Gaia current mission status

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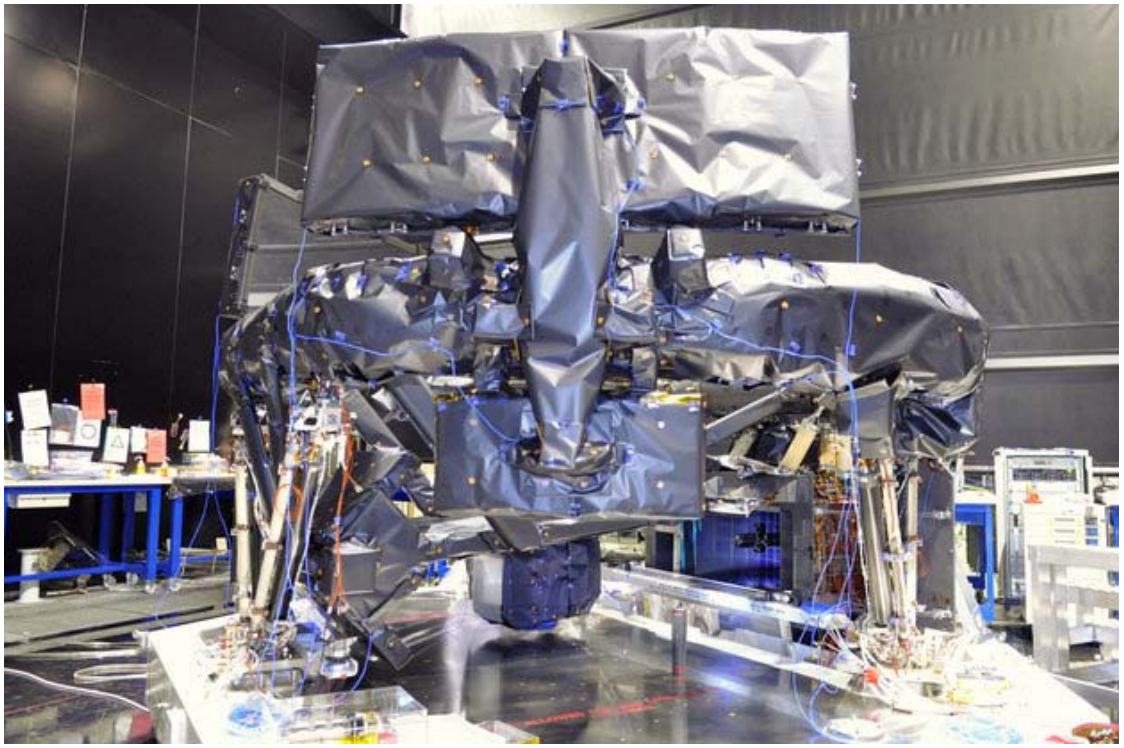
Current status

- **Technical development**
  - **Payload, service module, sunshield**
  - **On-ground segment**
  - **Launch**
  - **Data releases**
- **Data processing (A. Vallenari)**
  - **CU9 (X. Luri)**
- **Scientific exploitation (F. Figueras)**
  - **Gaia-ESO survey (I. Negueruela)**

The payload

Delivery and integration of the remaining systems:

- Phased Array Antenna
- Micro propulsion thrusters
- Basic Angle Monitor
- Radial Velocity Spectrometer (filter substituted in Oct-2012)
- Focal Plane Assembly



Telescopes alignment

The telescopes alignment and co-alignment was successfully accomplished with a performance prediction fully compliant . The process lasted 7 months instead 4 months scheduled

1- Telescopes focal length
   Requirement: f=35000 mm ±1%
   Measured: 35000≤f≤35013 ±23 mm
2- df Astro1/Astro2
   Requirement: df ≤ $8 \cdot 10^{-5}$
   Measured: df=$2.93 \cdot 10^{-5} \pm 1.56 \cdot 10^{-5}$
3- WFE FoV1 -- ASTRO: 48 nm rms RVS: 63 nm rms
   FoV2 -- ASTRO: 50 nm rms RVS: 67 nm rms

The optical tests during TV generally confirmed the telescopes performances and predictions in orbit

Some anomalies during the TV test are most probably due to the test environment

TB/TV tests (FPA, VPU, Optics)

7-Nov to 17-Dec (40 days)

The service module

- All its elements have been integrated
- All environmental tests completed
- Final system level tests with MOC are ongoing

A test of the separation mechanism that will free Gaia from its launcher's upper stage being conducted at Astrium Toulouse.

Solar sunshield

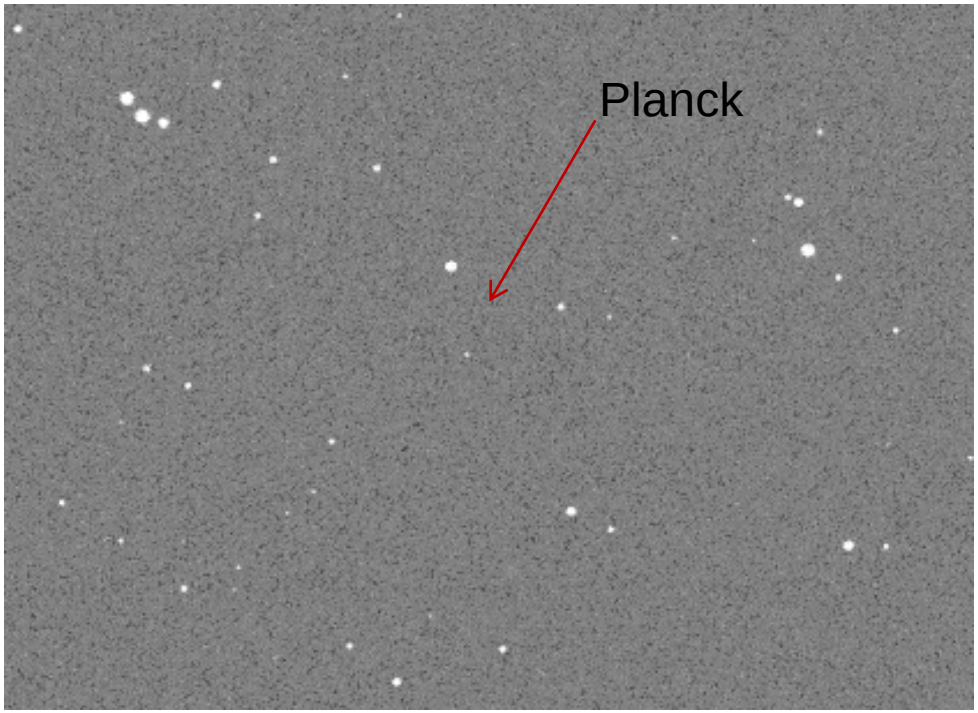
- All panels stored and ready for delivery in Kourou
- They will be assembled to the PLM/SVM in Kourou

Ground segment (1/2)

- The system validation test campaign on the Avionics Model was completed totalizing 21 days of operations with MOC, SOC and, to a limited extend, DPAC
- The system validation test campaign on the Flight Model spacecraft has started: 12 days in two slots (January and June 2013)
- OR#2 took place in December
- The completeness of schedule critical software at launch will be less than expected, but not endangering the commissioning (yet)

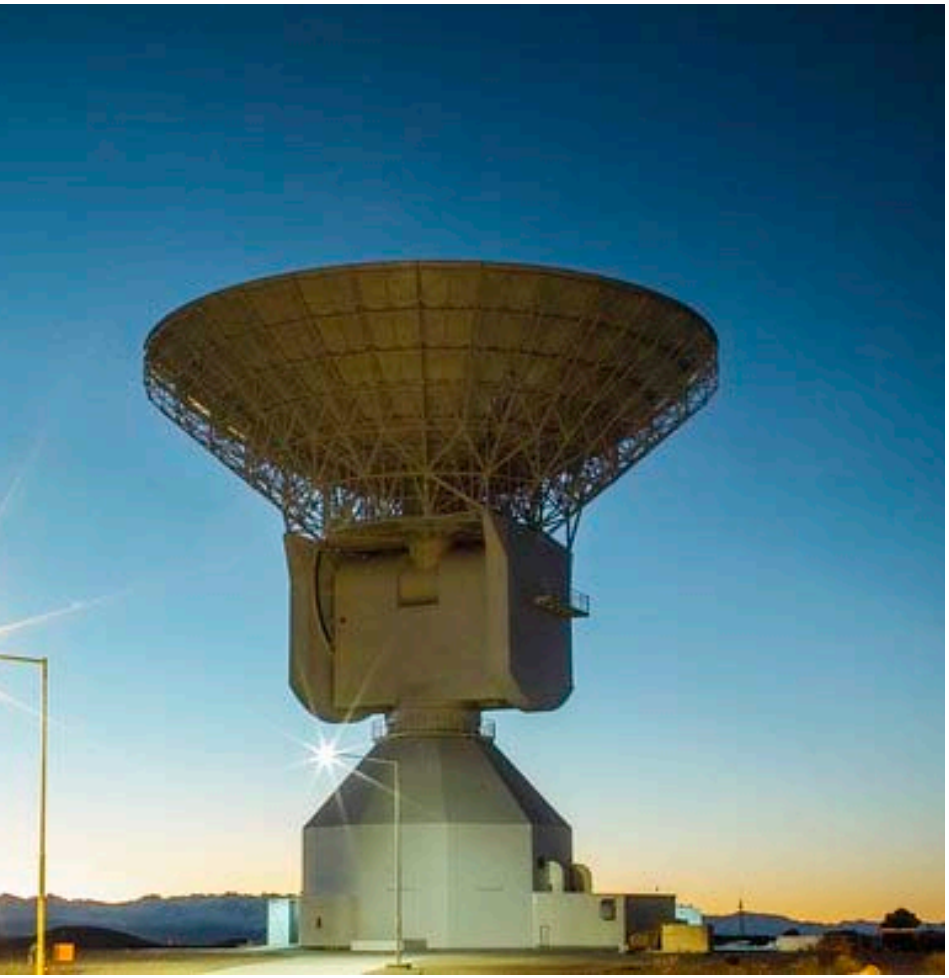
Ground segment (2/2)

- During OR#2 observations of Planck spacecraft at L2 were conducted from Liverpool Telescope at La Palma



The 4-metre Planck spacecraft on 5th December 2012, when it was 1.5 million km from Earth (© 2012 LT project).

Ground stations



- ESA third Deep Space Station at Malarguë, Argentina has been formally inaugurated in Dec-2012 and is available for Gaia

- New Norcia, Cebreros

More frequent contacts with Earth, which decreases the loss of data (avoiding full memory on board)

Phase Array Antenna is very efficient and the rate of telemetry could be increased

Next steps

- The assembling of the Payload module and the Service Module in January
- Combined test campaign planned by end of January
- Spacecraft mechanical acceptance (sinus vibration and acoustic tests) end of March
- SOC Operational Rehearsal #3 in April

Reviews ahead

- The GSRR (Ground Segment Readiness Review) kick off is planned on 20/3/2013 and the board on 28/5/2013
- The FMAR (Final Mission Analysis Review) kick off is planned on 30/1/2013 and the board on 30/5/2013
- The FAR/MFAR (Flight Acceptance Reviews) kick off is planned on 4/6/2013 and the board on 22/7/2013

Launcher: Soyuz–Fregat from Kourou

The Soyuz vehicle SZ012 (Soyuz 2.1.b three stages) and the Fregat MT upper stage 133-01 have been already assigned to Gaia

The official project launch date is 21/10/2013

Possible slots:
29/9/2013–9/10/2013
20/10/2013-7/11/2013
17/11/2013-5/12/2013
17/12/2013-5/1/2014
16/1/2014-3/2/2014

Target date: 29/9/2013

(review after the mating of PLM/SVM)

Data release scenario (1/2)

First release: launch + 22 months Oct-2013 → Aug-2015	• Positions (α,δ) and G-mag for single-like stars (90% of the sky) • the Hundred Thousand Proper Motions (HTPM) catalogue based on the Hipparcos stars • Ecliptic Pole data with adequately characterized calibration
Second release: launch + 28 Months Feb-2016	• **Positions (α,δ), proper motions, and parallaxes** and G-mag for single stars (90% of the sky) •Integrated photometry RP/BP (some astrophysical parameters, if available) • **Mean radial velocities for stars** with non-variable radial velocity (90% of the sky)
Third release: launch + 40 Months Feb-2017	• Updates of above + • Orbital solution for period between 2 months and 75% of the observation duration • Spectrophotometry from RP/BP for sources for which astrophysical parameters are simultaneously released • **Source classification based on BP/RP and astrometry** for stars with sufficiently high quality data • Mean RVS spectra for sources where single epoch spectra are usable and APs are simultaneously released

Data release scenario (2/2)

Fourth release: launch + 65 Months Mar-2019	Updates of all above + • **Variable star classifications and parameters** as available, and the epoch photometry • **Solar system results** with preliminary orbital solutions and individual epoch observations • Non-single star catalogue
Final release: End Mission + 3 years (36 months) **Mar-2019/2020** **Mar-2022/2023**	Full astrometric, photometric, radial velocity catalogue • All available variables and non-single stars solutions • Source classifications (probabilities) plus multiple astrophysical parameters derived from BP/RP, RVS and astrometry for stars, unresolved binaries, galaxies and quasars. Precision improved with respect to 4th release. Some parameters may not be available for fainter stars. • Non Single Stars solutions and exoplanet list • All epoch and transit data for all sources • All Ground Based Observations made for data processing purposes (or links to it)

Mission duration: fuel is foreseen for 0.5 yr of cruise and commissioning, 5 yrs of nominal mission + 1 yr of mission extension + 22 months of margin for emergences

Summary of status

The progress is overall good:

All elements integrated
All major milestones achieved
Expected performances confirmed after alignment of telescopes

Major milestones ahead:

The assembling of the Payload module and the Service Module in January
Flight Acceptance Review in June-July

The schedule is now stable:

Official date is 21-Oct-2013
There are 3 weeks of margin that allow a target launch date for 29-Sep-2013