



SBIR 24.4 R6 Q&A Telecon Transcript
14 May 2024

- SOCOM244-007: Thermal Barrier Minimal Deflection Handguard
- SOCOM244-008: Ruggedized Additive Mobile Manufacturing Unit (RAMMU)

SBIR Process Timeline

May 07, 2024: Topic issued for pre-release

May 21, 2024: USSOCOM begins accepting proposals via DSIP

June 11, 2024: DSIP Topic Q&A closes to new questions at 12:00 p.m. ET

June 25, 2024: Deadline for receipt of proposals no later than 12:00 p.m. ET

SOCOM244-008: Ruggedized Additive Mobile Manufacturing Unit (RAMMU)

1. What scale of printer is desired? Is the target a large system that is containerized, or would a man-portable system be of interest?

So, we're looking at a maximum weight of 10,000 pounds, or at least that's the threshold. We'll entertain other systems that are larger. But imagine this system being at a forward, austere location where we may have limitations. And this is where that 10,000 pound requirement derives from, as we're looking forward on the battlefield where you may or may not have material handling equipment that can handle weights, or containers that are heavier than 10,000 pounds. So that's where that originates from, looking forward in the battlefield, having limitations on material handling equipment. So, typically what we're looking at is a 463-L Air Force pallet or an ISU 90-size container at or under 10,000 pounds.

So with the manpack, how ruggedized is it? How much calibration is going to be needed once it gets to where it needs to go? The thought process is something that's in a container, that has some shock value to it, something that may be easily removed and replaced. Something that, if it breaks, it's not the end of the world. It's not going to cost \$250,000 to replace. It cannot have any outside transmission or to receive files, it's going to have to be either antiquated disk method or updated USB, something to that model and something very user friendly. So obviously the user would be, let's just say an 11 Bravo. Somebody who broke something and says, hey, I need this printed. He can go up and down, select through a menu of different options of what he's trying to do. He can go to a specific part and print that. So that's what we're looking for that.

2. Considering the needs of the Foreign Nonstandard Program, are reverse engineering capabilities / scanning desired in this capability?

For this capability, the answer is no. We are doing some reverse engineering and scanning of weapons parts within the program and building technical data packages for various parts. Now the idea is that we would have a container and additive manufacturing capabilities so that forward personnel could reach into our tech data package library and then print the part that they needed. So, for this particular capability, no, we don't need the reverse engineering or the scanning capabilities.





3. Are there any specific output material requirements? Plastics - ABS, Nylon, etc.? Metals - SS, Aluminum, etc.?

So, this is various materials. We definitely want to have the capability to do nylon, plastics, and various metals. The aluminum, stainless steel.

Yeah, you probably should look at the harder problem, which is going with the metals as the top of what you're trying to accomplish. And then I think you could back into other solutions. If you're able to replace a metal with an ultem that would be great. You also need to be able to consider, like an ultem aluminum type and the aluminum itself. But I think you have to go into the metal realm to be safe that the requirement that you're offering will deliver the needed solution for the TPOCs.

And then when you're looking at some of the parts and stuff that are being fabricated, the term "furniture" on weapons, you'll hear sometimes, that's when you're looking at forearms and butt stocks and maybe even dust covers and other plastic parts, is when they would leverage those plastic printing capabilities or polymers. But then we're also wanting to have that capability of producing metal weapons parts whenever a weapon goes down due to a breakage of a pin or a spring or obviously various parts or sights on a weapon system want to be able to print those or rails, and obviously those are metal.

4. What is the expected software toolchain for the RAMMU - will there be users with CAD experience and access, or an offline library of models, etc.?

The offline library of models is particularly of interest for us only because we don't want to have to pull information down from Wi Fi or anything like that. So, a library of models is the preferred method. The CAD experience is not really necessary. We want anybody that is a part of the allied forces to be able to go up to it, be able to pick a weapon system or a part, if you will, and be able to down select from that vehicle or that weapon system and be able to just print that part utilizing the system that we're talking about.

So, what we're looking at is a very well defined system that will accept library items from qualified engineers who do the reverse and do the reverse engineering, probably back at the depot level. So out forward there won't be a requirement for reverse prototyping and using CAD and working it in. We're looking for a library that is probably updated by an authoritative source back in the rear as they develop more parts. So, this is really just sort of a, for lack of better terms, a replicator opportunity where we, we drop down and scroll down. It's already been qualified by an engineer, hit print and it should come out for subtractive and heat treat next, if required.

We're using CAD files, but we're also using PDF right now as well as Step files.

So, as we develop our tech data packages, the signature page and the cover page, that's a PDF, but then embedded within that PDF file is a 3d solid model CAD file, step file, and then that's what they'll pull from.

5. What is the part size bounding box? What materials are you looking to print? What is Base power?

I would imagine if you think of probably a 4x4x4s, I think you're going to have to be tied to weight. I mean, at the end of the day, when we talk about bounding size, the overall box size, we're talking about potentially receiver parts for weapon systems, up to 7.62 and 50-cal





equivalents, I would imagine, and maybe more. So I think your bounding box needs to be within the 12x12x12, if you can come up with that, that would be a good start. And we've addressed the materials question previously, I don't want to hit that one again. And then base power, I would imagine we want to run off a traditional slave cabling that a foreign deployed unit might be deployed with. So, it's going to be running off of your standard generators that a SOF team would deploy with, but you also want it maybe with step-up conversion capabilities, so that if you're on local power, that you have the ability to do that. But I think the power problem will be taken care of by the using unit, I would imagine. So as long as you have it running off of a commercial 220 or whatever, or step up to much higher, I'm imagining we're going to have to go much higher than that for what we're trying to do, but as long as it's a standard setup, I think we can work around everything else.

6. The proposal documentation explicitly states Letters of Support (LoS) are prohibited, but talking with staff last week we were recommended to submit LoS. Help?

If you read the instructions, it says government letters of support are not acceptable. They will disqualify you. Now, letters of support from a company that you've worked with, industry letters of support are acceptable, but no government letters of support. And this is a SOCOM thing. So if you were talking to Army or Air Force or something, while at SOF Week, that could have been different. But USSOCOM does not accept government letters of support, and it will disqualify you.

7. Will the required printing capabilities be provided (size of parts, etc) or will that be a result of the study?

The intent is to have the capability to print or to fabricate various parts for various pieces of equipment, whether it be a weapon system, or even a small part for a vehicle. It's just having that printing capability. So the limiting factor as far as the size of the parts would be the capability of the equipment that's within the box itself. So we don't have a specific size of part that you would have to be able to achieve. The limiting factor would be that of the capability of the box itself.

Our desire is not to print a complete weapon system. Our desired end state is to create a small part. We're staying away from barrels and lower receivers. Stuff that needs to be stamped. It's more along the lines of, hey, this firing pin broke in this weapon. How can we get it back up and going again? If you're thinking part size, you probably want to limit it to a 2ftx2ftx2ft area. Anything bigger than that, and we're going outside that realm of what our need is now. Obviously, if you have a mount or a radiator mount that you're trying to build or an alternator bracket that you're trying to build. That limits the size, obviously, of the part that you're going to be able to produce. But for this need, you're probably not wanting to go much bigger than a 2ftx2ft, if you will.

8. Are there any case studies or examples of parts that have failed in the field, that are good candidates for replacement via the RAMMU capabilities?

Off the top of my head, I know that we had talked about various weapon parts, wishbone brackets and whatnot in the front ends of vehicles that have broken in forward locations due to the rough terrain where wish we had this capability to produce these at the point of need at the





forward location in order to get us by until we could get new actual OEM parts sent through the supply chain. When it comes to weapon parts, some of your primary weapon parts that may break are your grips, they are your dust covers on weapon systems. Retaining pins, forearms, and buttstocks.

I was going to just say on the forearms and buttstocks - You can test your system on aspects like that, but don't forget to also test your system on the metal capabilities. And I know the team isn't looking for lower receiver manufacturing, but you have to think in the sizes of lower receivers, if that makes sense. In other words, we're not saying we want to make lower receivers, but we want to make up to the size of a large metal component. Maybe a feed tray cover, maybe metallic butt stock plates. So, just don't limit yourself as you're trying to develop this. And realize that large polymer furniture pieces as well as large metal components inside of the bounding box that, I may have given some misguidance on, on the 2 ft, but I think the 12x12x12 is a very reasonable bounding box size.

9. Is it possible to work on a specialized unit that provides only metal printing capabilities? We're really looking to have polymer and metal. Polymer, plastics, and other nonmetal materials. So, all of those together, that's what we're looking for in this particular capability. If this question comes from a person who only works metal, there are teaming opportunities with maybe another team on the call that might work only polymers to create one solution. So the ruggedized additive manufacturing mobile unit, when you open those doors, you have the ability to print items out of polymers and or metals that's within one unit that is ruggedized. From the standpoint of being able to absorb shock. So, you've got this container that's going to come off of an aircraft, and then it's going to be put onto a flatbed truck, and it's going to be driven over God knows what kind of terrain to get to a forward location, then unloaded. And the intent there is to be able to put that into service once it's reached its destination over whatever type of terrain it has traveled over, and it still be able to work or at least be calibrated there on site and be able to work. So, if that ends up being the product of multiple companies teaming up, it may be a polymer expert and a metal expert and a container expert that all team up to create the perfect solution, and that's absolutely an acceptable solution.

As far as the SBIR program goes, with the phase one, the prime contractor needs to do at least 67% of the work. So just keep that in consideration when you're looking at subcontractors for this effort.

10. What are the power connection requirements for the forward operating bases? So, we're talking about slave capabilities with power generation capabilities of our forces currently. But that's a really hard question to answer truthfully, because you never know where you're going to be. It's going to be so situationally dependent. If you're on local shore power, it could be 220. Depending on what country you're in or where you're at. Ideal would be to be for it to be able to hook up to pretty much any generator. We don't want to go any higher than 220, really, just because of the fact that you're kind of limiting where you're going to be able to go. 110 is ideal. I know that's. That's kind of small or underpowered, but that's kind of the ideal thought process. The connection is not necessarily that important. That's something that's easy to change. However, single phase and multi-voltage is something we always look for on our





machines. Whether it's 110, 220, 50, or 60hz. Some sort of internal UPS systems, uninterrupted power supply system would be almost required in my mind, because we have had issues with the machines that we have deployed currently, where if it's on a camp that's generator powered and that generator needs to go down for maintenance, if you're 12 hours into a 24 hours build, then that build is scrapped and you've lost all that progress.

11. The 10klb container weight threshold should include the material feedstock weight for a minimum production batch. What would be that minimum production batch?

Everything's so situationally dependent. We would say a roll of each material, depending on how, if you're talking smaller print capabilities, then a roll of whatever material that is would suffice. We would have the stock on hand to be able to push forward, probably, if needed. On the polymer side, your materials are typically coming in like a kilogram somewhere on the kilogram scale, spool of material. If it's a wire fed metal process, we're sure is going to be driving towards wire instead of powder. Those rolls are, 30, 40, 50 pounds. That's kind of moot as far as the total weight goes. If you can get a minimum bomb of all the materials, if you can make the printers that they're looking for and you can do the weight, and you ended up being at 10,250 pounds with consumables, we would just say, hey, the 250 pounds will go into something else. Don't wrap yourself too much around the axle about how much of a bomb needs to ship with it. Focus on the print capabilities and the weight restrictions and the power restrictions. And then, as long as you cross the ID, the line of departure with like one roll of each, you'll be fine to. And then we just have to rely on the standard supply system to try to build up as needed.

12. What is the approach for submitting a "Direct to Phase II" proposal, for a capability that is Phase II ready

This is a phase one. We will not be accepting any direct to phase two proposals for this. Phase one is a feasibility study.

13. Is NATO member and/or EU member country involvement acceptable, or would this be DEEMED NON-COMPLIANT to the Foreign Affiliation requirements?

The company must be majority owned U.S. company. The contractor vendor must be a U.S. company doing work in the U.S. That's what I have from our due diligence team.

14. Are machining capabilities expected in Phase II - Phase III or will this be decided depending on results of Phase I?

We think once the product comes out, it's got to be an all in one. Ideally, what we're envisioning is an all in one container so that whenever the products produced, it's ready to be used. Phase I includes subtractive and probably heat treat. Depending on where you're at in the world, you may not exactly have a very robust machine shop nearby.

15. Does the container itself require moving capabilities?

So, the container itself needs to have the ability to be moved. We've envisioned it being a container type box that can be loaded up with material handling equipment onto a flatbed and then shipped. Now, if the question is asking to have moving capabilities under its own power, then no. It does need to have forklift prongs in it so it can receive forklift capability.





16. Are there any requirements for heat treating/ coating? Does the unit need to have compressed air and gases?
Yes, there would probably be a need. Obviously situationally dependent, but there will likely be times or requirements for heat treating. Does the unit need to have compressed air and gases? If the system that you are submitting for consideration, if it requires compressed gas or air, then yes, that would be something that would be needed included into the system.
17. Are metal capabilities a requirement for the systems that may be needing repair?
Depending on the system, yes, because it could be, depending on the part, could be supporting a weapon system or it could be supporting a non-weapon system like vehicles or whatever it may be brackets for a building or something.
18. Does the 10,000lb requirement include the container? Is there a container make/model preferred?
Yes. Is there a container make model preferred? Nope. Nothing specifically that we're specifying. Just something that can be put onto the back of a truck and moved and feasibly moved around with common material handling equipment. The ideal for the 10,000 pound container would be equivalent to an ISU 90 size, if you will.
19. Is the plan to fund multiple organizations with the capability of building out these systems or only one?
The plan is for multiple, given the capabilities of that specific container with the vision. Yes, it is going to multiple organizations across DoD, not just one.
20. Do the forward ops you refer to have subtractive capabilities such as CNC to finish machining critical dimensions and build platters?
If you are in the close fight or more towards that forward line of troops, and you're in forward austere environments, more than likely you will not have access to CNC or finishing machines. And that's something, when it came to any type of subtractive manufacturing, that's something that would have to be cap. That capability would have to be within that container. Now, if you were back in, say, more of a support area or rear area further back, maybe that would not necessarily be the case. You may have some of those finishing capabilities available, however, for this smaller unit, like we were talking about earlier, that what we're envisioning is that product, once produced, all that any type of subtractive manufacturing or finishing would need to be available within the container. We want a self-contained unit to do everything on this go round.
21. Are there any limitations to the methods of printing? Metal powder vs. filament?
So, powder is generally going to give you a better part as far as part quality. Long term, looking at the hazardous materials and the transportation, there are certain parties that are going to be involved that are going to be against powder. Going with a wire fed metal process is going to loosen your constraints a little bit. You don't have to worry quite as much about humidity and all that kind of stuff exposing to the wire. So, it's a double-edged sword. It depends on how far you want to look. We will say the powder is going to be more difficult to transport. It's going to give





you a better part. And then on the converse of that, the wire is going to be easier to transport, but lower fidelity on your part.

22. Should a generator be included in the RAMMU?

No.

23. Would taking a preexisting polymer system and adding metals capabilities be in scope for Phase 2 R&D?

Focus on phase I right now.

24. How many companies/awards are going to be given under Phase 1? Only one?

Any programmatic questions can be submitted through sbir@socom.mil. Questions like this we generally don't answer because we don't know. It will all depend on the proposals and what our TPOCs decide their needs are. On average, we award anywhere from one to three phase ones. But I've seen us award more because there was a need.

25. Is there a TRL threshold for the suggested technologies to be considered?

TRL-3.

26. Is the container a requirement at all, or if the capability can be "Pelican-ized", would that be allowable or even preferred?

In the scope of what you guys are working on here, I would say to stick with the container. As far as the pelican-ized, there's some stuff out there that fits in that box, so to speak. We think that's outside of the scope of your proposal here, it would be best to consolidate that equipment and integrate into a larger container. Gives you a lot more environmental control.

27. Should we consider analysis of the digital library in the study, such as systems, softwares, etc, or that will be provided?

That will be provided. That's something we always look for on our machines to where no Internet access is necessarily needed to be able to put a part on the processing computer and start the machine. We were talking about stuff that we were pulling from a local library, and then we talked about how we were developing tech data packages specifically for weapons, not necessarily for anything other than weapon systems, but specifically for weapon systems. We're building these tech data packages that have the CAD and the step files and the solid model files that would be put onto a local library and then that is from where those drawings would be pulled from.

28. Is there a max price of unit?

No, not at the moment. Once we see what's out there, then we'll look at affordability.

