Astro-WISE for KIDS

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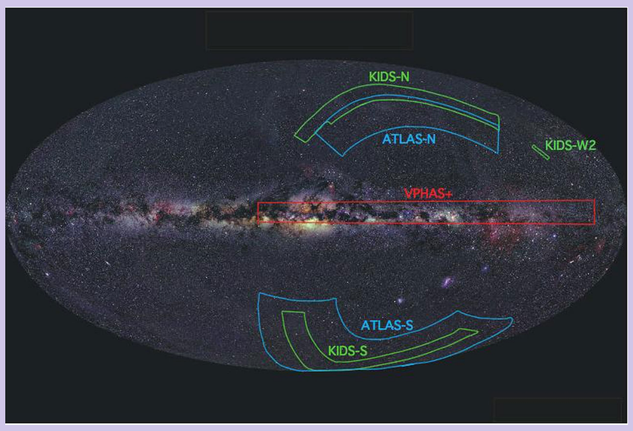
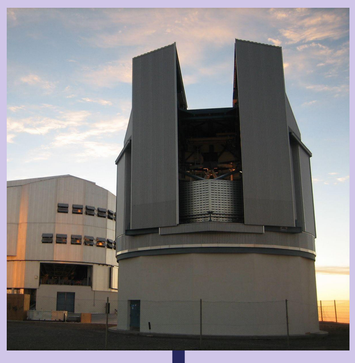
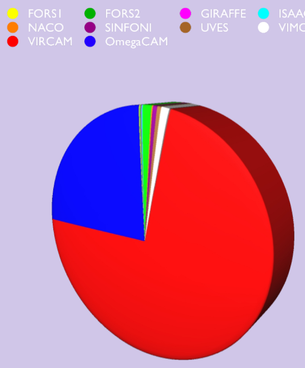


Kilo Degree Survey

The Kilo Degree Survey (KiDS) is an ESO public survey that is imaging 1500 sq.degree in 4 bands (u,g,r,i) using the VLT Survey Telescope at Paranal. Together with the infrared VIKING survey it provides 9-band photometry with excellent image quality. Central science case for KiDS and VIKING is mapping the matter distribution in the universe through weak gravitational lensing and photometric redshifts. The ~35 KiDS team members are spread over several institutes in 5 different countries and use Astro-WISE for survey data handling.





A new ball park at Paranal

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For ESO the advent of the dedicated survey telescopes VST and VISTA introduces new challenges. As indicated in the pie-chart, the data volumes delivered by these new instruments dwarf that from all other instrumentation on Paranal combined.

Left: *Data volume per instrument on Paranal. OmegaCAM (VST) and VIRCAM (VISTA) account for >90% of the total data flow.*

Astro-WISE

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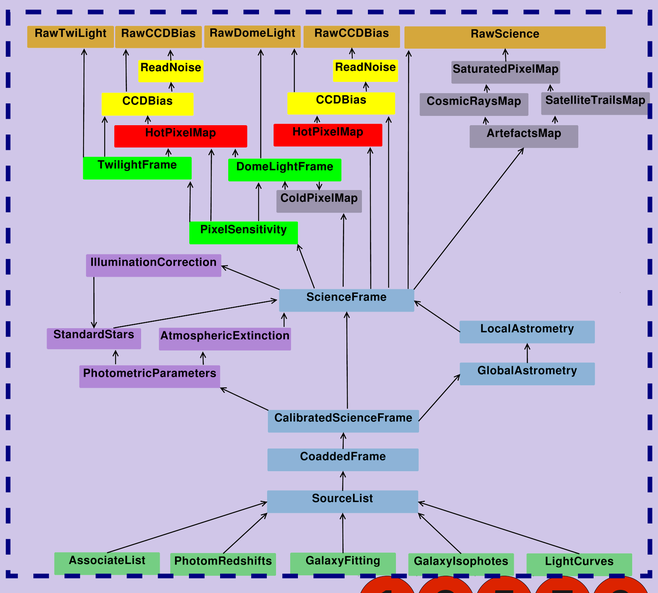
Astro-WISE is a data-centric survey handling system. All handling is implemented as operations by data objects.

Right: the data objects are instant-iations of a data model for imaging surveys. The data lineage is stored with the data objects: data objects them-selves can trace back their dependencies to raw data (arrows).



Survey calibration control via lineage

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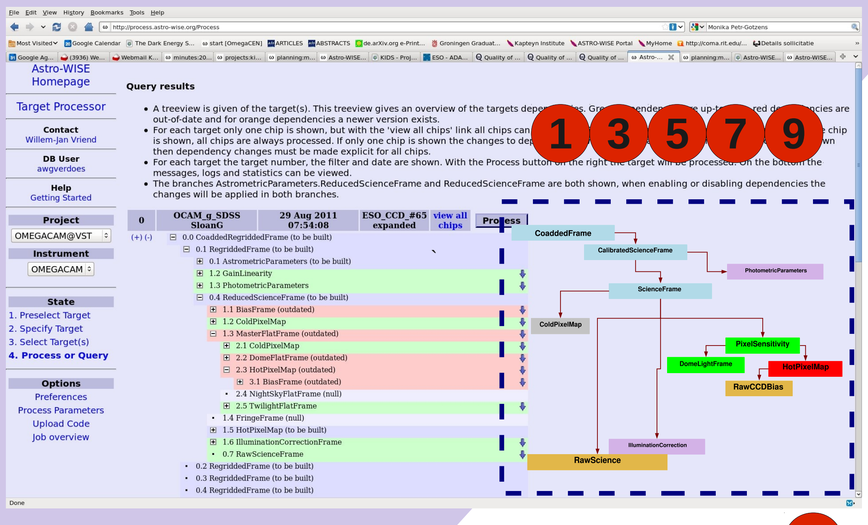
Data lineage allows requested data objects to "produce themselves" from raw data and to query automatically for existence of improved calibrations. **Snapshot below**: a request for a target generates automatically its own workflow (e.g., the one shown in **left diagram**) following dependencies for the requested object.

Target processing webservice

exploits stored data lineage to determine if the requested product will be outdated before the creation of the product itself. The metadata database is checked for existing versions of the same data product.



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Comparison to other surveys

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Survey	Status	Area (sq.deg)	u	g	r	i	z	Y	J	H	K
KiDS-VIKING	Active	1500	24,8	25,4	25,2	24,2	23,1	22,3	22.0	21,5	21,2
Pan-STARRS1	Active	30000		23,4	23.0	22,7	22,0	20,9			
ATLAS-VHS	Active	4500	22.0	22.2	22.2	21.3	20.5				
Pan-STARSS2	Planned	30000		24,8	24,4	24,1	23,4	22,3			
DES	Planned	5000		25,4	24,9	24,8	24,7	22,3			

Several other optical wide-field surveys are planned or currently active. Although KiDS-VIKING covers a smaller area, it is very deep and provides a large wavelength coverage, and excellent image quality.

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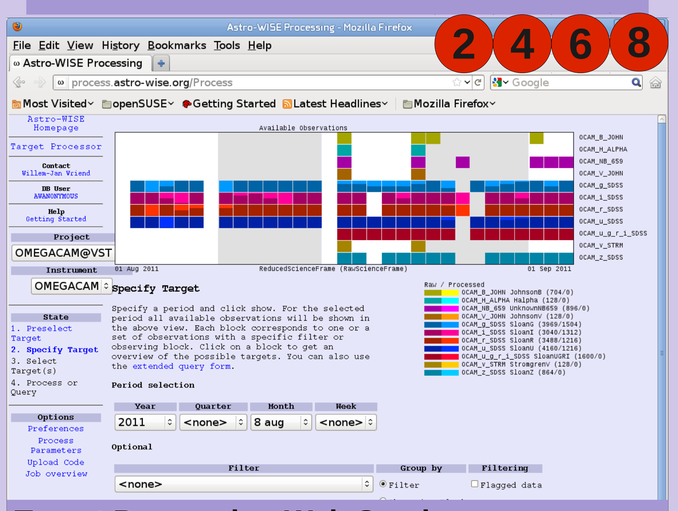
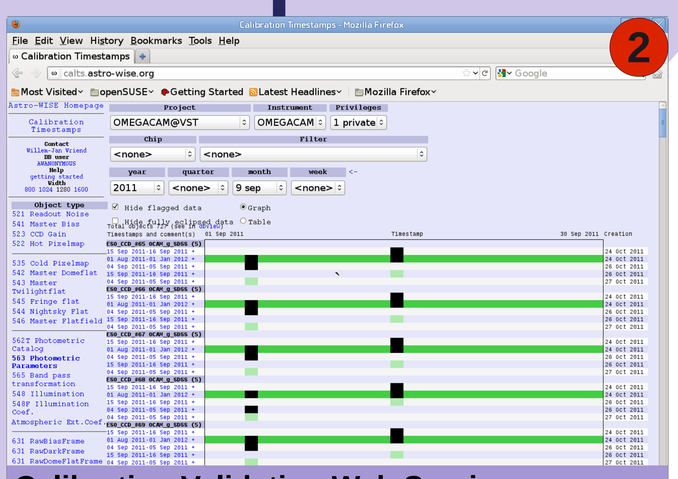


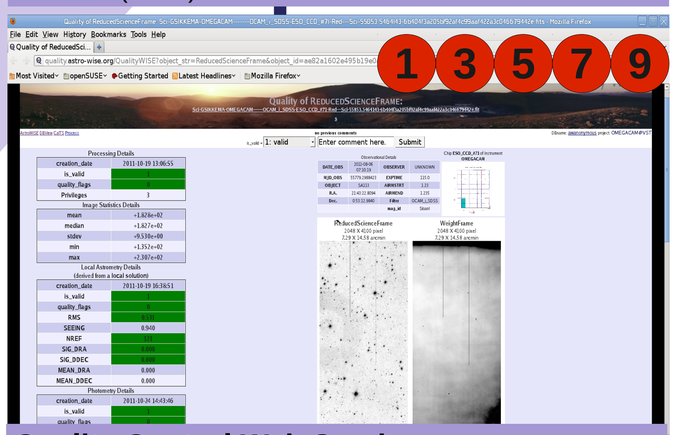
Target Processing Web Service

Survey products to be created are selected by querying on attributes (date, filter, name, Observing Block ID). A graphical display shows possible Targets as a function of time (horizontally) and passband (vertically). Shading per colored block distinguishes between new Targets and Targets for reprocessing.



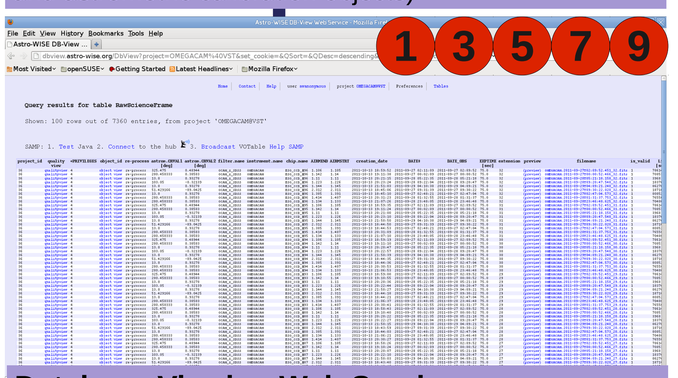
Calibration Validation Web Service

Driver's seat of survey calibration scientists to (in)validate all calibrations (listed left). A graphical display shows validity timerange (in green) of calibrations and how better calibrations eclipse older versions (black).



Quality Control Web Service

"Single-shot" view on the quality assessment for science data objects. Parameters and inspection figures are a bundling of the QC parameters for the requested data object plus those of its dependencies (e.g., photometric and astrometric calibration objects).



Database Viewing Web Service

Datamining service for objects and their full lineage. It is linked to Quality Control and Target Processing services. SAMP for data exchange with other applications is implemented.

http://www.astro-wise.org/projects/KIDS

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