**DATA DESIGN DOCUMENT**

*This document describes all the data which will be saved in database.*

DRONES PROJECT SOC09109

GitHub: https://github.com/NikitaEdin/SOC09109-2025-TR2-Group-Project

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# 1.Database Diagram

PDF diagram available in documents folder of GitHub Repository.

A screenshot of a computer

AI-generated content may be incorrect.

# 2.Tables Database (SQLAlchemy)

## 2.1 User

This table will hold all the relevant data on each user.

|  |  |  |
| --- | --- | --- |
| **Name** | **Type** | **Description** |
| id | int (PK) | Unique ID for each user. |
| username | string | Unique username for each user. |
| email | string | User’s email address. |
| password | string | Secure password for user to login. |
| role\_id | int (FK) | Grants or restricts user access based on their role (e.g., pilot, admin). |
| displayName | string | User’s name will be shown as, |
| flyer\_id | string | Unique flyer ID, given by the aviation authority |

## 2.2 Role

This table will define the types of permissions a user can have and their level of authority.

|  |  |  |
| --- | --- | --- |
| **Name** | **Type** | **Description** |
| id | Int (PK) | Unique id for the permission type |
| title | String | Name of the role (e.g., Responsible Officer  , pilot). |
| description | text | Why and what it will grant access to. |
| power | Int | The greater the number, the higher the level of authority. |

## 2.3 Project

Each planned flight is known as a ‘Project’, this is where their information will be held. The forms that will be filled out will be saved as JSON documents so they can be easily handled and updated.

|  |  |  |
| --- | --- | --- |
| **Name** | **Type** | **Description** |
| Id | Int (PK) | Unique id for each project |
| flightCode | String | Unique code generated for each flight. |
| dateOfFlight | Date | The date the flight will take place |
| authorID | Int (FK) | Id of user who has filled out project information |
| pilotID | Int (FK) | ID of user that will fly the drone |
| Longitude | float | Specifies the longitude position of the project, to be measured in degrees minutes seconds. |
| Latitude | float | Specifies the latitude position of the project, to be measured in degrees minutes seconds. |
| projectType | string | Rural or urban flight? |
| projectPurposeID | Int (FK) | ID of the projects purpose |
| Title | string | Create a name for project |
| Description | text | A description of the planned project and why it will take place. |
| lastEdited | dateTime | Displays when the project was last edited |
| created\_at | dateTime | Displays when the project was created |
| viabilityStudy | JSON | Holds the information on the flight to determine whether it will be possible. |
| siteEvaluation | JSON | Holds the information on the site of the flight (e.g. location and hazards). |
| riskAnalysis | JSON | Records details of hazards that could impact the project. |
| crewList | JSON | Records a list of created of added flight crew |
| Equipment | JSON | Contains a checklist of various equipment for users to check off when packed |
| maintanenceKit | JSON | Contains a checklist of the maintenance kit |
| safetyKit | JSON | Contains a checklist of the safety kit |
| groundEquipment | JSON | Contains a user created checklist of ground equipment they are bringing on the flight |
| postflight | JSON | Records information required after the flight has taken place. |
| personalChecklist | JSON | Contains a personal checklist made by the user |
| toggles | JSON | Stores data on what forms are needed within each project |
| checklist | JSON | Contains each of the required checklists |

## 2.5 Project Purpose

The project purpose table will store details on the different purposes of a flight.

|  |  |  |
| --- | --- | --- |
| **Name** | **Type** | **Description** |
| id | Int (PK) | Unique id for the type of flight |
| title | String | Name of the purpose of the flight (e.g., practice, training, research). |
| code | string | Unique letter, in line with the purpose, used in generating the flight code. |

## 2.5 Project File

The project file table will store details of the uploaded files of each project.

|  |  |  |
| --- | --- | --- |
| **Name** | **Type** | **Description** |
| id | Int (PK) | Unique id for each file |
| original\_filename | String | Original name of the file that was uploaded |
| filename | string | A unique file name generated from the original file name, project ID and a randomised unique identifier. |
| filepath | string | Path to the file in the app directory |
| size | int | File size |
| uploaded\_at | dateTime | Date and time of when the file was uploaded |
| project\_id | Int (FK) | ID of the project the file belongs to |

## 2.6 Project Access

The project access table will store unique combinations of the projects and users IDs, allowing admin or the author of the project to issue read only privileges to projects.

|  |  |  |
| --- | --- | --- |
| **Name** | **Type** | **Description** |
| Project\_id | Int (FK) | ID of the project it is linked to |
| User\_id | Int (FK) | ID of the user it is linked to |

## 2.7 Drone

This table will store the drones available at Napier University along with their details.

|  |  |  |
| --- | --- | --- |
| **Name** | **Type** | **Description** |
| droneID | Int (PK) | Unique id for each drone. |
| title | String | Name of the drone. |
| weight | String | Weight of the drone. (in kg) |
| homepage | String | URL for homepage of drone. |
| userGuide | String | URL for user guide of drone. |
| imageURL | String | Location of drone image. |
| best\_for | String | Different drones have better applications in different situations. A description of what situation this drone best suits. |
| release\_date | String | Date when this model of drone was released. |

## 2.8 AuditLog

This table will track modifications that users make to forms.

|  |  |  |
| --- | --- | --- |
| **Name** | **Type** | **Description** |
| id | Int (PK) | Unique id for each audit. |
| user\_id | Int (FK) | User who made the change. |
| action | String | Description of what user did. |
| message | String | Message explaining changes made by user. |
| timestamp | dateTime | When modification was made. |

# 3. JSON Files

## 3.1 ViabilityStudy

JSON containing the sections, fields and field attributes of the viability study form, once the form has been completed the value for each field will be replaced with the information the user has input.

The form fields and attributes are saved within the JSON to ensure that if any changes are made in the future, projects with older form versions are still viable and able to be updated and viewed.

The results of viability study form will determine if a project is feasible.

See Example JSON in the documents folder within the project directory.

|  |  |  |
| --- | --- | --- |
| **Name** | **Type** | **Description** |
| flightCode | String | Unique code for each project. |
| description | String | To describe the proposed flight. |
| flightDate | Date | Date when the flight will take place |
| preparedDate | Date | Date of when the viability study was last edited. |
| preparedBy | string | The name of user that completed the Viability Study Form. |
| airSpaceClass | string | Classification of the airspace |
| airSpaceObservations | String | Observations of what may affect the flight in that airspace. |
| airSpaceSources | String | Sources where this information was found. |
| groundObservations | String | What could affect the success of a flight from the ground? |
| groundSources | String | Sources where this information was found. |
| weatherObservations | String | The weather forecast, how it could affect the flight. |
| weatherSources | String | Sources where this information was found. |

## 3.2 SiteEvaluation

The Site Evaluation JSON will hold the sections, fields and field attributes of the form, with the data on the site of the flight being updated by the user. The data will consist of information on a pre-site visit, emergency contact details of local authorities including addresses and contact numbers where applicable, notes around the airspace and environment if applicable, and finally an on the day site survey.

The form fields and attributes are saved within the JSON to ensure that if any changes are made in the future, projects with older form versions are still viable and able to be used.

See Example JSON in the documents section within the documents section of the project directory.

|  |  |  |
| --- | --- | --- |
| **Name** | **Type** | **Description** |
| flightCode | String | Unique code for each project. |
| dateOfFlight | date | The date the flight is planned to take place |
| remotePilot | string | The name of the remote pilot |
| dateComplete | Date | Date Site evaluation was competed |
| locationdescription | string | A description containing information on location including: latitude/longitude (DMS); elevation above sea level (feet); 6-figure grid reference; address; postcode; and what3words (optional). |
| sensitivities | String | Areas which could cause issues with the public (e.g. schools and cemeteries). |
| airspace | String | Taken from original site evaluation form: *Example 1 – No ATC Permission required Class G airspace uncontrolled*  *Example 2 – No ATC Permission required, ATC Notification if deemed necessary Class D airspace Leeds Bradford CTR – Surface – 4500ft amsl*  *Example 3 – ATC Permission required Leeds* *Bradford Flight restriction zone* |
| restrictions | String | Restricted, danger and prohibited airspace (e.g. *restricted airspace 5km northwest of operating area (HMP Wakefield Prison)*) |
| terrain | String | Overview of what the location is like to assist with planning and risk assessment (user can look at ordnance survey maps can offer insight via contour information). |
| aviationProximities | String | The distance and direction to places where people of the public could be (e.g. residential housing estate 450m to the northwest, industrial estate 200m to south). |
| permissions | String | What permissions are required to fly in this area. |
| NOTAMS | String | Taken from original site evaluation: *e.g. NOTAMS checked at 13.00pm 24/09/2022 No NOTAMS in effect within 10km*  *Are there any temporary restricted areas or temporary danger areas identified by NOTAM?* |
| PPE | String | Minimum PPE required in line with OM and client. |
| livestock | String | Potential livestock and wildlife and their locations if possible. |
| people | String | The distance and direction where people of public could be found (e.g. 500m but further is wise to help assess issues if you have a “exit from operations area” issue during flight.  e.g. residential housing estate 450m to the north west, industrial estate 200m to south) |
| hazards | String | Identify collision risks and sources of interference (e.g. transmitters, power pylons and HIRTA’s). |
| Footpaths | String | Information on public footpaths (found on OS maps). |
| vehicleAccess | string | Information on where the parking is for the pilot and if members of the public can access the flight area by vehicles |
| signalCoverage | string | Information on mobile phone coverage |
| localPolice | string | Information on the local police including phone number, address and postcode.    If you were to log a flight via 101 this is where you could write down the case number for reference if needed |
| localAtc | string | Direct line to ATC is what you will want to obtain if possible.  This is obtained via the NATS AIS Website > EAIP link > Part 3 > AD2  This can be obtained through dronesafetymap.com in some instances by clicking on the FRZ for the airport/aerodrome/heliport and viewing the airspace information. |
| military | string | Phone number of Military Low flying booking cell (0800 515544) |
| hospital | string | Information on the local A&E include address and postcode. |
| airspaceNotes | string | Any information that would be useful about the airspace |
| enviromentNotes | string | Any information that would be useful about the environment |
| preSiteVisit | date | Date the pre-site visit was carried out. |
| obstructions2 | String | Masts, Wires, Buildings, Train lines, Trees, Lakes, Rivers etc, that were not recorded in pre-site visit that may affect the flight. |
| people2 | String | Any changes that might need to be considered within the planned flight or updated within the risk assessment |
| livestock2 | String | Any changes that might need to be considered within the planned flight or updated within the risk assessment |
| proximity2 | String | Any changes that might need to be considered within the planned flight or updated within the risk assessment |
| primarytolz | String | Information on the primary take-off and landing zones, needs to comply with applicable legislation around separation distances |
| secondarytolz | String | Information on the secondary take-off and landing zones, needs to comply with applicable legislation around separation distances |
| comms2 | String | Communications required by operations team and anything other relevant information such as if radios are needed, band/frequencies used. |
| Other | String | Any other factors that might affect the safety of the flight |

## 3.3 Loading List

The loading list is made up of 5 separate JSON files which are stored within their own column within the project table. Each focused on a separate list of either crew or type of kit or equipment.

The form fields and attributes are saved within the JSON to ensure that if any changes are made in the future, projects with older form versions are still viable and able to be used.

See Examples JSON in the documents section within the documents section of the project directory.

They consist of the following.

### 3.3.1 Crew List JSON

The crew list JSON will contain information of who is on the crew.

|  |  |  |
| --- | --- | --- |
| **Name** | **Type** | **Description** |
| user\_data | Array of objects | Each object is a crew member holding the variables: name, role, contact number, email, called. |

### 3.3.2 Maintenance Kit JSON

The maintenance kit JSON will contain a checklist to allow users to keep track of any kit packed, and as a reference to ensure they don’t forget anything.

|  |  |  |
| --- | --- | --- |
| **Name** | **Type** | **Description** |
| MaintenanceKit | Object | A JSON object holding an array list of Booleans, each referencing a checkbox for a piece of kit which can be checked by the user. |

### 3.3.3 Safety Kit JSON

The safety kit JSON will contain a checklist to allow users to keep track of any kit packed, and as a reference to ensure they don’t forget anything.

|  |  |  |
| --- | --- | --- |
| **Name** | **Type** | **Description** |
| SafetyKit | Object | A JSON object holding an array list of Booleans, each referencing a checkbox for a piece of kit which can be checked by the user. |

### 3.3.4 Equipment JSON

The equipment JSON will contain a checklist to allow users to keep track of any kit packed, and as a reference to ensure they don’t forget anything.

|  |  |  |
| --- | --- | --- |
| **Name** | **Type** | **Description** |
| Equipment | Object | A JSON object holding an array list of Booleans, each referencing a checkbox for a piece of equipment which can be checked by the user. |

### 3.3.5 Ground Equipment JSON

The equipment JSON will contain a user created checklist of ground equipment to allow users to keep track of any equipment packed, and as a reference to ensure they don’t forget anything.

|  |  |  |
| --- | --- | --- |
| **Name** | **Type** | **Description** |
| GroundEuipment | Array of objects | Each object holds a piece of ground equipment, action to take place and Boolean for whether that action has been taken. |

## 3.4 Risk Analysis

The risk analysis allows users to create and log a risk assessment related to their project, many of these can be linked to a single project depending on the hazards present.

The form fields and attributes are saved within the JSON to ensure that if any changes are made in the future, projects with older form versions are still viable and able to be used.

See Example JSON in the documents section within the documents section of the project directory.

|  |  |  |
| --- | --- | --- |
| **Name** | **Type** | **Description** |
| Hazards Identified | String | States the hazard present |
| Existing Control | String | States current procedure |
| People at Risk | String | A dropdown to allow users to select who is at risk from the hazard. |
| Risk | String | Shows the severity of the risk present |
| Further Actions  Residual Risk | String | Details further actions to be taken by the user to reduce the risk |
| Residual Risk | string | The risk still present after further actions have been taken |
| Action Taken By | String | The name of who has taken action to help resolve the risk |
| Action Taken When | Date | Date of when these actions took place |
| Completed | Boolean | Check box. Ticked when form complete |

## 3.5 Post Flight

The post flight checklist consists of 3 checklists to be completed post flight to ensure proper procedure has been taken.

|  |  |  |
| --- | --- | --- |
| **Name** | **Type** | **Description** |
| landing | Object | List of actions, using Booleans to determine whether action has taken place. |
| afterLanding | Object | List of actions, using Booleans to determine whether action has taken place. |
| reporting | Object | List of actions, using Booleans to determine whether action has taken place. |