

# Spatial technologies matter in armed conflicts

Sarah Poch

June 21, 2022

## Abstract

With more data and more advanced technologies and more free access to spatial images, gathering information in wartime is only made easier. Also, if in situ data are still relevant and useful, using spatial technologies is a good alternative. It allows authorities and organisations to collect data that are unavailable through ground sensors. In war times, the urgent need of information, the destruction of infrastructures among others make spatial data essential. This article will give a non-exhaustive overview of how spatial technologies matter.

## Introduction

Although it did not feature prominently in the major armed conflicts of the 20th century, space and its conquest were nevertheless a source of tension during the Cold War. For many years, it was a subject of discord between the great powers of the world [7]. Today, the power relations have changed and so has the space question. Many international and national space research programmes are flourishing and thriving [4]. These programmes are either for the conquest of space and its exploration, or for scientific research, or both, and are made possible by the research, development and use of new technologies. Earth Observation (EO) satellites provide a lot of images and data about our planet that are useful in various fields [10].

The ubiquity of space technology in armed conflict is well established, but its use can be diverse. More than anything, it is a powerful tool for information. But it is also a pillar in crisis and emergency management. In the context of international partnerships, space technology can be used as a means of pressure in these conflicts.

## Space technology as source of information

Space technology as a reliable source of information is useful at several levels. First, in the collection of information useful to the parties to a conflict and their armies, second, in the communication of events to the population, and third, in the collection of information for post-conflict use.

Precise information is essential for the armed forces as well as their frequent updating. Besides, major technological advances in this field have been made possible by military research laboratories. In this respect, space and remote sensing technologies have been early used [9]. Especially thanks to the research and development of more advanced tools.

Space technology, applied to military use makes possible to have regularly updated images with highest resolution. Military satellites are not just imagery satellites. Other types of satellites are to document a conflict but this data are not freely available.

Information, its veracity and speed of dissemination are key elements in today's societies. All these aspects make access to information essential in conflicts. Today, in a small amount of time, a large part of the population can access to a large amount of information and have its own interpretation of what happen on different parts of the world [5]. The major concern, which may arise in the near-instantaneous exchange and interpretation of information, is the source and veracity of the information. It is also interesting to keep in mind that the interpretation of certain data can be a somewhat subjective concept [6]. An image, for example, despite its clarity and veracity can be interpreted and used in different ways by different parties. If a satellite image can be sourced through its metadata and seems neutral at first sight, the question of the usage and neutrality of interpretation remains.

EO information acquired during the conflict can also be used afterwards. Indeed, for several reasons, crimes, damages and other events cannot be seen or studied during the conflict. These reasons can be material as the isolationist policy of a country or related to a lack of interest from the international community, etc [1]. In Darfur, Sudan, the inaccessibility of the city has implied a lack of information for humanitarian organisations. Satellite imagery helped to fill these gaps. This allows a useful humanitarian response. Afterwards, it also allows organisations to collect evidence for later lawsuits [8].

## Space technology as crisis management tool

Crisis management is a part of every armed conflict. And data from space technology is already present to manage it. First, the first crisis to be considered is the humanitarian crisis caused by such a conflict. Populations are caught in the crossfire, and their personal security is in question. Armed conflicts are a source of population displacement. These displaced people may end up in refugee camps, needs a different access to food or water. Figure 1 is an example of how satellites images can support Non-Governmental Organisation (NGO) in the water supplying of refugees camps in Chad. For example, commission as the United Nations High Commissioner for Refugees (UNHCR) use spatial imagery to estimate and found new sources of water for Sudanese refugees [8].

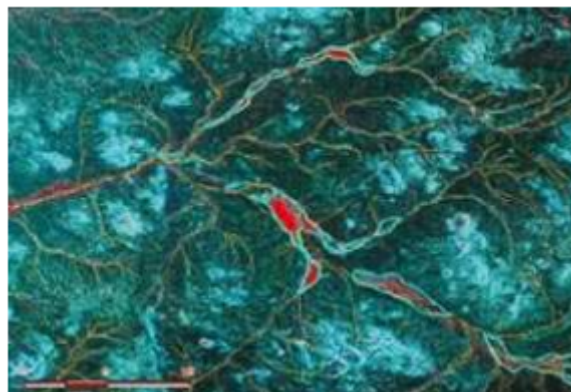


Fig.1. Satellite Image of Underground Water for Refugee Camps in Eastern Chad from [8]

The other crisis to consider is the environmental crisis. The use of weapons inflicts damages on anthropogenic constructions but nature. The data recorded will undoubtedly

be processed after the conflict but will provide very useful information on the damage inflicted. This data can help to determine the extent of damage in urban areas, but also the impact on agriculture, on forest land cover. In regions like Rakhine, Myanmar, where forest was predominant and cultivable lands are mainly present, a conflict can change this balance. Because of conflicts zone and buried area a decrease in agriculture and deforestation are observed [2]. Having this type of information is now indispensable with a view of reconstruction.

## **Space technology as means of pressure**

Space technology can also be used as a leverage in a context of international conflicts. During Cold War, the United States of America (USA) and the Union of Soviet Socialist Republics (USSR) were in competition to rule space and demonstrate their new space technologies. Currently, the conquest of space was synonymous of being a great power of the world [7]. But during the years 1960, this model changed. It changed to become a more collaborative model based on spatial research. Indeed, even if many countries have their own space agencies, the cooperation is predominant. This cooperation led to many international spatial projects such as the International Space Station (ISS). But this cooperation also creates dependencies on international projects. Each countries have their own specialties and competencies in the spatial technologies that they can offer [7].

In a spatial perspective, agreements between countries, cooperation on projects, etc are in danger in time of war. The relation of dependency explorer before can be used and put on-going projects in a halt. It also can be used as a leverage between the different warring parties. Perhaps the most recent example is the place of the ISS in the Russian-Ukrainian war. Indeed, as soon as the conflict began and the international community threatened to impose sanctions on the Russian Federation, the Russian authorities were quick to point out the possible consequences of the war and of excessive sanctions on the ISS. These consequences, according to the Russian authorities, could be the collapse of the ISS. This statement come from to three main facts. First, the Russian module of the ISS, Zvezda, is a module with a propulsion system. The rectification of the station orbit is managed by this system. Second, the Russian cargo Progress, main cargo used to resupply the ISS, is used in addition of the Zvezda module. In addition, the cargo delivers the fuel needed for the propulsion system [3]. This dependency became an instrument for exerting pressure or maintaining fear, particularly among the uninformed public.

## **Discussion**

In conclusion, we can see that space technology is present in armed conflicts today. It has a large part to play in. It is a powerful source of information for the military, the humanitarian response, the people and a source of information in collection of evidence. But in another side, spatial technology can be in danger by international tensions and become dissuasive force. It is a silent actor in conflicts that we are not necessarily aware of, but it is an indispensable actor. If spatial technology can be a great source of help, it also can be misused. More and more the question of false news is on the table. Spatial imagery can be one of the tools to fight against this tendency.

## References

- [1] Evidence from space: Use of space-derived earth observation information as evidence in judicial and administrative proceedings. Technical report, London Institute of Space Policy and Law, 2012.
- [2] Thiri Shwesiin Aung. Satellite analysis of the environmental impacts of armed-conflict in rakhine, myanmar. *Science of The Total Environment*, 781:146758, 2021.
- [3] NASA Johnson Space Center. Reference guide to the international space station. *National Aeronautics and Space Administration, Houston*, 2015.
- [4] Roy Gibson. The history of international space programmes. *Space Policy*, 23(3):155–158, 2007.
- [5] Steven Metz. *Armed conflict in the 21st century: the information revolution and post-modern warfare*. Strategic Studies Institute, US Army War College, 2000.
- [6] Tanya Notley and Camellia B Webb-Gannon. Visual evidence from above: assessing the value of earth observation satellites for supporting human rights. 2016.
- [7] Jean Raveneau. Verger, fernand, dir.(2002) l'espace, nouveau territoire. atlas des satellites et des politiques spatiales. paris, belin, 384 p.(isbn 9-782701-01). *Cahiers de géographie du Québec*, 47(131):348–350, 2003.
- [8] Jo-Ansie Van Wyk. Space for peace? the use of space technology to monitor conflict trends and human security in africa. *conflict trends*, 2008(4):12–17, 2008.
- [9] Frank Witmer. Remote sensing of violent conflict: eyes from above. *International Journal of Remote Sensing*, 36:2326–2352, 04 2015.
- [10] Qiang Zhao, Le Yu, Zhenrong Du, Dailiang Peng, Pengyu Hao, Yongguang Zhang, and Peng Gong. An overview of the applications of earth observation satellite data: Impacts and future trends. *Remote Sensing*, 14(8), 2022.