Status of OOPS project for LACE discussion

**Information collected by Mate Mile**

What is OOPS project?
## (highlights from report Y. Tremolet and M. Fisher)

- The primary motivation for the Object Oriented Prediction System (OOPS) is to provide a clean, and above all flexible framework for data assimilation that separates the algorithm from its specific implementation in any one model.

- The main objectives of OOPS are:

  - Flexibility.

  - A clean, modern code.

  - Efficiency (at least as effcient as the current IFS code).

  - To separate the implementation of data assimilation algorithms from the specific details of the numerical model.

  - To separate the implementation of models and applications that use the models so that scientists can focus on their area of expertise without being distracted by the technical details of other parts of the system.

  - To provide a research tool that allows new data assimilation algorithms to be developed and tested.

  - To allow these new algorithms to be transferred seamlessly from simplified models to real-world, large-scale applications, without requiring re-implementation.
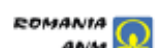
Where is it now?

- The C++/OOPS system has imposed a very deep restructuring of the IFS/Fortran codes.

- The C++/OOPS design level is more stable now (that the first QG and L95 trial versions) and contains advanced features.

- The CY40 release of the common code for the first time contains the OOPS compliant Fortran codes.

- This OOPS compliant Fortran code supports the basic funcionalities of the OOPS design.
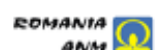
Where is it now?

- It means, if one has data assimilation related (algorithmic) developments, it should be implemented in the OOPS design-compliant way in the future.

- At ECMWF the OOPS IFS 4DVAR with all components at the same resolution is the next target.

- Plan at ECMWF is to switch IFS 4DVAR to OOPS after CY42 in 2015.
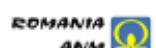
OOPS in cycles

(from Claude's presentation)

- CY38t1: operational at MF and ALADIN partners

- CY40t1: declared on 11 March 2014

- CY41: OOPS/Fortran – finalize encapsulation of Geometry and State; encapsulate Model object variables in Fortran; Trajectory handling adapted to OOPS

- CY41t1: pre-phasing in November 2014

- CY42: More OOPS/Fortran features inside, this cycle should host last major OOPS steps of IFS
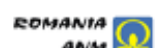
Recent OOPS actions in MF

(from Claude's presentations)

- Port OOPS/IFS 3DVAR prototype on BULL and on CY40 code

- Try ARPEGE forecast run from OOPS layer

- EnVAR as new algorithmic development in OOPS

- In near future LAM 3DVAR prototype and LAM forecast model runs as well (most probably with CY41 or CY42)
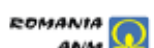
Recent OOPS actions in HIRLAM

(from Jelena's report)

- Targets in order:
  - LAM OOPS HARMONIE 3DVAR
  - LAM OOPS HARMONIE Centered FGAT 3DVAR
  - LAM OOPS HARMONIE 3DVAR HYBRID + Jk Constraint (with pre-conditioning)
- OOPS HARMONIE developments will be based on CY40 (not waiting to CY41 release)
- LAM OOPS HARMONIE 3DVAR will be an important learning tool and will help to bring LAM partners to "OOPS World"
- Collaboration with MF in LAM OOPS AROME 3DVAR
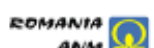
OOPS and LACE interests

- LACE interest in the project?

- Knowledge on C++/OOPS programming?

- Contribution(s), development(s)?

- Manpower, Who?

- Collaboration?