Open Nuclear Network’s
FACTORS RELATED TO PAST DPRK NUCLEAR TESTS
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I. Executive Summary
In light of recent analyses about a possible next nuclear weapon test by the DPRK, ONN has compiled data related to each of the six previous nuclear weapon tests of the DPRK, specifically the timing of the previous tests, nuclear test site preparations, launch vehicle development, environmental factors and the political context. These factors may assist in assessing when a next test might take place. It should be noted, however, that there may be other relevant factors that cannot be fully understood from open sources (e.g. the intentions of Kim Jong Un).

II. Past Nuclear Tests
A. Timing - Times, Days, Dates
All six previous nuclear tests took place between 9:30 and 12:30 (KST). On the other hand, there appears to be no strong correlation between the timing of the tests and the day of the week. Five out of the six nuclear tests were conducted on or in the lead-up to major anniversaries in the DPRK. Two tests took place on or very near a significant date on the U.S. calendar: the second test (2009), which took place on US Memorial Day; and the sixth test (2017), which took place one day before US Labor Day. Three nuclear tests took place during US or ROK presidential election campaigns or inaugurations: the third test (2013) took place on the day of the 2013 US State of the Union Address and nearly two weeks before the inauguration of former-ROK President Park Geun-hye; the fifth test (2016) took place in the month before the 2016 US presidential election; the sixth test (2017) took place just less than four months after former-ROK President Moon Jae-in’s inauguration.

B. Nuclear Test Site
No clear signatures of test preparations at the Punggye-ri nuclear test site were identified using commercially available satellite imagery. For the first (2006) and second (2009) nuclear tests, no sufficiently high-resolution satellite imagery has been identified that could be utilized to make such assessments. Several signs of activity starting at approximately three months before the third (2013) nuclear test were identified, including an increase in the number of personnel and vehicles near the test tunnel, concealment of the tunnel entrance, a probable cable line stretching from the tunnel entrance and a probable satellite dish near the tunnel entrance. In the run up to the fourth (2016), fifth (2016) and sixth (2017) nuclear tests, no clear signs were visible in available satellite images.

C. Launch Vehicle Development
The DPRK’s timing of nuclear tests seems to be correlated with its launch vehicle development programme schedule — five of the previous six nuclear tests were undertaken within three months of a long-range rocket or satellite launch. Conversely, the longest span of time separating a launch from a nuclear test was a failed test in April 2012, which was just over ten months before the third nuclear test (2013).

D. DPRK Statements
In two of the six previous nuclear tests, the first test (2006) and the third test (2013), explicit comments were made by the DPRK leadership in the weeks prior to the tests clearly indicating
its intention to perform a nuclear test. No similarly explicit statements were identified as having been made in the leadup to the other nuclear tests.

E. Environmental Factors
None of the DPRK’s previous nuclear tests, or intercontinental ballistic missile (ICBM) or satellite launches, were conducted in June or August. The inactivity in June is assessed as likely related to state-wide manpower-intensive agricultural projects, which may require the mobilization of the military during the rice transplantation season between mid-May and mid-June. With respect to August, heavy rainfall could potentially damage the nuclear test site and impact test operations.

F. Political Context
The second nuclear test (2009) took place while then-DPRK leader Kim Jong Il’s health was deteriorating and the DPRK was in a transition period.
## APPENDIX: PAST DPRK NUCLEAR TESTS

<table>
<thead>
<tr>
<th>Nuclear Test</th>
<th>Date</th>
<th>Time (KST)</th>
<th>Day of Week</th>
<th>Significant DPRK Date</th>
<th>Significant International Date</th>
<th>ICBM / Satellite launch (^{a})</th>
<th>Explicit Official Statement</th>
<th>Outside of Agricultural Season?</th>
<th>Outside of Rainy Season?</th>
<th>Political Context</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st</td>
<td>9 Oct 2006</td>
<td>10:35</td>
<td>Mon</td>
<td>10 Oct - 61st founding anniversary of the WPK</td>
<td>None</td>
<td>5 Jul 2006 Long-range rocket launch [failed] within ~3 months</td>
<td>Yes(^{b}) 6 days prior</td>
<td>Yes</td>
<td>Yes</td>
<td>15 Jul 2006: UNSC resolution 1695 adopted condemning DPRK missile launches</td>
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<td></td>
<td>24 Apr 2009: UNSC imposed financial sanctions on three DPRK firms related to WMD proliferation</td>
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<tr>
<td>3rd</td>
<td>12 Feb 2013</td>
<td>11:57</td>
<td>Tue</td>
<td>10 Feb - Korean New Year in 2013</td>
<td>None</td>
<td>5 Apr 2012 Satellite launch [failed] within ~10 months</td>
<td>Yes(^{c}) 19 days prior</td>
<td>Yes</td>
<td>Yes</td>
<td>22 Jan 2013: UNSC resolution 2087 adopted</td>
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<td></td>
<td></td>
<td>12 Dec 2012 Satellite launch within ~2 months</td>
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<tr>
<td>4th</td>
<td>6 Jan 2016</td>
<td>10:30</td>
<td>Wed</td>
<td>8 Jan - Kim Jong Un's 33rd birthday [note: not an official DPRK holiday]</td>
<td>None</td>
<td>7 Feb 2016 Satellite launch within ~1 month</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>No action taken by the UNSC between January 2013 and March 2016</td>
</tr>
<tr>
<td>5th</td>
<td>9 Sept 2016</td>
<td>9:30</td>
<td>Fri</td>
<td>9 Sept - 68th founding anniversary of the Republic</td>
<td>5 Sep - US Labor Day</td>
<td>7 Feb 2016 Satellite launch within ~7 months</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>2 Mar 2016: UNSC resolution 2270 adopted</td>
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<td>9 Dec 2016: impeachment of ROK President</td>
<td>28 Nov 2017 ICBM test within ~3 months</td>
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<td>9 Sept - 69th founding anniversary of the DPRK</td>
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<td>11 May 2017: ROK President Moon Jae-in inaugurated</td>
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<td>5 Aug 2017: UNSC resolution 2371 adopted</td>
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</table>

This table includes information that was identified as most relevant to a past nuclear test; this list is not exhaustive of all potentially relevant factors.
Endnotes


iii David Albright and Robert Avagyan, "Monitoring Activity at Punggye-ri Nuclear Test Site", 3 February 2013, available at: https://isis-online.org/isis-reports/detail/monitoring-activity-at-punggye-ri-nuclear-test-site/10#images. Also, see Planet Labs images for the periods between 1 December 2015 through 6 January 2016, 1 August through 9 September 2016, and 1 August through 3 September 2017 at the following locations: Punggye-ri, Tunnel 2 (41° 16′ 51″ N 129° 05′ 08″ E), the main administrative area (41° 16′ 41″ N 129° 05′ 15″ E) and the southern support areas (41° 13′ 39″ N 129° 06′ 37″ E and 41° 13′ 13″ N 129° 06′ 28″ E), available at: https://www.planet.com/explorer/.


v In the past, the Japanese Ministry of Defense has noted in its Annual White Papers that the DPRK soldiers were mobilized for agricultural works. For example, see, Japanese Ministry of Defense, Defense of Japan (Annual White Paper) 2014, Section l-1-2-1, available at: http://www.clearing.mod.go.jp/hakusho_data/2014/html/n1121000.html#a9

vi This list includes all known DPRK ICBM/satellite launches through December 2021. The list does not include the DPRK’s 1998 attempted launch of its first satellite using a small carrier rocket, as the vehicle had little potential for use as a long-range rocket.


viii The DPRK National Defence Commission stated: “We do not hide that a variety of satellites and long-range rockets which will be launched by the DPRK one after another and a nuclear test of higher level which will be carried out by it in the upcoming all-out action, a new phase of the anti-U.S. struggle that has lasted century after century, will target against the U.S., the sworn enemy of the Korean people....” Ju-min Park, Choonsik Yoo, “North Korea to target U.S. with nuclear, rocket tests,” Reuters, 24 January 2013, available at: https://www.reuters.com/article/uk-korea-north-nuclear-idUKBRE90N0Z020130124
One Earth Future Foundation (OEF) is an incubator of innovative peacebuilding programs that designs, tests, and partners to scale programs that work hand-in-hand with those most affected by conflict to eliminate the root causes of war. We believe in a world beyond war, where sustainable peace is truly possible.

One Earth Future's Open Nuclear Network programme is a non-aligned, non-governmental entity that seeks to increase security for all States by ensuring that nuclear decision makers have access to high quality, shareable open source information which enables them to make the best decisions in the face of escalating conflict.

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