STATEMENT OF WORK
for the procurement of
GUN MOUNT CONTROL PANEL MK 437

1 SCOPE

1.1 Description

This Statement of Work (SOW) describes the requirements for the manufacture, production, assembly, test, and acceptance of the Gun Mount Control Panel (GMCP) MK 437. Naval Surface Warfare Center (NSWC) Port Hueneme Division (PHD) is the In-Service-Engineering Agent (ISEA) for the Gun Computer System (GCS) MK 160 which includes the GMCP MK 437 and is responsible for this acquisition.

The GMCP to be procured under this contract is a major configuration item of the GCS MK 160 to be deployed on DDG 51-78 and CG 59-73 as part of the AEGIS Modernization Program as well as new construction DDGs. The GMCP procured under this SOW will be comprised of custom fabricated enclosures and Commercial-Off-The-Shelf (COTS) and Non-Developmental Item (NDI) components to meet the requirements outlined in WS 35463.

2 APPLICABLE DOCUMENTS

The following documents of the issue (i.e., revision) in effect at the time of the Requests for Proposals form a part of this SOW to the extent specified herein.

2.1 Military Specifications, Standards and Handbooks

Document Number	Document Title
MIL-STD-2073-1	Standard Practice for Military Packaging
MIL-HDBK-454	General Guidelines for Electronic Equipment
MIL-HDBK-61	Configuration Management Guidance
MIL-HDBK-2164	Environmental Stress Screening Process for Electronic Equipment

2.2 Engineering Documentation

Document Number	Document Title
WS 35463 MAR 2010	System Specification for the Gun Weapon System MK 34 with Gun Computer System MK 160 for the United States Navy Aegis Modernization Advanced Capability Build 12 Cruisers and Destroyers
NAVSEA DWG 7402676	MK 437 Mod 3 GMCP Installation Control Drawing

2.3 Commercial and Industry Specifications

Document Number	Document Title
ANSI/ISO/ASQC Q9001-2000 13 DEC 00	American National Standard, Quality Management System Requirements
ANSI/ISO/ASQC Q9000-1-1994 01 AUG 1994	American National Standard, Quality and Quality Assurance Standard

2.4 Availability of Specifications and Standards

Copies of Military specifications, standards, handbooks, and guidance data listed are available from the ASSIST website at https://assist.daps.dla.mil/.

Copies of Government documents other than specifications, standards, and handbooks may be obtained through the Contracting Officer.

Copies of non-Government publications should be requested from the organization(s) that prepare, maintain, and distribute the documents.

2.5 Order of Precedence

In the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence to all except WS 35463 and the MK 437 MOD 3 GMCP Installation Control Drawing (ICD) 7402676. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3 REQUIREMENTS

3.1 Gun Mount Control Panel (GMCP) MK 437

The contractor shall fabricate, assemble, test, and deliver GMCP MK 437 MOD 4 units per assembly drawing 7402675 (see Appendix A). Use MIL-HDBK-454, Requirement 9 as guidance. The contractor shall also incorporate all approved Class I and Class II Engineering Change Proposals (ECPs) at the date of award. The contractor shall use the 1000Base-LX, single-mode fiber indicated in the drawing package rather than the 100Base-FX depicted in the MK 437 MOD 3 GMCP ICD.

3.1.1 Software Installation

GMCP Front Panel Assembly 7245005 shall have the GMCP Flash Software provided as GFM installed in accordance with Appendix B.

3.1.2 Interface Cables

Each GMCP unit shall include one set of interface cables in accordance with Appendix C. Install blank "writable" cable markers at center of cables.

3.1.3 Adapter Plate

The contractor shall provide adapter plate 7402705 with each GMCP unit.

3.1.4 Painting of external surfaces

The contractor shall paint external surfaces with Polyurethane, color Light Gray 26307 per FED-STD-595 in accordance with drawing 7250920 (included in documentation package).

3.2 Testing, Inspection, and Acceptance Criteria

3.2.1 Environmental Stress Screening

The contractor shall conduct Environmental Stress Screening (ESS) on all GMCP MK 437 units as a complete assembly, using MIL-HDBK-2164A as guidance.

The ESS shall be conducted in a facility that has the equipment that can perform temperature and vibration testing on the GMCP with weight and dimensional parameters in accordance with the specifications listed below. The ESS shall be conducted on one GMCP MK 437 unit at a time with the unit under power at a temperature range of 0°C to +35°C and random vibration at:

- Spectral Density of 6G rms
- Frequency Limits 100-1000Hz
- Axis - 3
- Duration 10 minutes

The initial and final operational tests of the ESS process shall be in accordance with the operational testing requirements in Appendix D. The contractor shall provide all necessary equipment and software to conduct this testing.

The contractor shall review the provided ESS procedures and shall submit any revisions as well as implementation plans within thirty (30) after award of contract. The ESS plans and procedures shall address occurrence of failures and the process for rescreening of units. The Government (NSWC PHD Code L45) will review the plans and, if not approved, return the plans to the contractor with comments no later than fifteen (15) days after receipt. The contractor shall incorporate comments and resubmit to the Government no later than ten (10) days after receipt of comments. Government approval of the procedures and plans is required prior to implementation.

All GMCP MK 437 units shall successfully complete the aforementioned requirements of ESS. An ESS report for each test shall be developed to document ESS results and all problems encountered during ESS. The ESS report shall also address unit failures and develop proposed resolution(s) prior to rescreening of units. The ESS report shall be submitted concurrent with the delivery of each unit.

CDRL A01 — ESS Procedures and Implementation Plan
CDRL A02 — ESS Test Report

3.2.2 Acceptance Testing

Each GMCP unit shall be tested for acceptance in accordance with the test requirements in Appendix D. The contractor shall review the provided GMCP Test and Inspection Acceptance procedures and shall submit any revisions to the Government no later than sixty (60) days after contract award. The Government will review the procedure for approval. If not approved, the Government will return the procedure to the contractor with comments no later than thirty (30) days after receipt. The contractor shall incorporate comments and resubmit to the Government no later than fifteen (15) days after receipt of comments. Each GMCP unit must pass acceptance testing in accordance with the approved Test and Inspection Procedure before it will be accepted by the Government. A test report shall be submitted to the Government for each unit tested concurrent with the delivery of the unit to the Government. All acceptance testing shall be witnessed by the Government. The contractor shall provide the Government, at minimum, ten (10) working days prior notice of each test date or event.

CDRL A03 — Test and Inspection Acceptance Procedure
CDRL A04 — Test and Inspection Report

3.3 Quality Assurance

The contractor's quality system shall include the manufacture, production, and support of GMCP MK 437 units. The contractor's quality system model shall be compliant with the key requirements of ANSI/ISO/ASQC Q9001-2000. The contractor may utilize their existing quality system by demonstrating to the Government compliance to the key elements established in ANSI/ISO/ASQC Q9000. Documentation for COTS/NDI quality assurance shall be tracked and maintained in the contractor quality system for the life of the contract. The contactor shall provide a copy of the Quality System Plan to the Government no later than thirty (30) days after award of contract.

CDRL A05 — Contractor's Quality System Plan or Manual

3.4 Packaging, Handling, Shipping, and Transportation (PHS&T)

The contractor shall utilize MIL-STD-2073-1 for packaging, handling, and shipping requirements for all GMCP MK 437 units to ensure no operational or functional damage shall result under normal commercial handling and shipping from the assembly point to the delivery point.

Equipment shall be delivered to
Northrop Grumman Missile Systems
2230 Statham Blvd
Oxnard, CA 93033
ATTN: MK160 / Code L45

3.5 Configuration Management

3.5.1 Configuration Non-Conformances

The contractor shall document and report all configuration non-conformances no later than seven (7) days after discovery. All configuration non-conformances shall be documented against the Product Baseline using the contractor's established configuration management system. Government approval is required for all configuration non-conformances that take place under this contract. The non-conformances shall be documented and reported to the Government for

review and acceptance prior to implementation of the non-conformance into the GMCP MK 437 configuration.

CDRL A06 — Configuration Non-Conformance Report

3.5.2 As-Built Configuration List

The contractor shall generate and deliver an As-Built Configuration List (ABCL) for each GMCP MK 437 unit produced under this contract. The ABCL shall identify the specific GMCP MK 437 serial number and list the configuration of the unit as delivered to the Government including the Display Assembly and all other items to the third indenture level. Serialized COTS items listed on the ABCL shall include their serial number. The ABCL shall include a listing of configuration non-conformances incorporated, at sub-assembly level and up, into the GMCP MK 437 unit. Delivery of the ABCL shall be concurrent with each unit delivered. The contractor shall coordinate with the Government for proper sequencing of serial numbers.

CDRL A07 — As-Built Configuration List

3.5.3 Engineering Change Proposals

The contractor shall develop draft Class I and Class II ECPs resulting from Technical Data Package corrections and revisions or COTS component obsolescence in the manufacture of GMCP MK 437 units and shall submit the ECPs to the Government within fifteen (15) days after the need is identified. Government comments will be provided to the Contractor within ten (10) days after receipt. The contractor shall incorporate comments and resubmit to the Government within ten (10) days after receipt of comments. The contractor shall use MIL-HDBK-61 as guidance in preparing the ECPs. ECPs resulting in a change to the production engineering drawings shall include an attached Notice of Revision for each affected drawing documenting the changes to, or creation of, that drawing.

CDRL A08 — Class I Engineering Change Proposals
CDRL A09 — Class II Engineering Change Proposals

3.5.4 Obsolescence Notification

The contractor shall verify present availability of COTS items required in the manufacture, production, and assembly of GMCP MK 437 units within thirty (30) days after award of contract and shall submit a report indicating the availability status of each item. The contractor shall forward to the Government all component “end of life” notifications discovered at any time during the manufacture, production, and assembly of the GMCP MK 437 units within fifteen (15) days of discovery.

CDRL A10 — Availability Report

3.6 Warranty

COTS and NDI shall be covered by the original manufacturer/vendor warranty. Documentation from the manufacturer/vendor shall be provided with each GMCP MK 437 delivered detailing the standard COTS/NDI commercial warranty. The GMCP MK 437 shall be warranted free from defects in workmanship and manufacturing for a period of 12 months after delivery to the Government. After the warranty period, the Government reserves the right to pursue consideration as a result of latent defects discovered with a particular unit or units.

3.7 Status Report/Meetings

The contractor shall generate and deliver a monthly status report detailing progress, problems, and schedule compliance. In addition to these reports, the contractor shall schedule an initial meeting to share information. The contractor shall conduct a Production Readiness Review at their facility within thirty (30) days after award of contract. The contractor shall also conduct annual contract review meetings at NSWC PHD during the period of the contract. The contractor shall be responsible for establishing the meeting agenda, presentation materials, and recording and submitting minutes from these meetings.

CDRL A11 — Conference Agenda
CDRL A12 — Presentation Material
CDRL A13 — Conference Minutes
CDRL A14 — Monthly Status Report

4 Contract Deliverables

Contract deliverables shall be delivered to the Government in ISO 32000 Portable Document Format without content protection, unless otherwise specified herein. All computer files shall be delivered on CD or DVD and may, at the contractor's option, also be delivered electronically. Exceptions may be approved by the Government.

Contract data shall be delivered to:
Naval Surface Warfare Center, Port Hueneme Division
4363 MISSILE WAY
PORT HUENEME CA 93043-4307
Attn: L Department Data Manager

4.1 List of Deliverables

CDRL A01 — ESS Procedures and Implementation Plan 3
CDRL A02 — ESS Test Report 3
CDRL A03 — Test and Inspection Acceptance Procedure 4
CDRL A04 — Test and Inspection Report 4
CDRL A05 — Contractor's Quality System Plan or Manual 4
CDRL A06 — Configuration Non-Conformance Report 5
CDRL A07 — As-Built Configuration List 5
CDRL A08 — Class I Engineering Change Proposals 5
CDRL A09 — Class II Engineering Change Proposals 5
CDRL A10 — Availability Report 5
CDRL A11 — Conference Agenda 6
CDRL A12 — Presentation Material 6
CDRL A13 — Conference Minutes 6

CDRL A14 — Monthly Status Report 6

5 GOVERNMENT FURNISHED INFORMATION / EQUIPMENT / MATERIAL (GFI, GFE, GFM)

The Government shall provide Government Furnished Material (GFM) for this contract within sixty (60) days ARO to facilitate production and delivery of the GMCP MK 437 units. The contractor shall use the GFM only in the execution of this contract. All GFM shall be returned to the Government before the contract ends, and the contractor shall retain no rights to the GFM or any derivatives thereof. The Government Furnished Material shall include the following:

Software:
GMCP FLASH Software
GMCP Touch Screen Diagnostic (“Button Test”) binary and/or source

Documentation package including:
Engineering Drawings listed in Appendix A
Engineering Documentation listed in Section 2.2
Gerber Plot Files for Dimmer CCA 7244553
Gerber Plot Files for Velocimeter Communications Failsafe CCA 7625460

APPENDIX A – GMCP MK 437 MOD 4 DRAWING LIST

7244498	PLATE, IDENTIFICATION
7244500	ISOLATION PANEL ASSEMBLY
7244501	STANDOFF
7244502	CAPACITOR
7244503	BOX, MACHINING
7244504	BOX, WELDMENT
7244505	SKIN, WELDMENT
7244506	BAR
7244507	FRAME, REAR
7244508	FRAME, FRONT
7244509	SPACER, POWER SUPPLY
7244510	28VDC POWER SUPPLY
7244511	SKIN
7244512	TOP
7244513	PANEL, FRONT
7244514	PLATE
7244515	HEAT SINK
7244516	HEAT SINK EXTRUSION
7244517	BRACKET, RIGHT
7244518	BRACKET, LEFT
7244519	COUPLER, OPTOELECTRONIC
7244553	BOARD, DIMMER
7244581	GASKET, O-RING EMI
7244582	ADHESIVE, CONDUCTIVE
7244583	INDICATOR, ACTION SWITCH
7245004	ISOLATION TRANSFORMER ASSEMBLY
7245005	GMCP FRONT PANEL ASSEMBLY
7245013	.5 EMI GASKET
7245015	GASKET, EMI
7245029	EMI GASKET
7245032	GMCP FRONT PLATE
7245033	LEFT SIDE FRAME WELDMENT
7245034	RIGHT SIDE FRAME WELDMENT
7245035	FRONT FRAME
7245036	REAR FRAME
7245037	ENCLOSURE FRAME WELDMENT
7245038	ENCLOSURE WELDMENT
7245040	BASE PLATE
7245041	BASE SIDE
7245042	BASE REAR
7245043	ENCLOSURE SIDE
7245044	ENCLOSURE TOP
7245045	ENCLOSURE MACHINING
7245047	EXTERIOR HEAT SINK
7245048	INTERNAL HEAT SINK

7245049	AIR DUCT
7245050	FAN MOUNT
7245051	BOTTOM COVER
7245052	TOP COVER
7245053	SUPPORT ANGLE
7245054	CONNECTOR BRACKET
7245055	AIR DEFLECTOR
7245058	HEAT EXCHANGER ASSEMBLY
7245390	TRANSFORMER BOX, MACHINING
7245391	PANEL, TRANSFORMER
7245392	SUPPORT CHANNEL
7245393	SPACER
7245394	ANGLE BRACKET
7245395	GROUND BLOCK
7245396	IDENTIFICATION PLATE
7245397	STRAP
7245398	CHASSIS ASSEMBLY
7245399	PAD, RUBBER
7402612	BRACKET, ETHERNET SERVER
7402613	STRAP, ETHERNET SERVER
7402614	MK 437 MOD 4 NAMEPLATE
7402671	CABLE ASSEMBLIES
7402675	MK 437 GUN MOUNT CONTROL PANEL ASSEMBLY
7402677	CONNECTOR PLATE
7402678	WIRING DIAGRAM, ENCLOSURE ASSEMBLY, MK 437 GMCP
7402679	ENCLOSURE ASSEMBLY, MK 437 GMCP
7402705	ADAPTER PLATE
7402928	STANDOFF, HEX, MALE-MALE
7403425	WARNING PLATE
7625460	VELOCIMETER COMMUNICATIONS/FAILSAFE
7625768	WIRING DIAGRAM KEYBOARD TRAY ASSEMBLY
7625769	LAPTOP TRAY ASSEMBLY
7625770	KEYBOARD TRAY ASSEMBLY
7625771	KEYBOARD MOUNTING PLATE
7625772	KEYBOARD ANGLE, LEFT
7625773	KEYBOARD ANGLE, RIGHT
7625774	KEYBOARD ANGLE, FRONT
7625775	KEYBOARD FRONT PANEL
7625776	KEYBOARD ANGLE, REAR
7625777	DUAL SLIDE RAIL, LEFT
7625778	DUAL SLIDE RAIL, RIGHT
7625779	KEYBOARD CONNECTOR PLATE
7625780	LAPTOP PLATE
7625781	LAPTOP ANGLE, LEFT
7625782	LAPTOP ANGLE, RIGHT
7625783	LAPTOP TRAY FRONT PANEL

7625784	CABLE CARRIER MOUNT
7625785	PIVOT PLATE
7625786	HINGE PLATE, OUTER
7625787	HINGE PLATE, INNER
7625788	CABLE CARRIER ARM
7625790	CABLE CARRIER ASSEMBLY
7625791	KEYBOARD TRAY FRONT PANEL ASSEMBLY
7625792	LAPTOP TRAY FRONT PANEL ASSEMBLY
7625793	MK 437 MOD 3 NAMEPLATE
7625794	RELAY BRACKET
7625795	FRAME BASE
7625796	BRACKET, ETHERNET SERVER
7625797	STRAP, ETHERNET SERVER
7625798	MOUNTING PLATE, POWER SUPPLY
7628780	RUBBER ISOLATOR
PL7402679	PARTS LIST, MK 437 GMCP, ENCLOSURE ASSY
WL7402679	WIRE LIST, MK 437 MOD 3, GMCP ENCLOSURE ASSY
TR740265	TEST & INSPECTION ACCEPTANCE PROCEDURE GUN MOUNT CONTROL PANEL MK 437 MOD 3
7402671	CABLE ASSEMBLIES – W35570, W35571, W35261, W35262, W35263

APPENDIX B -FLASH PROCEDURE FOR GMCP DISPLAY

(Procedure assumes that the NcBridge Host is already configured)

NOTE: Confirm that the NCBridge host is running the Network File Service (NFS). From the NCBridge host command prompt execute the command (ps –ef | grep –I nfs). If the NFS service is running the following line will be returned (/usr/lib/nfs/nfsd –a 16). If the NFS service is not running then execute the following command from the NCBridge host command line: (/usr/lib/nfs/nfsd –a 16.

1. Connect a network cable from the Network Hub to the Unix workstation
2. Connect a network cable from the Network Hub to the GMCP display
3. Connect keyboard to the GMCP Unit
4. Apply power to the Network Hub
5. Turn on the UNIX NCBridge host (Superman)
   (Can check for connectivity using command ifconfig –a)
6. Turn on the GMCP host (gmcp_fwd). When "Boot Monitor" screen appears on your display, **hit the space bar to interrupt the boot sequence**.
7. At the "BOOT>" prompt input the following config info:
   BOOT> ia 192.168.122.43 <cr> <IP address for the GMCP>
   BOOT> ih 192.168.122.37 <cr> <IP address of the NCBridge host>
   BOOT> im 255.255.255.224 <cr> <netmask>
   BOOT> name gmcp_fwd <cr>
   BOOT> lan dup full rate 100 <cr> <error can be ignored>
   BOOT> bp </export/home/ncbridge/tekxp/boot/os.900> <cr>
   BOOT> bm nfs 8192 <cr>
   The 8192 is for optimal speed, but if you find it doesn't work with your setup, change it to 1024...
8. Save these settings on the GMCP in NVRAM with the following boot monitor command:
   BOOT> nvs <cr>
9. Re-start the boot sequence with the following boot monitor command:
   BOOT> b <cr>
   The GMCP should now boot from the os & config files on your NCBridge host and go through a flashing procedure now.
   It is important to never interrupt it when in the middle of flashing.

   You will see a message to this effect on the display.

   - **FLASH UPDATE IN PROGRESS – DO NOT DISTURB !**
   Leave it until the message goes away.
10. Re-boot the GMCP (hit Ctrl-Alt-Delete, or cycle power).
11. Hit the space bar to interrupt the boot sequence to get back to the boot monitor prompt "BOOT>"

12. Make the following setting change:
    BOOT> bm rom <cr>
    BOOT> nvs <cr>
    BOOT> b <cr>

The GMCP should now boot without accessing the NCBridge host whenever it is powered on.

Note: Perform a test by displaying an xclock on the GMCP host. From the NCBridge host execute the following command: (/usr/openwin/bin/xclock –display gmcp_fwd:00). The xclock should now be displayed on the GMCP host screen.

APPENDIX C - INTERFACE CABLES

CABLE NUMBER FOR REFERENCE ONLY DO NOT MARK ON CABLE	LENGTH	REMARKS
W35570	23 INCHES	FOR ESTIMATION ONLY - ASSEMBLY MAY REQUIRE DIFFERENT LENGTH
W35571	23 INCHES	FOR ESTIMATION ONLY - ASSEMBLY MAY REQUIRE DIFFERENT LENGTH
W35261	26 INCHES	FOR ESTIMATION ONLY – ASSEMBLY MAY REQUIRE DIFFERENT LENGTH
W35262	12 +/- 1 FEET	TERMINATE AT “A” END ONLY
W35263	12 +/- 1 FEET	TERMINATE AT “B” END ONLY

APPENDIX D - TESTING REQUIREMENTS

Functional Testing

Electrical testing shall consist of the following as a minimum:

- Point-to-point continuity checks and electrical shorts test of internal wiring and external cabling and loss testing of the fiber optic cable assemblies.
- Power on testing to demonstrate proper operation of the following:
  - POWER, GMCP, and VELOCIMETER switches on the Isolation Panel Assembly (7244500),
  - Daisy Data Interactive Display through “boot-up”,
  - Velocimeter Communications Failsafe CCA 7625460 in performing two functions;
    - As an RS-232 signal driver,
    - Interrupts Velocimeter Power for approximately 2 seconds in the absence of an RS-232 signal for approximately 60 seconds. This may be verified by observing the indicator light on the VELOCIMETER switch on the Isolation Panel Assembly.
  - Dimmer CCA (7244553) in dimming the indicator lights on the switches of the Isolation Panel Assembly when the BRT knob is rotated counter-clockwise.
  - Keyboard and micromodule operation.

Complete GMCP assemblies shall be inspected for workmanship and finish.

Operational Testing

Use external computer equipment and software to generate signals through the fiber optic connectors to the GMCP to provide the following:

- An updating XCLOCK display on the screen of the GMCP
- A touch panel button test in which a matrix of 1-inch square areas will be presented, filling the screen of the GMCP. When the operator presses each area, a visual indication (such as color change) will show that each area of the touch screen is functioning
- An RS 232 “loopback test”. By connecting the transmitted data line to the received data line at the GMCP connector, data keyed in at the computer will be echoed back using the TELNET function
- A pointing device (mouse) test to indicate that the pointing device is functioning
- A keyboard test to indicate that each key is functioning