Work Plan

2014-2015

In 2014, the Geoyynamo WG’s efforts focused on three main tasks.

TASK1. CALYPSO CODE DEVELOPMENT TASKS 2014

1.1 Calypso v1.1. April 2014

Heterogeneous boundary conditions; Thermal and compositional buoyancy sources; Improvements in output files. 1.2. Calypso Tutorials: CIDER (July) and ELSI Summer Institute (August)

1.3. Calypso v2.0. Late 2014.

Whole sphere dynamo capabilities; Legendre transform performance enhancements; Python template for viewing time-series outputs and 2D slice image outputs. 1.4. Hero Calculations

TASK 2. COMMUNITY BENCHMARK EXERCISE

2.1. Accuracy testing of contributed codes on Stampede 2.2. Performance testing of contributed codes on Stampede 2.3. 2nd CIG Dynamo Development Workshop, NCAR in Boulder, CO, Fall 2014

TASK 3. RAYLEIGH CODE DEVELOPMENT TASKS 2014

3.1. Hydrodynamic Convection Capabilities: simulate Boussinesq non-rotating, non-magnetic convection in spherical shell geometry 3.2. Rotating Convection Capabilities. 3.3. Magneto convection and Dynamo Capabilities

1. Benchmarking

on Release Fall 2014 3.6. Cartesian Geometry 3.7. Hero Calculations 3.8. User interface for broader ion and optimization (e.g. MIC and GPUs)

e scales well up to over 1000 cores on medium scale problems, which is 1000 times the scalability of st publications from Calypso are now in review. Watch a simulation here YouTube.

been initiated to assess both the accuracy and HPC performance of various dynamo models and community buy-in, with over 12 independent codes already having carried out the accuracy tests and 3 r both accuracy and performance. Performance testing is being carried out using the CIG allocation on

of the next generation geodynamo code, Rayleigh, which began in late 2013. Rayleigh makes use of use of upwards of 100,000 cores to efficiently simulate turbulent dynamo action in planetary and stellar

lypso – a Boussinesq spectral transform code.

a new dynamo code based on ASH that will scale to tens of thousands of processors. This new HPC ization of the ASH code, allowing for more realistic, turbulent systems to be studied than are presently

exercise of existing dynamo codes. The benchmark will be developed by the Working Group and be benchmark will test accuracy as well as performance. Performance benchmarking will be run by CIG

Developers Workshop, the Geodynamo Working Group developed a proposal for a Community Dynamo Hiroaki Matsui and Nick Featherstone were identifed as key developers for the project to be supported