

CAM Development Process: The Software Engineering View

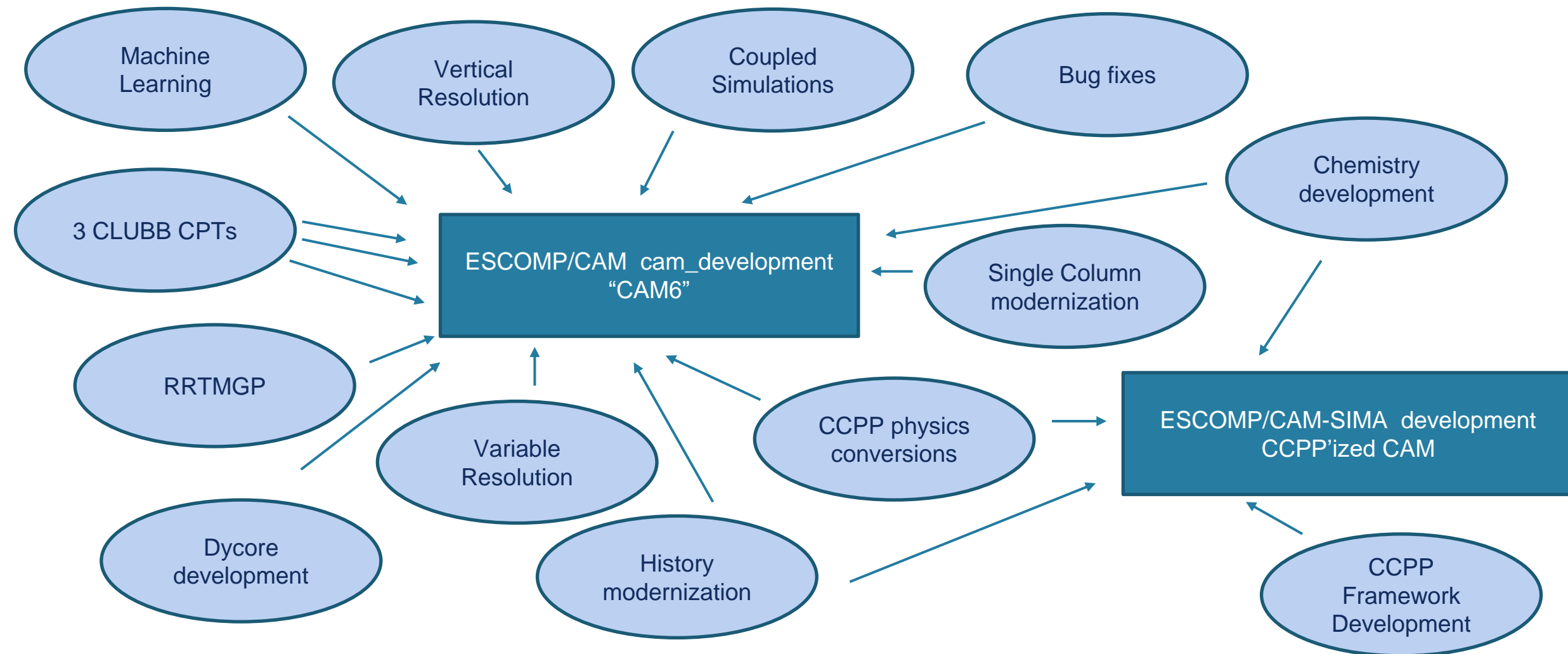
“Creating order without stifling scientific progress”

Cheryl Craig
NCAR, Software Engineer

June 14, 2023



CAM Simultaneous Development (non-exhaustive list)



Numerous development efforts occurring simultaneously into two code bases with some overlap – How do we maintain order?

Two Way Communication between scientists and SEs is essential

To track progress both internally and externally, use a mixture of:

- fluid documentation
- verbal communication
- static documentation

Fluid Documentation

Github is key component for 2-way fluid communication

- Github features used include:
 - Issues
 - Way to communicate new features or bugs which need to be implemented
 - Pull Requests (PRs)
 - Way to communicate actual proposed code changes
 - Projects pages
 - Graphical display of issues and PRs

Key - no duplication of effort from SE side

CAM Development Progression - summary

Developer's steps (scientists and SEs):

- Open an issue
 - Discuss what they propose to do and initiate discussion if needed
- Open a Pull Request (PR)
 - Code modifications have been made and ready for review

CAM Gatekeeper steps (when ready for review):

- Directs timings of reviews
- Assigns CAM tag number

Open an Issue

- Way to give everyone notification about a bug or future development
 - Use github templates to guide users to include pertinent information
- When select “New issue” get the following popup

Bug Report File a bug report - for CAM developers' use only (all other users should use the CESM forum)	Get started
Enhancement Request Request an enhancement and/or open a science discussion	Get started
Other ex. code clean-up, infrastructure updates	Get started
CESM forums For support with model use, troubleshooting, etc., please use the CESM forum	Open

Example Template

Fill-in fields differ by template, include:
* title

Issue: Bug Report

File a bug report - for CAM developers' use only (all other users should use the CESM forum) If this doesn't look right, [choose a different type](#).



Put brief (<65 char) bug title here!

What happened? *

Also - what did you expect to happen?

Tell us what you see!

What are the steps to reproduce the bug? *

How can we see this issue?

ex. Sneeze twice and then do a 5-second jig

What CAM tag were you using? *

Type "git describe" to see the tag

ex. cam6_3_042

What machine were you running CAM on? *

Selections: ▼

What compiler were you using? *

Selections: ▼

Path to a case directory, if applicable

The full path to a case in which the error occurred

ex. /glade/scratch/3p0/where-could-he-be

Will you be addressing this bug yourself? *

If Yes, please also assign this issue to yourself (if possible)

Yes

Extra info

Please provide any additional information here that you think might be relevant

ex. I am running CAM on izumi and I don't know what compiler I'm using.

Assignees



No one—assign yourself

Labels



bug

Projects



None yet

Milestone



No milestone

Development

Shows branches and pull requests linked to this issue.

Helpful resources

[Code of conduct](#)

[GitHub Community Guidelines](#)

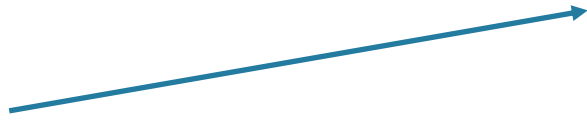
Beta

You're using an issue form, a new type of issue template.

Example Template

Fill-in fields differ by template, include:

- * title
- * description



Issue: Bug Report

File a bug report - for CAM developers' use only (all other users should use the CESM forum) If this doesn't look right, [choose a different type](#).



Put brief (<65 char) bug title here!

What happened? *

Also - what did you expect to happen?

Tell us what you see!

What are the steps to reproduce the bug? *

How can we see this issue?

ex. Sneeze twice and then do a 5-second jig

What CAM tag were you using? *

Type "git describe" to see the tag

ex. cam6_3_042

What machine were you running CAM on? *

Selections: ▼

What compiler were you using? *

Selections: ▼

Path to a case directory, if applicable

The full path to a case in which the error occurred

ex. /glade/scratch/3p0/where-could-he-be

Will you be addressing this bug yourself? *

If Yes, please also assign this issue to yourself (if possible)

Yes

Extra info

Please provide any additional information here that you think might be relevant

ex. I am running CAM on izumi and I don't know what compiler I'm using.

Assignees

No one—assign yourself

Labels

bug

Projects

None yet

Milestone

No milestone

Development

Shows branches and pull requests linked to this issue.

Helpful resources

[Code of conduct](#)

[GitHub Community Guidelines](#)

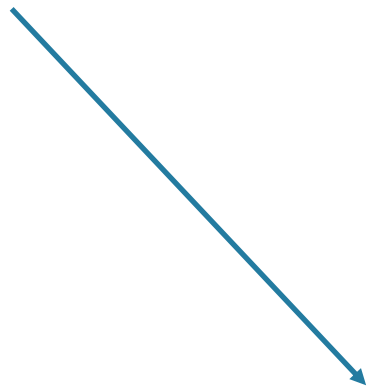
Beta

You're using an issue form, a new type of issue template.

Example Template


Fill-in fields differ by template, include:

- * title
- * description
- * who will be implementing.
“Any CAM SE” is one selection for who will be implementing



Issue: Bug Report

File a bug report - for CAM developers' use only (all other users should use the CESM forum) If this doesn't look right, [choose a different type](#).



What happened? *
Also - what did you expect to happen?

What are the steps to reproduce the bug? *
How can we see this issue?

What CAM tag were you using? *
Type "git describe" to see the tag


What machine were you running CAM on? *
Selections: ▼


What compiler were you using? *
Selections: ▼


Path to a case directory, if applicable
The full path to a case in which the error occurred


Will you be addressing this bug yourself? *
If Yes, please also assign this issue to yourself (if possible)

Extra info
Please provide any additional information here that you think might be relevant

Assignees 
No one—assign yourself

Labels 
bug

Projects 
None yet

Milestone 
No milestone

Development
Shows branches and pull requests linked to this issue.

Helpful resources
[Code of conduct](#)
[GitHub Community Guidelines](#)

Beta You're using an issue form, a new type of issue template.

Example Template

Fill-in fields differ by template, include:

- * title
- * description
- * who will be implementing.
“Any CAM SE” is one selection for who will be implementing

Bug template also includes

- * Steps to reproduce bug

Issue: Bug Report

File a bug report - for CAM developers' use only (all other users should use the CESM forum) If this doesn't look right, [choose a different type](#).



Put brief (<65 char) bug title here!

What happened? *

Also - what did you expect to happen?

Tell us what you see!

What are the steps to reproduce the bug? *

How can we see this issue?

ex. Sneeze twice and then do a 5-second jig

What CAM tag were you using? *

Type "git describe" to see the tag

ex. cam6_3_042

What machine were you running CAM on? *

Selections: ▾

What compiler were you using? *

Selections: ▾

Path to a case directory, if applicable

The full path to a case in which the error occurred

ex. /glade/scratch/3p0/where-could-he-be

Will you be addressing this bug yourself? *

If Yes, please also assign this issue to yourself (if possible)

Yes ⇅

Extra info

Please provide any additional information here that you think might be relevant

ex. I am running CAM on izumi and I don't know what compiler I'm using.

Assignees



No one—assign yourself

Labels



bug

Projects



None yet

Milestone



No milestone

Development

Shows branches and pull requests linked to this issue.

Helpful resources

[Code of conduct](#)

[GitHub Community Guidelines](#)

Beta

You're using an issue form, a new type of issue template.

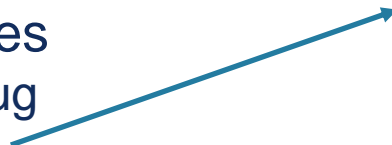
Example Template

Fill-in fields differ by template, include:

- * title
- * description
- * who will be implementing.
“Any CAM SE” is one selection for who will be implementing

Bug template also includes

- * Steps to reproduce bug
- * CAM tag being used



Issue: Bug Report

File a bug report - for CAM developers' use only (all other users should use the CESM forum) If this doesn't look right, [choose a different type](#).



Put brief (<65 char) bug title here!

What happened? *

Also - what did you expect to happen?

Tell us what you see!

What are the steps to reproduce the bug? *

How can we see this issue?

ex. Sneeze twice and then do a 5-second jig

What CAM tag were you using? *

Type "git describe" to see the tag

ex. cam6_3_042

What machine were you running CAM on? *

Selections: ▾

What compiler were you using? *

Selections: ▾

Path to a case directory, if applicable

The full path to a case in which the error occurred

ex. /glade/scratch/3p0/where-could-he-be

Will you be addressing this bug yourself? *

If Yes, please also assign this issue to yourself (if possible)

Yes ▾

Extra info

Please provide any additional information here that you think might be relevant

ex. I am running CAM on izumi and I don't know what compiler I'm using.

Assignees



No one—assign yourself

Labels



bug

Projects



None yet

Milestone



No milestone

Development

Shows branches and pull requests linked to this issue.

Helpful resources

[Code of conduct](#)

[GitHub Community Guidelines](#)

Beta

You're using an issue form, a new type of issue template.

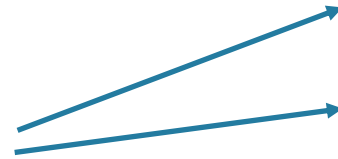
Example Template

Fill-in fields differ by template, include:

- * title
- * description
- * who will be implementing.
“Any CAM SE” is one selection for who will be implementing

Bug template also includes

- * Steps to reproduce bug
- * CAM tag being used
- * Machine and compiler



Issue: Bug Report

File a bug report - for CAM developers' use only (all other users should use the CESM forum) If this doesn't look right, [choose a different type](#).



Put brief (<65 char) bug title here!

What happened? *

Also - what did you expect to happen?

Tell us what you see!

What are the steps to reproduce the bug? *

How can we see this issue?

ex. Sneeze twice and then do a 5-second jig

What CAM tag were you using? *

Type "git describe" to see the tag

ex. cam6_3_042

What machine were you running CAM on? *

Selections: ▾

What compiler were you using? *

Selections: ▾

Path to a case directory, if applicable

The full path to a case in which the error occurred

ex. /glade/scratch/3p0/where-could-he-be

Will you be addressing this bug yourself? *

If Yes, please also assign this issue to yourself (if possible)

Yes ⇅

Extra info

Please provide any additional information here that you think might be relevant

ex. I am running CAM on izumi and I don't know what compiler I'm using.

Assignees



No one—assign yourself

Labels



bug

Projects



None yet

Milestone



No milestone

Development

Shows branches and pull requests linked to this issue.

Helpful resources

[Code of conduct](#)

[GitHub Community Guidelines](#)

Beta

You're using an issue form, a new type of issue template.

Example Template

Fill-in fields differ by template, include:

- * title
- * description
- * who will be implementing.
“Any CAM SE” is one selection for who will be implementing

Bug template also includes

- * Steps to reproduce bug
- * CAM tag being used
- * Machine and compiler
- * Location of case directory, if applicable

Issue: Bug Report

File a bug report - for CAM developers' use only (all other users should use the CESM forum) If this doesn't look right, [choose a different type](#).



Put brief (<65 char) bug title here!

What happened? *

Also - what did you expect to happen?

Tell us what you see!

What are the steps to reproduce the bug? *

How can we see this issue?

ex. Sneeze twice and then do a 5-second jig

What CAM tag were you using? *

Type "git describe" to see the tag

ex. cam6_3_042

What machine were you running CAM on? *

Selections: ▾

What compiler were you using? *

Selections: ▾

Path to a case directory, if applicable

The full path to a case in which the error occurred

ex. /glade/scratch/3p0/where-could-he-be

Will you be addressing this bug yourself? *

If Yes, please also assign this issue to yourself (if possible)

Yes

Extra info

Please provide any additional information here that you think might be relevant

ex. I am running CAM on izumi and I don't know what compiler I'm using.

Assignees

No one—assign yourself

Labels

bug

Projects

None yet

Milestone

No milestone

Development

Shows branches and pull requests linked to this issue.

Helpful resources

[Code of conduct](#)

[GitHub Community Guidelines](#)

Beta

You're using an issue form, a new type of issue template.

Once Code Development is Completed: Developer opens a Pull Request (PR)

- Two types of PRs to open
 - Draft PR
 - Draft designation indicates that development is still occurring.
 - Reviews are not started
 - Typically opened when two or more developers are working on a Pull Request
 - PR (without Draft designation)
 - Indicates that active code development is done
 - Indicates that the PR is ready to start the review process
 - PR contains a link to the original issue (where preliminary discussions may have occurred)

After PR is opened “without draft” – CAM gatekeeper manages the timing of the next steps

- Once a PR is no longer draft, it will make its way through the following steps:
 - ***PR- Review Not Started***
 - ***PR – Initial Review***
 - ***PR – Full Review***
 - ***Next Tag***
 - ***Tag***
- CAM Gatekeeper determines ordering of PRs based on several criteria
 - Urgency (based on specific request by developer)
 - Length of estimated time for review (minor PRs can slip in front of PRs which are intensive)
 - Discussions at weekly scientist/SE meeting
 - First-in, first-out

Verbal Communication

Weekly meeting with scientists and SEs

- Discuss SEs perspective on plans for the week and tweak as necessary based on feedback
- Meeting agenda is published a week before the meeting
 - Agenda is linked to the calendar invite (for viewing prior or after the meeting)
 - Agenda includes
 - Always reviewing the projects page (will show on next slides)
 - Projects page is key to communication between scientists and SEs
 - Additional items to report or which need discussion
 - Additional discussion items can be added by anyone prior to the meeting
 - Notes are taken during the meeting right into the agenda

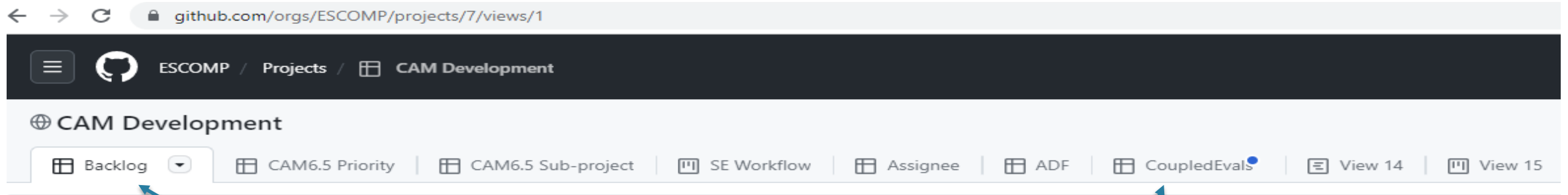
Communication on status of PRs done via github Projects page

Projects page

- is updated by hand weekly by CAM gatekeeper
 - Utilize github automation (to initially populate the projects pages)
 - Further automation is not implemented yet due to developer time constraints
- Plans for the upcoming week are described in detail
- Used in weekly meeting with Scientists/SEs to present plans and adjust as needed

Github Projects page – Utilize 3 tabs in weekly meeting

<https://github.com/orgs/ESCOMP/projects/7>



Backlog – List of all issues

SE Workflow – PRs Planning page

CoupledEvals

Github Projects: Issue tracking (labeled Backlog)

CAM Development

Backlog CAM6.5 Priority CAM6.5 Sub-project SE Workflow Assignee ADF CoupledEvals View 14 View 15 View 16 + New View

is:issue -status:Done status:"To Do" -is:Draft repo:"ESCOMP/CAM","ESCOMP/PUMAS"

Pri... ↑ ...	Title	Assignees	Sub-project	Milestone	Notes	Status
772	Issue with zonal means in regions of high terrain. #775	fvitt		CESM2.3		To Do
774	Expand dust_emis_fact namelist default values for different new dust_emis_method options #778	fvitt		CESM2.3		To Do
777	Initializing nag tests to NaN indicates there are issues which need to be addressed #786			CAM6.5		To Do
778	remove redundant mesh files in cam - point to mesh files in ccs_config #787	brian-eaton		CESM3		To Do
781	MA chemistry scheme (wacm_ma_mam4) needs O3S #793	fvitt				To Do
784	Energy Budget refactor (address deferred comments in PR #761) #796	jtruesdal				To Do
785	Bring in Machine Learning warm rain capability #801	cacraigucar		CESM3		To Do
786	Kessler physics using inconsistent reference pressures #802	nusbaume		CAM6.5		To Do
789	cplsec.F90 needs to be in a module #805					To Do
790	add UT and UQ to cam_diagnostics #807					To Do
792	Increase PE layout for MT runs #812					To Do
793	Add testing of zonal mean output to a cam_dev test. #811					To Do
794	Remove check for zonal mean output with non-FV dycores. #809					To Do
795	Add zonal mean output capability to simple models. #810					To Do
796	Introduce "-phys cam7" and remove "-phys cam_dev" #813					To Do
797	Introduce QPC7 and possibly QPS7 aquaplanet compsets #814					To Do

Github Projects: Tag planning (labeled SE workflow)

CAM Tags: Tags which are completed

The screenshot displays a GitHub Projects board with three columns representing different stages of the workflow:

- PR - Full Review (7):** Contains a 'Draft' card with a prioritized list of upcoming tags and three 'To Do' cards for CAM #560, CAM-SIMA #221, and CAM-SIMA #220.
- Next Tag (0):** An empty column.
- CAM Tags (219):** A column containing completed tags, including CAM #828, CAM #822, a 'Draft' card with 'WORK SINCE LAST MEETING', CAM #714, and CAM #806.

Blue arrows point from the text 'CAM Tags: Tags which are completed' to the 'CAM Tags' column and from the 'Draft' card in the 'PR - Full Review' column to the 'CAM Tags' column.

Github Projects: Tag planning (labeled SE workflow)

CAM Tags: Tags which are completed

Next Tag: Tag which is in regression testing phase (reviews complete)

The screenshot displays three GitHub Project columns:

- PR - Full Review 7:** A 'Draft' section lists prioritized tasks for upcoming tags, such as 'ESCOMP/CAM #560 (HEMCO) - fvitt - One failing regression test' and 'ESCOMP/CAM #820 Tuning "F" and increase PE layout for MT compsets'. Below this, individual tag entries are shown, including 'CAM #560' with the description 'cam6_3_114: Integrating HEMCO emissions component in CESM' and 'CAM-SIMA #221'.
- Next Tag 0:** An empty column, indicated by a blue arrow from the 'Next Tag' definition.
- CAM Tags 219:** A list of completed tags, including 'CAM #828' (cam6_3_113: Update manage_externals), 'CAM #822' (cam_cesm2_1_rel_r58: Use case to support BSSP585smbb compset), 'CAM #714' (cam6_3_112: Refactor aerosol heterogeneous freezing process), and 'CAM #806' (cam6_3_111: create CAM LT and MT 1850 use_cases).

Github Projects: Tag planning (labeled SE workflow)

CAM Tags: Tags which are completed

Next Tag: Tag which is in regression testing phase (reviews complete)

PR- Full Review: PRs which are in full review stage. Usually just the core SE team, but sometimes includes one or more scientists

The screenshot displays three GitHub Project boards:

- PR - Full Review (7 items):** Contains a draft titled "This week's prioritized list for upcoming tags" with a list of tasks and PR cards. A blue arrow points from the text "PR- Full Review" to the draft. Below the draft are PR cards for CAM #560, CAM-SIMA #221, and CAM-SIMA #220.
- Next Tag (0 items):** An empty board.
- CAM Tags (219 items):** Shows completed PR cards for CAM #828, CAM #822, CAM #714, and CAM #806.

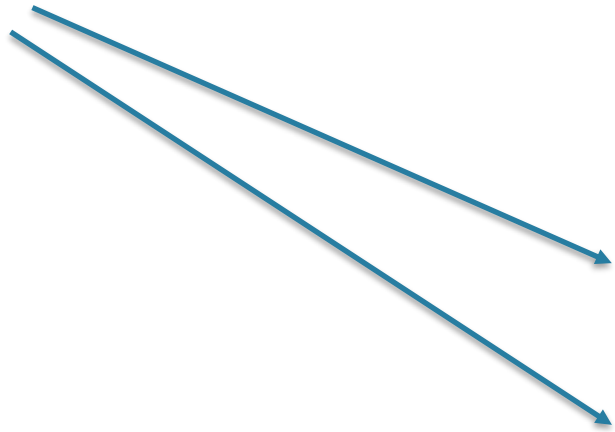
Github Projects: Tag planning (labeled SE workflow)

CAM Tags: Tags which are completed

Next Tag: Tag which is in regression testing phase (reviews complete)

PR- Full Review: PRs which are in full review stage. Usually just the core SE team, but sometimes includes one or more scientists

Both CAM and CAM-SIMA repositories are discussed



The screenshot displays three GitHub Project boards:

- PR - Full Review (7 items):** Contains a draft list of tasks and several entries with reviewer counts.
 - Draft:** This week's prioritized list for upcoming tags.
 - ESCOMP/CAM #560 (HEMCO) - fvitt - One failing regression test - Louisa indicated that we should take the time to fix this
 - ESCOMP/CAM #820 Tuning "F" and increase PE layout for MT compsets -(Cheryl) - Cecile just added three more settings - moved to Draft until these and the comments are addressed and will then ask for rereview
 - ESCOMP/CAM-SIMA #221 - Replace CAMDEN referneces with CAM-SIMA (Jesse) --
 - ESCOMP/CAM-SIMA #220 - Update issue template to reference CAM-SIMA
 - ESCOMP/CAM#537 (Frierson) - Isla has confirmed results - one last mod request to address
 - ESCOMP/CAM #688 (frontogenesis gw) - in queue for full review
 - CAM #560:** cam6_3_114: Integrating HEMCO emissions component in CESM (6 reviewers)
 - CAM-SIMA #221:** (2 reviewers)
- Next Tag (0 items):** Empty board.
- CAM Tags (219 items):** Shows completed tags.
 - CAM #828:** cam6_3_113: Update manage_externals (1 reviewer)
 - CAM #822:** cam_cesm2_1_rel_r58: Use case to support BSSP585smbb compset. (2 reviewers)
 - Draft:** WORK SINCE LAST MEETING
 - CAM #714:** cam6_3_112: Refactor aerosol heterogeneo freezing process (6 reviewers)
 - CAM #806:** cam6_3_111: create CAM LT and MT 1850 use_cases (2 reviewers)

Github Projects: Tag planning (labeled SE workflow)

CAM Tags: Tags which are completed

Next Tag: Tag which is in regression testing phase (reviews complete)

PR- Full Review: PRs which are in full review stage. Usually just the core SE team, but sometimes includes one or more scientists

Both CAM and CAM-SIMA repositories are discussed

Description at top of each column is a “kludge”

- Needed comments for each column and this was the only way we figured out how to implement it
- Long comment
- Bullets are lined up by hand with dashes

PR - Full Review 7

Draft

This week's prioritized list for upcoming tags-----

- ✦ ESCOMP/CAM #560 (HEMCO) - fvitt - One failing regression test - Louisa indicated that we should take the time to fix this -----
- ✦ ESCOMP/CAM #820 Tuning "F" and increase PE layout for MT compsets -(Cheryl) - Cecile just added three more settings - moved to Draft until these and the comments are addressed and will then ask for rereview -----
- ✦ ESCOMP/CAM-SIMA #221 - Replace CAMDEN referneces with CAM-SIMA (Jesse) --
- ✦ ESCOMP/CAM-SIMA #220 - Update issue template to reference CAM-SIMA-----
- ✦ ESCOMP/CAM#537 (Frierson) - Isla has confirmed results - one last mod request to address -----
- ✦ ESCOMP/CAM #688 (frontogenesis gw) - in queue for full review -----

To Do

CAM #560

cam6_3_114: Integrating HEMCO emissions component in CESM

To Do 6 reviewers

CAM-SIMA #221

Next Tag 0

CAM Tags 219

CAM #828

cam6_3_113: Update manage_externals

Tag 1 reviewer

CAM #822

cam_cesm2_1_rel_r58: Use case to support BSSP585smbb compset.

Tag 2 reviewers

Draft

WORK SINCE LAST MEETING

To Do

CAM #714

cam6_3_112: Refactor aerosol heterogeneous freezing process

Tag answer changing 6 reviewers

CAM6.5

CAM #806

cam6_3_111: create CAM LT and MT 1850 use_cases

Tag CoupledEval2 2 reviewers

Github Projects: Tag planning (labeled SE workflow)

The screenshot shows a GitHub Projects board for the 'CAM Development' organization. The board is organized into columns representing different stages of the pull request (PR) workflow:

- Upcoming PR (2 items):** Contains two draft PRs: 'ESCOMP/CAM #740 (update manageexternals)' and 'Update manageexternals to latest version'.
- PR - Review Not Started (14 items):** Contains PRs like 'Add support for additional SE grids' (CAM #815) and 'Refactor aerosol optics for radiation transfer' (CAM #824). The latter is labeled 'answer changing' and 'enhancement'.
- PR - Initial Review (4 items):** Contains PRs like 'GEOS-Chem chemistry and five new compsets that use it' (CAM #484) and 'external gridded forcing capability for SCAM' (CAM #628). This column is highlighted with a blue arrow.

The board also features a filter bar at the top with various status filters and a 'View' button.

PR – Initial Review: PRs where first reviewer has been assigned and is working on the preliminary review. More efficient for the first reviewer to find the “obvious” changes

Github Projects: Tag planning (labeled SE workflow)

The screenshot shows a GitHub Projects board for 'CAM Development'. The board is organized into columns representing different stages of the PR workflow. The first column, 'Upcoming PR', contains two items: a draft PR for 'ESCOMP/CAM #740 (update manageexternals)' and a PR for 'CAM #740 (Update manageexternals to latest version)'. The second column, 'PR - Review Not Started', contains three items: a draft PR for 'CAM #815 (Add support for additional SE grids)', a PR for 'CAM #824 (Refactor aerosol optics for radiation transfer)', and a draft PR for 'New PRs Since Last Meeting'. The third column, 'PR - Initial Review', contains three items: a draft PR for 'ESCOMP/CAM #484 (GEOS-Chem - fvitt - initial review)', a PR for 'CAM #484 (GEOS-Chem chemistry and five new compsets that use it)', and a PR for 'CAM #628 (external gridded forcing capability for SCAM)'. The board also features a filter bar at the top with various status filters and a navigation bar with tabs for Backlog, CAM6.5 Priority, CAM6.5 Sub-project, SE Workflow, Assignee, ADF, and CoupledEval.

PR – Initial Review: PRs where first reviewer has been assigned and is working on the preliminary review. More efficient for the first reviewer to find the “obvious” changes

PR – Review Not Started: PRs awaiting review. Note the “New PRs Since Last Meeting”

Github Projects: Tag planning (labeled SE workflow)

CAM Development

Backlog | CAM6.5 Priority | CAM6.5 Sub-project | SE Workflow | Assignee | ADF | CoupledEvals | View

prstatus:"Upcoming PR" "PR - Review Not Started" "PR - Initial Review" "PR - Full Review" "Next Tag Tag" "Closed (not tagged)" "CAM-SIMA Tags" "CAM Tags"

Upcoming PR 2

- Draft ...
★ ESCOMP/CAM #740 (update manage externals)
To Do
- CAM #740
Update manage_externals to latest version
To Do enhancement

PR - Review Not Started 14

- CAM #815 ...
Add support for additional SE grids
- CAM #824 ...
Refactor aerosol optics for radiation transfer
answer changing enhancement
1 reviewer CESM2.3
- Draft
👉 New PRs Since Last Meeting 👉
To Do
- Draft
👉 New PRs -----
👉 Ready for initial review: -----
★ ESCOMP/CAM #815 Coarse SE grid - ne3 - (John) - Will move out of draft soon and will be expedited to get coarse SE grids for testing
★ ESCOMP/CAM #824 - Refactor aerosol optics for radiation transfer - (fvitt) - High priority PR to start the process -----
★ ESCOMP/CAM #792 Fix PLB test - bring in with next externals update -----
★ ESCOMP/CAM #650 CARMA unstructured grids-----
★ ESCOMP/CAM #702 (rainbows) - ready for initial review -----
To Do

PR - Initial Review 4

- Draft
Progress:-----
★ ESCOMP/CAM #484 (GEOS-Chem) - fvitt - initial review -----
👉 PRs on HOLD -----
★ ESCOMP/CAM #628 [replaces ESCOMP/CAM #595 (SCAM forcing)] - Julio suggested this go on hold until after CCpp? - need to concentrate on out-of-the-box setup -----
To Do
- CAM #484
GEOS-Chem chemistry and five new compsets that use it
To Do 1 reviewer CESM2.3
- Draft ...
👉 PRs on hold 👉
To Do
- CAM #628
external gridded forcing capability for SCAM
Open PR - Initial Review enhancement
1 reviewer CESM2.3






+ Add item

PR – Initial Review: PRs where first reviewer has been assigned and is working on the preliminary review. More efficient for the first reviewer to find the “obvious” changes

PR – Review Not Started: PRs awaiting review. Note the “New PRs Since Last Meeting”

Upcoming PR: Issues which are being actively worked and are very high priority (need tracking at this level), but PR is not yet created

Github Projects: CoupledEval Tab

194	🕒 add UT and UQ to cam_diagnostics #807				CoupledEval3
195	🕒 Introduce "-phys cam7" and remove "-phys cam_dev" #813				CoupledEval3
196	🕒 Introduce QPC7 and possibly QPS7 aquaplanet compsets #814				CoupledEval3
197	🕒 make HEMCO the default emissions module for all CAM configurations w/ emissions #817				CoupledEval3
198	🕒 dependance of some namelist default on the number of vertical levels (lev)? #819			To Do	CoupledEval3
199	🕒 Provide RRTMGP as a radiation parameterization #255	 brianpm an...		In Progress	CoupledEval3
200	🕒 Create testing compsets based on FLT,FMT,FW and FX #765			To Do	CoupledEval3
202	🕒 Update tunings for LT and MT based on the "Tuning F" #818	 cacraigucar		To Do	CoupledEval2
204	🔗 CAM tuning F and increase PE count for MT compsets #820	 cacraigucar			CoupledEval2
205	🕒 Increase PE layout for MT runs #812			To Do	CoupledEval2
294	🕒 bug in the lidar simulator (COSP1.4 and COSP2) #262	 nusbaume		To Do	bug CoupledEval2
295	🕒 Ensure CAM history files are closed when last frame is written #290	 gold2718		To Do	bug CoupledEval2
296	🕒 failing history restart tests #325			To Do	bug CoupledEval2

- CoupledEval2: Current immediate need
- CoupledEval3: Needed before next Coupled Evaluation or CESM release
- CoupledEval4-wish list: Wish list items for CESM release, but not crucial

Static documentation

Resources For CAM Developers

CAM wiki page: <https://github.com/ESCOMP/CAM/wiki>

🔗 CAM documentation

- [CAM Documentation](#) ← 1
- [Atmosphere Model Working Group \(AMWG\)](#)
- [CAM Testing](#)

ESCOMP/CAM code development:

This section contains the workflows for anyone who is developing CAM -- that is, making any change to the CAM code, build method, or configuration.

- [How to notify NCAR of a problem or bug in CAM](#)
- [How to make/store revisions to your personal CAM repository \(GitHub fork\)](#)
- [How to submit code changes to be included in ESCOMP/CAM](#) ← 2
- [How to remove old or unused branches](#)
- [Code development with multiple repositories](#)

git and GitHub resources

The links below should help you to learn and use git. If you cannot find an answer to your question here, ask your question by opening a new issue with the 'type:question' label. Be sure to check the [FAQ](#) first!

- [Getting started with git](#)
- [Updating your login to a github token](#)

▶ Pages 11

CAM wiki

- [Home](#)

CAM Documentation

- [CAM Documentation](#)
- [Atmosphere Model Working Group](#)

CAM Model Development

- [CAM model development workflow GitHub](#)
- [git and GitHub](#)
- [git and Github FAQ](#)
- [CAM Coding Standards](#)
 - [Fortran](#)
 - [Python](#)
- [CAM debugging techniques](#)

3

4

Clone this wiki locally

<https://github.com/ESCOMP/CAM.wiki>

Includes:

1. CAM documentation
2. How to submit changes to ESCOMP/CAM
3. CAM Coding Standards
4. CAM debugging techniques

Specific CAM SE workflow

Have detailed “recipe” for CAM SEs to follow in making a tag

Includes:

- Opening a PR (if not already done)
- Addressing reviewer’s comments
- Waiting for tag assignment to be made by CAM gatekeeper
- Merging to head of cam_development
- Running regression testing
- Committing changes (use github Merge button)
- Tagging the commit
- Archiving Baselines
- Adding CAM tag to CESM plans page

<https://github.com/ESCOMP/CAM/wiki/CAM-SE-Workflows>

CAM SE Workflows

cacraigucar edited this page on Mar 9 · 13 revisions

Edit New page

CAM SE Workflows

Pages 11

This page describes the process once a scientist has indicated on their issue that their branch is ready for cam_development. This documents the steps that the assigned SE will perform.

Table of Contents

- [CAM SE scheduler duties](#)
- [Primary Assigned SE's duties for when code from scientists are being brought into CAM](#)
- [Run CAM tests](#)
- [Make a CAM tag](#)
- [Handle a pull request to cam_development](#)
- [Make a code change in release branch and cam_development](#)
- [Update development branch from cam_development or release branch](#)
- [Create a new release](#)

CAM SE scheduler duties

1. Enter a card for the request onto the [CAM project board](#) (barring PTO this should happen within a day of the request)
2. If possible, assign the SE who will be responsible for bringing this onto cam_development and/or a release branch.

Primary Assigned SE's duties for when code from scientists are being brought into CAM

IF SCIENTIST HAS OPENED A PR

1. Discuss with scientist if they want:
 - a. You push your changes back to their branch in the PR directly - then you clone their branch directly and push changes back to it

CAM wiki

- [Home](#)

CAM Documentation

- [CAM Documentation](#)
- [Atmosphere Model Working Group \(AMWG\)](#)

CAM Model Development

- [CAM model development workflow on GitHub](#)
- [git and GitHub](#)
- [git and Github FAQ](#)
- [CAM Coding Standards](#)
 - [Fortran](#)
 - [Python](#)
- [CAM debugging techniques](#)

Clone this wiki locally

<https://github.com/ESCOMP/CAM.wiki>

Gatekeeper viewpoint of pros/cons

Pros:

- Able to use projects page to organize thoughts as I make plans for the week and users to dive down into issues/PRs for more details
- No duplication of effort – the tool I use to manage my gatekeeping tasks is the tool we use to communicate with the scientists
- Enables communication between scientists and SEs

Cons:

- Takes some manual effort to implement the process (but I use the process to organize my thoughts, so not a bad con)
- Competing priorities need verbal discussion to determine final order
- Sometimes plans change mid-week due to external factors – need to be flexible – I don't guarantee that the projects page is updated mid-week, but will communicate via email with people who are impacted
- Comment at top of each column is very much a hack and a pain to implement bullets (but necessary to add descriptions and keep everything in one place)

Thank you

Questions?