Applications of Aerial Photography Technology in News Reporting and Regulatory Recommendations: Postprint

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Abstract

The development of modern technology has propelled media convergence, while public demands for timeliness, visual quality, and participation in news reporting continue to rise. Drawing on practical cases, this paper analyzes the evolution of aerial photography technology, its applications and limitations in news reporting, examines the significant role of drones—particularly FPV drones—in news dissemination, and proposes recommendations for the use and regulation of both drones and FPV drones. These measures aim to promote the safe application of new technologies and maximize the contribution of aerial photography to interactivity, sharing, and immediacy in converged media reporting.

Full Text

Preamble

Application and Regulatory Recommendations of Aerial Photography Technology in News Reporting

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Abstract: The development of modern technology has driven media convergence, while public demands for timeliness, visual appeal, and participation in news reporting continue to increase. This paper analyzes the evolution of aerial photography technology and its applications and limitations in news reporting through practical examples, explores the important role of unmanned aerial vehicles (UAVs), particularly first-person view (FPV) drones, in news dissemination, and proposes recommendations for the use and regulation of UAVs and FPV drones to promote the safe application of new technologies and maximize their contribution to interactivity, sharing, and immediacy in converged media reporting.

Keywords: aerial photography; FPV drone; converged media; application; regulation; UAV

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Traditional photojournalism methods suffer from significant limitations, primarily constrained by equipment capabilities and distance from subjects. Conventional approaches are generally restricted to short-range horizontal, high-angle, and low-angle shots, making comprehensive multi-perspective coverage difficult. Certain scenarios require high-altitude panoramic photography to increase information density and coverage, fully displaying features and surrounding contexts—this is where aerial photography becomes essential. In challenging environments such as natural disasters and breaking news events, where journalists cannot promptly reach or approach the scene, aerial photography enables timely, all-encompassing documentation of situations, providing accurate and effective news information that greatly enhances both the timeliness and accuracy of reporting. As modern technology advances, public demands for immediacy, visual quality, and engagement in news coverage continue to rise. News reporting has evolved from traditional fragmented formats in newspapers, television, and radio to integrated in-depth reporting combining text, images, video, graphics, and real-time interaction, with interactivity, sharing, and immediacy becoming critical considerations. The development of aerial photography technology and equipment will provide the public with more vivid, first-perspective scenes and videos. This paper analyzes the application of various aerial photography technologies in news reporting and proposes regulatory recommendations.

1. Application of Traditional Aerial Photography in News Reporting

Early aerial photography still relied on conventional photographic equipment, with photographers changing shooting altitude by boarding helicopters, hot air balloons, or powered paragliders. While relatively stable and safe, traditional aerial photography imposed stringent requirements on weather conditions and airspace above the target, necessitating favorable conditions for helicopter operations and advance communication between photographers and pilots to determine shooting plans and altitudes. Extensive preparation was required, and shooting schedules were heavily constrained by weather. Photographers also needed to secure themselves in the aircraft, limiting shooting angles. However,

due to high altitude capabilities, the resulting scenes were often grand and spectacular, making this approach suitable for large-scale events such as sports opening ceremonies and natural landscape features. During the 2010 Asian Games, Xinhua News Agency' s Guangdong Branch utilized helicopter aerial photography to capture extensive footage of the Games and Guangzhou' s cityscape, achieving excellent dissemination results. Nonetheless, manned aerial photography not only demanded strict weather conditions and complex coordination but also incurred prohibitively high equipment rental costs without guaranteeing success in a single flight. Some airspace required advance approval procedures to obtain flight permits, and due to these numerous restrictions, traditional aerial photography found relatively limited application in news reporting.

2. Application of UAV Aerial Photography

UAVs, or drones, are unmanned aircraft controlled via radio remote control devices and corresponding programs. Initially developed for military applications, drones have gradually expanded into civilian sectors such as electric power, agriculture, environmental protection, and news photography with advances in communication technology and satellite geolocation. UAV aerial photography involves wireless remote-controlled drones flying at altitude, utilizing onboard stabilizers and professional camera equipment (high-performance digital cameras/camcorders) to capture required image information from the air. The advantage of drone photography lies in its ability to shift the photographer' s perspective to airspace, altitudes, or dangerous areas that are inaccessible or inconvenient to reach, providing immersive first-person visual experiences. The resulting images feature high definition, large scale, small coverage area, and high currency, with substantial information content and rich detail [1].

Xinhua News Agency attaches great importance to drone photography, establishing the "Eye in the Sky" drone team in 2016, with 35 participants obtaining UAV pilot licenses in the first training session. By 2017, all photography journalists had completed training, and numerous drone-captured works began appearing in news reports. Xinhua News Agency' s Guangdong Branch was among the earliest news organizations to employ drones for news reporting, possessing four DJI Inspire series, five Phantom series, and six Mavic series drones —basically covering the full range of UAVs commonly used in news reporting. In 2015, the branch used a DJI Inspire 1 to document the landslide at the Hengtaiyu Industrial Park in Fenghuang Community, Guangming New District, Shenzhen, providing extensive on-site images and video footage. During the construction and official opening ceremony of the Hong Kong-Zhuhai-Macao Bridge, the Guangdong Branch conducted extensive filming and live broadcasting using the Phantom series. When the Humen Bridge exhibited abnormal vibrations in 2020, branch journalists promptly arrived at the scene and captured first-hand footage using the Mavic. As market demands and technology have advanced, drones have gradually overcome shortcomings such as large size and short battery life, evolving toward simpler operation, portability, and high-definition

capabilities, reducing physical and operational burdens on photographers and enabling them to focus more on image creation to produce more spectacular and clearer visual materials.

3. Emerging FPV Drone Aerial Photography

FPV drones, also known as racing drones, are high-speed, highly maneuverable aircraft assembled by enthusiasts according to personal preferences and needs. They consist primarily of a frame, power system, flight control system, and FPV equipment (camera, video transmitter, antenna, video receiver, display or video goggles). Unlike conventional four-axis aerial photography vehicles, FPV drones are small, high-speed aircraft with short endurance, capable of reaching maximum speeds of 260 kilometers per hour—covering 100 meters in one second. In pursuit of greater agility and lower inertia, FPV drones feature smaller volumes, allowing them to easily navigate through obstacles and deliver visually thrilling experiences combining speed and excitement. Most FPV drones lack self-stabilizing electronic equipment and require nearly fully manual flight, making their operation far more difficult than conventional aerial photography drones. FPV drone footage can achieve rapid vertical ascents and descents, providing perspectives that move close to and quickly past subjects—information conveyed through these rapidly changing viewpoints differs significantly from traditional news reporting angles, creating immersive experiences that better meet the demands of modern short-form video media audiences. In October 2020, Xinhua News Agency' s Guangdong Branch produced the report "Come! Let an FPV Drone Show You the Changes in Shenzhen' s Landmarks," which garnered over 100,000 views, demonstrating modern video media audiences' high acceptance of this high-speed, tumbling visual reporting format. However, since FPV drones lack GPS systems and often have incomplete or non-existent flight control systems, with bodies assembled from self-selected components of uncertain quality and high speeds that demand exceptional piloting skills, "crashes" (malfunctions and uncontrolled crashes due to operational errors or mechanical failures) are not uncommon and may threaten personal and property safety in flight areas.

4. Current Regulatory Status and Recommendations

4.1 Regulatory Status

Currently, management regulations have been issued for both manned aircraft and UAVs in low-altitude airspace, with some provinces and cities launching pilot programs for low-altitude airspace management. Under unified management through comprehensive regulatory platforms, the vast majority of consumer-grade drones can fly without application, while approval times for light, small, medium, and large industrial drones have been significantly shortened, greatly facilitating the application of aerial photography technology in news reporting. FPV drones lack autonomous cruise capability, leading regulators to classify

them more as model aircraft than UAVs. Consequently, unauthorized flights [2] (flights without registered aircraft or licensed pilots) occur frequently. However, due to their high speed and instability, FPV drones pose substantially greater safety risks than conventional civilian UAVs, making it urgent to clarify their classification and strengthen regulation.

4.2 Usage Recommendations

1. UAV operators must purchase relevant insurance (hull damage insurance, third-party liability insurance, etc.) as required, and operators must be certified to prevent economic losses from aircraft maintenance or total loss, as well as compensation for third-party personal injury or property damage resulting from operational accidents.
2. For major event coverage, flight times, locations (longitude and latitude), and plans should be reported to local aviation management departments in advance to ensure compliant operations. Operators should understand natural factors such as geographical environment and meteorological conditions at shooting locations to select appropriate aerial equipment. In spaces with strong convection, heavier drones (such as the DJI Inspire series) should be used to ensure shooting safety and stability, while in environments with lower altitude requirements and stable conditions, micro-drones (such as the DJI Phantom or Mavic series) can be used for quick visual information collection.
3. For special shooting requirements, third-party collaboration may be adopted to engage professional pilots. In cases requiring special techniques such as FPV drones, the technical demands on operators are extremely high and difficult for general photojournalists to master. To ensure shooting effectiveness and safety, collaboration with professional companies may be employed, with shooting content and plans determined in advance to achieve optimal results.

References

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Note: Figure translations are in progress. See original paper for figures.