

WG5

## **Item 13: Future of Verification Tools**

MGE2

## THE CONCEPT OF VERSUS SYSTEM (as proposed to be part of phase7 PPVERSUS2 plan)

“After the completion of the Project, **VERSUS will be regarded as a Verification System and not strictly as a simple verification software.** This means that VERSUS system will include different applications for different purposes, not necessarily included in the VERSUS software as functionalities of its main components like GUI and MySQL DB.

It can be seen as **a comprehensive package** with which, after a proper installation, it will be possible to perform traditional and conditional verification using Synop, Temp, Feedback files, gridded observations producing scores and plots, but also object-oriented and Fuzzy ones, **using dedicated applications.**

The user will have the possibility to choose which part of VERSUS system to use depending on the kind of verification he wants to perform and not less important that this solution will make it even more easy the maintenance of the tool.

With this solution VERSUS software, that in the last years grew more than expected including important and not trivial features like EPS verification and FF, **will not be complicated by the implementation of external software, but at the same time the whole VERSUS system will provide all the necessary tools to perform any kind of verification and the inclusion of other software will be possible, provided the control of SCA.**

In this frame, it has to be seen the activity proposal VAST (Versus additional statistical techniques) that will provide WG5 community a more complete tool. It can be foreseen, actually that VERSUS system will include VERSUS software, Phoenix library for grib and BUFR decoding, LIBSIM (TAG decision) for upscaling of high resolution observation and forecast data, software for Fuzzy”

## THE CONCEPT OF VERSUS SYSTEM

“With the above consideration the following 3 bullets will be provided to the VERSUS system by the Activity Proposal VAST developed in the frame of WG5.

- Final implementation of gridded precipitation from composite sources (e.g. radar, rain gauges) following WG5 requirements
- Final implementation of Fuzzy toolbox into VERSUS

The actual developments will be then restricted to the following points, including the necessary work on the stability and improvement of performances of VERSUS software:

- Refinements of VERSUS
- Implementation of XML import capabilities for post—processed fields
- Implementation of Confidence intervals
- Ingestion of GRIB2 in VERSUS as requested by the STC and SMC, this Implementation is connected with development of new module of Phoenix library. ”

## Outcome of correspondence of last period related to VERSUS2 phase7 plan

*“The STC requirement is to introduce spatial verification methods, that is fuzzy and SAL techniques. The project plan proposes a development of the fuzzy verification software via an action VAST (“VERSUS additional statistical techniques”) to be funded by COSMO activity fund and aimed at development of fuzzy verification software (having also gridded observations and GRIB2 capabilities), during this and next COSMO year. The action was already formally signed between DWD and University of Torino.*

*In results of further discussions, mainly between the SPM, WG5 Coordinator, VERSUS2 PP Leader and VERSUS Source Code Administrator, it appeared that the software to be developed **within the VAST project will be not functionally linked with VERSUS software. It will form a separate, functionally independent software. With that development it is proposed to form a ‘VERSUS system’ which would consist of the VERSUS software, as we know it now, together with additional independent tools dedicated to specific verification tasks”***

*“In my opinion, the idea of the “VERSUS system’ proposes a **new paradigm in the COSMO strategy** for verification software. It would have specific consequences for the system development, its maintenance and required resources. **As such, it would need to be discussed by the STC.***

## SMC opinion formed during the videoconference 20/08/2014

*“The long-term strategy on the COSMO verification software and possible VERSUS system has to be discussed and prepared separately as longer-term action. **WG5 should take proactive role in the process** (in between via considering Science Plan strategy and interacting with colleagues from outside COSMO). The process will be also supported by the SMC and STC. If the suggested strategy is going towards a VERSUS system, **the strategy should also clarify which functionalities should be inside the VERSUS software, and which ones in external packages.** It should also clarify the long-term maintenance of these packages.”*

## Long term VERSUS Maintenance

The long term maintenance will be assured by CNMCA-USAM.

VERSUS is the operational verification system of Italian Met Service and for this reason is permanently included in a specific contract for maintenance of CNMCA software (and hardware). This contract is already ongoing and renewed year by year; 300 hours are dedicated to VERSUS and managed by the actual Project leader. Some of these hours have been used during this COSMO year, for example, to set up the test machine for VERSUS and also for Help-Desk assistance.

In this way the following activities will be assured:

- **Help Desk**
- **Software updates (PHP, Phoenix libraries, R package)**
- **DB tuning and optimization**
- **Installation problems**

## Long term VERSUS Development

The long term development is assured from 2014 to 2015, that will be the last year of the project. It will mainly explore the **use of COSMO money for an external consultant to close the final developments together with the possibility to extend for a period the existing contract with the actual external consultant** or another company (some developments could be implemented also with the support of contract for maintenance). **For the future (after 2015) VERSUS should have the structure, year by year, of a COSMO PT in order to keep the developments well monitored.**

**Developments of no more than one or two main requirements in any COSMO year with a structured Plan will assure the monitoring of the development and the success of the deliverable provided the availability of manpower and support from other COSMO members.**

As the development will be restricted to one or two functionalities it would be possible to finance the development through the use of COSMO license for a consultant supporting the CNMCA Verification Section personnel for specific implementations. Estimate of the required cost can be given once specifications of the module that needs to be implemented are given. For any further development the PL Team will inform the WGC about exact hour/man charges.

## Verification Tool Future: Discussion-Decision Points

- Finalization of VERSUS2 project and VERSUS software development in 2015

Suggestion: Reevaluate the final product during a VUS meeting close to the end of the project and decide on further necessary (if any) refinements on existing capabilities (deterministic, EPS) or unfinished Tasks – Find resources (short term extension of project or activity proposal with COSMO funds)

- Clarification of what can be expected from the Long Term Plan (maintenance and Development) as listed in phase6 and phase7 VERSUS2 plan.

•As listed in the PT development plans, *“for the future (after 2015) VERSUS should have the structure, year by year, of a COSMO PT in order to keep the developments well monitored. Developments of no more than one or two main requirements in any COSMO year with a structured Plan will assure the monitoring of the development and the success of the deliverable provided the availability of manpower and support from other COSMO members.”*

CNMCA is the only service that can continue with the PT leader role taking into account that during the 7 years of VERSUS2 all the developments are performed or supervised by its personnel. Is this possible?

- Will the VERSUS Help Desk operate according to the Long Term maintenance Plan after the end of the project and on what basis it will provide solutions or deal with reported bug fixes?

## Verification Tool Future: Discussion-Decision Points

- Clarification of what can be expected from the Long Term Plan (maintenance and Development) as listed in phase6 and phase7 VERSUS2 plan (more)
  - Can VERSUS SCA support (code, documentation updates) VERSUS (as well as VERSUS external software packages if the VERSUS system concept is accepted by the STC)? Can the LT Maintenance (e.g. Help Desk) and Development Plan, include all external parts of VERSUS system?
- Need for development of verification tools within WG5 to meet the new SP requirements and national verifications needs:
  - Other Spatial methods (not only neighborhood as VAST offers)
  - More verification capabilities of convection permitting EPS systems (extension towards spatial methods)
  - Severe and high impact weather indices (SEDI, SEEPS)
  - As implementation of Feedback Files is going to be concluded in the last year of VERSUS2 project, with no possibility for operational use, it is very possible this to lead towards additional VERSUS refinements related to upper air verification
  - More....
- If the VERSUS concept idea is accepted by the STC, is there a COSMO need to define a **new Priority Project** that will not only provide the extension of spatial verification tools but also a strategy on their usability? (traditional deterministic and EPS verification developments will have to be always part of the VERSUS software and supported by the LT development plans)