

**TASK ORDER NO. 22-037**

**TASK ORDER NAME: MOW Training Yd. Signal/Communication Design**

**PROJECT CODE: MSP-271; 40-3271.68912**

This is Task Order No. 22-037 to the On Call Maintenance Contract entered into by and between Utah Transit Authority (UTA) and Rocky Mountain Systems Services, (Contractor) as of February 24<sup>th</sup>, 2021.

This Task Order is part of the On Call Maintenance Contract and is governed by the terms thereof.

The purpose of this Task Order is to specifically define the scope, schedule, lump sum price, and other terms applicable to the work identified herein.

UTA and Contractor hereby agree as follows:

**1.0 SCOPE OF SERVICES**

The scope of work for the Task Order #22-037 is hereby attached and incorporated into this Task Order.

**2.0 SCHEDULE**

The Substantial Completion Date for this Task is December 31, 2023. The Final Acceptance Date for this Task is December 31, 2023.

**3.0 LUMP SUM PRICE**

The price for this task order is a not to exceed \$325,183. Invoices will be billed on monthly basis for work completed to date.

**4.0 APPLICABILITY OF FEDERAL CLAUSES**

This Task Order does  does not  [Check Applicable] include federal assistance funds which requires the application of the Federal Clauses appended as Exhibit D to the On Call Maintenance Contract.

IN WITNESS WHEREOF, this Task Order has been executed by UTA and the Contractor or its appointed representative

UTAH TRANSIT AUTHORITY:

ROCKY MOUNTAIN SYSTEMS SERVICES:

By: \_\_\_\_\_  
Jay Fox, Executive Director Date  
> \$200,000

DocuSigned by:  
By: Anthony Artolani  
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By: \_\_\_\_\_  
Mary DeLoretto, Chief Service Development Ofc. Date  
DocuSigned by: < 200,000

Date: 11/11/2022

By: \_\_\_\_\_  
Jared Scarbrough, Director of Capital Constr. Date  
11/11/2022  
91A8D781A0BD4BE...  
< \$75,000

By: \_\_\_\_\_  
Jared Scarbrough, Project Manager Date  
< \$25,000

DocuSigned by:  
Mike Bell 11/14/2022  
Legal Review 7E83A415BA44F6... Date

DocuSigned by:  
Brian Motis 11/14/2022  
Procurement Review 69BAA9A9D7F448D... Date



November 2<sup>nd</sup>, 2022

RMSS-52598-065

Mr. Jared Scarbrough  
Director of Capital Construction  
2264 South 900 West  
Salt Lake City, UT 84119

Reference: Utah Transit Authority – Systems On-Call Services

Subject: Systems Training Facility - Design

Jared,

Rocky Mountain Systems Services (RMSS) is pleased to provide a proposal for developing a signal and communications design for the future UTA Systems Training Facility. The goal of this effort is to provide UTA with a facility that will allow the training of a workforce with comprehensive knowledge in all rail systems components utilized at UTA, allowing for more efficient response times and overall, more confidence in working with and around the components associated with the TRAX and FrontRunner alignments. This facility will provide real-life training scenarios on actual equipment that is utilized for both alignments.

Our lump sum price for this proposal is **\$325,183.00**.

#### Scope Overview

RMSS has identified eight (8) separately identifiable systems design elements to the training facility:

1. A western track section element that is representative of a double crossover interlocking on the TRAX alignment. This section will also have a signal case to house equipment needed to provide an approach to the interlocking.
  - a. RMSS will provide the **signal** design for this element of the facility.
2. An eastern track section which represents the FrontRunner alignment with a fully functional grade crossing equipped with both entrance and exit gates. This section will also be equipped with a standalone signal case at the northmost end of the eastern track section.
  - a. RMSS will provide the **signal** design for this element of the facility
3. A pad with four (4) switch modules that will be used to train personnel on switch maintenance and inspections. These switches will be able to be remotely controlled from within the primary signal house.
  - a. RMSS will provide the **signal** design for this element the facility
4. There will be a single “primary” signal house located between the track alignments that will house equipment for both the TRAX and FrontRunner sections of the facility. This primary signal house will also function as a classroom and the back office. As such it will be oversized to accommodate the extra equipment and personnel.
  - a. RMSS will provide the **signal** design for this element of the facility



5. A standalone TDX workstation will be housed in the primary signal house. This isolated office system will have custom screens required to accurately simulate the TRAX, FrontRunner, and traction power elements of the facility.
  - a. RMSS will provide the **head-end** design element of the facility
6. A small communications system will be required to connect the remote cases and TPSS to the primary signal house. Additionally a tie-in to the existing IT network will be provided.
  - a. RMSS will provide the **communications** design element of the facility
  - b. **\*\*Note:** the communications design for components internal to the traction power facility is not currently included in this scope of work. The network design will connect a managed network access ethernet switch to the non-vital network of the training facility
7. A Traction Power Substation (TPSS) that feeds the TRAX section of the facility with "simulated" (low voltage) traction power.
  - a. The design of this element of the facility is **"by others"**.
8. An overhead catenary system (OCS) will be installed along the TRAX section of the facility.
  - a. The design of the OCS system element of the facility is **"by others"**

All equipment will closely mimic existing in-service equipment. All materials and equipment will be built to the same standards as UTA's in-service equipment, unless approved otherwise in advance by UTA.

### Signal Design Scope

RMSS will develop the following design items for the MoW Training Facility:

- Circuit designs that include at a minimum:
  - Circuit design for the primary signal house that faithfully adheres to the existing design style and content of the in-service systems:
  - Circuit Plans for two (2) signal cases
    - One signal case at the south end of the "TRAX" section of the facility
    - One signal case at the north end of the "FrontRunner" section of the facility
  - Track layout plan for both the eastern "TRAX" section and the western "FrontRunner" section of the facility
    - Track layout will include wire schedule from the house to the field devices
    - Track layouts will include the switch module pad of four (4) stand-a-lone power operated switch machines
    - Track layout will include location of EGMS loops
  - Building layout for a signal bungalow designed to accommodate the following:
    - signaling equipment for both the western "TRAX" section and eastern "FrontRunner" section of the training facility
    - TRAX and FrontRunner equipment designed to be installed so it is easily identifiable which system the equipment is for
    - Single TDX workstation
    - Class size of 8 people
    - Whiteboard, table, and chairs
    - A/C unit and heater
    - battery banks and chargers



- terminal boards and other signaling equipment as needed
    - Elevation drawings for the mounting of all equipment in the signal house
    - Wiring plans for all signal equipment within and external to the signal house
  - Bill of material (BoM) outlining all equipment and materials enclosed in the house, signal cases, and field:
    - signaling equipment required for the western “TRAX” portion of the training facility
    - signaling equipment required for the “FrontRunner” portion of the training facility
    - signaling equipment required for the switch machine modules
    - communications equipment required for the training facility communications network
    - office hardware required for the standalone TDX system
- Equipment and materials included in the BoM will utilize materials outlined in the “Hardware Specifications” section below.
- Custom LCP for the western “TRAX” portion of the facility
    - designed to be enclosed in a black powder coated enclosure
    - designed to mimic modern LCP’s currently in service on TRAX
    - designed to have all controls and indications that would be found in an active TRAX interlocking
    - custom track layout to reflect the training facilities double crossover interlocking
  - Custom LCP for the eastern “FrontRunner” portion of the facility
    - designed to be enclosed in a black powder coated enclosure
    - designed to mimic modern LCP’s currently in service on FrontRunner
    - designed to have all controls and indication that would be found in an active FrontRunner crossing location including PTC indications for mandatory directives and temporary speed restrictions
  - Custom LCP for the switch machine modules that provide control and indication of the switch machines on the pad
  - Train control software logic for the “TRAX” interlocking section of the facility that includes:
    - Operation of the interlocking as a control point including all standard signal locking with the exception of traffic locking which is not required for the training facility
    - remote operation of power operated switch machines
    - train occupancy
    - other system elements to reflect the light rail system to the extent feasible within the confines of the training facility
  - Train control software logic for the “FrontRunner” section of the facility that includes:
    - grade crossing functions
    - proper gate activation
    - TSR implementation
    - MD0, MD15
    - use of existing cab rates from the Frontrunner alignment
    - track circuit occupancy
    - vital track code
    - other system elements to reflect the commuter rail system to the extent feasible within the confines of the training facility



- Design for both the “TRAX” and “FrontRunner” sections of the facility that include wayside equipment installed to the rail and intended to function properly when calibrated by MOW personnel and shunted
  - The design will incorporate the following track circuit types throughout the facility:
    - ElectroLogIXS track circuits
    - AFTAC
    - PSO
    - GCP Predictors
    - Cab Generators
- System level plans as appropriate
  - Due to restrictions inherent in the size and layout of the training facility it will not be possible to develop truly comprehensive system level plans such as control lines and crossing approach plans
  - However, RMSS will work with UTA to develop a simple set of system level plans (route & aspects, control lines, single lines, and crossing approach plans) that can be used for familiarization purposes
- RMSS will provide configuration files for the following equipment:
  - GCP
  - TDX
  - RuggedComm devices
  - EGMS
- Comm design for fiber links between the signal house and the remote signal cases that includes:
  - network topology diagram
  - fiber layout and termination drawings for vital and non-vital connections
  - cable interconnect drawings for patch cables
  - IP address list
  - Fiber links will be designed to have a connection in between all signal houses with the ability to pull logs
  - Tie-in for the IT network into the Technical Education Center (TEC). This network will need to be intercepted near the existing West Valley TRAX alignment and terminated in the TEC
  - \*\*Elevation drawings for comm equipment included in circuit plans
- RMSS will produce Issued for Construction (IFC) and As-in-service (AIS) level plans under this scope of work
  - \*\*development of Issued for Review (IFR) level plans is not included in this scope of work

### TDX Design Scope

This scope of work includes development of a local TDX system that will include custom screens specific to both the “TRAX” and “FrontRunner” sections of the facility. The standalone office system will include controls and indications for the interlocking, switch modules, grade crossing, switch heaters, and traction power system.

- The training facility TDX system will include the following modules:
  - Analog values module
    - Allows for real time values displaying on TDX screens
  - Traction Power module



- Monitors and controls the TPSS and OCS systems
- E-ATC module
  - Ability to place and remove MD's and TSR's on the "FrontRunner" section of the facility
- Forms Based Dispatch Module
  - Crossing repair form is included with this module
- The visual TDX screens will represent the training facility layout and function similarly to the existing TDX 3.0 system with respect to each element of the facility

#### Hardware Specification

UTA has provided the following direction on hardware that is to be used in the training facility design:

- One (1) oversized signal house sized appropriately to comfortably house all requirements set forth in this scope of work
- Hardware for the "TRAX" alignment portion of the facility is to include the following:
  - Four (4) powered switch machines
    - One (1) CSV-24 switch machine
    - One (1) M23 switch machine
    - One (1) 5F switch machine
    - One (1) CTS-2 switch machine
  - Four (4) functioning signal heads with foundations
  - One (1) small signal cabinet on the south end of the "TRAX" alignment portion of the facility to house vital track code equipment (ElectroLogIXS)
  - Two (2) ElectroLogIXS chassis with appropriate modules
    - One unit in the primary signal house to control the interlocking
    - One unit in the signal case on the south end of the property
  - One (1) Siemens Phase Shift Overlay (PSO) unit to be installed on a section of embedded straight track (roughly 300') to act as an approach track to the interlocking
  - Interlocking tracks circuits will be AFTAC circuits
  - One (1) custom LCP with configuration files
  - Two (2) RuggedComm switches with fiber patch panels
    - One located in the primary signal house
    - One unit in the signal case on the south end of the property
  - Track within the TRAX alignment will function as a negative return for the TPSS.
    - \*\*There is no intention to electrify the rail with 750 Volts; However, RMSS will design the signal system as if the rail were a negative return path on the TRAX segment which includes the use of impedance bonds for negative return locations and insulated joints (IJ's) as applicable
  - One (1) RECO switch heater (Gas Hot Air Blower type) with controls and indications incorporated in the Training Facility TDX control office station
  - Evaluate cable run sizes and distances to ensure proper operation
  - All signal equipment will be housed in a single location and ensure cable run distances are within proper maximums to operate powered switches and gate mechanisms



- Hardware for the “FrontRunner” portion of the facility includes the following:
  - One (1) fully functioning grade crossing with one (1) entrance gate and (1) exit gate
  - A unidirectional GCP predictor circuit with SSCCIII module, track modules, CPU, and all required hardware to simulate a fully functional grade crossing
    - RMSS will provide a GCP configuration
    - RMSS will design the use of dummy loads as needed if the track is not long enough
  - One (1) Exit Gate Management System (EGMS)
    - EGMS hardware will match existing hardware found on the Fronrunner North alignment
    - Loop detector wire
  - One (1) VHLC chassis with appropriate modules in the primary signal house
  - One (1) ElectroLogIXS unit in the FrontRunner signal case on the north end of the property
  - One (1) set cab generator and track interface equipment
  - One (1) signal case on north/east end of property
  - One (1) custom LCP configured for a Fronrunner grade crossing with program/configuration files
    - Local TDX workstation will have the ability to place restrictions on the grade crossing and/or FrontRunner track block
    - LCP will display PTC restrictions
  - Two (2) RuggedComm switches with fiber patch panels
    - One located in the FrontRunner signal case
    - One located in the primary signal house
- Hardware for the Four (4) switch modules
  - Switch modules to be standalone units for switch testing only - not tied into the logic of the interlocking.
    - However, power and control cables will be run to each module. These are separate from the switch machines located inside the interlocking
  - Switch Module Machines
    - Module 1 - H&K
    - Module 2 - T-21
    - Module 3 - 10A Electric Lock
    - Module 4 - TBD

#### Clarifications

1. This proposal is only for the design phase of the UTA training facility. The long lead material and construction phases of the training facility will be proposals under separate cover once the design is sufficiently complete. No material procurement or construction is included in this scope of work

#### Assumptions

1. This scope of work and the RMSS design will be based on direction established in the following documents:
  - a. *“Signal Design Scope 20220822\_Final-JS” dated August 22<sup>nd</sup>, 2022*
  - b. *“Training Yard\_Conduit\_Detail 20220629 R4” dated June 29<sup>th</sup>, 2022*



RMSS will review any design revisions to these documents and notify UTA of any changes that impact the cost of developing a design, procurement, or construction. RMSS will provide UTA with proposals to cover additional scope as needed.

2. TDX workstation and server are stand-alone and isolated from JRSC back office
3. TDX licenses and computer hardware will be included in the construction proposal

Exclusions

1. All civil design including track design, drainage, foundations, and underground infrastructure
2. All OCS and traction power design
3. Lightning protection design
4. Ground grid design
5. Issued for Review (IFR) level submittals

This proposal is valid for 60 days, unless extended in writing by RMSS.

If you need any additional information, please don't hesitate to contact us.

Sincerely,

A handwritten signature in black ink, appearing to be "DJ", is written over a horizontal line.

Doug Jones  
Project Engineer  
Rocky Mountain Systems Services

cc:

Marshall Wilson – RMSS  
Ben Smith - RMSS  
Anthony Ortolani– RMSS

\*\*\*Procurement lead times may be affected by Covid-19 pandemic\*\*\*  
Our pricing is in U.S. Dollars, F.O.B. Salt Lake City UT, and excludes all allowances, taxes, tariffs, licenses, and permits