Vigyan 2.0

Hackathon-2022

Problem Statement No.1

Sr. No.	Title	Details
1	**Theme**	Drone
2	**Student**	College/University
3	**Problem Statement**	Increasing the flight time of agricultural drone
4	**Details of Industry / Organization**	Name: Prime UAV Contact Person Name: Pradip Patel Designation: CEO Email Id: info@primeuav.com Mobile No.: +91 99799 63653
5	**Category**	Hardware
6	**Challenge Description**	Low flight time is key limitation currently being faced in agricultural drones. These drones weigh up to 25 kilograms including payload weights around 10 kilograms. The agricultural drone can have either four or six motors with respective Electronic Speed Controllers (ESC) and to feed up the power to this number of motors, battery with large capacity is required/used. With this setup, drone managed to get the flight time of around 15 minutes which is very short time of operation for large fields. So, a solution to surge up the flight time is the challenge, need to be solved. Remember, more the drone weights, lesser the flight time.
7	**Expected Outcomes**	Flight time of the drone should be at least 30 minutes.

Problem Statement No. 2

Sr. No.	Title	Details
1	**Theme**	Drone
2	**Student**	College/University
3	**Problem Statement**	Design and develop a seed spreading mechanism for drone
4	**Details of Industry / Organization**	Name: Prime UAV Contact Person Name: Pradip Patel Designation: CEO Email Id: info@primeuav.com Mobile No.: +91 99799 63653
5	**Category**	Hardware
6	**Challenge Description**	Seed spreading with a drone allows a user to reach places that traditionally would be hard to access, or to simply spread seeds much faster. Seed spreader drones can spread up to 40x faster than manual spreading, and allow users to spread seeds quickly and efficiently on hills, wetlands, and other places where heavy machinery would have a hard time reaching.  The current available mechanisms in industry are omnidirectional and not adjustable according to seeds' size (they are universal irrespective of size of seed); thus, such a mechanism is to be designed and developed that eliminate these problems and make the design more functional.

7	**Expected Outcomes**	A seed spreading mechanism should be capable of spreading seeds of variety of sizes in directional manner.

Problem Statement No. 3

Sr. No.	Title	Details
1	**Theme**	Drone
2	**Student**	College/University
3	**Problem Statement**	Design and develop a winch mechanism for drone.
4	**Details of Industry / Organization**	Name: Prime UAV Contact Person Name: Pradip Patel Designation: CEO Email Id: info@primeuav.com Mobile No.: +91 99799 63653
5	**Category**	Hardware
6	**Challenge Description**	The delivery of items typically includes picking and packaging the items, providing the packaged items to a carrier for delivery, and delivering the items. Even for small items or small numbers of items, boxes or other packages are transported by relatively large vehicles over roads, sometimes across long distances.  The delivery drones are becoming the popular choice for such kind of task as they can deliver the item quickly. A winch mechanism is attached to the drone's body that can pick the item up and deliver it to the destination.

		Challenge: The current available designs have some stability issues with hanged payload and product damage while unloading the payload. So, such a light weight winch mechanism is to be designed that finish off these limitations.
7	**Expected Outcomes**	A winch mechanism should be compatible to carry the 10 kilograms payload without affecting the stability of drone.

Problem Statement No. 4

Sr. No.	Title	Details
1	**Theme**	Drone
2	**Student**	School
3	**Problem Statement**	Design and develop an automatic parachute release system for drone crash safety.
4	**Details of Industry / Organization**	Name: Prime UAV Contact Person Name: Pradip Patel Designation: CEO Email Id: info@primeuav.com Mobile No.: +91 99799 63653
5	**Category**	Hardware

6	**Challenge Description**	Application of drones is becoming more popular and their safety is becoming a serious concern. Due to high cost of top-end drones and requirements for secure landing, development of reliable drone recovery systems is a hot topic in the industry. So, an automatic parachute release system is to be designed and developed for the drone crash safety.  **Challenge:** The current available designs in market sometime fails due to instant Network cut-off and are not able to land the drone safely.
7	**Expected Outcomes**	This automatic parachute system should be quick enough that it stabilises the heavy drone (weights up to 25 kilograms with payload) and land it safely.

Problem Statement No. 5

Sr. No.	Title	Details
1	**Theme**	Drone
2	**Student**	College
3	**Problem Statement**	Regeneration on the fly
4	**Details of Industry / Organization**	Name: Technoride Solution Pvt. Ltd. Contact Person Name: Mr. Prerak Sheth Designation: Director Email Id: prerak@technoride.net.in

5	**Category**	Hardware
6	**Challenge Description**	Energy / Power is a major constraint in Drone and a limiting factor for payloads. Identify if you can reconvert part of the energy used to overcome air resistance (similar to regenerative breaking)
7	**Expected Outcomes**	Some form of regeneration – target 10-20% of power saving.

Problem Statement No. 6

Sr. No.	Title	Details
1	**Theme**	Drone
2	**Student**	College
3	**Problem Statement**	Rotor design
4	**Details of Industry / Organization**	Name: Technoride Solution Pvt. Ltd. Contact Person Name: Mr. Prerak Sheth Designation: Director

		Email Id: prerak@technoride.net.in
5	**Category**	Hardware
6	**Challenge Description**	Currently the Drones have 4 rotor design. Every rotor adds energy and weight. Consider 3 rotor design and see if all working parameters can be fulfilled with 3 rotors. If not, list why it cannot be done
7	**Expected Outcomes**	Optimized design