



# PIAP Gryf

## Upgraded

By/Photo: Michał Sitarski

One of the flagship products of the Polish Industrial Research Institute for Automation and Measurements (PIAP) is the mobile EOD robot GRYF. The fact that this robot is popular among customers means that it meets their expectations – maybe it would be worthwhile to increase its capabilities even more and expand the group of potential users?

**PIAP Gryf** (English Gryphon) is a small and lightweight (basic weight of about 35 kg) EOD robot designed to examinations, including ground and hard-to-reach places, as well as EOR. By default, it is facilitated with a manipulator with five degrees of freedom, thanks to which it may pick up objects up to 15 kg.

Its construction includes combined wheel and tracked carriage system with additional tilting tracks in its front part. The allow the robot to overcome difficult terrain, stairs, or curbs. If necessary,

it is possible to dismount wheels from the drive system, so that only tracks are left. Thanks to this, Gryf may maneuver in confined spaces.

The robot has been facilitated with a PTZ color camera with 22x optical zoom and LED or LED IR illumination, which may move vertically through 150°, and horizontally through 350°. The second camera is mounted on the gripper and apart from support lights, it also has a heater. The surveillance equipment is complemented with two body cameras installed









in the hull of the robot, one in front and one in the back, both with light and integrated heaters.

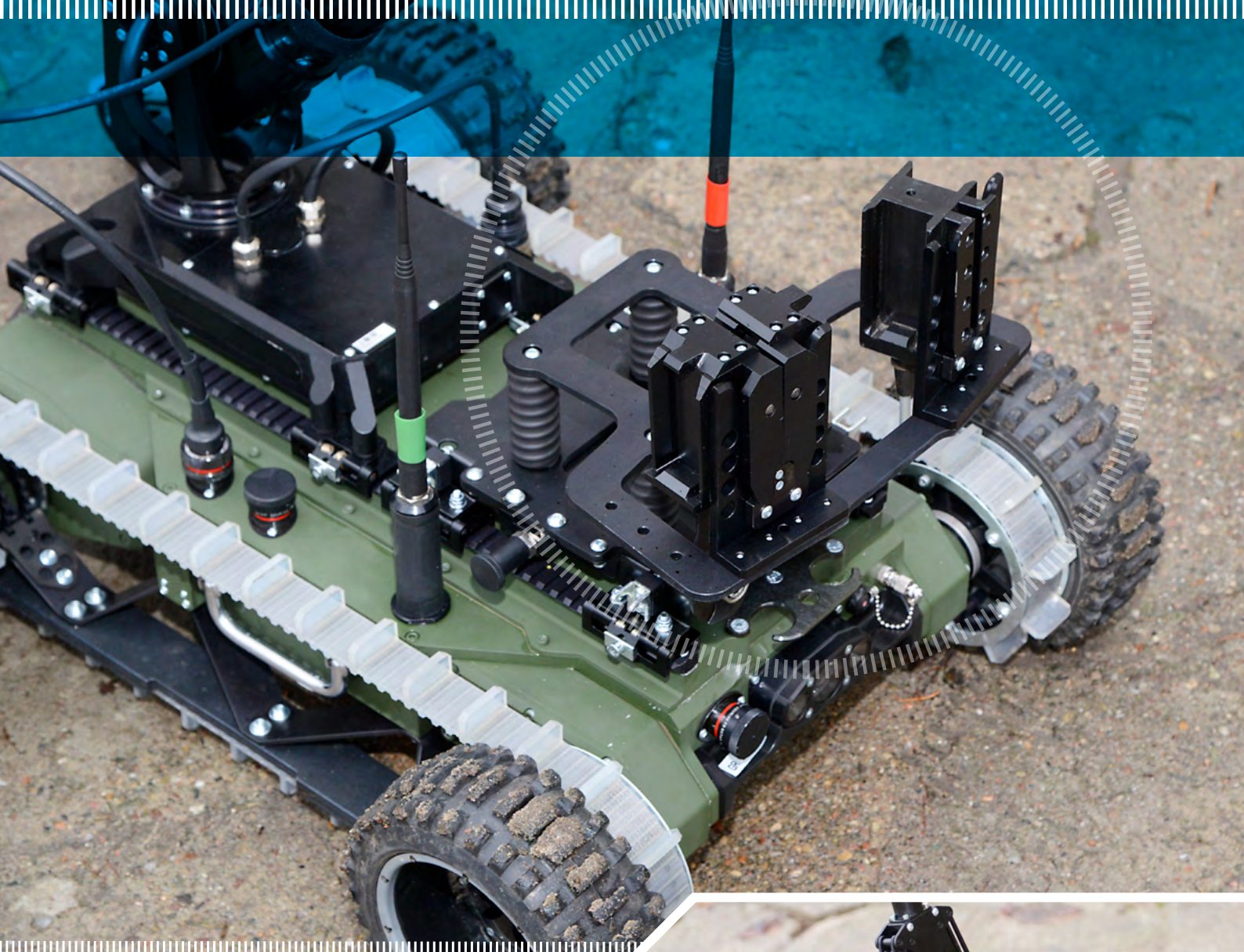
In order to increase the operational capabilities of the **Gryf** robot, it is possible to attach additional equipment, such as a mount for a pyrotechnical launcher, a mount for a shotgun with a camera and red dot sight (Benelli M4 Super 90), mounts for X-ray devices, sensors of vapor from explosives, and sensors of chemical contamination, fibre-optic wire winding (passive and active), a bus system for detonating explosives, a negotiator kit or additional antennas.

It is then very vivid that **Gryf** is a universal device with a wide scope of possible applications and it meets the requirements of many users. However, there are people who expect this small robot to

have even a wider range of functions. PIAP tried to face this and created a modernized version of Gryf.

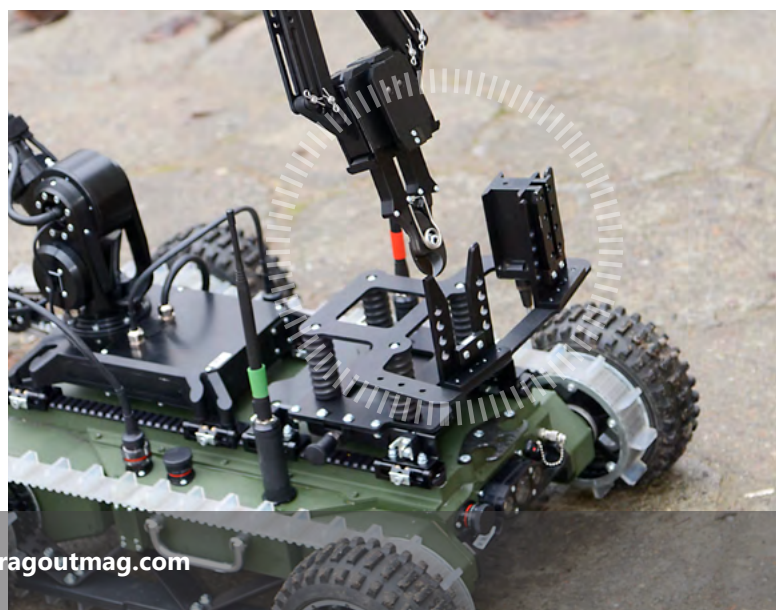
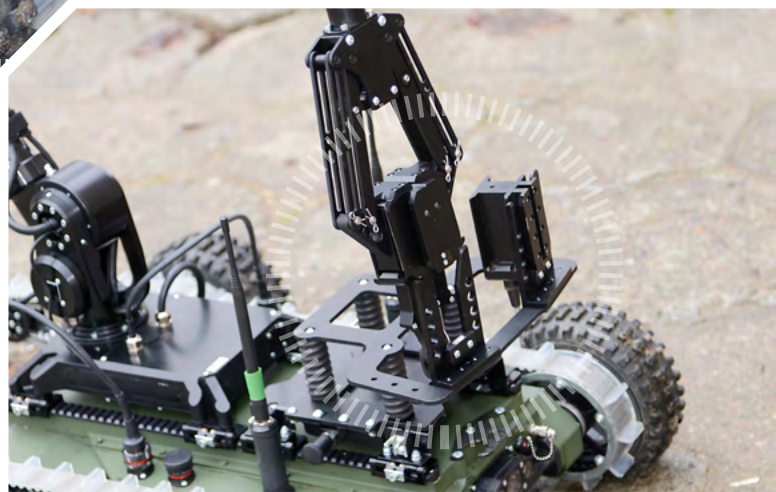
The new system increasing the universality includes a tool bank mounted to the mobile base (hull) of the robot. It has a form of a skeleton base for attaching the tool holders. The array of tools has been expanded with two new ones – wire cutters and a glass breaker. Both tools may be taken from the mounts thanks to the manipulator and do not prior installation on the arm – the specially elaborated algorithm allows the robot to automatically grab and put away the selected tool. The operator only needs to activate this function by pressing an appropriate button. Of course the operator may also collect and place back the tools on his own skills, but the automatic grab is a much quicker solution.





The glass breaker was designed for easier handling with panes in modern cars. During usage, the users noticed that vertical panes may be easily broken by the robot with the grapple – this may be achieved by simply hitting the glass with the grapple when the robot is in motion. Problems occurred in the case of tilted or spinning panes. In such cases the arm simply slipped on the glass. That is why the glass management tool has been created. It provides full efficiency for overcoming such obstacles without the need of tackling them with the grapple.

The mount of the pyrotechnical launcher was also redesigned – the new version allows simultaneous installation of two launchers, which makes it available to quickly repeat the shot in case of more complex construction of dangerous items and to quickly neutralize two suspicious items without the need for the robot to return to the operator in







order to reload or replace it with a new one, which usually takes some time. The visualization presenting the location of the manipulator on the control panel screen control is very convenient for the operator. Thanks to this, the operator may efficiently control the robot when it stays out of sight. What is more, the new version includes the ability to simultaneously generate image from four cameras on the screen of the control panel. This is also a helpful feature for the operator to control the robot and it shortens the reaction time, since there is no need to switch the screen between respective cameras.

The **new Gryf** also has new, modified engines that allow it to have a maximum speed of 10 km/h. Due to the requirements of the users, it is expected that the extension of the upper part of the manipulator will be automated (it has been extended manually) and several other solutions will be added as well. They will improve the capabilities of the robot and we will soon write about them.