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Thai National Telescope pointing and tracking: An analysis using secondary data product from science observation

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The National Astronomical Research Institute of Thailand (NARIT) is currently developing new low resolution and high-resolution spectrographs for the Thai National Telescope. These instruments will be used for follow-up observations for spectral type characterisation and exoplanet detections. Such observation typically will need long exposure (> 1 hour) where the target has to stay inside the slit of the spectrograph during the observation. Therefore, information on the pointing accuracy and the tracking performance of the telescope is essential as part of the preparation works for these two instrumentations.

To gather these information, we look into past science data collected with the 2.4-m telescope between 2014 to 2022. These photometric data are then re-analysed to obtain the pointing coordinates and the x-y position of the target on the CCD. We choose only science data where the observations cover at least 4 hours or longer for the tracking analysis.

Our results show that the Thai National Telescope has a satisfactory pointing accuracy where in most cases, the targets are positioned within 5-40 arcseconds from given coordinates. While such accuracy is acceptable for photometric observation, it will pose a problem for the spectrographs because the width of the slit is usually only a few arcseconds. As for the tracking, we found that the telescope has a good tracking (drift <5 arcsec/hour for ULTRASPEC) with an exception for targets near the zenith with declination close to 18^{\circ}. However, we also found that the tracking after 2019 is worse compared to previous years. Further investigations are needed to find the cause of this issue.

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