IXO
International X-ray Observatory

TOOs: Prospects and Capabilities

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QUESTIONS:

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- What are the TOO capabilities of IXO?
  - Ground System
  - Spacecraft systems
  - Lifetime
- What TOO science do we want to do?
  - White papers, FST
  - Compare to Previous missions (Chandra, XMM)

TOOS: Ground system

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- Requirements relevant to TOOs (from old Con-X TLRD – need XEUS input):
  - Must be on target within 24 hours of ‘go’ for TOO, goal to be on target in 12 hours.
  - Maximum of 2 TOOs per month (Chandra rate-not all ‘fast’). [replans require ~1 week of operations team time = $$]
  - Processed data to observer in <2 week, goal of 72 hours (Chandra often does 1 day).

TOOs: Spacecraft systems

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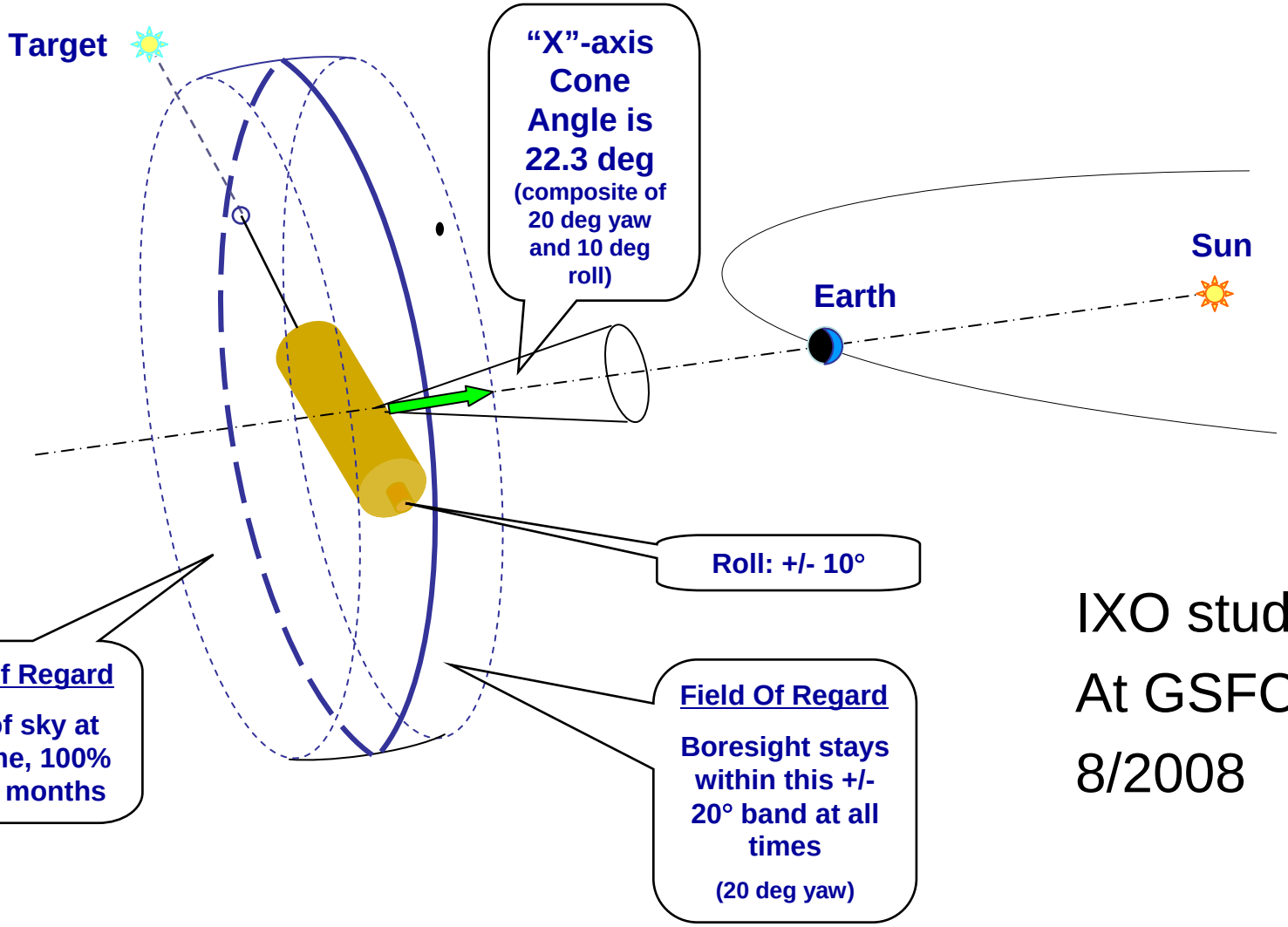

IXO study
At GSFC MDL
8/2008

TOOs: Spacecraft systems

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- Field of Regard (FOR):
  - 34% of sky at any moment
  - 100% of sky within 6 months
  - Solar arrays, sunshades, thermal control system all sized for +/- 20 degrees yaw, +/- 10 degrees roll
- Slew rate
  - 60 degrees in <1 hour
  - Includes settle time
- Lifetime
  - 5 year nominal, 10 year extended

Numbers/Types of TOOs?

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White Papers (both new and old)

- Accretion Physics (BH, NS, WD) in outburst (Miller)
  - Expect ~1, ~1, ~10 per year based on observed rate
- X-raying the Hot IGM (Shull)
  - IXO area increase means we do not need TOOs!
  - Still might expect a few special opportunities
- Comets (Feigelson)
  - Path may cross IXO field of regard – not really TOOs?
- TOO Observations of nearby SN1a/c (Hughes – old white paper)
  - Expect ~1 per year (within 10Mpc, Virgo). Average Chandra rate = 2/year (within 30Mpc, GRB like)
- GRB at high z (epoch of re-ionization, Brandt)
  - Less than 6 hour access helps a lot
  - trigger:? JANUS (proposed SMEX) rate 25(or 4)/year for z>5(or 8)

From Neil Gehrels

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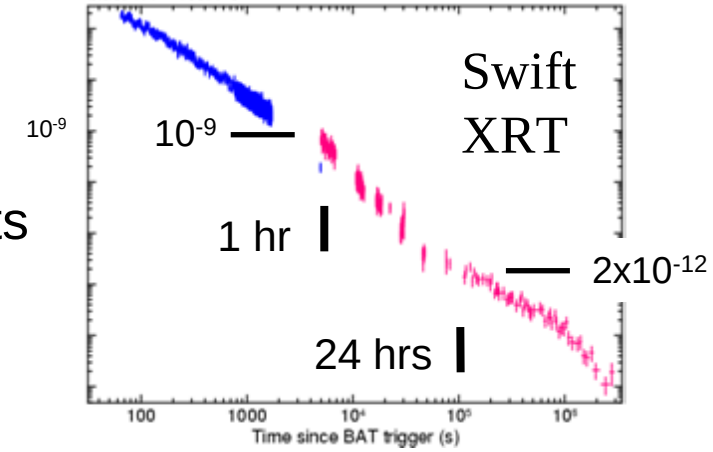
GRB 080319B
Naked Eye Burst



IXO will fly in era of transient astronomy
LSST, LISA, SKA, ICECUBE - transients

Suggested consideration of transients for IXO
- Fast response
- Constraint checking onboard (a la Swift, GLAST)

Ad hoc transient interest group:
- Gehrels, Brandt, Burrows, Mushotzky, Nousek, Piro, Garcia
- Others welcome

Numbers/Types of TOOs?

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- Compare Chandra and XMM TOO rates
  - Chandra: 215 unique targets/9 years = 24 targets/year
  - XMM: 104 unique targets/8 years = 13 targets/year
- Ratio of rates (=1.85) same as ratio of FOR (=1.81) – implies FOR predicts TOO capability

ASSUME: TOO distribution not correlated with FOR; therefore sky coverage = capacity to observe ToO (Caveat: Galactic center, overprediction?)

Chandra	XMM	IXO
Pitch = 45^{o}-180^{o}	Pitch = +/- 28^{o}	Yaw=+/-20^{o}
FOR=85%	FOR=47%	FOR=34%
Rate=24/y	Rate=13/y	Rate=9.4/y ?

Summary:

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- IXO is capable and likely to do significant and substantial TOO work
- Numbers of TOOs in 10 year mission may be ~94
- Increasing FOR (Field of Regard) via modifications to Solar Arrays, Sunshades, Thermal system might allow a factor of 2 higher TOO rate, but at expense of added mass – which may result in decreased effective area
- Will look into on-board constraint checking, ala Swift, GLAST: decrease replan $$?
- Email list: ixo-transients@list.nasa.gov