

FITS Image Archive at ESA'S NEO Coordination Centre



R. Rudawska^{1,2}, A. Foglietta^{1,3}, D. Koschny^{1,4,5}, J. L. Cano^{1,6}, L. Conversi^{1,7}, M. Micheli^{1,2}, P. Ramirez-Moreta^{1,8}, G. Di Girolamo⁹, J. Klug⁹

¹ESA NEO Coordination Centre, ²RHEA Systems, ³Alia Space Systems, ⁴ESA ESTEC, ⁵LRT/TU Munich, ⁶Elecnor Deimos, ⁷ESA ESRIN, ⁸GMV, ⁹ESA ESOC Space Safety Service Centre

Introduction

To assess the threat level of a near-Earth asteroid (NEA) the discovery alone is not enough. It is crucial to compute reliable orbits based on accurate astrometric positions that would cover an arc as long as possible. We can accomplish this by performing follow-up observations or mining astronomical archives to look for information preceding the discovery itself.

FITS image archive

To fulfil these goals, ESA's NEO Coordination Centre (NEOCC) coordinates, collects and analyses telescopic observations of NEOs using ESA's owned telescopes or telescopes under agreement with the Agency (Conversi et al., 2021; Micheli et al., 2021). All collected image data is then stored in the NEOCC FITS Image Archive for long-term preservation.

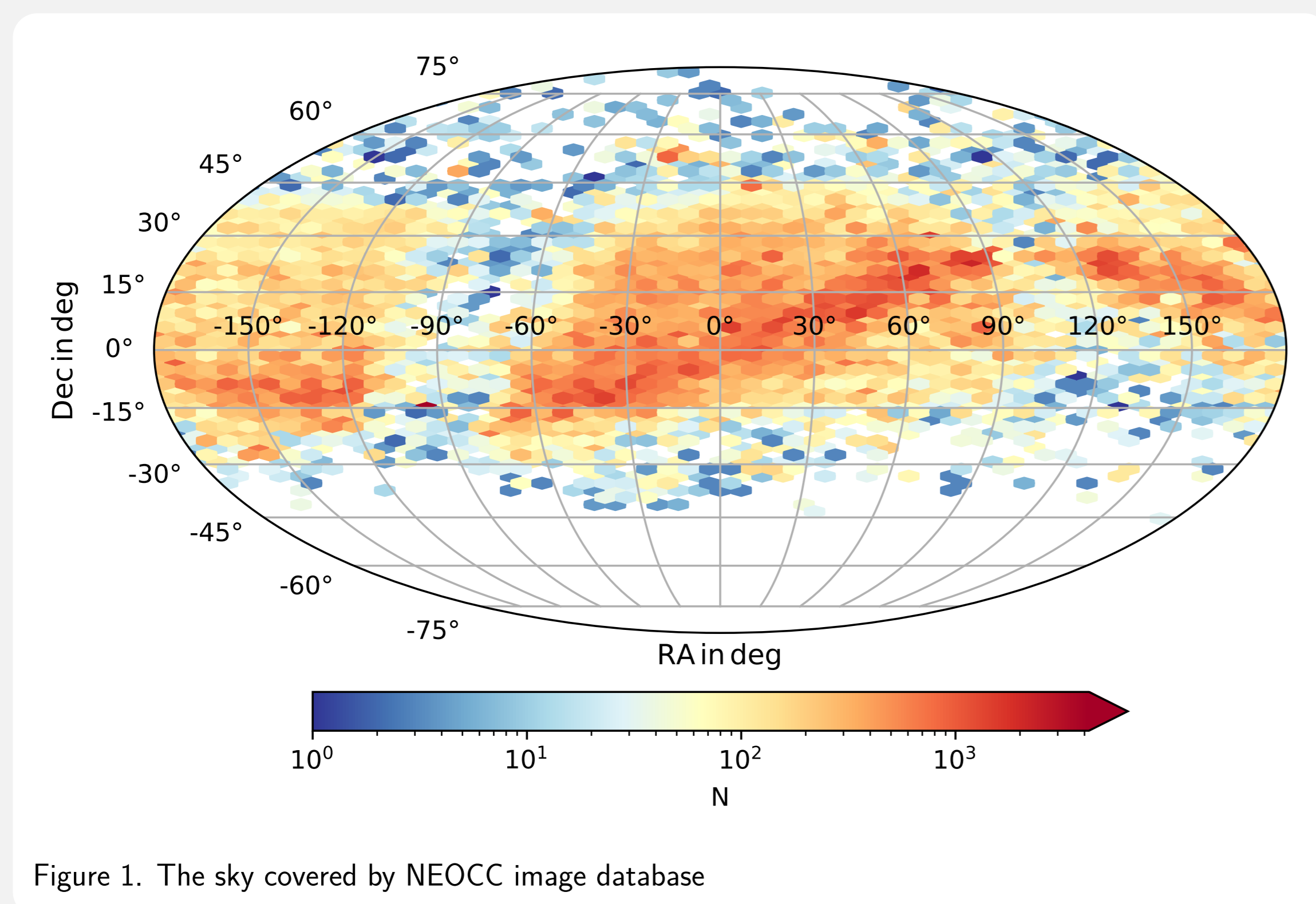


Figure 1. The sky covered by NEOCC image database

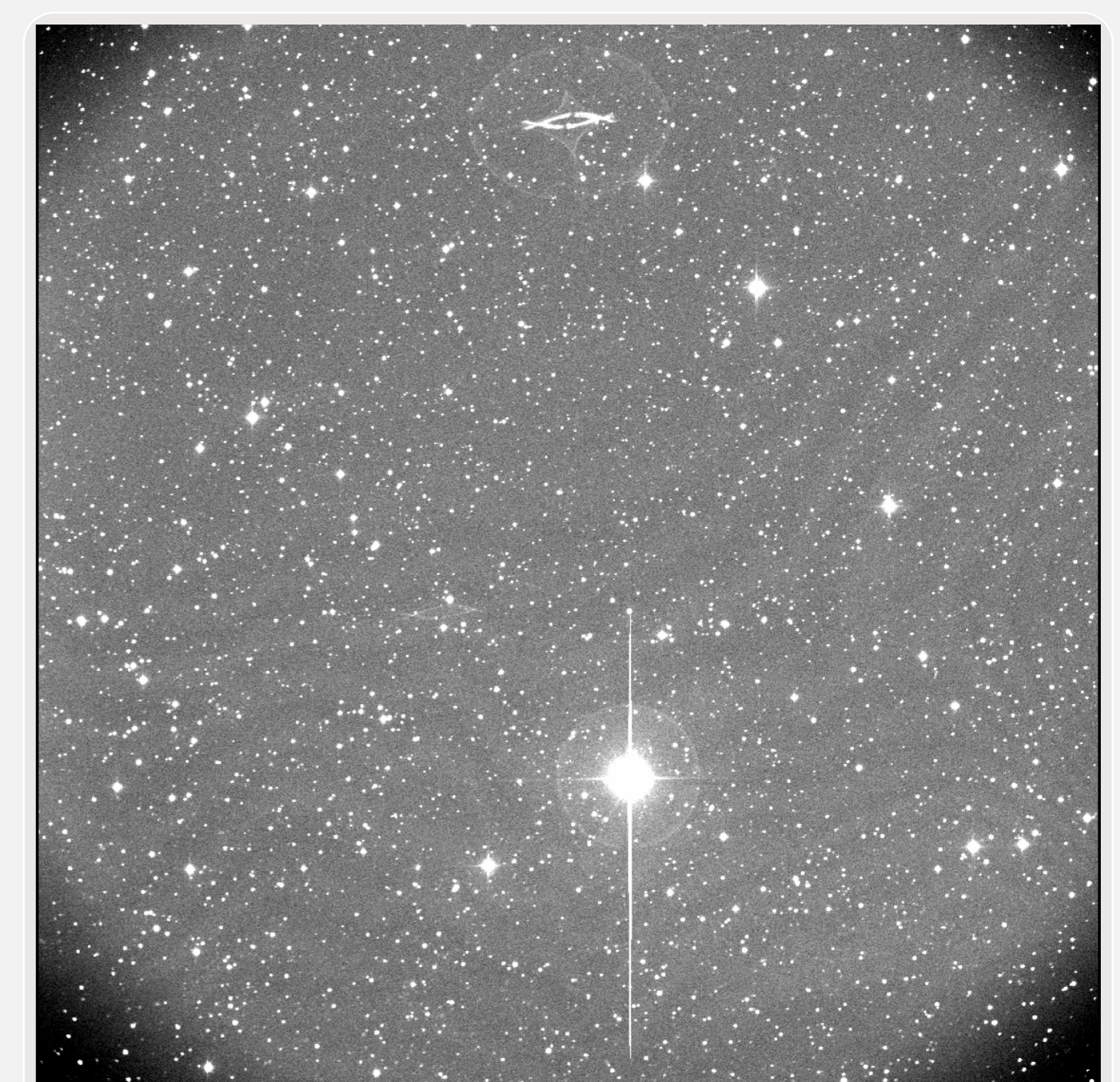
Currently, there are over 500 000 images in our database. The archive includes images from telescopes such as: Optical Ground Station (~270k), La Sagra Sky Survey (~116k), Klet Observatory (~28k), Karl Schwarzschild Observatory (~13k), Calar Alto-Schmidt (~78k), and soon from other observatories cooperating with ESA. Figure 1 shows the area of the sky covered by the NEOCC image database. All of the available images in the archive have already been analysed to discover or follow-up already known asteroids, and their astrometric measurements have been submitted to the Minor Planet Center (MPC). The image archive - upon user registration request to the NEOCC - provides capabilities to search and download selected image data (Figure 2).

Moreover, the NEOCC image database is planned to be linked into the Solar System Object Image Search (SSOIS) system developed by the Canadian Astronomy Data Centre (CADCC; Gwyn, Hill, Kavelaars, 2012). Therefore, the database will be extremely useful in order to allow further inspections of the images and to possibly find unidentified detections of NEOs or other moving objects.

Figure 2. <https://neo.ssa.esa.int/image-database>



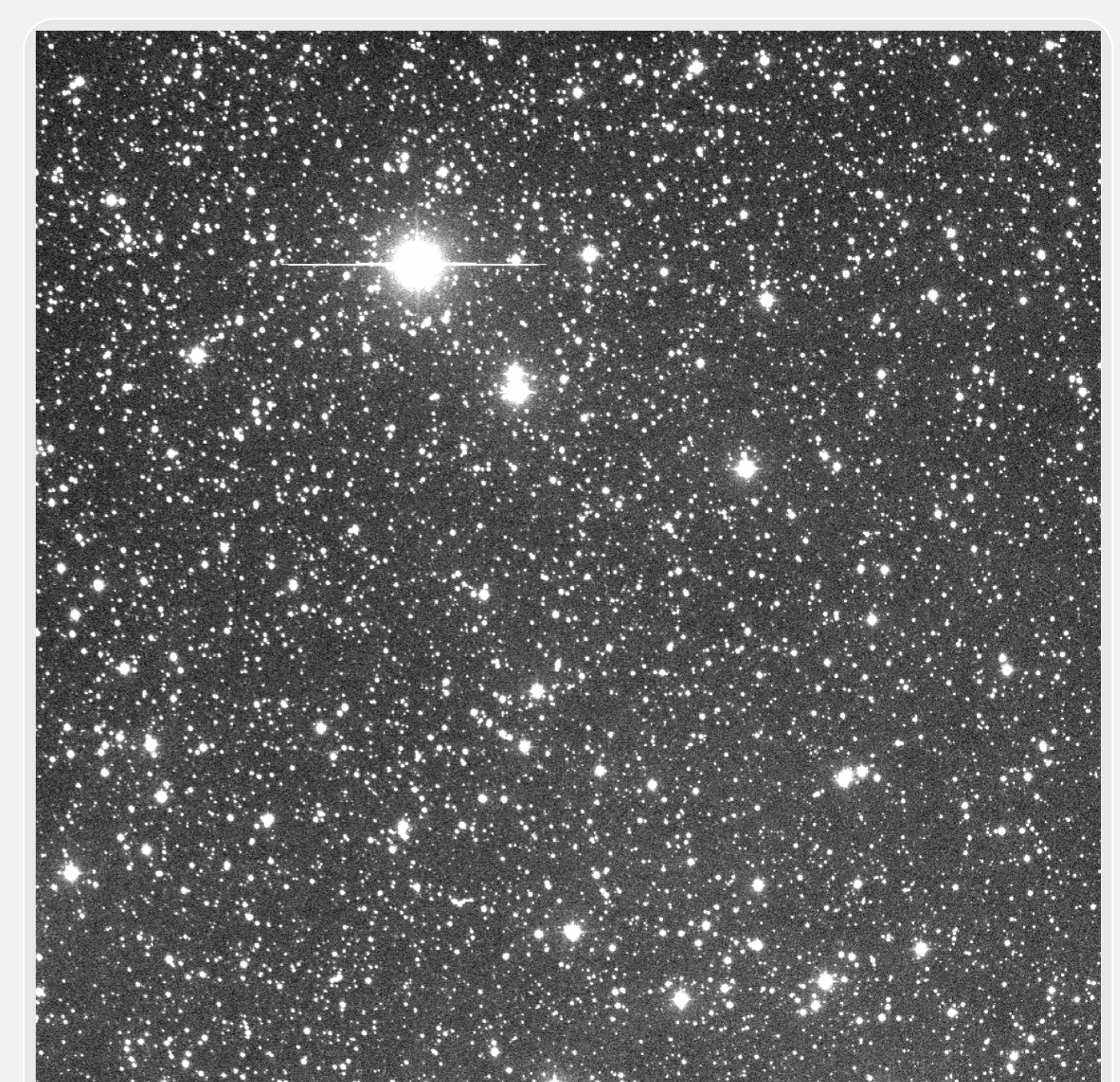
Optical Ground Station (J04)



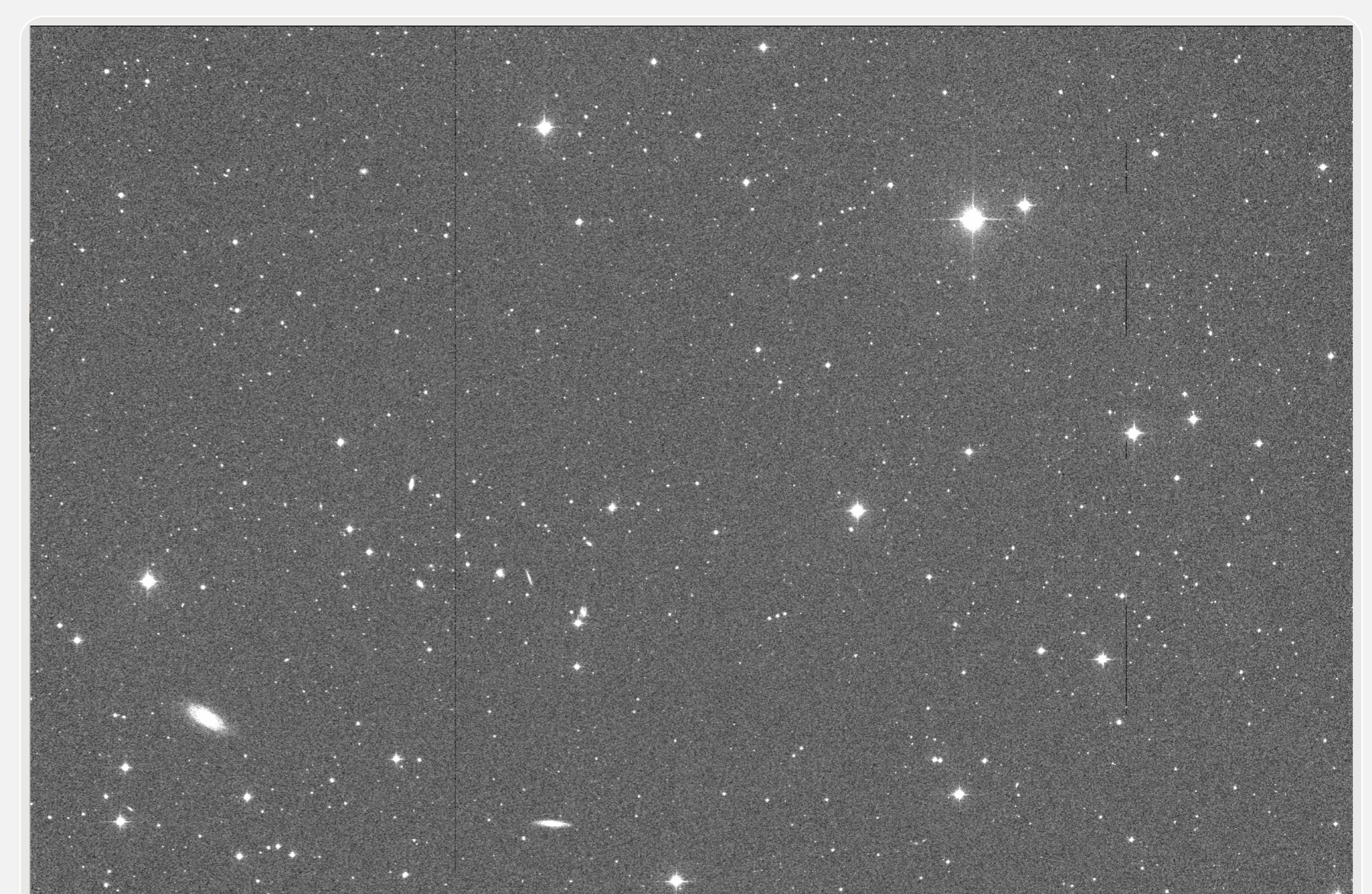
Calar Alto-Schmidt (Z84)



Karl Schwarzschild Observatory (033)



Klet Observatory (246)



La Sagra Sky Survey (J75)

References

- CONVERSI, L. ET AL. (2021), *ESA's NEOCC observational network*. This conference.
- GWYN, S.D., HILL, N., KAVELAARS, J.J. (2012), *SSOS: a moving-object image search tool for asteroid precovery*. Publications of the Astronomical Society of the Pacific, 124, 579.
- MICHELI, M. ET AL. (2021), *Recent observational highlights from ESA's NEO Coordination Centre*. This conference.