

# **A contextual vision on alarms in the intensive care unit**

---

*Adinda Freudenthal<sup>1</sup>, Marijke Melles<sup>1</sup>, Vera Pijl<sup>1</sup>,  
Addie Bouwman<sup>2</sup>, & Pieter Jan Stappers<sup>1</sup>*

*<sup>1</sup>Faculty of Industrial Design Engineering, Delft University of Technology*

*<sup>2</sup>Department of Nursing Affairs, University Medical Centre Groningen  
The Netherlands*

## **Abstract**

In the intensive care unit (ICU) alarms are crucial, but the large number of auditory alarms and the lack of harmonization also cause many problems for nurses. Despite intensive research efforts, no radical improvements have resulted so far. Our aim was to find new directions to get away from the current status quo in design of alarms for the ICU. To do this the focus was on work task support in the context of the entire nursing process of the team of nurses at the ward on the one hand and on developing a congruent overarching alarm/information system on the other hand. A participatory research and design approach was used and a new vision on alarms is proposed. Related fields of relevant ergonomic research and areas for technological development are identified.

## **Introduction**

An intensive care unit (ICU) supplies specially trained personnel and monitoring and therapy equipment. Close observation and immediate recognition of potentially life-threatening complications is crucial in treatment of the seriously ill patients (Skillman, 1975). Alarms are one of the main tools to notify nurses about a new situation in this often unpredictable work environment. In the current study the use of alarms is studied through a participatory research and design approach. New solutions tailored to support the work process are proposed.

The problems concerning alarms in the ICU are well-known and have been subject of numerous studies. First of all, there is the high proportion of alarms which are unrelated to emergencies. Chambrin et al. (1999) for example observed in an adult ICU that more than 70% of all alarms were false positives (alarms leading to no action). Lawless (1994), observing in a paediatric ICU, reported similar findings; 68% of all alarms were false alarms, and more than 94% of the alarms had no clinical significance. A consequence of this high number of false alarms is that medical staff is inclined to ignore alarms or respond more slowly (Lawless, 1994). The noise generated by this multitude of alarms leads to stress for both nurses and patients.