CS1 - Hands-free Controlled Drone

1. **Are you more interested in indoor navigation technology or outdoor GPS technology?**

   We are interested in both indoor navigation and outdoor GPS technology. The proposed prototype can start with outdoor GPS technology first.

2. **Is a voice-activated solution preferred?**

   We have no specific preference for a voice-activated solution. The proposed solution must be able to operate in a noisy environment.

3. **Which are the other types of drones that you are currently using and is beyond-the-line-of-sight (BLOS) control required?**

   We primarily use commercial off-the-shelf drones (e.g. Parrot ANAFI). We are open to using other drones. LOS control is sufficient for this challenge.

4. **Can the Parrot's systems be modified to integrate the required hardware for gesture control?**

   Yes, but it should not degrade the performance of the drone.

5. **What is a typical project duration?**

   It is between 6 to 12 months.

CS2 - Accident Prevention

1. **What are the examples of wrong postures and equal stance, and how do we map the danger zones?**

   An example of a wrong posture is bending our backs to lift heavy loads. Another example is working at heights without 3 point contact. Danger zones can be mapped onsite at the workshop.

2. **Are there existing cameras installed on the premises and whether the proposed solution requires the camera to be a fixed structure or mounted onto moving vehicles?**

   The proposed solution should come with cameras and necessary hardware. The camera should be installed on a fixed structure.

3. **Are you looking for the proposed solution to have video analytics capabilities or would a sensor-based solution suffice? Does the solution look to address concerns such as the battery lifespan?**

   We welcome both video analytics and sensor-based solutions. The solution should be connected to an electrical socket to enable uninterrupted operations.

4. **What are the acceptable performance standards?**

   The accuracy in detecting unsafe actions should be more than 80%.

5. **Where will the data be stored and can we pre-process the data using Cloud platform?**

   It will be a standalone network, and pre-processing of data must be done on the premises.

6. **How should the alert be transmitted (e.g. through mobile phone) and who will receive the alert?**

   The alert should be transmitted to a mobile phone. Typically the workshop overall-in-charge (OIC) will receive the alert.

CS3 - Interpretation of Data

1. **What is the format (e.g. native PDF or scanned PDF) and language used in the reports?**

   The reports are in English and typically 1-page in length. We use Word or Excel to develop the reports which are stored in a standalone system.

2. **Is the solution required to process the reports in real-time?**

   We do periodically receive “live” reports, and the proposed solution must be able to analyse such reports immediately. If it is not feasible to do so, the Solution Provider should state the optimal operating period and restrictions.

3. **Can you share some examples of the data that requires categorisation?**

   We will share the data categorisation list and sample data with the intended Solution Provider whom we We will provide the sample data when we will embark on the trial. The data is generally unstructured. Examples are as follows:

   a. Date and time of submission, location.
   b. Rank, Name, NRIC number.
   c. Description of situation.

4. **Are there data entries that may simultaneously belong in different categories?**

   It is possible.

5. **Are the free texts computerised text that can be filtered?**

   The free text is stored in individual Word / text files. It is not stored in a tabular form where it could be filtered directly.

6. **What do you mean by “easy to compute”?**

   The solution should be deployable on desktops and laptops. It should not require dedicated servers.

7. **Will the Solution Provider be required to deliver an end-to-end product including system integration of the front-end and user interfaces and the back-end algorithms?**

   For this trial, we require only the back-end algorithms that could be deployed in a Windows environment. The end-to-end product can be developed when the trial is successful.

CS4 - 3D mapping for search and rescue operations

1. **What are the requirements of the proposed solution regarding its endurance, range and accuracy?**

   a. Map an area of 1,000 square feet in 3D within one battery charge of the drone.
   b. Range – 1 kilometre
   c. Accuracy - Show the objects and dimension accuracy of within 10% when measured.

2. **What is the intended floor area for mapping and can the proposed solution break the windows using the UAV or UGV?**

   The target area to be mapped is 1,000 square feet. There is no need for the solution to break the windows

3. **Does the proposed solution need to interact with the environment?**

   The solution will not need to lift obstacles, break windows. However, to be able to map the environment, it will need to be able to avoid or handle collision within the environment.

4. **Does the solution need to be equipped with an illumination system?**

   An illumination system would be desired. Disaster and rescue operations may have no lighting due to interrupted power systems.

CS5 - Core Body Temperature

1. **How intrusive could the proposed solution be?**

   The proposed solution must not be intrusive. For instance, individuals should not need to ingest or have sensors embedded into their body.

2. **What is the required accuracy of the body temperature readings and whether other measurements such as heart rate, respiratory rates and ECG would be considered?**

   We would like the accuracy of the body temperature readings to be within 0.2 degree. We will consider all forms of measurement to detect and mitigate heat injuries. The measurement of body temperature is one approach to doing so.

3. **How durable should the proposed solution be?**

   The proposed solution will be used for physical training, military obstacle courses, and field training.

4. **Who should receive the alerts?**

   The proposed solution should send the alerts to both the user and the supervisor.

5. **Does the proposed solution require a secured communication channel to transmit the alerts?**

   We do not require a secured communication channel for the trial.

CS6 - Movement Tracking

1. **What are the specifications for the proposed solution (e.g. weight and size) and how many of the devices will be deployed?**

   The proposed solution should be a handsfree long-life small form factor tracker. For the trial, we will trace and display locations of minimally 20 trackers in both indoor and outdoor settings. The proposed solution should be able to scale up to trace and display locations of at least 500 tracks at any time.

2. **What are the requirements for distance accuracy and minimum latency?**

   We require near real-time location accuracy (better than ±5m; ideally ±1m). The real-time latency should be less than 0.1s.

3. **How long should the battery life of the trackers be?**

   It should last for 1 month of operations on a single charge (ideally 6 months).

CS7 - Tele-operations

1. **If the tele-operations controls have already been introduced for cars, can it be shown as a solution to be implemented in the heavy-duty vehicles? Would RSAF be interested in semi-autonomous remote controlled terrain vehicles?**

   We understand that there may be semi-autonomous vehicles in the market but currently, we are looking at tele-operating our existing vehicles, such as a wheel loader.

2. **Can we submit a joint proposal?**

   Innovation is all about collaboration. So we are definitely open to having joint proposals.

3. **Can we arrange a site visit to see the existing fleet of vehicles?**

   We will arrange for a site visit for the shortlisted Solution Provider.

4. **What is the required resolution and the required maximum latency?**

   The main aim is to enable the tele-operations safely. Part of the innovation is to explore the resolutions and latencies that would enable these operations.

5. **What are the communication connectivity requirements (5G/4G/etc)?**

   There is no fixed connectivity requirement, it is up to the Solution Providers to explore the different communications technology to enable tele-operations.