ICHEP 2022 BOLOGNA

The Euclid Mission

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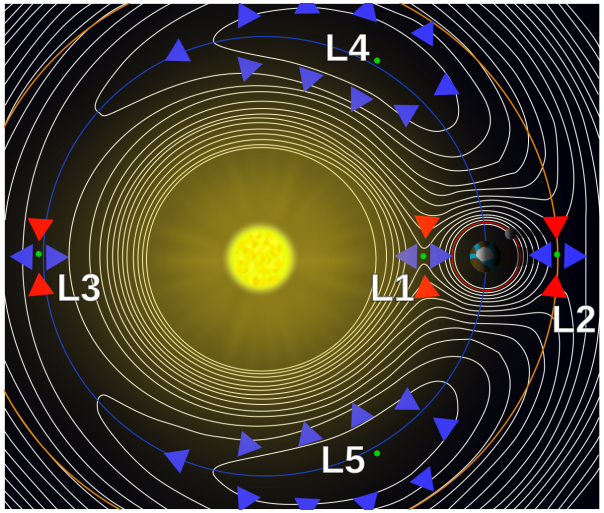
on behalf of EC

Euclid Space Mission

Euclid

Space mission to study dark energy by determining redshifts of extragalactic objects.

Large Sun-Earth Lagrange point 2



Euclid Space Mission

Euclid

Space mission to study dark energy by determining redshifts of extragalactic objects.

Observables:

1. Weak Lensing
2. Galaxy Clustering

Wavelength Coverage:

550nm–2000nm

Euclid Space Mission

Euclid

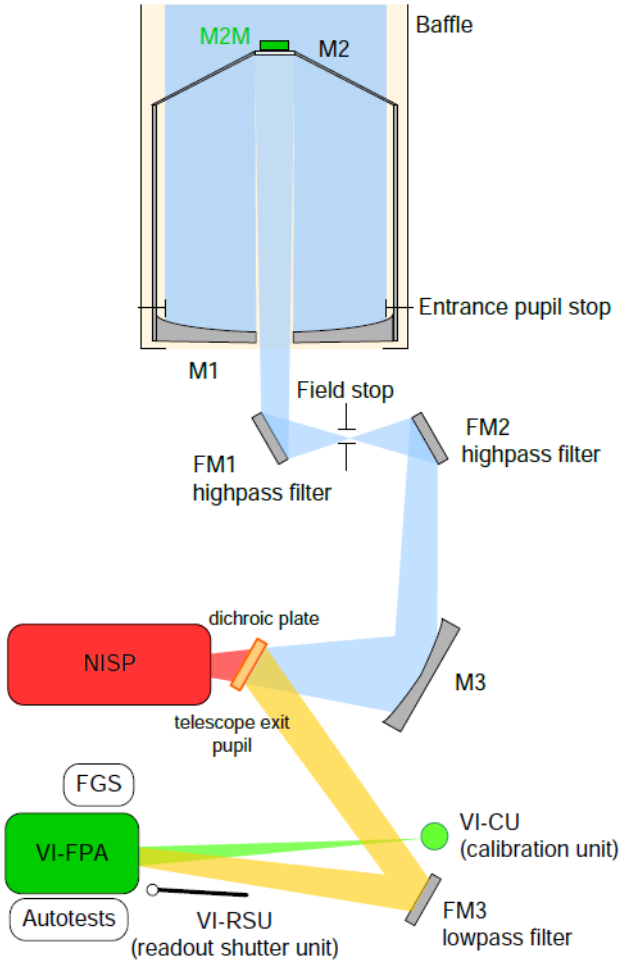
Korsch telescope: three-mirror-anastigmat reflector telescope

Primary Mirror: Concave ellipsoidal
1.2m diameter SiC

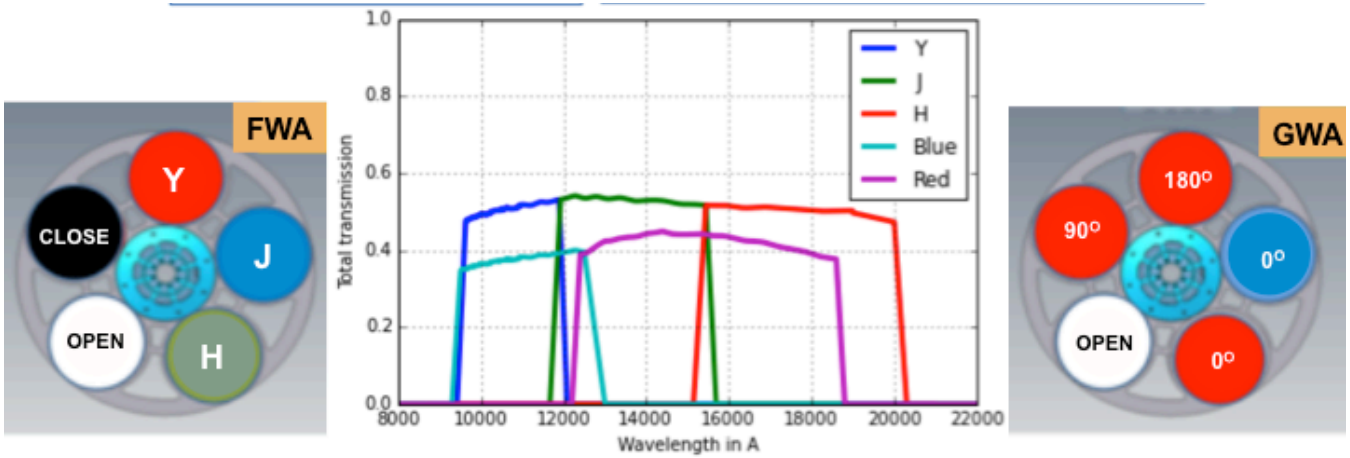
Secondary Mirror: Hyperbolic

Tertiary Mirror: Concave ellipsoidal

Flat focal plane (0.5 deg2)designed to avoid stray-light with accurate PSF.



Wavelength Coverage



Wavelength range	550– 900 nm	Y (920-1146nm),	J (1146-1372 nm)	H (1372-2000nm)	1100-2000 nm
Sensitivity	24.5 mag 10σ extended source	24 mag 5σ point source	24 mag 5σ point source	24 mag 5σ point source	$3\ 10^{-16}$ erg cm-2 s-1 3.5σ unresolved line flux
	Shapes + Photo-z of $n = 1.5 \times 10^9$ galaxies			z of $n=5 \times 10^7$ galaxies	

Survey

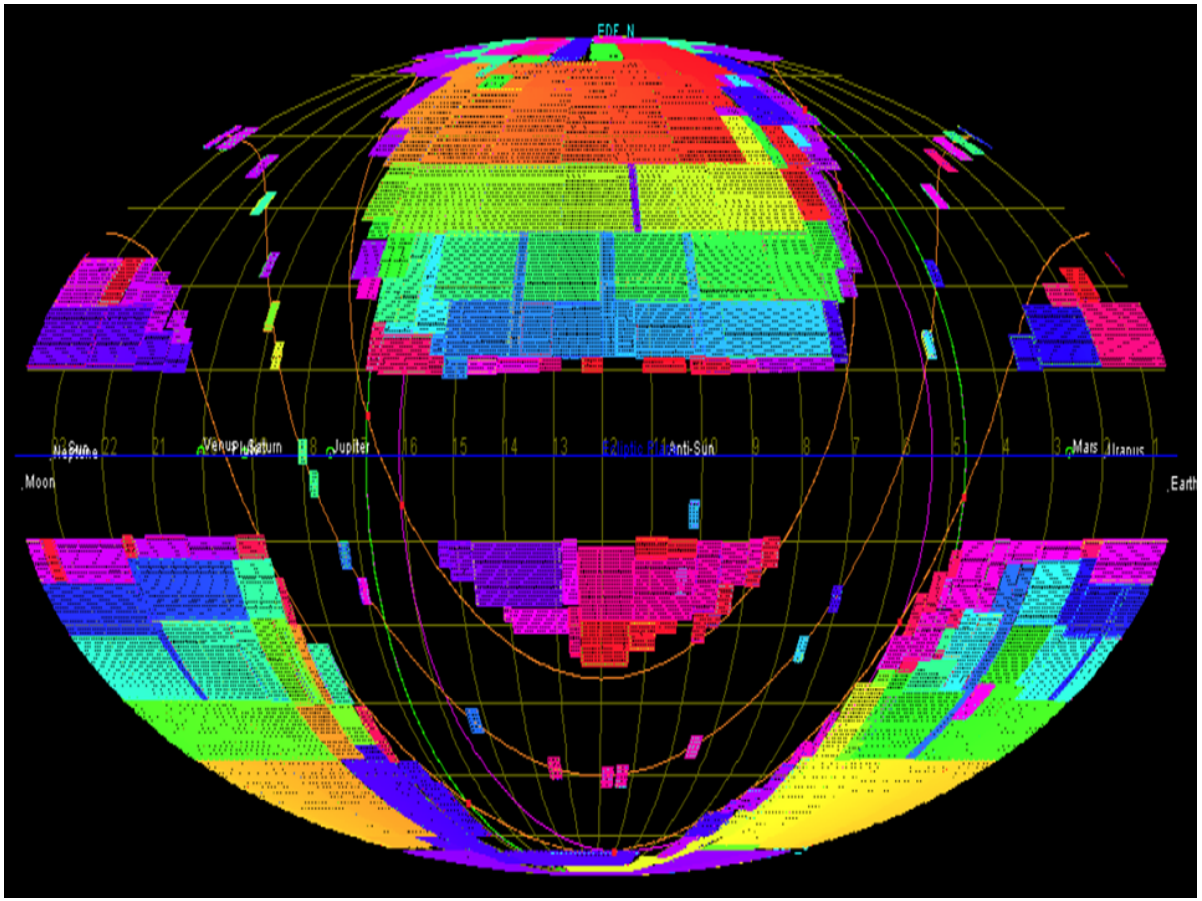
Wide survey:

15'000 deg2
24.5 mag (VIS)
24 mag (NIR)

Deep survey:

2x20 deg2
symmetric regions
north and south
26.5 mag (VIS)
26 mag (NIR)

6yrs planned data taking



Payload

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VIS

VIS: High-Quality panoramic visible imager
6×6 4096×4132 12 micron pixel e2v CCD's (~150K)

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NISP: Near Infrared Spectrometer and Photometer
4×4 2040×2040 18 micron pixel HgCdTe detectors (~120K)

Instruments

VIS will measure high quality imaging of the shapes of galaxies (resolution 0.1arcsec).

NISP will provide:

- NIR(between 900 and 2000 nm) photometry of all VIS galaxies (resolution 0.1arcsec);
- NIR low resolution (0.3arcsec) spectra ($\lambda/\Delta\lambda \sim 250$) and redshifts of millions of galaxies.

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NIR photometry + VIS data -> 1.5Bil redshifts: $\sigma(z)/(1+z) < 0.05$

NIR spectrometry (Ha) -> 35Mil redshifts: $\sigma(z)/(1+z) < 0.001$

From images to z

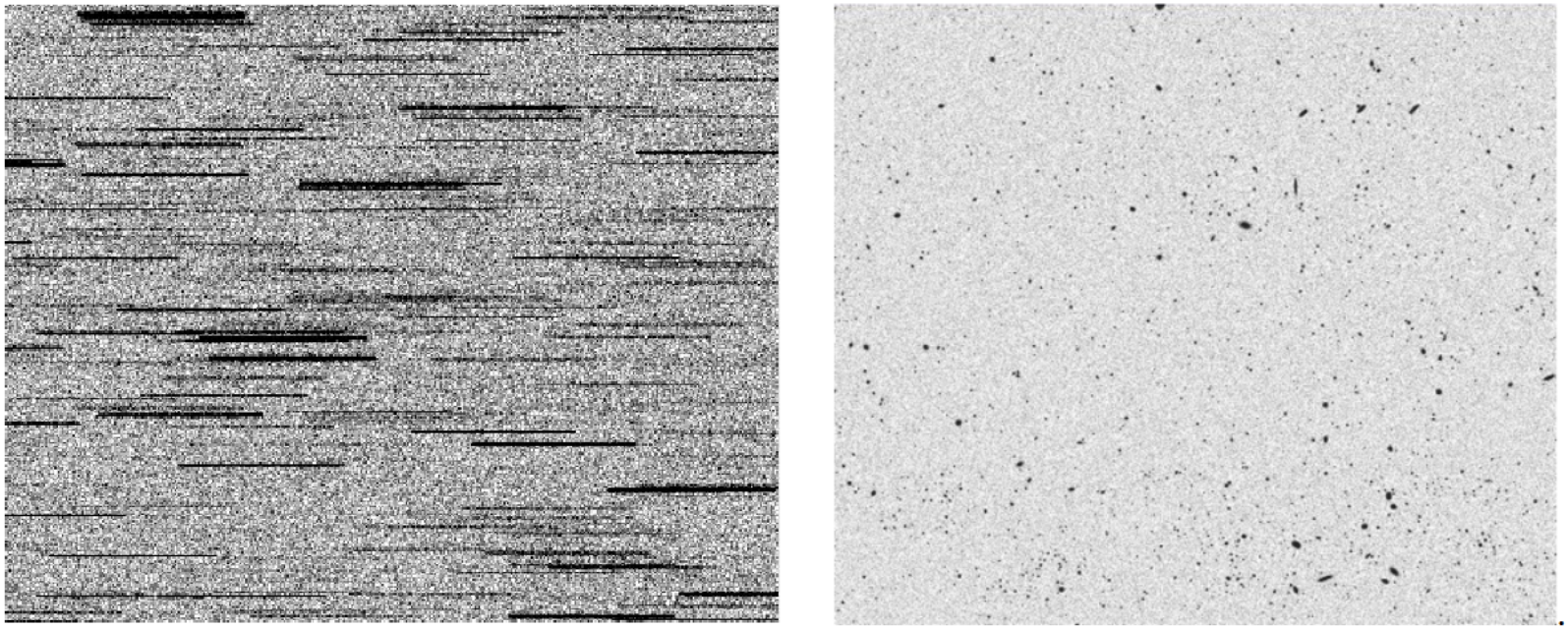
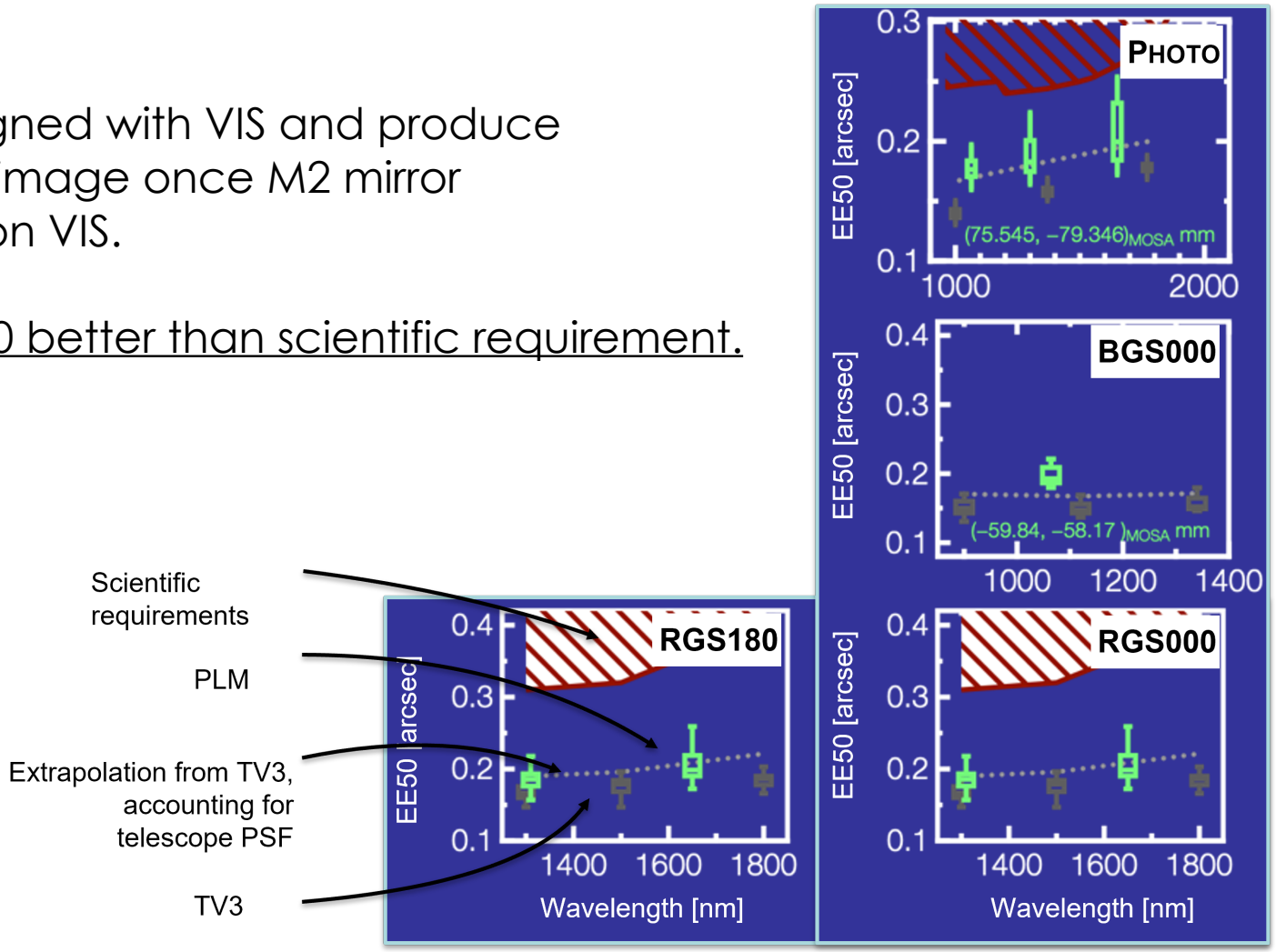


Figure 6.8: Simulation of a typical Euclid slitless observation (left: single array, 10.2 arcmin side); (right) and its corresponding direct image

Image Quality (CSL)

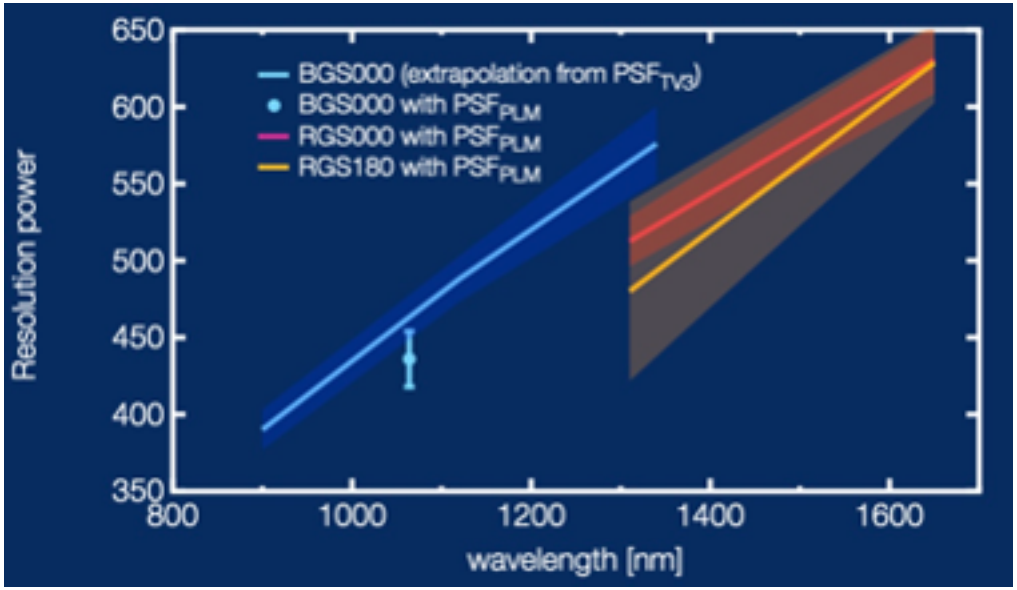
NISP well aligned with VIS and produce high quality image once M2 mirror is focalized on VIS.

<u>NISP PSF EE50 better than scientific requirement.</u>

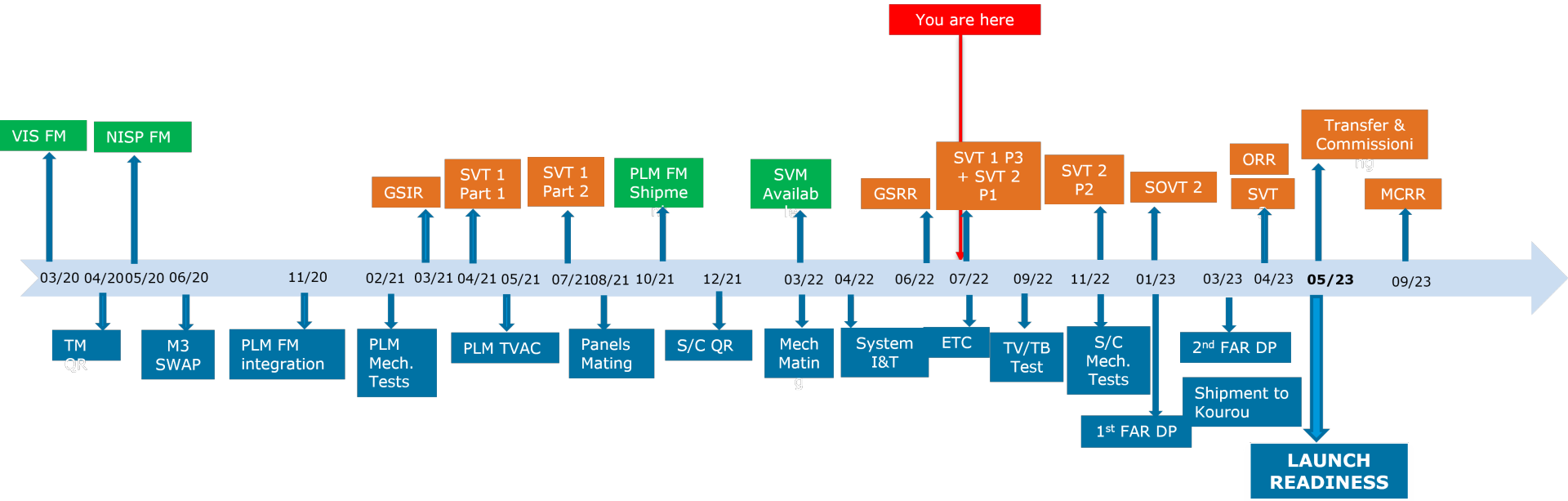


Spectral Resolution

Compliant with the requirement (R > 380)



Global Scheduling

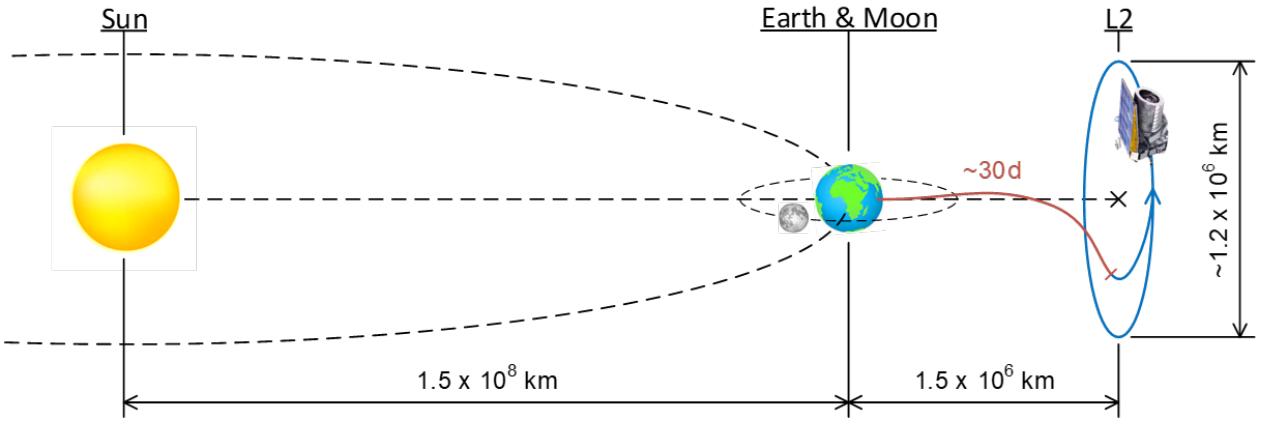


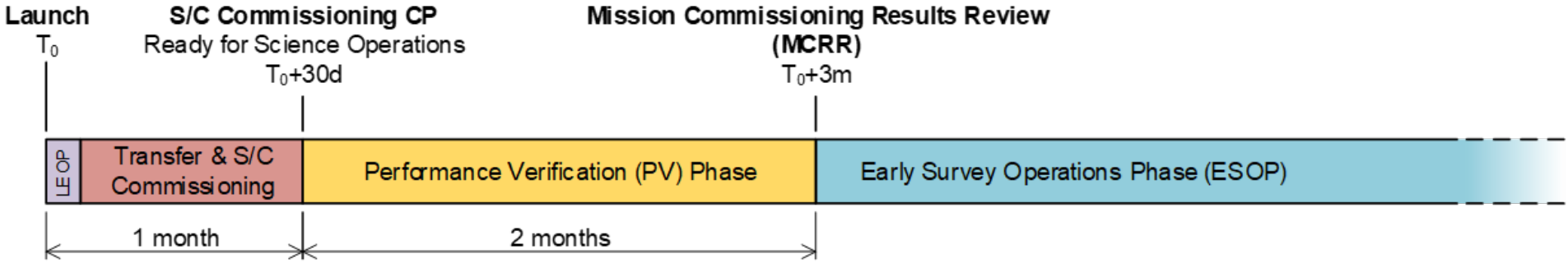
Delivery

S/C Activity

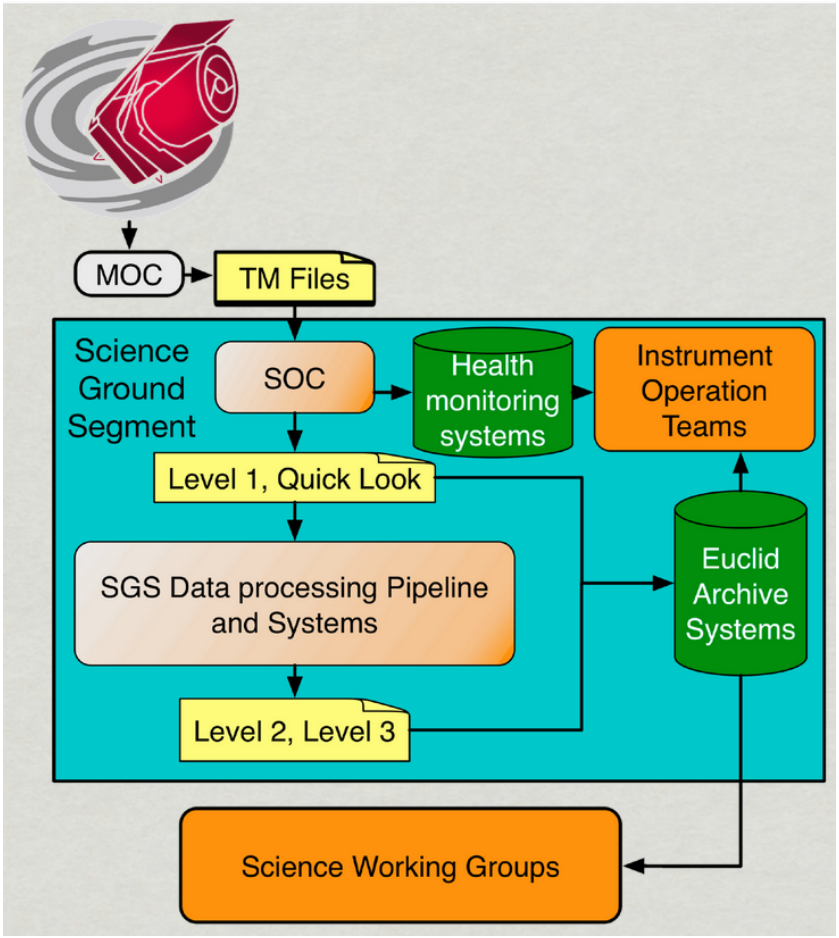
GS Activity

Transfer and Commissioning





Scientific Ground Segment



- The SGS combined with the MOC (Mission Operation Control) is the Extended Ground Segment
- The Science Ground Segment consist of
  - EC SGS
  - SOC (Science Operation Center)
- The Euclid Consortium Science Ground Segment consist of:
  - IOT (Instrument Operation Team)
  - OUs (Organisation Units)
  - SDCs (Science Data Centers)
  - System Team

Thank you for your attention!