CCMC support for LWS: Magnetosphere Version

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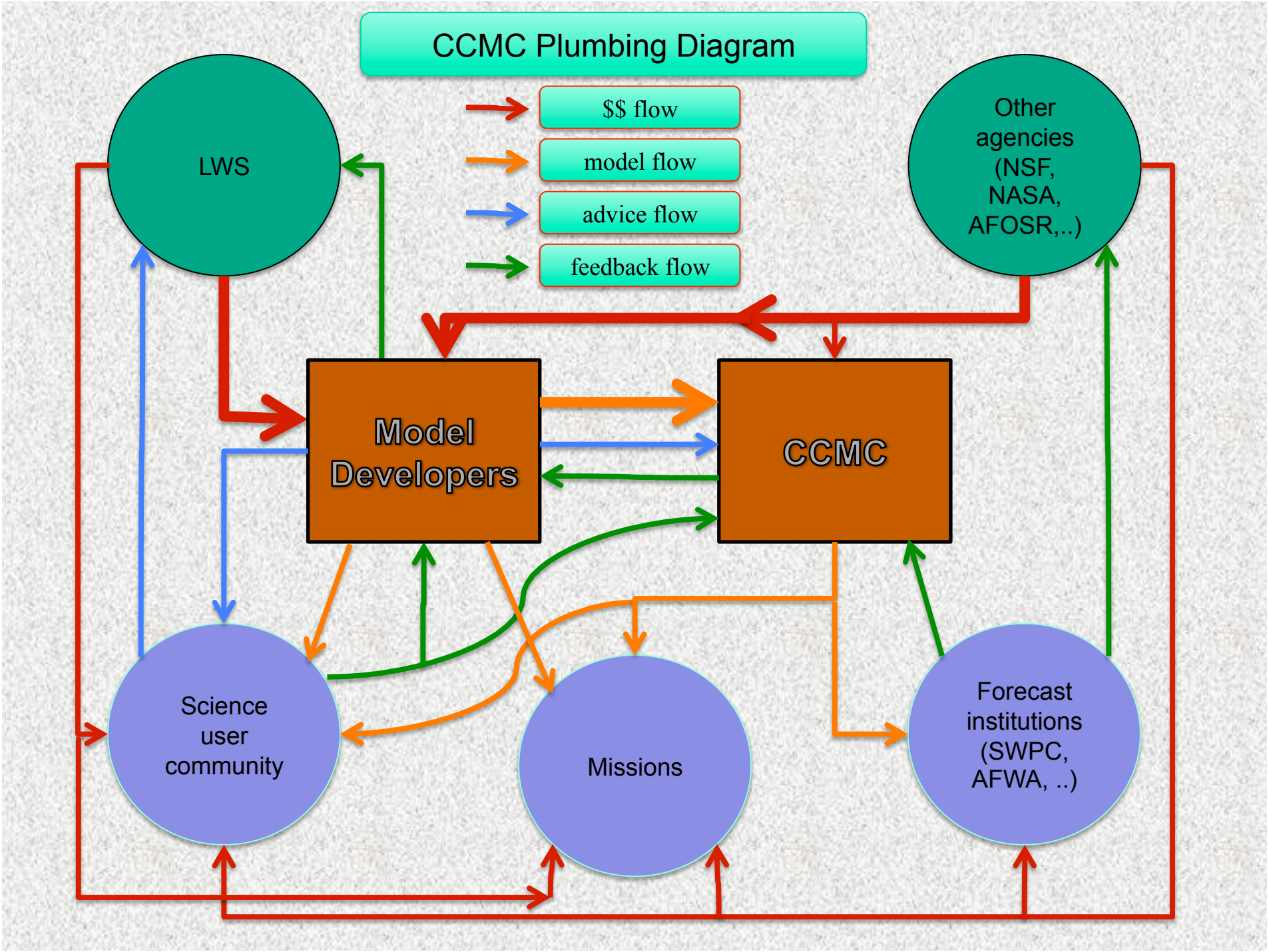
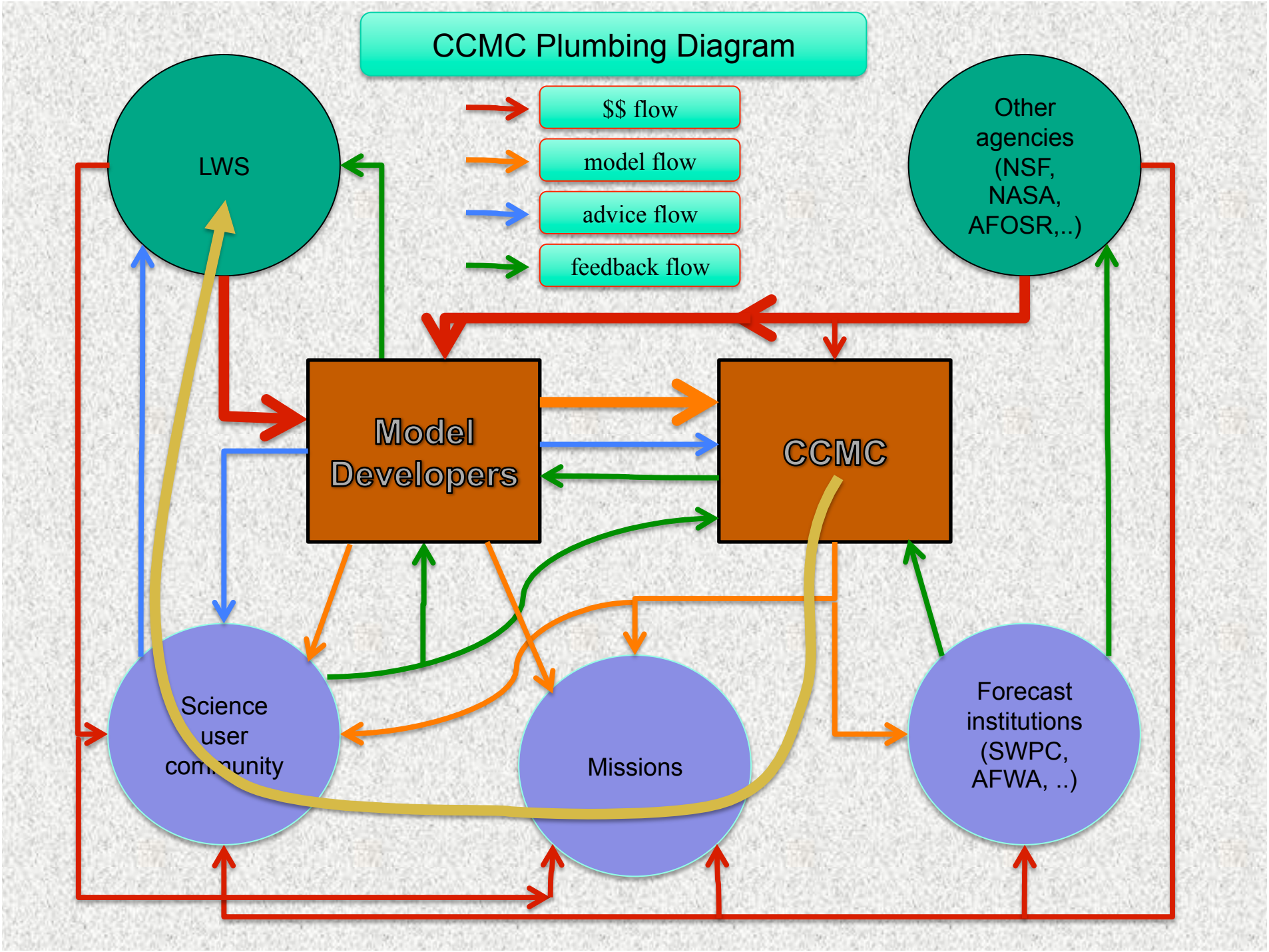
Magnetosphere Science Needs

- What triggers substorms: MI-coupling, relation of streamers to tail: global modeling.
- How does plasma get into the magnetosphere: global modeling, kinetic modeling.
- MMS: kinetic models, but scale is probably beyond what CCMC can do. Global modeling for context.
- Tail entropy: Global modeling, kinetic modeling. Heating processes?
- RB energization: wave mnodels, global modeling (ULF waves), coupled global – local models. Why high sw-speed? Why do some storms reduce RB?
- DFs, BBFs, and plasma injection: global modeling, coupled models.
- Boundary processes: KH waves, FTEs, reconnection type and geometry (component vs anti-parallel).
- Interaction of SW structures with MSP: IP shocks, TDs (a.k.a. hot-flow anomalies), Alfven waves, driving of ULF waves.
- Tail turbulence, relation to entropy, reconnection.
- MI coupling: How and how much does ionosphere control reconnection? Tail – ionosphere mapping.
- MI coupling: magnetosphere control of TEC, sub-auroral streams.
- MI coupling: thermosphere heating: Joule versus soft precipitation.
- Data Assimilation for parameter improvement.


CCMC Plumbing Diagram
$$ flow
model flow
advice flow
feedback flow
LWS
Other agencies (NSF, NASA, AFOSR,..)
Model Developers
CCMC
Science user community
Missions
Forecast institutions (SWPC, AFWA, ..)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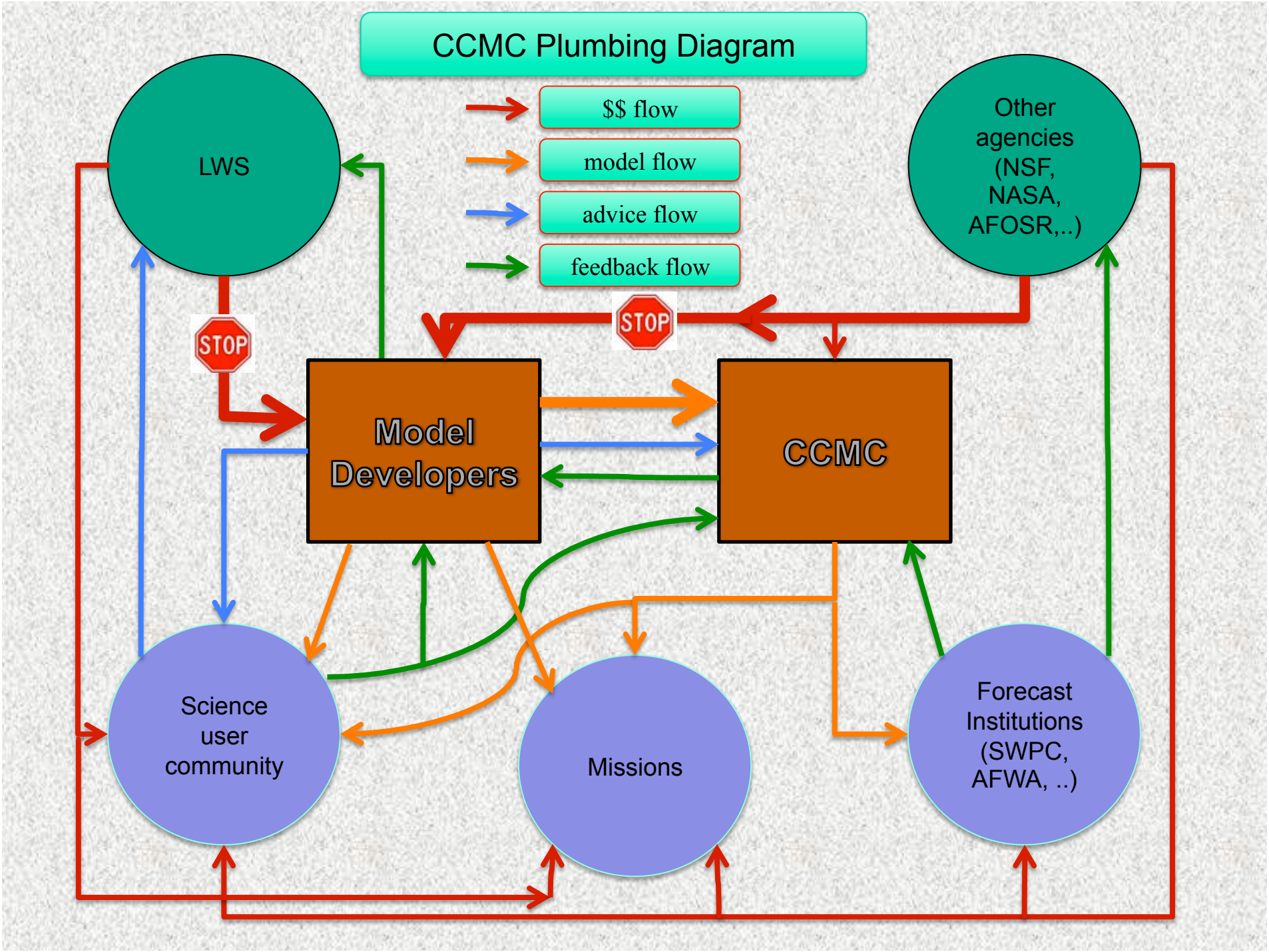
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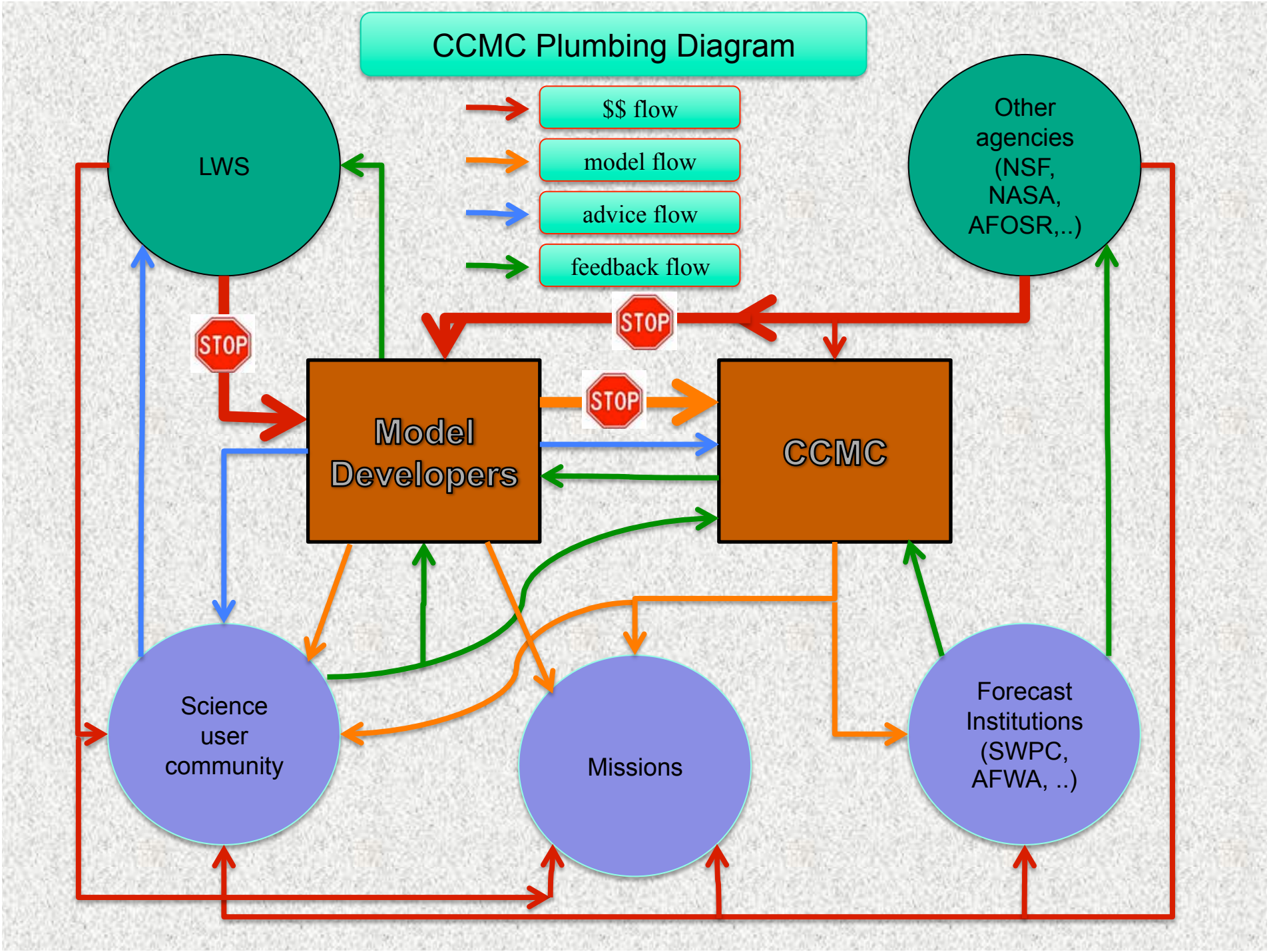
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Evidence

- NASA LWS TR&T-SC selection (5 solar/heliosphere, 2 ionosphere, 1 reconnection).
- TR&T-SC will not be competed for a while.
- No more TR&T-FG for magnetosphere IN SPITE OF TR&T-SC recommendations.
- NSF funds primarily “high risk – high return” programs like FESD, where continued model development (boring!) has no chance.
- NASA HSR (SR&T) and HGI explicitly forbid model development.
- NSF “Geospace Environment MODELING” does not fund much modeling, let alone model development.
- We have never seen a penny from NOAA.
- Numerous “white papers” from the community went unheeded.

→ One has to conclude that NASA/NSF/…. leadership has decided that global geospace model development shall no longer be supported.

Consequences:

- Soft-$$ researchers will drop development and go where the $$ is.
- Hard-$$ researchers will drop development and go where the $$ is (because we run a business and need to make payroll; also my dean needs the IDC, so he told me).
- Modeler support for CCMC will fade away.
- Capability of CCMC to support LWS (in whatever form) will fade away.
- Expertise IS vanishing. Once GT, JL, and JR leave the field you can turn the clock back 20 years, seriously! Looks like AR is already out building cubesats. Take a cue from JPL 20y ago, laying off engineers!
- Support for OpenGGCM at CCMC is reduced to bug fixes for now.
- Barring a miracle, support for OpenGGCM at CCMC will cease 12/2014.
- Note: By giving our models to CCMC we create competition for ourselves. That was no big problem as long as we were funded ok, now it is a major problem!
- You get what you pay for!