Members:

C5 is pleased to announce a Request for White Papers - C5-18-RWP-0033, *Radio Frequency Compatibility (RFC) Sensor Integration Unit (SIU)*, to meet the Systems Integration Technology Objective.

The [attached RWP](#) contains information regarding the Government requirement, as well as the requirements, format and submittal instructions for the White Paper. Please read and follow it carefully.

Upon receipt of your White Paper, C5’s Contracts Management team will perform a detailed compliance review and will contact you to request additional information as necessary for C5 to complete the review/assessment. Upon completion, C5 will submit your White Paper to the Government. You will be notified by C5 upon receipt of the Government’s selection decision. Please note that selection of a White Paper to form the basis of a Request for Prototype Project (RPP) is at the sole discretion of the Government.

All White Paper submittals for this RWP must be received by C5 by **4 pm Eastern, December 6, 2017**, in order to meet the Government's deadline of December 13, 2017.

*Important to note: Pursuant to the terms of its OTA, the Government requires that C5 conduct a thorough review of each White Paper submitted to ensure full compliance with both the requirements in the RWP and applicable statutes. C5 therefore requires members to submit their White Papers by the C5 deadline shown above to allow sufficient time to complete the necessary reviews for submittal by C5 to meet the Government’s deadline.*
Please submit White Papers via e-mail to RWP@C5technologies.org with "C5-18-RWP-0033" in the subject line. If you do not receive written confirmation of receipt shortly after your timely White Paper submittal, please call the Contracts Management team at (540) 937-6300.

C5's Contracts team is available to answer any questions related to White Papers and to assist throughout the process – please email or call Amanda or Denise at (540) 937-6300. Any other questions should be directed to C5.

Thank you for your participation.

Below is the Government’s answer to a member question related to White Papers in response to C5-18-RWP-0033. As a reminder, the deadline for submittal of White Papers to C5 is 4:00 Eastern, December 6, 2017.

Thank you.

Q1: Are the IBU and AIBU requirements replaceable with an alternative hardware, which would allow the receiver to continue functioning? If so, what are the SWAP requirements for such a replacement hardware?
A1: The Government is replacing the A/IBU with form and fit hardware with all new functionality and minimal legacy support, so alternative hardware within space and environmental limitations is expected. SWAP requirements are illustrated in the attached diagram, and a weight of the A/IBU is 7 - 10 pounds, but the Government currently expects no specific weight limitations for the SIU Power, Mil-Std-704A 28 VDC on a 5 amp breaker Environmental is per 16PS011E, zone 3 as the worst case, but it has not ruled out other locations offering a better environment.
Below are answers from the Government to member questions related to White Papers in response to C5-18-RWP-0033. As a reminder, the deadline for submittal of White Papers to C5 is December 6, 2017, by 4:00 Eastern. Thank you.

Q2. There was a Sources Sought solicitation for this same unit, which was generally available around August/September of this year. What is the relationship of this SON to that Sources Sought solicitation?
A2. This is the same unit that was listed in the Sources Sought a few months ago. Since the Sources Sought, the F-16 SPO has discovered the C5 process and decided to leverage it to meet schedule demands. It is the same SIU as listed in the Sources Sought posted on FBO.

Q3. The Statement of Need (SON) states that the RFC SIU replaces the BIU/ABIU unit, and must be form-factor compatible with those legacy units. The legacy units have many more discrete I/O than are specified in the SON. For example, the BIU has been through seventeen modifications (i.e., -1, through -17), and there are many discrete inputs and outputs. The SON mentions a requirement to distribute six 1PPS signals from an existing GPS receiver, but makes no mention of the many discrete signals currently provided by the BIU/ABIU units. The implication is that the RFC SIU fits in the same hole, but does not perform the same function. Please confirm.
A3. The SIU will occupy the space currently occupied by the A/IBU and that’s what drives the requirement to fit the same form factor and that’s also pretty much where the similarity with the existing unit ends. The SIU largely will be a general purpose computer with a custom interface supporting only a small subset of the A/IBU interface (about 9 of the legacy blanking signals will be retained). The rest of the I/O will support the new functionality listed in the SON. The Government has not yet identified how many of each interface type will be needed, and since most of the I/O will be provided for growth, there will be a trade study to finally decide how many of each to move forward with. Basically, the Government is looking to pack as much capability and growth into the physical space as possible. The SON states that a minimum of six 1 PPS outputs is needed. The A/IBU don’t support this capability, so this is a new requirement. Your observation is correct. The SIU is not a replacement for the Blanker; it will support about 9 of the legacy blanking signals, but the rest is an entirely new functionality.

Q4. Is there a system spec for the legacy BIU and ABIU units available? If not, are working units available for a reverse engineering analysis? The working assumption is that the RFC SIU will have to operate on the same power rail and limits (e.g., 115Vac, 400Hz) as the legacy units.
A4. Power requirement for the SIU is the same as the A/IBU – Mil-Std-704A 28 VDC on a 5 amp breaker. The legacy Blanker specs are obsolete, and the Government is in the process of publishing a new spec for the SIU to be built to.
Q5. What are the functional, electrical, and mechanical requirements for the 1PPS subsystem? What is the signal level, pulse width, and rise/fall times for the incoming 1PPS. What are the functional, electrical, and mechanical requirements for the six output 1PPS signals? Are they required to be programmable (i.e., programmable pulse width, programmable pulse delay)? What is the maximum allowable pulse delay between input and output, and the maximum allowable skew between the six outputs? What connectors (e.g., mil-C-38999, coaxial, tri/twin-axial) are required?

A5. The 1 PPS will be a wrap-around of the signal provided by the existing GPS, but not otherwise modified; however, some level of programmability might be desirable in case a future subsystem has peculiarities. Any skew will have to be accounted for in the overall latency for each connected subsystem, so that is not envisioned to be an SIU requirement. Connector configurations are TBD.

Here are the input signal characteristics:

PULSE AMPLITUDE:...LOGIC 1: ±1.0 VDC LOGIC 0: ±1.0 VDC
REPETITION RATE:...ONCE PER SECOND
RISE TIME:........20 NANOSEC MAX
FALL TIME:........1 MICROSEC MAX
PULSE WIDTH:.......200 MICROSECOND
SOURCE IMPEDANCE:.50 OHMS +/-5%
RECEIVER INPUT CHARACTERISTICS:.50 OHMS IMPEDANCE
CABLE TYPE:........50 OHMS COAX (M17/113−RG316)

Q6. What are the processing requirements for the SIU? The SON does not require a specific processor architecture (e.g., Intel X86, ARM, PowerPC) or speed. Memory size requirements for nonvolatile (e.g., Flash) and volatile (e.g., DRAM) are also not provided.

A6. As previously mentioned, the Government is looking to design as much processing power, I/O and memory as possible into the space provided. The prototyping effort will help to define the limits and requirements. The Government is not committed to a particular architecture except that it wants to design for unclassified data at rest. Non-volatile memory will be minimal (expect not more than 1 gig). Most of the memory will be volatile, and it wants as much as possible within space and environmental constraints.

Q7. Are there any software requirements for the SIU? The SON indicates that there must be a robust storage and processing capability, but provides no indication of what software the SIU will be running? Does it require an operating system (OS)?

A7. The prototype will include an OS or core OFP that provides basic I/O functionality and support for a very sophisticated integration engine that will reside on top. There is not necessarily a preference of OS, but it will have to be one that is supported to the satisfaction of the Information Assurance Department.
Q8. What are the functional, electrical, and mechanical requirements for the "peculiar" I/O not associated with 1PPS distribution? The SON provides a general mention of MIL-STD-1553, gigabit Ethernet, fiber channel, RS-422, and custom discretes. For example, is the MIL-STD-1553 interface required to be a Bus Controller (BC) Remote Terminal (RT), or Monitor (M)? Is the gigabit Ethernet physical layer copper, or fiber? What are the interface quantity and connector requirements for each interface?

A8. Again, the SIU I/O will be designed for maximum growth. Today, there are few specific minimum requirements other than at least two 1553 channels, five RS-422 ports and two gigabit Ethernet ports, but the goal is to design growth I/O to the limits of the physical space and environment.