The SCEC Broadband Platform (BBP) generates 0-10 Hz ground motions using deterministic low-frequency and stochastic high-frequency simulations. The Broadband platform integrates scientific software elements including rupture generation, low-frequency deterministic seismogram synthesis, high-frequency stochastic seismogram synthesis, and non-linear site effects. These complex scientific codes have been integrated into a system that supports easy on-demand computation of broadband seismograms. The Broadband platform is designed to be used by both geoscientists and engineers with some experience interpreting ground motion simulations.

**Software Sustainability Strategies:**

Commercial Broadband Platform users have stated their plans to use the software on future projects including for a 2016 nuclear fragilities study and a 2016 California dams hazard update, for the NGA-West3 project in 2018 leading to use in 2020 California Building Code development, and for SWUS-2 and NGA-East2 in 2023 leading to use in 2025 Nuclear power plant hazard update. Current Broadband Platform funding includes NSF SI2 SEISM award and funding from private companies (PG&E and Arizona Public Service). The California Department of Water Resources recently offered a possible consulting contract for Broadband Platform support (right).

SCEC’s Broadband Platform software sustainability strategies include: Keep the software development costs at a modest level (~2-3 FTE). Integrate the best available scientific modules into the software. Regularly release improved versions of Broadband as open-source software. Release the software under a license (Apache 2) that is acceptable to state and Federal agencies. Continue the ongoing group verification and validation exercises to build user confidence in the software. Implement software features and enhancements guided by a software development roadmap proposed by users.

Emerging Broadband Platform Software User Community:

Driven by the need of seismic hazard projects to supplement the existing recorded ground motion datasets, geoscientists, building engineers, and computer scientists are working together to develop and use the Broadband Platform for two SSHAC Level 3 seismic safety studies: (1) SWUS, and (2) NGA-E. SWUS Ground Motion Characterization (GMC) SSHAC Level 3 Project is co-sponsored by Pacific Gas & Electric Company (PG&E) and Arizona Public Service (APS) as requested by United States Nuclear Regulatory Commission (US NRC). The Broadband software is used to calculate ground motions for a reference site condition for earthquakes from 5.0 to 8.5 Mw at distances from 0 to 350km.

The NGA-East Ground Motion Characterization project is a SSHAC Level 3 seismic hazard analysis procedure lead by Pacific Earthquake Engineering Research Center (PEER). NGA-East will develop GMPEs with well characterized median, standard deviation (aleatory variability), and logic trees (epistemic uncertainty) that provide average horizontal ground motions (PGA, PGV and 5%-damped PSA for T=0.01-10s) at hard rock sites located up to 1,000 km from future earthquakes in Central North America in magnitude range from 4.0 to 8.2 Mw.

The Broadband Platform development team includes geoscientists, earthquake engineers, and experienced software developers working closely together, then preserving the group’s scientific, engineering and technical agreements in open-source software and data distributions.