PROPOSED FMEA TABLE

Process Step	Potential Failure Mode	Potenetial Failure Effect	SEV[1]
What is the step?	In what ways can step go wrong?	What is the impact on the customer if the failure mode is not prevented or corrected?	How severe is the effect on the customer?
Signal Aquisition	SDR fails to capture beacon signal	Drone cannot classify or navigate	9
Beacon classification	Misclassification of beacon type	Drone navigates to wrong beacon	8
Navigation	Beacon location estimated incorrectlly	Drone flies off course, potential crash	9
Power system management	Battery drains unexpectedly	Drone crashes mid flight	10
Failsafe return	Failsafe does not trigger	Drone lost or crashes	10

1. Severity : Severity of impact of failure event. It is scored on a scale of 1 to 10. A high score is assigned to higl
2. Occurrence: Frerqunecy of occurrence of failure event . It is scored on a scale of 1 to 10. A high score is assig
3 . Detection: Ability of process control to detect the occurrence of failure events. It is scored on a scale of 1 to 1
4. Risk priority number: The overall risk score of an event. It is calculated by multiplying the score for severity

Potential Causes	OCC[2]	Current Process Controls	DET[3]
What causes the step to ho wrong (i.e. how could the failure mode occur)?	How frequently is the cause likely to occur?	What are the existing controls that either prevent the failure mode from occuring or detect it should it occur?	How probabale is detection of the failure mode or its cause?
Antenna misalignment, SDR overload	4	Manual calibration, SDR gain monitoring	5
Insuffcient training data, noise	5	Model validation, confusion matrix checks	4
GPS loss, multipath interference	6	EKF sensor fusion, flight controller failsafe	6
Faulty battery, poor monitoring	3	Voltage telemetry, flight time estimation	3
Software bug, hardware fault	2	Manual override, watchdog timers	4

h-impact events while a low score is assigned to low -impact events

gned to frequently occuring events while eith low occurrence are assigned a low score

.0. A failure event that can be easily detected by the process control is assigned a low score while a high score is assigned to an inconspicuous

, occurrence and detection. An event with a high RPN demands immediate attention while events with lower RPN are less risky

RPN[4]	Action Recommended
Risk priority number calculated as SEV x OCC x DET	What are the actions for reducting the occurenece of the causes or for improving its detection? Provide actions on high RPNs and on severity ratings of 9 or 10
180	Add redundant antenna paths; automate gain control
160	Expand dataset, implement confidence threshold logic
324	Improve filtering, integrate IMU redundancy, refine conrol loops
90	Add redudant battery alerts, set conservative power margins
80	Extensive testing of failsafe logic, add hardware based safety switch

event