

# A Virtual Assembly Design Environment

**ABSTRACT:** The Virtual Assembly Design Environment (VADE) is a Virtual Reality (VR) based engineering application which allows engineers to evaluate, analyze, and plan the assembly of mechanical systems. This system focuses on utilizing an immersive virtual environment tightly coupled with commercial Computer Aided Design (CAD) systems. Salient features of VADE include: 1) data integration (two-way) with a parametric CAD system, 2) realistic interaction of user with parts in the virtual environment, 3) creation of valued design information in the virtual environment, 4) reverse data transfer of design information back to the CAD system, 5) significant interactivity in the virtual environment, 6) collision detection, and 7) physically-based modeling. This paper describes the functionality and applications of VADE. A discussion of the limitations of virtual assembly and a comparison with automated assembly planning systems are presented. Experiments conducted using real-world engineering models are also described.