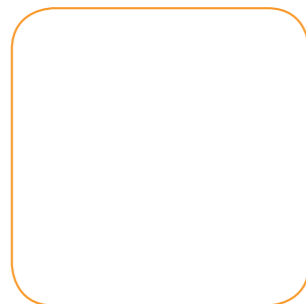
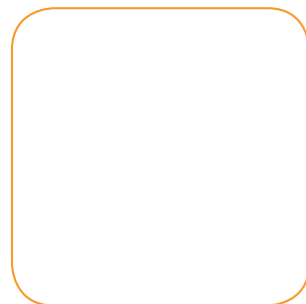
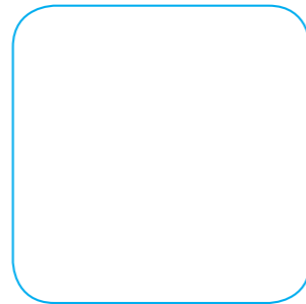


Contact Details

Dr. Leif Hanlen
NICTA – Canberra Research Laboratory
7 London Circuit
Canberra ACT 2612
Telephone: +61 2 6267 6246
Email: Leif.Hanlen@nicta.com.au
NICTA website: www.nicta.com.au



National ICT Australia is funded by the Australian Government's Department of Communications, Information Technology and the Arts and the Australian Research Council through Backing Australia's Ability and the ICT Centre of Excellence program.

NICTA is supported by its members:
•The Australian Capital Territory
•The Australian National University
•NSW Department of State and Regional Development
•The University of New South Wales

NICTA is supported by its affiliate partners:
•University of Sydney
•Victorian Government
•University of Melbourne
•Queensland Government
•Griffith University
•Queensland University of Technology
•The University of Queensland



BANESH (Body Area Networks for Embedded Systems for Humans)

from imagination to impact

2

The challenge

When elite athletes become fatigued their competitive edge may be lost. In the emergency services and defence industries, fatigue may be fatal. Monitoring human performance is critical to ensure safety and peak competitive output.

Coaches and commanders need to monitor personnel in training and in the field, and to have instant feedback on performance.

At present, athletes and soldiers are monitored under special laboratory conditions, have data returned to base after several days of logging, and may fill out surveys to determine their own performance.

The athlete and soldier of the future will be continuously monitored by coaches and commanders: the challenge is to interpret, transmit and present the data.

The NICTA approach

The BANESH project is focussed on developing small, smart devices which collect, interpret and transmit, biometric data reliably to those who need it in a form they can use, when they need it.

The development of such wearable and implantable devices allows new opportunities to monitor and analyze the biometric status of humans in a range of unrestricted natural activities and environments.

BANESH works by collecting data from small inexpensive sensors measuring heart-rate acceleration and position (via GPS). The biometric data is transformed into useful information as follows:

Collect: Smart processing algorithms combine the sensor data to detect patterns such as fatigue. Creating such algorithms is the task of the Machine Learning sub-group.

Share: The meaningful information is transmitted back to coaches wirelessly, in a time frame that ensures the data is up-to-the-minute. NICTA's wireless networking technology ensures the information is shared and stored reliably and securely.

Present: At the coach's end, the information must be understandable and useful: to help decision making. This requires prioritizing based upon what is happening and the user's needs. This employs NICTA's expertise in User Interface design.

ICT: The critical component

NICTA adds value by interpreting the raw data from inexpensive sensors to create useful information; and providing this information where and when it is needed. This process requires wide expertise in information communication technology - which is unique to NICTA.

BANESH will collect biometric data (such as heart rate) from sensors, filter this through algorithms to extract particular patterns (such as fatigue), transmit the data (using wireless networks) to commanders where it will be adapted and presented in a meaningful manner.

Future technologies - such as nanotechnology - may play a role in developing sensors, allowing miniaturisation and implanting of the BANESH technology.

NICTA partnerships

NICTA is forming collaborations with technology-users and technology-manufacturers, in addition to research institutes. This ensures our research has maximum national and international impact.

BANESH has received very positive feedback from elite sports, defence and emergency service industries.

Small, smart devices; collecting, interpreting and transmitting biometric data, reliably to those who need it, in a form they can use, when they need it. Allowing effective decision making.

