

Earth Observation for the Protection of Human Rights during the Armed Aggression

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Russia's military aggression against Ukraine has raised a wide range of issues concerning the use of remote sensing data for the protection of human rights and freedoms during armed conflicts. This article looked at how satellite images help prevent violations, reduce violations, and establish evidence to be held responsible. In addition, significant attention is paid to sources of such data from Ukraine, since it does not have its own grouping of satellites for these purposes. The article describes the legal and organizational aspects of data obtained from international institutions, businesses, and other open sources.

Keywords: Earth observation data, russian aggression against Ukraine, OSINT

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Introduction

One of the most famous statements of ancient lawyer Cicero is “inter arma enim silent leges.” A lot of time has passed from the ancient epoch where the position of victims was faced with silence, but today the inaction of a witness cannot be actual anymore due to real-time war monitoring by everyone interested in this.

Each person can count on human rights during the act of aggression of one State against another that is enshrined at least in: 1) the Universal Declaration of Human Rights (UDHR) on December 10, 1948; 2) the Geneva Convention Relative to the Protection of Civilian Persons in Time of War on August 12, 1949 (The Geneva, 2010); 3) the Protocol Additional to the Geneva Conventions from August 12, 1949, and relating to the Protection of Victims of International Armed Conflicts (Protocol I) from June 8, 1977, etc.

Since 1960, satellite reconnaissance has played a significant role in providing information

concerning enemy missiles, troop deployments and military positioning using photographic images and finding displaced persons fleeing conflict zones and relocating them to large refugee camps (Al-Doski et al., 2013). The Argentine and British governments to obtain images of the Falkland Islands could have used Landsat images even with a resolution of 80 meters and 24 hours of data processing. NASA gave them only by prior arrangement. (Wynn, 1982). Therefore, the widespread use of satellite imagery starts with the 1991 Gulf War between Iraq and Kuwait. Then, satellite images have played a key role in documenting the widespread burning of ethnic Rohingya villages in Burma, attacks against schools in Syria, and airstrikes in populated neighborhoods of Mosul, Iraq (New, 2017) and other types of harassment. With the full-scaled russian armed intervention into Ukraine, russian government made every effort for the whole world to believe that “inter arma enim silent leges” is absolute truth, but their efforts is broken due to the revealing potential of satellite imagery. Visual evidence, however, has never been so plentiful during an unfolding conflict as during Putin’s war in Ukraine (Russia’s, 2022).

Examples of the application of the satellite images for the protection of human rights during the russian aggression

The term “protection of human rights” covers preventing of violations, verifying of international treaties and bringing perpetrators to justice. So, let us see attentively the basic human rights in the light of such aspects.

First is the protection of lives and dignity that is guaranteed in different variations. “Everyone has the right to life, liberty and security of person” (Universal, 1948). “No one shall be subjected to torture or to cruel, inhuman, or degrading treatment or punishment.” “Protected persons shall at all times be humanely treated, and shall be protected especially against all acts of violence or threats thereof” (The Geneva, 2010) (art. 27 Geneva Convention 1949 and art. 51 Protocol I). “Prohibition of (...) murder, torture, corporal punishment, mutilation and medical or scientific experiments not necessitated by the medical treatment of a protected person, but also to any other measures of brutality whether applied by civilian or military agents” (art. 31 Geneva Convention 1949) (The Geneva, 2010). The democratic world expects that the prohibition of murder, torture, corporal punishment, mutilation, medical or scientific experiments, and all acts of violence are a solid guarantee of the protection of lives, even during the war. Such confidence might be the route of skepticism to the information from only the one side of the war. Nevertheless, Maxar’s images reveal contrary to the abovementioned proclamations, i.e., the corpses on the street of a Ukrainian town named Bucha and fresh burials during the russian occupation.

The second right we should mention is the protection of property rights. The international treaties proclaim that “Everyone has the right to own property alone as well as in association with others” (art. 17) (Universal, 1948), “facilitate the proper working of all institutions devoted to the care and education of children” (art. 50) (The Geneva, 2010). Furthermore, any destruction by the Occupying Power of real or personal property belonging individually or collectively to private persons, or to the State, or to other public authorities, or to social or co-operative organizations, is prohibited, except where such destruction is rendered absolutely necessary by military operations (art. 27) (The Geneva, 2010). Nevertheless, the Blacksky’s satellite images shows the total destruction of humanitarian infrastructure like as hospitals,



Image from Maxar, 19 March 2022
despite to their socially significant role.

(Bucha Killings: Satellite Image of Bodies Site Contradicts russian Claims BBC News, 2022)



(Satellite Images Map of Mariupol. Cesium Stories, 2022)

The next right that we need to highlight at this context is the freedom of movement and residence within the borders of each state, and has the right to leave any country, including his own, and to return to his country (art. 13) (Universal, 1948). Provision that is more specific is revealed in the art. 49 Geneva Convention, i.e., “individual or mass forcible transfers, as well as deportations of protected persons from occupied territory to the territory of the Occupying Power or to that of any other country, occupied or not, are prohibited, regardless of their

motive” (The Geneva, 2010). Trust to guarantee of the freedom of movement, including a return to the state of citizenship, without monitoring of their procuring during the occupation, may lead to falling out of sight-forced relocation as one of the acts of genocide. However,



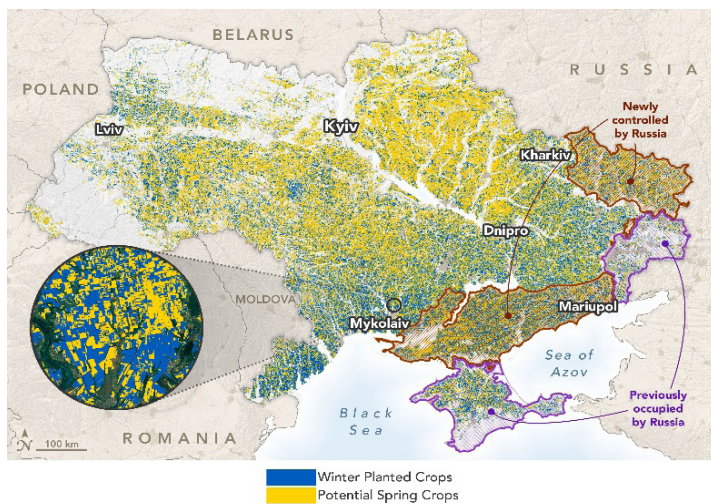
satellite images help to surveille such relocations.

(Sauer, Pjotr (2022) Hundreds of Ukrainians were forcibly deported to Russia, say Mariupol women.
The Guardian)

In warfare, care should be taken to protection of the natural environment against widespread, long-term and severe damage. This protection includes a prohibition of the use of methods or means of warfare, which are intended or may be expected to cause such damage to the natural environment and thereby to prejudice the health or survival of the population (art. 55 Protocol). Such characteristics as wide viewing strip and ability to retrieve data regardless of access area helps to evaluate natural and technological disaster far from the jurisdiction of the source of disaster emanated from air pollution, flooding or release of nuclear power. As well as the impact of armed conflict have boundless, unpredictable and long-term harmful consequences, the huge amount of Earth observation data focuses on surveillance of environment of the zone of the conflict, especially if it is concerned the nuclear power plants (The Geneva, 2010). Furthermore, the intended burning of the grain fields by russian military forces on the Eastern and Southern parts of Ukraine leads to the worldwide effect of starvation. As a response, NASA produces the harvest crop data, which flows to several partner organizations, like the U.N. Food and Agriculture Organization, for monitoring and response to emerging food shortages and famines.

Thus, Earth observation data help to gain such aims concerning the protection of human rights:

1. **Prevent their violations** by means of early warning and timely evacuation, to establish logistics networks taking into account the risks in different areas, etc.
2. **Mitigate the violations** by means of medical or humanitarian aid, evacuation, provision of communal services (electricity, water supply), to localize dangerous technological or natural disasters.
3. **Disclosure of the truth about the violations** and bringing to justice.





(Power Lost at the Zaporizhzhia NPP (2022) Energy industry review)

(Voiland, Adam (2022) Measuring War's Effect on a Global Breadbasket. NASA Earth Observatory)

(Maxar's WeatherDesk Predicts a Significant Decline in Ukrainian Crop Harvests (2022)
Maxar Technologies)

Sources of obtaining the Earth Observation data during the armed aggression

Today Ukraine has only one functional Ukrainian Earth observation satellite Sich 2-30 launched on 13 January 2022 (A Stable, 2022). Furthermore, according to the Copernicus Space Component Technical Operating Arrangement (TOA), 2018, ESA and State Space Agency of Ukraine (SSAU) are committed to the principle of full, free, and open access to the European Sentinel and certain Ukrainian Earth observation satellite data (Sich – 2-2, Sich 2-M planned to put into orbit by 2025) and information, subject to applicable restriction. (Ukraine, 2018) Sentinel data access contains the reproduction, distribution, communication to the public, adaptation, modification and combination with other data and information (Legal, 2018). In addition, the E.U. has approved an agreement with Ukraine that will allow sharing classified information, including satellite images (Bloomberg, 2022).

Therefore, even with Sentinel capabilities, Ukraine cannot provide the 24/7 data from the Earth observation constellation of satellites with synthetic aperture radars and 24/7 analysis of E.O. Data with photometric mapping and 3D visualizing in addition of the aerial intelligence data which is indispensable for the effective protection of rights during the armed aggression.

According to the fact that Ukraine faced with a shortage of Earth observation data, we can highlight such types of additional sources of Earth observation data:

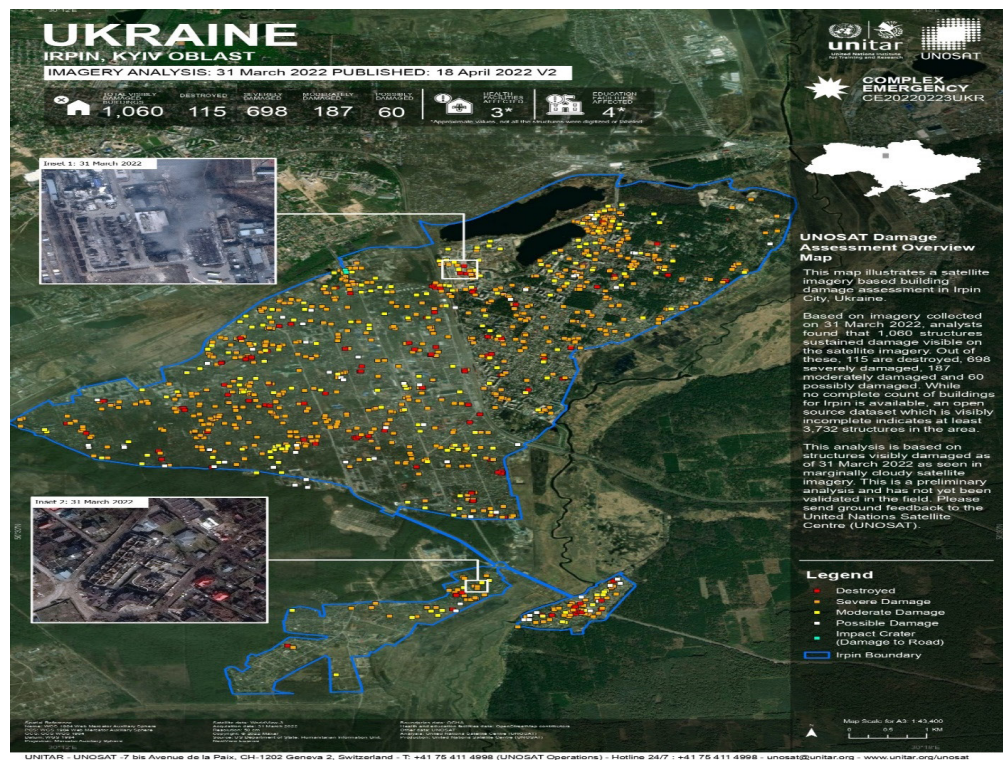
- a) intergovernmental open sources;
- b) business to open government sources;
- c) business social projects for the open-source intelligence;
- d) intergovernmental limited access data.

Let us consider the first three types in more detail. The fourth type is out of our research according to their regime of limited access. We can only estimate them according to some indirect data. For instance, David Gauthier, the director of commercial and business operations at the National Geospatial-Intelligence Agency, stated that the U.S. government more than doubled its purchase of commercial low-Earth orbit imagery over Ukraine from companies like Maxar, BlackSky, and Planet, which quickly shared with officials in U.S. European Command, NATO, and Ukraine (Nichols, 2022).

The first type to consider is intergovernmental open sources of Earth observation data. One of the principles of the UN Charter requires from all Members to give the United Nations every assistance in any action it takes in accordance with the present Charter (Art. 2.5 (UN Charter, 2022)). Such norm was more detail reflected in the Declaration on Principles of International Law concerning Friendly Relations and Cooperation among States in accordance with the Charter of the United Nations with proclaiming the duty of States to cooperate (Declaration, 1970). Promotion of international cooperation and understanding for maintaining peace and security is reflected in art. 3 (Treaty, 1966). Thus, there is a solid legal basis to procure satellite data by all States for the common interest, which was realized within the Operational Satellite Applications Programme (UNOSAT) under the U.N. Institute for Training and Research. Their mandate is to provide United Nations funds, programmes and specialized agencies with

satellite analysis, as well as to continue supporting the Member States with satellite imagery analysis over their respective territories. In case of natural hazards, complex emergency situations, or conflict crises, the services involve the very rapid acquisition and processing of satellite imagery to generate geospatial information and analytical reports in addition to GIS layers in support of humanitarian relief agencies (UNOSAT, 2011).

To obtain such images, UNOSAT cooperates with space agencies according to the Charter on Cooperation to Achieve the Coordinated Use of Space Facilities in the event of Natural or Technological Disasters (Text, 2000). The International Charter aims at providing a unified



system of space data acquisition and delivery to those affected by natural or man-made disasters through authorized users. Each member agency has committed resources to support the provisions of the Charter and thus is helping to mitigate the effects of disasters on human life and property. The authorities and bodies concerned in a country affected by a disaster (beneficiary bodies) should request the intervention of the parties either directly through the rescue and civil protection, defense, and security bodies of the country to which one of the parties belongs or of a State belonging to international organizations that are parties to the Charter (associated bodies) or where appropriate via a cooperating body acting in partnership with an associated body. Remarkably, Ukrainian bodies did not activate the information request according to this Charter. The reason may lay in the membership of the Russian Federation in this Charter, but this fact cannot prevent from the use of all evaluable measures for gathering

evidences of its crimes.

The one more public initiative is E.U. Agency for Space programs initiative called EUSpace4Ukraine. This platform offers ten solutions from innovators in the following categories: uncrewed solutions for transport and delivery of goods, safety and rescue, integration of displaced people in a new country, applications to help understand and inventory damage in Ukraine, safe, timely and accurate navigation for population migration (#EUSpace4Ukraine, 2022). Such initiative gathers applications and solutions that leverage freely accessible data from Galileo and Copernicus, two components of the E.U. Space program to enhance humanitarian support for the Ukrainian people. Galileo provides positioning and navigation services and Copernicus supplies Earth observation data and information. The applications and solutions published on this platform cover a wide range of uses, from supporting NGOs delivering medical goods via drones, to practical solutions to support the integration in E.U. countries of people fleeing the war (E.U., 2022).

Based on imagery collected on 31 March 2022 by the U.S. Department of State, Humanitarian Information Unit, NextView License UNOSAT provided building damage assessment in Irpin, Vorzel, Hostomel, Northeast Kharkiv, etc. (Ukraine, 2022). Such information hasn't operative feature and cannot prevent or mitigate violations because it grounded on the analytical assessment of open data provided by States to U.N. institution, but it is valuable for disclosing the truth about violations.

(Ukraine, 2022)

According to Rule 69(4) in the Rome Statute of the ICC, the Court may rule on the relevance or admissibility of any evidence, taking into account, inter alia, the probative value of the evidence (Rome, 1998). For instance, the satellite images were used as evidences at the case of Prosecutor v. Alfred Yekatom and Patrice-Edouard Ngaïssou (Yekatom, 2021).

The ICC has limited in-house capacity and expertise to conduct satellite imagery analysis, so it uses third parties capabilities. Nevertheless, non-real-time images complemented by aerial intelligence, geo-positioning, photogrammetry, etc., provide evidence of atrocities within blocked to get and over large geographic areas. Noticeably, analytical material prepared within one of the U.N. programs on the base of satellite images looks like the trustworthy source of evidence at the international juridical process.

The second source of obtaining the Earth observation data is private operators. Few years ago, SSAU suggested to the Parliament of Ukraine the Law about State Regulation of the Remote Sensing of the Earth (Law, 2019). Its main disadvantage was focusing only on the state sector of such type of space service and not counting their private segment. As a result, there is no legal basis for exchanging remote sensing data between the government and private sector. However, extraordinary challenges require creative solutions. As was mentioned, Ukraine does not have a satellite fleet of their own, but their needs in Earth observation data match with the needs of private satellite operators to improve their technologies and share their abilities. For instance, SAR is very useful for monitoring small areas, in short, response times, with more transparency – as it is weather agnostic – and high-quality information (Change, 2022). Thus, the brutal conflict in Ukraine is undoubtedly pivotal for rapid acceleration in interest and support for the commercial space sector (Russia's, 2022).

According to such tendency, the Ministry of Digital Transformation of Ukraine, in the letter № 1-05/1-08 (01.03/2022), called the E.O. satellite operators to provide Earth observation data Timmermans, 2022). The representative for obtaining was determined the private EO

Analysis Company, i.e., EOS Data Analytics. According to the Decree of the Cabinet of Ministers of Ukraine No 856 (18.09.2019), the Ministry has the authority to involve civil society representatives in the implementation of open data policy (Issues 2019). Nevertheless, the cooperation between this Ministry and the National Space Facilities Control and Testing Centre was unclear. The last one is the main institution in Ukraine responsible for and receiving information, documents and materials reception, processing, storage and analysis of scientific and special information from space vehicles, including for the purpose of operative prevention of sources of danger that threaten national security. Both of them have the authority to exchange information, so we can assume that such exchange was organized, but there is still a lack of regulation to the operation of some sensitive information between such public institutions and third persons that should be regulated in the near future (Regulations, 2016).

It should also be noted that the representation of governmental agencies by EOS Data Analytics had the risk of compromentation. The matter is that the owner of the Noosphere Venture Partners was added in December to the U.S. government list of individuals and organizations not permitted to receive federal contracts or assistance (Werner, 2022). At the same time, we should be far from illusions that some operators do not sell satellite data to russia or their partners who help to avoid sanctions. The positive news in this context is that due to U. S. Code para. 2279 any data should not transmit by any private entity to russia (7 U.S, 2019). With the recognition of russia as a state sponsor of terrorism, restrictions on the provision of such data will become even tighter and stricter.

There is another type of open sources, named open-source intelligence or OSINT. OSINT is publicly verifiable and can be proven or disproven without revealing government intelligence sources or methods (Hanham, 2021). OSINT reveals the truth in the hard information war that has an influence on the political and social reactions, aimed at deterrence of violence, and provides fast check the evidence for justice. There are many OSINT sources, such as photos and videos made by troops and civilians, data from drones, etc., but they are within the conflict and can be compromised. Satellite images, getting from different sources, are out of conflict and could be dispassionate.

The Maxar News Bureau has access to radar satellite imagery from MDA and advanced analytic capabilities from Radiant Solution, and from 2017 provided as high-resolution satellite imagery and analytics (Maxar, 2018). The Open Data Program Capella releases high-quality SAR imagery products for major humanitarian crisis events and natural disasters in a timely manner (Capella, 2022). BlackSky shares geospatial imagery and analytics from Ukraine to help show to the world the seriousness of the situation and be moved to help (BlackSky, 2022). The company is offering assistance to humanitarian groups, aid workers, customers and the media to understand the events on the ground as they unfold in order to assist in providing support to the people of Ukraine. Sattelologic Ukraine Observer is a platform that streamlines access and analysis for organizations to make timely decisions, like identifying safe transportation routes and monitoring critical infrastructure, monitor border to coordinate the safe evacuation, and identifying enemy-occupied areas and assets. Each 7-day all-region and near real-time updates for all data for free. Sattelologic is working directly with the Ukrainian government and partner nations (Astraea, 2022). The application to obtain the data is approved through a simplified and is vetted to ensure compliance with export controls. One more of actual example of OSINT with added value information is the Watanave maps project that includes satellite multispectral imaging to map fire in near real-time, identifying the exact location and map it on a browser-based mapping platform, named Cesium (Thompson, 2022).

Conclusions

Strong international support for Ukraine in its fight against Russian aggression and flexible approaches to obtaining data by the Ministry of Digital Transformation in cooperation with business representatives compensated the lack of data in Ukraine remote sensing of land at a critical moment of attack. However, in order to ensure stable data received in the future for a confident confrontation with Russian imperial vision need to do at least a few such steps. First, the key role will play the adoption of the law on Earth observation data service, which regulates the regime of data exchange related to national security, the compression of the development of the private segment of the market of these services, as well as the interaction of various state bodies in this sphere. Secondly, it is necessary to expand international cooperation with foreign partners and international organizations. Particular attention should be paid to the European Union's cyber and space business infrastructure.

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