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Open-source Investigations and the New Assemblages of Digital Investigative Journalism

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The practices of investigative reporting have benefited from digital and data-based tools and affordances in various and profound ways. This has happened thanks to the adoption of technologies and practices coming from areas and fields not directly or historically connected to traditional notions of journalism and from outside its own boundaries (Carlson and Lewis 2015). Data journalism is the clearest among these possible examples, as it can be considered as a form of reporting that bundles practices, tools and notions belonging to statistics, information design and coding with others that instead define journalism itself. Among the numerous instances now available, the 2016 *ProPublica* "Hell and high water" investigation represents one of the clearest examples of this kind, for its combination of reporting, statistical analysis, digital visualization and coding for covering climate issues and their potential future impact[i]. The history of data journalism dates to the seventies, but it has been in the past 10 years that data journalism became a mainstream notion, in parallel with the establishment of the data infrastructures needed to support and develop it (Porlezza and Splendore 2019).

Something similar can be said about other forms of "computational journalism", broadly intended as "the combination of algorithms, data, and knowledge from the social sciences to supplement the accountability function of journalism" (Coddington 2015, 335) that heavily relies on practices related to datafication to operate. Among others, traces of this can be found in the use of information security (infosec) and encryption tools to protect sources and investigations (Di Salvo 2021). Similar to others data-driven technologies and

practices, infosec is not something originated from within the "journalistic field" (Benson 2006). Rather, it is something that has been imported into journalistic practices, brought within its boundaries, and adopted at various levels, frequently following the influx of "interloper" actors, such as WikiLeaks (Eldridge 2018). This process brought various forms of hybridity, referring to when traditional notions and components of journalism go through various processes of change thanks to the mixing and influx of external components and practices (Russell 2016; see Splendore, this volume).

Within digital journalism research, social media have been identified as drivers of these process and the resultant hybridization effects, to the point that it would be impossible to summarize all of them here. However, these changes are visible in the ways hybrid notions of power, technology, business, genres, professional roles and, when it comes to issues closer to the scope of this chapter, sourcing have developed. Social media materials are now routinely used as sources by journalists, or as evidence to support news and claims made by other sources. This is evident in the context of breaking news, where footage posted on social media could signal the existence of potential news to report (so called 'user-generated content', or 'citizen witnessing' – see Allan, this volume). The undoubtably great informational value that can be extracted out of social media content has shown its potential for newsmakers in countless newsworthy occasions, making X/Twitter, among other platforms, the "first draft of the present" (Bruns and Weller 2016). At the same time, there are amble examples of the underlying risks, in terms of attribution, misinformation, or blatant disinformation. Thus, verification of social media content has become one of the primary areas of recent development in journalism practice, particularly in the wake of the *new wave* of interest in anything related to mis- and dis-information. Fact-checking and verification, which have always been core journalistic practices, have recently become established practices and reporting genres in their own right, with content produced by fact-checking organizations specializing in these activities and in publishing this kind of content (Graves and Amazeen 2019).

The need for verification and vetting of materials in a digital age, and particularly content coming from social media, is at the core also of another of these emerging genres: *Open-Source Investigations* (OSIs). As with other digital practices mentioned in this introduction, OSIs did not originate from within the borders of the journalistic field. Rather, they are mostly connected to the fields of intelligence, national security or even law enforcement where they are described in terms of *Open-Source Intelligence* (OSINT). As is the case for the other data-driven practices, within journalism OSIs are becoming an integral

component and an increasingly adopted aspect of newswork by various journalistic organizations, especially in the context of conflict reporting (Grut 2020).

OSI reporting is characterized by the use of various practices, techniques, strategies, and tools that are the core components of open-source intelligence (i.e. OSINT). According to Reese (2021), OSIs and the journalistic application of OSINT, can be considered an explicative representation of hybridity within the current "hybrid media system" (Chadwick 2017), where older and newer media logics often come together, in part thanks to the increasingly blurred boundaries surrounding the journalistic field. Open-source investigations, when used in a journalistic context, can also be seen as an "assemblage" of elements originating in different social realms. When it comes to the potential assemblage of organizations involved in producing these investigations, OSIs are usually conducted by "professional news organizations, NGO activists, norms and practices", who come together "in the service of a particular investigation" (Reese 2021, 262).

This chapter will explore the use of OSINT practices in journalism and the various shapes the OSI phenomenon is taking through a review of the existing literature in the field of journalism studies and the discussion of some case studies. The aim of this chapter is to provide an overview of the developments in the field of OSI and to discuss them in the context of the changing shapes of contemporary journalism.

OSI in the journalistic field

To understand the phenomenology of OSIs, an overview of the origins of OSINT is needed. Open-source intelligence (OSINT) can be defined as "insight gleaned from publicly available information that anyone can access by overt, non-clandestine or non-secret means to satisfy an intelligence requirement" (Wirtz and Rosenwasser 2010, 736). Through different technological and historical evolutions, OSINT has become increasingly central to government and commercial intelligence work, following the growth in available "open" sources of data and information, especially – but not exclusively – on the internet.

When it comes to the application of OSINT practices for journalistic purposes, a prominent early example can be found in the Digest of Foreign Broadcasts, later known as the Summary of World Broadcasts (SWB) and now known as the BBC Monitoring project, launched in 1939. In this case, the UK government asked the BBC to listen to "voices of friend and foe alike" through their "open" media broadcasting (Schaurer and Störger 2013, 2). More recently, and in the context of datafication, OSINT principles have also become a

new genre of investigative journalism, under the broader umbrella of OSIs and based on a similar leveraging of materials already in the public domain. This is built on journalists' ability to find, combine, and extract probative value from various digital sources across the internet. The journalistic and informational potential of OSINT practices are clear; they have the capability to "recreate an environment of the past in order to better understand what happened at a specific place and point in time" using different online sources, that can encompass "satellite imagery, social media, databases of wind, weather, and vessel movement", among others (Grut 2020). The one of OSINT also operate as a "media-archaeological" set of practices, based on the search, excavation and analysis of online materials coming from the past to "establish proof that crimes were committed, by whom, and with what instruments" (Gates 2020, 404).

Even if the origins of OSINT are not to be find within the boundaries of journalism (to the degree these boundaries are set), the intrinsic journalistic nature of some of the most important OSINT practices are evident. OSIs are based on different tactics, aiming at various informational goals related to the analysis of open-sources. These can include, as Hayden (2019) argues, verifying the authenticity of social media accounts, images and videos surfacing on social media, tracking fringe websites, or investigating online (and hostile) online communities. Additionally, OSINT for journalistic purposes can extend up to the use of satellite images, which are now increasingly cheaper to obtain, including by news organizations (Edwards 2022).

In their emergence, a community of practice has developed around OSINT practices in the context of journalism (Weiss and Domingo 2010). This community is composed of individuals and organizations of different backgrounds. As Forensic Archtecture's founder Eyal Weizman refers to it, this is an "investigative commons" that brings together a combination of aesthetic, political and epistemic structures (Fuller and Weizman 2021, 195). The individuals and organizations that form part of such community vary on a spectrum of professionalism and size and can include individual self-trained enthusiasts, frequently referred to as "sleuths" (McMahon 2021). These include specialized organizations, such as *Bellingcat* or Forensic Architecture; or individuals and specialized units working within major news organizations, such as *The New York Times* Visual Investigations team, among others (Ristovska 2022). As for other "hybrid" areas of contemporary journalism, OSIs are frequently conducted through collaborations, mixing the creation of assemblages of practices and roles across a network of participants.

When it comes to understanding how OSI reporting has evolved at least since at least

2012, the parabola of an organization such as *Bellingcat* is probably the clearest example. *Bellingcat* is an established independent organization employing a team of professionals producing investigations on their own or in partnership with media organizations. However, before the launch of this initiative, *Bellingcat* was basically the idea and individual effort of its British founder, Eliot Higgins, who started blogging as a "sleuth" from his home in 2012 while self-training in OSINT practices and weapons recognition (Cooper and Mutsvairo 2021). Progressively, Higgins – known online at the time by his blogging moniker "Brown Moses" (a reference to a Frank Zappa song) – and his investigations became a respected source for some of the most influential international news organizations, who started quoting him and his posts in their work (Radden Keefe 2013). Through this, he acquired journalistic capital which became the basis for the launch of *Bellingcat* as a full and independent organization. *Bellingcat* is now one of the most influential groups in this area and its work has been pivotal in for the investigations of various war crimes and human rights violation around the world.

The evolution of *Bellingcat* parallels with the developments of OSIs in general. In the past ten years, these practices have gone through a progressive path of acceptance and normalization, with various global events serving as occasions for further integration and expansion, together with the expanded availability of open sources. Recently, newsrooms have started "integrating" open-source methods into their coverage, "building" their own OSI teams (Edwards 2022) to strengthen their social media verification capabilities or to publish OSIs about difficult-to-cover scenarios and areas. The BBC was among the early adopters of OSINT as a standard reporting practice, leading with the creation of its internal social media verification hub (Bélair-Gagnon 2013). Other news outlets, including *Le Monde*, Associated Press, NBC News, CNN, *The Washington Post*, *The New York Times*, have followed suit, now adopt OSINT on a regular basis. OSINT practices are also adopted in combination with other, more traditional, reporting practices as an additional sourcing strategy, especially when it comes to visual materials, especially in the coverage of difficult-to-access territories or conflict scenarios. This is the case, among others, of the *New York Times* and its coverage from Ukraine, based on a mixture of reporting on the ground, supported by OSINT investigations (Samuels et al. 2022).

While the acceptance of OSIs within newsrooms signals their inclusion within professional journalistic routines, the practice has continued to grow among the community of practice of the amateur "sleuths". The 2022 war in Ukraine has also been a pivotal moment for the flourishing of this community, as the conflict offered various opportunities for

applying open-source techniques to the reporting of war. This is attributable to the abundance of social media content posted by soldiers in the conflict, including material that could serve as potential evidence in the investigation of war crimes. Various groups and individuals that operate in a less institutionalized manner than larger organizations such as *Bellingcat* have, for instance used, Twitter/X to disseminate the results of their open-source investigations, frequently contributing to wider understanding and coverage of the conflict, and also becoming direct sources for, or collaborating with, news media organizations (Schwartz 2022).

Considering these developments, contemporary OSIs in the context of journalism can be considered as *assemblages* of various elements, actors and technologies taking different shapes and outcomes (Reese 2022). As such, they can be considered one of the most defining and revealing phenomena in contemporary journalism. What follows is an overview of selected case studies offering a typology of how OSI are being conducted nowadays and of their network structures.

OSI as genre or collaboration

Organizations such as *Bellingcat* have specialized in open-source investigation and, in most cases, they publish the outcomes of their work on their websites, sharing their findings and evidence in more-or-less journalistic narratives. This reflects further how OSIs have become a standardized journalistic genre that can be conducted and published as a standalone journalistic piece; in this respect, they act as 'interlopers' who embrace journalistic identities and ideologies, doing so from beyond the field's traditional boundaries (Eldridge, 2018; see also Schapals, this volume). *Bellingcat* has published extensively its OSIs in the field of conflict reporting (Cooper and Mutsvairo 2021) and has frequently taken the role of demystifying narratives around specific events or scenarios. Among the most referred *Bellingcat's* investigations in the literature, the "Yemen Project"[ii] (Waters 2022) and the investigation into the downing of the MH17 flight[iii] appear to be the most explicative and analyzed (Rietjens 2019; Ilyuk 2019).

In the case of the Yemeni project, *Bellingcat,* focused on the Saudi-led military campaign in the country, a matter that has been extremely complex to report on given the difficulties in accessing the affected areas in Yemen (Waters 2022, 19). Using "open-source information obtained from social media, local media and NGO reports provided an untapped reserve of information" (Waters 2022: 19). *Bellingcat* combined evidence coming from online

spaces with knowledge from local experts and sources to produce a series of independently led investigations published on the *Bellingcat* website. The MH17 flight investigation is one of the most notorious *Bellingcat* works, as it shed light on the downing of a Boeing 777 flying from Amsterdam to Kuala Lumpur in Eastern Ukraine in 2014. Here, *Bellingcat* worked to reconstruct the chain of events that led to the crash and the death of the 298 people on board and, in the first two years following the downing only, it published over 70 stories devoted to the case (Ilyuk 2019, 62). Analysing evidence available online and using other OSINT practices and tools, including by relying on crowdsourcing, *Bellingcat* was able to confirm that a Buk missile launcher operated by Russia-backed separatists based in the separatist-controlled territory of eastern Ukraine was used to down the airplane (Higgins 2022, 63-109)[iv]. In the context of this case, *Bellingcat*'s investigations also played a major part in proving how various statements and narratives around the crash – like those emerging from Russia, blaming Ukrainian forces for the incident - were pure disinformation (Rietjens 2019).

Independent groups have also opted for using collaborative and open approaches to conduct OSIs, often working together with journalistic outlets. Organizations such as Forensic Architecture, Syrian Archive, Airwars, and, again, *Bellingcat*, despite their differences and various backgrounds, routinely "collaborate with news media and with different legal, social, or even artistic registers, in sum offering a variety of intersections with other fields and disciplines" (Müller and Wiik 2021, 190). Airwars defines itself as a "not-for-profit transparency watchdog which tracks, assesses and archives civilian harm claims resulting primarily from explosive weapons use in conflict-affected nations including Iraq, Syria, Libya, Somalia and Yemen"[v] and has published the results of its investigations mostly in partnership with established media outlets. In March, 2022, for instance, they published an investigation in collaboration with *The Guardian* showing how the Russian military was using the same destructive shelling tactics in Ukraine as they had previously deployed in Syria[vi]. Similarly, in 2021, Airwars joined forces with *Foreign Policy*, to publish an investigation into the civilian death toll of the NATO-backed bombing of Muammar al-Qaddafi's forces in Lybia[vii]. Forensic Architecture is a research agency "investigating human rights violations including violence committed by states, police forces, militaries, and corporations",[13] based at Goldsmiths University in London. It is also one of the most accomplished organizations operating in the OSINT field, on the borders between documentary and data activism (Gutierrez 2021). Forensic Architecture has worked in cooperation with various NGOs and media organizations with the aim of bringing evidence of crimes in various scenarios. This is done through the "production and presentation of architectural evidence – relating to buildings, urban

environments – within legal and political processes". For instance, Forensic Architecture has worked with *Le Monde* for the publication of an investigation into the death of Adama Traoré, a man killed while in custody by French police in 2021[viii]. They also joined forces with Al Jazeera to locate a secret facility in a military compound in Myanmar's largest city. The investigation exposed torture, deaths, disappearances, and detention without charge in the months following the 2021 military coup in Myanmar[ix].

Mainstream and underground assemblages

Journalists with OSINT backgrounds are now a commonly found in newsrooms, and a number of news organizations have routinized OSINT practices in their reporting strategies (Grut 2020; Picha Edwardsson et al. 2021; Ganguly 2022; Samuels et al. 2022). How this integration takes shape varies, but OSINT tools and practices are usually deployed in a "reactionary" way, used to verify, respond to, or debunk claims and news in regular day-to-day reporting settings or in the context of wider investigations or documentaries (Ganguly 2022, 154). In most cases, mainstream news organizations also publish OSIs as standalone journalistic products, treating them as a discrete journalistic genre. *The New York Times* Visual Investigations team[x] has been one of the most prolific in this area, winning four Pulitzer Prizes since 2017, investigating various themes from conflict to police violence. Keeping the "visual" as the most common thread in their work (Bjerknes 2022), witness video are frequently key elements, followed by still images and digital maps (Bjerknes 2022, 960). The Visual Investigations team, for instance, investigated the killing of Rayshard Brooks by the Atlanta police in 2020[xi] and the 2020 murder of George Floyd, under similar circumstances.[xii] They have also investigated war crimes committed in Bucha in Ukraine in 2022,[xiii] and the civilian death toll of US drone strikes in Afghanistan[xiv].

The *New York Times*' work with OSINT helped shed light also on the 2021 Jan. 6th attack on Capitol Hill, an investigation that is particularly interesting when it comes to revealing the potential assemblages that constitute OSIs today. As Reese and Chen argue, the assault left a trove of data traces on the Internet, made available "for journalists to process, with the help of an ad hoc alliance of news professionals, experts, data transparency activists, and citizens" (Reese and Chen 2022, 633). In the wake of the assault, an assemblage of groups and individuals, including professional journalists, largely anonymous citizen sleuthers, and research centres, worked together to shed light on the events, forming a "community" where "open-source work allows this assemblage model to build on the traditional norms and practices of investigative journalism" (Reese and Chen 2022, 644).

In the context of the Capitol Hill insurrection, the joint OSINT coverage of the events materialized as an assemblage at different layers. At one level, mainstream journalistic institutions (including but not limited to the *New York Times* Visual Investigation team), while at other levels network of independent open-source enthusiasts as well as OSINT-specialized organizations (such as *Bellingcat*) worked in parallel to investigate the events. Each mutually benefited, often integrating, the other's work. The "collective result" took the form "a massive trove of evidence preserved" that has been crucial for helping "identify perpetrators and victims, understand the historic tragedy, assist law enforcement, and smash false counter-narratives" (Philp 2021). As Reese and Che argue further (2022, 644), the Capitol Hill "assemblage" shows how, when it comes to this collaborations, mainstream news organizations and individual sleuthers do share similar "accountability-driven ethos" and an "epistemological dedication to standards of empirical evidence" while reciprocally assisting one another in different realms. Mainstream outlets can be supported by the "sleuthing" crowd when it comes to additional information gathering and sourcing, while the community of independent investigators can benefit from the mainstream exposure to efficiently broker the information in their hands.

Conclusion

Open-source investigations (OSIs) are a defining phenomenon of contemporary investigative digital journalism. From the examples presented in this chapter and the outcomes of the existing literature, OSIs appear now as an established element of what constitutes journalism today. Yet, their contribution is emerging from various perspectives and according to various driving forces. First, the success of OSIs is one of effective technological innovation: as discussed, with OSIs, the journalistic field has progressively absorbed and adopted techniques and tools whose genesis was elsewhere. Proving that these technologies can have explicit journalistic aims, they have become common in the contemporary journalistic toolbox. Second, OSIs are now conducted by highly specialized organizations (both within legacy news organizations and within OSINT-native ones), but also by amateurs and enthusiasts. Yet, these two segments also join forces, especially in the context of investigating major events, such as the war in Ukraine or the Capitol Hill insurrection, further blurring previous boundaries between professional journalists and so-called amateurs.

Existing literature agrees that the community of practice born around the journalistic use of OSINT is, nevertheless, characterized by shared core cultural/ethical elements: a culture

of transparency; an adversarial mindset; and collaboration (Belghith et al. 2022). These traits also characterize other "open" forms of journalism where computational traits play a major part. Following this framework, OSIs take shape in "trading zones" where fields and cultures come together: in the case of OSIs, this happens thanks to journalism becoming an integral part of what Fuller and Weizman call an "investigative commons" (2021. 12). In their view, this approach to investigation is also strongly connected with the contemporary Zeitgeist:

> this collective and diffused mode of truth production is made necessary by a political stuation in which conflicts are waged not only over resources but over interpretation of the real, and identities are formed around the formation and interpretation of facts. (Fuller and Weizman 2021, 12)

In this view, OSIs not only represent an innovation regarding the tools and practices of investigating and the players participating in it. OSIs also appears as a reaction to how knowledge can be built or dismantled. In that sense, they offer an occasion for reflection around the technologies used by journalism, and a strategy for a "deep introspection into the way such technologies are conceived and operate" (Fuller and Weizman 2021, 16). In that line, the fact that OSIs can be understood as something based on a "surveillant narration" that treats surveillance thematically, while at the same time incorporating its architectures and tools into the structure of the narration itself (Gates 2020). In this sense, through the implementation of OSINT practices and their digital eyes, journalism may also be developing a technological approach capable of finally counter-use data practices to investigate the real and the abuses occurring in it.

Further reading

This series of books and reading will offer additional insights about OSI and OSINT techniques in journalism both from the perspective of changing news practices and their epistemological implications. In her book, "Material Witness Media, Forensics, Evidence", Susan Schuppli overviews how media materials have progressively become sources for investigations in various contexts. In particular, the book focuses on how non-human entities and machinic ecologies can become the object of forensic analysis to ricreate and analyse historical events. Sylvain Parasie's "Computing the News Data Journalism and the Search for Objectivity" offers an overview of the progressive computationalization of journalism that took place in the past 15 years through the adoption of different data practices in reporting. This is useful

contextual information about the processes that led to the raise of OSI as well. "Digital Investigative Journalism Data, Visual Analytics and Innovative Methodologies in International Reporting", edited by Oliver Hahn and Florian Stalph is a comprehensive analysis of contemporary digital strategies for investigative reporting, including various forensic and verification tactics at the core of OSI. Eyal Weizman's "Forensic Architecture: Violence at the Threshold of Detectability" retraces the parabola of Forensic Architecture, the OSI pioneer group he founded. The book shed lights on FA's tecnquiques and aesthtics, while also focusing on the impact of the investigations.

References:

Bélair-Gagnon, Valerie. (2013) "Revisiting impartiality: Social Media and journalism at the BBC," *Symbolic Interaction*, 36(4), pp. 478–492. Available at: https://doi.org/10.1002/symb.72.

Belghith, Yasmine., Venkatagiri, Sukrit. and Luther, Kurt. (2022) "Compete, collaborate, investigate: Exploring the social structures of Open Source Intelligence Investigations," *CHI Conference on Human Factors in Computing Systems* [Preprint]. Available at: https://doi.org/10.1145/3491102.3517526.

Benson, Rodney. (2006). News Media as a "Journalistic Field": What Bourdieu Adds to New Institutionalism, and Vice Versa. *Political Communication* 23(2), 187-202.

Bjerknes, Fredrik. (2022). Images of Transgressions: Visuals as Reconstructed Evidence in Digital Investigative Journalism. *Journalism Studies* 23(8), 951-973.

Bruns, Axel. and Weller, Katrin. (2016). Twitter as a first draft of the present: and the challenges of preserving it for the future. *WebSci '16: Proceedings of the 8th ACM Conference on Web Science* 2016, 183–189. https://doi.org/10.1145/2908131.2908174.

Carlson, Matt., and Lewis, Seth. C. (Eds.). (2015). *Boundaries of journalism: Professionalism, practices and participation*. Abingdon-on-Thames: Routledge.

Chadwick, Andrew. (2017). *The Hybrid Media System. Politics and Power* (2nd edition). Oxford: Oxford University Press.

Coddington, Mark. (2015). Clarifying journalism's quantitative turn: A typology for evaluating data journalism, computational journalism, and computer-assisted reporting. *Digital Journalism*, *3*(3), 331-348.

Cooper, Glenda. and Mutsvairo, Bruce. (2021). Citizen journalism. Is Bellingcat revolutionising conflict journalism? In: Orgeret, K. S (Ed.) *Insights on Peace and Conflict Reporting*. London: Routledge, 106-120.

Di Salvo, Philip. (2021). Securing Whistleblowing in the Digital Age: SecureDrop and the Changing Journalistic Practices for Source Protection, *Digital Journalism*, Online First: https://doi.org/10.1080/21670811.2021.1889384.

Edwards, Maxim. (2022). Open-Source Journalism in a Wired World. *Nieman Reports*, December 7th. https://niemanreports.org/articles/open-source-journalism/.

Eldridge, Scott. (2018). *Online Journalism from the Periphery. Interloper Media and the Journalistic Field.* Abingdon-on-Thames: Routledge.

Fuller, Matthew. and Weizman, Eyal. (2021). *Investigative Aesthetics. Conflicts and Commons in the Politics of Truth*. London: Verso Books.

Ganguly, Manisha. (2022). The Future of Investigative Journalism in the Age of Automation, Open-Source Iintelligence (OSINT) and Artificial Intelligence (AI). PhD thesis University of Westminster Westminster School of Media and Communication. https://doi.org/10.34737/vx128.

Gates, Kelly. (2020). Media evidence and forensic journalism. *Surveillance & Society*, 18(3), 403-408.

Graves, Lucas. and Amazeen, Michelle. A. (2019). Fact-Checking as Idea and Practice in Journalism. *Oxford Research Encyclopedia of Communication*. Available at:

https://oxfordre.com/communication/display/10.1093/acrefore/9780190228613.001.0001/acrefore-9780190228613-e-808;jsessionid=A97767ABE601CE51D2844121D3B01060.

Grut, Ståle. (2020). OSINT journalism goes mainstream. *The Nieman Journalism Lab*, https://www.niemanlab.org/2020/01/osint-journalism-goes-mainstream/.

Gutierrez, Miren. (2021). Data activism and meta-documentary in six films by Forensic Architecture. *Studies in Documentary Film*, https://doi.org/10.1080/17503280.2021.1908932.

Hahn, Oliver and Stalph, Florian. (Eds.). (2018). *Digital Investigative Journalism Data, Visual Analytics and Innovative Methodologies in International Reporting*. London: Springer.

Hayden, Michael Edison. (2019). Guide to Open-source Intelligence (OSINT). Tow Center for Digital Journalism A Tow/Knight Report. https://www.cjr.org/tow_center_reports/guide-to-osint-and-hostile-communities.php.

Higgins, Elliot. (2022). *We Are Bellingcat. An Intelligence Agency for the People*. London: Bloomsbury.

Ilyuk, Yuliya. (2019). Journalistic investigations in the digital age of post-truth politics: the analysis of bellingcat's research approaches used for the (re) construction of the MH17 case. *Perekrestki*, (1), 56-78.

Krever, Mick. (2023). 'Strong indications' Putin decided to give separatists the missile that downed MH17 in 2014, say Dutch investigators. CNN, February 8th. https://edition.cnn.com/2023/02/08/europe/mh17-russia-ukraine-supply-missile-intl/index.html.

McMahon, Félim. (2021). Digital Sleuthing. In: de Burgh, H. and Lashmar, P. (Eds.). *Investigative Journalism*. Third Edition. London: Routledge, 54-70.

Müller, Nina. C., & Wiik, Jenni. (2021). From gatekeeper to gate-opener: Open-source spaces in investigative journalism. *Journalism Practice*, 17(2), 189-209.

Paraise, Sylvain. (2022). *Computing the News. Data Journalism and the Search for Objectivity*. New York, NY: Columbia University Press.

Philp, Rowan. (2021). How Open-source Experts Identified the US Capitol Rioters. *The Global Investigative Journalism Network*, January 15th. https://gijn.org/2021/01/15/how-open-source-experts-identified-the-us-capitol-rioters/.

Porlezza, Colin, and Splendore, Sergio. (2019). From open journalism to closed data: Data journalism in Italy. *Digital journalism*, *7*(9), 1230-1252.

Radden Keefe, Patrick. (2013). Rocket Man How an unemployed blogger confirmed that Syria had used chemical weapons. *The New Yorker*, November 17th. https://www.newyorker.com/magazine/2013/11/25/rocket-man-2.

Reese, Stephen. (2021). The Institution of Journalism: Conceptualizing the Press in a Hybrid Media System. *Digital Journalism*, 10(2) 253-266.

Reese, Stephen, and Chen, Bin. (2022). Emerging hybrid networks of verification, accountability, and institutional resilience: the US Capitol Riot and the work of open-source investigation. *Journal of Communication*, 72(6), 633–646.

Rietjens, Sebastiaan. (2019). Unraveling disinformation: the case of Malaysia Airlines flight MH17. *The International Journal of Intelligence, Security, and Public Affairs* 21(3), 195-218.

Ristovska, Sandra. (2022). Open-source investigation as a genre of conflict reporting. *Journalism* 23(3), 632-648.

Samuels, Elyse, King, Geoffrey, Browne, Malachy, Ajaka, Nadine. (2022). Putting Open-Source Methods Into Practice. *Nieman Reports*, December 15th. https://niemanreports.org/articles/open-source-newsrooms-methods/.

Schaurer, Florian, and Störger, Jan. (2013). The evolution of open-source intelligence (OSINT). International Relations and Security Network (ISN), ETH Zurich.

https://www.research-collection.ethz.ch/bitstream/handle/20.500.11850/25221/eth-2238-01.pdf.

Schuppli, Susan. (2020). *Material Witness. Media, Forensic, Evidence*. Cambridge, MA: MIT Press.

Schwartz, Leo. (2022). Amateur open-source researchers went viral unpacking the war in Ukraine. *Rest Of The World*, March 7th. https://restofworld.org/2022/osint-viral-ukraine/.

Waters, Nick. (2022) Bellingcat's Yemen Project. In: Mair, M., Meckin, R. and Elliot, M. (Eds) *Investigative Methods: An NCRM Innovation Collection*. Southampton: National Centre for Research Methods, pp. 19-31.

Weizman, Eyal. (2017). *Forensic Architecture: Violence at the Threshold of Detectability*. New York, NY: Zone Books.

Wirtz, J. James, and Rosenwasser, J. Jon. (2010). From combined arms to combined intelligence: philosophy, doctrine and operations. *Intelligence and National Security* 25(6), 725-743.

[i] Available at: https://projects.propublica.org/houston/
[ii] Available at: https://yemen.bellingcat.com/
[iii] Available at: https://www.bellingcat.com/category/news/?fwp_tags=mh17
[iv] In early 2023, Dutch investigators, after having convicted individuals for the downing of the plane, released new evidence claiming there are "strong indications that Russian President Vladimir Putin personally approved the decision to provide separatists in Ukraine with the missile that shot down the Malaysia Airlines flight MH17 in 2014" (Krever 2023).
[v] The definition is taken from Airwars' website: https://airwars.org/about/team/
[vi] Available at: https://www.theguardian.com/world/2022/mar/24/how-russia-is-using-tactics-from-the-syrian-playbook-in-ukraine
[vii] Available at: https://foreignpolicy.com/2021/03/20/nato-killed-civilians-in-libya-its-time-to-admit-it/.
[13] The definition is taken from Forensic Architecture's website, as the following quotes: https://forensic-architecture.org/about/agency
[viii] Available at: https://www.lemonde.fr/videos/video/2020/07/17/enquete-video-le-deroule-des-evenements-qui-ont-conduit-a-la-mort-d-adama-traore_6046510_1669088.html.
[ix] Available at: https://interactive.aljazeera.com/aje/2021/myanmar-state-of-fear/index.html.
[x] All the investigations are listed here: https://www.nytimes.com/spotlight/visual-investigations
[xi] Available at: https://www.nytimes.com/2020/06/14/us/videos-rayshard-brooks-shooting-atlanta-police.html
[xii] Available at: https://www.nytimes.com/2020/05/31/us/george-floyd-investigation.html
[xiii] Available at: https://www.nytimes.com/video/world/europe/100000008299178/ukraine-bucha-russia-massacre-video.html.
[xiv] Available at: https://www.nytimes.com/video/world/asia/100000007963596/us-drone-attack-kabul-investigation.html.