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## **YEARLY REPORT FOR THE PERIOD Jan-Dec 2012**

### **IC PROJECT W12c\_earthuq “ High-Performance Computing for Uncertainty Quantification of 3D Earth Models”**

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#### **Scientific and Programmatic Impact:**

This proposal was written to be a new project leveraging on computational achievements of the two IC11 proposals “3D Geophysical Modeling Validation” and “Time-Reversal Imaging of tremor sources”. W12c\_earthuq involves additional codes/tools other than SPEC3D for data processing and planned a strong effort to move toward modeling at much larger scales than the aforementioned projects. W12c\_earthuq goal was to use extensive HPC resources at LANL to assess the uncertainty of high-resolution 3D geophysical models. Validation of these models as planned in W11\_geophys is the first step in a full assessment of uncertainty. So, the scientific and programmatic impacts of this project are the same as W11\_geophys.

#### **Summary of Computational Effort Accomplished:**

The main effort related to w12c\_earthuq is the preparation to transition to large runs with a resolution down to 2s. We already report the work done in the report for w11\_geophys. Such resolution requires meshes with 10 billions elements with a size of about 5km and a few thousands of compute nodes. First tests on mustang have revealed that the I/O part of the code need to be reviewed because it opens too many files in its current version.

#### **Publications/Presentations:**

W12c\_earthuq was a development project so we don't have specific publications to report for this IC project. Nevertheless, W11\_geophys represents the first task to be done in the proposed work for w12c\_earthuq. The publications and presentations for w11\_geophys are thus relevant to this IC project.

#### **Financial Impact:**

W12c\_earthuq has the same scientific and programmatic impacts so the final impacts are the same as the ones reported for w11\_geophys.

#### **Supporting Viewgraphs:**

Viewgraphs submitted for w11\_geophys are relevant for w12c\_earthuq.