

Project/Work Package	Summary	Contact Person and MEMSA opportunities
<p>1. Real-Time Information Management Systems (RTIMS) RTIMS encapsulates and provides for the ultimate decision support, enablement and enactment system for mines – it aims to improve data transmission, storage, dissemination, and information management tools, practices, and procedures for mines.</p>		
1.1. Enterprise Architecture (EA)	<ul style="list-style-type: none"> • Decision support tools/systems and Optimization systems. • Envisaged as the architecture platform that captures the integrated result of the RTIMS scope • Go beyond drill & blast to other mining processes in the value chain 	<p style="text-align: center;">Jean-Jacques Verhaeghe jverhaeghe@mandelaminingprecinct.org.za</p> <p>Investigate whether MEMSA can cater for Software and Electronics</p>
1.2. Data Communications	<ul style="list-style-type: none"> • Voice, data, visual comms in stope face • Moving beyond stope areas into main access areas, to surface 	
1.3. Deployment guidelines and Standards	<ul style="list-style-type: none"> • Open standards portal for mining. • Standardized-spec systems/devices • Interfacing into Technology Availability and Readiness Atlas (TARA) • Everyone speaks the same language 	
1.4. Cross-cutting use case projects ILHD project @Two Rivers	<ul style="list-style-type: none"> • RTIMS: visual/positioning, data comms, sensor notes 	
1.5. Data Science	<ul style="list-style-type: none"> • specifications for Cloud offerings – integrated Data architecture platform (for WP11,2,7,3) 	
1.6. Visualisation, Simulation, and Modelling	<ul style="list-style-type: none"> • specifications for Business Intelligence, Data Engineering offerings • Link into/with Virtual Reality, Augmented Reality 	
1.7. Sensors and Motes	<ul style="list-style-type: none"> • research, design and develop secure control, monitoring, management and alarm 	

	<p>functionality for the RTIMS system with a focus in stope areas (most challenging area)</p> <ul style="list-style-type: none"> • Products with specs as demonstrated as part-design /development in an RTIMS model 	
1.8. Artificial intelligence, machine learning, autonomous systems	<ul style="list-style-type: none"> • Data engineering methods • Software development and tools 	
1.9. Unmanned Ariel Vehicles (UAV)	<ul style="list-style-type: none"> • Uses include mapping, geological surveying, real-time stockpile management, an inspection of high-risk areas amongst others 	
<p>2. Advanced Orebody Knowledge (AOK)</p> <p>AOK aims to create a “glass rock” environment which improves geological confidence ahead of the face, identify and reduce geological risks and collecting timeous information. (i.e.: where is the reef, what is the grade and other minerals, what are the geological structures).</p>		
2.1. Alternative diamond drilling technologies	<ul style="list-style-type: none"> • Investigate alternative techniques • Investigate potential improvements and/or modifications to RC rig. • Investigate suitable logging and sampling methods of RC chips. • Investigate deployment methods. 	<p>Michelle Pienaar mpienaar@mandelaminingprecinct.org.za</p> <p>An opportunity for a member to work on the AOK RC drill rig</p>
2.2. Face and belt sampling (off the shelf equipment)	<ul style="list-style-type: none"> • LIBS (Laser Induced Breakdown Spectrometry) • Hyperspectral scanner 	
2.3. Identifying geological features close to face (off the shelf equipment)	<ul style="list-style-type: none"> • Ground Penetrating Radar (GPR) • Thermography • Infra-red technology • Positioning systems 	
2.4. Gathering information ahead of the face (off the shelf equipment)	<ul style="list-style-type: none"> • Electric Resistance Tomography (ERT) • Radio Imaging Technology (RT) • Tunnel Seismic Profiling (TSP) 	
<p>3. Mechanised Drill and Blast (MDB)</p>		

aims to provide sustainable mechanised solutions to the gold and platinum mining industries by introducing disruptive technologies to facilitate Zero harm and achieve financially sound underground mining operations with consistent production rates at optimal cost.		
3.1. Ore reserve compilation (SHANGO)	<ul style="list-style-type: none"> Database with ore reserves and characteristics 	<p style="text-align: center;">Gokhan Guler</p> <p style="text-align: center;">GGuler@mandelaminingprecinct.org.za</p>
3.2. Electronic database (ESRI and Vuuma)	<ul style="list-style-type: none"> Of ore characteristics with current mine infrastructure (shafts, tailing dams, communities) 	
3.3 and 3.4. Development of hypothetical concepts for mining engineering and processing (e.g.: long hole stoping)	<ul style="list-style-type: none"> Look at 5-10 difference concepts (e.g.: where can long hole stoping; hybrid mining; conventional be used) 	
3.5. Focusing on first principles of mechanisation	<ul style="list-style-type: none"> In terms of machinery, rock engineering and orebody (looking at new/current tech in early development) 	
<p>4. Non-explosive rock breaking (NERB)</p> <p>To identify, develop and support the implementation of solutions that will enable the continuous breaking of rock from tabular, hard-rock orebodies just quick testing. Not looking at making a decision.</p> <p><i>NOTE: Gokhan will be conducting "quick & dirty testing" of thermal spalling on UG2 (in Aug) and by March 2020 we will know the next steps (i.e. underground or not). Underground testing is aimed for 2021 and then TIA can jump in (prototype testing)</i></p>		
4.1. Abrasive cutting	<ul style="list-style-type: none"> Diamond wire 	<p style="text-align: center;">Gokhan Guler</p> <p style="text-align: center;">GGuler@mandelaminingprecinct.org.za</p> <p style="text-align: center;">An opportunity for a member to work on Thermal Cleaning Concepts</p>
4.2. Thermal Spalling – (cleaning concepts and developing these concepts to identify which one the best. Then will progress to test underground)	<ul style="list-style-type: none"> Thermal Spalling 	
<p>5. Longevity of Current Mines (LOCM)</p> <p>Aimed at improving mining practices and procedures particularly for established mines, already constrained by their infrastructure. The aim is to prolong their sustainability, thereby maintaining current jobs.</p>		

Pipe stick support	<ul style="list-style-type: none"> • Replace current Timber support (light-weight manufactured support system) 	<p>Martin Pretorius</p> <p>mpretorius@mandelaminingprecinct.org.za</p>
Ore reserve development	<ul style="list-style-type: none"> • Rapid ore-reserve development 	
GST Drill	<ul style="list-style-type: none"> • Drill shot holes 	
Energy Savings and Regeneration	<ul style="list-style-type: none"> • Sustainable/alternative energy 	
Isidingo Drill Challenge	<ul style="list-style-type: none"> • 3 challengers (winners) which will develop a prototype (120 days) thereafter MVP and commercialisation 	
<p>6. SAIMM Young Professional's Council: Entrepreneurship and establishing SMMEs</p> <p>We are running a competition that looks into three areas as seen below that will address mining related challenges. Our expected outcome is providing support to the most viable solution that will be presented at the conference, this feeds into our goal of supporting and establishing SMMEs.</p>		
Category 1:	Web-based applications (apps)	<p>Katlego Letsoalo</p> <p>kletsoalo@mineralscouncil.org.za</p> <p>and</p> <p>Antony Mello</p> <p>amello@vuuma.com</p>
Category 2:	Artificial Intelligence / IoT	
Category 3:	Human-centred application of technology	