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Development of the EUCLID's Data Processing Unit Application Software

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The EUCLID mission will capture a 3D image of the distribution of dark and baryonic matter from which the acceleration of the Universe will be measured to the percent level accuracy. Combining weak gravitational-lensing patterns from intrinsic alignments of galaxies and galaxy clustering probes, it will reveal signatures of the physical processes responsible for the expansion and the hierarchical formation of structures and galaxies in the presence of dark matter.

EUCLID is been equipped with a common wide-field view visible imager and a Near-Infrared Spectro-Photometer (NISP) for redshift measurements (resolution of 0.3 arc s px); combined data will be used to derive an estimate of redshift for the two billion galaxies.

We offer a comprehensive description of the application software (ASW) of the NISP's Data Processing Unit (DPU), including the software development choices, standards, architecture, trade-offs, as well as the continuous integration, and the configuration control toolkits. We also provide a detailed description of a DPU-ASW's peculiarity, which is the implementation of the on-board data pre-processing that allows for high data reduction. Finally, we offer the validation campaigns of the ASW deployed in the NISP Flight model. All processes that lead to the qualification of the DPU-ASW's Flight version.

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