

## STATEMENT OF CONSIDERATIONS

CLASS ADVANCE WAIVER OF THE GOVERNMENT'S DOMESTIC AND FOREIGN PATENT RIGHTS AND COPYRIGHT UNDER DOMESTIC FIRST AND SECOND TIER SUBCONTRACTS ISSUED BY DOE/NNSA LABORATORIES FOR THE APEX (ALLIANCE FOR APPLICATION PERFORMANCE AT EXTREME SCALE) PROJECT;  
DOE WAIVER NO. W(C) 2016-002

The Department of Energy (DOE) has a long history of deploying leading-edge computing capability for science and national security. Going forward, DOE's compelling science, energy assurance and national security needs will require substantial increases in usable computing power, delivered as quickly and energy-efficiently as possible. Within DOE's Office of Science (SC), the mission of the Advanced Scientific Computing Research (ASCR) program is to discover, develop, and deploy computational and networking capabilities to analyze, model, simulate, and predict complex phenomena. A particular challenge of this program is fulfilling the science potential of emerging computing systems and other novel computing architectures, which will require numerous significant modifications to today's tools and techniques to deliver on the promise of exascale science. Within DOE's National Nuclear Security Administration (NNSA), the mission of the Advanced Simulation and Computing (ASC) Program supports NNSA Defense Programs to shift emphasis from test-based confidence to simulation-based confidence. Under ASC, computer simulation capabilities are developed to analyze and predict the performance, safety, and reliability of nuclear weapons and to certify their functionality. Modern simulations on powerful computing systems are key to supporting our national security mission.

### The APEX Phase of the DOE Exascale Program

DOE intended beneficiaries from APEX funding:

#### A) NERSC 9

ASCR operates the NERSC at LBNL to support the entire spectrum of SC research. Currently, NERSC supports nearly 6,000 users and over 800 projects using about 600 different application codes. NERSC's mission is to accelerate the pace of scientific discovery by providing advanced High performance computing (HPC), networking, data and support services for SC-sponsored research. During 2012-2014, ASCR commissioned a series of Requirements Reviews for each of the six SC program offices where the results showed that SC researchers will need the equivalent of about 30 times the sustained capability of National Energy Research Scientific Computing Edison (NERSC 7) supercomputer to meet their research objectives in 2017. By extrapolating the 2017 requirements for an additional three years to 2020 using the historical two-times per year



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trends, this requires about 250 times the capability of NERSC 7. From these reviews, it is clear that in 2020, NERSC-9 should provide a significant upgrade to current computational and data capabilities.

As the DOE and SC look ahead to the 2020 timeframe, a number of activities are being considered to take advantage of the changes in technology, including, as part of the Exascale Computing Initiative (ECI), the FastForward and DesignForward and their follow-on programs. The NERSC-9 system will be able to tie into these activities by building on successful innovations from these programs. In addition, the NERSC-9 project will align itself with the DOE ECI efforts as a risk mitigation strategy for the ECI program. This engagement will foster strong collaborations with the ECI software research efforts to enable – with the delivery of the NERSC-9 platform in 2020 – early exploration of key concepts and technologies that will be essential for exascale machines to be delivered in 2023-2024.

#### B. CROSSROADS

As the Nation's nuclear stockpile moves further from the nuclear test base due to aging, remanufactured components, and Life Extension Programs (LEP), the need for predictive weapon calculations is becoming increasingly urgent. Crossroads, the third Advanced Technology (AT) system in the Advanced Simulation and Computing (ASC) Program, will be critical to the success of the NNSA Stockpile Stewardship Program (SSP) and the current and planned LEP activities. The primary users of ASC platforms are designers, analysts, and computational scientists.

In 2020, the first AT system, Trinity, will be nearing the end of its useful lifetime. Crossroads is a Trinity replacement, a tri-lab computing resource for existing simulation codes, and a larger resource for ever-increasing computing requirements to support the weapons program. Crossroads will provide a large portion of the AT system resources for the NNSA ASC tri-lab simulation community: Lawrence Livermore National Laboratory (LLNL), Los Alamos National Laboratory (LANL), and Sandia National Laboratories (SNL), during the FY21-25 timeframe.

In addition to meeting NNSA Defense Programs' mission needs, the architecture of Crossroads will keep ASC moving forward by allowing applications to fully explore and exploit upcoming technologies. These new technologies include processors, memory, input/output (I/O), interconnect, power efficiency, and reliability. Some of the largest and most demanding capability-class jobs will be able to run on Crossroads. These capabilities are required for supporting stockpile stewardship certification and assessments to ensure that the Nation's nuclear stockpile is safe, secure, and reliable.



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Crossroads will continue to push the cutting edge of what is possible on current systems with its' 3D simulations capabilities. By 2020, the goal of running high-resolution 3D simulations with full physics and geometric features will be attainable. Ultimately, Crossroads will accelerate industry's R&D technology roadmap for the ASC program's future exascale-class computational needs.

#### C. FOR BOTH NERSC AND ACES – NRE

The use of Non-Recurring Engineering (NRE) funds to develop and deploy system functionality will enhance the user experience and allow us to take full advantage of the new technologies being deployed. NRE has been critical in tailoring computing technology to the needs of the broader HPC market as well as the SC workload in particular, and building on the results of earlier NRE investments (such as FastForward, DesignForward and CORAL) will be a major factor in successfully using the increased computational capabilities projected to be available in the FY2020 timeframe. Both NERSC and ACES plan to award NRE Subcontracts to the selected hardware vendor(s). The benefits of using NRE include a deeper and more productive partnership with vendors and risk mitigation because it allows for a deeper and more fruitful consideration of all technology alternatives.

#### The Allocation of Patent Rights

A small business or non-profit organization will retain the patent rights to its subject inventions under the Bayh-Dole Act. See 35 USC 200-212. These subcontracts will contain standard clause DEAR 952.227-11 Patent Rights—Retention by the Contractor.

For non-Bayh-Dole subcontractors, the Government retains title to subcontractor's subject inventions under DEAR 952.227-13 Patent Rights—Acquisition by the Government. However, a subcontractor that agrees to cost-share by an amount at least 40% of the total cost of the subcontract shall qualify for this Class Advance Waiver where DOE agrees to waive, in advance, patent rights to the subcontractor such that it may elect title to its subject inventions. See Appendix A, paragraph (b) of 10 CFR 784.12 PATENT RIGHTS--WAIVER (JUL 1996). The patent rights waiver is subject to the retained government-use license, march-in rights, reporting requirements, DOE approval of assignments, 35 U.S.C. 204, and a U.S. Competitiveness provision (paragraph (t)), which are all contained in the clause. See Appendix A.

If a non-Bayh-Dole subcontractor under the subject RFP does not agree to cost-share at least 40% of the total contract cost, that subcontractor will receive the standard DEAR patent and FAR data clauses in connection with the R&D procurement. However, such a subcontractor can still seek DOE Headquarters Program approval to have this Class Advance Waiver apply or petition the government for a separate Advance Waiver for its specific subcontract. If a



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subcontractor does not qualify for an advance waiver, there is a possibility that the subcontractor could petition for title for each subject invention by an Identified Invention Waiver process. However, HQ Program may deny that option during negotiations and the clause DEAR 952.227-84 Notice of Right to Request Patent Waiver should not be included in the subcontract.

### The Allocation of Rights in Computer Software

The Bayh-Dole Act only applies to the allocation of patent rights. However, many subcontractors prefer to have advance rights in technical data developed under their subcontracts. Therefore, this Class Advance Waiver also allows a domestic subcontractor (small business, non-profit or for-profit organization) to assert copyright in computer software without the Contracting Officer's prior approval. Under the subject *APEX* program, DOE agrees, in advance, to authorize the subcontractor to assert copyright, without the Contracting Officer's prior approval, in software produced under the subcontract by its employees. See Appendix B, paragraph (c)(1)(iii). However, ASC/ASCR policy is that all funded software should be released as Open Source Software (OSS). This requirement shall apply to original software developed under the subcontract. However, if the software developed under the subcontract is a derivative work of existing subcontractor's software (i.e. Restricted Computer Software), the derivative work can be commercially licensed by the subcontractor. In this situation, the right to assert copyright in software is subject to a limited government-use license to allow the subcontractor sufficient time to commercialize the computer software. In the limited government-use license, the subcontractor grants to the Government and others acting on its behalf, a paid-up nonexclusive, irrevocable worldwide license in such copyrighted computer software to reproduce, prepare derivative works, and perform publicly and display publicly by or on behalf of the Government. However, the limited government-use license in copyrighted software will revert to a broad Government license, which allows the Government to distribute copies to the public, if either the subcontractor abandons the commercialization of the software or DOE march-in rights are exercised, for example, where the subcontractor has not taken effective steps to commercialize the software. If the ASC/ASCR policy on OSS applies, then the Government will release the software as OSS and the broad Government license applies to allow distribution to the public without any restrictions.

The deliverables expected will be detailed reports of technical activities, performance results, and lessons learned associated with the endeavor. It is not expected that any software or hardware will be delivered to the Laboratories under the subcontracts. However, The Laboratories should consult with DOE Program to determine whether, if any, software developed under specific subcontracts should be delivered to DOE's Energy Science and Technology Software Center (ESTSC). DOE believes granting the copyright in software is warranted here in order to stimulate developed end products to purchase in the future.



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The Delayed Release of Unpublished Data—Other Data

Since these subcontracts are for long-term commercialization activity, many companies will want to protect their data generated under the subcontracts from public release. However, DOE's policy (and statutory provisions) is to publicly release technical data that is funded by the U.S. Government. This policy promotes both the commercialization of the technology and the further development of knowledge in the academic/research community. However, many companies would be reluctant to enter into this subcontract if its competitors could have immediate access to the technology. DOE could limit the data delivered to the Laboratories and DOE; however, the Laboratories need to receive all the pertinent data necessary to carry out the objectives of the Government's program. Therefore, DOE Program supports a delayed release of up to five years of technical data developed under the subcontracts in order to allow the subcontractor the opportunity for a competitive advantage to commercialize this technology. There are several exceptions where DOE may release the data, for example, when responding to a request under the Freedom of Information Act (FOIA). See Appendix B, Rights in Data (modified), paragraph (d)(3) for a full list of exceptions.

Foreign Subcontracts

The provisions of this Class Advance Waiver do not automatically apply to any foreign owned or controlled subcontractors at any tier. However, the Laboratories should consult with DOE Patent Counsel and HQ Program to determine whether a foreign subcontractor could be granted the above rights or require the foreign subcontractor to submit a separate petition for an Advance Waiver to be approved by HQ.

Conclusion

This Class Advance Waiver and the terms of the intellectual property clauses included within the subject subcontracts are meant to cover the scope of the work under the APEX Program and shall not serve as precedent for any follow-on work to be negotiated separately with the selected subcontractors. Also, this Class Advance Waiver shall apply to second tier subcontracts that a first tier subcontractor issues. However, this Class Advance Waiver will not apply to foreign owned or controlled companies.

DOE Patent Counsel will qualify each subcontractor by written certification by the Laboratory issuing the subcontract that this Class Advance Waiver is applicable. Such certification will include verification of the minimum percentage cost share by the subcontractor, a determination that the subcontractor is a U.S. company, and verification of the acceptability of the terms and conditions of the subcontract.

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If any company does not qualify for this Class Advance Waiver or is not satisfied with the terms and conditions of the subcontract necessary to qualify for this Waiver, then that company may request to separately petition DOE for its own Advance Waiver and HQ Program will be consulted to determine if that is a possibility.

For the foregoing reasons, and in view of the objectives and considerations set forth in 10 CFR 784, it is recommended that the requested waiver be granted for domestic first tier and second tier subcontracts issued under the APEX program.


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Based on the foregoing Statement of Considerations, it is determined that the interests of the United States and the general public will best be served by waiver of the United States' domestic and foreign patent rights, copyright in software copyright and delayed release of technical data as set forth herein, and therefore, the waiver is granted. Unless approved by DOE Program and DOE Patent Counsel, this waiver shall not apply to a modification or extension of the subcontracts where, through such modification or extension, the purpose, scope or DOE cost of the subcontracts has been substantially altered. This waiver shall not affect any waiver previously granted.

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