



S²MARTS Project: Neptune Payload Prototype Project
Request For Solutions (RFS) Question & Answer | Date: May 21, 2021

1. Question: What frequency band(s) is this SDR for Neptune payload? When does ONR need initial engineering model units? What production volume in 2022-24?

Answer: 1. See the RF/Signal Processing objectives section of the RFS.

Answer: 2. Refer to Project Deliverables section of the RFS

2. Question: Who within Govt will develop/evolve the expendable unmanned system?

Answer: There is a current design(s) and undergoing additional development, which may be competed separately in the future.

3. Question: What frequencies are of interest?

Answer: 0 MHz -20,000 MHz

4. Question: Do responders need a full system or are components viable for submission?

Answer: Components are an acceptable solution provided proposed integration to meet thresholds and objectives from a system perspective.

5. Question: Will there be CMMC requirements for this topic? If so, are they applicable to the prime, or both prime/subs?

Answer: NSTXL Answer - The DoD will specify the required CMMC level in Requests for Information (RFIs) and Requests for Proposals (RFPs). The costs associated with implementing CMMC requirements, supporting the CMMC assessment, and contracting with the C3PAO will be considered an allowed cost. For contracts that include the CMMC requirement, you will not be awarded the contract if you are not certified at the appropriate CMMC level at the time of contract award.

6. Question: Are we being asked to bid Phase 1,2,3,4 or just Phase 1? "Phase 1 description it states: Preliminary Design Review briefing, including a substantially more detailed plan conveying the technical approach, schedule, and Phase 2/3/4 costs to implement redesign plans to meet objectives."

Answer: FFP cost for Phase 1, all other Phases the government expects a ROM for planning and budgetary purposes to be adjusted based on progress and milestones throughout the course of the project.

7. Question: Section 7 outlines the budget. We are seeking clarification on the following: * Is the listed budget an overall one to be split among performers or is it per performer? * Is the budget listed for Phases 2 and 3 to be split between those phases or is it per phase?

Answer: 1.) The budgetary numbers in the RFS are the budget estimates for the entirety of each phase referenced. 2.) Phase 2/3 budget of \$3M is the total across both Phase 2 & 3.

8. Question: Is it acceptable to bid Phase 1 only, and estimate cost for Phases 2-4 during Phase 1, when the solution is more defined?

Answer: FFP cost for Phase 1, all other Phases the government expects a ROM.



9. Question: Will you accept a Firm Fixed Price - Level Of Effort proposal?

FFP cost for Phase 1, all other Phases the government expects a ROM. Based on proposal justifications, alternative contract types will be considered and reviewed. The Phase 4 description indicates a deliverable quantity of ≤ 100 . However, in the deliverable table you indicate exactly 100 quantity. The quantity of ≤ 100 is the projected number of deliverables identified for Phase 4. This will be dependent on the unit cost of the Phase 4 solution and the budgetary constraints of the project at that time.

10. Question: Is a FFP-LOE contract possible for this opportunity?

Answer: Contract Answer - FFP cost for Phase 1, all other Phases the government expects a ROM. Based on proposal justifications, alternative contract types will be considered and reviewed.

11. Question: Is ONR willing to accept proposals for partial solutions or sub-systems?

Answer: All solutions will be reviewed and considered from a system risk/reward evaluation criteria. Awards for partial solutions that would improve the total system performance would be acceptable to the government.

12. Question: In the RFS document, the Project Deliverables table lists different deliverables with Delivery Plan dates as #days DAA (Days After Agreement). Is DAA measured in calendar days or business days?

Answer: Calendar days

13. Question: Are the award values per awardee, meaning will there be two to three \$670 awards for Phase 1? Similarly, for phase 2/3 awards, are the values for each phase, meaning Phase 2 award is \$3M and the Phase 3 award another \$3M per awardee?

Answer: The budgetary numbers in the RFS are the budget estimates for the entirety of each phase referenced. Phase 2/3 budget of \$3M is the total across both Phase 2 & 3.

14. Question: What is the total expected volume of the end items?

Answer: The quantity of ≤ 100 is the projected number of deliverables identified for Phase 4. This will be dependent on the unit cost of the Phase 4 solution and the budgetary constraints of the project at that time.

15. Question: Will the govt provide the cylinder as GFE for the prototypes? At what phase will they provide these cylinders? Is there any other potential GFE?

Answer: The cylinder housing is not required to be included in your design proposal. If requested, a sample housing could be made available as GFE in Phase 2, provided the government deems your solution mature enough for integration.

16. Question: How many variants will the customer accept to cover the frequency range? Or is one transceiver expected to cover the entire frequency range?

Answer: The number of variants will be dependent on the specific proposed solution and could be one or more. The intent was not to cover the entirety of the RF Spectrum, but also to specify that there is not a limitation with the design or that the engineering could not be accomplished to cover another frequency range desired.

17. Question: What is the schedule for award and expected project start?

Answer: August 2021

18. Question: What is the projected schedule for each of the Phases?

Answer: The projected schedule will be dependent on the maturity of the proposed designed and the anticipated deliverables/milestones. Notionally: Phase 1 - 125 Days; Phase 2 - 350 Days; Phase 3 - 350 days

19. Question: If the payload can be adequately and reliably sealed against the storage/operational environment, does the payload need to allow internal purging and backfilling, or is that operation intended for the expendable unmanned system? Ref: S2MARTS-21-10-Neptune-RFS-13May2021.pdf Section 5, "Withstand inert gas purging / backfilling for reliable operation in maritime environment."

Answer: 1. It is not required for payloads to provide their own sealing solution.

Answer: 2. The expendable unmanned system (including the housing for the payload) can be assumed to be purged with inert gas during assembly.

20. Question: Can the Consortia or Gov't provide a notional diagram/sketch/drawing of the expendable unmanned system?

Answer: This will be included as part of the Neptune Payload TalX slide deck.

21. Question: What mechanical impulses will the payload experience on operation (e.g. "expendables"), and other environmental requirements will be imposed on the production units?

Answer: Mechanical / environmental qualification is anticipated to be performed at the system level, not at the payload level. Further contextual information will be provided during Phase 1.

22. Question: Is there an expectation that existing applications and waveforms will run on the new platform? Does the government expect to port currently developed applications and waveforms to new devices or configurations?

Answer: There is no expectation that devices will natively "run" existing "applications" (software / firmware). However, this capability is of interest. In general, the performer is free to select the processing architecture (hardware / software / firmware) that provides a framework to which existing / new capabilities can be adapted.

23. Question: Since the government is developing the applications and presumably, the waveforms that will operate on the developed platform, can the government provide the devices, development environments and modeling in use?

Answer: The government intends to provide additional technical information to the Phase 1 performers.

24. Question: The RFS states that a minimum of one Rx and one Tx channel are required (and phase coherent), with an objective of four Rx and four Tx channels. Is it preferred to have the additional channels independently tunable (different RF frequencies) or phase coherent (same RF frequency and consistent relative phase offset)?

Answer: The government will accept and evaluate proposals with either phase coherent and/or independently tunable channels.



25. Question: The RFS states an objective to provide hardware-accelerated RF signal processing functions, such as configurable filters, DUCs/DDCs, etc. Is the goal here to ensure that the hardware is capable of support these classes of functionality (but implemented by USG partners), or are you interested in this functionality being delivered as part of the proposed solution?

Answer: The government is interested in proposed solutions that would provide hardware-accelerated RF signal processing functions. For "flexible" solutions (e.g., FPGA, MCU, or the like), it is preferred that solutions provide at least a basic level of functionality as listed in order to permit evaluation of payload functionality without further USG development. For "inflexible" hardware processing (e.g., ASIC / DSP) additional assurance that capabilities are functional would be desired.

26. Question: The RFS mentions multiple performs participating in each stage. Is the proposed budget a total budget to be split across all performers at each stage, or is that amount expected to be available for each performer?

Answer: The budgetary numbers in the RFS are the budget estimates for the entirety of each phase referenced.

27. Question: The RFS indicates that the security classification of the effort is Secret. Can you clarify if a facility clearance for at least Secret is acceptable, or does the facility also need to be capable of possessing/storing Secret material? Is the engineering effort expected to be performed in a classified setting? Or is the interest in having a Secret classification for the project simply to ensure that performers can participate in customer meetings at the Secret level?

Answer: The solutions for the Neptune Payload are expected to be unclassified. The Secret security classification and associated DD254 are intended to support technical exchange of information at the Secret level. Potential classified work areas in Phase 1 and beyond could include mission specific design/analysis, operational software development (vs. test software), demonstration, etc.

28. Question: Since the goal of the RFS is to leverage significant IRAD investment that commercial companies have made in COTS SDR development, can you clarify the intent behind the required government purpose data rights for the resulting delivered products?

Answer: NSTXL/Contract/Legal Answer - The goal is to leverage COTS items as a starting point, but the modifications and development work needed to meet the military requirements makes the deliverables non-commercial. Because the Government is funding this work, we are requesting GPR to at least the modified deliverables. Less than government purpose rights will be considered as specified exemptions within the proposal.

29. Question: The RFS states a threshold instantaneous bandwidth of 55 MHz for both Tx and Rx. If a solution were capable of supporting a sample rate of 61.44 Msamples/sec at an instantaneous bandwidth of 40 MHz, would that be acceptable? Or would it be necessary to "stack" channels together to be able to support, say, 80 MHz of IBW with two channels next to each other (thus exceeding the 55 MHz IBW requirement)?

Answer: The government will accept and evaluate proposed solutions that will meet stated objectives of the Neptune Payload, to include multiple channel solutions.

30. Question: Can you provide any commentary on which would be preferred: (A) a solution that was closer to the objective requirements but correspondingly costs more per SDR, or (B) a solution that was focused on meeting the threshold requirements and correspondingly costs less?.

Answer: The government will accept, evaluate and award proposed solutions that best meet technical and performance objectives within cost constraints of the program. See the Price and Manufacturing objectives section of the RFS.

31. Question: What effective range/distance should there be for either communications or stored waveform transmission?

Answer: Performers are free to assume a value if necessary to illustrate the characteristics of their solution.

32. Question: What is the total/notional life-cycle (e.g. storage, operational, etc.)?

Answer: See the RFS - Electrical Objectives for the payload operational life-cycle. Performers may assume that storage life does not impact payload battery allocation.

33. Question: How does range/distance trade with mission time? Is one preferable over the other?

Answer: The government desires a solution that will support multiple missions. If the transmit power or other characteristics is critical to the design, the performer may assume a value for missing parameters as needed to illustrate the characteristics of their solution.

34. Question: Is the transmission waveform for pulsed, continuous wave, or combination?

Answer: The government desires a solution that will support multiple types of transmission types.

35. Question: Are antennas integrated into the radio module, or separate from SWAP specifications? If separate, what specifications are the antenna and its RF electronics (PA/LNA)? If integrated, what beamwidths?

Answer: Antennas are not included in the payload volume. It is preferable that any PA / LNA be included in the payload, however, these may be treated as external RF accessories at the discretion of the performer. If necessary to illustrate the characteristics of the performer's solution, missing antenna parameters may be assumed.

36. Question: What standard communication protocols should be modulated or demodulated?

Answer: The government desires a solution that supports a broad range of waveform types.

37. Question: Is this device to communicate with other devices like itself or other devices? If other devices, which ones? If within like devices, is encryption necessary? To what level?

Answer: The government desires a flexible solution that can support a variety of maritime RF missions. Data encryption to a particular standard is not currently required.

38. Question: Which maritime RF missions are needed to be supported? (it would help select RF performance parameters)

Answer: The Neptune Payload will need the flexibility to support a variety missions to support Electromagnetic Spectrum Operations (EMSO).

39. Question: Does storage need to be removeable?

Answer: No

40. Question: How much mission storage is needed?



Answer: The data rate and storage capacity will be driven by the performer's solution. Performers are free to assume driving parameters necessary to articulate their solution.

41. Question: When does the Days After Agreement period begin?

Answer: At time of award for each given Phase.

42. Question: In the Project Deliverables section, does the delivery plan represent hard deadlines, or are they recommendations that can be adjusted in our plan as necessary?

Answer: Phases and project deliverables align tightly to the DoD budgetary cycle and slippage incurs programmatic and funding risk for continuation. Proposed solutions must include realistic timelines given the targeted dates listed in the project deliverables section in order to maintain the Neptune Payload schedule.

43. Question: Can a member submit more than one proposal using different approaches?

Answer: Yes

44. Question: When deployed on a mission, will communications between heterogeneous maritime systems, each with a possibly different RF modulation, be a use case?

Answer: The government desires a flexible solution that can support a variety of maritime RF missions.

45. Question: Will reconfiguration of the SDR while deployed on a mission be a use case?

Answer: Full firmware / software reconfiguration can be assumed to occur prior to employment / activation. Once activated, we assume that reconfiguration will be limited to mode selection from the host microcontroller (see Electrical Objectives section of the RFS)

46. Question: Is communication with cellular networks, e.g. 5G NR, anticipated?

Answer: The government desires a flexible solution that can support a variety of maritime RF missions.

47. Question: Will MANET support be required?

Answer: The government desires a flexible solution that can support a variety of maritime RF missions.

48. Question: The schedule implies adapting an existing solution. Is there an existing system or software-defined radio being considered by the Program Team?

Answer: No, the government is seeking solutions that will meet performance and cost objectives outlined in the RFS for current mission and future adaptations.

49. Question: Is this replacing an existing system or solution?

Answer: No, this is a new capability

50. Question: Where is the data I/O and what are the specs on the I/O?



Answer: Other than the control interface from the host microcontroller (see Electrical objectives section of the RFS), data can be assumed to originate from secure mission storage or received via the solution's RF receiver.

51. Question: Does the level of data rights requested by the Government refer to inventions, software, and/or technical data developed by the contractor at private expense prior to execution of the contract, or to inventions, software, and/or technical data developed by the contractor under this proposed effort? (Section 9, Page 9)

Answer: NSTXL/Contract/Legal Answer - The Government desires sufficient rights to competitively produce prototypes through a follow-on activity. To this end, the Government desires GPR to at least the data developed under this effort.] Less than government purpose rights will be considered as specified exemptions within the proposal.

52. Question: For the delivery plan "DAA" (Days After Agreement), is that due "x" days after the overall contract agreement is in place, or "x" days after the execution of a contract agreement for each individual phase? In addition, what is considered the "Agreement" date; is it overall award date, or date of finalization and execution of the contract? (Section 6, Page 7)

Answer: NSTXL / Contracts Answer - DAA is days after agreement for the execution of a contract agreement for each individual phase.
NSTXL / Contracts Answer - It is the date of finalization and execution of the contract, in which work can begin.

53. Question: Section 7 reference to 2-3 performers. Is the allocated budget of \$670K per performer? What is the definition of performer?

Answer: The budgetary numbers in the RFS are the budget estimates for the entirety of each phase referenced. A performer is the entirety of the proposer's team to include any and all sub-contracting.

54. Question: Would the spec for customer battery input be provide? Also sample battery for testing?

Answer: Updated / additional battery specifications may be provided in Phase 1. A sample battery may be provided in Phase 2.

55. Question: : What is the budget of Phase 1 per awardee? Total of \$670K?

Answer: The total budget for Phase 1 is \$670K combined for all awardees.

56. Question: Are there any anticipated dynamic conditions (shock, acceleration, vibration, etc.) that would need to be met? b.

Answer: Mechanical / environmental qualification is anticipated to be performed at the system level, not at the payload level. Further contextual information will be provided during Phase 1.

57. Question: What are the thermal characteristics (min/max temperature, thermal capacity, conductivity, etc.) of the surrounding enclosure?

Answer: Assume the enclosure material is aluminum.

58. Question: Would you please confirm minimal operational threshold is 0.1 hours (6 minutes)?

Answer: Yes, during the most demanding operational mode

59. Question: Does the platform provide antennas for the payload? If so, how many and what frequency bands are covered? Are there separate TX and RX antennas available?

Answer: Yes, antenna integration is external to the payload. Performers may assume any antenna type / configuration as needed to illustrate the characteristics of their design. Operation with either a single antenna or separate transmit/receive antennas is required. If a multichannel payload is proposed a multichannel antenna may be assumed.

60. Question: For the GPIO Control, is the minimal # of GPIO pins required. What is the voltage rating of these GPIO pins (5V, 3.3V, etc)?

Answer: Performers are free to assume any value for GPIO pin count / voltage rating as determined by their proposed architecture.

61. Question: For the transmission of arbitrary stored waveforms, what is the minimum expected amount of data storage available?

Answer: Performers are free to assume any value for data storage capacity / throughput as needed to illustrate the characteristics of their design.

62. Question: For the secure storage of software / data, is the system recoverable after erasure, or is the erasure permanent (destructive)?

Answer: Assured erasure to ensure data is not recoverable.

63. Question: What are the quantitative values for RF performance parameters (frequency stability, sensitivity/dynamic range, Analog-to-Digital Converter (ADC) and Digital-to-Analog Converter (DAC) bit count, memory depth, spur levels, transmit/receive isolation, output power, etc.)?

Answer: Performers are free to assume any value for these missing parameters to illustrate the characteristics of their solution. As described in the RFS, the overall solution should provide a balance between performance, flexibility, and unit cost.

64. Question: Is there a specific response time that the system has to satisfy for signal detection and waveform generation?

Answer: No, the RFS only states low latency. Performers are free to assume any value for these missing parameters to illustrate the characteristics of their solution. As described in the RFS, the overall solution should provide a balance between performance, flexibility, and unit cost.

65. Question: Are there any additional data storage requirements? (e.g. Logging (Commands, Events, Previous Signals), Configuration Information, Waveforms)

Answer: Configuration information, waveforms, and logs (if any) should be considered part of secure mission storage.

66. Question: Is the system expected to store and/or relay information derived from demodulation processes?

Answer: Yes

67. Question: In regards to the select-ability of operational modes/functions, when will the selection of operational modes occur? e.g. During Deployment? Pre-Deployment? Both?



Answer: The Neptune Payload will need the flexibility to support multiple operational modes and functions that can be modified prior to deployment (e.g., change settings, software, or firmware) and selected during deployment (at runtime).

68. Question: Any guidance on health information to be provided with Built-In-Test? e.g. RF Good? Communications Good? Other Diagnostic related information (temperature, etc)

Answer: The health and status information may include, but not limited to, SDR status, communication/interface status, temperature, digital signal processing status, electrical power and other general hardware health status.

69. Question: In the DD254 included with the solicitation, relevant to cited FAR Clause 52.204, it says: Contractor employees occupying sensitive positions requiring access to classified information or CUI, whether embedded within the command or working from another location, require, at a minimum, a favorably-adjudicated T3 background investigation providing national security eligibility or an interim (temporary) national security eligibility, commensurate with contract requirements, prior to being afforded access to classified information or CUI. What is the definition of a "sensitive position" and can uncleared personnel have access to CUI in support of the effort?

Answer: Security - T3 is the investigation required for positions designated as non-critical sensitive and/or requiring eligibility for "L" access or access to Confidential or Secret information.

Safeguarding measures that agencies are authorized or accredited to use for classified information and national security systems are also sufficient for safeguarding CUI in accordance with the organization's management and acceptance of risk.

CUI and CNSI are separate executive orders and implementing directives.

CUI requires safeguarding measures identified by the CUI EA in Part 2002.14 of Title 32, CFR and, as necessary, in the law, regulation, or government-wide policy with which it is associated. DoD CUI may be disseminated to DoD personnel to conduct official DoD and U.S. Government business in accordance with a law, regulation, or government-wide policy.(1) No individual may have access to CUI information unless it is determined he or she has an authorized, lawful government purpose.(2) The person with authorized possession, knowledge, or control of CUI will determine whether an individual has an authorized, lawful government purpose to access designated CUI.(3) CUI information may be disseminated within the DoD Components and between DoD Component officials and DoD contractors, consultants, and grantees to conduct official business for the DoD, provided dissemination is consistent with controls imposed by a distribution statement or limited dissemination controls (LDC).(4) CUI designated information may be disseminated to a foreign recipient in order to conduct official business for the DoD, provided the dissemination has been approved by a disclosure authority in accordance with Paragraph 3.4.c. and the CUI is appropriately marked as releasable to the intended foreign recipient.

Answer: It is best practice to receive concurrence from your security manager and/or information security policy representative.

70. Question: Is there a Neptune UAV Concept of Operations available?

Answer: No

71. Question: Will a separate ATO and/or ATEA approval be required?



Answer: Not at this time. If required qualification plans will be developed during Phase 1 and/or Phase 2.

72. Question: Are there critical additional environmental requirements and/or constraints? (e.g. levels of hardening/ruggedization for the maritime application including shock/vib, temperature; threshold/objective)

Answer: Environmental is not considered to be a critical design parameter and the NEPTUNE payload is expected to be sufficiently isolated within the total system design. Mechanical / environmental qualification is anticipated to be performed at the system level, not at the payload level. Further contextual information will be provided during Phase 1.

73. Question: Are there known issues or weaknesses in the current system that need to be considered when developing the prototype?

Answer: The Neptune Payload is a new project

74. Question: Is there a block diagram available covering I/O (interfaces) etc.?

Answer: This will be further defined through technical exchange meetings between the government and awardees as part of Phase 2 and 3. At this time an ICD is not defined, performers are free to assume interfaces as determined by their proposed architecture.

75. Question: Confirm the assumption that the RF system does not directly feed the antennas but rather feeds a RF power amplifier. Is this amplifier external?

Answer: It is preferable that any PA / LNA be included in the payload, however, these may be treated as external RF accessories at the discretion of the performer. If necessary to illustrate the characteristics of the performer's solution, missing antenna parameters may be assumed.

76. Question: What is the actual lowest planned transmission frequency? and more info is needed about Bandwidth vs. RF Frequency. (e.g. 55 MHZ to 400 MHZ bandwidths are not possible at the lower transmission frequencies)

Answer: Specific limitations regarding planned transmission frequencies will be discussed during classified technical exchange meetings starting in Phase 1. At this time the government will accept and evaluate proposals that meet as much of the RF / Signal Processing Objective listed in Section 5 of the RFS.

77. Question: Are there any critical EMI/EMC requirements and/or sensitive bands?

Answer: None at this time. EMI/EMC qualification is anticipated to be performed at the system level, not at the payload level. Further contextual information will be provided during Phase 1.

78. Question: Where are the antennas located relative to the electronics? (Is the location such that the electronics are shielded from the antenna output?)

Answer: Yes, reasonable isolation and shielding between the payload housing and antenna will be provided. A Performers are free to assume any value for isolation as needed to illustrate the characteristics of their design, where if the provided solution is inadequate, a contractor designed solution to meet those requirements would be alternatively viable.



79. Question: What is the required RF band switching time? (new frequency time)

Answer: Per the RFS, "payload subsystem is only required to operate in a single letter-band at a time"; No switching time is specified between bands. Performers are free to assume any value for switching as needed to illustrate the characteristics of their design.

80. Question: What is the required waveform switching time? (time to shift from one TX waveform to another)

Answer: Performers are free to assume any value for switching as needed to illustrate the characteristics of their design.

81. Question: Is there a requirement for multiple RX waveforms detected/decoded/stored simultaneously? (versus only one waveform at a time).

Answer: The government desires a solution that will support multiple types of modulation and duplexing, which could include multiple RX waveforms.

82. Question: Will there be a prioritization of requirements?

Answer: As described in the RFS, the overall solution should provide a balance between performance, flexibility, and unit cost. The proposal will be evaluated from a total system perspective.

83. Question: The RFS indicates that the Current Project Budget for Phases 2-3 is \$3M. Is that \$3M for each of Phase 2 and Phase 3, or \$3M total across both phases?

Answer: Phase 2 and 3 have a combined estimated budget of \$3M total.

84. Question: The Project Budget for Phase 4 is \$3M with 2 performers. However, the threshold price for 100 prototype units to be delivered in Phase 4 is \$30,000/unit. With 100 prototype units to be delivered in Phase 4, one performer alone would require the entire Project Budget for Phase 4 if the price threshold were to be exactly met. If there are notionally two Phase 4 performers, is it expected that the price per unit by Phase 4 be at most half the threshold amount?

Answer: Budgetary and target price per unit (threshold/objective) estimates are a projection at this time. During Phase 4 the government will award the total number of units trading cost for capability/performance. If two performers are awarded during Phase 4, the numbers of units awarded to each performer may vary based on the funding available, while the cost and capability may be different between the two awardees.

85. Question: The RFS Electrical Objects provides a nominal energy allocation and max power draw based on the customer-provided battery. Is this energy budget fully available to the SDR delivered under NEPTUNE, or is some portion of that energy consumed by other payload components (e.g. an external HPA).

Answer: The energy budget listed in the RFS is for the Neptune Payload..

86. Question: The RF Objectives specify that each variant should cover a minimum of one NATO letter band, but also that the system should be configurable to support operation in any two letter bands. Can you please clarify how to reconcile these two statements?

Answer: The intent was the distinction of total operating frequency coverage compared to instantaneous frequency bandwidth. We expect the respondents to address architecture in the solution(s) and do

not have a specific requirement. The intent was not to cover the entirety of the RF Spectrum, but also to specify that there is not a limitation with the design or that the engineering could not be accomplished to cover another frequency range desired.

87. Question: Can you provide any guidance on expectations for RF performance specs, particularly those that may drive SWaP tradeoffs such as output power.

Answer: It is preferable that any PA / LNA be included in the payload, however, these may be treated as external RF accessories at the discretion of the performer. If necessary to illustrate the characteristics of the performer's solution, missing performance parameters may be assumed. The design should consider the Electrical Objectives from the RFS to include an energy budget for operations.

88. Question: Is the intended use of this device primarily intended to be data communications or Electronic Warfare in nature?

Answer: The Neptune Payload will perform variety of Electromagnetic Spectrum Operations (EMSO) missions.

89. Question: Would it be advantageous for this device to also have full communications capability?

Answer: The Neptune Payload will perform variety of Electromagnetic Spectrum Operations (EMSO) missions.

90. Question: Are there transmit RF power requirements?

Answer: There are not specific power requirements. It is preferable that any PA / LNA be included in the payload, however, these may be treated as external RF accessories at the discretion of the performer. If necessary to illustrate the characteristics of the performer's solution, missing performance parameters may be assumed. Based on preliminary assessments 10 mW to 10 W could be sufficient for a variety of missions.

91. Question: Are antenna performance characteristics known and can they be shared?

Answer: Antenna integration is external to the payload. Performers may assume any antenna type / configuration as needed to illustrate the characteristics of their design. Operation with either a single antenna or separate transmit/receive antennas is required. If a multichannel payload is proposed a multichannel antenna may be assumed. There is a current design(s) and undergoing additional development, which may be competed separately in the future. Additional information may be shared during Phase 1 or subsequent phases.

92. Question: Is there a need for security or cyber hardening?

Answer: At this time specific security and hardening requirements are not specified, other than what is stated in the RFS. Design considerations to ensure future compatibility or integration with security and cyber hardening should be considered, but implementation is outside the scope of Phase 1.

93. Question: Will the government require or desire a software development kit as a deliverable?

Answer: Yes, the government desires to have a software development kit (SDK)

94. Question: Is there a desire for significant receive I/Q storage memory?

Answer: If necessary to illustrate the characteristics of the performer's solution, missing performance parameters may be assumed. As described in the RFS, the overall solution should provide a balance

between performance, flexibility, and unit cost. The proposal will be evaluated from a total system perspective

95. Question: Does the government anticipate the need for an APNT capability?

Answer: No, the Neptune Payload does not have an objective for APNT. The Neptune Payload will perform a variety of Electromagnetic Spectrum Operations (EMSO) missions. If necessary to illustrate the characteristics of the performer's solution, missing performance parameters may be assumed.

96. Question: Does the government anticipate the eventual need for cooperative engagement with higher level systems?

Answer: The Neptune Payload will perform a variety of Electromagnetic Spectrum Operations (EMSO) missions, which could include future needs. As described in the RFS, the overall solution should provide a balance between performance, flexibility, and unit cost. The proposal will be evaluated from a total system perspective

97. Question: What is the required throughput for the waveform? Is the waveform expected to be point-to-point, between Neptune subsystems, to a ground station, or to airborne/space assets?

Answer: The Neptune Payload will perform a variety of Electromagnetic Spectrum Operations (EMSO) missions and could include a variety of link options. If necessary to illustrate the characteristics of the performer's solution, missing performance parameters may be assumed.

98. Question: Does the delivery include a waveform design/implementation, or is this intended as a platform for user-developed waveforms?

Answer: The Neptune Payload should provide the government with the ability to independently implement desired waveforms as needed. It is preferred that solutions provide at least a basic level of functionality as listed in order to permit evaluation of payload functionality without further USG development or additional assurance that capabilities are functional would be desired.

99. Question: What is the minimum frequency required in Band A?

Answer: The government is interested in solutions that include all of Band A. The government will accept and evaluate partial solutions. Specific limitations regarding planned transmission frequencies will be discussed during classified technical exchange meetings starting in Phase 1. At this time the government will accept and evaluate proposals that meet as much of the RF / Signal Processing Objective listed in Section 5 of the RFS.

100. Question: What is the minimum RF power level for transmit?

Answer: There are not specific power requirements. It is preferable that any PA / LNA be included in the payload, however, these may be treated as external RF accessories at the discretion of the performer. If necessary to illustrate the characteristics of the performer's solution, missing performance parameters may be assumed. Based on preliminary assessments 10 mW to 10 W could be sufficient for a variety of missions.

101. Question: Is there a required noise figure for receive?

Answer: At this time a noise figure is not specified as it will be dependent on the proposer's solution and capability, if necessary to illustrate the characteristics of the performer's solution, missing performance

parameters may be assumed. As described in the RFS, the overall solution should provide a balance between performance, flexibility, and unit cost. The proposal will be evaluated from a total system perspective

102. Question: Are there antenna requirements?

Answer: Antenna integration is external to the payload. Performers may assume any antenna type / configuration as needed to illustrate the characteristics of their design. Operation with either a single antenna or separate transmit/receive antennas is required. If a multichannel payload is proposed a multichannel antenna may be assumed.

103. Question: Are there desired thresholds and goals for RF characteristics such as modulation quality, spurs, and LO suppression?

Answer: At this time RF characteristics are not specified as it will be dependent on the proposer's solution and capability, if necessary to illustrate the characteristics of the performer's solution, missing performance parameters may be assumed. As described in the RFS, the overall solution should provide a balance between performance, flexibility, and unit cost. The proposal will be evaluated from a total system perspective

104. Question: What level of voltage is provided from the 137Watt battery power supply?

Answer: Notionally 14 V; Alternative power designs could be accommodated based on integration solutions.

105. Question: Does the 137 Watt power budget / 49 W instantaneous pull include RF front end power consumption (PAs/LNAs) or do they have a separate power budget?

Answer: The energy budget listed in the RFS is for the Neptune Payload.

106. Question: What is expected Rx standby and Tx time on the battery?

Answer: This will be dependent based on the energy budget of the proposer's solution. The energy budget listed in the RFS is for the Neptune Payload.

107. Question: Are there existing waveform threshold frequency hopping speed characteristics?

Answer: No, the government plans to implement a variety of applications and waveforms onto the Neptune Payload solution once delivered to the government. The Neptune Payload will need the flexibility to support a variety of missions to support Electromagnetic Spectrum Operations (EMSO). Performers are free to assume any value for these missing parameters to illustrate the characteristics of their solution. As described in the RFS, the overall solution should provide a balance between performance, flexibility, and unit cost.

108. Question: What environmental tests will be performed on the unit? Is there a particular MIL environmental test standard preferred? Will the housing be supplied GFE to enable performing the testing? I.e: Max / min temperature range, pressure, vibration, drop, acceleration, etc?

Answer: Mechanical / environmental qualification is anticipated to be performed at the system level, not at the payload level. Further contextual information will be provided during Phase 1.

109. Question: What threshold T/R time is desired for half duplex waveforms?



Answer: The Neptune Payload will need the flexibility to support a variety missions to support Electromagnetic Spectrum Operations (EMSO). Performers are free to assume any value for these missing parameters to illustrate the characteristics of their solution. As described in the RFS, the overall solution should provide a balance between performance, flexibility, and unit cost.

110. Question: Is support for common waveform development interfaces (GNURadio, etc) desired?

Answer: The government will accept and evaluate proposed solutions that include Open industry and government standard interfaces.

111. Question: What standard for Secure Storage and assured erase, tamper detect, etc is desired?

Answer: A current standard is not specified, and implementation to a standard is not currently within the scope of this project. At this time, design considerations to ensure future compatibility should be considered. Classified data and/or CUI will be handled in accordance with regulations and standards.

Answer:

112. Question: Can specifics of gas purging be provided? What atmospheric pressures and humidity levels can be expected during operation and purging.

Answer: The expendable unmanned system (including the housing for the payload) can be assumed to be purged with inert gas during assembly. Additional information can be provided during Phase 1.

113. Question: Please verify that the cylindrical housing design is not included as part of this effort and can be provided as GFE during development.

Answer: The cylinder housing is not required to be included in your design proposal. If requested, the cylinder could be made available as GFE, provided the government deems your solution mature enough for integration.

114. Question: The following two requirements appear to be in tension: Can the Government clarify these requirements? A. Note – payload subsystem is only required to operate in a single letter-band at a time B. The subsystem should be configurable either by the customer (preferable) or by the vendor to support operation in any two letter bands

Answer: The intent was the distinction of total operating frequency coverage compared to instantaneous frequency bandwidth. We expect the respondents to address architecture in the solution(s) and do not have a specific requirement. The intent was not to cover the entirety of the RF Spectrum, but also to specify that there is not a limitation with the design or that the engineering could not be accomplished to cover another frequency range desired.

115. Question: Can additional technical requirements be provided during the proposal process that could be used to optimize the solution for SWaP/Cost/delivery or should assumptions be made and documented in the technical response? Additional details about waveform, data rate, environmental requirements, RF Pout, LNA NF, data payload size, supply voltage, etc... would assist in proposing a solution that best aligns with the Government's performance, cost and SWaP needs.

Answer: Performers are free to assume any value for these missing parameters to illustrate the characteristics of their solution

