

# Computation Splinter Group

## Session Summary

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### 1. RUNS ON REQUEST

#### **SUMMARY & CONCLUSIONS**

During the initial experimental phase of operation of a model submitted to CCMC, the outputs of the model are to be regarded in the sense of "key parameters" in the data-provider world. Namely, they are suggestive of physical behavior, may or may not be reliable, and need to be checked by experts before the results can be used to draw physical conclusions.

To guard against misinterpretation of the results (e.g., due to runs with unanticipated parameter regimes), it was strongly felt that users should be required to contact the developers of the model before publishing results that are based on the output of CCMC models.

#### **DISCUSSION DETAILS**

##### **Initial Experience of Runs-on-Request**

The CCMC staff were surprised by the large number of runs requested so far (29), and they were pleased by the interest of the user community.

Users were generally very pleased by the services of the CCMC.

Users are beginning to discover the CCMC; more usage is expected in the future.

It may be too early to expect detailed user reactions and feedback.

Users want ease of use; many options should be provided

Developers were also pleased by their model submission experience; they had positive interactions with CCMC and a positive experience in preparing their model for submission; they see this as an exciting future for their models.

The present CCMC input/output/visualization interfaces are very basic, and were primarily designed to get an environment for runs-on-request in place quickly.

There are plans at CCMC to generalize and improve the interfaces and options available.

The majority of users seem to prefer web visualization.

Some users want a lot of detail; they may get this by reading the raw output files themselves and post-processing the data using their own software. CCMC should provide basic details on how to access the raw data.

CCMC is willing to accommodate specialized user requests (at this time).

CCMC current plans for improvement include: allowing different run lengths, interactive choice of starting grid, choice of conductance model, more models to add to CCMC (ionosphere / solar / heliosphere), more model combinations (coupling).

### **User's Perspective**

One user had difficulty with using the visualization software provided. CCMC could provide a User's Manual or tutorial to help this.

### **Developer's Perspective**

CCMC provides a framework for many users to test a model. This could be beneficial scientifically to the community, since it will lead to improved modeling.

CCMC may provide exposure for a model, and this may help it to gain acceptance in the community.

Model submission at CCMC may give the opportunity to skeptics of the model to find out for themselves the merits of the model.

Model submission at CCMC may also expose the weaknesses of the model, but this may be an opportunity to improve the robustness and applicability of the model.

CCMC does the "dirty work" (coordinating user input/output, running the code) and offloads this from the developer.

### **Source Code Availability**

Providing source code may not be very useful for the majority of users.

Source code is difficult to understand and therefore has limited usefulness.

The codes do not tend to be well documented, and are usually difficult to modify, since they are primarily "research grade".

Resources are usually not allocated by the funding agencies to document codes or to help users with source code questions.

### **Discussion on Runs-on-Request**

**Question:** What basic quality assurance or checking of model output needs to be done?

This issue becomes especially important when different models are coupled together, since this may lead to unanticipated inputs.

There was consensus in the group that there was a need to provide a mechanism for quality control in the interpretation of the output of model runs.

To guard against misinterpretation of the results (e.g., due to runs with unanticipated parameter regimes), it was strongly felt that users should be required to contact the developers of the model before publishing results that are based on the output of CCMC models.

CCMC can formalize this requirement by establishing "ground rules" or "conditions of use" of the CCMC (see draft by Janet Luhmann).

During the initial experimental phase of operation of a model submitted to CCMC, the outputs of the model are to be regarded in the sense of "key parameters" in the data-provider world. Namely, they are suggestive of physical behavior, may or may not be reliable, and need to be checked by experts before the results can be used to draw physical conclusions.

## **2. VISUALIZATION**

### **SUMMARY & CONCLUSIONS**

OpenDX was seen to be a very attractive product for use at CCMC. There was strong endorsement for using it as a standard visualization option at CCMC.

### **DISCUSSION DETAILS**

CCMC is implementing a different interface (web page) for each type of model. Each is setup via scripts to the plotting package and for the creation of the web page.

OpenDX is one of several plotting packages available to modelers and the CCMC.

It is free and open-source; it is well documented; there are many sample programs, and active user groups; it is popular.

It runs on many platforms.

It is very flexible, easily programmable, easy to learn, easy to use.

It was used in a summer school and provided students with an ability to diagnose a 3D magnetospheric simulation easily.

It can run using a server/client scheme.

It can generate web page interfaces easily.

Standard program "nets" (the equivalent of modules) can be provided by CCMC, and easily modified by users to suit their particular needs.

## **3. DATA INPUT AND OUTPUT**

### **SUMMARY & CONCLUSIONS**

There was general consensus that users will want ease of use in accessing spacecraft or ground-based data as input to CCMC models. It would be very convenient for users to specify a spacecraft, time, and date for data input to CCMC model runs. However, it was felt that this must remain a long-term goal at the present time, due to the difficulty of implementing this strategy with limited CCMC staff and resources. Quality checks of the data would be hard to do automatically and should not be the CCMC focus for the present time.

As a short-term goal (1-2 years) it was felt that users should fetch and process the data themselves, and format them in standard formats for input as data files for CCMC model runs. CCMC could assist with this if needed.

