Response to Final Peer Review Referee Comments #2

We thank the reviewer for their constructive comments which we have incorporated into the manuscript. The Reviewers comments are in plain text. The Authors responses are in "quotes" and the changes made in the text of the revised manuscript are in "*quoted italics*".

---

2. The pre-flight calibration of the three Euler angles of the rotation matrix and its accuracy should be discussed, as it is assumed to be the main cause of the difference between the prototype and the primary (science) magnetometer.

"The reviewer highlights the importance of the rotation in the calibration, especially since it is suspected that it may be a possible contributor to uncertainty of our calibration. We agree that this is important information to include, and the following context has been added to clarify on line 181:"

"$\bar{R}$ is a 3x3 rotation matrix consisting of three Euler angles that describe a rotation from the sensor frame into the frame of the rocket ACS. Uncertainty in the measurement of the Euler angles is dependent ability to accurately align the ACS with the coil system during calibration. We estimate that this alignment is good for angles larger than 0.05 degrees."

Reviewer Comment 2a: It is not clear what exactly is meant with the statement "We estimate that this alignment is good for angles larger than 0.05 degrees."? It was asked for the accuracy of the pre-flight calibration of the Euler angles.

2a. "The reviewer points out the ambiguity in the text describing the accuracy of the characterization of the Euler angles during preflight calibration. To clarify the uncertainty of the Euler angles and its origins, we have added in the following text to clarify in Line 181 which now reads:"

"Uncertainty in the measurement of the Euler angles is dependent on the ability to accurately align the ACS with the coil system during calibration. We estimate that this alignment is good for angles larger than 0.05 degrees and thus the uncertainty in the Euler angles measured during preflight calibration is 0.05 degrees."

Reviewer Comment 2b: It is appreciated that the new Figure 7 shows the differences between the Tesseract and the science magnetometer, but the authors should give an indication of what is causing the rather large RMS value of 5.53 nT.

2b. "The reviewer highlights the importance of clearly stating the causes of the difference in measured field between the two magnetometers. The following text has been changed on Lines 285-286 to clarify the causes of the RMS difference in measurement between the two sensors*:*

"These discrepancies and remaining periodicity are due to residual spin tones introduced by small (>0.05°) uncertainties in the alignment between the sensor coordinate system and the ACS coordinate system that were not accounted for in the preflight calibration. The preflight calibration procedure described in Section 3.1 was only able to measure Euler angles larger than 0.05°. The uncertainty in the

preflight characterization of the Euler angles reduces the ability to effectivity remove the effects of the rocket's spin through Earth's magnetic field, leading to a residual spin tone between the two sensors (Figure 7)."