



25P049 RFP LRT Operator Training Simulator

Submitted by ForgeFX Simulations

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Proposer: ForgeFX Simulations
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Addenda Acknowledgment

The proposer acknowledges receipt of the addenda issued for this RFP.

10205113 Addendum 1	06/09/2026
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Submission Information

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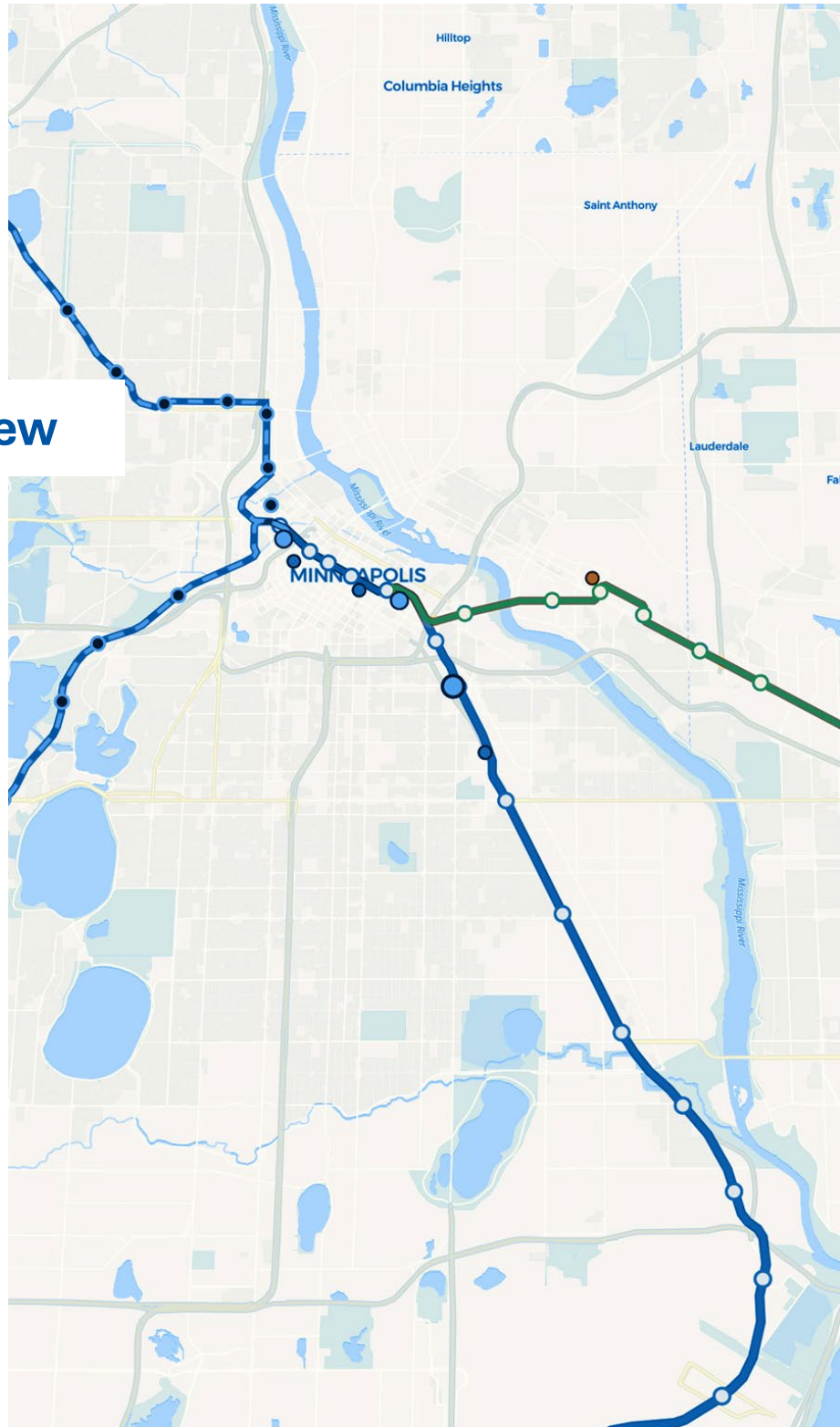
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Contents

1. Project Overview	4
2. Past Performance	9
3. Technical Solution Architecture	16
4. Project Work Plan & Implementation Approach	35
5. Training & Knowledge Transfer	42
6. Lifecycle Support & System Maintenance	47
7. Pricing	56
Appendix: ForgeFX Selected Clients	59

1. Project Overview



Executive Summary

Building Confident Light Rail Operators Through Immersive Simulation

Metro Transit is investing in a modern training solution that prepares operators to safely and confidently manage routine operations, challenging conditions, and unexpected events. Success requires more than realistic graphics. It requires immersive simulation, instructor-led scenario management, objective performance evaluation, and a system designed to support long-term training needs.

ForgeFX brings a highly relevant differentiator to this project: we have already developed an immersive operator-training simulator for the Washington Metropolitan Area Transit Authority, a major U.S. rail authority. That experience directly informs our understanding of rail operating environments, route-based training, signal recognition, procedural practice, operator decision-making, and measurable performance review.

ForgeFX Simulations proposes a realistic Light Rail Operator Training Simulator built on the ForgeSIM™ platform. The solution will replicate the Siemens S700 operating environment while providing instructors with the tools to create and manage training scenarios, monitor trainee performance, evaluate results, and conduct effective after-action reviews. The modular architecture also supports future expansion as Metro Transit's operational and training requirements evolve.

By combining proven rail simulation experience, immersive operating environments, objective performance measurement, and a scalable software platform, ForgeFX provides Metro Transit with a complete training solution that strengthens operator development while supporting the agency's long-term commitment to safety, operational excellence, and workforce readiness.

The sections that follow present ForgeFX's comprehensive response to the Request for Proposal, describing our qualifications, technical solution, implementation approach, training services, lifecycle support, and price proposal. Throughout this proposal, we demonstrate how the proposed solution meets Metro Transit's functional, technical, and operational requirements while providing long-term value and flexibility.



Executive Project Overview

Metro Transit operates a complex light rail network where operators must safely and efficiently perform across a wide range of operating conditions. Beyond mastering vehicle controls, operators are expected to interpret signals, comply with operating rules, communicate effectively with the Rail Control Center, respond to changing traffic and pedestrian conditions, and safely manage equipment malfunctions, degraded operations, and emergency situations. Effective training requires a realistic environment that allows operators to develop sound judgment and decision-making skills before encountering these situations in revenue service.

Metro Transit has identified the need for a comprehensive simulator that supports instructor-led, scenario-based training across the Blue Line, Green Line, their planned extensions, and associated operating facilities. The simulator must recreate the operational characteristics of the Metro Transit system while providing instructors with the ability to configure realistic operating conditions, evaluate operator performance, and reinforce safe operating practices through repeatable training exercises.

ForgeFX recognizes that training effectiveness depends on more than simulation fidelity alone. A successful training system must combine realistic vehicle behavior, immersive operating environments, flexible instructor controls, and objective performance evaluation into a single platform that enables operators to build confidence, improve proficiency, and consistently apply Metro Transit's operating procedures under both normal and abnormal conditions.



Executive Objective Overview

Operational Training Objectives

Metro Transit has identified the need for a comprehensive training solution that extends beyond vehicle familiarization to support the complete operator training lifecycle. Based on the RFP and subsequent addenda, ForgeFX understands the proposed simulator must achieve the following operational objectives.

01 Operator Qualification

Provide operators with a realistic training environment that reinforces vehicle operation, route familiarity, operating procedures, and safe decision-making throughout normal, abnormal, and emergency operations.

02 Scenario-Based Learning

Enable instructors to conduct dynamic training exercises that expose operators to normal operations, degraded conditions, equipment malfunctions, weather impacts, traffic interactions, and emergency events.

Provide instructors with a consistent platform for delivering repeatable training exercises, ensuring operators are evaluated using common instructional methods and performance criteria.

03 Performance Evaluation

Enable instructors to assess operator performance using measurable evaluation criteria, structured debriefings, and documented training results that support qualification, remediation, and continuous improvement.

04 Instructor Flexibility

Allow instructors to configure training sessions, tailor scenarios to specific learning objectives, and make real-time changes to environmental conditions and operational events during training.

05 Sustainable Training

Deliver a long-term training solution that can evolve with Metro Transit's operational procedures and future training requirements while supporting ongoing instructor-led curriculum development.

ForgeFX: The Strategic Solution

ForgeFX addresses Metro Transit’s objectives through a scalable simulation platform that combines high-fidelity vehicle simulation, immersive operating environments, instructor-led scenario management, and objective performance evaluation into a single integrated training solution. Rather than developing a simulator focused solely on vehicle operation, our approach supports the complete operator training process—from lesson delivery and scenario execution to performance assessment and post-exercise review.

The proposed solution leverages ForgeFX’s proven ForgeSIM™ platform to integrate the Siemens S700 operator cab, customer-furnished controls, detailed virtual route environments, instructor management tools, configurable training scenarios, and comprehensive reporting capabilities. This modular architecture reduces implementation risk by building on a mature simulation platform while providing Metro Transit with a flexible foundation that supports future operational changes and system expansion.

As described in Section 3, this architecture provides a comprehensive training ecosystem that enables instructors to develop, manage, and evaluate realistic training exercises while delivering the fidelity, flexibility, and long-term maintainability required to support Metro Transit’s operator training program.

2. Past Performance



2.1 Why ForgeFX

ForgeFX Simulations has designed and delivered high-fidelity simulation and immersive training systems for transportation, heavy equipment, autonomous vehicles, aviation, maritime, defense, industrial operations, and public safety.

Unlike organizations that primarily integrate commercial hardware or adapt off-the-shelf software, ForgeFX develops the simulation platform itself. This allows each system to be tailored to the customer's equipment, procedures, training objectives, and performance requirements while maintaining control over software quality, future enhancements, and long-term lifecycle support.

Every ForgeFX simulator is developed in close collaboration with the customer, helping ensure that the final system reflects real operational needs and supports measurable, repeatable training.



Proven Simulation Expertise

More than two decades of experience developing custom simulation and immersive training systems for mission-critical operations.



Platform Developer

ForgeFX develops and maintains the ForgeSIM™ platform, providing complete control over functionality, software quality, future enhancements, and configuration management.



Purpose-Built Solutions

Every simulator is engineered to reflect the customer's operating environment, procedures, and training objectives rather than relying on generic commercial software.



Long-Term Partnership

Our team supports customers throughout design, deployment, training, software updates, and ongoing lifecycle support to maximize long-term value.

Core Capabilities

- ✓ High-fidelity real-time simulation and visualization
- ✓ Custom software development and systems integration
- ✓ Instructor-led training and scenario management
- ✓ Objective performance measurement and reporting
- ✓ Modular, scalable simulator architecture
- ✓ Configuration management and lifecycle support

2.2 Past Performance:

Washington Metropolitan Area Transit Authority



Heavy-Rail Operator Training Simulator

*Authentic rail operations
transformed into safe,
repeatable, performance-
driven training.*

SOLUTION DELIVERED:

ForgeFX developed an immersive heavy-rail operator training simulator for the Washington Metropolitan Area Transit Authority (WMATA). The application recreated a Metrorail corridor, including stations, signals, switches, wayside personnel, and operationally significant route features.

Within the stereoscopic 3D environment, trainees interacted with a functional virtual facsimile of the train's prime mover controls. Operators could inspect equipment, complete startup procedures, practice control operation, interpret signals and hand commands, coordinate foul-time activities, and respond to unexpected hazards.

The result was a detailed rail training experience that combined realistic operating conditions, procedural practice, situational awareness, and measurable trainee performance within one integrated simulation.

TRAINING VALUE DELIVERED:

- ✓ Built operator familiarity before exposure to live equipment
- ✓ Supported safe, repeatable practice of complex procedures
- ✓ Strengthened hazard recognition and operating judgment
- ✓ Produced objective data for consistent trainee evaluation
- ✓ Converted real rail operations into structured, measurable training



2.2 Past Performance:

Washington Metropolitan Area Transit Authority

**Proven Rail
Simulation Capability**
*Applied to Metro Transit's
Operating Environment*

The WMATA simulator used immersive virtual reality, while Metro Transit's system will incorporate a seated cab configuration and physical Siemens S70 and S700 controls. The delivery configuration will be different, but the underlying simulation disciplines are directly aligned.

ForgeFX has demonstrated the ability to model real rail environments, reproduce interactive control behavior, translate operating procedures into training exercises, simulate safety-critical conditions, and convert operator actions into objective performance information.

Capability	Demonstrated on WMATA	Applied to Metro Transit
Rail Environment Modeling	Recreated the NoMa–Gallaudet to Union Station corridor with stations, signals, switches, and wayside activity.	Blue Line, Green Line, and Green Line Extension environments with Metro-specific route and operating features.
Operator Control Simulation	Developed an interactive virtual facsimile of the train's prime mover controls.	Integrate physical Siemens S70 and S700 controls within a realistic seated operator cab.
Procedural Training	Supported inspections, startup sequencing, equipment operation, and procedural practice.	Support qualification, recurrent, remedial, and procedure-based operator training.
Operational Scenarios	Incorporated coordination tasks, signals, wayside personnel, and unexpected hazards.	Deliver instructor-controlled normal, abnormal, emergency, weather, roadway, and service-disruption scenarios.
Situational Awareness	Required trainees to observe the environment, interpret conditions, and respond appropriately.	Reinforce signal recognition, route awareness, hazard identification, and operating judgment.
Performance Evaluation	Automatically captured trainee actions, missed steps, completed tasks, and procedural errors.	Provide objective assessment, after-action review, reporting, coaching, and performance trend analysis.

THE FORGEFX ADVANTAGE: PROVEN EXPERIENCE, PURPOSE-BUILT PERFORMANCE

Proven Rail Simulation Capability

ForgeFX has successfully translated real rail routes, controls, procedures, and operational hazards into an immersive training application.

Training Built Around Performance

ForgeFX simulations are designed to move beyond equipment familiarization by reinforcing procedural accuracy, situational awareness, decision-making, and instructor-led evaluation.

Integrated Simulation Development

Our team brings together environment development, control interaction, scenario logic, training design, and performance data within one coordinated system.

Purpose-Built for Metro Transit

The Metro Transit simulator will apply proven ForgeFX methods to the agency's vehicles, routes, operating rules, training priorities, and long-term program requirements.

2.3 Past Performance: Halliburton Cementing Services



Industrial Equipment Training | Oilfield Cementing Operations

High-fidelity control replication, equipment-response logic, and guided procedure training for complex, high-consequence operating systems.

ForgeFX developed an interactive digital-twin prototype of Halliburton's Elite II cementing equipment to support equipment familiarization, guided procedure training, and technical requirements validation. The simulator reproduced the operator's control environment and modeled the cause-and-effect behavior of pumps, valves, tanks, pressure systems, material flow, alarms, and unsafe operating states.

For operators, the simulator provided a safe way to build control familiarity and procedural confidence before working on live equipment. For stakeholders, it provided a working model that clarified requirements, validated system behavior, and reduced development risk before full production.

Value Proven for Metro Transit

This project demonstrates ForgeFX's ability to translate complex real-world equipment into a reliable training simulator where controls, system behavior, procedures, faults, and operator decisions are connected. That same discipline is critical to Metro Transit's Siemens S700 operator environment, where cab interaction, train behavior, operating procedures, signals, and abnormal conditions must work together as one realistic training system.

Capability	Demonstrated Value
Real-World Control Replication	Re-created the Elite II control stand, 18-position lever panel, valve layout, cRIO screens, operating states, and serial-interface behavior so users trained with the same control relationships used on the equipment.
Cause-and-Effect Equipment Logic	Modeled interconnected pumps, valves, tanks, pressure domains, flow restrictions, density, and pump-rate behavior so each operator action produced realistic downstream consequences.
Process and Flow Visualization	Visualized changing water/cement composition, tank levels, density, pressure, and flow rate across priming, mixing, pumping, recirculation, displacement, and cleanout paths.
Guided Procedure Training	Supported familiarization and guided lessons with saved equipment states, step-specific control highlighting, checklist preparation, equipment readiness, mixing, pumping, and bucket-test procedures.
Performance and Safety States	Included pressure buildup, valve dependencies, alarms, kickout conditions, health diagnostics, and unsafe-state consequences that could be practiced and corrected without risking equipment.
Engineering Discovery and Validation	Converted manuals, equipment photos, site-visit findings, lever-to-valve mapping, and bucket-test results into a working simulator model that closed scope questions before full production.

2.4 Past Performance:

Global Ground Support Deicing Simulator



AVIATION GROUND SUPPORT | AIRCRAFT DEICING OPERATIONS

*OEM control integration,
configurable operating
conditions, instructor-led
scenarios, and measurable
performance outcomes
for high-consequence
operator training.*

ForgeFX developed a networked aircraft-deicing training simulator for Global Ground Support that combined authentic deicer controls, immersive visual simulation, configurable aircraft and weather conditions, instructor-led scenario control, and performance measurement. The simulator allowed operators to train year-round in realistic operating conditions without consuming fuel, oil, or deicing fluid.

The platform evolved across multiple delivery formats, including physical controls, VR, portable laptop/Meta Quest configurations, VoIP, networked training roles, and observer participation. This demonstrated ForgeFX's ability to build a training system that could grow with operational needs while preserving consistent training value.

Value Proven for Metro Transit

This project shows ForgeFX's ability to build high-consequence operator training systems that combine authentic controls, environmental variation, instructor-managed scenarios, observer participation, and objective performance data. For Metro Transit, that experience directly supports the value of a simulator that can train operators on route familiarity, weather, visibility, signals, abnormal events, instructor intervention, session replay, and measurable operator performance in a safe, repeatable environment.

Capability	Demonstrated Value
Real-World Controls	Integrated OEM joysticks, pedals, and controls for boom movement, cab rotation, vehicle positioning, nozzle settings, fluid/spray selection, and lighting across three Global deicer models.
Configurable Weather Simulation	Enabled instructors to control precipitation type and intensity, temperature, wind speed and direction, and time of day, with weather-specific FAA holdover times applied in-session.
Scenario Variation at Scale	Combined 19 aircraft, three deicer models, weather variables, engines-on/off operations, and Deice, Anti-Ice, and AirPlus! modes to create more than one million scenario combinations.
True-to-Life Fluid Behavior	Rendered nozzle and spray dynamics in real time so operators could practice coverage, fluid efficiency, no-spray-area discipline, and safe maneuvering around aircraft surfaces.
Multi-User and Multi-Platform Delivery	Expanded from flat-screen physical controls to VR and portable laptop/Meta Quest configurations, with VoIP and networked roles for up to four drivers, four sprayers, and one observer.
Performance Measurement	Tracked time, gallons used, contaminant removed, violations, collisions, and holdover requirements; generated scores, leaderboards, and comprehensive reports for training records.

2.4 Past Performance: Global Ground Support Deicing Simulator

DOCUMENTED OPERATIONAL IMPACT VALUE

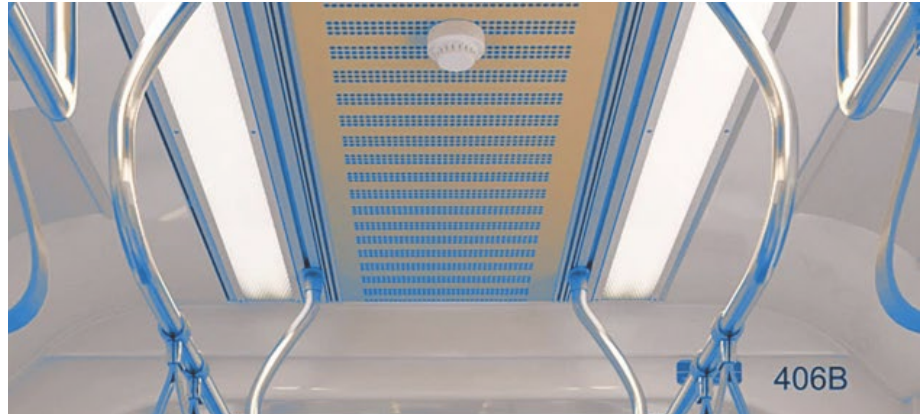
A U.S. Air Force customer at Fairchild Air Force Base reported more than \$1 million in consumables savings after adopting a trained forced-air deicing technique. Public reporting cited 38,296 gallons of annual deicing-fluid use at approximately \$11 per gallon, with the trained forced-air method using approximately 0.25 gallons per minute compared with 60–90 gallons per minute for traditional fluid injection. This documented result demonstrates how high-fidelity simulation can move beyond basic familiarization to support measurable changes in operator technique, resource use, and operational performance.



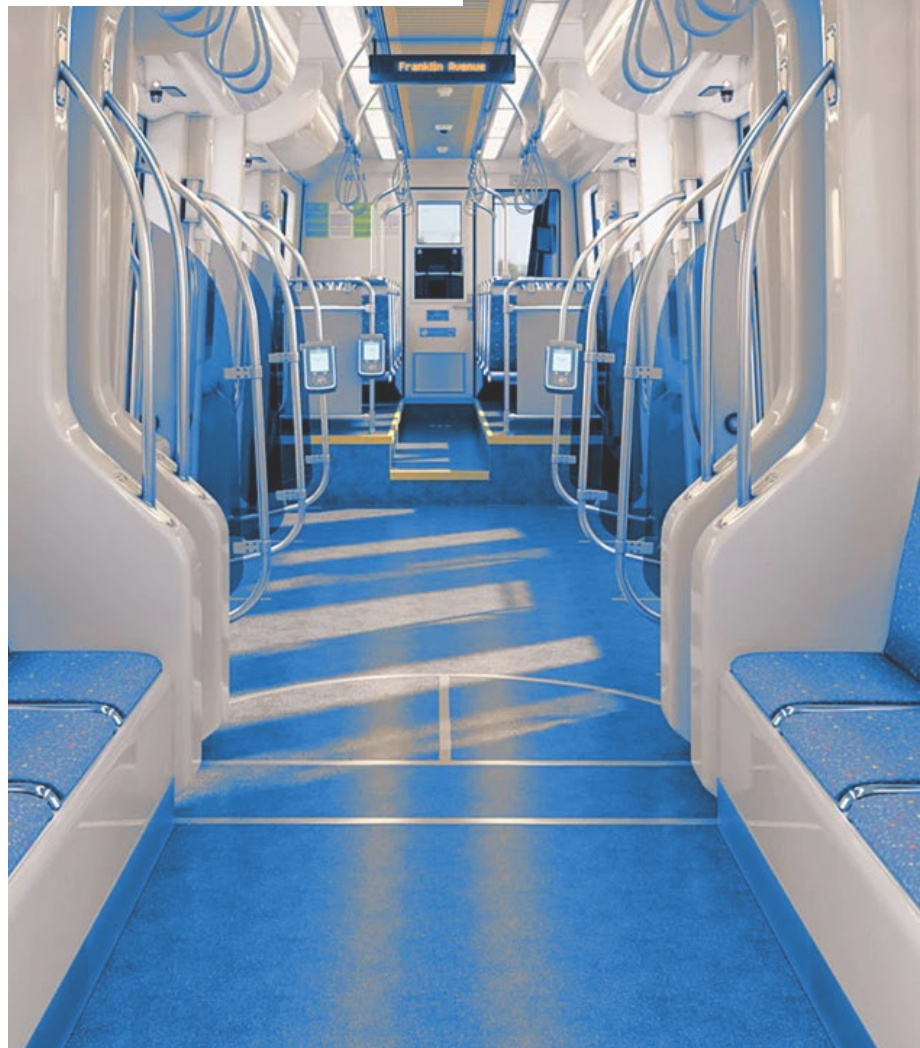
A trainee operates the deicing simulator while instructors and peers observe the same session, demonstrating guided practice, authentic operator interaction, and repeatable performance review in a safe training setting.

A multi-operator deicing scenario recreates snow, reduced visibility, aircraft hazards, and coordinated equipment movement, allowing teams to rehearse abnormal conditions and measurable responses without operational risk.





3. Technical Solution Architecture



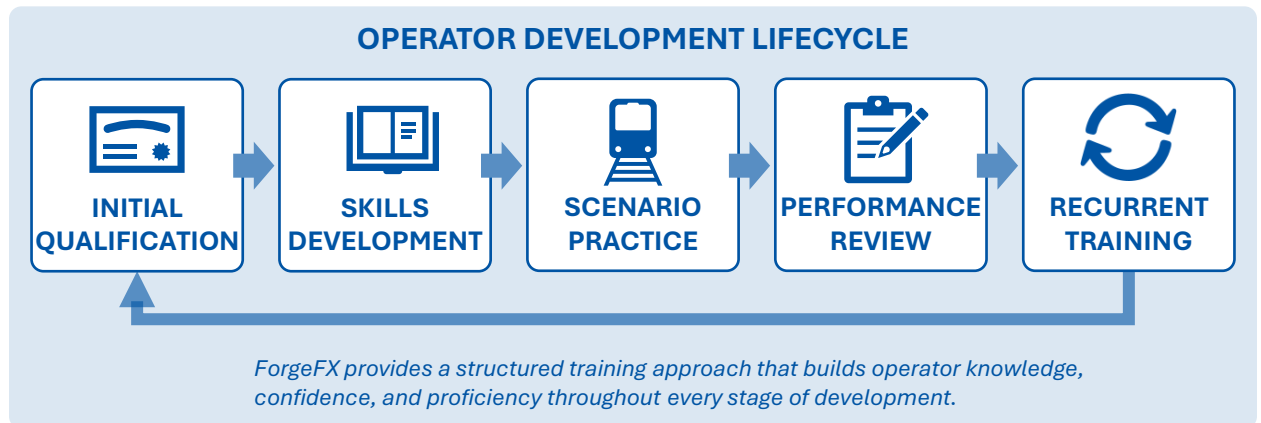
3.1 Understanding Metro Transit's Training Vision

Supporting the Complete Operator Training Lifecycle

Metro Transit requires a simulator that prepares operators to safely perform throughout revenue and non-revenue operations while building confidence in normal, abnormal, and emergency conditions. Effective operator training extends beyond vehicle familiarization by developing operational decision-making, procedural compliance, and consistent performance in a realistic, instructor-led environment.

ForgeFX's training philosophy emphasizes realistic simulation, structured instruction, and objective performance evaluation. Operators gain experience through repeatable scenarios that reinforce proper operating procedures while allowing instructors to observe, assess, and coach performance in a safe and controlled environment.

The proposed Light Rail Operator Training Simulator is designed to support the complete operator development lifecycle, from initial qualification through recurrent training. The following section describes how ForgeFX delivers this vision through an integrated simulator platform tailored to Metro Transit's operational requirements.



3.2 Proposed Solution Architecture

The proposed Metro Transit Light Rail Operator Training Simulator is a standalone, integrated training platform designed to support every stage of operator development, from initial qualification through recurrent training, remedial instruction, and objective performance evaluation. Rather than functioning as independent software applications, the proposed solution combines simulation software, operator controls, virtual operating environments, instructor tools, and performance evaluation into a single coordinated platform that supports realistic, repeatable, instructor-led training.

As illustrated on the following page, the proposed architecture is organized around six integrated subsystems that together form a standalone training platform. ForgeFX's ForgeSIM™ platform provides the underlying software framework that coordinates simulator operation, while the Operator Cab & Hardware Integration, Virtual Operating Environment, and Operational Training Scenarios recreate the operator experience. The Instructor Station provides instructors with comprehensive control over training sessions, while the Performance Evaluation & Reporting subsystem captures objective performance data to support evaluation, feedback, and operator development.

This integrated architecture allows instructors to manage the complete training lifecycle from scenario preparation and execution through post-exercise review and performance assessment using a single coordinated training system. Each subsystem has been designed to fulfill a specific role while operating together to provide Metro Transit with a comprehensive, maintainable, scalable, and standalone operator training capability that can be expanded and maintained throughout the system lifecycle. The following sections describe each subsystem in detail, beginning with the ForgeSIM simulation platform that serves as the foundation for the proposed training solution.

3.2 Proposed Solution Architecture

The Metro Transit LRT Operator Training Simulator is an integrated, standalone training solution built on the ForgeSIM™ platform. The components work together to deliver a realistic, effective, and measurable training experience.



3.3 ForgeSIM™ Framework

Overview

ForgeSIM™ is ForgeFX's production-proven simulation framework and serves as the software foundation for the proposed Metro Transit Light Rail Operator Training Simulator. Rather than developing separate software for each simulator component, ForgeSIM provides a common architecture that integrates the operator workstation, vehicle simulation, virtual operating environment, instructor station, training scenarios, and performance evaluation into a single, coordinated training system.

By leveraging a mature simulation platform, ForgeFX focuses development on Metro Transit-specific functionality such as Siemens S700 operations, route modeling, instructor workflows, and performance assessment while utilizing proven platform services for the core capabilities common to professional training simulators. This approach reduces technical risk, accelerates implementation, and provides Metro Transit with a scalable platform that can evolve as S70 vehicle operational needs, training requirements, and system capabilities expand over time.


Modular by Design
 Use only the systems a project actually needs, then add capabilities as requirements evolve.


Faster Development
 Start with reusable, production-ready technology instead of rebuilding core systems from scratch.


Cross-Platform Deployment
 Support VR, MR, desktop, mobile, and web from a shared architecture.


Enterprise Proven
 Built through real-world deployments with the scalability and support that enterprise programs require.

Integrated Platform Architecture

ForgeSIM integrates cab simulation, virtual operating environment, Instructor Station, scenario management, and performance evaluation into a single coordinated training environment. The platform synchronizes operator actions, instructor inputs, vehicle behavior, scenario events, and performance data in real time, ensuring every subsystem functions as part of a unified simulator rather than as independent applications.

This integrated architecture provides consistent simulator operation, centralized session management, and reliable data exchange while supporting future enhancements without requiring redevelopment of the underlying platform.

The following sections describe each major subsystem of the proposed simulator and how ForgeSIM integrates them into a complete Light Rail Operator Training Simulator.

Why ForgeSIM Matters to Metro Transit

The ForgeSIM framework provides the technical foundation that allows every simulator subsystem to function as a coordinated training environment. By utilizing a common software architecture, Metro Transit benefits from a solution that is easier to maintain, simpler to expand, and designed to support evolving operational and training requirements.

3.4 Operator Cab & Hardware Integration

Overview

The operator workstation is the primary interface between the trainee and the simulated Metro Transit operating environment. ForgeFX proposes a purpose-built, open-cab Siemens S700-based workstation with physical primary controls, high-resolution forward displays, rear-camera visualization, dedicated simulator hardware, and the ForgeSIM™ platform.

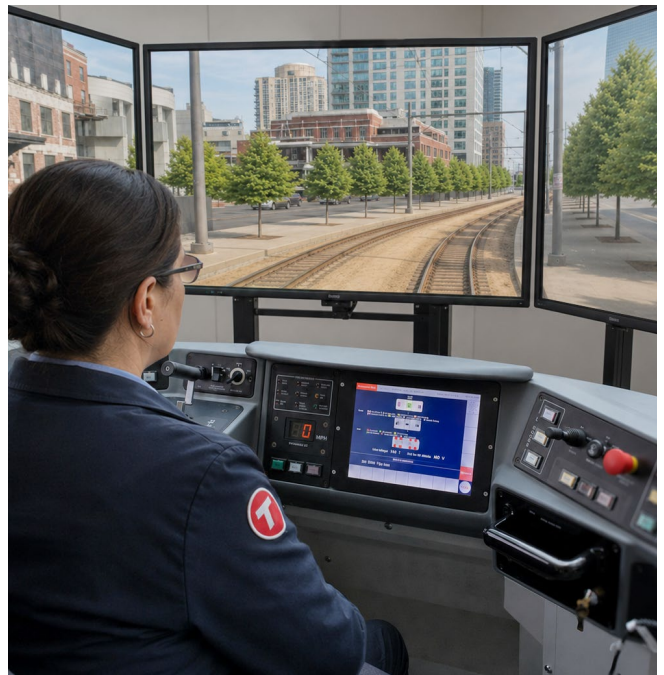
The workstation will support both Siemens S700 and Siemens S70 operating characteristics in software. The physical control layout will be based on the preferred S700 configuration and will use Council-furnished OEM components where confirmed, or functionally equivalent simulator controls where furnished hardware is unavailable.

ForgeFX will establish a hardware responsibility matrix during design, including component source, custody, inspection, integration, and replacement responsibilities. Overlapping or incomplete hardware information will be validated with Metro Transit before the final design baseline is approved.

Operator Workstation

The proposed workstation provides a high-resolution visual display system with a minimum 180-degree forward field of view from the operator trainee's normal seated position. The display arrangement is designed to support natural forward and peripheral sightlines, allowing trainees to visually acquire signals, station platforms, roadway crossings, adjacent traffic, pedestrians, and other operational cues consistent with real-world light rail operation.

Rear-camera visualization is integrated into the workstation presentation to support vehicle operation and situational awareness. The display system is synchronized with the operator controls and ForgeSIM platform, providing real-time visual feedback corresponding to vehicle movement, signaling, route conditions, environmental conditions, and instructor-directed events.



Conceptual rendering of the proposed open-cab operator workstation.

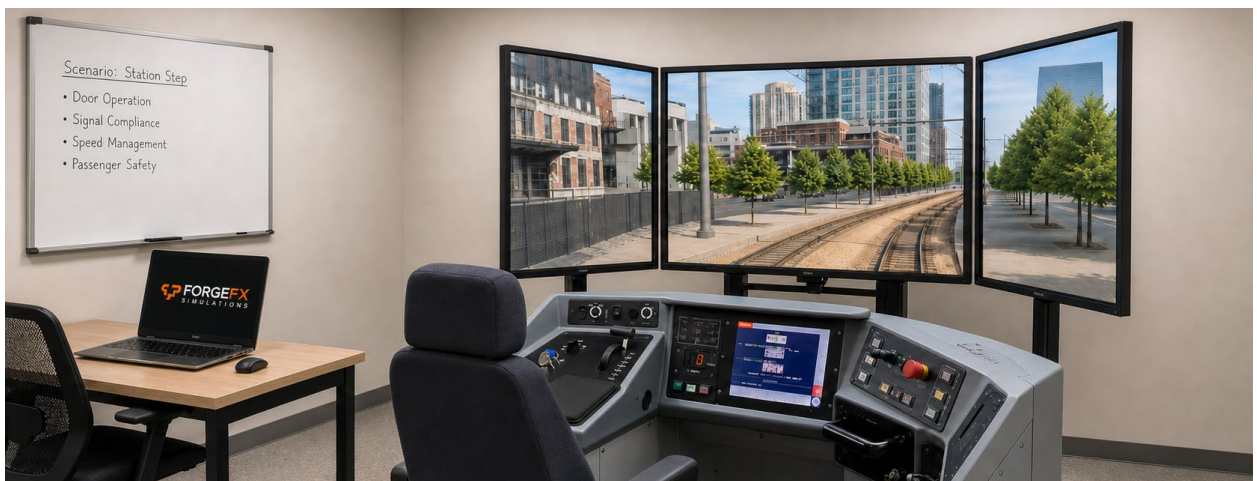
3.4 Operator Cab & Hardware Integration

Operator Workstation Capabilities

The proposed open-cab operator workstation combines purpose-built hardware, physical Siemens-representative controls, and the ForgeSIM™ platform into an integrated training system designed for realistic operation, maintainability, and future expansion.

Key capabilities include the ability to:

- Provide an open-cab, desk-style workstation based on Metro Transit's preferred Siemens S700 operator cab configuration, with software support for Siemens S700 and Siemens S70 vehicle operation.
- Use real physical primary operator controls that closely replicate Siemens S700 functionality; touchscreen substitutes will not be used for primary controls.
- Integrate Council-furnished OEM components where confirmed and available, or functionally equivalent simulator controls, through documented mechanical, electrical, and software interfaces.
- Provide a high-resolution visual presentation with a minimum 180-degree field of view, integrated forward displays, peripheral visibility, and rear-camera visualization that reproduces the operator's normal line of sight.
- Synchronize operator inputs with vehicle simulation, signaling, route conditions, instructor-controlled events, and performance evaluation.
- Use commercial computing hardware and modular interfaces that support commissioning, calibration, diagnostics, maintenance, replacement, and future expansion.



Conceptual rendering of the proposed training environment. Metro Transit-furnished Siemens S700 OEM controls are integrated into a purpose-built simulator platform that provides immersive operator training, simplified maintenance, and long-term lifecycle support.

3.4 Operator Cab & Hardware Integration

Designed for Realism, Built for Lifecycle Value

ForgeFX's operator workstation design gives Metro Transit a realistic place to build operator confidence before live service. Authentic control interaction, wide-field visual presentation, rear-camera awareness, and synchronized vehicle response help trainees practice the cues and decisions they will rely on in the field. At the same time, the modular hardware and ForgeSIM™ architecture support easier maintenance, future updates, and long-term training program growth.



IMMERSIVE VISUAL EXPERIENCE

High-resolution visuals, a minimum 180-degree field of view, and authentic Siemens OEM controls recreate the visual cues and spatial awareness required during daily revenue service.



ACCELERATES SKILL DEVELOPMENT

Realistic interaction with vehicle systems and instructor-driven scenarios strengthen operator confidence and decision-making.



SIMPLIFIES MAINTENANCE

Commercial hardware and modular interfaces support efficient servicing, replacement, and lifecycle maintenance.



PROTECTS LONG-TERM INVESTMENT

The modular simulator platform accommodates future hardware updates, new training content, and evolving operational needs.

3.5 Virtual Operating Environment

Overview

After the operator workstation establishes the physical training interface, the virtual operating environment provides the Metro Transit rail world in which operator skills are practiced, challenged, and evaluated. ForgeFX will develop a route-based environment representing existing and planned Blue Line and Green Line operations, including both extensions, yards, maintenance facilities, stations, track infrastructure, signaling, grade crossings, roadway interfaces, and operator-relevant wayside features. The environment will emphasize route familiarity, station approach, speed management, signal recognition, street-running conditions, traffic, pedestrians, weather, visibility, and other cues that influence operator decisions.

ForgeSIM™ Environment Development

The process draws on Council-provided engineering drawings, GIS and mapping resources, track charts, station plans, signal and track documentation, route video, photography, aerial imagery, and field verification when available. Where sources overlap, differ, or are incomplete, ForgeFX will identify discrepancies and confirm the controlling revision with Metro Transit during source intake before finalizing the design baseline.

Reusable infrastructure assets support efficient development and future route updates, while line-specific assets are developed where greater operational detail is required. The operational model will include applicable train, ABS, bar, and lunar crossing signals and ATP behavior. Addendum 3 is treated as controlling; the final ATP configuration will be validated with Metro Transit during design.



ForgeSIM delivers a virtual operating environment that recreates Metro Transit's rail network with representative infrastructure, vehicle models, and dynamic operating conditions to support realistic, repeatable operator training.

3.5 Virtual Operating Environment: Blue Line

Blue Line

The Blue Line route environment will represent the existing 12.4-mile route and the planned 13-mile extension as part of the base simulator scope. The environment will support route familiarity, station approach practice, signal recognition, speed management, grade crossing awareness, and scenario-based operating exercises.

Training-focused Blue Line elements include:

- Existing and planned Blue Line route geometry, stations, platforms, track assets, signals, switches, crossings, catenary, signage, and wayside references
- Blue Line-specific operating features, including airport tunnel operation and elevated track sections, where applicable to the modeled route scope and Metro Transit source data
- Roadway interfaces, traffic activity, pedestrians, weather, lighting, visibility, and temporary operating conditions that support repeatable qualification, remedial, degraded-operation, and emergency scenarios



3.5 Virtual Operating Environment: Green Line

Green Line

The Green Line route environment will represent the existing 10.8-mile route and the 14.55-mile extension currently under construction. The Green Line environment is especially important for street-running operation, urban roadway interaction, pedestrian awareness, shared corridor operation, and line-specific decision points.

Training-focused Green Line elements include:

- Existing and planned Green Line route geometry, stations, platforms, signals, crossings, catenary, street-running sections, roadway traffic, pedestrians, and corridor landmarks
- Shared downtown operating areas, the 35W junction, Green Line extension connection points, steep grade conditions, and other operationally significant areas identified through Metro Transit source data
- Grade crossings, street-running conditions, adverse weather, reduced visibility, service disruptions, and degraded operating conditions that challenge operator awareness and procedural response



3.5 Virtual Operating Environment

Virtual Environment Design Capabilities

The virtual operating environment is more than a visual backdrop. It is the operational context that teaches operators where they are, what they are approaching, what conditions are changing, and what decisions are required. ForgeFX will prioritize the environmental details that support operator performance, instructor-led scenarios, and long-term system growth.

- **Route Recognition and Location Awareness**

Operators repeatedly navigate Blue Line and Green Line environments with recognizable stations, approaches, landmarks, tunnels, elevated sections, shared corridors, and line-specific operating cues.

- **Operator-Relevant Infrastructure**

Track geometry, switches, crossings, catenary, signals, platforms, yards, maintenance facilities, terminals, roadway interfaces, and wayside references are developed around the information operators use during service.

- **Dynamic Operating Conditions**

Weather, lighting, visibility, traffic, pedestrians, maintenance activity, disabled vehicles, service disruptions, signal abnormalities, and other environmental conditions can be used to create realistic training variation.

- **Scenario-Ready Environment Assets**

The environment is built to support instructor-controlled normal, degraded, and emergency scenarios rather than functioning as static scenery.

- **Future Route and Infrastructure Updates**

ForgeSIM's modular environment architecture supports route extensions, infrastructure changes, revised operating procedures, and new training scenarios as Metro Transit's system evolves.



DEVELOPS ROUTE FAMILIARITY

Operators repeatedly navigate the complete Metro Transit rail network in a safe, controlled training environment.



STRENGTHENS SITUATIONAL AWARENESS

Realistic infrastructure, traffic, weather, and operational events reinforce observation, anticipation, and operational decision-making.



SUPPORTS SCENARIO-BASED INSTRUCTION

Dynamic operating conditions enable repeatable training for normal, degraded, and emergency operating scenarios.



ADAPTS WITH METRO TRANSIT

ForgeSIM's modular architecture supports future route extensions, infrastructure updates, and evolving operational requirements.

3.6 Operator Training Scenarios

Dynamic Scenario & Rulebook Management

ForgeSIM™ provides flexible scenario authoring and content management tools that enable authorized Metro Transit personnel to configure and update training exercises without vendor software redevelopment. Instructors can define operating routes, starting locations, environmental conditions, equipment status, instructor-triggered events, and learning objectives to address specific operational or performance goals such as normal revenue service, yard/non-revenue movement, degraded operations, emergency response, and recurrent proficiency.

Scenario content, instructional guidance, and rulebook references can be updated through ForgeSIM's content management tools, allowing Metro Transit to maintain training materials as operating procedures, rulebooks, and service requirements evolve without requiring ForgeFX intervention.



Initial Qualification

Progressive lessons introduce operators to train handling, route familiarization, station operations, signal recognition, speed management, communications, passenger service, and standard operating procedures through structured, repeatable exercises that build operator confidence and proficiency.



Abnormal & Emergency Operations

ForgeSIM supports instructor-controlled scenarios for equipment failures, service disruptions, communication failures, severe weather, pedestrian conflicts, roadway incidents, disabled trains, and other abnormal operating conditions. Operators practice applying Metro Transit procedures under realistic, controlled conditions.



Session Recording & Playback

ForgeSIM records operator actions, simulator events, instructor interventions, and objective performance metrics throughout each exercise. Session playback enables instructors to review critical events, evaluate procedural compliance, identify coaching opportunities, and document operator progress through consistent, objective performance assessments.



Remedial & Proficiency Training

Remedial and proficiency training provides repeatable operating conditions and objective evaluation criteria. Operators can safely practice challenging situations until proficiency is consistently demonstrated.

3.6 Operator Training Scenarios

ForgeSIM Scenario Lifecycle

Each training exercise within ForgeSIM™ follows a repeatable scenario lifecycle that supports consistent instruction while allowing training content to be tailored to specific learning objectives, operational procedures, and operator proficiency levels. Metro Transit instructors configure the exercise, operator trainees conduct the scenario in the simulator cab, and recorded performance data supports review, coaching, and objective evaluation.

This repeatable structure allows Metro Transit to deliver consistent qualification, recurrent, and remedial training while efficiently updating scenario content to reflect new operating procedures, route extensions, and evolving training priorities.

Training Value of the Scenario Framework

More than a collection of training exercises, the ForgeSIM scenario framework gives Metro Transit a scalable method for delivering structured operator development over time. By combining configurable operating conditions, instructor direction, immersive route-based practice, and objective evaluation, the simulator supports consistent skill development while preserving the flexibility to evolve with Metro Transit's operating environment.

ForgeSIM scenarios turn Metro Transit's cab, route environment, operating rules, instructor direction, and performance data into repeatable training exercises that can be configured, practiced, reviewed, and updated over time.



PROGRESSIVE SKILL DEVELOPMENT

Operators build confidence through increasingly challenging scenarios that reinforce operational knowledge and procedural compliance.



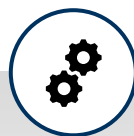
SAFE REPETITION

Complex operating situations can be practiced repeatedly without risk to passengers, equipment, or revenue service.



OBJECTIVE PERFORMANCE EVALUATION

Standardized scenarios, playback, and measurable performance metrics support fair and consistent operator assessments.



ADAPTABLE TRAINING CONTENT

ForgeSIM's modular scenario framework allows new operating procedures, route extensions, and instructional content to be incorporated throughout the simulator's lifecycle.

3.7 Instructor Station

Overview

The ForgeSIM™ Instructor Station serves as the operational command center for simulator-based operator training. From a centralized interface, Metro Transit instructors can configure training sessions, monitor trainee activity, manage scenario progression, introduce instructor-directed events, and support operator coaching without interrupting the trainee's simulator experience.

Designed for initial qualification, recurrent training, and remedial instruction, the Instructor Station gives instructors the tools needed to deliver consistent, repeatable training while adapting each exercise to specific learning objectives and operating conditions. The Instructor Station also supports approved remote visual display options, allowing authorized personnel to observe live or recorded sessions for coaching, grading, and debriefing without occupying the operator workstation.

ForgeSIM Instructor Workflow

The ForgeSIM Instructor Station supports a streamlined workflow that guides each simulator session from setup through live training and operator coaching. Instructors can configure the exercise, monitor simulator activity as it unfolds, and guide learning through scenario adjustments, event introduction, and real-time coaching. This centralized workflow helps instructors stay focused on operator performance and training delivery rather than switching between separate tools or interrupting the simulator session.

Configure Training



- Scenarios
- Conditions
- Objectives
- Equipment Status
- Starting Location

Monitor & Manage



- Live Monitoring
- Simulator Status
- Operator Actions
- Train & System Status
- Training Progress

Guide Learning



- Event Injection
- Adjust Scenarios
- Change Conditions
- Live Coaching
- Reinforce Learning Objectives

The ForgeSIM Instructor Station streamlines instructor operations by providing a centralized workflow for configuring training scenarios, monitoring operator performance, and managing instructor-directed events throughout each simulator session.

3.7 Instructor Station

Instructor Control Capabilities

The Instructor Station gives Metro Transit instructors direct control over the structure, timing, and progression of each simulator session. Prior to training, instructors can configure the exercise to match the lesson objective, route, starting location, environmental conditions, equipment status, and performance focus. During the session, instructors can manage progression without interrupting the operator trainee's simulator experience.

- **Session Setup**

Instructors configure each training session by selecting the route, starting location, weather, visibility, time of day, equipment status, operating conditions, and learning objectives.

- **Scenario Control**

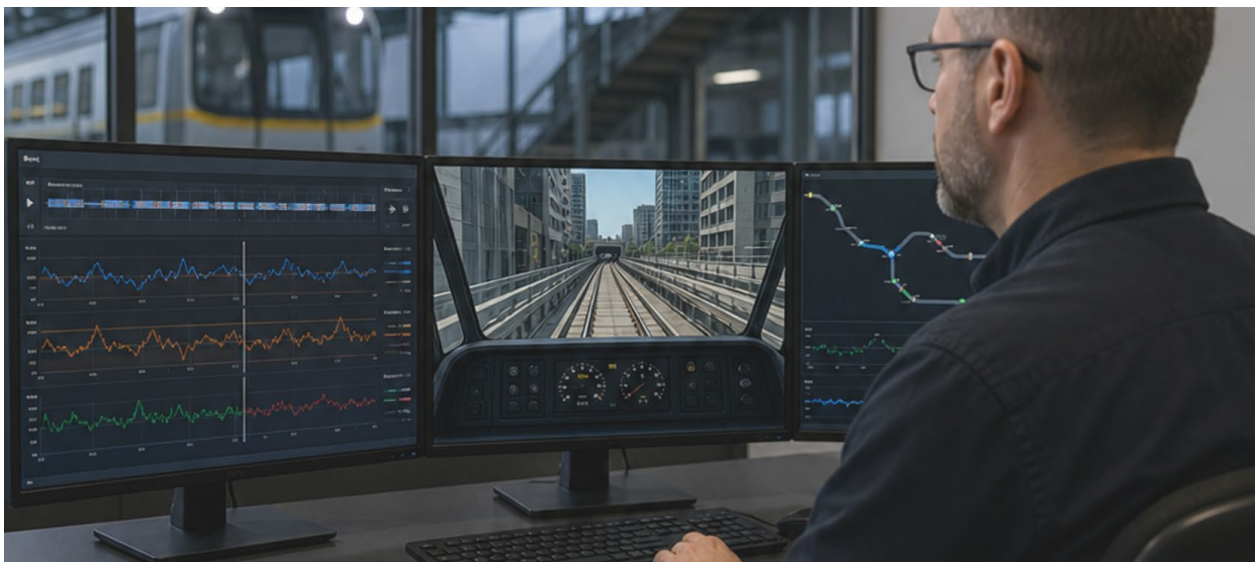
Scenarios can be launched, paused, resumed, reset, or repositioned during the exercise, giving instructors control over training progression and session pacing.

- **Real-Time Condition Changes**

Instructors can adjust conditions, introduce instructor-directed events, and modify scenario progression to reinforce learning objectives or evaluate operator response.

- **Observer & Training Support**

Approved remote display options allow authorized personnel to observe live or recorded sessions for viewing, grading, coaching, and debriefing. These workflows also support train-the-trainer instruction by preparing Metro Transit personnel to set up, run, monitor, and review simulator sessions.



3.7 Instructor Station

Real-Time Monitoring & Intervention

During simulator operation, instructors maintain continuous visibility into operator trainee activity, train status, simulator conditions, and scenario progression through the Instructor Station. Live monitoring tools allow instructors to observe performance as training unfolds and maintain situational awareness without interrupting the training exercise.

Instructors can influence training in real time by adjusting environmental conditions, introducing instructor-directed events, or modifying scenario progression to reinforce learning objectives and evaluate operator decision-making under changing operational conditions.

Scenario Control & Malfunction Injection

ForgeSIM™ enables instructors to dynamically introduce operational events and simulated equipment malfunctions during active training. Instructor-controlled event injection supports normal operations, degraded operations, and emergency response training while providing opportunities to evaluate operator judgment, procedural compliance, and safe operating practices.

The client-issued fault-code library will serve as the baseline for malfunction development. ForgeFX will map each applicable code to simulator behavior and test evidence, maintain requirements-to-test traceability, and confirm final implementation through engineering review with Metro Transit.

Integrated Training Management

The Instructor Station consolidates scenario configuration, simulator control, live monitoring, instructor-directed event management, and training administration within a single intuitive interface. By reducing the need to switch between separate software applications during active training, instructors can remain focused on operator performance, coaching, and training delivery.

Operator actions, simulator events, instructor interventions, scenario configurations, and session outcomes are centrally managed within ForgeSIM to support consistent training administration, organized records, playback, performance evaluation, and reporting.



CENTRALIZED INSTRUCTOR CONTROL

Operators build confidence through increasingly challenging scenarios that reinforce operational knowledge and procedural compliance.



REAL-TIME TRAINING MANAGEMENT

Complex operating situations can be practiced repeatedly without risk to passengers, equipment, or revenue service.



FLEXIBLE SCENARIO ADMINISTRATION

Quickly configure and adjust training exercises to support qualification, recurrent training, and remedial instruction.



STREAMLINED TRAINING DELIVERY

ForgeSIM's modular scenario framework allows new operating procedures, route extensions, and instructional content to be incorporated throughout the simulator's lifecycle.

3.8 Performance Evaluation & Reporting

Overview

The ForgeSIM™ Performance Evaluation & Reporting module records simulator activity throughout every training exercise, transforming operator actions, simulator events, and instructor interventions into objective performance information. Session recording, synchronized playback, and comprehensive reporting provide Metro Transit instructors with the tools needed to evaluate operator proficiency, reinforce operating procedures, and support continuous operator development.

Performance data is centrally managed to support consistent instruction, historical analysis, and long-term administration of Metro Transit's operator training program.

ForgeSIM Performance Evaluation Workflow

Every simulator session follows a structured performance evaluation workflow that transforms raw simulator activity into actionable training information. ForgeSIM captures objective performance data throughout each exercise, enables synchronized playback for instructor review, and generates comprehensive reports that support coaching, qualification, and continuous program improvement.

Capture & Record



Records operator actions, control inputs, train status, simulator events, instructor interventions, signal states, environmental conditions, and performance metrics throughout each training exercise.

Playback & Review



Synchronizes recorded activity with playback tools so instructors can review operator decisions, simulator conditions, instructor events, and performance outcomes in context.

Report & Analyze



Generates ad hoc and scheduled reports, supports data mining and trend analysis, and preserves Metro Transit-owned training records for qualification, documentation, and continuous program improvement.

3.8 Performance Evaluation & Reporting

Capture & Record Session Data

ForgeSIM™ continuously records operator actions, control inputs, train status, simulator events, instructor interventions, signal states, environmental conditions, and objective performance metrics throughout each training exercise. All recorded information is time-stamped and synchronized to preserve the complete sequence of operator decisions, simulator events, and instructor actions.

This comprehensive data collection provides an objective record of each training session, supporting consistent evaluation of train handling, procedural compliance, signal recognition, station operations, speed management, and operator response to routine and abnormal operating conditions.

Playback & Review

Following each exercise, instructors use synchronized playback tools to review the complete training session or navigate directly to significant events for detailed review. Playback controls allow instructors to pause, rewind, fast-forward, and review operator actions alongside simulator events and performance metrics, providing useful context during post-exercise debriefings.

Objective performance data enables instructors to evaluate procedural compliance, identify coaching opportunities, reinforce learning objectives, and document operator progress using consistent evaluation criteria.

Reporting & Training Analytics

ForgeSIM provides scheduled and ad hoc reporting capabilities that summarize operator performance, completed training activities, qualification progress, and historical training records. Training data can be filtered, queried, mined, and analyzed across operators, routes, scenarios, date ranges, and performance metrics to identify trends, recurring deficiencies, and opportunities for curriculum improvement.

Metro Transit retains exclusive ownership of training data, operator performance records, and simulator-generated information. Report formats, retention, export, security, data-mining access, and any external integration boundaries will be finalized during design and contract clarification.



OBJECTIVE PERFORMANCE ASSESSMENT

Converts simulator activity into measurable evidence of operator proficiency, compliance, and decision-making.



EFFECTIVE COACHING & DEBRIEFING

Gives instructors playback-based insight to review critical events and guide focused coaching.



METRO TRANSIT-OWNED TRAINING RECORDS

Preserves Metro Transit-owned performance records for qualification, documentation, and program administration.



CONTINUOUS PROGRAM IMPROVEMENT

Uses searchable records and trend analysis to identify recurring needs and improve training.

4. Project Work Plan & Implementation Approach



4.1 Project Execution Approach

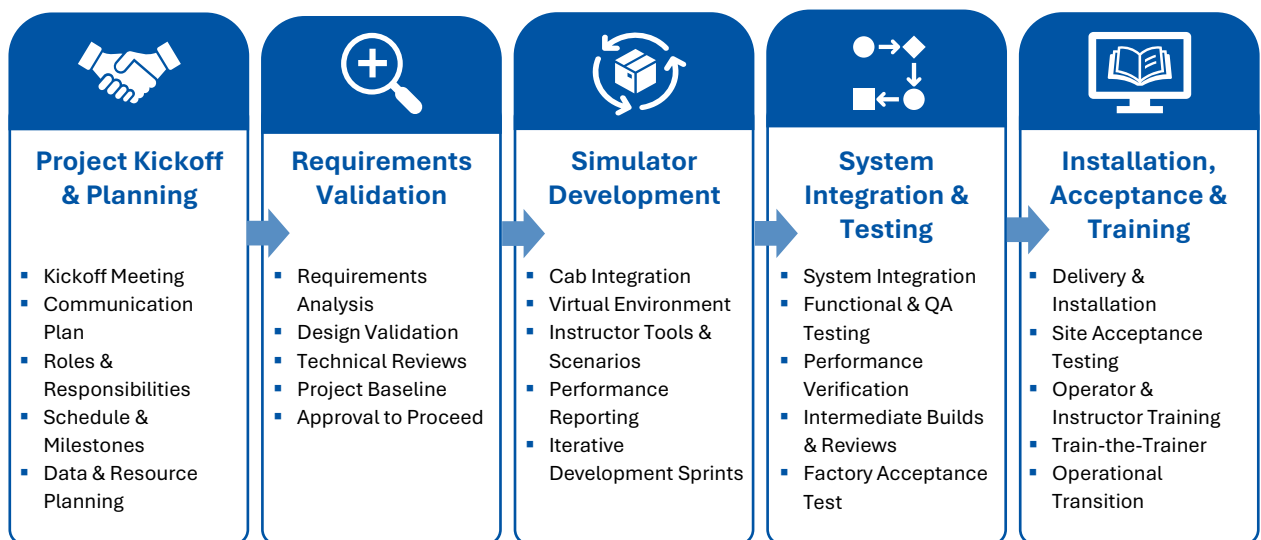
Overview

ForgeFX employs a structured, collaborative project delivery methodology that guides the simulator from project kickoff through deployment, acceptance, and long-term operational support. The implementation approach combines disciplined project management, incremental system development, and continuous stakeholder engagement to ensure the delivered solution aligns with Metro Transit's operational requirements, training objectives, and project schedule.

Regular design reviews, progress demonstrations, and customer collaboration provide opportunities to validate requirements, refine system functionality, and address project risks throughout development rather than waiting until final acceptance. This phased approach promotes predictable execution while ensuring the completed simulator reflects Metro Transit's operational procedures and training objectives.

ForgeFX Project Implementation and Delivery Process

ForgeFX follows a structured implementation process that provides clearly defined project phases, customer review points, and measurable milestones from contract award through operational deployment. Each phase builds upon the previous one, allowing Metro Transit to review progress, provide feedback, and approve key deliverables before advancing to the next stage of implementation.

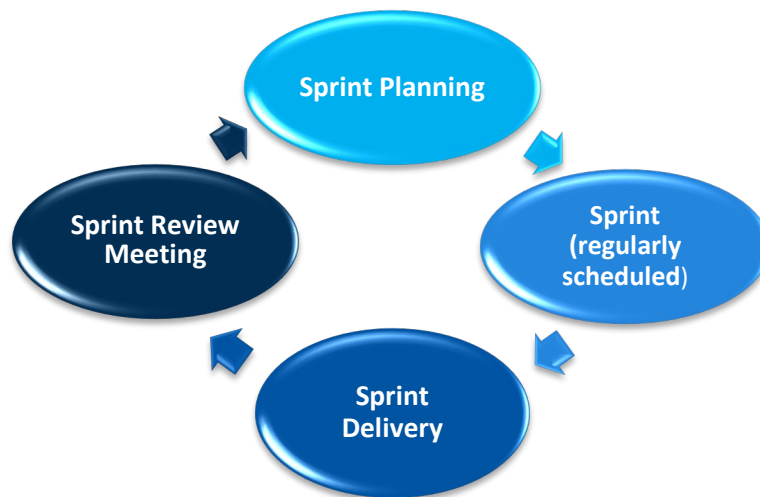


The ForgeFX Project Implementation and Delivery Process provides a structured methodology that guides the project from requirements validation through deployment, training, and long-term operational support.

4.1 Project Execution Approach

Continuous Customer Collaboration & Iterative Development

ForgeFX believes the highest-quality training simulators are developed through continuous collaboration with Metro Transit subject matter experts, not solely through requirements gathered at project kickoff. Throughout implementation, Metro Transit stakeholders remain actively engaged through structured design reviews, interim software builds, and recurring project meetings that validate progress, incorporate operational feedback, and guide development decisions.



Sprint-Based Development & Review Cycle

Within the broader project delivery process, ForgeFX uses recurring sprint cycles to develop, demonstrate, review, and refine simulator functionality before formal milestone acceptance.

Development is performed using an iterative sprint-based methodology in which functional simulator builds are delivered at regularly scheduled intervals for customer evaluation. These interim builds provide Metro Transit instructors, operators, and technical staff with opportunities to review simulator functionality, validate operational procedures, assess training realism, and recommend refinements before development progresses to subsequent phases.

Biweekly project meetings support this iterative process by reviewing completed work, demonstrating new capabilities, discussing technical questions, tracking project milestones, and identifying any required changes. Customer feedback is incorporated into subsequent development sprints, allowing the simulator to continuously mature throughout implementation while reducing project risk and minimizing rework.

This collaborative development approach ensures the delivered simulator accurately reflects Metro Transit's operating procedures, training objectives, and instructor expectations while providing complete transparency into project progress from kickoff through final acceptance.

4.2 Project Schedule Approach

Overview

ForgeFX will execute the Metro Transit Light Rail Operator Training Simulator project using a structured, iterative implementation approach that combines collaborative planning, agile software development, system integration, and progressive customer validation. Multiple development activities occur concurrently to maximize efficiency while maintaining continuous quality assurance throughout the project lifecycle.

The proposed schedule provides clearly defined workstreams, customer review milestones, and acceptance activities that culminate in system installation, instructor training, and operational deployment. Throughout the project, Metro Transit subject matter experts participate in regular demonstrations and milestone reviews to validate progress, provide operational feedback, and ensure the simulator remains aligned with training objectives.

The following page presents the proposed project schedule, illustrating the anticipated sequence of major workstreams, milestone reviews, testing activities, and deployment leading to operational readiness.

Schedule Highlights

The proposed schedule is organized around several concurrent workstreams that progress in parallel throughout the project, including:

- Project Management & Requirements Validation
- Simulator Software Development
- Operator Cab & Hardware Integration
- Instructor Station & Training Content
- Performance Evaluation & Reporting
- System Integration & Quality Assurance
- Installation, Acceptance Testing & Training

Customer milestone reviews and iterative software demonstrations are integrated throughout the schedule, allowing Metro Transit to validate progress, provide feedback, and guide development before advancing to subsequent project phases.



COLLABORATIVE PROJECT EXECUTION

Regular customer engagement, design reviews, and progress demonstrations keep Metro Transit actively involved throughout implementation.



PREDICTABLE PROJECT DELIVERY

Structured milestones and phased development reduce project risk while providing clear visibility into schedule, progress, and key deliverables.



QUALITY THROUGH CONTINUOUS VERIFICATION

Incremental integration and testing validate system functionality throughout development rather than waiting until final acceptance.



SUCCESSFUL OPERATIONAL TRANSITION

Comprehensive acceptance testing, training, and post-deployment support prepare Metro Transit to confidently operate and maintain the simulator.

4.3 Project Schedule

Schedule Assumptions

The proposed schedule assumes timely availability of Metro Transit technical documentation, validated source revisions, subject matter expert participation, required hardware and third-party interfaces, customer review cycles, facility readiness, network and IT support, and access for installation and acceptance testing. Delivery planning will account for the client-provided 9-foot entry, 12-by-24-foot corridor, and 7-foot 4.5-inch simulator-room entry. Final packaging and installation procedures will be validated during design. Changes to scope or external dependencies may require schedule adjustment.

Workstream/Dependency	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12
Mobilization, Scope Confirmation & Delivery Baseline M1-M2 · Contract Execution												
Metro Source Data, SME Access & Acceptance Plan M1-M3 · SS · Mobilization												
Architecture, Cab Interfaces, & Prototype M1-M4 · SS · Mobilization												
Route, Yard, Infrastructure, & Environment Production M3-M8 · PI · Inputs + architecture												
S700 Cab, Controls, Displays, & Hardware Integration M3-M8 · PI · Inputs + architecture												
Instructor Station, Scenarios, Faults, & Evaluation M4-M9 · PI · Architecture												
Integrated Build, Verification, & Acceptance Cycles M7-M10 · PI · Content + cab + training												
Installation, Commissioning, Training, & Handover M10-M12 · PI · Integration												
Controlled Contingency & Defect Closure M11-M12 · FS · Integration												

 Base Delivery
  Client input / technical integration
  Verification, acceptance, installation, or contingency

FS: finish-to-start · SS: start-to-start · PI: progressive input

4.4 ForgeFX Development Milestones

Each milestone represents a measurable advancement in simulator readiness, from project kickoff and foundation development through functional review, acceptance testing, and final operational deployment. These milestones work in parallel with the sprint-based development process described earlier: recurring sprint reviews provide ongoing visibility into progress, while formal milestone reviews establish contractual checkpoints for acceptance and payment.

Project Completion	Milestone/ Payment	Description
0%	1. Project Kickoff Payment Due	The project begins with kickoff, requirements validation, communication planning, and establishment of the project baseline. Metro Transit subject matter experts work with the ForgeFX project team to confirm operational requirements, technical interfaces, training objectives, and project priorities before development begins.
25%	2. Pre-Alpha Payment Due	The Pre-Alpha milestone establishes the simulator foundation and demonstrates the initial implementation of major system components. Metro Transit reviews the developing simulator architecture, operator cab integration, representative virtual environment, and core system functionality to validate project direction before full content development continues.
50%	3. Alpha Payment Due	The Alpha milestone delivers a functional simulator with the primary software systems integrated and available for operational review. Metro Transit subject matter experts participate in structured demonstrations to evaluate simulator functionality, operating procedures, instructor capabilities, and training workflows. Feedback collected during this review is incorporated into subsequent development sprints.
75%	4. Beta Payment Due	The Beta milestone represents a feature-complete simulator undergoing final refinement and validation. Operational testing focuses on simulator realism, scenario execution, instructor workflows, performance reporting, and overall system stability. Remaining issues identified during customer reviews are resolved prior to formal acceptance activities.
90%	5. Release Candidate/FAT Payment Due	The Release Candidate is a production-ready simulator that has completed feature development and is undergoing final verification before release. Metro Transit participates in Factory Acceptance Testing (FAT) to validate that the simulator satisfies the approved requirements, operational workflows, and training objectives. Any remaining punch-list items identified during acceptance testing are addressed before final release.
100%	6. Gold Master Final Payment	The Gold Master is the final approved software configuration authorized for deployment. Following successful Factory Acceptance Testing and Site Acceptance Testing (SAT), the Gold Master is installed as the operational production baseline at Metro Transit. This release establishes the configuration managed under warranty and provides the foundation for future software maintenance, enhancements, and version-controlled updates.

4.5 Quality Assurance & Validation

Overview

ForgeFX integrates quality assurance throughout the entire simulator development lifecycle to ensure the delivered solution meets Metro Transit’s functional, operational, and training requirements. Rather than relying on end-of-project testing alone, quality is continuously evaluated through structured verification, system integration, customer feedback, and controlled software releases. This iterative approach reduces project risk, improves software reliability, and ensures the simulator progresses through each development milestone with confidence.

Requirements Verification

Simulator functionality and acceptance evidence are traced to approved project requirements, operating procedures, and training objectives throughout development. ForgeFX will use documented verification and validation results, with final review, sign-off, and acceptance procedures jointly finalized with Metro Transit during design and reflected in the final contract baseline.

Continuous Software Quality Assurance

ForgeFX performs ongoing software verification throughout each development sprint to validate new functionality, maintain system stability, and identify issues early in the development lifecycle. Continuous testing throughout development minimizes integration risk and supports consistent software quality.

System Integration & Validation

Hardware and software components are progressively integrated and validated throughout development rather than deferred until the end of the project. This approach verifies compatibility between operator controls, instructor stations, visual systems, and simulator software while reducing implementation risk during deployment.

Customer Review & Feedback

Metro Transit subject matter experts participate in scheduled demonstrations and milestone reviews throughout development. Customer feedback is evaluated and incorporated into subsequent development iterations, helping ensure the simulator accurately reflects operational practices and training requirements.

Controlled Release Management

Each development milestone—Pre-Alpha, Alpha, Beta, Release Candidate, and Gold Master—represents a controlled software baseline that has successfully completed the appropriate level of verification before advancing to the next stage of development. This disciplined release process promotes software stability and predictable project progression.



QUALITY INTEGRATED THROUGHOUT DEVELOPMENT

Continuous verification and iterative testing reduce late-stage surprises.



REDUCED PROJECT RISK

Early issue identification supports faster resolution and minimizes rework.



COLLABORATIVE VALIDATION

Metro Transit reviews and SME feedback guide approved refinements.



RELIABLE PRODUCTION SOFTWARE

Controlled baselines support stable deployment and long-term maintainability.

5. Training & Knowledge Transfer



5.1 Simulator System Operational Training

Overview

ForgeFX will provide instructor-led system training to familiarize designated Metro Transit personnel with the operation and use of the Light Rail Operator Training Simulator. Training will be conducted using the delivered production system and will combine instructor-led demonstrations with hands-on operation so participants can become comfortable using the simulator in support of operator training activities.

Training will be tailored to the final simulator configuration and will focus on the system features, workflows, and operational capabilities provided at acceptance. The objective is to prepare Metro Transit personnel to operate the simulator confidently, support training delivery, and transition smoothly into day-to-day use.

ForgeSIM™ Instructor Workflow

System training is designed to introduce users to the primary functions and operational workflows of the delivered simulator. Instruction will include demonstrations and practical exercises appropriate for the delivered system configuration.

Routine System Operation



- Routine simulator operation
- Basic operational checks
- Recommended operational practices
- General system familiarization

Simulator Setup and Controls



- Simulator startup and shutdown procedures
- Operator workstation familiarization
- System operating modes
- Basic simulator controls and user interfaces

Training Session Operation



- Setting up and launching simulation sessions
- Selecting and executing available training scenarios
- Managing simulator exercises
- Conducting training sessions using the delivered functionality
- Reviewing available performance information
- Utilizing playback capabilities

Instructor Station Orientation

- Instructor Station navigation.
- Session configuration.
- Real-time monitoring of training exercises.
- Introduction of instructor-controlled events.
- Playback and review functions.

5.1 Simulator System Operational Training

Training Delivery

Training will be delivered by ForgeFX personnel following system installation and acceptance activities using the production simulator installed at Metro Transit. Instruction combines classroom discussion with guided hands-on exercises that allow participants to gain practical experience operating the simulator, setting up and running simulation sessions, and utilizing the Instructor Station in a representative training environment.

Supporting user documentation and reference materials will be provided to reinforce instruction and assist Metro Transit personnel following system deployment.

Training Objectives

Upon completion of system training, designated Metro Transit personnel should be able to:

- Operate the delivered simulator during routine training activities
- Set up and conduct simulation sessions using the delivered functionality
- Utilize the Instructor Station to configure and monitor training sessions
- Review simulator playback and available performance information
- Perform routine day-to-day operation of the simulator



HANDS-ON LEARNING

Participants gain practical experience using the delivered production simulator through instructor-led demonstrations and guided exercises.



OPERATIONAL FAMILIARITY

Training introduces users to the workflows and capabilities of the delivered simulator, supporting a smooth transition into daily operation.



KNOWLEDGE TRANSFER

Instructor-led instruction and supporting documentation help reinforce recommended operating practices and effective use of the simulator.



OPERATIONAL READINESS

Training prepares Metro Transit personnel to begin utilizing the simulator as part of their existing operator training program following system acceptance.

5.2 Train-the-Trainer

Overview

In addition to System Training, ForgeFX provides a Train-the-Trainer approach focused on transferring the operational knowledge and instructional techniques necessary for designated Metro Transit personnel to effectively utilize the Light Rail Operator Training Simulator as part of their existing operator training program.

The approach combines instructor-led demonstrations, guided hands-on operation, and practical exercises using the delivered production simulator. Training is tailored to the delivered system configuration and emphasizes recommended workflows, effective use of the Instructor Station, and performance review capabilities to support consistent simulator-based instruction.

Instructor Familiarization

The Train-the-Trainer approach familiarizes designated Metro Transit instructors with the tools and workflows used to support simulator-based training activities.



Instructor Station Operation

- Navigating the Instructor Station
- Monitoring trainee performance during live exercises
- Reviewing simulator playback
- Utilizing available reporting and performance information



Conducting Training Sessions

- Preparing and launching training sessions
- Selecting and executing available training scenarios
- Managing simulator exercises
- Utilizing instructor-controlled events
- Facilitating post-exercise discussions



Performance Coaching

- Reviewing operator performance
- Identifying opportunities for coaching
- Using playback to reinforce operational concepts
- Supporting structured post-exercise debriefings



Operational Maintenance

- Routine operation of the simulator
- General operational workflows
- Basic operational awareness and troubleshooting considerations
- Effective use of supporting documentation and reference materials

5.2 Train-the-Trainer

Training Delivery

ForgeFX emphasizes collaborative knowledge transfer throughout implementation and training activities. Rather than relying solely on classroom instruction, Metro Transit personnel actively participate in simulator operation while ForgeFX personnel demonstrate recommended workflows, instructor techniques, and operational best practices.

Supporting user documentation and reference materials complement the hands-on instruction and provide a continuing resource following system acceptance.

Training Objectives

Upon completion of the Train-the-Trainer approach, designated Metro Transit personnel should be familiar with the instructional capabilities of the delivered simulator and the recommended workflows for incorporating simulator-based exercises into Metro Transit's operator training program. This includes familiarity with:

- Conducting simulator-based training sessions using the delivered functionality
- Utilizing the Instructor Station during training exercises
- Monitoring trainee performance
- Reviewing simulator playback and available performance information
- Supporting operator coaching and post-exercise discussions
- Performing routine day-to-day use of the simulator in support of training activities



PRACTICAL KNOWLEDGE TRANSFER

Hands-on instruction and guided exercises reinforce recommended operational workflows and effective use of the delivered simulator.



INSTRUCTOR CONFIDENCE

Training familiarizes designated personnel with the tools and techniques used to conduct simulator-based training and evaluate trainee performance.



CONSISTENT TRAINING DELIVERY

Recommended instructional practices promote consistent use of the simulator across operator training activities.



LONG-TERM SUCCESS

System training, train-the-trainer instruction, and supporting documentation help Metro Transit successfully incorporate the simulator into its ongoing operator training program.

6. Lifecycle Support & System Maintenance



6.1 Lifecycle Support Services

Overview

ForgeFX is committed to supporting the Light Rail Operator Training Simulator throughout its operational lifecycle. Our lifecycle support approach is designed to help Metro Transit maintain a reliable, high-performing training system that continues to meet operational and training objectives following system deployment.

The simulator purchase includes a three (3) month limited warranty covering defects in the delivered system following final acceptance. After the warranty period, Metro Transit may elect to purchase an optional Support & Maintenance Agreement that provides ongoing technical support, software maintenance, engineering assistance, and lifecycle services to help maintain long-term system reliability, software compatibility, and simulator fidelity.

This approach provides Metro Transit with the flexibility to select the level of ongoing support that best aligns with its operational requirements while ensuring continued access to ForgeFX's simulation engineering expertise throughout the life of the system.

Included with the Simulator Purchase

The simulator purchase includes a three-month limited warranty beginning upon final system acceptance. During the warranty period, ForgeFX will provide support for warranty-covered issues associated with the delivered simulator, including:

- Technical assistance related to warranty-covered issues*
- Diagnosis and correction of software defects identified during normal operation
- Corrective software updates required to resolve verified warranty issues
- Coordination of warranty-covered hardware issues, as applicable
- Remote technical assistance when appropriate to facilitate issue resolution

*Additional warranty coverage is described in Section 6.4

6.1 Lifecycle Support Services

Optional Support & Maintenance Agreement

Following expiration of the standard warranty, Metro Transit may elect to purchase an annual Support & Maintenance Agreement to provide continued lifecycle support for the simulator.

Optional services may include:

- Remote technical support and system diagnostics
- Software maintenance and corrective updates
- Configuration management support
- Compatibility updates required for supported software platforms
- Engineering assistance for operational issues
- Performance optimization and system maintenance activities
- On-site technical assistance, when requested
- Ongoing simulator calibration and fidelity maintenance services

Additional lifecycle support services may be tailored to Metro Transit's operational requirements.

The Support & Maintenance Agreement is intended to sustain long-term simulator performance and operational reliability while providing continued access to ForgeFX engineering resources. Development of new simulator functionality or major feature enhancements would be performed under a separate statement of work.

Lifecycle Support Philosophy

ForgeFX's lifecycle support philosophy emphasizes proactive system maintenance, timely issue resolution, and ongoing collaboration with Metro Transit. Whenever practical, issues are evaluated through remote diagnostics to reduce downtime and accelerate resolution. When additional assistance is required, ForgeFX works collaboratively with Metro Transit to determine the most appropriate corrective action, which may include software updates, hardware coordination, engineering assistance, or scheduled on-site support.

Through structured configuration management and disciplined software maintenance practices, ForgeFX helps ensure the simulator remains a dependable training resource throughout its operational life.

6.1 Lifecycle Summary

Service	Basic Support Included with Simulator Base Cost	Optional Recurring 1-Year Support & Maintenance Agreement
Three-month limited warranty	✓	—
Warranty technical support	✓	—
Correction of covered software defects	✓	—
Remote technical support	During warranty	✓
Software maintenance & compatibility updates	During warranty	✓
Configuration management support	During warranty	✓
Engineering assistance	During warranty	✓
Hardware diagnostics & troubleshooting	During warranty	✓
On-site technical support	As required for warranty service	✓
Calibration verification & simulator fidelity services	—	✓
New features & major enhancements	—	Separate Statement of Work
Hardware component replacement	Warranty-covered items only	Additional cost

6.2 Software Updates & Configuration Management

Overview

ForgeFX utilizes a structured software maintenance and configuration management process to support the continued operation, reliability, and long-term evolution of the Light Rail Operator Training Simulator. Software updates are managed through controlled engineering and quality assurance processes to maintain system stability while preserving the operational integrity of the delivered simulator.

Configuration management provides a disciplined approach for tracking software revisions, validating changes, and maintaining consistency across simulator software, Instructor Station applications, and supporting system components throughout the simulator lifecycle.

Configuration Management

ForgeFX maintains configuration control throughout the simulator lifecycle to ensure software changes are properly documented, tested, and incorporated into the delivered system.

Configuration management activities include:

- Version control of simulator software
- Controlled software release management
- Change tracking and documentation
- Verification of software revisions prior to deployment
- Maintenance of baseline simulator configurations
- Support for long-term lifecycle management

These practices help ensure software updates are introduced in a controlled manner while minimizing operational disruption.

Software Maintenance

Software maintenance activities are intended to preserve reliable simulator operation while addressing verified software issues and maintaining compatibility with supported operating environments.

Software maintenance activities may include:

- Correction of verified software defects
- Compatibility updates for supported operating systems and software platforms
- Performance improvements and software optimizations
- Security-related software updates, when applicable
- Minor software enhancements that improve system reliability and usability

Development of significant new functionality or customer-requested feature enhancements is outside the scope of routine software maintenance and may be performed under a separate statement of work.

Software Update Process

Software updates are evaluated, developed, verified, and validated prior to deployment. When practical, updates are first assessed through remote diagnostics to identify the appropriate corrective action. Once validated, updates may be deployed remotely or installed during scheduled maintenance activities, depending upon the nature of the update and Metro Transit's operational requirements.

ForgeFX coordinates software update activities with Metro Transit to minimize impacts to simulator availability and ongoing training operations.

6.3 Hardware Service & Replacement Parts

Overview

The Light Rail Operator Training Simulator incorporates commercial and custom hardware components selected to provide a reliable, maintainable, and high-fidelity training environment. ForgeFX provides hardware support services to assist Metro Transit in maintaining operational readiness and coordinating the repair or replacement of hardware components when required.

Whenever practical, hardware-related issues are first evaluated through remote diagnostics to determine the nature of the issue and identify the most appropriate corrective action before recommending on-site service or component replacement.

Hardware Service

ForgeFX provides technical assistance to support the diagnosis and resolution of hardware-related issues associated with the delivered simulator. Hardware service activities focus on restoring reliable simulator operation while minimizing disruption to training activities.

Hardware support services may include:

- Remote diagnosis of reported hardware issues
- Assistance with troubleshooting simulator hardware components
- Coordination of repair activities for covered equipment
- Guidance regarding hardware configuration and installation
- Verification of proper system operation following hardware service

Where on-site service is required, ForgeFX will coordinate with Metro Transit to determine the appropriate service approach based on the nature of the issue and the affected equipment.

Replacement Parts

When hardware replacement is required, ForgeFX will assist Metro Transit in identifying the appropriate replacement components and coordinating their installation and system verification, as applicable. Replacement hardware components are supplied at additional cost unless otherwise covered under the applicable warranty.

Replacement parts may include components such as:

- Computing hardware
- Visual display components
- Operator controls and interface devices
- Audio system components
- Network and communications equipment
- Other simulator hardware components incorporated into the delivered system

Replacement components will consist of commercially available equipment or approved equivalent components compatible with the delivered simulator configuration. If an original component is no longer available due to manufacturer product lifecycle changes, ForgeFX will recommend a suitable replacement that maintains system functionality and performance.

6.3 Hardware Service & Replacement Parts

Optional Hardware Support

Following expiration of the standard warranty period, Metro Transit may elect to purchase an optional Support & Maintenance Agreement to provide ongoing technical assistance related to hardware operation and maintenance.

Optional hardware support services may include:

- Remote hardware diagnostics
- Technical troubleshooting assistance
- Coordination of repair activities
- Installation guidance and technical consultation
- System verification following hardware service
- On-site engineering support, when requested

Where on-site service is required, ForgeFX will coordinate with Metro Transit to determine the appropriate service approach based on the nature of the issue and the affected equipment.

6.4 Warranty

Overview

The Light Rail Operator Training Simulator includes a three-month limited warranty beginning upon final system acceptance. The warranty is intended to provide Metro Transit with assurance that the delivered simulator performs in accordance with the approved system requirements and to provide timely resolution of verified warranty-covered issues identified during normal operation.

The warranty complements the lifecycle support approach described in Section 6.1 and provides an initial period of engineering support following system deployment.

Warranty Coverage

During the warranty period, ForgeFX will provide support for verified warranty-covered issues associated with the delivered simulator, including:

- Diagnosis of reported software and hardware issues.
- Correction of verified software defects.
- Corrective software updates required to resolve covered software issues.
- Coordination of warranty-covered hardware repair or replacement, as applicable.
- Remote technical assistance when appropriate to facilitate issue resolution.

The warranty applies to the delivered simulator configuration and is intended to address defects in the delivered system. Customer-requested enhancements, new functionality, or changes to the approved project scope are outside the scope of the standard warranty and may be performed under a separate statement of work.

Optional Extended Support

Following expiration of the three-month warranty period, Metro Transit may elect to purchase the optional Support & Maintenance Agreement to continue receiving technical support, software maintenance, engineering assistance, and lifecycle services.

Details regarding optional support services and associated pricing are provided in the Price Proposal.

6.5 Calibration & Long-Term Simulator Fidelity

Overview

Simulator accuracy is essential to effective operator training. ForgeFX employs a structured engineering process to establish and maintain simulator fidelity throughout the operational life of the Light Rail Operator Training Simulator. Rather than viewing calibration as a one-time activity, ForgeFX treats simulator fidelity as an ongoing lifecycle process supported through verification, validation, configuration management, and controlled software maintenance.

This approach helps ensure the simulator continues to provide a realistic, consistent, and dependable training environment as software platforms, operating systems, and hardware components evolve over time.

Initial Calibration & System Verification

During system development and acceptance, ForgeFX performs calibration and verification activities to confirm that the delivered simulator accurately represents the approved training configuration. These activities help ensure that simulator performance, operator controls, visual presentation, and instructor functions operate as intended prior to final system acceptance.

Calibration and verification activities may include:

- Verification of operator control response
- Braking and acceleration performance validation
- Visual display alignment and synchronization
- Audio system verification
- Instructor Station functionality verification
- Validation of simulator behavior against approved operational requirements

Long-Term Simulator Fidelity

Following deployment, simulator fidelity is maintained through disciplined engineering and configuration management practices. Software updates and maintenance activities are evaluated to ensure they preserve the operational characteristics of the simulator while maintaining compatibility with supported software and hardware platforms.

Long-term fidelity management may include:

- Configuration management and version control
- Verification of software revisions
- Validation of software updates prior to deployment
- Assessment of simulator performance following significant maintenance activities
- Verification of operator controls and system interfaces
- Review of simulator behavior following hardware replacement, when applicable

Optional Calibration Services

Following expiration of the standard warranty period, Metro Transit may elect to purchase calibration verification and long-term simulator fidelity services under the optional Support & Maintenance Agreement or as separately authorized engineering services.

These services may include periodic evaluation of simulator performance, verification following major software or hardware updates, and engineering support to maintain the accuracy and consistency of the delivered training system as operational requirements evolve.

7. Pricing



Executed Price Proposal

The Base Price includes the proposed simulator system required to meet all requirements of the RFP and Addenda, including the Blue Line, Blue Line Extension, Green Line, and Green Line Extension scope. This proposal remains a binding, irrevocable offer for 120 days after the July 29, 2026 proposal due date.

This Price Proposal is executed by an authorized officer of ForgeFX LLC and represents the proposed pricing for the scope described herein.

Authorized Signature:  _____

Name: Greg Meyers

Title: CEO

Company: ForgeFX LLC

Date: July 27, 2026

TECHNICAL SOLUTION DEVELOPMENT & INTEGRATION				
RFP Workstream	Line Item	Feature	Scope of Work	Proposed Price
Core Platform & Infrastructure	F-01	Simulation Framework	ForgeSIM is ForgeFX's time-tested, modular software framework for building simulation applications. For this project, it will provide the foundation for integrating the S700 vehicle, routes, controls, scenarios, instructor tools, and training data. The completed system will operate independently of Metro Transit IT on dedicated hardware.	\$88,795
	F-02	3D Modeling - Train	A train-model package with a high-fidelity S700 cab interior—console, displays, instruments, panels, windows, and cab equipment—and lower-fidelity articulated exterior shells with accurate proportions, doors, lighting, equipment, markings, and livery, plus defined S70 visual differences.	\$212,953
Routes & Vehicle Models	F-03	3D Modeling - Full Train Routes	A 50.75-mile Blue/Green route model: Blue: 12.4 existing and 13 extension miles with 19 stations; Green: 10.8 existing and 14.55 extension miles with 23 existing, 16 extension, and 5 shared stations. Includes yards, tail tracks, turnouts, 40 landmarks, 27 unique stations, and 39 reused stations.	\$1,644,384
	F-04	Real World Controls Integration	A full-scale Metro-furnished S700 control assembly integrated as the project's single physical control set, connecting controls, switches, indicators, and operator inputs through wiring, interface electronics, CAN-to-USB transport, test harnesses, calibration, and simulator software interfaces.	\$310,008
Operator Training Systems	F-05	S700 Operation Framework	S700 software simulating movement, controls, displays, states, routes, and weather. Includes scenarios for normal service, signals, rulebook decisions, unusual conditions, and emergencies, plus S70 differences in screens, mirrors, bell/horn controls, annunciators, control logic, and operator cues.	\$288,584
	F-06	Instructor Control Station	A laptop-based instructor station for creating, monitoring, controlling, scoring, and reviewing live training sessions. Its dashboard configures routes, time, weather, visibility, obstructions, and scheduled events; injects faults during active sessions; and provides recording and full replay.	\$510,570
Instructor Tools & Evaluation	F-07	Fault Simulation System	A fault system with 24 distinct fault types requiring an operator response and resolution from inside the cab, including door-control alarms, cab-display faults, and operator-resettable brake indications. Informational faults and failures requiring exterior physical intervention are excluded.	\$261,739
	F-08	Multi-User Networking	A controlled network synchronizing trainee, instructor, and observer stations for live sessions, faults, scenarios, scoring, recording, and replay from approved network locations. It stores Council-owned training data for operator evaluation, review, analysis, and ad hoc or scheduled reports.	\$176,557
		Total		\$3,493,590

EQUIPMENT, IMPLEMENTATION & SUPPORT SERVICES				
RFP Workstream	Line Item	Feature	Scope of Work	Proposed Price
Hardware	F-09a	LRT Cab / Operator Station	Windows graphics workstation for the LRT cab/operator station, including required peripherals, imaging, freight, warranty, and allocated UPS/APS backup power.	\$6,000
	F-09b	Instructor Station	Windows instructor laptop and required peripherals for simulator control, monitoring, and instruction, including imaging, freight, warranty, and allocated UPS/APS backup power.	\$3,000
	F-09c	Observer Station	Observer workstation and required peripherals for live and replay viewing, including imaging, freight, warranty, and allocated UPS/APS backup power.	\$3,000
	F-10	Trainee Displays	A trainee display system providing at least a 180-degree forward field of view: forward displays, cab-information screens, mounts, cabling, adapters, and power distribution. Manufacturer warranty and freight included.	\$8,000
Support & Warranty	F-11	Basic Warranty	Provides a three-month limited warranty beginning at final system acceptance for the delivered simulator configuration. Covers diagnosis of reported software and hardware issues, verified software defect correction, corrective updates, hardware repair coordination, and remote technical assistance.	\$0
	F-12	Extended Warranty	Provides a three-year extended warranty beginning when the three-month limited warranty expires. Coverage includes continued technical support, diagnosis and resolution of covered software and hardware issues, verified software defect correction, corrective updates, engineering assistance, hardware repair coordination, lifecycle services, and ongoing calibration of the delivered simulator configuration. Ongoing calibration is included in the F-12 price with no additional calibration charge.	\$125,000
	F-13	Three-Year Support & Maintenance	A three-year software support and maintenance agreement providing service access, security and compatibility updates, patches, critical bug fixes, routine system reviews, escalation reporting, and limited refresher assistance for operation of the delivered simulator.	\$266,400
	F-14	Spare & Replacement Parts	Provides spare and replacement parts on a time-and-materials basis when needed. Commercial components are billed at actual cost, and Metro-furnished proprietary controls remain dependent on Metro or the original supplier and the approved hardware BOM. All T&M replacement-part charges are additional to, and excluded from, the fixed Base Price.	T&M
Delivery, Installation, Acceptance & Training	F-15a	Installation & Commissioning	Coordinates delivery to Minneapolis and on-site installation of the complete simulator, including hardware and software connection, configuration, integration support, initial calibration, commissioning, readiness verification, and operational handoff. Includes freight, travel, and site setup.	\$27,000
	F-15b	Testing, Validation & Acceptance	Provides documented testing and validation against final contract requirements, including requirements traceability, functional and performance checks, acceptance-test execution, issue tracking, retesting, objective evidence, acceptance documentation, and support through Metro Transit approval.	\$27,000
	F-16	Operator Training	Provides initial training for designated operators on general simulator use, operator-panel functions, starting and running simulations, safe operating practices, routine system care, and the standard training workflow. Includes practical instruction and supporting printed and digital materials.	\$6,000
	F-17	Train the Trainer	Provides train-the-trainer instruction for at least three full-time instructors, preparing them to independently deliver and manage simulator training. Covers session setup, instructor controls, scenario and fault management, trainee monitoring, scoring, recording, replay, reporting, basic maintenance, classroom integration, and supporting materials. Includes complete system user manuals and technical documentation in both digital and printed formats, maintained under revision control.	\$12,000
		Total		\$483,400

Pricing Component	Line Item	Proposal Section	Scope Summary	Base Price
Technical Solution Development & Integration		Technical Solution Development & Integration	Total proposed price for solution development, digital content, simulation functionality, and system integration.	\$3,493,590
Equipment, Implementation & Support Services		Equipment, Implementation & Support Services	Total fixed base price for equipment, delivery, installation, training, warranty, and lifecycle support. Excludes T&M spare and replacement parts.	\$483,400
		Base Price	The Base Price includes a complete Light Rail Operator Training Simulator system that meets all requirements of the RFP and Addenda, including all software, configuration, route modeling, and related elements necessary to support the Blue Line, Blue Line Extension, Green Line, and Green Line Extension scope	\$3,976,990

Appendix

Since 2002, ForgeFX Simulations has focused on the development of highly interactive 3D training simulations for clients across a wide spectrum of industries. The simulation-based training that ForgeFX has developed for our clients has set them apart as innovators in their industries. This section includes a collection of some of ForgeFX's latest development efforts for our clients.





CASE STUDY: JOHN DEERE



JOHN DEERE

Extended Reality Training System

ForgeFX recently partnered with John Deere to develop the Extended Reality Training System, designed to help operators, dealers, and customers learn construction machine operation, maintenance, and product features in a virtual environment. The system supports safer, more accessible training by allowing users to build skills and familiarity before working with physical equipment.

The XR Training System is delivered on portable Meta Quest 3 and Pico 4 Ultra Enterprise headsets and includes both virtual reality and augmented reality experiences. Users can complete guided lessons, perform hands-on maintenance tasks, explore machine systems, and participate in interactive challenges that reinforce learning through repetition and feedback.





CASE STUDY: HALLIBURTON

HALLIBURTON

HWO Simulator

ForgeFX recently partnered with Halliburton to develop the HWO Simulator, an immersive virtual reality training solution built around a full-scale, interactive model of the 225K SafeGrip® Quick Rig Hydraulic Workover Unit. The simulator enables trainees to identify components, understand system layout, and practice equipment operation in a virtual environment that improves familiarity, reinforces learning, and reduces the risks associated with real-world training. Delivered on Meta Quest 3 headsets, the HWO Simulator combines guided instruction, interactive controls, and hand-tracked user interaction to create a highly realistic training experience. Trainees can navigate the rig, engage with control panels, and follow step-by-step tutorials supported by integrated instructional content.



CASE STUDY: JLG INDUSTRIES



Read more



A Long-Standing Partnership

Since 2014, ForgeFX has developed several simulator solutions for JLG Industries, the world's leading manufacturer of aerial work platforms, telehandlers, and other access equipment. Not only has ForgeFX developed simulators that provide training on various types of equipment; we also designed a Scenario Builder for JLG in which trainers can create and edit their own custom training scenarios.

JLG training simulators run on multiple platforms including iPad, laptop, and VR-enabled real-world simulators. Recently ForgeFX upgraded the VR simulators from the HTC Vive to the Meta Quest platform, which provided enormous benefits in the form of non-tethered hand tracking and improved responsiveness between the operator and the equipment.





CASE STUDY: FEDEX



Airport Ramp Safety Training

For FedEx, ForgeFX developed a productivity- and safety-focused simulator geared towards training freight handlers. There are various scenarios in which the trainee must indicate the safest procedure in a particular situation. After the trainee has made their choice, they watch an animated cut scene which illustrates the results. Proper choices result in efficient, effective, safe, and successful completion of the operation. A visceral demonstration of unsafe practices is the result of incorrect choices.



CASE STUDY: GLOBAL GROUND SUPPORT



Highly Customizable VR-Based Training

Recently upgraded from the Oculus Rift to the Meta Quest platform, Global Ground Support's VR Deicer Simulator is available to customers worldwide. This networked multiplayer VR training simulator allows for safe, effective and cost-cutting training. Trainers have the ability to generate more than a million different situations for their trainees, choosing aircraft model and detailed environmental conditions: temperature, wind speed and direction, precipitation level and type. The simulation teaches equipment operators year-round to use GGS deicers quickly, with more flexibility and at a lower cost than traditional training. No real-world equipment is taken off the line and no expensive consumables, such as fuel, oil and deicing fluids, are required.

Read more





CASE STUDY: WMATA



Equipment Operator Training Simulator

ForgeFX developed an immersive heavy rail operator training simulator for the Washington Metropolitan Area Transit Authority (WMATA). The system places trainees at realistic virtual Metro controls and recreates the route between NoMa-Gallaudet and Union Station, including stations, signals, switches, personnel, and unexpected hazards. Operators practice startup procedures, control use, hand-signal interpretation, foul-time coordination, and safe responses to changing conditions within a risk-free environment. High-fidelity graphics, positional tracking, and interactive equipment support spatial awareness, critical thinking, hazard recognition, and command of railway procedures. The simulator also records trainee actions and generates session reports showing completed tasks, missed steps, and errors for instructor review.

[Read more](#)





CASE STUDY: KOMATSU

KOMATSU

Mining Equipment Simulations

ForgeFX is a proud partner of P&H Mining Equipment, a subsidiary of Komatsu. P&H Mining builds and supports a line of drilling and material-handling machinery for surface mining operations worldwide.

By providing a range of training simulators for underground longwall systems, surface mining equipment, and heavy earth movers, ForgeFX has established expertise in the creation of virtual training environments for complex machinery. Each of these custom simulators run on both desktop computers and real-world physical control stations.

[Read more](#)





CASE STUDY: STRATATECH EDUCATION GROUP



OcuWeld Welding Trainer for Meta Quest

ForgeFX recently worked with [Tulsa Welding School](#) and [The Refrigeration School, Inc.](#), to develop *OcuWeld*™, a virtual reality welding education simulator that teaches students how to prep, grind and join materials in a virtual environment that removes the safety and cost concerns.

Students are assigned a Meta Quest set on which *OcuWeld* is installed. Via *OcuWeld*, they log in to their Canvas learning management system accounts. ForgeFX worked closely with StrataTech to accurately reproduce the effects of welding with various types of torches and materials, mimicking as closely as possible the hands-on feel and physical effects of real-world tools.

[Read more](#)





CASE STUDY: VERMEER CORPORATION



HDD Fundamentals

With infrastructure development and underground utility installations rising around the world, the need for skilled horizontal directional drill (HDD) operators is skyrocketing. To meet this growing demand, market leader Vermeer Corporation partnered with ForgeFX Simulations to develop the *HDD Fundamentals* training tool for real-world simulators combined with virtual reality via the HTC Vive platform.

The simulator features tutorials in many aspects of drill preparation including checking underground utilities, lessons in soil types and bits, and operation of the mixing machine; and substantive interactive walk-throughs of bore planning, pipe feeding, and drill operation.

Read more





CASE STUDY: SOMERO S-22EZ LASER SCREED



Concrete Screeding Trainer for Meta Quest

ForgeFX is excited to announce our recent development of the Meta Quest-based S-22EZ Laser Screenshot Simulator for Somero Enterprises, Inc. The simulator provides a detailed and accurate digital replica of the S-22EZ Laser Screenshot cockpit with simulated physical controls, buttons, and mechanical and visual feedback solutions. The Meta Quest's superior hand-tracking capabilities allows for a fully immersive experience without the need for physical hardware controls. The simulator incorporates a robust system for tracking trainee performance and presents them with a score card at the end of their session. This feature provides valuable insights into the progress of each trainee, enabling trainers to identify areas of strength and improvement.

[Read more](#)





CASE STUDY: JPEO-CBRND



CBRND HoloTrainer

ForgeFX collaborated with [MRIGlobal](#) to develop the *CBRND HoloTrainer*, an augmented reality device training simulator built for the Microsoft HoloLens 2. The *CBRND HoloTrainer* instructs trainees in the familiarization, operation, and maintenance of chemical, biological, radiological, and nuclear detection devices by providing holographically-projected interactive 3D virtual versions of the equipment they need to learn to use. Trainees follow interactive narrated tutorial steps that teach the components and use of the devices and can learn collaboratively in a shared multi-user environment.

[Read more](#)





CASE STUDY: GE HEALTHCARE



GE HealthCare

AR-Based Training

ForgeFX developed several virtual training simulators products for GE HealthCare, including applications for MR, CT and Vascular services field engineers. These training simulators allow GE Healthcare technicians to train for the technical maintenance of diagnostic imaging apparatus on a standard computer, without the need for access to the real-world equipment. Trainees use the simulator to learn how to conduct the corrective and planned maintenance procedures and practice these tasks associated with each piece of equipment.

Read more





CASE STUDY: PIERCE MANUFACTURING



Heavy-Duty Sales Tool

ForgeFX Simulations is honored to be a simulation development partner for Pierce Manufacturing, one of the largest fire apparatus producers in the world. ForgeFX worked with Pierce to develop the *Pierce Ascendant® 100 Heavy Duty Aerial Tower Fire Truck Simulator* for real-world simulators combined with virtual reality via the HTC Vive platform. Pierce is an Appleton, Wisconsin-based manufacturer of custom fire and rescue apparatus and a wholly owned subsidiary of Oshkosh Corporation. ForgeFX is proud to be a simulation development partner with Oshkosh for more than five years, currently supporting their Pierce Manufacturing and JLG Industry brands, by providing simulation development services for a wide array of equipment and trucks across industry sectors.

Read more





CASE STUDY: CATERPILLAR



® Excavator Operation and Maintenance Training

The *CAT All Access Pass Experience* simulator is a robust training and sales tool for the 308 model Mini Excavator. It is intended to be used by both showroom sales teams and the end consumer who wants to practice operation of the machine. Inside either American or Mexican environments, the user can choose from a wide menu of activities including control familiarization, hammer and basket tutorials, and even a game of skill in the arena.

More importantly, the simulator includes both machine inspection and maintenance walk-throughs. The user is guided step-by-step through these crucial and complicated tasks on a highly detailed virtual model of the excavator to ensure comprehension of the many elements required.

[Read more](#)





CASE STUDY: JPEO-CBRND



RENR Tele-Op Simulator

This unmanned vehicle teleoperation training simulator was developed by ForgeFX Simulations and [MRIGlobal](#) for the Joint Program Executive Office for Chemical, Biological, Radiological and Nuclear Defense ([JPEO-CBRND](#)). The JPEO-CBRND is responsible for the development, acquisition, fielding and life-cycle support of chemical, biological, radiological and nuclear defense equipment and medical countermeasures. The training simulator allows soldiers to learn how to operate the unmanned vehicle, along with the suite of sensors it contains.

[Read more](#)



4. Workforce Certification Statement

(See Proposal Instructions, Section 17, for more information.)

Contractor Company Name: ForgeFX LLC

Contract Number: 25P049 Project Name: LRT Operator Training Simulator

(NOTE: Under Minnesota Statutes § 363A.36, if the proposal amount exceeds \$100,000, either this form or this form and a currently effective Workforce Certificate for the Contractor, issued by the Minnesota Department of Human Rights, must be submitted with the proposal.)

Instructions: If a proposal is in an amount greater than \$100,000, the Council cannot accept the proposal or bid unless the Proposer can affirm either Statement #1 or Statement #2 below. The Contractor must select (by checking the appropriate box) and certify as true one of the two statements below, if it is able to do so. In making its certification, the Contractor should carefully bear in mind the post-submittal requirements noted in connection with each statement. After submittal of the proposal, the Council reserves the right to require documentation from the Contractor supporting the certification or to otherwise verify the accuracy of the certification. **If neither statement can be affirmed, the Contractor should not submit a proposal.**

CHECK ONLY ONE BOX!

- | | |
|-------------------------------------|---|
| ☐ | The business executing this certification <u>did have more</u> than 40 full-time employees within the State of Minnesota or the state where the business has its primary place of business on a single day during the 12 months prior to the date the proposal is due. IN ADDITION, the business either:
<ul style="list-style-type: none">a. has submitted an application for a Workforce Certificate to the Commissioner of Human Rights for approval; orb. has a currently effective Workforce Certificate from the Commissioner of Human Rights. Note: Before execution of any agreement arising out of this procurement, the Contractor must provide the Council with a copy of its currently effective Workforce Certificate. |
| ☒ | The business executing this certification <u>did not have more</u> than 40 full-time employees within the State of Minnesota or the state where the business has its primary place of business on a single day during the 12 months prior to the date the proposal is due. Note: Before execution of any agreement arising out of this procurement, the Contractor must provide the Council with at least one of the following on a form to be provided by the Council
<ul style="list-style-type: none">a. certification that the business's primary place of business is not in the United States; orb. certification that the business did <u>not</u> have more than 40 full-time employees on any working day during the 12 months prior to the date the proposal is due, in the state where the business has its primary place of business. |

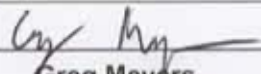
CERTIFICATION

On behalf of the Contractor, I certify that the above response is true as of the date this form is signed. I have read and understand the requirements related to this certification statement.

Contractor
Name:

ForgeFX , LLC

By:


Name: Greg Meyers

Date:

7/20/2026

Name:

Title:

CEO

5. Equal Pay Certification Statement

(See Proposal Instructions, Section 23, for more information.)
ForgeFX LLC

Proposer Company Name: _____

Contract Number: 25P049 Project Name: LRT Operator Training Simulator

Instructions: If a proposal is in an amount greater than \$500,000, the Council cannot accept the proposal unless the Proposer can affirm either Statement #1 or Statement #2 below. The Proposer must select (by checking the appropriate box) and certify as true one of the two statements below, if it is able to do so. In making its certification, the Proposer should carefully bear in mind the post-submittal requirements noted in connection with each statement. After submittal of the proposal the Council reserves the right to require documentation from the Proposer supporting the certification or to otherwise verify the accuracy of the certification. **If neither statement can be affirmed, no proposal should be submitted.**

CHECK ONLY ONE BOX!

☐ The business executing this certification has 40 or more full-time employees either in the State of Minnesota or in a state where it has its primary place of business on a single day during the prior 12 months. IN ADDITION, the Proposer will certify:

1. The business is in compliance with Title VII of the Civil Rights Act of 1964, Equal Pay Act of 1963, Minnesota Human Rights Act, and Minnesota Equal Pay for Equal Work Law;
2. The average compensation for its female employees is not consistently below the average compensation for its male employees within each of the major job categories in the EEO-1 employee information report for which an employee is expected to perform work under the contract, taking into account facts such as length of service, requirements of specific jobs, experience, skill, effort, responsibility, working conditions of the job, or other mitigating factors;
3. The business does not restrict employees of one sex to certain job classifications and makes retention and promotion decisions without regard to sex;
4. The wage and benefit disparities are corrected when identified to ensure compliance with the laws cited in Minn. Stat §363A.44, Subd.1; and
5. How often wages and benefits are evaluated to ensure compliance with the laws cited in Minn. Stat §363A.44, Subd. 2(a) (5).

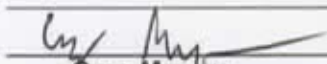
Note: Prior to execution of any agreement greater than \$500,000 arising out of this procurement, the Proposer must provide the Council with a copy of its currently effective Equal Pay Certificate pursuant to Minn. Stat. § 363A.44. An Equal Pay Certificate is also required if a subsequent modification to the contract increases the total amount of the contract to greater than \$500,000.

☒ The business executing this certification did not have 40 or more full-time employees within the State of Minnesota or a state where it has its primary place of business on a single day during the 12 months prior to the due date.

CERTIFICATION

On behalf of the Proposer, I certify that the above response is true as of the date this form is signed. I have read and understand the requirements related to this certification statement.

Proposer Name: **ForgeFX, LLC**

By:  Date: 7/20/2026

Name: Greg Meyers Title: CEO

6. Subcontractor Information Form

Proposer Company Name: ForgeFX LLC

Contract Number: 25P049 Project Name: LRT Operator Training Simulator

(NOTE: This form MUST be submitted with each proposal.)

Check ONE of the following:

☒ No subcontractors will be used by Proposer on this project.

☐ Subcontractors are proposed to be used on this project. The following is 1) a list of subcontractors proposed to be used on the project AND 2) a list of subcontractors who submitted bids or quotes to the Proposer for the project but were not selected by the Proposer.

1) SUBCONTRACTORS PROPOSED TO BE USED ON THE PROJECT:

Firm Name	Address	Telephone Number

2) SUBCONTRACTORS WHO SUBMITTED BIDS OR QUOTES BUT WERE NOT SELECTED:

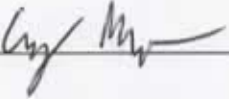
Firm Name	Address	Telephone Number

(. Use copies of page 1 of this form if space is needed to list additional subcontract firms and attach such copies to the form.)

CERTIFICATION

On behalf of the Proposer identified below, I certify that the information provided in this form is true and correct.

Proposer Name: ForgeFX LLC

By: 

Date: 7/20/2026

Name: Greg Meyers

Title: CEO

7. Disclosure and Certification Regarding Conflict of Interest

(See Proposal Instructions, Section 12, for more information.)

Name: ForgeFX LLC (the "Offeror")
Relationship: Contractor (i.e., contractor, consultant, subcontractor, etc.)

1. Certification. The Offeror hereby acknowledges that it has read the Conflict of Interest Guidelines included in the solicitation and has, to the best of its knowledge and belief:

A. Organizational Conflict of Interest (Choose One)

☒ Determined that there are no relevant facts or circumstances which could give rise to conflicts of interest. (Offeror may provide an explanation or any supporting documentation).

OR

☐ Determined that one or more conflicts of interest exists. (Offeror must provide a Mitigation Plan).

B. Personal Conflict of Interest (Choose One)

(The Council may not enter into any contract or purchase order for goods or services in which a Council member, or Council employee or their immediate family members has an indirect or direct personal financial interest or will personally benefit financially from the contract or purchase order.)

☒ Determined that no personal conflict of Interest exists

OR

☐ Determined that a personal conflict of Interest exists (Offeror must provide a Mitigation Plan)

2. Flow-Down. The Offeror must include a signed copy of this certification form for each of its subcontractors and subconsultants with the terms "contract," "Offeror," and "Council" modified appropriately to preserve the Council's rights. The Offeror must submit all subcontractor forms to the Council with its proposal.

3. Continuing Obligations. The Offeror has a continuing obligation to the Council to disclose conflicts of interest to the Council during the solicitation phase or, if awarded a contract, throughout the duration of the contract. During the solicitation, the Disclosure and Certification Regarding Conflict of Interest Form(s) and any related mitigation plan(s) must be submitted to the RFP Administrator. After the Council issues a Notice to Proceed, all documents must be submitted to the Contract Manager designated by the Council.

By signing below, the Offeror certifies that the information contained in this form is accurate to the best of its knowledge, and that the Offeror agrees to comply with the requirements herein. The Offeror has a continuing obligation to the Council to disclose conflicts of interest to the Council during the solicitation phase or, if awarded a contract, throughout the duration of the contract.

Signed: 

Name: Greg Meyers

Title: CEO

Date: 7/21/2026