Interactive comment on "Enhanced timing accuracy for Cluster data" *by* K. H. Yearby et al.

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1 Response to Referee #1

Specific comments.

The following paragraph will be added to section 1, to discuss in more detail the need for timing accuracy:

"The timing accuracy required to perform multi-spacecraft analysis is discussed by Pincon and Motschmann, 1998, following a series of simulations performed by Pincon and Lefeuvre, 1992. These suggest the phase error should ideally be less than $5°$, and that the fit with the model becomes very poor for an error of $30°$. At a frequency of 180 Hz, these phase errors correspond to a timing accuracy of 77 μs, and 460μs

respectively."

Technical corrections.

Points 1 and 2. Agreed. Text will be updated.

Point 3. The following new paragraph will be added to section 5 to address this point.

"The result of applying time corrections is illustrated in figure 5. The uncorrected time shows jumps due to the change in OFFSET at telemetry data acquisition (TDA) mode changes, and due to change in DIFF at a new time correlation. These jumps are removed when the corrections are applied."

2 Response to Referee #2

Specific comments / technical corrections.

WBD use of TCOR: The following paragraph will be added to section 5 to explain this:

"The TCOR dataset is applicable to all data acquired from the Cluster spacecraft via ESTRACK ground stations. The TCOR dataset itself is generally not used for creation of the Epoch variable in the WBD CDF/CEF data files archived at the CSA. This is because WBD data acquired via DSN or Panska Ves ground stations already have sufficient timing accuracy. However, on rare occasions the TCOR production process identifies apparent errors in the time calibration of these ground stations. For these cases, the WBD team will use the TCOR dataset to correct the Onboard time supplied in the WBD transfer frame to obtain the Epoch variable. The timing accuracy in these cases will be comparable to that attainable via DSN or Panka Ves ground stations."

DSN vs WBD diff. There is no difference in the measurement. 'WBD' is the experiment and 'DSN' is the ground station used to receive the data. The text will be changed so that 'WBD' is always used.

3 Other comments

Following the submission of the draft manuscript, the Cluster Final Archive (CFA) has been renamed the Cluster Science Archive (CSA) and opened for public use. The Cluster Active Archive (CAA) will soon be withdrawn from public use. The text will be updated to refer to the CSA rather than the CAA or CFA and a URL given.

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