

Inside this issue:

 Six MineWolf mine clearance machines for the National Institute of Demining in Angola **1**

 Mini MineWolf machine delivered to Colombia **2**

 Training of Iraqi staff on Mini MineWolf **2**

 Most productive season for NPA in Bosnia-Herzegovina **3**

 Mine clearance on the Jordan-Syrian border **4**

 Land release using machines in Southern Sudan **4**

 Danish Demining Group uses the Mini MineWolf in Afghanistan **6**

 New robotic arm attachment for MineWolf machines **6**

 MineWolf Systems presented its products at DSEi 2009 in London **7**

 MineWolf Systems demonstrates Mini MineWolf to German Army Engineers **8**

 MineWolf Mechanical Operations Workshop – Munich **8**

Six MineWolf mine clearance machines for the National Institute of Demining in Angola

Despite seven years of sustainable peace and stability Angola remains one of the countries most heavily affected by landmines. People in all parts of the country still suffer from the imminent landmine threat and the estimated ten million mines scattered around the country continue to slow down the urgently needed development of the country's infrastructure.

Since the end of the civil war in 2002, the Angolan authorities together with international organizations and donors have built a significant mine action capacity, raising awareness for the landmine problem and providing assistance to the numerous victims maimed by the "silent soldiers".

In order to enhance its efforts in clearing the landmines the Angolan Government signed a contract with Swiss defence contractor RUAG for the delivery of six large MineWolf mine clearance vehicles produced by Swiss-based company MineWolf Systems. The contract includes support equipment and a comprehensive training package.

MineWolf Systems' flagship product, the MineWolf has proven its effectiveness in many mine-contaminated countries and is well suited for dealing with the difficult conditions to be encountered in Angola. The machine is operator controlled and is capable of clearing all types of common anti-

personnel (AP) and anti-tank (AT) mines. In accordance with the contract, twelve mechanics from Angola undertook training at the manufacturer's facilities in Germany during July 2009. The first machines arrived in country at the beginning of November and training continued in real life conditions. MineWolf Systems will maintain a presence in Angola for



MineWolf being deployed to the field for training

a period of nine months to ensure that INAD (Instituto Nacional de Desminado) personnel will be fully capable of operating the equipment. The first machines will be deployed to Angola's Southern provinces in January 2010 to free the country's most heavily affected areas of landmines.

Operator training in Angola



Mini MineWolf machine delivered to Colombia



Mini MineWolf in Colombia

On 4th December 2009 Colombia successfully concluded its hosting of the Cartagena Summit on a Mine Free World. As confirmed at the summit, Colombia is considered to be the country most affected by landmines and explosive remnants of war (ERW) in the Americas and the casualty rate from mines and ERW is one of the highest in the world. The improved security situation means that mine clearance efforts will gain momentum. Whilst the exact extent of the contamination is still unknown, Colombia can now use a Mini MineWolf machine to speed up the process of releasing land back to the affected communities.

The Vice President's Office is the coordinating body for mine action in Colombia and in early 2009, thanks to a generous contribu-

tion from the Japanese Embassy in Bogota, they procured a Mini MineWolf machine with a tiller attachment and support equipment. MineWolf Systems brings its know-how and experience from other global operations to assist Colombia in reducing the dangerous areas. In July a technical advisor from MineWolf Systems spent five weeks in country providing training for the operators and mechanics from the military to ensure the machine donated can be operated and maintained to its maximum effectiveness.

Colombia is investing in its own infrastructure to address the mine problem and, following the success of the summit is looking to further develop its own capacity to achieve the goal to become mine-free.



Colombian trainees undergoing training course

Training of Iraqi staff on Mini MineWolf for Ronco/IMCO operations



Mini MineWolf with camera system

After a long wait for Ronco's newly acquired Mini MineWolf to cross the border from Kuwait, training is finally underway for operators & mechanics from IMCO – the 'Iraq Mine & UXO Clearance Organisation' set up by Ronco as part of their Weapons Removal & Abatement project in Az Zubayer, Basrah. The Mini MineWolf team consists of a team leader, three operators, a mechanic and a

driver and the training is being delivered over four weeks through an interpreter. Once the team were accustomed to the machine's daily maintenance procedures, their enthusiasm to get working held no bounds and within hours of training, the operators were processing the ground using the tiller, practising overlaps and getting used to the depth controls. The final week of training will concentrate on using

the Remote Video Guidance System which will allow the team to remotely operate the machine in slightly more built up areas and prevent the operator from running the tiller over war debris and 'difficult to see', partially buried steel pipelines, which are abundant throughout Iraq.

The equipment delivered included a containerised workshop and a full spare parts package plus six months on-site technical support. IMCO gained their accreditation to work in the South of Iraq in mid-November 2009 and will deploy the machine in suspected hazardous areas to assist with oil field

redevelopment, once the training is complete and the SOPs are fine tuned.



Instructor explaining the use of the remote control

Most productive season for NPA in Bosnia-Herzegovina



MineWolf working in Bosnia-Herzegovina

During the 2009 demining season in Bosnia and Herzegovina, Norwegian People's Aid (NPA) cleared almost two million square metres of land using MineWolf machines. The precise figure of 1,916,450 m² of land mechanically prepared between March and November showed that last season was NPA's most productive so far in Bosnia-Herzegovina.

NPA used their two Mini MineWolf demining machines from March to November to mechanically prepare a total of 1,457,450 m². March was the most productive month with 116,800 square metres of ground prepared by one Mini MineWolf machine.

In October and November NPA leased a larger MineWolf machine, and operated with it in the village of Brvnik in Šamac municipality in north-eastern Bosnia-Herzegovina. This is an area heavily contaminated with anti-personnel mines with many PROM bounding fragmentation mines. The heavy mine contamination resulted in a number of detonations during the two months of operations but these caused no major problems to the machine and NPA was able to continue with their operations as planned, clearing a total of 459,000 m².

During November 2009 MineWolf Systems conducted MineWolf training for two NPA

operators. NPA in Bosnia currently has six operators, who have been trained to operate both the Mini MineWolf and MineWolf machines.

The demining project in Brvnik is being cleared by NPA thanks to the donation of the German Federal Foreign Office (GFFO).

In August, NPA hosted representatives of the German Ministry of Foreign Affairs, from the Department for Humanitarian Aid and Humanitarian Demining and representatives of Brcko District Government at the Brvnik site to see the machines in action. The GFFO is one of the major donors for Norwegian People's Aid humanitarian demining projects in Bosnia and Herzegovina and thanks to joint efforts the cooperation will continue in future.



MineWolf clearing in heavy vegetation

Mine clearance on the Jordan-Syrian border



*Mini MineWolf with flail operating
in Jordan*

The last remaining minefield in Jordan is currently being cleared by Norwegian People's Aid (NPA) along the Syrian border to the North of the country. It consists of approximately 100 km of pattern laid military minefields – established in the 1970's.

NPA currently have two Mini MineWolf machines working primarily in a verification role, processing approximately 7–9,000 square metres of ground a day combined. The machines have each worked in excess of 1600 hours and are sustaining multiple anti-personnel mine blasts on a daily basis. They have also survived a number of M19 anti-tank mine detonations. There are two tiller and one flail attachments with the machines, along with a mounted workshop trailer and full support package, giving NPA a permanent backup solution should one of the tools get damaged during operations.

Operations began back in April 2008, initially with one machine fitted with cameras to clear a safe path between the mine rows, which were largely visible on the surface. As the manual teams became more experienced, the machines switched to a verification role. NPA purchased a second machine six months after the task started

and now benefit from a very effective clearance solution.

The ground proved to be very difficult in the first ten kilometres of clearance, with buried rocks in the minefields both the tillers and the flail suffered and both machines required a high amount of maintenance which made progress slow. The teams are now working in the western part of the task site where the ground is much better suited to mechanical treatment and NPA estimate that the task will be completed within the next two years. To achieve this, NPA are hoping to secure donor funds to purchase a large MineWolf machine to speed up the verification process.



Mini MineWolf undergoing maintenance

Land release using machines in Southern Sudan



MineWolf Bagger working in Sudan

MineWolf Systems actively promotes the concept of land release using a mechanical approach. Land release was chosen as the main theme for the 2009 MineWolf Mechanical Operations Workshop to stimulate discussion on the concept and further best practice. At the workshop, one of MineWolf's partners, Norwegian People's Aid (NPA) chose to elaborate on how they use MineWolf machines for the release of land in Southern Sudan. To

share this experience with our wider readership, their case study has been summarized below.

NPA's Mine Action Programme in Sudan uses a toolbox approach to demining, including non-technical survey, manual demining and the mechanical processing of land.

For the mechanical processing of land, NPA Sudan uses MineWolf products. It has been using the MineWolf machine since October



Operator handling the Mini MineWolf remote controlled

2005, the MineWolf Bagger since August 2008 and the Mini MineWolf since May 2009. Rather than focus primarily on mine clearance, NPA uses the concept of land release, which focuses on releasing land back to the community as soon as possible, through both non technical and technical processes. Typically a suspected hazardous area (SHA) is released by either general survey (or a re-assessment of existing survey information), by technical survey or by full clearance. Clearance is obviously the most expensive option and so the more land that can be released through general and technical surveys the better.

NPA uses the MineWolf machines for ground preparation, technical survey and clearance operations. For ground preparation they use the MineWolf Bagger with the bucket attached; for technical survey, a MineWolf with tiller or flail attachments is used and followed up by a visual search; and for clearance they use a MineWolf machine with the tiller or a flail plus tiller combination which is then followed up by a manual clearance check (Quality Control) of 10% of the area cleared. NPA deploys the three different MineWolf machines according to their capability. The MineWolf is best suited for processing large areas with light to medium vegetation

containing both anti-personnel and anti-tank mines. It is used for ground preparation, technical survey and clearance tasks.

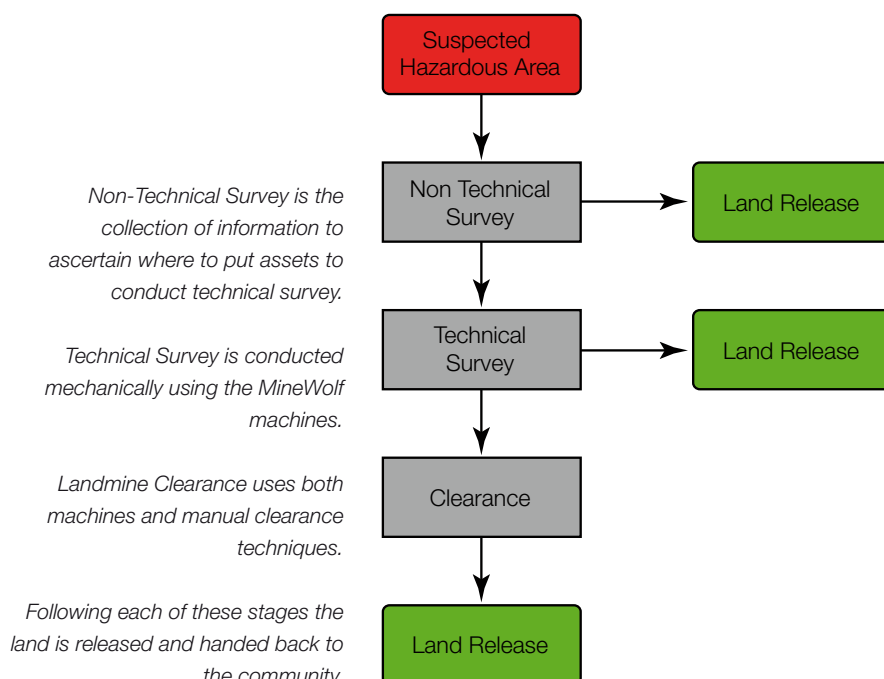
The Mini MineWolf is used in a similar way to the MineWolf but used on smaller areas. The Mini MineWolf is good for small tasks and NPA uses it both for technical survey and the verification of land after manual clearance.

The MineWolf Bagger is used for very small areas with heavy vegetation, primarily with anti-personnel mine contamination, though it can deal with anti-tank mines too. It is considered ideal for small tasks with its interchangeable tiller and bucket for the removal of obstacles and it processes about 400 m²/h. The MineWolf Bagger with the bucket attachment is also used for preparing the ground for manual demining tasks.

NPA always processes ground to a depth of 20 cm but for road clearance tasks the ground is processed to a depth of 30 cm as there are often deep buried bombs there. When processing ground which contains small anti-personnel mines, the machine passes over the ground twice with the tiller attached, the second time at a 90 degree angle to the first. This gives twice the confidence that every part of the area has been processed.

To give an idea of productivity of the machines, NPA referred to one project in Kenya. It was an emergency clearance of contaminated area for which little information was given and there was no apparent pattern to the mines laid. A technical survey was conducted with the MineWolf machine with the tiller attached. Where mines were found there was follow up quality control with manual demining. The MineWolf Bagger was also used to remove scraps (such as tanks and trucks) and to clear the river bank. The MineWolf worked for 530 operational hours processing 500,000 m² with the tiller attachment (averaging 940 m²/h) and 31,000 m² with the flail (averaging 400 m²/h). During this time there were two anti-tank mine detonations and six anti-personnel mine detonations.

We would like to thank NPA for the content of this article.



Danish Demining Group uses the Mini MineWolf in Afghanistan



Mini MineWolf operating in dusty environment in Afghanistan

The Danish Demining Group (DDG) received their first Mini MineWolf in 2008 and the operation team was trained by MineWolf Systems during April and May. Its first operation took place in Bagram in June 2008, and the machine and operators were accredited on June 4th by the UN Mine Action Centre in Afghanistan.

The Mini MineWolf machine is part of a toolbox approach. DDG Afghanistan has 80 clearance sections deployed in the Central and Northern Region, and three mechanical demining units supporting the clearance.

The ground in Afghanistan is very hard, and highly contaminated with mines, ammunition and fragments. These conditions make it very difficult to work with mine detectors, and most of the clearance is done by full manual excavation. The Mini MineWolf has shown to be a key-tool in DDG's operations, to loosen up the soil, and for the direct destruction of mines.

Working in Afghanistan DDG faces a number of challenges including the dusty conditions, the mix of anti-personnel and anti-tank minefields, the UXO and cluster contamination,

the accuracy of the tasking, not to mention the security situation.

The tools used with the machines include the tiller, flail and sifter. In the operation areas the flail has shown to be ineffective due to the hard ground. The hammers and chains do not penetrate to a satisfactory depth. The rotary tiller is the main working tool. It breaks up the soil very well and so far has detonated all the anti-personnel mines that it has passed over. There has also been low damage to the chisels, holders and frames.

The main uses of the Mini MineWolf machine are for preparing the ground before manual clearance takes place and for verifying that land is clear.

We would like to thank DDG for the content of this article.



Mini MineWolf working in sandy terrain in Afghanistan

New robotic arm attachment for MineWolf machines



Mini MineWolf with robotic arm and bucket attachment

MineWolf Systems' philosophy to product development is to enhance the functionality of its

prime movers by adding various attachments. In response to further operational requirements in the fields of EOD, Counter-IED and Military Engineering, MineWolf Systems has developed a new robotic arm attachment to be fitted to any of the MineWolf machines. In addition to attaching any of the attachments, the robotic arm can now also be added to the MineWolf toolbox. It incorporates the following functions:

- Complete system with independent hydraulics

- Very agile and functional with sideways movement, kink in the main arm, and telescope at the shaft
- Multi adapter for various tools (e.g. buckets, grippers, camera), all of which can rotate 360 degrees
- Fully remote controlled (one-man operation)
- The robotic arm is linked to the base vehicle via a quick release plate which allows exchange to take place in a very short time

MineWolf Systems aims to work together with its customers to develop applications and offer mechanical solutions for dealing with explosive devices on a daily basis.



Mini MineWolf with robotic arm and gripper attachment

MineWolf Systems presented its products at DSEi 2009 in London



Mini Minewolf with tiller displayed at DSEi

From 8th–11th September 2009, MineWolf Systems exhibited at one of the world's largest fully integrated defence and security exhibitions – DSEi 2009 in London. The exhibition was attended by a large number of official delegations from all around the world. Over four packed business days attendees from the defence, security and military aerospace community experienced first-hand the latest land, air and sea capabilities of more than 1,350 companies from 40 countries.

MineWolf Systems displayed its Mini MineWolf mine clearance system equipped with

a tiller working head and a sifter bucket, representing some of its new range of additional attachments.

The company, with its portfolio of mine clearance systems, received comprehensive support and appreciation for its expertise from a number of high level decision makers.

MineWolf Systems will exhibit again during Eurosatory in Paris from 14th–18th June, 2010.

MineWolf Systems' stand at DSEi





Spectators at the German Army Engineering School

MineWolf Systems demonstrates Mini MineWolf to German Army Engineers

From 14th–18th September 2009, MineWolf Systems participated in the annual demonstration exercise of the German Army Engineering Corps in Münchsmünster near Ingolstadt/Munich. The exercises conducted included a wide range of engineering tasks including water crossing and field camp construction as well as counter IED and demining missions. The annual event is organized to present various equipment and services to the German Army General Staff Course with national and international participants and many other guests like Army attachés as well as national and international General Staff Officers.

MineWolf Systems presented its Mini MineWolf in conjunction with different demining services and the mine detection dog platoon. Those attending were impressed by the superior performance and clearance rate of the Mini MineWolf and in particular praised the fact that operators are safe due their distance from the machine while operated remote controlled. MineWolf Systems was thanked with an official certificate for the continuous support by the Commanding General of German Engineer Corps and Commander Engineering school, Brigadier-General Krippel.



Presenting the Mini MineWolf to the German Army Engineers

2009 MineWolf Mechanical Operations Workshop – Munich



MineWolf and Mini MineWolf with a range of attachments

MineWolf Systems held its annual Mechanical Operations Workshop for its partners and customers between 22nd–25th September. The theme of the workshop was “Technical Survey and Land Release” and was presented by Paul Collinson, Director of Operations, for MineWolf Systems. The first day of the event included guest speakers from Geneva International Centre for Humanitarian Demin-

ing (GICHD), Danish Demining Group (DDG), Norwegian People’s Aid (NPA) and the Swedish Civil Contingencies Agency (MSB), who gave theoretical and practical overviews on how these processes are being implemented in the field in relation to the current IMAS series 8.20.

The main focus was based on IMAS 8.22 “Technical Survey” and covered mechanical

processes used within land release concepts. The country presentations from partners in Sudan, Afghanistan and Congo demonstrated how the machines are being used to best effect and also highlighted the logistical challenges of keeping machines operational in these environments.

The second day was more practical in nature with live demonstrations at the German Army Engineering School in Ingolstadt. The MineWolf with the lifter attached demonstrated a second means of mechanical verification. The lifter is attached to the rear of the machine and brings any large objects to the surface after the ground preparation process and places them in rows to the side of the machine. The Mini MineWolf was also demonstrated with its new additional attachments. These included the dozer shield, forklift, bucket, sifter bucket, tiller and flail.

The MineWolf global positioning and data logging system was another feature that

was displayed. Workshop participants were shown how data from the machine can be recorded in digital format which provides improved quality management on the machine's performance. The GPS and data logging system provides two functions: machine running data (machine temperatures, engine speed, tiller rotation speed, etc.) and machine tracking on areas worked.

As a round up to the workshop on the last evening participants experienced some old-fashioned German hospitality at the famous "Oktoberfest" in Munich.

MineWolf Systems was pleased to have representatives from the humanitarian and commercial sectors as well as representatives from the US State Department at the workshop and would like to thank all those involved for making this event a great success and an excellent opportunity to share mechanical demining knowledge from all over the world.

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Participants at the 2009 Mechanical Operations Workshop

