The American Journal of Political Science Law and Criminology
(ISSN – 2693-0803)
VOLUME 04 ISSUE 10 Pages: 62-65
SJIF IMPACT FACTOR (2020: 5. 453) (2021: 5. 952) (2022: 6. 215)
OCLC – 1176274523 METADATA IF – 7.659
Publisher: The USA Journals

Journal Website: https://theamericanjournals.com/index.php/tajpslc

Research Article

INSPECTION OF THE SCENE OF THE INCIDENT USING ADVANCED TECHNOLOGIES

Submission Date: October 15, 2022, Accepted Date: October 25, 2022,
Published Date: October 30, 2022 |
Crossref doi: https://doi.org/10.37547/tajpslc/Volume04Issue10-09

Abdullaev Rustam Kahramanovich
Lecturer Of Criminalistics And Forensic Science Department, Uzbekistan

ABSTRACT

The article highlights, on the basis of the analysis of the opinions of national and foreign forensic scientists, the peculiarities of inspection of the scene(of the incident using contemporary tools and digital technologies, including drones (quadcopters) equipped with high-performance photo and video cameras and remote technologies. In addition, the author considers the application an innovative approach to the use of 3D-modeling techniques of the circumstances of the scene of the incident with the aid of special software.

KEYWORDS

Investigator, forensic technical tools, inspection, scene of the incident, identifying traces, examination, drones (quadcopters), remote technologies.

INTRODUCTION

In detection and effective investigation of a crime inspection of the scene of the incident plays a significant role and of a great importance.

Intervention of criminal acts into person's life in the course of certain events, changes their direction to the normal and law-abiding life style, and this, of course, leads to various negative consequences. However, only the consequences determined to be legally

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relevant during the initial investigation matter in terms of the law1.

It is inspection of the scene of the incident is the direct study and analysis of the items present in the places where the traces and objects related to the crime are identified. It is an urgent investigative action that aims to find, document (record) and research the relevant evidence (traces) in order to determine the existence and specifics of the circumstances critical to the criminal case.

It is expected that inspection of scene of the incident as a preliminary and important investigative action should be adapted to the development and application of new forensic techniques as well as the context in which they are used. In this sense, the inspection of scene of the incident as an investigative action remains the same: to find traces to determine the incident and establish all the circumstances2.

The relevance of the topic is justify the need for innovative techniques for the qualitative and efficient collection of all required information, the identification of traces and the use of contemporary information and communication technology to solve the crime (during inspection of scene of the incident)3,4.

Today, one prospective approach to inspection of scene of the incident is the use of various imaging devices, including unmanned aerial vehicles. The advantage of this approach is that it significantly increases the completeness of the visual data gathered quickens the inspection process, and gives the opportunity to take pictures of locations that are challenging to identify or dangerous to an expert. Modern drones are equipped with high-performance digital cameras, and some of them have high-precision satellite navigation and positioning systems. They help to get very clear and quick visual information about the place where the incident took place. Additionally, the usage of cameras and video cameras today during inspections provide an illustrative picture of the situation of the scene. In addition, today, the use of cameras and video cameras during inspection provides an illustrative picture of the situation of the scene. Modern registration tools can use drones to provide coordinate location information and dimensional characterization of the object, which are left out when conventional methods are used.

The method of inspection using conventional photography and drones includes to inspect the scene from above in order to capture detailed photographs of any noteworthy or interesting objects. This approach is applied in situations where the work of an expert criminalist is dangerous or physically challenging. After the images are taken, the situation of the scene of the incident can be changed (rescue operations, using vehicles, obtaining and examining physical evidence, etc.)5. The photos taken and the images taken by drones are used to build a detailed 3D model of the individual objects of the scene of the incident.

This is a crucial component of conducting a successful criminal investigation since the 3D model of the incident scene gives you the ability to see a three-dimensional (large-scale) depiction of the place or region itself, items, and occurrences in it. For the members of the investigation-operational team, it is now possible to reconstruct the crime scene and find solutions to many problems. Skillful application of such software capabilities enables examination of the crime scene in both real and virtual formats.

What is more, the created model can be analyzed anywhere, at any time. This increases the potential for subsequent revisions and contributes to increase the reliability of the procedural actions. The use of objects

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such as a metal ruler as control scales during inspection refers to the metrological accuracy of the measurement work being carried out. The 3D-modeling with modern software tools can be used to evaluate the mutual location of objects, as well as measure their sizes and the distance between them6. The inspection and examination of the scene of explosions, man-made accidents and disasters, traffic accidents, construction sites, and technical expertise may all be done using the cited method of registration of the place of the incident and the state of the objects.

Furthermore, the current development of three-dimensional models greatly increases the potential uses of digital registration in the execution of inspections and expertise.

High-resolution 3D scanning is another option for capturing an accurate image of the incident site in addition to the above-mentioned method of obtaining an objective picture of the scene of the incident. However, there are some disadvantages such as the limited operating time of the laser scanner, the fact that data can be obtained only from the surface or small hills, the high cost of the scanning devices, as well as the small number of specialists who operate in this field. Therefore, the use of laser scanners is problematic or impossible at all.

For this reason, it is advisable to use an unmanned aerial vehicle. For example, quadcopters equipped with digital photo and video recording allow to obtain not only visual, but also dimensional characteristics of the scene of the incident and objects of forensic significance when using special software.

In order to carry out a quality inspection of the scene of the incident, it is necessary to clearly define the boundaries of the inspection, to determine the locations and items that require special attention. This isn't always possible due to the experience of the particular investigator, expert, or specialist. For a variety of reasons, it is not always possible to guarantee that the required specialist will be present during the inspection. At this point, there is a need to choose an alternative to the traditional inspection of the scene of the incident, namely interactive, with the participation of virtual persons, which ensures their participation in the investigative actions in real time (for example, the video conference service of the Ministry of Internal Affairs). With the aid of modern technologies and digital technological tools, it may be necessary to make additions or changes to its tactics when examining the scene of the incident, as well as new participants in these investigative actions. The mechanism of the use of interactive inspection techniques at the scene of the incident is not specified in legislation, can be used only at the discretion of experienced persons7.

An additional participant in the investigation will join in virtual mode when the scene of the incident is examined utilizing technological tools that provide online connection. Remote participation in crime scene inspection is becoming a new type of participation in investigative actions.

There arises a need to involve a remote participant for the inspection process in the following cases: when there is no possibility of going the place where the incident occurred due to remote location or natural conditions; when there is a need for the participation of persons who can show traces or objects that are important for the case, and who are sent to a medical institution at the same time; when the participation of a specialist who lives far away and cannot arrive at the scene of the incident on time is necessary; when the advice of a more experienced specialist is needed.

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Today, the application of new technologies and technical tools in the inspection of the scene of the incident is a very urgent issue, and it is of great importance in improving the quality and efficiency of the investigation, as well as in the investigation of crime and detection of crimes.

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