DREAMSys Distributed Remote Environmental Array & Monitoring System

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DREAMSys

Low-cost, long-term environmental noise monitoring and mapping hardware





TSB Technology Programme

- Initiated by DTI but now run by the independent Technology Strategy Board (TSB)
- The TSB vehicle for implementing the Technology Strategy by two mechanism
 - Knowledge Transfer Networks (KTNs)

e.g. Sensors KTN run by NPL

Sponsored Collaborative R&D typically at 50% funding level

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The proposal

New approach to environmental noise monitoring and mapping using novel sensors ...DREAMSys Distributed Remote Environmental Array & Monitoring System

- Value: £1.5M (including 50% partners' contributions)
 - Duration: 3 years

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- Start-date: October 2007



The Partners



SUCCEEDING THROUGH INNOVATION

dti

Networked Enterprise

COLLABORATIVE RESEARC



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National Physical Laboratory

Lead partner: NPL

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Castlegroup chrome stacked.jpg



Other stakeholders: AVI Ltd, Cardiff U., Newcastle U. (INEX), Imperial College, Serco Assurance, Coventry U., DEFRA, DfT, other NPL teams.



 UK & rest of Europe committed to producing strategic noise maps and mitigations



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 Maps based on prediction only (e.g., traffic flow assumptions)





- Complexity of modelling noise leads to limitations
- Validation difficult and often lacking







Only give Long term averages

Long Time

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dB(A)

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- Develop system components
 Second generation microphone
 - Weatherproofed wireless hardware
 - Software for data gathering, fusion, presentation
- Produce components in sufficient numbers for use in DREAMSys



- Assemble and test DREAMSys with 100 measurement points
 - MEMS microphones from QinetiQ
 - Knowles COTS microphones
 - 1 standard sound level meter monitoring station
 - Weather station

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Mounting hardware



- 1 year DREAMSys field trial
 - Identify suitable site
 - Set up and monitor DREAMSys regularly
 - Interim analysis of data
- Resulting in a data set indicating
 - Reliability of noise predictions
 - Daily variations

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Seasonal variations



- Use findings to develop guidance and policy recommendations for future noise mapping exercises
- Exploitation of project outcomes and products





DREAMSys Overview

- Noise mapping by measurement
- Low-cost array
- Dynamic maps
 - Time-based variation
 - Selectable average time



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Masthead Unit

- Silicon MEMS
 microphone
- Very low power signal processing unit with data storage
- Automatic data download via modem to FTP server







Base Unit

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- Houses modem and battery pack
- Space for storage of masthead unit for transit
- Change battery whilst operational
- Adjustable tripod with ground securing for location on any site





Data Transmission

- STORED DATA outputs per period
 - A & C weighted Leq
 - A & C weighted SPL Max
 - 3 Ln values user set in 1% steps







Data Retrieval

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- Data sent to FTP server location
- Downloaded data date and time stamped, with checksum, battery and overload information added
- Clocks re-synchronised at each download
- Analyse as required



Exploitation

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DREAMSys Systems
 Noise Mapping Projects
 Array of Sensors





Exploitation

Environmental Monitor
Short- or long-term
Fixed systems
Boundary monitoring
GSM comms







Exploitation

- Spin-off Products
 New Small Environmental Meter
 Weatherproof Systems
 GSM Ability
 - Dosemeters



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