AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. CONTRACT ID CODE	PAGE	OF	PAGES
	1		4

2. AMENDMENT/MODIFICATION NO.	3. EFFECTIVE DATE	4. REQUISITION/PURCHASE REQ. NO.	5. PROJECT NO. (If applicble)
0001	02/08/11	53-2004-11	

6. ISSUED BY CODE

CONTRACTING OFFICE
NAVAL RESEARCH LABORATORY
ATTN:3220
4555 OVERLOOK AVE, SW
WASHINGTON, DC 20375-5320

7. ADMINISTERED BY (If other than Item 6) CODE

8. NAME AND ADDRESS OF CONTRACTOR (No., street, county, State and ZIP Code)

TO ALL OFFERORS

CODE FACILITY CODE

(X) 9A. AMENDMENT OF SOLICIATION NO.

N00173-11-R-RK01

9B. DATED (SEE ITEM 11)

01/14/11

10A. MODIFICATION OF CONTRACT/ORDER NO.

10B. DATED (SEE ITEM 11)

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

[x] The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offers [ ] is extended, [x] is not extended.

Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods:

(a)By completing items 8 and 15, and returning _____ copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted;

or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment your desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

12. ACCOUNTING AND APPROPIRATION DATA (If required)

13. THIS ITEM ONLY APPLIES TO MODIFICATION OF CONTRACTS/ORDERS. IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.

CHECK ONE	
	A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.
	B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(b).
	C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:
	D. OTHER (Specify type of modification and authority)

E. IMPORTANT: Contractor [x] is not, [ ] is required to sign this document and return _____ copies to the issuing office.

14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract subject matter where feasible.)

SEE PAGE 2

Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.

15A. NAME AND TITLE OF SIGNER (Type or print)		16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print)	
15B. CONTRACTOR/OFFEROR	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA	16C. DATE SIGNED
(Signature of person authorized to sign)		(Signature of Contracting Officer)	

The purpose of this amendment is to revise #2 "Power Amplifier", #4 "Receive Antennae" and #6 "System Coherence and Timing" of the specification.

Specification for High Frequency Ionosonde System

Description

This solicitation is for a frequency agile phase coherent ionosonde system to be delivered by the contractor to the Naval Research Laboratory (NRL), Washington, DC. The system shall be capable of generating and receiving arbitrary waveforms over the frequency range of 500KHz to 25 MHz and be capable of recording and displaying the received data as Range verses Frequency. The exciter system and received system shall be capable of use in a bistatic configuration. The system shall include waveform generation, high power amplification, receive antennae, receiver/digitizer, control/processing and data storage. Documentation for system operation and all high level software source code necessary for the operation and customization of the system shall be supplied.

High Frequency Ionosonde System - CLIN 0001

1. Exciter

   The exciter shall consist of at least two channels capable of arbitrary waveform generation with up to 100KHz of instantaneous bandwidth from user input baseband waveforms with a carrier frequency from 500KHz to 30MHz. Documentation of data formats and protocols shall be provided such that waveforms can be created in MATLAB or other computer programs.

   - RF frequency — 500KHz to 25MHz
   - Frequency resolution — < 1Hz
   - pulse repetition rate — 10 - 200 pps
   - pulse bandwidth — 10 - 100 KHz
   - arbitrary modulation — ≥ 16K chips
   - output power — 0 dBm nominal
   - harmonic output (in band) — < -60 dBc
   - harmonic output (out of band) — < -80 dBc
   - spurious output — < -80 dBc

2. Power Amplifier

   The system shall provide a single channel pulsed output amplifier. **Amplifier shall be a linear design such as class A-B.**

• frequency	500 KHz to 25 MHz
• peak power	> 3KW at 1dB compression
• max duty cycle	≥ 20%
• gain flatness	± 1.5 dB at -10dB max
• Harmonics	-20dBc odd, -30 dBc even

3. Receiver

The receiver system shall consist of a minimum of 8 independent channels with appropriate front end analog amplification and filtering with instantaneous bandwidth of at least 100KHz with a carrier frequency from 500 KHz to 25 MHz. The system will have the capability to collect and apply calibration data.

• sampling rate	up to at least 200KHz
• dynamic range (noise)	> 100 dB at 25 KHz bandwidth
• dynamic range (spur free)	> 80 dB
• third order intercept	30 dBm at 10MHz
• minimum detectable signal	< -100 dBm at 25 KHz bandwidth
• attenuation	≥ 32 dB in 1 dB steps
• phase coherence	< ± 5º channel to channel

4. Receive Antennae

The system shall be supplied with a minimum of 4 cross polarized antennae which cover the frequency range of 500KHz to 25 MHz. **The Receive Antennae shall be transportable.**

5. Control and Data collection

The system shall be software controlled using a standard x86 based computer. Control and processing software shall be in C language. The system shall be capable of remote operation assuming the presence of a suitable network connection. The data collection shall be greater than 1 Msample/sec at 16 bits complex baseband.

6. System Coherence and Timing

The system shall be capable of operating in a monostatic or bistatic configuration assuming the presence of a GPS signal. The system clock shall be at least 80MHz.

• **frequency accuracy**	**$\pm 1 \times 10^{-8}$**

- SSB phase noise

  -110 dBc/Hz at 10Hz
  -130 dBc/Hz at 100Hz
  -145 dBc/Hz at 1KHz
  -150 dBc/Hz at 10KHz
  -150 dBc/Hz at 50KHz

7. Enclosures

   The system shall be mounted in a standard 19 inch rack with the ability to be separated for bistatic operation. All enclosures that require power shall operate using standard 120VAC at 60Hz.

Training – CLIN 0002

Training will be required for up to 6 people. Training will be conducted at the Naval Research Laboratory for a minimum of 3 full days at time of acceptance of CLIN 0001.

Documentation – CLIN 0003

Contractor shall provide documentation for system operation and all high level software source codes necessary for the operation and customization of the system.

Warranty - CLIN 0004

The system shall include at least a one year commercial warranty.