

This document contains 3 parts : the minutes of the meeting held on April 4, the minutes of the wrap-up meeting held on April 8 and the list of the main actions decided during these meetings (with responsible people).

Minutes of the HMG/CSSI meeting, Norrköping, April 4, 2011

List of participants :

Ulf Andrae, Pierre Bénard, Alex Deckmyn, Tilly Driesenaar, Ryad El Khatib, Claude Fischer, Mariano Hortal, Trond Iversen, Marek Jerczynski, Dijana Klaric, Magnus Lindskog, Jean-Antoine Maziejewski, Jeanette Onvlee, Patricia Pottier, Laura Rontu, Piet Termonia, Alena Trojakova, Filip Vana, Xiaohua Yang

1. Review of actions decided during Krakow HMG-CSSII meeting

Due to last year rather chaotic end of the Krakow meeting and to other priorities in both consortia during the second semester of 2011 (new MoUs, new HIRLAM MG, new ALADIN PM, ..), no official minutes of the Krakow HMG/CSSI meeting have been written. Thus, no formal review this year.

2. Status of ongoing activities

a. Data assimilation

- i. Common work and plans on upper air data assimilation algorithms: 3D-VAR in RUC mode, 4D-VAR, development of hybrid techniques
- ii. Observation pre-processing and impact studies; Radar assimilation, quality control, data exchange; steps towards BUFR2ODB data handling
- iii. Surface assimilation; lake assimilation, future spatialization tool

Points i. ii. iii.

Magnus presents the major issues HIRLAM is working on : focus on 3DVar system (making it operational, including satellite and radar data for high resolution, more frequent data cycling); longer perspectives on 4D-Var, ETKF approach; on surface DA, HIRLAM has faced and solved issues when interfacing SURFEX (snow synchronization); long-term use of ODB.

HIRLAM will work towards applying BUFR2ODB in HARMONIE..

Claude gives the contact point for coordination of BUFR2ODB actions ODB in Toulouse (Florence Rabier).

Jeanette adds that the radar assimilation is another point where close contacts are needed with Météo-France (exchanges of information and tools for quality control and pretreatment of radar data).

HIRLAM will not wait any more for OPERA to do the quality control job and will implement a radar pre-processor.

LACE is installing data assimilation. On the radar part, there are some progress towards the methods but not so much operational practice. LACE will choose between HIRLAM and MF tools. Magnus has agreed with Tomislav to implement a common radar data pre-processor and verification tool (CONGRAD).

'Magnus proposed to investigate whether HIRLAM support is needed for CANARI surface data assimilation developments

planned by Météo-France/SMHI within the external EU project EURO4M → to be discussed during this week with Eric Bazile and Jean-François Mahfouf.

On 4D-Var, HIRLAM is the main investigator.; Météo-France has some research activities on high frequency assimilation with AROME (Pierre Brousseau). LACE has made tests for rapid cycling. Magnus announces a working week on 4D-Var for the autumn and another working week on radar data in late autumn (depending on how HIRLAM's radar data work progresses).

Jeanette raises the point of how to take into account impact studies ?

Claude indicates Patrick Moll's work on re-addressing the quality control code and blacklisting for GPS ZTD data.

Dijana adds that LACE also works on GPS data.

Claude raises **the connection between the variational code and the OOPS project**. There will be changes in the B-matrices and elsewhere in the VAR code. This has an impact on scientific developments which will have to be sometimes re-phased before committing to the future common IFS/AAAAH cycles (eg: heterogeneous B matrices, hybrid VAR-LETKF).

Magnus agrees that people working on data assimilation should keep in close contact with what is done in OOPS : on HIRLAM side, Mariano, Nils and Magnus, Thilbaut Montmerle for Météo-France, and Gergely for LACE.

Claude indicates that OOPS documents and minutes of discussions are available on the aladin web : <http://www.cnrm.meteo.fr/aladin/spip.php?rubrique57> .

In summary, the priority to-do list is considered :

- **to have close interactions and to share experience on radar assimilation quality control**
- **to develop : BUFR to ODB**
- **to keep in mind and anticipate in order to avoid double work the effect on OOPS on the algorithmic side (hybrid B-matrix approach , VAR/LETKF,).**

SURFEX : Piet presents his last 3 month work on SURFEX coordination: the replacement of the old ISBA by SURFEX will be discussed at the next PAC; besides this, a SURFEX governance will be implemented,

b. Predictability

i. GLAMEPS and LAEF status and developments

GLAMEPS is now monitored at ECMWF and Trond presents the major axes for the next five years of developments : a new evaluation of GLAMEPS after increasing the resolution; a slight extension of the domain; runs until 60 hour range on a base time at 06 and 18 instead of 00 and 12. The switch to CY37 is planned.

The problem encountered with verification of probabilistic forecasting is raised. Besides KNMI forecasters evaluation (estimated through a survey), a 3 month verification will be made with the Spanish verification package to get relatively stable statistics. An extended logistic regression is developed to have local scores at lower costs.

Various methods for further improving GLAMEPS are planned: to mix a few high resolution members into the ensemble; to compare ETKF hybrid with Ensemble DA hybrid initial perturbations; some developments on singular vectors based on CAPE, ...

Alex presents the LAEF system : LAEF is comparable to GLAMEPS but with a smaller ensemble size and a domain situated more south-east with a similar resolution. For some common work in future it is suggested to study how to merge outputs from both LAMEPS and work on some mixed probabilistic

products.

The possibility to combine LAEF and GLAMEPS should be discussed during this week and reassessed on Friday.

- ii. Development of convection-permitting EPS; outcome of DA/EPS workshop

Claude explains mid-term Météo-France plans : research work on how to develop the AROME-EPS system (assimilation component or not, preparation of some verification aspects, various choices of the initial condition and lateral boundary perturbations, implementation of model error component, ...) and the technical work to prepare the future operational implementation

Trond sees that HIRLAM has a very parallel planning and proposes to collaborate on this with Météo-France. HIRLAM has prepared a setup for HARMONIE EPS : discussions with ECMWF to provide EPS boundary conditions: multi-models physics; several levels of nesting; attempts to use 16 km ECMWF EPS to couple 2.5 km HARMONIE EPS; attempts to use not only stochastic physics but also multi-model physics; some more frequent analysis.

Jeanette asks if there is anything to be shared with Météo-France for the implementation.

Claude proposes to work rather on the verification aspects (methodology or results) as, for implementations and generation of initial conditions, we have different approaches and it would be thus difficult to share tools (but still interesting to compare results).

Alex will present during the workshop the outcome of the Bologna DA/EPS workshop : some countries (in COSMO and UK) have presented their operational LAM-EPS but with no new ideas, nor science; it's a practical approach that offers an opportunity for gathering data and experiences.

- iii. Cooperation between GLAMEPS and LAEF

Piet and Jeanette both consider that, as many people have created their own solution, we may learn from each other's experience and still try to provide some combined output products . Calibrating such combined output is quite a challenge. The technical issue (can we add robustness or will we add instability ?) remains.

We also should harmonize the post-processing and share some verification results. The exchange of verification tools could also be studied (Claude will check for Météo-France, Xiaohua is considering Alex's tool and the HIRLAM one).

After this week's discussions, we will revisit our possible HIRLAM/ALADIN common activity on the following points :

- GLAMEPS : which products ?
- all ensembles : issues of further exchanges around verification and calibration
- how to further combine GLAMEPS and LAEF ? maybe first for upper-air parameters (easier and with some added economical values) ?
- harmonization of post-processing of LAEF and GLAMEPS

c. System aspects

- i. Phasing and maintenance; plans for 2011,2012

Claude gives info about CY37T1 phasing : with some 3000 routines modified (research developments, Karim Yessad code cleaning, ALARO physics, semi-Lagrangien aspects, Mariano works on E-zone treatment, SURFEX modification on AROME, Sami's modifications, ...) this pre-phasing represents a similar amount of work than a full-phasing with ECMWF. This huge source code merging is still under validation. It also needs a huge coordination work between GMAP, GCO (Météo-France people for operations), HIRLAM people on short visit in Toulouse (training on clearcase and phasing), ALADIN

phasers in Toulouse for 6 week stays (or twice 3 weeks), some HIRLAM remote phasing, ...Some contributions had to be rejected because of coding problems.

A discussion about general aspects of the coordination of software and phasing between MF/ALADIN and HIRLAM took place.

The main disagreement remains on the duration of the phasing visits : according to Claude, regular visits to Toulouse should not be shorter than 3 weeks and ALADIN experience shows that when we have 2 or 3 big contributions, we do need some people to be working close together for more than 1 week whereas most HIRLAM people are reluctant to come to Toulouse for more than 2 weeks. For very specific and complex contributions, a dedicated (more or less short) visit to Toulouse or to an ALADIN partner team can be very useful. The problem of potential contradiction between HIRLAM contributions and ECMWF releases has not yet been addressed either.

Furthermore, we have learned from this phasing that we do need more upstream coordination. Ulf underlines the important role of the HIRLAM person responsible for each phasing : the HIRLAM “correspondents” should also take care of the coordination of the remote phasing, realized by HIRLAM people “at home”, after their visit in Toulouse.

Claude proposes to settle a common MF/Aladin/Hirlam coordination teleconf about 2-3 months ahead of a target cycle “T” at MF for spotting potential code conflicts and have time to get back to the scientists.

Piet also insists on Surfex governance and its role on channelling and coordinating Surfex code evolutions and the link with the NWP libraries.

- ii. Code optimization and benchmarking; how to benefit from each other’s activities?

Ryad regrets that not so many centres contribute to benchmarking and code optimization : Sami and Ryad's modsets have been merged into 37T1; SURFEX for openMP has been added; last RAPS exercise was used by Norway, Austria. According to last year's discussions, we were supposed to also work on some optimizations.

Jeanette proposes to create a benchmark code with a test code for each new cycle as, every year, some partners are interested in benchmarking for a new machine.

RAPS could be used for that but, in that case, its scope should be extended.

RAPS extension and optimization work plan (what to optimize and how to share the tasks within HIRLAM/ALADIN) should be also defined; the scalability and the possibility of HPC shouldn't be missed → to be discussed during the system working group session and reassessed on Friday.

- iii. Format issues

The format issues is somehow related to optimization issues. HIRLAM expressed its wish to adopt GRIB2. Ryad reported that in the scope of a IO server in the model, a common raw data format may be the best choice for performance, and then tools to convert it toward any other format could be developed. → cf. interoperability discussion.

- iv. Visualization and verification; Tools, systematic model inter-comparisons, joint monitoring activities

Jeanette notes that there is a lot we should do there.

Marek presents the ROC methods developed in Poland and expected to be in quasi-operational use for the autumn. At the same time, some ALADIN flat-rate stays will be organized in Slovenia around the improvement (2D-verification, precipitations, clouds, ...) of the Slovenian verification data base.

Dijana reports about the request by LACE directors for a closer work with forecasters in terms of verification and post-processing products for high-resolution.

At HIRLAM, the necessity for more post-processing, visualization and verification tools has also been

questioned many times. Claude remarks that this is a quite wide topic to cooperate on ... Jeanette underlines that, for years, these things have been considered as important but not enough to dedicate manpower to it.

The opportunity for a joint ALADIN/HIRLAM Task Force (new possibility offered by our new MoUs) is raised together with its membership and coordinator → to be discussed on Friday.

v. OOPS

Mariano explains his (bad) experiment with the toy model, due to many technical requirements (requires the most recent versions of the IBM compiler, ...) and the new knowledge (C++, oriented object spirit, ..) needed to be able to run the toy model. The readability of the toy model is also questioned.

Claude says that, on the side of IFS Fortran, the code cleaning has started in a bottom-up approach (see Deborah's presentation for practical examples in the global model); the other aspect of OOPS is the principle of object-oriented coding and analysis, for which our knowledge is quite low. The use of C++ is a matter of discussion between Météo-France and ECMWF : C++ programming language is pretty different from Fortran coding.

Piet underlines the fact that it will be a big investment for us and it would be all the more difficult as we don't see any interest. The original motivation was given by the facilitation of the developments in 4Dvar. It would be useful to make that more clear and identify other areas where an object-oriented approach may be beneficial.

Claude reminds that the 3D-VAR prototype under development at ECMWF is part of the feasibility study of OOPS for IFS/ARPEGE. The prototype could be extended to the LAM case.

Claude indicates that OOPS will remain a permanent item on the agenda of the next MF/ECMWF technical coordination meetings and Ulf asks for some HIRLAM representatives to be part of these meetings, as a mean for the LAM community to get more involved in OOPS. **The participation of some representatives of the LAM community (ALADIN/HIRLAM) to these meetings is to be discussed within Météo-France/ECMWF.**

vi. SRNWP Interoperability programme

Jeanette and Piet share the same opinion : **to finish what was promised in SRNWP-I phase I** (upper-air convertors) and to be very careful about any further commitments. The problematic of convertors for surface fields and reservoirs is expected to be much more complicated. **There is no special wish nor interest for an extension of the interoperability programme through a phase II if extra deliverables (with respect to phase I) are asked.** It is preferred to agree internally within HARMONIE on the convectors we need and to develop them without the constraints of an EUMETNET programme that offers few advantages in return.

vii. SRNWP Verification programme

Marek explains the recent developments on his weighted median filters for field comparison and the next steps. The results are quite promising and the next stage is to have a proper robust treatment of irregular grids.

Dijana reports on the SRNWP verification mini-workshop held last November. LACE will enter the verification system as the 5th reference model; the proposed prototype (based on the MetOffice system) is not sufficient for directors nor for scientists; new scores are needed for the high resolution models; another workshop should take place in June (?). Dijana regrets that both official minutes and the announced database access are still missing.

Dijana, Piet and Jeanette are reluctant to support another SRNWM-V after 2012.

The idea of an ALADIN/HIRLAM Task Force on verification is reinforced by this conclusion.

d. Model physics and dynamics

- i. Dynamics: Nesting strategies, extension zone and Boyd solution treatment, NH-VFE, ...

Nesting strategies :

Mariano's tests have shown that 1 hour coupling isn't better than 3 hour coupling. Piet confirms that research work in ALADIN has shown that no impact should be expected unless a 20 minute frequency is used, for a strong cyclone case. Piet explains that ALADIN chooses to develop a technique based on the detection of boundary errors and restarts by means of grid-point nudging, instead of asking for 1 hour boundary files, since it seems not feasible to provide ARPEGE 1-h coupling files to all ALADIN countries in an operational manner.

The utility of the LBC project demand to ECMWF for 1 hour coupling file is questioned.

Changes in the extension zone treatment and Boyd solution treatment :

Mariano summarizes the changes that have been phased into CY37 (details may be found when looking at the modified routines but Claude would like a more extensive documentation). Meanwhile, some scientific work on Boyd is being finished in Brussels. Mariano explains that the main advantage of implementing Boyd is saving communication. The compatibility of Mariano's already phased contribution, his on-going developments and the developments in Brussels should be assessed : **more coordination is needed : to be discussed by Piet, Daan, Steven and Mariano during the week and to be considered during Friday wrap-up meeting along with the calendar of the next phasings.**

NH-VFE :

NH-VFE in z-coordinate is currently being coded in HARMONIE (by Juan Simarro). Pierre fears that it would touch most parts of the models' code and would imply many changes. Mariano explains that the structure will remain the same but agrees that the most sensible part will be the physics-dynamics interface where we can either more inter-cooperate or clash. Filip reminds that LACE hasn't given up NH-VFE in p- coordinate (the work is only postponed due to the lack of available persons).

- ii. Upper air physics:
 - a. Ongoing activities and new developments: Validation and development of mesoscale physics parametrizations; COST ES0905; stable (winter) conditions behaviour; aerosol treatment and chemistry.

As ARPEGE and AROME physics will be otherwise presented during the workshop, Filip only summarizes for HMG/CSSI the activities around the 3rd physics available in the ALADIN consortium, the ALARO physics : the TOUCANS scheme was phased in CY37T1, the next efforts will be put on radiation scheme and on cloudiness scheme.

Laura details the HIRLAM work on radiation schemes : implementation of different schemes (HIRLAM, ECMWF, ARPEGE/ALADIN/AROME, ..) in HARMONIE in order to intercompare them for a better understanding of their complexity (frequency of calls, impact on performance of forecast, numerical cost), the frequency of calls, the interactions with aerosols. **Chemistry people in some HIRLAM countries (Dk, Fi, Ir) wish an increased collaboration with the other chemistry teams in the ALADIN/HIRLAM community** (ie with Météo-France chemistry people).

To enhance the evaluation of model performance, the need for more cooperation around the installation of the 1D model and the DDH tools is underlined : a **working week** could be organized in Helsinki at the end of October (maybe not necessary, depending on the venue of an ECMWF seminar on this topic in November). These tools indeed offer a better understanding of targeted topics, like the stable surface boundary layers.

b. Convergence of interfacing and cross-use of parametrization schemes

Piet indicates that, according to GA15 decision, 3MT will be tested in global ARPEGE (ALARO partners together with GMAP scientists); a new working group of 6 persons is preparing the next steps and the relevant calendar of the convergence within the ALADIN consortium.

Piet reports on Daan Degrauwe' s work on CPTEND_FLEX.

Filip gives the example of the successful collaboration between ECMWF/ALADIN/HIRLAM on cellular automata : Lisa from SMHI has implemented into ALARO the code originally developed by ECMWF (but never implemented); once vectorized by Filip, this code is now committed to CY37T1 for a cross-check with ECMWF.

iii. Surface modelling: SURFEX/ALARO, MEB scheme, snow parametrizations, ...

Piet recalls the organisation and the aims of the COSP working week on SURFEX in **Brussels** (see point 2.a “data assimilation”).

Laura indicates that the status of the quite important on-going work on SURFEX realized in the HIRLAM framework can be consulted on the HIRLAM webpage : one important point remains the description of the orography itself.

iv. LAM-Climate developments

As LAM-climate developments exist within ALADIN and HIRLAM countries with very similar activities, Jeanette underlines the fact that more bilateral exchanges between people in charge could avoid to waste time when repeating the same work.

Piet agrees as far as our role remains limited to the personal level of scientists. The organization of more formal exchanges or coordination is up to the climate group.

Draft minutes of the HMG/CSSI wrap-up meeting, Norrköping, April 8, 2011

3. Institutional matters / longer-term strategic planning

Strategic workshop

Piet and Jeanette propose as outcome of the strategic workshop the update of the HIRLAM and ALADIN 10 year strategy plans (and the 4 year plans) in order to have a common strategy for the MoUs duration and not only common annual workplans.

The Brac workshop was focused on model aspects and its controversial issue has now been addressed by the “group of 4” : their consensual document will be presented in PAC and HAC and won't be re-discussed at the next strategic workshop. The scope of this strategic workshop will be extended to DA, LAMEPS and other aspects in dynamics, physics than those discussed in Brac.

It is proposed that the ALADIN and HIRLAM strategic documents will be updated separately and

presented to PAC and HAC (with no obligation to reach twin ALADIN-HIRLAM documents).

Jeanette and Piet will propose an adapted format of the strategic workshop (possibly, 1st part with experts and 2nd part with heads of research and/or HAC members). Laura will find an easily accessible location in Finland to host this workshop next September.

4. AOB

Claude warns the ALADIN/HIRLAM community of not being too ambitious : we should take care to keep our common workshops and workplans manageable and be careful when adding new activities.

Actions list

who	what
Magnus, Claude	Keep close track about radar assimilation developments (exchanges of information and tools for quality control and pretreatment of radar data). At MF, further contacts on radar topics will be Thibaut, Eric W. and J.F. Mahfouf
Magnus, Claude, Gergely	Impact studies, investigate other ways of impact assessment. Working week in autumn, also include radar obs and ground-level GPS
JF Mahfouf, Magnus	Cooperation with OPERA, meeting before summer
Magnus, Claude	BUFR to ODB: keep close track of developments, cooperation with ECMWF, contact point at Meteo-France Florence Rabier. Sami Saarinen, Magnus from HIRLAM, Roger, Alena for LACE. Sami Saarinen continues feasibility study, informs everyone within few weeks, starts discussion. Magnus informs Sami.
Ulf, Claude	Let relevant staff keep close track of OOPS developments. For HIRLAM: Ulf, Mariano, Nils. ALADIN: Thibaut, Gergely. Decide whether to wait or prepare to adapt. Ulf observer at IFS/Arpege meetings (27 June), teleconfs. Technical documentation is on the ALADIN website: http://www.cnrm.meteo.fr/aladin/spip.php?rubrique57
Jeanette	send report about KNMI forecasters experiences with GLAMEPS as soon as it is available to GLAMEPS people, Yong Wang for LAEF
Trond, Yong, Alex	What sort of products are wanted from EPS? Create product list, products and archiving (in MARS). Harmonise between GLAMEPS and LAEF
Claude and Trond	Look for ways to share efforts in high resolution EPS. Claude talks to M-F and sends around the information on contact persons and first feedbacks.
Alex, Yong, Trond	Cooperation GLAMEPS and LAEF: start to create plans for cooperation on post-processing. Consider a common post-processing domain. Look at possibilities to share verification results and methods

Alex, Geert	How to combine GLAMEPS and LAEF? First action by Alex and Geert, feed back to Yong and Trond.
Piet, Mariano	Discussion about work on Boyd's solution. Mariano will work on it together with Daan and Steven in Brussels. Check whether current developments are in line with each other and coordinate further work. Take up with extension zone treatment. Prepare for next phasing.
Laura, Claude	Arrange contact of Chemistry people of HIRLAM (esp. Dk, Fi, Ir) and ALADIN (ie Météo-France)
Laura, Filip, Ulf	Organisation of working week in November about the installation of the 1D-model MUSC and the DDH tools
Claude, Ulf	Organize coordination meeting to prepare contribution and cooperation towards a phasing. Wrap-up discussion of C37T1 → 3 months ahead of target cycle
Ryad, Ulf	Start with workplan for optimisation. List of tasks that needs to be done, not who is doing this. Extension of RAPS.
Piet, Jeanette	How to strengthen the efforts on code optimisation? (Potential LTM action)
Ryad, Ulf	Start discussion on format issues, how to deal with all data needed in the model.
Piet, Jeanette Dijana Claude Xiaohua	Set up task force for verification. First the subgroup makes preparations for the taskforce. Find leader plus team which may also include people from academia. Possible candidates within the ALADIN/HIRLAM members of the SRNWP expert team for verification ?
Xiaohua, Dijana	Post-processing: What is available and what is wanted as end products for users (focus internal users at institutes). Start with inventory and end up with recommendations.
Piet, Jeanette, main Expert Team rep.	SRNWP_I and V phase I: Finish promised work, no continuation in phase II. Inform roadmap taskforce.