

Task Order Plan (TOP)

Contract Number: NNM05AB50C
TO Title: Reconfigurable Computing Support
TO Number: 32-040304 **Revision:** 10

Period of Performance: 10/02/2010 to 9/30/2011

MSFC Initiator: Mike Watson

(b)(4)

Emergency: No

WBS#: 198059.04.02.08

Revision 10:

The purpose of revision 10 is to extend this task into Contract Year 6 of the NNM05AB50C ESTS contract. This revision defines and estimates work for the period October 2, 2010 through September 30, 2011. Per the customer's request, the revision adds additional effort to define forward plans and draft collaborative proposal topics/inputs related to reconfigurable computing. Additionally, the Schedule, Performance Plan and Risk Assessment have been revised to reflect changes in task activities for the new period of performance.

Revision 09:

The purpose of revision 09 is to add scope for additional effort and a 4th demonstration of a reconfigurable computing (RC) platform. Demonstrations #2 and #3 as delineated under Milestone and Deliverables in Rev.08 were completed ahead of schedule. Per the customer's request, Demonstration #4 has been added in Rev.09 to reflect current objectives. There is no increase to the cost estimate. The Task Order Description and Objectives, Milestone and Deliverables, in the Task Order Plan have been updated to add Demonstration #4. The Schedule has been updated to reflect actual completion dates of Demonstrations #2 and #3 and the addition of Demonstration #4. The Performance Plan has been updated to add Demonstration #4, and the Risk Assessment was updated to reflect the current revision number.

Revision 08:

The purpose of revision 08 is to extend this task into Contract Year 5 of the NNM05AB50C ESTS contract. This revision defines and estimates work for the period October 3, 2009 through October 14, 2010. Additionally, the Schedule, Performance Plan and Risk Assessment have been revised to reflect any changes in task activities for the new period of performance.

Revision 07:

The purpose of revision 07 is to add additional travel dollars due to an increase in travel requirements. The travel estimate increased by (b)(4). The Task Order Plan was modified to reflect current Milestones and Deliverables, a current estimation of trips to support task requirements, current Schedule, and (b)(4) and (b)(4). Additionally, the Risk Assessment Plan was modified to reflect (b)(4) as (b)(4) as (b)(4) and the Performance Plan was updated to reflect current objectives.

Revision 06;

The purpose of revision 06 is to update the labor category associated with this task. The modification is as follows: Was (b)(4) Is: (b)(4) The Performance Plan and Risk Assessment were not affected by this modification.

Revision 05;

The purpose of revision 05 is to extend this task into Contract Year 4 of the NNM05AB50C ESTS contract. This revision defines and estimates work for the period September 27, 2008 through October 02, 2009. Additionally, the Schedule, Performance Plan and Risk Assessment have been revised to reflect any changes in task activities for the new period of performance.

Revision 04;

The purpose of this revision is to more accurately reflect the Task activity during this period of performance due to a change in personnel. Travel was added for a trip to San Jose in July, 2008 and labor was reduced by (b)(4) with a corresponding total cost reduction of (b)(4) The Schedule, Performance Plan and Risk Assessment have not been revised since there are no expected changes in scope or schedule for this period of performance.

Revision 03;

The purpose of this revision is to extend this task into Contract Year 3 of the NNM05AB50C ESTS contract. This revision defines and estimates work for the period 29 September 2007 through 26 September 2008. Additionally, the Schedule, Performance Plan and Risk Assessment have been revised to reflect any changes in task activities for the new period of performance.

Revision 02;

The purpose of this revision is to support travel to a vendor site in (b)(4) for initial training and technical discussion on a platform planned for procurement to support NASA/MSFC work in Reconfigurable Computing. This travel for training and technical meetings is per request of NASA/MSFC/EV43. This revision also encompasses modifications to correctly reflect previous travel and costs associated with training also requested by NASA/MSFC/EV43 that was undertaken during the contract year. This Task Order Revision to support additional travel and refine accounting for other travel, training and labor hour costs results in a slight reduction in total cost from the previous estimate.

Revision 01;

The purpose of this revision is to extend this task into Contract Year 2 of the NNM05AB50C ESTS contract. This revision defines and estimates work for the period 30 September 2006 through 28 September 2007. Additionally, the Schedule, Performance Plan and Risk Assessment have been revised to reflect changes in task activities for the new period of performance.

PR Number: 4200164794

1.0 Task Order Description & Objectives [updated at Rev.10]

EV43 requires technical assistance in performing work involving fault tolerant and reconfigurable computing, where reconfigurable computing will be primarily involved with, but not limited to, the use of Field Programmable Gate Arrays (FPGAs). Activities require interfacing user controls and feedback displays, through standard operating systems such as Windows and Linux, in various PC-type architectures, to semi-custom FPGA-based reprogrammable hardware and support software.

1. Assist in development of avionics systems emulation(s) on reconfigurable computing test bed for demonstration of products in subsequent steps of this SOW. This will require in-depth capabilities in programming, typically but not exclusively on Microsoft Windows-based operating systems. C, C++, COM, and LabVIEW programming skills are necessary.
2. Research available avionics systems to be emulated. Produce choices from one or more systems suitable for emulation on appropriate reconfigurable computing (RC) platforms.

3. Reproduce selected avionics system, or a selected subset of its functionality (as feasible, and as directed), in the RC test bed. The resulting emulation(s) should contain features compatible with multiple redundancy and error checking to be implemented in later steps.
4. Demonstrate capability to replace functionality of the target avionics system.
5. Demonstrate capability to replace functionality of the target avionics system when a failure is induced.
6. Develop capability to detect error(s) and automatically effect circuit replacement.
7. Demonstrate automatic detection and mitigation of errors by circuit replacement, with single or multiple induced failure(s).
8. Integrate the capabilities demonstrated in above items 4-7 on a unified reconfigurable computing (RC) platform.
9. Provide engineering support to develop reconfigurable computing demonstrations based upon customer provided requirements and schedules.
10. Support EV43 as a Subject Matter Expert in the areas of fault tolerant and Reconfigurable Computing.
11. Provide engineering support to define forward plans and draft collaborative proposal topics/inputs related to reconfigurable and fault-tolerant computing.

2.0 Technical Approach (Including required input, guidelines & assumptions)

To ensure the successful completion of this task the following approach will be taken:

1. Analyze system requirements.
2. Define software requirements.
3. Design and develop software for simulation activities.
4. Perform and assist in the verification and validation of the software and documentation.

3.0 Discussion of Skills Required

Necessary skills include in-depth familiarity with Windows and DOS Operating Systems (O/S), in this case specifically Windows Server 2003; extensive experience with C/C++, and specifically Visual C/C++, with related capabilities in the manipulation of complex link and build operations; and substantial experience and capability in the development and application of various application interfacing schemes and standards, to include COM, ActiveX, POSIX, .DLL and .NET operations.

Support personnel will have some expertise in any of the following: Linux O/S and other O/S; LabVIEW programming and interfacing; Star Bridge VIVA programming and interfacing; binary arithmetic; neural networks; Field Programmable Gate Arrays and other programmable logic; and digital logic in general.

4.0 Special Tools Required

Software to be determined.

5.0 Participating Subcontractors

None.

6.0 Milestones & Deliverables [updated at Rev.10]

1. Monthly Activity Reports.
2. Reconfigurable Computing technology demonstrations per customer provided requirements and schedules.
3. Reconfigurable and fault-tolerant computing proposal topic/inputs, as requested.

7.0 Special Considerations (Recruiting, Special Equipment / Material, Safety, etc.)

Travel is estimated for three trips to support Task requirements.

8.0 Work Shelf

ESTS Contract Task Order Request Performance Plan

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Category	Weighting Technical %	End of Period Technical Score
Technical Objectives	65%	X 65% = Justification
EV43 requires technical assistance in performing work involving fault tolerant and reconfigurable computing, where reconfigurable computing will be primarily involved with, but not limited to, the use of Field Programmable Gate Arrays (FPGAs). Activities require interfacing user controls and feedback displays, through standard operating systems such as Windows and Linux, in various PC-type architectures, to semi-custom FPGA-based reprogrammable hardware and support software.		
Schedule Objectives (Milestones)	Weighting Schedule % 10% (min 10%)	Schedule Score X 10% = Justification
1.Reconfigurable computing technology demonstrations per customer provided requirements and schedules. 2.Reconfigurable and fault-tolerant computing proposal topic/inputs, as requested. 3.Monthly Activity Reports.		
Cost (actual vs. negotiated)	Weighting Cost% 25% (min.25%)	Cost Score X 25% = Justification
	Weighting Total % 100.00%	Total Score

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Technical, Schedule, and Cost Grading Scale

Score	Description
9.0-10.0	Exceeded TO Performance Plan objectives resulting in major benefit(s)
8.0-8.9	Exceeded TO Performance Plan objectives resulting in modest benefit(s)
7.0-7.9	Met TO Performance Plan objectives
3.0-6.9	Did not meet all TO Performance Plan objectives resulting in minimal impact or requiring additional agency funds
0.0-2.9	Did not meet TO Performance Plan objectives resulting in substantial impact and/or requiring additional agency funds

ESTS Contract Task Order Request Performance Plan

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Comments:

Risk Assessment

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(b)(4)

Task Order Risk Assessment to Cost, Technical, and Schedule

List identified risk associated with Task Order performance as related to task cost, technical, and schedule. Classify the risk(s) according to probability of occurrence and impact as defined below and enter the risk into risk matrix.

Risk	Risk Type	Probability (1-4)	Impact (1-4)	Risk Description
Risk C1	Cost	1	4	Technical demonstrations are associated with the estimate for this task. If more technology development demands arise, additional funds may be needed to meet the increased requirements.
Risk C2	Cost			
Risk T1	Technical			No technical risk has been identified.
Risk T2	Technical			
Risk S1	Schedule			No schedule risk has been identified.
Risk S2	Schedule			

*Note: See page 2 for risk mitigation plan for those risks which are Primary Risk Drivers.



