**Dissertation Abstract**

**Title of Dissertation**

**Physual Designing: A Supportive Framework for Dispersed Engineering Design**

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Corporations involved in engineering design face multiple challenges; collaboration in geographically dispersed value chains, pressure to reduce lead times, and challenges related to operating in truly global markets. Technologies such as video conferencing systems and desktop conferencing systems do not provide the necessary functionality for conveying graphic communication through sketching in the early stages of typical engineering design processes. In addition, little has been done to successfully explore and capture the unique advantages of allowing collocated work in combination teams consisting of a collocated core team and distributed node members. The main contribution of this research is a collaborative framework for dispersed engineering design in such combination teams. This framework is labeled physual designing and aims to enhance collaborative participation and performance for dispersed members, while maintaining the collaborative benefits of offering a collocated arena for core teams. The term physual refers to physical, virtual and visual respectively, and physual designing supports collaborative effectiveness and efficiency through a combination of a virtual workspace and various computer peripherals. Examples include large projected displays, an interactive whiteboard, wireless keyboard and mouse, and an SMS system for wireless coordination of team activities. Combined, these technologies facilitate creative flow across different working situations. The framework has been tested through a series of empirical studies at NTNU and in the Norwegian oil industry, and through a prototype research arena, the IMM design studio. This design studio acts as a manifestation of physual designing as an approach to overcome collaboration challenges for dispersed teams.