

IMPROVING DATA ACCESS AND CREDIBILITY IN LOW-INFORMATION ENVIRONMENTS: CASE OF DPRK

E. BERGNER, R. M. LEE, J. SHIN, T. XU [1]

Open Nuclear Network – A Programme of One Earth Future

Vienna, Austria

Emails: ebergner@oneearthfuture.org, rmlee@oneearthfuture.org, jshin@oneearthfuture.org,
txu@oneearthfuture.org

Abstract

Low-information environments with nuclear capabilities present challenges to the safeguards community due to the difficulty of information access and questions surrounding the accuracy of the information obtained from those locations. With the DPRK, this problem is compounded by the country's exceptionally tight control of information, enabled and sustained by a well-established nationwide surveillance network overseen by the key departments of the Workers' Party of Korea.

These limitations, while challenging, are not insurmountable. To improve access to and credibility of information on the DPRK, including safeguards-related data, the authors propose leveraging the State's well-established propaganda and satellite imagery analysis methods, and also the DPRK-provided ground photos and third-party reporting.

1. DPRK PROPAGANDA ANALYSIS [2]

The DPRK is known as a "low-information environment" primarily due to the difficulty of access to credible information about the country. In the case of its propaganda, the *volume* of or access to information is not so much an issue as is the *interpretation* of the information released by State-run media. In addition to being a "low-information environment," the DPRK can easily become a "high-confusion environment" depending on how well or badly an analyst interprets Pyongyang's intentions.

The importance of understanding the DPRK's intentions well seems too obvious a statement, but at this juncture, some may ask why we should even care what its media say? Is it not all controlled by the State anyway?

This question may be best answered as below:

"Discussions appearing in controlled media are valuable precisely because they are controlled. That the discussions take place within a carefully constrained environment does not diminish their utility. It just requires the right lens to see clearly what is going on." [3]

The DPRK's public messaging matters because such closed governments exercise complete control over their media to shape and manage public opinion both at home and abroad. As such, Pyongyang calibrates its public messaging meticulously: what information it releases and how it frames that information, at what level, to whom, and when. By tracking patterns and discerning shifts in trends in the media, one can gain insight into the DPRK leadership's current thinking and future intentions.

What makes the DPRK media analysis tricky is that much of the media content is routine propaganda. Trends and patterns, or even single words that are key to understanding Pyongyang's intentions, tend to be buried underneath meaningless noise, often wrong-footing observers. In that vein, DPRK propaganda analysis may fairly be summed up as separating the wheat from the chaff. Fortunately, serious analysis of the DPRK's public messaging is not impossible. It just requires the right methodology and a well-trained eye to apply it rigorously and systematically.

Propaganda analysis is a time-tested method for deciphering the underlying intentions of closed regimes like that of the DPRK. This methodology is made up of five key diagnostic elements: *level*, *audience*, *timing*, *tone* and *everything else*.

Level refers to the authoritative nature of a message. The DPRK chooses carefully from a well-established hierarchy of official and media vehicles depending on how strongly it wishes to commit itself to a message. And the higher the level of a vehicle Pyongyang uses to communicate its message, the more officially the regime wishes to be linked to a particular policy line.

Audience refers to the intended recipient of the communication. The DPRK targets different pockets of the audience to maintain policy flexibility or shield certain parts of the audience from sensitive information while voicing or even reinforcing its message to the target recipients. The two broad categories are internal and external audiences.

Timing refers to the speed with which the DPRK reacts or responds to an issue. The faster the response, the more sensitivity the DPRK feels, and the slower the reaction, the less sensitivity.

Tone refers to the substance of the messaging. Substance covers language, omission of language, placement of an article and, if available, photos. Examining tone requires knowing what language to key in on, building a baseline of historical patterns, and comparing and contrasting similar past events or statements.

Finally, *everything else* refers to the context in which the DPRK's perceptions are formed and decisions are made and rolled out. Context, to be specific, entails examining domestic and external factors and connecting the dots of ongoing trends and patterns to understand what may be driving the DPRK's behaviour. The DPRK does not issue statements or engage in actions in a vacuum. Hence, taking a single instance of the DPRK's behaviour and parsing it in isolation without seeing the bigger picture could lead analysts astray.

Pyongyang's public communications require careful study of all these five elements. Singling out or overemphasizing particular elements from the start can mislead or confuse, although at times certain elements may end up being more relevant than others.

2. SATELLITE IMAGERY ANALYSIS

The DPRK is a prime example of a low-information environment, which is why satellite imagery can be of particular importance when studying the country. Access to the country is difficult, if not impossible, and information flow to the outside is highly controlled, making satellite imagery one of the few information sources that do not go through State control.

Satellite imagery analysis requires an understanding of usual patterns of life, natural phenomena, and topographic features at a particular area of interest, as well as access to a library of imagery that allows for comparative assessments. Traditionally, having access to or building such a library was feasible for intelligence services only through national technical means. Increasing commercialization of the space industry and rapid advancements in related technology, however, have made products more affordable and accessible to the extent that non-governmental entities can now utilize a variety of data types from space-based sensors. [4] These developments have affected the study of our natural environment and social behaviour in many parts of the world, including the DPRK.

Therefore, research and news reports on activities in the DPRK increasingly feature satellite imagery as supporting evidence or as a key information source on which assessments are based. These assessments can range from analyses of the DPRK's fishing and trans-border trade activities to missile launches and nuclear-weapon development. Most commonly, they derive from outside observers' near-constant monitoring of the country's economic development: for example, industrial development, agricultural output, and natural disaster impacts, or its military capabilities, namely defence industrial capacity, missile launches, and weapons of mass destruction programmes.

While satellite imagery can provide a unique perspective on what is happening on the ground in the DPRK at a particular time, contextualization of captured information is crucial and the risk of misinformation, even if unintentional, can be high. [5] The chosen processing and analytical methodology, the availability of imagery (which, in part, also depends on budget constraints), and existing knowledge of other relevant information all highly influence what conclusions can be drawn from a particular study.

Furthermore, analysts need to be wary of a number of factors unique to the DPRK. Dense vegetation and mountainous terrain in most parts of the country make it difficult to acquire unobstructed imagery. Strong seasonal changes, frequent cloud cover and extreme weather conditions can similarly obstruct view and introduce atmospheric interferences that lead to false positives if these limitations are not properly accounted for. With much of the commercial acquisition process still task dependent, some sites yield a high volume of imagery, mostly military-related, while others have little or no available imagery. Also, some practices observed at military sites suggest that the DPRK is well attuned to external observers' monitoring through space-based sensors and engages in deceptive practices. [6] All these factors can lead to biased or inaccurate baselines and false positive interpretations of observed changes. Studies have to be purposefully designed and explicitly caveated to account for such factors and potential limitations.

Therefore, although not unique to the DPRK context, some key questions analysts should ask themselves at the outset of a study to avoid bias or inaccuracy are as follows:

- What is the area of interest? Why is it an area of interest and what changes do we seek to assess?
- What is already known about the area of interest? How unusual would an observed change be?
- What imagery type, methodology and processing technique would be best suited to capture the changes of interest?
- What is the available budget and how time-sensitive is the study?
- Is sufficient imagery already available or is custom tasking required?

As an example of why keeping these questions in mind is important to achieving accurate results, while an assessment of the impact of regional flooding on the DPRK's expected harvest may require acquisitions over large areas, it may not require the highest resolution or a deep understanding of behavioural specificities on the ground. It would benefit, however, from the availability of multi-spectral electro-optical and synthetic aperture radar data. In contrast, an assessment of the operational status of the DPRK's 5MWe nuclear reactor in Yongbyon requires acquisitions over only a very limited area, but it primarily requires very high-resolution imagery and a good understanding of the country's nuclear fuel cycle and typical operational patterns at the site.

In conclusion, the growing availability of satellite imagery has opened up many possibilities for studying the DPRK. It is best leveraged when combined with information from other sources in a purposefully designed study that is explicit about key parameters and potential limitations. Generally speaking, however, causal factors, the intent behind observed behaviour or policy implications for the DPRK and other countries can never be determined from satellite imagery alone, but require contextual knowledge and analytical expertise beyond remote sensing.

3. GROUND PHOTO ANALYSIS

In a low-information environment like the DPRK's, images and videos released by State media – most of the time intentionally but occasionally unintentionally – are another important source for analysis. Although images and frames at times appear to have been altered or even manipulated, they could still offer important clues about key topics of interest to the outside world due to its limited access to the DPRK.

For example, in a 2015 documentary released by State-run Korean Central Television (KCTV), late DPRK leader Kim Jong Il is seen inspecting Hwasong-13 intercontinental ballistic missiles (ICBMs). Analysts spotted the first-stage engines of the missiles in a few fleeting frames in this documentary (Fig. 1.). This discovery offered the world's first concrete indication of these missiles' configuration.



Fig. 1. Kim Jong Il inspects Hwasong-13 ICBM. Inset photo: a corner of the frame revealed the engine configuration of the missile's first stage. Red circles illustrate the contour of the bottom of the first stage. Image: KCTV [7]

In another example, KCTV reported on a munition industry meeting in December 2017 in celebration of the completion of the country's "nuclear armed forces." In that same programme, KCTV showed Kim Jong Il inspecting a spherical object (Figure 2). Considering the main theme of the meeting, and that other photos displayed during the meeting were relevant to the country's nuclear weapon and ballistic missiles, Kim's inspection of a purported fission device seemed possible. If Kim did in fact inspect a fission device, this photo would remain the only publicly available image of an early DPRK nuclear device. [8]



Fig. 2. Processed and enhanced image of a photo displayed at a meeting in celebration of the completion of the DPRK's nuclear arsenal. Image:KCTV [9]

Furthermore, State media photos can also provide raw material for further analysis to obtain previously unknown information and insights, for example the use of mensuration techniques to obtain technical specifications of weapon systems whose potential and capabilities remain relatively unknown. Using images published by DPRK State media, ONN measured the dimensions of submarine-launched ballistic missiles showcased by the DPRK and analysed their potential. [10]

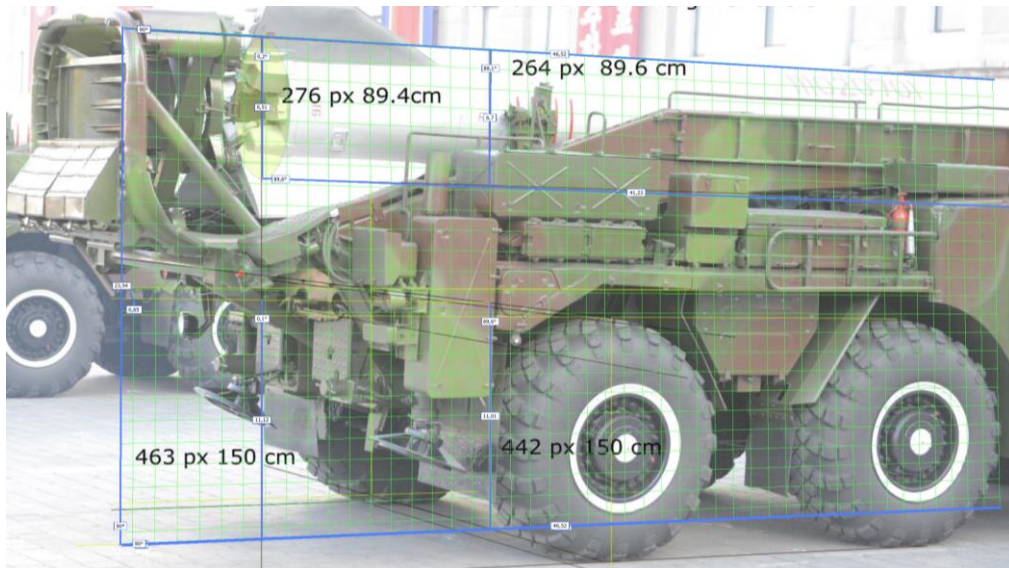


Fig. 3. The SCUD missile is known to have a diameter of 88 cm. The error of this measurement is ~ 1.5 cm. The grid is a vertical plane where the measurement is made. The reference is the wheel diameter of the MAZ-543 truck. "Px" stands for pixels. Image: Tianran Xu

4. THIRD-PARTY REPORTING

All news media outlets in the DPRK are tightly controlled by the State, and a dearth of alternative news sources makes open source mapping of the State plans and nuclear-related activities extremely difficult.

However, another viable access point for information from inside the country exists: foreign news media outlets with reporting partners from within the DPRK and the northeastern provinces of neighbouring China. Among these, *Daily NK* [11] is the most active. Leveraging a large network of DPRK residents across all provinces built up over two decades, the outlet is credited with breaking the 2009 currency redenomination, the North's economic reform policies, and the 2021 shoot-to-kill order in the newly established buffer zone along the China-DPRK border to prevent a COVID outbreak at home. [12] The informants, often recruited and trained in the China-DPRK border area and belonging to a variety of social strata, share their insights through clandestine phone calls and messaging.

Yet, third-party reports, including those by outlets with a strong track record for credibility, raise concerns to those open source practitioners who need to write accurate analysis, including that intended for nuclear safeguards stakeholders. Of particular concern is the inherent lack of transparency that comes with networks of anonymous informants, the near impossibility of independently verifying their claims, and the potential for accidental modifications of information dispersed over time.

That notwithstanding, there are methods for accessing relevant data from third-party reporting. The data can be divided into two broad categories: one that directly relates to the nuclear-related activities and intentions of the DPRK, and one that relates to the general security situation in the country, particularly in view of potentially escalatory events that could ultimately lead to the use of nuclear weapons. The latter could include humanitarian catastrophes that may result in the international community's involvement, followed by misinterpretation and retaliation by the DPRK. It could also include indicators of domestic political instability and decreased leadership control over the nuclear weapons programme.

The data collected from third-party reporting must be viewed largely as complementary to or guiding the other methodologies advanced in this paper. As with the other sources discussed in this paper, bias and intent must be examined and analysis utilizing these sources should be properly caveated.

4.1. Satellite Imagery Support

The most straightforward application of third-party reporting is in support of satellite imagery analysis. Comprehensive satellite monitoring of all visible surfaces in the DPRK on a daily basis is challenging for most organizations. Instead, an indication of where and when to search and what to look for vastly increases the ability of a researcher to collect relevant information with fewer resources. This is particularly true when investigating general security issues with potential destabilizing effects, such as natural disasters, pandemics and food security, which often require covering vast geographical areas, but may also be applied when investigating the nuclear programme.

4.1.1. Where to Search

When mapping the impact of natural disasters such as floods through satellite imagery, third-party reporting from within the country can often add value by pointing the researcher to the specific sites of damage and details thereof not included in State media reporting. It also has the potential to directly support satellite monitoring of the DPRK's nuclear programme. While most areas related to the programme are known and under frequent surveillance, third-party reporting on newly designated military areas, conspicuous removal of residents from certain regions, or even Kim Jong Un's personal visits to such areas that are not presented in State media may facilitate the search for new or additional areas to monitor.

4.1.2. When to Search

Similarly, third-party reporting can also help identify a time frame for increasing the satellite monitoring of a specific area to facilitate the acquisition of relevant data. This could include reports on an upcoming resumption of rail-based trade with China, or a sudden rapid increase in ship-based trade, which would necessitate a more detailed satellite investigation of even the slightest changes in the goods in the disinfection area outside Sinuiju or in the ship traffic at Nampo Port. Changes in trade patterns with China might indicate that the food security situation in the DPRK is becoming seriously strained, that the country requires foreign material for its pandemic response, or that it may be preparing for a phased opening of borders.

4.1.3. What to Search for

Insights from third-party reporting may also serve to inform the researcher of potential satellite imagery research projects. For example, when a proposal was made to investigate the potential existence of mass graves in the DPRK in the light of expert opinion on the likelihood of high numbers of COVID-19 deaths in the country, a quick investigation of third-party reporting indicated that the DPRK cremated its epidemic dead. This could be subsequently substantiated by defector testimonies deemed to be without clear bias, who reported a similar treatment of previous epidemic victims, and the project idea was dismissed as mass cremation was not a new development in the DPRK.

4.1.3.1 Monitoring of Patterns

Long-term wide-scale monitoring of patterns across several outlets may help to detect emerging signs of instability and may be less sensitive to individual defector biases but could still be subject to any systemic bias. This is particularly useful for identifying whether food insecurity is escalating into a famine. This can be done by monitoring reports on starvation, agricultural output and staple food market prices, or by identifying the resurgence of COVID-19 and other deadly epidemics. Long-term monitoring of patterns can also be used to track the DPRK's domestic propaganda on nuclear weapons, the country's military structure, and institutes involved in the nuclear programme, or even changes in the DPRK's missile testing intentions.

4.1.3.2 Radiation Safety and Protection Insights

Third-party reporting may also enable insight into the nation's radiation safety and population protection strategies. Following the sixth nuclear test, residents of several areas in the vicinity of the test reported to Daily NK that there had been damage to buildings, which might indicate that the DPRK leadership misjudged the scale of the nuclear test or had inadequate civil protection protocols. [13] Other reports cited residents who claimed to be suffering from radiation-related illnesses from living or working close to mines and nuclear facilities. [14] Although these reports are difficult to substantiate with the limited information available, they may provide some information on the state of nuclear and radiological safety in the DPRK.

4.2 Importance of Third-Party Reporting

Third-party reports will likely be the first open source indicators of potential societal ruptures such as civil unrest, a famine, economic collapse or mass defections across the border into China. It may also provide indications of comprehensive changes in political leadership or military structures. Should the current isolation of the DPRK continue, third-party reporting will prove even more valuable. Whether immediate substantiation of such claims through other monitoring techniques is possible or not, it does provide the safeguards community with an early-warning system that would allow for preparations to be made before international verification is possible.

5. CONCLUSION

In this paper, the authors have proposed that DPRK propaganda and satellite imagery analysis methods, DPRK media-provided ground photos and video, and third-party reporting are the most viable options for both increasing access to the country's information and improving the safeguards community's understanding of the country's situation and the Pyongyang leadership's current and future calculus.

No one of these techniques should dominate: the efficacy of each tool can be maximized when used in conjunction with other techniques. For example, increased DPRK State media rhetoric on missiles is typically a strong indicator of the country's increased interest in missile development and testing, and a tip-off from a DPRK propaganda analyst can be useful to a satellite imagery analyst or even to one studying third-party reporting. Conversely, satellite imagery analysts can never determine intent behind observed behaviour, but their observations can complement a propaganda analyst's study of the DPRK leadership's thinking on an issue.

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