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## Security, Knowledge and Technology

### Non-Governmental Satellite Imagery Analysis of North Korea's Nuclear Threat

#### Topic and Research Question

The thesis builds on the observations that North Korea is not only hard to access but that its nuclear program has significant implications for international security and regional peace. These conditions create a great demand in verified security knowledge. Against this background, a U.S.-based expert group of non-governmental satellite imagery analysts attempts to bridge the physical limitations to study the country via commercial satellite imagery.

The central research question asks if this group of experts qualifies as an epistemic community. The question is then divided into two interrelated parts. First, it is necessary to provide the techno-political context of remote sensing that the analysts operate in. Second, the group of analysts itself is investigated in more detail with a particular focus on its knowledge production practices.

#### State of the Art

The thesis is located at the intersection between International Relations (IR) and Science and Technology Studies (STS). Only recently research has started to bring together both disciplines on a theoretical and empirical level (Bueger 2015; Fritsch 2011, 2014; Herrera 2006; Scheuerman 2009; Weiss 2005). More specifically, studies on remote sensing in international politics can be grouped in two different realms, i.e. governmental and non-governmental. The former focuses on the capabilities and application in a state security or intelligence context (Graham & Hansen 2007; Harris 2006). The latter mostly analyzes non-governmental usage and work in areas of human security and environmental issues (Aday & Livingston 2009; Herscher 2014; Hong 2013; Livingston & Robinson 2003; Shim 2014).

Early on, scholars pointed to the difficulties of satellite imagery analysis and the potentially severe consequences of incorrect conclusions that are difficult to challenge by non-experts (Florini & Dehqanzada 1999; Skolnikoff 1993). Despite these early warnings, the knowledge practices of non-governmental satellite imagery analysts are still insufficiently understood and only very limited research has been done on the ways that non-governmental analysts deal with the challenges of analyzing and interpreting satellite imagery in a politically highly sensitive context and how they cope with uncertainties.

#### Methodology and Approach

There is no ready-made theory available that brings together relevant concepts of STS and IR for this thesis, so an eclectic approach was chosen. First, the concept of technological systems (Hughes 1987) constitutes a middle ground between the two most influential schools of thought in the study of technologies, i.e. technological determinism and the social construction of technology. While the former focuses on the autonomous social impact of technologies, the latter takes into account the social norms and interests that are involved in their development. Taken together, technology is defined as more than a physical artifact but contingent on specific norms and its social context that also mediate its social impact. Second, the concept of epistemic communities (Haas 1992) allows for analyzing expert groups which are founded on the basis of common knowledge and norms. The approach is complemented by an additional category to examine the imagery analysts' knowledge production and uncertainties therein. Both concepts originate from constructivist thinking in their respective disciplines and compatibly lend themselves to combination with each other (cf. Hopf 1998: 198). The approach is understood as a conceptual bridge between the theoretical and empirical foci of STS and IR. The individual steps of analysis can be grouped into a comprehensive table:

Theoretical Concept	Analytical Category
Technological Systems	Early techno-political development of remote sensing
	Transfer and adaption to commercial sector
	Reverse salients
	Momentum and epistemic capacity
Epistemic Communities	Shared set of normative & principled beliefs
	Shared causal beliefs
	Shared notions of validity
	Common policy enterprise
	Knowledge production

Data is comprised of a collection of official documents, legal code, historic data and research literature on commercial satellite technologies as well as seven semi-structured expert interviews conducted with U.S.-based non-governmental satellite imagery analysts. Software-assisted content analysis (Atlas.ti) follows the logic of process tracing (Collier 2011).

#### Main Facts

Previously an exclusive domain of governments, it is argued that the development and commercialization of Earth observation satellites was strongly influenced by a change of political, economic and legal rationales of the U.S. as a result of the end of the Cold War. When the technological system had reached momentum during the 1990s it has effectively diversified the circle of users of remote sensing data to non-state actors. Although physical access to North Korea's nuclear program is still virtually impossible, non-governmental actors now have the chance to observe developments on the ground via space-based surveillance. As of now, an estimated 20 non-governmental satellite imagery analysts work on North Korea's nuclear program and regularly publish their assessments on open-source platforms.

Even though, they feature a quite diverse background in terms of training, age, employment, gender, experience and education, they feature a shared set of norms that mainly is based on the believed importance of transparency of knowledge and non-proliferation issues. The commercialization of remote sensing has enhanced their epistemic capacity to produce information about North Korea's nuclear program that the regime and governmental intelligence services refuse to make public. In accordance with their principled beliefs they mostly provide their analyses in open-source publications. In doing so, they constitute an important and independent source of knowledge. The fact that their knowledge is based on "seeing" reinforces the public validity of their knowledge claims and magazines, newspapers, TV channels but also government institutions increasingly make use of this resource. However, even though it is a technological system that enables the analysts to produce this information, the interpretative process adds a human factor and is thereby liable to errors and adds uncertainty. The non-governmental analysts are aware of these difficulties and have developed various coping strategies such as a cautious language, acquisition of technical knowledge, co-production and communicative validation of analyses as well as the multiplication of sources other than imagery such as refugee testimony, media publications, official documents and so on. In accordance with the analytical framework, they constitute an epistemic community. For the time being, however, satellite imagery analysis of North Korea cannot completely compensate for the inability of field research in North Korea.

#### Results

In essence, the thesis makes two major arguments: First, the commercialization of space-based remote sensing has laid the foundation for an epistemic community of satellite imagery analysts by increasing the epistemic capacity of North Korea observers. Second, although it can be described as a rather loose network, non-governmental satellite imagery analysts share particular norms and epistemic practices and experience uncertainties when producing knowledge about North Korea's nuclear program.

The advent of commercial satellite imagery has effectively challenged the nation state's interpretational sovereignty of global security knowledge regarding places that are difficult to access. Non-governmental actors now have the ability to verify or refute claims by policy makers or officials that before were literally out of reach for them. Even more so, NGOs and other civil actors can produce original knowledge on issues that are ignored by governments or the international community such as human rights violations, environmental degradation or security issues. These actors are unified in their ability to operate a new technological system that effectively extends their epistemic capacity. In conjunction with the progress of communication technologies they are able to independently disseminate knowledge and influence decision making. The results of this thesis only constitute a first but necessary step to better understand the interrelations of technology and international politics in general and the relevance of non-governmental satellite imagery for the issue of North Korea in particular.

#### References

All references can be found in the full version of the MA thesis available at <http://othes.univie.ac.at>.

#### About the Author

Philipp Olbrich holds a B.Sc. in Social Sciences and is researcher at the Austrian Institute for International Affairs. His research interests include science, technology and international relations and East Asian security affairs.

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