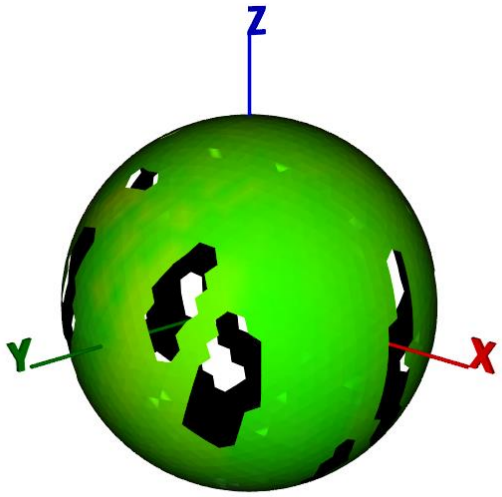
Don’t want to read the introductory tech stuff and just try the MagData Player? Then skip to the section “Using the MagData Player”. Interested to know more about how the MagData Player works? Then skip to the last section “Theory of Operation”.

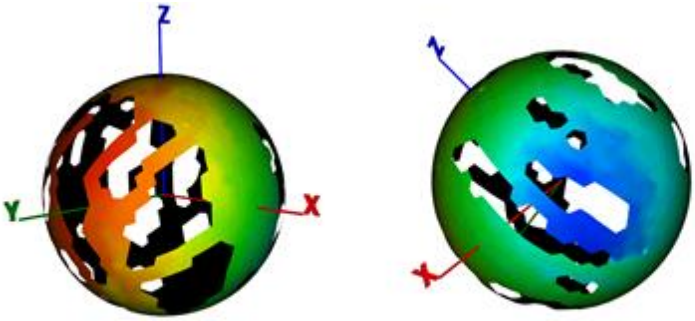
1. Introduction

The MagData Player presents the measured strength of the geomagnetic field for each attitude of the AC. Among other uses the MagData Player can be used to determine how well the compass is calibrated. The measured strength is depicted by the color of the surface of a sphere centered on the AC. Here is an example where the measured strength is almost uniform.



The green represents the median value of the measured strength. Note the slight yellow tinge in regions between the Z and X axes indicating a slightly higher measured strength. The holes in the surface are the result of no data being available for those orientations.

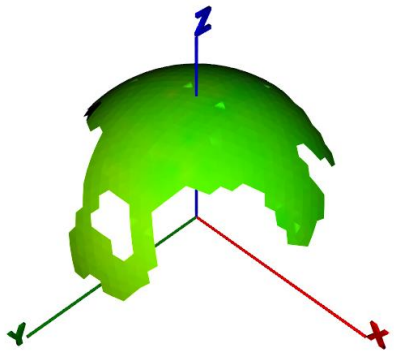
Here is an example where bad compass calibration is simulated by attaching an Allen wrench to one of the legs of a Phantom 3.



On the left it can be seen that the measured strength is lower in the direction of the positive Y axis. On the right the view is in the direction of the negative Y Y axis where the measured strength is higher.

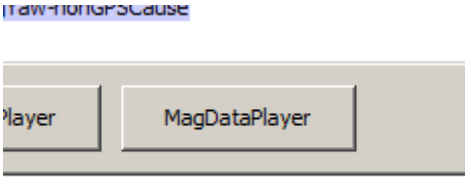
Mag data is produced any time the AC is powered up. However, a typical flight will gather only a limited amount of data since the AC is in a limited number of orientations. Suppose the AC were to remain perfectly level throughout the flight and fly in every possible heading. Then the result would be a narrow ring on the surface of the sphere whose “latitude” would be the geomagnetic inclination. In reality, the AC will pitch and roll some yielding a wider ring.

Here is an example of a flight where the geomagnetic inclination is 59.53 degrees.



2. Using the MagData Player

After loading a .DAT (or a .csv produced by DatCon) the MagData Player button will be enabled.



Pressing this button will cause the MagData Player to appear. To change the orientation of the sphere, do a left mouse down and then drag the surface of the sphere. Zooming in and out on the sphere is done by a right mouse drag left and right.

By default, the MagData Player uses all of the magnetometer data in the .DAT. Selecting an interval can be accomplished by zooming to the desired interval in a SigPlayer.

3. Obtaining Data for the MagData Player

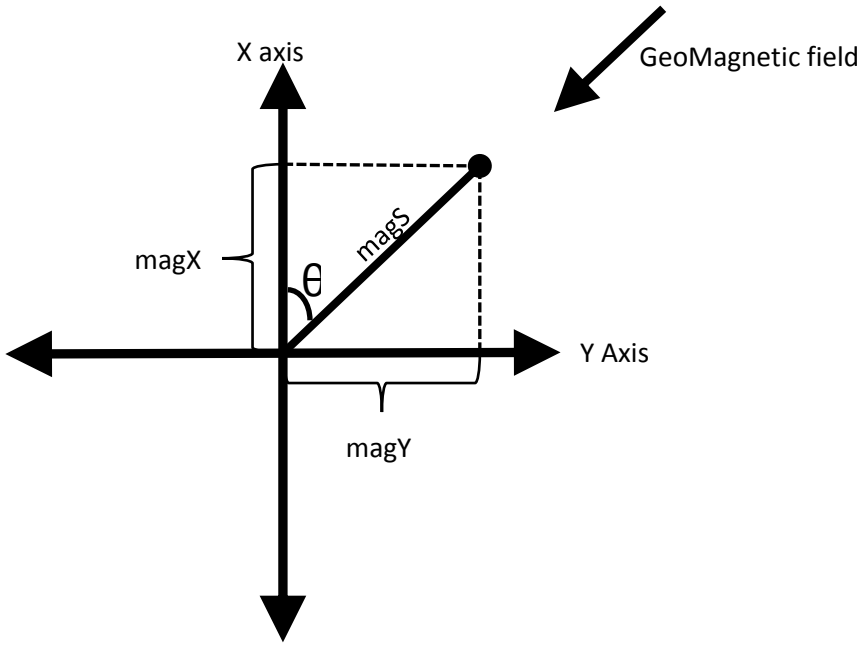
If the MagData Player is to be used to evaluate a compass calibration, then the best way to obtain data is to do an extended version of the compass dance specified by DJI. Here is the procedure I use.

Hold the AC in front of you with the X axis pointing away from you. Now, turn slowly in a circle while at the same time rotating the AC end over end in front of you. After turning 360 degrees stop and turn the AC so that it has the X axis pointing to your right. Repeat the slow turning while rotating the AC end over

end in front of you. Finally, orient the AC with the X axis pointing to the left and r Repeat the slow turning while rotating the AC end over end in front of you.

4. Theory of Operation (under construction)

To make this discussion simpler it is assumed that the compass is a 2D compass with a magnetometer on the X axis and a magnetometer on the Y axis. Further, temporarily assume that the magnetometers have the same gain and that there are no onboard objects that will distort the geomagnetic field.



The values magX and magY are the measured strength of the geomagnetic field for these two magnetometers.

If the AC is rotated counterclockwise we have