Perceptions of the Role of the Media in the Understanding of UAS for Civil Use – The Case of the Republic of Serbia

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Abstract: Unmanned Aircraft Systems (UAS) have major benefits for humanity, nevertheless they are perceived through their widespread use for military purposes with ethical reservations. However, the possibilities for non-military use of UAS are extensive: scientific research; disaster prevention and management; protection of critical infrastructure; homeland security; communications; and environmental protection. Media can have a significant role in promoting and explaining the use of UAS for civil purposes to the wider public. This paper explores perceptions of academics and professionals in various fields (security, environmental protection, STEM, etc.) of media reporting on UAS in general, UAS for military use, and UAS for civil use in the Republic of Serbia. The findings show that media are perceived as underutilized vehicles in promoting UAS for civil use and develop a model for media use in promoting UAS for civil purposes.

1. INTRODUCTION

In the second decade of the 21st century, Unmanned Aircraft Systems (UAS) have been developed for various fields of human life, other than military usage which has been their original purpose. There is an ongoing debate on the added value on one side and legal and moral restrictions on the other side. The use of unmanned combat aerial vehicles (UCAV) is on the rise and many countries are considering their use in current and future conflicts, especially after their application in Nagorno-Karabakh region (Ilić & Tomašević 2021). This, on the other hand, raises many ethical questions and increases doubts about the possibility of their civil use for the benefit of societies.

Undoubtedly, UAS have great potential in implementation for civil purpose and influence on improving everyday life, nevertheless, the public is still not aware of advantages of the use of UAS for civil purposes. One of the main reasons is that the media is still very much focused on their military use and destruction they can bring to people and their communities in war and other conflict circumstances, especially in the terms of terrorist attacks for which they have been used in the past.

Nevertheless, the possibilities of non-military use of UAS, as previous studies demonstrate are wide. UAS can be used in scientific research (archaeology, geography, biology, etc.); environmental and disaster management (environmental protection, disaster prevention and management); security (management and protection of critical infrastructure, homeland security, etc.); education; communications; creative industries; etc. (Skrzypietz 2012).

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Public mostly perceives UAS use and develops attitudes on UAS applications either in military or civil purposes through media. Media can have a significant role in promoting and explaining the use of UAS for civil purposes to the wider public.

The first part of this paper explores existing literature on UAS use for civil purposes, the second part analyses topics on UAS use that Serbian media are focused on. The third part of this paper explores perceptions of academics and professionals in various fields (security, environmental protection, STEM, etc.) of media influence on promoting UAS for civil use in the Republic of Serbia. The final part develops a model for media usage in promoting UAS for civil purposes.

2. LITERATURE REVIEW

2.1. UAS Implementation

Unmanned Aircraft Systems (UAS) during the last decade have been given many roles in various aspects of human life other than military purposes. Those applications are not widely known in general public in the Republic of Serbia. In existent scientific literature, however, UAS are often represented as low-cost, easy to use tools in many aspects of human activities (González-Jorge et al. 2017).

UAS has growth potential in medicine, namely delivering medical supplies to inaccessible areas, especially during extreme situations. They showed great potential for use in pandemics during the Covid-19 outbreak (decontamination, monitoring, etc.) (Restás 2022).

UAS has huge potential in agriculture which is one of the main sectors of the Serbian economy. UAS is already used in precision agriculture – crop monitoring and mapping, weed identifying and control, irrigation planning, crop spraying, health assessment, etc. (Ehmke 2013; Rasmussen et al. 2013; Faical et al. 2014; Simelli and Tsagaris, 2015; Comba et al. 2015; Souza et al. 2017; Pantazi et al. 2017; Huang et al. 2018) and its potentials in agriculture are almost endless.

UAS also have potential use in construction, namely in 3D mapping, inspection and assessment of construction sites (Dupont et al. 2017; Freimuth and Koenig, 2018), which significantly influences mapping and inspection processes and requires a new set of knowledge and skills, but also reduces the possibilities of accidents and assists strict implementing of safety rules and regulations. It also helps the improvement of the precision of collected data.

One of the important possibilities is the use of UAS in the process of monitoring critical infrastructure, namely inspection of power lines, especially in mountain or hilly areas; it helps speedy identification of problems, risk assessment and reduces the time for the feedback and lessens various dangerous situations for the manpower (Zormpas et al. 2018; Wang et al. 2022).

UAS has potential use in traffic control and observing and sending data on accidents to traffic control authorities that can lessen the consequences of those accidents (Kamnik et al. 2020). Similarly, UAS has great potential in photogrammetry and remote sensing (Everaerts, 2008).

UAS has promising application in all phases of the disaster management cycle. UAS are scarcely used but have great potential to be used in monitoring areas prone to wildfires, floods, avalanches and they can send real-time data to monitoring centres that can assess the risk of disas-
turous situations. However, UAS are already extensively used in response to floods or fivers and earthquakes (Fernández-Guisuraga et al. 2018; Gebrehiwot et al. 2019; Ilic, et al. 2021). They have potential use in man-made disaster scenarios, like radiation incidents, and can be used in assessing the severity of a situation without endangering people (Li et al. 2018).

Archaeology is one of the fields where UAS are already being used with great success in 3D mapping, analysing and building 3D models of the most important historic sites (Bakirman et al. 2020), like Egyptian pyramids, Hagia Sofia in Istanbul, Parthenon in Athens, etc., thus tremendously expanding the existent knowledge.

Various types of media themselves can ensure great benefits of using UAS for filming documentaries, films, various types of live events (sports, concerts, etc.), while respecting privacy and other laws (Gynnild, Uskali 2018; Barrero, 2018; Karakostas et al. 2020).

2.2. Media in the Republic of Serbia on UAS

Most of the media focus in the Republic of Serbia is given on military usage of UAS, nevertheless, there were occasional stories about the use of drones for civil purposes.

• In 2018, Deutsche Welle (DW) in Serbian has been analysing usage of drones in potential future conflicts (27.08.2018). In 2021, Deutsche Welle has been focused on the political and military implications of use of drones of pro-Iranian militants in Iraq and Syria (03.07.2021), use of Turkish drone Baryaktar in Ukraine (02.11.2021), implementation of drones at the wars of future and loitering munition (07.06.2021).

• Web portal Slobodna Evropa focused on Serbian military orientation on UAS procurement and development (08.10.2020). Web portal B92 focused on military drones Serbian developed and produced in Serbia (18.08.2021) as a showcase of Serbian defence industry development. Web portal Tangosix (25.10.2021) focused on kamikaze drones.

• Web portal Srbija danas focused on Russian drones (13.12.2021).

• Russian Sputnik News web portal in Serbian language in the period between 2015 and the end of 2021, published 98 texts on drones, most of them focused on military use of drones in Iraq, Syria, Nagorno Karabah, Ukraine, UAE, etc., nevertheless handful of texts focused on civil implementation of UAS in scientific research, traffic, creative industries, and quarantine control during Covid-19 pandemic (Sputnik News, 2021).

• Balkans.AlJazeera.net portal in the period of 2016 to the end of 2021 published sixty three texts on UAS, among them 46 have been focused on usage of drones in military purposes (USA, Iran, Turkey, Ukraine, Russia, Yemen, Saudi Arabia, Afghanistan, and Iraq), and the rest of the texts focused on topics such are: delivery of medicines in the USA and Rwanda; delivery of university documents in Singapore; UPS drone delivery in Florida; mail delivery by drones in Mostar; photos made by drones in New York; drone flight control in Singapore; a drone competition in Dubai; Airbus development of taxi drones; private drones flying restrictions in Iran; eagle training in catching illegal drones in Holland; droneboarding; legal issues of UAS usage in Serbia and Bosnia and Herzegovina; restrictions of drone using in crowd monitoring in France; UN drone register (n.d.).

• Politika (n.d.) portal from 2014 until the end of 2021 published 148 texts on UAS, mostly on military purposes (USA, China, Russia, Ukraine, Iran, Iraq, Yemen, Nagorno Karabah; Israel; India; Pakistan; Syria) and political purposes (Albanian drone football match incident in Belgrade). Texts on civil use of drones included: UAS use in pipelines monitoring; several articles on drones usage in agriculture; pocket drones for selfies; British regulative problems.
with private drones; near hits of planes with drones at London airport; drones incident at Frankfurt airport; British Embassy donation of drones with georadar for missing persons bodies recovery from previous war conflicts in former Yugoslavia for Serbian committee on missing persons; drones monitoring of Greek beaches during Covid-19 pandemic; drones flying in California threatening the birds; drones for documentaries filming; drones for weddings filming; drones in photogrammetry; drones in fighting illegal drug trade, etc.).

- Telegraf.rs (22.12.2021) focused on the use of UAS in policing, namely in shooting response. 021.rs (28.07.2021) portal focused on similar topic – traffic police use of drones instead of radar.
- Some of the media focused on texts on UAS implementation in civil use (for example traffic control) at their Technology sections (Danas, 10.11.2019). Web portal Biznis i finansije (10.08.2021) focused on the use of UAS for meteorology. Web portal Energija Balkana (04.03.2021) focused on the possibilities of UAS use for green energy producing.
- Web portal Biznis.rs (13.06.2021) published an article on legal issues and problems of drones operating in the Republic of Serbia that was repeated at portal Energyobserver (18.06.2021).
- Webportal 013info.rs (13.09.2021) focused on drones for education program by Serbian Ministry of education, science and technological development.

3. MATERIALS AND METHODS

3.1. Research Methodology

In order to develop the list of the most important topics for media promotion of UAS for civil purposes in the Republic of Serbia and types of media coverage significant for UAS promotion experienced experts in different fields who are involved in studies on UAS or UAS implementation were interviewed through semi-structured interviews regarding their attitudes on the most important topics for media promotion of UAS for civil purposes in the Republic of Serbia and types of media coverage significant for UAS promotion. Two open questions were given to the participants:
1. What are the most important topics for media promotion of UAS for civil purposes in the Republic of Serbia?
2. What are types of media coverage significant for UAS promotion in the Republic of Serbia?

3.2. Sample

During the period from November 1 to November 12, 2021 twenty participants from Belgrade, Serbia, researchers in the fields of security studies, civil construction engineering, engineering management, management, architecture, waste management, strategic management; professionals in the fields of information technologies, archaeology, project management, water management, construction and drones’ operations were interviewed through semi-structured interviews. Participants were contacted through academic networks.
Table 1. Demographic Variables

<table>
<thead>
<tr>
<th>Code Name</th>
<th>Position</th>
<th>Type of institution/Field of expertise</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1</td>
<td>Full professor</td>
<td>Faculty/Security</td>
</tr>
<tr>
<td>P2</td>
<td>Full professor</td>
<td>Faculty/Security</td>
</tr>
<tr>
<td>P3</td>
<td>Full professor</td>
<td>Faculty/Civil construction engineering</td>
</tr>
<tr>
<td>P4</td>
<td>Full professor</td>
<td>Faculty/Architecture</td>
</tr>
<tr>
<td>P5</td>
<td>Assistant professor</td>
<td>Faculty/Environmental protection</td>
</tr>
<tr>
<td>P6</td>
<td>Associate professor</td>
<td>Faculty/Management in education</td>
</tr>
<tr>
<td>P7</td>
<td>Associate professor</td>
<td>Faculty/Information technologies development</td>
</tr>
<tr>
<td>P8</td>
<td>General manager</td>
<td>Agriculture company/Management</td>
</tr>
<tr>
<td>P9</td>
<td>General manager</td>
<td>Security company/Management</td>
</tr>
<tr>
<td>P10</td>
<td>Chief information technologies officer</td>
<td>IT company/Information technologies development</td>
</tr>
<tr>
<td>P11</td>
<td>General manager</td>
<td>Construction company</td>
</tr>
<tr>
<td>P12</td>
<td>Risk manager</td>
<td>International company/Information technologies</td>
</tr>
<tr>
<td>P13</td>
<td>PhD student</td>
<td>Faculty/Strategic management</td>
</tr>
<tr>
<td>P14</td>
<td>PhD student</td>
<td>Faculty/Waste management</td>
</tr>
<tr>
<td>P15</td>
<td>PhD student</td>
<td>Faculty/Waste management</td>
</tr>
<tr>
<td>P16</td>
<td>PhD student</td>
<td>Faculty/Engineering management</td>
</tr>
<tr>
<td>P17</td>
<td>Associate</td>
<td>Public institution/Archaeology</td>
</tr>
<tr>
<td>P18</td>
<td>Associate</td>
<td>Creative industries/Project management</td>
</tr>
<tr>
<td>P19</td>
<td>Associate</td>
<td>Public company/Water supply and distribution</td>
</tr>
<tr>
<td>P20</td>
<td>IT engineer/UAS operator</td>
<td>Private institute for risk management/UAS operations</td>
</tr>
</tbody>
</table>

Results and Discussion

Based on the answers of the interviewees on the first question, the most important topics for media promotion of implementation of UAS for civil purposes are presented at Table 2 in order of relevance.

Table 2. Most important topics for media promotion of UAS for civil purposes with relevance

<table>
<thead>
<tr>
<th>Implementation possibility</th>
<th>Relevance</th>
<th>Implementation possibility</th>
<th>Relevance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risk assessment of disaster scenarios</td>
<td>1</td>
<td>Medicine</td>
<td>8</td>
</tr>
<tr>
<td>Emergency response (in case of disasters: floods, earthquakes, etc.)</td>
<td>2</td>
<td>Traffic control</td>
<td>9</td>
</tr>
<tr>
<td>Critical infrastructure monitoring</td>
<td>3</td>
<td>Wildlife monitoring</td>
<td>10</td>
</tr>
<tr>
<td>Agriculture</td>
<td>4</td>
<td>Waste management</td>
<td>11</td>
</tr>
<tr>
<td>Education</td>
<td>5</td>
<td>Remote sensing</td>
<td>12</td>
</tr>
<tr>
<td>Urban planning</td>
<td>6</td>
<td>Archaeology</td>
<td>13</td>
</tr>
<tr>
<td>Construction</td>
<td>7</td>
<td>Creative industries</td>
<td>14</td>
</tr>
</tbody>
</table>

Source: Authors

Based on the answers of the interviewees on the second question, the list of types of media coverage significant for UAS promotion is presented in Table 3.

Table 3. Types of media coverage significant for UAS for civil use promotion

<table>
<thead>
<tr>
<th>Success stories in preventing worst case disaster scenarios in TV news and video format on Internet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Examples from agriculture in TV programs and in print media</td>
</tr>
<tr>
<td>Stories on successful implementation in archaeology in educational TV shows</td>
</tr>
<tr>
<td>Stories on successful implementation of UAS for medical purposes on TV and Internet</td>
</tr>
<tr>
<td>Presentation of waste management successful initiatives using UAS on TV and Internet</td>
</tr>
<tr>
<td>Presentations of UAS students’ competitions for educational purposes on TV</td>
</tr>
</tbody>
</table>

Source: Authors
Interviews helped developing a list of the most important media for UAS for civil use promotion to the wider public.

**Table 4.** Types of media significant for UAS for civil use promotion sorted by relevance

<table>
<thead>
<tr>
<th>Type of Media</th>
<th>Relevance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Television</td>
<td></td>
</tr>
<tr>
<td>Internet portals</td>
<td></td>
</tr>
<tr>
<td>V-logs</td>
<td></td>
</tr>
<tr>
<td>Social media</td>
<td></td>
</tr>
<tr>
<td>Print media</td>
<td></td>
</tr>
<tr>
<td>Specialised print media</td>
<td></td>
</tr>
<tr>
<td>Blogs</td>
<td></td>
</tr>
</tbody>
</table>

*Source: Authors*

For the purpose of promoting UAS for civil use, we propose developing continuous promotion projects that would include various media outlets. The projects could be developed and funded by cooperation of government, local government, academia, educational NGO’s and societies, and interested companies. At the first stage, promotion project would be designed and developed, at the second stage media outlets for promotion would be chosen, at the third stage the project would be implemented, at the fourth stage the results should be evaluated and recommendations would be given at the final stage for the following promotion projects.

![Proposed model of UAS promotion project for civil use](image)

*Source: Authors*

This research supports the previous research that emphasised the importance of the role of media in promoting UAS for civil purposes as they are often represented in public only through military purpose (Boucher 2014; Richards, 2018).

### 3.3. Limitations of the Study and Implications for Further Research

The sample of the study was quite small and further research requires empirical research on a wider scope of participants with the usage of statistical analysis.
4. CONCLUSION

Unmanned Aircraft Systems (UAS) are mostly seen by public, media, and, often, by researchers through their military purposes and destruction they can put upon people, infrastructure, and businesses. One of the major topics of interest of researchers and media is the ethical component.

Nevertheless, as literature review demonstrations, the opportunities for non-military use of UAS are almost limitless: scientific research; environmental protection; disaster prevention and management; protection of critical infrastructure; construction, security; photogrammetry; communications; and creative industries. Media in the Republic of Serbia are already covering various UAS civil applications, but are still more focused on military uses and their dire consequences. However, media are starting to explore various topics of civil use of UAS.

Interviews of academics and professionals in various fields supported the claim that media can have a significant role in promoting and explaining the civil use of UAS to the broader public.

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