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| **Document ID: DroneFlyingInSportsHall-002** | | | | |
| **Risk Assessment** | | | | |
| **Risk Assessment for the activity of** | GDP Group 53 - Collaborative Robot Perception for mm-wave radar – drone flying | | **Date** | 29/11/2024 |
| **Unit/Faculty/Directorate** | ECS - FEPS | **Assessor** | Name | |
| **Line Manager/Supervisor** | Klaus-Peter Zauner | **Signed off** | Signature | |

| ***PART A*** | | | | | | | | | | |
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| **(1) Risk identification** | | | **(2) Risk assessment** | | | | **(3) Risk management** | | | |
| Hazard | **Potential Consequences** | **Who might be harmed**  **(user; those nearby; those in the vicinity; members of the public)** | **Inherent** | | |  | **Residual** | | | **Further controls (use the risk hierarchy)** |
| **Likelihood** | **Impact** | **Score** | **Control measures (use the risk hierarchy)** | **Likelihood** | **Impact** | **Score** |
| 1) Drone operation | Serious injury, damage to property from contact with flying drone. | Main user and anyone in the immediate vicinity of the equipment | 4 | 4 | 16 | Specific risks associated with the indoor flying operation of drones: risk of crashing into person(s) and building fittings and fixture through driver error or malfunction.  All flying (including testing) will take place within a designated enclosed flying zone. This zone will be unpopulated when any testing/flying is undertaken. The zone will be a fully enclosed environment with restricted access to the test area.  All testing and flying within the designated zone will have an observer present in addition to the pilot.  All drones will be equipped with propeller guards. The propeller guards will protect person(s), building, and drone from the risk of harm from the drone’s rotors.  The guards will minimise this from happening accidentally. The drone is light-weight (~2kg).  Signs will be placed in prominent view to display and advice that drones will be flown in the designated zone.  (NB - Reference method statement: DroneFlyingInSportsHall-001) | 1 | 4 | 4 |  |
| 2) Exposure to RF - (close proximity) | Heating effect and potential cause of cataracts. | User or anybody nearby who is within 5 cm of the transmitter. | 4 | 4 | 16 | Place the radar module in a box when operating in a lab.  The box when closed will have a push to make switch that will only allow the radar to be turned on when securely in place in the box so that no-one can go withing 5 cm of the transmitter.  When not operating the radar, the box should be left open so the switch is left open meaning the radar cannot be powered.  Place not to touch sign on box, saying so that someone doesn’t touch the setup.  (The European RF exposure radiation limit is fulfilled if a minimum distance of 5 cm between the body and the radio transmitter is respected). | 1 | 4 | 4 |  |

**Assessment Guidance**

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| 1. Eliminate | Remove the hazard wherever possible which negates the need for further controls | If this is not possible then explain why |  |
| 1. Substitute | Replace the hazard with one less hazardous | If not possible then explain why |
| 1. Physical controls | Examples: enclosure, fume cupboard, glove box | Likely to still require admin controls as well |
| 1. Admin controls | Examples: training, supervision, signage |  |
| 1. Personal protection | Examples: respirators, safety specs, gloves | Last resort as it only protects the individual |

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| **LIKELIHOOD** | 5 | 5 | 10 | 15 | 20 | 25 |
| 4 | 4 | 8 | 12 | 16 | 20 |
| 3 | 3 | 6 | 9 | 12 | 15 |
| 2 | 2 | 4 | 6 | 8 | 10 |
| 1 | 1 | 2 | 3 | 4 | 5 |
|  | | 1 | 2 | 3 | 4 | 5 |
| **IMPACT** | | | | |

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| Impact | | Health & Safety |
| 1 | Trivial - insignificant | Very minor injuries e.g. slight bruising |
| 2 | Minor | Injuries or illness e.g. small cut or abrasion which require basic first aid treatment even in self-administered. |
| 3 | Moderate | Injuries or illness e.g. strain or sprain requiring first aid or medical support. |
| 4 | Major | Injuries or illness e.g. broken bone requiring medical support >24 hours and time off work >4 weeks. |
| 5 | Severe – extremely significant | Fatality or multiple serious injuries or illness requiring hospital admission or significant time off work. |

Risk process

1. Identify the impact and likelihood using the tables above.
2. Identify the risk rating by multiplying the Impact by the likelihood using the coloured matrix.
3. If the risk is amber or red – identify control measures to reduce the risk to as low as is reasonably practicable.
4. If the residual risk is green, additional controls are not necessary.
5. If the residual risk is amber the activity can continue but you must identify and implement further controls to reduce the risk to as low as reasonably practicable.
6. If the residual risk is red do not continue with the activity until additional controls have been implemented and the risk is reduced.
7. Control measures should follow the risk hierarchy, where appropriate as per the pyramid above.
8. The cost of implementing control measures can be taken into account but should be proportional to the risk i.e. a control to reduce low risk may not need to be carried out if the cost is high but a control to manage high risk means that even at high cost the control would be necessary.

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| Likelihood | |
| 1 | Rare e.g. 1 in 100,000 chance or higher |
| 2 | Unlikely e.g. 1 in 10,000 chance or higher |
| 3 | Possible e.g. 1 in 1,000 chance or higher |
| 4 | Likely e.g. 1 in 100 chance or higher |
| 5 | Very Likely e.g. 1 in 10 chance or higher |