

**ERC32 Evaluators Workshop
Summary of Conclusions**

ESTEC, January 28, 1998

1. Outline of the ERC32 Evaluation Programme

The ERC32 Evaluation Programme was first announced at the ERC32 Products Day held at ESTEC on the 1st of October 1996 in anticipation of the formal completion of the ERC32 development contract.

The goal of the Evaluation Programme was to allow a number of industrial teams to get a time-limited low-cost access to the ERC32 software and hardware technology for the sake of familiarisation, evaluation and assessment.

The Programme was co-financed by the Agency and the participating companies in accordance with a long-established practice at TOS-ES:

- (1) the Agency would contribute to the incurred expenses with a ceiling amount of 5,000 ECU and also arrange for the time-limited free-of-charge availability of the required hardware board and software tools;
- (2) the participating company would provide for the necessary labour and commit to the issue of a summary evaluation report and the presentation of the evaluation findings in the ERC32 Evaluators Workshop.

The Programme schedule was to run from January on to December 1997. In actual fact, the first evaluator was kicked off about mid February, whereas the last couple of evaluators completed their work in mid January 1988, just in time for the Workshop.

Since the announcement of the evaluation opportunity, the Agency received over 20 subscriptions from interested companies. 8 were selected on the basis of the maturity and technical interest of the evaluation proposal and the criticality of the participation in the Programme for the strategy of the proposing company.

The total investment by TOS-ES for the execution of the Programme, inclusive of the provision of a fixed quota of pre-paid vendor support to evaluators, amounted to about 90,000 ECU.

Retrospectively, it can certainly be said that the return obtained from that modest investment has been extremely high from both the technical and the programmatic stand-point.

2. Structure of the Workshop

The ERC32 Evaluators Workshop was an planned integral part of the Evaluation Programme. The role of the Workshop was in fact crucial to bring the Programme to completion by giving exposure and dissemination of the results from the evaluation activities, the lessons learned by the users and their recommendations for necessary improvements and amendments.

The structure and schedule of the Workshop is summarised in the table below. The Workshop was first announced in early December 1997 with a call for participation and contributions and finally held at ESTEC on the 28th of January.

Overall, the workshop was contributed by 7 "official" evaluators (Terma, Intecs Sistemi, Laben, Aerospatiale, GMV, Dasa, MMS-UK), 2 independent users of the ERC32 technology (Fokker Space, prime contractor of the ERA project and Sextant Avionique, supplier of the ERC32-based TOPSTART GPS receiver) and 3 technology suppliers (Temic, Tharsys and Spacebel). The 8th "official" evaluator (GEC Marconi, UK) was not able to supply their contribution for the Workshop.

Topic	Start Time (approx.)
Opening and Objectives of the Day	09:30
ERC32 Hardware and Software Status	09:40
<i>Experience Reports (Session 1)</i>	10:00
CRI (NOW TERMA), DK; INTECS SISTEMI, I; LABEN, I;	
Coffee Break	10:45
<i>Experience Reports (Session 2)</i>	11:00
FOKKER SPACE, NL; AEROSPATIALE @ LES MUREAUX, F; GMV, E; DORNIER/DASA @ OTTORBRUNN, D: MATRA MARCONI SPACE @ BRISTOL, UK SEXTANT AVIONIQUE, F	
Summary of Outstanding Issues	12:30
Lunch Break	12:45
Announcements & Contributions	14:00
TEMIC, F; THARSYS, F; SPACEBEL, B; ESTEC (ERC32 SVF; GNU SW INITIATIVE)	
Technical & Programmatic Discussion	14:45
Conclusions and Future Directions	16:15
Close	16:30

3. Level of Participation

The Workshop was well attended (over 50 participants in total) and actively participated. The room for open discussion scheduled at the end of the daily programme proved extremely useful for pulling together the various strings of messages and suggestions for future directions with the ERC32 technology.

4. Technical Issues

4.1 ERC32 Hardware

- A. There is immediate need for readily available ERC32 boards for test and early-development purposes. The SPARC RT VME Single Board Computer developed by Tharsys and briefly presented at the Workshop may contribute to satisfy this need.

4.2 ERC32 Software

- B. Project-level users need a "use guide" to the present generation of the ERC32 software technology with practical advice on how to maximise return and avoid known limitations.
- C. The base ERC32 Ada technology is sufficiently solid for industrial developments. However, some deficiencies and limitations have been identified with the link

utilities that need urgent fixes. This need can effectively be accommodated by the on-going initiative by TOS-EM to support the integration of the ERC32 ACS by Aonix with the GNU-based ERC32 utilities.

- D. The engineering value and maturity of the “HRT” engineering approach are now apparent. There is consensus that the HRT approach would benefit from industrial-quality tool support. According to evaluators, however, the present generation of support technology (i.e.: worst-case execution time extractor and scheduling analysis tools) is still at pre-industrial level but the gap to be filled is comparatively tiny: (1) the WCETE needs the ability to relax some of its major coding style restrictions; (2) the scheduling analysis tools have minor operation inaccuracies and insufficient user documentation. *It is, therefore, advisable that the Agency plan the additional effort required to bridge the gap to actual industrial quality.*
- E. There is general interest in the Agency initiative to provide a structured basis for the maintenance of GNU-based software tools targeting the ERC32. *Potential users emphasised the need for the Agency to clarify the “mission” of the initiative (i.e.: level of criticality of the intended application) and the need for the scheme to allow for the establishment of contractual support to users “customised” for the level required by the application.*

5. Programmatic Issues

- F. There is consensus that the software support for ERC32-based development is more than adequate to meet the basic needs of users at the technical level. Concerns were raised, however, on the risk to excessively broaden the spectrum of “reference” software technologies suited for on-board applications. This is particularly the case with the run-time executives, operating systems and associated compilation systems suitable for real-time embedded applications (Aonix Ada <ERA, ATV>, VxWorks + GNU C <DMS-R, COF>, RTEMS, smaller-sized custom C-oriented executives <TOPSTAR 3000>). The space (ERC32) market is tiny and incompatible with the level of investment required to ensure the durability and the quality of a large range of alternate solutions. As a reflection of that, *the request was raised for the Agency to identify a streamlined range of options capable of meeting the application needs while ensuring compatibility with investments already in place.*