

LIQUID ANTI-FIRE MISSILES. THE METHOD OF EXTINGUISHING FIRES

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INTRODUCTION

Such types of fires as forest fires are becoming an increasingly acute problem around the world affecting life on our entire planet. In just the past few years, large fires have besieged a number of countries, including the United States, Canada, Australia, Turkey, and Brazil, and even such regions as Greenland and Northern Europe [1-4].

Global fire protection associations are working on new standards and practices that address wildfires. One of the ways to increase efficiency of fighting against forest fires and fires in general is the use of automated systems for detecting and extinguishing fires.

THE AIM AND TASKS

The aim of this article is working and studying the method for extinguishing fire with the use of automated fire safety system based on reactive fire systems.

The following tasks are solved herein:

- drawing up an analytical review of the use of liquid rockets to extinguish fires.
- development of a new method of extinguishing a fire.
- creation of an automated system for use in the method of reactive fire systems.

There is a method of using traditional high-explosive and high-explosive munitions to extinguish forest fires. The disadvantage of this method is the danger of its use due to the possibility of re-ignition [5].

PROBLEM DEFINITION

THE ANTIFIRE ROCKETS AUTOMATED MULTIPLE LAUNCH ROCKET SYSTEM

A method of extinguishing fires using an automated safety system based on multiple launch rocket systems is working [5, 6].

The Global fire protection associations are working on new standards and practices that address wildfires. One of the ways to increase efficiency of fighting against forest fires and fires in general is the use of automated systems for detecting and extinguishing fires. The «Antifire Rockets» automated multiple launch rocket system is a network of transport-launch containers. This network of transport-launch containers is managed by the Center Remote Monitoring and Control, and if necessary, information from Earth remote sensing satellites can be used. At the same time, the autonomy of the transport-launch container while identifying and launching missiles in the automatic mode for extinguishing fires is preserved. The "smart" firefighting missile it self consists of two units: a unit with a fire extinguishing agent and a reusable jet drone. System composition the Transport and Launch Container are depicted in Fig. 1.

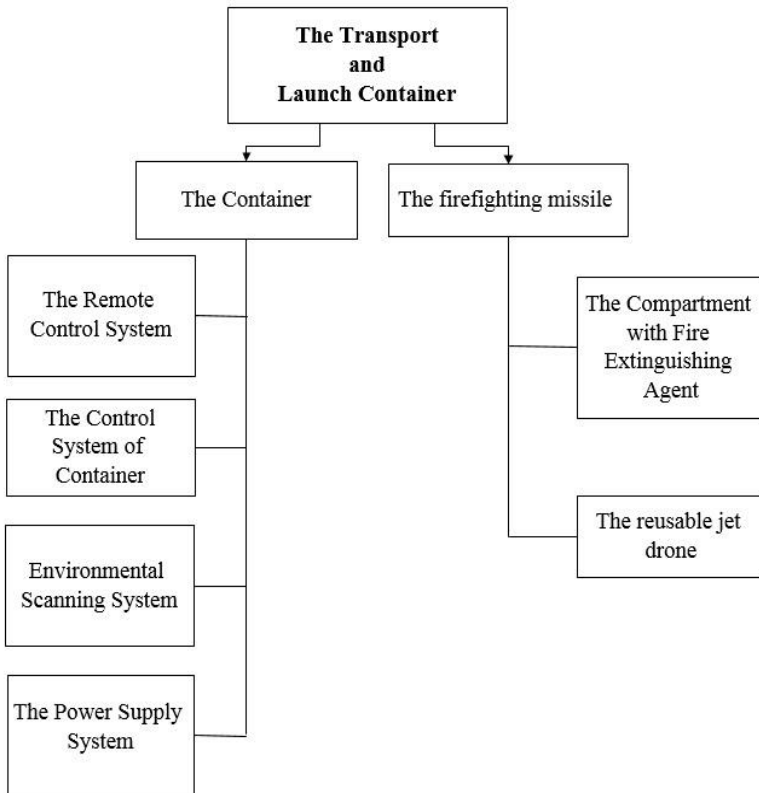


Fig. 1. System composition the Transport and Launch Container

The jet drone is equipped with the necessary sensors, smart avionics, and controlled jet engines, which allows the firefighting missile to bypass obstacles while flying to the target.

The "charge" of one robotic firefighting missile is capable of spraying a fire extinguishing agent over an area of $\sim 100 \text{ m}^2$ (~ 1000 square feet). One container contains twelve robotic firefighting missiles, which makes it possible to extinguish twelve ignitions or a forest fire with an area of $\sim 1200 \text{ m}^2$ (~ 12000 square feet).

In the event of lacking firefighting missiles when extinguishing a fire from one transport-launch container, neighboring transport-launch containers from the network will be connected to extinguish the fire.

The compact dimensions of the transport-launch container allow it to be transported in the back of a conventional pickup truck. Initially, the system was considered as a means of extinguishing fires in high-rise buildings.

But it can also be safely put in defense of densely populated areas and megacities, in industrial areas where there is a danger of contamination with hazardous substances during a fire, as well as objects on the water surface.

Unlike existing vehicles for extinguishing fires, «Antifire Rockets»:

- do not depend on the state of the road surface, traffic jams, and landscape drops, like the fire fighting vehicles;
- do not depend on weather conditions, like firefighting aircrafts;
- do not require preparatory measures and deployment of fire brigades.

Along the way, this system can not only monitor the surrounding area in order to detect ignitions, but also provide relevant information in real time for law enforcement agencies, hydro meteorological services, as well as provide sparsely populated areas with wireless communication.

CONCLUSION

Achievements of Ukrainian scientists will help to solve the issue of prompt fire extinguishing at the stage of ignition and thus save the population and business from more global damage and, as a result, colossal insurance payments.

The research papers dedicated the method for extinguishing fire with the use of automated fire safety system based on reactive fire systems.

REFERENCES

1. Sokol G.I., Sokol A.V. Automated system based on multiple launch rocket systems for extinguishing fire. / Novel problems of continuum

medium and strength of structures / Abstracts of reports of the Second International Scientific and Technical Conference in memory of academician of the NAS of Ukraine Volodimir. Mossakovskii (to the 100th anniversary of birthday), Dnipro, October 10-12, 2019, Ukraine. – Dnipro: 2019. – P. 327.

2. Sokol Andrey, Sokol Galyna. Firefighting Method using Automated System on the Basis of Multiple Launch Rocket Systems. Section 8. Fire and Civil Safety / Abstracts of II International Scientific and Theoretical Conference (Vol. 1), November 26, 2021. Tel Aviv, State of Israel: European Scientific Platform. ISBN 978-1-68564-147-4/ DOI 10.36074/scientia-26.11.2021 –P. 86-88.

3. Patent № 3519080, 1968. USA, Helicopter with a suspended tank for extinguishing forest fires. Morz F. Kolebaniya i zvuk. – M.: Gostehizdat, 1937. – 465 p.

4. Patent RU №30418 U, A62C 3/00, 2006. A method of extinguishing a forest fire.

5. Sokol. A.V, Sokol G.I. A Method of Extinguishing Fires Using an Automated Safety System Based on Multiple Launch Rocket Systems. Patent for an utility model of Ukraine No. 123017 dated 12.02.2018 Bull. No. 12 dated 25.06. 2018. Electronic document identifier 3305200618.

6. Galyna Sokol, Andrey Sokol. The Method of Extinguishing Fires using an Antifire / GJSFR Volume 22 Issue 2 Version. 1.0 Global Journal of Science Frontier Research: I Interdisciplinary Volume 22, Issue 2 ,Version 1.0 Year, 2022 . p.1-4.Type: Double Blind Peer Reviewed International Research Journal Publisher: Global Journals Online ISSN: 2249-4626 & Print ISSN: 0975-5896 / I Classification: DDC Code: 614.845 LCC Code: QC100, DOI:10.17406/GJSFR. https://globaljournals.org/index.php//GJSFR_Volume22/1-The-Method-of-Extinguishing.pdf.