

Innovative Solutions Canada Program

Challenge EN578-170003/07: High Energy Lasers

Attachment 3

Question and Answer #3

This document contains questions and answers related to this challenge.

Question #3:

I have a question with regards to [Attachment 1 - Question and Answer #1](#) that was recently added to the challenge.

Specifically, the attachment was to clarify what the scope of the challenge encompassed.

The question we have is in the response to the statement that the focus was to be on the "laser technology itself, not the supporting equipment" addressing current issues such as "insufficient efficiencies, low peak and average powers, and excessive SWaP (size, weight and power)", with examples being "laser diodes, gas, chemical, dye, metal-vapour or solid-state lasers, or wavelength-conversion methods", and that non-laser specific technologies such as "improvements to non-laser specific technologies (electrical power storage or generation)" would not be considered to be within the scope of the challenge.

Can you please explain why certain critical systems are considered support equipment and other systems considered specific laser technology?

The reason we ask this question is that after studying the response it seems that if this challenge is meant to actually address shortcomings with current laser technology, and the government and defence department are genuinely looking to improve laser system technology it does not make sense to our organization why certain systems would be excluded from the challenge and others not excluded, especially excluding key systems such as power systems. If the challenge is meant to address different shortcomings then our view would be to approach the challenge looking at all of the systems involved with current laser technology, especially critical support systems and specifically power systems. This is due to the fact that many of these systems have been continuously improved over decades, and breakthrough improvements meeting the challenge outcomes are less likely to come from a single major transformational technology, and more likely to come from many smaller incremental improvements.

Further to this point, in order for the project outcome to meet the goals of addressing issues and shortcomings of laser technology with respect to identified "insufficient efficiencies, low peak and average powers, and excessive SWaP (size, weight and power)" power systems will have to be a major consideration and part of the planning and development. These identified shortcomings are specific to laser power systems, and if all power systems and delivery methods are considered support equipment, and not considered within the scope of this challenge we do not see a clear path to actually addressing these critical challenges and major drawbacks.

To explain this further, lasers systems need power delivery systems to even operate and intrinsically use a large amount of energy, this is what has limited the use of these devices to larger stationary units. If

the outcome of the challenge is to address the excessive size, weight and power then we are of the opinion that this for the most part can only be addressed by improving the energy delivery system to a major extent. This is due to the fact that it is not likely that lasers which have been developed over decades will see massive reductions in the amount of power needed for their operation. Specifically, with our proposed solution utilizing a greatly improved technology to actually deliver this large quantity of needed energy at faster charging times and better efficiency. These improvements will meet the intended outcomes of this challenge and provide the ability for reductions in laser unit footprint and therefore mobility.

Can we please request clarification as to why critical energy systems required for laser technology operation, such as energy delivery systems, are considered supporting systems even though they are critical to system performance and robustness?

Response #3:

The intention of the response to the original question was to only consider laser system specific improvements and not proposals that would only consider 'off-the-shelf' sub-components without consideration to the laser system level application and integration. Therefore, innovative ancillary systems such as power supplies are considered to be within the scope of the Challenge if the bidder can clearly demonstrate that such systems are specific to a laser system, and a demonstrated improvement to the overall laser efficiency or reduction in size, weight and power.