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mmea

Measurement, Monitoring and Environmental Assessment

From measurements to services - the CLEEN approach

EURACHEM Workshop 21.5.2013

Tero Eklin MIKES/CLEEN Ltd

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Measurement, Monitoring and Environmental Assessment

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Cluster for Energy and Environment

- A non-profit limited Company (reg. 16.7. 2008)
- 45 shareholders
- Industry driven joint R&D&I, open innovation platform

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Principles

The shareholders define the focus, targets and practices for CLEEN Oy

The current focus areas of CLEEN Oy are described in the Strategic Research Agenda (SRA) defining the areas where CLEEN aims to initiate joint research activities

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DEMAND FOR SUSTAINABLE
”green footprint” SOLUTIONS

BIG DATA

New enabling technologies

Nanotechnology, sensor networks, …

Societal benefits & business opportunities for everyone

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MMEA fast facts

- Scheduled for 5 years.
- Program started practically in may 2010
- Annual total budget about 10.7 M€
- Total budget 54,5 M€, TEKES funded
- 44 partners including 19 SMEs and 13 research institutes & universities

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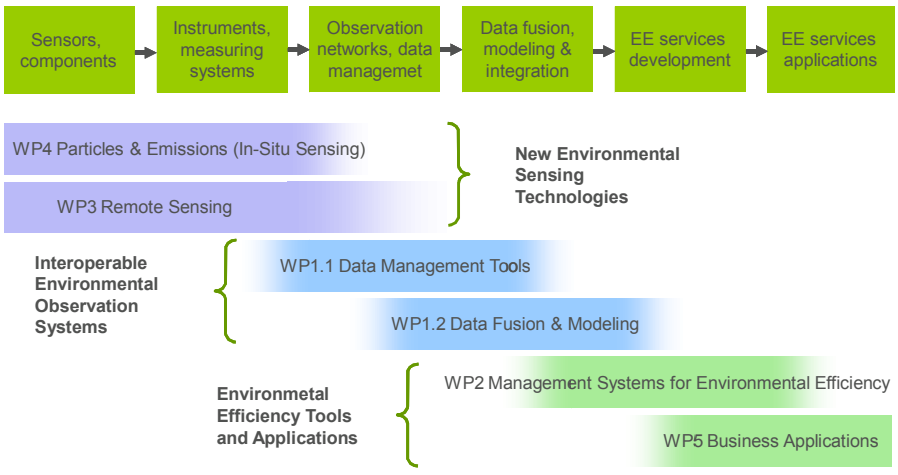
MMEA contents



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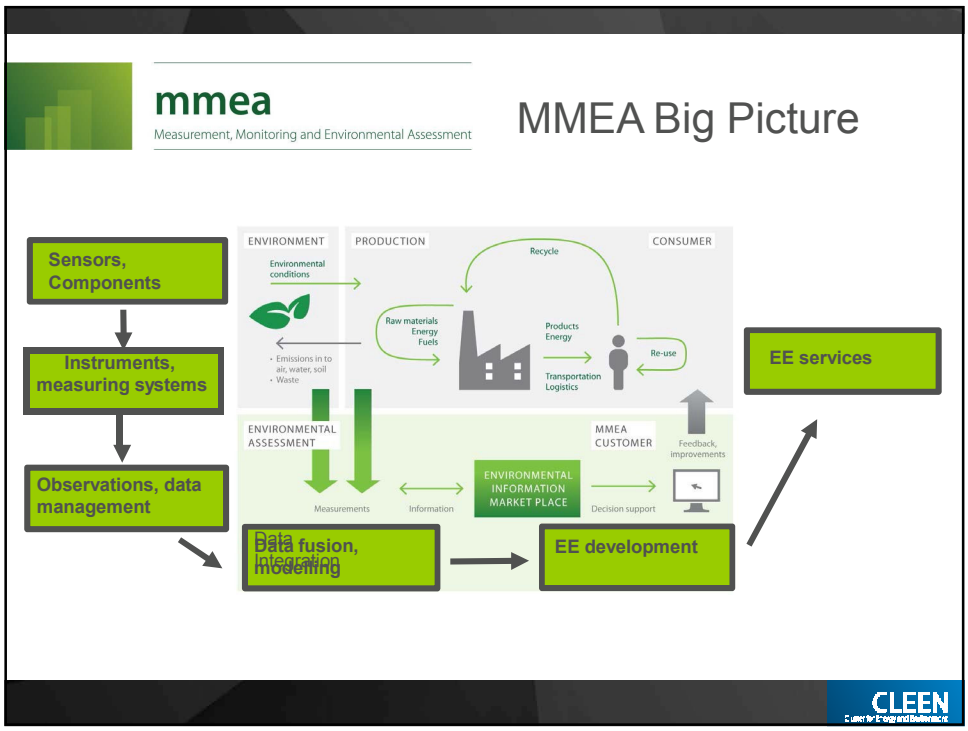
mmea
Measurement, Monitoring and Environmental Assessment
MMEA Big Picture
Sensors, Components
Instruments, measuring systems
Observations, data management
Data fusion, modelling
EE development
EE services
ENVIRONMENT
PRODUCTION
CONSUMER
Environmental conditions
Recycle
Raw materials Energy Fuels
Products Energy
Re-use
Transportation Logistics
Emissions in to air, water, soil
Waste
ENVIRONMENTAL ASSESSMENT
MMEA CUSTOMER
Feedback, improvements
Measurements
Information
ENVIRONMENTAL INFORMATION MARKET PLACE
Decision support
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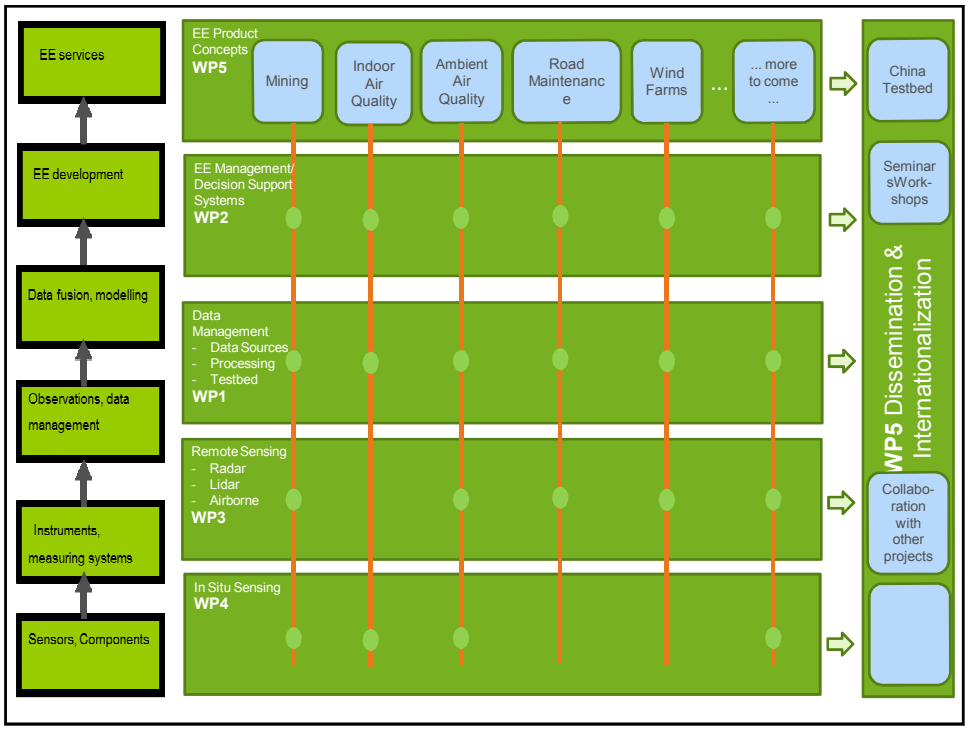
EE services
EE development
Data fusion, modelling
Observations, data management
Instruments, measuring systems
Sensors, Components
EE Product Concepts WP5
Mining
Indoor Air Quality
Ambient Air Quality
Road Maintenance
Wind Farms
... more to come ...
EE Management/ Decision Support Systems WP2
Data Management
- Data Sources
- Processing
- Testbed
WP1
Remote Sensing
- Radar
- Lidar
- Airborne
WP3
In Situ Sensing WP4
China Testbed
Seminar sWork-shops
WP5 Dissemination & Internationalization
Collabo-ration with other projects

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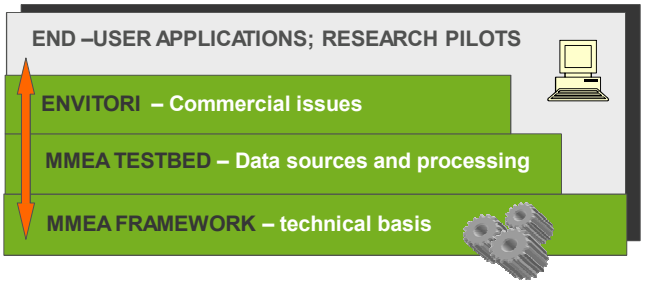
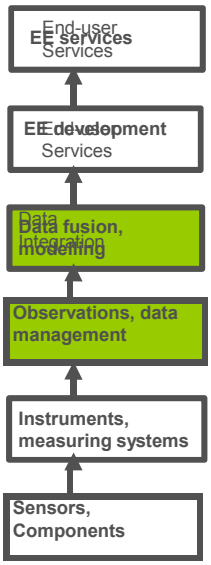
MMEA Platform prototype





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MMEA Testbed

Goal:
Development of
•Aquatic observations and modeling products
•Meteorological and air quality observations and modeling products
•Agro-meteorological observations and modeling products
•Demonstrations of an integrated, interoperable environmental service ecosystem. Extension of Helsinki Testbed to include – in addition to weather - all relevant environmental data (hydrology, water quality, air quality, radiation, etc.)

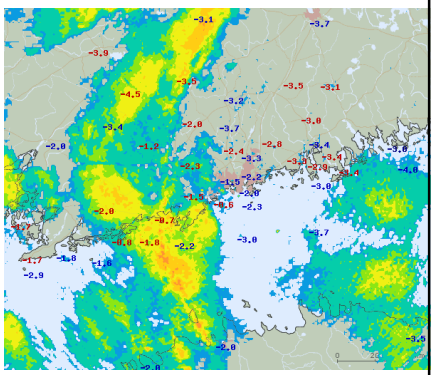

Image: Helsinki Testbed

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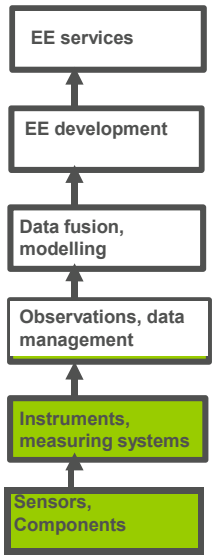
Novel radar

- The preliminary design and documentation of the new 3-frequency radar platform has been completed, and the assembly of the radar has been started
- A working prototype of a new software product for environmental radars.
- Applications in air traffic safety, sand storms, …



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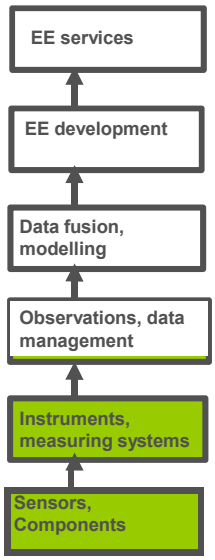
Novel particle sensors

- The performance of particle size measurements for ambient and combustion processes is significantly improved; measurement capability is extended to bipolar charge distributions.
- The capability to generate singly charged particles of known size for calibration purposes is improved.
- New sensors will be tested within China testbed pilot along with participatory sensing application



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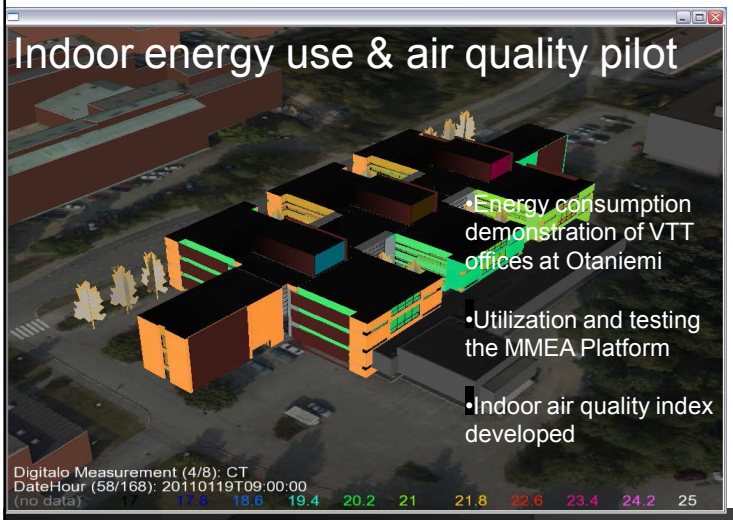
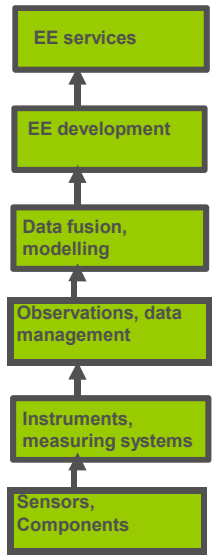
Indoor energy use & air quality pilot



- Energy consumption demonstration of VTT offices at Otaniemi
- Utilization and testing the MMEA Platform
- Indoor air quality index developed



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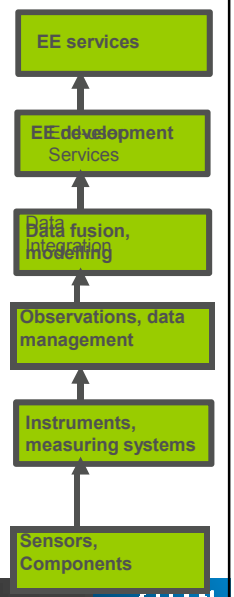
China Testbed

- Business application pilot initiated with Chinese partners, special emphasis is on air quality
- Enables the utilization of MMEA's plug and play sensors and systems
- Participatory sensing included - "Citizens of science"
- MoU signed by both parties



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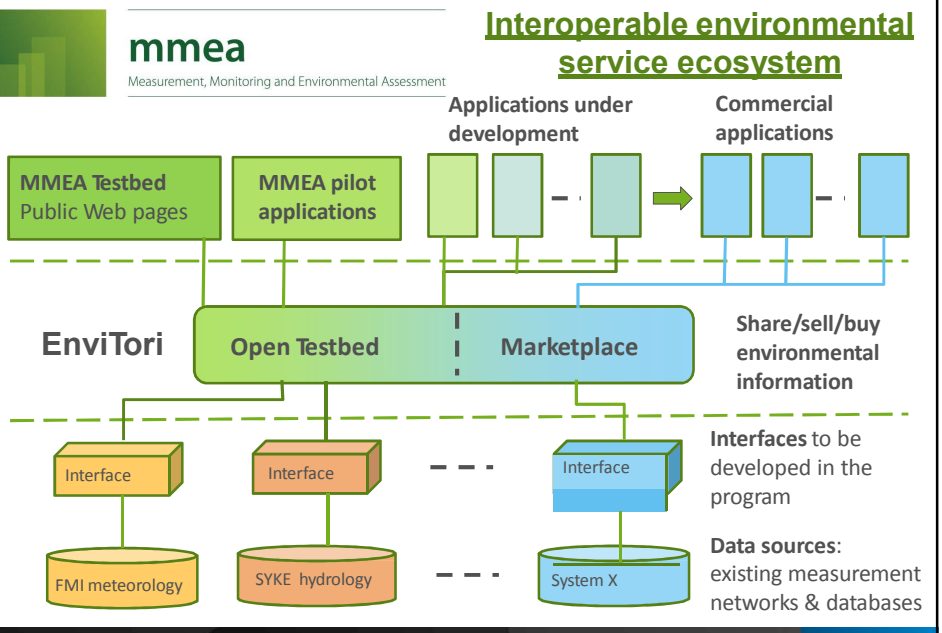
Interoperable environmental service ecosystem



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Data quality

- An integrated part of the MMEA program
- Succesful end user applications require information about data quality

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About Data quality metadata

- Data quality information should be maintained
- Data quality metadata can vary from case to case
- Various kind of data sources for the same parameter (for instance temperature)
- Developers and services should get the data quality metadata in order to provide correct services for intended purposes

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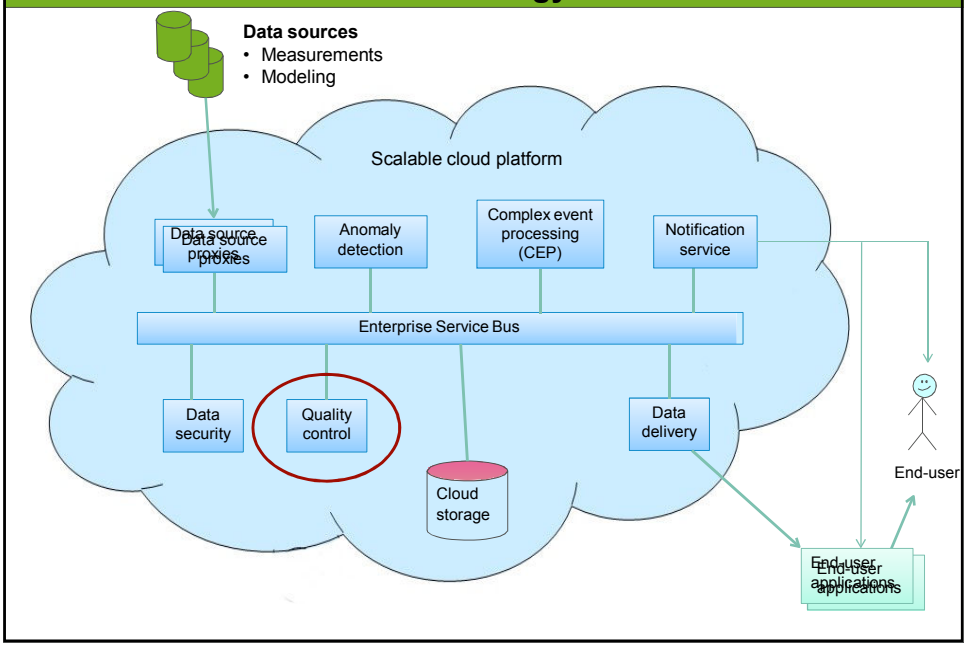
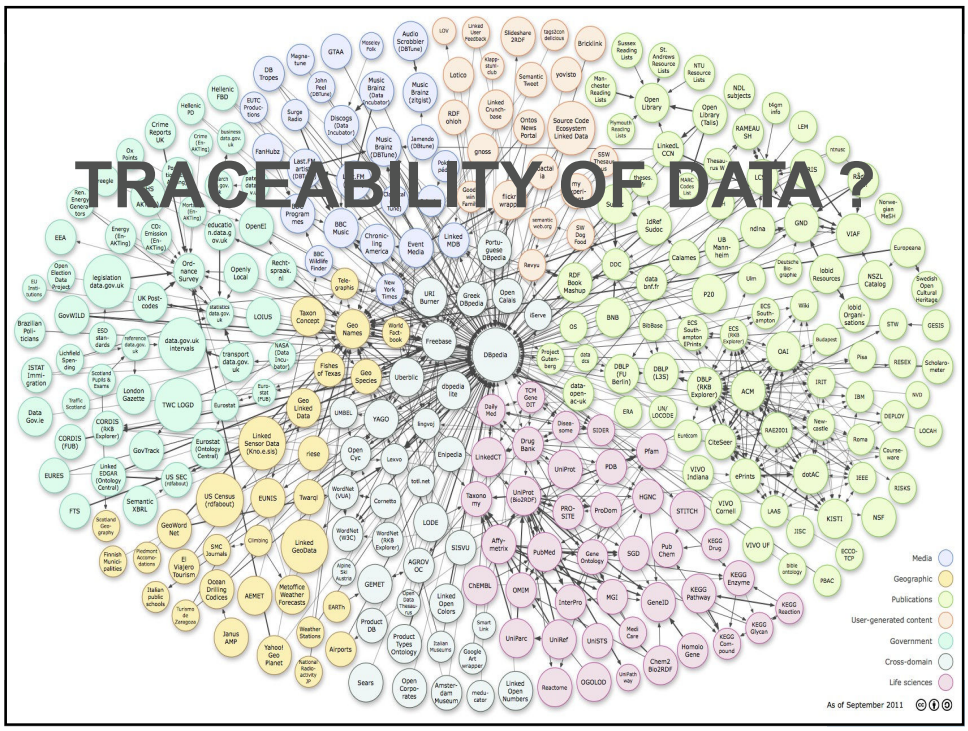
MMEA Platform / EnviTori implementation is based on cloud technology





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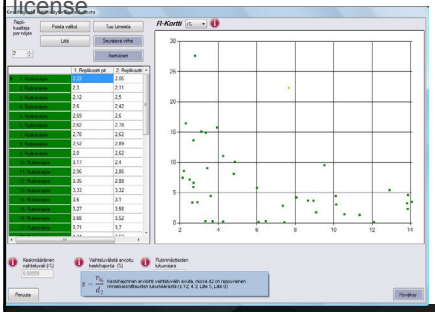
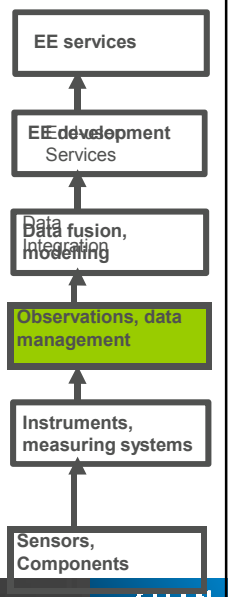
Measurement uncertainty kit

- Tool for estimating the measurement uncertainty
- Supports new data sets to be imported into MMEA platform
- Main contributor SYKE, published as open source under BSD license



ENVICAL MUkit



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What next 2013-2015

- MMEA Testbed will be launched in June
- Data quality algorithms will be tested in pilots and demonstrations
- New algorithms will be developed for on-line systems

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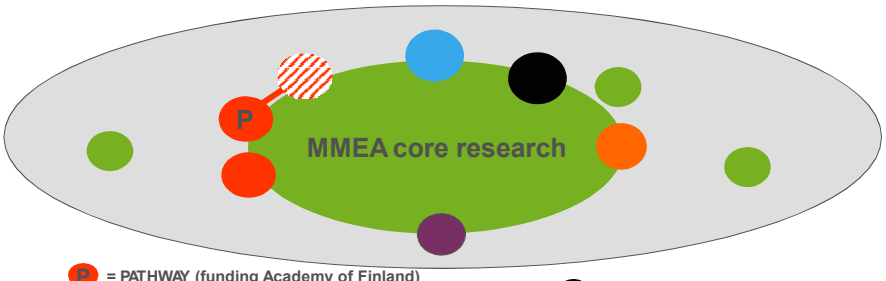
MMEA links & collaboration



- P = PATHWAY (funding Academy of Finland)
- = URCA (funding Academy of Finland)
- = Enterprise group project (Vaisala, One1 Oy, L energia Oy), TEKES funded
- = China Testbed JRP between MMEA and Chinese partners, Chinese partners have organised their own funding
- = MU-kit open source tool collaboration with Tartu University (own funding)
- =collaboration with FCEP & CCSP programs, Green Mining
- = miscallenous collaboration, such as European Metrology Research program (EMRP), OSKEs (TEM funding)
- = FidiPro Prof Chandrasekar & Colorado research team TEKES FUNDING

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"What you cannot measure, you cannot manage or improve"

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