

V102a Geometrical algorithm to flag outlier pointing data in ALMA Total Power observation

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In ALMA observations, control software of the antenna sets a flag when antenna pointing deviates from pre-defined trajectory so that downstream data processing using ALMA Pipeline can exclude such data. However, some rare cases were reported where spectral data associated with deviant pointing direction weren't flagged properly. In terms of data processing, those unflagged outlier data are harmful since resulting image cube including the outlier data often becomes too large and they cannot be handled with the current data processing machine. Once it happens, ALMA Pipeline either hangs-up or fails after days of data processing, which requires manual intervention and leads to significant delay of data delivery to the user. Although its occurrence is relatively low (a few instances per year), the impact to the telescope operation is not negligible.

To overcome this issue, we developed a geometrical algorithm to flag outlier pointing data without knowing the extent of the observing region specified by the user. The algorithm estimates the radius of a circle that encompasses the valid data while expels outlier data out of it. Despite its simplicity, the algorithm works efficiently when it is applied to the data taken by the on-the-fly raster-scan observation. In this talk, we will outline the algorithm and show the result for the simulated data. We will also demonstrate that the ALMA Single-Dish Pipeline with this new algorithm can successfully detect and flag outlier data automatically.