

# Fit4WORK

www.fit4work-aal.eu

SELF-MANAGEMENT  
OF PHYSICAL AND MENTAL FITNESS  
OF OLDER WORKERS



## CO-FUNDED BY



AAL  
PROGRAMME



EFSCADI  
EXECUTIVE AGENCY FOR  
HIGHER EDUCATION,  
RESEARCH, DEVELOPMENT  
AND INNOVATION  
FUNDING



REPUBLIC OF SLOVENIA  
MINISTRY OF HIGHER EDUCATION,  
SCIENCE AND TECHNOLOGY



## PARTNERS





SELF-MANAGEMENT OF PHYSICAL AND MENTAL FITNESS OF OLDER WORKERS

## Does an AAL Programme project need more support from its investor?

Michał Kosiedowski, Project Coordinator  
Poznań Supercomputing and Networking Center

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### PARTNERS



## Consortium



Research entities



Enterprises

TEAMNET



User organization

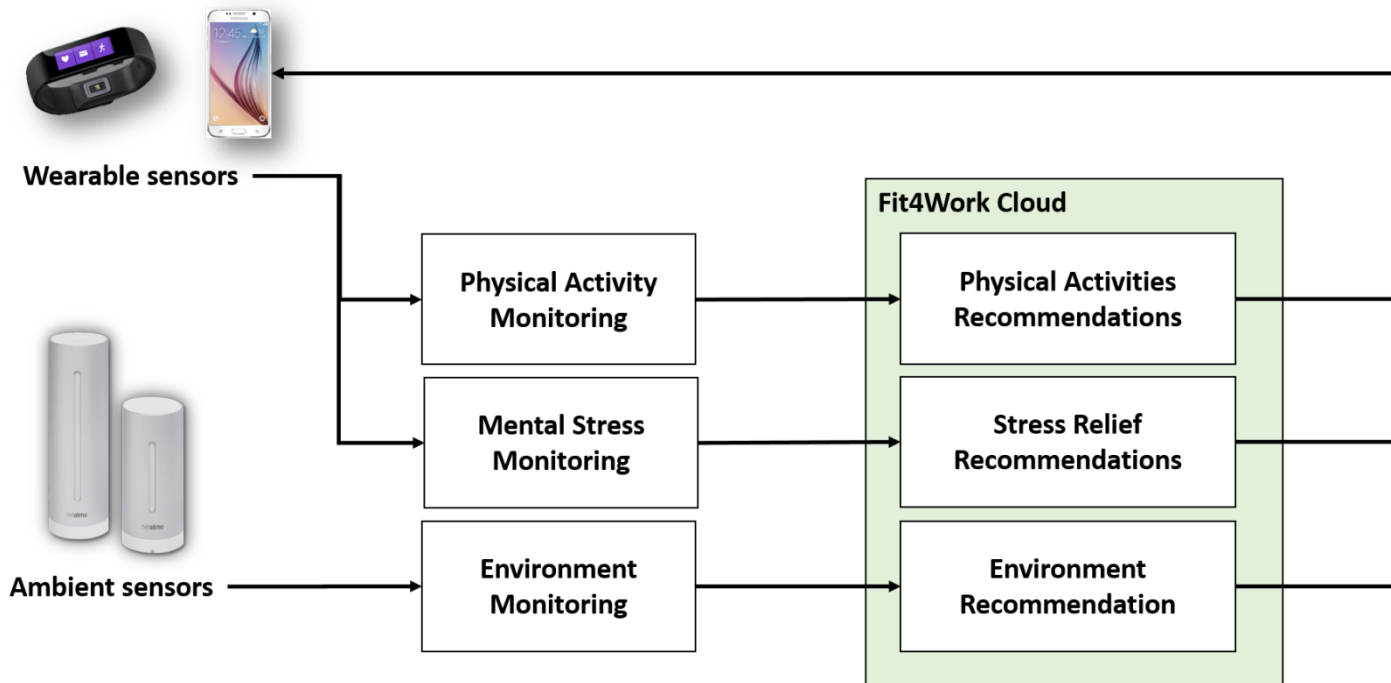
## Objective

**innovative easy-to-use and unobtrusive system**  
**that supports older workers in reducing and**  
**managing physical, mental and environmental**  
**stress resulting from their occupation**

## What should the solution do?

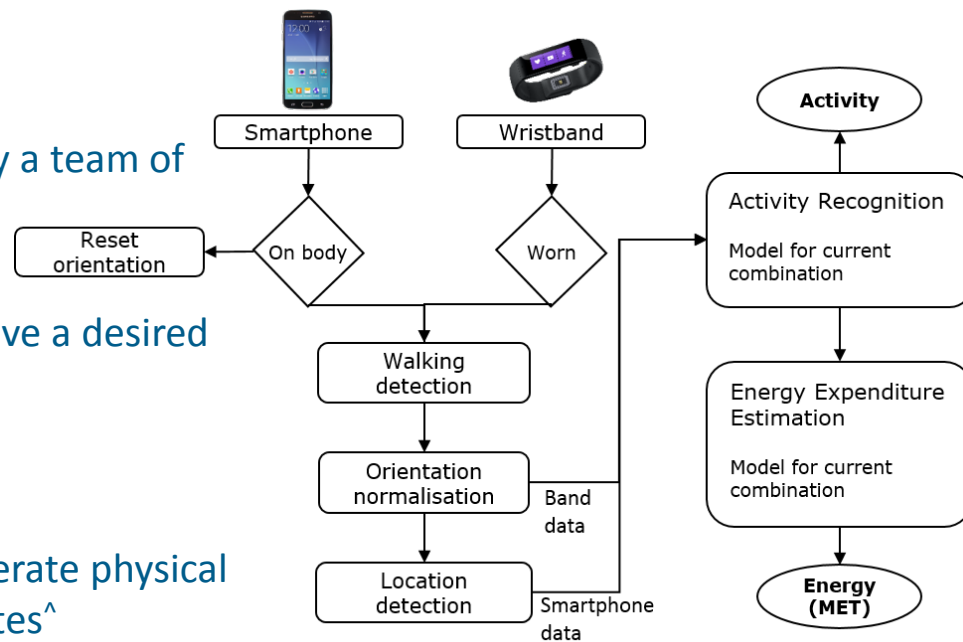


# Stress monitoring in Fit4Work



# Physical activity monitoring

- Results from earlier (and project) work by a team of researchers at Jožef Stefan Institute\*
- Monitoring in order to help the user achieve a desired level of physical activity:
  - Daily goal
    - 200 active kcal<sup>#</sup>
    - one (or more) continuous moderate physical activity lasting at least 10 minutes<sup>^</sup>



\* Cvetković, B., Janko, V., & Luštrek, M. (2015). Activity Recognition and Human Energy Expenditure Estimation with a Smartphone. Proceedings of PerCom 2015

<sup>#</sup> Pate R.R., Pratt M., Blair S.N., Haskell W.L., Macera C.A., Bouchard C., Buchner D., Ettinger W., Heath G.W., King A.C. (1995). Physical activity and public health: a recommendation from the Centers for Disease Control and Prevention and the American College of Sports Medicine. *Journal of the American Medical Association* 273 (5): 402-407.

<sup>^</sup> World Health Organization (2010). *Global Recommendations on Physical Activity for Health*. WHO Library Cataloguing-in-Publication Data

## Postural stress monitoring

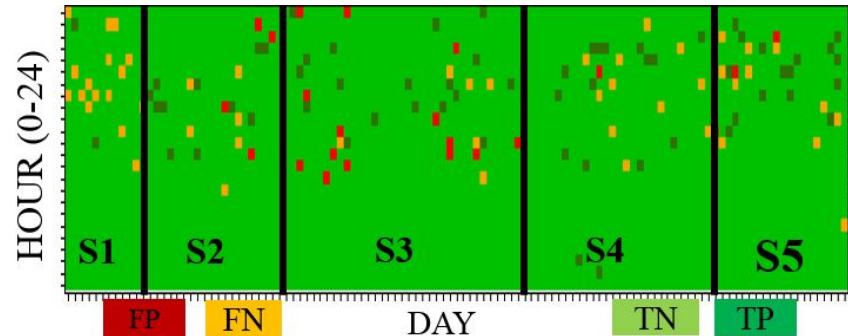
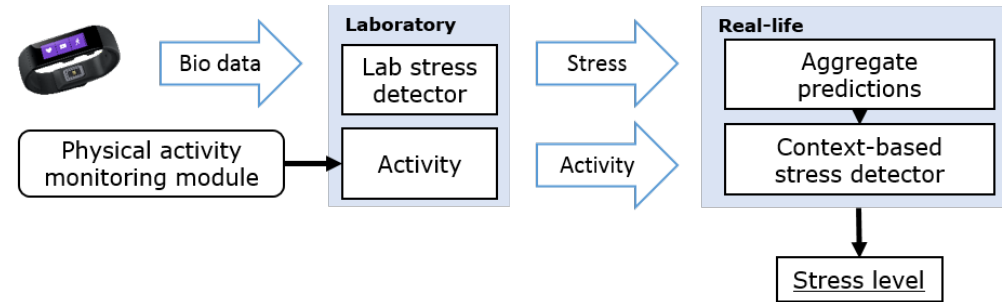
- Monitored through detecting type of physical activity
- Recognized activities:
  - Standing
  - Sitting
  - Walking
  - Running
  - Lying
  - Cycling
  - Mixed (standing activity like e.g. cooking)
  - Transition
- Goal: detect prolonged physically demanding positioning of the users (e.g. office – sitting for longer than an hour straight) and recommend to take a relevant break from this positioning (e.g. stand up and take a walk)





# Mental stress monitoring

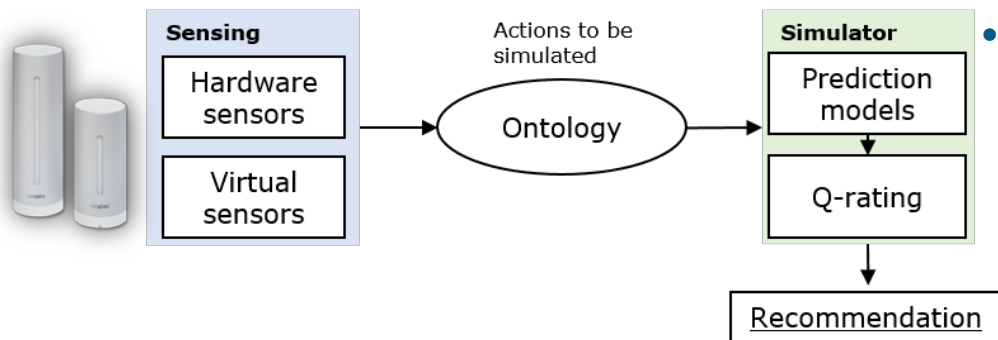
- Machine-learning method applied on raw data collected from bio-sensors
  - blood volume pulse
  - heart rate
  - R-R intervals (heart rate variability)
  - galvanic skin response
  - skin temperature
  - and acceleration sensor.
- Processed using signal processing techniques in order to provide numerical features relevant for stress
- Goal: detect the level of mental stress as a derivative of
  - physiological signals
  - context



*Stress classifications: green correct, yellow&red false*

## Workplace conditions monitoring

- Good workplace conditions – ISO standards:
  - air temperature
  - concentration of carbon dioxide - CO<sub>2</sub> - in the air
  - relative humidity
  - noise
  - luminosity
- Goal: detect if any workplace environment condition is outside the norm and recommend action that could help to improve that
- The algorithm needs configuration based on available (in the given workplace) measures of changing the environment (e.g. availability of air conditioning)



- The algorithm uses external temperature and external relative humidity measurements in working out recommendations that might relate to opening windows

## Functional exercise

- Goal: ensure functional independence (at work / occupation) through a programme of functional exercises with multiple (difficulty) levels
- Exercises do NOT pose risk for persons with (minor) health problems



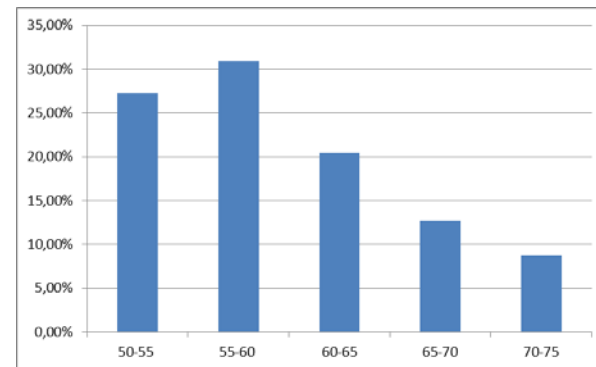
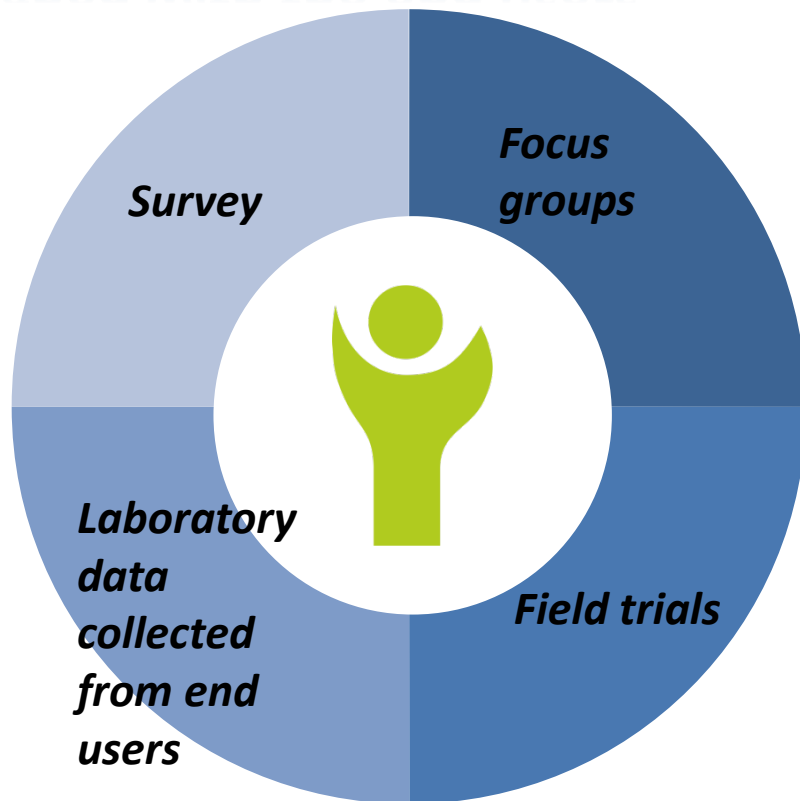
*Long term goal: use 3D motion sensor built into the smartphone*

# User application



*Complimentary PC (web) interface*

# Designed with the end users



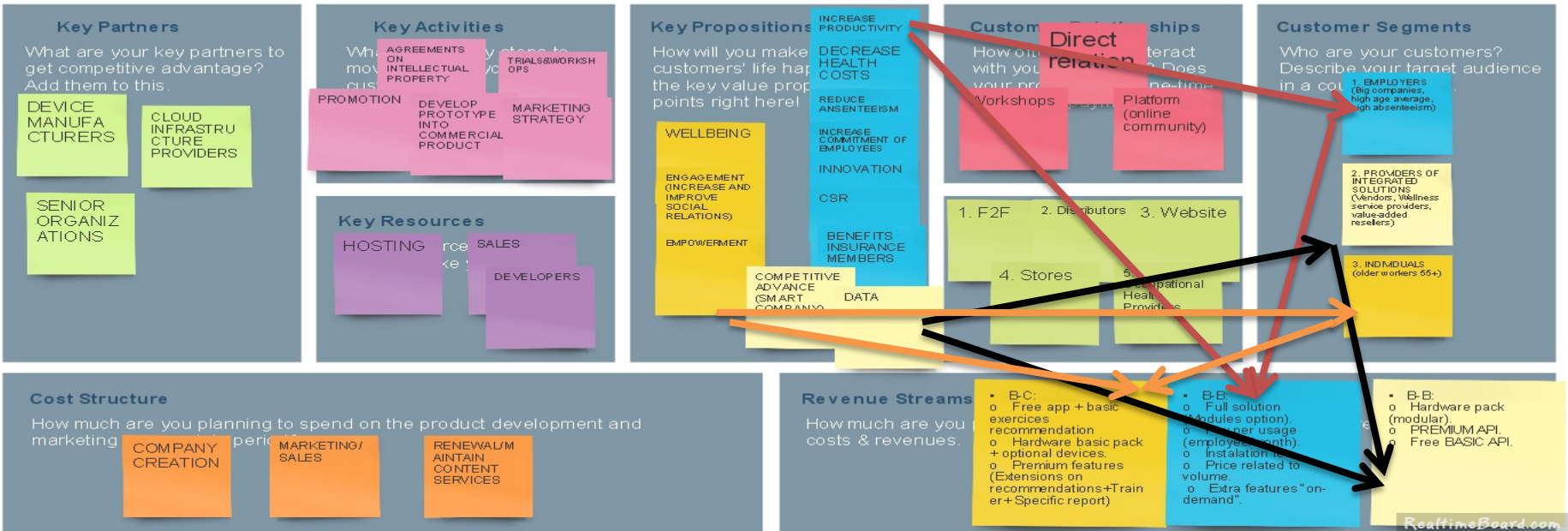
*Survey: age of respondents*



*Physical activity monitoring: laboratory data collection*

## Business model

Project name: FIT4WORK



## Target customers

- **Employers**



- Companies 1.000-3.000 employees
- Retailers and manufacturers
- Other factors:
  - High age average
  - High absenteeism

**PRIMARY (envisaged)  
CUSTOMER SEGMENT**

- **Providers of integrated solutions**



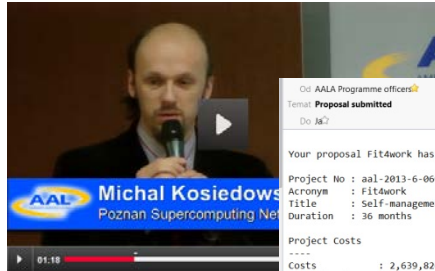
- Vendors
- Wellness service providers
- Value-added resellers

- **Individuals (Older Workers)**



- Older worker 55+

# AAL Programme project life cycle



Idea

Old AALA Programme officers

Temat: **Proposal submitted**

Do: **AA**

Your proposal Fit4work has been successfully submitted.

Project No : aal-2013-6-060  
 Acronym : Fit4work  
 Title : Self-management of physical and mental fitness of older workers  
 Duration : 36 months

Project Costs  
 ----  
 Costs : 2,639,826.80 Euro  
 Subcontract : 55,200.00 Euro  
 Contribution : 1,910,850.50 Euro  
 Effort : 426.60 person months  
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INTRODUCTION

*R+D investment*

THIS CONSORTIUM AGREEMENT is based upon Decision No 742/2008/EC of the European Parliament and of the Council of 9 July 2008 on the Community's participation in a research and development programme undertaken by several Member States aimed at enhancing the quality of life of older people through the use of new information and communication technologies, henceforth referred to as the Basic Act, General Agreement No. 30-CE-00228962/00-54 with its Annex: "Detailed arrangements for the AAL Joint Programme", Call for Proposals AAL-2013-6, bilateral agreements between Ambient Assisted Living Association and Narodowe Centrum Badań i Rozwoju (National Centre for Research and Development, Poland), Luxinnovation GIE (National Agency for Innovation and Research, Luxembourg), ZonMw (The Netherlands Organisation for Health Research and Development, The Netherlands), Unitatea Executiva pentru Finantarea Invatamantului Superior, a Cercetarii, Dezvoltarii si Inovarii (Executive Agency for Higher Education, Research, Development and Innovation Funding, Romania), Ministrstvo za Visoko šolstvo, Znanost in Tehnologijo (Ministry of Higher Education, Science and Technology, Slovenia), Ministerio de Industria, Energia y Turismo (Ministry of Industry, Energy and Tourism, Spain) henceforth referred to as Administrative Agreements, bilateral agreements between:

- Narodowe Centrum Badań i Rozwoju and Institute of Bioorganic Chemistry of the Polish Academy of Sciences- Poznan Supercomputing and Networking Center,



Solution prototype



Commercialization







SELF-MANAGEMENT OF PHYSICAL AND MENTAL FITNESS OF OLDER WORKERS

Project coordinator:

Poznan Supercomputing and Networking Center

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[www.fit4work-aal.eu](http://www.fit4work-aal.eu)

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The National Centre  
for Research and Development



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