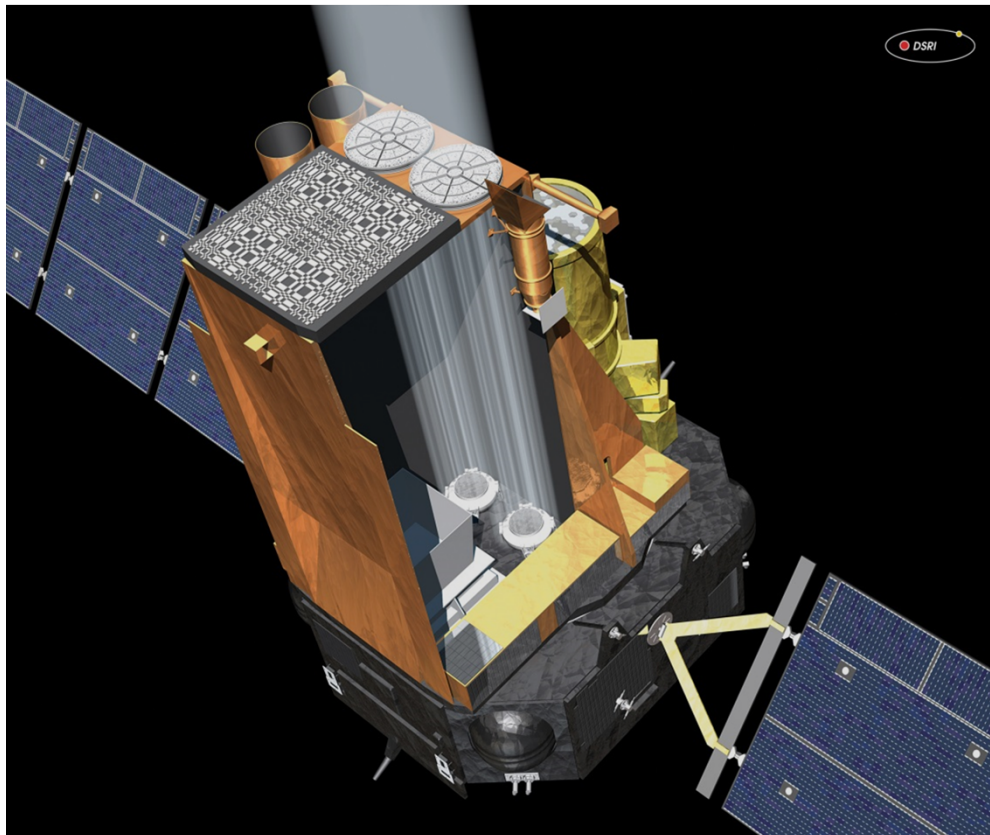


Technical University of Denmark



JEM-X Status, Nov 2018

Søren Brandt



 **DTU Space**
National Space Institute

Anode status

- Was on average ~2-3% loss per year (256 anodes in total), but now << 1% per year
- JEM-X1 (~1500 orbits of use)
 - 63 of 256 anodes affected (~25% of area)
 - 35 dead (4 pre-launch, latest loss in 2011)
 - 12 neighbor
 - 16 unstable or low
- JEM-X2 (~1100 orbits of use)
 - 64 of 256 anodes affected (almost 25% of area)
 - 32 dead (9 pre-launch) (latest loss in Aug 2013)
 - 16 neighbor
 - 16 unstable or low

No anode loss in more than 6 years!

No anode loss in ~5 years!

JEM-X Gain Calibration in OSA

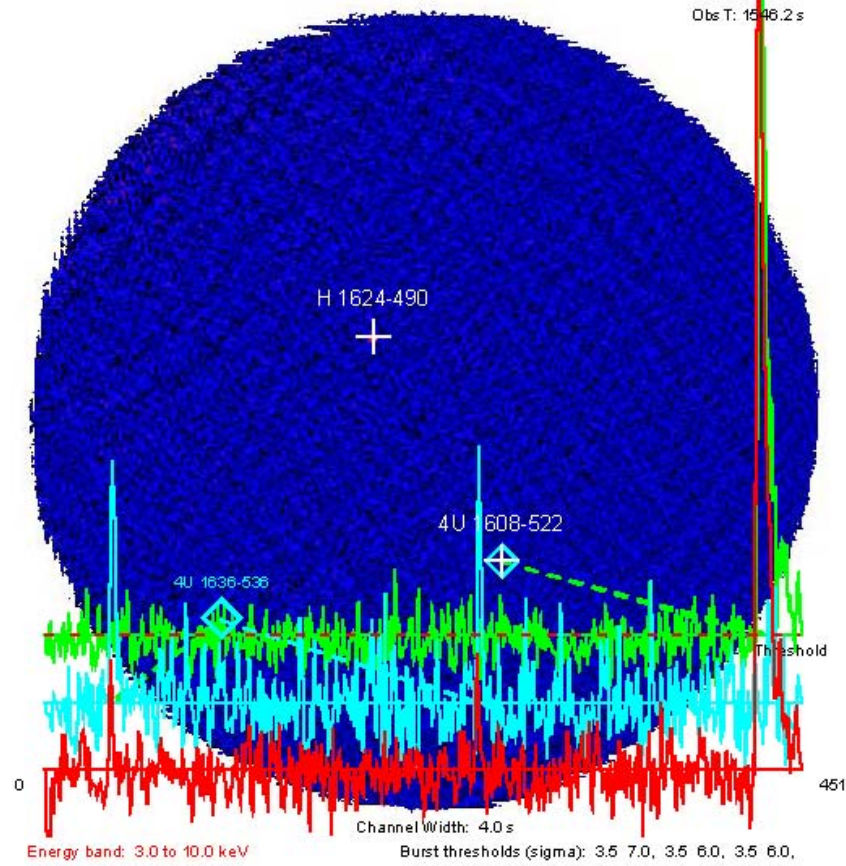
- Gain calibration requires continued efforts because of the decaying calibration sources
 - Further complicated by increased dependence on temperature = more variation over an orbit
- Calibration data must be collected in increasing time periods
- offline analysis of gain required to ensure correct results
- Calibration analysis is more difficult in orbits with grey filter
- Calibration provided by “Instrument Characteristics” tables delivered to ISDC for each revolution
- The gain calibration depends mainly on the Xe fluorescence background line at 29.6 keV and temperature variation modeling
- Calibration curves are derived and delivered by DTU for each orbit

Improvements in the JEM-X analysis software for OSA 11

- An improved light curve extraction tool has been introduced in the JEM-X software with OSA-11.
- The new tool exploits the better knowledge of the instrument parameters accumulated over the past 16 years.
- The new tool offers the possibility of an automated burst search in the extracted light curves.
- Light curves are extracted for all source detected as significant in the standard single-science-window analysis, but in addition, the user can specify additional sources which should be checked for burst occurrences, even if they do not appear significant in the sky images.
- This tool offers a convenient way to do systematic searches for bursts, also in archival data.

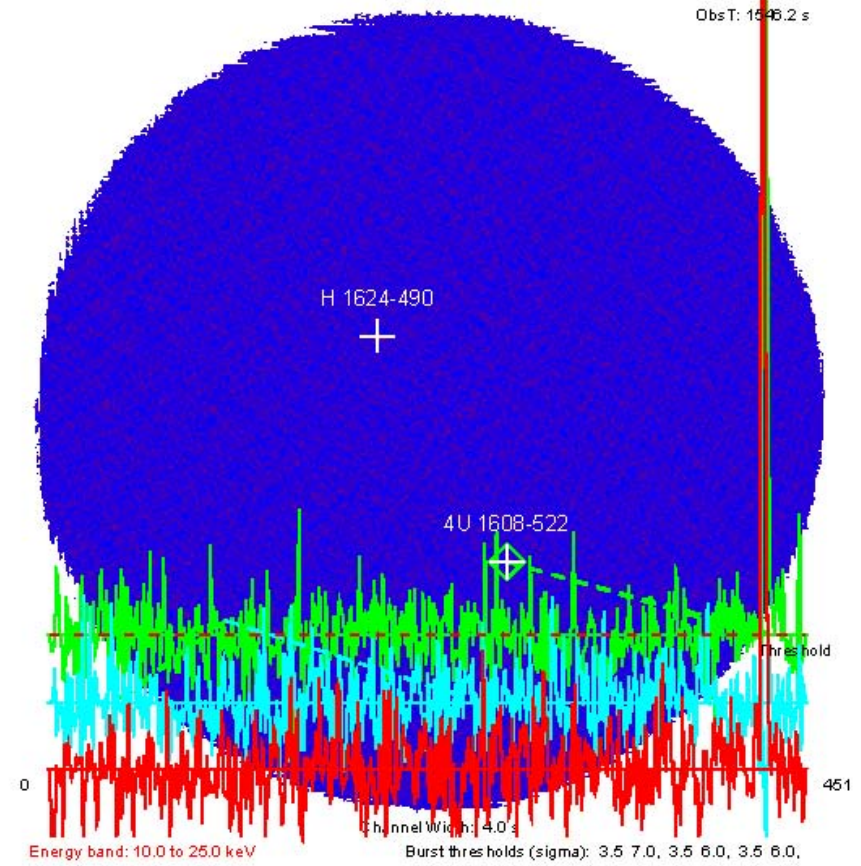
JEM-X1_035000670010

Obs T: 1946.2 s



JEM-X1_035000670010

Obs T: 1946.2 s



Conclusion

- JEM-X is running smoothly (with various signs of age)
- No anode loss for many years
- Gain evolution is slowing down (no HV reduction since March 2014)
- Gain fitting is becoming more challenging, as calibration sources decay and temperature dependence increases, but under control
- Running both JEM-X1 and JEM-X2 was implemented in Oct 2010, as sufficient telemetry became available
- Instrument Team is still intact – but also busy with other projects
 - Niels Lund, Carl Budtz-Jørgensen, Niels Jørgen Westergaard, Ib Lundgaard Rasmussen have emeritus status
- PRODEX only partly funds INTEGRAL in 2018 (internal DTU support)
- We expect JEM-X and to operate smoothly in the 2019-22 (and beyond... maybe not all the way to 2029 😊)
 - Performance is monitored to ensure that running both units will not endanger the future use