Team E: Fall Validation Demo	
Objective	To validate the full-stack integration of the autonomous patrol system, specifically the system's ability to switch from global path following to active personnel tracking and successfully rejoin the original mission route.
Element	ACM submodule, ICM submodule, Master ICM submodule
Location	Tepper Parking Lot, Knightscope Headquarter.
Equipment	LSV, K7.
Personnel	Sam Dong, Po-Ting Ko, Joshua Tsai, Maddie Wang, Leo Xu.

Procedure

Prior Setup:

1. Manually run LSV for mapping, operate map processing step for static map files.

Demo Procedure:

1. Visualize map and robot position in the user interface that corresponds to the real-world.
2. Initialize vehicle localization from user command.
3. Show recommended waypoints in the user interface.
4. The user selects “accept” or “discard” the recommended waypoints in the user interface.
5. Operate (add/drag-and-drop/delete) new waypoints in the user interface.
6. Publish the waypoints to the ACM submodule.
7. LSV starts navigating in the real-world based on the path generated.
8. During patrolling, LSV constantly detects people and sends metadata to Master ICM if detected.
9. Two people pretend to be fighting in another location under surveillance of another camera.
10. Visualize a new waypoint at the fighting location and a path from the current position on UI.
11. The user selects whether to accept the change.
12. If selected, LSV autonomously go to the spot, inspect for 30s, and return to the closest point on the original patrol path.

Verification Criteria (The system must …)

1. Ensure map consistency with no structural misalignment, dynamic obstacles, and outliers.
2. Initialize and localize LSV with a success rate > 90%.
3. Recommended waypoints show up < 1s after the system started.
4. “Accept” or “discard” pop-up windows disappear after 10s if the user has no action.
5. Waypoint operation in UI and publishment to the ROS2 stack within 50 ms.
6. LSV manages to patrol in the real-world with 0 collisions to static and dynamic objects.
7. Fully exposed person detected with success rate > 90%.
8. Partially exposed person detected with success rate > 50%.
9. Metadata is sent to Master ICM with latency < 30 fps.
10. Flag actions, like fighting or loitering, are an anomaly action > 50% of the time. (TBD)
11. Show a new waypoint at location < 1m of the fighting location on the UI map within 500ms of the anomaly being flagged.
12. Display a clear, highlighted path from the LSV’s current position to the new waypoint.
13. A pop-up window must clearly ask the user to "Accept" or "Discard" the path change.
14. Upon acceptance, navigate to the new waypoint with 0 collisions.
15. After the 30s inspection, autonomously calculate and navigate to the nearest point on its original patrol path in the correct lanelet direction within 50ms.