

Technical Direction

Surveying

SVTD 2019/02 | 19.1514 – December 2019

Using Remotely Piloted Aircraft (RPA) or ‘Drones’

Summary:	Audience:
<p>Using remotely piloted aircraft (RPA) can be effective for capturing spatial and survey data for infrastructure projects and other purposes. However, a number of risks and privacy constraints need to be addressed before the technology can be used to acquire spatial and survey data for the needs of Transport for NSW.</p> <p>Until a policy and procedure is developed, this interim technical direction is to be adhered to for all RPA operations that acquire spatial and survey data undertaken by or on behalf of Transport. This technical direction supersedes SVTD 2016/01 issue 2.</p>	<ul style="list-style-type: none"> • Project managers • Surveyors • Remote pilot • Construction entities • Road designers • Engineers • Transport for NSW employees and divisions • Delivery offices • Stewardship companies • Road maintenance • Local and state government

Background

A remotely piloted aircraft (RPA) is an aircraft without an onboard pilot. It may be known as a drone, an unmanned aircraft system (UAS), unmanned aircraft vehicle system (UAVS), remotely piloted aircraft system (RPAS), or an unmanned aerial vehicle (UAV).

RPAs typically have one or more sensors for capturing a range of data for mapping, investigation or for public display activities. The sensors may include still cameras, video cameras, multi-spectral sensors,

Approvals:

Owner:	Armen Dervisevic Director Surveying Surveying Unit	Review Date:	15 November 2021
Authorised by:	Chris Harrison Director of Engineering Services	Effective Date:	15 November 2019

thermal sensors and Light Detection and Ranging (LiDAR) sensors. Additional sensors may be used to assist with navigation and positioning of the RPA including Inertial Measurement Unit (IMU), global navigation satellite system (GNSS), gyroscope, accelerometer, compass and altimeter. The RPA may be controlled by a ground based pilot in real time, or by a ground based pilot monitoring the RPA during a pre-programmed flight, capable of taking control at any time during the flight.

Requirements

The following requirements are for spatial and survey data acquisition activities, however, the technical direction requirements can be used to assist with other forms of RPA data capture (e.g. single image digital photographs, orthomosaic images, videos, thermal or multispectral imagery and videos).

When submitting an application for approval, ensure that all of the following requirements are addressed in a memo:

1. Approval to procure and operate

• Purchasing or hiring of a RPA by Transport

- Prior written approval is required from the relevant Section Director to purchase or hire an RPA and to operate the RPA
- Endorsement from the Director Surveying is required for RPA operations to acquire spatial or survey data. Written approval is to include the type of RPA and its use
- After purchase, the aircraft details must be added to the Transport Asset Register
- All Civil Aviation Safety Authority (CASA) registration requirements are required to be met
- Business Units and Teams that operate under an RPA Operator's Certificate (ReOC) are to obtain a single approval from relevant Section Director, and endorsement from Director Surveying to cover their spatial and survey operations.

• Engaging a RPA contractor to provide services

- Prior written approval is required from the relevant Section Director to engage an RPA contractor
- Endorsement from the Director Surveying is required for RPAs used to acquire spatial or survey data.

Note - For Maritime and Sydney Trains operations, endorsement from the Maritime Survey Manager or Sydney Trains Principal Surveyor is required for use of RPAs to acquire spatial or survey data. Additionally, for any flights over the Sydney Trains network, consultation with the Sydney Trains Chief Remote Pilot is required in order to comply with the *Sydney Trains Drone Management Procedure (PRM 50941)* and the *RPA Information Management Procedure (PRM50942)*. It is also a requirement to notify the Incident Command on Network (ICON) and the Rail Operations Command (ROC) when undertaking RPA operations over the Sydney Trains Rail Network. These notifications are to be arranged by contacting the Sydney Trains Chief Remote Pilot.

Note - All RPA operations undertaken for the purposes of bridge inspections should be done in consultation with Director Bridges and Structures. RPA operations around bridges may require contacting the Transport Management Centre Operations Room to ascertain any site specific requirements. Beyond Visual Line of Sight (BVLOS) flights are not permissible for the purposes of bridge inspection.

2. Operation of the RPA

For risk management reasons (excluding the exemption below) the use of RPA should be outsourced to a reputable licensed contractor who holds an RPA Operator's Certificate (ReOC) from the Civil Aviation Safety Authority (CASA). Details of the RPA and maintenance logs must be provided to Transport.

For any RPA flights undertaken by a contractor, the contractor is to provide Transport with a current RPA system operations manual and operations library (maintenance and servicing records) for review.

Operations of RPAs by Transport staff for acquisition of spatial or survey data are allowed for the very small category (as defined by CASA, 100g < 2kg) and do not require a ReOC as long as approved standard operating procedures are endorsed by Director Surveying and comply with CASA’s Excluded Category safety rules and, in addition, meet the requirements below for Remote pilot qualifications and experience.

3. Remote pilot must be qualified and experienced

The Remote pilot must hold a CASA Remote Pilot Licence (RePL), even if operating a RPA in the very small (100g < 2kg) category. The Remote pilot must produce evidence of at least 20 hours logged flight time. Adherence with Civil Aviation Safety Regulation 1998 Part 101, observance of restricted air space locations and compliance with flying below 400 feet limitations is required. Refer to the website for more information: <https://www.casa.gov.au/aircraft/landing-page/remotely-piloted-aircraft-system>

The Remote pilot must hold an Aeronautical Radio Operators Certificate (AROC) and have their radio (ICOM IC-A15 or equivalent) operational when in proximity to towered and un-towered aerodromes (including Helicopter Landing Sites) as listed in the Air services ERSA (En-route Supplement Australia) with the relevant frequency for the area of operation.

For areas near aerodromes or heliports, or inside prohibited or restricted areas, a CASA instrument may be required. The approval(s) are to be supplied before flights are undertaken by the RPA.

4. Risk management

The operation of an RPA introduces a number of risks that need to be managed:

- Compliance risk – breaches of aviation laws and CASA rules
- Operational risk – damage to property and/or injury to persons
- Privacy risk – complaints concerning the collection of personal information and where individuals are captured on film.

The submission to the relevant Section Director is to include a risk assessment of:

- Risk analysis regarding:
 - People (including public and other non-operational personnel)
 - Property
 - Equipment
 - Environment
 - Infrastructure
 - Vehicles, boats and other modes of transport.
- Efficiency benefits regarding:
 - Quality of data and/or information
 - Speed of operation
 - Risk mitigation
 - Improved stakeholder engagement through the use of the data and/or information.

All RPA operations will require a site-specific job safety assessment (JSA) and safe work method statement (SWMS). The risk assessment is to be undertaken to ensure there are no adverse impacts upon Transport staff, motorists, landowners and members of the public or wildlife.

5. Stakeholder engagement

If the RPA will fly over property not owned by TfNSW then, in consultation with the relevant Community & Stakeholder Engagement business unit, a communication strategy should be developed to inform landowners and occupants.

6. Personal identity protection

Where the quality of any information captured by the RPA may result in a person's face being identifiable or a vehicle's number plate being legible this will trigger the application of the Privacy & Personal Information Protection Act 1998 (PPIPA). To avoid the additional requirements of PPIPA, filming should ensure that faces and number plates are not filmed or that the footage is pixelated. If that is not possible then Transport legal branch should be contacted to discuss how to comply with PPIPA. For more information on PPIPA requirements see <http://home.rta.nsw.gov.au/organisation/divisions-and-branches/business-services/legal/legal-guidance/assets/privacy-personal-information.docx>

7. No audio recording

To ensure compliance with the Surveillance Devices Act 2007 audio recording functionality must always be disabled or the RPA operated to ensure that conversations are not recorded.

8. No filming of staff engaged on Transport projects or operations

If capturing imagery of staff is unavoidable then a notice under the Workplace Surveillance Act 2005 must be given. This is to occur at least 14 days before the filming occurs unless the location where they are filmed is not one of their usual workplaces.

9. No recording en-route to and from the location

Among other things, privacy law prohibits the excessive collection of information. The RPA should be operated so that filming is limited to the location in question and that recording is disabled on the route to and from the location.

10. Insurances

The RPA Contractor must provide evidence of public liability risk insurance with an APRA-approved Australian insurance company for at least \$20 million and where required, provide professional indemnity insurance for at least \$1 million. Contractor insurance must cover RPA operations.

For any in-house RPA operations, insurance coverage is through the Treasury Managed Fund under the Statement of Cover without exclusions. Implementation of risk management protocols is expected to minimise potential third party property damage or injury.

11. Intellectual property

The terms of engagement with the contractor operating the RPA must state that “intellectual property and copyright rights in all images and data collected by the RPA vest in Transport. If the contractor insists, then it is permissible for the contractor to retain one copy for records management purposes provided the contract obliges the contractor to keep the copy secure and clearly marked as confidential and the intellectual property of Transport for NSW.”

12. Unlawful activity captured

Where any image collected by the RPA shows any unlawful activity by any party on or adjacent to TfNSW operations must be reported to Transport legal branch immediately for advice.

13. Spatial and Survey data records management

All spatial and survey project information and contracting documentation and records are to be stored in agency's corporate document management system.

There is an obligation upon the Transport representative to ensure that all the information can be converted to the standard data format without loss of functionality or integrity for archival purposes. For roads

infrastructure projects, adhere to specification G71 – Construction Surveys, or G73 – Detail Survey for spatial data requirements.

Seek advice from those listed in the Table 1 and ensure that the RPA Contractor has a system in place that addresses how RPAs will meet the requirements of the specifications (which may require site specific specifications to be written). In particular:

- Surveyor qualifications and experience
- Site specific Project Quality Plan and survey modelling software
- Compliance with Transport infrastructure tolerances
- Compliance with survey control network and mark class and standards requirements
- Compliance with Transport for NSW CADD data standard, metadata and data management requirements
- Compliance with Transport Digital Engineering Framework, if required

Variations to the above may be required by NSW Maritime or Sydney Trains through advice by the NSW Maritime Survey Manager and Sydney Trains Principal Surveyor.

It is also the responsibility of the Transport representative to ensure that any non-standard spatial or survey data formats, if kept, are clearly marked as non-standard.

General guidelines

In addition to CASA rules which can be found on the following website <https://www.casa.gov.au/drones/rules>, a number of operational and site restrictions apply.

Operational restrictions

- A spotter must be used at all times whose responsibility is to look out for both aerial and ground based hazards/distractions to the pilot. The spotter must be an experienced and qualified Remote pilot that is familiar with the RPA operation
- Only operate an RPA when the wind velocity (including gusts at flying height) is below that of the recommended Maximum Wind Speed Resistance for the specific RPA but never more than 10m/s (19 knots or 35km/hr). Note that there is a large variation between wind velocity and turbulence on the ground and at flying height
- RPAs must be fitted with hi-visibility strobes to increase the situational awareness and RPA orientation

Site restrictions

- Do not operate an RPA within 30 metres (horizontal distance) of any person not directly involved with the flight of the RPA i.e. RPA pilot and spotter
- Do not operate an RPA within 30 metres (horizontal distance) of any road or project site with active traffic and/or machinery
- Do not operate an RPA over or near an area affecting public safety or where emergency operations are underway unless Transport is directly involved in the operation and the other agencies have approved the RPAS operation
- Do not operate an RPA without owners and/or occupants consent for the flight path over property not owned or controlled by Transport
- Do not operate an RPA within the vicinity of equipment that can cause radio frequency interference to the RPAS e.g. high gain transmitters

Contacts

Further advice may be obtained from Transport. Contact phone numbers are listed in table 1.

Agency	Position	Phone number	Email
Transport for NSW	Director Surveying	0476 816 200	armen.dervisevic@transport.nsw.gov.au
Sydney Trains	Principal Surveyor	0413 852 810	alex.burridge@transport.nsw.gov.au
Transport for NSW	Manager, Survey Certification and Compliance	0413 270 190	ray.gilmour@transport.nsw.gov.au
Transport for NSW	Senior Manager Survey & Spatial Services	0414 452 869	glenn.egan1@transport.nsw.gov.au
Transport for NSW	Senior Surveyor, Asset Standards Authority	0413 005 391	david.brown2@transport.nsw.gov.au
Transport for NSW	Survey Manager, NSW Maritime	0405 802 703	Ryan.Fifield@transport.nsw.gov.au
Transport for NSW	Director Bridges and Structures	0428 013 988	Christian.Christodoulou@transport.nsw.gov.au
Sydney Trains	Chief Remote Pilot	0448 860 804	Andrew.Watson@transport.nsw.gov.au
Transport for NSW	Chief Remote Pilot	0413 368 129	Paul.Kenny@tmc.transport.nsw.gov.au

Table 1.subject matter experts contact details

Reference: SVTD2016-01 issue 2

Technical Information – T MU AM 06015 TI Operational Concept for Deployment of Drones on the TfNSW Transport Network (version 1 5 December 2019)

https://www.transport.nsw.gov.au/system/files/media/asa_standards/2018/t-mu-am-06015-ti.pdf

Contact Us:

If you have any questions or would like more information on this document please contact :



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