

WMP Briefing Paper

Drone Unit Analysis

Ethics Committee (02 March 2022)

This project is at the proposal stage and is presented to the committee 'in principle' so that any immediate concerns can be raised.

The finer details of the methodology, exact data to be used and mode of communicating the results will not be determined until after the exploratory data analysis (EDA) phase has been undertaken.

Once the analyses have been completed the project will be presented to the Committee again so that the data used, methodology, findings, intention for deployment and communication plans can be examined in more detail.

Legal opinion has been sought and the Data Protection Impact Assessment (DPIA) is being reviewed by the Force Data Protection Officer (DPO).

Tasking

This project was requested by the Drone Unit on 25 November 2021. The request is to extract data relating to the deployment of drones and associated costs. In addition to identify any potential cost savings compared to the alternative options of deploying manpower on the ground or the helicopter.

Purpose

The purpose of this project is to assist the Senior Leadership Team (SLT) of the Drone Unit and the Force Executive Team (FET) to make decisions about the balance of investment that should be made in the available air support options.

In addition, the Drone Team are building a business case to become a stand-alone unit and require data relating to current and future expenditure.

Data is currently held across a number of platforms and systems making it challenging for the team to provide sound evidence of the value provided by their service. A recommendation of the Drone Strategy (Dec 2021) is for the Data Analytics Lab (DAL) to undertake a detailed cost benefit analysis of the unit's work.

Context

West Midlands Police (WMP) has been deploying drones¹ since 2017 and currently has 64 pilots flying multiple aircraft. The emphasis is on harnessing modern technology to effectively service traditional

¹ Drones are miniature aircraft controlled from the ground by a pilot. Also referred to as Unmanned Aerial Vehicles (UAVs) or Small Unmanned Aircraft (SUA).

policing concepts of preserving life, preventing and detecting crime. The unit is developing an effective counter hostile drone capacity; with the ability to track, identify and if necessary 'stun' hostile drones. All this is done with substantial community engagement; 16,000 twitter followers and a positive, engaging presence - often within traditionally hard to reach groups.

Drones offer a cost effective addition to the helicopter service provided by the National Police Air Service (NPAS). In 2021, WMP were allocated 400 hours of helicopter flying time at a cost of £1.6m. Any hours used in excess of this allocation are charged at a premium rate of £579 per hour compared to an hourly rate of £48.90 to deploy a drone. Drones are an alternative (often more appropriate) air asset to NPAS for deployment to both spontaneous and pre-planned incidents. Requests are triaged using a threat, risk and harm assessment.

WMP Drones are licensed through the Civil Aviation Authority (CAA), and the unit holds an Operator's Authority which is renewed annually and can be withdrawn if the Force significantly deviates from its 'permission' or operates in a dangerous or unfit manner. Any accidents are reported to the CAA and if found reckless the Force could be prosecuted.

The Force's Accountable Manager (AM) liaises with the CAA and ensures that the unit operates safely and legally. They manage a core team of eight Force Support Unit (FSU) officers, experienced drone pilots who train and mentor a further 37 pilots across the Force. The FSU Core Team also manage and audit the safety management system (Centrik), investigate any accidents and pass their findings to the CAA, implement any lessons learnt across the wider team and act as subject matter experts for the National Police Chief's Council (NPCC), Home Office and other forces.

WMP does not deploy drones in a covert capacity, nor do they link to other integrated surveillance technology such as automatic number plate recognition (ANPR) or automatic facial recognition software (which is not used by WMP). All pilots receive training about what constitutes overt or covert use of drones and their responsibilities in relation to the Regulation of Investigatory Powers Act 2000 (RIPA). They are trained to fly in a manner which minimises unnecessary surveillance and cameras are only turned 'on' to record crimes in progress or offence subjects or locations.

For transparency, information about the Force's use of drones is available on the WMP external website², including a link to the Surveillance Camera Commissioner's (SCC) Self-Assessment Tool³. This contains detailed information against the SCC's 12 guiding principles, including the legislation under which the unit operates, the retention period for images, security of data, automatic deletion, governance, training and impact assessments. This is a reference tool to give our communities confidence that we have robust systems in place to preserve privacy and prevent collateral intrusion. The 'Overt Surveillance Governance Board' sits quarterly and reports to the FET.

The FSU Core Team also undertake substantial community engagement to promote awareness of the Force's use of this technology to gain public approval and consent for operational deployment. The team attends a variety of community events, in particular engaging hard to reach communities through events such as Black Inclusion Week and 'name the drone' competitions in schools in underprivileged communities. The WMP 'Eye in the Sky' twitter feed [@DronesWMP](http://www.twitter.com/DronesWMP)⁴ has 16,000 followers.

² WMP external website drones page. <https://www.west-midlands.police.uk/frequently-asked-questions/police-drones>

³ Surveillance Camera Commissioner Self-Assessment Tool for WMP Overt use of Drones.

<https://www.west-midlands.police.uk/flysystem/public-sync/inline-files/Surveillance%20Self-assessment%20tool%20-%20WMP%20Overt%20Use%20of%20Drones.pdf>

⁴ <http://www.twitter.com/DronesWMP>

Intended activity resulting from the project

Drone deployments are controlled by the Force control room for spontaneous deployments and the weekly Operations Tasking meetings for pre-planned operations such as football matches. There is a lower level of direct tasking for cannabis factories and anti-social behaviour (ASB). Deployments cover all parts of the Force area. Examples of drone activity from 2021 include:

Task	Drone Capability	Alternative capability
Searching crime scenes	For example, successfully located a knife used in a murder in a roof top gutter within 1 hour 15 minutes.	A physical search would have taken 4 specialist search trained officers 4 hours, exposing them to a high risk environment.
Searching for missing people	Supported 753 searches for missing people in 2021. Able to search wide areas rapidly & operate at night with thermal imaging cameras. A 2 person drone crew can search a one mile area in 12 minutes.	Physically the same task takes multiple officers many hours.
Searching of events and planned operations and events	Drones conduct daily sweeps of secure sites to check for any changes in the physical environment that could indicate hostile activity. A detailed search can be conducted in less than half an hour by a 2 person drone crew covering street level & roof tops.	In previous years a police search team of five officers working alongside the Fire Service would take a number of hours to complete the same task.
Command & control for events and major incidents	Drones are routinely deployed to football, protests & other events to aid command & control, providing an enhanced view & aiding effective deployment of limited resources on the ground.	
Thermal imaging	983 thermal flyovers were completed in 2021. Used to confirm community generated intelligence regarding the location of cannabis factories, providing the evidence for officers to obtain a warrant & conduct enforcement activity. Thermal flyovers take minutes to perform.	Officers knocking on doors or trying to confirm the initial intelligence by other means.
Arrest attempts	Assisted in 282 arrest attempts in 2021. The aerial view & heat source detection facilitates the coordination of scarce resources on the ground. This ensures we can achieve operational success with fewer people.	

FSU provides the Force with 24/7 drone capacity with all teams being mandated to deploy at least one double crewed drone car. FSU officers conduct a number of tasks and sometimes, utilising THRIVE⁵ principles drone pilots are required to conduct urgent arrest attempts or attend urgent calls for service. Moreover, pre-planned events draw on the same supply of pilots simultaneously.

The work to be undertaken by the DAL is to understand the likely number and type of incidents which would benefit from a drone deployment and how the cost of using a drone compares to deploying NPAS or officers on the ground. This will assist with decisions around future funding and the operating model. The analysis will only consider deployments and the associated costs; it will not involve viewing or assessing any drone footage.

⁵ Threat, Harm, Risk, Investigative opportunities, Vulnerability, Engagement – the framework used by WMP to assess and prioritise incidents for attendance.

Data

Data to be used:

- Drone Deployment Tracker (manually generated Excel)
- Centrik Flight Management System
- Connect (Crimes and Custody)
- ControlWorks (incident logs)

Level of analysis:

- Individual
 Individuals aggregated?
 Yes
- Specific Area:
 West Midlands

Reliability of data:

The data are sourced from WMP systems / manually developed tracker which are used as part of daily business.

An extensive exploratory data analysis (EDA) phase will be undertaken to examine the extent of any data quality issues, including processes to identify the presences of any bias, to ensure that no bias is built into the analyses.

Discussions with SMEs will be undertaken both to capture any extraneous requirements and to sense check the analyses.

Sample or entirety: Entirety

Type of analysis:

- Exploratory
 Explanatory
 Predictive
 Optimisation

Proposed methodology:

To undertake a cost benefit analysis of the Drone Unit and enable the development of a dashboard (regularly updated) which allows the identification of costs and cost savings (benefits) of the unit.

1. Identify relevant sources of data.
2. Source numbers and types of missions / activities
3. Identify the costs of the drone unit (including vehicles, personnel and equipment)
4. Estimate the benefits of the activities of the unit (e.g. help capturing drug dealers, finding mispers, patrolling events, etc.).
5. Compare benefits to costs (benefit / cost ratio).
6. Develop a Qlik app that provides information resulting from 1 – 4 that is capable of regular updating; enable consolidation of differing data sources into the one app.
7. Compare benefits and costs to NPAS.

Will the project eventually be automated:

- Yes

Means of evaluation:

NA

ALGO-CARE considerations

As this project is at the proposal stage and is presented to the committee 'in principle' in order that any immediate concerns can be raised, the finer details of the methodology will not be determined until after the EDA. Once the analyses have been completed the projects will be presented to the Committee again so that findings and methodology can be examined in more detail.

Advisory	
If applicable, are the outputs from the algorithm to be used in an advisory capacity?	The output would be an initial report and a dashboard for use by the Drones Unit SLT to understand their ongoing costs and the benefits the unit provides to the Force. The information will be used in an advisory capacity.
Does a human officer retain decision-making discretion?	Senior leaders responsible for the Drones Unit will use the output of this analysis in conjunction with other considerations to make a decision about the future operating model.
Lawful	
What is the policing purpose justifying the use of the algorithm (means and ends)?	This project supports the Force Strategy and the <i>Precision Policing Doctrine</i> by ensuring that resourcing decisions are based on data and evidence. The intention is to help maximise resource use of the Drones Unit and ensure that an excellent service can be provided.
Is the potential interference with the privacy of individuals necessary and proportionate for legitimate policing purposes?	The objective is to understand the volume and nature of drone deployments. Where this relates to incidents, crimes or arrests it is only to aggregate the number of types of events rather than to assess any details relating to individuals. Footage from the drones will not be required to undertake the analysis. Therefore the privacy of individuals will not be interfered with.
In what way will the tool improve the current system and is this demonstrable?	There is no current tool available to the Drones Team to assess the cost and impact of their deployments. Data is held across a number of systems making any assessment challenging. The DAL has the capability to merge these diverse data sources and present the information in a single Business Insight (Qlik) dashboard. Given the public interest in the deployment of police drones it is beneficial for the team to be able to report their activity routinely and simply.
Are the data processed by the algorithm lawfully obtained, processed and retained, according to a genuine necessity with a	The data used are gathered from day-to-day operations of the Drones Unit and systems of WMP, such as incident logs, crimes and arrests. As such the data are collected in the appropriate manner for the appropriate

rational connection to a policing aim?	purposes.
Is the operation of the tool compliant with national guidance?	The analyses proposed would accord with the DCMS Data Ethics Framework 2018. ⁶
Granularity	
Does the algorithm make suggestions at a sufficient level of detail given its purpose and the nature of the data processed?	The resulting analyses will provide information about the volume, nature and cost of drone deployments and a comparison with the volume and cost of alternative resources. This will be at an appropriate level of detail to inform decision making at a strategic departmental level.
Are data categorised to avoid broad-brush grouping and results and therefore issues of potential bias?	Some categorisation may take place in forming the features of the analyses, however, the details will become apparent during the analyses which will check for any potential bias.
Do the potential benefits outweigh any data quality uncertainties or gaps?	The project will include an extensive EDA element and this should highlight areas of heightened uncertainty in the data or where particular gaps exist. The intention is that the analysis will enable the Force to make the best resourcing decisions in respect of aerial support for operational officers.
Is the provenance and quality of the data sufficiently sound?	The data have been gathered during the day-to-day work of WMP and of the Drone Unit and will enable analyses of the type envisioned for this project.
If applicable, how often are the data to be refreshed?	Monthly
If the tool takes a precautionary approach in setting trade-offs, what are the justifications for the approach taken?	Not applicable
Ownership	
Who owns the algorithm and the data analysed?	WMP own the analyses and data.

⁶ <https://www.gov.uk/government/publications/data-ethics-framework/data-ethics-framework>

Does WMP need rights to access, use and amend the source code and data?	No The Drone Unit uses an aviation software system called Centrik where all activity including flights, training and servicing is recorded. This is a service that the Force already subscribes to and is part of routine business processes.
Are there any contractual or other restrictions which might limit accountability or evaluation?	No
How is the operation of the algorithm kept secure?	The data and the analyses are contained wholly within the WMP Hadoop system and the security measures employed therein.
Challenge	
What are the post-implementation oversight and audit mechanisms, e.g. to identify any bias?	For any analyses to be developed and productionised, checks will be made as to its accuracy on an on-going basis and sense checked with subject matter experts.
If the algorithm is to inform criminal justice disposals, how are individuals notified of its use?	Not applicable
Accuracy	
Does the specification of the algorithm match the policing aim and decision policy?	The research question matches the policing aim and is aimed at supporting the <i>Precision Policing Doctrine</i> . The nature of the analyses used will be determined to be the best means of addressing the research question.
Can the accuracy of the algorithm be validated periodically?	The productionisation of any analyses resulting from the project would include checking its accuracy on an on-going basis.
Can the percentage of false positives / negatives be justified?	Not applicable
How was the method chosen as opposed to other available methods?	The method will be chosen once discussions have taken place with SMEs and the EDA has been undertaken.

What are the (potential) consequences of inaccurate forecasts?	Not applicable
Does this represent an acceptable risk?	Not applicable
How are the results checked for accuracy and how is historic accuracy fed back into the algorithm for the future?	Not applicable
How would inaccurate or out-of-date data affect the result?	If data were to be wholly inaccurate then the analyses would essentially provide inapplicable findings. The Lab will seek to minimise this potential through a thorough analysis of the data and their pitfalls, issues and overall nature; through discussions with SMEs.
Responsible	
Would the operation of the algorithm be considered fair?	The analyses will be fair in that each data point will be considered on its own merits.
Is the use of the algorithm transparent (taking account of the context of its use), accountable and placed under review?	The nature of the intended method(s) is such that the end-use is to provide information rather than predictions that feed into a process on an on-going basis.
Would it be considered to be used in the public interest and to be ethical?	The information provided will assist the Force in making resourcing decisions about air support for operational officers. Given the cost of using NPAS it is in the public interest to ensure the Force makes decisions which offer the best value for money.
Explainable	
Is information available about the algorithm / decision-making rules and the impact of each feature?	A technical report will be produced which will include information about the methods used and assumptions made.

Appendix 1: Glossary of Terms

WMP / Law Enforcement Terminology	
AM	Accountable Manager (for drones, accountable to the CAA)
ANPR	Automatic Number Plate Recognition
ASB	Anti-Social Behaviour
CAA	Civil Aviation Authority
DAL	Data Analytics Lab
DPIA	Data Protection Impact Assessment
DPO	Data Protection Officer
FET	Force Executive Team
FSU	Force Support Unit
NPAS	National Police Air Service
NPCC	National Police Chief's Council
RIPA	Regulation of Investigatory Powers Act 2000
SME	Subject Matter Expert
SUA	Small Unmanned Aircraft
SCC	Surveillance Camera Commissioner
SLT	Senior Leadership Team
THRIVE	Threat, Harm, Risk, Investigative opportunities, Vulnerability, Engagement – the framework used by WMP to assess and prioritise incidents for attendance.

UAV	Unmanned Aerial Vehicles
WMP	West Midlands Police

Data Science Terminology	
ALGO-CARE	All projects have used the ALGO-CARE to consider ethical implications: Advisory, Lawful, Granularity, Ownership, Challenge, Accuracy, Responsible, Explainable
EDA	Exploratory Data Analysis
Productionise	To 'productionise' means that once we are satisfied that the model works well, we would automate the process of providing predictions every 4 weeks.