

# Minutes of the HMG-CSSI meeting, Bucharest, April 11, 2014

## List of participants :

*Jelena Bojarova, Alex Deckmyn, Daan Degrauwe, Maria Derkova, Tilly Driesenaar, Inger-Lise Frogner, Ryad El Khatib, Claude Fischer, Mariano Hortal, Jean-François Mahfouf, Jeanette Onvlee, Patricia Pottier, Laura Rontu, Piet Termonia, Alena Trojakova, Xiaohua Yang, Yong Wang, Christoph Zingerle*

**Web-participant :** *Pierre Bénard (by Skype during point 2.e),*

**Excused :** *Ulf Andrae*

The CSSI chair (Claude Fischer, CF) accepts to act as chair for this meeting, and proposes the adoption of the agenda below. No A.O.B. is proposed and the agenda is unanimously adopted.

- 1. Review of actions agreed on in the Reykjavik HMG-CSSI meeting**
- 2. Ongoing/planned activities**
  - a. System aspects
    - i. Phasing and maintenance; Progress and plans 2013-2015
    - ii. Scalability, code optimization, ECMWF workshop
  - b. Verification and validation
    - i. HARP
    - ii. Follow-up from Turkey (Cy38) WW
  - c. Predictability
    - i. GLAMEPS and LAEF status and developments
    - ii. Convection-permitting EPS; SRNWP/EPS
  - d. Data assimilation
    - i. Algorithmic developments; OOPS
    - ii. Observation pre-processing and impact studies; COPE; outcome radar WG
    - iii. SODA status and future developments (outcome surface DA WG)
  - e. Model physics and dynamics
    - i. Dynamics
    - ii. Upper air physics :
      - a. New physics-dynamics interface; cross-use of parametrization schemes and radiation inter-comparison.
      - b. ALARO-1
      - c. convection and turbulence; fog and stable BL experimentation; COST ES0905 and follow-up;
      - d. microphysics and aerosol/chemistry
    - iii. Surface modelling: issues from Surfex SC
- 3. Organizational issues**
  - a. Report on past HIRLAM/ALADIN convergence issues during past meetings
  - b. Organization of common meetings
- 4. Options/initiatives for external funding: Horizon2020, ...?**
- 5. A.O.B**

## 1. Review of actions agreed on in the Reykjavik HMG-CSSI meeting

Patricia has prepared a googledocs where HMG/CSSI members have filled the status of the 2013 actions. This status is discussed.

Who	PLANNED in MAY 2013	STATUS in APRIL 2014
<b>Verification</b>		
Christoph, Joao, Xiaohua	Post-processing: What is available and what is wanted as end products for users (focus internal users at institutes). Proceed with Joao's inquiry and end up with recommendations.	Monthly reports from Ljubljana tool are under construction. Portfolio started. <b>To be followed this year.</b>
Christoph	Announce first version of HARP when ready	Not finished, good progress during working week. <b>Action kept for 2014.</b>
<b>EPS</b>		
Alex	Move GLAMEPS from HIRLAM to HIRALD user group	Done : All HIRALD members are automatic members of GLAMEPS. Claude is MF contact point. <b>Action closed.</b>
Alex, Yong Wang	Cooperation GLAMEPS and LAEF: Alex and Theresa will check for a common domain, perform experiments and try to make some basic products to begin with (EPSgrams, ...)	Not happened in the past year. Hopefully in 2014. <b>Action kept opened.</b>
Alex, Inger-Lise	set up a transverse collaboration on convective-scale EPS (HarmonEPS, AROME-EPS) including contact with Francois Bouttier	<b>Action done:</b> contact between HarmoEPS and MF (François Bouttier); closer contact between HarmonEPS, LACE and Belgium people.
<b>Data Assimilation and Observations</b>		
Alena	Join COPE meetings for ALADIN to have wide LAM commitment	Not so many COPE video-conferences were organised in 2013. <b>Important to be kept for 2014.</b>
Jelena, Piet	Jelena will send Claude and Mariska information about the OOPS training end of May 2013; Piet asks Mariska to coordinate participation from ALADIN.	Postponed but <b>done.</b> Piet reminds that the ALADIN budget can support missions but they must be decided before February.
Piet, Jeanette, Jelena and Claude	Improve cooperation between HIRLAM and MF on data assimilation	<b>Done.</b> Action hard to evaluate but <b>closed.</b>
Alex	Draft plan for transversal issues linking data assimilation, physics and predictability, circulate and organize video-conference (WebEx) to discuss the plans, before the June Wk in Madrid. Alex will coordinate ; other people involved are Jose Antonio, Inger-Lise, Lisa, Alex, Radmila or Neva (Yong Wang will provide a name for the LACE contact)	Not done. <b>Action closed.</b> New actions will be defined for 2014.

Jeanette, Roger	Prepare the minutes of the WG on transversal issues held during ASM/Wk 2013	Done. Action closed.
<b>System</b>		
Laura, JF Mahfouf	Contact between Mariken Homleid (via Laura Rontu) and Patrick Le Moigne (via Jean-François) to discuss the precise steps of the commitment of the ICE tile in SURFEX (necessary to implement the simple ice model).	Coordination done and work completed in common. See web document : <a href="https://hirlam.org/trac/wiki/SURFEX-ice">https://hirlam.org/trac/wiki/SURFEX-ice</a> . Done. Action closed.
Ulf	Ulf will create a VAR-toy for technical pre-validation of components of the assimilation.	Not done but still important. Action kept for 2014.
Ulf	Ulf will help Marco Kupiainen familiarizing with the HARMONIE code (to study numerical consequences associated with increasing resolutions). Marco and Daan should keep in touch and Fabrice and Pierre Bénard can be involved in the discussions.	Marco will visit Brussels on week 16 to discuss dynamics further with Piet, Daan, Mariano and Fabrice. He's currently looking at boundary problems and more fundamental properties of the spectral formulation. Action closed.
<b>Dynamics</b>		
Pierre	Pierre will communicate to ALADIN and HIRLAM PMs the result of the phase 2 submission of PRACE	Submission rejected. Action closed.
Mariano, Daan	Daan will finish testing the code of the Extension zone treatment, as implemented by him and Mariano. Provide documentation as requested by Claude	Mariano has still to finish part of documentation. The rest was done. Implementation to be studied. Action still open.
<b>Physics</b>		
	Get the Eumetchem (EnviroHirlam in Denmark) people in contact with the MesoNH and MF climate people, e.g. at the common workshop in Toulouse (Sept 26-27).	Done. Meeting took place. Action to be continued.
JF Mahfouf and C Fischer	Organise a visio-conference between the various people involved in order to redefine a common strategy for surface assimilation in SURFEX.	Done and note written by Jean-François. Action closed.
<b>Transversal issue : sub-km experimentation</b>		
Laura, Claude	Start a living community on sub-km applications. First step: identify people and ask people to write 2-3 pages to describe purpose, application and encountered difficulties. Then organize video-conference or email exchange, possibly followed by specific working days. Mariska will coordinate for ALADIN.	List of contacts created and used; video-conference organised by Laura and data summarised in a table (Petra's work). <a href="https://hirlam.org/trac/wiki/VeryFineResolution">https://hirlam.org/trac/wiki/VeryFineResolution</a> Done. Action closed.
<b>A.O.B.</b>		
Piet, Jeanette	Meeting about update of rolling plan with video-conferencing (end of 2013, wrap-up for 2014)	Done without video-conferencing. Action closed.
Patricia, Jeanette	Send around agenda and action list for HMG/CSSI meeting at least two weeks in advance	Done. Successfully closed.

## 2. Ongoing/planned activities

### a. System aspects

#### i. Phasing and maintenance; Progress and plans 2013-2015

Claude recalls some technical aspects of the last cycles and the calendar for the next cycles. *This information is appended to the present Minutes for completeness.* It is reminded that ALADIN and HIRLAM are represented at the coordination meetings with ECMWF (Ulf for HIRLAM and Piet or Daan for ALADIN). The IFS/Arpège coordination meeting is the place where possible interferences between the many contributions are discussed together and possible coding actions with scientists/developers involved are decided. The time table of the cycles is addressed as well. For the forthcoming cycles CY41 and CY42, Claude stresses that more OOPS-related re-factoring of the Fortran code is to be expected.

The minutes of these coordination meetings are available on the ALADIN website (once logged in as “Partners only”, with the usual access) <http://www.cnrm.meteo.fr/aladin/spip.php?article170>. Claude emphasizes people to take into account the calendar of the cycles when planning scientific or technical developments. Action : distribute the link to the page with the minutes of the coordination meetings.

Xiaohua mentioned HIRLAM was starting implementing CY40T1 in Harmonie. Could this become a ground for common HIRLAM/ALADIN work ? Piet stressed that such common effort of early new code implementation and testing was not yet possible, as first we need to converge on possible common validation tools. The next step for ALADIN will be to further evaluate the Harmonie scripting tools and implement there specific ALADIN needs. This work will take place at the next ALADIN/Harmonie system working week, to take place in October in Bratislava. The code version there will still be CY38T1. Further merge of common technical activities will be addressed at the end of the Bratislava WW.

Part of this discussion was already held during the System WG, and Mariska will send the minutes of that WG discussion to HMG/CSSI when ready. Action.

#### ii. Scalability, code optimization, ECMWF workshop

Scalability will be dealt with during the scalability workshop at ECMWF next week. Scalability includes OOPS, porting to MPP/ManyCore computer aspects, dynamic kernel brainstorming and a project about adapting the IT surrounds of an NWP center.

About code optimisation, the work of Rymvidas impacts the code very transversally, thus had to be coordinated including the IFS coordinator. This very wide transversal coordination was done for CY41. Ulf is requested to contact Ryad and Claude about Rymvidas' work on optimization in order to evaluate to which extend it may affect the code.

### b. Verification and validation

#### i. Follow-up from Turkey (Cy38) WW

The minutes of the working week have been circulating and should be put on the ALADIN web.

Mariska summarizes the discussion of the WG on technical issues (see report on the ALADIN web-page):

- After Roger's proposal for a market of tools, it's recommended that Roger starts a repository with documentation.
- On the issue of common testing and validation of new cycles, it's recommended that Roger starts an inventory of ways of technical and scientific validation by the institutes. It will be helpful if logs and configuration files can be made more widely available. The LACE forum could be used to exchange the information.
- A HARMONIE System workshop will be held in Bratislava, second half of October : test of HARMONIE as a platform to see how ALADIN and HIRLAM can do more efficiently validation together.

## ii. HARP

The HARP team is still working on the code cleaning, the documentation, installation instructions and the development of the R-shiny interface. Within the 3 complementary tools in the consortia (APMT, HARP, HIRLAM verification system), HARP is expected to overtake the HIRLAM verification tool in the long term.

The EPS part should be installed in HARP (cf ECMWF developments): Alex and Xiaohua. Xiaohua and Christoph will advertise the new release of HARP.

## c. Predictability

### i. GLAMEPS and LAEF status and developments

See actions list.

### ii. Convection-permitting EPS; SRNWP/EPS

Not everybody focusses on the same priorities and with the same time table (LAEF is still focussing on 5km scale, ALADIN/ HIRLAM is finalizing version 2 of GLAMEPS and aims at convection permitting EPS). Yet, to trigger more common efforts, extra funding would be very welcome in order to increase manpower. Different proposals are either already on the table or could be investigated (COST action about the link of stochastic aspects with physics, the SRNWP proposal on EPS, brainstorm on a proposal for H2020 or other European programmes) but should not become competitive. Yong mentioned that ZAMG had experience with preparing proposals such as H2020 and offered that ZAMG could help with advice, should a proposal be envisaged. Also, more frequent exchange of information about each partners' convection-permitting EPS work would be welcome. Finally, next year's plans are to be written in the rolling work plan after contact between Alex, Theresa, Inger-Lise and François Bouttier.

For addressing all these aspects of the collaboration (i.e. funding schemes, exchange of information and RWP update), tele- or video-conferencing should be investigated. The whole is an action !

## d. Data assimilation

### i. Algorithmic developments; OOPS

Jelena considers collaboration is going on as well as it can and thanks Claude for his support. Her aims for 2014 are to make available 3D-Var and later hybrid 3D-Var/ETKF in the OOPS framework, and later to add 4D-Var and 4D-EnVar. She would like to know about the future OOPS developments in greater detail in order to fit her codes in the common interface.

As code implementations are topics of the technical video-conferences held between all code partners, Claude proposes to add from time to time the LAM point of perspective on their agenda (note: a check with ECMWF is necessary first). It could be good that then both Ulf and Jelena can attend. A technical input can be prepared in view of the discussion on any specific item, while a comprehensive scientific debate should be avoided.

Jelena recalls the objectives of HIRLAM in the long run: Arome-based 4D-VAR, ETKF, implementation of Jk term, be able to apply SQRT(B). Jelena further mentions that there is no I/O scheme coded for handling ensemble members in the Fortran IFS layer, which is confirmed by Claude. For observation operators, Jelena stresses that going from interpolation towards more integration for the horizontal and vertical transforms between obs and model grid spaces, will become an increasing matter of interest as resolution of the analysis grid increases. Furthermore, we should exchange experiences on data assimilation using new types of observations (dual-pol radar, GNSS slant delays, use of VarBC). Action: keep this item for next year's HMG/CSSI agenda, for a (formal or informal) wrap-up.

### ii. Observation pre-processing and impact studies; COPE; outcome radar WG

Jean-François summarises the discussion of the radar WG: number of ongoing developments; Martin Ridal will gather information on the variety of approaches for providing radar information, while Jean-François will provide a template for gathering the information of what quality controls already are done, their impact on data assimilation and what is provided to OPERA. It is also important to consider quality control alternatives (OPERA will not provide solutions quickly, and they are keen to use developments that are already available). The report of the radar working group meeting will be provided separately.

About COPE: ECMWF has invited MF, ALADIN and HIRLAM to resume the discussions about coordination and share of work. A meeting is planned in Toulouse in beginning of June (EC and MF) which will also be attended by Alena Trojakova for LACE and Jelena for HIRLAM. Mats Dahlbom and Eoin Whelan will go to ECMWF for training on COPE codes this spring.

### iii. SODA status and future developments (outcome surface DA WG)

The note written by Jean-François was discussed in the surface DA WG. A number of short-term actions were defined aiming to have convergence of several developments within the SODA framework (Trygve and Philippe Marguinaud, convergence EKF and SODA, lake data assimilation implementation in SURFEX; ...).

It was proposed to hold a workshop in 2015 to plan longer-term developments. The report on the SODA working group will be provided separately.

The SURFEX SC is an efficient platform for exchange of information and coordination of actions.

One specific technical outcome of the last SURFEX SC was that the off-line version of OI\_main was proposed for pruning. Before proceeding, all partners need to check who's still running this option. Action (reminder): Piet to check with all ALADIN LTM's and also with Christoph and Alex (for INCA surface analysis and LAM-EPS possible use). This is an action derived from the SSC.

Claude mentioned that MF (Claude, Françoise) and HIRLAM (Trygve, Ulf) probably should liaise in preparation of CY41T1, as there were some issues seen in part of the CANARI/OI\_main code for I/O as originally proposed for CY40T1 (and not yet implemented in a common cycle). Action !

Yong explains that ZAMG has set up agreements with several universities in order to use all kinds of satellite data for surface assimilation. Action: Yong to send web-link to the satellite surface data portal.

## e. Model physics and dynamics

### i. Dynamics

Pierre reports from Toulouse by Skype. He explains his work on the use of local schemes (of the HEVI-type) in order to solve scalability issues for LAM (collaboration between the Belgian and the French teams). The Spanish team works on the implementation of the finite elements discretization in the vertical in collaboration with LACE, as well as on improving the mass conserving properties of the SL scheme and a study on vertical nesting..

More collaboration on the implementation of transparent lateral boundary conditions will start after the meeting in Brussels later this month (Marko, Mariano, Belgian team, Fabrice). We need to follow the modularization of the dynamics for OOPS, for instance the strategy for boundary conditions.

Contrary to Petra's recommendations, Mariano would prefer not to use the predictor-corrector scheme because of the instability he found and the strange energy spectra he noticed at sub-km resolutions, all this in the top levels. Pierre pointed out that his own studies rather suggested that the P/C scheme is more stable. The test of a specific upper-bound relaxation was compared with an old work on a radiative upper-boundary condition (RUBC), which was however stopped in ALADIN years ago. Pierre will send a note on this topic (written by D. Dvorak) to Mariano and Petra.

Pierre, Mariano and Petra will further address this issue. Claude mentioned that Yann Seity would probably try to rerun one problematic situation studied by Mariano.

Mariano also recalled his work on spectral coupling and the filtering of surface pressure (option LGRADSP). Those features might soon become candidates for a common cycle, and liaison between Mariano and Daan should take place for preparing this contribution (=> action !).

## ii. Upper air physics

### a. New physics-dynamics interface; cross-use of parametrization schemes and radiation inter-comparison.

There is an intensive cooperation in place about the overhaul of the physics/dynamics interface. A number of Webex meetings have been held, led by Daan and Piet, in order to discuss the foreseen changes in view of CY40T1 in 2013/2014. There is now a common interface call ready for radiation, and a novel tendency routine CPTEND\_FLEX. The new version of the interface shall facilitate the inter-comparison work of radiation schemes undertaken by HIRLAM (information on Laura's wiki, ...). It is to a wide extent implemented in CY40T1.

The next step should concern further cleaning in APLPAR (this should be fairly feasible) and start an analysis of what can be done for turbulence/microphysics. The latter item is probably quite complex, and it remains essential that all parties agree on the evolution that can be suggested. It is mentioned that Radmila will start disentangling the microphysics in 3MT in ALARO. More work force will be sought to follow this topic. DMI might be interested.

Extra manpower will also be discussed during the ALARO-1 WW (Laura will attend).

### b. ALARO-1

So far, the baseline is ALARO-0 and the scientific validation of ALARO-1 should start soon (the next status and work plan shall be established at the WW in Vienna in May).

### c. convection and turbulence; fog and stable BL experimentation; COST ES0905 and follow-up;

Eric and Wim have initiated an informal meeting to discuss the necessity for coordination between all physics developments in the area of cloud and turbulence schemes. The report on this working group will be supplied separately. They will continue to exchange and try to converge towards common comparison and evaluation of test cases. The WG initiated here in Bucharest at the ASM should be kept alive by them for that purpose, as well.

The various scientific initiatives also can cause new code options to appear, such as a revival of the RACMO approach for closure of the turbulence. Piet and Daan confirmed that the code design for implementing this turbulence approach within the Aladin/Alaro/Arome codes would not be a difficult issue.

Laura explained that she considered TOUCANS as the most general framework for adapting turbulence schemes. She suggested to hold a workshop dedicated to turbulence issues in 1 or 2 years time, perhaps in Toulouse ? Piet answered that we should consider this in due time, but in terms of analysis of how turbulence could be best interfaced, much work indeed remains to be done. Daan would probably need help from extra staff for this topic, and work might not progress that quickly.

### d. microphysics and aerosol/chemistry

See list of actions.

## iv. Surface modelling: issues from Surfex SC

Jean-François reports on the last SURFEX SC : Surfex v8 will be released at the end of the year with many contributions (both scientific and more OOPS compliant, with a wish to reduce the cost of the code). Surfex v8 will enter a cycle 42Tx only in 2015.

Concern was raised about the efficiency of SURFEX code for NWP. Piet mentioned he was considering to search for a specific funding in order to trigger a technical effort for recoding some parts of SURFEX like PREP. Jeanette raised the issue of how to better identify the possible bottlenecks in terms of efficiency, when new codes are delivered to the SURFEX trunk from scientific communities that stand outside NWP.

The convergence of file formats is needed but not all preliminary questions have been addressed. For instance, to remove the LFI file format from the NWP/Surfex interface code (the "mse"-code), 3 issues

were raised during the system WG discussions: MUSC; necessity to test the FA/LFI converter; memory consumption. The follow-on of actions and the status will be discussed during the preparation of the contents of cy41T1.

Laura mentioned she saw the crucial link between SURFEX as a prognostic surface code, and the code for surface data assimilation, to become even more complex with time. This is because there is an increasing complexity on the side of representing surface properties and prognostic elements, while DA schemes remain simple in comparison.

Jeanette, Laura and Katya have submitted a proposal for a European cooperation on physiographic data : a questionnaire was sent and got positive answers from Cosmo, MetOffice and ALADIN/HIRLAM. The action should now be started (find experts, define actions, exchange of information). ALADIN/HIRLAM partners are indeed interested by higher resolution data (for instance Sentinel products). Partners should look out for available high resolution datasets and share information with the MF/GMME team.

### **3. Organizational issues**

#### **a. Report on past HIRLAM/ALADIN convergence issues during past meetings**

Piet reports on the ALADIN/HIRLAM convergence status after the 2013 meetings (recommendation of the 1st joint HAC/PAC, decisions of the ALADIN GA and HIRLAM Council, ...): two separate MoUs will be signed at the end of 2015, but the two consortia should focus on actions that bring convergence on system/maintenance to fruition. It is also recommended to look at ways that would facilitate at least some convergence at governance level, e.g. back-to-back meetings

A Task Force met in Brussels last March and made some proposals. The goal of CSSI is proposed to be more focused than in the past on system, maintenance and code design, in addition to scientific exchange. This reorientation might require some small adaptation in the definition of CSSI, but no drastic modification. The CSSI and HMG/CSSI discussions shall concentrate more on code design and implementation, while keeping scientific exchange alive. Claude suggests that HMG/CSSI members can react to this proposal and contact their PM's, preferably before the next common HAC/PAC (Lisbon, May 19, 2014).

#### **b. Organization of common meetings**

The last ALADIN General Assembly agreed on using ALADIN budget for funding the participation to HIRLAM or common ALADIN/HIRLAM meetings. Due to the constraints of its budgetary mechanism, the ALADIN PM asks to have a list of proposed meetings at the very beginning of the year.

### **4. Options/initiatives for external funding: Horizon2020, ...?**

We should explore external funding in mainly 2 contexts :

- scalability : how to make the code efficient for massive parallel machines. Contacts with IMEC (Leuven). Link with the Scalability Program at ECMWF.
- EPS : as there is not much funding to be expected from the SRNWP-EPS proposal for EUMETNET, Yong suggested that the EPS people consider to contact possible partners on a larger scale, not limited to NWP. Yong offered that ZAMG could help for building a wider proposal (suggest contacts, support for writing a EU proposal).

### **5. A.O.B**

As there is no A.O.B, the meeting is closed. Next meeting in Copenhagen on April 17, 2015.



## ANNEX 1: 2014 TO-DO LIST

<b>2014 Action list (as planned in April 2014)</b>	
Who	Action
<b>Verification</b>	
Christoph, Joao, Xiaohua	Post-processing: What is available and what is wanted as end products for users (focus internal users at institutes). ALADIN forecasters meeting, not yet fully defined but HIRLAM people welcome.
Xiaohua, Alex, Christoph	Implement EPS verification in HARP, and finalize and advertise the new release of HARP.
<b>Predictability</b>	
Alex, Theresa	Cooperation GLAMEPS and LAEF: Alex and Theresa will check for the definition of a possible common domain, and perform test experiments. In addition, they would try to prepare some basic common products to begin with (EPSgrams, ...)
Alex, Theresa	Estimation of the added value of combining GLAMEPS and LAEF
Alex, Theresa, Inger-Lise, François B.	For addressing all aspects of the collaboration (i.e. Funding schemes, exchange of information and RWP update), tele- or video-conferencing should be investigated and a common discussion take place.
<b>Data Assimilation and Observations</b>	
Alena	Join COPE meetings for ALADIN; keep in touch with JF Mahfouf and HIRLAM contacts.
Jean-François	Provide a template and the Météo-France information as an example of what should be shared with Martin Ridal, for his inventory of what should be provided to the OPERA inquiry.
Claude, Jelena	improve the exchange of information about the technical implementation of EnVar and/or LAM features in OOPS; possibly use the EC/MF/LAM technical video-conferences for exchange
Yong	Send information when the joint work with a group of Austrian universities on the use of satellite data for surface assimilation concretely begins. Send link to web-page for the satellite surface data portal.
Jean-François, Claude, Jelena	Exchange experiences about new types of observations (like GNSS, dual-polar radar, use of VarBC) and the trend from interpolation to integration for obs operators for very high resolution assimilation => item to be put on the agenda of the 2015 HMG/CSSI.
Claude, Françoise, Ulf, Trygve	liaise in preparation of CY41T1, on issues seen in part of the CANARI/OI_main code for I/O, as originally proposed for CY40T1 (and not yet implemented in a common cycle)
Martin Ridal, Jean-Francois	Send minutes of the radar and SODA WG discussions, respectively, to HMG/CSSI when ready
<b>System</b>	

Mariska	Send minutes of the System WG discussion to HMG/CSSI, when ready.
Ulf	Ulf will create a VAR-toy for technical pre-validation of components of the assimilation.
Roger, Olda	Roger should start a repository of ancillary user tools with documentation; Olda will study the possibility to exchange information through LACE forum
Ulf, Mariska, Piet, Olda, Claude ?	Test of HARMONIE as a platform to see how ALADIN and HIRLAM can do more efficient validation together (WW in Bratislava, October 2014)
Patricia	Make the Minutes of the Ankara WW available on the ALADIN website
Ulf, Claude	Within preparation of cy41t1, study the impact of removing the LFI format from the SURFEX/NWP interface ("mse") code: MUSC, test of FA/LFI converter, assess memory consumption
Ulf	to contact Ryad and Claude about Rymvidas' work on optimization in order to evaluate to which extend it may affect the code.
<b>Dynamics</b>	
Mariano, Daan	Propose a strategy for the implementation of the code of the spectral coupling solution in the new cycles. Mariano should finish the documentation.
Belgian team, Pierre, Fabrice, Mariano,	Follow the work of re-factoring the LBC code for OOPS (which is part of the LAM design)
Petra, Pierre, Mariano,	Address the issue : predictor-corrector versus single semi-implicit + upper-boundary condition (relaxation, RUBC, etc.). Pierre will send the note by David Dvorak, 1997: Radiative upper boundary (RUBC) in ALADIN.
<b>Physics</b>	
Laura, Bent, Yong	Enhance contacts between the Eumetchem people (EnviroHirlam in Denmark) and HARMONIE community: first steps (radiation) to be discussed in the next interface web-meeting (Denmark, date tbd) where Laura will present the use of our model by chemistry people; LACE will join and is interesting in being kept informed.
Laura, Neva	How to involve more people on turbulence and the analysis of a common interface block for turbulence : to be discussed during ALARO-1 WW
Eric, Wim	Follow the exchange initiated in Bucharest via web-conferences (exchange of information and cross-testing, inter-comparison with MUSC, enhance cooperation on KNMI test-bed). Send around minutes of physics WG to HMG/CSSI when ready. Exploratory research: where/how do we imagine to converge in terms of code design?
Jeanette, Laura, Katya, Jean-François	European cooperation on the physiographic data and physiographic data in SURFEX: follow the kick-off of this proposal and ensure link with SURFEX SC.
Piet, Jean-François	Check the needs of people outside MF in term of high-resolution physiographic data (Sentinel versus Ecoclimap); help exchange information between the MF/GMME team and the ALADIN/HIRLAM partners.

**A.O.B.**

Patricia	Distribute the link to the page with the minutes of the coordination meetings for people to take into account the calendar of the cycles when planning scientific or technical developments.
Jeanette, Piet	Have a list of HIRLAM and/or ALADIN proposed meetings defined well in advance for budgetary constraints;
All	HMG/CSSI members are invited to contact Piet and Jeanette and express their opinion on the re-formulated goal of the HMG/CSSI meetings in respect to the new MoUs and the ALADIN/HIRLAM convergence (code design and implementation besides science)

## ANNEX 2: Slides shown by Claude for System aspects (cycles)

### CYCLES:

**CY40: build started in April 2013. This cycle was the last one in Clearcase, with a copy to the GIT repository.**

The technical content of CY40 includes (non exhaustive list ! / see FLUB for details):

- First part of the re-organization of global variables and setup to cope with the Geometry and the State objects (Tomas W., Karim, Alexandre)
- IFS physics cleaning (CALLPAR, Filip)
- specific code cleaning taken from Karim's document (EC and MF); pruning of a few keys in the assimilation (MF / note: we will leave LOBSTL and L131TL as is, since they still are active in the screening/traj and configuration 601); some further encapsulation of current Fortran control vector code for VAR (Mike)

MF abandoned Clearcase immediately after CY40 was declared in Toulouse, and moved to GIT. Declaration of CY40 took place on July 3, 2013.

Significant efforts in GMAP were devoted to porting to BULL in summer 2013. Besides those efforts, GMAP staff also tested the variational assimilation configurations (Arpège 4D-Var and Arome 3D-Var) in CY40. These efforts paved the way for considering CY40 as a basis for the high resolution (HR) E-suite of 2014 in MF. Therefore, a (very preliminary) pre-operational branch **CY40\_op1.01/02** was decided, in order to build a code release enabling further integration and testing of the HR E-suite changes, on CY40, during the autumn and winter 2013/14.

**CY40T1: build of the cycle from December 2013 through February 2014. This cycle was only handled with GIT. Declaration took place on 11 March 2014.**

Technical content includes:

- All contributions to CY40\_op1.01/02 are repeated for CY40T1
- System/code aspects:
  - removal of command line options (E. Arbogast)
  - specific code cleaning (final part) in LAM LBC code (B. Bochenek, F. Voituis)
  - fixes for SLHD and some minor code cleaning (K. Yessad)
  - optimization of I/O; re-write of LFI package in C; frame option for coupling data (P. Marguinaud)
  - re-write of the IO server; first implementation of a post-processing server (P. Marguinaud)
  - optimization and parallelization of FESTAT for LAM. (R. El Khatib)
  - fixes for CANARI in CY40. CANARI now runs in CY40\_op1.03 and CY40T1\_main (F. Taillefer)
- Full-POS:
  - Fullpos-2 : CPU optimizations and support for Boyd bi-periodization (REK)
  - On-line computation of dilatation/contraction matrices and filtering matrices (for post-processing); optimization of the computation of filtering matrices for Arpège post-processing (REK)
- Observations:
  - Fixes for MF's cloud detection method "CO2-slicing" (V. Guidard)
  - Support for SAPHIR sensor aboard MEGHA-TROPIQUES (L.-F. Meunier)
  - Modified parameters for the geographic mask of winds derived from geostationary satellites, and impact on blacklists (C. Payan)
  - Multi-grid facility for the use of scatterometer winds (C. Payan)
- AROME:

- Introduction of sub-grid precipitation (S. Riette)
- Adaptations in “mse” to interface Surfex V7.3+ (Y. Seity, F. Taillefer)
- Fixes and optimisation in EDKF (S. Riette, Y. Seity)
- Fixes for hail, cloud sedimentation, coupling with 1D model (Y. Seity)
- Fix about the post-processing period of wind gusts (F. Bouttier)
- Flow-dependent SL interpolations (D. Ricard, in collaboration with S. Malardel and GMAP), so-called “COMAD” option
- Optimization in “couplingsurf” task (for restart) (Y. Seity)
- ARPEGE:
  - Developments for the convection scheme PCMT (J.-M. Piriou)
  - Developments for the new shallow convection scheme PMMC09 (Y. Bouteloup)
  - Fix to ensure bit reproducibility of the “old” shallow convection code KFB in distributed memory (F. Bouysse)
  - Developments for the 1D model MUSC (Y. Bouteloup)
- ALADIN:
  - Vertical Finite Elements code for NH/LAM+global (J. Vivoda, P. Smolikova, K. Yessad)
  - New physics/dynamics interface CPTEND\_FLEX (D. Degrauwe, F. Bouysse, Y. Seity)
  - New radiation code ACRANEB2 (J. Masek, R. Brozkova)
  - Some adjustments in TOUCANS (R. Brozkova)
- HIRLAM:
  - adaptations to improve porting of codes & technical fixes, in particular for the IO server, the assimilation code, for pruning SAMIO (E. Whelan, U. Andrae, others)
  - extended VarBC code for GNSS/GPS ZTD (P. Moll, R. Randriamampianina, M. Lindskog)
  - improvement of code normalization features (R. Jasinkas, U. Andrae, in liaison with MF and ECMWF)
- SURFEX version 7.3++ including:
  - Optimisation in PREP (work by T. Dalkilic & D. Degrauwe with S. Faroux), corresponding to the NEW\_PREP branch in the Surfex repository
  - Surface perturbations in Surfex for PEARO (F. Bouttier)
  - *Note the Hirlam contribution for SODA will enter Surfex V8 planned for 2014*

**CY41: between end of March and end of June 2014.**

Technical content includes a number of code re-factoring items for OOPS in the NL, TL and AD models:

- LEVEL 1:
  - Geometry: final part of the re-organization of global variables and break up of setup to cope with the (*horizontal*) Geometry and the State objects. Encapsulation of the related Fortran MODULE variables in YOMGEM, YOMDIM, YOMDIMV, YOMMP (T. Wilhelmsson)
  - Encapsulation of Model object variables like YOMDYN, YOMPHY\*, etc. using the ASSOCIATE Fortran 2003 statement (T. Wilhelmsson, K. Yessad, E. Arbogast)
  - Extra fixes and cleanings related to the encapsulation, and the work towards an OOPS/Arpège forecast prototype (K. Yessad, A. Mary)
  - STEPO (J. Hague, D. Salmond)
  - VarBC accumulation code for statistical update moved from HOP, which enables reproducible results under Open-MP (M. Hamrud, A. Geer)
  - Any additional fix to make full IFS 3D-Var work from OOPS
- LEVEL 2:
  - trajectory handling (F. Vana)
  -
- RTTOV-11
- Other technical aspects from CY40R2:
  - Parallelization: TASKOB aspects put to C++ layer (J. Hague)
  - Fixes for Cray (D. Salmond, G. Radnoti, P. Towers, J. Hague)

- Cloudy IR developments, Blacklist tidying and safety, All-sky microwave developments (A. Geer)
- Bug Fix for sink temperature sink variable for clear-sky radiances (N. Bormann, H. Lawrence)
- Cleaning of MPL (G. Carver)
- Remove low-level allocations in rttov\_boundary\_conditions (J. Hague)
- MACC contributions (R.Engelin et al)
- Changes for ECMWF O-suite (G. Radnoti)
- Flexible LSETTLS (S. Malardel, K. Yessad)
- Put in remaining GPHPRE (except in EC\_PHYS) (K. Yessad)
- Re-introduce FSOBS code (removed at CY40) (C. Cardinali, J. Hague)

During the IFS/Arpège coordination meeting of December 9, 2013, the following timetable was tentatively prepared:

Joint cycle	ECMWF	MF	Start pre-φ	Declaration	Misc. / Oper plans
CY40			March 2013	End of June 2013 at the latest	
	CY40R1			Oct 2013	Oper in Feb 2014
	CY40R2			Feb 2014	Technical cycle including many OOPS & refactoring features
		CY40T1	Dec 2013	Feb 2014	
	CY40R3			May 2014 (RD)	Handover to OD/FD in May 2014
CY41			Between March 17 and April 3 2014	June 2014	Merge of CY40T1 and CY40R2
	CY41R1		Includes merge of CY40R3	Sept 2014 (RD)	Handover to OD/FD in Dec 2014; migration to COPE
		CY41T1	Nov or Dec 2014 ?		
CY42				April 2015 ? (1)	
	CY42R1				Implement OOPS

(1) MF has suggested a back-up scenario with a fairly late declaration by July 2015 to take into account the period of one single BULL – C2 – cluster available. This schedule should be further addressed in future coord meetings.

### **CY42: spring/summer 2015.**

CY42 was the target for OOPS to replace IFS in operations at EC (2015 ?). A second important set of code refactoring for OOPS/IFS is expected to enter this cycle:

- LEVEL 2:
  - obs operators: if possible, keep only one call to COBSALL in or near to STEPO (A. Geer)
  - Jb and change of variables: adapt nonlinear balance and nonlinear change of variables in Q and O3 (M. Fisher)
  - TOVSCV (M. Fisher)
  - interpolation codes for IFS 4D-Var (T. Wilhelmsson)
  - TL/AD of STEPO (F. Vana ?)
  - Full-POS: (Ryad ?)
  - IOPACK: write out model fields for IFS to FDB (M. Hamrud, D. Salmond)
- LEVEL 3:
  - overhaul in the VarBC code and call from OOPS (A. Geer).
  - VarQC: Huber norm and obs error covariance (L. Isaksen, Niels Bormann)
  - WAM/Ocean model (K. Mogensen)
  - Model bias term (Y. Trémolet)