Local Control of Materials Synthesis (LoCo)
Frequently Asked Questions

5/24/12 updates in **BLUE**
6/5/12 updates in **GREEN**
7/17/12 updates in **RED**

ADMINISTRATIVE

Q: How do I get answers to questions that are not covered in the BAA or in this FAQ?
A: Please submit all questions to DARPA-BAA-12-43@darpa.mil.

Q: Are proposal abstracts (white papers) requested?
A: Submission of proposal abstracts is strongly encouraged to enable potential proposers to outline their concepts with some supporting information, obtain feedback, and minimize unnecessary effort in proposal preparation and review. Please review the guidelines outlined in the BAA for specifics on proposal abstract content and format. Proposal abstracts may be sent in on a rolling basis, but the final due date is June 7, 2012.

Q: Is there a date by which proposal abstract feedback will be provided?
A: DARPA will attempt to respond to all proposal abstracts in a timely manner. The amount of time that it takes is dependent on the volume of abstracts received.

Q: I was not able to attend the Proposers' Day Workshop. Can I still submit a proposal? Is there a way to see the presentations/view the webcast?
A: Yes, you may propose regardless of whether you attended the Proposers' Day Workshop. Presentations presented at the workshop, as well as an on-demand version of the webcast can be found here:
http://events.dvimaging.net/008/00172/20120416_DARPA/?contid=20120509#powershow

Q: Where can I find information about the technical requirements of the program and how to submit a proposal?
A: Pertinent technical and programmatic information, including proposal format and submission procedures are fully described in the Local Control of Materials Synthesis Broad Agency Announcement, DARPA-BAA-12-43, which appears in FedBizOpps.

Q: Are companies with foreign investors involved in their company/board of directors eligible to apply to the LoCo program?
A: This question is answered on a case-by-case basis depending on the country from which the investors come. Questions on specific cases should be submitted to DARPA-BAA-12-43@darpa.mil.

Q: Can the initial effort be carried out outside the United States?
A: This may be possible, but must be answered on a case-by-case basis depending on the country in which the work will be done. Questions on specific cases should be submitted to DARPA-BAA-12-43@darpa.mil.

Q: Does DARPA prefer a specific accounting system?
A: DARPA does not have a preference on which accounting system is used by performers. All performers should check with the Defense Contract Audit Agency for specific requirements, policies, and procedures that should be met when doing business with the Department of Defense.

Q: Can we combine multiple process components (intellectual separate ideas) in a single white paper if they are priced separately?
A: White papers must meet the page requirements set forth in the BAA or may be deemed non-responsive. DARPA encourages submission of multiple white papers if needed to cover ideas in an intellectually separate fashion.

PROGRAMMATIC

Q: What are the evaluation criteria?
A: Evaluation criteria are specified in the BAA.

Q: Can one organization submit to both Thrusts 1 and 2?
A: Yes, but the proposals must be intellectually and contractually separate.

Q: Will technologies developed under the LoCo program be restricted in terms of export control?
A: It is the proposer's/performer's responsibility to adhere to all export control laws and regulations regarding technology developed under the LoCo program.

Q: When technologies are merged to an overall process, who decides how the technologies are paired? What happens if a technology is successful, but it's not compatible with the others?
A: DARPA will be actively involved from the start of the program through process component integration to facilitate the communication between compatible approaches so unanticipated compatibility issues do not arise. Proposers should clearly define the capabilities of their proposed approach, and also address the questions that begin on the bottom of page nine in the BAA. Specifically regarding process component compatibility, proposals should describe anticipated compatibility issues, as well as any known or projected criteria that must be met by partner process components. DARPA will use this information so that compatibility issues are mitigated early on.

Q: If we are responding to Thrust 1, do we need to identify/discuss applications?
A: No. However, Thrust 1 proposals should present an understanding of the material(s) with which the process component may be compatible and also materials or classes of materials which are incompatible with the proposed approach.

Q: If our approach addresses more than one process component simultaneously for Thrust 1, should we submit two separate proposals, or one?
A: Proposals should be broken down into the smallest intellectual units so that DARPA can evaluate the approaches separately. Note that if two process component approaches are

combined, proposals will be evaluated on the weakest link. However, if a single approach can simultaneously address two process components (e.g., reactant flux and byproduct removal) and cannot be broken down into smaller intellectual units, proposers are encouraged to discuss all anticipated capabilities of the approach.

Q: Is the go/no-go decision point for participation in the Thrust 1 option period made at month 5 in the base period?
A: The anticipated path forward for the program is ongoing evaluation and possible down-select as soon as month 5. Termination conditions will be negotiated in any grant or contract.

TECHNICAL

Q: Will you provide feedback on whether you would be interested in a specific approach to the LoCo program?
A: The evaluation process for both the proposal abstracts and full proposals are designed to provide this feedback. No feedback will be provided on specific approaches submitted to DARPA outside of these channels.

Q: Is the process limited to chemical vapor deposition/gas-phase methods? Are other methods such as solution-based approaches of interest?
A: The goal of the LoCo program is to create a new way to synthesize or fabricate thin films at temperatures lower than the minimum temperature from state-of-the-art deposition technologies. Proposed approaches to this challenge are not limited to gas-phase, CVD-like processes. Each Thrust 1 proposal should clearly address the questions posed beginning at the bottom of page nine of the LoCo BAA, and explicitly state projected compatibility issues/opportunities.

Q: Is the LoCo program interested only in materials that are already used in existing systems, or would a new material be of interest to replace an existing one?
A: The LoCo program is focused on materials that we already know about, but cannot currently use because the deposition/processing temperature exceeds the maximum temperature substrates of interest can withstand. The program is not focused on developing new materials that we cannot currently fabricate under any conditions.

Q: Is the metric "below 100°C" a specific requirement or just a target? Would a process/process component approach projected to reach a higher temperature such as 200 °C be of interest?
A: The maximum deposition temperature will be defined by the requirements of the challenge problem substrate material. Deposition below 100 °C is a goal that illustrates DARPA's vision for the program, and any process component that can approach 100 °C is highly encouraged. However, approaches that offer a way to significantly reduce deposition temperatures from current state-of-the-art processes are of interest, even if they are not projected to meet the 100 °C metric.

Q: Can the temperature required for a particular process component be high, as long as the substrate is not affected?
A: The LoCo program is concerned with the temperature of the substrate. Any approach that does not significantly increase the substrate temperature is of interest.

Q: Is active cooling of the substrate of interest?
A: No.

Q: Are you interested in thin films that are currently deposited at less than 100 °C on DoD relevant substrates?
A: No. Please note, DARPA is interested in depositing films that currently require high temperatures (e.g., optically clear, high quality microcrystalline diamond thin film), NOT similar materials that can currently be deposited at low temperature (e.g., diamond-like carbon).

Q: What are the requirements for minimum hardness of the coating on zinc sulfide? What IR transmission range is required for the coating material? Do you want crystalline or amorphous diamond? How thick of a coating do you want?
A: LoCo is a deposition process development program, not a program designed to deposit a specific material. The diamond/zinc sulfide example provided in the BAA was only an example; the challenge material/problem, as well as the film quality/specification requirements will be defined as a result of the Thrust 2 technical analyses.

Q: Is a computational modeling effort critical for a successful proposal? The milestones/program description in the BAA is heavily focused on experimental efforts. What role do you see for computational research as part of this effort?
A: Integration of computation modeling into an experimental effort is not required, but may strengthen a proposal. Both integrated computational modeling, and stand-along modeling efforts should help predict and refine experimental approaches/program goals, reduce risk in the program, and enhance the success of either specific process components, or the integrated process. However, modeling efforts in LoCo should not be designed to create new modeling/computational/theoretical capabilities as part of a fundamental effort in chemical synthesis. They should be designed to support the overall success of the LoCo effort.

Q: What level of spatial control is targeted in the LoCo program?
A: The LoCo program is designed to ultimately deposit a coating of interest on a substrate of interest to the DoD, at a rate that matters in terms of a thin-film deposition. LoCo is not a nanoscale technology development program, it is a program designed to develop a process for low-temperature thin-film deposition of materials that currently require high temperatures to achieve various characteristics (e.g., high optical quality, hardness, etc). The bottom line answer in terms of spatial control is to limit substrate damage during deposition.

Q: Are processing approaches that involve techniques like direct write schemes of interest?
A: Generally speaking, yes. Although it will depend on the speed, quality, and throughput of the proposed approach with respect to the size of the identified challenge part.

Q: How many different coatings/materials systems should the process be able to address at minimum?
A: The more materials systems with which your approach is compatible, the better. However, there is no minimum/maximum defined for the LoCo program. At the end of the program, LoCo performers will demonstrate deposition of a challenge thin film on a part defined as part of the Thrust 2 technical analyses. DARPA anticipates that methods developed during the LoCo program should be able to evolve to other materials systems with further development, but that evolution is not a specific requirement of the program. Proposals should address (as described in the BAA), materials classes to which the proposed approach is and is not applicable.

Q: Have you compiled a definitive reference list to define the current state-of-the-art performance in all anticipated process component areas?
A: All information available to DARPA will be used as part of the evaluation process. However, it will not be publicly released.

Q: Can I propose a complete solution to Thrust 1?
A: Proposals may address the total solution to the LoCo Thrust 1 challenge. However, any investigators that take this approach must offer extensive technical justification for how their approach will solve a problem that the chemical vapor deposition industry has been working on for decades. Performers are not encouraged to form a team that links individual process components; DARPA prefers that process component proposals be submitted independently.

Q: How many challenge problems will be identified from Thrust 2?
A: The number of challenge problems will be identified as a result of the Thrust 2 studies, process component/approach capabilities from Thrust 1 projects, and evaluation criteria cited in the BAA. It is anticipated that there will be one to a few challenge problems carried past the base period.

Q: Are specific equipment design concepts expected/required?
A: Approaches to address the challenges put forth in the LoCo BAA should be defined by the performer in the proposal.

Q: Can the part in a Thrust 2 effort be a large and/or complex object (e.g., bigger than 1-2 meters, and/or something that has curves, holes, channels, etc.)? What are the largest part sizes desired?
A: There is no restriction on the size, shape, or complexity of DoD-relevant parts proposed in Thrust 2. However, parts/systems that introduce additional risk to the success of the program should be justified in the proposal. While many of the details (e.g., complexity of coating the part including line of sight, pressure, thermal budget etc.) will be identified during the base period of Thrust 2, proposals should include a reasonable description of size/complexity of the part/piece/assembly so that major challenges can be identified.

Q: Is it necessary to demonstrate deposition on nonflat substrates by the end of the program?
A: The substrate for final thin film deposition will be chosen as a result of the Thrust 2 technical analyses. It is possible that the final substrate will be curved, convoluted, have holes, etc. As

stated on the bottom of page nine in the BAA, Thrust 1 proposals should address whether their approach would be compatible with flat/nonflat/complex substrates.

Q: Do proposals need to create/populate a version of Table 3 for the material if diamond is not the material described in the process component approach?
A: While this is not a requirement, more scientific detail and technical rationale helps to better establish the ideas technical merit and the team's expertise.

Q: Is DARPA interested in depositing on a new substrate by the end of the program, or is developing the capability to re-coat working surfaces of more interest?
A: There is no preference here, and the final part/piece will be defined as a result of the Thrust 2 technical analyses (these should be parts that are currently used in DoD systems, but the deposition need only happen on the part of interest, not the entire assembly or sub-assembly. The emphasis for the challenge problem will be one that helps prove out LoCo, but minimizes the amount of additional risk brought by the particular part or piece coated.

Q: I have a method of bonding zinc sulfide to polished diamond surface which could be used to process these structures. Is this of any interest to DARPA?
A: The goal of the LoCo program is to develop a process to chemically deposit high temperature materials at or below 100 °C directly onto substrates. This goal does not include subsequent post-process bonding.

Q: The BAA describes a process development program and not a materials development program. As such, proposals based solely on established methods such as plasma-enhanced CVD and pulsed-laser deposition would be considered unresponsive to the BAA. Is this statement an accurate interpretation of the BAA?
A: Yes.

Q: This BAA addresses a process (deposition) development program, but the time-line of Thrust 1 suggests proposers must have their proposed method operational at or very near the beginning of the program to meet time-line milestones. Would proposals which require assembly of new deposition tools be considered responsive, provided the premise upon which the new tool is based can be demonstrated by leveraging existing equipment? For example, if we propose to investigate controlling kinetic energy of carbon species as a way to increase the sp^3 bonding in deposited films, is it sufficient to show the relationship between sp^3 bond fraction and kinetic energy in parallel with the assembly of a new tool?
A: There must be at least qualitative progress to show that the concept is feasible by month 5. Specific milestones and exit criteria should be quantified and detailed in any white paper and proposal submitted.

Q: Where can I find a list of materials that the DoD currently is interested in coating with at lower temperatures?
A: DARPA is not providing a list of materials for the LoCo program. As described in the BAA, "initial areas of interest for LoCo thin films include synthesis of covalent thin films with long-range order that require high deposition temperatures (>700 °C) for insertion points in tribological, thermal management, optical and electronic applications (e.g., crystalline diamond

thin films)." Several example materials were presented during the Proposer's Day, which can be viewed in an on-demand webcast. However, as stated during the webcast, the graph is not fully populated; there are several other materials of technological interest that may be proposed. The final material/substrate combination will be defined at month four of the program as a result of the Thrust 2 technical analyses, so Thrust 1 proposals should describe in detail "classes of thin films that should be applicable" to the proposed process (see BAA page nine).

Q: Can DARPA advise of potential Thrust 2 respondents who are seeking feedback from potential coatings developers?
A: DARPA will not release information on who is submitting proposal abstracts for either Thrust 1 or Thrust 2.

ELIGIBILITY and TEAMING

Q: Will proposals be accepted/deemed competitive from a single investigator, or is teaming/collaboration encouraged?
A: Proposals from single investigators and teams are both fine. However, as described in the BAA, DARPA is soliciting proposals for thin film deposition process components in Thrust 1 (e.g., solutions that address reactant flux, surface mobility, reaction energy, etc., independently), not necessarily the total deposition solution. If teaming/collaboration strengthens the expertise and capabilities required for a particular process component (either through a fully experimental team, or through an experimental/computational team), teaming is encouraged. If teaming is done to merge expertise on one or more process components to offer a total solution, DARPA encourages submission of each process component as a separate proposal.

Q: Can FFRDCs submit proposals to the BAA?
A: FFRDCs and government entities are subject to applicable direct competition limitations and cannot propose to this BAA in any capacity unless they meet the specific conditions. FFRDCs must clearly demonstrate that the work is not otherwise available from the private sector AND they must also provide a letter on letterhead from their sponsoring organization citing the specific authority establishing their eligibility to propose to government solicitations and compete with industry in compliance with the associated FFRDC sponsor agreement terms and conditions. Please see the BAA for more details and the definitive answer to this question.

Q: Can DoD Laboratories submit proposals to the BAA or be members of a non-Government led Team?
A: DoD laboratories are not permitted to propose under a BAA in any capacity unless they provide written documentation citing the specific statutory authority allowing them to do so. The cognizant DoD Command must also establish that the Laboratory is not competing with private industry (unique capability). Authority to do the work (do work for others) should also be provided to be a member of a non-Government team. Also, all potential conflicts of interest must be demonstrably avoided. Please see the BAA for more details and the definitive answer to this question.

Q: Can foreign nationals work on this project? Are we allowed to collaborate with foreign universities?

A: This is an unclassified solicitation. As specified in the BAA, the contractor must comply with the security requirements as described and all U.S. export control laws and regulations, including the International Traffic in Arms Regulations (ITAR). As long as these requirements are satisfied, foreign nationals may support research efforts.

COST/PERIODS OF PERFORMANCE

Q: How many proposals will be funded?
A: DARPA anticipates multiple awards. Each proposal should include a realistic and reasonable cost/cost profile with respect to the research necessary to accomplish the proposed project goals. Even if a proposal has appropriate technical content, failure to strictly adhere to the Volume II Cost Proposal guidelines may result in a proposal being rejected, or may subsequently complicate or eliminate the ability to negotiate an award on a proposal recommended for funding.

Q: When will the program begin?
A: DARPA anticipates awards being executed during the fall of 2012.

Q: Is cost sharing required? How does cost sharing work if we are already commercializing a new approach, but still have a need for basic R&D?
A: Please see the BAA.

Q: What are the intellectual property ownership rules? If we develop new intellectual property, do we own it?
A: Intellectual property (IP) considerations are specific to the details of each case. Please refer to the details provided about IP in the LoCo BAA.

Q: Should the option period costs be submitted as a rough order of magnitude (ROM) or fully costed? If fully costed, how do we price the deposition of a film that is to be determined on a substrate that is to be determined?
A: The base period should be firmly priced for all proposals. Option periods should be priced as accurately as possible considering the guidance provided in the BAA about program structure/travel/equipment/etc. As stated in the BAA, option period costs and technical approach will be updated according to the status and progress of the program.

Q: For the efforts in months 10-36, specifically regarding the movement of equipment to a DARPA selected location, is there is an expected ceiling for this item or a specified target amount, relative to the total period effort? Is there is a frequency of moving costs associated or is the expected moving activity a single event? What would be a not-to-exceed expected moving distance, in approximate terms? Are personnel travel expenses for this activity are considered additional to the scheduled program reviews' travel expenses?
A: DARPA cannot provide further details as the integration and testing site has not yet been determined and the program investment profile has not been finalized. However, we anticipate the move will be a single event to a test facility for process component integration and target material deposition. Travel expenses associated with conducting research at the integration site are in addition to scheduled program reviews.