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WINK, a pathfinder for a future all-sky X and gamma-ray space-based detector

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Monitoring the sky in the MeV energy range is crucial for understanding the nature of explosive events in the Universe. Since the Universe is transparent to MeV gamma rays, we can observe the most distant transient phenomena, such as gamma-ray bursts (GRBs). In 2017, there was the first joint observation of gravitational waves (GW) events from binary neutron stars and a GRB that initiated a new multi-messenger era. In the coming decade, a rapidly growing of multi-messenger astronomy with GW is expected and corresponding improvements in electromagnetic observation capabilities are required. Crystal Eye (CE), an innovative all-sky monitor, has been designed to detect photons of energies ranging from 10 keV to 30 MeV with accurate localization across the entire sky. Its autonomous, real-time monitoring ability makes it uniquely suited for studying transient events and multi-messenger astrophysics in the MeV energy range. CE has an hemispherical shape and consists of 112 pixels of scintillating crystals. The CE pathfinder, WINK, composed of 3 CE pixels, will fly aboard Space Rider in 2027 with the goal of characterize the cosmic background and validating CE's innovative technologies. In this contribution, the results of the initial tests on the WINK qualification model, the future plans, and the mission's expectations will be presented.

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