

# Computing model for the Spanish contribution to the EUCLID Ground Segment

$OU_{SIM}$  and  $SDC_{SPAIN}$

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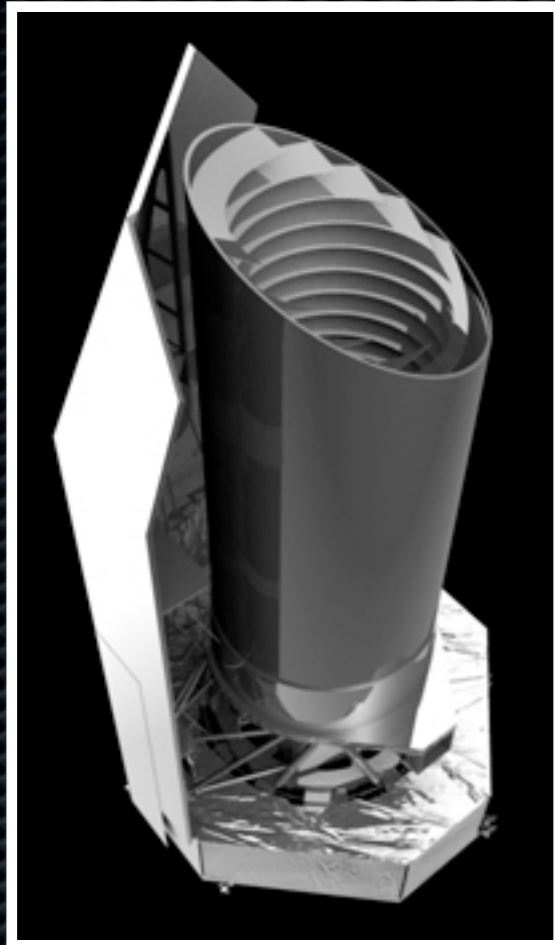
# Outline

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- The EUCLID mission
  - Science Ground Segment
    - Organization Units
    - OU vs SDC
  - Organization Unit - Simulations
    - Algorithm model
    - Data model
  - Science Data Centre - Spain
    - PIC
    - Model implementation
- Conclusions

# EUCLID

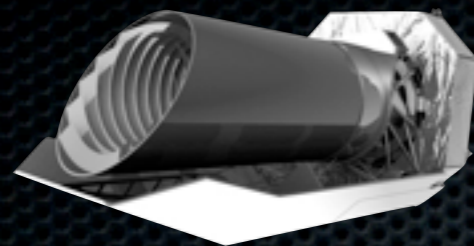
## Mission



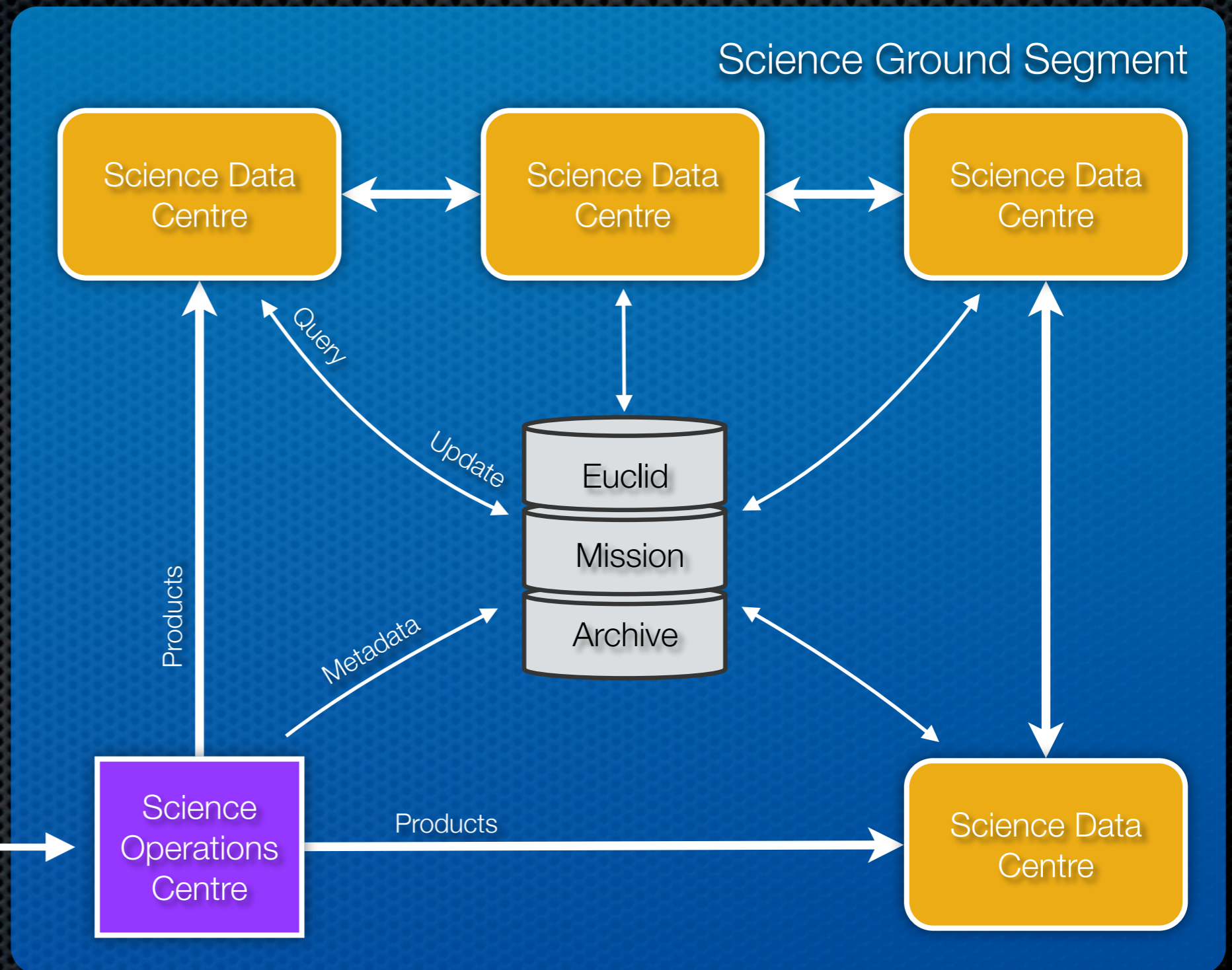
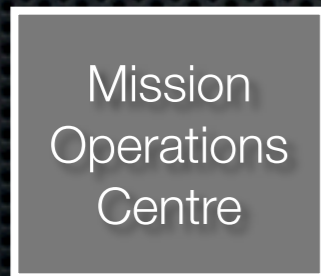
- ESA Cosmic Vision M-class mission
- Study Dark Energy and fundamental cosmology
- Main probes: Weak lensing + BAO
- Mapping 20.000 deg<sup>2</sup>
- 2 instruments - 3 modes:
  - Visual Imager (VIS)
  - Near Infrared Spectrometer and Photometer (NISP)
    - Near Infrared Imager
    - Near Infrared Slitless Spectrometer

# EUCLID

## Science Ground Segment



Commanding  
Telemetry

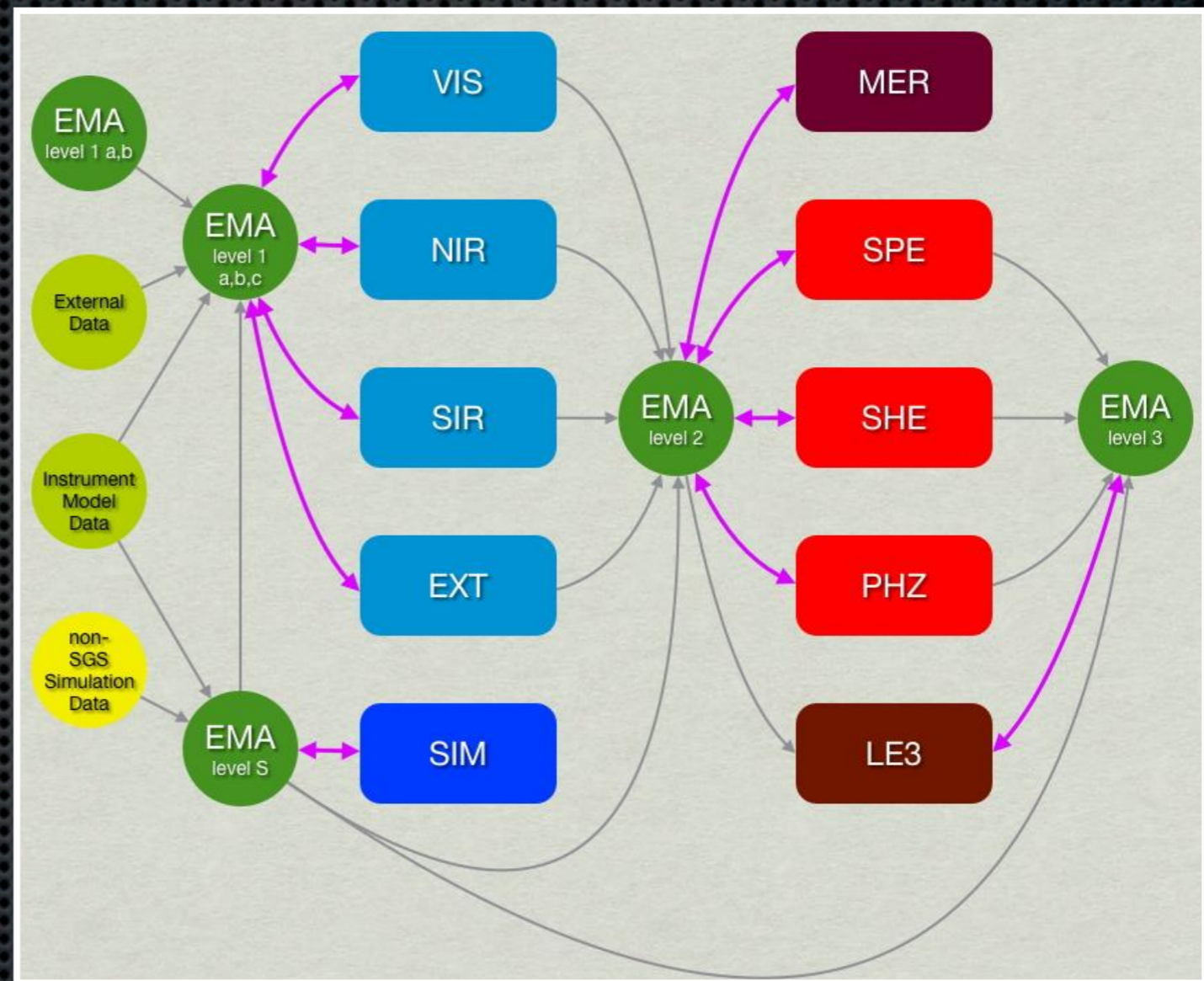


# EUCLID

## Organization Units

OU: Develop algorithms.  
SDC: Implement, test, run.

Visible image reduction - VIS  
Near Infrared image reduction - NIR  
Near Infrared Spectrograph reduction - SIR  
External Data euclidization - EXT  
SGS Simulations - SIM  
Merging level 1 data - MER  
Extract spectroscopic redshifts - SPE  
Compute photometric redshifts - PHZ  
Compute shear measurements - SHE  
Compute high-level science products - LE3



# EUCLID

## Organization Units vs Science Data Centers

	Volume	Processing	ES	ITA	UK	D	NL	FR	CH
Storage*			L	L	XL	XL	L	XL	L
Computing*			L	L	M	M	L	L	L
VIS	1 PB	M							
NIR	0.5 PB	M							
SIR	60 TB	S							
EXT	10 PB	L							
SIM	TBD	TBD							
MER	13 PB	L							
SPE	0.4 PB	M							
PHZ	<0.1 PB	M							
SHE	1 PB	M							
LE3	0.1 PB	L							

OU to SDC  
MATRIX  
(TBC)

\* The facility estimation is not 100% exact as some SDCs reported the current status and some other the expected future facilities after funding.

### COMPUTING

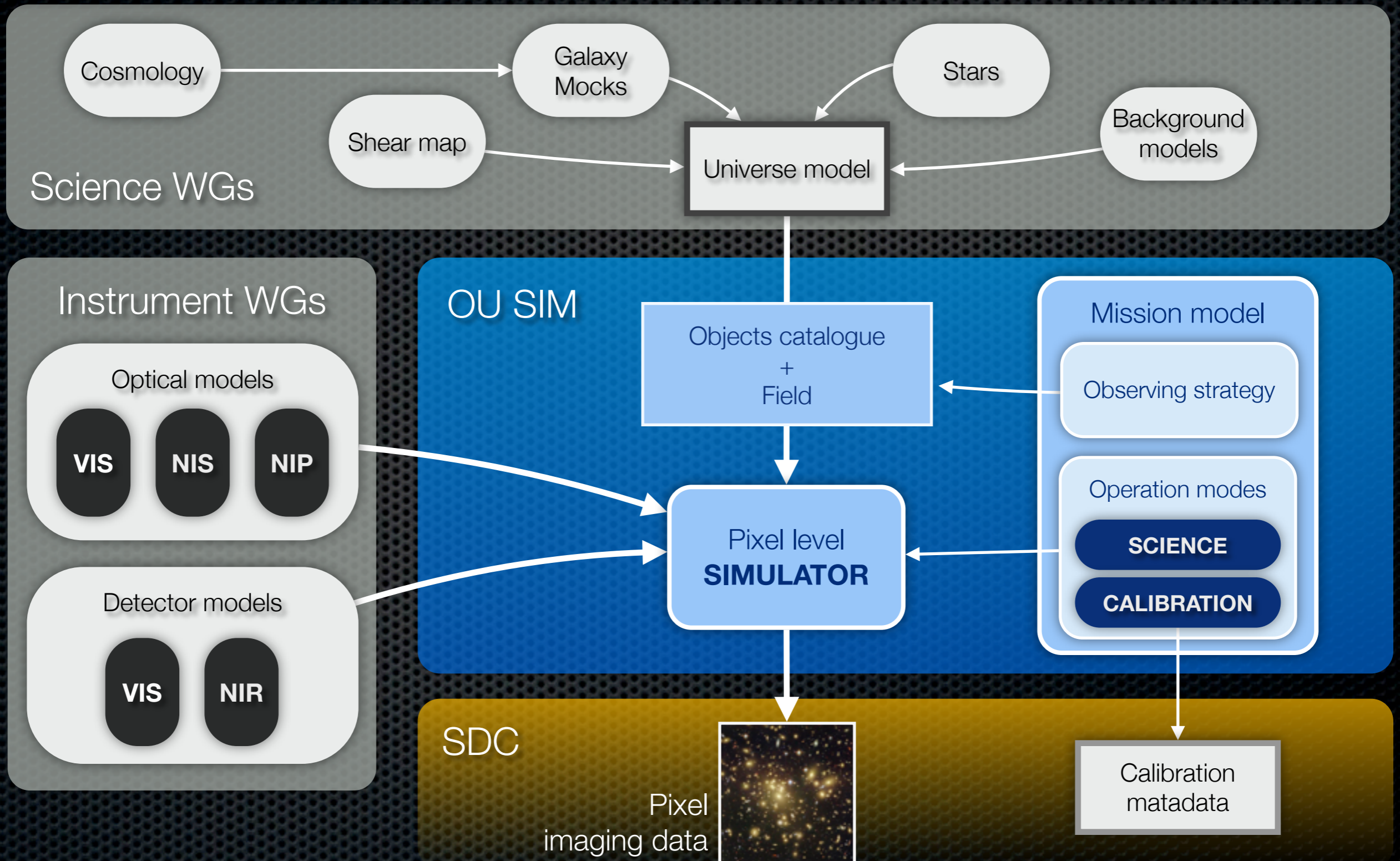
S: Small (<800 core)  
M: Medium (800-3000 core)  
L: Large (3000-13000 core)  
XL: Very Large (>13000 core)

### STORAGE

S: Small (<800TB)  
M: Medium (800TB-3PB)  
L: Large (3PB-13PB)  
XL: Very Large (>13PB)

# EUCLID

## OU SIM - Algorithm model



### Official Data Releases

- > Increasing complexity and area with time
- > Include all instrument products

### On demand minor simulations

To carry out specific tests on instrumentation, algorithm validation, pipeline development, ...

development ...

development ...

development ...



**Actual status:**

- 3500 processing cores
  - 3 PB of disk storage
  - 4 PB of tape storage
  - 10 Gb/s internet access
  - 10 Gb/s switched wire-speed optical fibre LAN
- 
- Tier-1 for CERN's Large Hadron Collider
  - Main data centre for the MAGIC Cerenkov Gamma-Ray Telescopes
  - Main data centre for PAU and MICE
  - Medical imaging

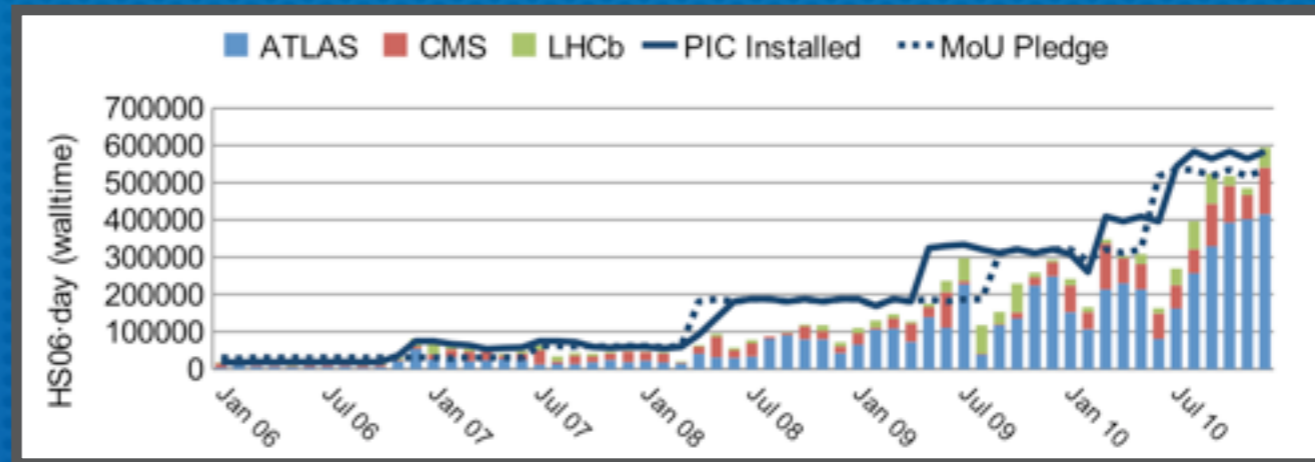




PIC  
port d'informació  
científica

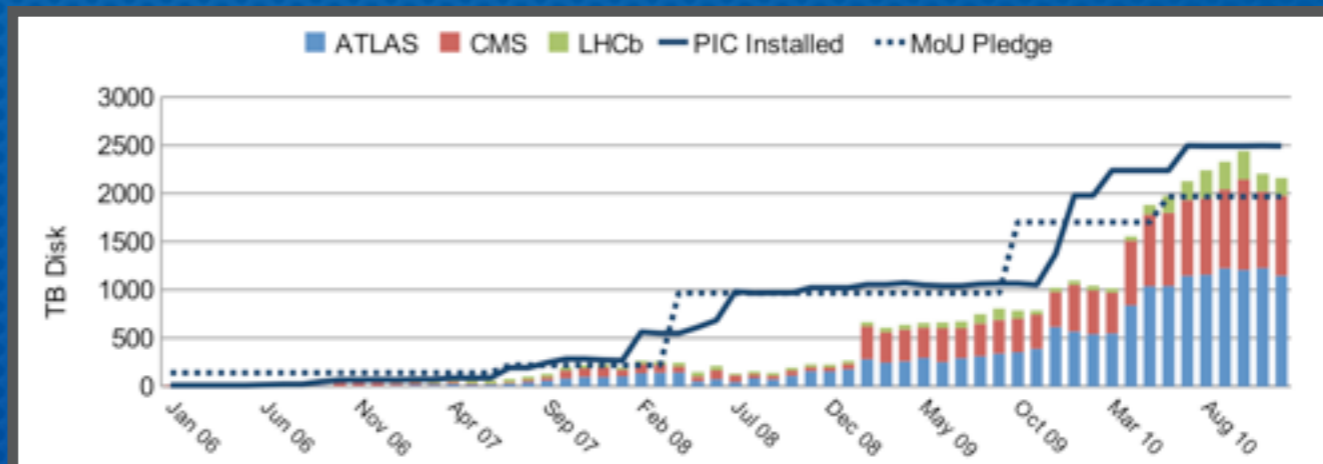
by March 2011:  
approx. 3000 cores

## Computing



## Storage

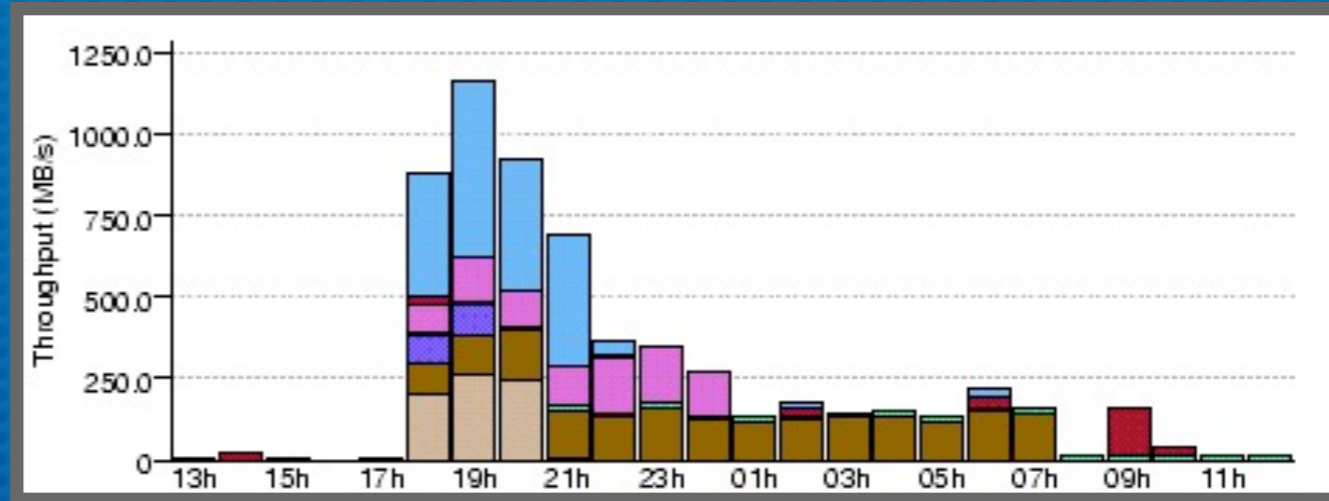
by March 2011:  
> 3500TB disk  
> 3500TB tape





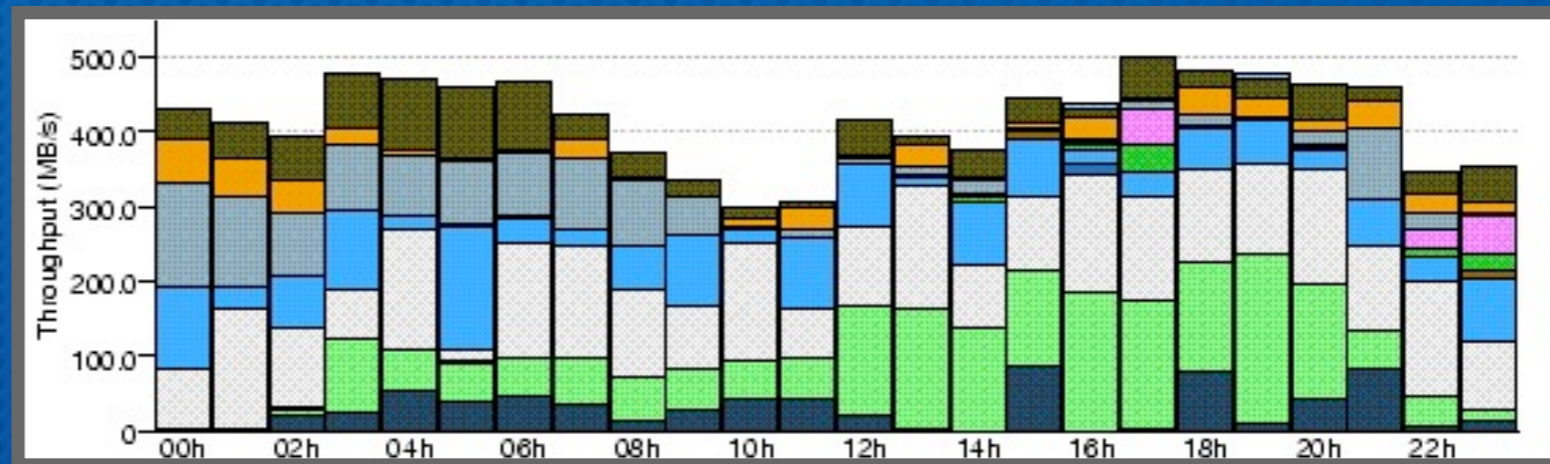
## Transfer Peak

1000 MB/s peak



## Transfer Sustainability

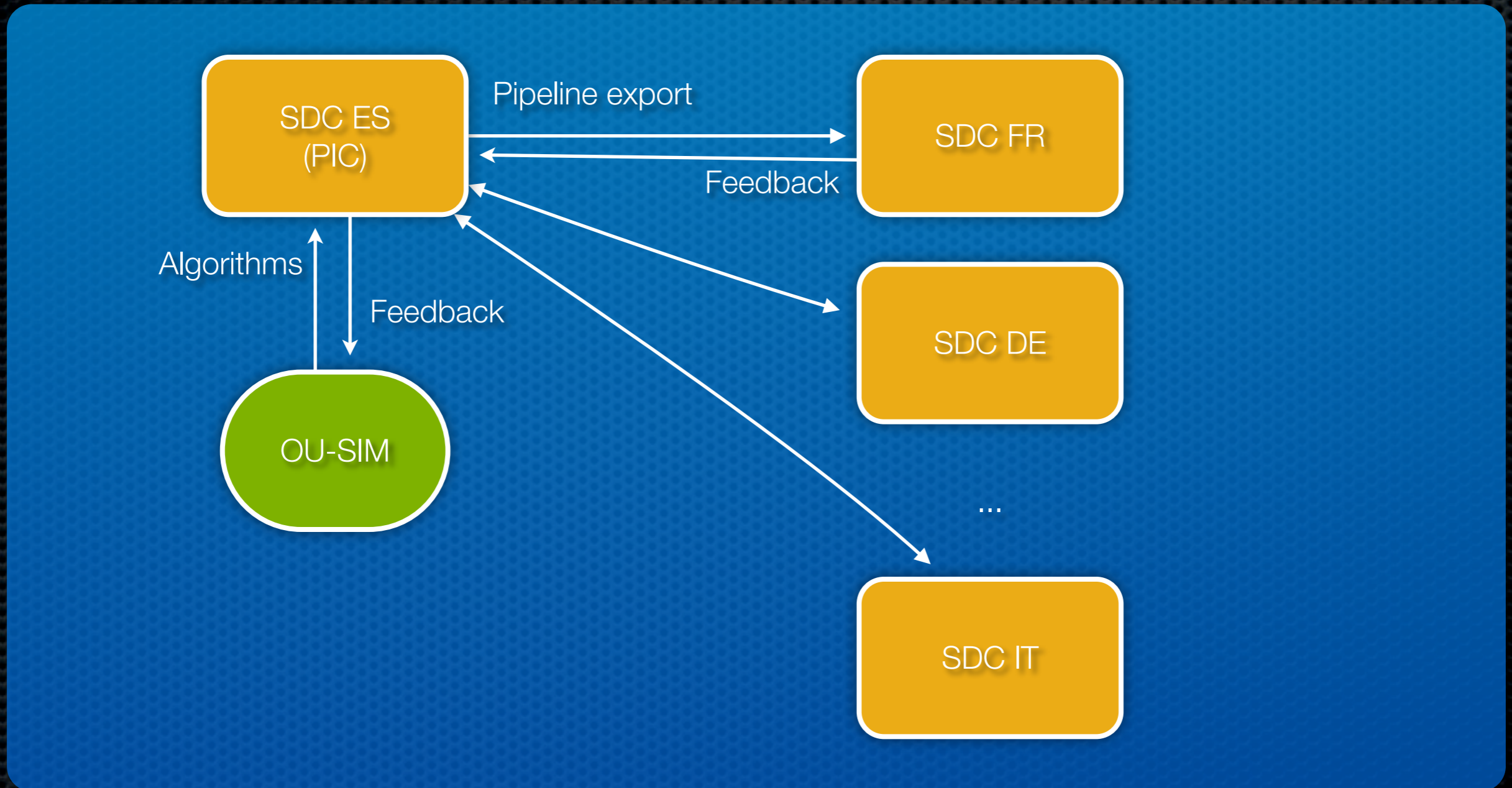
24h sustained  
500MB/s transfers



# EUCLID

SDC-ES and OU-SIM

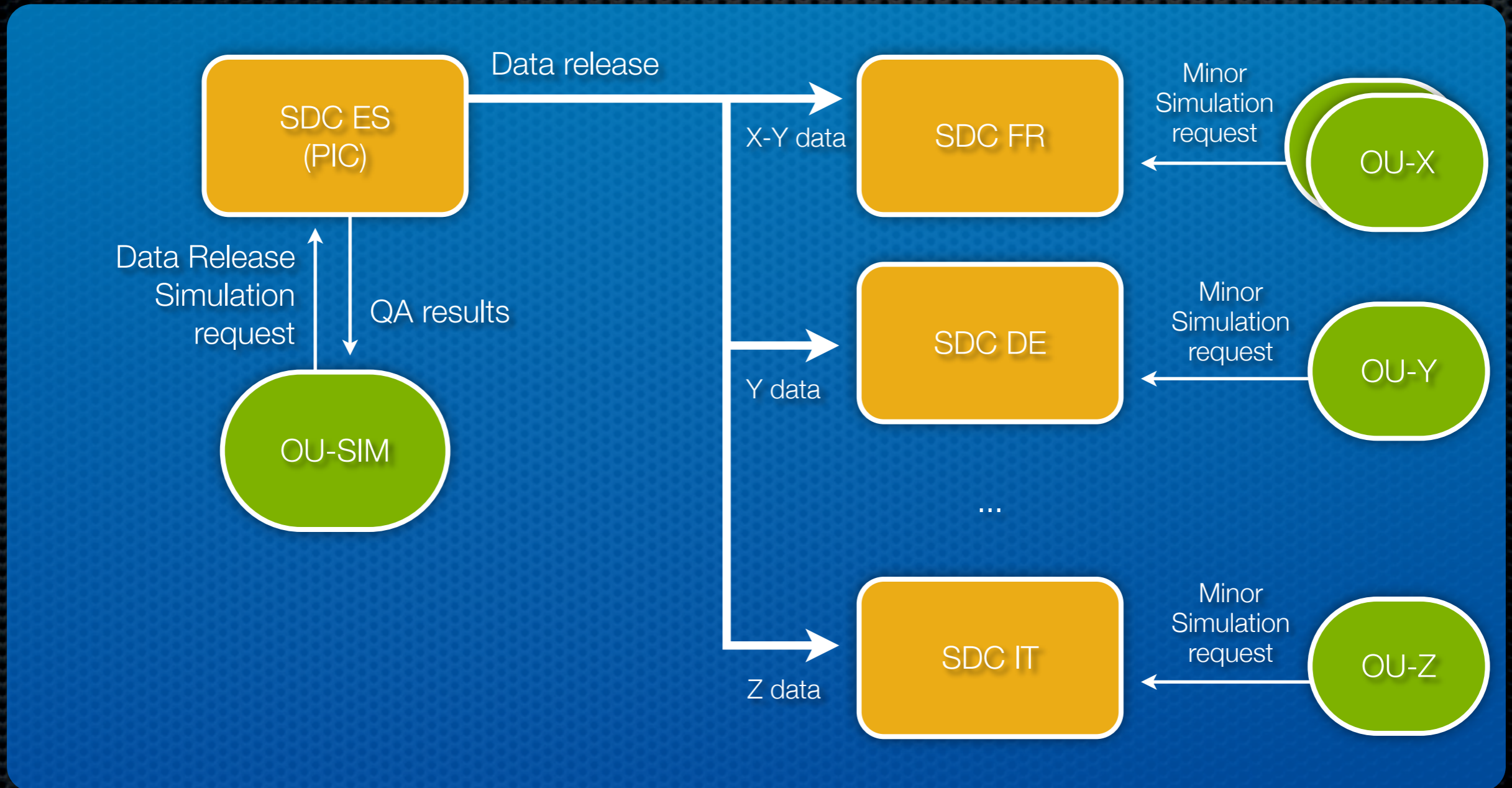
## Implementation Phase



# EUCLID

## SDC-ES and OU-SIM

### Execution Phase



# Conclusions

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- OU SIM will provide EUCLID simulated data to the SGS, being a challenge due to the large amounts of data and its complexity.
- OU SIM is critical as the rest of OUs require its output. Now is at the definition phase.
- SDC Spain seems to be the proper place to carry out the main implementation and execution of OU SIM due to facilities, experience and proximity.