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VPEC-Program / UK

VEHICLE PARTICLE EMISSIONS CLUB -A PARTNERSHIP OF GOVERNMENT & INDUSTRY

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This paper describes the establishment of a shared-cost research club as a partnership between government and industry as a means of conducting generic research in measurement and calibration issues.

Perceived advantages include the scope to improve the quality and value of measurements, to develop tools which enable laboratories to implement best practice, to work towards national / international comparability of measurements and to avoid duplication of effort on generic issues.

Initial priorities have been established amongst the members and two measurement programmes initiated. In the first, a calibration study to assess the accuracy and precision of the SMPS instruments owned by the member laboratories, with calibration techniques based on a prototype number calibration standard under development at AEA Technology. In the second phase, a round-robin test will be conducted to assess (total) measurement system variability between members CVS facilities. Future priorities likely to remain focused on experimental issues linked with a broader information / 'know-how' content

Vehicle Particle Emissions Club

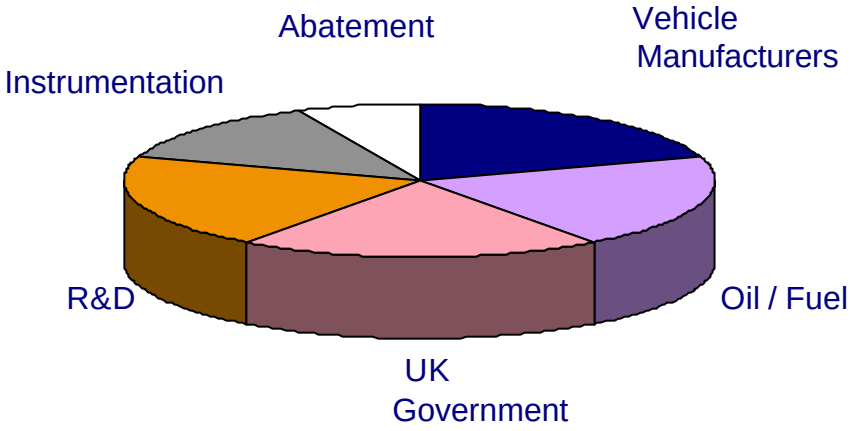
-a partnership of Government & Industry

4th Nanoparticle Conference, ETH Zürich, 2000

John McAughey, AEA Technology

CLUB OBJECTIVES - Measurement

- To improve the quality and value of measurements
- To develop tools which enable laboratories to implement best practice
- To work towards national / international comparability of measurements
- To avoid duplication of effort on generic issues

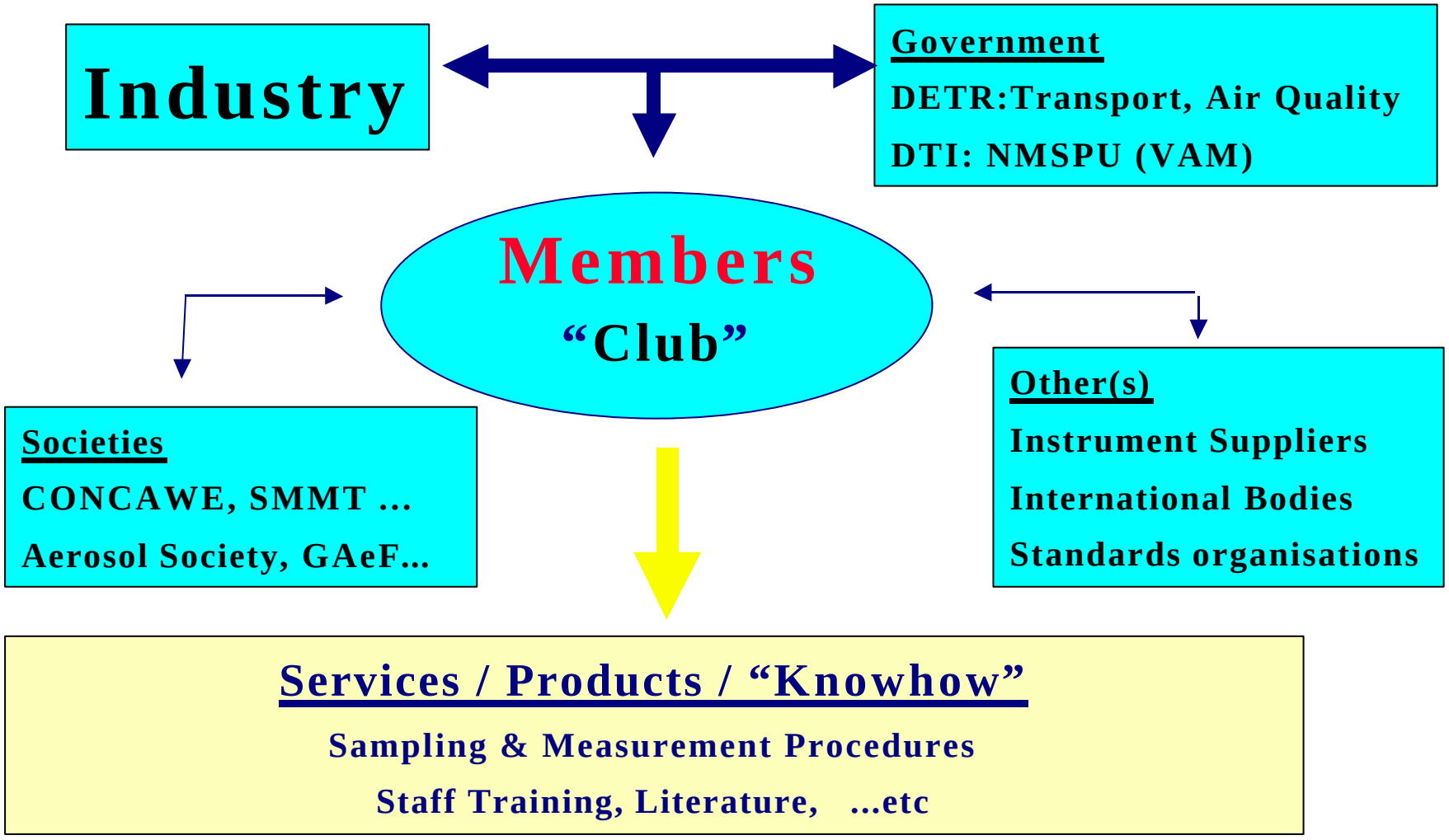


50 delegates attended to define and disseminate the priorities for the Launch of a NEW Vehicle Emissions Club (December 1998)

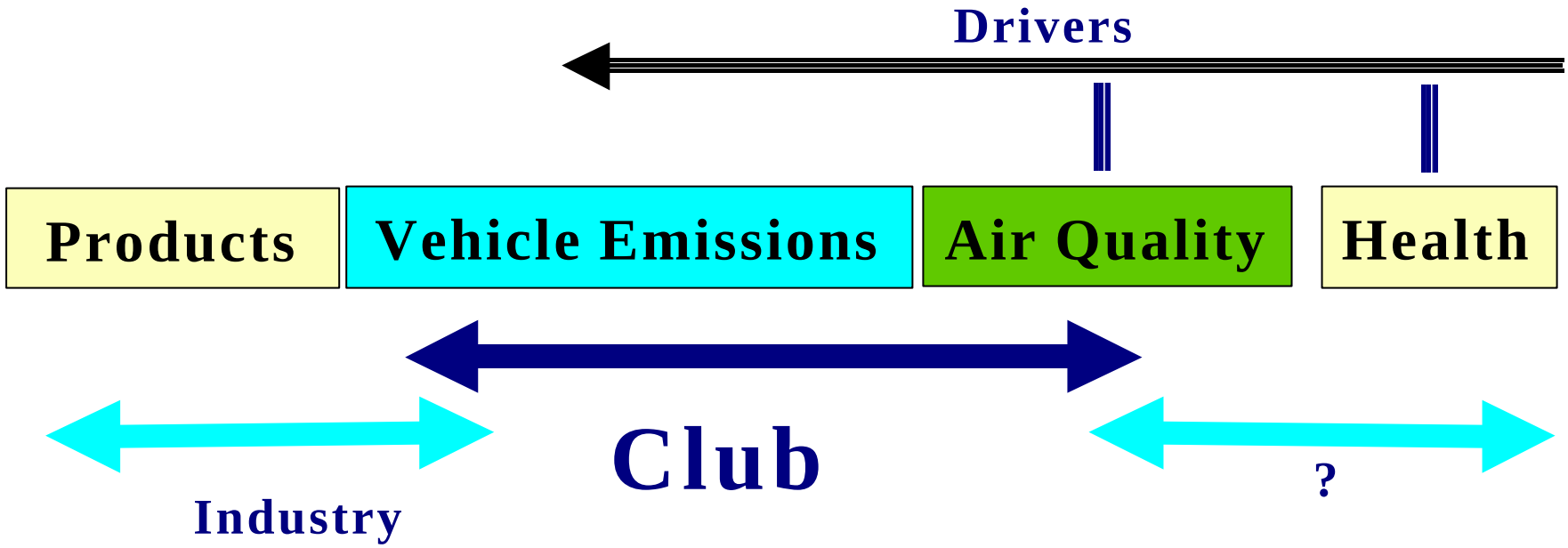
VPEC Objectives

- To address generic measurement & sampling issues by experiment
- Calibration activities
- Information Management / Services to members
- Government / Industry / External Bodies Liaison
- ....?

Vehicle Emissions Club



Positioning



Focus - emissions and the environment

Outcome

- Existing experience of particle sizing and particle number measurements of vehicle emissions suggest that it is timely that some form of inter-comparison be carried out

- A shared cost club, directed by its members offers an independent cost-effective route to address issues generic to industry and government

VPEC Founder members

National Renewable Energy Laboratory

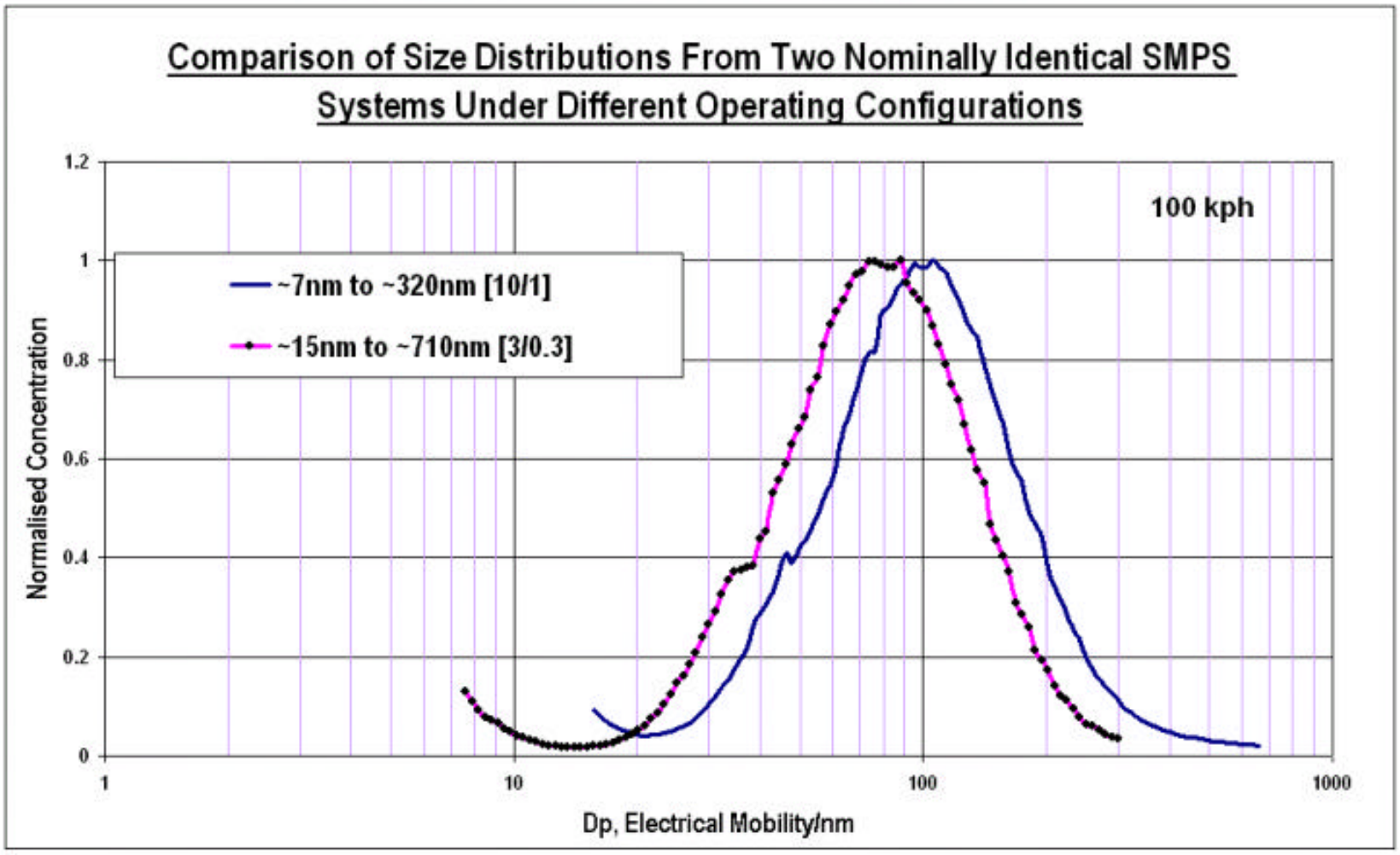
Review of key uncertainty factors

- Dilution Technique
- Dilution Ratio
- Dilution Rate

- Size Range
- Instrument Choice
- Data Processing
- Data Format for Model Input

- Sample Residence Time
- Sample Temperature
- Sample Humidity
- Sampling System Construction
- Sampling for Chemical Analysis
- Sample Ageing
- Pre-Tailpipe Factors
- Post Tailpipe Factors

Size Distribution Affected by Set-up

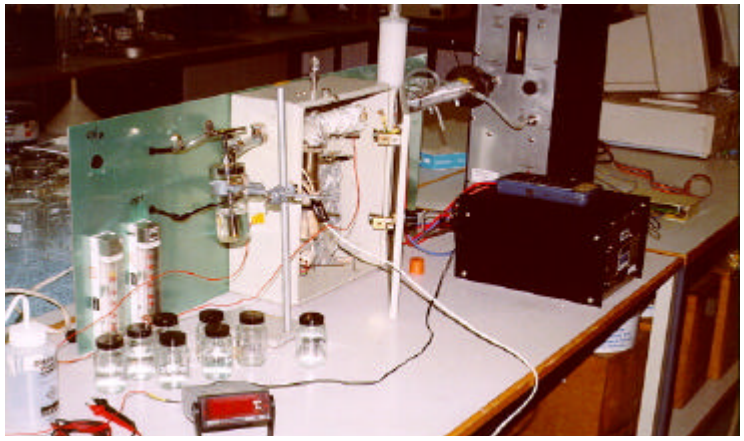


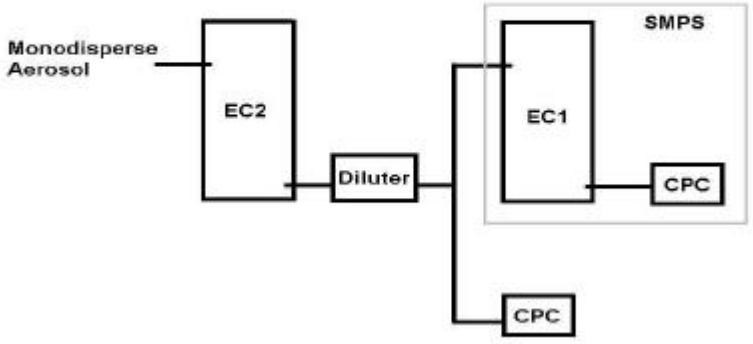
JD A/ZURICH

Programme 1 - Calibration of SMPS

Prototype Number Calibration Standard

- Condensation Particle Counter
  - linearity
  - accuracy
  - detection efficiency (< 10 nm)
- Electrostatic Classifier
  - size dependent losses at several flow rates
- Diluter
  - linearity



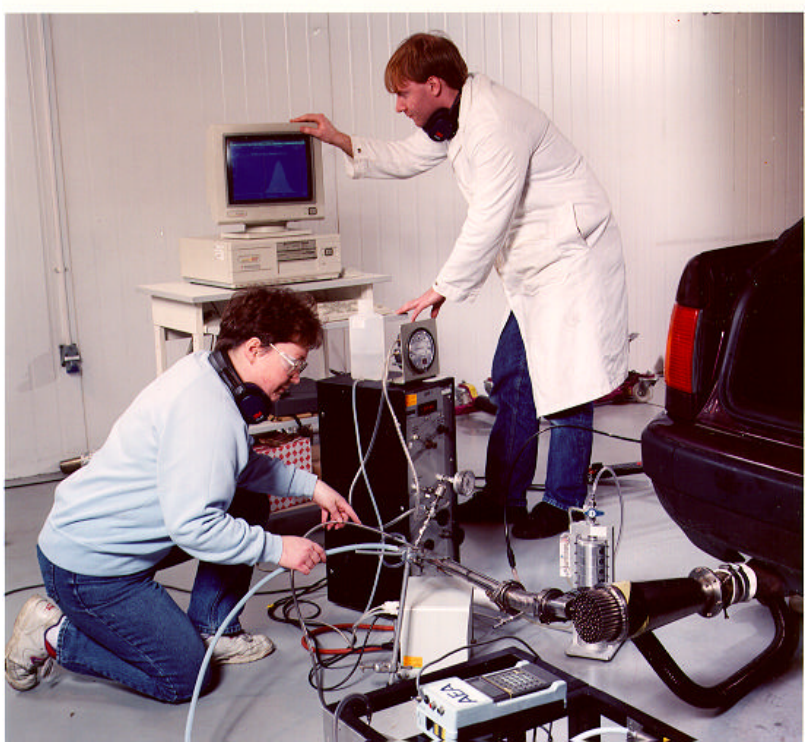


Programme 2 : Round - robin

- Reference vehicle - IDI
- Reference fuel - ULSD
- Reference SMPS

- 80 nm transient EUDC
- Total particle number

- 5 steady states (x2) at 0, 30, 50, 70, 120 kph



Commercial Structure

- Membership by annual subscription
- Members define priorities and experimental programme
- Fee to reflect purchase of sampling time at member sites (Target = £10k, $15k)
- Membership
  - Full : eligible to vote in steering group priorities
  - Associate : participation in individual round-robin programme at cost (fee offset against subscription)
- Calibration Programme : July / August 2000
- SMPS round-robin : August / October 2000

Conclusions

- A shared-cost research club has been established as a partnership between government and industry as a means of conducting generic research in measurement and calibration issues
- Initial priorities have been established and 2 measurement programmes initiated - accuracy and precision of SMPS (absolute & between facilities)
- Future priorities likely to remain focused on experimental issues linked with broader information / 'know-how' content