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# Multifunctional Helmet for IT provision of Mine Rescue operations

# Organization of communication during mine rescue work



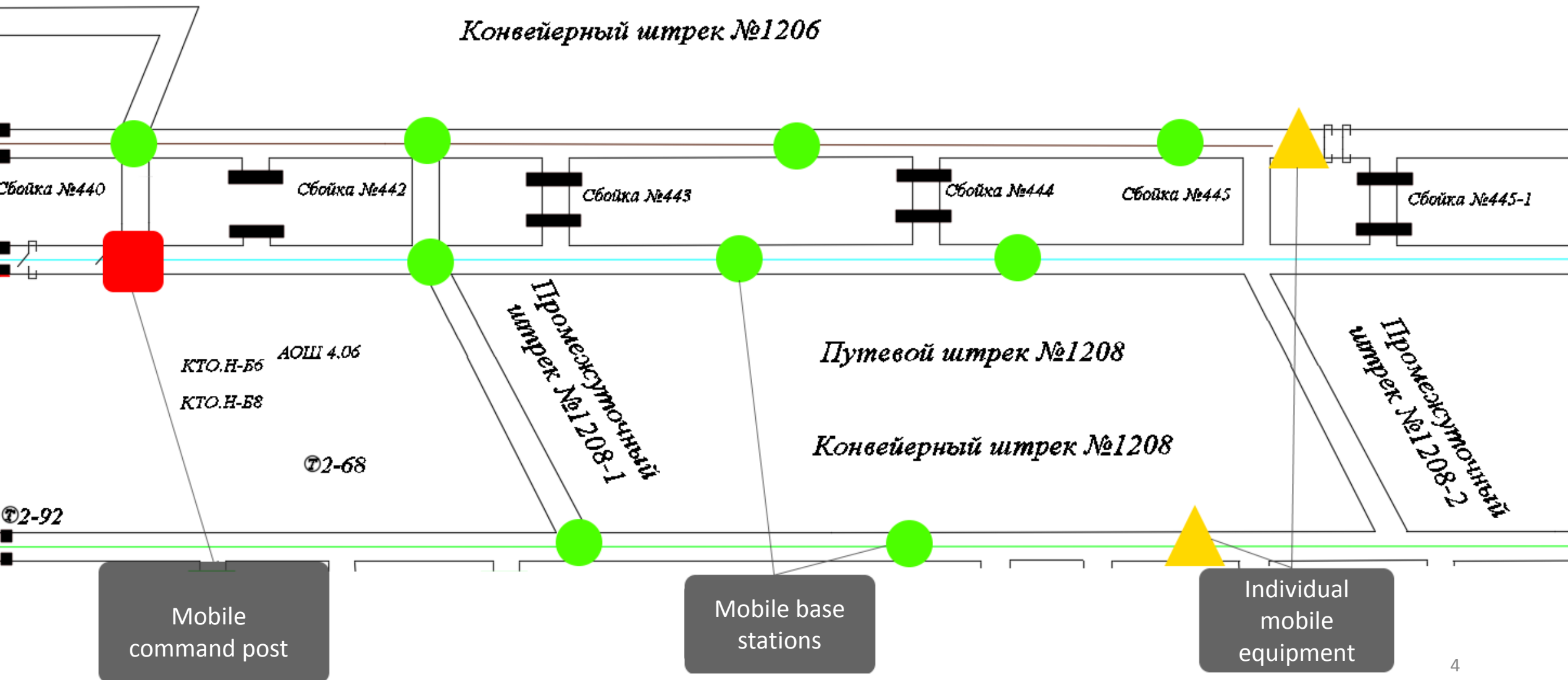
- between the dispatcher of the mine and the duty officer at the telephone of the mine rescue unit;
- between the units of mine rescue body;
- between the responsible head of liquidation of the accident and the places of conducting mine rescue work;
- between the head of mine rescue work and the departments in the mine, underground and ground bases, units of mine rescue body;
- between departments of mine rescue body, working in a gaseous atmosphere, with underground bases and the head of mine rescue work;
- between the respirators of the compartment during operation in a gaseous atmosphere, descent and lifting of vehicles by vertical and inclined workings;
- between special transport, engaged in the delivery of emergency materials and equipment, and the duty officer at the telephone unit, etc.

# Currently used equipment

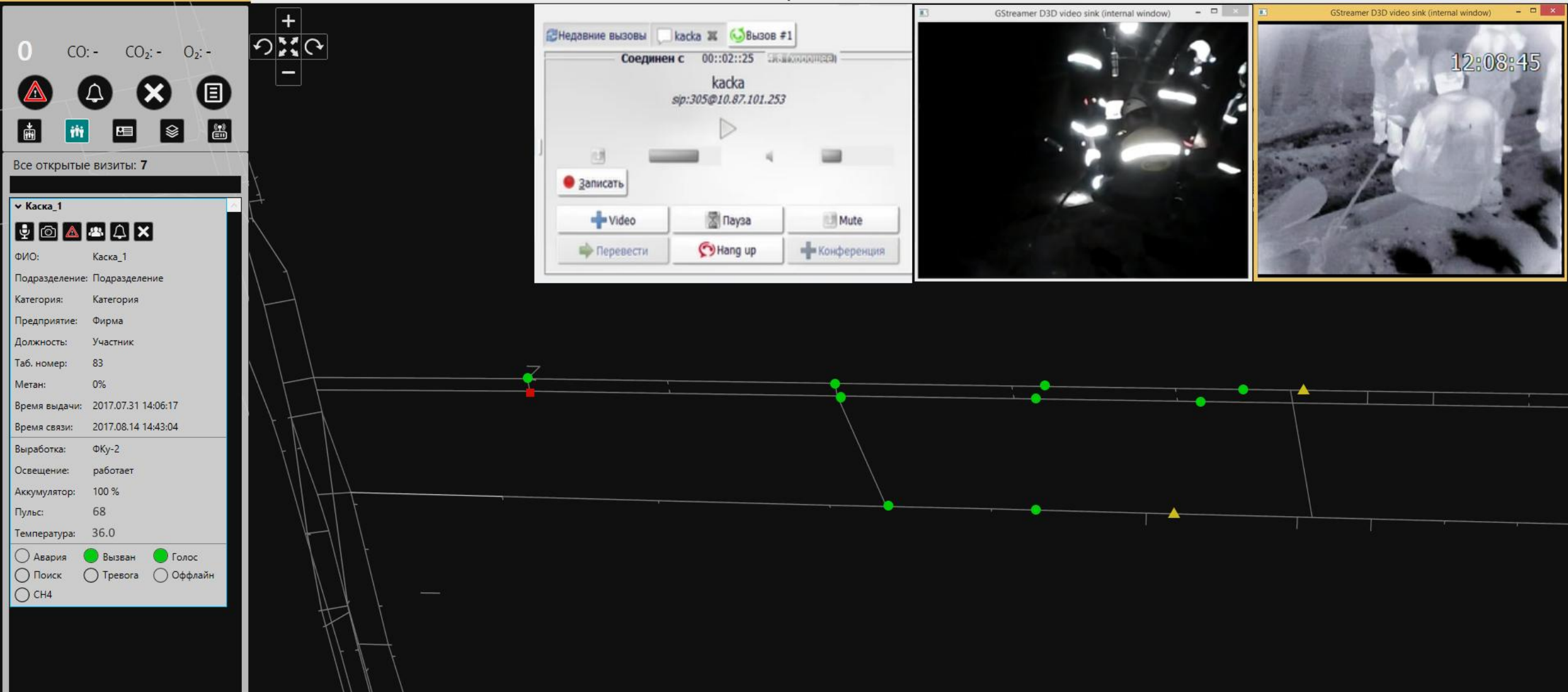
- Susceptibility to mechanical breakage;
- Restriction on the type of transmitting information - only voice and code signals;
- Impossibility to record conversations with built-in means;
- Branching of communication lines is possible only from the coil;
- Difficulty of dismantlement of the system after completion of work.



# Equipment installation







Mobile command post

# Mobile base station

- Wireless communication through Wi-Fi
- Mesh networking topology
- Radius of coverage: up to 600 m
- Intrinsic safe design
- Battery life: 24 h
- Indication of signal level for installation



# Multifunction helmet

- Vision in smoke and darkness
- Lighting
- Video streaming to the underground base and command post
- Full-duplex voice communication
- Measurement, display and transmission of the concentration of dangerous gases in the atmosphere
- Measurement, display and transmission of body temperature and heart rate of the rescuer
- Locate and display the location of all rescuers
- Battery life: up to 4 hours



# Image in front of rescuer's eyes

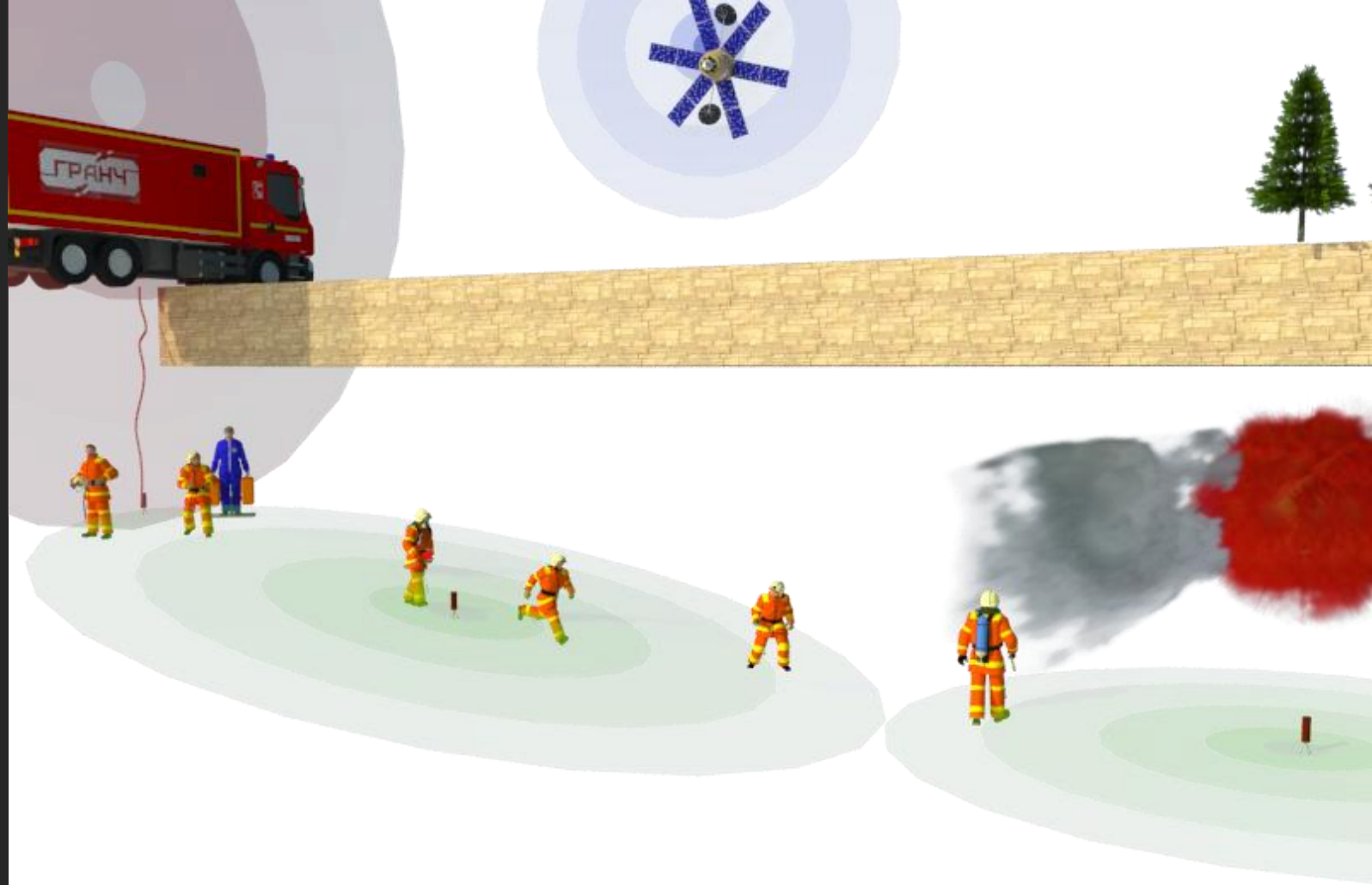
- Thermal image
- Location in the mine
- Name of groove
- Time
- Body temperature
- Heart rate
- Concentration of CO and CH<sub>4</sub>

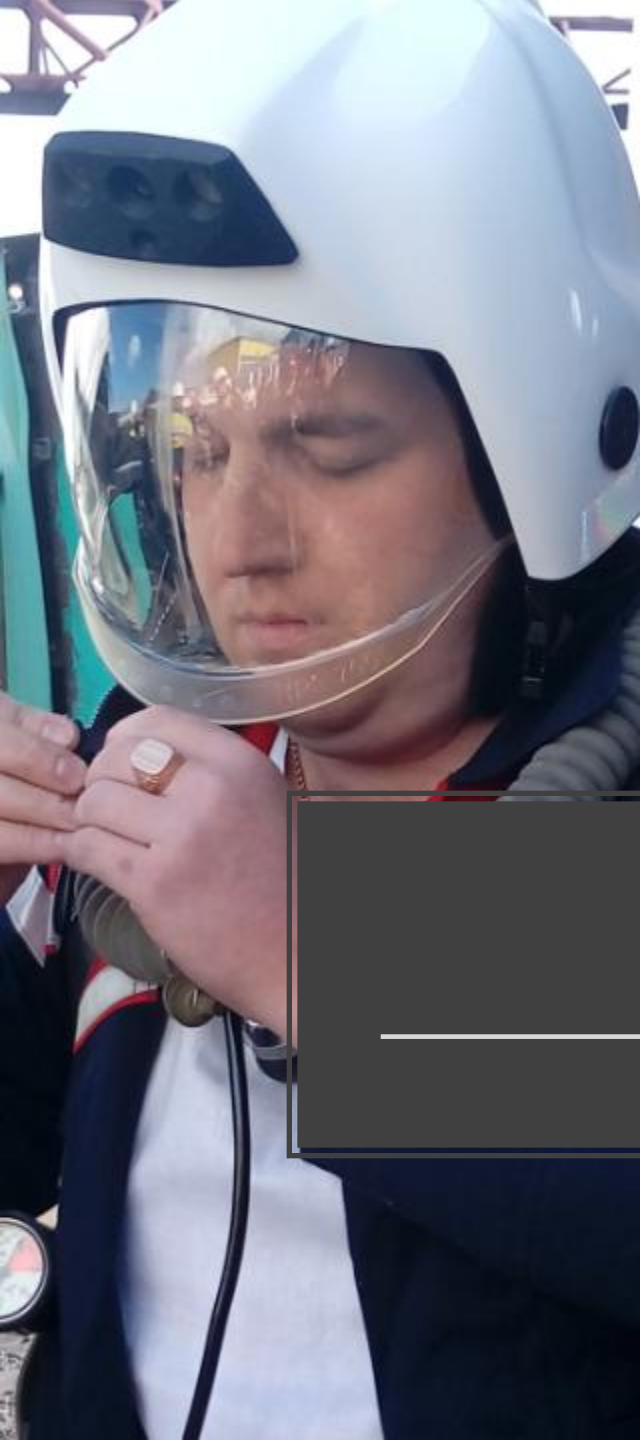




# Rescue work tactics

- Delivery of equipment to underground base and organization of connection of underground base with ground command post
- Turn on the mobile command post to create a network and start monitoring. Turn on all the mobile equipment
- Installation of mobile base stations while moving forward, with preservation of continuous voice communication, video streaming and data transmission





# Tests



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