

Ref:	NR/L3/OPS/251
Issue:	2
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V4

# Level 3

## Work Instruction

### Unmanned aircraft system (DRONE/UAS) operations (formally NR/L3/OPS/251/1.1)

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## User information

This Network Rail document contains colour-coding according to the following Red–Amber–Green classification.

### **Red requirements – no variations permitted**

- Red requirements are to be complied with and achieved at all times.
- Red requirements are presented in a red box.
- Red requirements are monitored for compliance.
- Non-compliances will be investigated and corrective actions enforced.

### **Amber requirements – variations permitted subject to approved risk analysis and mitigation**

- Amber requirements are to be complied with unless an approved variation is in place.
- Amber requirements are presented with an amber sidebar.
- Amber requirements are monitored for compliance.
- Variations can only be approved through the national variations process.
- Non-approved variations will be investigated and corrective actions enforced.

### **Green guidance – to be used unless alternative solutions are followed**

- Guidance should be followed unless an alternative solution produces a better result.
- Guidance is presented with a dotted green sidebar.
- Guidance is not monitored for compliance.
- Alternative solutions should be documented to demonstrate effective control.

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## Compliance

This Network Rail standard/control document is mandatory and shall be complied with by Network Rail Infrastructure Limited and its contractors if applicable from 02 March 2019.

Where it is considered not reasonably practicable<sup>1</sup> to comply with the requirements in this standard/control document, permission to comply with a specified alternative should be sought in accordance with the Network Rail standards and controls process, or with the Railway Group Standards Code if applicable.

If this standard/control document contains requirements that are designed to demonstrate compliance with legislation they shall be complied with irrespective of a project's Governance for Railway Investment Projects (GRIP) stage. In all other circumstances, projects that have formally completed GRIP Stage 3 (Option Selection) may continue to comply with any relevant Network Rail standards/control documents that were current when GRIP Stage 3 was completed.

**NOTE 1:** Legislation includes Technical Specifications for Interoperability (TSIs).

**NOTE 2:** The relationship of this standard/control document with legislation and/or external standards is described in the purpose of this standard.

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<sup>1</sup> This can include gross proportionate project costs with the agreement of the Network Rail Assurance Panel (NRAP).

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**Issue record**

<b>Issue</b>	<b>Date</b>	<b>Comments</b>
1	December 2016	First Edition.
2	December 2018	Out of date information removed. Safety procedures added. Level 2 module now Level 3 standard.

**Reference documentation**

Civil Aviation Authority (CAA) Guidance Publication CAP 722

European Aviation Safety Authority (EASA)

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## 1 Purpose

This work instruction sets out:

- a) the operating arrangements for in-house trained Drone Pilots, Framework Drone Pilots and Drone Pilots operating on behalf of lineside neighbours
- b) mitigates the risk of uncontrolled operation of Small Unmanned Aircraft (SUA / Drones) being operated near, on or over Network Rail infrastructure, as these may result in:
  - 1) damage to overhead lines and electrical wires;
  - 2) distractions for train drivers; and
  - 3) system failure resulting in injury or derailment.

This document provides a process for compliance with:

- a) The Air Navigation Order (ANO);
- b) The Civil Aviation Authority (CAA) Guidance Publication CAP 722; and
- c) European Aviation Authority (EASA).

## 2 Scope

This work instruction applies to any person who wishes to operate drones or SUA near, on or over Network Rail infrastructure and details:

- a) competency;
- b) equipment;
- c) proximity to Network Rail Infrastructure;
- d) notification arrangements; and
- e) accident reporting.

## 3 Definitions

For the purpose of this document, the following terms and definitions apply.

<b>Air Navigation Order (ANO)</b>	The legal foundation for most areas of civil aviation that are regulated at a national level.
<b>Beyond Visual Line of Sight (BVLOS)</b>	<p>Anything which is at or beyond the distance at which it can be seen without additional visual aided equipment.</p> <p><b>NOTE:</b> <i>It is not always possible for the operator to directly see the unmanned aircraft. To avoid other aircraft or objects for operations beyond visual line of sight, alternative arrangements to prevent collisions need to be taken. In these cases, the aircraft needs to be either be fitted with a Sense – and – Avoid system or, in the absence of such a system; it operated within Segregated Airspace.</i></p> <p><b>NOTE:</b> <i>Contact the Network Rail Air Operations team for further advice.</i></p>

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<b>CAP 722</b>	Guidance published by the CAA which is intended to assist those who are involved in all aspects of drone operations.
<b>Congested Area</b>	Area which is substantially used for residential, commercial, industrial or recreational purposes. <b>NOTE:</b> : It is defined in relation to a city, town or settlement. Specific permission(s) from the CAA needs to be obtained to operate in a congested area.
<b>European Aviation Safety Agency (EASA)</b>	The agency of the European Union (EU) with regulatory and executive tasks in the field of civilian aviation safety.
<b>Framework Agreement for Unmanned Aircraft Systems</b>	Approved suppliers within the Network Rail supply chain who are contracted to provide services detailed within the agreement. <b>NOTE:</b> For a list of current approved suppliers, contact the Network Rail Air Operations team.
<b>Mandatory Occurrence Reporting (MOR)</b>	A MOR scheme governed by European Regulations.
<b>Maximum Take-off Mass (MTOM)</b>	Maximum weight at which the operator is allowed to attempt to take off. <b>NOTE:</b> The limits are imposed due to structure or other reasons.
<b>Near, on or over Network Rail infrastructure</b>	Operating from, over or closer than 50m to Network Rail infrastructure, people, buildings or structures.
<b>Network Rail Infrastructure</b>	Infrastructure and land owned by Network Rail. <b>NOTE:</b> The land might be leased to, or under the control, of, another party.
<b>National Qualified Entity (NQE)</b>	The CAA approved training school that trains basic Drone/SUA Pilots. At the end of the course a successful candidate will be a certified Drone/SUA Pilot.
<b>Operations Manual (As defined in CAP 722)</b>	Document produced by the operator relating to operation of the drone and related equipment. <b>NOTE:</b> It might be leased to, or under the control, of, another party and is defined in CAP 772.

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Operational Safety Case (OSC)	Approval granted by the CAA which allows drone operators to operate closer than standard permissions. <b>NOTE:</b> Drones of 7kg or less are not required to use the OSC for standard permission (this implies keeping at least 50m clear of third parties etc.)
Congested Area Operational Safety Case (CAOSC)	Approval granted by the CAA which allows drone operators to undertake works in congested areas.
Permission	An approval granted by the CAA upon successful completion of a CAA certified Ground School, written examination and flight test.
Small Unmanned Aircraft (SUA)	The Drone system flown by the SUA Operator.
Unmanned Aircraft System (UAS) / Drone	Aircraft (or aircraft system) that is flown from a remote location without a pilot located in the aircraft itself. <b>NOTE:</b> CAA further defines this as 'Small unmanned aircraft' which means any unmanned aircraft, other than a balloon or a kite, having a mass of not more than 20kg without its fuel but including any articles or equipment installed in or attached to the aircraft at the commencement of its flight.
Unmanned Traffic Management system (UTM)	Automated system that allows for de-confliction between manned and unmanned aircraft systems. <b>NOTE:</b> This is similar to the ATM that NATS utilise on a daily basis for Air Traffic Control.
Visual Line of Sight (VLOS)	Maximum distance at which the flight crew is able to maintain separation and collision avoidance, under the prevailing atmospheric conditions, with the unaided eye (other than corrective lenses). <b>NOTE:</b> Within the UK, VLOS operations are normally accepted out to a maximum distance of 500m horizontally and 400ft vertically, from the operator. The parameters are maximum and entirely dependent on visibility and weather conditions at the time.

Table 1 – Terms and definitions



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#### 4 Minimum operating requirements for individual / organisations

For Network Rail in house drone operations, before the pilot can operate a drone or small unmanned aircraft (SUA) near, on or over Network Rail infrastructure, the pilot shall demonstrate to the Network Rail Air Operations department they have:

- a) a qualification from a National Qualified Entity (NQE);
- b) passed a Network Rail flight assessment prior to live flights (for in-house trained Drone/SUA Pilots only);
- c) been assessed as fit to fly over Network Rail Infrastructure within twelve months of passing NQE status by experienced Network Rail Drone/SUA Pilot;
- d) an authorised risk assessment / method statement / safe system of work; which is approved by the client;
- e) notified the Network Rail Air Operations team via the notification procedure.

For framework and external SUA drone operations, before the pilot can operate a drone or small unmanned aircraft (SUA) near, on or over Network Rail infrastructure, the pilot shall demonstrate to the Network Rail Air Operations department they have:

- a) current [CAA] Permission supported by an approved operations manual;
- b) notified the Network Rail Air Operations team via the notification procedure;
- c) an authorised risk assessment /method statement /safe system of work; which is approved by the client;
- d) risk management arrangements; and

**NOTE:** Attention should be paid to the following risks:

1. Boundary ownership
2. Moving trains / line speeds
3. Electrification and lineside hazards (overhead line equipment, conductor rails etc) and electrical overhead powerlines.
- e) Public Liability Insurance for the minimum value of £5 million for drone operations on or near the railway.

**NOTE:** Often referred to by Insurers as "Railway Work"

- f) compliance with the Network Rails Life Saving Rules.

#### 5 Minimum equipment requirements

Any drone or SUA operated near Network Rail Infrastructure shall meet the following minimum technology requirements:

- a) return to home capability;

**NOTE:** such that system failures will always result in the drone returning to a safe landing zone.

- b) system technology that complies with their granted CAA permission and approved Operations Manual; and
- c) the Maximum Take-Off Mass (MTOM) including fuel shall not exceed 7kg unless pre agreed with Network Rail Air Operations. Agreements should be signed off in the task specific risk assessment no later than 21 days prior to

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the proposed flight date. An authorised risk assessment shall be signed off by the client.

## 6 Proximity to Network Rail Infrastructure

Only authorised and trained Network Rail employees and suppliers approved under the Framework Agreement for Unmanned Aircraft Systems and drone operators permitted by the Network Rail Air Operations team shall fly over or closer than 50m to Network Rail infrastructure.

Operations shall be within Visual Line of Sight (VLOS).

Authority for Beyond Visual Line of Sight (BVLOS) operations may be given by Network Rail Air Operations department.

Except during a possession, drones and SUAs shall not be flown closer than 20 metres to the track vertically or horizontally.

Except during an isolation, drones and SUAs shall not be flown closer than 10 feet to Overhead Line Electrification (OLE) or Third Rail.

Drones and SUAs will not fly closer than 15 metres to National Grid Electricity Pylons.

**NOTE:** Extra care should especially be taken if in close proximity to OLE.

For external and framework SUA operators with an Operational Safety Case (OSC) shall seek permission of the Air Operations department to fly closer than 50 metres to Network Rail infrastructure, to comply with Article 94 ANO16 Para 2.

## 7 Notification Arrangements

Permission to fly near Network Rail infrastructure shall be requested from the Air Operations department no less than 10 working days prior to proposed operation start date.

**NOTE:** Air Operations department can be contacted via [DroneEnquiries@networkrail.co.uk](mailto:DroneEnquiries@networkrail.co.uk)

In emergency deployments, once safety checks have been completed by the pilot and prior to take off flights shall be agreed:

- a) with the Network Rail Air Operations department; or
- b) the National Operations Centre.

## 8 Accident Reporting

In addition to mandatory occurrence reporting process(es) (MOR), drone pilots shall have a system in place to notify the following within two hours of the incident:

- a) Network Rail Air Operations department;
- b) Network Rail Accountable Manager;
- c) Route Control, (National);
- d) National Operations Centre (NOC).

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A written report shall be sent to the Air Operations Team of any accidents, incidents or occurrences within five working days.

This report will include:

- a) time of incident;
- b) date of incident;
- c) location of the incident, including full grid reference or latitude and longitude;
- d) the Pilots name;
- e) details of equipment involved;
- f) a brief description of the occurrence;
- g) any witnesses and their contact details.