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ABSTRACT

The Global Environment for Network Innovations (GENI) is a large-scale, experimental facility concept conceived by the computing research community. GENI promises to support the experimental exploration of robust new networking, distributed systems, and service architectures. It will advance and revolutionize large scale understanding and development of these areas.

In order to support the GENI design and development processes, BBN Technologies, Corp. will serve as the GENI Project Office (GPO). Working closely with the computing research community, the GPO will assume responsibility for the project management necessary to successfully complete all planning, design, and development activities essential to adequately prepare for GENI construction.

Intellectual Merit: GENI is envisioned as a comprehensive, continental-scale research facility that will allow controlled end-to-end experimentation with new architectures, protocols, services, data dissemination techniques, and more, running over an extensive national fiber optic infrastructure with next generation dynamic optical switching and

routing, fully programmable core and edge nodes, heterogeneous sensor networks, wireless networks and other edge devices. All infrastructure will be shared among a large number of individual, simultaneous experiments and will be instrumented for the collection, analysis and pooling of measurements.

In order to manage such a complex endeavor, BBN Technologies will establish a dynamic and effective GPO that provides project management, high-level system architecture, engineering, and operations planning leadership. The GPO management structure and processes will include the broadest possible participation from both academic departments and industrial partners, so that nearly every mechanism in the GPO can be used to encourage broad community participation, throughout the planning phase.

This project entails two basic types of activities: (1) detailed planning documents must be prepared and pass review; and (2) construction risks must be identified and rapidly driven down, via analyses, prototypes, experiments, and trial integrations.

BBN understands all the technologies required in GENI, and has built large systems incorporating all of them, from optical networking, through field-deployed urban radio networks, to large-scale distributed software systems. BBN will bring discipline and clarity to the community's vision, and provide credible, realistic, and low-risk plans for constructing GENI -- the keys to successful design reviews.

Broader Impacts: The construction of GENI and the research that GENI supports is intended to lead to a revolution in information and communications technology as significant as the digitization of communication in the 1950s and the development of the Internet in the 1970s and 1980s. It is essential that everyone participate in this revolution, not just top-tier universities. Accordingly, BBN has structured every part of the GPO's planning processes to aggressively recruit underrepresented groups and institutions into GENI planning, including those of gender, ethnicity, disability, geography, etc. The project includes concrete actions, with objective metrics, for GPO success in building facilities, instrumentation, networks, and ongoing partnerships with underrepresented groups and institutions, for training and education, and for spreading the benefits of GENI experimentation broadly throughout society.

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