

A Consortium for CONvection-scale modelling
Research and Development

2021-2025 ACCORD System recap

Daniel Santos Muñoz, ACCORD AL for System

5th ACCORD ASW, 31 March - 4 April 2025, Zalakaros and hybrid

3 ACTIONS:

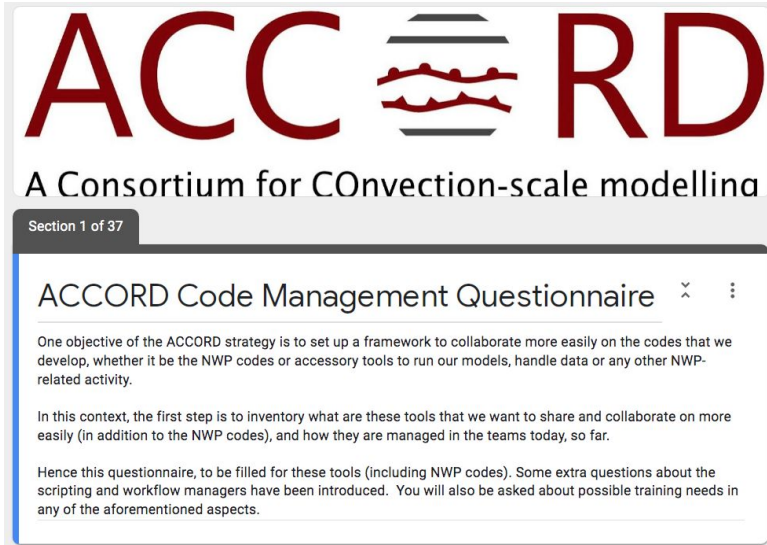
- **ACTION 1: Organize the codes:**
 - Create a **prototype multiple repository organization for NWP core codes** (content and structure) and establish a **platform for exchange of technical information** which is well integrated with the multiple GIT repository infrastructure.
 - **Determine a flexible and efficient way to link all of repos** by **bundling tool**. The **ecbundle and bundle.yml** definition infrastructure appears to be quite mature and should be evaluated as overall solution.
 - Explore **repository solutions for supplementary codes and new tools** (testing tools, scripting, etc.).

- **ACTION2: test the codes:**
 - Development of the **unit testing based on DAVAI**
 - **Ensure Davai portability** creating an interface which allows users to **execute the Davai tool on other platforms** and **implement tests** of components **for different CSCs**.
 - Further develop a **user-friendly tool and interface for visualizing the results** of unit testing (eg. “ciboulaï”)
 - Arrange **training of key integrators to use the Davai tool**, to allow them to locally test **possible code contributions more frequently**.

- **ACTION 3: increase system usability and maintenance:**

We consider a system the **ECOSYSTEM** of **codes, configurations and accessory software that allows**

- One of the **key part of the ECOSYSTEM** are the **scripting systems**. They allow to **execute, control and validate all the process** that a numerical weather forecast generation requires.
- **Not all the ACCORD partners** have the **same level of functionality** on their scripting systems To **increase the productivity, the model usability and facilitate the maintenance** the **convergence** to a **single scripting** system is desirable
 - Collect information from Members **to map their current scripting systems, their functionalities and their dependencies on IT** elements



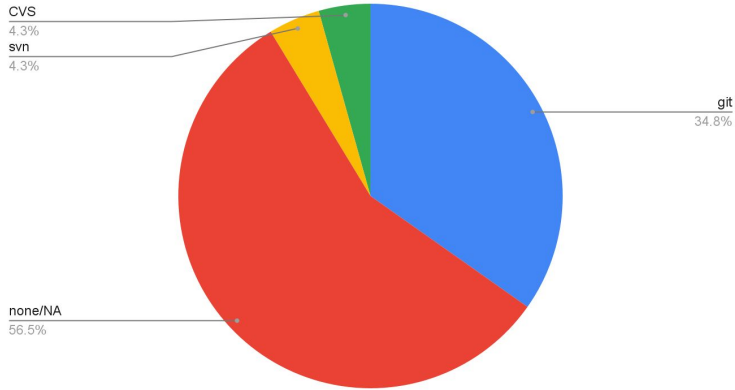
The screenshot shows the ACCORD logo at the top, followed by the text "A Consortium for COnvection-scale modelling". Below this is a dark grey bar with "Section 1 of 37" in white. The main content area has a title "ACCORD Code Management Questionnaire" with a close button and a menu icon. The text below the title reads: "One objective of the ACCORD strategy is to set up a framework to collaborate more easily on the codes that we develop, whether it be the NWP codes or accessory tools to run our models, handle data or any other NWP-related activity. In this context, the first step is to inventory what are these tools that we want to share and collaborate on more easily (in addition to the NWP codes), and how they are managed in the teams today, so far. Hence this questionnaire, to be filled for these tools (including NWP codes). Some extra questions about the scripting and workflow managers have been introduced. You will also be asked about possible training needs in any of the aforementioned aspects."

ACCORD Code Management Questionnaire.

The quiz addressed some **extra questions** about the **scripting, workflow managers**, possible **training needs**, future **code development techniques ...**

23 ACCORDers answered

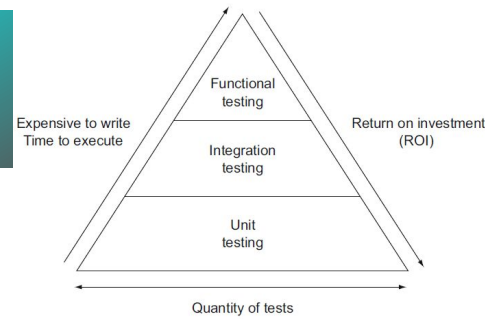
SCM for NWP-CSC codes



NWP-CSC codes
Git (35%)

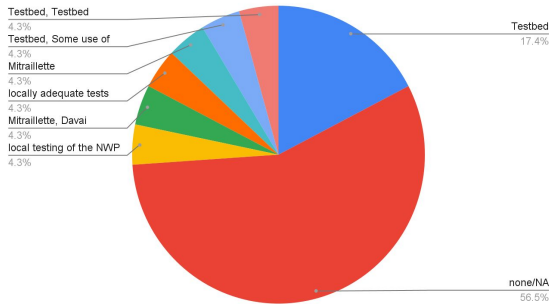
ACCORD GitHub prototype

The screenshot shows the GitHub profile for ACCORD. The repository list is empty, with a message stating: "ACCORD-NWP doesn't have any pinned public repositories yet." The repository list shows two entries: "DAVAI-tests" (Public, Python, 0 stars, 1 fork, 0 issues, 0 pull requests, updated 19 days ago) and "OOPS-configs" (Private, 0 stars, 0 forks, 0 issues, 0 pull requests, updated 19 days ago).



Testing codes

Testing NWP-CSC codes



SPFRACCO ECMWF Special project 2022-2024

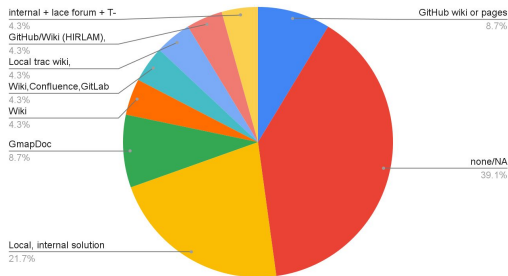
1. An enhanced **portability and improved capability** of the code testing tools in ACCORD (**DAVAI**).
2. An enhanced definition of **common working practices and work environment for ACCORD** code and system activity, with a strong focus on code integration and technical validation of new cycles.
3. An improved **evaluation of the portability of new code** versions for ACCORD Members.
4. Through the additional testing on the ECMWF HPC an **improved technical quality assurance of new cycles, with feedback of potential bug-fixes or optimization fixes to the Central Code Repository**

https://www.ecmwf.int/sites/default/files/special_projects/2022/spfracco-2022-request.pdf

NWP-CSC
Testbed(26%)

Documentation

Docs NWP-CSC codes



NWP-CSC Codes

Local solution (22%)

Private (65%)

CODE DOCUMENTATION

0) Inside code and print outs and error messages

- Integration rules ..

1) Technical evolution of code content

- pull request, release notes, tech validation results ...

2) Practical guidance on how to use new features

- how to, README, commented namelist, examples, tutorials ...

SCIENTIFIC DOCUMENTATION

- newsletters, reports, papers, exp results, met validation summary...

MODEL DOCUMENTATION

- equations, used in the code,algorithm explanation...

Create a sense of community

ACCORD-DEODE synergies on scripting

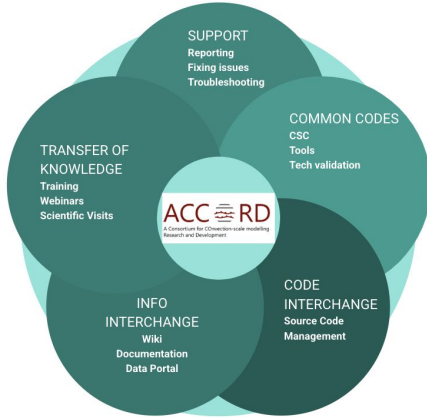


- DEODE script design meeting ZAMG 28-29th of November 2022
 - The primary goal is to **deliver a system for the DestinE** engine workflow with a clear ambition that this **can be of further usage within ACCORD**.

DAVAI contributors Working Week



- 23 - 27 Nov 2022 at DMI (Copenhagen)
 - [Introduction to 2022 ECMWF working env](#)
 - Introduction to Davai
 - **Davai repos**
 - DAVAİ IN ATOS
 - **Necessary changes to add ALARO test CY48T3**
 - **Pseudo Harmonie test based on CY48T**



Create a sense of community

Transfer of knowledge

GIT :

- GitHub for ACCORD forge
- local support to implement GIT working practices

Git Forge webinar

DAP - Tech support visits for GIT transfer of knowledge

DAVAï:

- Dev working week
- Users training
- Training on ECMWF's HPCF for Davaï testers and integrators (spfracco project)

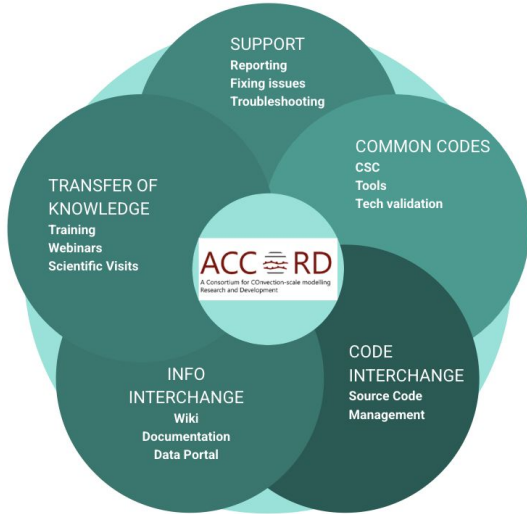
DAVAï training for users webinar

DAP DAVAï contributors-developers WW

Vortex:

- Scientific visit

DAP - Visit to MF



DAVAI contributors Working Week



Home

GitHub

DAVAI User Guide

DAVAI embeds the whole workflow from the source code to the green/red light validation status: fetching sources from Git, building executables, running test cases, analysing the results and displaying them on a dashboard.

For now, the only build system embedded is `ginkpack`, but we expect other systems to be plugged when required. The second limitation of this version is that the starting point is still an IAL^[1] Git reference only. The next version of the DAVAI system will include multi-projects/repositories fetching, using the *bundle* concept as starting point.

The dimensioning of tests (grid sizes, number of observations, parallelization...) is done in order to conceal representativity and execution speed. Therefore, in the general usecases, the tests are supposed to run on HPC. A dedicated usecase will target smaller configurations to run on workstation (not available yet). An accessible source code forge is set within the ACCORD consortium to host the IAL central repository on which updates and releases are published, and where integration requests will be posted, reviewed and monitored.

By the way: DAVAI stands for "Device Aiming at the Validation of IAL"

- IAL = IFS-Arpege-LAM

Creating a branch »

Powered by Documenter.jl and the Julia Programming Language.

23-27 Oct 2023 at RMI, Brussels

https://opensource.umr-cnrm.fr/projects/accord/wiki/Davai_Developers_Working_Week_#1

- **Namelist in git repo per CSC**
 - Manipulation in the repo with TNT <https://github.com/UMR-CNRM/bronx>
 - Namelist handling as deltas or per CSC or per NM
- **Data storage** of the permanent data in cloud for static resources
- **Portability** to other HPCs, PCs, AWS, compilation tools ..
- **Move docs from Latex to MD** and creating a github web page
<https://accord-nwp.github.io/DAVAI-env/stable/>
- **Data version control** comparison as alternative to the catalog data management
<https://lakefs.io/data-version-control/dvc-tools>
<https://git-annex.branchable.com/>

ACCORD GitHub

ACCORD
A Consortium for COnvection-scale modelling Research and Development
AI 17 followers <http://www.accord-nwp.org>

[Overview](#) [Repositories 17](#) [Projects](#) [Packages](#) [Teams 8](#) [People 91](#) [Settings](#)

Popular repositories

- EPyGRAM** (Public)
Forked from UMR-CNRM/EPyGRAM
Enhanced Python for Graphics and Analysis of Meteorological fields
● Python 1 5
- IAL-expertise** (Public)
IAL: outputs expertise toolbox
● Python 1
- IAL-build** (Public)
Wrappers to help building IAL executables from SCM
● Python 2
- DAVAI-tests** (Public)
DAVAI tests templates and config files
● Python 3
- DAVAI-env** (Public)
DAVAI environment for testing experiment creation
● Python 3
- ickit** (Public)
Forked from ecmwf/ickit
A C++ toolkit that supports development of tools and applications
● C++ 1

Mar 29, 2022

AlexandreMary

CY48T1
e656fe7

[Compare](#)

CY48T1

- Call for contribution
- Deadline for contribution
- Integration: Oct.
- Feb. 2021 -> July validated (+ coll)
- Declaration: July

Release notes: [Cont](#)

[Assets](#) 2

ACCORD-NWP/IAL released last week

CY49T2

Associated IAL tag: CY49T2
Bundle (for side packages): [BDL49T2-default](#)
DavaI tests version: `--v DV49T2`

[List of Contents](#) (of which contributions with [numerical impact](#))

This cycle is mostly a technic...

[Read more](#)

Repositories

- IAL** (Private)
IFS-Arpegge/LAM - NWP models & DA common code
● Fortran 3 29 2 1 6 Updated on Mar 17
- EPyGRAM** (Public)
Enhanced Python for Graphics and Analysis of Meteorological fields
● Python 1 5 9 0 1 1 Updated on Mar 16
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- SURFEX-NWP** (Private)
A version of the Surfex repository, cleaned from STRATO binary files and other spurious binary files
● Fortran 0 0 21 0 1 1 1 Updated on Mar 10

ACCORD-NWP / IAL

Code Issues 10 Pull requests Discussions Actions Projects Security Insights Settings

Filters [Clear current search query, filters, and sorts](#)

22 22 5 [New pull request](#)

207 Closed

Author	Label	Projects	Milestones	Reviews	Assignee	Sort
More lightning and porting FPO tests	bug					
Fix a Single Precision overflow in Arpegge	bug					
Bugfix lightning field in Arpegge	bug					
Bugfix writing Wigoa ID for Arpegge model	bug					
Fixing AD of GISS STD	bug					
4941 test2atlab	bug					
Bugfix for variable nudging in time in cpg_forcing	bug					
fix outflow segfault	bug					
Fix out of bounds access in balmbv.F90	bug					
indent esp_arpegge.F90, cpg_gp.F90 and cpg_dyn_hlg.F90	bug					
Fix reproducibility issue LAPL_ARPEGE+TP in single precision	bug					

ACCORD-NWP / IAL

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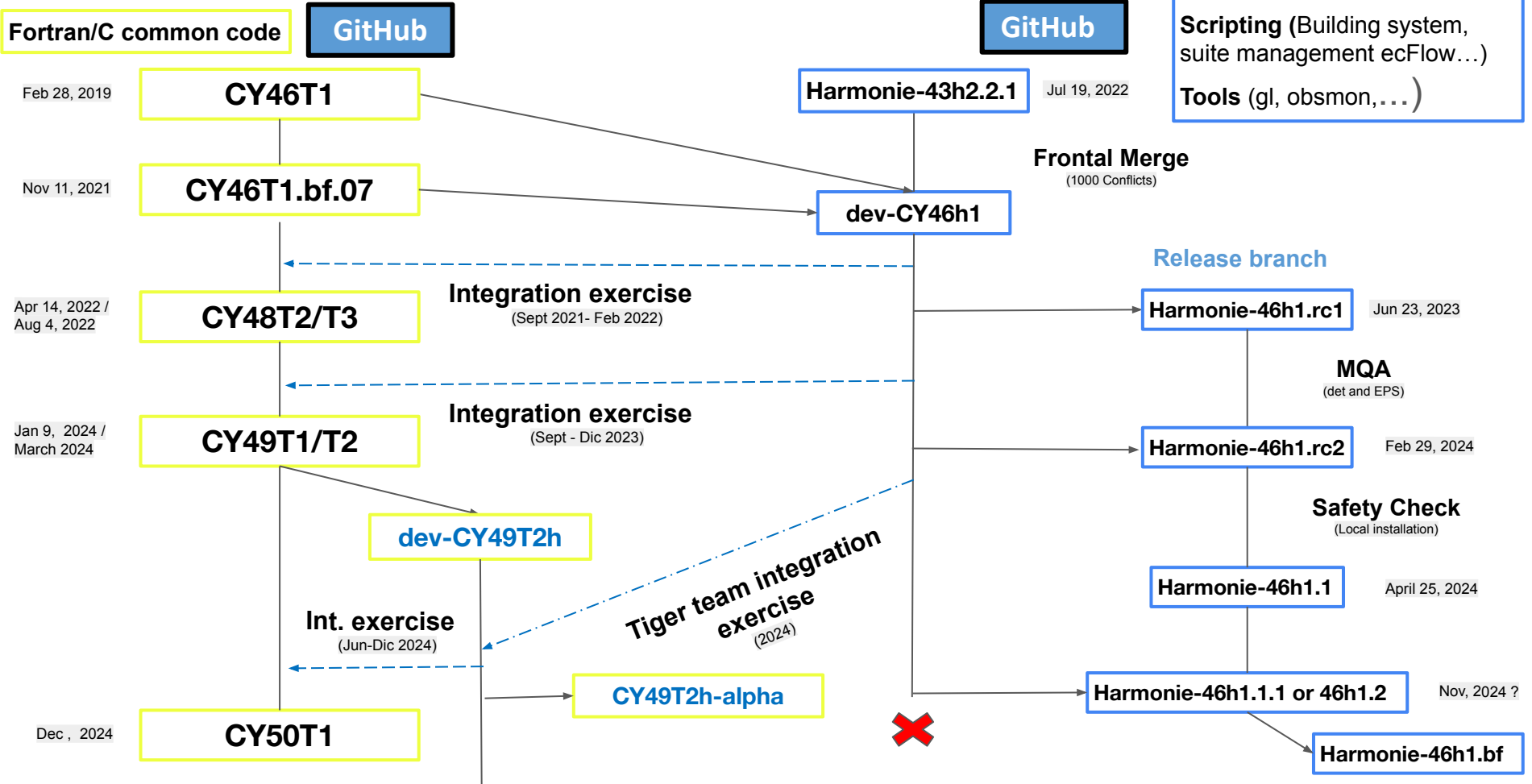
Filters [is issue is open](#)

22 22 5 [New issue](#)

10 Open 18 Closed

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CY49: writing of minimisation residues in the adequate ODB columns (diagnostic)	bug				
no plug CLOUDPROXY diagnostics for alisky randances	bug				
CY49T0_to_T1_array overflow in Arpegge/Fullpao if compiled with bound-checking	bug				
CY48T1 export bug in inline FPOS	bug				
Arpegge NH not bitwise repeatable	bug				
Fullpao LBC Arpegge -> LAM @ Axa/Balagne	bug				
CY49 - ALARO - setup requires reading of BRTM Ozone files	bug				
CY49 - IFS snow scheme	bug				

Fortran/C common code (src)
Scripting (Building system, suite management ecFlow...)
Tools (gl, obsmon,...)



ACCORD GitHub

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Release notes: [Cont](#)

Assets 2

Discussions
Set up discussions to engage with your community
Turn on discussions

People

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ACCORD-NWP / IAL

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ACCORD-NWP / IAL

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CY49 - ALARO - setup requires reading of BRTM Ozone files	bug				
CY49 - IFS snow scheme	bug				

ACCORD COMMON SCRIPTING SYSTEM

The screenshot shows a GitHub repository page for 'Deode-Workflow'. The repository is a clone of the 'Deode-Workflow' repository, created to collaborate on analyzing it for the development of the roadmap for the ACCORD common scripting system. The repository has 2 branches and 19 tags. The file list includes: .github, deode, docs, tests, .codecov.yml, .flakeheaven.toml, .gitignore, CHANGELOG.md, LICENSE.md, README.md, poetry.toml, and pyproject.toml. The repository is owned by 'uandreae and Ulf Andrae'.

- [ACCORD strategy 2026-2030 adopted by the 9th Assembly on 9 Dec. 2024](#)

The design of **ACCORD common scripting system** will start from the **DEODE scripting system** and adopt a co-analysis and co-development strategy leading to a stepwise development and to a genuine co-ownership of the tools, also leveraging on existing knowledge and tools that can accelerate the development.

- To facilitate **the implementation of the ACCORD 2026-2030 Strategy on the Common Scripting System (“CSSy”)**, a dedicated **roadmap** is proposed to be made.
- **Roadmap task force composition**

Management-level: Xiaohua Yang (DMI), François Bouyssel (MF), Martina Txudor (DHZ/LACE)

Expert-level: Ulf Andrae (SMHI), Thibault Lestang (MF), Zahra Sahlaoui (DGM-Morocco)

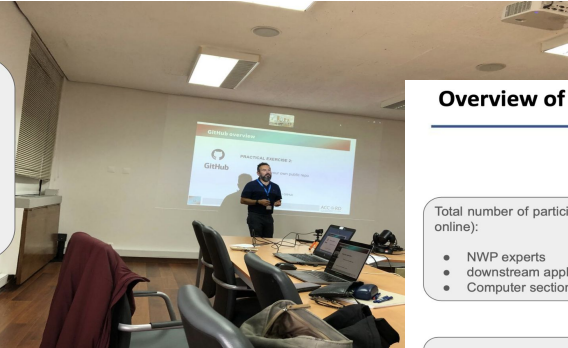
MG members: Claude Fischer (ACCORD/PM), Alexandre Mary (MF - Integration Leader), Daniel Santos (DMI - System Area Leader)

The Task Force will be co-chaired by Claude Fischer and Daniel Santos.

The proposed roadmap will be presented to **STAC** and then to the **ACCORD Assembly (spring 2025)**

Consensual actions in line with the roadmap and the strategy **can start with no delay in the autumn 2024** or any time afterward.

DAP: GIT Transfer of knowledge



Overview of the training

Total number of participants (12 in presence; 4 online):

- NWP experts
- downstream applications experts
- Computer section experts

Prerequisites:

- Personal laptop (Linux or Windows)



Outcomes

All the participants enjoyed the training

Individually, all participants were enthusiastic to start using these practices/utilities on their daily work, to handle personal work projects

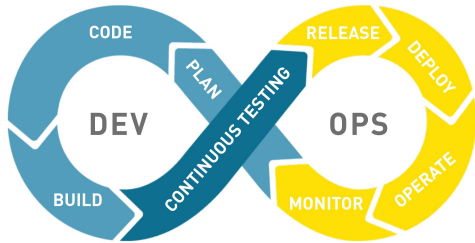
Participants were trained to start contributing at any time (were given permissions to the ACCORD forge)...

Locally, there is a need to design the best way to use this facility - which relies on new concepts (i.e. local code will be archived to into platforms exterior to IPMA) - and to plan the moving from SVN to Git/GitHub which should occur in 2025

This was an excellent team opportunity !

DAP: Workflow analysis and discussion towards a more CI/CD in IAL, Before summer 2025, Copenhagen

- GitHub actions for running DAVAI in remote HPC
 - [Self-hosted runners at ECMWF](#)
- Bit-reproducible branch and Scientific Branch



DAP: 4th Davai developers days, autumn 2025

Facilitate the research activities: release validation

Cycle

Source codes

94,2% Fortran codes

R cycle from Reading (ECMWF)

T cycle from Toulouse
(MF/ACCORD)

- Code synchronization per cycle between repos in so called common cycle (name without letter)
- Technically validated by ECMWF and MF/ACCORD using Davai
- Base code for contributions
- After declaration base code for export version (Aladin) op version (MF) and

Export

Source codes and namelist

94,2% Fortran codes

Tx_export from MF

Includes the latest contributions
from ACCORD

- Technically validated AROME version
- Meteorological quality assured over France with DA for a short season
- Base code for Operational implementation in Aladin countries

All CSC Export

Source codes and namelist AND tool (scripting)
to run DA cycling

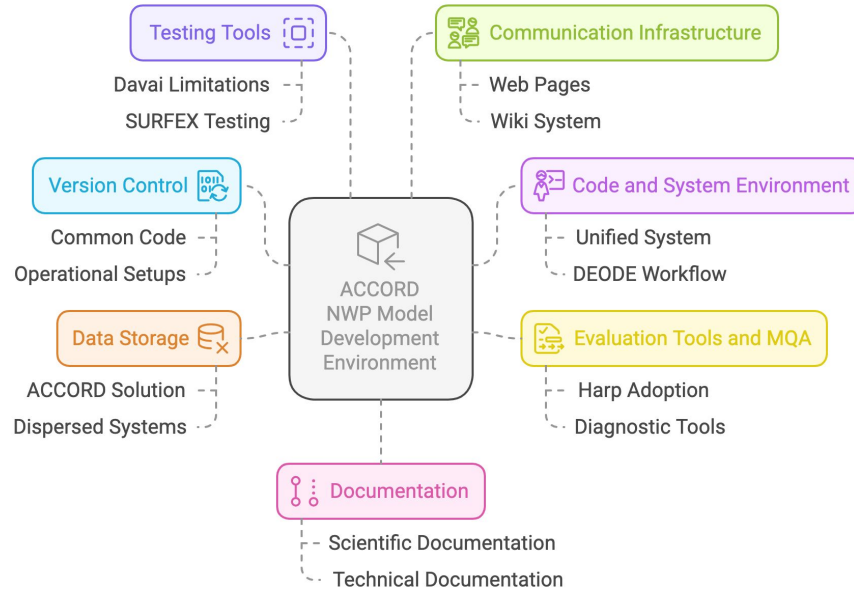
94,2% Fortran codes + Tool

Tx_export from ACCORD

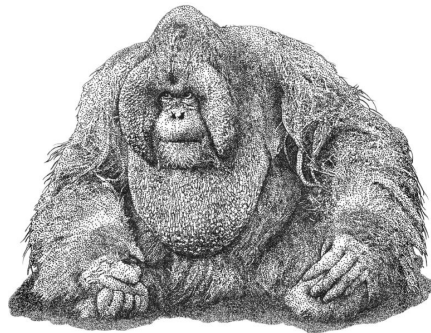
Includes the latest contributions from ACCORD

- Technically validated AROME, ALARO and HARMONIE version
- Meteorological quality assured over France with DA for a short season for AROME, the same for ALARO and HARMONIE over LACE and HIRLAM domains
- Base code for Operational implementation and research for ACCORD

ACCORD NWP Model Development Environment Discussion



2021-2025 ACCORD System recap



Friendly NWP
system enviroment

Waiting for ML/AI-base solution

O RLY?

dsm@dmi.dk