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ECONOMIC JUSTIFICATION FOR THE USE OF A DRONE TO ASSESS THE CHARACTERISTICS OF RADAR SYSTEMS

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Abstract

The immediate goal of obtaining an economic result (effect) from the implementation of scientific and technical programs is to increase production efficiency. The article substantiates that the costs of obtaining research results using a drone compared to a helicopter are significantly lower, which indicates a high economic effect from using the proposed method.

Keywords: helicopter, unmanned aerial vehicle, economic effect.

Introduction

Scientific and technical measures are related to the following directions: introduction of advanced technologies, automation and mechanization of production processes and technologies, improvement of raw materials, introduction of technical characteristics and constructions of products, assimilation of new types of products.

The expediency of the implementation of scientific and technical measures should be determined by their economic justification and the prospective of the research should be confirmed by ensuring the utility of the use of new techniques in the economy.

The overall assessment of the long-term effectiveness of scientific and technical measures is evaluated by the size of the economic result (effect) that the public economy will receive in the event of the application and use of these innovations.

The magnitude of the annual economic result (effect) obtained from the application of scientific and technical measures is the sum of the savings received by the manufacturers and users of the new technology from all types of production resources (live labor, raw materials and materials, capital investment) that they receive in the economy, in the application and use of that product.

As a result of all that, in the end, the newly created value of the state is created by increasing the size of the national income.

The basis for evaluating the economic effectiveness of scientific and technical measures is the increased amount of profit obtained from these measures (decrease in cost), which is obtained from the application and use of new techniques and technologies.

According to the "Methodology for determining the economic efficiency of the use of new technologies, innovations and rationalization recommendations in the national economy (main provision)" the expected profit of the new technology to be released the increase is determined by the following formula [1]:

$$\Delta П_t=(Ц_t - C_t)A_t - (Ц_1 - C_1)A_1, \quad (1)$$

where: $\Delta П_t$- is the amount of planned (programmed) profit increase in year t, in drams, $Ц_t$ and C_t are the wholesale price and cost per unit of new equipment per year of production: $Ц_1$ and C_1 are the wholesale price and cost of the product to be replaced in the year preceding the year of release of the new equipment, A_t is the external volume of new products released in year t (planned), A_1 is the size of the annual production volume prior to year t.

The amount of cost reduction from the use of new techniques in the resulting processes is determined by the following formula [1]:

$$\Delta C=(C_1 - C_t)A_t, \quad (2)$$

where C_t and C_1 −are the annual cost of the product (work) unit in year t and the amount of the cost of the year preceding the planned year, in drams, A_t– is the volume of output in year t in natural units.

The amount of savings is determined for all types of replaceable units of raw materials, materials, fuel, energy, wages and equivalent means and other production costs, which are related to the implemented scientific and technical measures.

The summary economic effect of the release and use of new technology is calculated by the following formula:

$$Э_{х}^{t}=\sum_{s}\prod_{t}-E_{h}\sum_{\Delta}K_{t}, \quad (3)$$

where: $Э_{х}^{t}$ in the tth year of technology (scientific and technical event) is the summary effect of the economy as a result of implementation (investment), $\prod_{t}-$is the increase in profit received from the investments of all scientific and technical activities in the t-th year. The results of the calculations are calculated using the coefficient $E_{н}$ ($E_{н}$=0,15) of the costs brought to the efficiency of the new technique. $\sum_{s}K_{t}$ are capital (simultaneous costs) related to the implementation of all measures for the introduction of new technology in year t.

In the case of the summary accounting calculation (effect) determination (temporary) of capital investments (simultaneous costs) of manufacturers and users of new equipment, both direct capital costs and other simultaneous costs that are necessary for the creation and use of new technologies, regardless of their funding sources. Such expenses include R&D (R&D) costs, including the costs of testing and processing prototypes (only for new equipment). In that case, the results of the GRPCA, which are related to the inventions of new technologies at the level of discoveries, make it possible to significantly expand the scale of their application in the future, because such measures of new technologies should be considered (attributed) only to those costs. The costs of acquisition, transportation, assembly, disassembly, technical preparation related to the acquisition of new equipment and new productions. The costs of replenishing working capital associated with the creation and use of new equipment. The costs of production areas, other elements of fixed assets, which are related to the production and use of new equipment and basic equipment. Costs related to technical measures and equipment that prevent the negative effects of the use and operation of the equipment on the environment (environmental pollution is prevented), as well as working conditions (external noise is reduced, costs to exclude damages, etc.)

The effectiveness of scientific and technical measures for each year is determined by the following criteria and indicators:

In terms of production:

The increase in the volume of production due to the introduction of new technology.

a) number of important types of products per measurement units,

b) the increase in the volume of net product output,

c) increase in the release of products with the highest quality category.

In line of work:

a) increasing the productivity of work thanks to the introduction of new technology. That calculation is made by the following formula [1]:

$$B_{t}=\left[\frac{Ц_{t}}{Ч_{1}-\sum_{\Delta}Ч_{t}}:\frac{Ч_{t}}{Ч_{1}}-1\right].100, \quad (4)$$

where: B_{t} is the increase in labor productivity due to the introduction of new equipment in the t-th year in %, ,$Ц_{t}$ and $Ч_{1}$ are the volume of goods produced (without taxes), in AMD, and the average number of industrial production personnel in the year preceding the introduction of new equipment. $\sum_{\Delta}Ч_{t}$- the decrease in the number of industrial production personnel (conditional dismissal of workers, which is achieved at the expense of the introduction of new equipment in year t).

b) the relative dismissal of the number of industrial production personnel. The calculation is made by the following formula [1]:

$$\Delta Ч_t = \frac{(T_1 - T_t), A_t}{T_ф}, \quad (5)$$

where $T_1 - ը$ and T_t are the labor costs per unit product in kind or value terms before the new technique and after its introduction in the t-th year, respectively, $T_ф$ is the labor time fund of one worker, in days. A_t is the volume of production of new equipment in year t in natural indices,

c) the relative economy of the salary fund. The calculation is made by the following formula [1]:

$$\Delta З = (З_1 - З_t).A_t, \quad (6)$$

where $\Delta З$ is the comparative economy of wages, in drams, $З_1$- and $З_t$, respectively, in terms of in-kind or value externalities per unit of output, is the amount of wage costs before the introduction of new equipment and in the t-th year after that.

d) the amount of saving material costs. The amount of savings in material costs is determined by the following formula:

$$\Delta m_t = (m_1 - m_t).A_t, \quad (7)$$

where Δm_t is the reduction in material costs in the t-th year before the introduction of new equipment and in value terms, m_1 and m_t are the material costs per unit of output in the nth year, respectively, before the introduction of the new technology and after it in terms of kind or value.

Conflict Setting

The results of the implementation of scientific and technical measures in terms of the development and application of new techniques should be taken into account, the savings of material, technical and labor resources, norms and standards of material resources per unit of output. It appears through the evaluation of the norms and normative indicators of these types of resources, as well as the calculation of labor and capital. In addition to the above-mentioned indicators of economic efficiency, the calculations of the use of new technology are also carried out on the basis of the consumer effect of the product unit, that is, the units of productivity and other similar indicators. At the same time, it is necessary to carry out the calculations according to individual elements of costs, both in terms of value and in kind units, based on the considerations in order to increase the effect of new technology on increasing the technical and economic indicators of the released products (reducing the costs of material resources, reducing work time). by increasing the unit capacity).

Research Results

Complex calculation of equipment for testing the directivity properties of metric range radars using a drone in a hover mode: 2 options were the basis for the calculations. In case of the 1st option, the studies are done with the help of a helicopter, and in the case of the 2nd, with the help of a drone. It is estimated that the cost of 1 hour of helicopter service is 3000

USD:, and the cost of purchasing a drone is 7000 USD. It is also assumed that the helicopter will make a 5-hour flight in one day, and in the case of the drone, flights of the same size will be made. Therefore, according to the above methodology, the expected increase in profit of the new technique, which is determined according to formula 1 of the methodological guideline, will be:

In the case of a helicopter,	In the case of a drone
At = 5 hours * 3 thousand USD:= 15 thousand	USD A1 = 7 thousand USD
Ct = 15000-1500=13500	C1 = 0.5 thousand USD: 7-
0.5 = 6.513.5 - 6.5 = 7.0 thousand USD:	

Aaccording to formula 2 of the methodological guideline:

$C1$= 0.5 thousand USD:

Ct = 1.5 thousand USD:

Therefore, the cost savings will be within 1 day 1.5-0.5=1.0 thousand. USD:

Summary analysis of drone versus helicopter studies. the calculated effect according to formula 3 given above will be:

$$Пt = 7.0$$

ΔKt = 2.0 thousand USD:

7.0 thousand USD: - 0.15 * 2 thousand USD = 6.7 thousand USD:

According to the (4th) formula, the labor saving will be:

In the case of the helicopter, it is assumed that its crew consists of three people, and in the case of the drone, they are absent. therefore, the saving will be:

*21.6/8-4*4/8-1=5.4*0.5-1=2.7-1=1.7* thousand USD:

*Цt=15*1.2*1.2=21.6* thousand USD:

According to formula 5, saving 1 day's work will be:

8 – 4 = 4 people

According to formula (6), the relative savings of the salary fund per day will be:

110 - 20 = 90 USD:

According to the formula (7), the material costs will be (in the case of a helicopter, it is formed through fuel, wear and tear of the helicopter and overhead costs), it will be:

3000 US*D* - *800* US*D* = 2200 USD:

Conclusion

The costs of research results using a drone compared to a helicopter are significantly lower, which indicates the high economic effect of using the proposed method.

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ՌԱԴԱՐԱՅԻՆ ՀԱՄԱԿԱՐԳԵՐԻ ԲՆՈՒԹԱԳԻՐԵՐԻ ԳՆԱՀԱՏՄԱՆ ՀԱՄԱՐ ԴՐՈՆԻ ՕԳՏԱԳՈՐԾՄԱՆ ՆՊԱՏԱԿԱՀԱՐՄԱՐՈՒԹՅԱՆ ՏՆՏԵՍԱԿԱՆ ՀԻՄՆԱՎՈՐՈՒՄԸ

Ա.Խ. Մարկոսյան, Մ.Վ. Մարկոսյան, Վ.Հ. Ավետիսյան, Հ.Գ. Մարտիրոսյան
Երևանի կապի միջոցների գիտահետազոտական ինստիտուտ

Գիտատեխնիկական միջոցառումների իրականացումից ստացված տնտեսական արդյունքի (էֆեկտի) անմիջական նպատակն է հանրային արտադրության արդյունավետության բարձրացումը: Անօդաչու թռչող սարքի (դրոն) օգտագործմամբ հետազոտության արդյունքների ստացման արժեքն, ի համեմատություն ուղղաթիռի, զգալիորեն ցածր է, ինչը վկայում է առաջարկվող մեթոդի կիրառման բարձր տնտեսական արդյունավետության մասին:

Բանալի բառեր. ուղղաթիռ, անօդաչու թռչող սարք, տնտեսական արդյունաոետություն

Աշխատանքն իրականացվել է ՀՀ գիտության կոմիտեի աջակցությամբ՝ նախագիծ № 21DP-2B011 հետազոտության շրջանակներում

ЭКОНОМИЧЕСКОЕ ОБОСНОВАНИЕ ЦЕЛЕСООБРАЗНОСТИ ИСПОЛЬЗОВАНИЯ ДРОНА ДЛЯ ОЦЕНКИ ХАРАКТЕРИСТИК РАДИОЛОКАЦИОННЫХ СИСТЕМ

А.Х. Маркосян, М.В. Маркосян, В.Г. Аветисян, А.Г. Мартиросян
Ереванский НИИ средств связи

Непосредственной целью получения экономического результата (эффекта) от реализации научно-технических программ является повышение эффективности производства. Расхды на результаты исследований с использованием дрона по сравнению с вертолетом, значительно меньше, что свидетельствует о высоком экономическом эффекте применения предложенного метода.

Ключевые слова. вертолет, безпилотний летательныи аппарат, экономический эффект.

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