The THESEUS Ground Segment

2021 March 23
G. Belanger, ESAC
In this talk

- Ground segment components
- Observation scheduling
- AO handling
- Data handling
- Community Support
Ground Segment

- MOC, SOC, SDC, IOCs, TBAGS
  - MOC: mission operations centre (ESA)
  - SOC: science operations centre (ESA)
  - SDC: science data centre
  - IOCs: instrument operations centres
  - TBAGS: Theseus burst alert ground segment
Scheduling

• Aim is to detect GRBs in polar regions
• There is some flexibility in pointing strategy
• Streamlined scheduling
  • Fully autonomous spacecraft (detect, validate trigger, slew, observe, transmit, return to survey)
  • Nominal scheduling by upload of target list
  • Mostly automated processing and response to TOOs
AO Handling

• Central ESA Proposal Handling System
  • NLP-based processing of proposals
  • AI-supported review process
  • Distributed TAC
  • ML-based system evaluation and self-improvement
Data Handling

• Centralized data handling
  • SOC processes TM into L0
  • SDC processes L0 into L1+
  • Archive contains all data
  • Data access through ESA archive
  • Data processing through ESA Datalabs
Community Support

- Distributed expert support
  - SOC — hosting and coordinating
  - IOCs — instrument-specific questions
  - SDC — software-related questions
  - Consortium — science-related questions
Conclusion

• Automated spacecraft is new and different
  • Allows extensive automation in operations
  • Inspired much new developments
• Major novelties:
  • Scheduling
  • Data access is through ESA archive
  • Science processing through ESA Datalabs
  • AO and TAC through ESA PHS