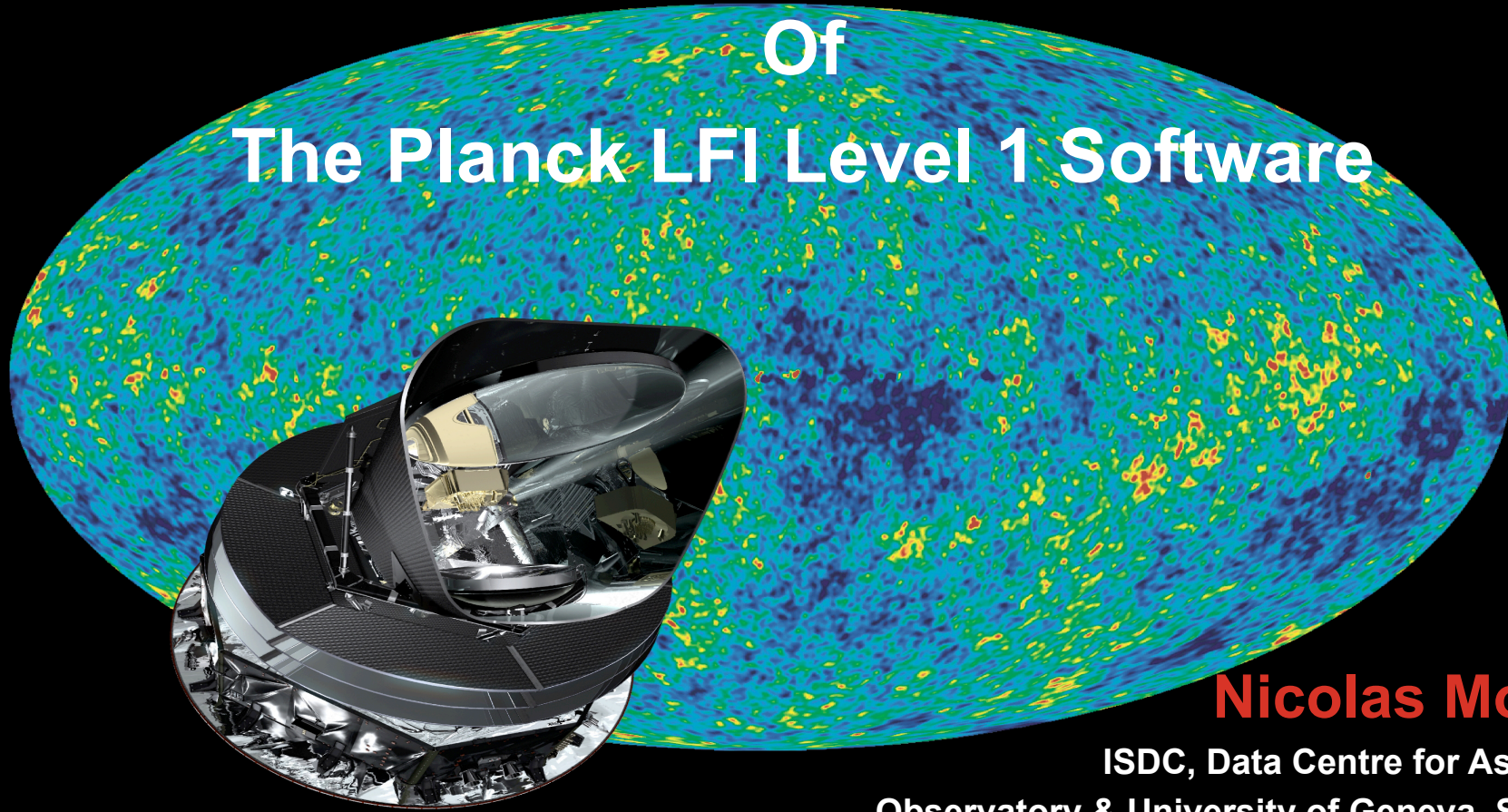


Critical Design Decisions Of The Planck LFI Level 1 Software



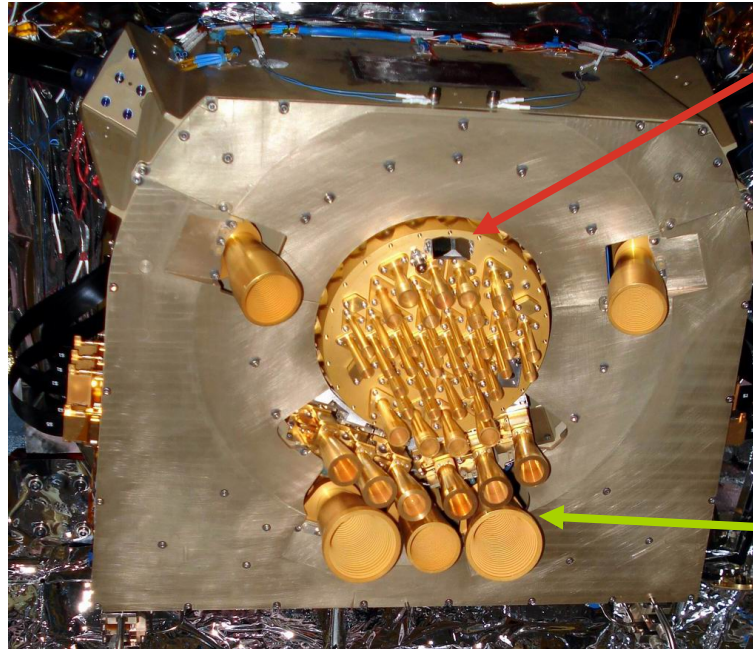
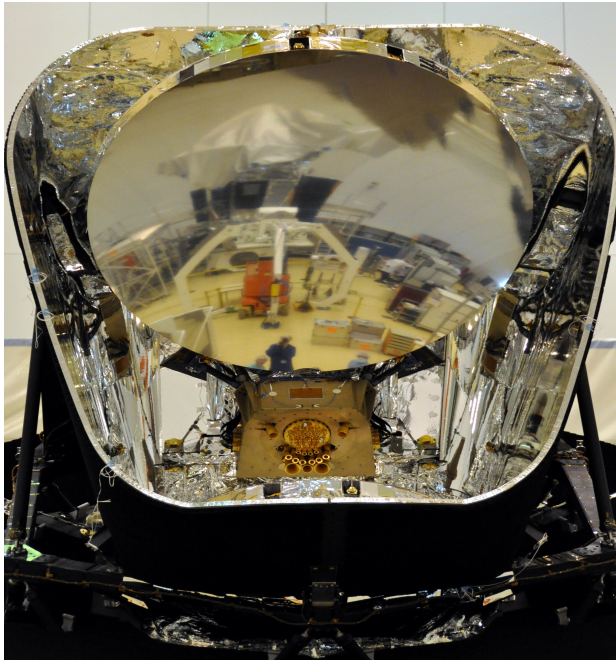
Nicolas Morisset

ISDC, Data Centre for Astrophysics
Observatory & University of Geneva, Switzerland

<http://www.isdc.unige.ch/>



- ✓ First European CMB satellite
- ✓ Height: 4m
- ✓ 1.5m primary mirror
- ✓ 1.9t
- ✓ 2 cooled instruments LFI & HFI
- ✓ 2 consortia: 41 institutes
- ✓ 2 DPCs: Paris & Trieste

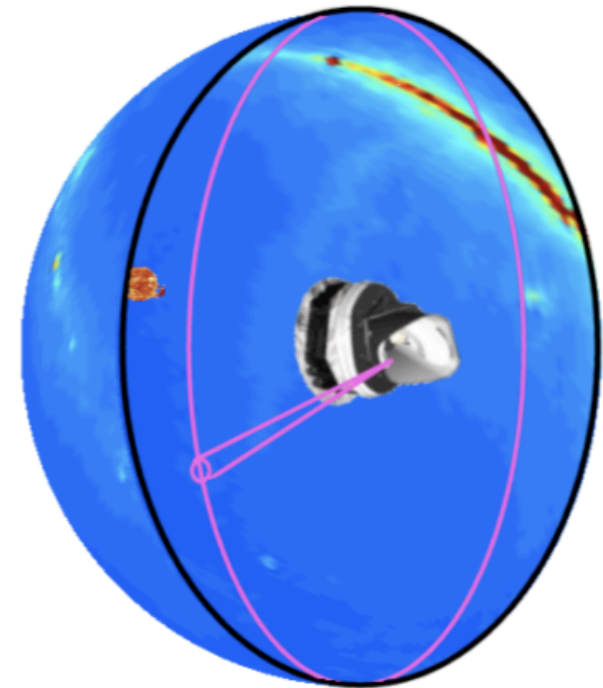
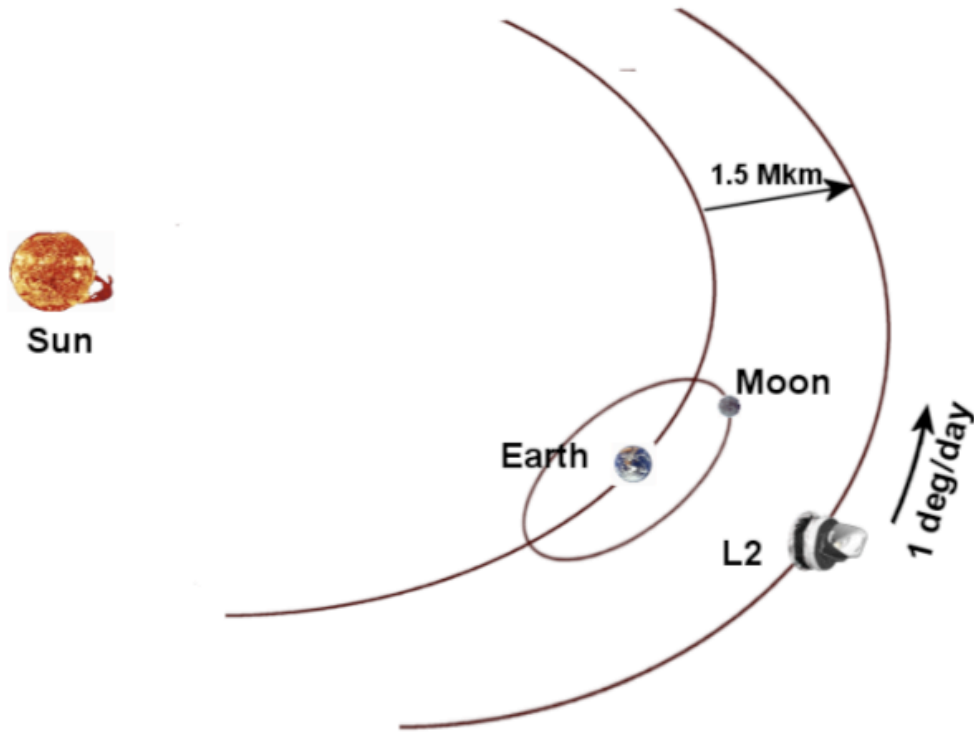


HFI

- ✓ 100-900GHz
- ✓ 36 feedhorns
- ✓ cooled at 0.1K

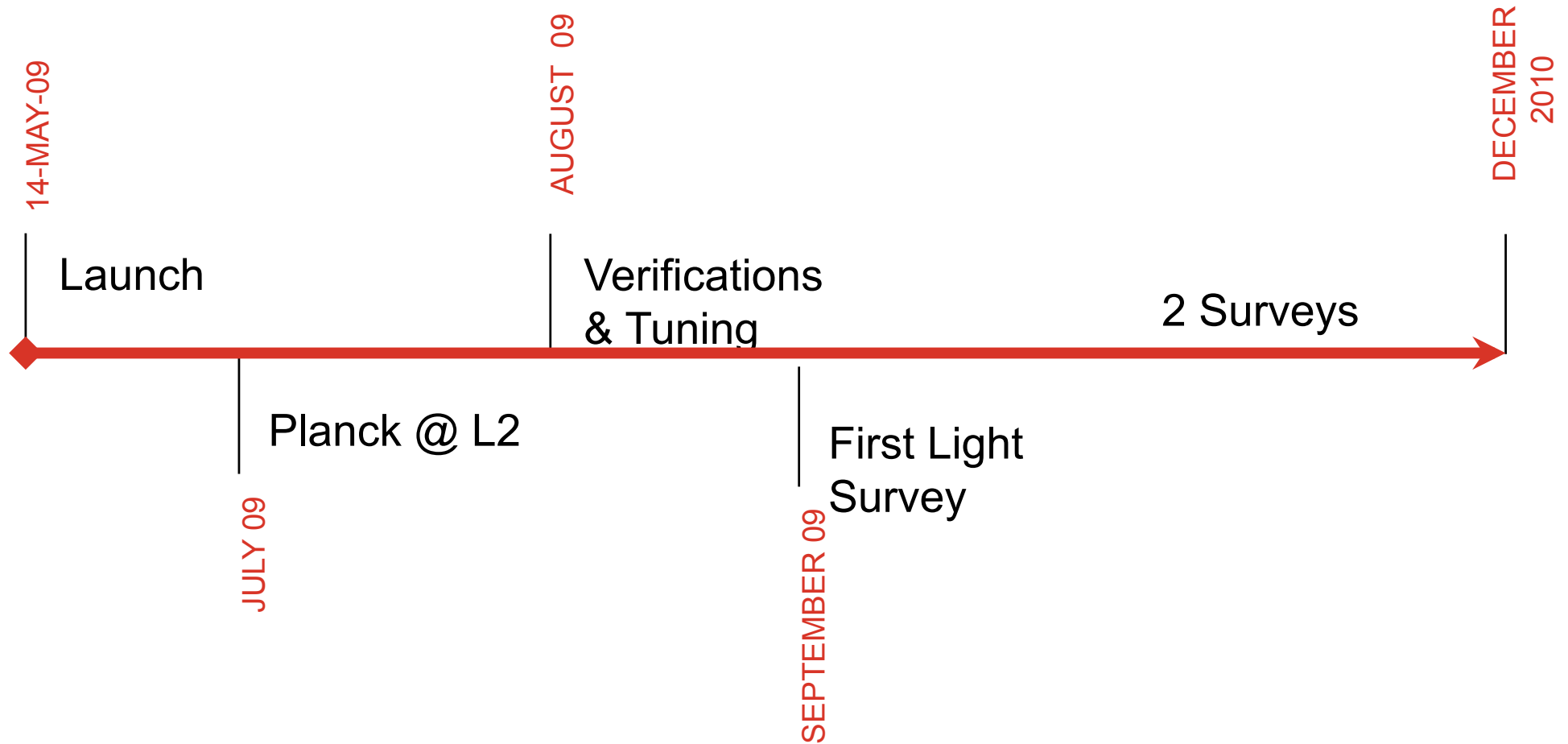
LFI

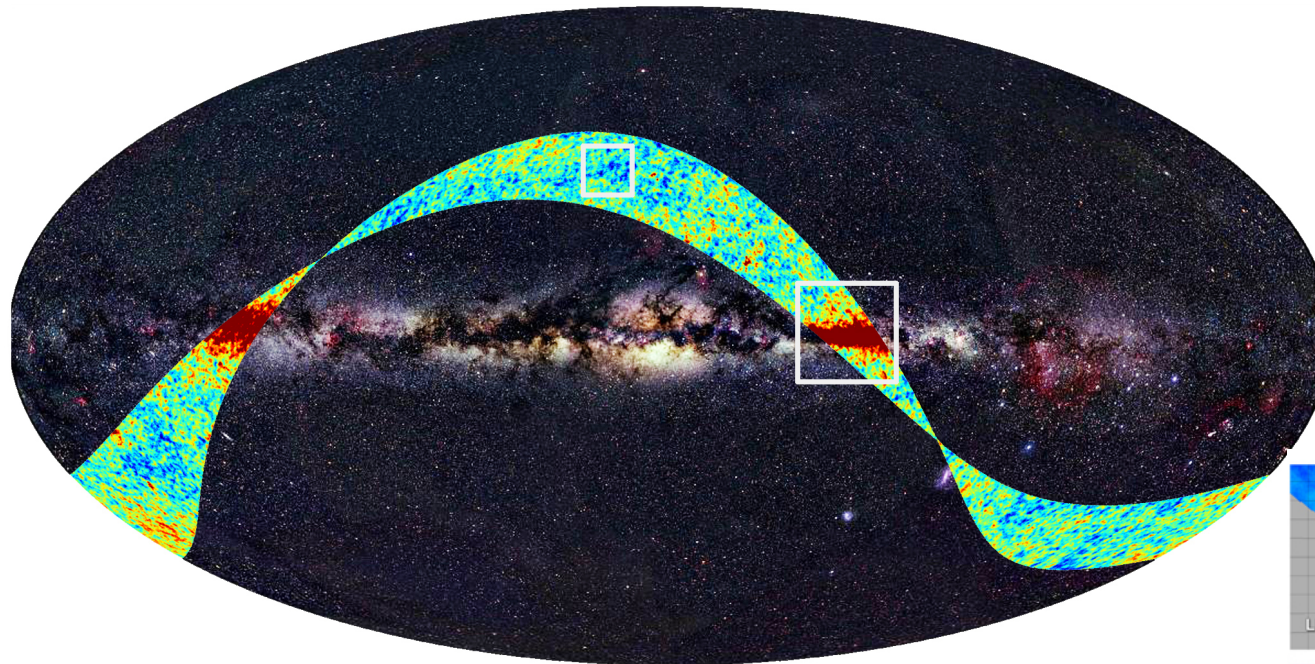
- ✓ 30-44-70GHz
- ✓ 11 feedhorns
- ✓ cooled at 20K



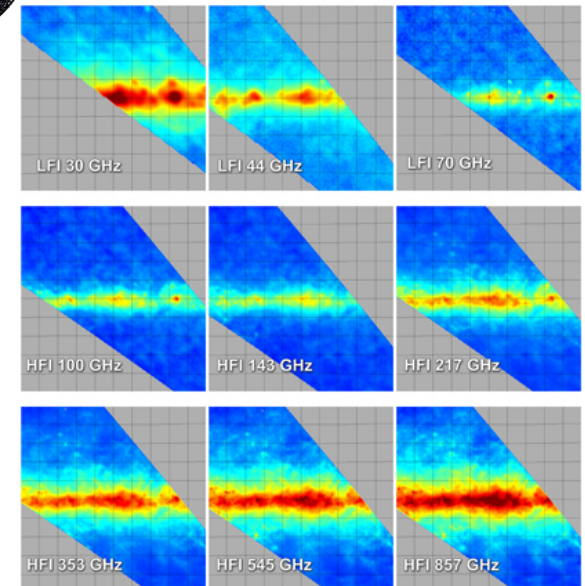


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Map of the emission imaged by Planck in different frequencies



Credits: ESA, LFI & HFI Consortia. Background optical image: Axel Mellinger

Sky mapped by Planck during the First Light Survey.

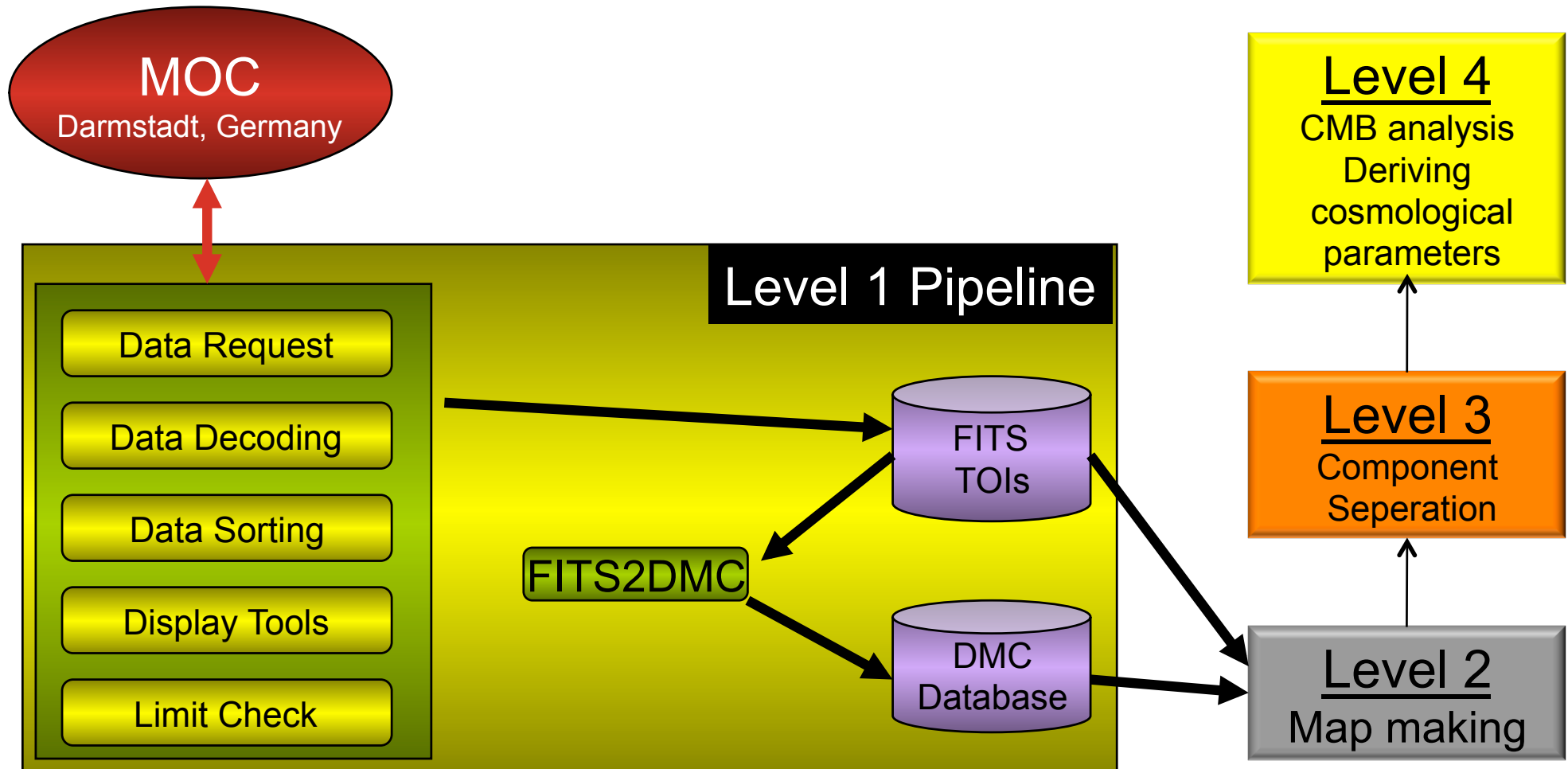


- ✓ ISDC, **Data Centre for several astrophysics missions** in Geneva, Switzerland.
- ✓ First mission : The ESA INTEGRAL gamma-ray satellite

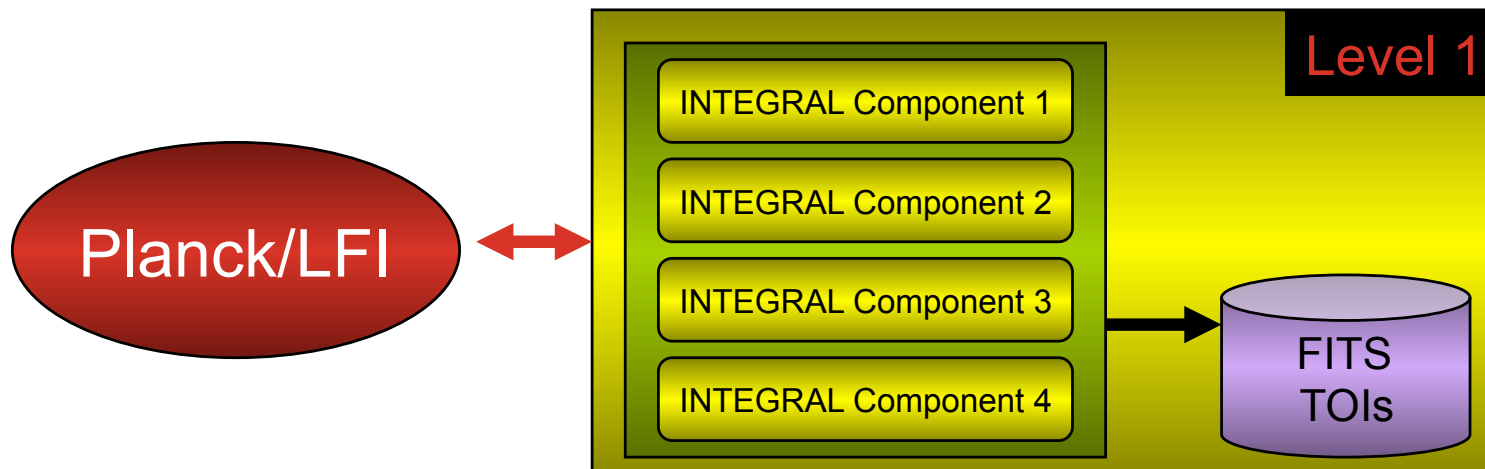


- ✓ **PLANCK LFI DPC** (Data Processing Centre, INAF-OATs) in Trieste , Italy.





Reusing INTEGRAL Software?

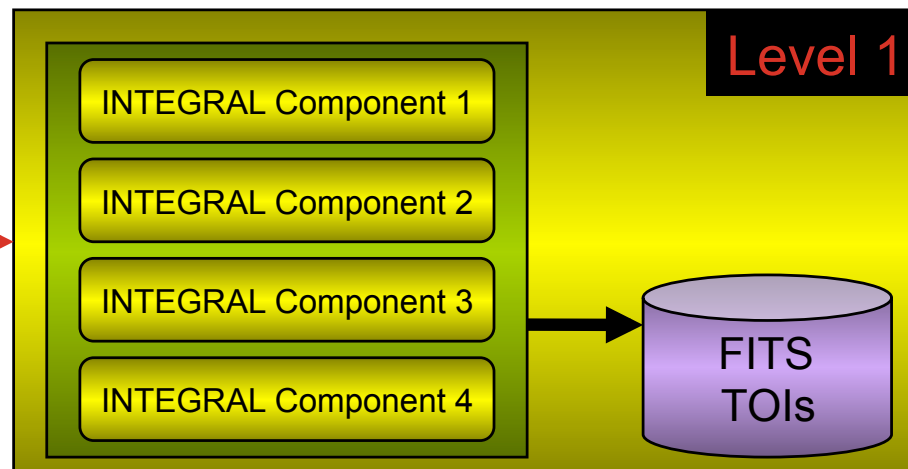


Decision drivers

1. Deliver quickly the software for test phases
2. Level 1 is part of the Mission Critical items
3. Test phases & Operations are done by the same team

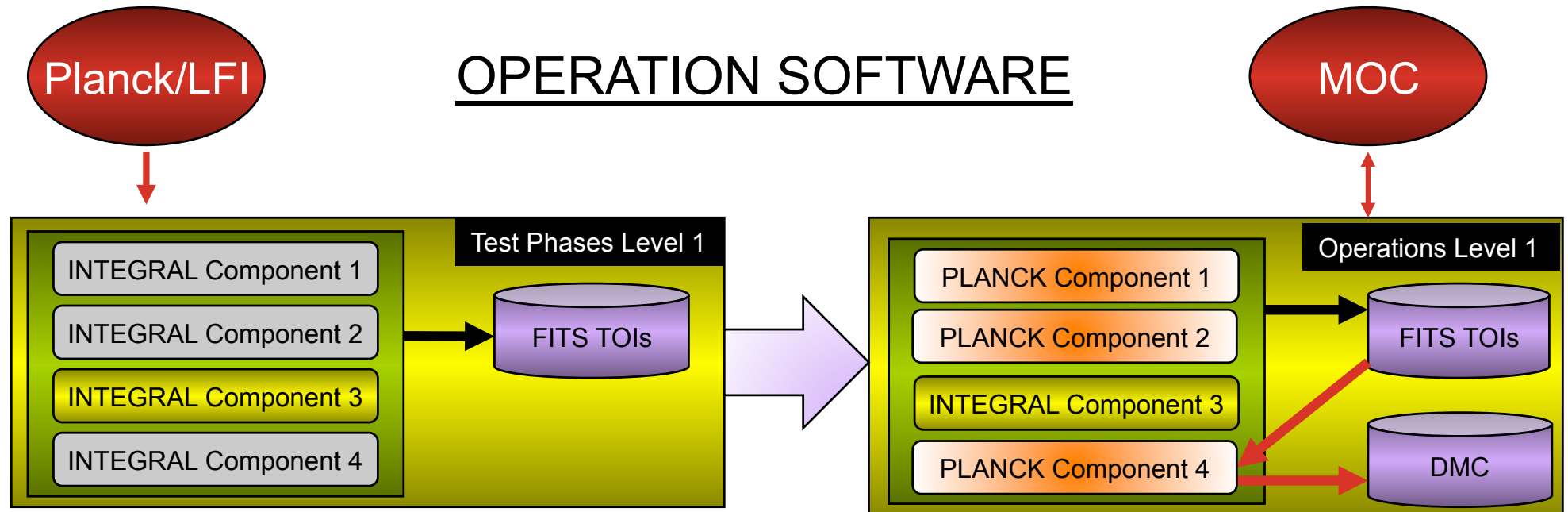
Planck/LFI

Evolution to the OPERATIONAL Software



Why to evolve?



1. Features specific to INTEGRAL
2. Input/output interfaces changed for the OPERATIONS
3. Less maintenance





Advantages

1. Components dedicated for PLANCK/LFI data processing
2. Less complex => Less maintenance

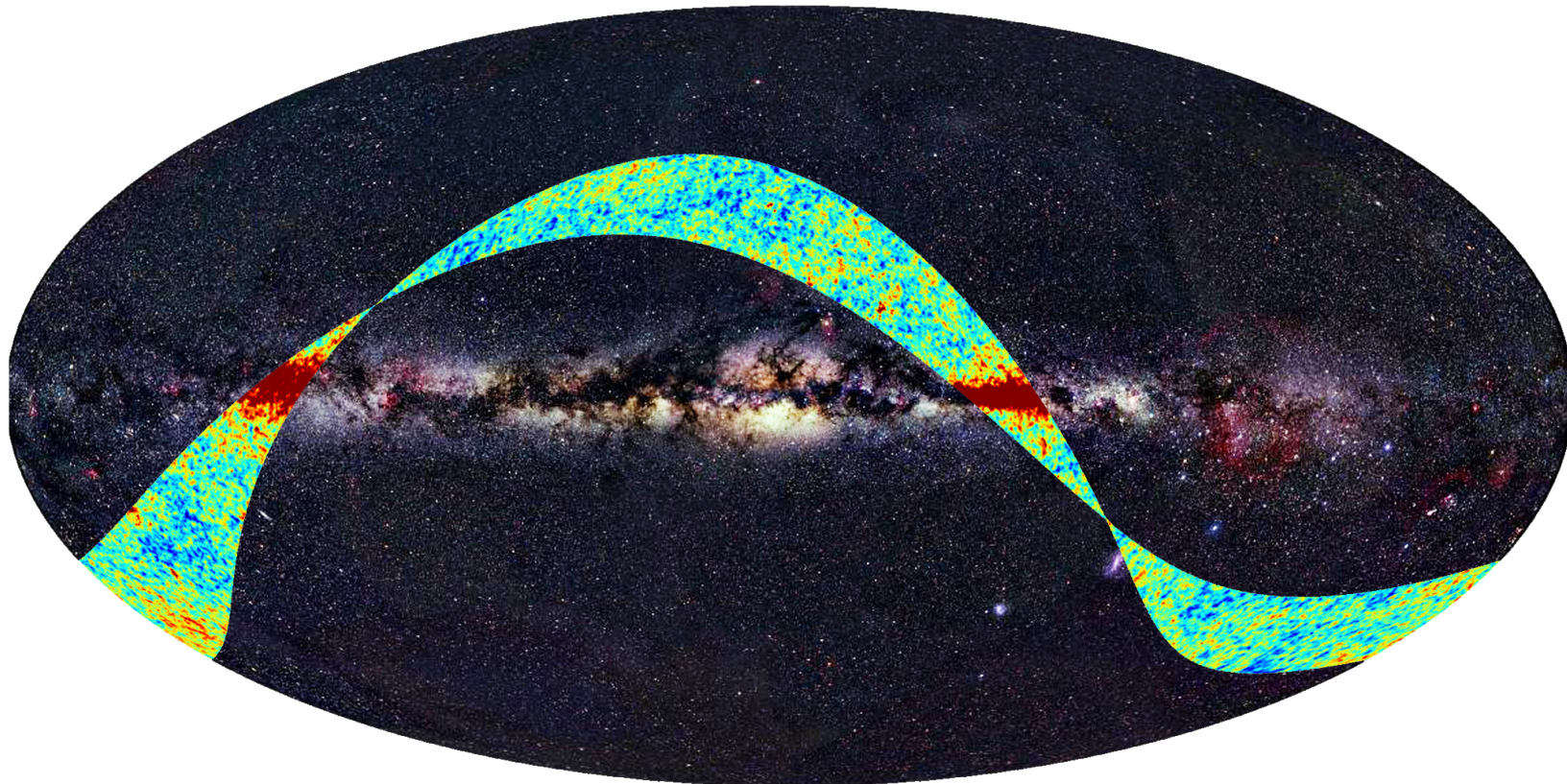
WHICH DATA FORMAT?

		
FITS	<ul style="list-style-type: none"> ▪ Standard ▪ Libraries already existing for I/O 	
DMC database (Data Management Component)	<ul style="list-style-type: none"> ▪ Used in every Planck/LFI processing levels 	<ul style="list-style-type: none"> ▪ New Product by MPA Munich ▪ Late for level 1 at that time (2003) ▪ Installation & Maintenance time consuming at that time
FITS & DMC	<ul style="list-style-type: none"> ▪ Full control of the Level 1 Software ▪ Ingest data into DMC after producing the TOIs (FITS files) ▪ Less risk at critical processing 	<ul style="list-style-type: none"> ▪ Disk Space ▪ CPU Time

WHICH PIPELINE SYSTEM?

		
ProC (PROcess Coordinator)	<ul style="list-style-type: none"> ▪ Used by the other Planck/LFI processing levels 	<ul style="list-style-type: none"> ▪ New Product by MPA Munich ▪ Late for level 1 at that time (2003)
PERL Scripts	<ul style="list-style-type: none"> ▪ Simple ▪ Maintenance 	<ul style="list-style-type: none"> ▪ Not a GUI

- ✓ Helpful to be part of the Test phases & Operations
- ✓ Accept to throw away software
- ✓ Make it simple → ease maintenance
- ✓ The Level 1 software is running smoothly since
launch



Credits: ESA, LFI & HFI Consortia. Background optical image: Axel Mellinger