

## ExIS Newsletter, October 2010

*The breaking news in this issue of ExIS newsletter is the new ELPI+ from Dekati. This instrument is built on experiences from the successful "old" ELPI, yet a totally new design with many new features. We have also updated one of our most downloaded documents, i.e. our selection of instruments for automotive PMP measurements. New equipment from Control Sistem and presentations from the ETH Nanoparticle conference will round up this newsletter.*

### Headlines

#### New ELPI+

The new ELPI+™ from Dekati is launched! This instrument is based on the principles of the old ELPI™ but it is improved in many areas and provides numerous new features. ELPI+ is now ready for ordering and the first deliveries will be made by the end of 2010.

#### PMP measurement systems from ExIS

An update of a document of instrumentation and equipment provided by ExIS for measurements according to the automotive Particulate Measurement Protocol (PMP) is made. ExIS has the most comprehensive supply of instruments of any distributor in this area.

#### Excellent results with the Pegasor sensor at West Virginia University

West Virginia University presented excellent results with the Pegasor PPS-M sensor at the 14<sup>th</sup> Nanoparticle Conference held at ETH in Zürich, Switzerland on August 1-4.

#### Product news from Control Sistem

Control Sistem has launched a couple of new products for chassis dynamometer testing, i.e. a 48'' single roller dynamometer, a pedal actuator for automated testing and an automation unit for test cell integration. The full-flow dilution tunnel, CVS-R03, is now available on the Nordic market.

#### Matter Aerosol

Matter Engineering has become a 100% subsidiary of Testo and changed its name to Matter Aerosol. The acquirement gives Matter Aerosol more resources for long-term R&D. The products will be distributed through the current distribution network.

#### Conferences, exhibitions and workshops

An update on the papers presented on our products at the 14th ETH-Conference on Combustion Generated Nanoparticles was held in Zürich, August 1-4 is provided.

### New ELPI+

The Dekati® ELPI™ instrument has been on the market since 1996. Since its release, hundreds of units have been sold and the instrument has been successfully applied to various particle measurement applications. In fact, ELPI™ is the most sold real-time instrument of its kind in the world.

Over the years, a lot of feedback from valued customers has been received and based on these comments and requests; Dekati has developed the instrument further. Now Dekati is proud to introduce a new version of the ELPI™ instrument on the market. The ELPI+™ instrument was officially launched at the International Aerosol Conference (IAC) in Helsinki, August 29 to September 3. Never before has Dekati seen such great interest in their booth at an exhibition, which is an indication of the great interest and good reception on the market. The first orders on the ELPI+™ have been placed and the first units are scheduled for delivery by the end of 2010.

The ELPI+™ is based on the same operating principle as the previous ELPI™ instrument and can be divided into three major parts:

particle charging, size classification in a cascade impactor and electrical detection with sensitive electrometers. The particles are first charged in the corona charger. After charging, the particles enter a low pressure impactor with 14 electrically insulated collection stages. The particles are collected in the different impactor stages according to their aerodynamic diameter, and the electric charge carried by particles into each impactor stage is measured in real time by sensitive electrometers. Measured current signals are converted to particle size distribution using particle size dependent relations describing the properties of the charger and the impactor stages. The result is particle number concentration and size distribution in real-time.



Features of the new ELPI+™ include:

- Wide particle size range; 6nm to 10µm
- 14 size fractions in real-time
- 10 l/min sample flow rate
- Wide operational concentration range
- Possibility for chemical characterization of the size classified particles
- Automated charge distribution measurement
- Independent stand-alone operation or control via laptop using ELPI+VI software
- Large 7" display with graphic user interface
- 10Hz sampling rate
- 6 analogue inputs, 3 outputs, all 0-10V

Although based on the same principles as the previous and well-proven ELPI™, the ELPI+™ is a completely new development. Layout of the whole system has been simplified yet maintaining the unit as robust as the previous ELPI™ model to endure operation even in harsh conditions. At the same time, the weight of the ELPI+™ unit has been reduced to 22 kg making it more easily transportable. The impactor and charger units have been re-designed to simplify the use and service of the instrument and optimize the operation. Automated features related to e.g. zeroing have also been added to the system to make its use even simpler.

Previously, Dekati has provided four different ELPI™ models: Standard ELPI™ model at either 10 or 30 l/min flow rate, and Outdoor Air ELPI™ model at either 10 or 30 l/min flow rate. The features of

standard and Outdoor Air ELPI™ models have been combined into one in the new ELPI+™. Improvements in the charger and electrometers have improved the detection level so that the larger flow versions are no longer necessary.

A new electrometer design enables a wider concentration range. The minimum detection level is now better than competitor instruments. Furthermore, the time resolution has been increased to 10 Hz. Lower sample residence time in the impactor and the fact that sample residence time between impactor stages is taken into account in the concentration calculation has enabled the improved time resolution.

The new ELPI+™ instrument can be used either as a stand-alone unit or via a laptop running the ELPI+VI software provided with the ELPI+™. In stand-alone operation, the system can be programmed and controlled via the 7" display located at the front panel of the unit where the measured particle size distribution can also be monitored in real-time. The ELPI+™ data can be saved on the laptop running the ELPI+VI software and/or inside the ELPI+™ unit where it can be retrieved via a USB connection. The analogue outputs also enable integration of the data to external systems. Further development of the ELPI+™ and accessories is currently being conducted and the following features will soon be available:

- Data inversion (providing more interpolated size channels)
- Heated ELPI+™ setup
- Automatic particle density measurement
- Sintered collection plates

More information about ELPI+™ is available in the following documents.

[ELPI+ brochure](#)

[Dekati newsletter about ELPI+](#)

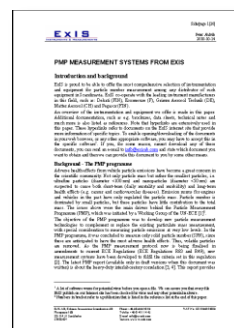
## PMP measurement systems from ExIS

An overview of measurement systems for the automotive Particle Measurement Protocol (PMP) has previously been provided at the ExIS home page. This has been one of the most downloaded documents on our home page, surpassed only by a few brochures. Thus, we recognize that this document is of great interest and we have now updated the information.

ExIS is proud to be able to offer the most comprehensive selection of instrumentation and equipment for particle number measurement among any distributor of such equipment in Scandinavia. An overview of the instrumentation and equipment we offer is made in the paper mentioned.

Additional documentation, such as e.g. brochures, data sheets, technical notes and much more is also listed as references. Hyperlinks are extensively used in the paper to enable easy access to other documents on the ExIS home page.

[ExIS PMP overview](#)



## Excellent results with the Pegasor PPS-M sensor at West Virginia University

In a paper presented at the 14<sup>th</sup> Nanoparticle Conference at ETH in Zürich, Switzerland on August 1-4, West Virginia University (WVU) reported on tests with the Pegasor PPS-M sensor (see also note below about the ETH conference). The objective of the study was to test this sensor under laboratory conditions and compare it to other proven aerosol measurement instruments in order to understand its capabilities and limits with regard to future applications for OBD monitoring or control strategies of PM filter system. Testing was carried out on a heavy-duty diesel engine. The test matrix involved two transient test cycles, as well as a four mode steady state cycle. Engine-out emissions and the emissions after three different DPFs were measured.

First test results demonstrated a stable and repeatable response, with coefficients of variation below 2,4%. Comparisons between the PPS and CPC, and between the PPS and EEPS showed similar and reproducible response patterns even during the highly transient portions of the FTP and ETC. The signal of the PPS exhibited the same trend as measured with the CPC; thus, emphasizes the high sensitivity of the PPS. Further measurements are currently under way.

The conclusions by the authors of the paper were:

- The new particle sensor shows good promise for OBD applications, and development of DPF regeneration controls and strategies.
- Plug and play operation opens a new era in engine emission PM monitoring and measurement
- Sensor shows repeatability over consecutive test cycles
- Response of PPS to PM emissions during the FTP and ETC transient test cycles was similar to that of EEPS.
- Evaluation of the PPS sensor is on-going
  - Pre- and post-DPF, steady state and transient cycles, on-highway and off-road engines, different fuels



More information is available in the paper and presentation by Besch et al., which can be downloaded using the link below.

[Besch et al. @ ETH Nanoparticle](#)

## Product news from Control Sistem

### New products for dynamometer testing

Three new products intended for dynamometer testing have been introduced as "standard" products by from Control Sistem and are now also available on the Nordic market. These products are:

- **DYNOSAUR** is a 48" single roller chassis dynamometer for light-duty vehicle and light commercial vehicle (up to 5 500 kg) testing. DYNOSAUR conforms to European and US standards. The DBS automation system (see below) is used to control the system and integration in the test cell is accomplished by the INT9000 software also developed by control Sistem.



- **xPA** is a pedal actuator for automated testing at chassis dynamometers and in other test rigs. The xPA is based on the same technology that has already been used in the driving robot DREAMS.
- **DBS** is an automation unit available in three different versions for engine, roller and transmission test benches. DBS is an interface to control electric motors, throttle, speed, torque, temperatures etc.



More information about DYNOSAUR and xPA is available in the brochure and the technical description via the links below. Information about the DBS will follow shortly.

[DYNOSAUR description](#)

[xPA brochure](#)

## Full-flow CVS sampling system

The CVS-R03 full-flow constant volume sampling system (CVS) from Control System for light-duty test cells has—until now—not been actively marketed by ExIS on the Nordic market. Now, this product has been included in the “standard” range of products from Control System and thus, we can now provide this measurement system for our customers. CVS-R03 uses a variable-speed positive displacement pump (PDP) for flow control and it can be fully integrated in the test cell by e.g. using Control System’s own software INT9000 for this purpose. CVS-R03 is available in four different sizes.



More information about CVS-R03 is available in the brochure and the technical description.

[CVS-R03 brochure](#)

[CVS-R03 description](#)

## Micro-PSS in PEMS version

A couple of weeks ago, the Joint Research Centre (JRC) of the European Union in Ispra, Italy, finalised testing of the Control System Micro-PSS as a Portable Emission Measurement System (PEMS) for on-board particle mass emission measurements. We will come back and provide results from these measurements when we have all data evaluated. At this stage, there are two measurement systems recommended by JRC for the next test phase, one from Horiba and one from Control System. The Horiba system is a prototype but the Control System is built on the Micro-PSS, which is a measurement system commercialised already some three years ago.

Modifications for PEMS application include integration of the Pegasor PPS-M sensor for real-time mass measurement, a built-in PC and a couple of other features. The Micro-PSS in PEMS version will be launched shortly. A pre-production version of the Micro-PSS is now available for demonstrations. If you are interested in a demo, please contact us on [e-mail](#).

More information is available in the Micro-PSS brochure and the description. Note that some details and pictures are not fully up-to-date in these documents. They will be updated shortly for the official launch of the Micro-PSS in PEMS version.



[Micro-PSS brochure](#)

[Micro-PSS description](#)

## Matter Aerosol

With effect of 1 July, 2010, Matter Engineering became a 100% subsidiary of Testo in Lenzkirch, Germany ([www.testo.de](http://www.testo.de)).

Under the brand name "Matter Aerosol", the team of specialists in Wohlen, Switzerland will continue to develop and manufacture high-profile nanoparticle measuring equipment for automotive, laboratory and ambient applications. Matter Aerosol products will be marketed through existing distribution network also in the future.

With the support of Testo, Matter Aerosol envisage a slight shift towards more long-term oriented research and development projects at much enhanced efficiency. Testo's expertise in innovation transfer and large-scale production will boost access of Matter Aerosol technologies to new markets.

## Conferences, exhibitions and workshops

### Documentation from the 14th ETH-Conference on Combustion Generated Nanoparticles

The 14th ETH-Conference on Combustion Generated Nanoparticles was held in Zürich, August 1-4. Documentation from this conference can now be ordered from the home page of the conference.

[ETH Nanoparticle conference home page](#)

For your convenience, we have made the presentations and papers from our partners (including their partners) and associated customers accessible for downloading. These papers are listed below and access to the papers is obtained by using the highlighted hyperlinks.

[In-line, real-time exhaust PM emissions sensor for use in emission control and OBD application](#)

Marc C. Besch<sup>1</sup>, Arvind Thiruvengadam<sup>1</sup>, Ben Shade<sup>1</sup>, Juha Tikkanen<sup>2</sup>, Mridul Gautam<sup>1</sup>

<sup>1</sup>West Virginia University, Dept. of Mechanical & Aerospace Engineering, Morgantown, WV 26506

<sup>2</sup>Pegasor Ltd., Hämeenkatu 15 b 12, 33100 Tampere, Finland

[A portable instrument for PMP-like field measurements](#)

M. Fierz, P. Steigmeier and H. Burtscher

University of Applied Sciences Northwestern Switzerland, 5210 CH-Windisch

[Characterization of fine and ultrafine particles in emissions from CHP Plants in Denmark](#)

K. Fuglsang, J.B. Markussen, T.G. Frederiksen, and K.B. Hummer

FORCE Technology, Park Alle 345, 2830 Brøndby



[Engine Emitted Toxic Metal Oxide Nanoparticles](#)

Mayer A., Czerwinski J., Ulrich A., Kasper M.  
TTM, AFHB, EMPA, Matter Aerosol

[Toxic Potential of 2- and 4-stroke Scooter and Diesel Car Exhaust Emissions in Lung Cells In Vitro](#)

Loretta L. Müller<sup>1,2</sup>, Pierre Comte<sup>2</sup>, Jan Czerwinski<sup>2</sup>, Peter Gehr<sup>1</sup>, Markus Kasper<sup>3</sup>, Andreas C.R. Mayer<sup>4</sup>, and Barbara Rothen-Rutishauser<sup>1</sup>

<sup>1</sup> Institute of Anatomy, University of Bern, Switzerland

<sup>2</sup> AFHB, University of Applied Sciences, Biel-Bienne, Switzerland

<sup>3</sup> Matter Engineering AG, Nanoparticle Measurement, Wohlen, Switzerland

<sup>4</sup> Technik Thermische Maschinen (TTM), Zurich, Switzerland

[Flue Gas Particle Characterization at Different Parts of the Power Plant](#)

Ville Niemelä and Erkki Lamminen, Dekati Ltd.

**Grimm workshops in 2010**

The schedule for the Grimm workshops in 2010 has now been posted on the Grimm website. More information on the content of these workshops will be provided later.

It is also of interest for you to note that if you have purchased a Grimm instrument during the last year, you are entitled to one day of training at Grimm premises in Germany (Ainring or Pouch). This training is free of charge. Hotels can be booked with Grimm's discount.

[Grimm workshops, schedule](#)

[Grimm training](#)

You are always welcome with questions and we are happy to send you our newsletter.

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Best regards,

Peter Ahlvik and Staffan Larsson

**Do you have questions or comments? Send an e-mail to: [info@exisab.com](mailto:info@exisab.com) or phone +46-8-647 45 99**