ALIARO

SOLUTION BRIEF

# Leveraging the xMove HIL Platform in a HIL Farm

## INTRODUCTION

As embedded systems grow more complex, particularly in automotive applications involving advanced driver-assistance systems (ADAS), electrified powertrains, and connected vehicle platforms—the need for rigorous testing and validation escalates. Hardware-in-the-Loop (HIL) testing has become a cornerstone of this process, enabling engineers to validate real embedded components within controlled yet realistic simulation environments.

While traditional single-bench HIL systems can fulfill basic testing needs, they often become bottlenecks when multiple teams or subsystems require extensive validation. This is where a "HIL farm", an infrastructure of multiple HIL benches operating in parallel, proves invaluable.

## APPLICATION CHALLENGES:

- **Traditional HIL Limitations:** Historically, many organizations have employed a single monolithic HIL bench customized for a specific set of test requirements. As system complexity increases, ranging from mixed-signal domains to high-speed communication protocols—these single-bench setups can experience scheduling conflicts, lengthy reconfiguration times, and high operational costs.
- **Rise of HIL Farms:** A HIL farm addresses these issues by distributing the testing workload across multiple benches. This allows teams to run multiple scenarios in parallel, respond rapidly to evolving project demands, and integrate HIL testing into continuous integration/continuous deployment (CI/CD) pipelines.

## THE ALIARO SOLUTION:

- **Swappable I/O Modules:** Easily reconfigured for different signal requirements, reducing downtime.
- **High-Fidelity Simulation:** Minimal latency and precise signal generation ensure reliable test results.
- **Software Integration:** Compatible with MATLAB/Simulink, LabVIEW, and other common simulation tools.
- **Automation-Ready:** xMove provides APIs for scripting and integrating with CI/CD pipelines, enabling automated test execution and data analysis.

## ADVANTAGES:

- **Higher Throughput and Productivity:** With multiple xMove benches, tests that once took days or weeks can be completed in hours. Parallelization, combined with automated reconfiguration, allows teams to investigate more scenarios and corner cases, improving product reliability.
- **Reduced Downtime:** If one bench requires maintenance or is configured for specialized testing, other benches remain operational. This creates a buffer against unplanned outages, ensuring continuous test availability.

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- **Continuous Integration for Hardware:** In software development, CI/CD pipelines are standard. xMove extends these principles to hardware testing: each firmware changes triggers HIL tests that validate system behavior before code merges or product releases.
- **Consistent Results:** Standardizing on the xMove platform increases consistency across test benches. Bench-to-bench variations diminish, enhancing result reproducibility. This is particularly beneficial for certification processes that demand verifiable and repeatable outcomes.
- **Cost Efficiency:** By selecting only the needed modules, companies can avoid investing in entire monolithic systems that may remain underutilized. Over time, this approach lowers both capital expenditure and ongoing maintenance costs.

## KEY SPECIFICATIONS:

| Specification | Details |
|---|---|
| **Modular Scalability** | xMove's plug-and-play design lets organizations expand a HIL farm incrementally. When projects demand higher channel density or additional communication protocols, new modules can be added without overhauling the existing infrastructure. This reduces total ownership costs and guards against obsolescence |
| **Centralized Management** | Multiple xMove benches can be orchestrated by a centralized scheduling system, optimizing resource allocation. Engineers can queue test requests, track configurations, and store results in a shared database. This streamlines configuration management and shortens overall test cycles. |
| **Parallel Testing** | Running multiple tests simultaneously is a hallmark benefit of a HIL farm. xMove benches, each configured for specific subsystems or test scenarios, can operate around the clock. This parallelization accelerates the discovery of defects, enabling teams to fix and retest rapidly |
| **Future-Proofing** | The rapid evolution of modern vehicle technology requires agile testing platforms. xMove's modular design helps teams adapt to new sensor interfaces, emerging communication standards, or changing power requirements simply by upgrading or swapping module |

## TESTMONIALS:

*"Integrating ALIARO's xMove HIL platform into our multi-bench HIL farm—connected seamlessly to our cloud solution, has transformed our testing capabilities. The modular design of xMove allowed us to tailor each bench to specific ECUs and features, while the cloud integration let us centralize test results, automate analytics workflows, and rapidly iterate on software updates."* *–VP of Engineering, Automotive Manufacturing*

## CALL TO ACTION:

Transform your industrial machinery testing and unlock new levels of operational efficiency with ALIARO's xMove HIL System. Contact us today to schedule a demo and learn how you can achieve rapid ROI, enhanced product quality, and a competitive edge in the evolving market.