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# THE OVER-EXPOSURE OF GEOGRAPHIC INFORMATION ABOUT INSTALLATIONS OF INTEREST FOR DEFENCE IN THE NETWORK

*Geographic information could be a problem when it displays infrastructures of interest to defence and governments do not have tools to control their diffusion. In order to face this difficulty, we have collected information about more than forty military bases in different countries and we have developed a methodology for the evaluation of such information. In addition, the authors propose the creation of an indicator measuring the exposure level of the observed infrastructures to determine the extent to which this compromises their safety. Therefore, we find appropriate to include the monitoring of images provided by mapping services in counterintelligence plans and the establishment of an international framework that could manage neutrally the geographic information available on the Internet.nd the ability of actors who use it*

*Asymmetric threats, defence, counterintelligence, geographic systems, monitoring, OSINT (Open Source Intelligence).*

# THE OVER-EXPOSURE OF GEOGRAPHIC INFORMATION ABOUT INSTALLATIONS OF INTEREST FOR DEFENCE IN THE NETWORK

## 1. Introduction

The use of open sources as the basis for the creation of intelligence is an established fact. Nowadays, a large number of existing OSINT tools, also known as open sources[1], have become a fundamental pillar for undertaking new analyses.

The process for obtaining satellite images using traditional geographical information systems is complicated, because of technological, meteorological and market factors. High-resolution satellites, the subject of study of this paper, are located a few kilometres above the Earth, so they have a limited angle of vision and they cover a minimum portion of the planet's surface area. In addition, the weather conditions have to be sufficiently optimum to guarantee a certain level of quality in the images. On the other hand, with the aim of making their investments profitable, the companies that own these satellites make use of the most modern images, and only those that are most out of date are placed at the disposal of other providers such as Google, Yahoo or Bing.

In this context, the availability of a large quantity of geographical information is an important support tool for analysts. However, such easy access has become an obstacle, by displaying information about the infrastructures of zones with a high strategic or military value, which means that this could be used with the aim of planning new attacks[2].

Thus, the Popular Party Parliamentary Group made a proposal in the Congress to the government for a study to be prepared so as to evaluate the potential security problems deriving from information available on these platforms[3]. Spain is not an exceptional case, countries such as India had already proposed the

1 ESTEBAN NAVARRO, Miguel Ángel. Glosario de Inteligencia [Intelligence Glossary], page 86 and 87., Ed. Ministry of Defence, 2007.

2 HARDING, Thomas. Terrorists "use Google maps to hit UK troops'", The Telegraph, January 13, 2007.

3 SPANISH CONGRESS (2013). Draft Bill submitted by the Popular Party Parliamentary Group in Congress, concerning the information about installations that are sensitive for National Security obtained from cartographic satellites and that can be accessed through open sources or those with limited access. [Internet] Official Parliament Bulletin, Monday March 11, 2013, series D, no. 236, pp.

closing down of Google Earth in 2009, in order to prevent attacks such as that in Bombay[4] Changes have been taking place in the classification of the threats that have been developing from 2001 until today, moving towards a more asymmetric focus, and some authors have called these fourth generation wars[5]. Governments must now not only concern themselves with protecting their borders against attacks from abroad, but they also have to protect their populations from the attacks against civilian targets, which are part of the terrorist strategy.

We have moved on from the technological superiority that some powers enjoyed to a scenario in which the acceleration of technological development, and above all the democratisation of access to technology, with the rise of the Internet, have made asymmetric confrontation possible. Nowadays, the capacity to obtain, distribute and act on reliable information is more critical than the capacity for destruction of weapon systems[6] . This context is where online cartographic systems could represent an even greater threat in the future.

The rest of the paper is structured as follows. The next point proposes the fundamental hypothesis and the objectives of the paper. Then, we study the capacity of the countries to modify the geographical information that is shown in online cartographic systems. Afterwards, we propose a methodology for the evaluation of the images and thus create an indicator that reflects the over-exposure of current information that the countries could be subject to. Finally, the main conclusions arising from the analysis set out are set forth.

## 2. Methodology and objectives

The **fundamental hypothesis** that this paper is based on is the following: "it is possible a situation of over-exposure of cartographic information about installations of a military nature is occurring, which is compromising their security and that may become a greater threat in the future".

In order to be able to corroborate this hypothesis, we have defined the following general objective: to identify the need for special vigilance over the information provided by online cartographic systems and the inclusion of this in counterintelligence plans, as well as ascertaining the impact of this for Defence.

4 PÚBLICO. Censoring Google Earth so as to put an end to terrorism, in publico.es, Madrid (Spain), March 11, 2009.

5 LIND, William S. (2004). Internet World Stats: Usage and Population Statistics. [Internet] Antiwar.com [consultation date: April 2, 2013]. Available at: http://goo.gl/2e3sc

6 LIND, William S., NIGHTENGALE, Keith; SCHMITT, John F.; SUTTON, Joseph W. & WILSON, Gary I. (1989). The Changing Face of War: Into the Fourth Generation in Marine Corps Gazette, 73, 10; ProQuest Direct Complete, pg. 22.

The following **specific objectives** for this study are itemised from the scope of the general objective:

- Determine whether the countries have the capacity to modify the information shown by the cartographic systems, by means of refusal and deception operations, so as to mitigate the over-exposure that they are subject to.
- Create a methodology capable of evaluating the quality of the images provided by the cartographic systems and, on the basis of this, estimate the quality of the information shown about any country.
- Define an indicator that reflects the level of exposure of military bases offered by the geographic information systems.

Different types of studies will be carried out, in order to develop each one of the different parts into which the problem will be sub-divided, and to confirm or refute the initial hypothesis of the paper from analysing this, with a methodological base that is mostly in document form and comes from open sources, complemented by field research.


Figure 1. Phases of the intelligence cycle according to NATO.

From here onwards, to obtain the proposed objectives, we have followed the methodology based on the four phases that mark the NATO intelligence cycle (see Figure 1).

1. **Direction: T**his the first part of the intelligence cycle, whose objective is to determine the intelligence needs and to plan the actions that have to be carried out to fulfil them.

- *General requirement*: determine whether the over-exposure of cartographic information about installations of a military nature in the network is occurring,

which could constitute a threat.

- *Specific requirement*: determine the variables that determine the current level of exposure of the military installations. The list of military targets selected (see Table I) sets out over 40 bases from 16 countries, which have been grouped together by regions of geographical interest in the following way: Europe (Germany, France, Italy, the United Kingdom), large powers (Russia, USA, China), South America (Brazil, Colombia, Venezuela), The Middle East (Iran, Israel, Syria) and the Asian-Pacific (North Korea, South Korea, Japan).

Table I. List of military bases analysed.

| | |
|---|---|
| **Asian-Pacific** | – North Korea: S.Anch'ang-ni (38° 54′ 28″ N, 125° 14′ 12″ E), N. Pyongyang (39° 13′ 28″ N, 125° 40′ 20″ E), S. Hamgyong (9° 59′ 44″ N, 127° 36′ 51″ E).<br>– South Korea: Osan AB (39° 59′ 44″ N, 127° 36′ 51″ E), Kunsan AB (35° 54′ 13″ N, 126° 36′ 57″ E) and Commander Fleet Activities Chinhae (35° 8′ 53.13″ N, 128° 38′ 1.56″ E).<br>– Japan: Misawa AB (40° 42′ 19″ N, 141° 22′ 19″ E), Yokota AB (35° 44′ 55″ N, 139° 20′ 55″ E) and Kadena AFB (26° 21′ 6″ N, 127° 46′ 10″ E) |
| **Europe** | – Germany: Spangdalehm (49° 58′ 33″ N, 6° 41′ 50″ E) and Ramstein (49° 26′ 38.1″ N, 7° 36′ 8.13″ E).<br>– Spain: Los Llanos (38° 56′ 48″ N, 1° 51′ 48″ W), Morón de la Frontera (37° 10′ 29″ N, 5° 36′ 57″ W), Torrejón de Ardoz (40° 29′ 48″ N, 3° 26′ 45″ W) and Zaragoza (41° 39′ 58″ N, 1° 2′ 30″ W).<br>– France: Avord (47° 3′ 12″ N, 2° 37′ 57″ E) and Nancy (48° 34′ 59.75″ N, 5° 57′ 15.67″ E).<br>– Italy: Aviano (46° 1′ 53″ N, 12° 35′ 49″ E) and Decimomannu (39° 21′ 15″ N, 8° 58′ 20″ E).<br>– United Kingdom: RAF Cottesmore (52°43′46″N 000°39′05″O) and Military Marine LTD (50° 23′ 23″ N, 4° 10′ 49″ W). |
| **Middle East** | – Iran: Omdiyeh Air Base (30° 49′ 51″ N, 49° 32′ 35″ E), Mehrabad International Airport (35° 41' 19″ N, 51° 18' 46″ E) and Shahkrokhi Air Base (35° 12′ 37″ N, 48° 39′ 12″ E).<br>– Israel: Atlit Naval Base (32° 42′ 19″ N, 34° 56′ 2″ E), Ramat David Airbase (32° 40' 0″ N, 35° 11' 0″ E) and Rosh Pina Airport (32° 58′ 51.77″ N, 35° 34′ 18.87″ E).<br>– Syria: As Suwayda (36° 31′ 19″ N, 37° 2′ 12″ E), Jirah (36° 5′ 48″ N, 37° 56′ 11″ E) and Minakh (36° 31' 19″ N, 37° 2' 12″ E). |
| **South America** | – Brazil: Florianópolis Air Force Base (27° 40' 13″ S, 48° 32' 49″ W) and Porto Velho-Nova Esperança (8° 42' 33″ S, 63° 54' 7″ W).<br>– Colombia: Cartagena de Indias (10° 24′ 49″ N, 75° 32′ 58″ W) and Puerto Salgar (5° 29' 1″ N, 74° 39' 26″ W).<br>– Venezuela: Puerto Cabello (10° 11′ 0.15″ N, 67° 33′ 26.35″ W) and Palo Negro (10° 11′ 0.15″ N, 67° 33′ 26.35″ W). |
| **Large Powers** | – China: Huairen Air Base (39° 43' 3″ N, 113″ 8' 34″ E) and Tangshan Air Base (39° 39′ 23″ N, 118° 8′ 11″ E).<br>– USA: Guantanamo (19° 55' 59″ N, 75° 8' 38″ W) and San Diego (32° 40′ 53″ N, 117° 7′ 19″ W).<br>– Russia: Kaliningrad (54° 46′ 0″ N, 20° 23′ 48″ E) and Severomorsk (69° 4′ 0″ N, 33° 25′ 0″ E). |

2. **Compilation**. The aim is to obtain data by very diverse means, from different

information sources, which will constitute the informative base on which the new knowledge will be generated.

- *Selection of cartographic services*: Google Maps, Bing Maps, Yahoo Maps, OpenStreetMap and Google Earth.
- *Open sources (OSINT)*. A possible –not complete- classification of the open sources that may be used is the following:

- Professional and academic: theses, papers, conferences, expert work, documents from think tanks, as well as periodic publications and scientific magazines.

- Public and private databases: SIPRI, OECD, The CIA World Factbook, Global Peace Index, Transparency.org and TI-Defence.

- Mass media: newspapers, television, radio and other audio-visual media.

- Legislation.

Official documents: reports, balance sheets, statistics, strategies, communiques, official bulletins, contracts.

- *Human sourcess (HUMINT)*. As regards to human sources, we have had the assistance of supervisors of psychological operations, information from satellites and the protection of critical infrastructures.

In order to handle the documents in a suitable way, we have used the Topomapper[7] online tool that makes it possible to view the images that show the different services in a dual manner, assisting the task of comparing these and making it possible to simultaneously browse through the different services.

3. **Processing.** The phase of the intellectual processing and use of the information is then initiated.

- The Heuer and Pherson checklist has been used in order to detect deception and a methodology (OPAC) has been formulated in order to evaluate the quality of the images supplied, as a preliminary step for measuring the reliability of the cartographic services and the credibility of the contents provided by them.
- *Passing on of the results to the international source evaluation system*. The reliability of the sources and the credibility of the content have been measured, depending on the international source evaluation system.
- *Analysis***.** The pertinent relations and inferences will be established in order to create an indicator that makes it possible to estimate the degree of exposure. Once the OPAC checklist has been defined, the data are shown in a scatter plot, with the aim of defining a model capable of estimating what

7 http://www.topomapper.com

would be the quality of the data shown on the basis of a set of parameters. We will utilise the accuracy of this regression model to generate an indicator of the degree of exposure in the geographic information network. In order to verify the predictive model set out above, we have compared the score obtained for Spain with the values estimated by the model, with a twofold objective: first to determine what is the place that it refers to, in comparison with the other countries in the sample and then to specify the margin of error of this.

4. **Dissemination**.The conclusions obtained through the following publication will be placed at the disposal of the readers.

## 3. Detection of deception

Easy access to geographic information becomes a problem for national defence when there are infrastructures available that have great strategic or military value. Amongst the reasons that exist for practising deception in cartographic services is the importance of the information shown and the large numbers of people that can obtain access to this via Internet by means of it being distributed. This is why it is necessary to determine whether the countries are taking measures to protect themselves as regards the over-exposure of information, producing certain potential alterations that the images may be subject to[8]

This is related to a concept that must always be present in an analysis: deception as a set of measures aimed at inducing mistakes by the enemy by means of the manipulation, the deformation or the falsification of evidence so as to get it to act in a way that is detrimental to its interests. In this context, there is a fundamental benefit to the mere consideration of the hypothesis of the deception: the fact of providing greater consistency to the information utilised or to discredit it, in this way assisting those undertaking it to reinforce their decision-making capacity.

However, if the analyst accepts the possibility that part of the information has been manipulated, this could cast doubts about the validity of the conclusions drawn. We have used the methodology proposed by Heuer and Pherson for detecting deception so as to avoid the analysis becoming paralysed[9], which consists of responding to a set of questions grouped together into four blocks: MOM (Motives, Opportunities, Means), POP (Past Opposition Practices), MOSES (Manipulability of Sources) and EVE (Evaluation of Evidence).

8 HEUER, Richard J. Cognitive factors in deception and counterdeception, in Strategic Military Deception, 1982.

9 HEUER, Richard J. and PHERSON, Randolph H. Structured Analytic Techniques for Intelligence Analysis, CQ Press College, 2010.

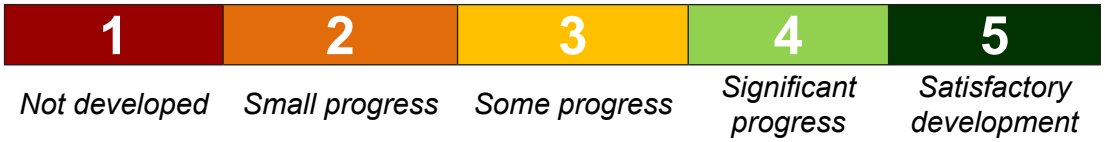
The objective is to detect any hint of concealment or simulation of contents of the different military sites that could reflect strategic activities or demonstrate the level of force of a country. The conclusion that has been obtained is that, despite Internet having become a source of instantaneous information, and that it is a channel with the potential to carry out deception because of the quantity of users, it is considered rather unlikely that it is present in geographic information systems (GISs), owing to the fact that the reputation of the servers could be affected and that there are other ways of comparing the information[10].

## 4.OPAC: a geographic information quality evaluation system

The countries with a high degree of exposure must be aware of the importance of having surveillance mechanisms for the information that flows through the network concerning installations of interest for security and defence. In this context, the authors propose using a set of questions to evaluate the precision of online cartographic services. The objective is to be able to draw up a checklist that can measure the quality of those systems, regardless of the magnitude of the technological progress that may take place in the future.

### 4.1 OPAC formulation

In this case, we have used an evaluation system whose range oscillates from 1 to 5. Unless stated to the contrary, the generic significance of this system is the following:




Below, in tables II, III, IV and V, we group together the questions that make up the OPAC checklist (left-hand column) together with the explanations about them (middle column) and the numerical weighting system utilised for each one of these (right-hand column).

10 RUBIO, Yaiza and BREZO, Félix. Limitaciones de los motores cartográficos en línea para el analista de inteligencia [Limitations on online cartographic engines for the intelligence analyst], at the 3rd International Congress on Intelligence, Barcelona (Spain), November 12, 2012.

Table II. Questions relating to the origin of the images of the OPAC checklist.

| **Origin of the images** *(O)* | | |
|---|---|---|
| **O.1 Does the cartographic service analysed have a wide range of image providers over the region?** | It is considered that the more providers supply the service, then the images displayed are going to be more in line with reality, in the case of there being no limits on access to the information. | |
| **O.2 Can the users update the information analysed?** | Evaluate which mechanisms each tool makes available to the users, so that they can update the information available. | |
| **O.3 How does the concept of the digital divide affect?** | Some studies observe big differences between the existing information about the western countries, much more abundant than in developing countries, with a population with less access to Internet. The more people are connected, the more possibilities there will be of participating. | Use of percentage data about Internet access furnished by the Internet World Stats * weighted at values from 1 to 5. |

Table III. Questions relating to the information of the OPAC checklist.

| **Precision** *(P)* | | |
|---|---|---|
| **P.1 What is the level of information breakdown available as compared to other countries?** | The analyst has to know whether more or les information will be available, depending on the implementation of that service in the country. | |
| **P.2 What is the level of updating of the images?** | The providers offer images from different dates to the cartographic services that acquire them and process them and combine, so as to create the end product that the display to the user, which could led to images with a poor level of updating. | |
| **P.3 What is the zoom level of the images?** | This section evaluates the degree of precision of the images displayed. | |
| **P.4 What is the level of responsibility of the services when it comes to displaying their errors?** | This variable could have repercussions when it comes to displaying information with better quality. | |



* INTERNET WORLD STATS (2013). Internet World Stats: Usage and Population Statistics. [Internet] Miniwatts Marketing Group [consultation date: April 2, 2013]. Available at http://www.internetworldstats.com/

Table IV. Questions relating to the accessibility of the images of the OPAC checklist.

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| Accessibility *(A)* | | |
|---|---|---|
| **A.1 is the information available or closed?** | This criterion will evaluate whether the cartographic system shows the information requested or not. | |
| **A.2 What level of threat does the country have to have in order to justify a special level of protection about certain images?** | In the case of being open, it is appropriate to propose what the reason for this would be, whether it is conscious that the exposure of certain images could represent a threat. | To evaluate this aspect, we evaluate the classification of the Global Peace Index*, in which 5 relates to the countries with the highest peace rating and 1 to the less peaceful countries. |
| **A.3 What capacity does the country have to carry out counterintelligence operations on the tool?** | What we want to analyse on this point is whether the information shown about the base has a lesser definition than that of areas near the base, relating this to the country of location of the service and policy about the users of the tool. | |
| **A.4 What is the level of transparency of the institutions of the country as regards the defence information?** | India has seen the need to propose that these tools should be closed, with the aim of preventing terrorist attacks, given that it is known certain groups use them as a means of obtaining information. It is important to take account of the reputation of a country that has practiced censorship in recent times. | We have used the index of transparency relating to defence provided by TI Defence** where 5 corresponds to the highest level of transparency. |
| **A.5 To what extent does the enquiries limit represent an obstacle?** | Some services restrict the number of enquiries that can be made: limiting the daily enquiries by IP or setting annual limits. | |

13 14

* VISION OF HUMANITY. 2012 Global Peace Index. [Internet] Vision of Humanity, 2012 [consultation date: April 2, 2013]. Available at: http://www.visionofhumanity.org/gpi-data/#/2011/scor

** GORBANOVA, Mariya and WAWRO, Leah. The Transparency of Defence Budgets, [Internet] in International Defence & Security Programme, 2011 [consultation date: April 2, 2013]. Available at: http://www.ti-defence.org/publications/893-the-transparency-of-defence-budgets

Table V. Questions relating to the possibility of comparing the images of the OPAC checklist.

| **Comparison** *(C)* | | |
|---|---|---|
| **C.1 To what extent is there a possibility of corroborating that information with other types of sources (OSINT, HUMINT, etc.)?** | This section considers databases, official sources, social networks, personal contacts that travel to or are resident in the zone, company workers, etc. | |
| **C.2 Is there a possibility of the Public Administration offering other information about the site to be analysed?** | This makes reference to the need to compare the visual information with that offered by the public bodies in Registers, Land Registries and similar institutions. In fact, in the case of the property register, the only limitation that there is on offering this information or not is the judgement of the registrar when it comes to determining whether there is a legitimate interest or not. | To evaluate this aspect we have established the relationship as that of the greater accessibility to public information there is, the less corruption there will be. To do this we use the corruption perception index provided annually for International Transparency. While the scale of this runs from 1 to 10, the weighting given for this evaluation is from 1 to 5. |

## 4.2 Interpretation of results

Below, we show the information corresponding to the analyses carried out for each one of the tools. Specifically, we have prepared the mean $X$ ($\forall X \in \{O,P,A,C\}$) of the $n$ questions ($x_1, x_2, \ldots, x_n$) that comprise each OPAC sub-group. Mathematically, this can be represented with the following expression.

$$\bar{x} = \frac{1}{n}\sum_{i=1}^{n} x_i = \frac{x_1 + x_2 + \cdots + x_n}{n}$$

In a parallel fashion, the final evaluation of the tool for each country corresponds to the mean of the values O, P, A and C set out above. This value will always fall between a minimum of one and a maximum of five.

In I and Table VII we represent the data with colours so as to facilitate the visualising of the degree of reliability of the tools based upon the countries concerned. The boxes with lower scores (as these are closer to one) are shown in redder tones, and the ones with greener tones show those with a higher score (as these are closer to five). The objective is to show, in a visual form, which countries have more reliable information

for each one of the tools and which aspects of these are less senstive to the specific characteristics of each country.

For example: in the case of North Korea, the values seen in its column are generally rather low for all of the tools, which mainfestts itself in the form of a large number of reddish or yellowish tones. This situation visually contrasts with that of the USA, whose values are higher;and therefore, these appear in greener tones.

In this way, we can also compare aspects relating to the tools. This is the case of the precision of OpenStreetMap, whose general average valuation is lower than the rest of the tools, as this is a service that does not have satellite images and whose information is only updated by its users. However, higher values are generally obtained in the Accesibility section.

Table VI. Evaluation of the cartographic systems utilised by Germany, France, the United Kingdom, Italy, USA, China, Russia and N. Korea.

| | | GERMANY | FRANCE | UNITED KINGDOM | ITALY | USA | CHINA | RUSSIA | NORTH KOREA |
|---|---|---|---|---|---|---|---|---|---|
| Google Maps | O | 4.38 | 3.95 | 4.40 | 3.31 | 3.65 | 2.67 | 2.41 | 3.50 |
| | P | 3.00 | 3.25 | 2.75 | 3.00 | 3.50 | 2.00 | 2.50 | 2.00 |
| | A | 4.20 | 4.00 | 4.20 | 3.60 | 4.40 | 3.00 | 3.20 | 2.60 |
| | C | 4.00 | 3.75 | 3.95 | 2.73 | 3.78 | 2.15 | 1.85 | 1.00 |
| | MEAN | 3.89 | 3.74 | 3.83 | 3.16 | 3.83 | 2.45 | 2.49 | 2.28 |
| Bing Maps | O | 3.71 | 2.95 | 3.74 | 2.65 | 2.65 | 2.00 | 2.41 | 1.33 |
| | P | 2.75 | 2.75 | 2.75 | 2.75 | 3.25 | 2.00 | 2.25 | 2.00 |
| | A | 3.80 | 2.80 | 3.80 | 3.20 | 4.00 | 2.60 | 2.80 | 2.20 |
| | C | 4.00 | 3.75 | 3.95 | 2.73 | 3.78 | 2.15 | 1.85 | 1.00 |
| | MEAN | 3.57 | 3.06 | 3.56 | 2.83 | 3.42 | 2.19 | 2.33 | 1.63 |
| Yahoo Maps | O | 2.38 | 2.29 | 2.74 | 1.98 | 1.98 | 1.67 | 1.41 | 0.67 |
| | P | 2.50 | 2.50 | 2.25 | 2.50 | 3.00 | 1.50 | 1.75 | 1.33 |
| | A | 4.00 | 3.80 | 4.00 | 3.40 | 4.20 | 2.80 | 3.00 | 2.40 |
| | C | 4.00 | 3.75 | 3.95 | 2.73 | 3.78 | 2.15 | 1.85 | 1.00 |
| | MEAN | 3.22 | 3.08 | 3.23 | 2.65 | 3.24 | 2.03 | 2.00 | 1.35 |
| Open Street Map | O | 2.71 | 2.62 | 2.74 | 2.31 | 2.65 | 2.00 | 2.07 | 1.33 |
| | P | 1.75 | 1.75 | 1.75 | 1.50 | 1.75 | 1.25 | 1.25 | 1.00 |
| | A | 4.60 | 4.40 | 4.60 | 4.00 | 4.40 | 3.60 | 3.80 | 3.20 |
| | C | 4.00 | 3.75 | 3.95 | 2.73 | 3.78 | 2.15 | 1.85 | 1.00 |
| | MEAN | 3.27 | 3.13 | 3.26 | 2.63 | 3.14 | 2.25 | 2.24 | 1.63 |
| Google Earth | O | 4.71 | 3.95 | 4.07 | 3.31 | 3.32 | 2.67 | 2.74 | 2.00 |
| | P | 3.00 | 3.25 | 3.25 | 3.00 | 3.25 | 2.00 | 2.50 | 2.00 |
| | A | 4.20 | 4.00 | 4.20 | 3.60 | 4.40 | 3.00 | 3.20 | 2.60 |
| | C | 4.00 | 3.75 | 3.95 | 2.73 | 3.78 | 2.15 | 1.85 | 1.00 |
| | MEAN | 3.98 | 3.74 | 3.87 | 3.16 | 3.69 | 2.45 | 2.57 | 1.90 |
| | | GERMANY | FRANCE | UNITED KINGDOM | ITALY | USA | CHINA | RUSSIA | NORTH KOREA |
| TOTALS | O | 3.58 | 3.15 | 3.54 | 2.71 | 2.85 | 2.20 | 2.21 | 1.77 |
| | P | 2.60 | 2.70 | 2.55 | 2.55 | 2.95 | 1.75 | 2.05 | 1.67 |
| | A | 4.16 | 3.80 | 4.16 | 3.56 | 4.28 | 3.00 | 3.20 | 2.60 |
| | C | 4.00 | 3.75 | 3.95 | 2.73 | 3.78 | 2.15 | 1.85 | 1.00 |
| | MEAN | 3.58 | 3.35 | 3.55 | 2.89 | 3.46 | 2.28 | 2.33 | 1.76 |

Table VII. Evaluation of the cartographic systems utilised by S. Korea, Japan, Iran, Syria, Venezuela, Colombia and Brazil.

| | | SOUTH KOREA | JAPAN | IRAN | ISRAEL | SYRIA | VENEZUELA | COLOMBIA | BRAZIL |
|---|---|---|---|---|---|---|---|---|---|
| Google Maps | O | 3.38 | 3.99 | 2.87 | 3.17 | 2.38 | 2.68 | 3.27 | 3.04 |
| | P | 2.75 | 3.25 | 3.00 | 2.50 | 2.25 | 2.00 | 2.50 | 2.75 |
| | A | 3.60 | 3.80 | 3.00 | 3.20 | 2.60 | 3.00 | 3.00 | 3.60 |
| | C | 3.10 | 4.00 | 1.68 | 2.95 | 1.65 | 2.00 | 2.35 | 2.45 |
| | MEAN | 3.21 | 3.76 | 2.64 | 2.95 | 2.22 | 2.42 | 2.78 | 2.96 |
| Bing Maps | O | 2.71 | 2.66 | 2.21 | 2.50 | 1.71 | 2.02 | 2.27 | 2.04 |
| | P | 2.50 | 2.75 | 2.25 | 2.25 | 1.50 | 1.75 | 2.75 | 2.50 |
| | A | 3.20 | 3.40 | 2.60 | 2.80 | 2.20 | 2.60 | 2.60 | 3.20 |
| | C | 3.10 | 4.00 | 1.68 | 2.95 | 1.65 | 2.00 | 2.35 | 2.45 |
| | MEAN | 2.88 | 3.20 | 2.18 | 2.63 | 1.76 | 2.09 | 2.49 | 2.55 |
| Yahoo Maps | O | 2.04 | 1.99 | 1.87 | 1.83 | 1.04 | 1.35 | 1.60 | 1.37 |
| | P | 2.25 | 2.25 | 2.50 | 2.25 | 1.25 | 1.75 | 2.25 | 2.50 |
| | A | 3.40 | 3.60 | 2.80 | 3.00 | 2.40 | 2.80 | 2.80 | 3.40 |
| | C | 3.10 | 4.00 | 1.68 | 2.95 | 1.65 | 2.00 | 2.35 | 2.45 |
| | MEAN | 2.70 | 2.96 | 2.21 | 2.51 | 1.59 | 1.98 | 2.25 | 2.43 |
| Open Street Map | O | 2.71 | 2.66 | 2.21 | 2.50 | 1.71 | 2.02 | 2.27 | 2.04 |
| | P | 1.75 | 1.75 | 1.50 | 1.50 | 1.00 | 1.25 | 1.50 | 1.25 |
| | A | 4.20 | 4.40 | 3.60 | 3.60 | 3.20 | 3.60 | 3.60 | 4.20 |
| | C | 3.10 | 4.00 | 1.68 | 2.95 | 1.65 | 2.00 | 2.35 | 2.45 |
| | MEAN | 2.94 | 3.20 | 2.25 | 2.64 | 1.89 | 2.22 | 2.43 | 2.48 |
| Google Earth | O | 3.38 | 3.66 | 2.87 | 3.17 | 2.38 | 2.68 | 2.93 | 3.04 |
| | P | 3.50 | 3.25 | 3.00 | 2.50 | 2.25 | 2.00 | 3.25 | 3.25 |
| | A | 3.60 | 3.80 | 3.00 | 3.20 | 2.60 | 3.00 | 3.00 | 3.60 |
| | C | 3.10 | 4.00 | 1.68 | 2.95 | 1.65 | 2.00 | 2.35 | 2.45 |
| | MEAN | 3.39 | 3.68 | 2.64 | 2.95 | 2.22 | 2.42 | 2.88 | 3.08 |
| | | SOUTH KOREA | JAPAN | IRAN | ISRAEL | SYRIA | VENEZUELA | COLOMBIA | BRAZIL |
| TOTALS | O | 2.84 | 2.99 | 2.41 | 2.63 | 1.84 | 2.15 | 2.47 | 2.30 |
| | P | 2.55 | 2.65 | 2.45 | 2.20 | 1.65 | 1.75 | 2.45 | 2.45 |
| | A | 3.60 | 3.80 | 3.00 | 3.16 | 2.60 | 3.00 | 3.00 | 3.60 |
| | C | 3.10 | 4.00 | 1.68 | 2.95 | 1.65 | 2.00 | 2.35 | 2.45 |

### 4.2.1 By countries

By way of summary, Figure 2 shows the results of the tables above classified by countries. We can see that countries such as Germany, France, the United Kingdom, USA and Japan obtain the highest values in all sections.

On the other hand, the rest such as North Korea or Syria have lesser scores, obtaining marks well below the average. The fundamental reasons that could lie

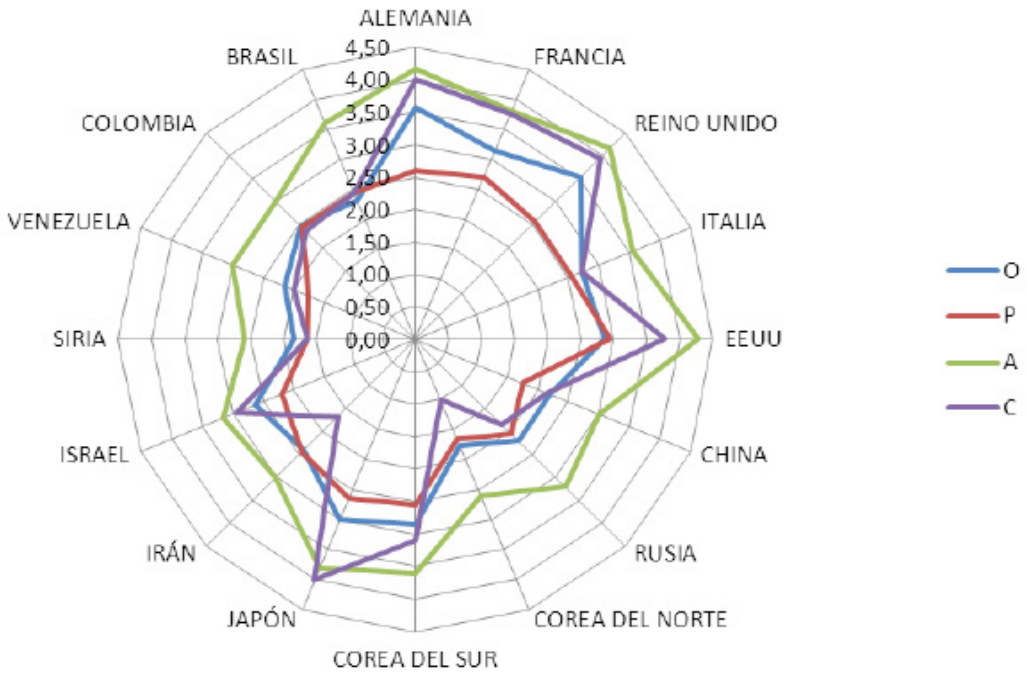



Figura 2. Comparación por países de los valores medios de OPAC

behind these observations would be less access to new technologies and the existence of policies restricting the availability of information.

Key:
ALEMANIA-GERMANY
FRANCIA-FRANCE
REINO UNIDO-UNITED KINGDOM
ITALIA-ITALY
EEUU-USA
CHINA-CHINA
RUSIA-RUSSIA
COREA DEL NORTE-NORTH KOREA
COREA DEL SUR-SOUTH KOREA
JAPON-JAPAN
IRAN-IRAN
ISRAEL-ISRAEL
SIRIA-SYRIA

VENEZUELA-VENEZUELA
COLOMBIA-COLOMBIA
BRASIL-BRAZIL

Table VIII. Strengths and weaknesses of each one of the cartographic services

| TOOL | STRENGTHS | WEAKNESSES |
|---|---|---|
| Google Maps | – Error notification system<br>– Permit users to include content<br>– The information is always accessible<br>– 2.500 daily requests/IP (100,000 payment version)<br>– Accessible through web browser | – Not responsible for possible errors<br>– The countries do not have legal tools to protect themselves from the publication of sensitive information* |
| Bing Maps | – In general, the information is always accessible<br>– Accessible through web browser | – Few interactivity tools<br>– Little updating of images<br>– Not responsible for possible errors<br>– The countries do not have legal tools to protect themselves from the publication of sensitive information[16]<br>– Small number of daily enquiries permitted |
| Yahoo Maps | – The information is always accessible<br>– Accessible through web browser | – Does not have user interactivity tools<br>– Poor level of updating<br>– Not responsible for possible errors<br>– The countries do not have legal tools to protect themselves from the publication of sensitive information[16] |
| Open-StreetMap | – The information is always accessible<br>– No limitation on enquiries<br>– Accessible through web browser | – No images service available<br>– Not responsible for possible errors |
| Google Earth | – Error notification system<br>– Large quantity of layers<br>– Permit users to include multimedia content (3D models, images, routes, etc.) | – Not responsible for possible errors<br>– The countries do not have legal tools to protect themselves from the publication of sensitive information [16]<br>– Client has to download it |

Figure 3. Mean evaluation of each one of the sections for each geographic information system.

### 4.2.2.By tools

This section provides a summary of the information shown by tools. In Figure 3 we can see the breakdown by questions of the scores obtained for each system analysed.

Having seen the particular *Strengths and Weaknesses* of each tool that have been inferred from the results shown in the graph above and that are listed in Table VIII, in Figure 4 we make a general comparison of the mean values of each one of these for each sub-group. These values of O, P, A and C correspond to the average of the individual values of each country. Here we can observe that Yahoo Maps has a low score in the *Origin* and *Precision* sections, which contrast with the high scores of the Google services: Google Maps and Google Earth. In the case of OpenStreetMap, it is

again clear that the chief weakness of the tool is its low score on the *Precision* section, as it does not have satellite images, and it obtains the maximum score in *Accessibility,* which is highlighted by the possibility of making enquiries without the limit imposed by the other services. Finally, the convergence of all of these in terms of *Contrast* is relevant. This is due to the fact that the questions posed in this section make reference to the country about which the enquiry is made and they are not relative to the tools in themselves.

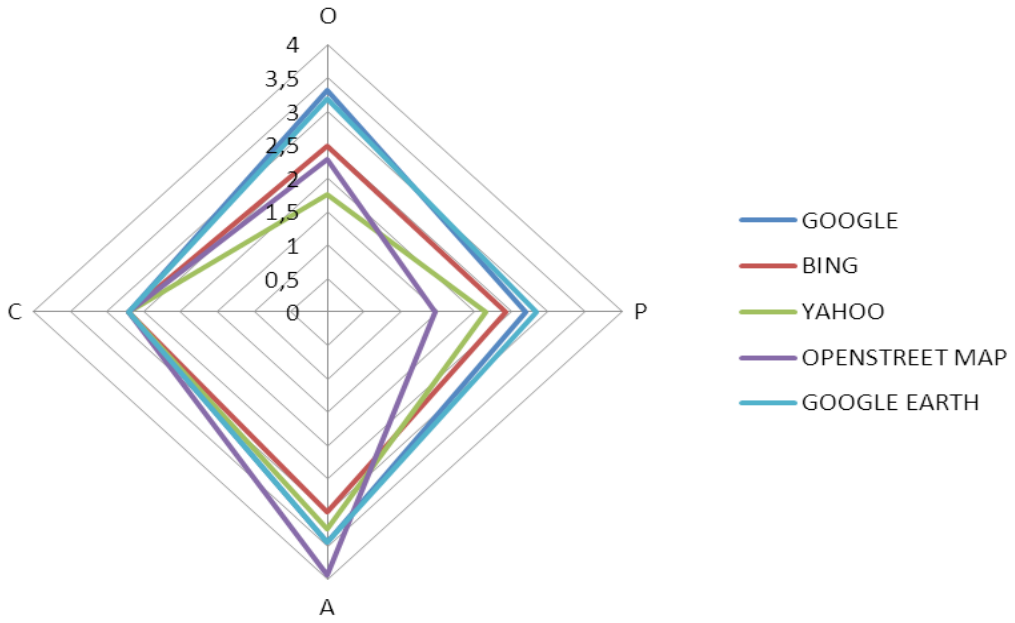



Figure 4. Comparison of the tools based on each one of the OPAC sub-groups.

### 4.2.3. Passing on of the results to the international sources evaluation system

The intelligence glossary published by the Ministry of Defence in 2007[15], state that western intelligence services utilise a standardised evaluation system with the aim of determining the reliability, the credibility and the relevance of the information in the first processing phase of the intelligence cycle. In order to assess the reliability of the tools (sources) we give an OPAC values interval to each letter of the international system.

15 ESTEBAN NAVARRO, Miguel Ángel. Glosario de Inteligencia [Intelligence Glossary], page 59 and subsq., Pub. Ministry of Defence, 2007.

Table IX. Weighting of the reliability of the tools in accordance with the OPAC values obtained.

| Letter | Meaning | Interval |
|---|---|---|
| **A** | *Reliable* | (4.2-5] |
| **B** | *Generally reliable* | (3.4-4] |
| **C** | *Quite reliable* | (2.6-3.4] |
| **D** | *Not always reliable* | (1.8-2.6] |
| **E** | *Not safe* | [1-1.8] |
| **F** | *Reliability cannot be evaluated* | - |

In the same way as happens with reliability, in order to evaluate the credibility of the content about each country, we give an OPAC values interval to each number of the international system.

Table X. Weighting of the credibility of the content for each country according to their OPAC averages

| Number | Meaning | Interval |
|---|---|---|
| **1** | *Confirmed* | (4.2-5] |
| **2** | *Probable* | (3.4-4] |
| **3** | *Possible* | (2.6-3.4] |
| **4** | *Doubtful* | (1.8-2.6] |
| **5** | *Unlikely* | [1-1.8] |
| **6** | *Precision cannot be evaluated* | - |

In this way, we have provided a pair of characters corresponding to these two scales to the information available in the different information systems, based upon the OPAC values obtained, as is shown in Table XI. The reliability of the source will be in line with the reliability of each one of the tools, whilst the credibility of the content will be based upon the country. The aim of this table is to offer the analyst a value of reference regarding the reliability of the tools following the country about which the enquiry seeking information is made.

Table XI. Evaluation of the information available concerning each one of the countries of the sample in the international sources evaluation system.

| | GOOGLE MAPS | | BING MAPS | | YAHOO MAPS | | OPEN STREET MAP | | GOOGLE EARTH | |
|---|---|---|---|---|---|---|---|---|---|---|
| GERMANY | 3.89 | C2 | 3.57 | C2 | 3.22 | D3 | 3.27 | D3 | 3.98 | C2 |
| FRANCE | 3.74 | C2 | 3.06 | C3 | 3.08 | D3 | 3.13 | D3 | 3.74 | C2 |
| UNITED KING-DOM | 3.83 | C2 | 3.56 | C2 | 3.23 | D3 | 3.26 | D3 | 3.87 | C2 |
| ITALY | 3.16 | C3 | 2.83 | C3 | 2.65 | D3 | 2.63 | D3 | 3.16 | C3 |
| USA | 3.83 | C2 | 3.42 | C2 | 3.24 | D3 | 3.14 | D3 | 3.69 | C2 |
| CHINA | 2.45 | C4 | 2.19 | C4 | 2.03 | D4 | 2.25 | D4 | 2.45 | C4 |
| RUSSIA | 2.49 | C4 | 2.33 | C4 | 2.00 | D4 | 2.24 | D4 | 2.57 | C4 |
| NORTH KOREA | 2.28 | C4 | 1.63 | C5 | 1.35 | D5 | 1.63 | D5 | 1.90 | C4 |
| SOUTH KOREA | 3.21 | C3 | 2.88 | C3 | 2.70 | D3 | 2.94 | D3 | 3.39 | C3 |
| JAPAN | 3.76 | C2 | 3.20 | C3 | 2.96 | D3 | 3.20 | D3 | 3.68 | C2 |
| IRAN | 2.64 | C3 | 2.18 | C4 | 2.21 | D4 | 2.25 | D4 | 2.64 | C3 |
| ISRAEL | 2.95 | C3 | 2.63 | C3 | 2.51 | D4 | 2.64 | D3 | 2.95 | C3 |
| SYRIA | 2.22 | C4 | 1.76 | C5 | 1.59 | D5 | 1.89 | D4 | 2.22 | C4 |
| VENEZUELA | 2.42 | C4 | 2.09 | C4 | 1.98 | D4 | 2.22 | D4 | 2.42 | C4 |
| COLOMBIA | 2.78 | C3 | 2.49 | C4 | 2.25 | D4 | 2.43 | D4 | 2.88 | C3 |
| BRAZIL | 2.96 | C3 | 2.55 | C4 | 2.43 | D4 | 2.48 | D4 | 3.08 | C3 |

## 4.3. Creation of an indicator: degree of exposure

On the basis of the conclusions that it has been possible to draw from the previous section, we establish that the penetration index and population concentration are the variables that set the differences between the countries that obtain the highest scores apart from those that record lower results. This is relevant because the cartographic services will consider the acquisition of those images that can be consulted by more people to be a more profitable investment. With greater Internet penetration and with greater population concentration, greater profitability is obtained for every square image of kilometre. Should this be the case, it would be interesting to be able to determine in advance which countries are likely to be over-exposed through these tools. Data have been obtained from the following sources to develop this approach:

- Internet penetration index (in %) according to Internet World Stats.
- Urban population (in %) according to the *Urbanization Prospects* report. *The*

*2011 Revision: Urban Data and Rural Population* of the United Nations[16].

The degree of intensity of the relationship between Internet population and the urban population with the OPAC values assigned to each tool (values calculated as the general average of O, P, A and C of each country) has been represented in scatter plots, obtaining the regression line that these relationships represent, their equation and the $R^2$ value or accuracy of the model. In statistics, the lineal regression or lineal adjustment is a mathematical method whose objective is to model the relationship between a dependent variable and a set of *i* independent variables, $x_i$, and an independent term with the objective of making predictions for the dependent variable. This model can be expressed, in general terms, as a line:

$$y = \sum(\beta_i x_i + N)$$

Where:

*y* is the dependent variable to be estimated, which will correspond to the OPAC values in this case

$x_i$ will be each one of the independent variables used in the model. In this case, these will correspond to the Internet penetration index (at a certain percentage) and to the urban population percentage of the country analysed.

$\beta_i$ corresponds to the coefficient of each one of the independent variables, being a parameter that measures the influence of these on the dependent variable.

- In the case of $\beta_i > 0$: the inclination of the line is positive and the relationship between $x_i$ and *y* is directly proportional. That is to say: at a higher value of $x_i$, we will obtain a higher value of *y*.
- In the case of $\beta_i < 0$: the inclination of the line will be negative and the relationship between $x_i$ and *y* is inversely proportional. That is to say: at a higher value of $x_i$, we will obtain a lesser value of *y*.

*N* is the independent term that represents the value of *y* for $x_i = 0$.

On the basis of this equation, two simple lineal adjustments will be made so as to ascertain the intensity of relationship of each one of the independent variables with the dependent variable (OPAC).

In the case of the Internet penetration variable, the lineal adjustment is:

$$y = 0{,}0242x + 1{,}6599$$

While, in the case of the urban population variable, the lineal adjustment is:

$$y = 0{,}0261x + 1{,}046$$

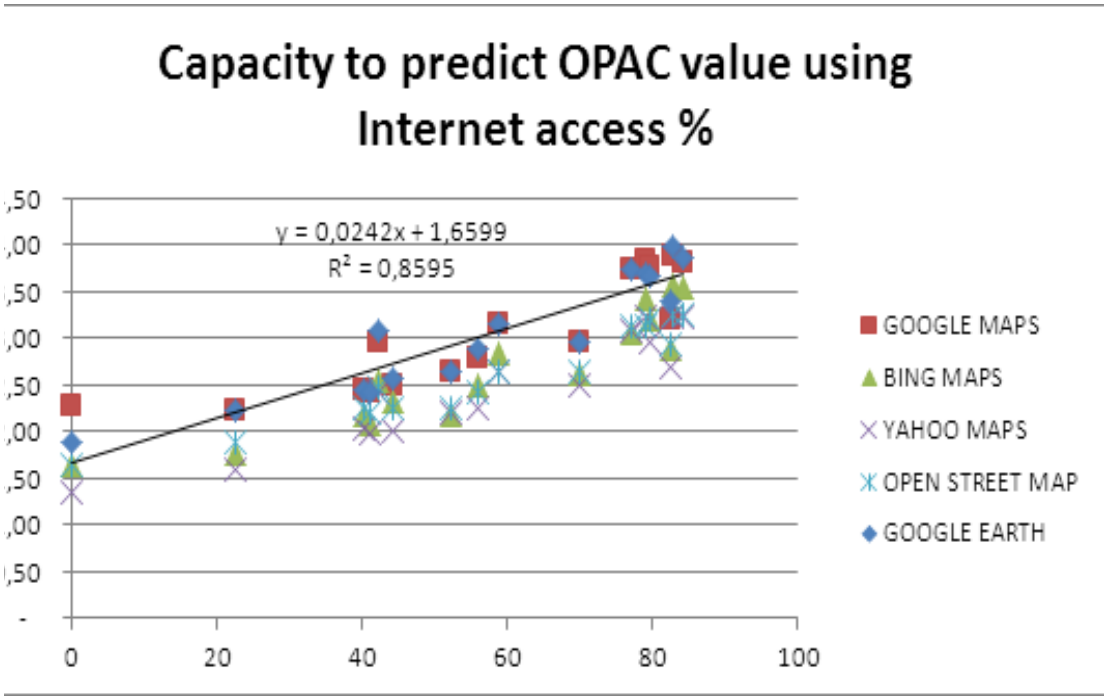
16 UNITED NATIONS (UN). World Urbanization Prospects, the 2011 Revision: Data on Urban and Rural Populations, [Internet] Department of Economic and Social Affairs, 2011 [consultation date: April 2, 2013]. Available at: http://esa.un.org/unup/CD-ROM/Urban-Rural-Population.htm

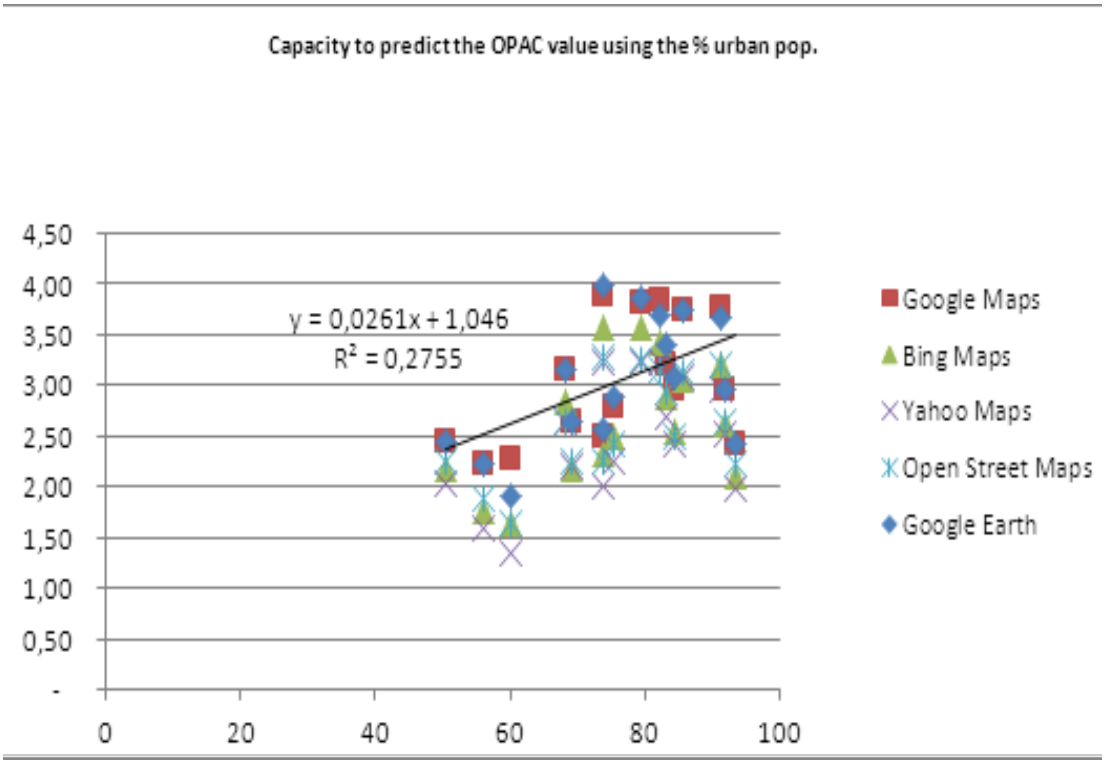
The accuracy of the model ($R^2$) is a value that ranges between 0 and 1, and it determines the degree of representativeness of the lineal model; that is to say, to what extent the starting hypothesis is sufficiently well-explained by the independent variables. The closer the values are to 1, the more representative the model is. The accuracy of the model is determined mathematically using the following equation:

$$R^2 = \frac{S_{xy}^2}{S_x^2 \cdot S_y^2}$$

The graphs that are shown in Figure 5 bring togther the results of each tool, matched against the percentage of Internet access and the urban population of each country analysed.

Figure 5. Comparisons of the graphs for all of the tools based upon the variables of Internet penetration and the percentage of urban population by country






As can be seen, the R2 value for the Internet penetration variable has greater weight when it comes to explianing the OPAC, in comparision with the urban population concentration variable, which is notably lower. For this reason, Intrnet penetration will be the variable that is most important for setting the degree of exposure of each country. These values will be the ones used as coefficients of the variables, in the equation concerning the degree of exposure propsed by the authors below:

$$Degree\ of\ exposure = (R12 \bullet X1 + R22 \bullet X2) \bullet 100$$

Where:

- $X_1$ is the percentage of Internet penetration amongst a country's users according to Internet World Stats.
- $X_2$ is the percentage of urban population of a country according to official data from the United Nations.
- $R_1^2$ is the coefficient of regression of the first lineal adjustment.
- $R_2^2$ is the coefficient of regression of the second lineal adjustment.

Thus, the degree of exposure of a country will be determined by the following equation:

$$Degree\ of\ exposure=(0.8595\ X\_1+0.2755 \bullet X\_2 ) \bullet 100$$

On the basis of this equation, we have determined the degree of exposure for all of the countries, endowing them with a colour according to their value (see Figure 6): the order it is the higher this will be, it is more yellow if the degree of exposure is

intermediate, and it is greyer for those countries with less exposure.

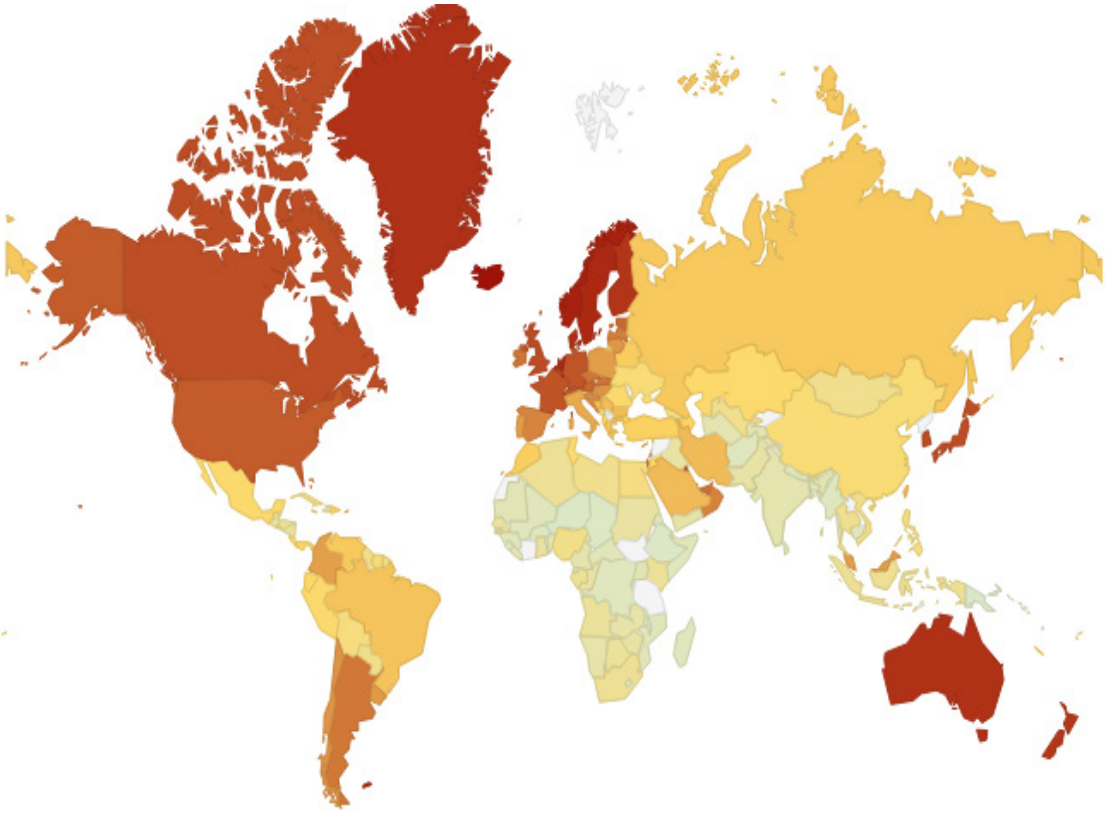


Figure 6. Degree of exposure of geographical information.

## 4.4. Validation of the methodology for the case of the Spanish bases

After establishing that it is rather unlikely that there is deception, we will set out the validation of the methodology for the case of Spain below. Firstly, there will be an analysis of the quality of the tools applying the OPAC checklist as this is shown in the following Table.

Table XII. OPAC values for Spain.

| | | Google Maps | | Bing Maps | | Yahoo Maps | | OpenStreetMap | | Google Earth | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | MEAN | | MEAN | | MEAN | | MEAN | | MEAN |
| O | O.1 | 5 | 4.09 | 2 | 2.43 | 1 | 1.76 | 1 | 2.43 | 3 | 3.43 |
| | O.2 | 4 | | 2 | | 1 | | 3 | | 4 | |
| | O.3 | 3.28 | | 3.28 | | 3.28 | | 3.28 | | 3.28 | |
| P | P.1 | 3 | 3.00 | 3 | 1.75 | 3 | 2.25 | 3 | 1.50 | 3 | 3.75 |
| | P.2 | 3 | | 1 | | 1 | | 1 | | 4 | |
| | P.3 | 4 | | 1 | | 3 | | 1 | | 4 | |
| | P.4 | 2 | | 2 | | 2 | | 1 | | 4 | |
| A | A.1 | 5 | 4.00 | 1 | 2.80 | 5 | 3.80 | 5 | 4.20 | 5 | 4.00 |
| | A.2 | 5 | | 5 | | 5 | | 5 | | 5 | |
| | A.3 | 2 | | 2 | | 2 | | 2 | | 2 | |
| | A.4 | 4 | | 4 | | 4 | | 4 | | 4 | |
| | A.5 | 4 | | 2 | | 3 | | 5 | | 4 | |
| C | C.1 | 4 | 3.55 | 4 | 3.55 | 4 | 3.55 | 4 | 3.55 | 4 | 3.55 |
| | C.2 | 3.1 | | 3.1 | | 3.1 | | 3.1 | | 3.1 | |
| OPAC | | | 3.66 | | 2.63 | | 2.84 | | 2.92 | | 3.68 |

In the case of Spain, we can see high values in all of the sections, except for in those that make reference to the availability of the images in the Bing Maps service, which closes off access to the information about the four Spanish military bases analysed: Albacete, Morón de la Frontera,Torrejón and Zaragoza. It follows from this that the low score in the image availability section is what catches the eye, leaving Bing Maps with one of the lowest scores of the study in that section.

### 4.4.1. Evaluation of the information available about Spain according to the international sources evaluation system

With the information that is available on the basis of the mean OPAC vales for each tool, we will state a pair of characters corresponding to the two scales of the international sources evaluation system (reliability of the source, which will remain constant as this is a generic value of each tool, and represents the credibility of the content) in the same way as has been done above for the rest of the countries.

Table XIII. Evaluation of the information available about Spain in the international sources evaluation system.

| | GOOGLE MAPS | | BING MAPS | | YAHOO MAPS | | OPEN STREET-MAP | | GOOGLE EARTH | |
|---|---|---|---|---|---|---|---|---|---|---|
| SPAIN | 3.66 | **C2** | 2.63 | **C3** | 2.84 | **D3** | 2.92 | **D3** | 3.68 | **C2** |

### 4.4.2. Calculation of the percentiles: situation of Spain as compared to other countries

The objective of this section is to identify the score of Spain and place it within each OPAC section, as compared to other countries. To do this, we have used the sum of the scores obtained and we have done a calculation of percentiles that helps with the task of ascertaining how far Spain is above certain countries for each tool. That is to say: a 75% percentile means that Spain's score in that section is higher than 75% of the countries that have been the subject of the study.

Figure 7 shows a representation of the percentiles obtained by Spain for each tool based upon their *Origin*, *Precision*, *Accessibility* and *Comparison*. As can be seen, in general figures are obtained that are above 60%, other than in the well-known case of the *Precision* of Bing Maps. This takes account of the exceptional factor, already remarked on, that none of the four Spanish bases analysed were open.

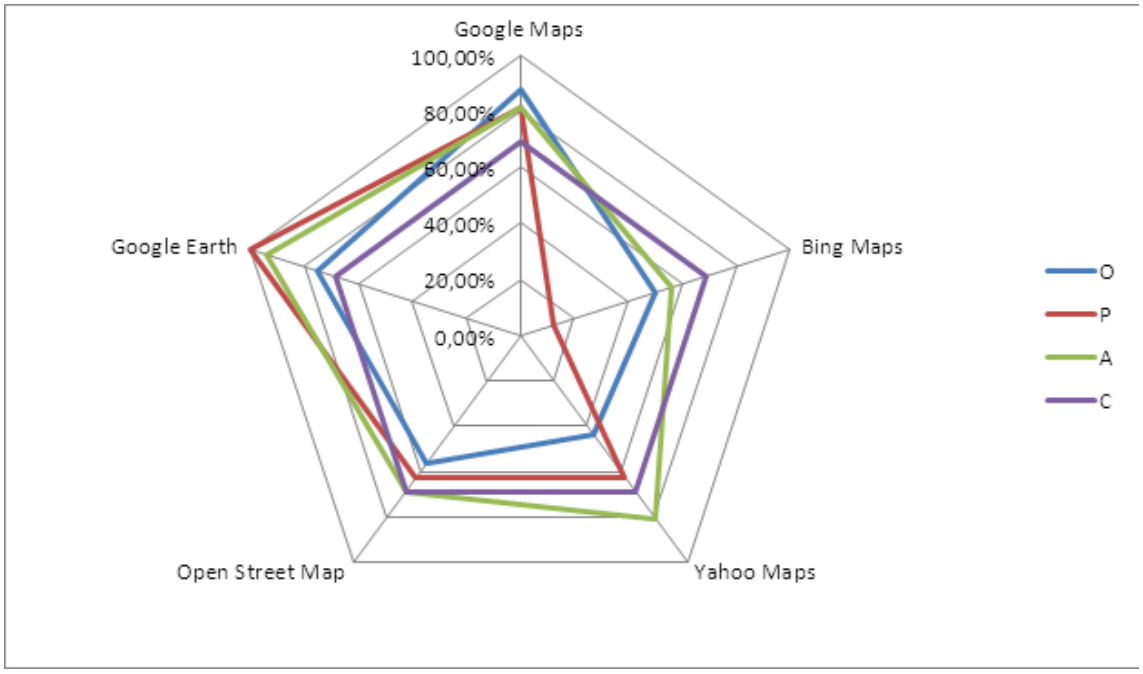



Figure 7. Graph of percentiles of Spain.

### 4.4.3. Verification of the reliability of the model

Once the OPAC regression lines for each tool have been calculated in the previous section, on the basis of the percentages of Internet penetration and of urban population, we have calculated the degree of deviation of the model as compared to the data obtained following the observation of the Spanish bases. In the following table we can

observe how these two variables make it possible to estimate, with a limited margin of error, what the degree of exposure of the Spanish bases is. This is in spite of the fact that the regression models have not been instructed with information that comes from them so as to best simulate the estimation about an unknown base. The values used for the estimation of the degree of Spain's exposure were 67.2% for Internet penetration and 77.4% for the percentage of urban population.

Table XIV. Calculation of the deviations from the OPAC estimation model for the case of Spain.

| | | % Internet Penetration | % Urban Population |
|---|---|---|---|
| TOTAL | Actual value | 3.15 | 3.15 |
| | Estim. value | 3.29 | 3.07 |
| | Dev. | 0.14 | -0.08 |

The average error obtained for the equation proposed, for the Internet penetration variable, over-estimates the actual value of the observations by barely 0.14 points on a scale of 1 to 5, while the urban population variable under-estimates this value by 0.08. In any case, these errors are tolerable, demonstrating that these variables could be utilised so as to *a priori* measure the quality of the images of a country for which no information is available. Therefore, it will be possible to also calculate their degree of exposure.

## 5. Conclusions

The fundamental hypothesis on which the content of this paper was based consisted of seeing to what extent it was possible –given a situation of over-exposure of cartographic information about installations of a military nature – that security could be compromised and become a greater threat in the future. Given that partial conclusions have been offered in each section, we devote this section to summarising the most significant ones:

1. The starting hypothesis is accepted: there is a high degree of exposure of information about zones of interest for national defence. This problem also could be extrapolated to another type of critical infrastructures.
2. The countries do not have capacity to impose restrictions on the information available regarding zones of strategic-military interest beyond their own borders.
3. Online cartographic systems offer high-resolution and up-to-date images, depending on the possibilities that they have for making the investment made profitable.
4. There is a significant correlation between the current level of investment

in images of a region and the internet penetration and the degree of urban concentration taken together, which will subsequently increase the degree of exposure of the critical installations located in these zones.

Given the serious nature of the problem, it is believed to be appropriate to include monitoring of the images distributed by online cartographic services in the counterintelligence plans, as well as the updates to these, with the aim of neutralising the knowledge that other people involved could acquire regarding essential aspects of the functioning of the State using those systems. From the institutional side, it is considered relevant to promote supra-national legislative, which endow an international body with the capacity to manage the information available in a neutral way, thus meeting the security needs of the States.

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