

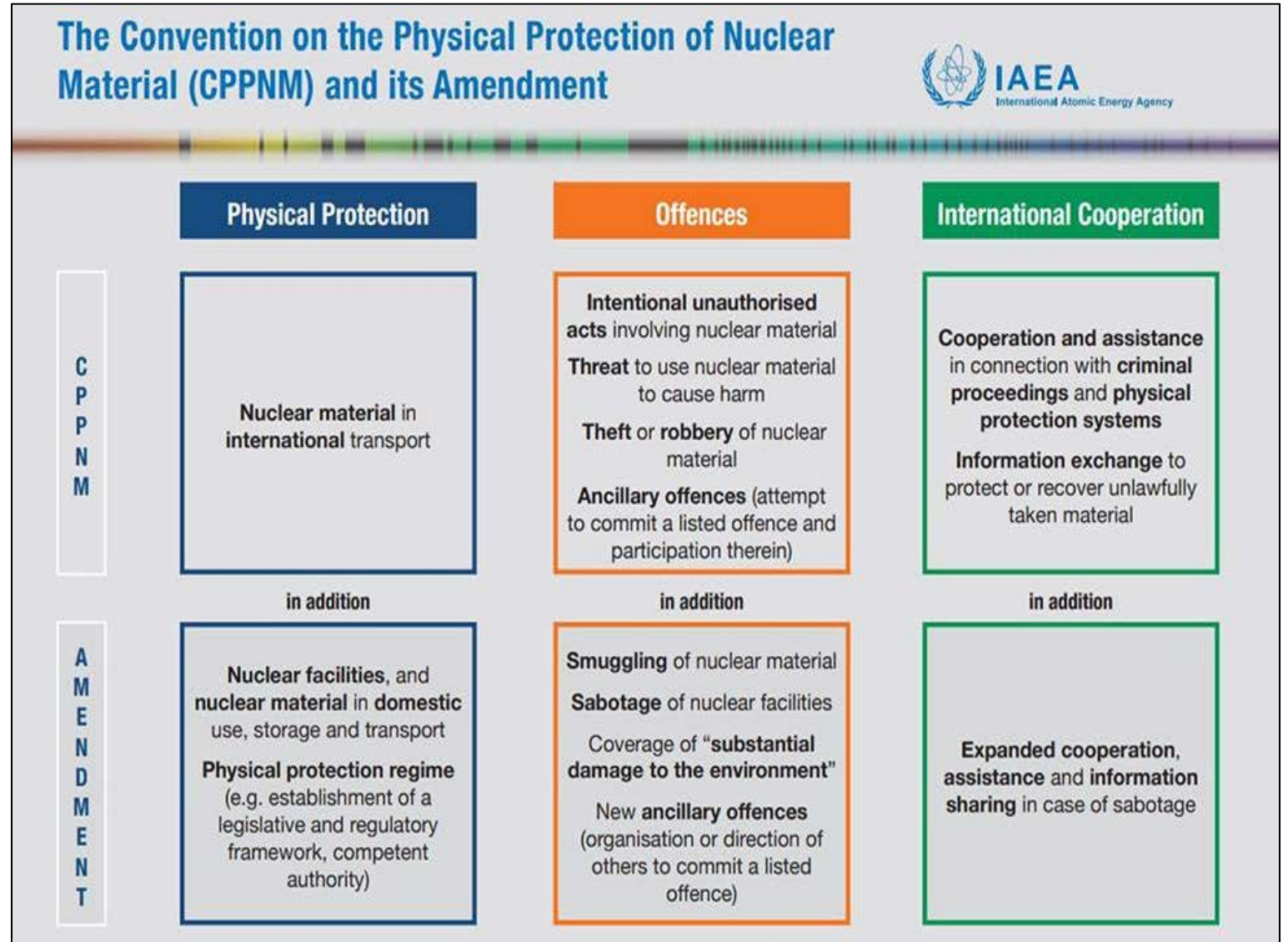


# Uncrewed Systems: Threats and Opportunities in the Civil Nuclear Sector

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# CPPNM/A

The entry into force of the CPPNM in 1987 and its Amendment in May 2016 were crucial milestones in the development of the international legal framework for nuclear security, as they remain the only internationally legally binding undertakings in the area of physical protection of nuclear material and of nuclear facilities used for peaceful purposes. The UK is a signatory of the CPPNM/A.



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## Overview – Uncrewed Systems

- Uncrewed Systems, collectively known as Drones – UAVs, UGVs, USVs, UUVs.
- 1849 - Austrian Empire use pilotless balloons approx. six metres in diameter, equipped with timed fuses, to conduct an aerial bombardment of the city of Venice.
- First quadcopter developed in 1907 by the French aircraft designers Jacques and Louis Bréguet.
- World War I - UK and the USA develop pilotless radio-controlled aircraft - never deployed operationally. Development continued between the 1930s – 1950s.
- 1960s - Vietnam War era jet-propelled Ryan 'Lightning Bug' and QH-50 Drone Anti-submarine Helicopter (DASH) see service.
- 2001 – War in Afghanistan increased development of uncrewed systems.
- 2006 – USA FAA begin issuing commercial drone permits.







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# WHAT DOES THIS HAVE TO DO WITH THE CPPNM/A?

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## NM in international transport





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## NM in domestic use, storage, and transport





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## Offences

- Theft
- Robbery
- Intentional unauthorised acts involving NM
- Smuggling
- Sabotage
- Substantial damage to the environment

### IAEA Security of Nuclear Material in Transport NSS No. 26-G (p. 42)

***5.27. Using a graded approach, the shipper or carrier of the conveyance and/or the guards involved in the shipment should provide continuous surveillance of the conveyance and the surrounding area.***

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**“In the civilian domain counter – drone systems are likewise set to figure as an important tool for security and law enforcement, as unmanned aircraft are increasingly put to a variety of nefarious purposes.”**

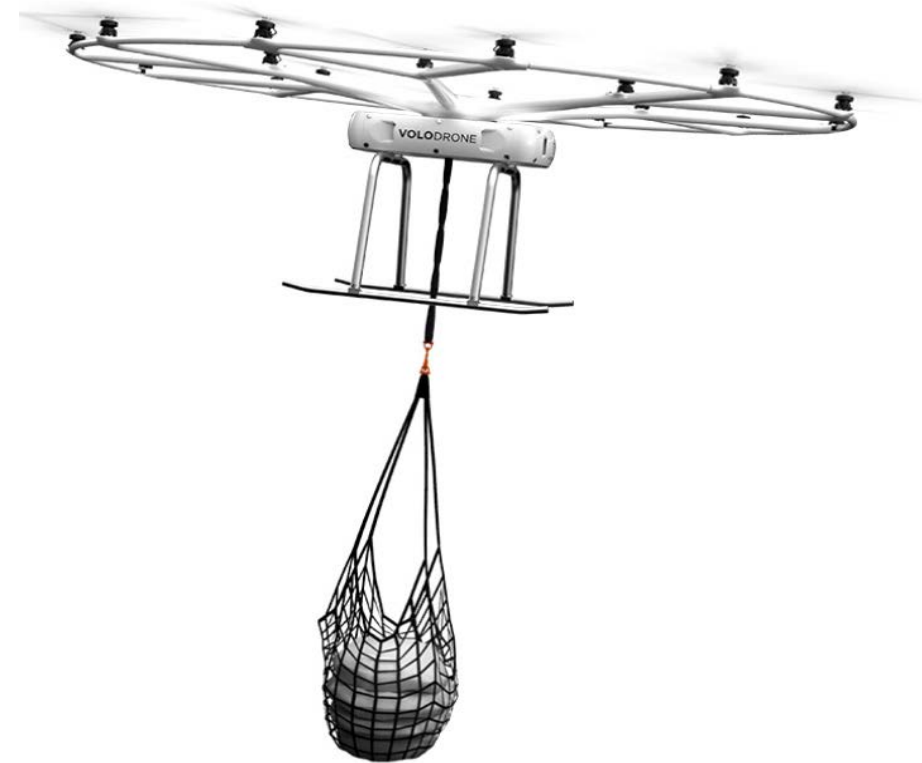
**Michel, A.H.  
Counter-Drone Systems (2<sup>nd</sup>. Ed.),**

**DJI Mini 3 Pro**



**Sub 250g.  
Radiological  
Dispersal Device?**

**Volocopter Volodrone**



**200 Kg Payload. Theft  
of NM?**

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# Canadian approvals milestone for drone delivery of radioisotopes

16 June 2023



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## Threats

**Red Sea War: Houthi drone boat detonation opens a new chapter**

**Major blow to Putin's Black Sea fleet after drones wipe out another warship**



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## Threats

**Ukraine war: Russia says drone injures five at Kursk railway station**

**Video reportedly shows strike on train transporting Russian cruise missiles**

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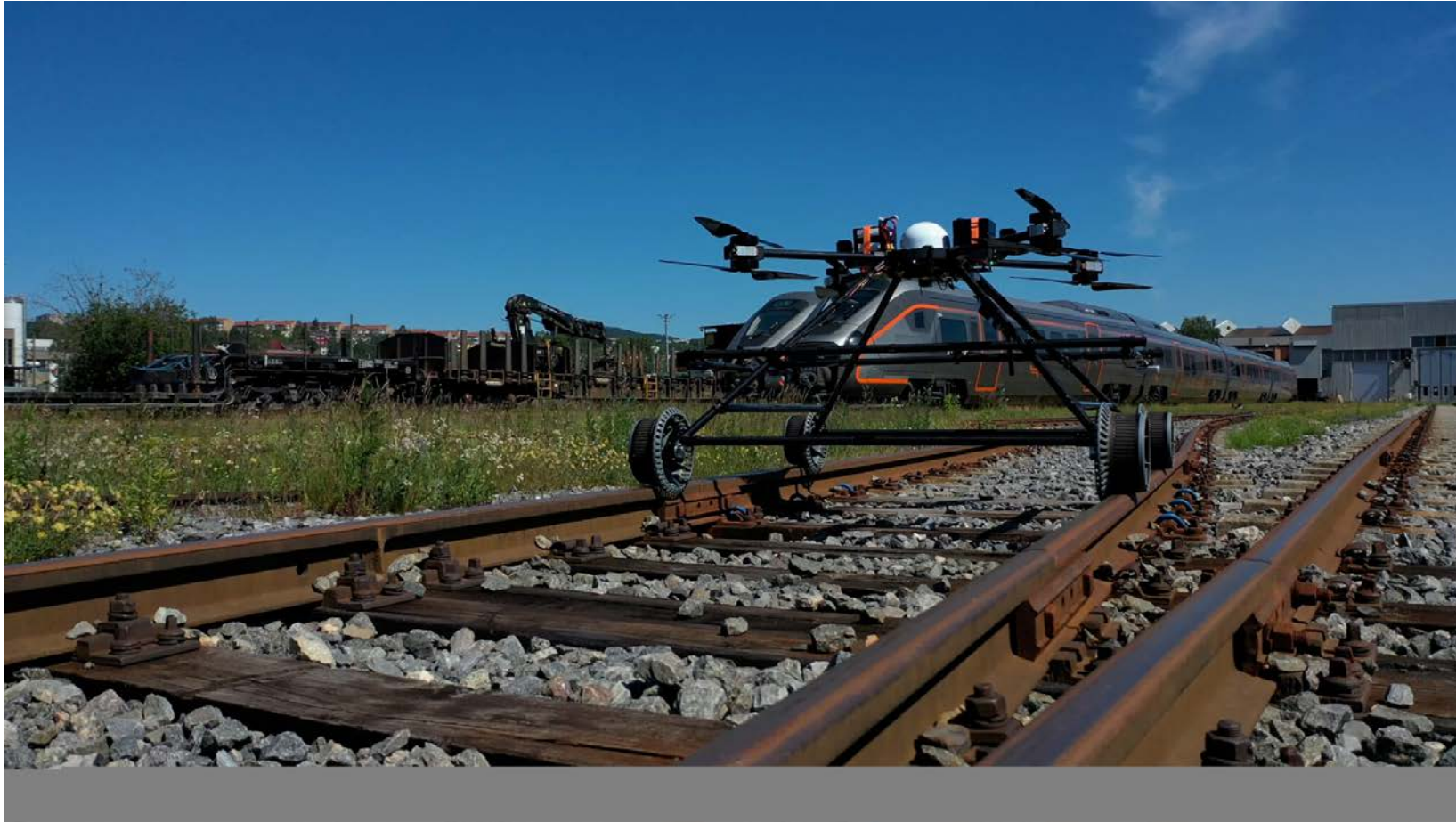
## Opportunities



USVs for security escort, extended range surveillance, re-supply of vessels transporting NM.

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## Opportunities



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## PKP UAV VIDEO



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## DRS RAILHEAD VIDEO



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**NTS Security and Resilience Directorate.**  
**E: [scott.reardon@ntsglobal.uk](mailto:scott.reardon@ntsglobal.uk)**  
**T: 07736 168 271**  
**Scott Reardon Security Manager (Rail)**

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