

Volume 1, Issue 1, March 2017

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Research Articles

DOI:

10.14658/pupj-phrg-2017- 1-5

How to cite:

Nardone, V., Candelmo, C., (2017), Satellite Evidence in Human Rights Cases: Merits and Shortcomings, *Peace Human Rights Governance*, 1(1), 87-113.

Article first published online

March 2017

Satellite Evidence in Human Rights Cases: Merits and Shortcomings

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Abstract

The present paper examines the use of satellite data as evidence in legal proceedings before international courts, with a particular focus on human rights cases. The first part of the paper analyses applicable law and provides an overview of international case law up to date, taking into consideration the jurisprudence of the International Court of Justice (ICJ), the International Tribunal for the Law of the Sea (ITLOS), and the International Criminal Court (ICC), and highlighting general merits and shortcomings of this issue. The second part shows that even human rights courts are starting to deal with satellite evidence; among them the European Court of Human Rights (ECtHR) plays a prominent role. Some recent decisions rendered by it are analysed, underlying the specific value of satellite evidence in human rights cases, and taking into account some potential conflicts that may arise with human rights. In contributing to the research on the special relation between space law and human rights, the paper shows that the role of human rights courts in this context is twofold. While admitting satellite evidence in proceedings before them, human rights courts contribute to the confirmation of this kind of information as valid means of proof, although its probative value is to be assessed on a case-by-case basis. Additionally, these courts are best placed to rule on the compatibility of these means of proof with some fundamental human rights such as the right to privacy and also the freedom of information.

Key-words: *International Space Law; Human Rights; Digital Evidence; Satellite Evidence; ECtHR; New Technologies*

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1. Introduction

During the last decades, the debate about the implications of the use of Information and Communication Technologies (ICTs), including those space-based, on human rights, has been growing in legal literature. This debate is mirrored by the increasing relevance of this issue in international case law.

At the same time, the use of satellite information as legal evidence in international courts has become common, such as the jurisprudence of the International Court of Justice (ICJ), the International Tribunal for the Law of the Sea (ITLOS) and the International Criminal Court (ICC) show. In the form of images, they have been widely used in international legal proceedings concerning both the protection of the environment and territorial or maritime boundary disputes involving neighbouring States. On the other hand, in the form of geolocation data, they have been mainly, but not only, employed in criminal trials (Ravillon, 2015). Following an evolutionary process, today it is possible to find examples of the use of this data even in legal proceedings concerning the protection of human rights. Although disputed in its initial case law, more recently the European Court of Human Rights (ECtHR) asked and relied on satellite data in some of its latest cases. This pragmatic trend, supported by the practice of other human rights courts such as the Inter-American Court of Human Rights and the African Commission on Human and Peoples' Rights, represents an opportunity to contribute to the enhancement of the protection of human rights. However, although the use of evidence collected through satellites may play a remarkable role in this sense, it also raises a number of questions relating to the potential violation of some fundamental human rights, both in their procedural and substantial meaning. A few examples may be taken especially from the ECtHR case law, where the compatibility between the use of satellite data with right to privacy and the right to a family life have been called into question.

The research here presented intends to enrich existing literature on this issue, which has not adequately taken into consideration international human rights courts jurisprudence and its added value in this context.

The methodology used is based on an analytical approach which encompasses an examination of relevant literature on the topic, international and national case law and applicable international law, including substantial and procedural rules.

In the light of the aforementioned developments, it is evident that a critical analysis of the various impacts that satellite evidence may have during human rights proceedings appears interesting and challenging at the same time. The examination must start by clarifying some general terms and

concepts that are useful to understand the peculiar nature of the object of research carried out.

2. Satellite Data as Evidence

In international adjudication, evidence includes ‘information submitted to an international court or tribunal by parties to a case or from other sources with the view of establishing or disproving alleged facts’ (Wolfrum and Möldner, 2013, 1). Along with oral evidence, such as witness and expert testimony, the category of documentary evidence is broad enough to encompass any relevant paper or document adduced in support of the contentions contained in the pleading.

Undoubtedly, evidence that can be obtained through the use of satellites is part of the category of documentary evidence, and more specifically, it fits in the narrower subcategory of digital or electronic evidence, as opposed to the physical one, to which it is nevertheless generally assimilated (Roscini, 2016, 4). Evidently, if the source of this kind of evidence is always the satellite, the analysis of international case law up to date shows that it can take two different forms: in fact, satellite evidence includes digital images as well as geolocation information.

Satellite images consist of high-resolution photographs, charts or maps of whatever on Earth collected from outer space. They may be acquired through remote sensing technology, mainly installed on satellites operating in the *Earth Observation Satellite System* (EOSS). Remote sensing, more simply referred to as Earth Observation (EO), is the ability to gather information from distant object or area through the analysis of data acquired by sensors that are not in direct contact with that object or area, and to transmit them through electromagnetic radiation (Hofmann, 2011)¹. In order to acquire remote sensing information, a complex infrastructure is needed, composed by a constellation of satellites located generally, but not exclusively, in Low Earth Orbits (LEOs), together with a series of ground stations in which information is processed. The ground segment of this infrastructure is extremely important because imagery collected by satellites is not immediately useful in practice². Information arrives on Earth in the form

¹ ‘The term ‘remote sensing’ means the sensing of the Earth’s surface from space by making use of the properties of electromagnetic waves emitted, reflected or diffracted by the sensed objects, for the purpose of improving natural resources management, land use and the protection of the environment’, Principle 1 (a), *Principles Relating to Remote Sensing of the Earth from Outer Space*.

² It is important to recall that some ground stations are also necessary to operate the satellite technically: it is the case of TT&C ground stations.

of ‘primary data’³, and to be useful in practice it needs firstly to be filtered by computers and other sophisticated techniques that produce exploitable data⁴, and secondly to be interpreted by experts that can obtain ‘analysed information’ from images or maps previously processed⁵.

On the other hand, geolocation information, containing spatial and temporal details, allows the detection of the exact position of people or objects around the world and it is acquired using satellites operating in the *Global Navigation Satellite System* (GNSS). The two major systems currently in operation are the United States’ *Global Positioning System* (GPS), the first GNSS structure to become operational, and the *Global Orbiting Navigation Satellite System* (GLONASS), operated by the Russian Federation (Smith, 2015). Along with them, it is worth mentioning the GALILEO system, which is handled under the supervision of the European Union (EU) and also the European Space Agency (ESA); on 15 December 2016, it has been officially declared on behalf of the European Commission that GALILEO ‘is operational and has started delivering its initial services’. Even if the functioning is differently arranged depending on the GNSS system taken into consideration, it can generally be assumed that the infrastructure encompasses both the satellites sending the Positioning, Navigation and Timing (PNT) signals to the ground, mainly placed into Medium Earth Orbits (MEOs), and the receiving stations, i.e. each user equipped with a GNSS receiver.

3. The Applicable Law

Turning to applicable law, one should distinguish between the law that is applicable at the moment of the production of information that could be used as evidence in international proceedings, and the one applicable at the moment of the admission of the evidence itself during a trial.

The study of the first level of applicable law, i.e. the rules applicable to the production of data likely to be used during legal proceedings, is indispensable

³ “The term “primary data” means those raw data that are acquired by remote sensors borne by a space object and that are transmitted or delivered to the ground from space by telemetry in the form of electromagnetic signals, by photographic film, magnetic tape or any other means’, Principle 1 (b), *Principles Relating to Remote Sensing of the Earth from Outer Space*.

⁴ They are also called ‘processed data’ and defined as ‘the products resulting from the processing of the primary data, needed to make such data usable, Principle 1 (c), *Principles Relating to Remote Sensing of the Earth from Outer Space*.

⁵ “The UN Remote Sensing Principles refers to three types of data: primary data, processed data, and analysed information. However, in practice, remote sensing operators utilize many other terms: for instance, “raw data” or “unenhanced data” for primary data, and “derived products” and “value-added products” for analysed information. The bottom line is that there is no consistency in the way products from different systems are referred to’ (Tronchetti 2015, 504).

in order to ascertain the existence (or not) of special provisions relevant for the matter here examined. Due to the international character of both GNSS and EOSS, international law is to be examined.

International law concerning space activities, generally referred to as *corpus iuris spatialis*, is made of five major treaties, establishing general norms applicable in principle to all space activities with compulsory character for those States bound to abide by them as a consequence of their ratification. General principles relevant in this context are the freedom of exploration and use of outer space and the common benefits, expressly stated in the *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies* hereafter *Outer Space Treaty*) of 1967⁶, and eventually recalled in the following four treaties⁷. Along with the abovementioned mandatory instruments, international space law is composed of a plethora of soft law documents, among which the most important are five resolutions of principles, dedicated to specific matters relevant in the space domain.⁸ One of them is absolutely central for data produced by EO satellites, because it is expressly dedicated to remote sensing, and for this reason it deserves special attention.

The 1986 *Principles Relating to Remote Sensing of the Earth from Outer Space* (hereafter *Remote Sensing Resolution*), adopted by the United Nations General Assembly (UNGA) by consensus, aimed at regulating one out of three classical space applications⁹, at that time perceived as a threat to sovereignty, particularly by States in the soviet bloc. Along with legally examining the data production chain outlined above, it establishes paramount principles concerning the applicability of international law and the UN

⁶ *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies*, 27 January 1967, 610 UNTS 205 (entered into force 10 October 1967).

⁷ The other four treaties are: *Agreement on the rescue of astronauts, the return of astronauts and the return of objects launched into outer space*, 22 April 1968, 672 UNTS 119 (entered into force 3 December 1968); *Convention on International Liability for Damage Caused by Space Objects*, 29 March 1972, 961 UNTS 187 (entered into force 1 September 1972); *Convention on the Registration of Space Objects Launched into Outer Space*, 14 January 1975, 1023 UNTS 15 (entered into force 15 September 1976); *Agreement Governing the Activities of States on the Moon and Other Celestial Bodies*, 18 December 1979, 1363 UNTS 3 (11 July 1984).

⁸ These resolutions of principles are: *Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space*, adopted in 1963; *Principles Governing the Use by States of Artificial Earth Satellites for International Direct Broadcasting*, adopted in 1982; *Principles Relating to Remote Sensing of the Earth from Outer Space*, adopted in 1986; *Principles Relevant to the Use of Nuclear Power Sources in Outer Space*, adopted in 1992; *Declaration on International Cooperation in the Exploration and Use of Outer Space for the Benefits and in the Interests of all States, Taking into Particular Accounts the Needs of Developing Countries*, adopted in 1996.

⁹ The other two sensible sectors were satellite communications and navigation.

Charter, the international cooperation, the international responsibility and the consideration of special needs for developing States; in addition it refers to the accessibility of data by the sensed State as well as the freedom of using and disseminate data gathered by the sensing State, that ultimately depends on data policies adopted by the State concerned (Jakhu, 2003). Moreover, it highlights the role of remote sensing in promoting the protection of Earth's natural environment on the one hand and of humankind from natural disasters on the other. Otherwise, it does not consider the possibility to use satellite imagery during trials and do not provide any specific rule on it.

Conversely, neither space law treaties nor resolutions of principles provide any specific rule concerning the GNSS (Larsen 2015). More recently, a series of soft law instruments have been adopted, but the absence of specific reference to the use of these data in legal proceedings is to be underlined.

The lack of precise international space law provisions aiming at regulating possible applications of satellite imagery and geolocation information as evidence during legal proceedings is absolutely not surprising. In fact, international space law treaties, as well as the UNGA resolutions of principles, have been adopted at the beginning of the space era, when it was impossible to foresee either the following development of space technology or its numerous downstream applications. For this reason, those instruments are frequently considered inadequate to deal with current challenges and their revision is often presented as the only answer to their upgrade, especially on the occasion of the 50th anniversary of the *Outer Space Treaty* celebrated this year, although a Pandora's Box effect may be feared. The eventual revision of space law instruments would include also the already mentioned *Remote Sensing Resolution*, in order to update and elucidate its narrowly defined purpose. But, differently from those scholars who only suggested a clarification of what 'environmental protection' or 'natural resources' mean (Gabrynowicz et al. 2015), the paper advocates that the scope of remote sensing application has no frontier at the moment and the protection of human rights could be also another important objective that can be mentioned next to the protection of the Earth's natural environment as well as protection of mankind from natural disasters. Additionally, it has been observed that satellite data were used to assess treaty implementation and also arm control (Latin et al. 1976; Courteix 1995; Markowitz 2002; Hettling 2003; Peter 2004; Purdy 2009; Golda and Lupo, 2012; Moens 2012).

To conclude, the absence of a provision concerning the possibility to use satellite data, both images and geolocation information, during proceedings before courts do not necessarily mean that this practice is prohibited¹⁰.

¹⁰ 'Igualmente, se ha puesto de manifiesto que la ausencia de normas internacionales

On the other hand, as far as the admissibility of satellite evidence during legal proceedings is concerned, the analysis of international practice shows that it is generally treated as other documentary evidence. Consequently, its acceptance during legal proceedings depends only on specific regulations that each court or tribunal has developed on who can present evidence, on which evidence can be admitted or not, that can be found in their statutes, rules of procedures and also inferred from the established practice. Furthermore, one should consider that the probative value of evidence presented is assessed on a case-by-case basis, according to the principle of free assessment of evidence, clearly defined in the *Nicaragua v. United States of America* case¹¹ by the ICJ¹².

It is necessary to say that the rules concerning the admissibility of evidence of the courts here taken into consideration are very different: this is especially true when the ICJ, ITLOS and human rights courts on the one hand, and ICC on the other, are compared. While the latter has precise and detailed rules on the admissibility of evidence, the former do not deal in depth with questions of evidence and a broad margin of decision is largely in the hands of judges.

Certainly, the foundation of this antithesis has to be attributed to the disparity of the parties involved in the trials: while the ICJ and ITLOS are concerned only with interstate litigation, where the leading principle is the equality of the parties, ICC judges on crimes committed by individuals, and considerations based on the necessity to protect the right of the accused should not be neglected, even in evaluating the admissibility of evidence, according to the principle of fair trial (Wolfrum and Möldner, 2013). As for human rights courts, even if they can be interested by interstate litigations, the majority of cases before them concerns individuals or groups of individuals on the one side, and States on the other. In any case, States are always the defendants, and this circumstance justifies the permissive rules on the admissibility of evidence before human rights courts. However, the

generales y específica aplicables a la información obtenida por la teledetección de la Tierra y su presentación ante los tribunales [...] no constituye un obstáculo insalvable para la utilización de la información satelital; pero es indudable que una mayor precisión jurídica y una norma más clara en materia de procedimiento, ayudarían a crear un clima de confianza que permitiría a las partes y a los jueces o árbitros beneficiarse de este avance tecnológico en el campo' (Muñoz Rodríguez, 2013, 45).

¹¹ *Military and paramilitary activities in and against Nicaragua (Nicaragua v. United States of America)*, Merits, Judgment, I.C.J. Reports 1986, p. 14.

¹² '[...] within the limits of its Statute and Rules, it has freedom in estimating the value of the various elements of evidence, though it is clear that general principles of judicial procedure necessarily govern the determination of what can be regarded as proved', *Military and paramilitary activities*, para 60.

principle of fair trial, along with the principle of the equality of the parties, plays a decisive role here as well.

Given that human rights courts' practice is examined later in the present paper, before the ICJ¹³ and ITLOS¹⁴ evidence can be presented by the parties generally during the written proceedings, and exceptionally during the oral one. The Court and the Tribunal can also request the production of documentary evidence. Moreover, the two judicial institutions provide for the possibility to nominate experts after the request of a party or *motu proprio* in order to help the definition of the facts of the case. However, no reference is made to the substance of the evidence, and consequently no provision related to satellite data are envisaged¹⁵.

The ICC, like other international criminal courts, has different standards for the admission of evidence, which have 'to pass an "admissibility test", which means that [it has] to meet the standards of relevancy, probative value, and reliability' (Wolfrum and Möldner, 2013, 21). Even in the case of the ICC formal rules for admissibility, request by the Court and admission of expert are considered. No reference to the type of evidence that can be admitted is made¹⁶.

As observed, none of the judicial institutions here considered provide special rules for satellite evidence. The freedom of assessment of evidence, on the understanding that courts must show the reasoning followed to reach their conclusions, let them accepting all documents produced and decide their probative value on a case-by-case basis. Therefore, the case law hereafter presented show that general rules in force are applied every time the courts and tribunals considered are dealing with satellite evidence.

4. An Overview of International Case Law

As previously underlined, the admission of satellite evidence during legal proceedings is becoming more and more widespread. The court that examined the first case in which they have ever been dealt with is the ICJ, and its reasoning has had a great influence thereafter. An overview of selected cases rendered by it will be offered, along with relevant cases from

¹³ The rules concerning both the production and admissibility of evidence before the ICJ are contained in arts 48-52 of its Statute. These are further specified in the ICJ Rules of Procedure.

¹⁴ General rules governing the production of evidence before the ITLOS are contained in arts 77-82 of its Rules of Procedure.

¹⁵ The ICJ regulates the admissibility of documentary evidence in arts 43 and 48-52 of its Statute. These rules are further specified in the Court's Rules of Procedure.

¹⁶ The ICC regulates the admissibility of evidence in arts 64 (9) (a), 69 (4) ICC Statute and in the ICC Rules of Procedure and Evidence.

the jurisprudence of the other two international courts taken into account here, respectively the ITLOS and the ICC.¹⁷

4.1. ICJ

The first case in which satellite images have ever been employed is the *Burkina Faso/Republic of Mali*¹⁸, decided by the ICJ in 1986 in which the use of maps and data from the sky was crucial in order to recognise the gradual shifting of the riverbed from where the border between these two African countries was arranged during the colonial period. In this occasion the ICJ stated that maps, even if more accurate and consequently more reliable than in the past because acquired through high resolution technology such as remote sensing by satellites, do not constitute a territorial title by themselves, unless the parties so decided. Moreover, the ICJ said that in order to decide on the weight to be attributed to maps, many considerations such as the technical reliability and also the interpretation of the information gathered have to be considered, raising some doubts still valid today. Actually, it cannot be denied that ‘an important consequence of this judgment was the awareness it created in legal circles regarding a means of evidence infinitely more precise than those available so far, such as aerial photography for map evidence’ (Williams 2013, 196-197).

The use of satellite data as evidence continued in the 1990s and after, preponderantly when boundary disputes were at stake. In *Cameroon v. Nigeria* (Preliminary Objections)¹⁹, decided in 1998, satellite images have been important not only during the proceedings but also after the award delivery to monitor its implementation (Froehlich 2012, 480-481). In *Botswana/Namibia of 1999*²⁰, the Court was called upon to decide the status of the Kasikili/Sedudu Island, and satellite imagery as well as aerial photographs were presented²¹. To solve geographical questions still related

¹⁷ The use of satellite evidence can be found in international arbitration, too. The use of the report *Ethiopia's Violations of International Law Arising From Its Attacks on and Occupation of the Central Zone of Eritrea*, provided by the AAAS, in the case *Eritrea v. Ethiopia* (brought before the Permanent Court of Arbitration), is an example.

¹⁸ *Frontier Dispute*, Judgment, I.C.J. Reports 1986, p. 554.

¹⁹ *Land and Maritime Boundary between Cameroon and Nigeria*, Preliminary Objections, Judgment, I.C.J. Reports 1998, p. 275.

²⁰ *Kasikili/Sedudu Island (Botswana/Namibia)*, Judgment, I.C.J. Reports 1999, p. 1045.

²¹ In its dissenting opinion, judge Parra Aranguren was doubtful about the use of data submitted to the Court. He clearly affirmed that ‘[t]he aerial photographs and satellite images submitted to the Court do not contain any indication which would enable it to determine the boundary between the Parties at Kasikili Island, even though they may have relevance in relation to the question whether Kasikili Island was occupied or cultivated. However, they are irrelevant because they were taken after 1914, the critical date as regards

to the legal regime of islands, satellite images were presented in *Qatar v. Bahrain* (Merits)²², in *Indonesia/Malaysia*²³, in *Nicaragua v. Honduras*²⁴, as well as in *Malaysia/Singapore*²⁵ and *Romania v. Ukraine*²⁶.

Other cases have been decided using satellite data produced by the parties concerning environmental issues. An example is represented by the *Islamic Republic of Iran v. United States of America* case²⁷, in which satellite images were presented to prove the existence and the use of weapons and also the adequacy of the environment to host them (Froehlich 2012). In *Argentina v. Uruguay*²⁸, Argentina used some satellite images showing the huge concentration of chlorophyll into the water of River Uruguay. In *Ecuador v. Colombia* also, satellite imagery and GPS data were largely used²⁹. Very recently, in *Costa Rica v. Nicaragua*³⁰ parties presented and discussed about the practical value of the satellite evidence presented by the other party to explain and defend about the environmental consequences of some activities.

Other two important ICJ judgments are worth mentioning in this analysis: the first one is the *Bosnia and Herzegovina v. Serbia and Montenegro* case³¹, where the Court took into consideration a UN Report based on satellites images; the second one is the *Georgia/Russian Federation* case (Preliminary Objections)³², in which Georgia presented satellite images to give evidence of

the subsequent practice of the Parties for purposes of interpreting the 1890 Anglo-German Agreement. Moreover, aerial photographs or satellite images cannot determine whether any occupation of Kasikili Island was carried out by Masubia people of the Eastern Caprivi or by natives or authorities of the Bechuanaland Protectorate', Parra Aranguren, dissenting opinion, ICJ Reports 1999, Judgment, 1208 et seq., at 1229, para 78.

²² *Maritime Delimitation and Territorial Questions between Qatar and Bahrain*, Merits Judgment, I.C.J. Reports 2011, p. 40.

²³ *Sovereignty over Pulau Ligitan and Pulau Sipadan (Indonesia/Malaysia)*, Judgment, I.C.J. Reports 2002, p. 625.

²⁴ *Territorial and Maritime Dispute between Nicaragua and Honduras in the Caribbean Sea (Nicaragua v. Honduras)*, Judgment, I.C.J. Reports 2007, p. 659.

²⁵ *Sovereignty over Pedra Branca/Pulau Batu Puteh, Middle Rocks and South Ledge (Malaysia/Singapore)*, Judgment, I.C.J. Reports 2008, p. 12.

²⁶ *Maritime Delimitation in the Black Sea (Romania v. Ukraine)*, Judgment, I.C.J. Reports 2009, p. 61.

²⁷ *Oil Platforms (Islamic Republic of Iran v. United States of America)*, Judgment, I.C.J. Reports 2003, p. 161.

²⁸ *Case Concerning Pulp Mills on the River Uruguay (Argentina v. Uruguay)*, Judgment, I.C.J. Reports 2010, p. 14.

²⁹ The case is also referred to as *Aerial Herbicide Spraying*, now removed from the Court's List at the request of Ecuador.

³⁰ *Certain Activities Carried out by Nicaragua in the Border Area (Costa Rica v. Nicaragua)*, Judgment, 16 December 2015, available on the Court's website, www.icj-cij.org.

³¹ *Application of the Convention on the Prevention and Punishment of the Crime of Genocide (Bosnia and Herzegovina v. Serbia and Montenegro)*, Judgment, I.C.J. Reports 2007, p. 43.

³² *Application of the International Convention on the Elimination of All Forms of Racial Discrimination (Georgia v. Russian Federation)*, Preliminary Objections, Judgment, I.C.J.

the presence of Russian militaries in the area interested by massive violations of international law (Roscini 2016).

4.2. ITLOS

Even the tribunal established by the *United Nations Convention on the Law of the Sea* of 1982 to adjudicate disputes concerning its interpretation and application and based in Hamburg, had the occasion to deal with satellite evidence in the Bangladesh/Myanmar case on which it delivered its judgment in 2012³³. The dispute pertained to the clarification of the maritime boundary, aiming at defining the territorial sea, the exclusive economic zone, and the continental shelves of the parties involved in the Bay of Bengal. The bone of contention was the St. Martin's island, and Bangladesh adduced satellite evidence to assess the dimension of the disputed territory, claiming its decisive impact on the delimitation concerned (Froehlich 2012).

4.3. ICC

Even the ICC has dealt with cases using satellite information. Among the most famous, *The Prosecutor v. Thomas Lubanga Dyilo*, *The Prosecutor v. Germain Katanga and Mathieu Ngudjolo Chui*, *The Prosecutor v. Bahar Idriss Abu Garda* and *The Prosecutor v. Abdallah Banda Abakaer Nourain and Saleh Mohammed Jerbo Jamus* cases can be recalled (Macauley, 2013). In all these cases, the Prosecutor used satellite data during the proceedings in order to argue against the accused and to support their alleged violations (Sandalinas 2015).

Along with the importance of its jurisprudence, the study of the ICC's praxis is particularly important because in 2013 the Office of the Prosecutor of the ICC hired an expert in digital forensics for its Scientific Response Unit to improve its ability to collect and analyse digital evidence³⁴.

This circumstance is of utmost importance for several reasons. First, the analysis and interpretation of data acquired through satellites are carried out in-house and not by external technicians, promoting in this way the judicial institution's independence as well as its credibility (Macauley 2013).

Reports 2011, p. 70.

³³ *Delimitation of the maritime boundary in the Bay of Bengal (Bangladesh/Myanmar), Judgment, ITLOS Reports 2012*, p. 4.

³⁴ The expert is Mr. Lars Bromley from USA, who, in the List of expert before the ICC, is indicated as expert in 'remote sensing and satellite imagery'.

Additionally, it could be inspiring for other international courts such as the ICJ, contributing to the creation of an international standards in this regard.

5. Positive and Negative Aspects: Preliminary Considerations

In the light of the aforementioned analysis, a few general observations may be drawn. First of all, the use of this kind of evidence has some positive aspects, such as the immediate and uninterrupted availability, the extreme accuracy due to use of high resolution technology and highly technical receivers. These positive features are more remarkable if compared to the land surveys done in the past with aircrafts, and considering the impossibility to continuously track the position of a suspected before the advent of space technology.

However, some negative features should be underlined. Even if they are more accurate than aerial photographs, raw satellite images need to be processed. Consequently, they can be manipulated without little if not any possibility to detect the manipulation *ex post facto*; in addition, for their interpretation, judges need to be helped by experts: this means that judges would depend on experts who enjoy wide discretion and a large margin of error. These findings are not valid for GNSS data because the receiving devices are immediately able to decode geospatial coordination received and there is no need for processing. Nevertheless, doubts about the compatibility of both satellite images and geolocation data with some internationally protected human rights may arise, as will be shown below.

Concerning particularly satellite images, the Space Law Committee of the International Law Association (ILA), currently chaired by professor Maureen Williams, one of the major experts in the field, started to conduct investigations at the inception of the XXI century³⁵. The indications of these studies along with decades of doctrine can be summarised as follows: a strict control of chain of custody, supervising the whole process from the gathering until the final product that can be submitted to courts would be greatly important; the creation of international standards for the production and the presentation of satellite images would be desirable; investment in the capacity building of the legal sector, together with the provision of list of expert in any court capable of help them in interpreting satellite information should be encouraged (Arzt 1999; Williams 2013)³⁶.

³⁵ The ILA Space Law Committee is still working on the topic of the use of satellite data in courts. For recent reflections, see ILA Space Law Committee Reports of the Washington Conference (2014) and the Johannesburg Conference (2016).

³⁶ Especially considering this last point, it is important to mention the foundation in the

6. The Use of Satellite Data before Human Rights Courts: Questions of Procedure

The general disagreement in literature (Nuñez 2012, 2) does not allow inferring a general rule on the admissibility or not of satellite evidence in legal proceedings, especially in human rights cases. However, for this purpose, the rules of procedure of the various bodies that have been confronted with satellite data in their case law, are particularly relevant because they show that there is no rule prohibiting the use of satellite data in legal proceedings. Absent any specific prohibition on this point, it must be presumed, as case law also shows, that, although problematic, satellite evidence can be admitted in human rights proceedings, and that its probative value must be assessed on a case-by-case basis.

Generally speaking, in fact, the rules of procedure of the various courts examined have an element in common: they leave broad liberty on the evidence that can be admitted or requested by the judges. This is true for all the human rights bodies that have been included in the research, that is the European Court of Human Rights, the Inter-American Court of Human Rights and the African Court on Human and Peoples' Rights. For instance, the European Court of Human Rights can admit or request any evidence that it considers useful to ascertain the facts.³⁷

In the same way, the Inter-American Court of Human Rights³⁸ and the African Court on Human and Peoples' Rights equally enjoy much freedom in the admission of evidence considered to be useful to the resolution of the dispute. These include also special evidence or evidence that arises from reports that a Court has asked to a person, an institution, or an association of its choice.³⁹ More specifically, it is interesting to recall that when the European Court of Human Rights requested satellite images, it did so according to rule A1 of the Annex to the Rules of Procedure, which basically leaves the Court free to choose evidence that may be adopted, requested or generally admitted⁴⁰.

United Kingdom in 2014 of the *Air and Space Evidence*, a highly-expert consultancy also known as the World's first 'Space Detective Agency'. The main purpose of its founders is to bridge the gap between law and technology, combining legal knowledge and technical expertise on earth observation. For more information, visit www.space-evidence.net.

³⁷ See rule A1-1 of the Annex to the Rules of Procedure of the European Court of Human Rights.

³⁸ This emerged evidently in recent judgments. See, for example, *Caso Granier y otros (Radio Caracas Televisión) vs. Venezuela*, Judgment, 22 June 2015, preliminary objections, merits, reparations and costs.

³⁹ See arts 57-58 of the Rules of Procedure of the Inter-American Court of Human Rights.

⁴⁰ See, again, rule A1- 1: "The Chamber may, at the request of a party or of its own motion, adopt any investigative measure which it considers capable of clarifying the facts of the

Accordingly, the African Court can ask or obtain any evidence that it considers useful to clarify an aspect of a case according to article 45(1) of the Rules of Procedure⁴¹ and, in the same way, the Inter-American Court may obtain or request any evidence that it considers helpful and necessary⁴² for the dispute, as per article 58 of the Rules.

It is clear that the Rules of Procedure of the various courts mentioned so far aim at leaving much freedom to the judges in order not to restrain their means and to allow them to collect all the evidence that may help them to ensure the solution of the case and the ascertainment of the truth⁴³. In other words, they intend to make sure that no useful evidence is excluded from the examination of the judges, for procedural reasons.

Therefore, it can be affirmed that, among the evidence considered by the Rules of Procedure of the courts, satellite evidence can be usefully included. Also, the rules on the admissibility of evidence show clear similarities, although in general terms.

7. The Use of Satellite Data before Human Rights Courts: Questions of Admissibility and Merits

Having said that satellite evidence can be generally admitted in human rights proceedings, the evaluation on its admission and probative value must be made on a case-by-case basis, due to the fact that each piece of evidence may raise specific problems. For example, an image can be contested or found to have been manipulated and GPS tracking of the suspected may be considered a disproportionate measure, in consideration of the aim pursued. Of course, this is a problem that arises both in general litigation (Williams 2013, 213) and in proceedings concerning human rights violations.

Moving the analysis on the problems and opportunities that arise from the use of satellite evidence in human rights proceedings, it is possible to find examples of the use of satellite data as evidence in several legal proceedings

case. The Chamber may, *inter alia*, invite the parties to produce documentary evidence and decide to hear as a witness or expert or in any other capacity any person whose evidence or statements seem likely to assist it in carrying out its tasks⁷.

⁴¹ See art 45 (1) of the Rules of the African Court on Human and Peoples' Rights.

⁴² See art 58 of the Rules of Procedure of the Inter-American Court of Human Rights, *Procedure for taking evidence*. In particular, see art 58 (a).

⁴³ More recently, the Court reaffirmed the importance that it confers to its freedom in admitting or refusing elements of proof in the *Nasr et Ghali v. Italy* case (Fourth Section, application No. 44883/09, 23 February 2016), where the judges stated clearly that, although the Italian government requested to admit only selected documents and evidence, the Court enjoys much freedom as far as evidence are concerned and that judges may decide to admit whatever element they believe could be useful in the verification of the facts.

concerning the protection of human rights settled in recent years, although the case law on this matter is still evolving. In fact, the selected case law that will be examined in the following pages shows an evolutionary process, with a growing diffusion of this kind of data as evidence in human rights cases brought before the European Court, the African Court and the Inter-American Court of Human Rights. The use of satellite evidence in human rights proceedings has evident advantages, such as the possibility for human rights courts to rule not only on the *admissibility* and value of GPS tracking and satellite imagery in legal proceedings, but also on their *compatibility* with human rights principles when they are used as evidence in national legal proceedings. In fact, in some cases, national courts have also used GPS tracking to monitor a suspect and to prevent a crime, and this raises also the question of the compatibility of these methods with human rights.⁴⁴ Although there is no case law on this point, the same principle can be potentially extended to interim or provisional measures taken by international courts and tribunals, concerning GPS monitoring and satellite imagery. On this point, in fact, it must be recalled that both international courts⁴⁵ and international human rights bodies⁴⁶ can indicate provisional measures to the parties, when the judges believe it necessary to do so. It is reasonable to believe that interim or provisional measures eventually indicated by human rights courts should respect basic human rights principles, especially considering their inherent competence.

This implies that a court which judges on human rights violations committed by Member States can also verify whether a measure, adopted by a State and involving satellite data, is compatible or not with human rights protected by a specific international convention. It is also clear that the fundamental rights called into question most often in this respect, are the right to privacy and the right to personal freedom but, also, the right to information.

⁴⁴ See for example the case of *Ben Faiza v. France* (still pending, application No. 31446/12) or the case recently decided by the Italian Court of Cassation concerning the value and reliability of evidence acquired through GPS monitoring (Judgment No. 5550, 10 February 2016).

⁴⁵ The International Court of Justice can decide to adopt provisional measures according to arts 73 and following of the Rules of the Court. For a deeper analysis of the issue of provisional measures and the International Court of Justice see Kempen and He, 2009, PP. 919-929.

⁴⁶ For instance, the European Court of Human Rights can adopt interim measures according to art 39 of the Rules of Procedure, which essentially leave the judges free to choose to adopt interim measures when they consider it appropriate to do so (see especially paras 1 and 2 of art 39).

7.1. *The European Court of Human Rights' Case Law*

The European Court of Human Rights is one of the leading bodies on this issue and, unlike other courts which have a more limited case law, it has already rendered a few relevant judgments which show the current importance that data acquired through satellites may have in legal proceedings concerning human rights.

The Court addressed the issue, albeit indirectly, as early as 2011, when the judges at first expressed some doubts on the problem of reliability and margin of error of evidence acquired only through satellite images, as the *Sufi and Elmi v. the United Kingdom* case⁴⁷ clearly shows. In particular, the judges raised the doubt that the estimates of the UN, adduced to support the claims of the applicant, were not entirely reliable, because they were based on satellite images which showed houses thought to have been built on purpose, to mislead aid organisations⁴⁸. This implied the need for further evidence to corroborate the claim of the applicant and that those satellite images were flawed. But, most of all, the case confirmed the need for experts to interpret and verify the reliability of the evidence brought before the judges, in order to avoid errors.

However, in other subsequent cases satellite evidence has been admitted and considered useful. In the *Moghaddas v. Turkey* case⁴⁹, the applicant submitted as evidence a satellite image, in support of his claims of ill treatment, to show the relevant Iraqi border area where he had been rejected⁵⁰. The Court, however, found that the evidence brought by the applicant was not sufficient to prove that he had been deported in a manner contrary to article 3 of the Convention⁵¹. In this case, the nature of the evidence was not contested and it was admitted as relevant, but it was not considered sufficient to prove the claim of the applicant.

More recently, it was the Court that asked for satellite images to ascertain the facts surrounding the *Sargsyan v. Azerbaijan* case⁵². The Court had to rule on the responsibility of a State within whose jurisdiction fell the violations, but there were difficulties in accessing the territory in order to verify the facts, since the place where the alleged violations took place is

⁴⁷ European Court of Human Rights, Fourth Section, *Case of Sufi and Elmi v. the United Kingdom*, applications nos. 8319/07 and 11449/07, Judgment, 28 June 2011, para 119.

⁴⁸ *Ibid.*

⁴⁹ European Court of Human Rights, Second Section, *Case of Moghaddas v. Turkey*, application No. 46134/08, Judgment, 15 February 2011.

⁵⁰ See paras 29-31 of the Judgment.

⁵¹ See paras 36-37 of the Judgment.

⁵² European Court of Human Rights, Grand Chamber, *Case of Sargsyan v. Azerbaijan*, application No. 40167/06, Judgment, 16 June 2015.

a disputed area (in particular, the village of Gulistan). Therefore, the Court requested high-resolution images to ascertain whether there had been a violation or not and, in particular, whether there had been military activity and an indiscriminate destruction of buildings in the relevant area⁵³, in the period contested. The images were crucial in ascertaining the situation in the area and in verifying which kind of activity the government of Azerbaijan had been carrying out and if there had been a violation or not. The images showed ‘the location of military positions such as trenches and fortifications in and around the village of Gulistan, for the period between the entry into force of the Convention in respect of Azerbaijan to the present [...]’⁵⁴. In this case, the evidence acquired through satellite has been crucial to ascertain the existence of the violation but, nonetheless, they had to be interpreted. In the case examined, the interpretation was carried out by the American Association for the Advancement of Science – AAAS⁵⁵, to whom the Court had also requested the images.

However, as mentioned before, the Court has not used these data exclusively as evidence, but it has also judged on the merits of the use of images and GPS tracking as evidence by Member States in national proceedings and their compatibility with human rights. This shows not only the potential of human rights courts, but also the relevance that satellite images and data may have in protecting human rights and defending individuals from human rights abuses.

The relevance of the issue is even more evident considering the recent case law of the European Court of Human Rights on measures involving GPS tracking or the use of satellite images as restraining measures in national proceedings that have been brought to the attention of the Court. One of the most important cases on this matter is surely *Uzun v. Germany*⁵⁶, where the Court decided on the proportionality of the use of geolocation data and GPS tracking with human rights, and specifically with article 8 of the Convention, which protects the right to privacy⁵⁷. The Court ruled that the surveillance of a suspected terrorist served the interests of protection of security (Tronchetti 2014, 649-663), public safety, and the right of the victims to be protected from crime.⁵⁸ The legitimate aim was therefore proportionate to article 8 of the Convention. The judgment is particularly interesting because, as for

⁵³ See especially para 233.

⁵⁴ See, *ivi*, para 72.

⁵⁵ See, *ivi*, para 73.

⁵⁶ European Court of Human Rights, Fifth Section, *Case of Uzun v. Germany*, application No. 35623/05, Judgment, 2 September 2010.

⁵⁷ See European Convention on Human Rights, art 8, paras (1) and (2).

⁵⁸ Cf. paras 20-21, 26, 59, 76, 78 and 80 of the Judgment.

other restraining measures that have an impact on a right protected by the Convention, the Court affirmed the need for a balancing between measures that serve specific goals, such as national security, and fundamental rights (Doldrina 2014). In other words, a restriction on a certain right is admissible, but it has to be proportionate and the country that imposes a certain measure must do so balancing properly the various elements that are involved.⁵⁹ The relevance of this problem is demonstrated by the fact that, more recently, another issue of compatibility between measures which involve satellite data and human rights was at stake before the Court. The appellants in the *Ben Faiza v. France* case claimed that the use of GPS without the supervised person knowing is contrary to article 8 of the ECHR. The application is still pending before the Court; however, it shows the growing importance of the issue: Strasbourg's case law is, in fact, becoming richer and richer, and it contributes to the regulation of the use of satellite data in legal proceedings, both at the national and at the international level.

The case of *Lagutin and others v. Russia*⁶⁰ is particularly interesting because, in his concurring opinion, judge Pinto de Albuquerque highlighted a few principles that should be followed in order not to infringe human rights when special techniques of investigations are being used to monitor and investigate a suspect. He included the monitoring of a suspect through the GPS system⁶¹ among those measures that need a judicial authorisation and regular reviews in the light of their impact on some fundamental rights, such as the right to privacy and to respect of private life⁶². Although not referring specifically to video and photographs acquired through satellites, judge Pinto de Albuquerque also included 'acoustic and optical surveillance, by means of covert photography, and covert audio – or video – recording'⁶³

⁵⁹ This is no news in Strasbourg's jurisprudence, which has been always very clear on the need to balance the restriction of the right to privacy with other needs that the State must protect. See, for instance, the *Case of Malone v. United Kingdom*, Court (Chamber), application No. 8691/79, Judgment, 2 August 1984; *Case of Kruslin v. France*, Court (Chamber), application No. 11801/85, Judgment, 24 April 1990; *Case of Amann v. Switzerland*, Grand Chamber, application No. 27789/95, Judgment, 16 February 2000.

⁶⁰ See *Lagutin and others v. Russia*. The case concerned the applications of four individuals which claimed that the Russian courts had not properly reviewed the measures that had been imposed on them. More specifically, the four applicants had been subject to special investigation measures. In particular, police officers had been carrying out secret operations in the form of a test purchase of drugs (see para 5 of the Judgment), but the applicants claimed that the operation was actually a form of entrapment, carried out by the officers to make the applicants commit the crimes of which they have been later accused. The applicants claimed the violation of art 6 of the Convention, which protects the right to a fair trial.

⁶¹ Cf. *Lagutin and others v. Russia*, Separate opinion of judge Pinto de Albuquerque joined by judge Dedov, p. 37.

⁶² *Ibid.*

⁶³ *Ibid.*

in the measures considered. In this case, the Court was not confronted with an application concerning the merits of the use of such evidence nor did request evidence acquired through satellites. Nevertheless, it is relevant to note that, in the light of its impact on some specific rights, GPS monitoring has been included among those ‘special investigation techniques’⁶⁴ that need a special authorisation and must be constantly reviewed, so as not to impact negatively on the right to private life of the individual affected by the measure.

Although the European Court of Human Rights has proven to be a leading court on the issue, some remarks concerning other human rights courts are necessary. These remarks have a twofold impact: on the one hand, they help showing that the use of satellite evidence is spreading steadily and that new technologies are having a clear impact on human rights, not only in selected geographical areas. On the other hand, being their nature transnational and their boundaries often very fleeting, they show that a global regulation of the use of evidence could be very helpful, although not easy to establish.

7.2. *The African Commission on Human and Peoples’ Rights*

In the *Mohammed Abdullah Saleh Al-Asad v. the Republic of Djibouti* case⁶⁵ (which was however declared inadmissible before reaching the merits stage)⁶⁶, the applicant complained that he had been subject to an extraordinary rendition under the U.S. rendition programme, and that he had been detained in Djibouti, before being brought to the United States. Although the case examined is only a decision on admissibility, it contains some interesting elements. The Commission, in fact, had to conclude that the case was inadmissible because the evidence brought before the judges (among which a satellite image of the prison) was circumstantial and could not prove definitely that the applicant had been detained in Djibouti. However, the Commission did not exclude the photograph presented or contested it: it simply did not consider it sufficient to justify the prosecution of the case to the merits stage. In other words, the nature of the evidence

⁶⁴ See *Lagutin and others v. Russia*, Separate opinion of judge Pinto de Albuquerque joined by judge Dedov, p. 33, para 1.

⁶⁵ See Communication 383/10 – *Mohammed Abdullah Saleh Al-Asad v. The Republic of Djibouti*, decision taken during the 55th Ordinary Session of the African Commission on Human and Peoples’ Rights, 28 April to 12 May 2014.

⁶⁶ Cf. para 183. The Court affirmed that the circumstantial evidence, among which a satellite image of the Ambouli International Airport was included, was not sufficient to confirm that the applicant had been detained on the territory of Djibouti. Without any confirmation that Djibouti was directly involved, the application was considered inadmissible for incompatibility with art 56 of the African Charter on Human and Peoples’ Rights.

was not questioned: the image was admitted but its probative value was considered to be very low and, more specifically only ‘circumstantial’⁶⁷.

7.3. *The Inter-American Court of Human Rights*

The Inter-American Court of Human Rights was confronted with satellite evidence in proceedings concerning alleged violations of the American Convention on Human Rights. The relevant case law is fairly recent and mostly focuses on cases of expropriation or contended land⁶⁸ or on cases which involve a presumed violation of the right to life⁶⁹. The *Salvador Chiriboga v. Ecuador*⁷⁰ and *Xákmok Kásek Indigenous Community v. Paraguay*⁷¹ cases are particularly interesting because the applicants submitted, among other documents, images obtained through Google Earth or Google Maps. Both judgments concluded that the defendant States were responsible for violations of the American Convention on Human Rights. The use of satellite images as evidence in these proceedings is certainly important because they help showing and identifying the portions of land that a particular community is claiming or the private property that has been expropriated to an individual for reasons of general interest.

8. Merits and Shortcomings for Human Rights

In the light of the above, the use of satellite evidence with specific reference to human rights cases does have important consequences and, in particular, shows both advantages and shortcomings. First of all, as the *Sargsyan v. Azerbaijan* case has shown, evidence acquired through satellites can be fundamental in helping the judges verifying whether a certain right has been violated or not (Núñez 2012). When there are no other means to ascertain the existence of a specific violation, images acquired through satellites play a crucial role: they show digitally what could not be acquired manually. Naturally, this can be of huge help to the judges to ascertain the truth. However, as mentioned for legal litigation in general, a problem of

⁶⁷ See para 168.

⁶⁸ See *Salvador Chiriboga v. Ecuador* and *Xákmok Kásek Indigenous Community v. Paraguay*, where the applicants showed images obtained through Google Earth or Google Maps to support their claims.

⁶⁹ Inter-American Court of Human Rights, *Case of the Santo Domingo Massacre v. Colombia*, 30 November 2012, Preliminary objections, merits, and reparations.

⁷⁰ Inter-American Court of Human Rights, *Salvador Chiriboga v. Ecuador*, 6 May 2008, Preliminary objections and merits.

⁷¹ Inter-American Court of Human Rights, *Xákmok Kásek Indigenous Community v. Paraguay*, 24 August 2010, Merits, reparations, and costs.

manipulability arises in human rights cases as well, given the persistent need to rely on evidence that often requires the help of experts to be interpreted.

Moreover, evidence such as GPS monitoring and satellite images, although very accurate, has proved to be less invasive when compared to other means of proof, such as telephone interceptions, which concern the secret recording of private calls of the suspect (Galetta and De Hert 2014, 60). In fact, in the *Uzun v. Germany* case, the European Court of Human Rights found that the interception of private communications shows a deeper impact on the right to privacy compared to GPS surveillance of movements (De Hert and Boehm 2012, 19)⁷². Indeed, while images show what a person is doing with a reasonable margin of error and GPS tracking monitors the location of a person, interceptions record private or even intimate conversations, which the individual might not want other people to hear. Therefore, they clearly have a more direct impact on the right to privacy and on the more general right to private life. Although indirectly, this has also been found by the Italian Court of Cassation, which, in a very recent judgment, admitted that GPS tracking is not regulated by the same regime as interceptions, but by separate rules⁷³, in consideration of the different nature of the measure considered, but also due to the different impact that they have on private life and its protection⁷⁴.

Finally, it must be highlighted that a specific positive aspect of the use of satellite evidence in human rights cases concerns the competence that judges have not only regarding the admissibility of this evidence, but also to rule on the merits of using specific data as evidence (or as restrictive measures) in national proceedings, and on their compatibility with human rights rules. This could not have happened in cases brought before bodies such as the International Court of Justice, which do not have the authority to hear private applications and cannot rule on violations of human rights, nor before special bodies such as the International Criminal Tribunal for Former

⁷² See para. 52 of the Judgment *Uzun v. Germany*. The Court had also made a further difference between strategic monitoring (that is screening conversations for key words which are considered particularly dangerous and give hints on the possible commission of a crime) and the individual monitoring (which, on the other hand, is based on the interception of telecommunications of specific persons). On this point see the decision of the European Court of Human Rights, Third Section, *Case of Weber and Saravia v. Germany*, application No. 54934/00, decision on admissibility, 26 June 2006, esp. para 4.

⁷³ See Italian Court of Cassation, Judgment No. 5550, 10 February 2016. Aspects of possible conflict between the right to privacy and the use of satellite data has arisen also in other national cases, such as the *United States v. Jones* case (case No. 10-1259, January 23, 2012), rendered by the Supreme Court of the United States, which found a violation of the fourth Amendment and of the right to privacy.

⁷⁴ See, in particular, para 4.2 (i).

Yugoslavia or the Special Tribunal for Lebanon, which only have a clearly defined mandate and specific competences.

However, a possible contradiction with some specific rights must be highlighted, and this is the first and most important shortcoming of satellite data evidence. For example, the right to privacy, under article 8 of the ECHR, can be affected by the use of a certain measure that has been acquired violating or in any other way impacting on the right to private life of the individual. Also, article 10 of the ECHR may be called into question because the use of satellite images and the increasing acquisition of these kind of data may require an accurate balance between the right to information and the right to privacy, especially where these data are used as evidence. In fact, a problem of search for truth and freedom of information may come up when this type of evidence is eventually precluded in legal disputes. Therefore, a balancing between rights, but also between human rights and other necessities such as national security is required. In this respect, precisely the case law of human rights bodies such as the European Court of Human Rights can guide States in the adoption of certain measures that would prevent infringing those rights. Consequently, the more international human rights courts give their interpretation in human rights cases, the more the use of satellite evidence will be indirectly shaped, in full respect of human rights.

9. Concluding Remarks

In addition to the general considerations outlined above, it must be noted that the applications brought before human rights courts and involving satellite evidence are not many but are constantly growing, especially in recent years. The comparison between the rules of procedure of the various courts examined shows that satellite evidence is not explicitly excluded from human rights proceedings. This is mirrored by the absence of a provision of similar nature in international space law relating to the production of data likely to be used in international legal proceedings.

Therefore, the case law examined allows to draw a few conclusions. On the one hand, the use of satellite evidence in human rights cases, particularly in the European Court of Human Rights' case law, is indicative because it can be a crucial resource in legal proceedings concerning human rights. At the same time, human rights courts have a special role in this connection, because they can decide on the merits and, particularly, on the compatibility of the use of satellite evidence with human rights. In fact, individuals can bring the case before these courts when issues concerning the compatibility between these devices and human rights arise, and judges can rule on the merits of their use by Member States.

On the other hand, in the future, it can be envisaged that these data will be more and more widespread, as the cases brought before the African Commission on Human and Peoples' Rights and the Inter-American Court of Human Rights show. Satellite data will be important not only for the classic issues they were thought to be used for, such as environmental protection or borders delimitation, but also in other domains, like human rights protection. This is why, with a special attention to satellite imagery, the paper concurs with those authors (Gabrynowicz et al. 2015, 187) who had imagined the necessity to revise the *Remote Sensing Resolution*, and suggests, furthermore, to pay special attention to the various and heterogeneous interactions that satellite evidence can have with human rights.

These findings should be taken into account by the literature and other relevant actors with the aim of creating common standards for the use of evidence before international courts, including human rights courts. In fact, even though the admissibility of satellite data will be of course on a case-by-case basis, exactly like the decision on their probative value, it is not possible to deny that a harmonisation of the legal framework would be highly useful, both in order to regulate the treatment of this kind of data after their gathering, and to have a general procedural framework applicable to different international legal proceedings. In this sense, the role played by human rights cases can be very important, because it shows that similar standards and similar evidence have been admitted by human rights bodies that are very different in nature and in membership. Moreover, although different, there is one thing that the different rules of procedure of the various bodies considered have in common: evidence plays a crucial role in the outcome of the judgment and each piece of evidence that can be useful to the solution of the dispute deserves the highest consideration.

To conclude, it is believed that this field of study can be fruitful and fertile, and deserves special consideration now and in the future perspective, especially in the light of the recent development of remote sensing devices, operated not only by States, but by private actors, too, totally in line with the effects of commercialisation and privatisation. This is confirmed by the ever-growing chances to acquire this data, and consequently use it, allowed by technological developments and demonstrated, among others, by the spread of mega constellations and small satellites.

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