

COMPREHENSIVE SYSTEM FOR PHYSICAL PROTECTIONS OF
EQUIPMENT AND STRUCTURES FROM DRONES AND UASs

ANT  DEFENSE

Shelter ANT&DRONE



THE RAPIDLY CHANGING SECURITY CONDITIONS OF INDUSTRIAL, CIVILIAN AND OTHER STRATEGIC OBJECTIVES OF TODAY'S WORLD REQUIRE NEW SAFEGUARDING MEASURES TO PROTECT PRODUCTION FACILITIES AGAINST EVOLVING THREATS



Parks storage oil and petroleum products



Warehouses flammable substances



Warehouses chemical products (compressed gases, ammonia, products petrochemicals)



Production, with are applied petroleum products, chemical substances and explosives chemicals substances



Commodity stations railways, with located fuel reservoirs



Gas compressors stations and open gas pipelines



Strategic and infrastructural objects- refinery plants, power



plant and nuclear stations



One of the key factors threats – attacks with using drones

Attack drones and UAS (Unmanned Aerial Systems) pose a rising threat against high value industrial facilities.

Physical protections of the industrial objects should be based on the proliferated drone threats:

Small and Medium size UASs - drones and quadro-copter types capable of deploying airborne ammunition.

Larger and Heavier UAVs - Fixed wing aircraft of up to 400kg, capable of traveling at speeds of up to 200km/h

REQUIREMENTS FOR DRONE PROTECTION SYSTEM - SHELTER "ANTIDRONE"

- The fully assembled shelter prevents drones of the aircraft type weighing up to 400 kg and flying at speeds up to 200 km/h with a wingspan of 1.5 meters, as well as small with droppable ammunition from hitting the protected object
- Ensuring a minimum distance of 5 meters from the shelter of protected objects
- Non-interference with existing technological equipment. Possibly, some supports may be supported by buildings and structures
- Availability of technological transport and personnel
- Reliability of the shelter - the shelter's own design should not threaten the existing equipment and communications of the enterprise, even in the event of a direct hit by a drones
- Compliance with current standards and requirements in terms of wind, snow, and seismic loads
- The masts and power grid of the shelter take on additional functions in accordance with the technical specifications - lighting, video surveillance
- Shelter maintainability

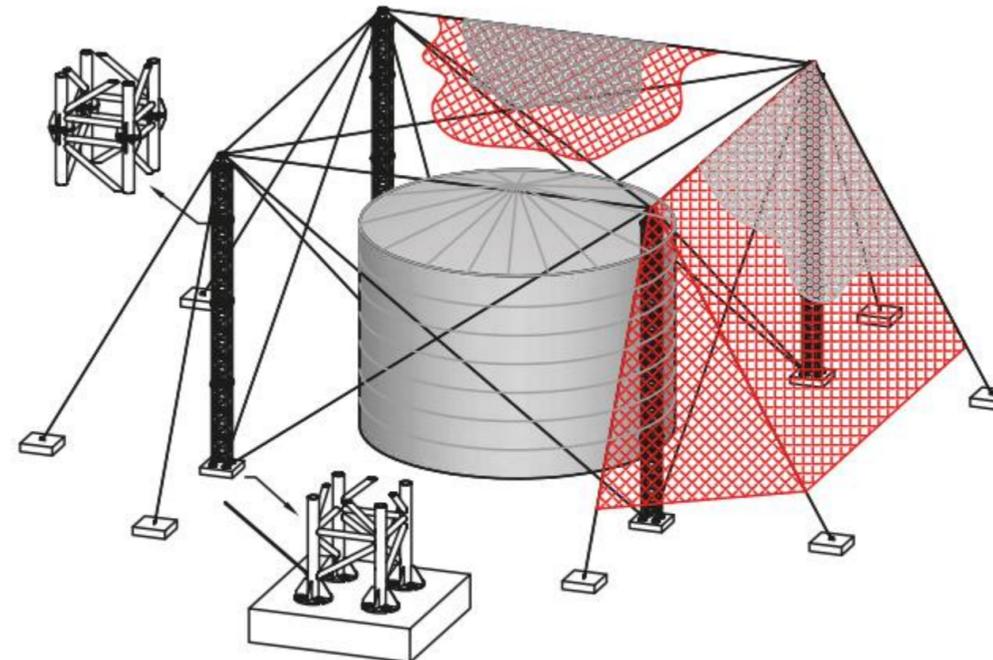
Types of ANTIDRONE shelters

	MAX	Medium	Light	Small
Maximum conditions	UAV weighing up to 400 kg and reaching speeds of up to 200 km/h. Kinetic energy of 617 kJ.	UAV weighing up to 250 kg and reaching speeds of up to 200 km/h. Kinetic energy of 385 kJ	UAV weighing up to 100 kg and reaching speeds of up to 120 km/h. Kinetic energy of 55 kJ.	UAV weighing up to 30 kg and reaching speeds of up to 60 km/h. Kinetic energy of 4 kJ.
Mass of the charge in TNT equivalent	Up to 30 kg	10 - 15 kg	6 -10 kg	Before 6 kg
Safety distance (recommended)	5-15 m	5 - 15 m	3-10 m	3-8 m

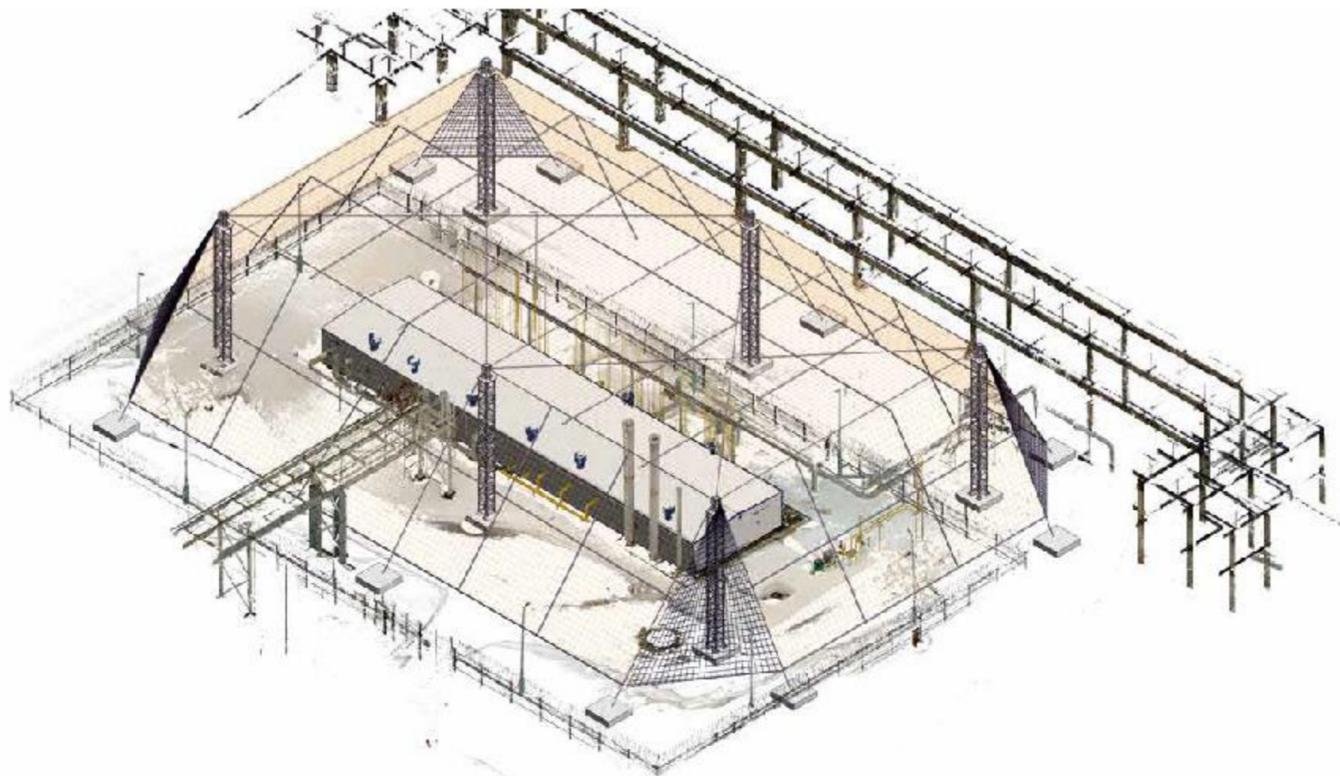
Company ANT-GROUP offers a comprehensive solution for the defense of the technical, specialized, energy equipment and other various facilities against the threat of Drones and UASs strikes

Small mesh (made out of polyamide or gabion net) with a cell size from 50*50 mm to 120*120 mm can be stretched over the metal net for additional protection against small UAS, FPV drones, and quadro-copters with a detachable munitions. All elements of the ANTI-DRONE shelter are galvanized and ensured to maintain long lasting results with extra coatings of anti-corrosion paints, resistant to ultra-violet radiation and is entirely fire-proof.

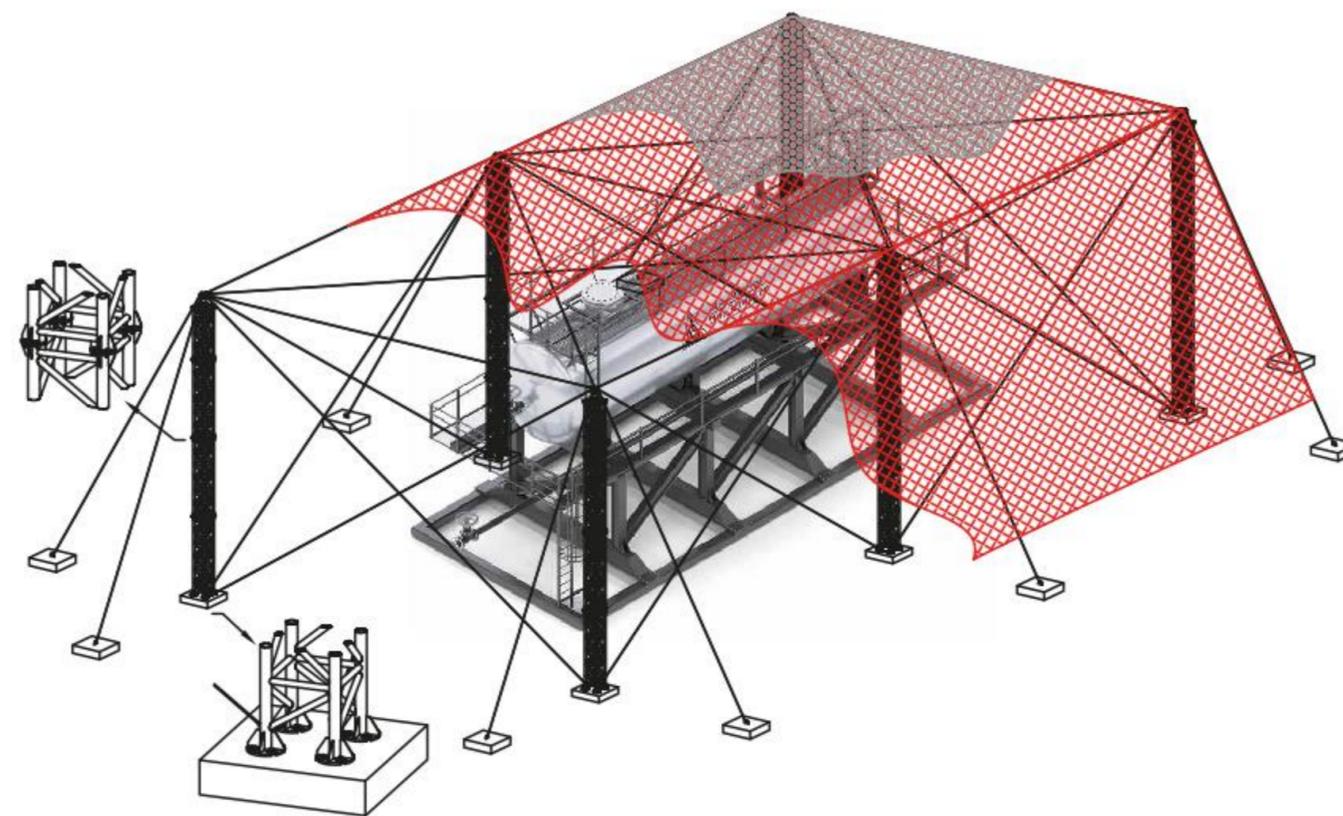
→ The system is designed as a pre-built collapsible engineering structure which unfolds into a full anti-drone shelter. The system consists of metal basing masts reaching upwards of 80 meter. The supports are located on custom made, transportable, prebuilt foundation pads specifically designed to support the anti-drone structure. The masts are supported by the grounding 20 – 35 mm steel tension cables, which make up the first layer of the protection net with the mesh gaps of approximately 10m*10m. The net base layer is secured via additional means to foundation pads with the use of extra counterweights. Over the tension cables, there is a second, finer special layer of metal netting made up of 5-6mm steel wire, with the mesh gaps between 350mm*350mm and 500mm*500mm

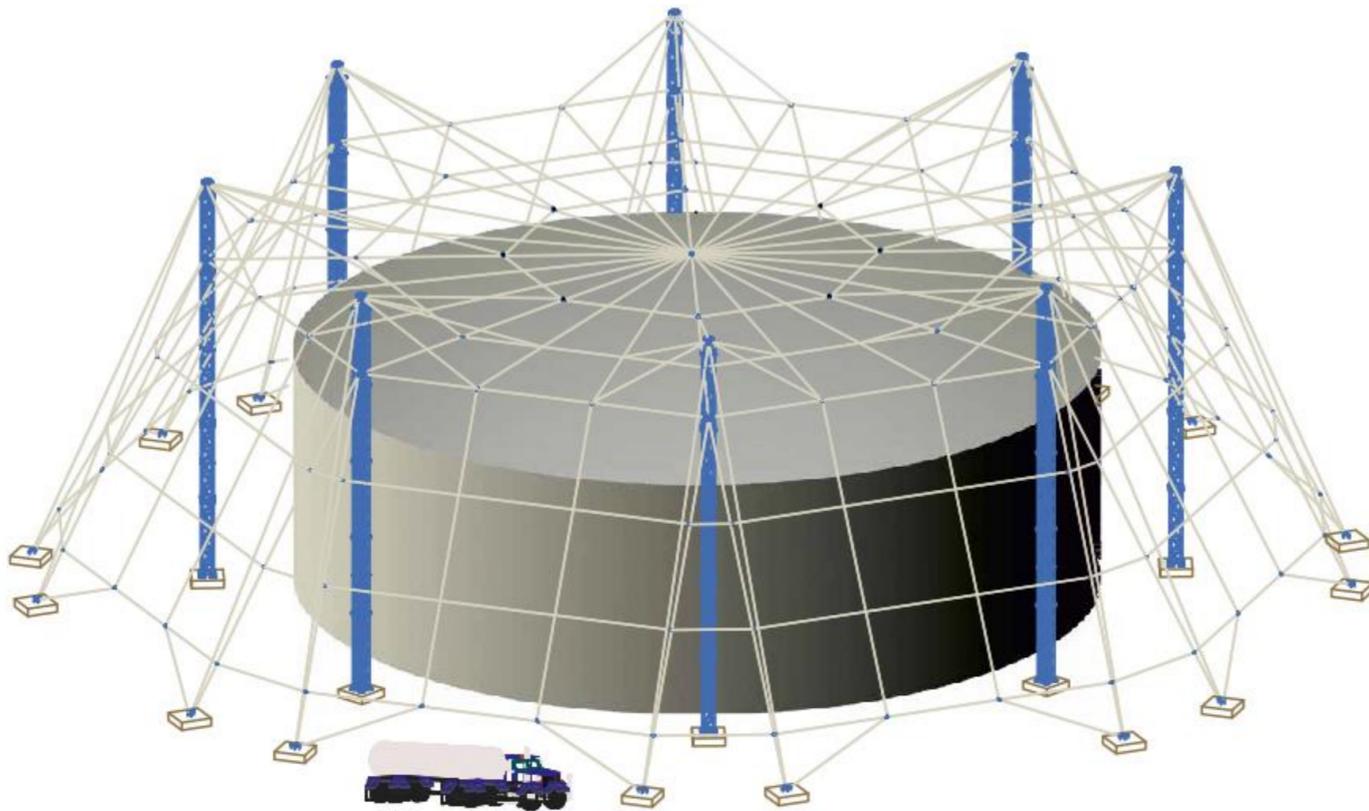
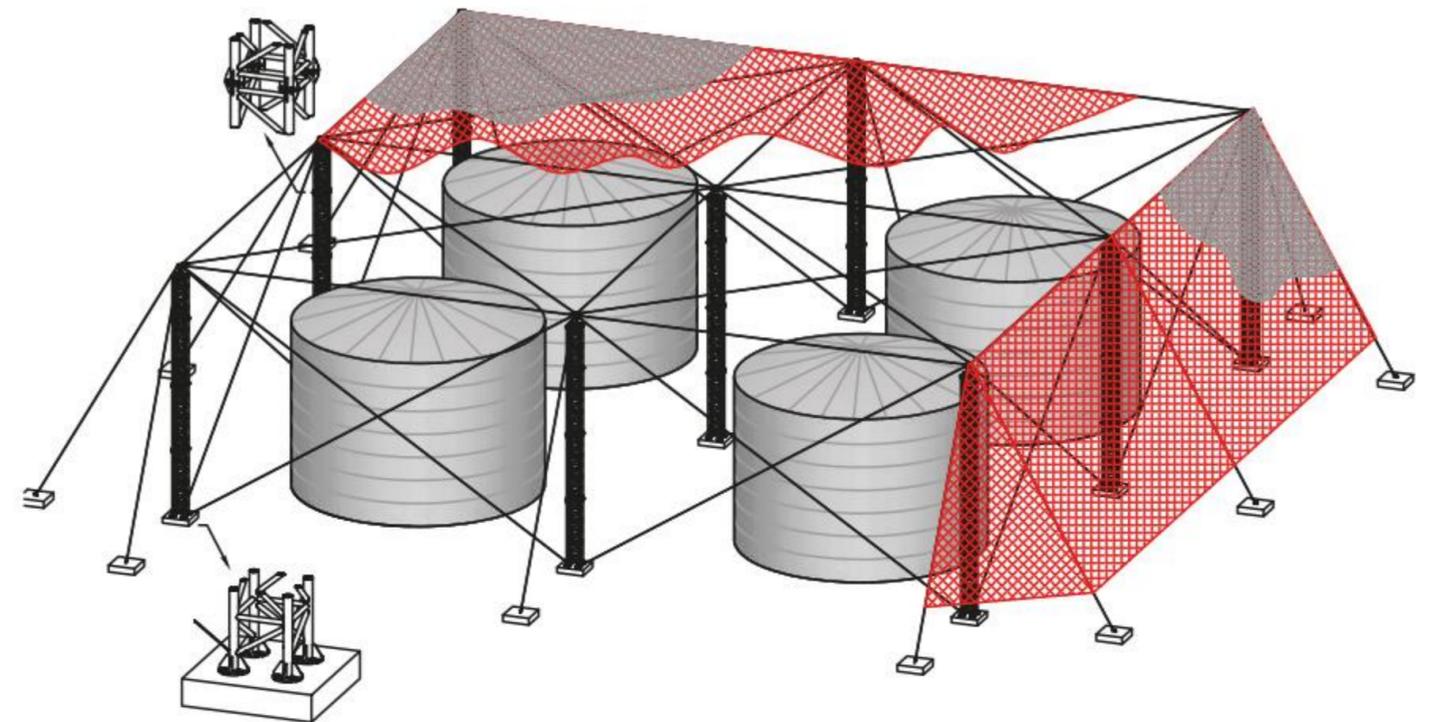


BIM-model of ANTIDRONE shelter for a gas preparation modular system

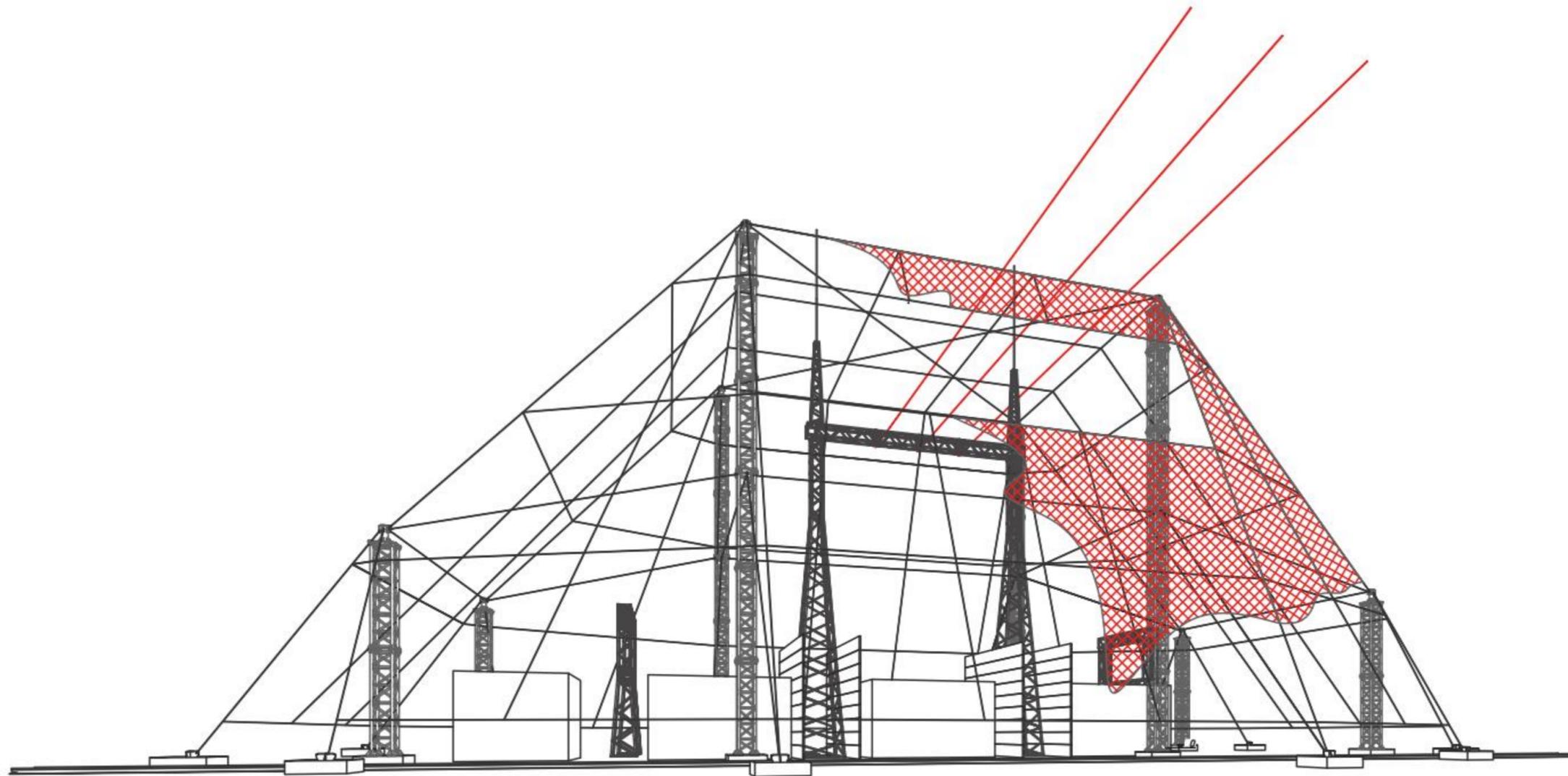


Model of ANTIDRONE shelter for a separate equipment

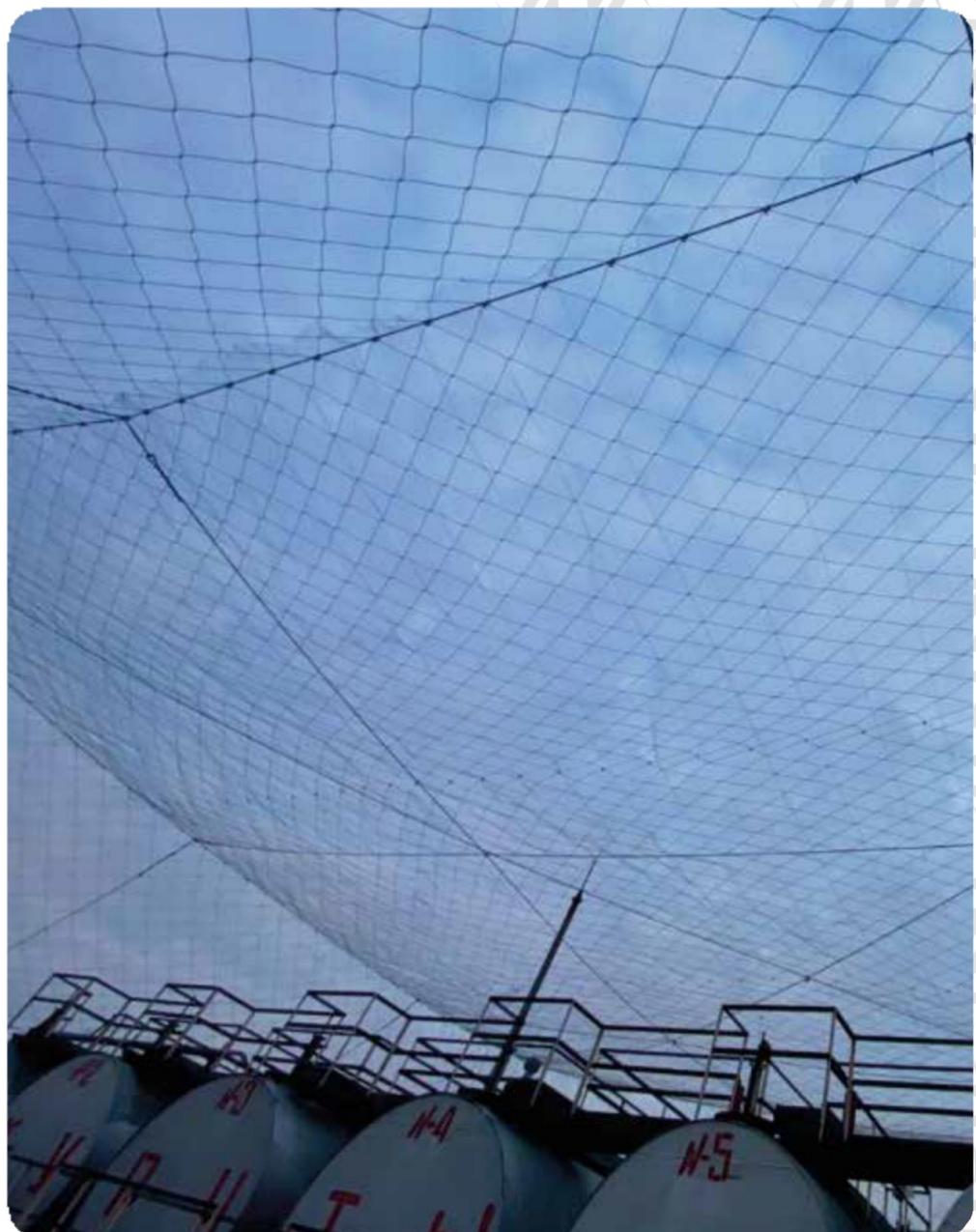


Model of ANTIDRONE shelter for reservoir 50 000 m³**Model of ANTIDRONE shelter for group of reservoirs 4x5000 m³**

Model of ANTIDRONE shelter for group of transformers 500 kV



EXAMPLES OF IMPLEMENTED SOLUTIONS



OPERATING PROCEDURE**STAGE 1 — DESIGN**

- Survey of the target area and data collection for the initial architectural design
- Verification and confirmation of the technical feasibility of the project
- Execution of the initial project draft in conjunction to the intended design objective
- Visualization of the project via the initial 3D model of the designed end-goal
- Final project consultation, with the final mesh-net calculations and shelter configurations

STAGE 2 – PRODUCTION AND CONSTRUCTION

- Production metal structures, the mesh-net and the tension cables of shelters
- Assembly of engineering design elements at the installation site
- Installation of the ANTIDRONE Shelter - the foundation pads, base masts, tension cables and mesh-net layer
- Final documentation and certification of the project completion

COMPETITIVE ADVANTAGES

→ **Does not require lengthy, time consuming design, approval and examination process**

The foundation pads of the supports are manufactured with a special standard reinforced concrete platform with support attachment points. Due to remote production point, there is no need for submersible foundation. The only necessary calculations for the project consist of architectural data gathering and 3D modeling.

→ **Durability**

The service life of the shelters is estimated to be over 10 years. All shelter structures are treated with an anti-corrosion coating in accordance with the standards of work in the oil and gas industry.

→ **Speed and ease the installation**

The shelter is quickly erected using standard support structures and prefabricated shelter sections. No welding is required. All elements of the shelter are assembled using metalworking methods.

→ **Low price**

The metal content and cost of the shelter are significantly lower than competitors' offers due to standardized equipment and the absence of the need to install on-site concrete foundation

→ **Conformity normative requirements**

→ **Short deadline of production**

The shelter consists of base support sections, foundation pads, tension cables and mesh-net. Once all necessary pre-built elements have been collected for the project, the only missing part of the project is the custom built netting that can be produced in a factory setting on a short timeline

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