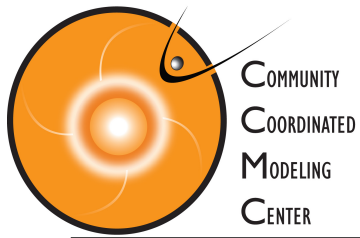


New Horizons Flyby Modeling

**Peter MacNeice,
Leila Mays, Rick Mullinix, Anna Chulaki
NASA/GSFC**

CCMC Workshop

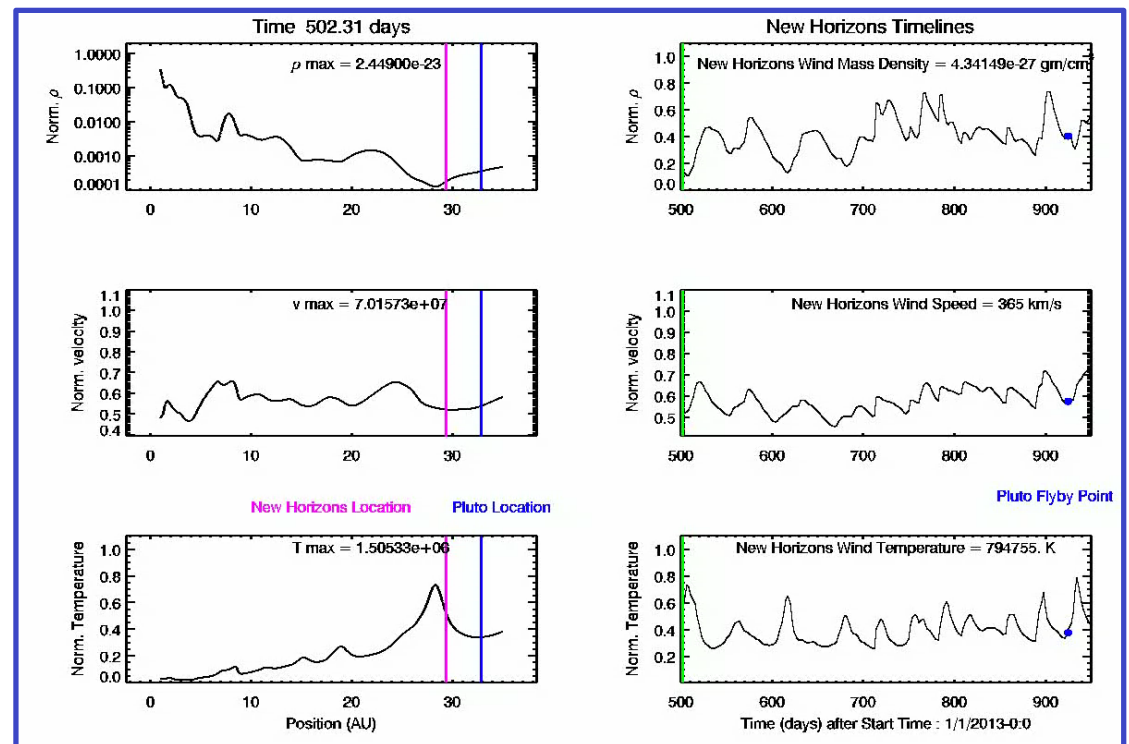
Annapolis, MD
April 16, 2016.

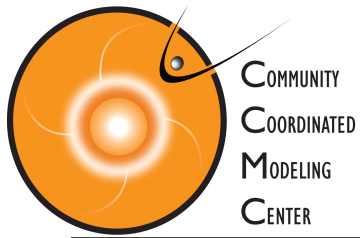


New Horizons Flyby Model Support

Example of CCMC role as facilitator of community modeling project

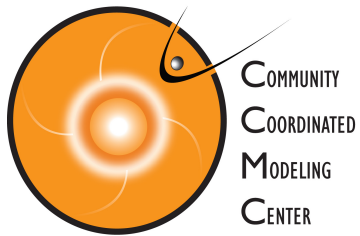
- Request from Jim Green to provide some modeling context for the flyby (about 90 days notice)
 - ENLIL ?
 - Fall back – simple 1D gasdynamic model
 - ‘Dance first, think later. It’s the natural order.’ – Samuel Beckett
- Solicited the Outer Heliosphere modeling community’s help
- Created web pages to host contributed model results





New Horizons Flyby Model Support

Model	Authors	Description
MS-FLUKSS	T.Kim, N.Pogorelov, G.Zank	3D MHD-plasma/kinetic-neutral
ENLIL-2D	D.Odstreil	2D MHD with CMEs
ENLIL-3D	D.Odstreil	3D MHD with CMEs
USMANOV	A.Usmanov	3 fluid 3D MHD
mSWIM	K.Hansen	1.5D MHD
SWMF-OH	B.Zieger, M.Opher, G.Toth, T.Gombosi	2.5D multifluid MHD
Cor-1D	P.MacNeice, N.Schwadron	1D Gasdynamics



New Horizons Flyby Model Support

[ccmc.gsfc.nasa.gov/missionsupport/NewHorizons_support.ph](http://ccmc.gsfc.nasa.gov/missionsupport/NewHorizons_support.php)

The screenshot shows a web browser window with the URL ccmc.gsfc.nasa.gov/missionsupport/NewHorizons_support.php. The page header includes the CCMC logo and navigation links such as "About", "Models at CCMC", "Request A Run", "View Results", "Instant Run", "Metrics and Validation", "Education", "R2O Support", "Mission Support", and "Community Support".

New Horizons Mission Support

Community-wide effort to provide solar wind modeling support for the New Horizons Flyby:
"New Horizons Flyby Modeling Challenge"

This site presents initial results from computer simulations of the near Pluto Solar wind environment for the time period of the New Horizons Spacecraft flyby. Results are presented from models that range from a simpler 1D gasdynamic approximation, a 2D magnetohydrodynamic(MHD) simulation that includes passage of nearly 120 interplanetary coronal mass ejections, and 3D multi-fluid and 3D multiscale Fluid-Kinetic MHD models. Click on the caption in the slider for detailed results from and information about each model.

Current contributors include:

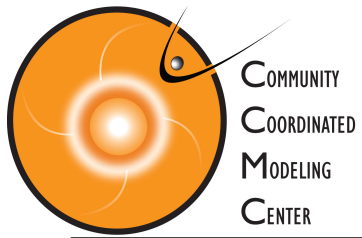
- Tae Kim
- Nikolai Pogorelov
- Gary Zank
- Dusan Odstrcil
- Arcadi Usmanov
- Kenneth Hansen
- Nathan Schwadron
- Peter MacNeice
- Bertalan Zieger
- Merav Opher
- Gabor Toth
- Tamas Gombosi

Project facilitator: Peter MacNeice. Please contact [Peter MacNeice](#) or [Leila Mays](#) if you would like to join the challenge.

Modeling Results for the New Horizons Flyby Modeling Challenge

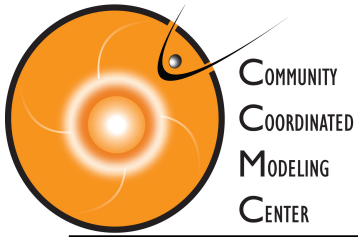
Under construction, results are continually posted as they are received, please check back regularly for new results.

The visualization shows a 3D model of the solar wind environment around Pluto. It includes a "Global view" (a) showing the solar wind flow and the spacecraft's path, a "Detail view" (b) showing a close-up of the solar wind structure, and a "Temporal profile" (c) showing the solar wind number density over time. The text "2D Models Preliminary 2D ENLIL results from Dusan Odstrcil (details here)" is overlaid on the visualization.

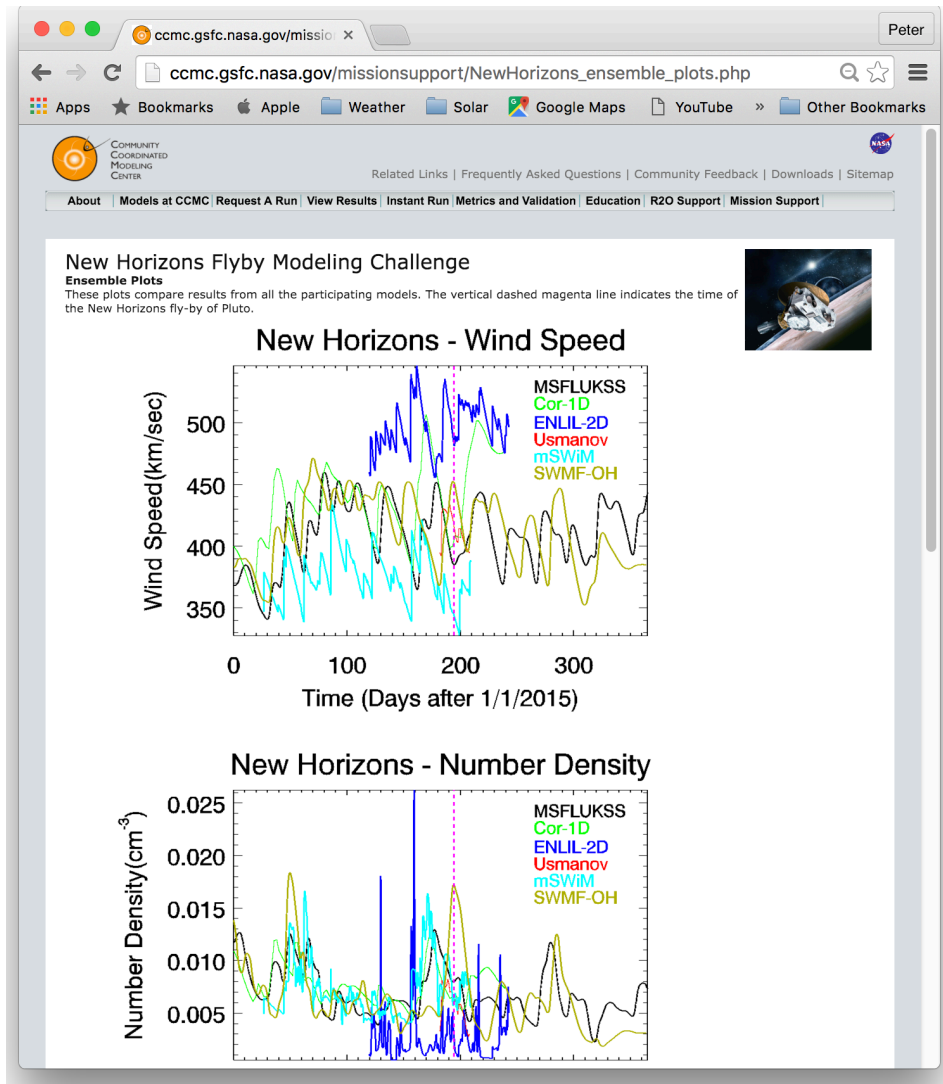


New Horizons Flyby Model Support

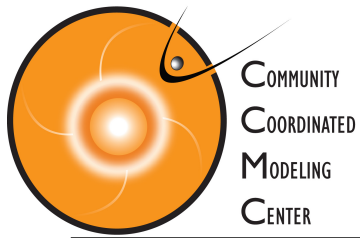




New Horizons Flyby Model Support



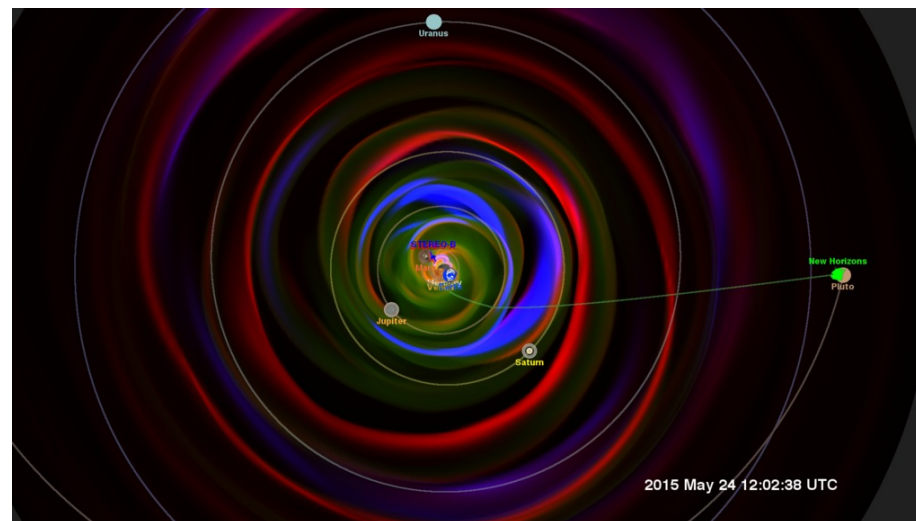
Will it lead to collaborations between modelers and the New Horizons SWAP team ?

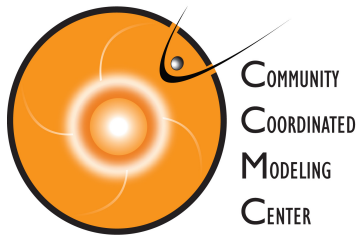


New Horizons Flyby Model Support Visualization

http://ccmc.gsfc.nasa.gov/missionsupport/NewHorizons_support.ph

- Fly thru visualizations
 - GSFC Visualization studio – Bridgeman
 - Linköping Univ. in collaboration with the Hayden Planetarium- Bok et al





Reflections

- Showcases the CCMC's rapid response capabilities
- 'Community Coordinated' means more than model hosting for Runs-On-Request
- Is the Outer Heliosphere a sensible growth area for the CCMC model inventory?