Plan Overview

A Data Management Plan created using DMPonline

Title: Governance And Trust in Emerging Systems (GATES) An in-depth analysis of current challenges and future prospects for UK drone delivery

Creator: Michael Lewis

Principal Investigator: Michael Lewis

Data Manager: Michael Lewis

Contributor: Daniela Paddeu, Mariela Deamstalden

Affiliation: University of Bath

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Project abstract:

The call emphasises that for Future Flight technologies to "reach their potential in terms of social, environmental and economic benefits" it is vital to understand numerous factors including the governance arrangements that "may enable or constrain the operation and potential of Future Flight transport systems". We propose a multi-disciplinary (law, management and geography/transport planning) approach to understand two inter-related research questions. What are the (1) current challenges ("where are we now?") and (2) future prospects ("where do we want to be?") for governance and trust in emerging systems, as specifically applied to Unmanned Aircraft Systems (UAS), or Drones, for Delivery. For this project, we use the term 'Governance' to denote "the dynamic interrelations of (mostly organised) actors, their resources, interests and power, fora for debate and arenas for negotiation between actors, rules of the game, and policy instruments applied to help achieve legitimate agreements" (Kuhlmann et al., 2019). We represent this in a simple model showing the over-overlapping interactions between policy (overall government and specific departments -such as Department of Transport-, policy intent and relevant international agreements), planning (sub-national/local government and their interactions with key stakeholders), regulation (UK CAA authorize all air users, including un-piloted aircraft), and practice (Concept of Operations (CONOPS), safety systems, local and international supply chains, etc.). The structure provides the basis for addressing the two research questions (RQ): RQ1. Where we are now? It is critical to establish a baseline picture of the various governance arrangements applicable to UAS for freight. To date there is no comprehensive mapping of the multi-stakeholder perspectives. It is far from a simple, static, task. For example, current CAA guidance for UAS operation has been revised 5 times since July 2019. Case sampling will also have to acknowledge key contingencies even within apparently similar application settings (e.g., delivery of NHS medical supplies cf. Royal Mail parcel delivery). RQ2. Where do we want to be? What options exist for designing and delivering 'smart' (understood as temporary, flexible, reflexive) UAS governance arrangements. There has been considerable academic reflection on some aspects of this problem, e.g., people's trust in transport automation, but only partial investigation into the role of governance for these rapidly evolving (delivery drone) technologies and operating models. This represents a significant gap and research opportunity. These RQs translate into four main research objectives (RO) with associated Work Packages (WP). RO1 (WP1 led by Lewis) is to develop a more comprehensive picture of current UK UAS for freight governance. Following the definitional model, we will 'map' across the policy, planning, regulation and practice spectrum. Detailed case studies of governance arrangements are critical for both this proposal and subsequent study further work. Part of this objective is also reflection on the wider challenges of capturing and representing ('governance mapping') multi-faceted emergent arrangements. RO2 (WP2 joint led by Lewis, Paddeu and Deamstalden) is to confirm the current 'state of the art' in practice and theory. It will involve a structured literature review of governance for drone technologies specifically, and emerging technologies more generally. This will include comparative work where relevant (e.g., Japan, China, India, etc.); being mindful of the limits to simplistic translation across different multi-jurisdictional innovation ecosystems. RO3 (WP3 led by Deamstalden) is to investigate the design of relevant smart governance processes. This will combine (and inform) emerging insights from RO1 and 2 but is specifically centred on a

critical examination of 'smart' governance using a range of theoretical lens (e.g., experimentalist) in combination with additional stakeholder interviews (i.e., beyond the case study framing). RO4 (WP4 led by Paddeu) is to begin to translate emerging insights into implications for future governance practice. This will include engagement, documentary guidance, and dissemination via a series of multi-stakeholder workshops where we will deploy smart governance in a range of possible futures developed using the scenario planning approach from the Futures Toolkit, UK Government Office for Science.

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Governance And Trust in Emerging Systems (GATES) An in-depth analysis of current challenges and future prospects for UK drone delivery

Assessment of existing data

Provide an explanation of the existing data sources that will be used by the research project, with references

Given the emerging nature of both the technology and governance, we found no extant data sets (ESRC SN 852612 was the only Drone reference and was concerned with drone strikes in North and South Waziristan) in our search using Discover UK Data Services and, beyond that, only published literature together with the BEIS commissioned review of the RPF and some documents published by the CAA. For example, the BVLOS report by Flylogix from September 2021.

Provide an analysis of the gaps identified between the currently available and required data for the research

Whilst there is significant 'drone' research, to the best of our knowledge there has been no previous work carried out in the manner proposed by this research and there are no (publicly available) datasets in the archives which are adequate for answering the proposed research questions.

Information on new data

Provide information on the data that will be produced or accessed by the research project

Data volume and data type: Qualitative data will be generated in mp3 or WAV format from interviews with practitioners (n uncertain at this point but unlikely to exceed 20 for WP1 + up to 10 (WP3). There will be workshops groups (2) with a range of stakeholders which will be fully transcribed and anonymised. Fieldnotes of groups and any notes/charts, etc. created by participants will also be kept. This data will be anonymised and then processed and analysed using NVivo.

Data quality, formats, standards documentation and metadata: Audio files will be stored in MP3 or WAV format. Digital images will be stored as JPEGs. (nb. neither will be made available for data sharing, see section 7.) Microsoft Word will be used for text-based documents. These file formats have been chosen as effective standards that are in widespread use. At the end of the project, Word documents will be converted to both plain text and PDF. To ensure the integrity and quality of the research data and increase the potential for data sharing, transcriptions will be checked and anonymised to make them ready for archiving. The formatting of data and the provision of metadata will conform to the UKDA standards and guidelines. This will also include clear data description, annotation, contextual information and documentation, e.g. unique identifier for each transcript

Methodologies for data collection: Semi-structured interviews and focus groups/workshops will be digitally recorded and subsequently transcribed into Microsoft Office 365 Word. Fieldnotes will be kept in Microsoft Office 365 Word. A consistent system of file naming and an organised folder structure will be used across the project to ensure easy retrieval. This will involve creating meaningful but brief file names to classify types of files.

Source and trustworthiness of third party data: We will carefully review any third-party data but ex-ante the key sources are likely to be what is available from CAA and other governmental agencies (GDPR compliant etc.).

Quality assurance of data

Describe the procedures for quality assurance that will be carried out on the data collected at the time of data collection, data entry, digitisation and data checking.

We will seek the informed consent of all subjects and confidentiality will be maintained throughout the research and beyond. All interviewees will have the opportunity to view and approve transcripts. No personal characteristics will be recorded (pseudonyms will be used) for analysis and all data will be stored on password protected university systems. A consent form has been drafted. Moreover, it will be explained fully to all participants that they can withdraw from the research at any stage. In the first instance, identification and sampling will be from the relatively comparable the UAS for freight cases that have been involved in the CAA Sandbox. We have established links with at least two of these networks. We will also adopt a snowball sampling approach to capture the other facets of governance - such as key technology supply chains. Again subject to informed consent, interviews will be recorded and transcribed followed by structured data analysis. Starting with open coding by grouping data into first-order codes, we will then use axial coding to group codes into categories (i.e., second-order codes) and then continue at a higher level of abstraction (i.e., relevant theoretical concepts). This iterative process will help highlight overlaps with known theoretical concepts and/or gaps that help contribute to new theoretical insights. Given data availability constraints, the collection, coding, and analysis will be iterative until "theoretical saturation," where additional data or analysis do not add significant new insights. We will use the NVivo software to support the coding process and tables to assist and structure the analysis. The interviews will be carried out either face-to-face or remotely, with the target participants there should be no 'digital divide' limits to participation - in fact convenience may be the key consideration. Although online interviewing can generate additional concerns regarding privacy and confidentiality these will be addressed in our core consent and data management plans. Moreover, how remote interviewing shapes rapport between the researcher and participant will be the subject of close attention. Finally, as each of the core research researchers will conduct interviews, we will carry out inter-coder agreement analysis on a sub-sample of documents using Krippendorff's Alpha, which is generally agreed to be the strongest, most adaptive inter-coder agreement measure (Hayes and Krippendorff, 2007). Building on expertise within the group, we will establish a specific data collections and ethics protocol for the workshop stage of research and submit it for review to the Bath Research Ethics Committee.

Backup and security of data

Describe the data security and backup procedures you will adopt to ensure the data and metadata are securely stored during the lifetime of the project.

The project will follow the University of Bath Research Data Policy and as such, three key principles will be applied: (1) All data are stored securely and protected from loss on enterprise level file servers in physically secure data centres, (2) To minimise the risk of data loss, digital material will be secured through use of the University managed file storage, (3) where possible, non-digital material should be digitised at the earliest possible opportunity. The PI will decide which users require read-only and read-write access. Off-campus access is via VPN. Any sensitive data (as defined by the Data Protection Act) that is stored on portable electronic devices needs to be transmitted will be protected by encryption software.

Management and curation of data

Outline your plans for preparing, organising and documenting data.

A consistent system of file naming and an organised folder structure will be used across the project to ensure easy retrieval. This will involve creating meaningful but brief names and using file names to classify types of files. Although an outline system had been agreed, agreeing these protocols will be a key milestone in week 1 of the project.

Difficulties in data sharing and measures to overcome these

Identify any potential obstacles to sharing your data, explain which and the possible measures you can apply to overcome these.

In the proposed project much of the data is generated through interviews and workshops; therefore the ability to make it available for reuse will be entirely subject to receiving the necessary level of informed consent from all subjects. Due to the highly sensitive nature of this research, it is likely that the identities of participants will remain anonymised, especially as we are planning to engage with a quite narrow range of specific informants – especially given the limited number of CAA Sandbox pilots and the relatively short time frame. No personal characteristics will be recorded (pseudonyms will be used) for analysis and all data will be stored on password protected university systems. A consent form has been drafted. Moreover, it will be explained fully to all participants that they can withdraw from the research at any stage. If such challenges emerge, given the impetus for openness and data sharing, options to share a sub-sample of the data (including specific extracts rather than full transcripts) will be actively considered.

Consent, anonymisation and strategies to enable further re-use of data

Make explicit mention of the planned procedures to handle consent for data sharing for data obtained from human participants, and/or how to anonymise data, to make sure that data can be made available and accessible for future scientific research.

Even fully anonymised data arising from interviews and workshops will not be shared, without explicit consent. All the research team have significant experience of interviewing such key informants. As discussed above, one way of approaching potentially sensitive data could be to hand-pick a number of sample transcripts in partnership with respondents and edit these further, to ensure adequate removal of identifiers (e.g., particular phrases used or personal stories shared by a person that makes them easy to identify). Workshops data may not be shared, unless all participants consented to data sharing – with the same potential sub-sampling/editing as an alternative route to sharing at least some of the data.

Copyright and intellectual property ownership

State who will own the copyright and IPR of any new data that you will generate.

The intellectual property of the data generated will remain with the University of Bath, University of Birmingham and UWE. However, the policy of all institutions with respect to research data requires all data arising from research projects to be made openly available where possible. Given commercial and regulatory constraints we will use NDAs where necessary – providing this does not compromise the core research intent.

Responsibilities

Outline responsibilities for data management within research teams at all partner institutions

The PI will have overall responsibility for implementing the data management plan but each team member will have their own institutional and WP responsibilities and DM will be a standing agenda item. The Bath IT Manager will advise on other aspects of data storage and security. ROs involved in the project at any participating organisations will be responsible for following data management procedures.

Preparation of data for sharing and archiving

Are the plans for preparing and documenting data for sharing and archiving with the UK Data Service appropriate?

As required by ESRC, we will prepare the project data for future sharing and potential secondary analysis. This is particularly important in this project, as detailed UAS governance work has been subject to limited research. Therefore, the data (including anonymised transcripts of interviews where permission has been granted - but not audio or visual files) will be deposited for archiving and re-use with the ESRC data service provider, UKDA, at the end of the project and within three months of the end of the award. The data management plan will be reviewed during the life of the project to ensure the success of the long-term strategy. Prior to archiving, the data files will be converted to suitable open formats for long term preservation as described earlier.

Is there evidence that data will be well documented during research to provide highquality contextual information and/or structured metadata for secondary users?

Subject to considerations regarding anonymity, etc. the formatting of all data and the provision of metadata will conform to the UKDA standards and guidelines. This will also include clear data description, annotation, contextual information and documentation, e.g. unique identifier for each transcript.