Project Execution Plan
(Jan - April 2026)

**S26-04
Low-Cost Smart Sensor
Spoofer on UAS**

NAVAIR Sponsored

This section defines the project execution plan from January through late April 2026. The schedule emphasizes parallel development, defined dependencies, tangible milestones, and individual accountability across subsystems. It is aligned with course deliverables, sponsor expectations, and system integration risk.

Project Schedule

Phase	Dates	Focus	Parallel Activities	Dependencies	Deliverables
1A – Virtual System Foundation	Jan 20 – Feb 2	UE5, Simulink, GCS baseline	UE5 LiDAR generation, TCP protocol, Simulink frame parsing, GitHub Pages setup	None	Point-cloud generator, frame parser, system architecture site
1B – Edge AI Bring-Up	Feb 3 – Feb 13	Jetson, HAL, Neural Network	Jetson OS, inference engine, HAL protocol, baseline NN	Phase 1A complete	Running NN on Jetson, HAL communication verified
2 – Dataset & Procurement	Feb 14 – Mar 1	NN training + hardware selection	Spoof dataset generation, Livox LiDAR configuration, procurement tracking	Phase 1B complete	Training dataset, finalized BoM, sensor configs
3 – Dynamic Spoofing Simulations	Mar 2 – Mar 20	Full System Integration	Adaptive spoofing, telemetry integration, NN tuning	Phase 2 complete	HIL validation results, performance metrics
4 – UAV Deployment & Testing (Simulated)	Mar 21 – Apr 10	UE5-based flight simulation + Jetson/Raspberry Pi/Livox validation	Payload mounting simulation, vibration modeling, telemetry	Phase 3 complete	Stable in-flight inference, failover logic, test compliance report

			dashboard, verification documentation		
Final – Presentation & Handoff	Apr 11 – Apr 23	Reporting & Sponsor Delivery	Poster, final report, system documentation, website polishing	All phases complete	Final demo, sponsor handoff, MDE Expo presentation

Milestones

Milestone	Date	Tangible Outcome	Resources Required	Risks	Constraints
M2.1 – Digital Thread Established	Feb 6	Verified UE5 → Simulink → Jetson data path with CRC validation and inference stub running	UE5, Simulink, Jetson, TCP tools, datasets	Frame format mismatch, timing instability	20–30 Hz pipeline timing
M3.1 – Real-Time Detection Achieved	Feb 27	Spoof injected and flagged by NN within latency budget	TensorRT, spoof profiles, HAL MCU	Inference exceeds real-time budget	<80 ms end-to-end latency
M3.2 – HIL Validation	Mar 20	HAL emulates real sensors, Jetson consumes bus-level data	Simulink bridge, sensor protocols, MCU/FPGA	Bus timing errors, data corruption	<5 ms bus latency
M4.1 – Flight-Ready System (Simulated)	Apr 7	Stable inference during motion with telemetry and failover active	UE5, Jetson, Raspberry Pi, Livox LiDAR	Power instability, motion noise	Payload and FAA simulation constraints
M5.2 – Customer Handoff	Apr 23	Final demo, documentation, and system transfer to sponsor	Poster, GitHub site, final report	Knowledge loss post-semester	Documentation completeness

Meeting Schedule

Team Meetings: Weekly - Monday/Wednesday via Teams at 1:00pm
Mentor Meetings: Biweekly - Starting Friday (1/30) at 1:30pm + three mandatory meetings

SME Meetings: Biweekly – Starting Wednesday (2/4) at 1:00pm

POC Meetings: Monthly - Last Wednesday of every month at 1:00pm (Starting 2/25)

All: Expo – (4/23)

Date	Meeting/Deliverable	Output
Jan 30	Mentor Meeting 2.1	Architecture review, pipeline demo
Feb 6	Team Progress Report #2	Digital thread validation
Feb 27	Mentor Meeting 2.2	Spoof detection demo
Mar 20	Sponsor Review	HIL validation results
Apr 7	Team Presentation	Flight-ready system
Apr 10	Mentor Meeting 2.3	Expo readiness
Apr 23	MDE Expo	Final system handoff

Work Breakdown Structure (WBS)

WBS ID	Subsystem	Task	Owner	Dependency	Output
1.1	UE5 Virtual Environment	LiDAR raycast engine	Kush	None	Point-cloud generator
1.2	UE5 Virtual Environment	Spoof generation module	Kush	1.1	Spoof profiles
1.3	UE5 Virtual Environment	Frame serialization	Kush	1.1	Binary frame stream
2.1	Simulink Bridge	TCP ingest + CRC validation	Sachel	1.3	Verified frame input
2.2	Simulink Bridge	Queue + timing controller	Sachel	2.1	Stable latency pipeline
2.3	Simulink Bridge	HAL output driver	Sachel	2.2	Sensor data stream
3.1	HAL	MCU firmware (SPI/I2C/UART)	Will	2.3	Sensor emulation

3.2	HAL	GPIO timing/IRQ logic	Will	3.1	Hardware sync
3.3	HAL	Electrical validation	Will	3.2	Verified bus integrity
4.1	Edge AI	Dataset generation	Drew	1.1	Training data
4.2	Edge AI	Model training	Drew	4.1	Trained NN
4.3	Edge AI	Jetson optimization	Drew	4.2	Quantized model
4.4	Edge AI	Fallback logic	Drew	4.3	Degraded mode
5.1	UAV Integration (Simulated)	Power system validation	Izzy	3.3	Stable power
5.2	UAV Integration (Simulated)	Payload mounting model	Izzy	5.1	Secure enclosure
5.3	UAV Integration (Simulated)	Flight testing (UE5)	Izzy	5.2	Flight data
6.1	Documentation	GitHub site	Izzy	All	Project website
6.2	Documentation	Verification matrix	Izzy	Phase 4	Test compliance
6.3	Documentation	Final report	Izzy	All	Sponsor binder