Institut für Textiltechnik und Lehrstuhl für Textilmaschinenbau
RWTH AACHEN UNIVERSITY

Projekttitel:	StEnd – Method for the automated production of wire-based stent implants with atraumatic ends in the braiding process
Partner:	Institut für Textiltechnik der RWTH Aachen (ITA) Feinmechanik Mehr GmbH & Co. KG
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Mission Statement

According to the Robert Koch Institute, the number of new cases of cancer in 2014 in Germany alone will be 476,120. 53,840 of these will be lung cancer patients. This makes lung cancer one of the cancers with the third highest probability of developing the disease. In terms of cancer deaths, the most frequent tumour localisation is in the lung in men (24.4%), while lung tumours are the second most frequent cause of death from cancer in women (15.3%). The narrowing (stenosis) of the airways is a typical consequence of lung cancer, since the tumour presses on the airways from the outside (extraluminal) or closes them endoluminally. To improve the quality of life of lung cancer patients, the placement of a tracheal stent is necessary in most cases. The stent is inserted into the narrowed region as a support to keep the lumen permanently open and maintain the primary function of the organ. For the treatment of large-lumen vessels / organs, wire-based single thread stents are the gold standard. There is a difference between implants with open (wire) ends, which can be manufactured very cheaply by machine, and single thread stent implants with closed ends, which are currently manufactured manually (Figure 2). Stent implants with open wire ends often cause tissue irritation or even inflammation at the site of implantation, whereas closed single-thread stents have a considerably improved tolerance. Therefore, atraumatic, manually perforated single-thread stents are currently the most commonly used type of stent.

According to the current industrial standard, there are two approaches for the production of braided semi-finished stent products, which are partially or completely performed manually due to the complexity of the procedure. The approaches described below are both time-consuming and cost-intensive due to the manual work involved. The reproducibility is only limited.

1. A multi-thread stent is braided by machine, thermally fixed, assembled and all wire ends are manually re-braided into the structure. This is followed by a further thermal fixing process.
2. The so-called single-thread stent is fully manually braided from a single wire. The ends of the wire are finally braided and crimped to form a completely closed wire structure. Finally, a thermal fixing process takes place.

The **goal** of the StEnd project is the development of a machine for the automated production of wire-based, atraumatic multi-threaded stents (1) which can be implemented as an integratable solution in the conventional mechan-

ical round braiding process. For this purpose, a concept for the targeted deflection of the filaments in the conventional round braiding process is validated and a compatible assembly process is developed.

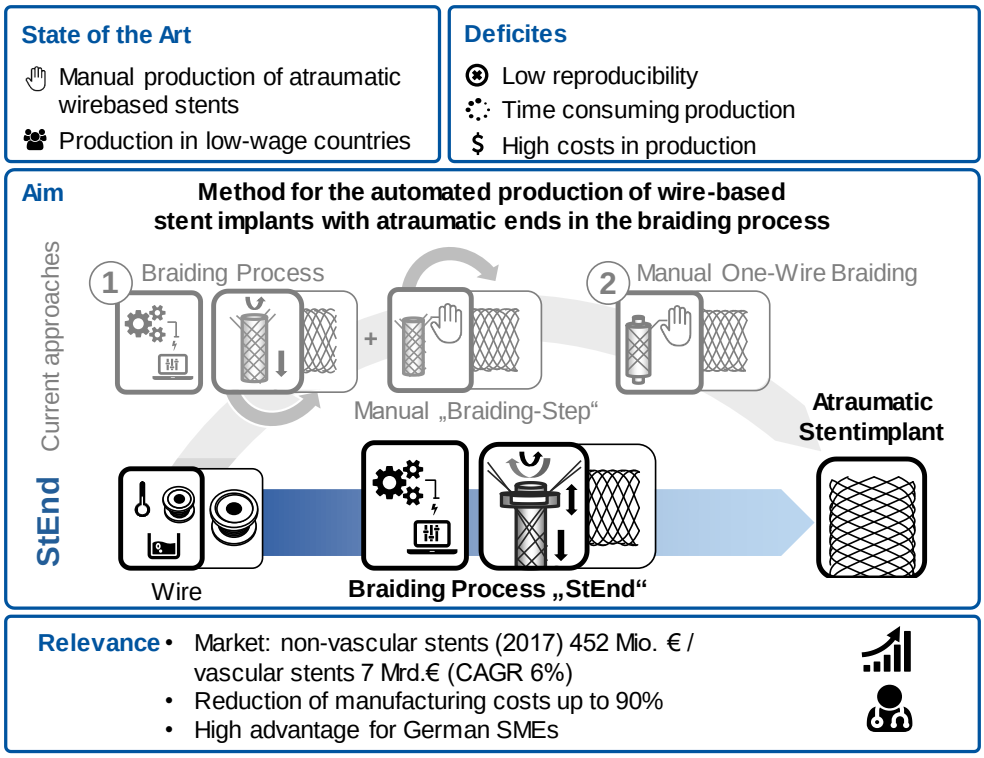

Figure 1: Missionbild StEnd

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