

Managing Development of the Controller Working Position

The development or modification of controller working positions is one of the most visible and critical activities in the upgrade of an ATM system. It is also one of the most difficult. For controllers, the CWP is both their working environment and the tool through which they exercise their professional skills. Consequently, changes to the CWP are a matter of considerable significance, potential sensitivity and an area in which acceptance of a system upgrade can be won or lost.

Successful development and introduction of a controller working position involves the integration of operational, technical and human factors expertise as well as good management and effective communication. It is also a long process and increasingly stringent regulatory and safety standards are generating new requirements in terms of traceability.

CWP development, testing and acceptance has been a source of difficulties for R&D concept studies as well as a major contributor to delays in the introduction of major systems upgrades in Europe and elsewhere.

The EUROCONTROL Experimental Centre, Brétigny has a long history of HMI development both for simulation and in support of member states engaged in requirements definition. As part of the EATMP Human Factors Programme, this experience has been directed towards improving the processes and reducing the risk in the CWP development lifecycle. The benefits are targeted at a wide range of concept developers, ANSPs developing systems and supplying industry.

What it is

To better manage ATM CWP Development we must first understand the context and the problems. The CoRe (Core Requirements for ATM Working Positions) Project was created to identify and mitigate problems within the CWP development process. It surveyed current issues and practice, using a bottom-up approach to identify problem issues. The analysis was then complemented by a top-down process to understand and describe CWP development practice in our ATM community and identify, firstly, requirements and then solutions for difficulties as they really occur within our current practices.

What it does

CoRe identified that many of the problems were not technical but were related to the availability of the right information at key stages of the development process; to communication between experts engaged at different stages of development; and to information flow between the stages of development themselves. It also identified the need for a more structured approach to the identification of requirements and subsequent requirements based evaluation of the CWP HMI. CoRe then tackled these issues.

The resulting CoRe method proposes a view of the development process in terms of:

- ▶ the managed collaboration of a community of experts;
- ▶ traceable Functional and HMI Requirements which form the basis for evaluation and re-use;
- ▶ and an interactive system development process (CoRe Framework) based on the use and extension of industry standard methods (e.g. UML, XML, etc)

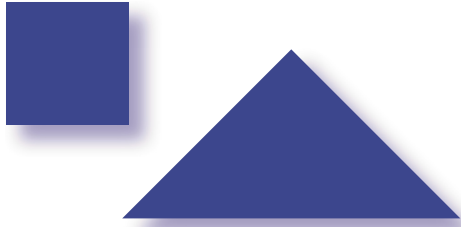
The CoRe Framework, which seeks to provide traceability of requirements and design rationale from conception through to structured evaluations, is supported by the use of models in UML. Using an innovative GLUE model the framework simultaneously maintains coherent FUNCTIONAL and COMPONENT views of the system, manages and generates documents (MSWord™, WINHELP™ and HTML formats) and provides support for re-use and consolidation (emphasising the role of requirements). CoRe has been supported in its activities by external contracts with CENA, Deep Blue and Pacte Novation.



What it has developed

Having created the development framework, CoRe went on to illustrate its applicability by specifying and implementing a stripless, en-route ATM CWP on the EEC ESCAPE Platform together with a complete set of documentation.

In addition to specifications, technical documentation and technical training presentations, CoRe has produced a significant volume of guidance material intended for use by those involved in the processes of ATM CWP development. This material covers requirements for difficult aspects of ATM CWP design: such as font selection; the management of requirements; the development and use of style guides; and techniques and methods for use in evaluation of ATM interfaces. The material is available as EATMP Reports and EEC Notes in both paper and electronic forms.



Documents related to requirements

1. Font Requirements for Next Generation Air Traffic Management Systems HF 19
2. An Experimental Methodology for selecting Fonts for Next Generation ATM Systems HF 20
3. Requirements for the implementation of Automatic and Manual label anti-overlap functions EEC Note 21/00
4. Expression of Requirements for HMI Specifications for ATC/CWP EEC Note 06/01
5. Capture and Exploitation of Requirements EEC Note 01/03

Documents related to CWP design development and evaluation

1. CoRe Requirements for ATM working Positions an Overview of the project activity HF 31
2. Style Guides for ATM Development EEC Note 02/03
3. Recommendations for HMI Evaluation in the context of CWP Development EEC Note 03/03
4. A Baseline Exemplary Style Guide DRAFT HF
5. A Qualitative Model of the process of developing HMI for Controller Working Positions DRAFT HF

CoRe is now being applied in the EUROCONTROL: Consolidation of HMI for Operations, Evaluation and Simulation (ECHOES) Project to document, develop and test HMI for a range of advanced study simulations.



Further information and deliverables are available at:
www.eurocontrol.int/humanfactors
EEC publications are available from:
<http://eurocontrol.fr/> and select "Documents"

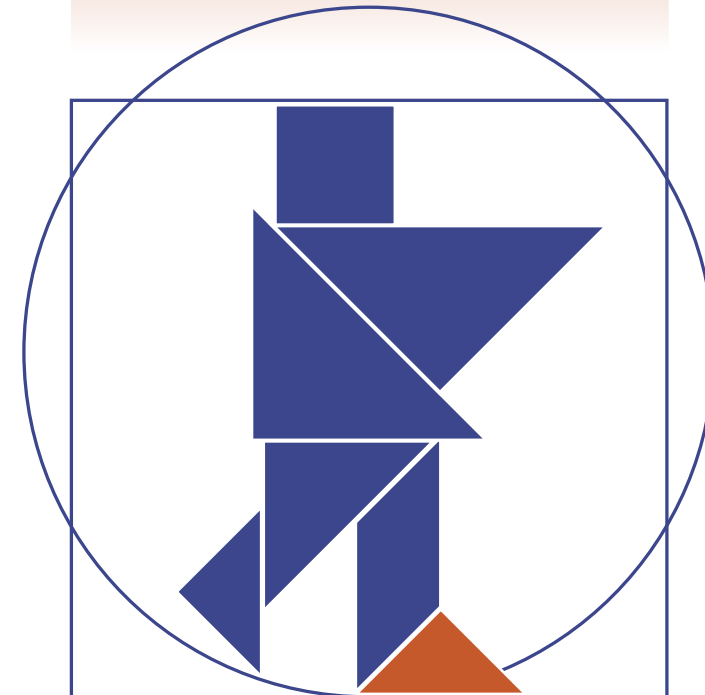
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EATM Human Resources Programme

Controller Working Position



CWP
HUMAN FACTORS

