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Design concepts and options for the Thermal Infrared Imager (TIRI) as part of ESA's Asteroid Impact Mission.

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ESA's Asteroid Impact Mission (AIM) is being studied as part of the joint ESA/NASA AIDA mission for launch in 2020. AIDA's primary mission is to investigate the effect of a kinetic impactor on the secondary component of the binary asteroid 65803 Didymos in late 2022. AIM will characterise the Didymos system and monitor the response of the binary system to the impact.

A multi-spectral, thermal-infrared imaging instrument (TIRI) will be an essential component of AIM's remote sensing payload, as it will provide key information on the nature of the surfaces (e.g. presence or absence of materials, degree of compaction, and rock abundance of the regolith) of both components in the Didymos system. The temperature maps provided by TIRI will be important for navigation and spacecraft health and safety for proximity/lander operations. By measuring the asteroids' diurnal thermal responses (thermal inertia) and their surface compositions via spectral signatures, TIRI will provide information on the origin and evolution of the binary system.

In this presentation we will discuss possible instrument design for TIRI, exploring options that include imaging spectroscopy to broadband imaging. By using thermal models and compositional analogues of the Didymos system we will show how the performance of each design option compares to the wider scientific goals of the AIDA/AIM mission.