

Transitioning Models to Space Weather Operations: Thoughts and Suggestions

Michael Hesse

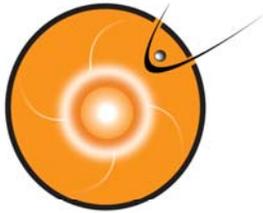
Chief, Space Weather Laboratory

and

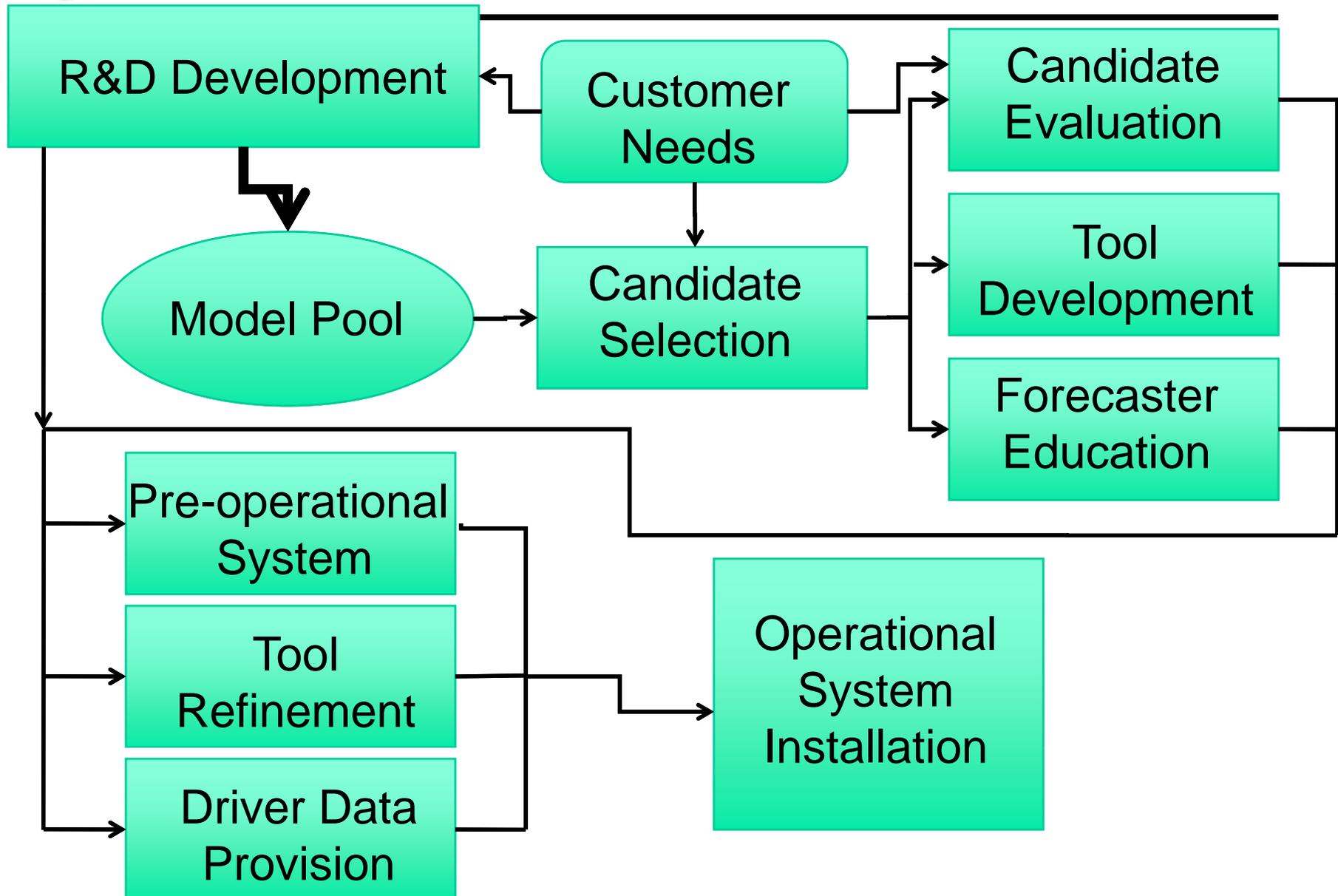
Director, CCMC

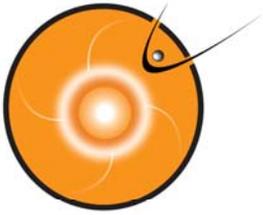
NASA Goddard Space Flight Center





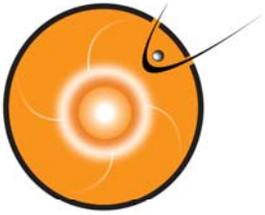
Cradle-to-Operations Process: The Standard Picture





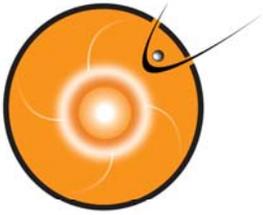
Nonstandard Considerations

... and issues particular to space science model
development



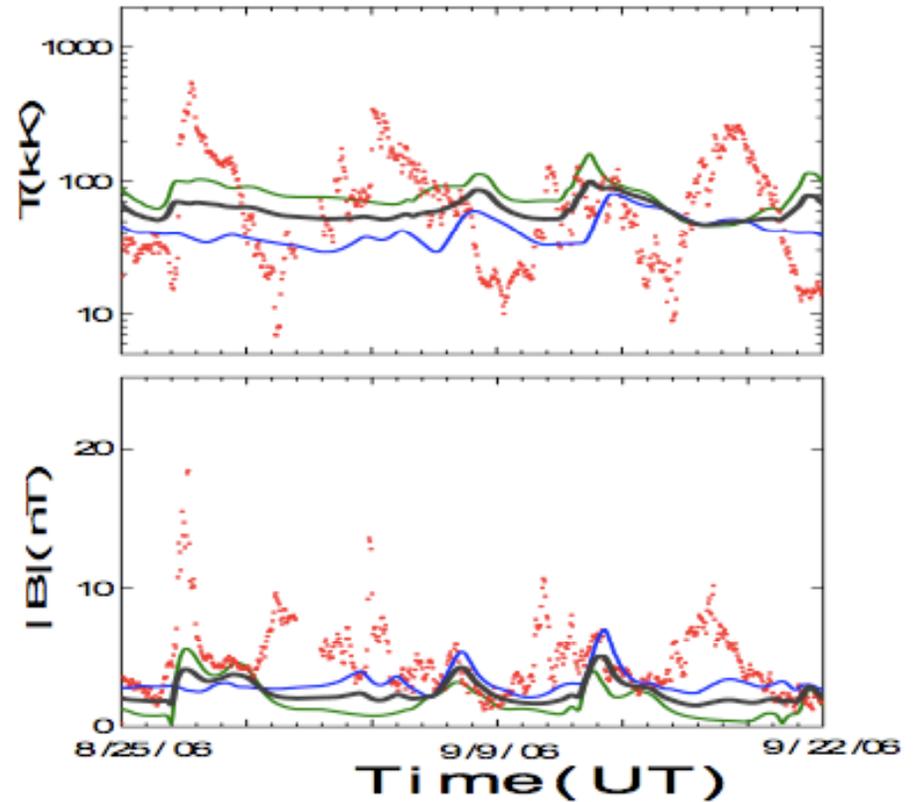
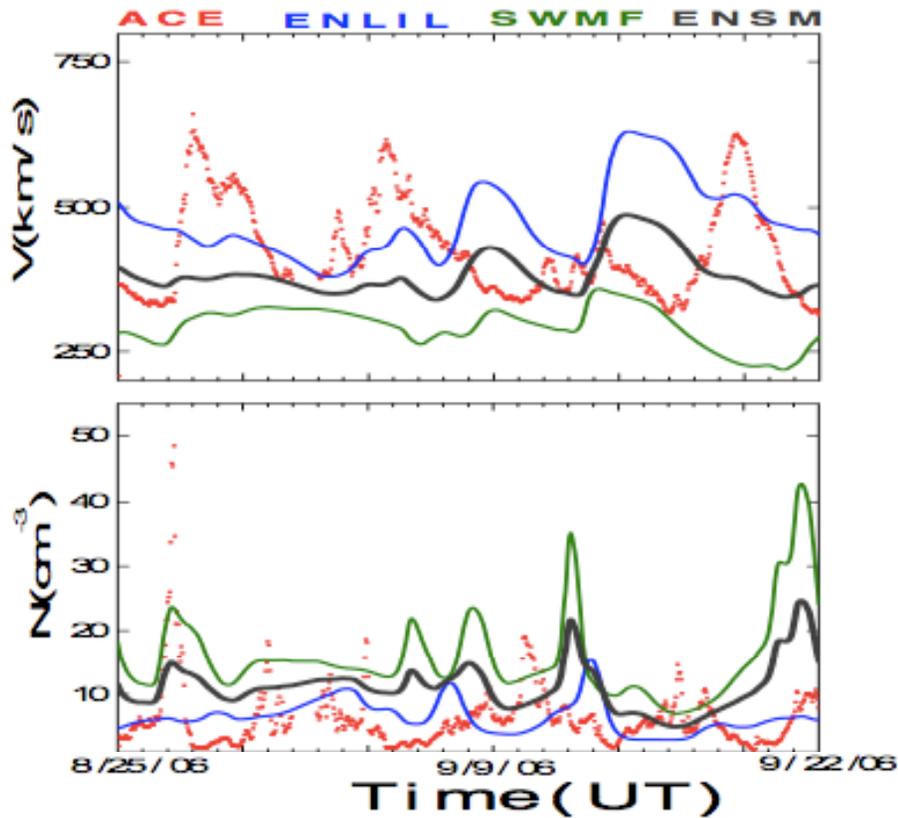
Space Science Models are not Mature

- State-of-the-art is often limited
- Development cycle commonly smaller than one year
- Frequent updates
- Often dramatically improved capability

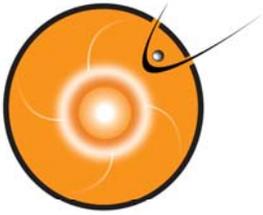


Example: Solar Wind Forecasts

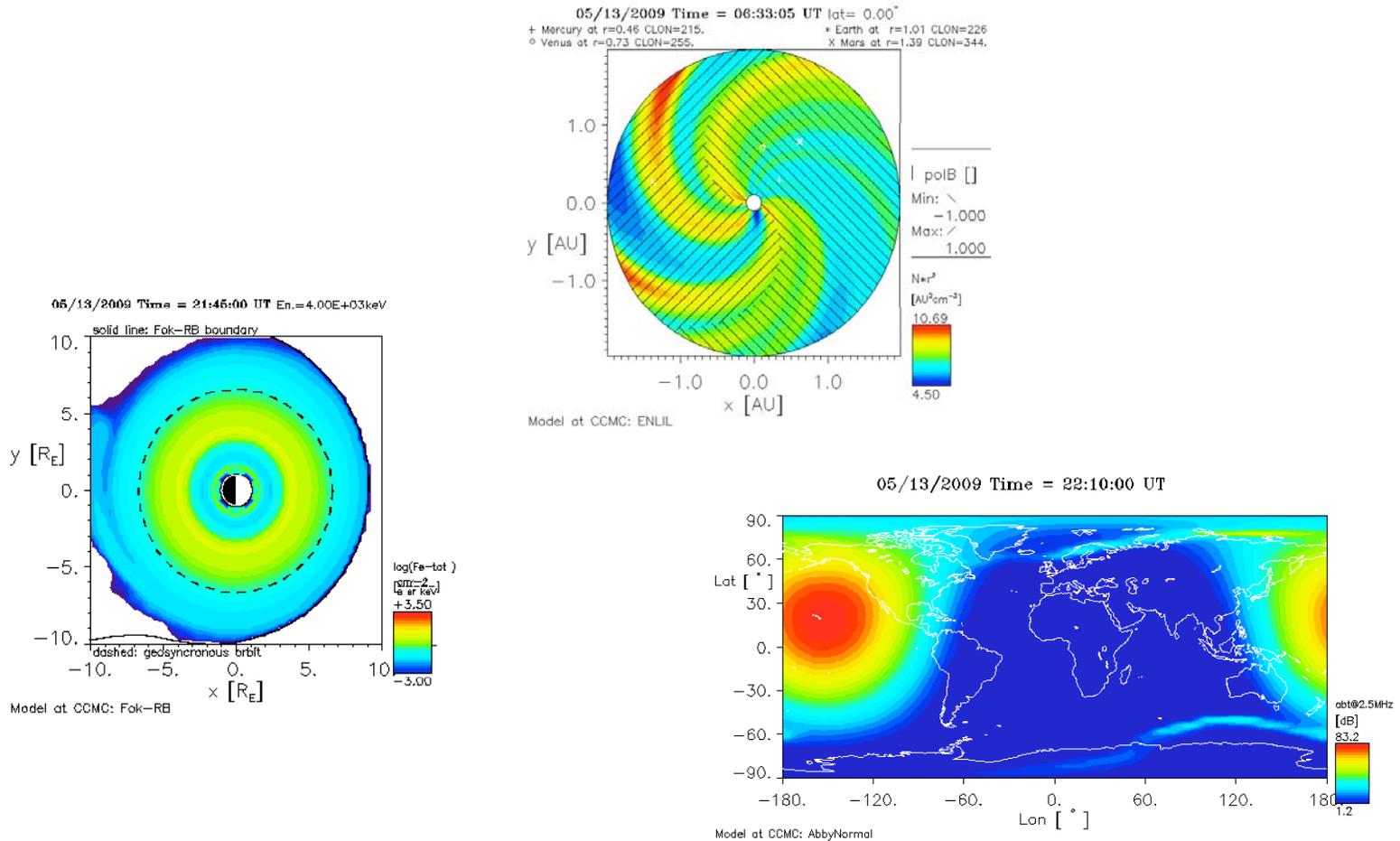
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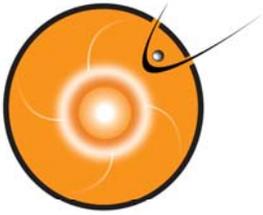
Model: WSA/ENLIL (CISM), SWMF (CSEM)



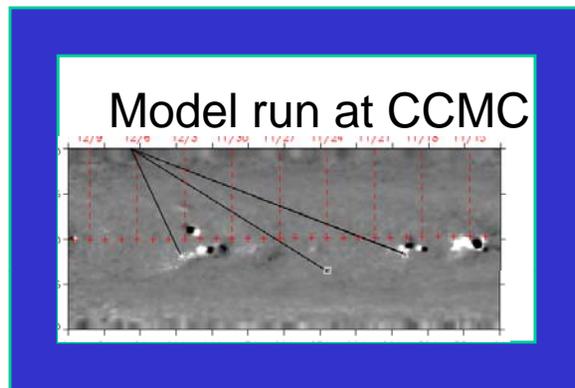
Tools and Pre-operational System Exist



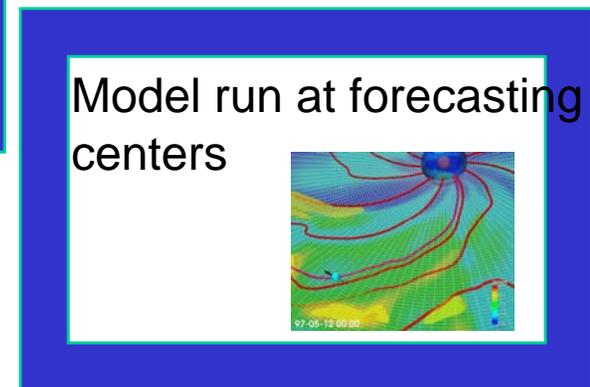
..option to exploit prior to transition to operations



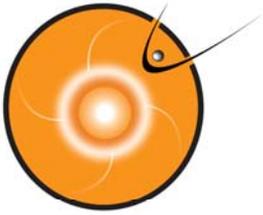
Bootstrapping Opportunity



Tool used at AFWA,
SWPC, ...
Customer feedback



folds tool development and operator education into process

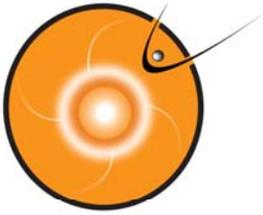


Model Selection Process

- Modelers very competitive
- Wary of historical selections
- Wary of selections influenced by competitors

Solution:

- Selection determined by forecasters
- Evaluations conducted by unbiased agents, scientific community, forecasters
- Criteria set by forecasters based on customer needs



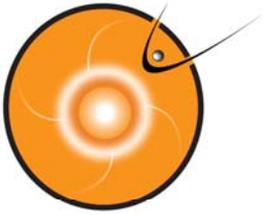
Forecasting Centers

Staffing level is major concern

Need:

- Staff abreast of latest developments
- More staff skilled in interpretation of complex model results
- More staff skilled in execution of modern models
- Sufficient staff

Sufficient personnel to exploit the power of modern models



Summary: Suggestions

- Develop a positive relation with model owners
- Develop a transparent model selection process
 - Evaluations by disinterested parties
 - Based on criteria defined by forecasters
- Utilize ubiquitous real-time calculations and tool developments
 - Use for capability development
 - Use for bootstrapping
 - Use control software technology
- Recognize that models are not mature
 - Keep process as flexible and open as possible
 - If possible, avoid locking into one model development
- Provide sufficient staff - it is essential