INTEGRAL Mission Status

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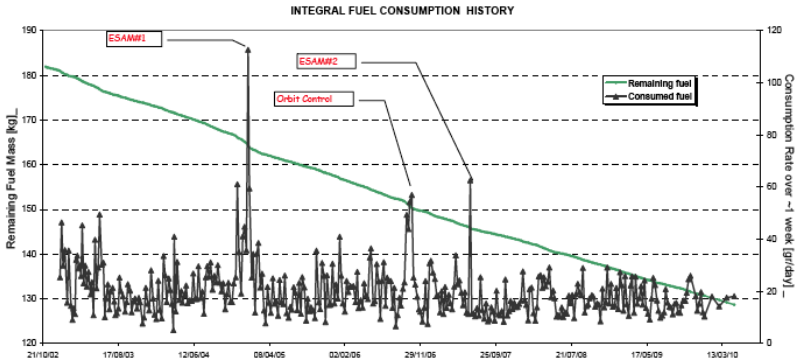
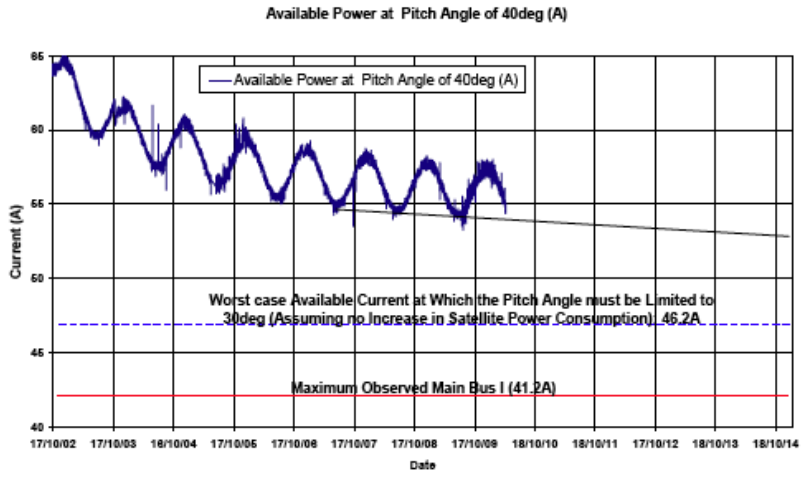
INTEGRAL User Group Meeting

ESTEC - 16 June 2010

PLATFORM STATUS

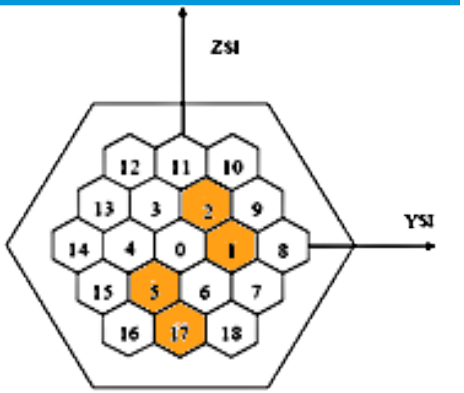
- AOCS: Nominal with all prime units in use. Avg. monthly fuel usage ~0.55 kg, remaining fuel ~128 kg.
- EPS: Nominal with all prime units in use. Available power from solar arrays is ~2100W. Performance of batteries unchanged.
- OBDH: Nominal with all prime units in use.
- TCS: Nominal with all prime units in use.
- RF: Nominal with all prime units in use.





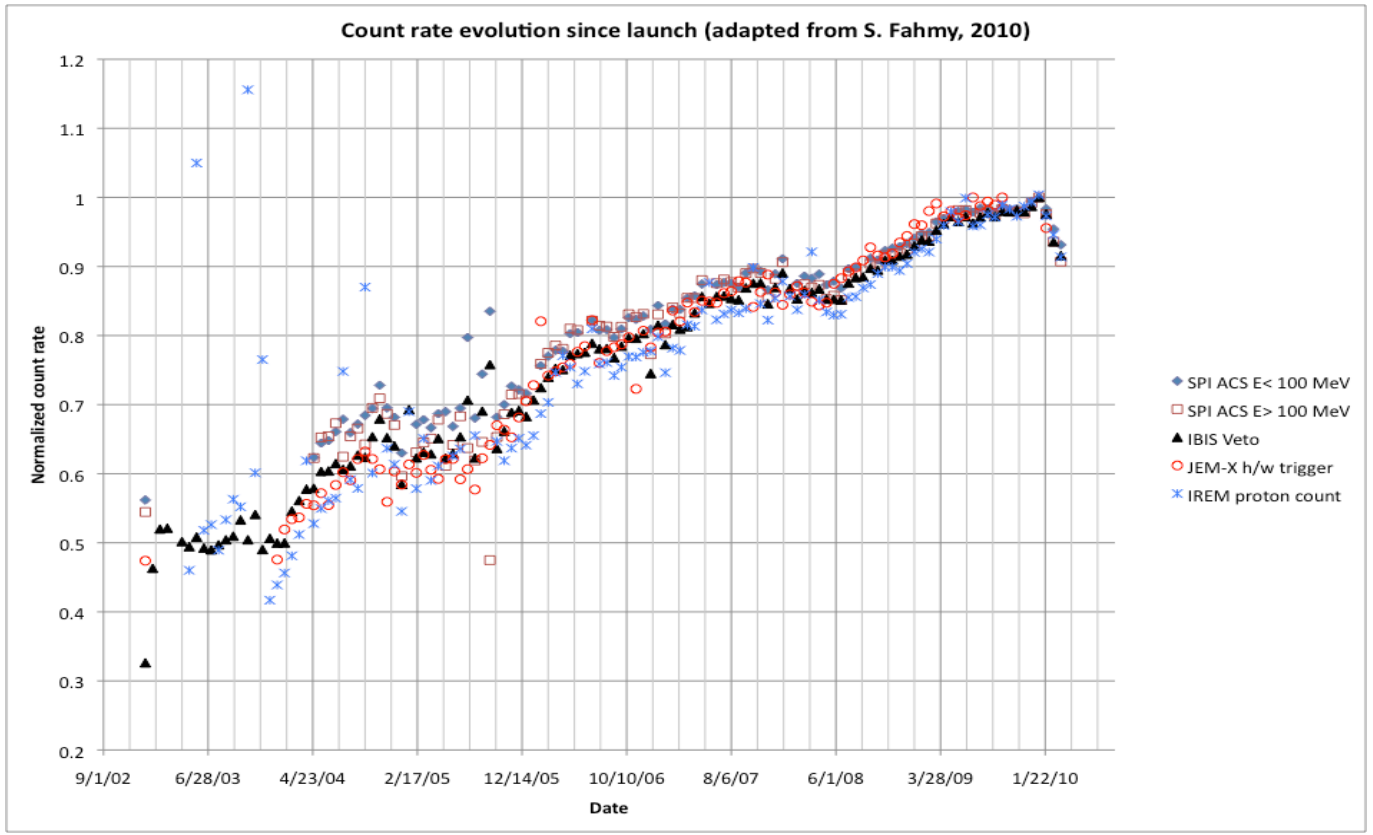
PAYLOAD STATUS

- SPI: Nominal with prime units in use, but lost GeD#1 on 27 May 2010. Tests with reduced HV are scheduled for Rev 937 (16-18 June).
  ➔ **See SPI presentation**.
  Cooling system worries have been resolved with last annealing.
- IBIS: Nominal with prime units in use.
  No unrecoverable anomalies.
- JEM-X: Nominal, no unrecoverable anomalies.
- OMC: Nominal, prime equipment in use.
  No unrecoverable anomalies.
- IREM: Nominal, prime equipment in use.
  No unrecoverable anomalies.



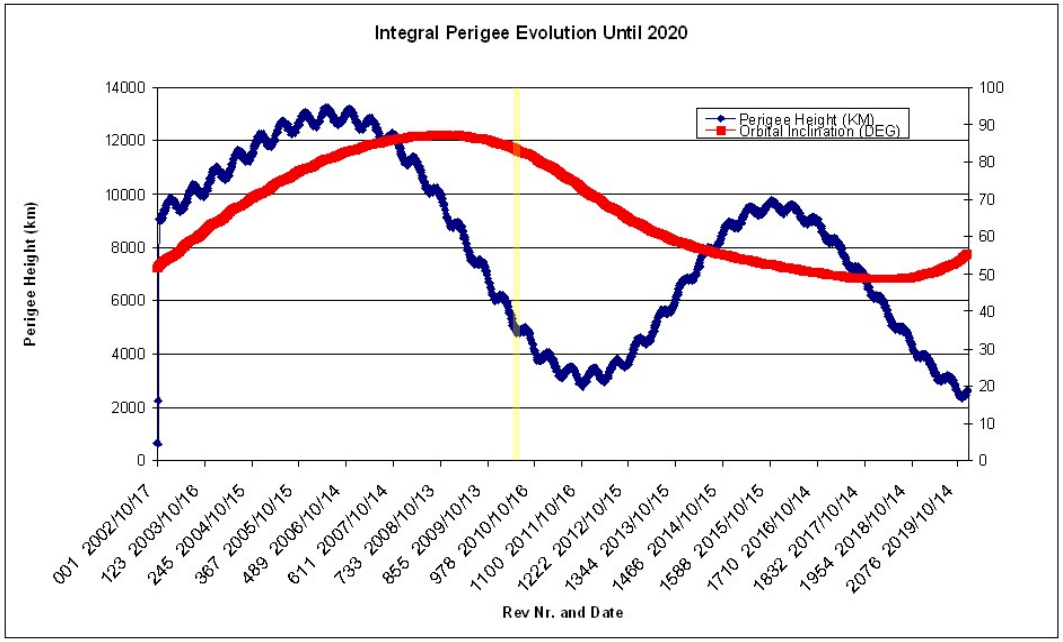
BACKGROUND & TELEMETRY

- **GOOD NEWS**: Background decreasing in all high-energy instruments. Minimum expected 2014.
- But too early to make prediction of level that will be reached.
- SPI have reduced TM use by several packets through implementation of lossy compression (16 April 2010).



ORBIT EVOLUTION

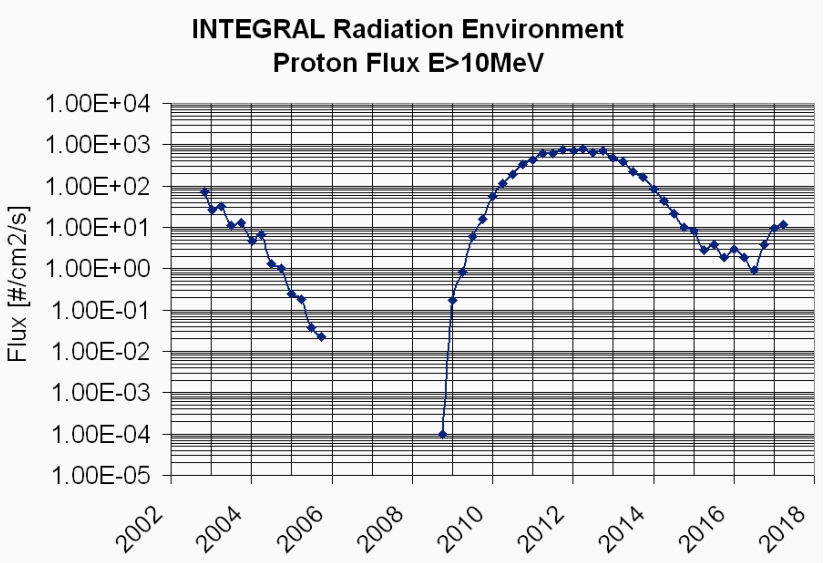
- Perigee altitude currently at ~5000 km. Minimum of ~2800 km will be reached in October 2011.
- No special problems reported so far from belt passages.
- Belt configuration is similar to early mission, when no significant effects were observed (but see next slide).
- Belts passage time will decrease from ~8 h in 2008/2009 to ~5 h.

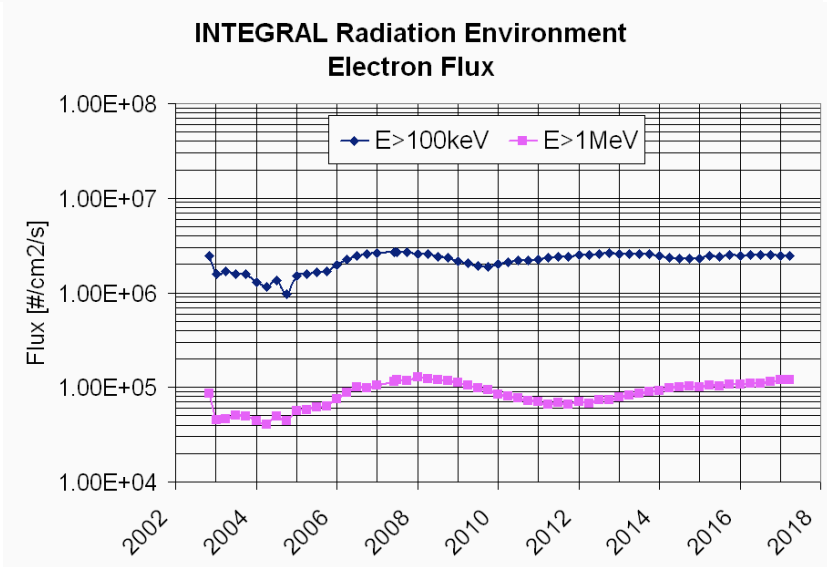


- Transmitters will need to be switched off and back on via time-tagged commands during perigee passage from late 2010 in order not to violate ITU regulations. Transmitters tested successfully on 23 March 2010.

RADIATION DOSE AND LIFETIME

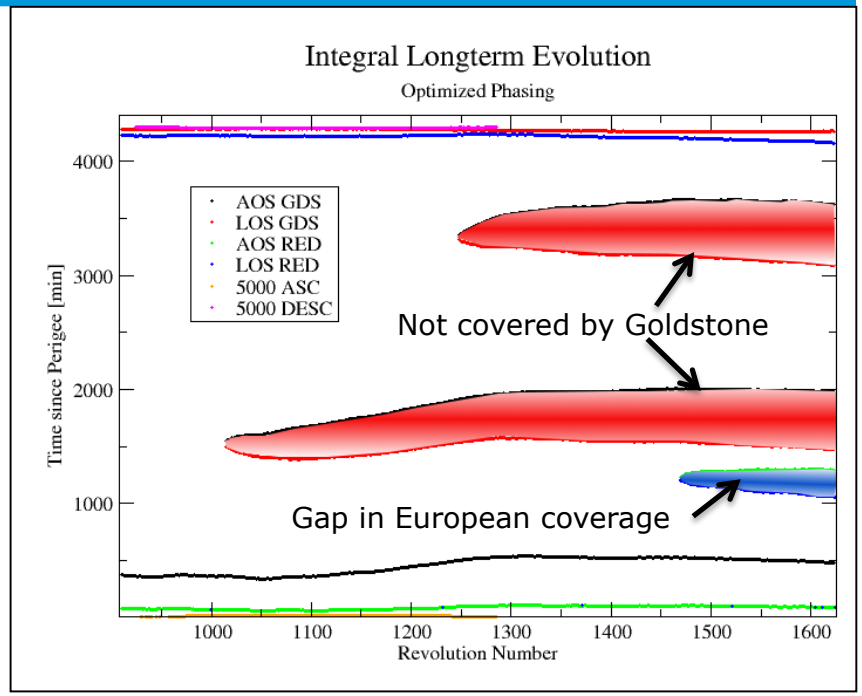
- Radiation dose modeled with static belt model.
- Proton flux will rise to very high level in 2011/12, exceeding that encountered in the early mission.
- Electron flux will remain roughly constant.
- By end 2012 total qualification dose for all SVM units will have been slightly exceeded (<10%) – note that this is under worst case assumptions!
- **Up to end 2014 limits will be exceeded by 30-35% and it is possible that redundant (currently non-powered) units will have to be used.**
- Plan to do slightly deeper study of possible effects on solar arrays by ESTEC specialists.





ORBIT EVOLUTION

- Orbital inclination decreasing from max. 87° in Oct 2008 to 48° in 2018, assuming no orbital control maneuver
  ⇒ affects ground station coverage.
- Starting in mid 2010 a gap in visibility from DSN will appear before Apogee.
- Starting late 2012 a second gap in visibility from DSN will appear ~¾ through the revolution.
- Both gaps easily covered by Redu.
- Starting in late 2014 a gap in visibility from REDU (or any other European station) may appear
  ⇒ **coverage would be required from a non-European station such as Goldstone.**
- MOC and Flight Dynamics are studying in how far the orbit could be influenced in order to reduce or avoid these gaps. Work in progress.

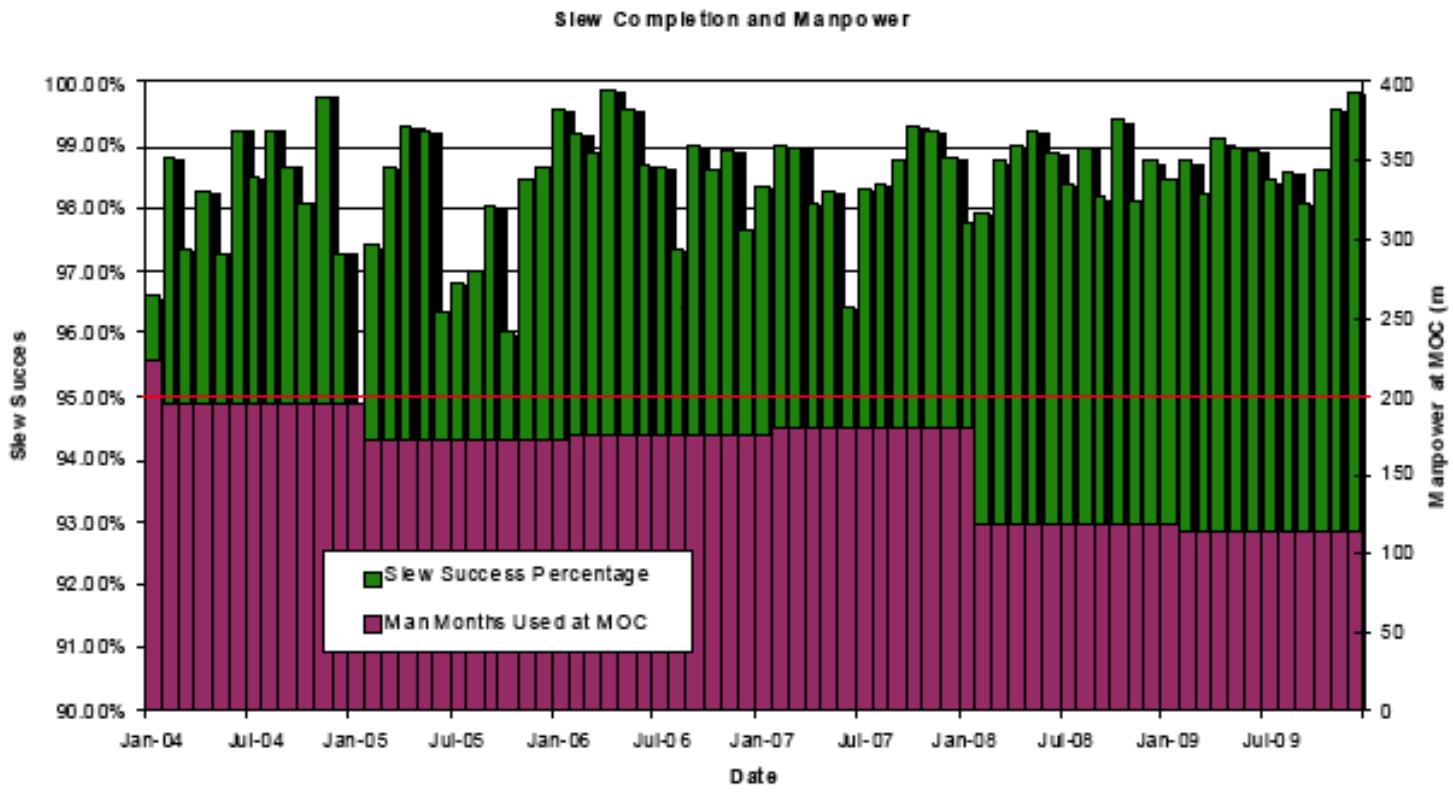


NASA SUPPORT

- NASA will honour their commitments on Integral until the expiration of the current agreement (16 Dec 2010), but will not seek its extension.
- NASA could continue to provide the support from Goldstone until end of 2012 through ESA/NASA cross support agreement.
- Before decisions are taken the 'charged rate' against the virtual budget of this agreement must be clarified.
- At some point will have to budget for coverage by DSN or replacement.

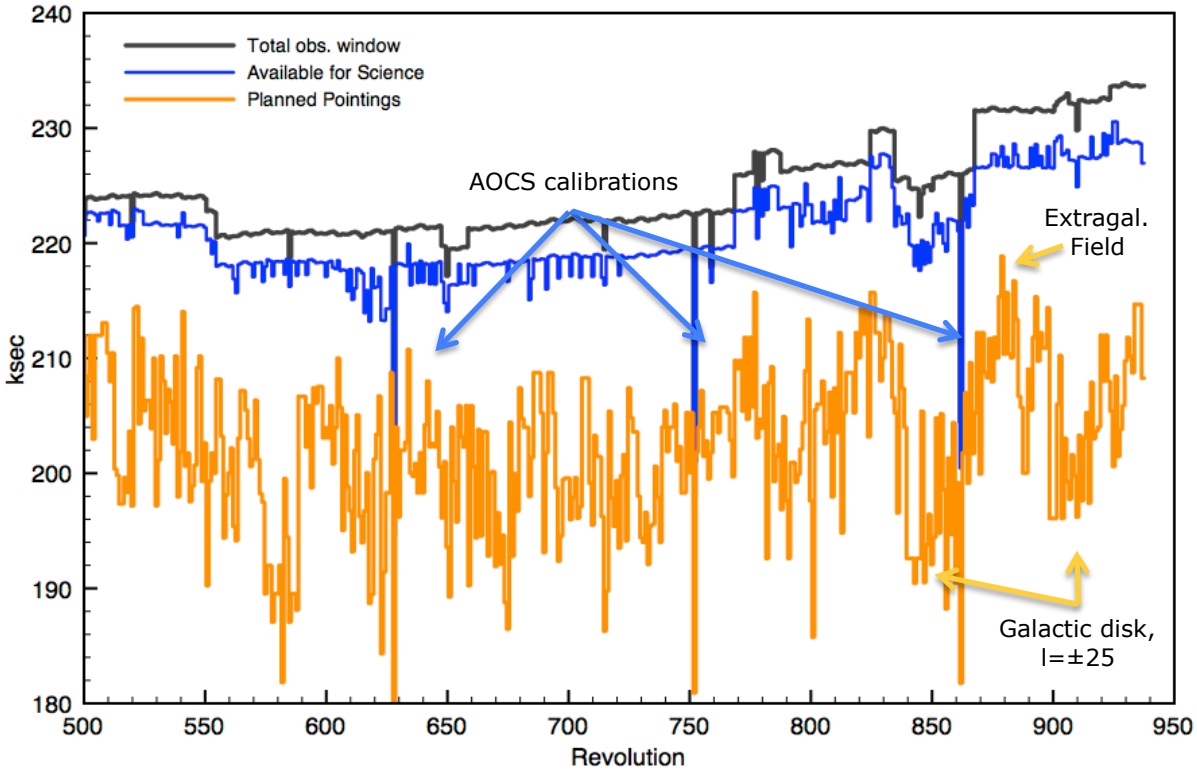
MOC STATUS

- Partially merged INTEGRAL and XMM Flight Control Teams working routinely.
- No degradation in routine mission performance by reduced FCT.
- But slower "return to normal" in case of problems; occasional delays on lower priority tasks and slower implementation of changes.



ISOC NEWS

- Delphine Anger (YGT) is leaving. eAIMS long-term planning tool appears mature and is supposed to be used in operations from summer onward.
- Proposal submission and TAC meeting went smoothly. Starting to update database, will inform PIs as soon as this is done.
- TOO response unchanged. Three targets in parallel during revs. 916+917.
- Slight increase in available science time since 2007 is 'compensated' by higher fraction of complex and/or constrained observations.
  ⇒ No real gain on average time used in pointings.



MISSION EXTENSION

- MEOR on 1 July 2010. Presentations by PS (20'), SOM (1h) and MM (1h).
- Draft presentations by PS and MM circulated to PIs for comments and being finalized. Deadline for submission to panel: 21 June.
- Platform and payload in very good shape overall. Well able to reach 2014 and beyond.
- Very strong support from instrument and data centre consortia.

- Extension budget to be finalized with SRE-O management in July. No dramatic changes, but some savings.
- Document with Extension Case (5 p. science case, 2 p. rest) to be delivered by 31 August.