

DIADROM

Reference Case Pack

Proof in service — Saab Dynamics · BAE Systems Bofors · FMV · Nippon Seiki & BCS AIS →
Volvo Cars · AB Volvo · Volvo Group · NEVS · Lynk & Co · Mitsubishi Electric (MELCO) →
Volvo Cars · Scania

Customer-as-hero, real numbers and verbatim quotes. The test every case is held to: remove Diadrom's name, and it should still teach you something true about your own challenge.

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Further information available to qualified parties under NDA.

Keeping RBS 70 NG mission-ready for decades

How Saab designed lifecycle diagnostics into a next-generation air-defence system — with Diadrom.

Saab Dynamics and Diadrom developed OBELISK (now MAS), the off-board system that manages the RBS 70 NG sight across its entire service life.

IN SERVICE		DIAGNOSTICS
RBS 70 since 1977 · NG since 2011	SERVICE LIFE 30+ years	Designed in at the concept phase
BUSINESS	Built to lower life-cycle cost (LCC) across a multi-decade service life — the metric Saab's customers select on.	
TECHNICAL	One off-board system to read status, update configuration, download software, run in-sight tests and calibrate a networked digital sight.	
LIFECYCLE	Diagnostics designed in from the concept phase, supporting condition-based maintenance across a 30-year-plus service life.	

01 · THE BIGGER PICTURE

Why diagnostics became a design-phase decision

Advanced defence products are increasingly judged not on unit price but on what they cost to own and keep ready over decades. Across industry, moving from reactive or calendar-based maintenance to condition-based maintenance is documented to cut maintenance costs by roughly 18–30% and unplanned downtime by 30–50% (industry benchmarks, McKinsey and the U.S. Department of Energy). Defence is now applying the same logic to systems that must stay ready for a generation. RBS 70 NG — built to defeat aircraft, drones and missiles out to nine kilometres — is a clear example of that shift, and of why diagnostics has become a design-phase decision rather than an afterthought.

02 · THE PROTAGONIST

A combat-proven system goes digital

In 2011 Saab launched RBS 70 NG, the new generation of its combat-proven short-range air-defence system. The leap was as much digital as ballistic: the analogue sight became a networked digital one — with a thermal camera, night vision, video recording, built-in test sequences and calibration, and control units linked in a network. A more capable sight is also a more complex one to keep running in the field for thirty years and more.

03 · THE CHALLENGE

Total cost of ownership decides the deal

For Saab's customers, total cost of ownership is a decisive factor when choosing an air-defence supplier — and a digital, networked sight raises the stakes. How do you diagnose, configure, update and calibrate that system reliably, securely and affordably, in the field, across its entire life? Saab's insight was that the answer could not be bolted on afterwards: the maintenance concept had to be designed in alongside the

product itself, with diagnostics requirements brought in already at the design phase so the product could be managed efficiently across its whole life cycle.

04 · THE APPROACH

A joint pre-study, then a product

Saab brought Diadrom in early — during the development of RBS 70 NG itself. The two teams ran a joint pre-study in which Diadrom carried two decades of automotive diagnostics rigour into the defence and security context: how to architect a robust, secure on-sight network, and how to design for condition-based maintenance from the start. Out of that work came OBELISK (now MAS), a PC-based off-board system that became — and remains — the way the RBS 70 NG sight is managed through its life.

Work was carried out in Gothenburg and Karlskoga, with Diadrom contributing front-end, back-end and full-stack developers, an embedded software developer, a software tester, a business analyst / requirements engineer and a project manager.

“We drew on Diadrom’s knowledge very early in the development of RBS 70 NG, which was extremely valuable. Together we developed the concept into a finished product. OBELISK is a very effective tool for managing the product across its entire life cycle — and an important part of our ability to offer innovative solutions to our customers’ challenges.”

— Lars Liljegren · then Saab’s project manager for RBS 70 NG

TECHNICAL
DEEP-DIVE

SYSTEM	OBELISK / MAS — PC-based off-board diagnostics and maintenance application for the RBS 70 NG sight
FUNCTIONS	Control sight status; read and update sight configuration and parameters; software download to the sight; trigger in-sight (built-in) tests; calibration and tests with external equipment; review engagement history, including graphs and video
ARCHITECTURE	Multiple control nodes networked on the sight (e.g. GBTE, MAC, MMEE, SCG, SCO, SMU, T1, VU), each running its own software and, where relevant, holding its own calibration data
TRANSPORTS	Node and sub-component links over RS232 and IP; connection to the off-board system over Ethernet through a firewall
MAINTENANCE MODEL	Fault detection and remedy logging, boot-mode and heartbeat monitoring, and scheduled-inspection tracking (e.g. periodic sight inspections) in support of condition-based maintenance

06 · THE IMPACT

What it changed

OBELISK gave Saab a single, consistent way to manage the RBS 70 NG sight from production through every year of field service — reading status, resolving faults, downloading software and calibrating, without bespoke tooling for each task. Because diagnostics were designed in rather than retrofitted, Saab and its customers can build new maintenance solutions on top — condition-based maintenance and remote services — that lower life-cycle cost, the metric their customers actually buy on. It is the same

discipline, proven in automotive serial production, applied to a system that has to stay ready for decades.

“Diagnostics is no longer an aftermarket detail — it is a design decision that determines what a system costs to keep ready for thirty years. RBS 70 NG showed how much value sits in getting that right from the start.”

— Viktor Eliasson · CEO, Diadrom

07 · WHAT'S NEXT

Advice to peers

The direction of travel is more condition-based maintenance and more remote support — the automotive-born model that RBS 70 NG helped prove out in defence. Saab's own lesson generalises: the cheapest way to lower a product's life-cycle cost is to decide how you will diagnose and maintain it before the design is frozen — not after it is fielded.

Details drawn from Diadrom's published reference material on the RBS 70 NG / OBELISK programme. Industry benchmark figures attributed to McKinsey and the U.S. Department of Energy. Further information available to qualified parties under NDA.

From vehicle bus to fleet readiness

How BAE Systems Bofors turned the Archer howitzer's operational data into a fleet-management capability — with Diadrom.

BAE Systems Bofors and Diadrom built the Fleet Management Interface Module (FIM) — an embedded logger that captures Archer's onboard data and turns it into fleet-management insight.

PLATFORM	IN SERVICE	STANDARDS
Archer 155 mm self-propelled howitzer	Since 2016 — Sweden, the UK and others	SAE J1587 · J1939
CAPABILITY	A standardised, rugged way to collect fielded-vehicle data in support of fleet availability and readiness.	
TECHNICAL	Embedded Linux logger reading the vehicle bus via SAE J1587 / J1939, configurable by XML, storing parsed data in persistent memory.	
HERITAGE	Commercial-vehicle data standards brought into a frontline artillery platform.	

01 · THE BIGGER PICTURE

Usage data is the foundation of readiness

Modern land systems generate a constant stream of operational data on the vehicle bus — engine hours, usage, events. Capturing that data reliably is the foundation of fleet management: knowing what each vehicle has actually done lets an army plan maintenance, manage spares and keep more guns available. Defence is adopting the same usage-data discipline that commercial-vehicle fleets built on open standards such as SAE J1587 and J1939. For a highly automated, hard-worked system like Archer, that data is the difference between guessing and knowing.

02 · THE PROTAGONIST

One of the most automated artillery systems in service

Archer — the BAE Systems Bofors 155 mm wheeled self-propelled howitzer, designed and built in Karlskoga — is one of the most automated artillery systems in service, able to come into action, fire and move within a minute. Sweden, the UK and Ukraine field it. A system that mobile and that heavily used needs its operators to understand exactly how the fleet is being run.

03 · THE CHALLENGE

Get the data off the vehicle — reliably, in the field

BAE Systems Bofors needed a dependable way to get operational data off the vehicle — not diagnostics, but the fleet-management information that tells an army how its guns are being used and what they will need. That data lives on the vehicle bus in heavy-vehicle protocols; it has to be read, parsed, made sense of and stored, on rugged embedded hardware, in the field. The purpose was explicit from the first design meetings: retrieve information for fleet management, distinct from the on-board maintenance system.

04 · THE APPROACH

Open standards on rugged embedded Linux

Diadrom developed the Fleet Management Interface Module (FIM) — a CAN logger application running on embedded Linux, on a platform of two FOX board computers, configured through XML files. FIM reads the vehicle bus (initially via SAE J1587), parses and manipulates the data, and stores it in persistent memory for later retrieval. A second generation, FIM 2, ran on the same platform with SAE J1939 support added.

The work sat alongside Diadrom's wider role on the programme — including the DAIM application and the EMMS PDA — with the operator interface co-designed with BAE's GUI team for the Linux handheld environment. As with its automotive heritage, Diadrom applied proven commercial-vehicle data standards to a defence platform.

“The cheapest readiness gain in a land fleet is often the data you already generate but don’t capture. Read the vehicle bus cleanly, store it well, and you can keep building on it for the life of the platform.”

— Viktor Eliasson · CEO, Diadrom

TECHNICAL
DEEP-DIVE

SYSTEM	FIM (Fleet Management Interface Module) — embedded CAN logger application
PLATFORM	Embedded Linux on two FOX board computers; configuration via XML files
PROTOCOLS	SAE J1587 (FIM); SAE J1939 added in FIM 2
DATA PATH	Vehicle-bus data read, parsed and manipulated by the FIM application, then written to persistent memory for retrieval
RELATED WORK	The DAIM application; the EMMS PDA; an operator GUI co-designed with BAE for the Linux handheld

06 · THE IMPACT

What it changed

FIM gave BAE Systems Bofors a repeatable, rugged way to capture Archer's operational data and turn it into fleet-management information — the raw material for planning maintenance, managing spares and keeping more systems ready. Because it was built on open commercial-vehicle standards and configured by XML, it could be extended without a redesign: when a newer protocol was needed, FIM 2 added J1939 on the same platform. It is the same engineering logic Diadrom honed in automotive serial production, applied to a frontline artillery system.

07 · WHAT'S NEXT

Advice to peers

The value of fielded-system data only grows as armies push for higher availability and condition-based support. Bofors' approach points the way: standardise how you read the vehicle bus and store it cleanly, and you build a fleet-data foundation you can keep extending — exactly what the next generation of connected, data-driven land systems will demand.

Details drawn from Diadrom's reference material on the Archer / FIM programme; programme facts from public sources. Further technical detail available to qualified parties under NDA.

One interface for an entire military fleet

How FMV unified vehicle diagnostics across a mixed fleet — with Diadrom.

For well over a decade, unbroken, Diadrom has built FMV's Vehicle Communication Box (VCB): one rugged Linux device that connects to many vehicle types and replaces a drawer full of manufacturer-specific tools.

PARTNERSHIP		DEVICE	ENGINEERING
Well over a decade — unbroken		VCB — rugged, EMC-hardened embedded Linux	C++ and Rust
CAPABILITY	One box replaces many OEM-specific tools and interfaces across a heterogeneous fleet.		
TECHNICAL	A single device speaking CAN, MOST, Ethernet and the automotive diagnostic stack (J1587 / J1939, J2534, ISO 22900, RP1210).		
COMMITMENT	Well over a decade of unbroken delivery to a sovereign Swedish customer.		

01 · THE BIGGER PICTURE

Fragmented tooling is slow, expensive — and a sovereignty question

A modern armed force runs dozens of vehicle types from many manufacturers, each historically arriving with its own diagnostic tool, connector and protocol. That fragmentation is slow and expensive in the field. The civilian vehicle world tackled a version of this with standard diagnostic protocols and APIs; defence is now doing the same — and adding a sovereignty requirement, because the tooling and the data touch national security. Memory-safe languages such as Rust are part of the same shift: in mission-critical embedded software, security has to be designed in, not bolted on.

02 · THE PROTAGONIST

A national-scale logistics problem

FMV, the Swedish Defence Materiel Administration, procures and sustains the equipment of the Swedish Armed Forces — including a large, mixed fleet of military vehicles. Keeping that fleet diagnosable and maintainable, across many manufacturers and decades of service, is a national-scale logistics problem.

03 · THE CHALLENGE

One thing that talks to all of them

Almost every vehicle type brought its own diagnostic tool, connector and protocol. Technicians in the field needed one thing that could talk to all of them — read faults, run the manufacturers' own diagnostics, and log how vehicles are actually used — on hardware rugged enough for military service and trusted enough for a sovereign defence customer. And it had to last: with a platform life measured in decades, the software itself had to stay maintainable for the long haul.

04 · THE APPROACH

A sovereign embedded partnership, well into its second decade

For well over a decade, unbroken, Diadrom has worked alongside FMV as an embedded-development partner — requirements engineering, software development in C++ and, increasingly, memory-safe Rust, and test and validation — drawing on diagnostics knowledge across a wide variety of military vehicles, both on- and off-board.

The centrepiece is the Vehicle Communication Box (VCB): a rugged, EMC-hardened Linux device that interfaces to many vehicles in a fleet and runs diagnostic applications on- and off-board, with a wide selection of interfaces for different physical communication layers. Instead of a drawer full of manufacturer-specific tools, a technician connects one box.

“A military fleet has dozens of vehicle types and just as many ways to talk to them. The value of one rugged, sovereign box that speaks them all — and logs how each vehicle is really used — compounds every year it stays in service.”

— Viktor Eliasson · CEO, Diadrom

TECHNICAL DEEP-DIVE	
SYSTEM	VCB (Vehicle Communication Box) — rugged, EMC-hardened embedded Linux device
REACH	Connects to many vehicle types through a wide selection of physical interfaces — CAN, MOST, Ethernet and serial layers
STANDARDS	Supports the automotive diagnostic stack used by vehicle OEMs — J1587 / J1939, J2534, ISO 22900 and RP1210 — so existing OEM diagnostic applications can run through it
MODES	Runs diagnostic applications both on-board (mounted in the vehicle) and off-board (technician with a PC host)
OPERATIONAL LOGGING	Records vehicle operational data to build a usage and mission profile of the vehicle
ENGINEERING	C++ and Rust; requirements engineering, test and validation across a programme now well into its second decade

06 · THE IMPACT

What it changed

The VCB collapses a fragmented toolchain into a single, trusted device. Where each manufacturer and each protocol once meant another tool to buy, learn and carry, FMV’s technicians get one rugged box that connects to the fleet, runs the OEMs’ own diagnostics, and logs how vehicles are used. Built on a sovereign Swedish supply relationship and modern, memory-safe software, it is designed to stay maintainable across the platform’s full multi-decade life — and an unbroken delivery record now well into its second decade is itself the proof that the model works.

07 · WHAT’S NEXT

Advice to peers

As fleets become more software-defined and more connected, the case for a single, secure, sovereign diagnostic interface only grows — and security-by-design, including languages like Rust, moves from nice-to-have to baseline. FMV’s lesson for peers: treat fleet diagnostics as long-lived national infrastructure, standardise the interface, and invest in a partner who will still be there in a decade.

Built from Diadrom's published capability material. Programme details, personal data and the customer's technical requirements are excluded. Further information available to qualified parties under NDA.

Getting an ECU into a Volvo Cars platform — securely

How Diadrom helped Nippon Seiki and BCS AIS make their head-up display and wireless phone charger meet Volvo Cars' secure software-update requirements.

Robust software download, with authenticity and integrity anchored in a hardware root of trust.

RELIABILITY		VERIFICATION	STANDARDS
Zero bricked units since 2016		~550 test cases · ~30 releases · ~16,000 executions	UDS / ISO 14229 · UNECE R156
RELIABILITY	Zero units bricked by Diadrom's software since 2016.		
VERIFICATION	~550 test cases across ~30 releases — roughly 16,000 test executions in a single project.		
CAPABILITY	ECUs that meet Volvo Cars' secure software-update requirements and integrate into its platforms.		
TECHNICAL	Secure boot, SecurityAccess (UDS / ISO 14229), signed and encrypted software packages — over CAN, CAN FD, LIN, GMSL and DoIP.		

01 · THE BIGGER PICTURE

A computer on wheels, updated for life

The car is becoming a computer on wheels — updated across its whole life like any other software product. That makes one capability non-negotiable: proving that every software package reaching an ECU is authentic and complete, and that only trusted software ever runs. Regulators have codified it (UNECE R156), and the bar keeps rising as more updates happen over the air, away from any workshop. It is the same secure-software discipline that mission-critical defence systems demand — the automotive rigour Diadrom has built since 1999, and now carries into defence as well.

02 · THE PROTAGONISTS

Two suppliers, one gate to integration

Nippon Seiki builds head-up displays; BCS AIS builds wireless phone chargers. Two very different ECUs — but each only earns its place in a modern vehicle platform if it can be updated the way the car maker requires: securely, verifiably, for years. For both suppliers, meeting Volvo Cars' software-update procedures is the gate to integration.

03 · THE CHALLENGE

Comply, or it cannot be integrated

Volvo Cars specifies exactly how software must be delivered to, and updated on, the ECUs in its platforms. A supplier's ECU has to comply, or it simply cannot be integrated — software download would not work as required, and the delivery for integration would not be possible. And the hard part is not moving bytes: it is guaranteeing, in the field and at production scale, that every software package is

authentic and complete and that nothing untrusted can ever run — all on constrained embedded hardware.

04 · THE APPROACH

Security built around robust software download

Diadrom delivered a software-update capability with robust software download at its core, and built the security around it: the authenticity and completeness of every software package, enforced through a hardware root of trust (a Hardware Secure Module) for cryptography, together with secure boot and SecurityAccess. The work spanned embedded development, test and verification of deliveries, and the setup of ASPICE requirements-traceability processes, so every requirement could be traced to its implementation. It is offered as both engineering services and a licensed product, supporting UDS over CAN, CAN FD, LIN, GMSL and DoIP across a range of target MCUs, tailored to each customer. Diadrom has worked on the product since 2016.

“A modern car is updated across its whole life, often far from any workshop. The only way that works is if every software package can be proven authentic and complete, and only trusted code ever runs. That foundation is what we build — and it is the same discipline mission-critical defence systems rely on.”

— Viktor Eliasson · CEO, Diadrom

TECHNICAL DEEP-DIVE

CAPABILITY	Secure software update with robust software download
SECURITY	Authenticity and completeness of software packages via a hardware root of trust (HSM); signed and encrypted packages; secure boot; SecurityAccess (UDS / ISO 14229)
TRANSPORTS	UDS over CAN, CAN FD, LIN, GMSL and DoIP
TARGETS	Multiple MCUs on target hardware, adapted per customer
EMBEDDED SCOPE	Bootloader plus implementation of the security functionality
PROCESS	ASPICE requirements traceability; test and verification of deliveries
STANDARDS	Aligned to UNECE R156 (software update) through the hardware root of trust

06 · THE IMPACT

What it changed

The capability turns “can this ECU be updated the way the car maker demands?” from a blocker into a solved problem — and the record backs it up. Since 2016, not a single unit has been bricked by Diadrom's software. That reliability is no accident: it rests on disciplined verification — around 550 test cases, run across roughly 30 releases, adding up to some 16,000 test executions in a single project. Nippon Seiki and BCS AIS integrate their ECUs into Volvo Cars platforms with software download that works as specified and security that holds at production scale — without each supplier rebuilding secure-update and bootloader expertise from scratch. Diadrom has sustained and evolved the product since 2016 as requirements and protocols have grown.

Advice to peers

The direction is clear: more software over the air, more updates happening away from the workshop, and more security requirements layered on top — everything has to keep working, all the time, with no service bay in reach. Diadrom's hard-won lessons for anyone facing the same challenge: keep a traceable process from the very start, so the details never fall between the cracks — and test a lot, and often. The zero-bricked record is what that discipline buys you.

Vehicle-platform specifics are not disclosed. Further detail available to qualified parties under NDA.

Built as ordered, proven before it ships

How AB Volvo programs, tests and calibrates every ECU on the line — with Diadrom in the order-to-delivery process since 2007.

Diadrom has been part of the order-to-delivery process at AB Volvo since 2007: the manufacturing process tool that handles the electrical architecture in production, programming, checking, testing and calibrating ECUs as part of the assembly process.

ENGAGEMENT		ON THE LINE	COVERAGE
Order-to-delivery at AB Volvo · since 2007		Programs, checks, tests and calibrates ECUs	Volvo Trucks · Renault Trucks · Mack · Buses · Penta
BUSINESS	Production diagnostics that verify every vehicle was built exactly as the customer ordered it — safely and efficiently, at line speed, across the Group's brands.		
TECHNICAL	One process tool handling the electrical architecture in production: software download, configuration, test and calibration of ECUs, mounted or not yet mounted.		
LIFECYCLE	The calibrations created in the factory follow and define the product through its life — manufacturing is where the vehicle's digital identity is born.		

01 · THE BIGGER PICTURE

Why the factory is a diagnostics problem

A bill of material for a product with built-in software is not just mechanical. It contains a large amount of order-specific software and hardware components, and the factory creates unique settings — calibrations — that follow and define the product throughout its life. Diagnostics fulfils a decisive function in that process: ensuring that what leaves the line is exactly what the customer ordered, in all respects, and that it was produced safely and efficiently. In serial production there is no room for “almost right”. Nothing works until everything works.

02 · THE PROTAGONIST

The order-to-delivery process at AB Volvo

AB Volvo builds commercial vehicles where every unit can carry a different, order-specific combination of software and hardware — across Volvo Trucks, Renault Trucks, Mack, buses and Volvo Penta. Since 2007, Diadrom has been involved in the order-to-delivery process — the chain that turns a customer order into a finished, verified vehicle. At its centre sits the manufacturing process tool that handles the electrical architecture in production as part of the assembly process.

03 · THE CHALLENGE

Program and prove every ECU, at line speed

Each vehicle's electronic control units must be programmed with the right software, given the right parameters, tested and calibrated — without slowing the line. Some ECUs are already mounted and reachable through the vehicle's diagnostic connector; others are not yet mounted and must be reached through a fixture or an adapter. The tooling has to handle both, reliably, for every order configuration the factory can produce.

04 · THE APPROACH

One process tool for the electrical architecture

The manufacturing process tool is used to program, check, test and calibrate ECUs as part of the assembly process. It communicates with connected ECUs through the diagnostic connector or an adapter, and with separate, not-yet-mounted ECUs through a fixture or an adapter. Diadrom's work spans the systems and processes for software download, configuration and parameter setting, and the testing, verification and validation of the product — the discipline of ensuring the factory produced what the end customer ordered.

TECHNICAL
DEEP-DIVE

SYSTEM	Manufacturing process tool — handles the electrical architecture in production as part of the assembly process
FUNCTIONS	Program, check, test and calibrate ECUs; software download; configuration and parameter setting
INTERFACES	Connected ECUs via the diagnostic connector or an adapter; separate (not yet mounted) ECUs via a fixture or an adapter
COVERAGE	All AB Volvo brands — Volvo Trucks, Renault Trucks, Mack, buses — and Volvo Penta
SCOPE	Part of the order-to-delivery process at AB Volvo since 2007

06 · THE IMPACT

What it changed

Production is where diagnostics pays for itself first: every vehicle leaves the line programmed, tested and calibrated to its exact order specification, and the calibrations created there define the product for the rest of its life. Nearly two decades inside the same process is its own result — manufacturing tooling is only kept for as long as it keeps the line moving.

“Serial production is the hardest room in the building. If your diagnostics discipline holds at line speed, it holds everywhere — that is what 2007-to-today at AB Volvo has taught us.”

— Viktor Eliasson · CEO, Diadrom

07 · WHAT'S NEXT

Advice to peers

The same discipline now extends in both directions: upstream into R&D;, where diagnostics requirements are designed in before production starts, and downstream into the aftermarket, where the factory's calibrations and software baselines must remain known and manageable for the vehicle's whole life.

Details drawn from Diadrom's published reference material on the manufacturing engagement at AB Volvo (diadrom.se). Further information available to qualified parties under NDA.

A quarter-century of aftermarket tools, one modern platform

How Volvo Group is moving from a “fat” PC client to a modular service platform — with a Diadrom team of more than ten system developers.

Diadrom has worked in central IT systems and aftermarket tools at Volvo Group since 1999. Today that experience supports Volvo Group Digital & IT's move from the legacy Aftermarket Tool PC client to a modern, future-proof, modularised ecosystem serving both remote and workshop scenarios — for all Group brands, worldwide.

ENGAGEMENT		TEAM	SCOPE
Central IT & aftermarket tools · since 1999		More than 10 system developers	All Group brands · worldwide · remote + workshop
BUSINESS	A future-proof service platform replacing a legacy 'fat' PC client — one diagnostics foundation for all the Group's brands, in every market they serve.		
TECHNICAL	Unified diagnostic services, software download, and fault tracing & troubleshooting, delivered as a modularised ecosystem rather than a monolith.		
LIFECYCLE	More than 25 years of accumulated diagnostics-domain knowledge of Volvo Group, carried forward into the platform that will serve the next decades.		

01 · THE BIGGER PICTURE

The workshop is still where uptime is won

Repair shops and mechanics are central to the commercial-vehicle business and will be so for years to come. The mechanic's role is growing more demanding, not less: as products become connected, the competence requirements rise — and the diagnostic tools have to keep pace. The most common diagnostic solutions are still local, technician-operated tools; the industry's direction is connected services and remote scenarios. The aftermarket platform has to serve both worlds at once.

02 · THE PROTAGONIST

Volvo Group's aftermarket toolchain

Diadrom has been involved in central IT systems and aftermarket tools at Volvo Group since 1999, building a deep knowledge of the diagnostics domain across the Group. The centrepiece of the current work is the Aftermarket Tool — the application a workshop reaches for, in any market worldwide, to find out what is wrong with a vehicle and put it right.

03 · THE CHALLENGE

Replace the fat client without dropping the workshop

The existing Aftermarket Tool is a 'fat' PC client: proven, but monolithic, and built for a local, workshop-only world. Volvo Group Digital & IT's goal is a modern, future-proof, modularised ecosystem — a service platform that can serve multiple end-user applications, handle both remote and workshop scenarios, and carry all the Group's brands on one foundation. The hard part is doing that while the

world's Volvo workshops keep working every day.

04 · THE APPROACH

A team, not a handover

Diadrom supports Volvo Group Digital & IT with a team of more than ten system developers, working in the core of the new service platform: unified diagnostic services, software download, and fault tracing & troubleshooting. It is the model Diadrom prefers — a long-term team inside the customer's process, carrying its diagnostics-domain knowledge of the Group into every design decision, rather than a one-off delivery thrown over a wall.

“Diadrom has always supplied high skilled consultants, with a great attitude, and profound knowledge of the business. The 'getting things done' attitude of Diadrom is impressive.”

— Thomas Axberg · then Director Solution Center, VCE/Penta, IT Services · AB Volvo

TECHNICAL
DEEP-DIVE

PROGRAMME	Modernisation of the Volvo Group Aftermarket Tool — from 'fat' PC client to a modular service platform
PLATFORM	Service platform used by multiple end-user applications, handling both remote and workshop scenarios — all Group brands, worldwide
FUNCTIONS	Unified diagnostic services (UDS) · software download · fault tracing & troubleshooting
TEAM	More than 10 Diadrom system developers, integrated with Volvo Group Digital & IT
HERITAGE	In Volvo Group central IT systems and aftermarket tools since 1999

06 · THE IMPACT

What it changed

The aftermarket is where a vehicle spends almost all of its life, and the platform that diagnoses it decides how fast a workshop turns a fault into a fix. By modularising the toolchain, Volvo Group gets a foundation that serves today's workshop bay and tomorrow's remote scenario from the same diagnostics core — and Diadrom's quarter-century in the Group's diagnostics domain is what makes the migration a continuation rather than a restart.

“You cannot modernise two decades of aftermarket tooling from the outside. It takes a team that already knows where the bodies are buried — and stays until the new platform carries the load.”

— Viktor Eliasson · CEO, Diadrom

07 · WHAT'S NEXT

Advice to peers

The direction is set by the connected vehicle: more remote diagnostics, more over-the-air capability, and a growing share of fixes that begin before the vehicle reaches the workshop. The modular platform is built to absorb that shift — the same uptime logic that runs through everything Diadrom builds.

Details drawn from Diadrom's published reference material on the Volvo Group aftermarket engagement (diadrom.se). Customer quote published by Diadrom; reproduced verbatim. Further information available to qualified parties under NDA.

One diagnostics system for workshops in 60+ markets

How NEVS got a complete workshop diagnostics system for every NEVS and Saab workshop worldwide — built on Diadrom Diag Studio.

Diadrom developed NDS — the diagnostics system rolled out to all NEVS and Saab workshops in more than 60 markets worldwide. A Life Cycle Management system built on the Diadrom product Diag Studio, it performed fault tracing and software download to the cars.

BUILT ON		DEPLOYMENT	FUNCTIONS
Diadrom Diag Studio		All NEVS and Saab workshops · 60+ markets worldwide	Fault tracing · software download
BUSINESS	A complete, global workshop diagnostics capability delivered on a product foundation — not built from scratch — for a car maker that needed worldwide coverage.		
TECHNICAL	Fault tracing and software download to the cars, starting from read-out of the vehicle's fault codes, in one system for every workshop.		
LIFECYCLE	A Life Cycle Management system that kept the existing Saab fleet and NEVS vehicles maintainable across their service life, wherever they were.		

01 · THE BIGGER PICTURE

Uptime is a lifecycle promise

A vehicle maker's responsibility does not end at the factory gate. Maintaining products and services throughout their lifecycle requires Life Cycle Management systems — and at the heart of any such system for vehicles sits workshop diagnostics: the ability, in any market, to connect to a car, find out what is wrong, and put it right.

02 · THE PROTAGONIST

The Saab heritage, carried forward by NEVS

The heritage and culture of Saab Automobile was carried forward by NEVS, with its focus on mobility solutions and the electrified car. That heritage came with a concrete obligation: a worldwide fleet of Saab and NEVS vehicles in service, and the workshops in more than 60 markets that kept them running.

03 · THE CHALLENGE

Every workshop, every market, one answer

A workshop diagnostics system has to work the same way in every market: read out what is wrong with the current vehicle — the first step is reading the fault codes — then guide fault tracing and perform software download safely. Building such a system from scratch for a global footprint is slow and expensive. NEVS needed it on a proven foundation.

04 · THE APPROACH

A product foundation, not a blank page

Diadrom developed the system — NDS — for NEVS based on the Diadrom product Diag Studio. Building on the product meant the foundations (vehicle communication, diagnostics workflows, software download) were already engineered and verified; the work could concentrate on NEVS's vehicles and processes. NDS was rolled out to all NEVS and Saab workshops in more than 60 markets worldwide.

“NEVS intends to use mobility solutions, where the electrified car is in focus, to create the sustainable cities of the future. To maximize customer value and Uptime, we must always prioritize a rapid pace of development and verification, where the focus on diagnostics is a cornerstone.”

— Thomas Kjellberg · then Director Product Lifecycle Management & Readiness · NEVS

TECHNICAL DEEP-DIVE

SYSTEM	NDS — workshop diagnostics and Life Cycle Management system for NEVS
FOUNDATION	Built on Diadrom Diag Studio
DEPLOYMENT	Rolled out to all NEVS and Saab workshops, more than 60 markets worldwide
FUNCTIONS	Fault-code read-out · fault tracing · software download to the cars
DOMAIN	Life Cycle Management for products and services across the vehicle lifecycle

06 · THE IMPACT

What it changed

NDS shows what the Diag Studio foundation is for: a car maker got a complete, global workshop diagnostics capability — deployed to every workshop in its network — without building the diagnostics core from scratch. For the workshops it was the daily answer to “what is wrong with this car?”; for NEVS it was the Life Cycle Management backbone that kept a worldwide fleet maintainable.

“Sixty markets is the real test of a diagnostics product. NDS proved that Diag Studio's foundations carry a global workshop network — that is the scale the platform was built for.”

— Viktor Eliasson · CEO, Diadrom

07 · WHAT'S NEXT

Advice to peers

The NDS engagement is also the clearest bridge to today's DiagStudio: the same platform thinking — one verified picture of the vehicle, its software and its faults — now extended to baseline control and software traceability for any organisation that builds and operates software-intensive systems.

Details drawn from Diadrom's published reference material on the NEVS NDS engagement (diadrom.se). Customer quote published by Diadrom; reproduced verbatim. Further information available to qualified parties under NDA.

Proven diagnostics modules, lifted into the cloud

How Lynk & Co builds new diagnostic services on licensed, reused Diag Studio functionality — UDS, DoIP, VCI and software over the air — serving both Lynk & Co and Lotus.

A Diadrom development team, together with a licence to reuse functionality from Diadrom Diag Studio, develops new diagnostic services with Lynk & Co: software modules reused into the cloud, unified diagnostic services and diagnostics over internet protocol, vehicle communication interface and software over the air. The services serve both Lynk & Co and Lotus, and the engagement continues today with Diadrom maintaining them in production.

MODEL

**Development team +
licensed reuse of Diag
Studio functionality**

STACK

UDS · DoIP · VCI · SOTA

SERVES

**Lynk & Co and Lotus ·
maintained in production**

BUSINESS	A faster route to new diagnostic services: license and reuse proven Diag Studio modules instead of writing the diagnostics core from scratch — one core now serving two Geely-family brands.
TECHNICAL	Diag Studio software modules reused into the cloud, with unified diagnostic services, diagnostics over internet protocol, vehicle communication interface and software over the air.
LIFECYCLE	Connected-car diagnostics built on the same verified foundations that already run workshop systems — one discipline from bench to cloud, now in ongoing production maintenance.

01 · THE BIGGER PICTURE

The connected car moves diagnostics off the bench

The rising importance of on- and off-board software for connected and autonomous vehicles changes where diagnostics happens. It is no longer only a workshop activity over a cable: it is a cloud service, reaching the vehicle over the internet, updating software over the air. The OEMs that move fastest are the ones that do not rebuild their diagnostics foundations to get there.

02 · THE PROTAGONIST

Lynk & Co

Lynk & Co develops connected mobility within the Geely family — vehicles where the digital service experience is as much the product as the car itself. New diagnostic services are part of that promise: knowing the state of the vehicle, tracing faults and delivering software wherever the car is.

03 · THE CHALLENGE

New services, without a new core

Building cloud-based diagnostic services from scratch means re-solving problems that proven workshop diagnostics already solved: vehicle communication, unified diagnostic services, safe software delivery. The faster route is to reuse a verified core — if the supplier's product is engineered so its functionality can

be licensed and lifted into a new context.

04 · THE APPROACH

A team and a licence

The engagement combines a Diadrom development team with a licence fee for the right to reuse functionality of Diadrom Diag Studio, developing new diagnostic services together with Lynk & Co. Concretely: Diag Studio software modules reused into the cloud; unified diagnostic services and diagnostics over internet protocol (DoIP); vehicle communication interface (VCI); and software over the air (SOTA). The services built on this core serve both Lynk & Co and Lotus, and the engagement continues today, with Diadrom maintaining them in production.

TECHNICAL DEEP-DIVE

ENGAGEMENT	Development team + licence fee for the right to reuse Diag Studio functionality — ongoing, now in production maintenance
REUSE	Diag Studio software modules reused into the cloud
PROTOCOLS	Unified diagnostic services (UDS) · diagnostics over internet protocol (DoIP)
DELIVERY	Vehicle communication interface (VCI) · software over the air (SOTA)
SERVES	Lynk & Co and Lotus (Geely family)

06 · THE IMPACT

What it changed

The Lynk & Co engagement proves the reuse model that defines Diadrom's product thinking: diagnostics functionality engineered once, verified hard, then licensed into new contexts — from workshop client to cloud service, and from one brand to two, with the same core now serving both Lynk & Co and Lotus. For the customer it compresses time-to-service; for the industry it shows that the connected car does not need a new diagnostics core, it needs a proven one with an API.

“The licence is the headline for us: when a customer pays to reuse your modules in their cloud, your product architecture has passed its hardest review.”

— Viktor Eliasson · CEO, Diadrom

07 · WHAT'S NEXT

Advice to peers

Software over the air and internet-protocol diagnostics are becoming the default delivery path for the software-defined vehicle. The module-reuse model scales with it — the same verified diagnostics core, surfacing wherever the vehicle's software lifecycle needs it.

Details drawn from Diadrom's published reference material on the Lynk & Co engagement (diadrom.se). Further information available to qualified parties under NDA.

From a three-day manual build to a one-hour automated one

How Mitsubishi Electric (MELCO) automated the verification of its infotainment head unit for a Volvo Cars platform — with Diadrom.

Diadrom built the continuous-integration chain and automated verification with Diadrom Dolphin: every test case automated, and the release build cut from three days of manual work to a one-hour automated run.

RELEASE BUILD		PLATFORM
3 days manual → ~1 hour automated	COVERAGE Every test case automated	Infotainment head unit · Volvo Cars SPA
BUSINESS	Faster, more predictable releases: a build that took three days of manual work now runs automatically in about an hour, so the team ships more often with less risk.	
TECHNICAL	A full continuous-integration chain — module-level feeding system-level — building and testing automatically on every commit.	
QUALITY	Every change is verified automatically, so regressions surface in minutes instead of at the end of a multi-day manual cycle.	

01 · THE BIGGER PICTURE

Software-defined means continuously integrated

As more of a vehicle's behaviour moves into software, the bottleneck moves to verification. Teams ship changes continuously, but a release is only as fast as the slowest manual step in front of it — and for embedded ECU software that step is usually testing. Continuous integration, where every change is built and tested automatically, is how the rest of the software world removed that bottleneck; the automotive industry is now applying it to embedded software, where the cost of a late-discovered regression is higher.

02 · THE PROTAGONIST

A Tier-1 shipping a complex head unit

Mitsubishi Electric (MELCO) develops the infotainment head unit (IHU) for a Volvo Cars platform (SPA) — a feature-rich ECU whose software has to keep pace with an agile programme. The team wanted to develop and verify in parallel rather than in sequence, but its release build was a manual, multi-day effort and testing happened too late to catch problems cheaply.

03 · THE CHALLENGE

Verification was the bottleneck

Producing a release meant roughly three days of manual work, and tests were run by hand rather than on every change. That made releases slow and regressions expensive: a defect introduced early might not surface until the end of a manual cycle, when it is hardest and most costly to fix. The team needed every test case automated and the release build itself made repeatable and fast — without lowering the verification bar a vehicle ECU demands.

04 · THE APPROACH

A CI chain, with Dolphin doing the testing

Diadrom ran a pre-study and then implemented an automated continuous-integration chain for the ECU software — module-level CI feeding system-level CI, so each change is built and integrated automatically. Verification was automated with Diadrom Dolphin: test execution configured through Dolphin's interface, exported and version-controlled, and kept in sync across platforms, so the same suite runs the same way on every build.

The result is a pipeline where every commit is built and tested automatically, and producing a release is a roughly one-hour automated run instead of three days of manual assembly — the agile 'develop and verify in parallel' model made real for a complex vehicle ECU.

"It's fun to work again now that we've automated all the test cases."

— Mitsubishi Electric (MELCO)

TECHNICAL
DEEP-DIVE

CAPABILITY	Automated continuous-integration chain for embedded ECU software — module-level CI feeding system-level CI
VERIFICATION	Test execution automated with Diadrom Dolphin — configured in the GUI, exported and version-controlled, synchronised across platforms
TRIGGER	Every commit built and tested automatically
RELEASE BUILD	Reduced from roughly three days of manual work to a one-hour automated run
MODEL	Develop and verify in parallel — agile delivery for a complex vehicle ECU

06 · THE IMPACT

What it changed

The pipeline turned verification from the slowest step into an automatic one. Every commit is now built and tested without anyone waiting on it, and the release that once took three days of manual work runs in about an hour — so the team releases more often, catches regressions while they are cheap to fix, and holds an agile pace without lowering the bar a vehicle ECU demands. It is the same verification discipline Diadrom builds into its products, applied to a customer's own development process.

"The cheapest quality you will ever buy is the regression you catch on the commit that caused it. Automate the build and the test, and a three-day release becomes an hour — without giving up an inch of rigour."

— Viktor Eliasson · CEO, Diadrom

07 · WHAT'S NEXT

Advice to peers

As vehicles become more software-defined, the teams that win are the ones that can change software quickly and prove it still works — continuously. The lesson generalises: automate the build and the verification together, put every commit under test, and 'fast' and 'safe' stop being a trade-off.

Details drawn from Diadrom's reference material on the engagement. Programme and platform specifics beyond those stated are excluded. Further information available to qualified parties under NDA.

Expert consulting for a next-generation vehicle network

How Scania brought in Diadrom's communication and diagnostics expertise for a new generation of vehicle-network communication — with Diadrom.

Scania engaged Diadrom for expert consulting on a new generation of vehicle-network communication technology and the diagnostics around it, for heavy commercial vehicles.

SCOPE		
SECTOR	Next-gen vehicle-network communication + diagnostics	ENGAGEMENT
Heavy commercial vehicles		Expert consulting
CAPABILITY	Diadrom's vehicle-network communication and diagnostics expertise applied to a next-generation heavy-vehicle programme.	
TECHNICAL	Consulting across a new generation of vehicle-network communication technology and the diagnostics that depend on it.	
REACH	Brings Diadrom's automotive diagnostics rigour into the heavy commercial-vehicle world.	

01 · THE BIGGER PICTURE

Heavy vehicles are rebuilding their networks

The electrical and electronic architecture of a commercial vehicle is being rebuilt. As trucks and buses take on more software, more connectivity and more autonomy, the in-vehicle network that carries it all is moving to a new generation — higher bandwidth, service-oriented communication, and the diagnostics needed to develop, manufacture and maintain it. Getting that communication layer right is foundational: everything above it depends on a network that is fast, deterministic and diagnosable.

02 · THE PROTAGONIST

A leader in heavy commercial vehicles

Scania is one of the world's leading makers of heavy trucks, buses and industrial and marine engines — a manufacturer with a long engineering tradition and a clear stake in getting the next generation of vehicle architecture right.

03 · THE CHALLENGE

A new communication generation, done properly

Moving to a new generation of vehicle-network communication is not a single component change; it touches architecture, protocols and the diagnostics that have to work across development, production and the aftermarket. It calls for deep, specific expertise in vehicle-network communication and diagnostics — the kind that is hard to staff internally for a one-time architectural shift.

04 · THE APPROACH

Expert consulting where it counts

Scania brought in Diadrom for expert consulting on the new generation of vehicle-network communication technology and the diagnostics around it. It is the model Diadrom is built for: specific, senior diagnostics and communication expertise, brought into a customer's own programme exactly where the hard problems are — the same automotive diagnostics rigour Diadrom has carried since 1999, applied here to heavy commercial vehicles.

“The communication layer is where a vehicle's software future is won or lost. Get the next-generation network and its diagnostics right, and everything built on top of it has a foundation it can trust.”

— Viktor Eliasson · CEO, Diadrom

TECHNICAL DEEP-DIVE

ENGAGEMENT	Expert consulting
DOMAIN	A new generation of vehicle-network communication technology
DISCIPLINE	Vehicle-network communication and diagnostics for automotive technology
SECTOR	Heavy commercial vehicles
HERITAGE	Automotive diagnostics rigour since 1999, applied to commercial vehicles

06 · THE IMPACT

What it changed

The engagement extends Diadrom's diagnostics and communication expertise beyond passenger cars into heavy commercial vehicles, at the layer that matters most for a software-defined future: how the vehicle communicates. It is the same discipline — deep, specific, senior expertise in vehicle-network communication and diagnostics — that Diadrom brings across automotive and defence.

07 · WHAT'S NEXT

Advice to peers

As commercial vehicles become more software-defined and more connected, the next-generation network underneath them only grows in importance. The lesson generalises across heavy vehicles: treat vehicle-network communication and its diagnostics as a foundational, expertise-led investment — not a late-stage integration detail.

Drawn from Diadrom's reference material on the Scania engagement. Project specifics are excluded. Further information available to qualified parties under NDA.

FROM HERITAGE TO PLATFORM

DiagStudio — know exactly what software is running where, and prove it

From RBS 70 NG lifecycle diagnostics to the FMV fleet communication box, Diadrom has spent more than two decades keeping mission-critical systems diagnosable and maintainable. DiagStudio is where that discipline becomes a product — platform design, traceable delivery and verified availability in one place. It doesn't replace your systems; it connects them into one picture you can trust.

- Platform design — every component, version, dependency and relationship in one model.
- Traceable, controlled software delivery — configurable stages, formal approvals, a tamper-evident audit log.
- Verified supplier chain — governance and compliance profiles across the network (emerging capability, proof of concept).
- Secure system availability — automated impact analysis and verified baselines of what is deployed.

Read more: next.diadrom.se/diagstudio

Talk to Diadrom about designing diagnostics into your next mission-critical system: info@diadrom.se · +46 (0) 31 774 11 00 · next.diadrom.se/cases

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