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External environmental air distribution exchange by using UAV

Theoretical aspects of the emergence of problems in the assessment of the air condition of the environment through expert procedures is an urgent topic of study. Solving the problems of the influence of parameters and characteristics of the gas mixture on air pollution of the environment and the peculiarities of the criteria for their assessment requires clarification of many theoretical moments.

Introduction. In the process of eco-monitoring of the UAV pollution of the air condition of the environment, is solving the following main tasks:
- detection and control of the intensity of emissions of gases by industrial enterprises into the atmosphere;
- detection and control of the intensity of emissions of natural and man-made air pollution;
- detection and control of the definition of transparency of the atmosphere for the purpose of atmospheric correction of space and aviation.

Formulation of the problem. It is proposed to correctly formulate the task of the study. This is not only simulate the processes of pollution of the air condition of the environment, which occur in a complex system of formation of the content of toxic substances (PR), but also by monitoring and registration of the UAV to evaluate the image of the environment in the final the result of the action on nature and people.

The aim of the study. The nessecity to determine the purpose of the study will allow correctly formalizing the tasks that are solved by the UAV registration system to assess the state of air pollution, the main factors that are evaluated and determine the effectiveness of its operation and conditions that limit its capabilities.

Let $x\in \Omega$ - an alternative in the task of estimating m air pollution criteria. Recommendations concerning the requirements for assessing the authenticity of monitoring and registration of UAVs as air pollution are proposed:

1. Immigration. The assessment should not contain a systematic error that exaggerates or diminishes the parameter value for all PR choices. If the actual value of the parameter is denoted as α, and its estimate as, then the requirement of non-integrity will be written as:

$$M(\acute{\alpha}) = \alpha \quad (1)$$

2. Persuasion. The estimate should approach the value of the parameter α with an increase in the sample size. This means that the likelihood is that the difference $|\acute{\alpha} - \varepsilon|$ will be less than some arbitrary number ε> 0, tends to one for n → ∞, that is,

$$lim_{n\to\infty} P\{|\acute{\alpha} - \alpha| < \varepsilon\} = 1 \quad (2)$$

3. Efficiency. Of all persuasive and immutable evaluations, one should give preference to one that is closest to the estimated parameter, that is, at which large variations in the use of different choices would be as small as possible. Mathematically, this means the requirement for a minimum dispersion rating

$$D(\acute{\alpha}) = m \quad (3)$$

The scientific result obtained on the basis of the application of the theory and scientific and methodological apparatus of the study is to reveal a mechanism for evaluating the parameters and characteristics of the gas mixture in the airspace of the airspace within each of the classes, therefore, it is possible to determine a large number of indicators that differ depending on the purpose and research tasks. We believe that in each case, the choice of the indicator for the UAV registration system requires a special approach and research. This is due to a number of other reasons:

- organizational difficulties in collecting and processing information;
- labor-intensive research;
- insufficient sensitivity and accuracy of the control and registration equipment of the UAV, which causes false rejections;
- not always high-quality performers.

It has been established [4] that in many cases these reasons do not allow to obtain the probable characteristics of OP. It is sometimes difficult to monitor UAVs in the state of individual areas of the airspace due to the inability to detect latent mistakes in a timely manner (for example, during an UAV flight). Thus, the above reasons determine the need for a wide range of airborne, space and monitoring systems for UAV airspace, for example, the airport environment.

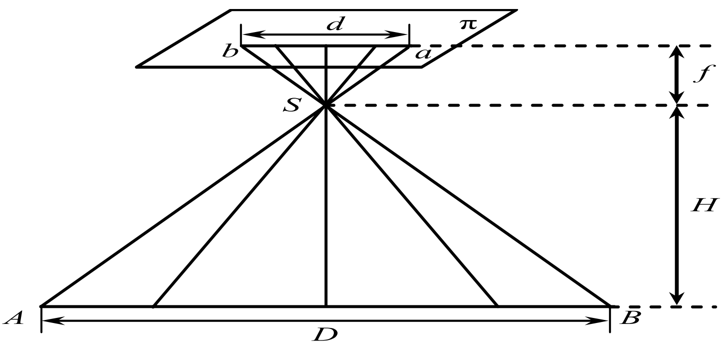

Fig. 1. Determination of the size of aerial image in the monitoring of the UAV using the principles of human vision and its mechanism to scan whole image fields

Consider the definition of the scale of the airborne UAV as the ratio of the length *d* of some of the segment *ab* represented on it, to the length *D* of the same segment *AB* on the earth's surface. The design center *S*, which houses the lens of the UAV visualization devices, on planes and space stations, is located at a focal length

f from the picture plane πof the aerial photo and at the height of shooting H from the earth's surface. From the similarity of the triangles bSa and BSA it follows that $\frac{d}{D} = \frac{f}{H}$. Consequently, the scale m aero-image will be $n = \frac{H}{f}$ or $\frac{1}{n} = \frac{f}{H}$.

In normal visual observation, the role of the lens performs the eyes of a person, and the center of projection is the point of view. One of the ways to receive high-quality information is the path of laboratory research, which enables the experiment to be carried out within a very short time, repeat it repeatedly, and modify it and replace the actual picture of the environmental condition of the airspace, for example, the airport environment by monitoring and recording the UAV pollution.

To construct the proposed theory, we use the ideal gas model. On the basis of this model and the laws of classical mechanics, the basic equation of gases is derived:

$$p = nkT \quad (4)$$

It is called the main one, because it derives from other gas laws, in particular the Clapeyron-Mendeleyev equation, which follows the gas laws of Avogadro, Boyle-Mariotte, Gay-Lussac, Dalton, and Charles.

$$p = \bar{p} = \frac{1}{3} m n_0 \bar{v}^2 \frac{2}{3} n \frac{m_0 \overline{v^2}}{2} = \frac{2}{3} n \bar{E}_k \quad (5)$$

This equation establishes the relationship between the pressure p of the ideal gas, the mass of the molecule m_0, the concentration of molecules n, the mean value of the square of the velocity, and the average kinetic energy of the translational motion of the molecules. Therefore, the pressure of the gas mixture is equal:

$$p = p1 + p2 + p3 + \ldots = (n1 + n2 + n3 + \ldots)kT \quad (6)$$

where n_1, n_2, n_3,... - concentration of molecules of different gases in the mixture.

Experimentally established at the beginning of the XIX century, the law of Dalton: the pressure in a mixture of chemically non-interacting gases is equal to the sum of their partial pressures.

After mathematical transformations, we rewrite the basic equation and use equality:

$$n = \frac{N}{V} = \frac{vN_A}{V} = \frac{m}{M}\frac{N_A}{V}, \quad (7)$$

where N is the number of molecules in a vessel, N_A - Avogadro became,

m is the mass of gas in the vessel, M is the molar mass of gas.

As a result, we get:

$$pV = vN_A kT = \frac{m}{M} N_A kT \quad (8)$$

The product of the stable Avogadro N_A on k is called universal gas constant and is denoted by the letter R. Its numerical value in SI is R = 8,31 J / mol • K.

$$pV = vRT = \frac{m}{M} RT \quad (9)$$

Scientific analysis. These properties, advantages and disadvantages of the components of gas mixtures OP [4] are a consequence of the possibility of using in them a large variety of gases, which can be not only much better cleared, but also calculated by composition and degree of action through process management.

In the process of conducting experiments, a systematic approach was used and simple gas mixtures were considered in the modeling complex [3]. From this it follows that if the thermodynamic condition is correct, then there must necessarily be a mechanical equation for the energy of the oscillator. Understanding this phenomenon has led modern physics to the derivation of a unique equation called the mechanical oscillator equation, which was used in the model for calculating the OR.

In other words, in the volume of the V_{go} globule, the oscillator has a reciprocating stupid motion with a linear velocity v_0, at the same time, the globule wanders around the occupied gas in volume at a velocity u_0 and with the oscillator frequency in the middle of the volume of the globule f_0 at a temperature T_0. Freeing from the root and after mathematical transformations, the energy equation of the oscillator acquires the complete form and status of the basic equation of hyperfacial mechanics in modern physics, which was used in the model of processes occurring in the gas mixture of the PR.

Conclusions

In order to solve the problems of the monitoring and registration processes of UAV, air pollution, as well as processes occurring in the gas mixture of the OP in order to calculate the parameters, new representations of modern physics were introduced into the research model. Also it was introduced parameters and characteristics of the structural elements of gases previously unknown to experts, whose calculations were specified its composition. This marks are very important and qualitative transition from the study of the macro volume and processes occurring in the OP to the elemental micro volume of gases, ranging from statistics to the consideration of the physical nature of the interaction between the oscillators. It was established [4] that in the experiment the uniform distribution of pressure across the entire volume of the gas flask being studied in the model is equal to the filling of the energy of all globules creating this volume, which is possible only with the orderly motion of each oscillator.

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