

# Gaia spacecraft status

**Jos de Bruijne**



# Spacecraft status and schedule

- All Sub-system Preliminary Design Reviews (PDRs) are closed
- Sub-system Critical Design Reviews (CDRs) are progressing
  - Closed: CCD, PEM, BAM OMA, M2MM, MX, BAM & WFS OSE
  - Ongoing: IM, VPU, BP/RP OMA, CDU
  - Upcoming shortly: PDHU, WFS OMA, RVS OMA
- Flight hardware is being delivered!
- Payload Module CDR in spring 2010
- Spacecraft CDR in summer 2010
- Launch currently planned in spring 2012 (Soyuz from CSG)

# CCDs & Proximity Electronics Modules

AS Gaia  
Besançon, 29 June 2009

- CCD production close to finalisation

CCD type	Flight model (delivered / required)	Flight spare (delivered / required)
SM/AF/BAM/WFS	80 / 80	14 / 14
BP	7 / 7	2 / 3
RP/RVS	3 / 19	0 / 7

- RP CCD yield lower than expected
- PEM-CCD coupling testing ongoing
- Excellent PEM noise + linearity performance
- Offset instability under investigation (also partially caused by CCD)
- On-ground calibration needed, notably for RVS



# Focal-Plane Assembly (FPA)

- FPA bread-board testing finished
- CCD and PEM support structures under fabrication
- FPA Engineering Model (EM) later this year, with two CCD rows

# Mirrors

- All mirrors are in various phases (CVD coating, grinding, polishing, lapping, ion-beam figuring, optical coating)
- Small mirrors done first (risk mitigation)
- M1's delivered in spring 2010

# Torus

- All 17 torus segments have been manufactured and proof-tested
- Torus assembly is finished
- Torus brazing took place this weekend ( $T \sim 1500 \text{ }^\circ\text{C}$  for few hours  $\rightarrow$  1 MWatt)
- Mass  $\sim$  215 kg

# Radiation tests (campaign #3)

- Bench characterisation, AF regular-mask, AF sky-like-mask, RVS, and serial-register testing done (data available through the RCWG)
- BP/RP testing ongoing
- End of campaign #3 in summer 2009
- Campaign #4 under discussion
  
- Regular charge injection, phase-shifted from CCD strip to strip, is possible, including link to VOs

# VPU algorithms (VPAs)

- VPU prototype software delivered to DPAC, under non-disclosure agreement
- (De-)compression software delivered last week
- Contact points: Shan Mignot or Juan-Manuel Fleitas
- Integration with GIBIS ongoing within CU2
  
- ASD7 added to allow on-ground reconstruction of FPA serial-register sequencing
- RVS window-overlap scheme revised to improve science



# Basic angle

- Basic-angle stability was non-compliant at spacecraft PDR
- Design improvements and model refinement now gives  $<10 \mu\text{as}$  for systematic and random components (requirements are 7 and 4  $\mu\text{as}$ )
- Full documentation due at spacecraft CDR
- BAM is needed to meet the required 1  $\mu\text{as}$  (measures at 0.5  $\mu\text{as}$  accuracy @ 5 min)
- The difference between the BAM measurement and the LoS variations in any point of the FoV is below 0.1  $\mu\text{as}$

# BP/RP

- RP filter OK
- BP filter OK, except for slightly lower UV throughput (bulk transmission)
- Overlap between BP/RP spectra OK

# RVS

- RVS redesign made to accommodate new grating from IOF
- Grating efficiency exceeds 70% transmission requirement
- RVS Opto-Mechanical Assembly CDR in summer 2009
- RVS window-overlap-scheme revision has been implemented
- Low CCD-PEM noise demonstration important for faint-star performance but PEM-CCD offset instability raises new concern (review team report due later this week)

# Miscellaneous news

- MOC Design Review successfully concluded in February 2009
- SOC/DPAC Design Review successfully concluded last week
- ESA Deep Space Antenna #3 site selection concluded in favour of Argentina (operational in mid-2012)
- ESA Project / DPAC  
Interface Control  
Document under “final”  
iterations
- Optimisation of  
scanning-law initial  
conditions under study  
to optimise Jupiter  
quadrupole light  
deflection experiment