

# Proposal for construction of demining machines and trailers for the transport of dangerous goods carried out within the project TIRAMISU

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## Abstract

The issue of work will be wide range and will cover both the destruction (by trawling), transport and storage of hazardous materials of various nature, including mines, unexploded ordnance, IEDs, ammunition and explosives. The proposed work will describe the issues related to hardware problems and the latest proposals of technical solutions related to the destruction, storage and transport of munitions. In the section on structural solutions will present information and ideas proposed two recent work related to the project TIRAMISU: modular demining machine, working by pressure, connected to a remote-controlled mobile support platform - for example: tractor of PIERRE and trailer for temporary storage and transport of explosives and munitions.

## 1. Family of Modular Vehicles for Road Reconnaissance and IED Disposal

Engagement of the Polish Armed Forces in stabilisation missions both in Afghanistan and in Iraq verifies the requirements of the post battlefield areas. One of the areas requiring equipment upgrade is the issue neutralizing and transport of antipersonel mines, UXO and submunition. That charges are characterized by diversified construction and using different explosives.

From 2010 year WITI leads a new project as System Modular Vehicles for Road Reconnaissance and IED Disposal.

The system will consist of three different light armored vehicles tailored to performed specific tasks – fig. 1.

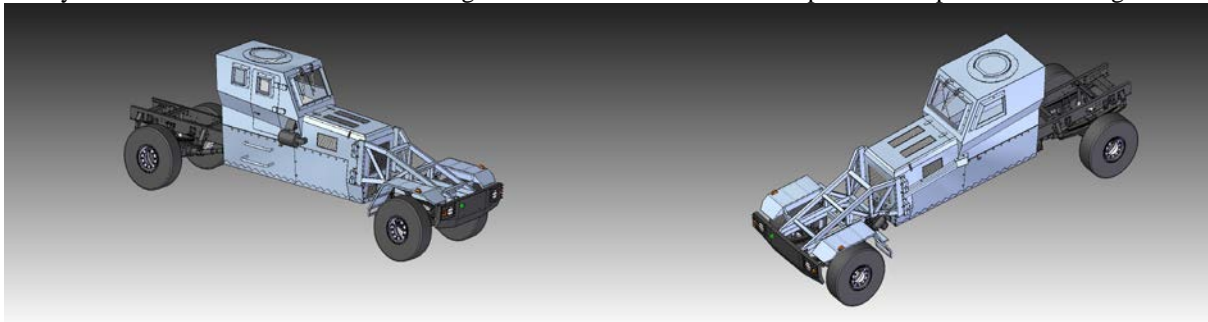


Fig.1. Light vehicle designed to specific tasks

The system allows detection, and most important: disposal and transport of mines, UXO, IEDs and explosive materials. Each vehicle of the system have its own dedicated equipment. The first in the group has a GPR [13] with metal detector, the second one – a mine flail, and the third one – a boom with manipulator to pick the detected object up – fig.2.

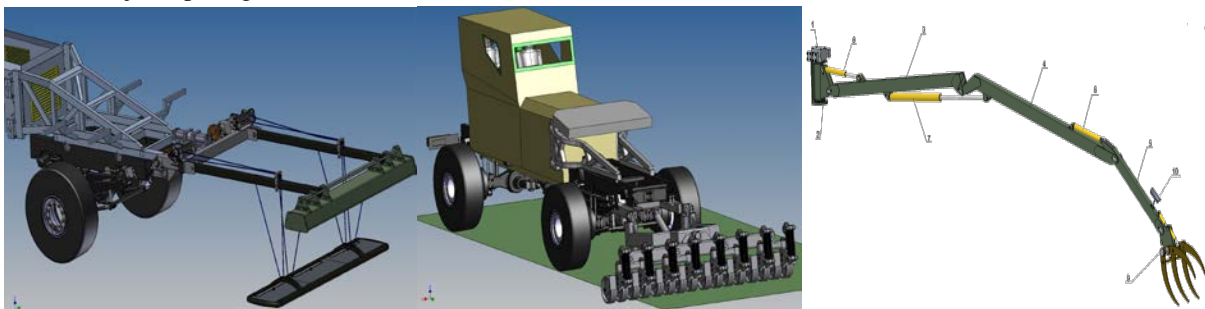


Fig.2. The equipment of a light vehicle: a multisensor detector (metal detector and GPR), a mine roller, an arm used to remove dangerous objects

Based on the experiences from construction of the system, we decided to create a new design of the modular demining machine, working by pressure, connected to a remote-controlled mobile support platform and trailer for temporary storage and transport of explosives and munitions

## 2. The modular demining machine

The Project is aimed at developing a state-of-the-art demining machine, working by pressure from polish national program, called SHIBA – fig.2. The modular demining machine, working by pressure, will be connected to a remote-controlled mobile support platform - for example: tractor of PIERRE. Width of the device will be matched to the dimensions of the vehicle.

The modular demining machine – fig. 3, 4 – contains:

- protection kit (1, 2);
- mounting arrangement for vehicle (3);
- boom (4, 5);
- working part of machine (6).

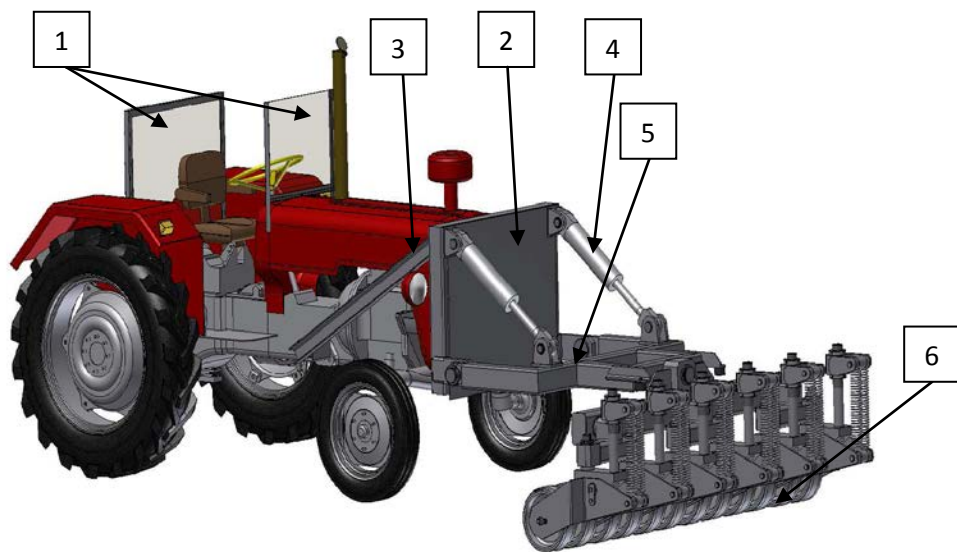


fig.3. The light modular demining machine, working by pressure with tractor – in working position

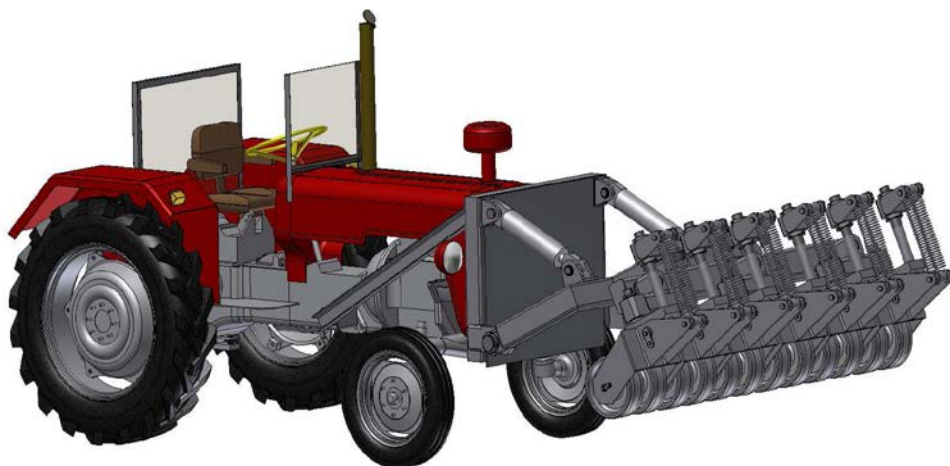


fig.4. The light modular demining machine, working by pressure with tractor – in transport

## 3. Trailer for temporary storage and transport of explosives and munitions

The aim of the project is to develop a idea storage and transport of explosives and munitions, extracted from areas at risk of post-war remnants – fig. 5, 6. The modular (demountable - exchangeable, composite structures

barriers) trailer, will be connected to a remote-controlled mobile support platform - for example: tractor of PIERRE.

The trailer for temporary storage and transport of explosives and munitions – fig. 5, 6 – contains:

- protection kit (1);
- transport trailer (2);
- container lid (3) – pressure with safety;
- protective barrier (4);
- capture zone of debris (5);
- reinforced chassis/suspension (6).

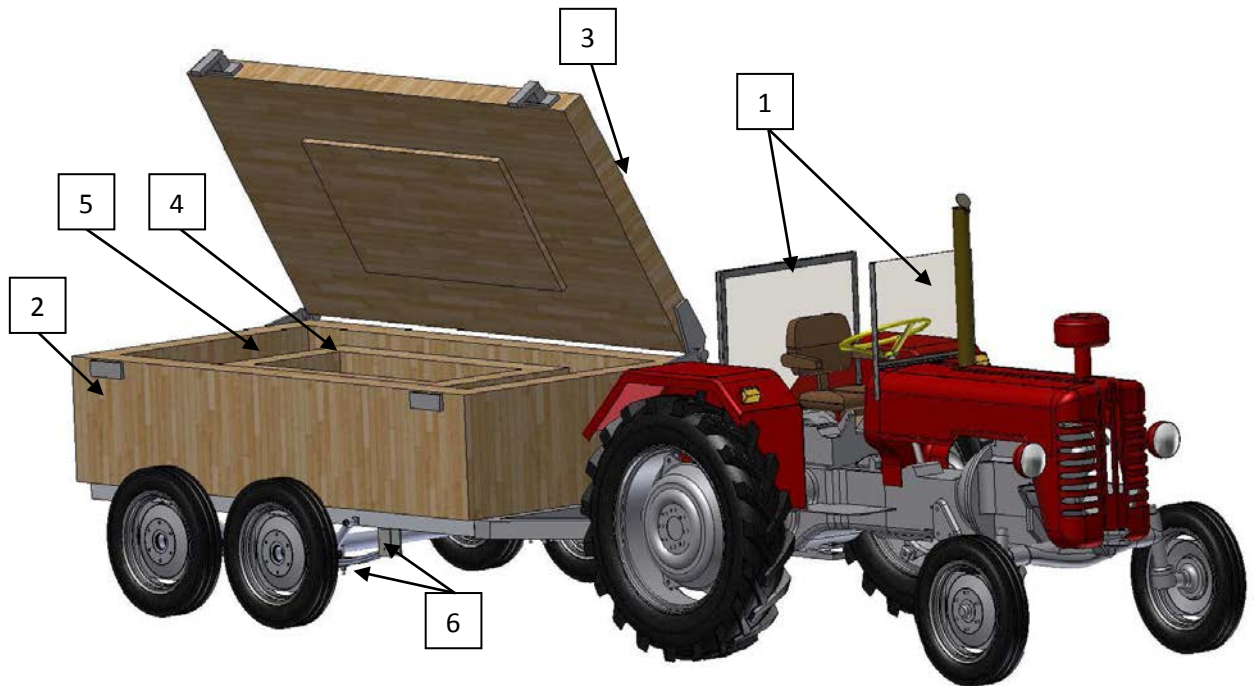


Fig.5. Trailer for temporary storage and transport of explosives and munitions – in open position



Fig.6. Trailer for temporary storage and transport of explosives and munitions – in closed position

#### **4. The comprehensive set of trailer and demining machine**

In order to maintain safe operation of the potential minefield is proposed to submit a set of two devices: the light modular demining machine and the trailer for temporary storage and transport of explosives – fig. 7, 8.

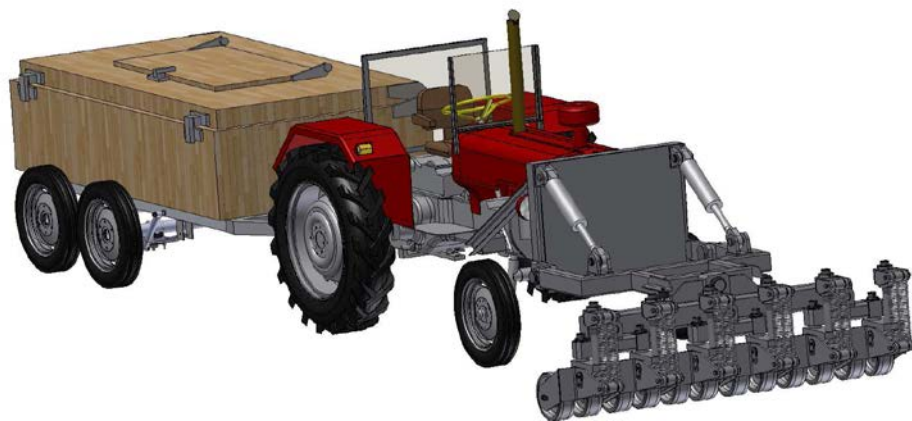


Fig.7. Trailer for temporary storage and transport of explosives with demining machine



Fig.8. Trailer for temporary storage and transport of explosives with demining machine

## 5. Conclusions

- In the project we'll establish the resistance of the demining machine to several hundred grams of explosive material (700 - 900 g).
- Weight at similar level assumes the maximum amount of explosive carried in the trailer for temporary storage and transport of explosives.
- In order to decrease of costs and increase of rebuilding the trailer after detonation of the explosive, barriers and housing are made of composite panels.

## 6. Acknowledgment

To the FP7 security Project TIRAMISU, GA 284747 which partially funds this research.

## References

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