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On behalf of the UK Near-Earth Objects (NEOs) Community
28th October 2025**To:**

The Members of the Science, Innovation and Technology Committee
House of Commons
London SW1A 0AA

Subject: Strengthening the UK's Role in Planetary Defence and Asteroid Exploration**Executive Summary**

This submission, prepared on behalf of the UK Near-Earth Objects (NEOs) Community, outlines recommendations to strengthen the United Kingdom's leadership in planetary defence and asteroid exploration. The UK plays an active role in planetary defence through the National Space Operations Centre (NSPOC) and its involvement in the International Asteroid Warning Network (IAWN) and the Space Mission Planning Advisory Group (SMPAG). However, planetary defence is not yet formally integrated into the UK's national space safety priorities, which currently focus on space weather and space domain awareness (SDA). We recommend developing a **National Space Safety Strategy**, aligned with the European Space Agency (ESA)'s Space Safety Programme and relevant bilateral initiatives, that explicitly incorporating planetary defence by:

- **Enhancing UK ground-based observations** to improve detection and tracking capabilities;
- **Ensuring UK participation in international asteroid missions** such as ESA's *HERA* and *RAMSES*, while also pursuing national or bilateral mission opportunities;
- **Establishing targeted funding mechanisms** for research, training, and the development of mission platforms and payloads.

In addition, hosting a **future Planetary Defence Conference** would consolidate the UK's position as a trusted and valuable international partner in safeguarding Earth from natural space hazards.

Background and context

This submission follows the Committee's oral evidence session of 24 June 2025, which examined the threat posed by asteroids¹. The UK Near-Earth Objects (NEOs) Community comprises experts from UK academia and industry (as listed by the UK Space Agency) who collaborate to advance planetary defence and asteroid research. The recommendations provided here reflect international best practice and the UK's current and emerging capabilities.

Why This Matters

Asteroid impacts are one of the few natural disasters that humanity can prevent with sufficient warning. They are exemplified by events like the 2013 Chelyabinsk meteor, which caused over 1,500 injuries and \$33 million in damage. Events of this scale are expected to recur every few decades, highlighting both the importance of preparedness and the limitations of current detection capabilities. Recent discoveries, such as asteroid 2024 YR4, highlight persistent blind

¹ <https://www.parliamentlive.tv/Event/Index/840342ad-7702-4f2f-9343-51be47403c36?agenda=True>

spots in observing objects approaching from the Sun's direction. Developing asteroid-defence technologies not only strengthens planetary protection but also advances dual-use capabilities in surveillance, tracking, and on-orbit operations. The recent U.S.-U.K. Operation OLYMPIC DEFENDER demonstrated inter-satellite proximity manoeuvres directly applicable to future asteroid-deflection and planetary-defence missions². UK industrial partners, such as Surrey Satellite Technology Ltd (SSTL), are also developing Space Domain Awareness mission and spacecraft capability for long range detection and tracking objects in the space occupied by Earth's artificial satellites, for example in Geostationary orbit. These capabilities, combined with UK involvement in NASA's DART mission³ and European radar tracking (e.g. Jodrell Bank), demonstrate the nation's growing expertise and its potential to play a leadership role in global space safety and resilience. We recommend supporting UK initiatives aligned with the United Nations Office for Outer Space Affairs (UNOOSA) and the Space Mission Planning Advisory Group (SMPAG) Roadmap, which emphasise planetary defence, international coordination, and technological readiness⁴. Advancing these capabilities drives innovation, supports scientific exploration, and strengthens the UK's high-tech economy and leadership in responsible space governance.

The UK's Current Role in Planetary Defence

The UK is a member of two key UN-endorsed planetary defence bodies. In 2024, the UK joined the International Asteroid Warning Network (IAWN⁵), which communicates impact risks and mitigation plans to national governments, and was a founding member of the Space Mission Planning Advisory Group (SMPAG⁶), which coordinates international responses and mission planning. In July 2024, the National Space Operations Centre (NSpOC) was established to coordinate national efforts in space safety and planetary defence⁷. The UK Space Agency (UKSA) also convenes the national NEO community to support IAWN and SMPAG activities through monthly reporting and engagement events such as the **UK NEO Community Day**⁸.

Apophis 2029: A unique opportunity for public engagement and international cooperation

The close approach of asteroid Apophis in April 2029, passing within geostationary orbit and visible from the UK, offers a rare opportunity to engage the public in planetary defence and to showcase the UK's contribution to safeguarding Earth. Coinciding with the UN's *International Year of Asteroid Awareness and Planetary Defence*⁹, it provides an ideal platform for international collaboration. The UK could work with UNOOSA to establish a Panel on Asteroid Orbit Alteration (PAOA) to guide responsible activities that may intentionally or unintentionally alter the trajectories of asteroids or comets. Given rising international activity, including the China National Space Administration's planned 2028 deflection mission, the UK is well placed to lead on the governance of planetary-defence operations.

Strategic Recommendations for the UK

1. Investment in ground-based observations

The UK has demonstrated radar detections, including Doppler resolution, for asteroids **2006 WB**¹⁰ and **2025 FA22**¹¹, using the **76 m Lovell Telescope** as receiver and the **JPL/DSN Madrid**

² U.S. Space Command, 2025, <https://www.spacecom.mil/Newsroom/News/Article-Display/Article/4308024/press-release-us-and-uk-demonstrate-partnership-in-first-ever-on-orbit-operation/>

³ <https://dart.lhuapl.edu/Team/>

⁴ UNOOSA, ST/SPACE/73, 2023,

https://www.unoosa.org/oosa/en/oodoc/data/documents/2023/stspace/stspace73_0.html

⁵ <https://iawn.net/>

⁶ <https://www.cosmos.esa.int/web/smpag>

⁷ UKSA blog post, July 2025: *UK Space Safety Centre marks one-year milestone*, <https://space.blog.gov.uk/2025/07/11/uk-space-safety-centre-marks-one-year-milestone/>

⁸ <https://www.eventbrite.co.uk/e/2nd-uk-neo-community-day-tickets-1635235376029?aff=oddtcreator>

⁹ <https://www.un.org/en/observances/asteroid-awareness-year>

¹⁰ <https://conference.astro.dur.ac.uk/event/7/contributions/757/>

¹¹ <https://echo.jpl.nasa.gov/asteroids/2025fa22.2025.goldstone.planning.html>

antenna as transmitter. These demonstrations show radar's ability to achieve Doppler measurements better than 1 cm/s and enable range-Doppler imaging, crucial for characterising near-Earth asteroids even during daylight. **Jodrell Bank** plays a central role in European radio astronomy and asteroid detection, making radar an essential complement to optical observations and a key component of the UK's contribution to planetary defence. Other national initiatives include the **UK Fireball Alliance** (UKFAI¹²), a collaboration between academic and citizen-science led camera networks that provides near complete coverage of the skies over the UK. The networks record objects as they enter and travel through the atmosphere, providing details on their origin, composition, size, strength, and disruption behaviour. UKFAI was crucial to the recovery of the Winchcombe meteorite in 2021, and more recently, contributed to planetary defence efforts by characterising the 2023 CX1 asteroid impact over northern France.

2. Facilitate UK Participation in International Asteroid Missions

The UK has world-class expertise in observation, planetary science, sample analysis, instrumentation, engineering, impact physics, and mission design. However, UK scientists contributing to major international missions (e.g. NASA's DART, OSIRIS-REx, Lucy; ESA's HERA, RAMSES; JAXA's Hayabusa2 and MMX) currently receive no dedicated domestic funding. Since international agencies do not fund foreign participation, and UKSA's general planetary science calls have not specifically supported asteroid missions, we recommend allocating UKSA funding calls to enable:

- UK-led payloads, Small Satellites (e.g. those manufactured by SSTL), and CubeSats;
- Scientific participation in international asteroid missions; and
- National advocacy for UK involvement in ESA's RAMSES mission at the ESA Council at Ministerial Level (CMIN25) in November 2025.

3. Bridge the Fragmented Funding Landscape

There is currently no dedicated Centre for Doctoral Training (CDT) dedicated on space-related disciplines, enabling a long-term skills gap in areas critical to the UK's space ambitions. A coordinated funding mechanism between UKSA, DASA, EPSRC, and STFC should support interdisciplinary research and training in space engineering and safety. Building on successful models such as the Rocketry Research, Training and Teaching Hub (R2T2), a similar collaboration could underpin a national CDT in space engineering and safety. While a CDT focused solely on planetary defence may not align with current funding priorities, dedicated calls for asteroid mission payloads and scientific participation should be considered separately.

Long-Term Strategic Needs

The UK should integrate planetary defence within a National Space Safety Strategy aligned with ESA's Space Safety Programme, covering space weather, debris mitigation, and planetary defence. Expanding the remit of NSpOC to strengthen national analytical capability and coordinate with ESA's NEO Data Centre and IAWN would avoid duplication and reinforce the UK's leadership. Investment in sunward detection and tracking, including solar coronagraphs, L1/L2 observatories, and participation in ESA's NEOMIR and FlyEye initiatives, would close key monitoring gaps and strengthen UK and European resilience. The UK could also demonstrate leadership by hosting a future Planetary Defence Conference, reinforcing its role in international coordination. Contributions to ground-based observations and radar systems should be pursued as near-term objectives, while participation in future mission-class activities could form part of a long-term planetary defence roadmap.

¹² <https://ukfall.org.uk/>

Conclusions

Asteroids pose a measurable and preventable risk to human populations and global infrastructure. The United Kingdom has the expertise, facilities, and partnerships necessary to assume a leading role in planetary defence but lacks a sustained and coordinated national framework comparable to other nations. We identify three critical priorities to secure the UK's sovereign capability and international contribution in this field:

1. Investment in ground-based observation infrastructure;
2. Participation in international asteroid missions;
3. Coordination of funding for research and training.

With targeted investment and cross-agency collaboration, the UK can strengthen national resilience, accelerate space innovation, train the next generation of scientists and engineers, and inspire young people through world-class STEM engagement.

Yours sincerely,

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