Collider/Disrupter Event TFA#1 Q&A Telecon Transcript
05 March 2024

SOCOM TFA #1. Laser-Augmented Midwave Imager (LAMI) Demonstrator
Technology Focus Area Advocate: USASOC, NSW, PM-SOF Lethality, Visual Augmentation Systems
Modernization Priority: Battlespace Awareness

1. **Are you interested in solutions where the operator in overwatch controls the laser?**
   It's not really applicable to this topic. The announcement just used that "operator in overwatch" as an operational picture to try to give you an idea of what this could be utilized for. The operator utilizing the LAMI may or may not have lasers with him mounted to the device or integrated into that end use device, but the LAMI would not be required to control them or interact with them.

2. **Is there a desired operating voltage? Any current/capacity limitations on the power source (mAh)?**
   For this demonstrator, we don't have any hard limitations. Now keep in mind that, like it says in the topic, if capability or a technology like this gets packaged and fielded, it's going to go in a form factor that's appropriate to mount on top of a weapon or be handheld and carried by an operator. If it takes a car battery to power this device then it's not operationally useful. To give a little better idea, keep in mind that anything operational is looking at being powered by lithium AA's or CR123 batteries.

3. **What ground sample distance (GSD) does your current MWIR system have at 1200 m? At 800 m?**
   Ground sample distance doesn't, at least as far as we know, doesn't really make sense in this situation because we're not doing aerial or satellite imaging. We're definitely looking for as wide a field of view as we can achieve with this system. Still keeping in mind that you need to be able to recognize a human at 800 meters and at 1200 meters with the two different sets of lenses.

4. **Is there a desired frame rate for operational LASI systems?**
   60 Hertz.

5. **What solutions have you previously evaluated, and why didn't they work?**
   We have not previously evaluated any solutions in this subject area (mid-wave imagers that are also capable of seeing lasers in the shortwave infrared or near-infrared bands). We can't provide any direct feedback because we haven't looked at them before.

6. **Can they give a better description of "successful proto"? Is Broadband preferred? Or is a MWIR with a separate SWIR truly okay?**
   We don't have a preference one way or another, keeping in mind that we are not requiring that you provide great SWIR (or NIR) imagery. The intent is that the mid-wave is what the user looks at the world with and then the SWIR or near-infrared channels are what is utilized to pick up

lasers in those spectrums. We don't have a hard preference to a broadband sensor or a dual focal plane system.

7. **Is there any bonus value to the SWIR imaging? Like maybe looking through glass (if that would be at useful ranges 800/1200m?**
Useful SWIR imaging at range would be a benefit, but as far as SWAP, (size, weight and power) impact, we suspect that would have detriment to the system if it's not a broadband sensor. If it is a broadband sensor potentially, getting good imagery at those ranges would be of use. Of course, you do have to be cautious with potential noise or degradation of the mid-wave infrared image. Again, the mid-wave infrared is what we intend that the user is looking at the world with and then the SWIR or near-infrared is there to pick up lasers. If you can do all that and give us good SWIR imagery, that certainly would be a benefit, but obviously, that's a challenge.

8. **Is there funding for prototypes? For EMD? For Production?**
There is funding for this demonstrator. If this technology demonstrates well and seems like it would provide operational capability to our operators, then we'd look at the next phase of prototypes and then potentially production. But right now, there's funding slated for this demonstrator.

9. **What are the power, divergence, distance, reflectivity… of the NIR/SWIR laser source? What it is the lasing angle of incidence… to our detector(s)…?**
For the NIR you can expect that's going to be between 800 to 900 nanometers, somewhere between 20 to 80 milliwatts of energy with a .8-ish MRAD divergence. Keep in mind that's lasing things in the world (not the LAMI), so depending on the position of the operator using a device like a LAMI versus somebody else emitting that NIR laser, that angle of incidence and reflectivity of what that laser is actually hitting could vary greatly. For the SWIR: you're looking at the 15xx range of nanojoule pulses at kHz ranges or higher, or a ~three-millijoule single pulse laser is what we'd be expecting from the SWIR sources. And again, it's lazing things in the world, so there could be different ranges and different angles of incidence and reflectivities of the target.

10. **If LAMI were to go to production, what are the expected quantities?**
Keeping in mind that this LAMI just a demonstrator, 'science cameras in a science box' sort of thing, not an end-packaged item or shock-hardened weapon mountable platform: if the follow-on prototype for this technology does get integrated into a shock-hardened weapon mountable device, and were to go to production you'd be looking at sub 2000 unit quantity. But again, this current effort is just a demonstrator for the base technology,

11. **Is a dual-FOV lens an acceptable option versus two sets of lenses?**
This question is coming from one of the things we asked for in the topic paper was two sets of lenses; one that lets you recognize a human at 1200 meters and then a set of lenses that lets you recognize a human at 800 meters but with a wider field of view than the first set of lenses. In this effort we're not interested in a dual field of view lens. Really, we're trying to evaluate the base detector technology.

12. **Recognize a human at 1200 / 800m - how many pixels on target is considered as Recognize**
    We don't think we can give a solid pixel count. An end user needs to be able to determine; Is
    that a deer? Is that a human? Is that a fence post? That sort of thing. They don't need to be able
    to identify this is a specific human. They don't need to be able to identify, but they do need to
    be able to recognize that it is a human. Depending on the detector and field of view, the number
    of pixels required to do that is going to change, so we're not putting a hard requirement or
    definition on pixels.

13. **Do we have limits on power devices typically carried by operators?**
    No hard power limits for this technology demonstrator. However, I don't think we've ever seen a
    device that an operator carried (at least as far as a visual augmentation system goes) that
    utilized more than six or eight lithium AA's or CR123's and those are kind of the extreme case.
    Usually most of our systems use far fewer, but obviously, with a mid-wave imager you do have
    the cooler to contend with and so there's a pretty significant power draw.

14. **The submission criteria requests identifying cost and schedule to achieve TRL 7. How long is
    too long? How much is too much?**
    That's really up to you guys to decide. Faster is always better, but science does take time and we
    understand that, so we can't give a hard answer one way or the other.

15. **SD or HD sensors?**
    We don't specify one way or the other in this effort. Based upon the ability to see it recognize a
    human at 800 or 1200 meters depending on the lens, that's going to be a trade-off for design.

16. **Is there a desire for a laser target handoff capability?**
    No.

17. **Are government labs eligible to participate?**
    Yes, FFRDCS and Government/National Labs are eligible to participate.

18. **Would SOCOM be willing to provide exemplar laser sources for in house testing prior to
    demonstrations?**
    If an offeror is awarded an agreement of some sort that is something that we likely could work
    out as GFE (government furnished equipment).

19. **Does the laser detector need to operate at the same resolution as the MWIR system?**
    No, it does not. I'll say that the intent is, if it is not a broadband system, that the system would
    be able to overlay the position of the laser spot onto the mid-wave image when it's displayed to
    the user. It doesn't need to be the same resolution, you just need to be able to do that.

20. **Can you please explain "The operator in overwatch is able to provide hostile position to the
    assault elements"**
    That's coming from the topic paper and that's providing just an operational vignette that's "Hey
    if an operator using this mid-wave imager can also see near-infrared lasers, he can see a hostile
    near infrared laser, so he can relay that information to the assault element". He can get on his

radio and say "Hey look I see a laser coming from this position" That's all that means.

21. **How many companies will be selected as "path forward" after one-on-one evaluation?**
We don't have a set number right now, most likely one. If there's two really good proposals that are aiming to achieve this in separate manners, potentially we could do two, but I certainly wouldn't expect any more.

22. **What aspect of the technologies involved is the limiting factor in today's system?**
It's just the focal plane detector of most current mid-wave imagers is not sensitive in the SWIR or near-infrared regions.

23. **So, the intent is purely to indicate that a human seen in MWIR is using a NIR/SWIR laser?**
Not necessarily, let us put it this way. The mid-infrared or mid-wave infrared band is what we expect that the operator will use to look at the world to see people, to see vehicles, to see buildings, etc. If there are also near-infrared or SWIR lasers being emitted within that field of view, this device should be able to see those as well. The device doesn't need to be able to provide great imagery in the near-infrared or SWIR, it just needs to be able to see lasers.

24. **When you say 1200m / 800m recognition range - is this for hostile or friendly elements in reference to the topic**
It is for humans, so recognizing again, Is this a human? Is this a fence post? Is this an animal? Not necessarily determining intent or determining gun vs. no gun at that range.

25. **How many companies will be selected for "path forward"?**
Most likely one, potentially two.

26. **Does SOCOM want to know specifically what aspect of the MWIR scene is being illuminated by enemy lasers?**
If the system can overlay the near IR or SWIR lasers onto the mid-infrared or mid-wave infrared imagery, that'd be great.

27. **Is there any benefit to the operator for the hardware to ID laser sources based on their observed characteristics?**
Potentially. It's not something that we've usually looked at, but if it's not a SWaP driver then it's something that we potentially might be interested in looking at, assuming that it meets all the other requirements.

28. **Is the intent of the prototype to limit to two bands NIR@800-900nm and SWIR @1550nm or should be capable of supporting out-of-band lasers as well in future?**
Right now, we're really just looking for that near-infrared or SWIR (it doesn't necessarily have to do both - if it does do both that's great), but the ability to see one of those two bands for lasers, if it supports out-of-band lasers in the future, great, but that's not a requirement right now.

29. **Have meta materials been considered such as borophene for power storage or conductance and software for tracking with the Lazer such as geo&geo spatial tracking?**
No.

30. **Is it correct to say that the objective of the topic is to find the hostile with the active laser?**
That is one objective. It could also be that there's a friendly that is trying to point out something with their laser, whether that's near-infrared or SWIR.

31. **Does SOCOM have any restrictions in terms of exotic materials used in devices?**
We prefer no unobtanium. Otherwise, as long as it's not incredibly expensive, we think it's fine. We would probably have a Buy American Act clause in there along with any EPA-restricted products or any anything designated as a pollutant.

32. **How soon do you expect the first awardees under contract to perform work?**
We will try and announce how many people will be selected to move forward to develop the breadboards at SOF Week this year, which is in May. From there we would have to negotiate a delivery schedule and then from there we'd have to do testing and down selects. It would all be to be determined.

33. **Approx. budget for this development effort**
This is technology demonstrator. It's whatever you feel like your cost to develop the item that meets the requirements that we've laid out.

34. **Is there a do-not-exceed value on proposals?**
We're looking for the cost to complete the effort. It's not like it's an end-use item that you're designing and developing here as a technology demonstrator. We don't have a hard "do not exceed".

35. **How many prototypes will be delivered to the government at the end of POP?**
It's just one: The single LAMI device with the two sets of lenses, one to enable human recognition of human at 1200 meters. One to enable recognition of humans at 800 meters and being able to see the corresponding laser spots at both those distances. So a single device, two sets of lenses.

36. **Why MWIR? both ranges are easily accomplished by LWIR?**
In this case, mid-wave has some specific end-user applications that we are interested in.

37. **Could you elaborate on the other use cases you have for MWIR?**
I'll provide one: Being able to watch bullets trace out at those really far distances. That's not something you can achieve with long-wave.

38. **Overlay is rendered as in computer graphics or alpha blending of actual laser line / spot**?
Either would be fine. We'll say initially the intention was if again, in an end-use sort of our end packaged item, say the mid-wave imagery would be in grayscale and any lasers picked up (if it was a dual focal plane system by the other focal plane would be in a different color to make it

really obvious what's lasers and what's not. If there was some sort of graphical indicator of the actual laser spot, that also would be acceptable. We would say it has to be good enough for a human observer to be able to accurately interpret what is happening on the battlefield. If it's achieved through software or if it's achieved through just blending of the outputs of a detector or multiple detectors, we think either solution is OK. It just has to be clear to the user.

39. **Just to clarify, is there a MWIR system in use today that we will augment in the future or are we expected to deliver a MWIR camera with the prototype?**
It's expected that you'll be delivering either a MWIR camera that is broadband that can see near-infrared or SWIR as well, or a MWIR camera that has been coaligned to a separate camera.

40. **Would the eventual end-use case display be more of a tablet form factor, or small scope-size display?**
The eventual end use would be like a small scope size display or a small, imagine like a range finder binocular type display. For this case though for this demonstrator, a tablet display or an output to a laptop would be entirely acceptable. We don't expect a packaged end item that you would look at with a rifle scope. For this case, for the demonstrator, a tablet display or laptop display is entirely fine.

41. **Are specific targets identified for performance characteristics such as payload weight, payload type, range, speed etc.?**
Not applicable to this effort.

42. **Is M-Code compliance desired/required?**
No

43. **What is the timeframe that end users are looking to showcase TRL 3-5 capabilities?**
Within a year at the most, ideally within 6 months.

44. **Do end-users have a timeframe in mind of when they would like to advance TRL from a 3-5 range to a 6-7 range?**
Not at the moment. That would be a follow-on effort if this demonstrator is successful.

45. **Is it expected that there will be a prototype OTA to get a technology to a TRL 3-5 or an OTA to take a 3-5 TRL product to a greater TRL level?**
Potentially, again, that depends on if the demonstrator is successful.