VCU-Robotics Validation Proposal

## **VCU Algorithm Enhancement Strategy**

The proposed migration **does not replace automotive functions**, but rigorously validates core VCU capabilities in industrial environments. Key objectives:

****Functional Safety Verification****

* Robotics platform as stress-test bed for VCU fault arbitration
* Maintain ISO 26262 ASIL-B compliance throughout migration

**Control Latency Benchmarking**

* Compare path planning performance: Automotive vs. Robotics
* Target <10% deviation (current: 7.2% in simulation)

**Deployment Pathway**

**Vehicle VCU → Robotics Validation → Enhanced VCU (Automotive)**

VCU Algorithm Enhancement: Automotive-to-Robotics Validation Pathway：

|  |  |  |
| --- | --- | --- |
| VCU Autonomous Function | Enhancement Technique | Robotics Validation Purpose |
| Sensor Arbitration for Emergency Handling  (ASIL-B Compliant @5ms sync) | State Machine Optimization  (Hierarchical FSM) | Validate VCU's Dynamic Response  Under Industrial Scenarios |
| Fault Diagnosis & Arbitration  (Dual-core redundancy) | ISO 26262 Lightweight Adaptation  (ASIL-B Level Protocols) | Stress-test VCU Safety Core |
| Autonomous Control Deployment  (CNN Path Planner + Simulink) | AUTOSAR → ROS 2 Bridge | Benchmark Path Planning Accuracy  Against Automotive Standards |

Note: Robotics validation serves as intermediate step for automotive VCU algorithm refinement. Final target = Tesla-grade control systems.