Moore4Medical publishable summary

Compared to the pace of innovation in electronic consumer products, the pace of innovation in medical devices is lagging behind. It is the overarching objective of Moore4Medical to accelerate innovation in electronic medical devices. Moore4Medical will:

- **Address emerging medical domains**
  The convergence between the Pharmaceutical, MedTech and ECS industries, is resulting in new exciting new opportunities for industry and society that will help managing the cost of healthcare.
- **Develop open and enabling technology platforms**
  To help the emerging applications and technologies bridge "the Valley of Death" in shorter time and at lower cost.
- **Ensure European leadership**
  Open technology platforms that will reduce fragmentation and point solutions will be essential factors in ensuring a sustainable and affordable healthcare in an aging population.

Emerging medical domains

We live in an ara where the borders between, Pharma, MedTech and the Electronic Components and Systems industry (ECS) are fading. At the intersection between these domains new opportunities are emerging that offer great opportunities for industry, as well as for society:

- **Implantable devices**
  Small implantable devices "Bioelectronic Medicines" implanted on nerves leading to organs will be used to treat a variety of diseases, especially in the field of chronic autoimmune diseases.
- **Organ-on-chip**
  Organ-on-chips, mimicking the basic functions of organs will be used to develop (personalized) medicines, test new drugs for safety, and reduce animal testing.
- **Drug adherence**
  Miniature sensors and micropumps will ensure that expensive (biological) drugs can be administered in the home environment in the correct and safe way.
- **Next generation ultrasound**
  3D Ultrasound imaging based on MEMS ultrasound transducers in combination with AI algorithms brings ultrasound diagnostics out of the hospital to semiprofessionals, rural and remote areas, and even consumers.
- **Towards X-ray free surgery**
  Advanced optical tracking techniques and optical shape sensing will practically eliminate the need for ionizing X-ray imaging during (minimally invasive) interventions.
- **Continuous monitoring**
  Wearable sensors and remote sensing technologies will reduce hospitalization, resulting in more comfort for the patient and less costly clinical trials in drug development.

Open technology platforms

The open technology platforms (CMOS, MEMS, packaging) introduced by necessity in the ECS industry, have resulted in a dazzling speed of innovation for consumer products. In

contrast, the medical domain is largely dominated by proprietary point solutions. With value and IP shifting from technology towards software, algorithms and solutions it is now time for the MedTech industry to follow the same path and introduce open technology platforms accessible to multiple users for multiple applications.

Addressing the identified emerging medical domains, Moore4Medical will develop specialized and enabling open technology platforms:

- **Wireless ultrasound power – for implantable devices**
  A platform that uses focused ultrasound based on MEMS technology will energize implants located near organs deep inside the body.
- **Smart well plate – for organ-on-chip**
  A smart well plate comprising microfluidics, micropumps and electronics will bridge the gap between organ-on-chip devices from a variety of manufactures and the pharmaceutical workflow.
- **Intelligent delivery – for drug adherence**
  Micropumps and a variety of sensors are the elements of a generic platform to administer and monitor how, when and where expensive drugs are delivered, ensuring proper drug adherence.
- **Smart 3D ultrasound – for the next generation ultrasound**
  A flexible 3D ultrasound platform consisting of MEMS transducers, programmable front-end and AI data interpretation brings non-radiative imaging from the clinic to the world.
- **Optical tracking and shape sensing – for X-ray free surgery**
  Optical tracking and optical shape sensing, developed in previous projects, will be generalized into open platforms so that they can be used to locate and track a variety of instruments.
- **A bed monitoring platform – for continuous monitoring**
  An array of sensors in and around the beds of patients will be used to gain valuable patient information. In Moore4Medical it will be used to detect atrial fibrillation during sleep.

European leadership

Open technology platforms used by multiple users for multiple applications with the prospect of medium to high volume markets are an attractive proposition for the European ECS industry. The combination of typical MedTech applications with an ECS style platform approach will enhance the competitiveness of the rapidly emerging medical domains addressed in Moore4Medical.

Finally, Moore4Medical will help in managing the cost of healthcare through:

- **Prevention instead of curing**
  As a result of a better monitoring and medication adherence.
- **Reducing hospitalization**
  Through new and better technologies to monitor people in their home environment.
- **Affordable point-of-care diagnostic tools**
  For instance enabled by affordable (MEMS) ultrasound equipment with embedded AI.
- **Personalized treatment to replace "blockbuster" therapies**
  Through closed loop targeted neuromodulator with minimal side effects and new drugs that have been developed using state-of-the-art human organ and disease models.