Africa	Sub-Saharan Africa	260
IPN	Japan	Asia	Eastern Asia	296

Runways with coordinates	Runways without coordinates	With True	With Mag	Currently	Mag > True
14800	470	9815	6005	4466	
2831	118	2588	818	651	
1616	30	1640	252	217	
1328	38	936	317	285	
408	38	446	107	89	
502	76	346	196	152	
360	2	298	85	53	
260	0	260	92	69	
296	0	196	55	43	

## Runway Type

The Runway Type Sheet is meant to provide a selectable view of what types of runways to include in the analysis, and counts may be run worldwide or by country. Due to the amount of data in the file, once changed, the indication of country selection takes a few minutes to switch and indicate the correct country for which the data was run. This spreadsheet includes all runways in the ARINC Cycle 21-12 database and counts the changes based on the projected 2030 magnetic variation values. The runway length categories are selectable by the user and will be described below. You can also generate a GOOGLE EARTH KML file to view the locations of the runways. In GOOGLE EARTH, Hard Surface runways have a Green Symbol, Soft Surface runways have a Yellow Symbol, and Water/Ice/Snow runways have a Red SYMBOL.

The following describes each of the sheets' field selections:

Columns U-W	Contain worldwide counts for all the different runway surfaces listed in the 21-12 database. This data should not be altered.
GET COUNT (Z/AA)	After you have made your data selections as described below, select the GET COUNT button under columns Z & AA to run the data requested, and that will run the data selected
Runway Category	Cell Z4. Select the kind of runway you want to use in the analysis. Either HARD, SOFT or WATER/ICE/SNOW
Country Selection	Select either WORLD for all 36,980 runways analyzed or by country. NOTE: After the 'GET COUNT' is run, it will take some time for the country indicated in the selection cell to change to the country selected.
Runway Length Categories	Cells Z8 AA8 down to cells Z18 AA18 can be changed to categorize the runway lengths to any length the user wishes. It is currently set to 2000' increments.
Column AB	# of RWY's: shows the number of runways in the country selected meeting the length requirements set in the previous cells.
Column AC	Requiring Changes With True: shows the number of runways in the country selected in the chosen length that will require numbering changes using 2030 magnetic variation values to meet Annex 14 requirements when changing to True

Column AD

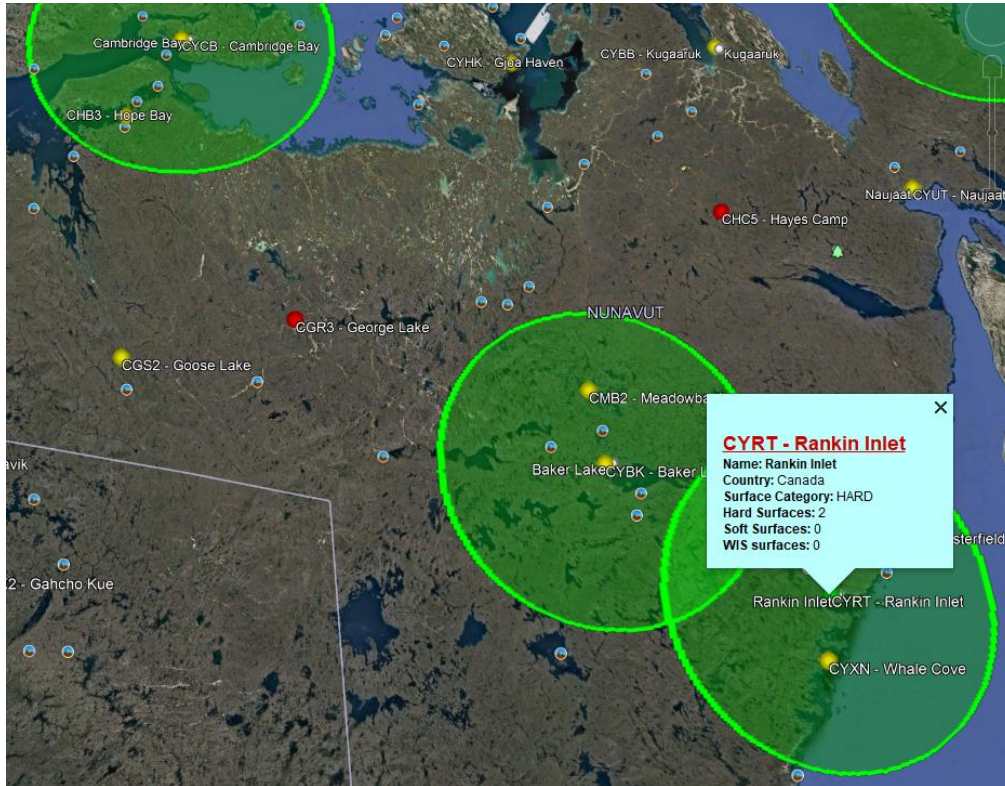
Requiring Changes With Mag: shows the number of runways in the country selected, in the chosen length that will require numbering changes using 2030 magnetic variation values to meet Annex 14 requirements if staying in magnetic

Column AC

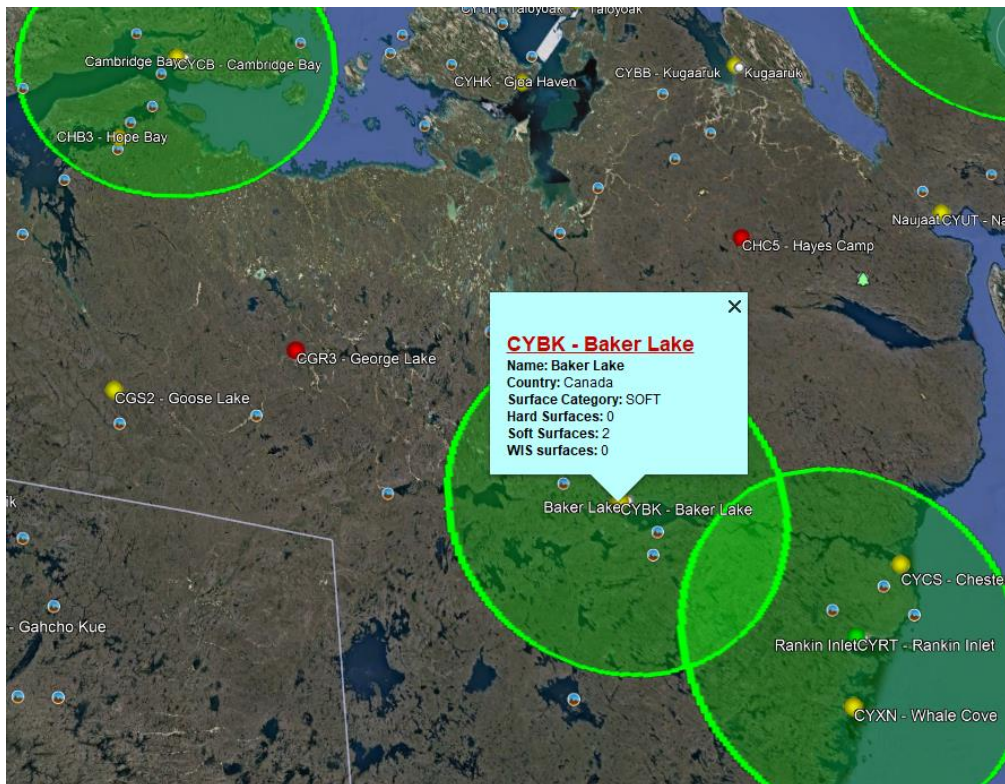
Requiring Changes NOW with Mag: shows the number of runways in the country selected, in the chosen length that will require numbering changes using 2022 magnetic variation values to meet Annex 14 requirements today (current alignment out of date)

Z	AA	AB	AC	AD	AE
<b>GET COUNT</b>		<b>Country Selection</b>			
<b>Runway Category</b>	<b>Country Code</b>				
HARD	DEU	Germany - DEU			
Runway Length categories			Requiring changes		
From	To	# of RWY's	With True	With Mag	Now with Mag
0 ft	4000 ft	329	44	116	56
4000 ft	6000 ft	78	16	18	6
6000 ft	8000 ft	54	10	16	12
8000 ft	10000 ft	58	8	30	16
10000 ft	12000 ft	20	6	4	4
12000 ft	14000 ft	17	0	9	4
14000 ft	16000 ft	0	0	0	0
16000 ft	25000 ft	0	0	0	0
Total		556	84	193	98
<b>KML Point Color</b>	<b>Category</b>	<b>GENERATE GLOBAL KML AIRPORT FILE</b>			
TEXT	HARD				
TEXT	SOFT				
TEXT	WATER/ICE/SNOW				

KML File HARD RUNWAY:

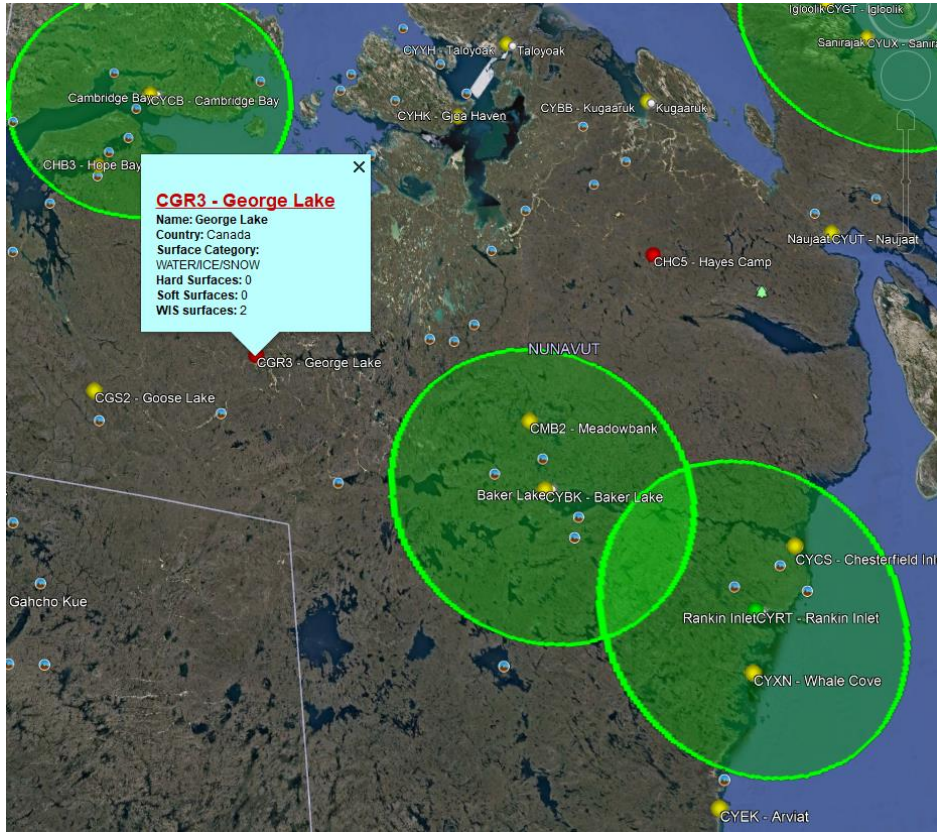


KML File SOFT RUNWAY:





KML File WATER/ICE/SNOW RUNWAY:





## NavAID Magnetic Variation

The Nav Aid Magnetic Variation Sheet is meant to provide a selectable view of the level of effort to rotate VHF navigation aids to True either worldwide or by country. Due to the amount of data in the file, once changed, the indication of country selection takes a few minutes to switch and indicate the correct country for which the data was run. This spreadsheet includes all VOR, VOR-DME, TACAN, and VORTAC in the ARINC Cycle 21-12 database and counts the changes based on the projected 2030 magnetic variation values. The magnetic variation difference from the 0-degree isogonal line is selectable by the user and will be described below. You can also generate a GOOGLE EARTH KML file to view the locations of the navigation aids. In GOOGLE EARTH, VOR has a Green Symbol, VOR-DME has a Yellow Symbol, TACAN has a Red Symbol and VORTAC has a Purple Symbol.

The following describes each of the sheets' field selections:

GET COUNT (C/D)	After you have made your data selections as described below, select the GET COUNT button under column C/D to run the data requested, and that will run the data selected
Country Selection	Select either WORLD for all VHF Navigation aids analyzed or by COUNTRY. NOTE: After the 'GET COUNT' is run, it will take some time for the country indication in the selection cell to change to the country selected.
From-To Columns	Cells C8 D8 down to cells C18 D18 can be changed to categorize the number of degrees from the 0 isogonal line the user wishes. It is currently set to increments used by Canada for VOR alignment 0-3, FAA Alignment up to 5 degrees, then 5-10 degrees and then 10 to 359 degrees. These values are helpful when planning the rotation to True North Transition.
Column E	# of NAVAIDS: shows the number of navigation meeting each condition selected in the cells to the left
Mag var Reference	Mag Var values between 2020 and 2030 may be selected

Navaid Type	Country Code
ALL	ESP

**Country Selection**  
Spain - E SP

Magnetic Variations from True North using 2030 model		
From	To	# of NAVAIDS
0.0 deg	3.0 deg	86
3.0 deg	5.0 deg	5
5.0 deg	10.0 deg	0
10.0 deg	359.0 deg	2
Total		93

**Mag var Reference**  
2030

**NOTE:** The term "NAVAID" here refers to one or all of the following facility types;  
VOR  
VOR-DME  
TACAN  
VORTAC

KML Point Color	Category
Green	VOR
Yellow	VOR-DME
Red	TACAN
Purple	VORTAC

GENERATE GLOBAL KML NAVAIID FILE

KML File depicting different VHF Navigation Aids:

