



Contract no. 016817

SmartHEALTH

Smart Integrated Biodiagnostic Systems for Healthcare

INSTRUMENT: Integrated Project

PRIORITY: FP6-2004-IST-NMP-2

Publishable Results (taken from 3rd Periodic Activity Report)

Period Covered: from 1st December 2007 to 30th November 2008

Date of Preparation: 17th January 2009

Start date of project: 1st December 2005 Duration: 48 months

Revision: v1

Project Coordinator Name: Prof. Calum McNeil
Coordinator Organisation: University of Newcastle upon Tyne

UNEW-1: Micro-electro-mechanical (MEMS) sensor device

Result description (products envisaged, functional description, main advantage, innovations)	Newcastle University has developed a novel resonant mass sensor detector and biomolecular patterning technique, the advantages of which include: a) inherent design and performance characteristics which confer a two-order of magnitude increase in sensitivity compared with existing mass sensors based on resonant structures, b) an in-built compensation mechanism for all non-specific interactions, c) dimensions and geometry which are particularly suited to the development of multi-sensor, multi-analyte arrays.
Possible market applications (sectors, type of use...) or how it might be used in further research (including expected timings)	Medical Diagnostics, Drug Discovery, Environmental, Food Safety, Bio-processing, Defence and Homeland Security sectors.
Stage of development (laboratory prototype, demonstrator, industrial product...)	Laboratory prototype which will become demonstrator within 2009.
Collaboration sought or offered (manufacturing agreement, financial support or investment, information exchange, training, consultancy, other)	The technology is available for co-development and licensing.
Collaborator details (type of partner sought, task to be performed)	Companies requiring a sensitive diagnostic platform.
Intellectual property rights granted or published	National stage patents have been granted in Europe and the USA, with patent pending in Canada and Japan.
Contact details	Dr. Samuel Neill, Business Development Manager (Bioscience & Healthcare), Intellectual Property and Commercialisation, Commercial Development Team, Business Development Directorate, Stephenson Building, Newcastle University, Newcastle upon Tyne, NE1 7RU. e- mail: sam.neill@ncl.ac.uk, Tel: +44 191 222 5860.

IMM-1: General detection chip (chip 1)

Result description (products envisaged, functional description, main advantage, innovations)	Development of a chip for protein detection by an integrated ELISA assay with an electrochemical sensor system. This should be in combination with results of instrument A
Possible market applications (sectors, type of use...) or how it might be used in further research (including expected timings)	Biomedical instrumentation/diagnostics
Stage of development (laboratory prototype, demonstrator, industrial product...)	Laboratory prototype
Collaboration sought or offered (manufacturing agreement, financial support or investment, information exchange, training, consultancy, other)	
Collaborator details (type of partner sought, task to be performed)	Biomedical instrumentation company
Intellectual property rights granted or published	None
Contact details	Frithjof v. Germar Institut für Mikrotechnik Mainz GmbH Carl-Zeiss-Str. 18-20 D-55129 Mainz

IMM-2: Cervical cancer detection chip

Result description (products envisaged, functional description, main advantage, innovations)	Functional integration into a microfluidic cartridge including cell concentration, cell lysis, RNA purification, Reverse Transcription, qPCR detection, optical readout. This should be combined with results of SINTEF, CSEM and OIJ regarding the instrument development.
Possible market applications (sectors, type of use...) or how it might be used in further research (including expected timings)	Biomedical instrumentation/diagnostics
Stage of development (laboratory prototype, demonstrator, industrial product...)	Laboratory prototype
Collaboration sought or offered (manufacturing agreement, financial support or investment, information exchange, training, consultancy, other)	
Collaborator details (type of partner sought, task to be performed)	Biomedical instrumentation company
Intellectual property rights granted or published	None
Contact details	Frithjof v. Germar Institut für Mikrotechnik Mainz GmbH Carl-Zeiss-Str. 18-20 D-55129 Mainz

IBMT-1: Packaging and Integration of MEMS Biochips

Result description (products envisaged, functional description, main advantage, innovations)	Customized Chip-on-Board technique for the packaging and integration of a MEMS device, especially biochip. It provides reliable electrical connection of the chip and protects the connections against environmental impact, while simultaneously maintaining ambient access to functional chip surface areas. A very compact and flat design could be realized, which can be easily interfaced to an appropriate fluidic cartridge.
Possible market applications (sectors, type of use...) or how it might be used in further research (including expected timings)	The technique might be useful with regard to Lab-on-Chip systems for biological and chemical applications. If a three-chip-design with chip dimensions of 2 mm x 2 mm is aspired, available tools like the silicone mould can be used directly. Elsewhere, modified tools must be designed - adaptation to special demands will require about six months.
Stage of development (laboratory prototype, demonstrator, industrial product...)	Laboratory prototype, demonstrator.
Collaboration sought or offered (manufacturing agreement, financial support or investment, information exchange, training, consultancy, other)	Collaboration might consist of research and development contracts for customized integration challenges up to small scale production.
Collaborator details (type of partner sought, task to be performed)	Companies developing MEMS multichip-modules, especially for microfluidic applications. Research institutions who wish to integrate and test their MEMS devices.
Intellectual property rights granted or published	EP 0 995 235 B1: Contact for very small liaison contacts and method for producing a contact.
Contact details	margit.biehl@ibmt.fraunhofer.de

IBMT-5: Semantic Coordination of Ambient Intelligent Medical Devices

Result description (products envisaged, functional description, main advantage, innovations)	The SMDS software framework provides a technique for semantic interoperability and ambient intelligence of medical devices. More concretely, it is a methodology for the discovery and invocation of semantic web services offered by the medical devices and/or sensors in a network characterised by first extracting the physical and/or functional characteristics from one or more ontologies stored locally on a medical device or sensor, matching with the requirements of a particular application and then invoking the desired semantic web services.
Possible market applications (sectors, type of use...) or how it might be used in further research (including expected timings)	The technique might be used for medical device development and for making devices intelligent and interoperable
Stage of development (laboratory prototype, demonstrator, industrial product...)	Laboratory prototype, demonstrator.
Collaboration sought or offered (manufacturing agreement, financial support or investment, information exchange, training, consultancy, other)	Collaboration might consist of research and development contracts for customized development/integration challenges or licensing models.
Collaborator details (type of partner sought, task to be performed)	Medical device manufactures, research organisations
Intellectual property rights granted or published	Europ. Patent Number: 08016368.6 Title: Semantic Coordination of Ambient Intelligent Medical Devices FPL-Case number: 08F49628-IBMT-EP
Contact details	Stephan.Kiefer@ibmt.fraunhofer.de

TNO-1 Microfluidic platform for selection and implementation of (m)RNA isolation assays Title of new public result

Result description (products envisaged, functional description, main advantage, innovations)	Solutions/knowledge for (microfluidic and biological aspects of) transferring lab bench scale bioassays into disposable lab-on-chip (microfluidic cartridge) designs.
Possible market applications (sectors, type of use...) or how it might be used in further research (including expected timings)	Point of care, diagnostics, drugs testing
Stage of development (laboratory prototype, demonstrator, industrial product...)	Laboratory prototype
Collaboration sought or offered (manufacturing agreement, financial support or investment, information exchange, training, consultancy, other)	Companies interested in exploitation of research results or further development based on current technology, looking for know how on transferring bioassays into microfluidic cartridges
Collaborator details (type of partner sought, task to be performed)	Supplier / OEM of biomedical, diagnostic test devices, equipment and kits.
Intellectual property rights granted or published	-
Contact details	martijn.degraaff@tno.nl

Gaiker-1: Molecular diagnosis of colorectal cancer from blood

Result description (products envisaged, functional description, main advantage, innovations)	A panel of molecular markers based on RNA molecules able to distinguish between colorectal cancer and healthy state from a blood sample by PCR. This will be a simple, fast and non-invasive method to screen for colorectal cancer. Patentability to be assessed first.
Possible market applications (sectors, type of use...) or how it might be used in further research (including expected timings)	This panel is envisaged to be used by an oncologist or a general practitioner as a way to screen population at risk of colorectal cancer.
Stage of development (laboratory prototype, demonstrator, industrial product...)	A total of 15 markers and 4 housekeeping genes are being analysed to search for the most selective markers for a diagnosis application.
Collaboration sought or offered (manufacturing agreement, financial support or investment, information exchange, training, consultancy, other)	Company interested in the development of a handheld device to screen a set of markers by PCR from small amounts of RNA derived from blood. Commercial company interested in the exploitation of the above device.
Collaborator details (type of partner sought, task to be performed)	Device developer company, Biomedical Instrumentation company, marketing.
Intellectual property rights granted or published	None as yet. To be applied for during 2009 if results from a market study allow so.
Contact details	bsuarez@gaiker.es

Gaiker-2: Molecular prognosis of colorectal cancer from blood

Result description (products envisaged, functional description, main advantage, innovations)	A panel of molecular markers based on RNA molecules able to distinguish between different stages of colorectal cancer from a blood sample by PCR. This will be a simple, fast and non-invasive method to screen for colorectal cancer. Patentability to be assessed first.
Possible market applications (sectors, type of use...) or how it might be used in further research (including expected timings)	This panel is envisaged to be used by an oncologist or a general practitioner as a way to screen population suffering from colorectal cancer.
Stage of development (laboratory prototype, demonstrator, industrial product...)	A total of 15 markers and 4 housekeeping genes are being analysed to search for the most selective markers for a prognosis application.
Collaboration sought or offered (manufacturing agreement, financial support or investment, information exchange, training, consultancy, other)	Company interested in the development of a handheld device to screen a set of markers by PCR from small amounts of RNA derived from blood. Commercial company interested in the exploitation of the above device.
Collaborator details (type of partner sought, task to be performed)	Device developer company, Biomedical Instrumentation company, marketing
Intellectual property rights granted or published	None as yet. To be applied for during 2009 if results from a market study allow so.
Contact details	bsuarez@gaiker.es

FDAB-1: Monoclonal antibodies against HPV16 and 18 E7 oncoprotein

Result description (products envisaged, functional description, main advantage, innovations)	Monoclonal antibodies specific for HPV 16 and 18 E7 oncoprotein
Possible market applications (sectors, type of use...) or how it might be used in further research (including expected timings)	Useful for research community with focus on HPV and early detection of malignant transformation to cervical cancer.
Stage of development (laboratory prototype, demonstrator, industrial product...)	Research reagents
Collaboration sought or offered (manufacturing agreement, financial support or investment, information exchange, training, consultancy, other)	Distribution of E7 MAb as research reagents
Collaborator details (type of partner sought, task to be performed)	Antibody supplying commercial company
Intellectual property rights granted or published	none
Contact details	olle.nilsson@fdab.com

FDAB-2: Immunoassays for HPV16 and 18 E7 oncoproteins

Result description (products envisaged, functional description, main advantage, innovations)	Sandwich immunoassays specific for HPV 16 and 18 E7 oncoprotein
Possible market applications (sectors, type of use...) or how it might be used in further research (including expected timings)	Useful for research community with focus on HPV and early detection of malignant transformation to cervical cancer.
Stage of development (laboratory prototype, demonstrator, industrial product...)	Highly sensitive immunoassays assays not yet validated on clinical samples
Collaboration sought or offered (manufacturing agreement, financial support or investment, information exchange, training, consultancy, other)	
Collaborator details (type of partner sought, task to be performed)	
Intellectual property rights granted or published	none
Contact details	olle.nilsson@fdab.com

SINTEF-1: instrumentation platform for hand-held POC devices

Result description (products envisaged, functional description, main advantage, innovations)	Development of a handheld instrumentation platform for analysis of lab-on-a-chip cartridges
Possible market applications (sectors, type of use...) or how it might be used in further research (including expected timings)	Biomedical instrumentation
Stage of development (laboratory prototype, demonstrator, industrial product...)	Laboratory prototype
Collaboration sought or offered (manufacturing agreement, financial support or investment, information exchange, training, consultancy, other)	Commercial partner for exploitation of research
Collaborator details (type of partner sought, task to be performed)	Biomedical instrumentation company
Intellectual property rights granted or published	None
Contact details	Frode Strisland, SINTEF ICT, P.O.Box 124 Blindern, NO - 0314 Oslo, Norway

SINTEF-2: Fluorescence detection solution

Result description (products envisaged, functional description, main advantage, innovations)	Fluorescence detection solution for disposable lab-on-a-chip cartridges
Possible market applications (sectors, type of use...) or how it might be used in further research (including expected timings)	Biomedical instrumentation for qPCR and NASBA type amplification techniques
Stage of development (laboratory prototype, demonstrator, industrial product...)	Laboratory prototype
Collaboration sought or offered (manufacturing agreement, financial support or investment, information exchange, training, consultancy, other)	Commercial company interested in exploitation of research results or further development based on current technology
Collaborator details (type of partner sought, task to be performed)	Biomedical instrumentation company
Intellectual property rights granted or published	Patent application under development
Contact details	Frode Strisland, SINTEF ICT, P.O.Box 124 Blindern, NO - 0314 Oslo, Norway

MultiD-1: A neural network module to the GenEx software

Result description (products envisaged, functional description, main advantage, innovations)	A neural network module to the GenEx software was developed as part of the SmartHEALTH project last year. It is a valuable prediction tool that will assist doctors in making diagnosis of cancer by using the SmartHEALTH biodiagnostic system. The neural network predictions are themselves associated with intrinsic levels of confidence depending on the particular clinical measurements. It would be of added value for the doctor to also receive a report on these confidence levels for each clinical measurement.
Possible market applications (sectors, type of use...) or how it might be used in further research (including expected timings)	Any clinical market that exploits neural network predictions could also have an advantage of using reports of confidence levels on the predictions. In our case we will develop this for use together with realtime-qPCR expression profiling. Development of a GenEx module with this purpose will be initiated 2008 and a commercial product will be available by the latest 2009.
Stage of development (laboratory prototype, demonstrator, industrial product...)	Prototype
Collaboration sought or offered (manufacturing agreement, financial support or investment, information exchange, training, consultancy, other)	Information exchange
Collaborator details (type of partner sought, task to be performed)	Computer programming, marketing
Intellectual property rights granted or published	None
Contact details	anders.bergkvist@multid.se