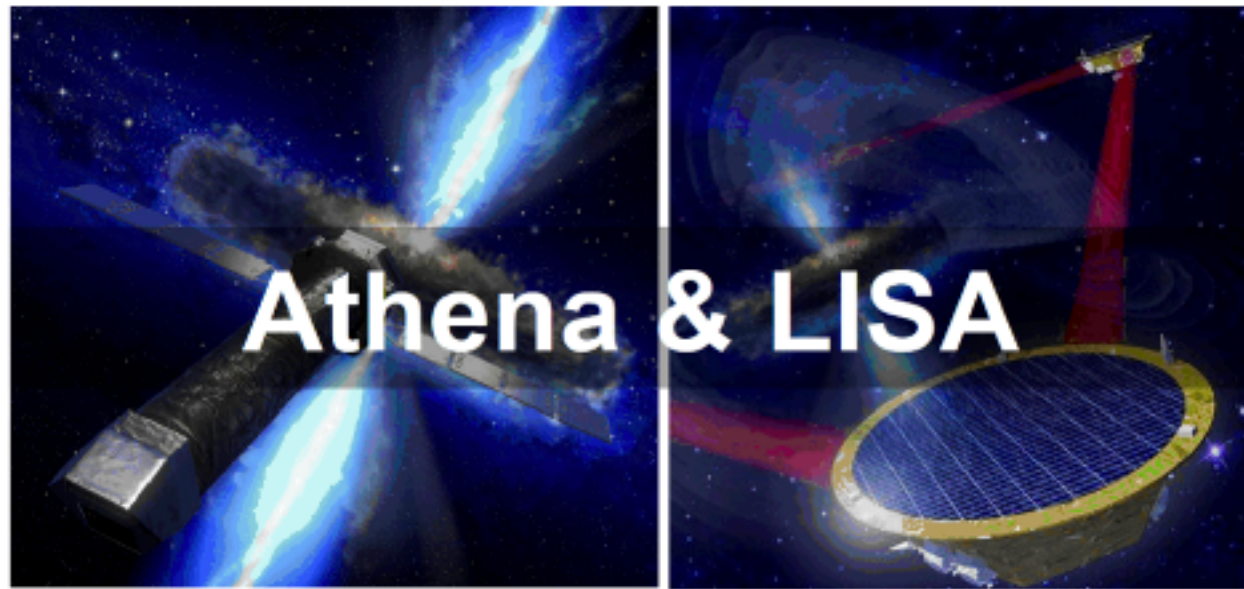


LISA-Athena Working Group

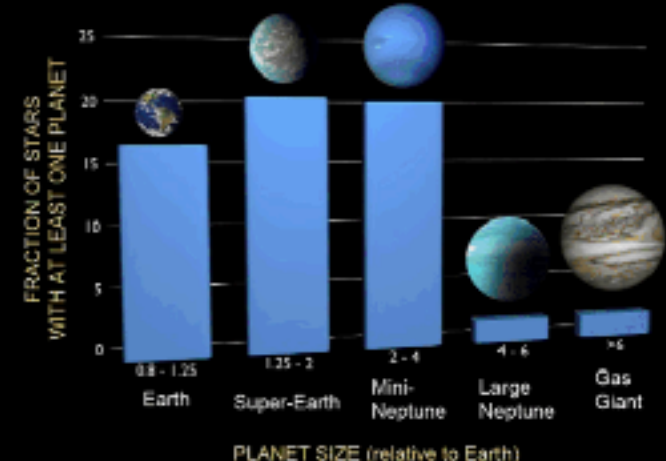
Paul McNamara
Joint NLST/SST meeting
Baltimore, August 2018

Strategic Plan for ESA Ministerial 2019



F-missions in sync with M-missions (joint launch) → new line of opportunities with special emphasis on novel implementations

Unique celestial opportunity to explore Ice Giants



Payload system provision → alleviate/facilitate/support Member State provision

Preparation of Cosmic Vision in the 2050 time frame

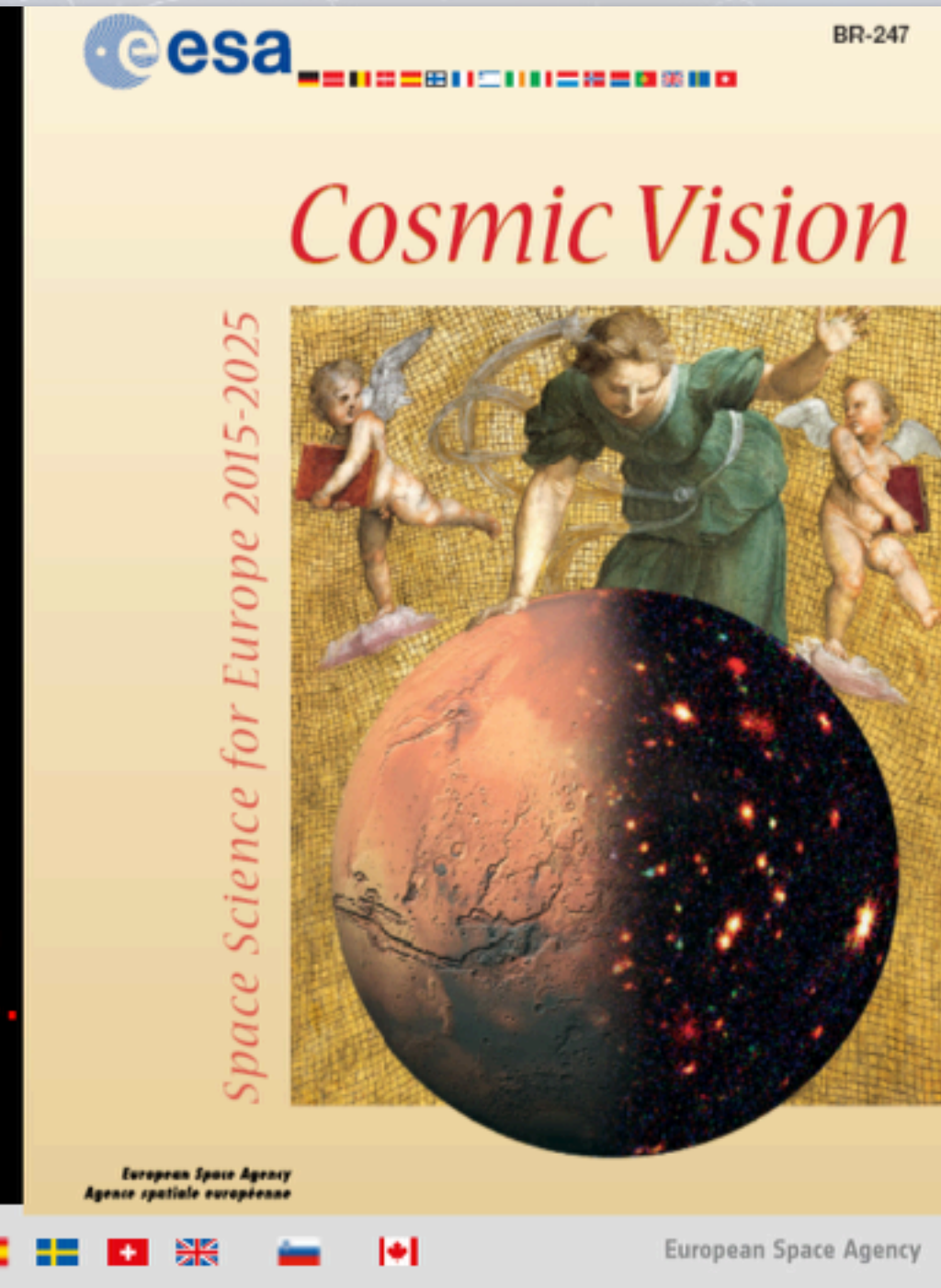
Guenther Hasinger - ESA Director of Science
Charts taken from presentation at LISA Symposium

Athena and LISA synergy

- The hot and violent universe: Strong gravity produces high energy radiation and gravitational waves.
- "Bringing sound to the movies": crucial orthogonal information on physical processes, e.g. compact object mergers.
- Black holes may contribute to the elusive Dark Matter, solving two riddles simultaneously.

We encourage the Athena and LISA teams to jointly work on a study about these synergies.

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- In order to prepare for the Ministerial in 2019, the Athena study scientist and I are working on establishing a joint working group of the two SSTs to prepare a “added-value” science case document of having both mission operate concurrently
 - This will be submitted to the ESA executive and Advisory Structure as inputs towards the Ministerial submission
 - *NB: LISA can achieve its full science case without Athena follow-up observations*
 - *This WG is looking at the added-value of both mission observing the same source*
- The WG will (initially) consist of 2 members of each science team as well as the two Study Scientists
 - However, this may be extended by external experts if required
- From the LISA SST, we have nominated Monica Colpi and Nial Tanvir as our representatives
 - From Athena, it is likely Luigi Piro and one other (possibly Peter Jonker)
 - Formal invites will be issued by the Coordination office

• Schedule:

- The Terms of Reference are now being finalised with the ESA Coordination Office
- Face-to-face kick-off will take place in Sept-Oct timeframe (assuming we can find a date!)
- First draft of joint science case by end of year
- Final document to be submitted to Advisory Structure for their February-March meetings

- Assess the relevant science environment expected in the 2030s
- Identify key astrophysical questions that synergetic observations by Athena and LISA could answer
- Establish common science objectives/goals, including, but not limited to
 - Multi-messenger astrophysics pertaining to the study of compact objects such as supermassive black holes and neutron stars
 - Tests of General Relativity in the strong field environment
- Propose possible observational strategies to achieve the common scientific objective/goals above identified
- Identify operational requirements on which the Athena/LISA common scientific objective/goals are dependent

- Anything else?