

Ukrainian innovative technologies for solving radiation safety problems



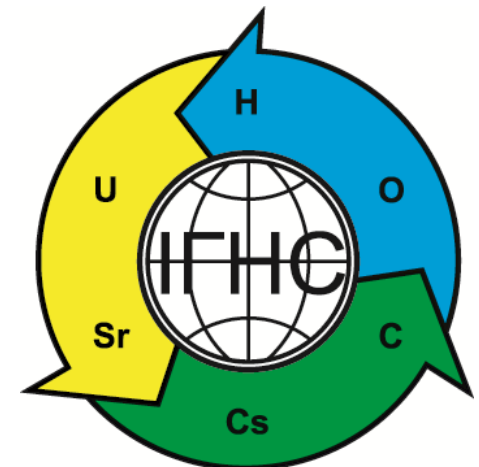
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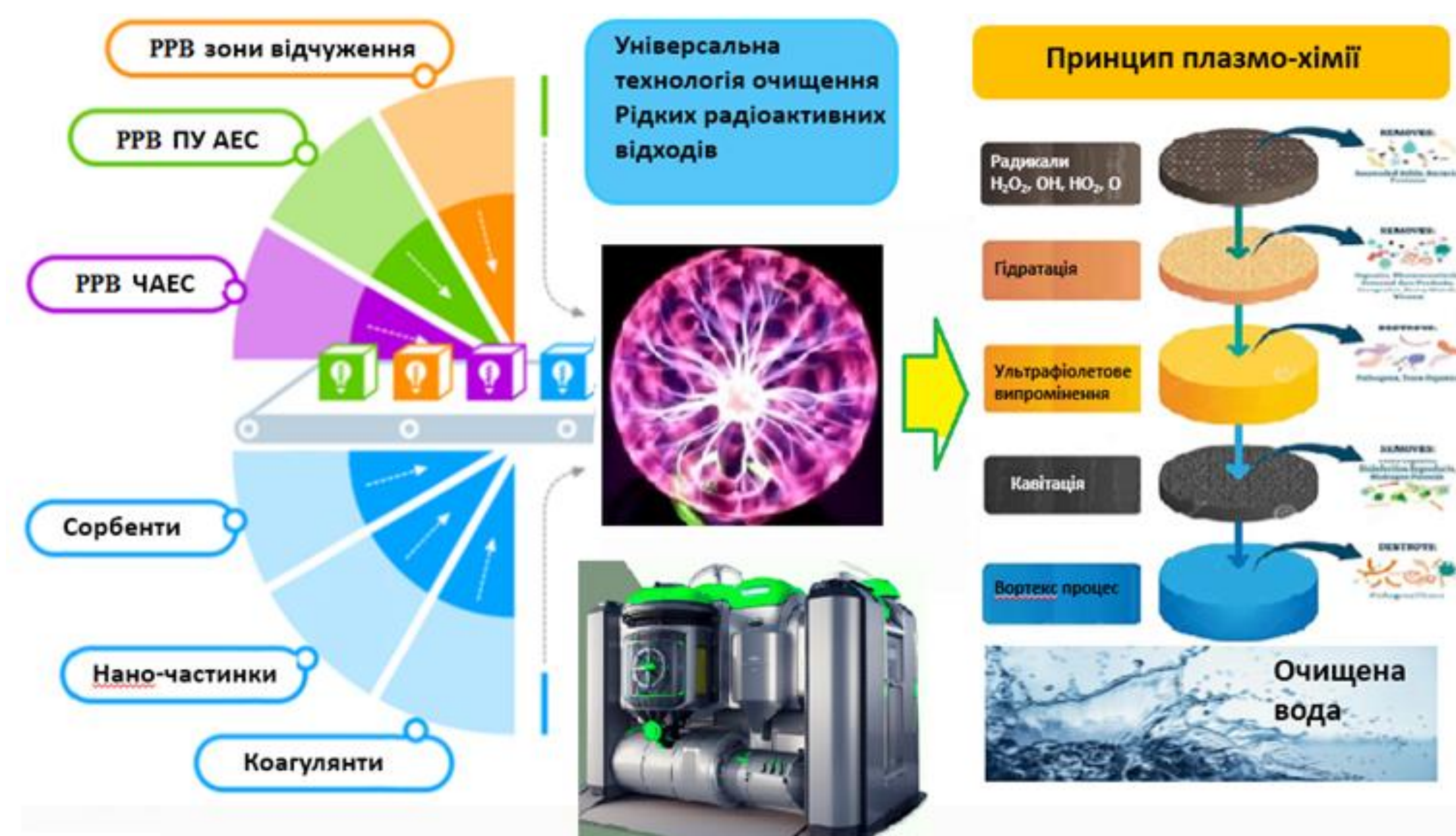
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The state institution "Institute of Environmental Geochemistry of the National Academy of Sciences of Ukraine (IGNASU)" is the leading scientific organization in Ukraine on the problems of radioactive waste management and rehabilitation of contaminated territories.

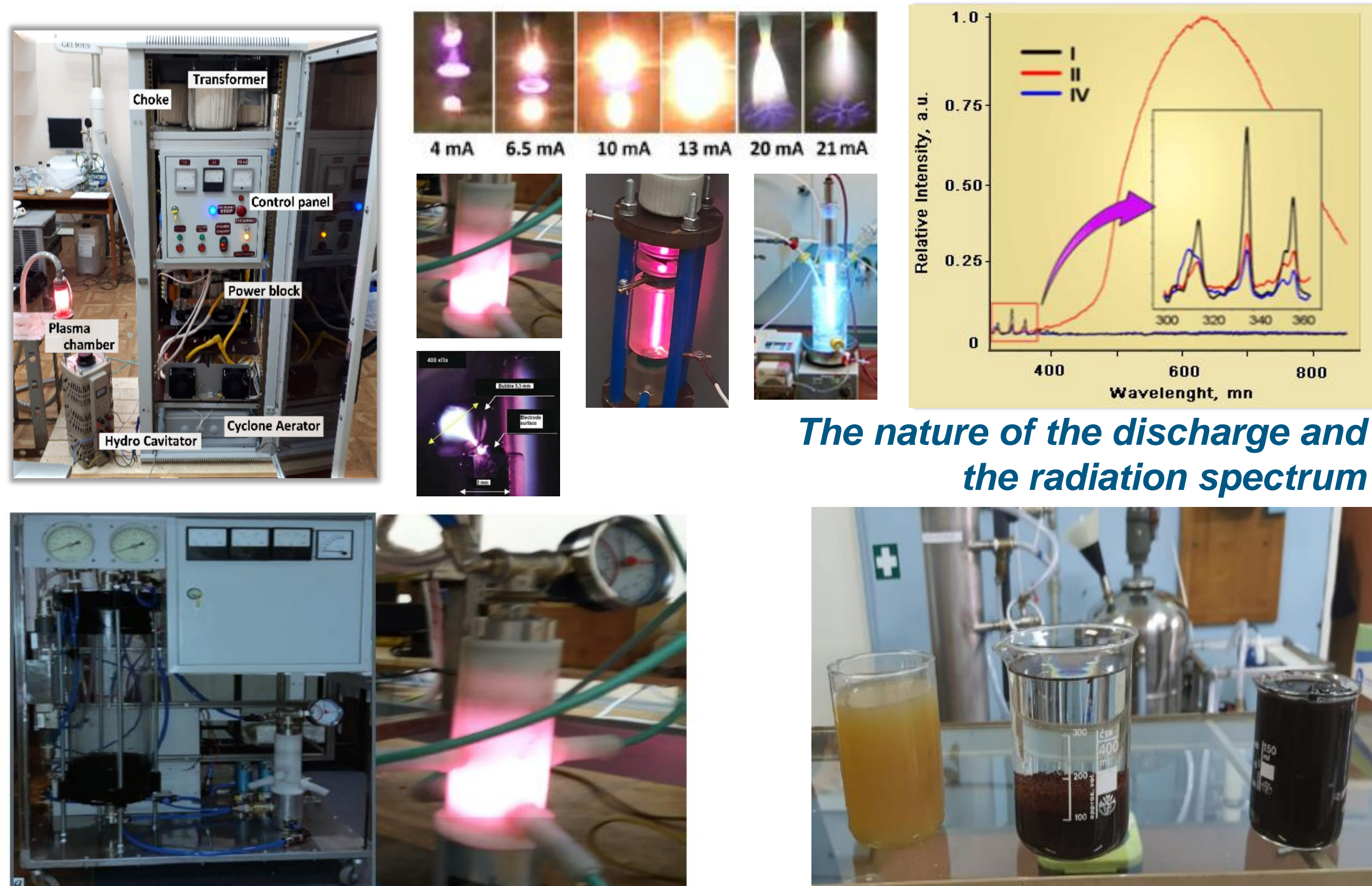
The Center for Information-Analytical and Technical Monitoring of Atomic Energy Facilities of the National Academy of Sciences of Ukraine (the Center) is the leading scientific organization of Ukraine for comprehensive radiation monitoring of radiation contamination of territories and nuclear fuel cycle facilities, as well as for solving problems of physical protection of critical infrastructure facilities.



Universal technology for cleaning liquid radioactive waste using the "PLASMA-SORB" technology

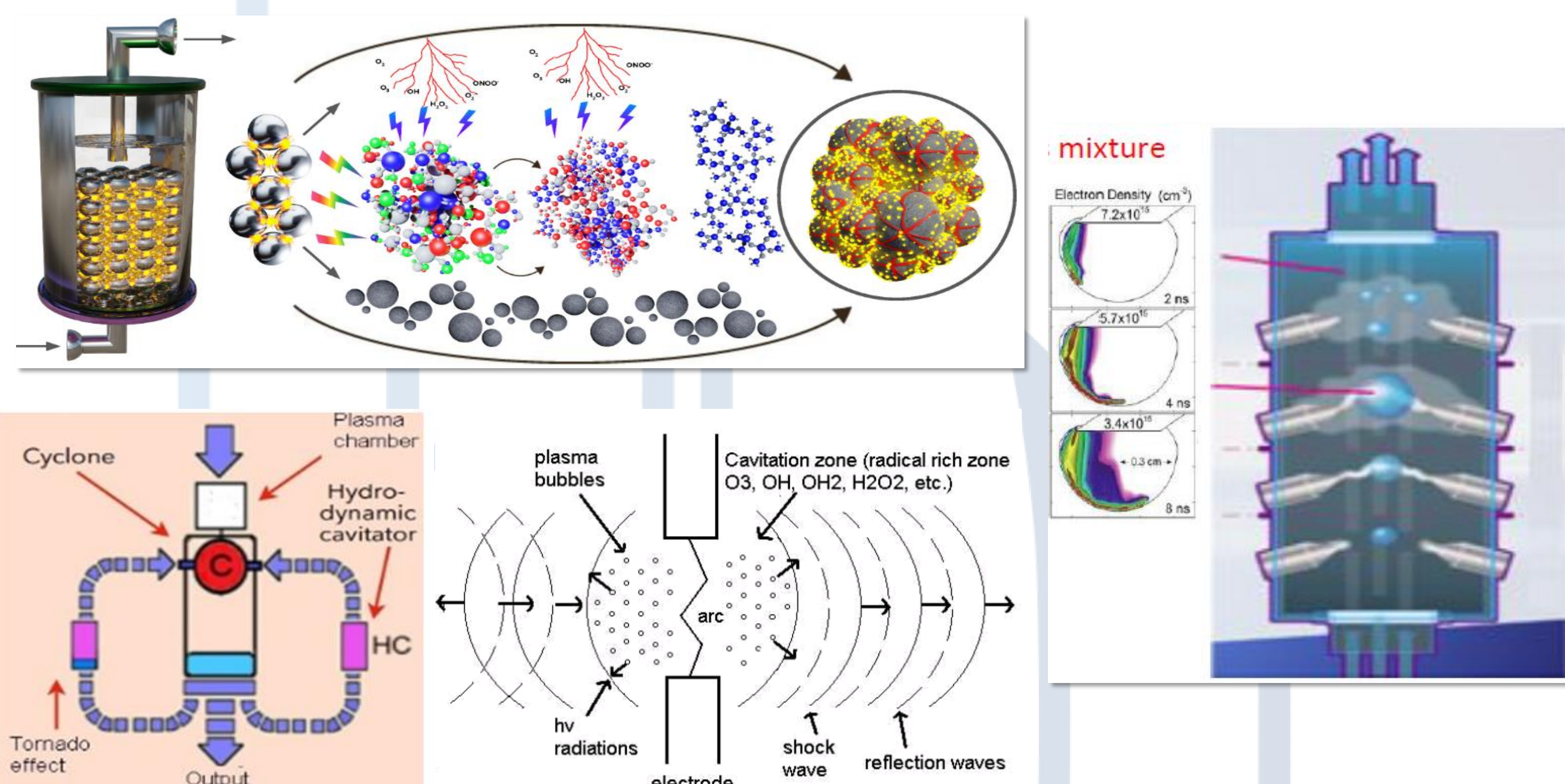


Experimental samples of plasma-chemical technology for cleaning liquid radioactive waste



The nature of the discharge and the radiation spectrum

Universal thermo-chemical cavitation technology



Complex of remote radiation monitoring based on an unmanned aerial vehicle for operational response in real time to man-made and military radiation threats



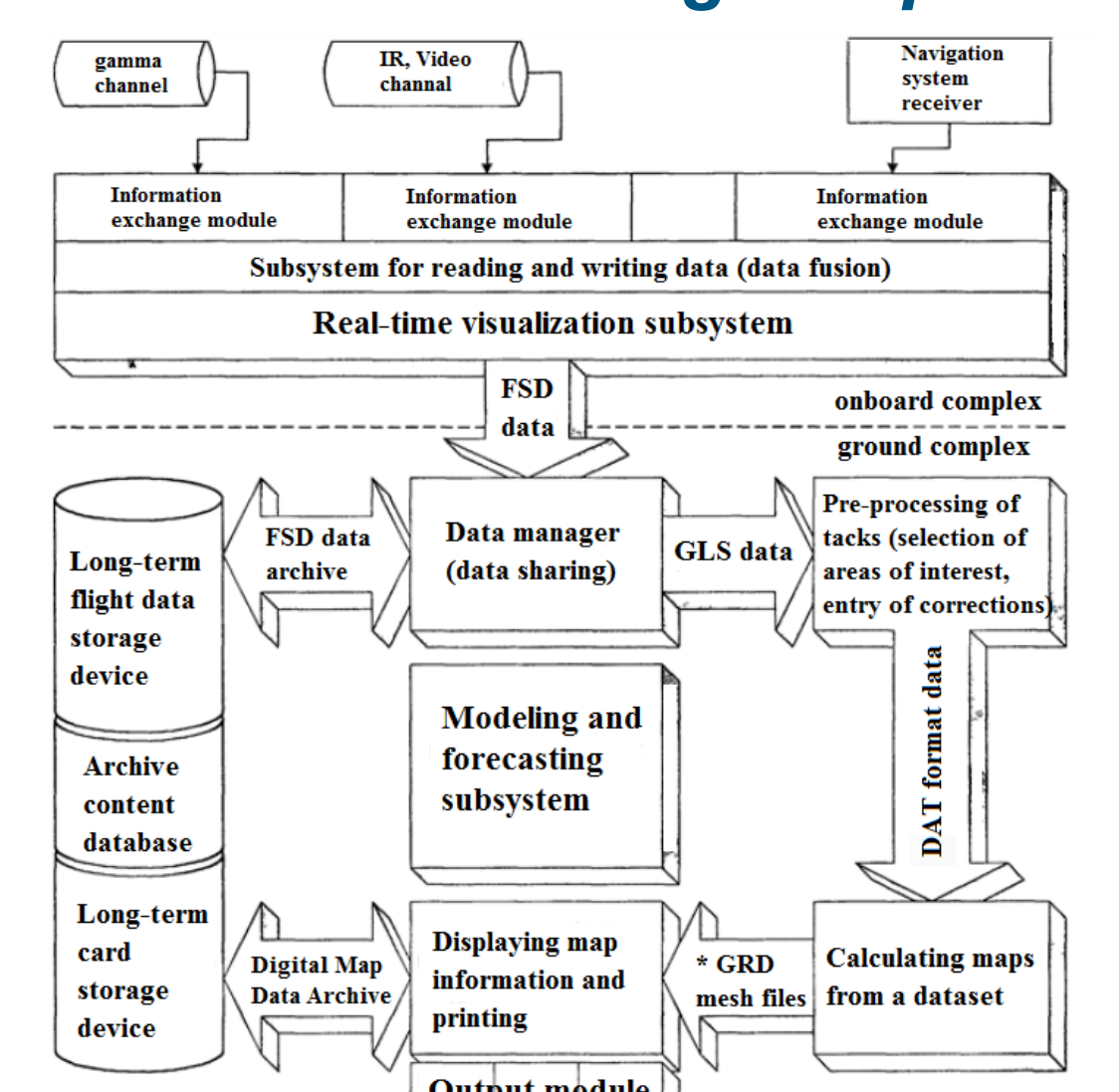
-Allows you to identify radioactive sources, determine their isotopic composition and distribution on the Earth's surface, with subsequent construction of maps of radiation contamination of territories

- It is used at the state border to detect unauthorized movement of radioactive materials in order to counter threats of nuclear terrorism

Structural diagram of the measuring complex



Complex Characteristics	
Number of rotors	8
Lifting force	10 kg
Flight duration	up to 60 min
Height	1-500 m
Distance	up to 10 km
Maximum speed	65 km/h
Wind resistance	up to 12 m/sec
Temperature mode	-15 up to +40 °C



Measuring tank



Measuring unit characteristics	
Range of registered energies, MeV	0.05÷3
Relative energy resolution along the 662 keV (137Cs) line, %	6.5
Maximum input statistical load, s ⁻¹	1.5 · 10 ⁵
The number of channels of accumulated spectrum	1024
The range of gamma radiation dose rate assessment, Sv/h	10 ⁻⁷ ÷10 ⁻¹
The sensitivity of the scintillation detector (based on the 137Cs source) s ⁻¹ /μSv	400
Operating temperature range, °C	0÷+50
Weight, kg	1.5
Overall dimensions, mm	111×90×126
Detectors	NaI(Tl), 31×31 mm, 5 units



Ground equipment

Detecting systems for measuring radioactive radiation

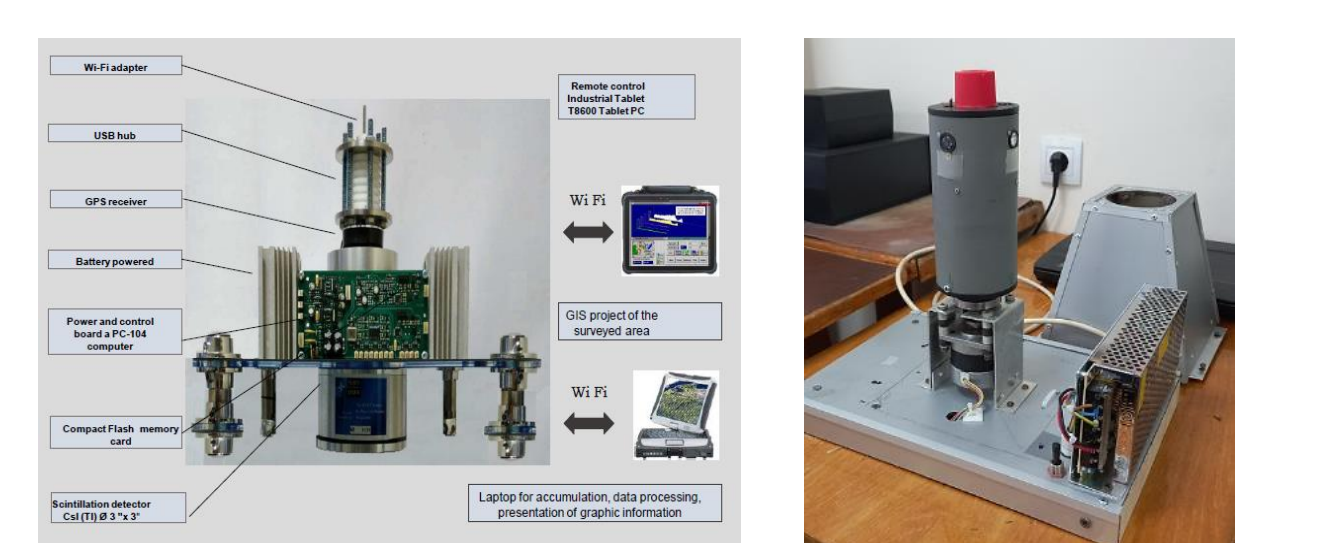
The process of installing detection equipment on an unmanned aerial vehicle



4-position alpha detector for measuring and analyzing aerosols



Alpha-, beta-, gamma - detecting system for the analysis of aerosols



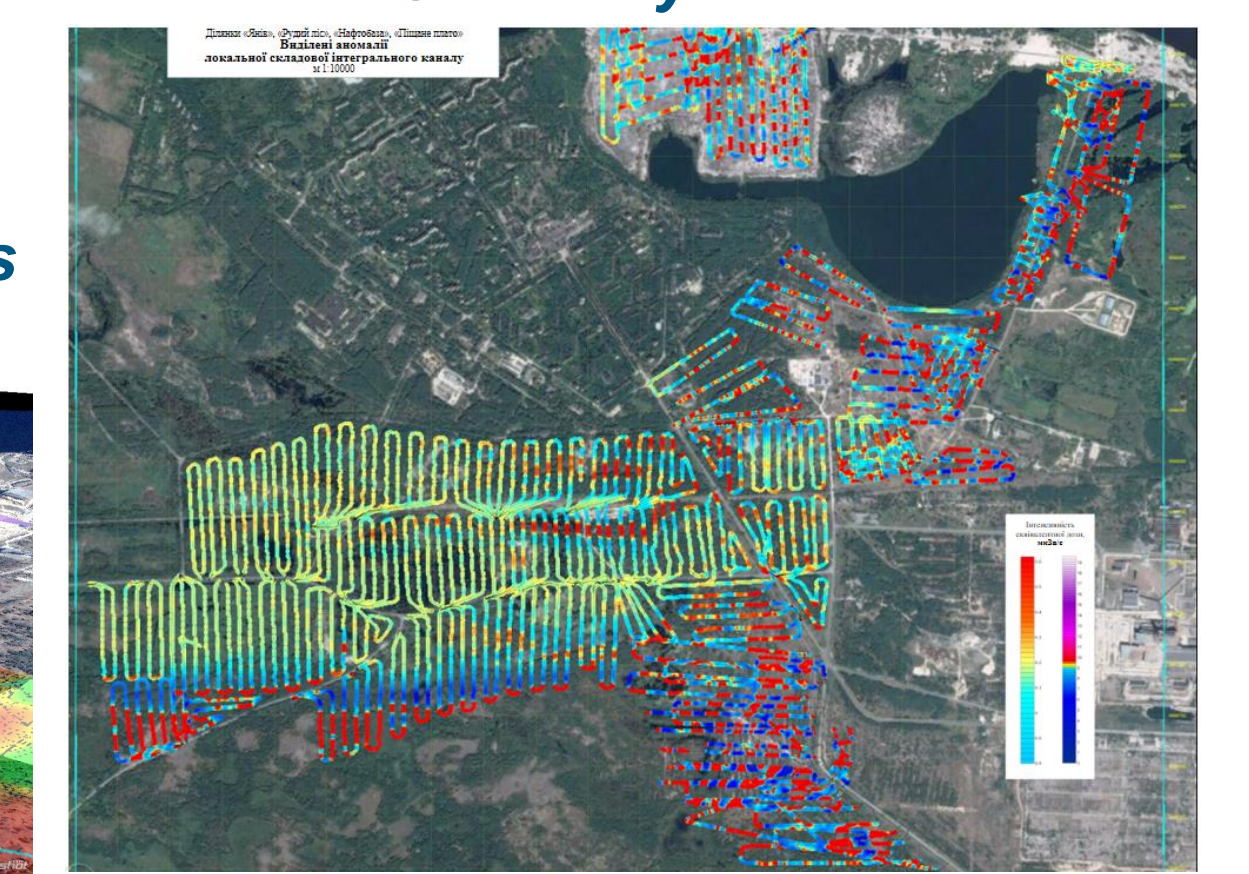
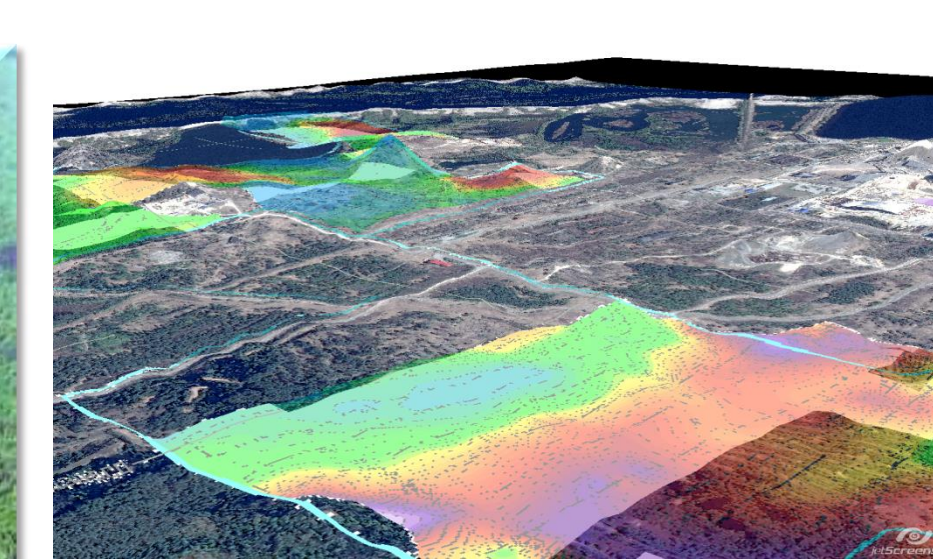
Scintillation detector with a microprocessor system for processing spectrometric data



Results of the use of the complex for remote monitoring of the points of temporary localization of radioactive waste in the Chernobyl Exclusion Zone

Visualization of the results of the flight of the complex over the points of temporary localization of radioactive waste of the Chernobyl exclusion zone

2D visualization of measurement results



As part of the state project related to the construction of a geological repository complex for the disposal of long-lived and highly active radioactive waste in the exclusion zone of the Kyiv region, the Center screened the given territory and identified areas (potential sites) suitable for placing such a repository