

Name	Monash Drone Discovery Platform_RPA_DJI Matrice 600	Current Rating	Residual Rating
Location		Medium	Low
Business Unit		Last Review Date	Risk Owner
		13/11/2019	Christopher Peter Dixon
Risk Assessment Team		Risk Approver	
Chris Dixon - Manager Drone Discovery Platform Anthony Marsh - Monash University Chief Remote Pilot Leigh Burgess - MDDP Technical Officer, RePL Pilot		Rohan Hartley Clarke	
Additional Notes			
Describe task / use			
This risk assessment describes the hazards, risks and controls associated with the use of the MDDP DJI Matrice 600 RPA. This includes items to enable the safe transport, storage and operation of the MDDP DJI Matrice 600 RPA but excludes flight activities and field operations, which are covered in separate risk assessments.			

Risk Factors

Risk Factor

2.1 - Struck by objects or persons by accident (if violence code to 8.2)

Description

Component malfunction, serious injury and property damage resulting from the use of non-genuine DJI Parts;
 - The modification or alteration of the aircraft, its components and parts;
 - Faulty operation/poor performance of aircraft and systems (remote controller, flight controller, Lightbridge 2 Air System, landing gears, GPS, compass, propulsion system, and batteries);
 - Changing the orientation position of flight control system or the IMU Pro (redundancy) system.

- 1.0 - Fixed plant (e.g. cool rooms, fume cupboards, safety showers, boilers, lathes, lifts, gas mains, PET scanners) -- No
- 2.0 - Transport and mobile plant (e.g. motor vehicles, forklifts, walky stackers, trolleys and wheelbarrows) -- Yes
- 3.0 - Powered equipment, tools and appliances (e.g. computers, workshop equipment, kitchen equipment, gas cylinders) -- Yes
- 4.0 - Non-powered handtools and equipment (e.g. furniture and fittings, ladders, handtools, packing equipment, glassware) -- No
- 5.0 - Chemical materials (e.g. dangerous goods, hazardous substances, poisons and drugs) -- No
- 6.0 - Materials and substances (not otherwise selected from category 5.0) -- No
- 6.3 - Fire and smoke -- No
- 7.1 - Outdoor working environment (e.g. carparks, walkways, outdoor stairs) -- Yes
- 7.2 - Indoor working environment (e.g. internal rooms, floor surfaces, stairwells) -- No
- 8.5 - Biological materials (e.g. animals, non-living animal materials, microorganisms) -- No
- 8.4 - Personal impairment and/or interaction (e.g. pre-existing medical condition, assisting a patient) -- No
- 9.1 - Psychological (e.g. stressful situations) -- No

Medium	Low		
Existing Controls	Proposed Controls		
<ul style="list-style-type: none"> 4 - Engineering control measure: Only authorised and genuine DJI parts and consumables (batteries, propellers, spare parts, motors, etc.) are to be used identified. 5 - Administrative control measures: Procedure to ensure items returned from field/flight operations are identified as requiring maintenance, have received damage or not function correctly, instigating maintenance and investigation. 	Description	Responsibility	Target Date
	Pre-flight checklist and iLab booking system to include details and specify that the modification, removal and replacement of the flight controller, power management unit, Lightbridge 2 Air System or any other aircraft components is strictly prohibited unless authorised and conducted by the MDDP.	Christopher Peter Dixon	29/11/2019
	Maintenance procedures include the requirement to use genuine DJI products and services when repairing or modifying aircraft.	Christopher Peter Dixon	29/11/2019
	Pre-flight checklist to note Pilots are to report any instances of aged, chipped or broken propellers to MDDP staff. Only replace propellers at the authority of the MDDP and with DJI propellers.	Christopher Peter Dixon	29/11/2019
Procedure to ensure items returned from field/flight operations are identified as requiring maintenance, have received damage or not function correctly, instigating maintenance and investigation.	Christopher Peter Dixon	29/11/2019	

Risk Factor

2.1 - Struck by objects or persons by accident (if violence code to 8.2)

Description

Collision, serious injury and property damage resulting from flight environment or weather conditions:

- Crash, loss of stabilisation and impact flying aircraft in wind speeds greater than 25km per hour, rain, snow, fog, smog, hail, lightening, tornadoes, hurricanes;
- Fling indoors, with impact to GPS and stabilization features;
- Flying within close vicinity (less than 10m) to obstacles, buildings, people, animals, trees, bodies of water, infrastructure, etc;
- Flying or conducting operations in vicinity to magnetic or radio interference (high voltage power lines, large scale power transmission stations, mobile base stations, broadcast stations) which may impact communication with flight controller

Medium	Low		
Existing Controls	Proposed Controls		
<ul style="list-style-type: none"> 5 - Administrative control measures: Pilots are required to conduct operations in suitable environmental conditions, with information being noted on the Pre-Flight checklist. Pilots must conduct a site visit and reconnaissance activity prior to flight to determine any potential flight issues, obstacles and items that could impact operations. 	Description	Responsibility	Target Date
	Reconnaissance activity/flight area review to be part of documentation and information gathered by MDDP Platform Pilots when conducting services/activities on behalf of clients/researchers.	Christopher Peter Dixon	29/11/2019

Risk Factor

2.1 - Struck by objects or persons by accident (if violence code to 8.2)

Description

Component malfunction, serious injury and property damage resulting from GPS-Compass

Pro:

- Incorrect setup of the GPS-Compass Pro collapsible mount, not folded and not correctly mounted;
- GPS-Compass Pro not securely mounted, arrows not pointing toward the front of the aircraft;
- Incorrect settings in the DJI Assistant 2;

Medium				
Existing Controls		Proposed Controls		
<ul style="list-style-type: none"> 5 - Administrative control measures: Flights must be completed in open areas. Areas with tall buildings or steel structures may block the GPS signal and affect the accuracy of the on-board compass. Similarly, do not carry ferromagnetic materials (such as mobile phones) with you during calibration activities. This information is noted on the Pre-Flight checklist. 5 - Administrative control measures: Pre-flight checklist to note Pilots are to report any instances of aged, chipped or broken propellers to MDDP staff. Only replace propellers at the authority of the MDDP and with DJI propellers. 		Description	Responsibility	Target Date
		Pre-Flight checklist to note Pilot to check and rectify any calibration issues in accordance with the DJI Go app. Do not calibrate the compass where there is a chance of strong magnetic interference, such as magnetite, parking structures and steel reinforcements underground.	Christopher Peter Dixon	29/11/2019

Risk Factor

2.1 - Struck by objects or persons by accident (if violence code to 8.2)

Description

Component malfunction, serious injury and property damage resulting from Flight Control

System:

- Modifying the structure of the flight controller;
- Changing the mounting position of the flight controller;
- Shorting the ports on the on the flight controller;
- Incorrectly connecting cables to port descriptions;
- Using non-supplied cabling to connect the centre frame to supply power to the Power Management Unit (PMU);

Low	
Existing Controls	Proposed Controls
<ul style="list-style-type: none">• 5 - Administrative control measures: Pre-flight checklist and iLab booking system to include details and specify that the modification, removal and replacement of the flight controller, power management unit, Lightbridge 2 Air System or any other aircraft components is strictly prohibited unless authorised and conducted by the MDDP.	

Risk Factor

2.1 - Struck by objects or persons by accident (if violence code to 8.2)

Description

Component malfunction, serious injury and property damage resulting from the Retractable Modules, Frame Arms and Centre Frame:

- Damaging the cables when mounting or removing the upper or lower plate of the centre frame, shorting out the reserved ports on the centre frame or using the DC18V and LiPO-6S power ports not according to their specifications;
- Modification/removal of the Lightbridge 2 Air System antennas mounted on the M3 and M6 frames;
- Interchanging cabling on the left and right retractable modules, causing landing gear malfunction.

Low

Existing Controls

- 5 - Administrative control measures:
Pre-flight checklist and iLab booking system to include details and specify that the modification, removal and replacement of the flight controller, power management unit, Lightbridge 2 Air System or any other aircraft components is strictly prohibited unless authorised and conducted by the MDDP.

Proposed Controls

Risk Factor

2.1 - Struck by objects or persons by accident (if violence code to 8.2)

Description

Component malfunction, serious injury and property damage resulting from the Remote Controller:

- Remote controller being flat and loosing communication with aircraft or loosing sync after 10 minutes on non use;
- Damaged or faulty remote antennas;
- Damage to the remote controller, including exposure to oil/liquid;

Medium	Low		
Existing Controls	Proposed Controls		
<ul style="list-style-type: none"> 5 - Administrative control measures: Maintenance procedures to include observation/checks of remote controller, flight controller, Lightbridge 2 Air System, landing gears, GPS, compass, propulsion system, propellers and batteries. 	Description	Responsibility	Target Date
	Procedure implemented to ensure items returned from field/flight operations are identified as requiring maintenance, have received damage (physical, liquid, etc.) or not function correctly, instigating maintenance and investigation.	Christopher Peter Dixon	29/11/2019

Risk Factor	1.2 - Injuring oneself with tools or objects
Description	
<p>Serious injury to operator or others resulting from rotating propellers and motors associated with the Aircraft Propulsion System:</p> <ul style="list-style-type: none"> - Using aged, chipped or broken propellers; - Interacting with the aircraft prior to powering down; - Incorrectly/insecurely mounted propellers; - Using non-authorized DJI propellers; - Commencing operations/starting aircraft in proximity to others, children and animals 	<ul style="list-style-type: none"> ● 1.0 - Fixed plant (e.g. cool rooms, fume cupboards, safety showers, boilers, lathes, lifts, gas mains, PET scanners) -- No ● 2.0 - Transport and mobile plant (e.g. motor vehicles, forklifts, walky stackers, trolleys and wheelbarrows) -- Yes ● 3.0 - Powered equipment, tools and appliances (e.g. computers, workshop equipment, kitchen equipment, gas cylinders) -- Yes ● 4.0 - Non-powered handtools and equipment (e.g. furniture and fittings, ladders, handtools, packing equipment, glassware) -- No ● 5.0 - Chemical materials (e.g. dangerous goods, hazardous substances, poisons and drugs) -- No ● 6.0 - Materials and substances (not otherwise selected from category 5.0) -- No ● 6.3 - Fire and smoke -- No ● 7.1 - Outdoor working environment (e.g. carparks, walkways, outdoor stairs) -- Yes ● 7.2 - Indoor working environment (e.g. internal rooms, floor surfaces, stairwells) -- No ● 8.5 - Biological materials (e.g. animals, non-living animal materials, microorganisms) -- No ● 8.4 - Personal impairment and/or interaction (e.g. pre-existing medical condition, assisting a patient) -- No ● 9.1 - Psychological (e.g. stressful situations) -- No

Medium	Low		
Existing Controls	Proposed Controls		
<ul style="list-style-type: none"> 5 - Administrative control measures: Pre-flight checklist to state to ensure a clear area and maintain a safe distance from the aircraft during take-off and landing. Do not attempt to touch, modify or make changes to the aircraft once powered on. Pilots must report any instances of aged, chipped or broken propellers to MDDP staff. Only replace propellers at the authority of the MDDP and with DJI propellers. 4 - Engineering control measure: Maintenance procedures to include observation/checks of remote controller, flight controller, Lightbridge 2 Air System, landing gears, GPS, compass, propulsion system, propellers and batteries. 	Description	Responsibility	Target Date
	Include reference to gloves as PPE and determine suitable gloves.	Christopher Peter Dixon	29/11/2019

Risk Factor	1.2 - Injuring oneself with tools or objects
Description	
<p>Serious injury to operator or others resulting from remote/aircraft firmware:</p> <ul style="list-style-type: none">- Being old and outdated;- Using unofficial firmware not supported by DJI;- Having incorrect firmware versions between the remote control and aircraft.	

Medium	
Existing Controls	Proposed Controls
<ul style="list-style-type: none">• 5 - Administrative control measures: Firmware to be monitored/updated as part of leasing/returning equipment. Pilots must adhere to notifications shown in the DJI Go app and update/follow instructions indicated on flight controllers screen if update arrives in the field.	

Risk Factor	5.1 - Hot objects
Description	
<p>Serious injury to operator or others resulting from RPA storage and Transport:</p> <ul style="list-style-type: none"> - Batteries left in aircraft during transport; - Batteries exposed to temperatures <-20 and >45 degrees celcius, impacting performance or causing batteries to overheat/combust; - Batteries placed in direct exposure to sunlight, impacting performance or causing batteries to overheat/combust; 	<ul style="list-style-type: none"> ● 1.0 - Fixed plant (e.g. cool rooms, fume cupboards, safety showers, boilers, lathes, lifts, gas mains, PET scanners) -- No ● 2.0 - Transport and mobile plant (e.g. motor vehicles, forklifts, walky stackers, trolleys and wheelbarrows) -- No ● 3.0 - Powered equipment, tools and appliances (e.g. computers, workshop equipment, kitchen equipment, gas cylinders) -- Yes ● 4.0 - Non-powered handtools and equipment (e.g. furniture and fittings, ladders, handtools, packing equipment, glassware) -- No ● 5.0 - Chemical materials (e.g. dangerous goods, hazardous substances, poisons and drugs) -- No ● 6.0 - Materials and substances (not otherwise selected from category 5.0) -- No ● 6.3 - Fire and smoke -- Yes ● 7.1 - Outdoor working environment (e.g. carparks, walkways, outdoor stairs) -- Yes ● 7.2 - Indoor working environment (e.g. internal rooms, floor surfaces, stairwells) -- No ● 8.5 - Biological materials (e.g. animals, non-living animal materials, microorganisms) -- No ● 8.4 - Personal impairment and/or interaction (e.g. pre-existing medical condition, assisting a patient) -- No ● 9.1 - Psychological (e.g. stressful situations) -- No

Medium	
Existing Controls	Proposed Controls
<ul style="list-style-type: none">4 - Engineering control measure: A portable battery pack is provided for the storage, handling and transport of the Matrice 600 batteries during field operations. Batteries are stored in a temperature controlled environment (between 18~28 degrees celcius) when not conducting operations, in the MDDP workshop.	

Appendix

Risk Matrix Level

Negligible	No additional control measures required
Low	Manage by routine procedures at local management level
Medium	Management responsibility must be specified and response procedures monitored
High	Senior management attention needed and management responsibility specified
Extreme	Immediate action required and must be managed by senior management with a detailed plan