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Interactive comment on "Advanced calibration of magnetometers on spin-stabilized spacecraft based on parameter decoupling" *by* Ferdinand Plaschke et al.

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Comments on "Advanced calibration of magnetometers on spin-stabilized spacecraft based on parameter decoupling" by Ferdinand Plaschke, Hans-Ulrich Auster, David Fischer, Karl-Heinz Fornaçon, Werner Magnes, Ingo Richter, Dragos Constantinescu, and Yasuhito Narita (Geoscientific Instrumentation, Methods and Data Systems (GI), gi-2018-45)

The paper concerns an additional aspect of FGM application onboard the rotating spacecrafts and is useful for magnetic field measurements in space plasma. Major remarks: For such a serious problem as space magnetic field measurements the MS contains non-metrological definitions as "approximately", "slightly over" etc. at estima-

tion of physical values and approximation procedures. See, for example: p. 4, lines 15-16: "... the spin axis is assumed to be approximately aligned with the Pz = S3 axis" [The admissible errors should be estimated] ; p. 6, lines 10-15, Eqs. (11)-(15). [The admissible approximation errors should be estimated]; p. 7, line 11: "... and further dropping second order factors, "[The approximation errors should be indicated]; p. 11, line 1: "... slightly over and under the spin frequency: $\omega\pm$ = 2πn$\pm$/tint with n$\pm$ âĹĹ N and slightly over/under n ..." [The admissible intervals should be estimated]; p. 11, line 20: "... slightly over/under n." [The admissible intervals should be estimated]; p. 11, line 28: "... can be omitted due to linearization." [The approximation errors should be indicated] ; p. 11, line 32: "... if the initial set of calibration parameters is not too inaccurate." [The admissible approximation errors should be indicated] ; [During linearization procedure (see, for example, p.6, lines 10-15; p.11, line 28) the basic equations are simplified what leads to the appearance of additional errors at data processing. So, the errors of such an approximation should be estimated, at least for main cases]. P. 11, lines 6-9. It is unclear, how to de-trend the B data, i. e. to separate the studied process and linear trend with given error. P. 13, line 8. What does it mean "... as temperatures relax to stationary values." in practical sense, i. e. admissible unbalance between stationary value and real unsteady temperature after eclipse, for example? What level was assumed by authors during data processing? It should be clearly indicated. P. 10, line 27. Why for Bp "...the minimal modulus of the spin plane field over the subinterval: min($\sqrt{}$(B_xˆ2 + B_yˆ2))." was chosen? It seems to be the better value is avg($\sqrt{}$(B_xˆ2 + B_yˆ2)). Numerical example: Gp = 0.999 Ga = 1.0001 g = 1.002 thetaS1 = pi/2+0.001 thetaS2 = pi/2-0.0015 phiS12 = pi/2+0.002 sigmaPx = 0.0008 sigmaPy = -0.0012

Normalized magnetic field in the non-spinning (inertial), orthogonal, spin-axis aligned (Z = z) coordinate system BX = 0.3 BY = 0.8 BZ $\approx$ -0.5196

Spin frequency is 2*pi The test data was generated for 5 rotation periods with the time discretization dt = 0.2 True value Bp = $\sqrt{}$(B_xˆ2 + B_yˆ2) = 0,85440 The estimation of Bp using the minimum of the modulus of the B' projection on plane XOY (the rotation

plane) gives the value dBp_min = Bp – min(√(B_xˆ'2 (t) + B_yˆ'2 (t))) = 0,00236270
The estimation of Bp at use of the average value of the modulus for the B' projection on plane XOY gives the value dBp_avg = Bp – avg(√(B_xˆ'2 (t) + B_yˆ'2 (t))) = 0,00087464
Finally (dB_p_min)/(dB_p_avg)=2.7013

Minor remarks: P.5, line 16, Eq. (6): No definition of angle φa P.9, Table 2, group 1: No definition of Fa P.9, line 20, p.10, line 26: No definition of Fa P.9, Table 2, group 3: it should be OS1 and OS2 instead of OS1 and OS1 P.10, line 12: it should be GT(Ts, Te) instead of GT(Ts, Ts) P.13, line 16: it should be FGM instead of FGL.

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