



Some special points of interest

- Large orders received for turnkey integrated airborne systems from India, China, Egypt, Pakistan & Hong Kong
- PEI introduces its *new IMPAC* Multi-Parameter Airborne Console
- PEI introduces its new *AGRS* Advanced Gammaray Spectrometer
- PEI introduces its *new PDOSE-2* gammaray dose meter
- PEI introduces its new *P-THEM* time domain EM systems

Pico Envirotec NEWS

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2009 was an exciting year!

2009 was a very exciting year for Pico Envirotec Inc. (PEI), despite the economic downturn experienced in general, and more particularly in the natural resources market. In 2009, orders for turnkey integrated airborne systems were received from clients in India, Hong Kong, China, Pakistan & Egypt. Several large orders for our PGIS portable gammaray spectrometers were also received and shipments were made to Australia, South Africa, Mongolia, China, Libya, France and Nigeria to name a few.

In the airborne geophysical instrumentation department, PEI maintained its focus on quality, reliability and user friendliness throughout 2009. This was achieved by continuing with the development of its automated airborne survey systems introduced in 2008, namely AutoMAG, AutoSPEC and SmartDART, and by completing the development of the AGRS-10 Advanced Gamma-ray Spectrometer and the IMPAC Integrated Multi-Parameter Airborne Console.

The IMPAC airborne data acquisition system combines all of the

features of PEI's AGIS-XP and MMS-4 instruments into an integrated package housed in a 19in rack-mountable console. The AGRS-10, is a highly advanced system well-suited for airborne geophysical exploration and mapping as well as for high contamination environmental surveys where the maximum throughput may be as high as 250,000 counts per second (cps) per detector.

Finally, a partnership with THEM Geophysics Inc. of Gatineau, Quebec has led to the development by PEI of the P-THEM and P-THEM-Lite Helicopter-borne Time Domain EM Systems.

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NEW AGRS Advanced Gammaray Spectrometer

AGRS is a highly advanced gammaray spectrometer system, featuring high speed LAN (Ethernet) communications and proprietary technology. AGRS is well-suited for airborne geophysical exploration and mapping as well as for high contamination environmental surveys where the maximum throughput may be as high as 250,000 counts per second (cps) per detector.

AGRS features:

- Energy detection range 20 KeV to 3 MeV.
- 256 / 512 / 1024 channels
- Output is fully linearized and the Poisson Distribution is not affected
- Individual detector processing
- Real-time stabilization on natural radioactive elements.
- Extremely wide dynamic range: up to 250,000 cps per detector.
- Insignificant Dead Time
- Individual detector Acquisition

and Live time is provided.

- Stabilization time of less than 40 seconds on the ground
- All data acquisition is accomplished via Ethernet, which eliminates bandwidth problems and permits remote monitoring and trouble shooting.
- Selectable sampling rates from 10 Hz to 0.1 Hz
- High level of self-diagnostics
- Automatic HV calibration and linearization based on natural radioactive elements (radioactive sources are NOT required). This permits field replacement of detectors and/or photomultiplier tubes.

- analog inputs
- GPS connectivity & synchronization
- input power: 10 to 35 VDC
- HV and analog gain digitally controlled by 16-bit D/A converter
- 14-bit A/D converter - 80 MHz FPGA master clock

A variety of gammaray sensors are available for use the AGRS, including the GSX-256 with 4.2 litres of detector "downward-looking" NaI(Tl) detector to the GSX-1024/256 with 16.8 litres of detector "downward-looking" and 4.2 litres of detector "upward-looking".



GSX-1024/256 sensor in the NEW AGRS configuration



Airborne Gravimeter System delivered to AMSE Wing of the Geological Survey of India

In late 2008 PEI were awarded a contract by the AMSE Wing of the Geological Survey of India for two turnkey integrated multi-sensor airborne systems. Deliveries of these systems commenced in September 2009 with an airborne gravity system, configured for use on multiple platforms, including AMSE's Dhruv helicopter, their deHavilland DHC-6 Twin Otter airplane, and road vehicles. Delivery of the second system comprised of an integrated time-domain EM, spectroradiometer, magnetometer and gamma-ray spectrometer system will be completed in the spring of 2010.

Airborne Gravity System

The airborne gravity system delivered to AMSE comprised a GT-1A airborne gravimeter, dual-frequency GPS receivers, radar and barometric altimeters, a data acquisition system and spare parts. Software and computers for QC of data, data processing, interpretation and mapping were also delivered.

Training Programs in Canada

AMSE sent two groups of engineers and geoscientists to Toronto for training on system



AMSE trainees receiving instruction at the airpark

operation and maintenance and on QC of data, data processing, interpretation and mapping. These one month long programs included classroom instructions and "hands-on" training at the airport.

It was not all work though, the trainees went sight-seeing and shopping most weekends and many evenings during their stay in Toronto.

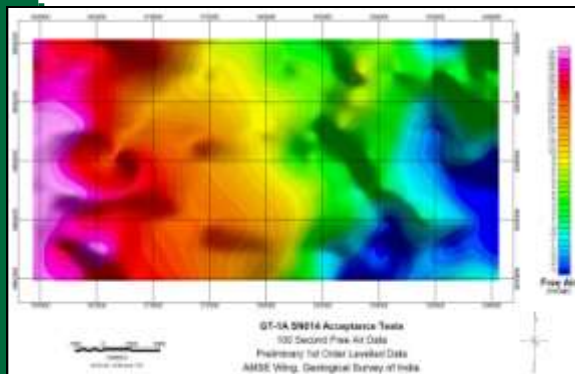
Flight & Acceptance Tests

Prior to shipment to India, the airborne gravity system underwent extensive flight and acceptance testing. The entire system was installed in an Eurocopter AS350B2 A-Star helicopter at Holland's Landing Airpark in Newmarket.

An AMSE inspection team attended the testing, which took place over a period of one week. The testing included bench tests, and then flight testing to determine the repeatability of the system, and culminated in the acquisition of data over a survey area near Bradford, Ontario, which has published ground gravity data available for comparison to the airborne data. The test survey area was 800 km² in extent, and was flown with a grid of lines 2,500m x 5,000m. The flying was undertaken in a loose drape AGL mode and at a constant ASL altitude. Excellent results were obtained. The repeat lines had an RMS error of 0.45 mGal. The error of the survey grid was 0.45 mGal RMS.



The AMSE GT-1A installed in an Eurocopter AS350B2 helicopter in Toronto for flight and acceptance tests



Free air colour contour images (100 second filter) of the loose drape data set acquired over the test survey area

NEW

PEI introduces the PDOSE-2 Gammaray Dose Meter

The PDOSE-2 Gammaray Dose Meter, a state-of-the-art portable survey meter, is a hand-held battery operated instrument designed for use in both rugged and normal environments. The PDOSE-2 can be equipped with several peripheral units providing the operator with a flexible instrument for in-situ or "on-the-go" applications. In a stationary mode, PDOSE-2 is equipped with a remote power supply, communicating via RS-232 or Bluetooth with a remote computer; for "on-the-go" operations the unit is equipped with a GPS receiver and a PC Hand Held computer (HHC).

Main Features:

- 2 Geiger tubes for full range monitoring -

automatically switches from low-range Geiger tube to high-range Geiger tube

- Full range from natural background to 400,000,000 nGy/h (400mGy/h)
- Embedded GPS receiver
- Rugged windows mobile PC Hand-held with Bluetooth communication
- Data recording includes: GPS position; time and date, Total Counts on each tube; dose level; record number
- Settable audio alarms at user defined levels
- Very portable - PC Hand Held is easily removed from sensor/battery unit if required

- Optional backpack for mobile/surveying functionality
- Sensor powered by 4 x D-cell rechargeable batteries for portable operation or AC adapter for laboratory use



P-Dose-2 in "on-the-go" configuration with its HHC

Multi-sensor airborne system delivered to the Egyptian Nuclear Materials Authority

In the summer of 2009, PEI were awarded a contract by the Egyptian Nuclear Materials Authority (NMA) to modify NMA's Beech B200SE King Air aircraft with a vertical magnetic gradiometer tail boom, and to provide a complex airborne geophysical survey system for installation on the King Air. This system included a Canadian Micro Gravity GT-1A airborne gravimeter, a vertical magnetic gradiometer and a 50 litres gammaray spectrometer system, radar and barometric altimeters, a data acquisition system, spare parts, an equipment rack, a GPU and more. The contract also included a full suite of data QC and data processing software. Commissioning of the aircraft and geophysical system in Egypt was included, as well as training on system operation and maintenance, and on data QC and data processing.

In the fall of 2009 PEI brought the King Air aircraft from its base in Germany and brought it to Toronto. The modification work (which included painting the aircraft) was completed on the King Air at the end of 2009. Equipment was installed in the aircraft and flight testing was undertaken. A Transport Canada STC for the modifications and installed equipment was obtained, which will be used by NMA to obtain an equivalent STC in Egypt. In January



NMA's modified and newly painted Beech B200SE King Air aircraft undergoing its flight testing in Canada

2010 PEI delivered the modified King Air aircraft and all of the equipment to NMA in Egypt. At the time of writing this article, the commissioning of the aircraft and equipment, and the various training programs are underway in Egypt, conducted by two of PEI's engineers and two of Canadian Micro Gravity's geophysicists.



An AGRS-10S advanced gammaray spectrometer system was part of the airborne system. It included 4 of these GSX-1024 sensors with a total of 50 litres of detector



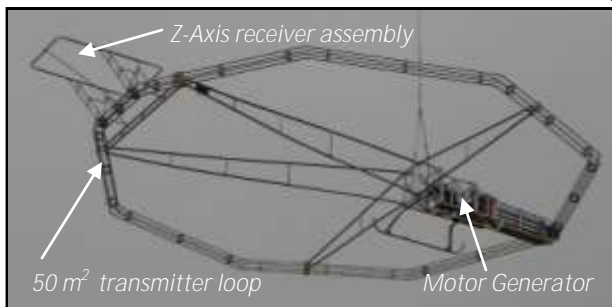
The GT-1A airborne gravimeter with its restraint system and base plate, prior to installation in the aircraft

PEI introduces its P-THEM Helicopter-borne Time Domain EM Systems

The P-THEM systems are compact, focused, small footprint, rigid and high-spatial resolution, state-of-the-art, time-domain helicopter-borne electromagnetic systems based on computer controlled electronics, a powerful transmitter and an advanced digital signal processing software package. They are light-weight, highly adaptable and suited for shallow soil mapping and/or deep ore body exploration. They are available with different power sources, and are ideal for flying in a "low and slow" tight line spacing survey mode for detailing known conductive targets. Two models are available; P-THEM standard system, and P-THEM-Lite lightweight system:

P-THEM "Standard" Time Domain EM System

P-THEM Time Domain EM System - standard system, with base operating frequency of 30Hz in the Americas, 25 Hz in other parts of the world (other frequencies are available)



P-THEM Transmitter Assembly

and transmitting a half-sine wave pulse. Dipole moment is 250,000+ NIA. Transmitter power source is a Honda motor generator mounted on the tow-cable.

P-THEM features an 8m diameter (50 m²) loop-transmitter assembly and a digital receiver. A 3-axis EM receiver and a cesium magnetometer are suspended in an assembly on the tow-cable midway between the transmitter and the helicopter. Another Z-axis receiver coil is mounted on the transmitter assembly. The towed system weight is approximately 300 kg, making P-THEM suitable for use with medium-sized helicopter such as Eurocopter's AS350B2 & AS350B3 Ecureuil (A-Star) models.

P-THEM's depth of penetration is typically 300 to 400 metres in low to moderate resistive conditions.

P-THEM-Lite "Light-Weight" Time Domain EM System

The P-THEM-Lite Time Domain EM System is a light-weight system, with base operating frequency of 90Hz in the Americas, 75 Hz in other parts of the world (other frequencies are available) and transmitting a half-sine wave pulse. Dipole moment is 100,000+ NIA. Transmitter power source is a high-performance Lithium Phosphate rechargeable battery pack, providing 3-hours operations on a single charge.

viding 3-hours operations on a single charge.

P-THEM-Lite features a 6m diameter (30 m²) loop-transmitter assembly and a digital receiver. A 3-axis receiver and a cesium magnetometer are suspended in an assembly on the tow-cable midway between the transmitter and the helicopter. The towed system weight is about 150 kg, making P-THEM-Lite suitable for use with light helicopters, such as the MD-500 series, Bell's 206B3 Jet Ranger and Robinson's R44 Raven models.



P-THEM-Lite lightweight time domain EM system in flight with a Robinson R44 Raven helicopter



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Pico Envirotec Inc. (PEI) is a Canadian company, established in 1992. Since 1998 it has been engaged primarily in manufacturing advanced instrumentation for use in airborne and ground geophysical surveys for mining, oil and gas and environmental applications. PEI's core expertise is the development and manufacture of instrumentation for remotely measuring magnetic, gravity and gamma-ray radiation data, using real-time data acquisition and precise satellite (GPS) navigation and positioning. Because of PEI's close co-operation with other geophysical companies, it provides complete, integrated, turnkey airborne or ground geophysical systems for acquiring geophysical data for either mining, oil and gas or environmental applications. This is made possible by its development of "intelligent" instruments, using advanced technology, which facilitates easy and safe integration of just about any sensor or measuring device into a system. The AGIS and the new IMPAC (airborne data acquisition systems for airborne geophysical exploration), IRIS (Integrated Radiation Information System for environmental monitoring), and the PGIS (Portable Geophysical Information System) are PEI's most successful systems based on this "intelligent" philosophy.

During the many years PEI has been in business, it has installed more than 100 airborne systems on a wide variety of aircraft and helicopters for clients that include mining companies, exploration services companies, and government agencies. Airborne systems designed, built, integrated and installed by PEI are flying in many countries around the world, including Canada, USA, UK, Austria, Australia, Brazil, China, Czech Republic, Germany, South Africa, India, Brazil, France, Sweden, Finland, Italy, Egypt, Mexico, Libya, Russia, and Norway. These airborne survey systems include sensors for taking measurements of magnetics and magnetic gradients, gamma-ray spectrometry, time-domain electromagnetics and gravity.

During this same time frame, PEI has also delivered many portable, mobile and base station systems based on its PGIS technology. These systems included sensors for magnetic and/or magnetic gradient measurements and gamma-ray spectrometry, with GPS for navigation and/or positioning of the acquired data.

www.picoenvirotec.com

NEW

IMPAC Integrated Multi-Parameter Airborne Console

IMPAC is a NEW real-time data acquisition and navigation system designed for airborne geophysical exploration and environmental science applications. IMPAC combines the field proven technology found in Pico Envirotec's AGIS-XP and MMS-4 instruments into a single rack-mountable enclosure. IMPAC follows Pico Envirotec's modular design structure allowing the system to become highly flexible and easily reconfigurable. The modular design allows a wide variety of PEI "intelligent instruments" and third party sensors and instruments to be quickly interfaced. The IMPAC system eliminates the need for interconnect wires creating a much more user friendly and robust product.

IMPAC is provided with a full suite of PEI's proprietary software for data QC, data viewing, survey preparation, system calibration and more.



Features:

- Rack-mountable airborne data acquisition system
- Data recorded to a solid-state drive
- Precise time synchronization between Sensor & GPS data
- NEW AGRS compatible (up to 64 litres of sensor)
- GRS-10 backwards compatible
- GPS input and 2 PPS outputs
- Multiple Ethernet connections
- Multiple RS232 Serial ports
- Multiple USB ports (2 on front for data transfer)
- 28V DC power input
- Eliminates interconnect wiring

Magnetics Add-in Module

- Four Sensor magnetometer processor
- Selectable sampling rates up to 100Hz
- Real-time compensation with triaxial fluxgate sensor
- In-flight automatic compensation (no processing required)
- Eight 16-bit differential analog input channels



Navigation Add-in Module

- Output for second VGA monitor for pilot guidance
- Provides full navigation for survey flying
- Input for Geo-Image USB camera