

Anticipated Impact Report for Unmanned Aerial Vehicles (UAV)/Drones

1. Information Describing the Unmanned Aerial Vehicles and How It Works

An Unmanned Aerial Vehicle (UAV) is an aircraft that is intended to navigate in the air without an on-board pilot. UAVs are alternatively called Remotely Piloted Aircrafts (RPA), Remotely Operated Vehicles (ROV), or Drones. UAVs are part of Unmanned Aircraft Systems (UAS) that include the necessary equipment, network, and personnel to control UAVs.

Sample Images of a street improvement project that would be captured with a UAV:



UAVs may be equipped with Cameras and/or Mapping Software:

Cameras

- UAVs may be equipped with regular RGB (visible light) cameras for digitally capturing still images and video footage.
- Depending on the need and capacity, UAV cameras may also use thermographic camera technology to sense infrared radiation for capturing still 3-D image and/or video 3-D footage. Thermal imaging cameras detect infrared radiation, typically emitted from a heat source (thermal radiation), to create a "picture" assembled for video output.

Thermal imaging cameras detect the heat given off by an object or person. A person, warmer than the surrounding air, appears “white” while the cooler surrounding air or buildings will appear in varying shades of gray. The “white” images do not always show a clear silhouette and, as such, are subject to the observer’s interpretation.

Sample UAV Regular RGB (Visible Light) Image of Earthquake Rescue (Beichuan, China)



Sample Thermal Image to Identify People in the Dark (San Diego)



Mapping Software

In addition to cameras, UAVs may also be equipped with a mapping system that link images from compatible camera(s) with a Ground Control Point (GCP) taken from a Global Positioning System (GPS) or Real Time Kinematic (RTK) coordinate. Mapping may be used to capture essential identifying, topographical, or functional information regarding a transportation or natural disaster site.

Information that may be available from the use of mapping software includes:

- Site identifiers (e.g., addresses, business names, parcel numbers);
- Topographical information (e.g., terrain area, elevation, land contour lines and boundaries, water drainage areas, soil erosion, areas with water leaks or poor insulation coverage); and
- Functional information (e.g., 3D models of construction sites, stockpiles of raw materials, health of agricultural plots, etc.).

2. **Proposed Purpose**

UAVs/drones with cameras and/or mapping systems will be used by the Department of Transportation (DOT) for two primary purposes:

- 1) For DOT project documentation to capture before and after impacts of transportation improvement projects in the public right of way; and
- 2) For emergency response to rapidly assess roadway and infrastructure conditions without endangering city staff on public and private properties following a natural disaster (e.g., mudslide, flood, earthquake, fire, sinkhole, etc.).

When UAVs are deployed by the Department of Transportation for use in these situations, they will be guided by a pilot in command (PIC) who has an FAA Remote Pilot Certificate. The PIC will be accompanied by one or more Visual Observers (VO) who are trained to view live footage.

Any cameras or mapping systems will be activated only when in the relevant area, such as:

- **DOT Transportation Project Areas**
Once the UAV enters a DOT project area, the PIC and VO will be permitted to take still images, record video footage, and/or map public rights-of-way from specific angles that capture the local of proposed or completed transportation improvement projects. The purpose of this information is to communicate Department of Transportation work to the public.
- **Emergency Response Sites**
Once the UAV enters the emergency response areas, the PIC and VO will be permitted to take still images, record video footage, and/or map natural disasters in order to assess conditions that may endanger public safety. The purpose of this

information is to allow Department of Transportation staff to quickly and safely respond to natural disasters.

3. Locations Where UAVs May Be Deployed

Federal guidelines state that UAVs may fly no higher than 400 feet and remain below any surrounding obstacles when possible. They must remain thoroughly clear of and not interfere with manned aircraft operations and must avoid other aircraft and obstacles at all times.

UAVs may be deployed by DOT to observe and document only:

1. DOT transportation improvement projects; and
2. Sites of natural disaster for which the DOT needs to assess conditions that may endanger public safety.

4. Potential Impact on Civil Liberties & Privacy

The Department of Transportation recognizes that all people have an inalienable right to privacy and is committed to protecting and safeguarding this right. The DOT also recognizes that the UAV could raise concerns regarding real and/or perceived threats to civil liberties and privacy.

Specifically, the Department recognizes the following actual or potential public concerns:

a) Capturing the identity or recording the activity of persons

The public may be concerned that UAVs/Drones will capture personally identifiable information (PII) without notice or consent, or that UAVs/Drones will enable individuals' behaviors to be revealed to and/or monitored by DOT or other government agencies, their partners or affiliates, and/or the public. To these points, it should be noted that UAV cameras and integrated mapping system will be deployed for infrastructure documentation and public safety purposes. They will not be deployed to establish the identity or monitor the behavior of individuals or groups of individuals. Finally, these devices will not be used by law enforcement. UAV photographs and video recordings are similar to existing project photographs and emergency response photographs presently taken by Department of Transportation staff.

b) Targeted high-powered surveillance or voyeurism

Two concerns stem from potential surveillance and voyeurism practices enabled by UAVs.

- First, the public may be concerned about UAV and other surveillance technologies using powerful cameras for discriminatory targeting or other purposes. To this end, it should be noted that the RGB and infrared cameras available on commercially-available drones, which the DOT would acquire, cannot see through exterior walls, roofs, cars, clothing, or any object that would normally block a view observable by the naked eye. They also cannot see through glass because glass has its own thermal profile. Further, unlike night vision cameras that have the ability to see in low light conditions, infrared cameras can only detect an abnormal heat source which would appear

“white” while the cooler surrounding air or buildings will appear in varying shades of gray. The “white” images do not always show a clear silhouette and, as such, are subject to the observer’s interpretation.

- Second, the public may be concerned about UAVs enabling voyeurism. Concerns over voyeurism often stem from UAV operators who work alone, since it provides the most opportunity for abuse. To this end, it should be noted that UAV Visual Observer (VO) cannot operate the integrated mapping system without the UAV Pilot in Command (PIC) present, since the system can only be operated while the UAV is in flight. Second, while the UAV Visual Observer (VO) may potentially see members of the public who are incidentally present at the site of the transportation project or natural disaster, the observer would only be able to view the image for a brief period through the UAV monitor since the focus would remain on the transportation project or disaster site being assessed.
- c) **Data Use and Retention, Accountability and Auditing.** Finally, potential privacy and civil liberties concerns may arise from uncertainties regarding UAV/Drone data access, use, distribution, storage, security, and the accountability of handlers and owners of that data.

5. Mitigations

To be directly responsive to potential or feared impacts enumerated in Section 4 of this Anticipated Impact Report, DOT will take the following actions to protect the Privacy, and Civil Rights and Civil Liberties interests of the public:

a) **Capturing the identity or recording the activity of persons.**

To further assuage public concerns about identity capturing and/or activity monitoring identified in Section 4, the following protective measures will be taken by DOD or those acting on its behalf:

1. DOT will not capture still or video footage of persons in areas where there is an expectation of privacy without the individual’s permission, unless responding to a natural disaster.
2. Excepting deployments for natural disaster impact assessments or for project monitoring in areas where there is no reasonable expectation of privacy, as in a public transit area, DOT will provide advance and ongoing notice to the public regarding where, when, and for how long UAVs will be authorized to operate. Notice will be posted conspicuously onsite 72 hours prior to the first anticipated usage and including a project date range.
3. Where PII, such as faces, license plates, and house numbers, is captured in camera or video footage that is retained by DOT that data will be obfuscated through technical means, such as blurring, pixilation, blocking, or redaction of hard copies, such that it is no longer identifiable or reasonably re-identifiable.

4. The DOT will keep the public informed about planned and actual DOT UAV usage, as well as changes that would significantly affect privacy, civil rights, or civil liberties.

b) Targeted high-powered surveillance or voyeurism

To further assuage concerns regarding high-powered surveillance or voyeurism raised in Section 4, DOT will take the following steps:

5. DOT will not supplement existing commercially-available UAV technology with technologies that enable the detection of persons or objects through walls, roofs, cars, clothing, or other objects that would normally block a view observable by a standard RGB camera or the naked eye.
6. All recordings made by the UAV VO will be subject to review by the Department of Transportation.

c) Data Use, Retention, Distribution, and Accountability and Auditing.

Finally, to assuage potential privacy and civil liberties arising from uncertainties regarding UAV/Drone data access, use, storage, security, and the accountability of handlers and owners of that data, the following mitigating steps will be taken:

7. DOT will collect information using UAVs, or use UAV-collected information, only to the extent that such collection or use is consistent with and relevant to an authorized purpose and DOT privacy and use policy.
8. PII collected by DOT with UAVs that cannot be technically obfuscated will be used solely for the purpose(s) specified in the notice. PII will be retained for no longer than 730 days unless retention of the information is determined to be necessary to an authorized mission, is maintained in a system of records covered by the Privacy Act or is required to be retained for longer period by any other applicable law or regulation.
9. Video footage or photographs may potentially be shared with the following: a)The public to increase awareness and understanding of transportation improvement projects and natural disasters; b)Data on natural disasters may be shared with relevant utility companies (e.g. PG&E) and partner agencies (e.g. EBMUD, Caltrans). Outside of these planned distributions, DOT will take steps to ensure that systems and data will not be disseminated outside of DOT unless dissemination is required by law, or fulfills an authorized purpose and complies with the DOT's UAV use purposes.
10. DOT will make available to the public, in an Annual Surveillance Report pursuant to Chapter 9.64 of the Oakland Municipal Code, a description of how the technology was used, including the type and quantity of data gathered or analyzed by the technology; whether and how often data acquired through the technology

was shared with outside entities, the name of any recipient entity, the type(s) of data disclosed, under what legal standards the information was disclosed, and the justification for the disclosure(s); and other information required per Section 9.64.010 of that Ordinance.

6. Data Types and Sources

Data Sources	Data Types	Information
RGB and IR Cameras	<ul style="list-style-type: none"> • Regular (visible light) RGB still images • Regular (visible light) RGB video images • Thermal (thermographic/infrared) 3-D still images • Thermal (thermographic/infrared) 3-D video images 	<ul style="list-style-type: none"> • Images and videos of streets, crosswalks, medians, sidewalks, curb cuts, and other transportation infrastructure • Images and videos of incidentally-captured persons, vehicles, and dwellings, and commercial buildings • Images and videos of natural disaster sites
Mapping Software	<ul style="list-style-type: none"> • Linked images from compatible camera(s) with a Ground Control Point (GCP) taken from a Global Positioning System (GPS) or Real Time Kinematic (RTK) coordinate 	<ul style="list-style-type: none"> • Site identifiers (e.g., addresses, business names, parcel numbers); • Topographical information (e.g., terrain area, elevation, land contour lines and boundaries, water drainage areas, soil erosion, areas with water leaks or poor insulation coverage); and • Functional information (e.g., 3D models of construction sites, stockpiles of raw materials, health of agricultural plots, etc.).

7. Data Security

DOT will protect all acquired and stored data through appropriate security safeguards against risks such as loss, unauthorized access or use, destruction, modification, or unintended or inappropriate disclosure.

8. Fiscal Cost

The Department of Transportation will acquire UAV equipment from KTOP TV-10, the City of Oakland's own TV station.

Potential Sources of Funding

The UAV will be fully funded with grants from UASI (Urban Areas Security Initiative) and SHSGP (State Homeland Security Grant Program).

9. Third Party Dependence

Data will be collected, processed, and stored by a City Staff who will share images and video footage exclusively with the relevant Department of Transportation staff. All data collected by DOT will be owned by the City of Oakland, which will be accountable for ensuring that staff adheres to all data use and handling principles, provides appropriate data handling training to all its employees and contractors, and is audited regularly to demonstrate compliance with these principles and all applicable privacy protection requirements.

10. Alternatives

Project photography: an alternative that the Department of Transportation has employed is the use of electrical services "bucket" trucks, typically used to service traffic signals. This effort has proved an unsustainable use of staff time: rather than servicing broken signals and lights, electricians are deployed to project locations to take photographs. Capacity to complete this work has been limited.

Emergency response to natural disasters: presently, Department of Transportation staff take photographs from ground level to capture impacts of natural disasters, and in certain circumstances, staff can't fully assess the scene of a natural disaster if conditions are unsafe to enter. Further, staff might enter an area believed to be safe from visual inspection, but may realize upon entry that there are hazards beyond their initial viewpoint that may endanger their safety.

11. Track Record

[[INSERT CITY MATERIAL HERE, PULLING FROM <http://www.cacities.org/Policy-Advocacy/Hot-Issues/Drones> and other sources]] As of March 2018, a minority of state DOTs report deploying drones on a daily basis for purposes as varied as visually documenting highway construction projects, surveying, public education and outreach, bridge inspection, and emergency response.