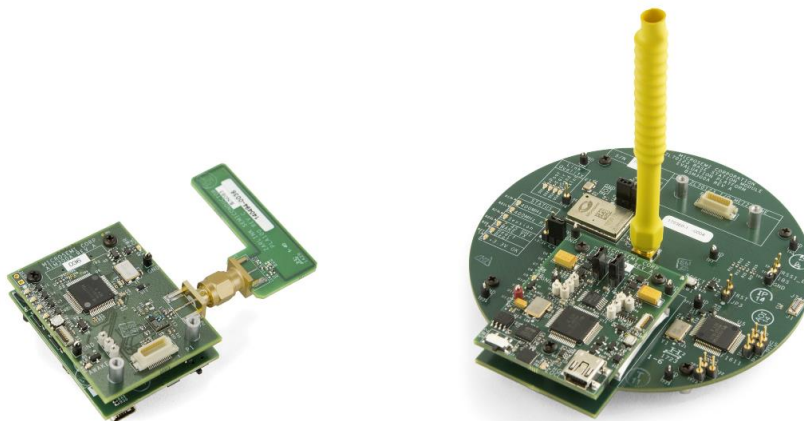


## Master Thesis / Specialization Module: Evaluation of a MICS-Band Transceiver and Concept and Prototypical Development of Interoperability Capabilities for Implants

European populations are ageing rapidly. By the year 2060, every third person living in Germany will be older than 65 years. For this reason, the social and socio-economic relevance of regenerative therapies is clearly increasing. This holds particularly true for implants: the older the population grows, the more medical implants for various indication areas are required and the more often they have to be replaced during the course of therapy. Within the Collaborative Research Centre 1270 ELAINE (ELectrically Active ImplANts)<sup>1</sup> the University of Rostock focuses on novel electrically active implants. One objective is to establish innovative energy autonomous implants that allow a feedback-controlled electrical stimulation.

These implants need the ability to communicate with other medical devices within the operating room during implantation and with the medical information systems mainly during the period the device is implanted in the patient's body. For this purpose, Microsemi provides an implantable radio module. The abilities of this module shall be evaluated. The interoperability aspect shall be addressed with concepts and prototypical developments for IEEE 11073 SDC<sup>2</sup> and FHIR<sup>3</sup> compliant models and interfaces.



Microsemi ZL70103 Application Development Kit: Implant Unit (left) and Base Station Unit (right)

[Source: [https://www.microsemi.com/document-portal/doc\\_view/134303-zl70103-product-preview](https://www.microsemi.com/document-portal/doc_view/134303-zl70103-product-preview)]

In detail, the following tasks need to be fulfilled (amount will be adjusted according to the thesis):

- The Microsemi ZL70103 Application Development Kit shall be evaluated for our purposes
- Concepts and literature studies for IEEE 11073 SDC compliant model of an implant
- Concepts and literature studies for FHIR compliant model of an implant
- Concept for an extracorporeal device establishing the connection to the MICS-based implant and providing the interoperability capabilities
- Prototypical development of the extracorporeal device connected to the MICS-based implant
- Prototypical implementation of the interoperability capabilities

Supervisors:

- M. Sc. Christoph Niemann ([christoph.niemann@uni-rostock.de](mailto:christoph.niemann@uni-rostock.de))
- Dipl.-Inf. Martin Kasparick ([martin.kasparick@uni-rostock.de](mailto:martin.kasparick@uni-rostock.de))

Supervising professor: Prof. Dr.-Ing. Dirk Timmermann

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<sup>1</sup> <https://www.elaine.uni-rostock.de/en/>

<sup>2</sup> IEEE 11073 Service-oriented Connectivity (SDC): Standard family addressing the interconnection of medical devices based on the concept of a service-oriented architecture (SOA)

<sup>3</sup> Fast Healthcare Interoperability Resources (FHIR, pronounced "fire"): Draft standard for the semantically interpretable exchange of electronic health records.