CCMC 2022 Workshop
College Park, Maryland
June 6-10, 2022
Final Agenda
all times Eastern
https://bit.ly/ccmcagenda

Monday 6/6:
CCMC Report, Agency Stakeholders, Community Discussion

8:00 am – 9:00 am Registration, Continental breakfast

Chair: *Antti Pulkkinen*
9:00 am – 9:05 am Welcome, *Antti Pulkkinen*

9:05 am – 10:20 am CCMC Team Report
10:20 am – 10:40 am Q&A

10:40 am – 11:00 am Coffee Break

11:00 am – 11:15 am NASA Heliophysics view of CCMC, *Nicky Fox*
11:15 am – 11:30 am NSF view of CCMC, *Tai-Yin Huang*
11:30 am – 11:45 am ISEP: The CCMC-SRAG-M2M partnership to address needs for human exploration, *Kerry Lee*
11:45 am – 12:00 pm Future of DoD Space Weather Support, *Jerry Sanders,* USAF
12:00 pm – 12:15 pm How can CCMC better support the SWxSA program and ongoing national space weather activities, *Jim Spann*
12:15 pm – 12:30 pm CCMC partnership with HDRL, *Aaron Roberts* VIRTUAL

12:30 pm – 1:30 pm Lunch on own

1:30 pm – 6:00 pm **Discussions on CCMC community and agencies support and strategic planning** [discussion folders]

This session includes topical discussion items. Each topical discussion will start with short viewpoint presentations (1-2 slides) given by discussion organizers (research community representatives, programs/initiative leads at NASA HQ, NSF and CCMC staff). We will invite community representatives (CCMC analysis group) to help gather community feedback prior to the workshop, moderate discussions during the workshop, and summarize outcomes after the workshop. Please contact organizers if you would like to discuss your view point and/or you have suggestions for additional topics. Viewpoint presentations by the CCMC, HQ, and the community will be made available in advance.

75 min

1:30 pm – 2:45 pm **Streamlining the Model On-boarding Process** [discussion folder | **FEEDBACK SURVEY**]

Discussion Organizers: CCMC: *Tina Tsui, Leila Mays;* Modelers*: Jon Linker (lead), Tamas Gombosi*VIRTUAL*, Shaela Jones, Lulu Zhao, John Dorelli*VIRTUAL*, Slava Merkin;* HQ*: Simon Plunkett*VIRTUAL

- Shared collaborative environments at NASA HECC and AWS. Increase modeler participation in on-boarding. Lessons learned, what is working well and what isn't?
- Best practices for preparing for model on-boarding and implementing simulations services
- Improving readiness for on-boarding of LWS SC deliverables
- CCMC plans for increased computational resources (NASA HECC and NASA AWS GPU nodes): What are reasonable resource requests?
- Do modelers prefer that their models be served from CCMC in-house infrastructure or AWS/NASA HECC?
- Are model developers interested in providing CI/CD pipelines to CCMC?
- What policies/procedures are necessary for model access to external data sources, either for input or validation?
- Should CCMC provide standard querying that can be accessed by all models?
- Are models familiar with/prefer containerization as a means of supplying models?
- How should updates/changes to models be communicated to users? Can/should multiple versions be maintained?

45 min

Heliophysics models beyond Earth and the Solar System - CCMC's role

[discussion folder | **FEEDBACK SURVEY**]

2:45 pm – 2:55 pm NASA Heliophysics interest in using heliophysics models beyond Earth and the Solar System, *Galen Fowler*VIRTUAL

2:55 pm – 3:30 pm Discussion

Discussion Organizers: CCMC*: Katherine Garcia-Sage (lead);* Modelers/Community*: Alison Farrish*VIRTUAL*, Chuanfei Dong*VIRTUAL*, Dave Brain*VIRTUAL*, Gina DiBraccio, Christina Kay;* HQ*: Galen Fowler*VIRTUAL*, Katya Verner, Jared Leisner;* NSF*: Carrie Black*VIRTUAL

- Heliophysics models applied to planets beyond earth and systems beyond the solar system. How can CCMC support these applications?
- What are the highest-priority planetary/exoplanetary-related needs for modeling services?
- How does modeling beyond Earth and the solar system compare to "core" heliophysics modeling?
- What links can be built to show the value of heliophysics to other science communities?
- Follow-on discussions/actions planning

3:30 pm – 4:00 pm Coffee Break

75 min

4:00 pm – 5:15 pm **CCMC Support of Open Science** [discussion folder | **FEEDBACK SURVEY**]

Discussion Organizers: CCMC*: Rebecca Ringuette, Yihua Zheng;* Modelers/Community*: Lan Jian (co-lead), Tuija Pulkkinen, Yue Deng, Michael Wiltberger, Aaron Ridley, Vania Jordanova*[VIRTUAL]*; Agnit Mukhopadhyay;* HQ*: Reinhard Friedel (co-lead)*

- Open source: What opportunities should CCMC offer to maximize return on open source software and open access data? Should CCMC pilot open source projects (e.g., community-wide projects/challenges on model improvements, plug and play with code portions)?
- What should CCMC's role be in addressing requirements for open science and reproducibility?
- Should CCMC host results of simulations performed outside of CCMC and utilize CCMC and other tools for visualization and analysis of those results? What should the requirements be for simulation outputs to be hosted by CCMC?
- Several journals are requiring simulation outputs to be accessible for the publications using them. What role should CCMC take in this area? Should CCMC generate DOIs for runs that are used in papers/publications?
- Of the action items collected, what should CCMC's priorities be?

45 min

5:15 pm – 6:00 pm **What should CCMC's education focus be?** [discussion folder | **FEEDBACK SURVEY**]

Discussion Organizers: CCMC*: Rebecca Ringuette, Yihua Zheng;* Community*: Aaron Ridley, Dan Emmons (lead), Nick Gross, Elon Olsson, Vivian Trakinski*[VIRTUAL]*, Ray Walker*[VIRTUAL]

- Does the community want CCMC to begin running periodic user workshops? How should CCMC support its user community?
- What does the community want to see from CCMC in terms of facilitating training for new members of the model development community through collaborations?
- What is the best strategy to use CCMC models and visualization resources in classrooms and outreach venues?
- How can CCMC best support and complement community summer schools and graduate professional development?
- Of the action items collected, what should CCMC's priorities be?

Tuesday 6/7: *Solar/Heliosphere*

8:00 am – 9:00 am Continental breakfast

Chair: *Martin Reiss*

SOLAR

9:00 am – 9:15 am 01 ADAPT, *Carl Henney* VIRTUAL
9:15 am – 9:25 am 02 WSA, *Nick Arge*
9:25 am – 9:35 am 03 WSA in research, *Jamie Staeben*
9:35 am – 9:45 am 04 WSA Dashboard, *Daniel da Silva and Jaime Landeros*

SOLAR/HELIOSPHERE

9:45 am – 10:00 am 05 CORHEL, *Jon Linker*
10:00 am – 10:15 am 06 ENLIL, *Dusan Odstrcil*
10:15 am – 10:30 pm 07 How can ENLIL help us in heliophysics research? *Laura Rodriguez-Garcia* VIRTUAL

10:30 am – 11:00 am Coffee Break

Chair: *Katie Whitman*

11:00 am – 11:15 am 08 GAMERA-Helio: A new addition to the CCMC family of inner heliosphere models, *Elena Provornikova*
11:15 am – 11:30 am 09 Run-on-Request and Real-Time Simulation System for AWSoM-R at the CCMC, *Igor Sokolov*
11:30 pm – 11:45 am 10 Using AWSoM to model stellar winds, *Ofer Cohen*
11:45 pm – 12:00 pm 11a 11b Discussion on synoptic map data used by models, Chairs*: Alexei Pevtsov and Martin Reiss,* Scene-setter*: Luca Bertello*

- Vector synoptic maps
- Synoptic (pseudo-/true-radial and vector) maps pole filling.
- Composite maps combining pseudo- and true radial field.
- What would be a useful set of parameters/requirements to have as synoptic maps?

12:00 pm – 1:30 pm Lunch on own

Chair: *Claudio Corti*

SEP models - candidates for support of Human Exploration

1:30 pm – 1:45 pm 01 Demonstration of the physics-based approach to nowcast/forecast the SEP events using coupled AWSoM-R and M-FLAMPA, *Lulu Zhao*
1:45 pm – 2:00 pm 02 Simulation of SEPs in the heliosphere with SWMF/AMPS, *Valeriy Tenishev*
2:00 pm – 2:15 pm 03 EPREM, *Matt Young*
2:15 pm – 2:30 pm 04 OpenSpace demo of STAT visualization, *Elon Olsson* LIVE DEMO?
2:30 pm – 2:45 pm 05 iPATH and SEPCASTER, *Gang Li*

2:45 pm – 3:00 pm	06 SEPMOD, *Janet Luhmann* VIRTUAL
3:00 pm – 3:15 pm	07 SEPSTER, *Ian Richardson*
3:15 pm – 3:30 pm	08 SEPSTER2D: Empirical Model of 10 – 130 MeV Solar Energetic Particle Spectra at 1 AU Based on Coronal Mass Ejection Speed and Direction, *Alessandro Bruno*
3:30 pm – 4:00 pm	Coffee Break

Chair: *Chris Light*

4:00 pm – 4:15 pm	09 SEP forecasting with HESPERIA REleASE*, Olga Malandraki*VIRTUAL
4:15 pm – 4:30 pm	10 UMASEP: a suite of models for predicting SEP events in real-time, *Marlon Núñez* VIRTUAL
4:30 pm – 4:45 pm	11 The SAWS-ASPECS tool integration within CCMC: Challenges and Prospects, *Athanasios Papaioannou*VIRTUAL and *Anastasios Anastasiadis* VIRTUAL
4:45 pm – 5:00 pm	12 Solar Source SEP Event Prediction through Multi-Layer Ensembling at GSU, *Dustin Kempton*
5:00 pm – 5:15 pm	13 SPRINTS SEP forecast, *Alec Engell*
5:15 pm – 5:30 pm	14 Near-real-time MLSO CME Alerts to SEP Scoreboard, *Chris St.Cyr*VIRTUAL *and Joan Burkepile*
5:30 pm – 5:45 pm	15 Combining Physics and Machine Learning-based Models for Full-Energy-Range Solar Energetic Particles Events Prediction, *Soukaina Boubrahimi*VIRTUAL
5:45 pm – 6:00 pm	16 Radiation forecasting for Mars Exploration: The bare essentials, *Arik Posner*

Wednesday 6/8: *Magnetosphere/Ionosphere/Thermosphere*

8:00 am – 9:00 am	Continental breakfast

Chair: *Mike Wiltberger*
MAGNETOSPHERE

9:00 am – 9:15 am	01 Latest updates of the Space Weather Modeling Framework (SWMF): from the Sun to the Earth, *Zhenguang Huang*
9:15 am – 9:30 am	02 Multiscale Atmosphere-Geospace Environment (MAGE) model: New developments and onboarding at the CCMC, *Slava Merkin*
9:30 pm – 9:45 pm	03 OpenGGCM new developments, *Doug Cramer*
9:45 am – 10:00 am	04 Geomagnetic storm statistics: SWMF Geospace simulation perspective, *Tuija I. Pulkkinen*
10:00 am – 10:20 am	05 OpenSpace visualization and topological analysis of the magnetosphere, *Elon Olsson*[VIRTUAL]*, Måns Aronsson, Simon Brefält*
10:20 am – 10:45 am	Coffee Break

Chair: *Mostafa El Alaoui*

10:45 am – 11:00 am	06 HYPERS, *Yuri Omelchenko*
11:00 am – 11:15 am	07 IPIC3D, *Giovanni Lapenta*[VIRTUAL]
11:15 am – 11:30 am	08 Multifluid simulations of the solar wind interaction with the Earth magnetosphere, *Amitava Bhattacharjee*
11:30 am – 11:45 am	09 Discussion: Moving beyond MHD for global magnetosphere simulations at CCMC.

Chair: *Slava Merkin*
IONOSPHERE ELECTRODYNAMICS

11:45 am – 12:00 pm	10 ADELPHI, *Bob Robinson*[VIRTUAL]
12:00 pm – 12:15 pm	11 COMPASS ionosphere conductance model and comparisons to other existing conductance models, *Zihan Wang*[VIRTUAL]*, Shasha Zou*[VIRTUAL]
12:15 pm – 12:30 pm	12 AMPERE, *Brian Anderson*
12:30 pm – 12:45 pm	13 Ionospheric Conductance in the SWMF: Code Refactoring and Physics Improvements, *Dan Welling, Agnit Mukhopadhyay*
12:45 pm – 1:00 pm	14 Data Assimilation Capabilities, AMGeO and DART_TIEGCM, *Tomoko Matsuo*
1:00 pm – 2:00 pm	Lunch - CCMC will provide a light lunch with snacks in the main meeting room

Chair: *Yue Deng*
IONOSPHERE/THERMOSPHERE

2:00 pm – 2:15 pm	01 DTM2020, *Sean Bruinsma*

2:15 pm – 2:30 pm	02 SAMI3, *Joe Huba*
2:30 pm – 2:45 pm	03 TIEGCM 2.5, *Wenbin Wang*
2:45 pm – 3:00 pm	04 Atmosphere-ionosphere model development at NCAR: WACCM-X, *Hanli Liu* VIRTUAL
3:00 pm – 3:15 pm	05 PBMod (scintillations), *John Retterer* VIRTUAL
3:15 pm – 3:30 pm	06 Amateur radio use for plasma density model validation, *Bill Engelke*
3:30 pm – 4:00 pm	Coffee Break

Chair: *Wenbin Wang*

4:00 pm – 4:15 pm	07 GEOS5/WACCM-X, *Valery Yudin*
4:15 pm – 4:30 pm	08 WP-GITM, *Xing Meng* VIRTUAL
4:30 pm – 4:45 pm	09 Using ICON data to drive ionosphere/thermosphere models from below someone from ICON, *Astrid Maute* VIRTUAL
4:45 pm – 5:00 pm	10 Role of coupling with lower atmosphere on ionosphere/thermosphere model performance, *Ja Soon Shim*
5:00 pm – 5:15 pm	11 Discussion: Infrastructure for coupling and swapping drivers from below
5:15 pm – 5:30 pm	12 GITM / Aether, *Aaron Ridley*
5:30 pm – 5:45 pm	13 Exo-, Gas Giant, and Titan-GITM, *Jared Bell* VIRTUAL
5:45 pm – 6:00 pm	14 KePWOM and Planet-ITTR, *Alex Glocer*

Thursday 6/9: *R2O2R, Validation, Uncertainty*

8:00 am – 9:00 am Continental breakfast

Chair: Janet Green

INNER MAGNETOSPHERE/NEAR-EARTH RADIATION ENVIRONMENT

9:00 am – 9:15 am	01 SEAES-FC (Space Environmental Anomalies Expert System Flow Charts), *Paul O'Brien*
9:15 am – 9:30 am	02 CIMI Update, *Mei-Ching Fok*
9:30 am – 9:45 am	03 RAM-SCB, *Steve Morley*
9:45 am – 10:00 am	04 VERB, *Alexander Drozdov*
10:00 am – 10:15 am	05 PINE and more, *Yuri Shprits*VIRTUAL
10:15 am – 10:30 am	06 DREAM3D results for the ISWAT challenge, *Sang-Yun Lee*
10:30 am – 10:45 am	07 Simulation of SEPs in geospace with SWMF/AMPS, *Valeriy Tenishev*
10:45 am – 11:15 am	Coffee Break

Chair: *Paul O'Brien*

SPACE ENVIRONMENT IMPACT ON AVIATION

11:15 am – 11:30 am	08 NAIRAS version 3, *Chris Mertens*
11:30 am – 11:45 am	09 Characterizing the Global Aviation Radiation Environment based on Model and Measurement Databases, *Kent Tobiska*VIRTUAL

Operational Models at NOAA SWPC addressing ICAO needs

11:45 am – 12:00 pm	10 CARI-7, *Hazel Bain*VIRTUAL
12:00 pm – 12:15 pm	11 WAM-IPE operational, *Tzu-Wei Fang*
12:15 pm – 12:30 pm	12 GloTEC, *Dominic Fuller-Rowell*
12:30 pm – 2:00 pm	Lunch - CCMC will provide a boxed lunch in the main meeting room

Lunch Discussion (attendance is optional):

Innovative Solutions to Improve Near Earth Environment Modeling: [agenda]

What more (machine learning, data assimilation, adding missing physics, utilization of open science, etc) is needed for modeling the near-Earth radiation and space plasma environment. Discussion leads: *Weichao Tu, Jacob Bortnik*VIRTUAL, *Yihua Zheng*. Panel: *Janet Green, Paul O'Brien, Yuri Shprits*VIRTUAL, *Piyush Mehta*VIRTUAL

Chair: *Samantha Howard*

2:00 pm – 2:15 pm	01 Summary of lunch discussion outcome, *Weichao Tu, Jacob Bortnik*VIRTUAL

Validation and R2O transition

2:15 pm – 2:30 pm	02 CCMC-SWPC partnership on R2O2R utilizing shared architecture for collaborative evaluations, *Steve Hill* VIRTUAL
2:30 pm – 2:45 pm	03 Essential space environment quantities for benchmarking, evaluation of model-candidates to enter the R2O transition pipeline, and tracking progress over time, *Eric Adamson*
2:45 pm – 3:00 pm	04 CCMC Validation and R2O transition tools: ISWA, CAMEL and Scoreboards, *Leila Mays*
3:00 pm – 3:15 pm	05 M2M Real-time Validation Studies, *Yari Collado-Vega and Michelangelo Romano*
3:15 pm – 3:30 pm	06 ISWAT SEP Model Validation Team, *Kathryn Whitman*
3:30 pm – 3:45 pm	07 Paving the way towards an ambient solar wind scoreboard, *Martin Reiss*
3:45 pm – 4:15 pm	Coffee Break

Chair: *Jia Yue*

Neutral Density and Satellite Drag

4:15 pm – 4:30 pm	08 Partnership with CNES on neutral density model evaluations, *Sean Bruinsma*
4:30 pm – 4:45 pm	09 Partnership with SWx TREC: Coupling with orbit propagators to evaluate neutral density modeling, *Zach Waldron*

Chair: *Steve Morley*

Uncertainty Quantification

4:45 pm – 5:00 pm	10 SWQU project: Improving Space Weather Predictions with Data-Driven Models of the Solar Atmosphere and Inner Heliosphere, *Nick Pogorelov* VIRTUAL
5:00 pm – 5:15 pm	11 Improvement of CIMI Model for Uncertainty Quantification at CCMC, *Piyush Mehta* VIRTUAL
5:15 pm – 5:30 pm	12 Recent Developments Using Interplanetary Scintillation Tomography: Adjusting the IPS-Driven ENLIL to Work Better? *Bernie Jackson*
5:30 pm – 5:45 pm	13 eXtreme Benchmarks (XB) Framework, *Pete Riley* VIRTUAL
5:45 pm – 6:00 pm	14 Sun-to-Earth CME Modeling with OSPREI: Using Ensembles to Explore Uncertainties, *Christina Kay*

Friday 6/10: *Partnerships and Infrastructure*

8:00 am – 9:00 am Continental breakfast

Chair: *Angelos Vourlidas*

Opportunities for partnership with international modeling centers and programs

9:00 am – 9:15 am	01 Virtual Space Weather Modelling Centre (VSWMC), *Stefaan Poedts* VIRTUAL
9:15 am – 9:30 am	02 EUHFORIA, *Christine Verbeke* VIRTUAL
9:30 am – 9:45 am	03 PITHIA-NRF, *Anna Belehaki* VIRTUAL
9:45 am – 10:00 am	04 New SPENVIS system and the current status of the aviation service within the ESA S2P Space Weather Programme, *Erwin De Donder* VIRTUAL
10:00 am – 10:15 am	05 SWIMMR, *Ian McCrea* VIRTUAL
10:15 am – 10:30 am	06 UK Met Office space weather research, operations & verification, *Suzy Bingham* VIRTUAL
10:30 am – 11:00 am	Coffee Break
11:00 am – 11:15 am	07 Korean Space Weather Center, *Kichang Yoon* VIRTUAL
11:15 am – 11:30 am	08 Real-time space weather predictions by IRAP-STORMS, *Alexis Rouillard* VIRTUAL

Chair: *Chris Pankratz*

CCMC Collaborations with Data Centers

11:30 am – 11:45 am	09 HDRL and CCMC, *Aaron Roberts* VIRTUAL
11:45 pm – 12:00 pm	10 SPDF and CCMC, *Lan Jian*
12:00 pm – 12:15 pm	11 SDAC and CCMC, *Jack Ireland*
12:15 pm – 12:30 pm	12 HAPI Overview, *Jon Vandegriff*
12:30 pm – 1:30 pm	Lunch - CCMC will provide a boxed lunch in main meeting room

Chair: *Janet Barzilla*

Update and Feedback on CCMC Services

1:30 pm – 1:45 pm	01 Runs-on-Request (ROR), *Maksym Petrenko*
1:45 pm – 2:00 pm	02 Continuous/real-time runs, *Chinwe Didigu*
2:00 pm – 2:10 pm	03 iSWA, *Rick Mullinix*
2:10 pm – 2:20 pm	04 Instant Runs, *Mark Moussa*
2:20 pm – 2:30 pm	05 New website, *Tyler Schiewe* VIRTUAL
2:30 pm – 2:45 pm	06 Discussion: What improvements do CCMC users want to see most in terms of CCMC simulation services and software tools?
2:45 pm – 3:10 pm	07 CCMC tools for visualization and analysis, *Rebecca Ringuette, Darren DeZeeuw, Lutz Rastaetter, Asher Pembroke* LIVE DEMO?
3:10 pm – 3:30 pm	08 Discussion: Long term archive/storage requirements for CCMC ○ What should be made available online to users? ○ What can be put in 'cold' storage and users will need to wait a few days to a week to download/access the output

3:30pm	Workshop adjourns