

TASK ORDER NO. 016

TASK ORDER NAME: MDER FRS Vineyard Group

PROJECT CODE: SGR404 40-7404.68912

This is Task Order No. 016 to the On Call Maintenance Contract entered into by and between Utah Transit Authority (UTA) and Rocky Mountain System Services. (Contractor) as of February 2nd, 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 #016 is hereby attached and incorporated into this Task Order.

2.0 SCHEDULE

The Substantial Completion Date for this Task is December 31st, 2022. The Final Acceptance Date for this Task is December 31st, 2022.

3.0 LUMP SUM PRICE

The price for this task order is a not to exceed \$382,814.00. Invoices will be billed on monthly basis for work completed to date.

4.0 APPLICABILITY OF FEDERAL CLAUSES

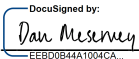
This Task Order does does not [Check Applicable] include federal assistance funds which requires the application of the Federal Clauses appended as Exhibit D to the On Call Maintenance Contract.

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

UTAH TRANSIT AUTHORITY:

ROCKY MOUNTAIN SYSTEM SERVICES:

By: _____
Mary DeLoretto, Interim Executive Director Date
> \$100,000

By:  _____
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Date: 10/4/2021 _____

By: _____
David Hancock, Interim Chief Service Dvlpmt. Ofc. Date
< 100,000

By: _____
Jared Scarbrough, Interim Dir. of Cap Construction Date
< \$50,000

By: _____
Jared Scarbrough, Project Manager Date
< \$10,000

 _____
361E18E9370A48
Legal Review

Procurement Review



July 15th, 2021

RMSS-52598-016

Mr. Jared Scarbrough
 Manager of Systems Engineering
 2264 South 900 West
 Salt Lake City, UT 84119

Reference: Utah Transit Authority – Systems On-Call Services

Subject: FrontRunner South MDER Groups 16, 18 and 19

Jared,

Rocky Mountain Systems Services (RMSS) is pleased to provide a proposal to upgrade additional FrontRunner South grade crossings with MDER functionality similarly to the existing MDER functionality that is beginning to be placed in service currently at multiple locations on the FrontRunner South alignment.

Our lump sum price for this proposal is **\$382,814.00**

The scope of work covered in this proposal is as follows:

RMSS's proposed scope is to design, install, test, and cut over the new functionality as described in the attached whitepaper at the following locations:

Group	Location	Location Type
16	861+00 1500 South	Grade Crossing / Cut Section
16	896+30 1100 South	Grade Crossing
18	934+97 100 East	Grade Crossing
18	960+68 100 West	Grade Crossing
18	975+72 Storrs Ave	Grade Crossing
18	989+73 200 South	Grade Crossing
19	614+86 400 South	Grade Crossing / Cut Section
19	765+50 1600 North	Grade Crossing / Cut Section

Additionally, the following items are inclusive of this scope of work:

- RMSS will update signaling/crossing location plans and application software for this scope of work and will provide as-in-service revisions following cutovers including affected adjacent locations
- RMSS will perform SATS lab testing as required to verify upgrade functionality in advance of cutovers, at its discretion.
- RMSS will coordinate and perform dynamic testing of MDER upgrades to affected crossings.



Assumptions

- RMSS will comply with UTA requirements for personnel safety. UTA will provide Roadway Worker Protection (RWP) and any other training required for work on its right of way.
- Existing spare input/output capability will be used for this work as required, even if the result is that no spares will remain following the upgrade.
- UTA will provide all native design files and configuration data for the affected locations.
- RMSS responsible for software configuration management of affected locations only.
- RMSS assumes that software and drawings will be submitted only at the Issued for Construction (IFC) level for the UTA review cycle.
- Installation and other preparatory work will occur during normal working hours, and all precautions will be taken to prevent impacts to FrontRunner revenue service.
- Final field testing and cutovers will occur during non-revenue periods (nights and weekends).
- All cutovers of MD upgrade functionality will require dynamic testing with test trains. Test trains will be provided by UTA, and RMSS will coordinate the test train needs with UTA for each cutover.

Exclusions

- Spare parts/equipment
- Manuals and documentation updates, including updates to the PTCIP and System Design Document (SDD); (updates to location plan and application software are included)
- Operational simulator updates
- Issued for Review (IFR) level software and drawing 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 blue ink, appearing to read "Anthony Ortolani", is positioned below the "Sincerely," text.

Anthony Ortolani
Project Manager
Rocky Mountain Systems Services

Attachments:

- Whitepaper "Expedient Release of Mandatory Directives"
- Change Order Summary
- Change Order Estimate Worksheet – FRS MDER

cc:

Marshall Wilson – RMSS
Dan Meservey – RMSS



Doug Jones – 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

Expedient Release of Mandatory Directives

Introduction

The UTA has installed Enhanced Automatic Train Control (E-ATC) on the FrontRunner line of their railroad to meet the Positive Train Control regulations. The E-ATC system utilizes cab signals to enforce speed restrictions, including Mandatory Directives (MD). The UTA utilizes two MD speeds; 15 MPH and 0 MPH. The MD speed is enforced prior to the train reaching the crossing island.

Issue

As a result of current system limitations, the MD speed may continue to be enforced even after the train is clear of the crossing island. These limitations are due to the current design's inability to accurately determine when the train has moved beyond the crossing with the MD applied. The current design utilizes the signaling system's track circuits to make this determination, which can exceed several thousands of feet from the crossing. This delays the ability of the E-ATC system to upgrade the cab speed back to more permissive speeds once the train has moved through the island.

Proposed resolution

To better define the location of the train, specifically to establish when the train has moved beyond the crossing, the status of the crossing island circuit could be used. Logic in the E-ATC system could be developed to determine when the train has; approached the crossing, occupied the island circuit, and vacated the island circuit. The logic would need to ensure the island circuit is functioning and the crossing control unit is healthy. Traffic direction, correct sequences of track occupancies, crossing approaches and island status along with timing would be confirmed before concluding the MD speed can be released. The sequences would be different based on the location of the track circuit IJs.

There two primary types of IJ locations:

- IJ located at one side of the island circuit (Figure 1)
- IJs not near the island circuit (Figure 2)

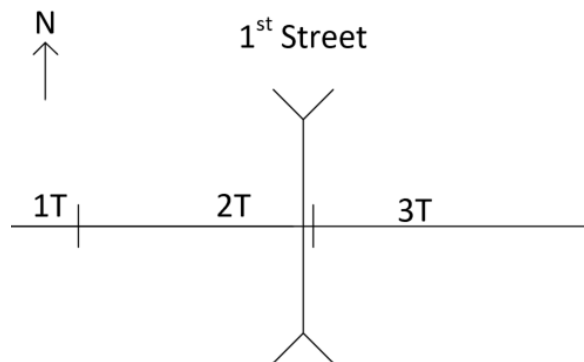


Figure 1

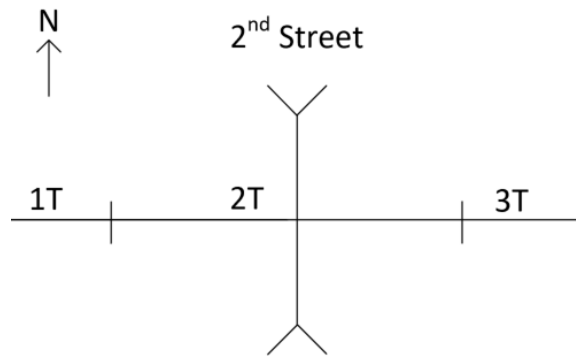


Figure 2

Crossings like 1st Street with an IJ on one side of the island circuit would only benefit from the Expedient Release in one direction. Eastbound routes currently receive permissive cab speeds once the train reaches the 3T track circuit since MD speeds are only enforced on the headend, i.e., no lookback enforcement. Conversely westbound routes would benefit by implementing the Expedient Release since a train would not receive permissive cab speeds until reaching the 1T track circuit.

Dependent upon distances, crossings like 2nd Street could benefit from Expedient Release in both directions. A westbound route would not receive permissive cab speeds until reaching the 1T and an eastbound route would not receive permissive cab speeds until reaching train the 3T track circuit.

Once the health of the island circuit (up and stable) and crossing control unit (approach up and stable) are confirmed with the correct sequence of occupancy (Vital traffic, directional sticks and timing), the recovery of the island circuit could be used to temporarily release the MD speed restriction while the 2T track circuit is still occupied. After the 2T track circuit recovers the release circuit will drop and the MD speed will again be enforced for following trains.

The sequence will be:

- Mandatory Directive applied to the crossing
- Track circuit occupied (with crossing approach stable)
- Crossing approach down (while island circuit remains stable for at least minimum warning time)
- Island circuit occupied (after calculated time based on restricted speed runtime)
- Crossing approach and island both recover

If the above sequence occurs the MD checks in the cab speeds will be bypassed, allowing normal cab speeds to resume, until the track circuit is unoccupied.

Safety and Reliability

The design will be based on closed-loop signaling principals in existing in-service regulatory compliant vital logic controllers that have proven to be reliable. Events like track occupancy, crossing activation and island occupancy must happen in the correct sequence within expected timeframes before an Expedient Release will occur. These sequences will be confirmed using established logic concepts that will keep the design simplified and efficient. Slow moving or stopping trains are expected but fast moving trains without proper warning time at the crossing will not be released. The positive start feature of the crossing control units will be used to keep the crossing active for the stopped trains. Failed inputs or track circuits will not meet the required progression of events which shall prevent unexpected release of MDs. Data passed via vital remote links will only be used if the link is healthy and stable. Power cycling or a reboot of the logic controller will purge any stored event progression which shall require that the sequence start from the beginning.

Summary

Utilizing the island circuits for an Expedient Release of an MD would provide improved operation under most situations but not all. The Expedient Release would be available when the MD application was due to a failure on the adjacent UPRR crossing and the UTA equipment is healthy. When the UTA crossing control unit is not healthy or the island circuit is unable to recover, the existing operation would continue so there would be no disadvantages if the Expedient Release function failed.

UTA - On Call

RMSS-52598-016 - FRS MDER Groups 16, 18, and 19

Task Order Estimate Summary



7/15/2021

Subcontractors	\$	-
Materials	\$	-
Administrative	\$	47,129.00
Design/Engineering	\$	156,144.00
Construction/Testing	\$	76,681.00
Travel & Perdiem	\$	4,000.00
Other Costs and Fee	\$	98,860.00
Total:	\$	<u>382,814.00</u>

UTA - On Call
RMSS-52598-016 - FRS MDER Groups 16, 18, and 19
Task Order Estimate Worksheet


TRADE SECRET PROPRIETARY CONTRACTOR INFORMATION

7/15/2021

SUBCONTRACTORS

	Quantity	UOM	Price	Extended
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Subtotal - Subcontractors: \$ -
MATERIALS

	Quantity	UOM	Price	Extended
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Subtotal - Materials: \$ -
ADMINISTRATIVE

	Quantity	UOM	Price	Extended
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Indirect Labor & Office Personnel

Senior Project Manager	ST	0.0	Hr	\$ 162.00	\$ -
Project Engineer w/ pickup (non-overhead)	ST	346.0	Hr	\$ 124.95	\$ 43,233.00
Safety/Quality Engineer	ST	0.0	Hr	\$ 80.00	\$ -
Document Control Specialist	ST	40.0	Hr	\$ 81.91	\$ 3,276.00
Project Controls	ST	10.0	Hr	\$ 62.00	\$ 620.00

Subtotal - Administrative: \$ 47,129.00
DESIGN / ENGINEERING

	Quantity	UOM	Price	Extended
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Hardware Engineering

Senior Signal Engineer	ST	32.0	Hr	\$ 150.00	\$ 4,800.00
Signal Engineer	ST	248.0	Hr	\$ 112.00	\$ 27,776.00
CADD Technician	ST	144.0	Hr	\$ 50.00	\$ 7,200.00
Manager of CADD	ST	16.0	Hr	\$ 50.00	\$ 800.00
Verification Engineer	ST	32.0	Hr	\$ 150.00	\$ 4,800.00

Software Engineering

Senior Signal Engineer	ST	48.0	Hr	\$ 150.00	\$ 7,200.00
Signal Engineer	ST	464.0	Hr	\$ 112.00	\$ 51,968.00
Verification Engineer	ST	344.0	Hr	\$ 150.00	\$ 51,600.00

Head-end Engineering

Senior Head-end Engineer	ST	0.0	Hr	\$ 143.57	\$ -
Head-end Engineer	ST	0.0	Hr	\$ 51.41	\$ -
Verification Engineer	ST	0.0	Hr	\$ 143.57	\$ -

Subtotal - Design: \$ 156,144.00
CONSTRUCTION / INSTALLATION / TESTING

	Quantity	UOM	Price	Extended
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Construction - General

Construction Manager ST	ST	16.0	Hr	\$ 105.00	\$ 1,680.00
Construction Manager OT (40+)	ST	0.0	Hr	\$ 131.25	\$ -
Systems Construction Labor ST	ST	64.0	Hr	\$ 95.00	\$ 6,080.00
Systems Construction Labor OT (40+)	ST	0.0	Hr	\$ 118.75	\$ -
Systems Construction Labor DT (Sunday)	ST	0.0	Hr	\$ 166.25	\$ -

All Locations - Testing

Signal Test Manager	ST	36.8	Hr	\$ 131.00	\$ 4,821.00
Signal Test Engineer	ST	368.0	Hr	\$ 111.00	\$ 40,848.00
Signal Test Support	ST	0.0	Hr	\$ 105.00	\$ -
Signal Test Support OT (40+)	ST	0.0	Hr	\$ 131.25	\$ -
Signal Test Support DT (Sunday)	ST	72.0	Hr	\$ 183.75	\$ 13,230.00

Subtotal - Construction / Install / Testing: \$ 66,659.00

UTA - On Call
RMSS-52598-016 - FRS MDER Groups 16, 18, and 19
Task Order Estimate Worksheet


TRADE SECRET PROPRIETARY CONTRACTOR INFORMATION

7/15/2021

<u>EQUIPMENT</u>	Quantity	UOM	Price	Extended
<u>Construction</u>				
Pickup Truck	152.0	Hr	\$ 18.00	\$ 2,736.00
Trailer	0.0	Hr	\$ 14.63	\$ -
Mini Ex	0.0	Hr	\$ 52.00	\$ -
Specialty tools	0.0	Hr	\$ 13.00	\$ -
<u>All Locations - Testing</u>				
Pickup Truck	404.8	Hr	\$ 18.00	\$ 7,286.00
Subtotal - Equipment:				\$ 10,022.00

<u>TRAVEL & PERDIEM</u>	Quantity	UOM	Price	Extended
Test Engineer - T&E	2.0	Man-weeks	\$ 2,000.00	\$ 4,000.00
Application & Design	0.0	Man-weeks	\$ 2,000.00	\$ -
Senior PM	0.0	Man-weeks	\$ 2,000.00	\$ -
Subtotal - Travel & Perdiem				\$ 4,000.00

<u>OTHER</u>	Quantity	UOM	Price	Extended
ST&S	1.00	LS	\$ 3,000.00	\$ 3,000.00
SATS License (2022)	1.00	LS	\$ 25,000.00	\$ 25,000.00
Subtotal - Other:				\$ 28,000.00

<u>TOTALS</u>				
Subtotal Direct Costs				\$ 311,954.00
Fee	12.5%	\$	311,954.00	\$ 38,994.00
Subtotal Costs with Fee				\$ 350,948.00
Contingency	8.0%	\$	350,948.00	\$ 28,076.00
Subtotal Cost with Provisional Sum				\$ 379,024.00
Bond Premium	0.0%	\$	379,024.00	\$ -
Job Related Insurance	1.0%	\$	379,024.00	\$ 3,790.24
Tax	0.0%	\$	311,954.00	\$ -
TOTAL PRICE - RMSS				\$ 382,814.00