

Minerals and mining

Opening remarks:

- Both expressed appreciation and commitment to the SA-EU S&T partnership. Highlighted that the partnerships is meant to be of a mutual benefit partnership. SA and the EU have various platforms to discuss future possible areas of collaboration and ways to improving the partnership.

Mintek PP

- Alan gave a brief background on the European Technology platforms and encouraged other SA researchers to take part in this platform. The TP are divided into the following groups: energy, ICT, bio-economy, production and processes and transport. It is important to note that the TP are not led by the EU but by the industry themselves and there are 34 platforms that exist.

Mintek is involved in the European Tech Platform on Sustainable Minerals Resources (ETP SMR) which started in 2005 is also aligned with the European Strategic Research Agenda established in 2009

FP projects

All projects are happy with their FP participation and have highlighted the importance of FP7 collaborative projects. They believe that all partners in the projects brought something valuable to the team including SA partners. BioMine was funded under FP6 and it is the only project amongst those presented that has ended. The SA partner highlighted that this is the only Mintek FP funded project where they have signed a Joint venture agreement with one of the EU partners in the BioMine to further their collaboration outside FP.

AEGOS and EOMiners are funded under FP7 and have not yet ended.

FP7 experience by SA partners:

- Tricky internal budgeting because you receive the funds in Euros
- Keep the consortium small, and join a consortium with a good reputation
- Delays in receiving final funding
- Benefited in collaborating with big companies and top European researcher in their field
- So it is not only about money but also about long term partnerships and networks

Coaltech

- Group of research groups (including universities) doing researchers for mines
- Research collaboration is not only important for universities and science council, industry can also benefit from collaboration and address challenges together

FP7 NMP call

- Calls open in July and closing on 8 November: small collaborative projects(<M€4), large collaborative projects(>M€4), SME, MDEMO, PPP
- Take note of the 1 or 2 stage project and closing dates
- Span the spectrum from enabling research, to applications and demonstration activities
- Focus on smart and sustainable growth, for a greener industry, its three constituent activities being the tools rather than ends in themselves
- Increasing emphasis on applications and longer-term research in key enabling technologies
- Specific Challenges
 - Energy and Energy efficiency
 - Activities inline with Strategic Energy Technology (SET) Plan
 - Energy Efficient Buildings
 - Green Cars
 - Complement activities of the Transport and Energy Themes
 - Environmental issues and sustainable development
 - Complement activities of the Environment and FAFB Themes
 - Raw Materials
 - Extraction and processing of raw materials; reduction of waste and recycling
 - Health and safety
 - Nano safety, medicine and materials complementing the Health Theme
 - Factories of the Future
 - Adapt to global competitive pressures by increasing the technological base
- Increase of research funding to €7 billion with the Industrial Technologies (NMP) work programme receiving €510 million
- There is a strong support of SMEs in FP7 and a strong focus on involvement of industry in this current calls
- Demonstration and validating activities taking things further than just research
- Exploitation strategy (service)
- Also advised researcher to join the mobility programmes (MCA and COST)

Discussions

Not much came out of this session as expected.

- More emphasis on the fact that EU has identified the mining and advanced manufacturing areas as important areas for the NMP area
- One of the participants asked if it could be possible to discuss with the EU during the JSTCC that they consider technologies applicable to small mines (such as environmental impact) water treatment in the next calls
- Clarity: on how do people get student's to be involved in FP projects

- Clarity: on opportunities for social science researchers
- Encouraged participants to contact ESASTAP should they have NMP areas (not covered by FP calls) that they would like DST to discuss during the JSTCC

Francois to add more points from researchers who contacted him and couldn't come to the event:

- South Africa is particularly experienced in the field of rock bursting. As mines get deeper, they inevitably encounter situations where the induced stresses exceed the rock strength. This happened in the 1960's in Wits gold mines, has happened elsewhere in the world, and is starting to become a problem in European mines. There is a "Mining Initiative on Ground Support Systems and Equipments" working group convened by the RockTech Centre in Sweden. Interest in solutions particularly in monitoring, but also in design of support elements, mining layouts and systems.
- Mining industries use expensive equipment in extremely aggressive environments. As a result, machinery is frequently shutdown for repair and maintenance, which is costly and can have a direct impact on production or consumer supply. High power laser systems can be used to refurbish this equipment in-situ to increase efficiency, reduce repair costs by reducing downtime and potentially extend a component's life through improved surface engineering. Interest in collaborating with EU institutions in the development of integrated laser based refurbishment systems for use by mining and other industries.
- Occupational exposure to dust is a serious hazard on South African mines. While mining has specific hazards, particularly silica, the problem is the same in industrial settings, just different hazards. South Africa has expertise on the measurement side, covering the range from survey design and running of surveys, through to state of the art analytical techniques. On the analytical side, South Africa is working as part of ISO to develop new standards, and that process is being led by the Health and Safety Executive (HSE) in the UK. While there is also considerable health expertise at the National Institute for Occupational Health (NIOH), the modeling expertise in the country is limited. By contrast, exposure modeling is a strength of European research organisations.
- In order to optimize safety when using steel wire ropes in mining, a Continuous Rope Monitoring System (CRMS) was developed in South Africa. This CRMS monitors the condition of steel wire ropes used in the lowering and hoisting of the conveyances in mine shafts under normal operating conditions every time the rope moves under dynamic operational speeds and loads. (Full load, acceleration, deceleration, start, stop, etc). There would be interested in further development of the technology to increase the efficiency of mining production and develop new replacement strategies and procedures instead of the existing slow offline unloaded test standards.
- In noise induced hearing loss (NIHL), there is European interest in using the very large hearing databases collected in the South African mining industry to

investigate synergistic effects of noise and other agents - what else could contribute to NIHL, including smoking and the presence of other chemicals.

- Also in the broad field of NIHL, we are working with the HSE on development of protocols for the use of otoacoustic emissions (OAE) technology. OAEs provide an objective measurement of ear function and can compliment or replace conventional audiograms. They are also significantly more sensitive, so they can pick up a trend of loss of hearing before it becomes noticeable to the individual, which makes it possible to intervene before hearing loss occurs.
- Worldwide, there is growing interest in workplace stress. It is emerging as a major contributor to sick leave, and to the incidence of accidents. We're starting a research programme in this area, focused on developing good, fast, objective tools for measuring stress levels. While we're concentrating on mining, this applies equally in industrial or commercial work settings.
- As mines become deeper and hotter, seismic and heat stress risks increase, so there is a drive to remove people from the environment. Working on mobile autonomous machines to perform various tasks, and particularly in mines. Our focus is on industrializing technology to make it survivable underground, and on developing viable tools for mine use.
- Instrumentation of underground operation, particularly a labour intensive one, is difficult to do because of the need to maintain a wired infrastructure. Activities in wireless sensor networks for mining where we're developing sensors, network architectures and supporting systems. Interested in collaborating in this field.
- Interest in research in applying near-surface geophysical techniques. We are using some techniques, particularly ground penetrating radar and electrical resistance tomography in underground settings, and could collaborate on developing these for mining or industrial applications.