



**NRL BAA Announcement
#55-17-06**

FEDERATED, DISTRIBUTED COMPUTING/NETWORK INFRASTRUCTURE

The Center for Computational Science of the Naval Research Laboratory (NRL) is interested in receiving proposals in emerging scalable leading edge technologies relevant to high performance (HP) distributed supercomputing, wide area networking and visualization, and data collaboration technology for High End Computing (HEC). Research involves work in scaling single-image large memory supercomputer processing for scientific problems undertaken as part of the NRL, ONR and High Performance Computing Modernization Office programs; research is ongoing in the areas of exascale computing, infrastructure virtualization, collaboratory and conferencing environments; streaming multi-gigabit multimedia network technology while providing E2E QoS guarantees; federated, distributed technology for multi-petabyte scale file systems; prototype environments for the design of scalable, object oriented multimedia databases for near-realtime access, archival and retrieval; and stream and compression technology for transmission of progressive motion and/or high resolution imagery.

Recent advances in very high resolution sensors with collocated energy-efficient processors continue to mount challenges to various dynamic metrics of agile, adaptive and comprehensive processing of sensor data across C4ISR networks with embedded computing distributed across these networks: at the sensor, at the archives and near the end-user. Large scale data-analytic solutions in the areas multisource information fusion, persistent video analytics, content characterization and retrieval based on dynamic content features are now being recast from the perspective of near-real-time high performance computing networks. Algorithm development aimed at C4ISR networks using adaptively taskable sensors in size weight and power (SWAP) constrained computing environments are also of interest. Innovative sensing inside latency- and bandwidth-challenged degraded, actively contested and/or urban environments requires new approaches. Video analytics that extract content dynamics, situation awareness, 3D structure of rich scenes, and exploit geospatial information including 3D point clouds, terrain maps, multi-sensor motion imagery, etc. are of interest.

The research objective is to investigate and develop innovative approaches and techniques that have the potential to create superior revolutionary rather than evolutionary advances in computing, communications, display and information infrastructures and tools. In addition to software and emerging hardware advances, NRL seeks new methodologies for interconnecting energy-efficient heterogeneous systems through high speed network

technologies that over time have the potential to scale to terabit flows; all-optical amplified wavelength division networking and optical burst switching technology; high performance stream access to remote assets over commercial networks; leading edge flow routing architectures capable of end-to-end streams with QoS guarantees; and information assurance and encryption technologies and tools for the above. Alternatives to von Neumann architectures are of interest.

Address White Papers (WP) to baa@cmf.nrl.navy.mil. Allow one month before requesting confirmation of receipt of WP, if confirmation is desired. Substantive contact should not take place prior to evaluation of a WP by NRL. If necessary, NRL will initiate substantive contact.