HAFS Code Management and Community Engagement

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...with contributions from the HAFS application team and community

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HAFS Code Management Goals

- Ensure latest HAFS developments are available to the community.
- Provide a standard, easy-to-follow set of guidelines for the community to contribute to HAFS development.
- Detect and fix bugs before they reach the main HAFS development branch.
- Minimize time spent reviewing pull requests.
- Engage in code management and development practices that are consistent with other UFS applications and submodules.
The authoritative HAFS repository:

- [https://github.com/hafs-community/HAFS](https://github.com/hafs-community/HAFS)
- Maintained by EMC and DTC with community/application team contributions
- HAFS forking/branching/tagging rationale
  - **develop**: the main development branch
  - **support/[name]**: branches used by operations or real-time parallels
  - **release/vx.x.x**: public release branches
  - **tag**: `hafs.v0.2.0`, `hafs.v1.0.0`, `public.v1.0.0`, etc.
  - **hotfix/[name]**: temporary bug fix branches
  - **feature/[name]**: feature branches for adding major new capabilities or enhancements
  - Small/individual efforts should fork the repository
The current HAFS workflow is based on:
- HWRF/HMON workflows
- FV3CAM regional workflow
- FV3GFS global workflow

- Supports both on-demand triggering and continuous cycling
- Supports both standalone regional and global-nesting configurations
- Supports both basin-focused (static) and storm-focused (relocatable) configurations
HAFS Workflow: Current Capabilities

- Supports **zero-storm** (TC genesis, or any other regional/global-nesting application), **one-storm**, and **multiple-storms**
- Supports C768 as well as other resolutions (C96, C192, C384, C1152, C1536, etc) for both regional and global-nesting configurations
- Includes TC specific pre-processing and post-processing workflow elements
- Supports WCOSS (Cray and Dell) as well as NOAA RDHPCS (Jet, Hera, Orion)

**Zero-storm**

- 2019062512Z

**Multiple-storm**

- 2018091000Z
  - Florence, Helene, Isaac
- 2019071400Z
  - for a CONUS domain
HAFS Workflow (with DA and coupling)

High-resolution deterministic variational analysis/forecast system

- `ocn_prep`
- `wav_prep`
- `atm_prep`
- `atm_ic`
- `atm_lbc`
- `atm_init`
- `analysis_vr`
- `atm_vr`
- `analysis_vr_fgathh`
- `atm_vr_fgathh`
- `analysis (FGAT, 3DEnVar, 4DEnVar, IAU)`
- `atm_merge`
- `forecast`
- `ocn_post`
- `wav_post`
- `atm_post`
- `graphics`
- `product`

EnKF analysis system

- `input`
- `atm_prep_ens`
- `atm_ic_ensxx`
- `atm_lbc_ensxxx`
- `analysis_vr_ensxxx`
- `enkf_mean`
- `enkf_hx_mean`
- `enkf_hx_ensxxx`
- `enkf_update`
- `enkf_recen`
- `forecast_ensxxx`
- `ocn_post_ensxxx`
- `atm_post_ensxxx`
- `product_ensxxx`

Current default workflow without DA/coupling

Optional or configurable tasks

To be implemented

Not needed for first or coldstart cycles

Igathh means all FGAT hours: e.g., 03, 09

Ensxxx means all ensemble members

Next analysis/forecast cycle

Prior cycle

NOAA Hurricane Forecast Improvement Project

Meeting the Nation’s Needs
How to Contribute to HAFS Development

● The governance policy explains how the community can contribute.
  ○ Before starting development
    ■ Discuss plans during the biweekly HAFS developers meeting
    ■ Create a new issue in the repository
    ■ Either create a new feature branch in hafs-community (for collaborative efforts) or fork the repository (for individual work).
      ● Applies to submodules as well
      ● Start from develop or support/HAFS branch (for submodules)
HAFS Code Repository Governance

- **During development**
  - Commit your work back to the repository in manageable chunks
  - Provide meaningful commit messages
  - Keep your fork(s) or branch(es) synced with develop, support/HAFS

- **Submitting Pull Requests (PRs)**
  - Sync first
  - Retest and ensure your development is working
  - Fill out the PR template on GitHub and submit
  - DTC and EMC staff will run regression tests
Submitting a Pull Request

1) Navigate to github.com/hafs-community/HAFS

2) Log in

3) Select PR tab

4) Select your branch

5) Complete title and template

6) Designate reviewers

7) Create PR
Resources for HAFS Developers

● See the [HAFS User Quick Start](#) and [HAFS Developers Guide](#).

● Documentation for using [CDEPS in HAFS](#) is also available.

● We are working on unifying this documentation under Read the Docs.

● [Repository governance](#) is in the hafs-community/HAFS Wiki.

● The [GitHub discussions](#) page under hafs-community/HAFS is actively monitored.

● Join the next biweekly HAFS Developers call on Monday, Nov. 29th at 12 ET.
  ○ Email evan.kalina@noaa.gov to be added to the calendar invite.