What Will 2014 Bring for North Korea's Nuclear Program?

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The 250,000-feet Vantage Point: A Satellite Tour of North Korea's WMD Program

- North Korea's WMD program includes R&D facilities, nuclear and missile test sites, plutonium production and uranium enrichment facilities
- Commercial satellites taking pictures of North Korea can reveal a great deal about what Pyongyang has up its sleeve
- Satellite imagery at four of North Korea's key WMD installations suggest that 2013 was a productive year for Pyongyang in its push to modernize the country's nuclear weapons complex

North Korea's WMD Development in 2013 and Its Implications for the Year Ahead

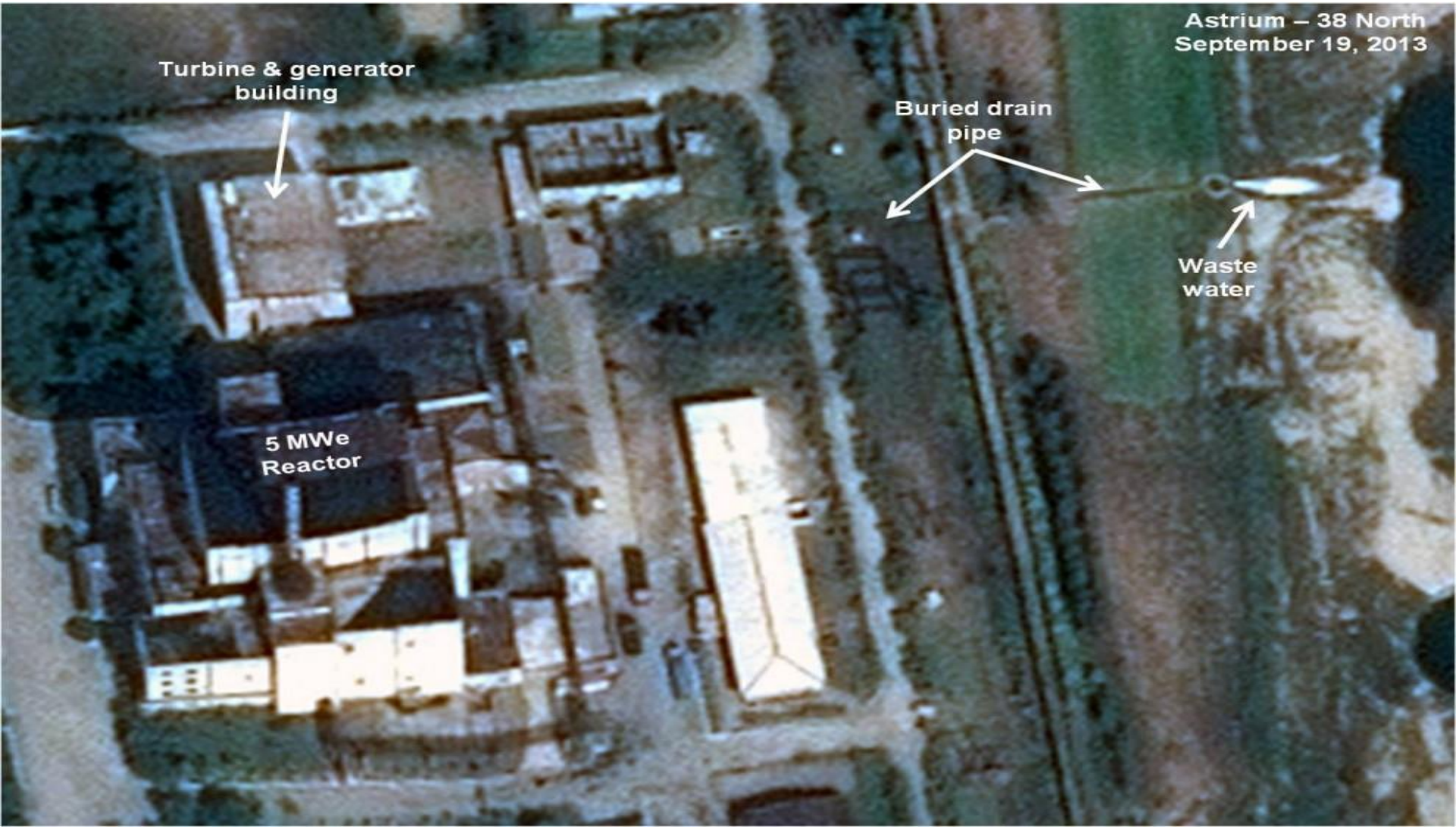
- Analyses of Commercial Satellite Imagery at Key Facilities:
  - Yongbyon Nuclear Facility
  - Punggye-ri Nuclear Test Site
  - Sohae Rocket Test Facility
  - Tonghae Rocket Test Facility
- 2014?

1. Yongbyon Nuclear Facility

- North Korea's oldest nuclear installation
- Launched a major modernization program 2 years ago, which began to yield results:
  - Restart of an old 5MW Plutonium production reactor
    - Shuttered in 2007 as part of the Six-Party Talks agreement
    - Plutonium used in the North's nuclear tests and nuclear arsenal
    - Produce on bomb's worth of fissile material every year
  - Doubling the size of new uranium enrichment plant – first revealed in 2010, probably not yet fully operational
    - ELWR externally complete—internal work ongoing
    - Football field size structure built—possible ELWR fuel assembly building

Yongbyon Nuclear Facility (Cont'd)

Figure 1. Evidence that North Korea Has Restarted Its 5MW Reactor – Waste Water Dumped into the Kuryoung River (September 19, 2013)

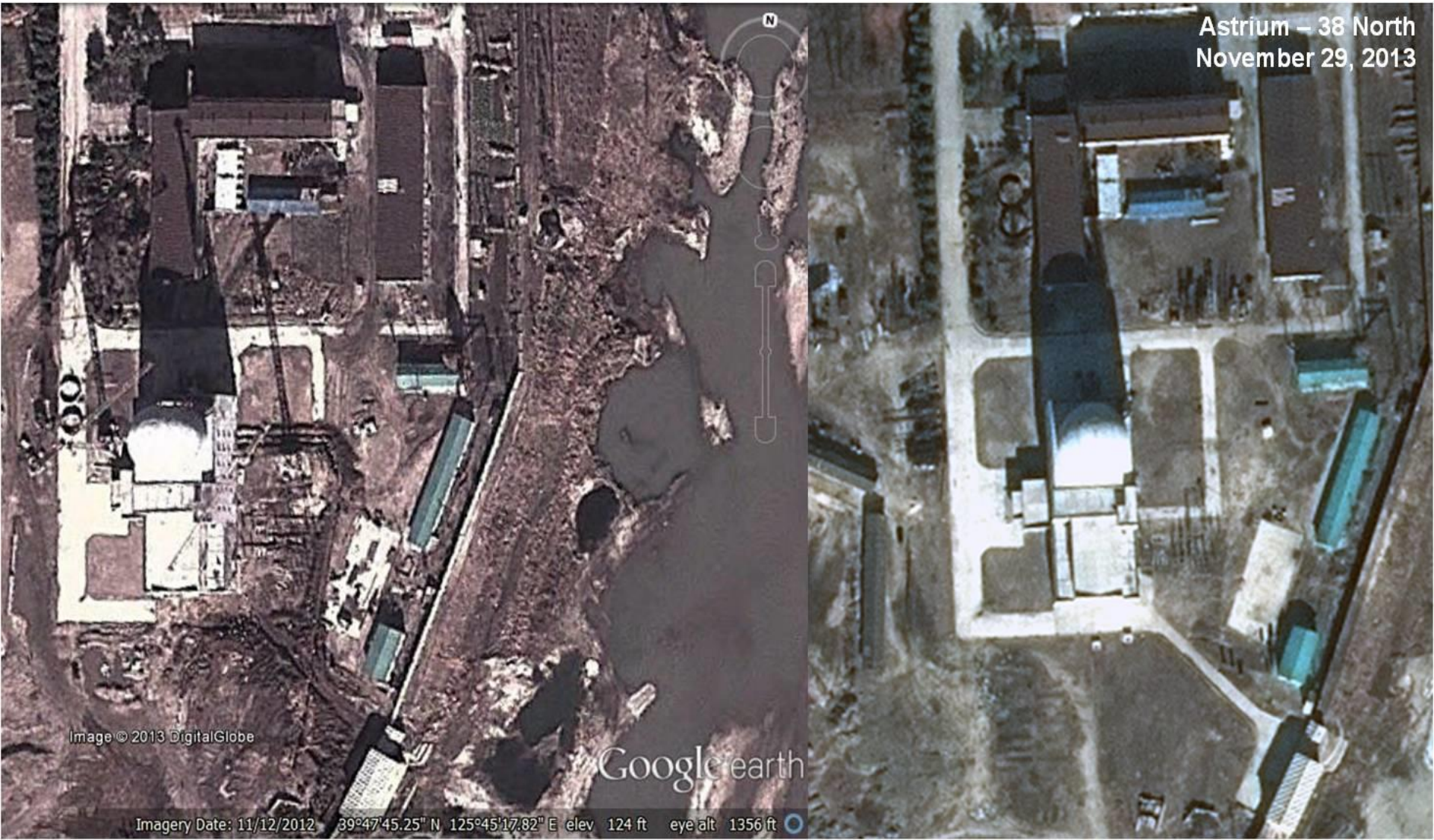


Yongbyon Nuclear Facility (Cont'd)

Figure 2. Expanded Uranium Enrichment Facility (November 10, 2013)

Yongbyon Nuclear Facility (Cont'd)

Figure 3. Construction of the ELWR (November 29, 2013)



Yongbyon Nuclear Facility (Cont'd)

Figure 4.

Possible ELWR Fuel Assembly Building (September 19, 2013)

Yongbyon Nuclear Facility: Things To Watch in 2014

- **Restart a large reprocessing plant** that can separate plutonium from the spent fuel rods in the operation reactor
- **Uranium enrichment plant – could become operational**
- Pyongyang finish inside the new LWR and get ready for trail runs leading to eventual operation

2. Punggye-ri Nuclear Test Site

- Site of 3 nuclear tests in 2006, 2009, and 2013
- Most of past year spent getting ready for more blasts
  - New tunnel is being dug to add to 2 already completed ones
  - Key facilities to support detonations upgraded

Punggye-ri Nuclear Test Site (Cont'd)

Figure 5. West Portal Activity – Tunnel Excavation and Spoil Pile Growth (November 11, 2013 and December 2, 2013)

Punggye-ri Nuclear Test Site (Cont'd)

Figure 6. Two South Tunnel Entrances (May 12, 2013)

Punggye-ri Nuclear Test Site: Things To Watch in 2014

- 2013 cannot provide strong insight into whether the North plans to test again in 2014
- **Can conduct a test quickly—two months**—once it decides to do so
- Growing number of tunnels suggests **North Korea can test** into the foreseeable future

3. Sohae Rocket Test Facility

- Site of North Korea's 2012 rocket launches; 5 times larger than older Tonghae test facility
- Tests of engines to develop bigger rockets
- Six new construction projects started in 2013
  - Modify the pad used for 2012 tests of the Unha SLV to fire bigger rocket reportedly 25% longer with a larger booster that can lift satellites into higher orbits. Develop missiles able to fly intercontinental distances
  - Appears to be constructing flat-launch pads for testing new mobile missiles still under development
    - Includes the KN-08, a mobile intercontinental range ballistic missiles

Sohae Rocket Test Facility (Cont'd)

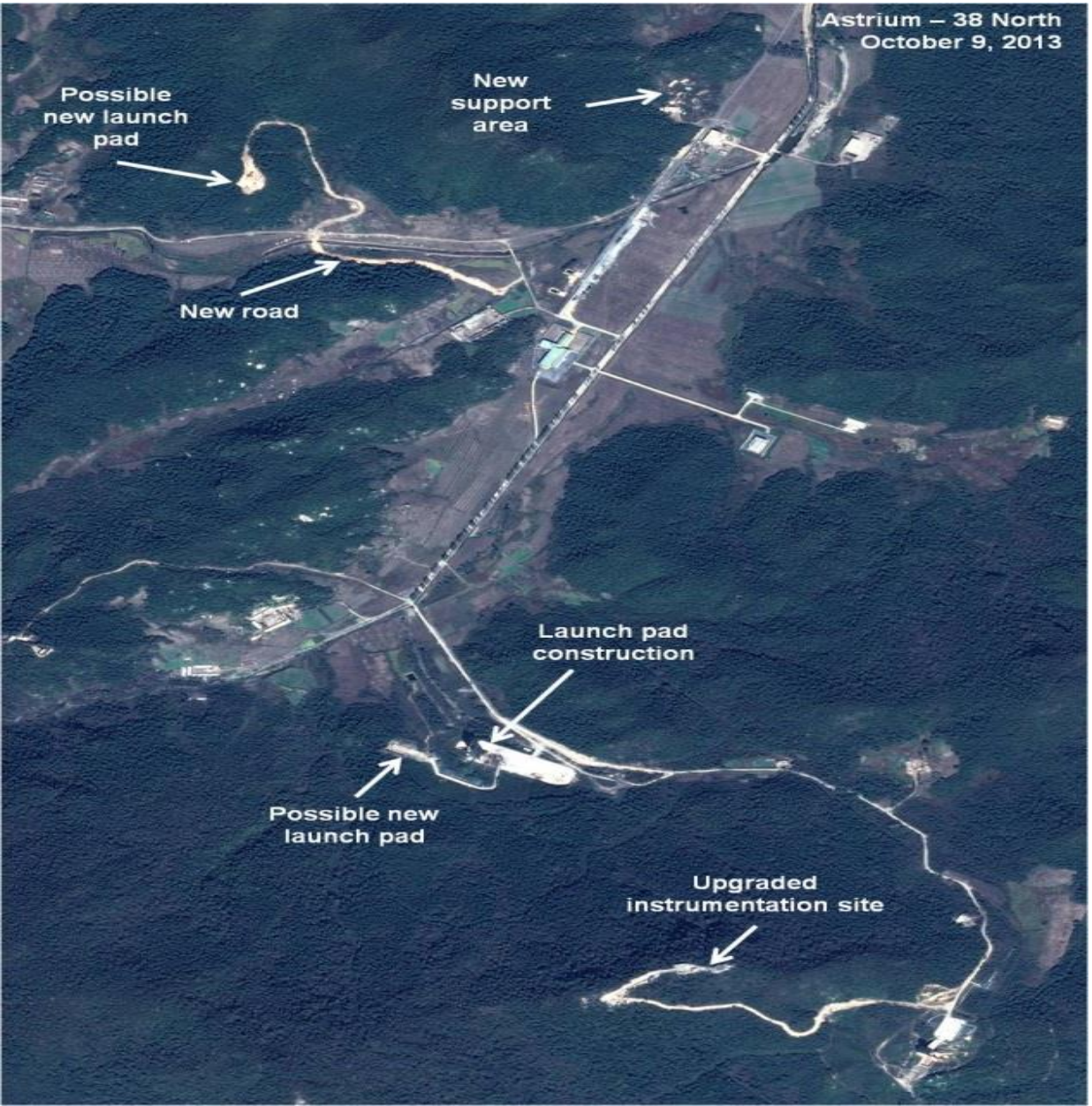


Figure 7.

Overview of Sohae Construction Projects (October 9, 2013)

Sohae Rocket Test Facility (Cont'd)

Figure 8.

Possible Flat Launch Pad for Mobile Missiles (October 9, 2013)

Sohae Rocket Test Facility (Cont'd)

Figure 9. Pre-rocket Engine Test Activity (August 25, 2013)

Sohae Rocket Test Facility: Things To Watch in 2014

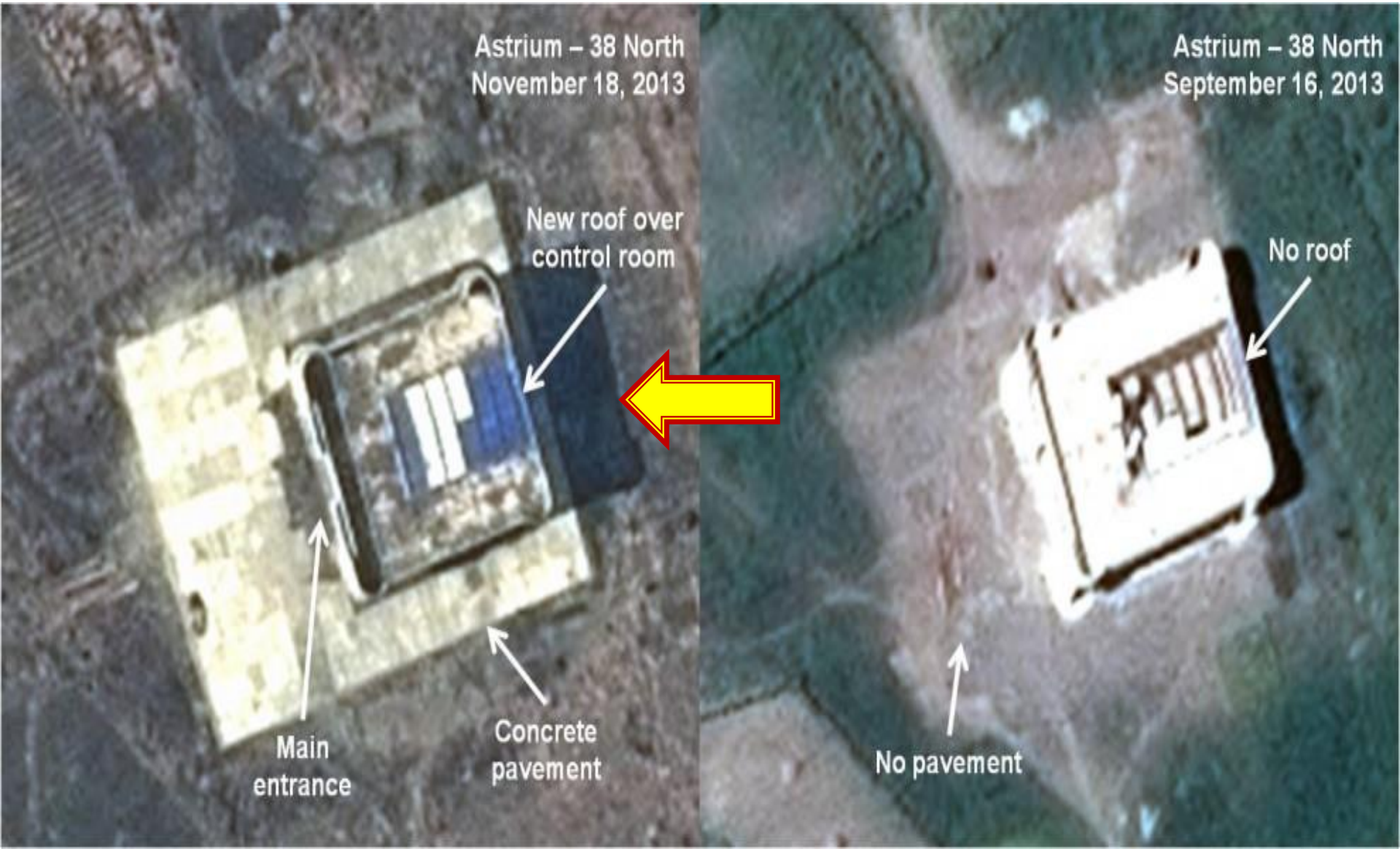
- **Construction of the modified launch pad completed** by early spring
  - Allow the North to conduct full-scale launches of either its old Unha rocket or a new larger SLV
- **Mobile missile tests** could take place at any time after summer if flat launch pads completed

4. Tonghae Rocket Test Facility

- Fell into disuse after a rocket launch in 2009. Newer Sohae facility had been completed
- Major construction program started in 2011, then halted in late 2012, and resumed in the fall of 2013
  - Pyongyang could be planning an active rocket development and space-launch program that requires another facility
- In eight weeks, North Korea completed a new launch-control center and resumed construction of a rocket-assembly building
  - Work yet to resume on a new pad for launching larger rockets
  - Nearby buildings will house fuel tanks 3 to 4 times larger than those needed to support launces of the Unha

Tonghae Rocket Test Facility (Cont'd)

Figure 10. Roof Installed at the New Control Center (November 18, 2013)



Tonghae Rocket Test Facility (Cont'd)

Figure 11. Major Construction at the New Assembly Building (November 18, 2013)

Tonghae Rocket Test Facility (Cont'd)

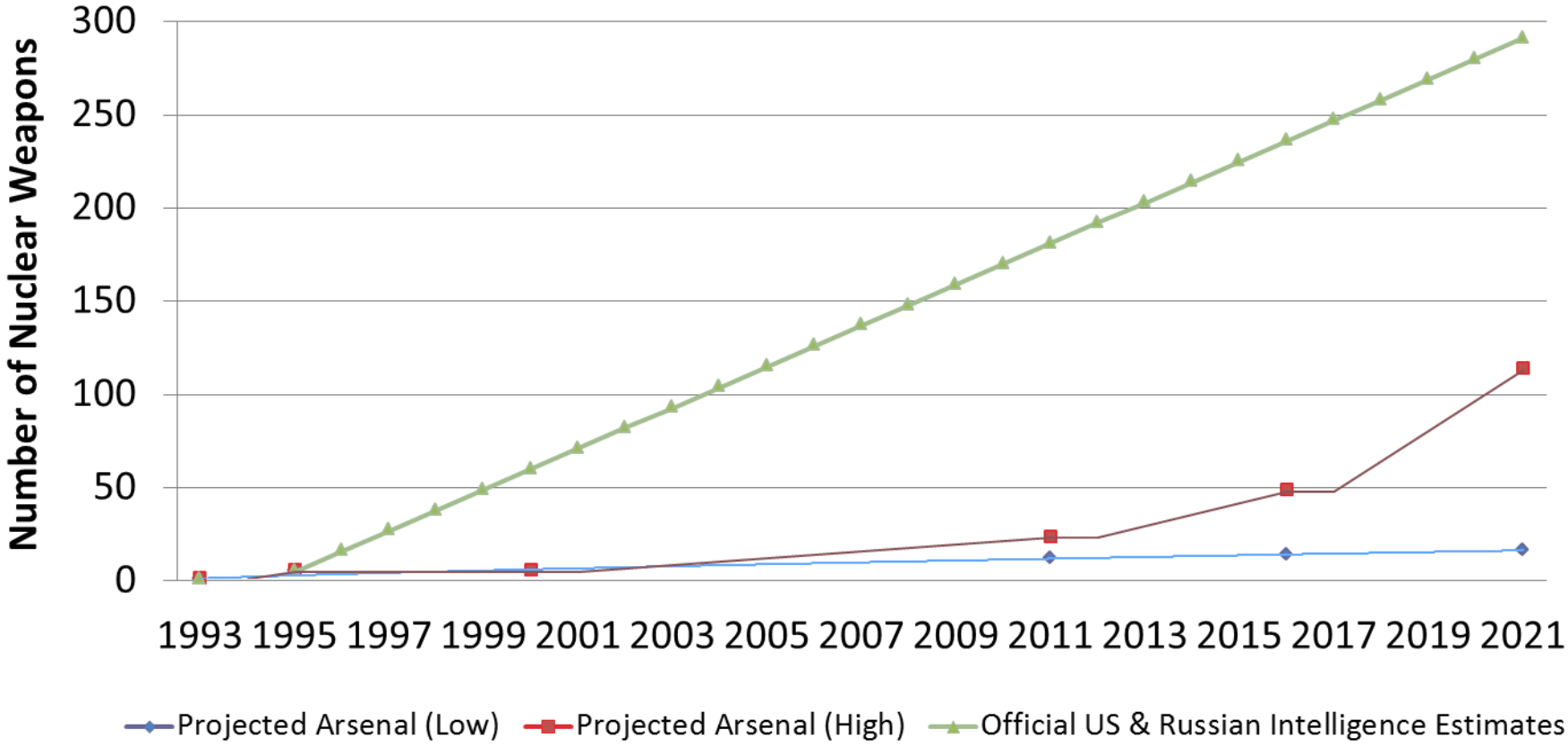
Figure 12.

New Launch Pad Construction (November 18, 2013)

Tonghae Rocket Test Facility: Things To Watch in 2014

- North Korea may make **significant progress in completing construction**
  - New launch pad, rocket assembly building, and fuel-tank buildings
  - Enable Pyongyang to use the newly modernized site for **support firing large rockets in the future**

Projected Nuclear Weapons Arsenal, 1993-2021



Notes: The above graph does not include larger power reactors (150kg of plutonium per year)
The estimated baseline at the end of 2011 was 12-23 weapons.