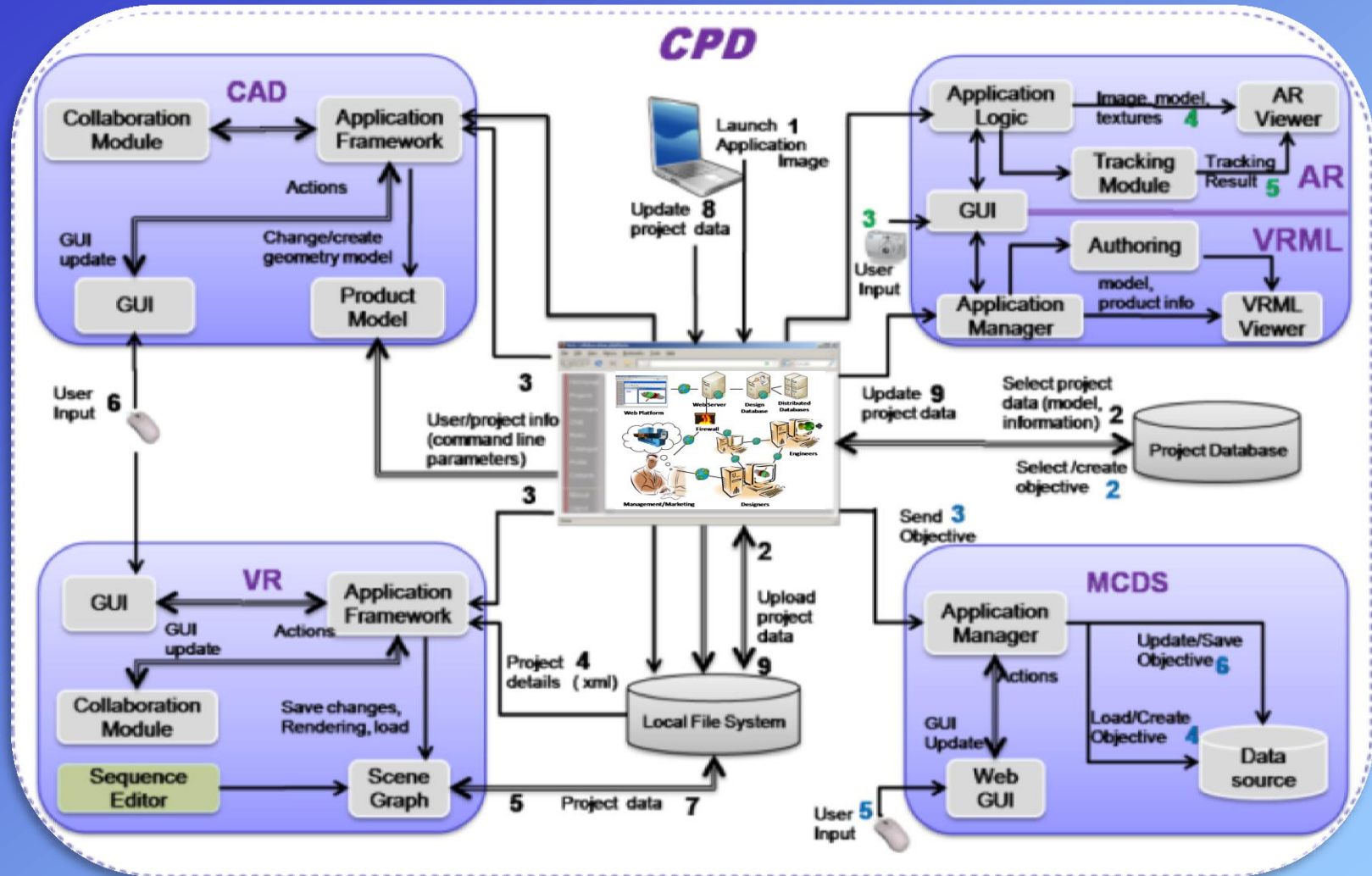


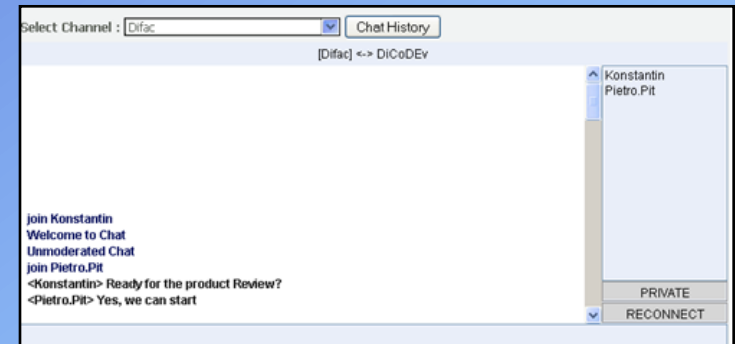
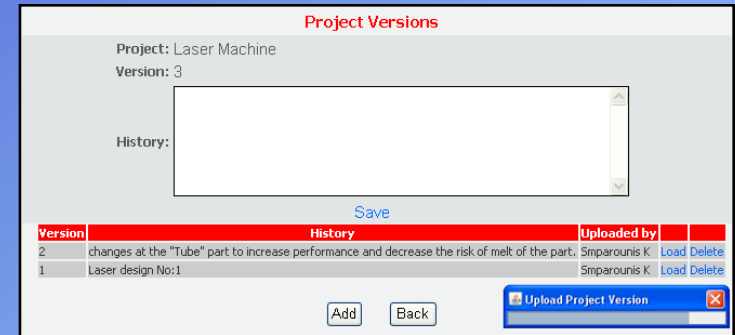
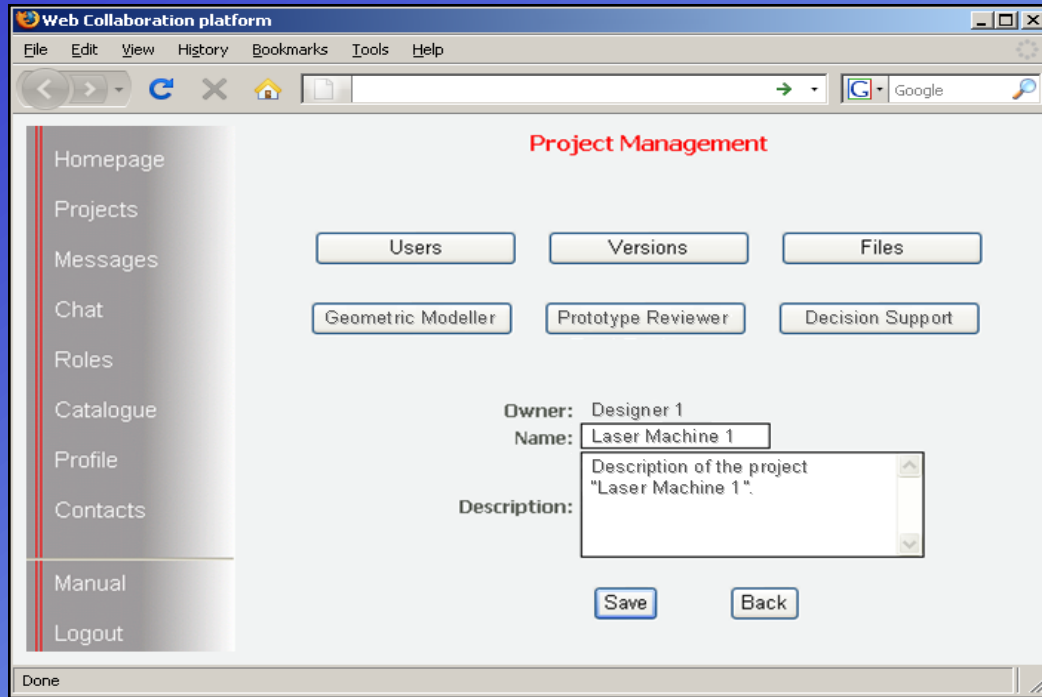
ROBOTS, AUTOMATION AND VIRTUAL REALITY IN MANUFACTURING

CWE Integration Framework



REF: D. Mavrikios, K. Alexopoulos, V. Xanthakis, M. Pappas, K. Smarounis, G. Chryssolouris, "A Web-based Platform for Collaborative Product Design, Review and Evaluation", Digital Factory for Human-oriented Production Systems. The Integration of International Research Projects, L. Canetta, C. Redaelli, M. Flores (eds) 1st printing, Springer (2011)

Collaborative Prototype Designer



- Content(data & user) management functionalities
- Remote Synchronous & Asynchronous communication
- Online products catalogue based on 3D interactive environment

Multi-criteria Decision Support

The screenshot shows a web browser window titled "Multi Criteria Decision Support". The browser's address bar contains "Google". The main content area is titled "Configure Objective" and is divided into two sections: "Criteria" and "Evaluators".

Criteria Section:

- Owner*:** Designer 1
- Name*:** Laser Machine 1
- Description:** Evaluation of alternative designs for the laser head
- Status*:** Configuration

Evaluators Section:

Name	Description	Weight	Benefit	
Cost	Criterion 1	0.5	false	Delete
Aesthetics	Criterion 2	0.2	true	Delete
Production Rate	Criterion 3	0.3	true	Delete

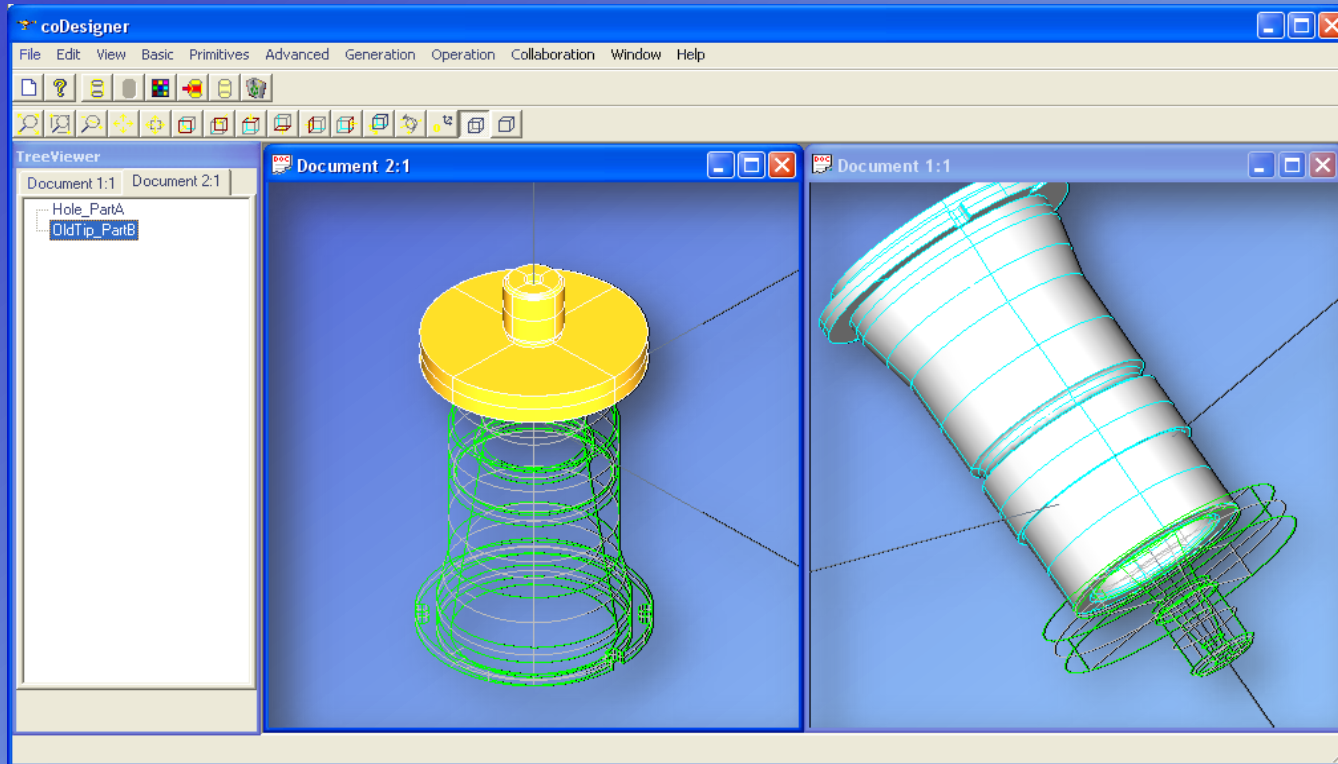
Form Fields for Adding a Criterion:

- Name*:** Production Rate
- Description:** Criterion 3
- Weight*:** 0.3
- Benefit

Buttons: Update, Add Criterion, Configuration Completed

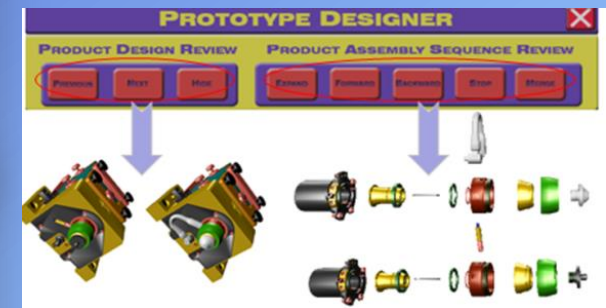
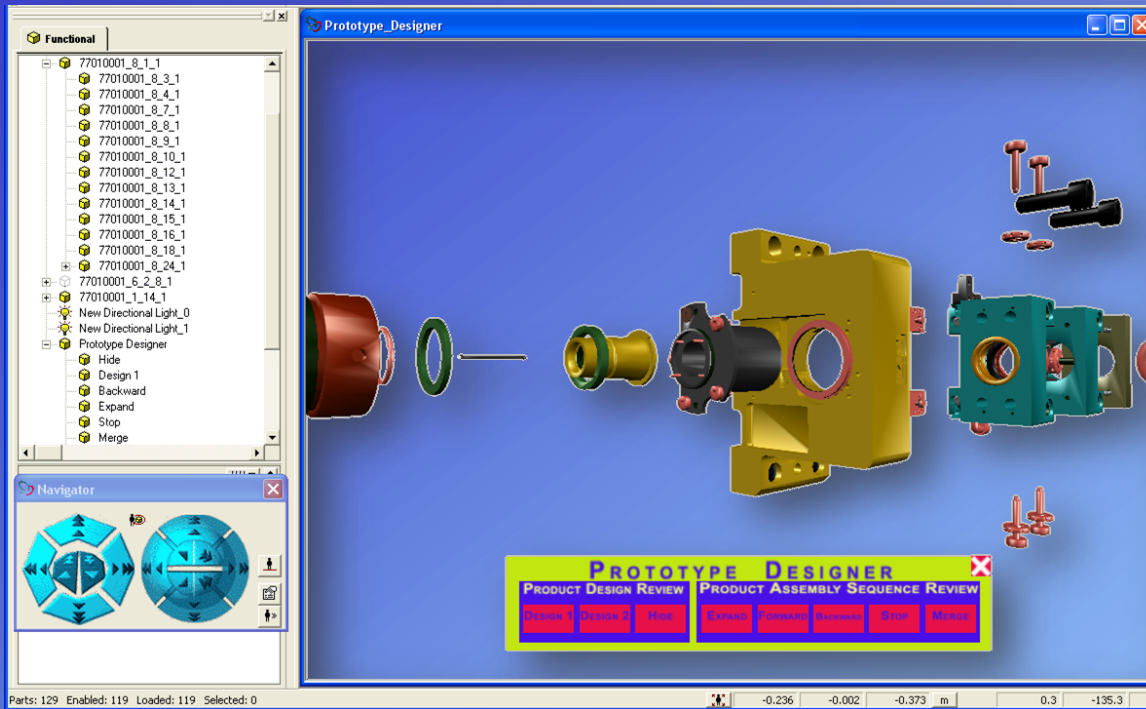
- Multi-criteria decision making for evaluation of alternative solutions
- Theoretical and empirical product design evaluation weighted criteria
- Calculation of the evaluation score for each design alternative
- Ranking of design alternative solutions based on their score

Collaborative Designer



- Multi-user collaborative product design sessions
- Shared CAD environment providing with basic functionalities
- Concurrent visualization & modification of the geometrical product model
- Real time changes of geometry to create alternative designs

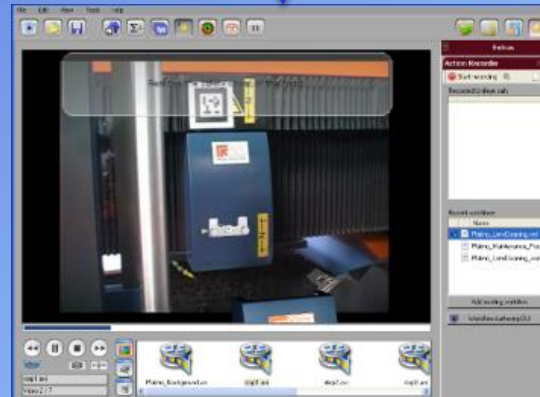
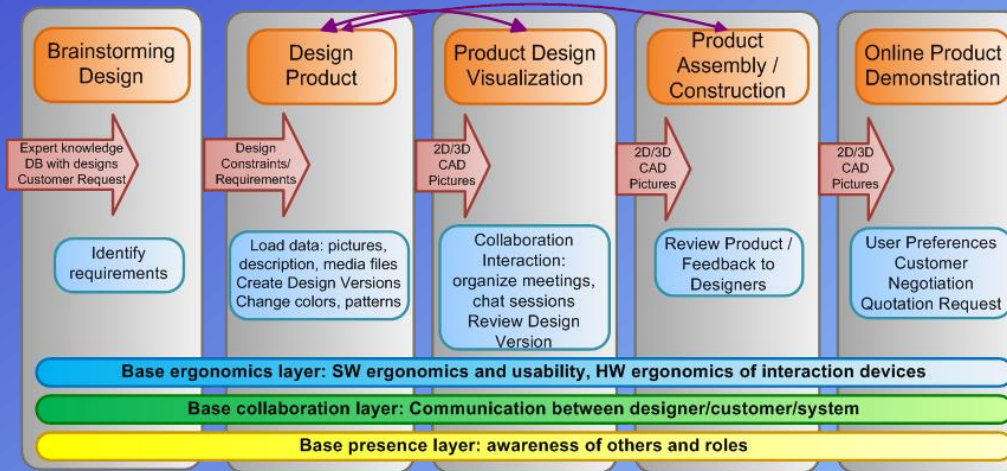
Multi-user Virtual Prototype Reviewer



- Integration with both a commercial VR platform & a research 3D viewer
- Review of alternative prototype assembly simulations
- Shared VE(multi-user, visualization, navigation & interaction)
- Virtual product prototyping & virtual scene building functions

ROBOTS, AUTOMATION AND VIRTUAL REALITY IN MANUFACTURING

Real-time distributed cooperative demonstration using Virtual Reality & Augmented Reality



REF: K. Smparonis, D. Mavrikios, M. Pappas, V. Xanthakis, G.P. Vigano, K. Pentenrieder, "A virtual and augmented reality approach to collaborative product design and demonstration", (ICE08), 14th International Conference on Concurrent Enterprising, Lisbon, Portugal (2008)