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MODULE FOR PROCESSING AND SYNTHESIS OF DATA FROM MULTI-CHANNEL SENSORS

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Abstract: This article presents methods of digital systems processing data from various sensors or sources, synchronization system and block scheme based on the program developed for data processing in the system. In a digital system, it has been investigated whether data from multi-channel sensors can be delayed in time t or cause errors in calculation due to the time taken for measurement.

Key words: synchronous processing, meteorological station, meteorological data, rangefinder, optoelectronic system.

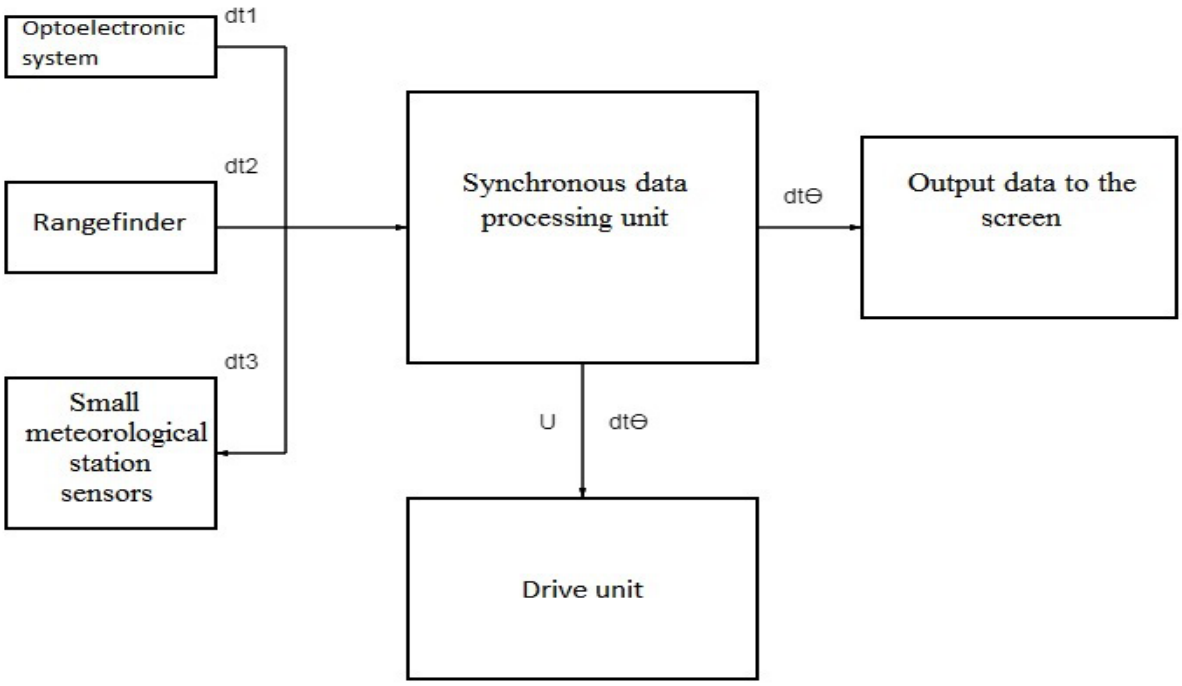
Introduction. Simultaneous data synchronization from multi-channel sensors is an important part of any system. In weather-related systems, time synchronization is essential for the correct interpretation and accurate calculation of changing meteorological data. It is important to use the time-synchronized meteorological data system, especially for the purpose of performing special tasks in the Ministry of emergency situation, hydrometeorological center, and ballistic artillery and aviation of the military sector. An object moving in space is affected by changes in meteorological parameters. Among these parameters, the influence of wind direction and speed is significant, it can change its direction every minute

and there are errors in achieving certain goals [1]. In practice, almost no studies have been conducted on the device model based on the method of obtaining data from many sensors and their simultaneous processing based on targeting an object moving in space and predicting the point of arrival after a certain time *t* [2].

In order to target an object moving in space, in addition to the parameters such as the object's distance *s* and its speed *v*, atmospheric effects are also important. This affects the change of the second coordinate of the object under the influence of air temperature T_v, wind speed w_0 and direction a_w, air pressure H_0.

In order to ensure continuous synchronous operation of the presented system, the synchronous data processing module receives data from several sensors and synchronously processes the received data for time ***t***, finding the values of *s, v, Tv,* a_w*, w,* H_0 from the specified virtual correction table [3] transmits it to the screen and to the drive unit at time t_Θ (Fig. 1).

The optoelectronic system performs the task of determining the moving object at time *t* and its speed *v*. Rangefinder is a device that measures the distance ***s*** to a moving object. In the small weather station, 4 sensors are placed for measuring special parameters, which transmit data to the synchronous data processing unit[4] (SDPU) at time *t* according to the specified special parameters atmospheric temperature *Tv*, wind speed w_0 and direction aw, atmospheric pressure H_0. In the SDPU block, values such as $\Delta\tau_Y$ - elimination of ballistic deviation of atmospheric temperature, a_{Wy} - directional angle of wind direction [5], Y_{st} - wind speed at standard heights are calculated based on special formulas and tables.



Synchronous data processing module

Atmospheric pressure change difference is determined

$$\Delta H = H_0 - 750 \quad (1)$$

Here it is: ΔH – difference in pressure change;
H_0 – measured air pressure.

Air temperature change is considered:

$$\sigma_0 = T_v + \Delta t_y \quad (2)$$

T_v – measured air temperature;
Δt_y – value obtained from virtual corrections of air temperature;
σ_0 – virtual temperature.
The temperature difference from the normal temperature is determined:

$$\Delta\sigma_0 = \sigma_0 - 15.9 \quad (3)$$

$\Delta\sigma_0$– difference of temperature from normal temperature;
σ_0– virtual temperature.
$\Delta\tau_O$ according to the result, it is entered according to table 2 and the temperature deviation values at the standard heights given for each $\Delta\tau_Y$ standard heights are found.

Summary. The given model is designed to measure the changing parameters of the atmosphere, to target an object moving in space, and to process data from multi-channel sensors to perform special tasks, to transmit the data obtained from them at time *t*, to predict the point of the object's arrival trajectory, and to determine the launch angle. The model works in real (online) mode. The time *t* required for simultaneous processing of data and measurement of meteoparameters is taken into account.

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