

UNMANNED ROBOTIC COMPLEX

Robotic transport platform ROVER-S5 allows creating an unmanned complex that consists of a ground robot and an aircraft on board. In such complex, the ground robot delivers the aircraft to a specific location to execute flight tasks, which reduces the time spent as well as the power used for flying from the place of dislocation to a specific area. Thus, significantly extending the operation range. In addition, the ground robot has a considerable amount of power that can be supplied to the UAV.

THE UNMANNED ROBOTIC COMPLEX IS AVAILABLE IN TWO VERSIONS.



The first one is a tethered type of an aircraft. This version allows the ground vehicle to supply electric energy to the aircraft via wire so that it has enough disposable loads to rotate the screws. This version permits the aircraft to stay at specified height indefinitely long.

The second version is an unmanned aircraft that operates in an autonomous mode; it automatically takes off and lands on a ground vehicle. Unlike the first variant, in which an aircraft hovers over a ground robot, the second variant allows an UAV to fly within a considerable distance from a ground robot. When a flight mission is fulfilled or the batteries are flat an UAV

automatically lands on a ground robot and recharges its batteries using the robot's power generation system. An unmanned robotic complex comprised of a mobile robotic platform as well as vertical takeoff and landing, has the following applications depending on a payload taken.

VIDEO SURVEILLANCE OF SECURITY AREAS AND PERIMETERS AT VARIOUS HEIGHTS.

Video cameras are fixed on a gyrostabilized suspension and are able to obtain surveillance range of several kilometers. The use of multispectral video cameras with a night vision option ensures 24-hour surveillance and a high degree of detection of distant objects. An UAV conducts flights over the specified perimeter in the autonomous mode. For recharging it lands on an unmanned ground vehicle at the location other than its original takeoff. Thus, performing perimeter surveillance in hard-to-access areas becomes feasible. Video cameras and a video signal transmitter fitted into UAV allow transmission of video images over a considerable distance. At the flight height of 300 meters a stable connection is available within 35 km range.

RETRANSMISSION OF WIRELESS COMMUNICATION CHANNELS AND SETTING UP TEMPORARY WIRELESS COVERAGE.

A radio repeater lifted by a UAV can quickly set up a radio communication network to cover large areas. For such applications, it is effective to use a tethered execution of UAV with a ground robot. A quadcopter and extender receive electric power through a wire from a petrol-driven generator of the ground robot. This technique allows a UAV to hover over the ground robot indefinitely long. Using an unmanned ground vehicle as an UAV carrier pursues two aims — to provide the UAV with electric power and find the most convenient location for the extender. Ground robot's high mobility, maneuverability and autonomy give it a considerable advantage over off-road automobiles in the aforesaid mission.



A group of unmanned robotic complexes fitted with extenders on board are able to set up a self-organizing MESH network to ensure its automatic operation in case of a possible failure of some cross-point extenders. Such unmanned complexes can be delivered to a disaster area by trucks with a high terrain-crossing performance.

NIGHT LIGHTING OF HARD-TO-REACH OBJECTS.



A LED floodlight that is mounted in the UAV can enable rapid lighting of objects during rescue and search operations as well as other missions. The tethered aircraft that is connected to the ground robot has unlimited lightning time.

RADIATION CONTROL IN HAZARDOUS AREAS AND SITES.

The unmanned robotic complex can be effectively used to

distantly measure radiation levels without the risk to an operator. Automatic control systems allow taking regular measurements in a fully autonomous mode. Highest efficiency of the unmanned robotic complex has been achieved in missions that require systematic and methodical measurement taking. The complex is very cost effective — it allows taking accurate measurements without the use of personnel and vehicles for transportation of operators.

Wheeled chassis allow long distance traveling while UAV is able to reach areas and facilities that are difficult to access. Once all necessary measurements are taken, the UAV returns to its ground robot in order to proceed to the next point of takeoff.

For effective operation at high latitudes and Far North, the aircraft's vertical takeoff and landing is placed in a closed heated container to prevent the accumulators from fast discharge and ensure quick starts of the UAV at low temperatures.