

## Time to Fly True ? (Draft 1 of Preamble)

In Aviation, Compasses showing Magnetic North have served us well for over a hundred years. The advantages of using magnetic compasses include their lightness and simplicity, and the disadvantages are easily compensated for when operating at low or medium latitudes, but are more apparent when operating nearer the Magnetic poles where the lines of magnetic force have a greater vertical component and a smaller horizontal component.

Mariners, however, have been using the True North reference for many years now as Naval ships, and later Merchant ones too, have long had a direct True Heading readout from their Sperry Gyrocompasses which align themselves to True North using the interaction of gyroscopic forces with the rotation of the earth, and thus have no magnetic input whatsoever. Sperry Gyrocompasses were heavy, and they also had some errors at high speed, especially on easterly or westerly headings, so Aviators had to wait for INS before they had a good True North display for the pilots. Of course, Astronavigation always worked from True North and courses were then adjusted to Magnetic by the Navigator.

Most aircraft now do not have fluxgate sensors to find Magnetic North but rather apply a factor to the True North that they get from the INS to create a Synthetic Magnetic North. Anecdotally there is some suggestion that not all aircraft are applying the same factor as some older aircraft may be using out of date predictions on the movements of the Magnetic North Pole. This could mean that aircraft on the same heading could theoretically converge.

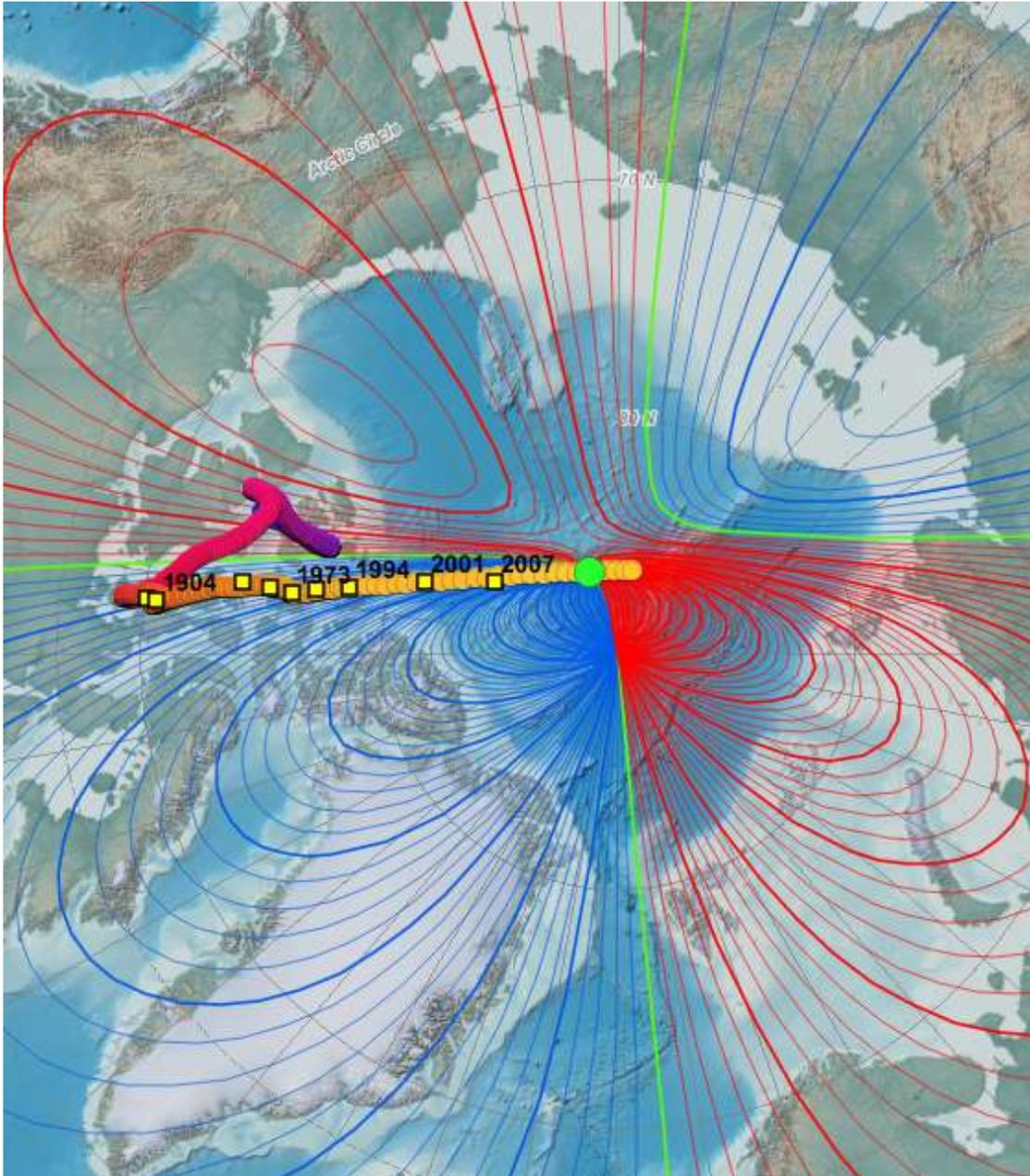
Most people would agree that an ideal reference point is one that does not move relative to all the other points which they are interested in. The Magnetic North Pole fails this test on two counts. Every day it follows an elliptical path of about 200 miles, but even more importantly, it is on a journey which will take it over to the other side of the True North Pole, towards Siberia. See diagram on following page.

Switching to True North would doubtless entail some costs in the short term but those would be more than compensated for by the long term savings to chart updates, Airway centrelines, and of course to Runway Identification Numbers which currently have to be updated from time to time necessitating temporary runway closures.

If not all countries switched to True at the same time, use could be made of procedures that are used in Polar regions, which can be largely automated, to ensure that pilots are using the correct heading reference for their actual position, so although it would be very desirable, it is not absolutely essential that all countries switch simultaneously.

Switching to True North as the primary reference for Aviation offers improved standardisation right away, and is an necessary precursor to further modernisation of navigation systems.

**Map showing the North Magnetic Pole over the last 500 years**  
Copied from [maps.ngdc.noaa.gov/viewers/historical\\_declination](https://maps.ngdc.noaa.gov/viewers/historical_declination)



It is interesting to note that the Magnetic North Pole is now very close to the True North Pole, and that most of the movement has taken place in the last hundred years. The fact that the Magnetic North Pole and the True North Pole are quite close at the moment might suggest that this is a good time for the Aviation Industry to switch to True North, as for many users there will be little change involved.

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## **References and Links for 'True North'**

The reason that we can make this proposal now is that we have proper research to work on, which shows how nebulous the Magnetic North Pole is as a reference and indeed how the Earth's Magnetic Field is weakening. This Research was conducted by the European Space Agency with three satellites and is called the [SWARM](#) Project.

[The Wandering of the Magnetic Poles](#)

[Natural Resources Canada](#)

[North Pole moving towards Russia -- ESA SWARM measurements](#)

[Tromsø Geophysical Observatory - University of Tromsø](#)

[Magnetic North, Geomagnetic and Magnetic Poles Kyoto](#)

[General Background](#)

[Tracking the Magnetic North Pole](#)

[North Pole shifting dramatically towards Russia National Geographic](#)