Take the human risk out of IED disposal

There's no point using a robot to detect and neutralise IEDs if its operator has to help it do the job. Enter **telerob**'s teleMAX, an IED disposal platform famed for its ease of use.

The motto, motivation and mission that drives telerob is simple: "To develop machines, equipment and systems that protect or replace human beings in situations where their presence is either impossible or would place them at great risk." Whether the client is deploying a telerob product in an attempt to dismantle a nuclear facility or disarm a potentially explosive device, protecting people and their surroundings is always the company's paramount concern.

The task

The task can be summed up as follows: enter a potentially dangerous area, search for suspicious items, neutralise all possible threats, and come back healthy and in one piece. One should be very happy if this can be done using a remotely controlled robot.

Precise manipulator control is essential when neutralising IEDs.

Getting to a suspicious object sometimes requires moving up or down stairs, over gaps or through closed doors. Ideally this job should be done by the robot itself. Having a robot makes no sense if you have to go into the dangerous zone to open the door for it.

Don't send a man to do a robot's job

What's new about teleMAX, the company's medium-sized IED disposal platform, is that the user no longer needs to think about which of the manipulator's seven axes have to be moved, nor the direction or speed required. The only thing that a user has to do is to look through a camera and move the joystick in the direction he wants to move the gripper. Operating in the background, the system does all the necessary calculations, taking the pressure off the operator and saving time, nerves and a lot of sweat. At telerob, we let the robot do the job.

"Why is it so difficult to operate a robot manipulator by remote control?" This is the question that users most often ask after their initial training on how to use a new robot. The instructor normally answers that the operator will only need a little bit of experience with the system and will be soon an expert. But the real reason is that the user is restricted by the abilities of the manipulator control software, and could do much better with an alternative technology.

> "Having a robot makes no sense if you have to go into the dangerous zone to open the door for it."

This was witnessed at the Response Robot Evaluation Exercise in Disaster City in Texas, which was staged by the National Institute of Technology. Several task forces from the US have tested the teleMAX and its new manipulator control technology; these parties have developed 15 test methods in recent years as a means of deciding which robot fits best their needs.

The results astonished even telerob. First responders who were completely new to the teleMAX were able to operate the manipulator competently after a short introduction – literally in a matter of minutes. They picked up blocks, stacked blocks on top of each other and aligned them with each other. It's true that this does not sound very tricky compared with what a human can do with his hand, but doing it with a robot is quite a different thing. With conventional

technology one wouldn't usually come close to achieving this result. More likely, everybody would be happy if a block was successfully picked up. No one would even try to attempt anything more complicated.

Don't do it twice if once is enough

It's common situation: you know exactly what the right tool is for the task at hand, but you don't have it in the vicinity. It is easy to imagine what's going through the user's head at this point in time.

> "First responders were able to operate the manipulator after a short introduction – literally in a matter of minutes."

The user usually has to return with the robot to the base station to pick up a new tool – even though it might have been very difficult to get the robot to the place where the tool is needed. It is not unusual for the user to bring the robot only partially back to the base station, and to leave the secure area with the tool and take it to the robot. The alternative is the user driving all the way twice.

The simplest solution would be to put a tool magazine on the robot, develop useful tools and implement some easy functions for automatically picking up the tools as they are needed. Placing the tool into the gripper the first time the robot is sent into the danger zone is not really an option: the user often doesn't know what is needed, and this would leave the gripper unavailable for manipulation tasks. Once again, it's best to let the robot do the job.

The teleMAX is the only vehicle in its class that has two tool magazines integrated into the chassis. This means that up to two additional tools or sensors can be carried during an operation, eliminating the need to drive back to the base station in order to pick up new equipment and return to the dangerous zone again. The user saves valuable time, allowing him to concentrate on the actual task. At the touch of a button, the manipulator arm automatically picks up an extra tool from the magazine.

Two chassis-integrated magazines allow the teleMAX to carry more tools and sensors than any other vehicle in its class.

The teleMAX can be equipped with an environment-scanning sensor capable of identifying chemical and biological threats.

Be sure an object is as harmless as it looks

CBRN detection is most often done by specialists wearing heavy suits to protect them. Nevertheless, these individuals are still risking their lives when they inspect suspicious items like dirty bombs. Preferably, a remotely controlled robot should do that job, with the operator sitting well away from the danger zone.

To be sure an object really is harmless, close inspection with special sensors is needed. Otherwise one can only tell that the area surrounding the suspicious object is safe, but nothing about the object itself.

This is especially true when you are dealing with a chemical or biological threat. A systematic search is necessary and is best done with an easy-to-use manipulator. This is why the teleMAX can be equipped with a sensor platform that scans the environment, and special sensors that can be used by the manipulator thanks to innovative and easy-to-use manipulator control technology.

In all scenarios, telerob adheres to a basic tenet: don't send a man to do a robot's job. ■

Further information
telerob
www.telerob.de