Spectrum-Roentgen-Gamma

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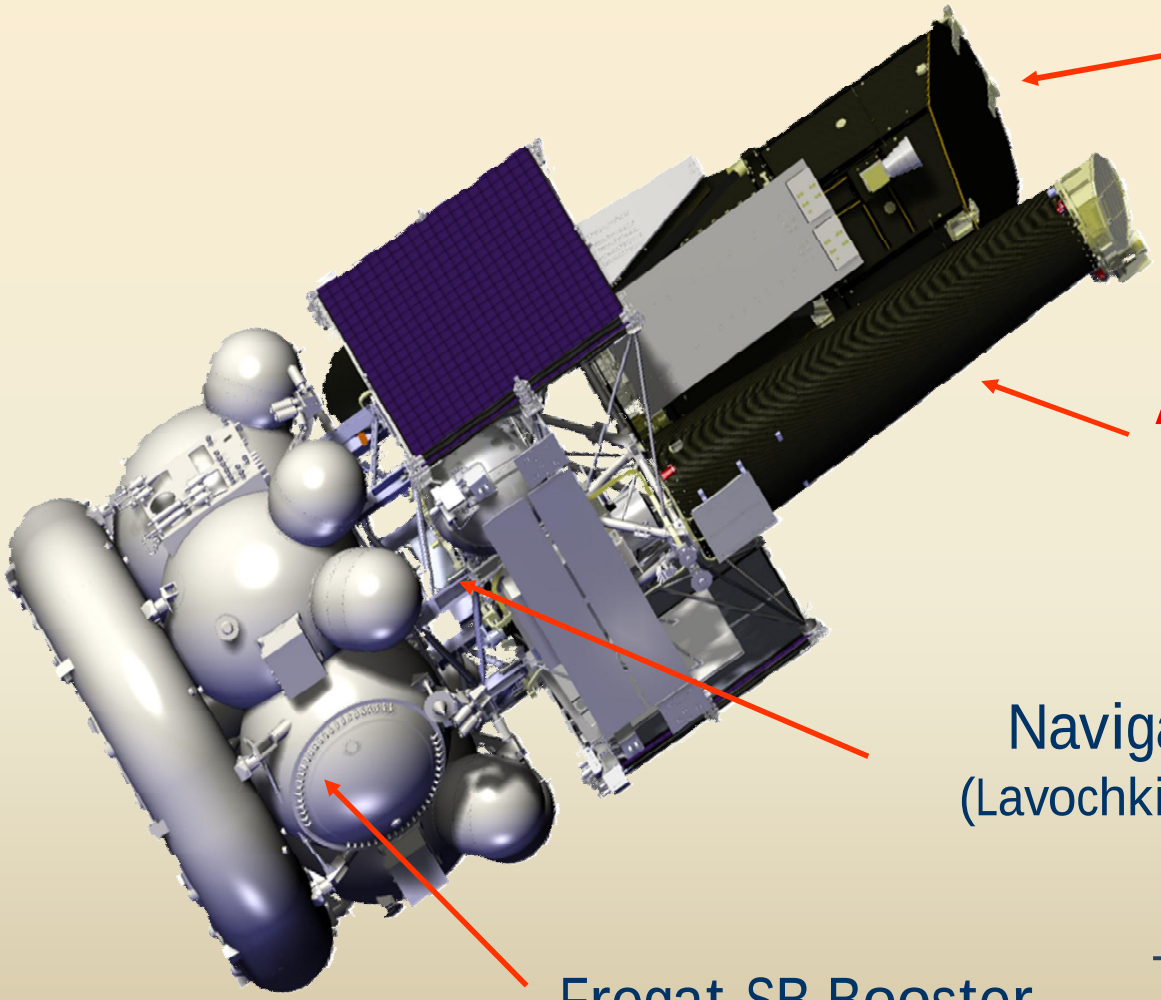
Spectrum-Roentgen-Gamma



eROSITA
(MPE)

ART-XC
(IKI)

Navigator
(Lavochkin Ass.)

Fregat-SB Booster

+ Launcher
+ Ground Segment

Launch Date

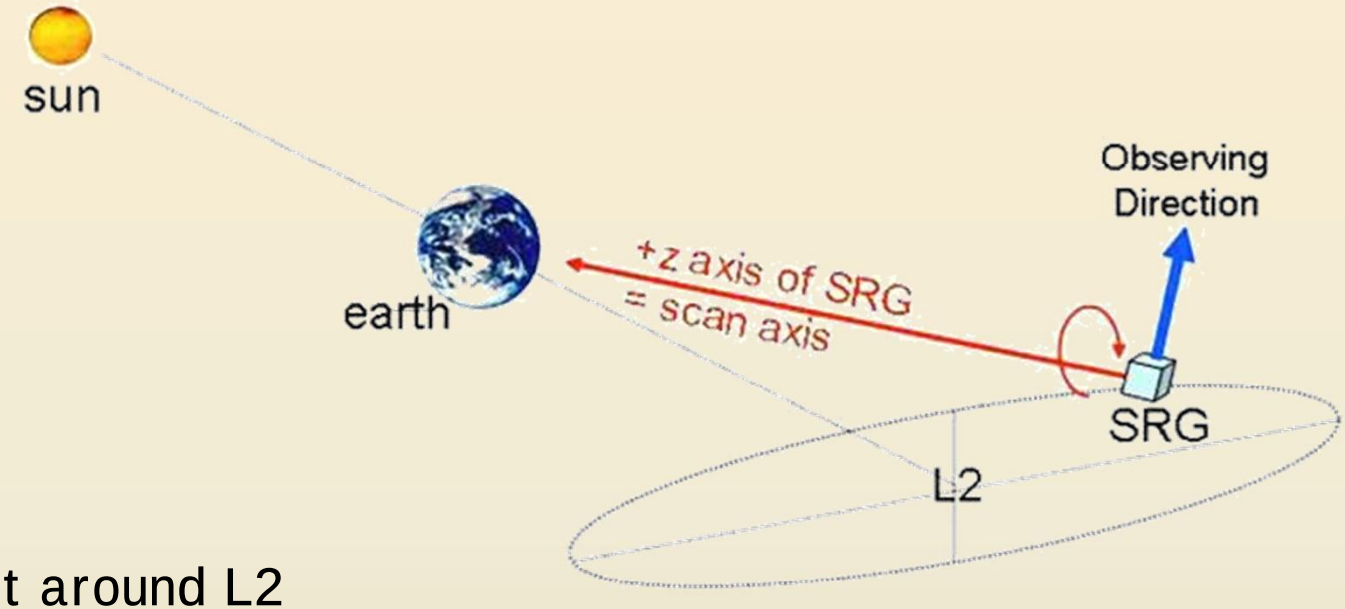
Berlin	2011	2013
Dublin	2014	2016
Madrid	2016	2017

Past problems:

- technical
- different standards
- political (export licenses)

Launch date: September 25, 2017
Launch Windows every half year

Mission-Profile

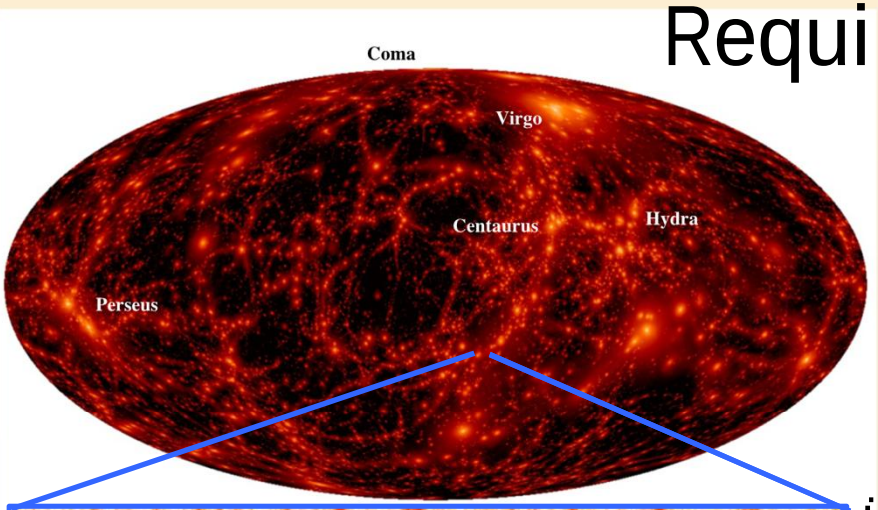


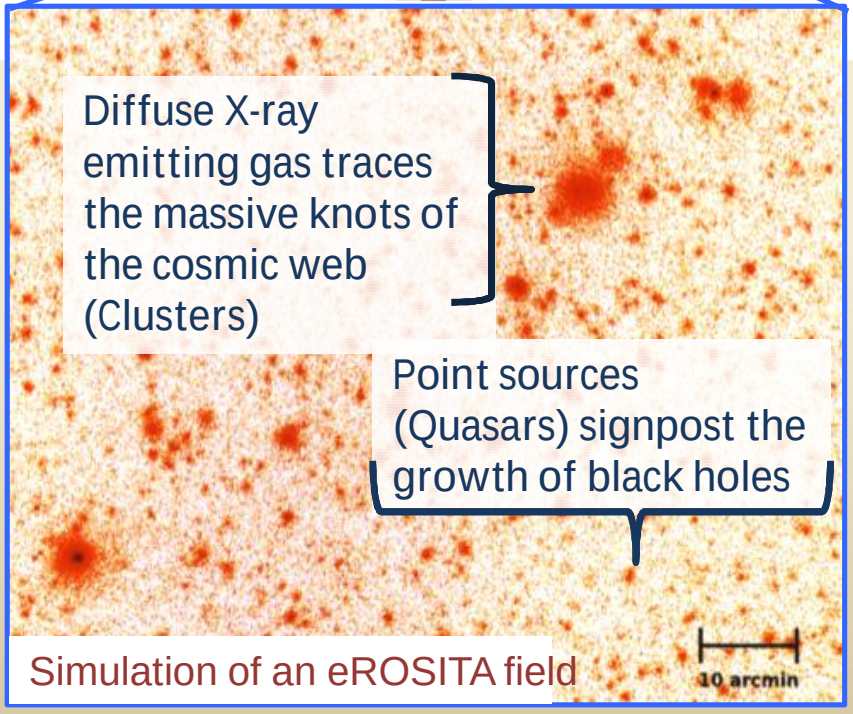
Orbit around L2

Permanent Rotation des S/C, ~ 4 hours / revolution

4 years all-sky survey
3 years pointed observations

Mapping the structure of the hot Universe: Requirements





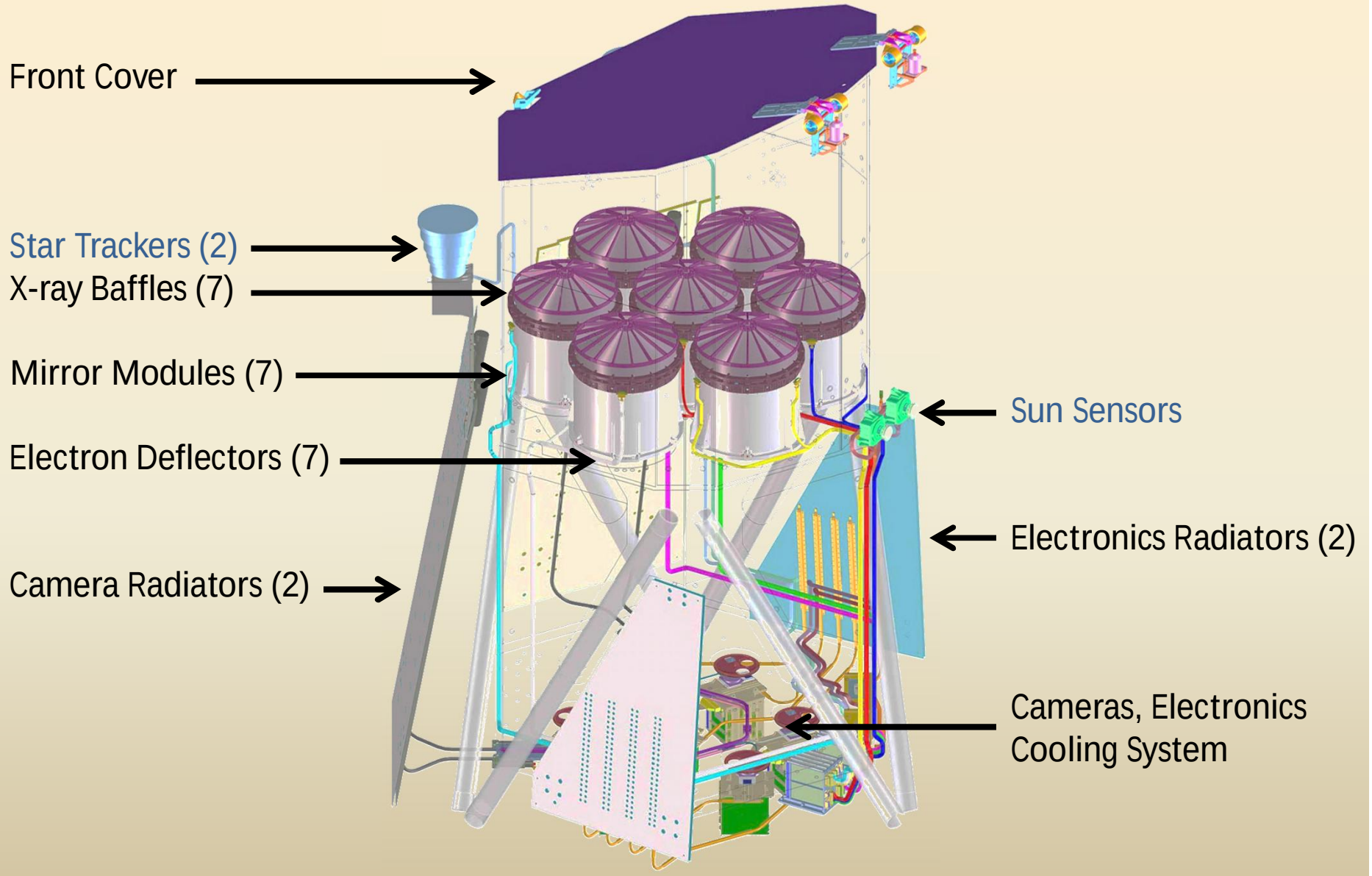
Simulation of an eROSITA field

Images coutesy of K. Dolag (LMU), M. Mühlegger (MPE), O. Hahn (ETH)

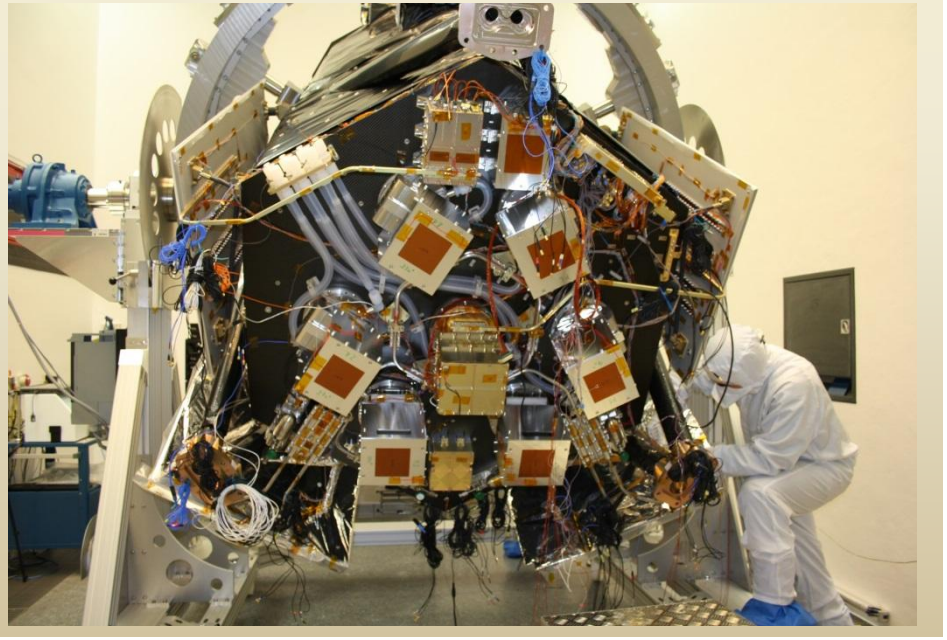
Detect 100.000 Clusters of Galaxies

- ü All-sky survey sensitivity 6×10^{-14} erg/cm^2/s
- ü Deep survey field(s) (~100 deg^2) to 1×10^{-14}
- ü Individual pointed observations
- ü Moderate angular resolution (<30‘‘ aver. over FoV)
- ü Large collecting area (> 2000 cm^2 @1keV)
- ü Large FoV (1° Ø)
- ü Long duration survey: 4 years ß à 1/2 year (ROSAT)

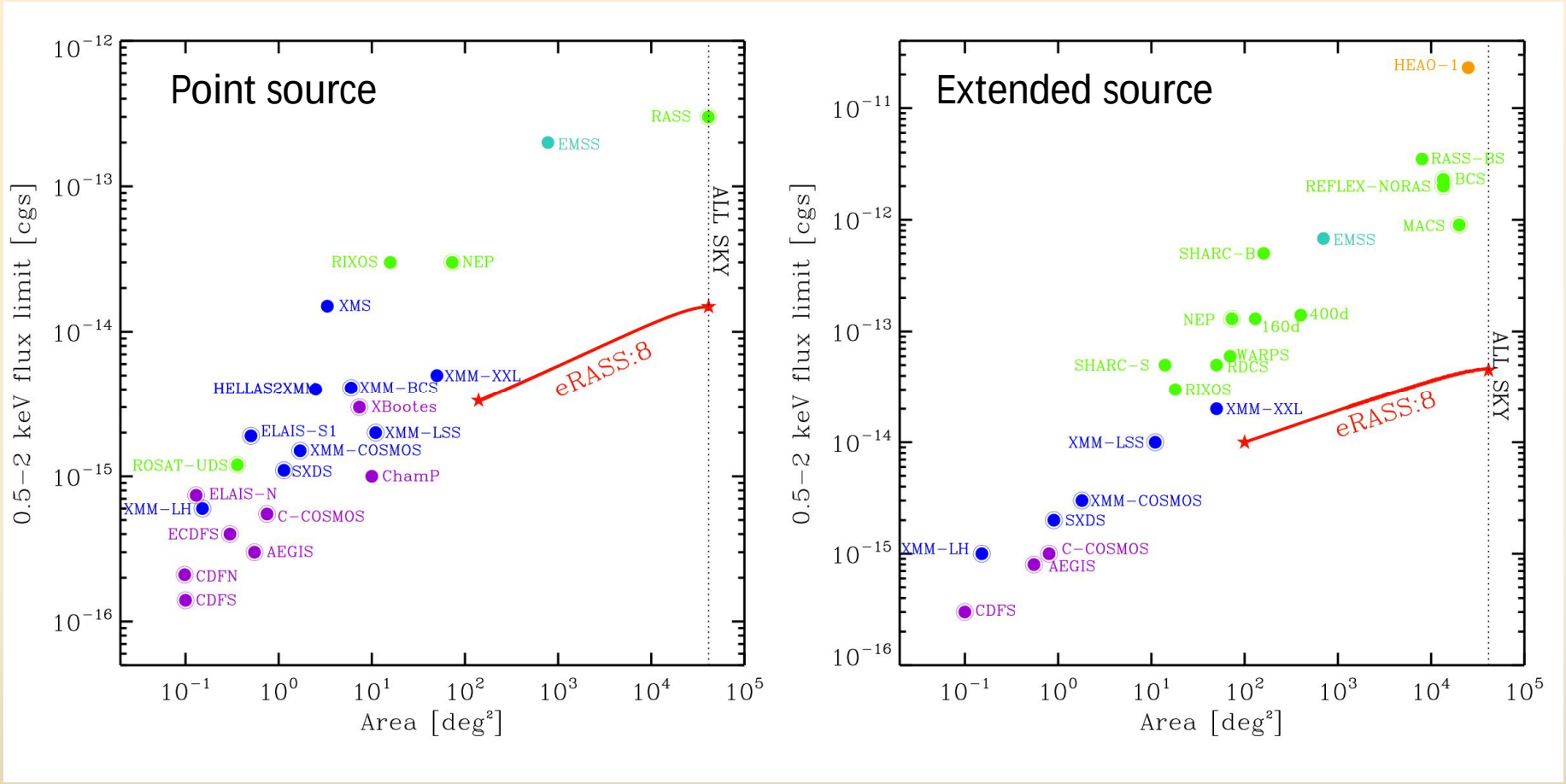
eROSITA: Scheme



eROSITA: Real Thing



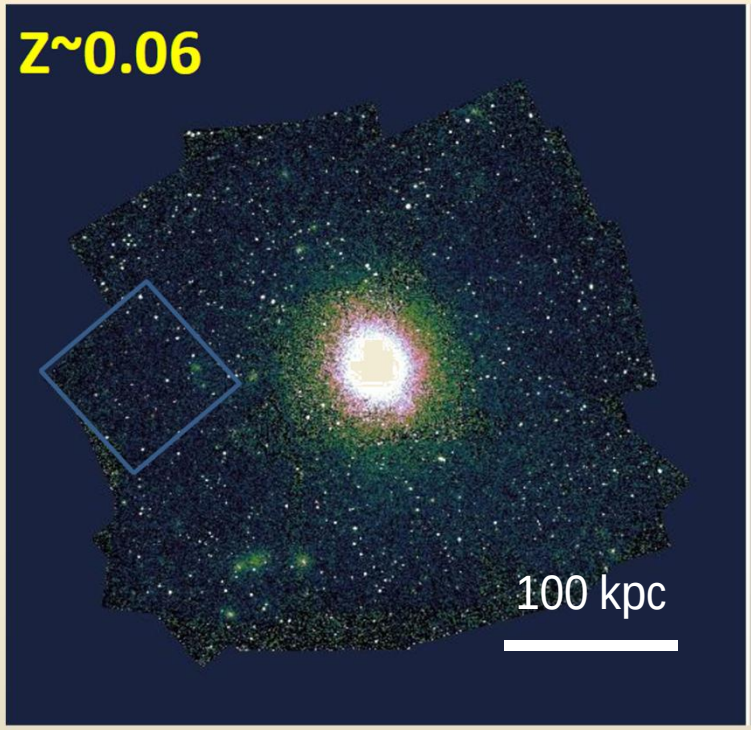
eROSITA Performance



Point source sensitivity:
~30 times better than ROSAT (soft band 0.5-2 keV)
~100 times better than HEAO/RXTE (hard band 2-10 keV)

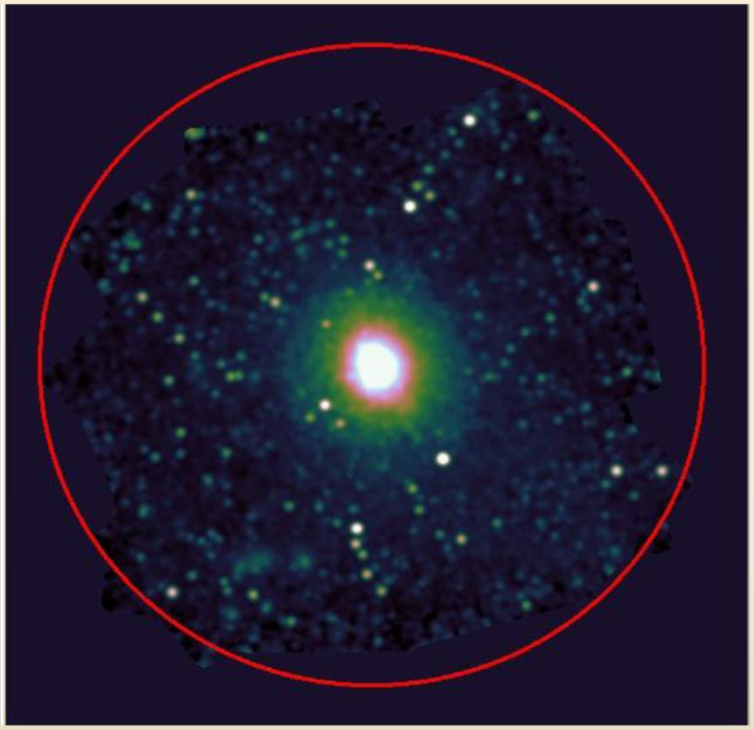
Fast Survey Machine

Chandra



~30 pointings
~2 Msec
[0.5” HEW]

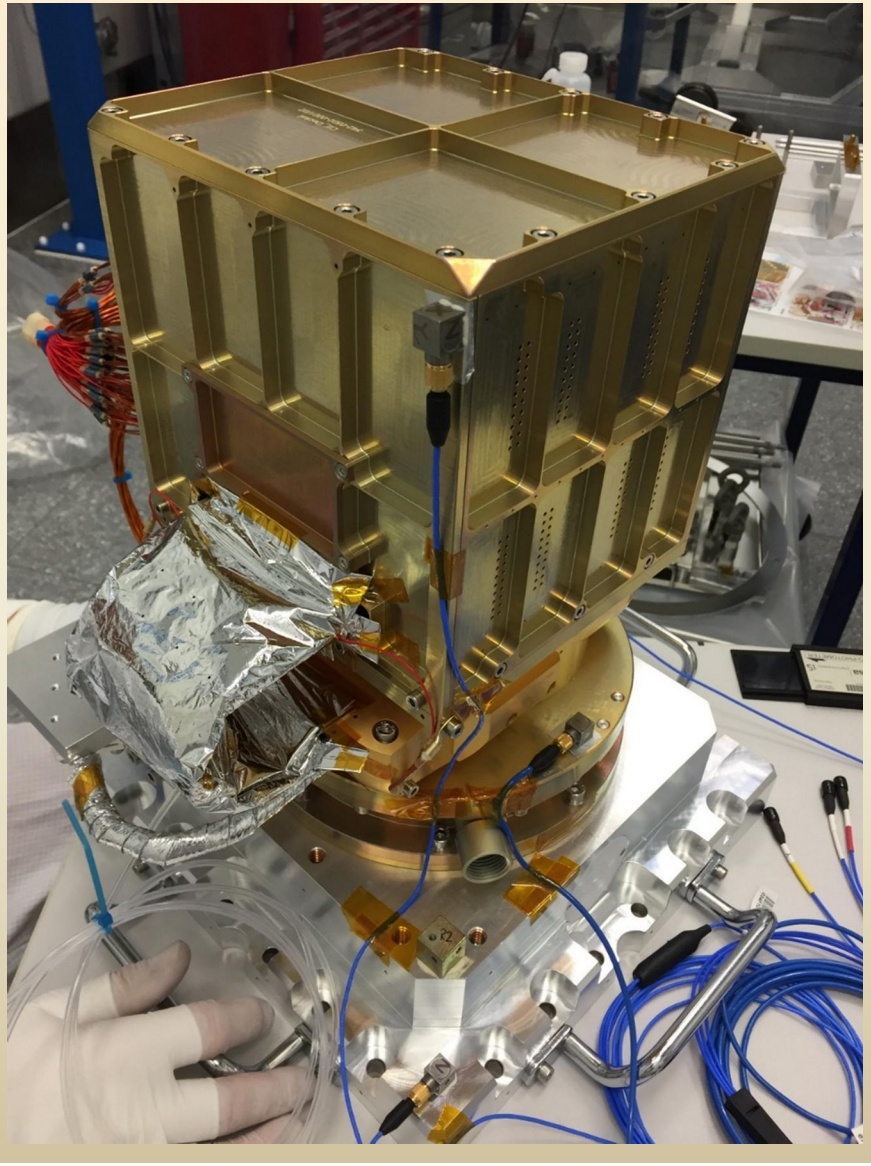
eRosita

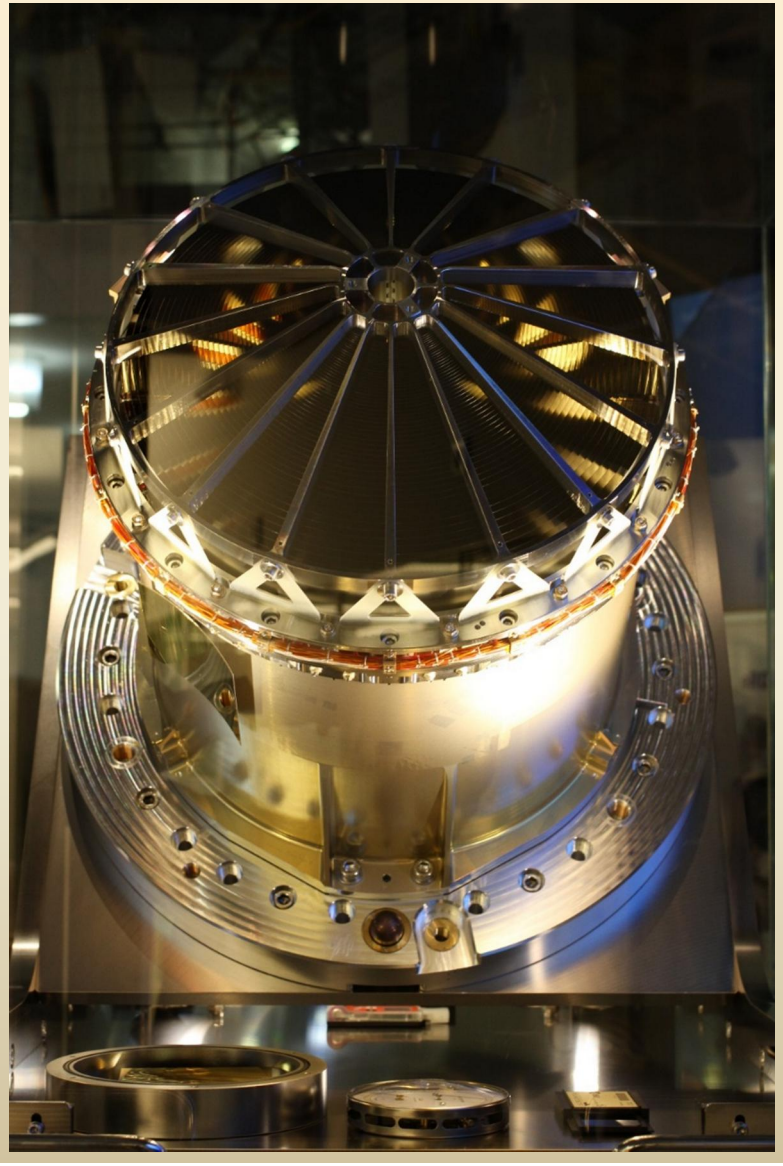


~1 pointing
~80 ksec
[26” HEW (FoV avg)]

Churazov, IKI, MPA

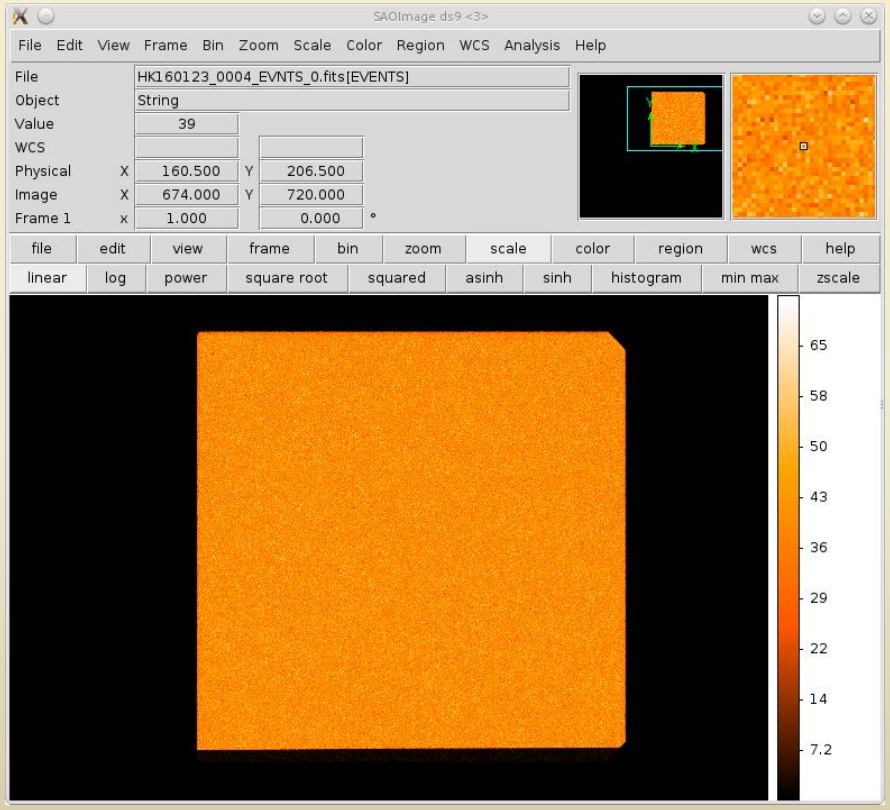
Camera and Mirror Assemblies

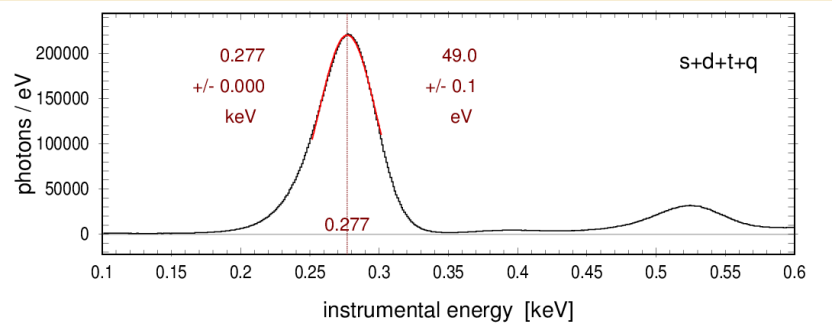


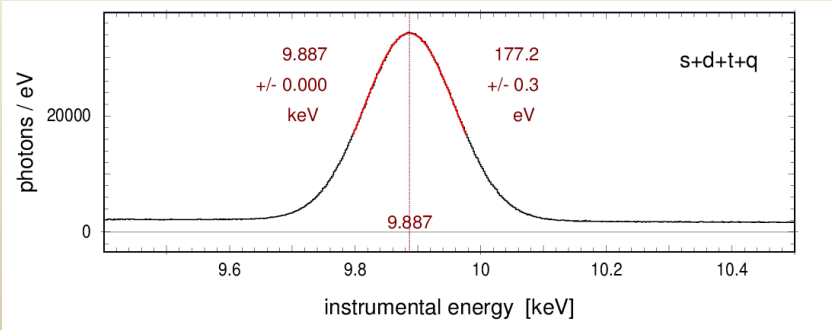


FM Camera Calibration

- Spectral resolution at all 9 measured energies well within specification
- Extremely good uniformity
- Only weak dependence on temperature of CCD and electronics (unlike XMM-EPIC!)







Key Performance

	FM1	FM2	FM3	FM4	FM5	FM6	FM7	FM8
C-K	16,3“	16,0“	15,5“	16,3“	17,3“	16,1“	16,2“	
Al-K	16,4“	16,3“	15,8“	16,2“	16,8“	16,4“	15,9“	
Cu-K	15,0“	14,7“	15,3“	16,5“	15,8“	15,3“	16,4“	

Mirror Assemblies (HEW)

	FM1	FM2	FM3	FM4	FM5	FM6	FM7	FM8
C-K	49	58	58	58	50			
O-K	56	65	64	64	57			
Cu-L	68	74	70	70	68			
Al-K	77	82	77	77	75			
Ti-K	117	125	118	118	116			
Fe-K	136	145	138	138	135			
Cu-K	156	167	158	159	155			
Ge-K	175	204	178	173	170			

Camera Assemblies [eV]

eROSITA Status

• Final Integration	started recently
• Mirror Calibration	done
• Camera Calibration	almost done
• Acceptance Tests at IABG	starts August 2016
• End-to-end Test in PANTER	ends in October 2016
• Shipment to Russia	October 2016

eROSITA Collaboration

Core Institutes (DLR funding):
MPE, Garching/D
Universität Erlangen-Nürnberg/D
IAAT (Universät Tübingen)/D
SB (Universität Hamburg)/D
Leibniz Institut für Astrophysik Potsdam/D

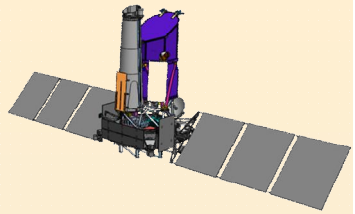
Associated Institutes:
MPA, Garching/D
IKI, Moscow/Ru
USM (Universität München)/D
AIA (Universität Bonn)/D

Industry:

Media Lario/I	Mirrors, Mandrels
Kayser-Threde/D	Mirror Structures
Carl Zeiss/D	ABRIXAS-Mandrels
Invent/D	Telescope Structure
pnSensor/D	CCDs
IberEspacio/E	Heatpipes
RUAG/A	Mechanisms
HPS/D,P	MLI
Moog/USA	Valves
MAP/F	Painting
Laserjob/D	X-ray Baffles
NPOL/Ru	Spacecraft, Mission

+ many other (small) companies

MPE: Scientific Lead Institute, Project Management
Instrument Design, Manufacturing, Integration & Test
Data Handling & Processing, Archive etc.



www.mpe.mpg.de/eROSITA

- eROSITA is a PI instrument
  - Data split 50% MPE and 50% IKI West/East (gal. coord.)
  - German data public after 2 years, 2-3 releases (~T_{launch}+2.5, +3.5, +5.5 years, TBC); no commitment yet on the Russian side
  - Proprietary access via eROSITA_DE consortium
  - Projects/papers regulated by working groups
- Working Groups:
  - Science: Clusters/Cosmology, AGN, Normal galaxies, Compact objects, Diffuse emission/SNR, Stars, Solar System, Time Domain Astrophysics
  - Infrastructure: Data analysis and catalogues, Multiwavelength follow-up, Calibration, Background
- Collaboration policy:
  - Individual External Collaborations (proposal to WGs)
  - Group External Collaborations (team-to-team MoUs)