The Future of UAS

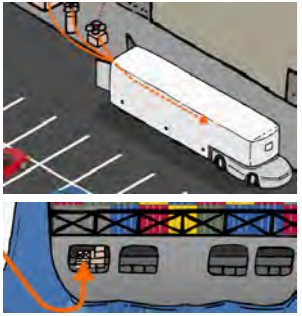**Performance monitoring and surveillance**

Multiple autonomous UAS with variety of sensors to monitor performance, identify problems and feed back to a central system.

Example: Tracking worker performance, or for safety / security.

(1)

Caged UAS

System able to navigate through otherwise difficult to access locations with protective 'cage'.

Example: Inspecting interior of pipes and areas with many obstacles.

(2)

Remote inspection of high risk areas

Use of UAS to remotely inspect areas, reducing health and safety risk - e.g. inspection of High Voltage electrical systems / connections, or working at height.

(3)

Indoor Environment

Integration with other autonomous systems (17)

Seamless integration with other autonomous platforms at various scales such as (A) trolleys, (B) cars / taxis, (C) trucks, (D) boats or (E) container ships (for autonomous loading and distribution of goods).

Security & surveillance (16)

Following perimeter / path with recording equipment and feeding back to central point - allowing for more flexible security and surveillance.

Point-to-point delivery (15)

Direct delivery of payloads to any target destinations, reducing delivery times and the environmental impact.

Examples: Package delivery, medical supplies.

Relocatable adverts / public messages (14)

Single or multiple drones to autonomously carry and relocate information displays where desired, to more effectively communicate.
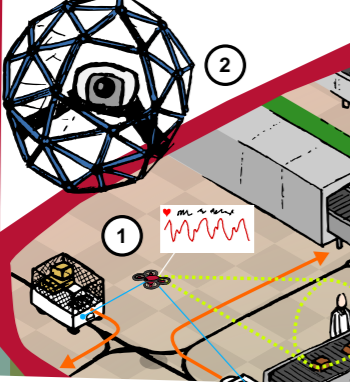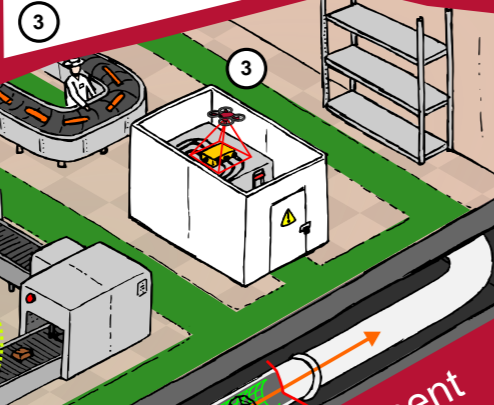
Examples: Rapidly deploying road signs or advertising displays.

3D printing repairs

UAS with 3D printer - enables rapid 3D printing, to otherwise inaccessible locations.

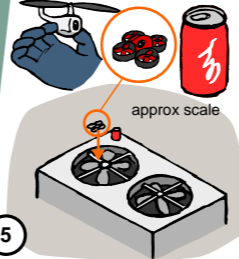**Example:** Rapid emergency repair for roofing or pipes.

(4)

Micro UAS

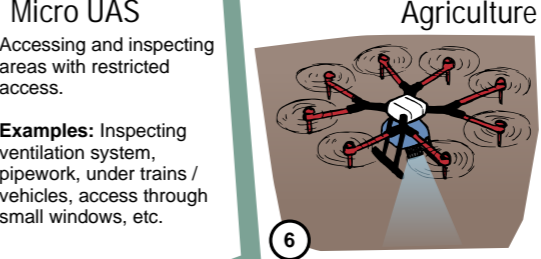Accessing and inspecting areas with restricted access.

approx scale

Examples: Inspecting ventilation system, pipework, under trains / vehicles, access through small windows, etc.

(5)

Agriculture / Crop spreading
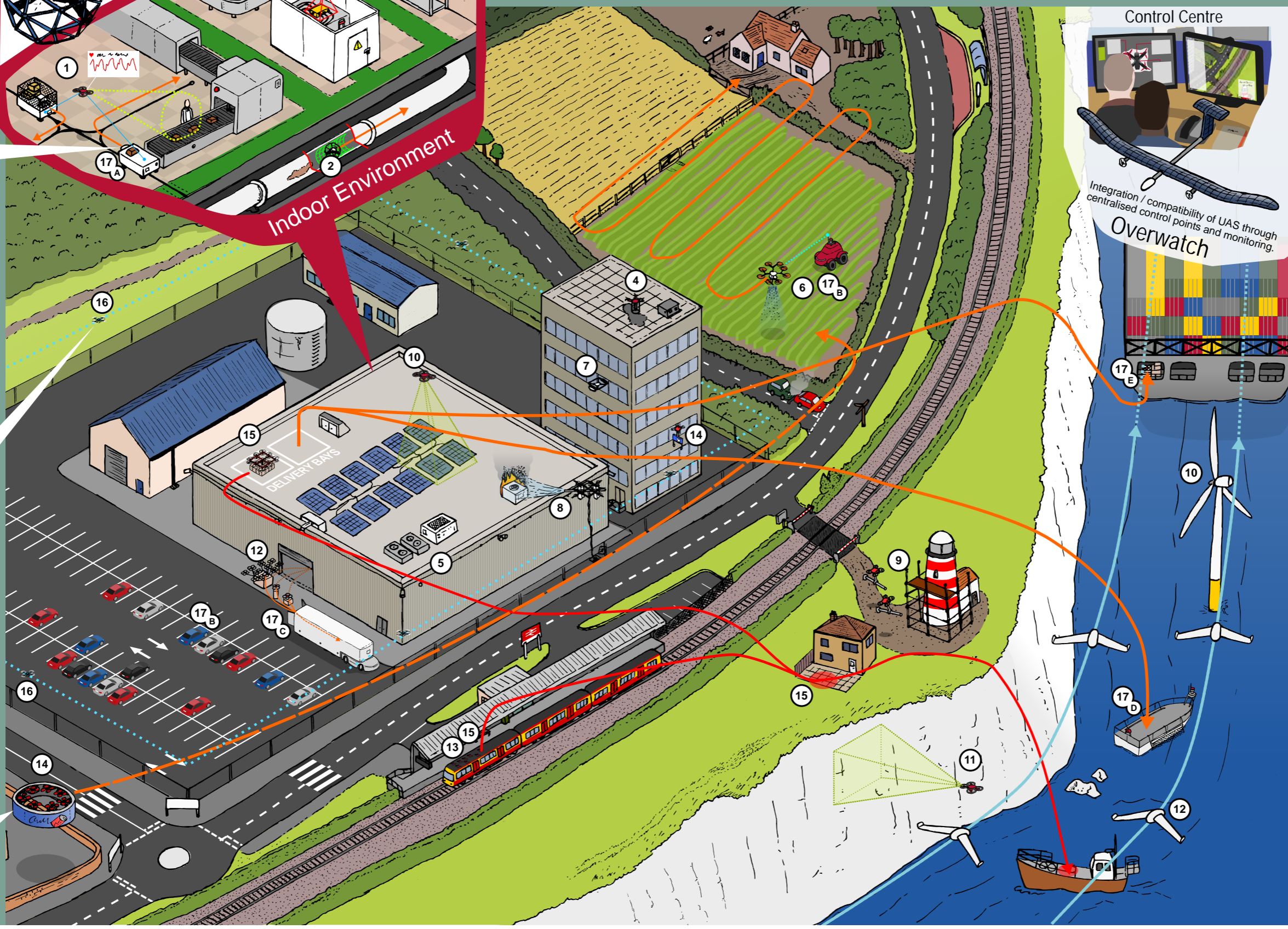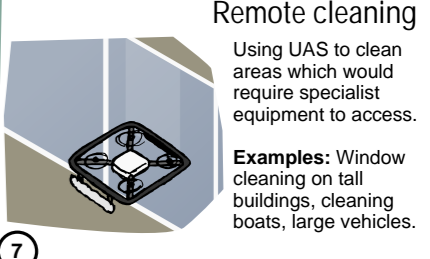
Autonomous UAS - capable of following pre-determined path.

Examples: Dispersing seeds, fertilising, monitoring crops, and directing other agricultural vehicles, measuring topology.

(6)

Remote cleaning

Using UAS to clean areas which would require specialist equipment to access.

Examples: Window cleaning on tall buildings, cleaning boats, large vehicles.

(7)

Firefighting (8)

Targeted firefighting with rapid response for areas difficult to access with traditional firefighting equipment.

Construction (9)

Use of swarm of UAS to assemble structures autonomously.

Example: Autonomously constructing scaffolding.

Asset inspection (10)

Remote inspection and condition monitoring of assets.

Examples: Wind turbine condition monitoring, solar panel inspection - through visual inspection, and / or specialised thermal imaging or acoustic sensors.

Structural assessment (11)

Scanning to assess structural condition.

Example: Remote scanning of cliffs to assess rate of erosion / risk of collapse.

Collaborative swarms (12)

Multiple UAS working together autonomously to complete tasks - with greater payload capacity, or wider coverage.

Examples: Transporting packages, surveying large areas.

Extending distance (13)

Use of other transport systems to reduce the power requirement and extend range of UAS.

Examples: On train to travel long distances then facilitate 'last mile' delivery by UAS.

Control Centre

Integration / compatibility of UAS through centralised control points and monitoring.

Overwatch

DELIVERY BAYS

A look into how Unmanned Aerial Systems (UAS) could provide significant benefit through a wide range of applications.

FRAZER–NASH
CONSULTANCY