

PROSPECTS FOR LARGE AREA X-RAY SPECTRAL-TIMING

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ON BEHALF OF THE LOFT, EXTP AND LOFT-P TEAMS

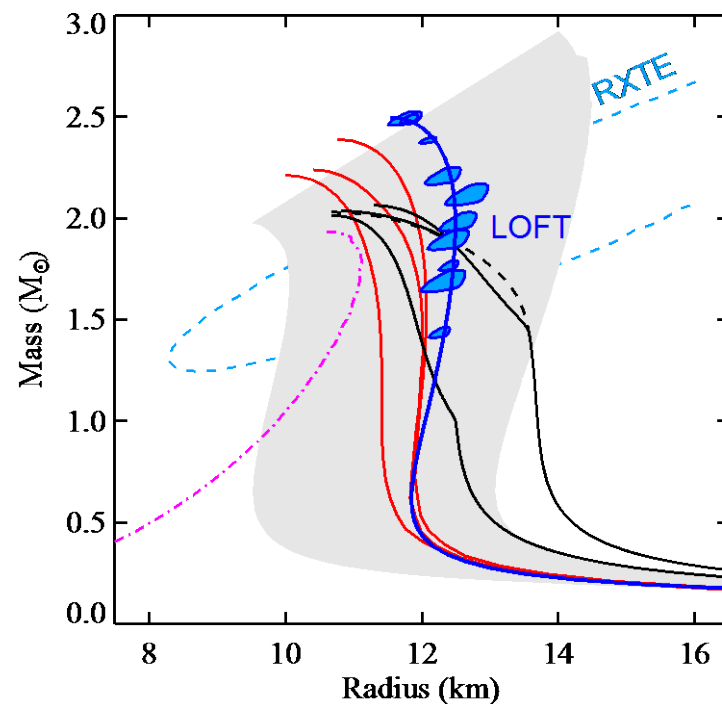
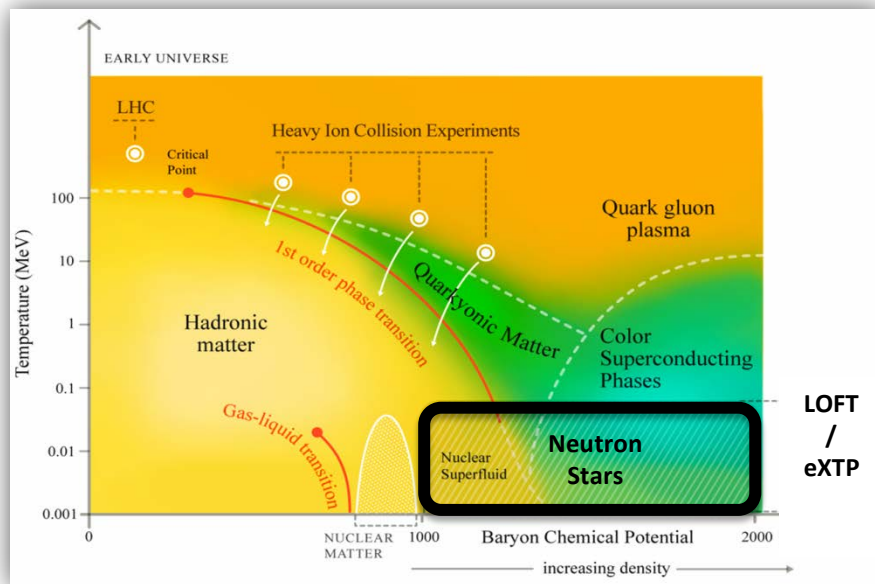


OBIETTIVI SCIENTIFICI PRIMARI

- STUDIO DELLA MATERIA IN CONDIZIONI ULTRADENSE (EoS)
- STUDIO DEL COMPORTAMENTO DELLA MATERIA IN PRESENZA DI CAMPO GRAVITAZIONALE FORTE



DENSE MATTER IN NEUTRON STARS – A UNIQUE REGIME



LOFT AND eXTP WILL STUDY **NUCLEONIC MATTER IN A UNIQUE REGIME**, AND **EXOTIC STATES OF MATTER** THAT COULD NEVER EXIST IN THE LABORATORY.

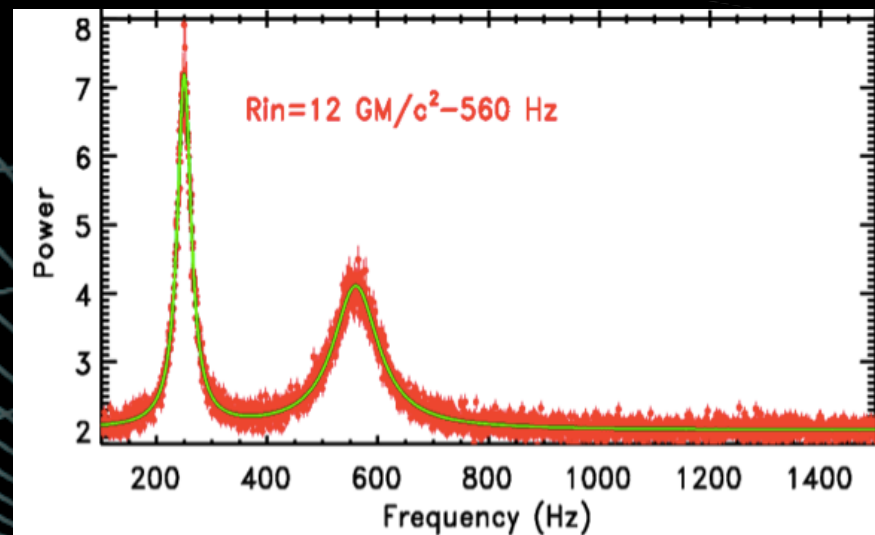
USING ONLY KNOWN SOURCES, PULSE PROFILE MODELLING MEASUREMENTS WILL **MAP THE M-R RELATION** AND HENCE THE **EOS**.



ACCRETION NEAR THE EVENT HORIZON

ASTROPHYSICS NEAR BLACK HOLES: STRONG FIELD EFFECTS

- Inner Stable Circular Orbit
- Orbital motion near ISCO
- Orbital and epicyclic frequencies
- Frame dragging, light deflection, Shapiro effect



CLOSE TO THE BLACK HOLE

LOFT/eXTP: near the event horizon

RELATIVISTIC EFFECTS DOMINATE

Current best tests of General Relativity:

- ✓ millisecond radiopulsars in weak-field regime (GR small perturbation)
- ✓ GW150914: strong field in a highly dynamic regime

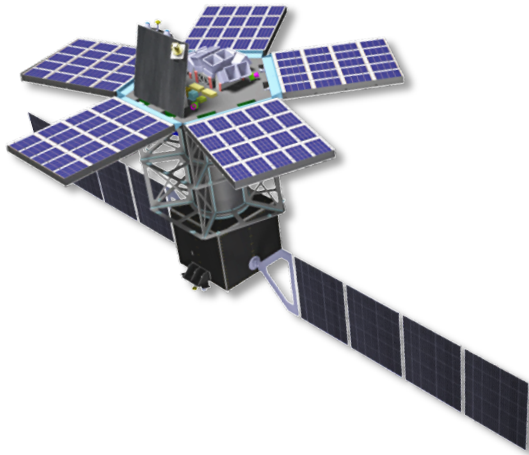
➡ **LOFT: GR effects in a stationary spacetime**



THREE POSSIBLE MISSION APPROACHES

LOFT

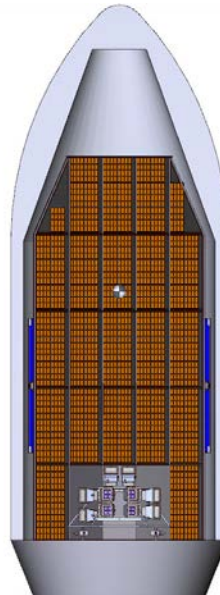
Large Observatory
For x-ray Timing
(ESA)



Bright sources: Large Collimated Area

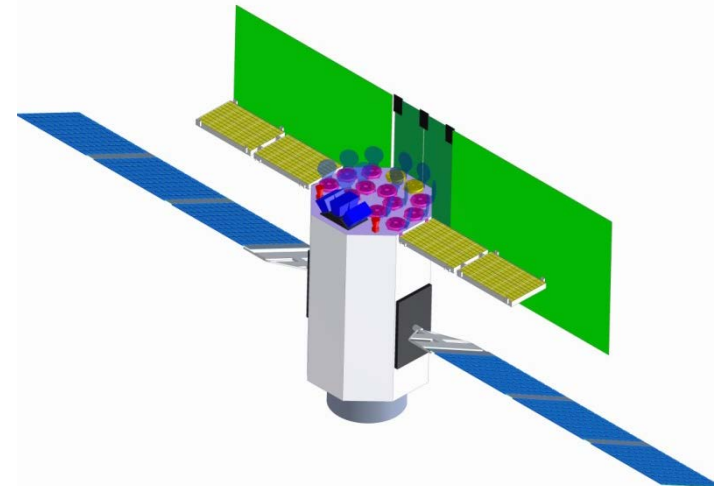
LOFT-P

LOFT-Probe
(NASA)



eXTP

enhanced X-ray Timing and
Polarization mission (CAS)



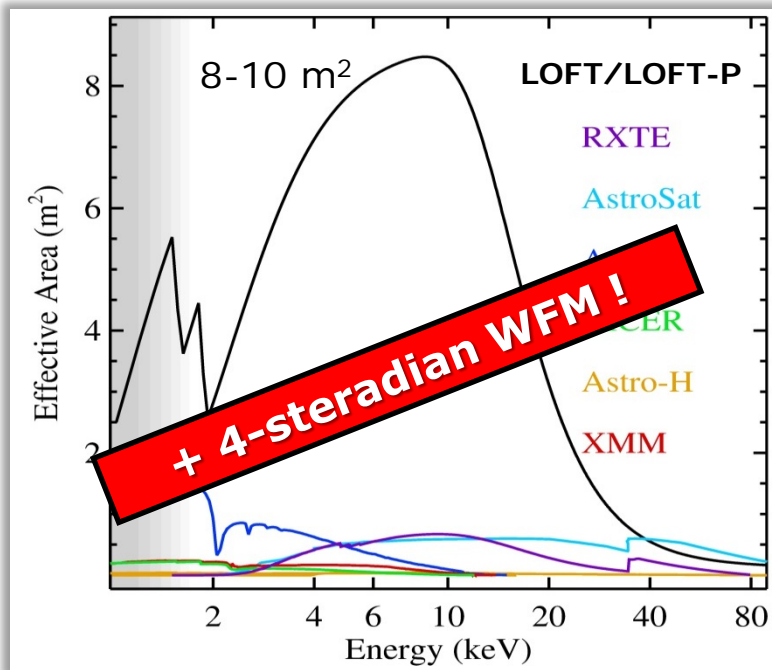
*Weak/soft sources: Collimated
Area + Telescopes.
And Polarimeter*



THREE POSSIBLE MISSION APPROACHES

LOFT / LOFT-P

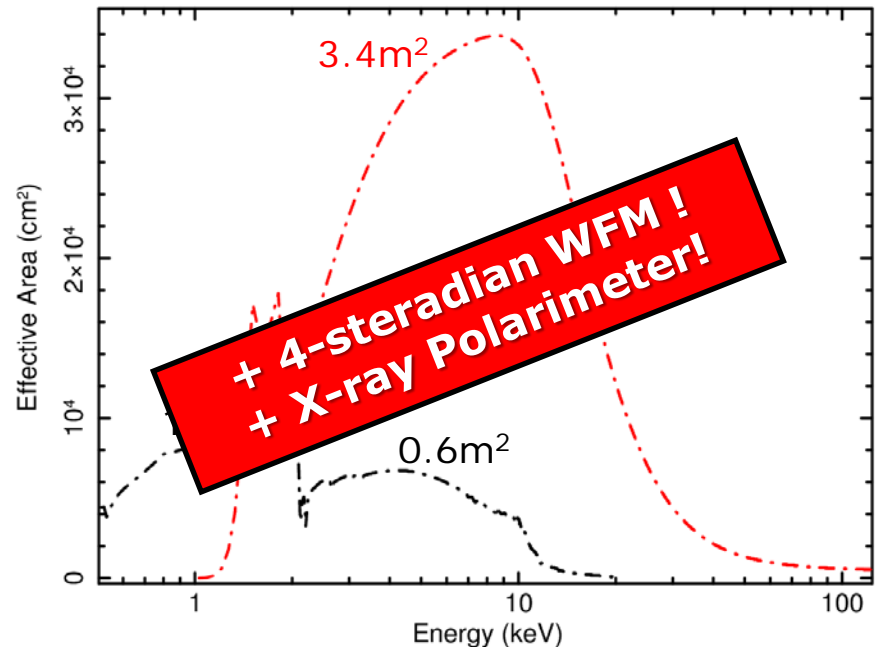
Large Observatory For x-ray Timing
(ESA or NASA)



*Bright sources:
Large Collimated Area*

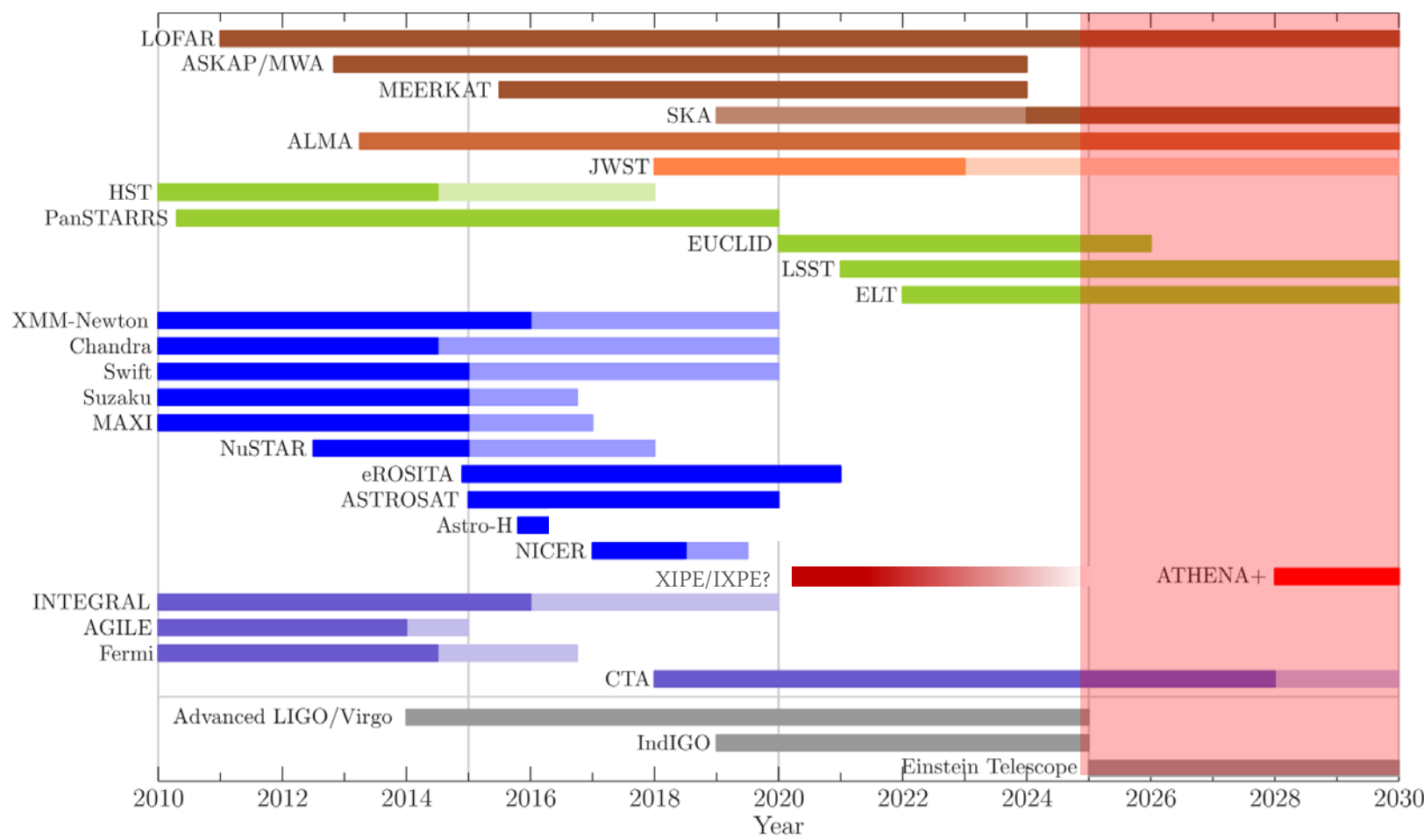
eXTP

enhanced X-ray Timing and
Polarization mission (CAS)

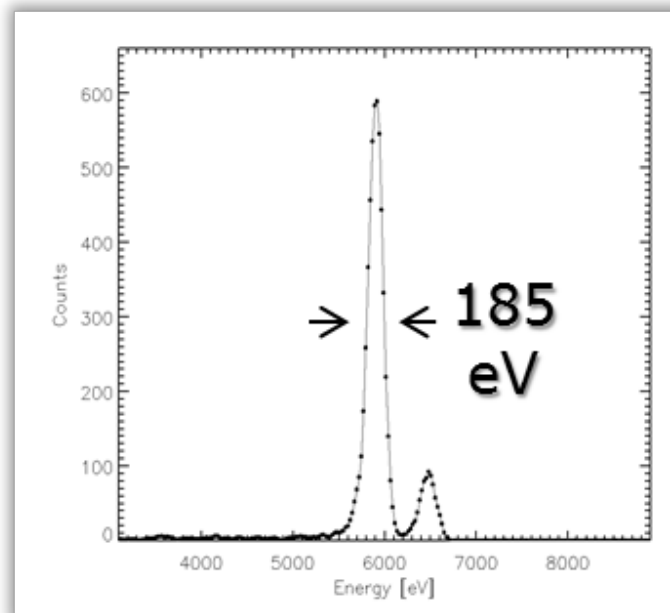


*Weak/soft sources:
Collimated + Focused Area*

The Multi-wavelength and Multi-messenger Context of Time Domain Astronomy

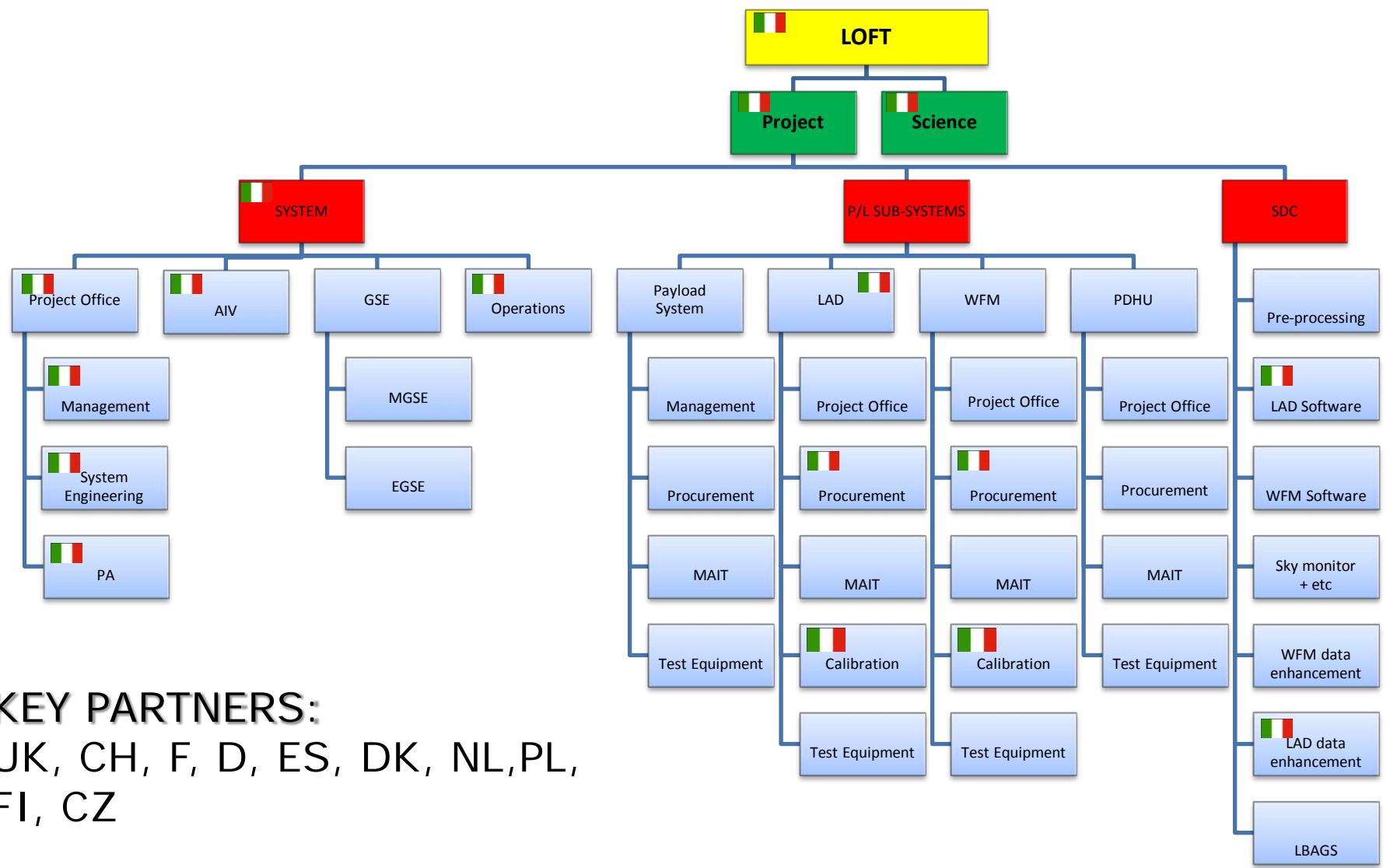


LARGE AREA SILICON DRIFT DETECTORS TECHNOLOGY



- 120 mm x 72.5 mm
- 450 μm thick
- 224 anodes, 970 μm pitch
- $<150 \text{ pA/cm}^2$ leakage at 20°C





KEY PARTNERS:
UK, CH, F, D, ES, DK, NL, PL,
FI, CZ



eXTP

- Pre-selected in China, currently in phase 0/A. Possible selection in 2016 or 2017, for a launch in 2024-2025. Participation of the whole LOFT consortium + INAF/OAB + MPE.

LOFT-M5

- ESA M5 call already issued. Proposals due Oct 2016. Selection in June 2017. Launch in 2029.

LOFT-P

- Preparation activities for the Decadal Survey 2020. NASA-funded mission study currently ongoing. Probe-class. Possible notional mission call end-2016/early-2017. Real mission call early-2020's. Launch in late-2020's.

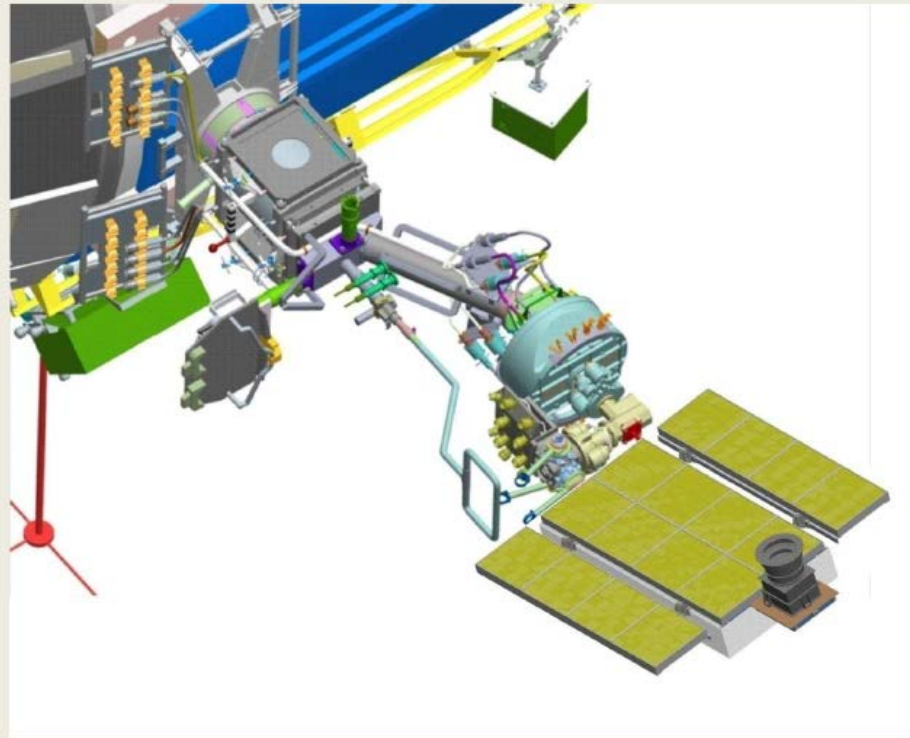
Current support: TECNO-INAF and ASI (future missions call).



LOFT-pathfinder

1-m² experiment on ISS (Russian segment) to be launched in 2020

Rotary pointing system on the Russian segment of the ISS



At the moment the Canadian telescopes successively operates



THANK YOU

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