

### Minutes

#### Participants (remote; in-situ)

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| Flat-Rate ALADIN MoU5<br>Representatives        | Rafiq Hamdi (Belgium)  |
|   | Ilian Gospodinov (Bulgaria)  |
|   | Vanda Costa (Portugal)   |
| RC-LACE-MoU5 Representatives                    | Christoph Wittmann (Austria)   |
|   | Kristian Horvath (Croatia)   |
|   | Simona Tascu (Romania)   |
| HIRLAM-C Representatives                        | Saji Varghese (Ireland) STAC Chair   |
|   | Sami Niemelä (Finland)   |
|   | Xiaohua Yang (Denmark)   |
| Météo-France Representatives                    | François Bouysse STAC vice-Chair   |
|   | Alain Joly   |
|   | Christine Lac  |
| ACCORD PM                                       | Claude Fischer   |
| ACCORD CSS                                      | Patricia Pottier   |
| ECMWF Observer                                  | Steve English  |
| Invited experts from ACCORD<br>Management Group | SPTR Area Leaders: Daan Degrauwe (4 only) & Piet Termonia (3 only)<br>AROME CSC Leader: Eric Bazile<br>ALARO CSC Leader: Martina Tudor |

## 1. Opening

Saji opened the meeting and thanked DMI and Xiaohua for hosting this hybrid STAC meeting. Saji welcomed the STAC members, the ECMWF observer and the invited experts from ACCORD MG. Saji thanked Christine for her contribution as vice-chair and François who accepted to take over.

## 2. Adoption of the draft agenda

Saji introduced the items at the agenda and opened the floor to comment on the agenda or proposals for A.O.B. Claude proposed an A.O.B for item 8: to discuss the possibility of having a small piece of LAM code (the LAM spectral transforms) as open source code. The agenda is unanimously adopted, with this A.O.B.

## 3. Reports by PM

### *a. achievements of the RWP2022 actions*

Claude first presented the consortium activities at the management level, including two major scientific management documents, both with a yearly life cycle: the Rolling Work Plan (RWP) and the Detailed Action Plan (DAP). An important task in ACCORD is the commitments and the registration of the manpower figures by each partner (through the LTM), under the coordination of the Consortium Scientific Secretary (CSS) and the responsibility of the PM.

The Management Group (MG) meets every second Friday online; MG members organize their topical teams and meetings according to their work arrangements. Claude introduced highlights of 2022 achievements by each of these R&D topical teams: dynamics, surface, physics, (upper-air) DA, EPS and MQA.

Claude also summarized the progress on technical topics and modernization of working practices:

- SPTR (code adaptation);
- source forge in place under github.com, with the intention to generalise its use, if approved formally by the Assembly,
- the “ecosystem” of codes (multi-repository approach with bundling mechanism);
- testing of new versions with *davaï*;
- integration of code contributions and testing of new versions, system;
- optimization (mixed-precision).

More details on these scientific or technical achievements can be found in the 2022 scientific reporting document<sup>1</sup>.

Saji thanked Claude for the very good presentation and the huge work accomplished by ACCORD teams.

Sami appreciated the progress in the source code forge and supported the idea to continue in that way. Sami asked about the status of the use of AI in NWP in the context of ACCORD. Claude explained that the WG-ML is working on a portfolio to identify thematic areas where teams can draft research topics using AI or ML close to the NWP codes. Conversely, AI/ML for post-processing has been kept out of the scope of the portfolio (see item 9).

Steve added that ECMWF Tech Memo 878 describes ECMWF's ML roadmap with similar strands of activity to those Claude presented.

Steve commented his appreciation on progress with OOPS running EnVAR and VAR.

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<sup>1</sup> the version of the “Execution of RWP2022” document adopted by the Assembly will be published [here](#)

Rafiq asked about an expected increase in work on hectometric modelling in the future. Claude confirmed that the commitments for 2023 increase in the dedicated hectometric WP but such work appears also in other WPs (i.e. physics, DA, ...).

Alain proposed to stress in the recommendations for the Assembly, the importance of SPTR and the importance of keeping up with the code adaptation of the spectral transforms, and to underline that the work on the preparation of the codes ahead of adapting them to new architectures requires an increase of staffing and a careful planning.

Saji asked about any issues on medium/long-term needs for manpower resources. Claude answered that the crucial point is to be able to staff the *davaï* contributors team. Piet added that, for code adaptation, finding and training the right skilled people is important. François pointed to the importance of documentation and training on these new working practices.

### ***b. realisation of the manpower commitments***

Claude presented the 2022 manpower figures (commitments and half-term realisation) and commented that the realisations are well on track with respect to the commitments, and for SPTR, the realisations are already nearly reaching the commitments for the whole year.

Following these discussions, **STAC agreed on recommendations for the Assembly (see Annex I, item 1).**

## **4. Cross-analysis of the interaction between the DEODE work plans and the ACCORD RWP**

Claude explained how the DEODE work plan relates to the ACCORD RWP. Taking into account the work at the intersection of the DEODE and ACCORD work plans:

- for relevant RWP2023-WP's, the estimated part of DE-funded manpower is 23 FTE over a total ACCORD manpower of 136 FTE;
- among the work plans: there is a large overlap of DE/WP2 and ACCORD/RWP-SPTR;
- efforts in DE/WP3 are scattered over various RWP-WP's, but they seem overall traceable;

Opportunities versus risks were identified: expertise/manpower, acceleration of work at hm-resolutions, collaborations (BSC, CSC, ECMWF, impact-based institutes), funding.

The MG proposed to ensure the link with DEODE through different actions:

- to engage proactively into informal meetings with DE/WP co-leads;
- the ACCORD/PM will stay in regular contact with the DE core MT;
- the PM would agree with the DEODE Lead Scientist on specific MG/MT meetings on arising matters of concern or of mutual interest.

Sami commented that DestinE was originally seen as an opportunity to boost the work on SPTR. It is encouraging to see that this original assumption is already visible in the figures (plans are to double efforts on SPTR). Based on the analysis, the opportunities still oversized the risks.

Claude added that the DEODE-supported staff can be new staff hired (thus additional staff) or staff already working on this topic, thus not all "DEODE-funded" staff is new staff.

Kristian supported this cross-analysis very much. It might be good to keep the communication channel with DE/WP3 open and consider also with DE/WP4. Kristian wondered about the risks of non-assignment back to ACCORD of the IPR of the improved codes and whether this could be in a

contradiction with EU's FAIR directives. Claude's feeling is that there is no clear risk that the subsisting IPRs would not be assigned back, however this will have to be formally requested to ECMWF. Claude doesn't see any contradiction with [FAIR](#) as one might reasonably assume that the EU framework Agreements are in line with such directives.

**STAC agreed on recommendations for the Assembly (see Annex I, item 2).**

## **5. Update on the preparation of the ACCORD roadmap and the white paper on R2O/O2R**

Claude explained that the MG drafted a roadmap for ACCORD, describing the main goals the MG would like to reach, along the lines (and complementing) the contents of the MoU and the Strategy. This document explains the main goals and milestones, with only broad indications of timeline, however marking the headlines of what the MG would like to achieve by 2025 or a bit beyond. The MG will, for itself, monitor the progress of the bullets.

STAC proposed to review the goals and milestones of the roadmap within one year, taking into account the DEODE achievements by then.

Xiaohua missed in the roadmap visions for the convergence of the 3 CSCs and on-the-fly model launch (necessary for DEODE). Claude proposed to discuss this between the relevant ACCORD MG members and DEODE/WP5 leaders.

Kristian appreciated the document and congratulated the authors. While ACCORD has no operational responsibilities, some details could be added about DAsKIT for instance. Claude considered DAsKIT to be more and more embedded in the DA RT and ST DA teams, as the DAsKIT teams build their capacity.

Rafiq pointed out that sub-kilometric modelling is not explicitly mentioned. Claude confirmed that the relevant goals for sub-kilometric modelling are spread over the different areas of the roadmap.

Rafiq also pointed out that DEODE specific goals don't appear in the roadmap. Claude answered that the roadmap could not anticipate the negotiation between DEODE teams and ECMWF for the phase 2 bid.

Claude introduced the White Paper. The White Paper deals with the interface between R&D (in the sense of the ACCORD Strategy and RWP content) and users (operational teams for system, forecasters, production-oriented teams, end-users sometimes). It is composed of three main items:

- Proposals by MG on testing, technical and meteorological QA:
  - to strengthen the validation of new code releases over time (the new working practices will help);
  - to add more code components to the systematic testing; the range of tests would go from Unit through Integrated and System testing;
  - the DAVAĪ-contributors team will be formed;
  - documentation close to code commits will be implemented;
  - meteorological QA (Acceptance testing) would be mostly done by the institutes as it highly depends on local settings, metrics, priority of evaluation at institutes, involves discussions with Operations and requires a significant amount of real-time and computer-time (long periods of evaluation).
- Proposals by MG on O2R and users' feedback:
  - the MG wants to find an organization in order to streamline users' feedback;

- the MG faces the difficulty that ACCORD Partners all have very different ways of organizing O2R, and they also have fairly different local systems to evaluate; conversely, ACCORD aims at homogenizing R&D across the consortium;
- ACCORD however needs feedback to feed its priorities;
- the MG has decided to form a WG with O2R experts from all families, to formulate recommendations to the MG (the WG is to start in November);
- the next steps would be to communicate at the ASW (with the teams) and to discuss a work plan and a suggested organization.
- On documentation, a weak point in our consortium, the MG has first defined 5 levels of documentation:
  - priority goes to documentation close to the code commits (level 1), scientific and technical model documentation (level 2) and practical guides (level 3);
  - the MG intends to discuss with ECMWF and MF (a first meeting took place on 21 October; documentation also will be addressed at an upcoming IFS-Arpege coordination meeting);
  - the opportunity to propose a new part-time position in ACCORD, the Documentation Officer, is being considered.

Saji thanked Claude for this introduction to the White Paper and opened the floor for discussion. Christoph appreciated the plans to organise the users' feedback and asked about the role of the LTMs in the finalization of the questionnaire. Claude explained that the questions have been drafted and proposed to the WG of O2R experts, who will finalise the questionnaire from this material. The teams and therefore the LTMs will be presented the result during the ASW.

Sami summarized the discussions on the white paper at the last HAC meeting. HAC appreciated that the white paper defined the boundary between ACCORD activities and activities that will be taken over by UWC for instance. The white paper however describes the current situation (where the boundaries are today) and HAC would like to be also presented with where the boundaries should be optimally placed and what would be the needed actions to reach this optimal boundary. HAC would like to trigger brainstorming on how to move forward the current boundaries (consider possibilities for a reference system, for a common testbed for the different CSCs, ...). HAC acknowledges that the subject is challenging (huge inhomogeneity in operational applications and in quality control). HAC also commented that users' feedback activities at UWC level could be useful to ACCORD, and Xiaohua noted that DEODE could also provide external users' feedback. Saji added that HAC proposed to explore WRF-style testbest for Harmonie (testbed format), and share it with ACCORD.

François congratulated the MG for the huge thinking behind this document and approved the proposals by MG. He considered the document is ambitious: gathering the users' feedback, huge work on documentation, ... The improvement of technical QA is important but, because the Partners are working on different CSCs, on different cycles, on different calendars and on different operational conditions, it is difficult to estimate the cost and the benefit of going further in common QA.

Claude underlined the importance of understanding the intentions below the reference system, in terms of technical QA and of MQA. Claude warned that some members in ACCORD might understand the intercomparison of models or applications as beauty contests. So far, the MG tries to organise the users' feedback from their comments on their local operational forecasts, not on a reference system. Claude proposed that the MG could explore possibilities of cooperation in the process of preparing and validating new code releases and how to ingest a certain level of MQA-style validation.

*The meeting was suspended at 6:15pm and resumed on Friday 4 at 9am.*

STAC concluded that the current border of R2O and O2R should be regularly re-evaluated taking into account the future evolution, needs and new opportunities of the consortium (Claude gave the example of running the 3 CSCs with the same version of SURFEX as such an opportunity).

**STAC agreed on recommendations for the Assembly (see Annex I, item 3).**

## 6. Outcome of WG-interopability

Claude introduced the items 6a and 6b.

### *a. physics interoperability roadmap proposal*

The WG-interopability was formed by the Assembly in March 2021 with the goal to propose a roadmap towards an enhanced interoperability in Physics in ACCORD. This roadmap will be presented on 7-8 December Assembly and proposes:

- to implement WPs and organize the actual work in physics by thematics (WWs, online meetings ...), regardless of the CSC (this already is reflected in the RWP2023);
- to work on the physics codes in strong link with SPTR/code refactoring;
- to tackle scientific challenges such as physics evaluation for VHR confs, 3D effects, ML tools, regardless of the CSC.

The WG considers that these steps will bring the physics teams closer and having them working together by thematics will naturally open the path for more interoperability. The call and the ToR of the Physics AL have been prepared along the lines of this roadmap.

### *b. opening of the Physics AL position*

Under the condition that the Assembly approves the roadmap, the opening of the position of the Physics Area Leader could be launched (the text of the Call, the ToR of the Physics AL position and the calendar are proposed in the preparatory document 6b).

Saji opened the floor for discussions on items 6a & 6b:

- Alain explained that the physics calling routines have grown very complex due to their ability to call different physics parameterizations. Their simplification for code adaptation is a necessity.
- Alain pointed out the importance of ensemble prediction, ensemble assimilation and stochastic aspects of physics processus, in the mid to long term.
  - Claude proposed to make these items more explicit in the scientific challenges mentioned in the roadmap and in the ToR of the Physics AL.
  - Martina commented that stochasticity (including physics perturbations) is part of a specific EPS WP, and uncertainty in relation to the physics parameterizations also plays a role in upper air and surface data assimilation. There should therefore be a strong collaboration between the Physics AL and the EPS (DA/SU) ALs.

**STAC agreed on recommendations for the Assembly (see Annex I, item 4).**

## 7. Membership in STAC

STAC members are designated by the Assembly for a two year period, renewable. The Bureau suggested that STAC members could discuss and confirm whether they would like to continue or not. Continuation or replacement should be discussed and agreed at the level of each family (MF, Hirlam, LACE, Aladin-MoU5 through the PM).

The representatives from HIRLAM, LACE and MF confirmed their willingness to continue and the approval of their family chair. Saji also confirmed his wish to continue as chair and François as vice-chair.

For the Aladin-MoU5 family, Vanda announced that she makes her place available for others to participate, Rafiq that he is willing to continue and Ilian proposed to step down for others (and might stay only if necessary). Claude has started to approach other ALADIN-MoU5 teams for participation in STAC (and PAC).

Saji reminded that the ECMWF observer is proposed by ECMWF and STAC appreciates Steve's participation.

Rafiq commented that ACCORD members not involved in DEODE should also be represented in STAC. STAC agreed. It is already the case with Romania and the ALADIN-MoU5 members approached by Claude to enter STAC could possibly provide additional non-DEODE members.

## 8. Review of proposal for 2023

Regarding the committed manpower by Areas in 2023, there is an increase in manpower, partly due to DEODE-funding. ML tasks are now included in the thematic WPs. There is a slight decrease in "common activities" WPs: it is more difficult to explain, but could be partly linked to the changing work practices. There is an increase in the other areas.

Regarding the 2023 commitments by WP (including DEODE-funded manpower), SPTR is largely increased by DEODE, however this increase has two components: funding of current staff (allocated to some DEODE tasks) and recruitment. The WP towards VHR configurations (HR) also is increased. The rest of ACCORD-relevant DEODE-funded manpower spreads over a range of WPs (see also analysis in item 4).

The staffing of the main WPs in link with modernization of work practices (COM2.T, SY4, COM2.1, SY3.) is rather stable.

Claude summarized the expected changes in MG and ST positions for 2023:

- DA/AL: Call open until 16 Nov;
- Physics/AL: proposal to open the Call provided the Physics interoperability roadmap is approved by the Assembly (see item 6);
- CSS position will have to be staffed by mid-2023.

ACCORD has still to decide on the opportunity to open a position of Documentation Officer (on a part-time basis) - if so, ToRs will be drafted taking into account the outcome of discussions on documentation and perhaps some other Support Team needs.

The MG will look out for a new Wiki solution, and this may raise the need for a Wiki manager position (on a part-time basis).

At the interface of ACCORD with its members or external partners:

- MG would like to organize visits or online discussions to/with member countries, and a proposal on how MG would like to organize them will be made to the Assembly;

- roadmap & R2O/O2R white paper (see item 5);
- scientific exchange with COSMO;
- link with DEODE (see item 4).

Claude gave some headlines from RWP2023 (more details in the preparatory document 8.RWP2023) on:

- methods (modernization of working methods),
- code adaptation,
- codes (timing and content of the T-cycles),
- WG activities in WG-ML (item 9), WG-VHR (item 9), O2R-WG (item5).

For the sake of time, Claude did not introduce the other areas for RWP2023<sup>2</sup>.

Claude introduced the AOB on LAM spectral transforms:

- the LAM spectral transform codes are currently being significantly refactored in the context of preparing the codes for new HPC architectures (like GPUs), following partially what is being done in the global transforms for IFS/Arpege;
- on the technical side, there are several reasons to go for a common, single packaging of the global and the LAM spectral transform codes:
  - the current refactoring could be continued more efficiently,
  - the synchronization of future code versions would be simpler,
  - the spectral transform code maintenance would be easier,
  - the future evolution and use of the sp. tr. in IFS/Arpege/LAM codes will remain a topic of regular discussion at IFS/Arpege coordination meetings, where ACCORD is represented;
- there is (in principle) no specific ACCORD or LEGACY scientific innovation in the LAM components;
- the reference version of the refactored global transforms is under an open source distribution at ECMWF (Council decision; APACHE-2);
- therefore, the issue of discussing an open source distribution of the LAM spectral transform codes becomes relevant and fairly urgent.

Claude opened the floor for comments on the RWP2023 and on the A.O.B. and proposed draft recommendations. Claude pointed out that there won't be much time to present the details of the RWP2023 at the Assembly; thus the Assembly is relying on recommendations by STAC.

STAC appreciated the increase in manpower and recommended the adoption of the RWP2023.

About the A.O.B, François explained that the externalisation of LAM spectral transforms is a short term issue (for CY49T1 already), and the Apache2 license ensures that we are not obliged to implement modifications proposed by constructors but we can chose (anyhow constructors may not want to give back optimisations when they did some).

Sami considered that the benefits of licensing the LAM spectral transforms outweigh the risks, as long as it doesn't create a precedent.

Steve noted that there are several components of IFS under Apache2 license but ECMWF are holding back from putting the whole code out, because of the risks. Claude concluded that, thus, the ACCORD members should not be worried that they will be asked to put other pieces of the code under open source in any foreseeable future.

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<sup>2</sup> the version of the "RWP2023" document adopted by the Assembly will be published [here](#)

Claude will prepare for the Assembly a summary of technical information (as discussed above) and point out that ECMWF won't propose a complete IFS code for open source in the foreseeable future (the exact formulation will be agreed with Steve).

**STAC agreed on recommendations for the Assembly (see Annex I, item 5).**

## **9. Informal reporting about the activity of the WG-ML and the WG-VHR groups**

In addition to the previous discussions (see items 3a, 6 and 8), Claude shortly reported on Working Groups on ML and VHR modelling:

- The WG-ML has drafted a portfolio with concrete elements of reasoning on general issues for using ML tools within the NWP codes, and suggestions on specific thematics (turbulence, radiation, surface, obs operators ...). The WG will finish the portfolio by spring 2023 and publish it. The WG-ML furthermore will try to provide recommendations from a mid-term perspective.
- The outcome of the WG-VHR will be presented in a VHR-WW on 14-16 Feb '23 (SMHI). The WW agenda will be complemented with time slots for practical work on VHR configurations (the WW can be useful for those teams also involved in DEODE). A summary document of the WG outcome will be published.

Rafiq commented that the publication of the conclusion of the WG-VHR in an ACCORD newsletter and/or a presentation at ACCORD ASW can be beneficial for all ACCORD countries involved or not in DEODE.

## **10. Date of the next STAC meeting**

STAC agreed to meet twice a year, preferably on-line for the spring meeting and in-person for the end-of-the-year meeting as the agenda would probably need two half-days.

Patricia will distribute a poll for the choice or the date of the 5th STAC meeting (in the 22 May - 2 June period).

When the Assembly agrees on their end-of-2023 meeting, Patricia will distribute another poll for the choice of the date and place of the 6th STAC meeting (to be held roughly four weeks ahead of this Assembly meeting).

## **11. AOB**

Discussed with item 8.

## **12. Closing**

Saji thanked the participants for fruitful discussions, and thanked the PM, the MG and the teams for their huge work. Saji asked Claude to pass STAC's appreciation to the MG.

Saji closed the meeting at 12:00.

# Annex I: STAC recommendations

Draft recommendations from STAC:

## **1. on RWP2022 report :**

- STAC reviewed the work done in 2022 and discussed the progress report. STAC formulated the following specific recommendations:
  - STAC recommends the Assembly to formally agree on the use of the source code forge implemented under Github.com;
  - STAC reminds the importance of implementing the new working practices, and building the team of “DAVAI-contributors”;
  - STAC stresses the importance of SPTR and keeping up with the code adaptation of the spectral transforms, considers that the work on the preparation of the codes ahead of adapting them (to new architectures) requires an increase of staffing and careful planning;
- STAC recommends the Assembly to adopt the progress report.

## **2. on the cross-analysis DEODE/ACCORD:**

- STAC recommends to set in place informal exchanges at the level of the management of ACCORD and DEODE, for the benefit of both projects:
  - between relevant ACCORD MG members and DEODE WP leaders,
  - between the ACCORD PM and the DEODE Lead Scientific & Technical Coordinators;
  - Upon proposal by the ACCORD/PM and the DEODE/Lead Coordinator, dedicated cross MG/MT meetings could be arranged to discuss specific items of mutual concern or of joint interest. The ACCORD PM could report back to STAC on the outcome.

## **3. on the roadmap and white paper:**

- STAC expresses its support to the roadmap and to the white paper.
- STAC recommends the MG to report on the progress with the roadmap, taking into account the opportunities arising from DEODE.
- STAC encourages the MG to continue to work along the lines outlined in the roadmap and the white paper, and continue implementing the current proposals.
- STAC recommends the MG to regularly revisit the conclusions of the white paper and re-evaluate the current border of R2O and O2R taking into account the future evolution, needs and new opportunities of the consortium.
- STAC will follow the progress on the white paper proposals in its next meetings.

## **4. on the outcome of WG-interopability in physics:**

- STAC recommends to make more explicit in the roadmap and the ToR of the Physics AL position, the importance of taking into account the stochastic aspects of physics processes and the link of physics parametrizations with ensemble prediction and ensemble assimilation.

- STAC expresses its support to the “roadmap for Physics interoperability” and recommends the Assembly to approve the roadmap.
- STAC recommends to make explicit the need for the Physics AL to coordinate the work on stochastic aspects with the EPS AL.
- STAC recommends the Assembly to also approve the text of the Call and the ToR of the Physics Area Leader position, and to open the position (assuming that the roadmap is accepted beforehand).

**5. on RWP2023:**

- STAC reviewed the draft RWP2023. STAC recommends the Assembly to adopt the RWP2023.
- Regarding the LAM spectral transform codes:
  - on the basis of the scientific and technical considerations, STAC recommends the Assembly to discuss and approve an open source licensing of the LAM spectral transform codes shared in ACCORD;
  - STAC notices that the open source licensing for the global transforms is APACHE-2.