DPRK nuclear status

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Update of DPRK nuclear progress

- **Reactors**
  - 5 MWe reactor operating, ELWR close to operation
- **Reprocessing facility**
  - Remained in stand-by, possible reactivation in 9/15
- **Fuel fabrication facility**
  - Much expansion since 2009
- **Uranium enrichment**
  - Apparent expansion, possibly large capacity
- **Nuclear test site** (Activity, but no signs of new test)
- **Missile program** (Lots of activity at Sohae)

Update of DPRK nuclear progress

- 1965 – 1985 Laying the foundation
- 1986 – 1994 Nuclear weapon option developed
- 1995 – 2003 Plutonium freeze, HEU hedge
- 2003 – 2006 Build and test the bomb
- 2007 – 2008 Disable Pu, continue HEU
- 2009 – 2010 Test #2, preparing HEU option
- 2010 – 2015 Test #3 Build up of nuclear arsenal

Estimates of DPRK nuclear program

Nuclear Capability	December 2015 Estimates	December 2016 Estimates
Plutonium	34 – 42 kg	34 – 52 kg
HEU (Highly enriched U)	Possibly 300 kg	Possibly 450 kg
Nuclear tests	3 (possible 4th	3 or 4
Nuclear weapons	**~ 6 Pu + 12 HEU = 18**	**Possibly 8 Pu + 18 HEU**
Long-range rockets	Successful Unha-3 launch (Dec. 2012)	Unha-3 Possibly more tests

Estimates of DPRK nuclear program by 2020

Nuclear Capability	December 2016 Estimates	2020
Plutonium	34 – 52 kg	Possibly 70 kg
HEU (Highly enriched U)	Possibly 450 kg	~150 kg/yr
Nuclear tests	3 or 4	Possibly 4
Nuclear weapons	**Possibly 8 Pu + 18 HEU**	**~10 Pu + 42 HEU**
Long-range rockets	Unha-3 Possibly more tests	Musudan or KN-08 tests

Three no's are still a good option

- **Essentially no hope of giving up nukes in the near term**

- **Should we still push for 3 No's in return for 3 Yes's**
  - No more bombs
    - Important to stop buildup and diversification
  - No better bombs (no nuclear or missile testing)
    - Important to constrict miniaturization
  - No export
    - New concerns – ISIS or others

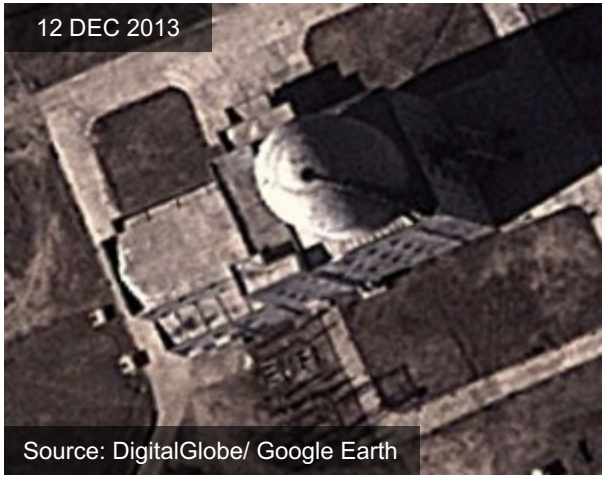
  In return
  - Address the North's security concerns
  - Provide energy assistance
  - Provide economic assistance

Backup

DPRK nuclear program: Rate of growth

Nuclear Capability	January 2003	December 2014
Plutonium	0 to 10 kg	24 to 42 kg
HEU (Highly enriched U)	Likely zero	Possibly 150 kg
Nuclear tests	Zero	3 (possible 4th)
Nuclear weapons	Likely zero Pu Zero HEU	~ 6 Pu + 6 HEU = 12
Long-range rockets	One failed Taepodong-1 launch (1998)	Successful Unha-3 launch (Dec. 2012)

Overhead imagery



IHS Jane's Satellite Imagery Analysis

Yongbyon, North Korea
39.796924 N 125.754810 E
Image Date: 3 February 2014 / Pleiades Satellite

The new Experimental Light Water Reactor (ELWR) sits on the site of the original 5 MWe reactor's cooling tower. The ELWR's pump house will now serve a secondary cooling system for each reactor.


Airbus Defense & Space / 38 North
August 22, 2015
Reprocessing building
Spent fuel rod receiving building
Unidentified material
Support building
Chemical storage building
Vehicles
Vehicles
A 38 North exclusive with analysis by William Mugford and Jack Liu, 9/8/15
Image includes material Pleiades © CNES 2015
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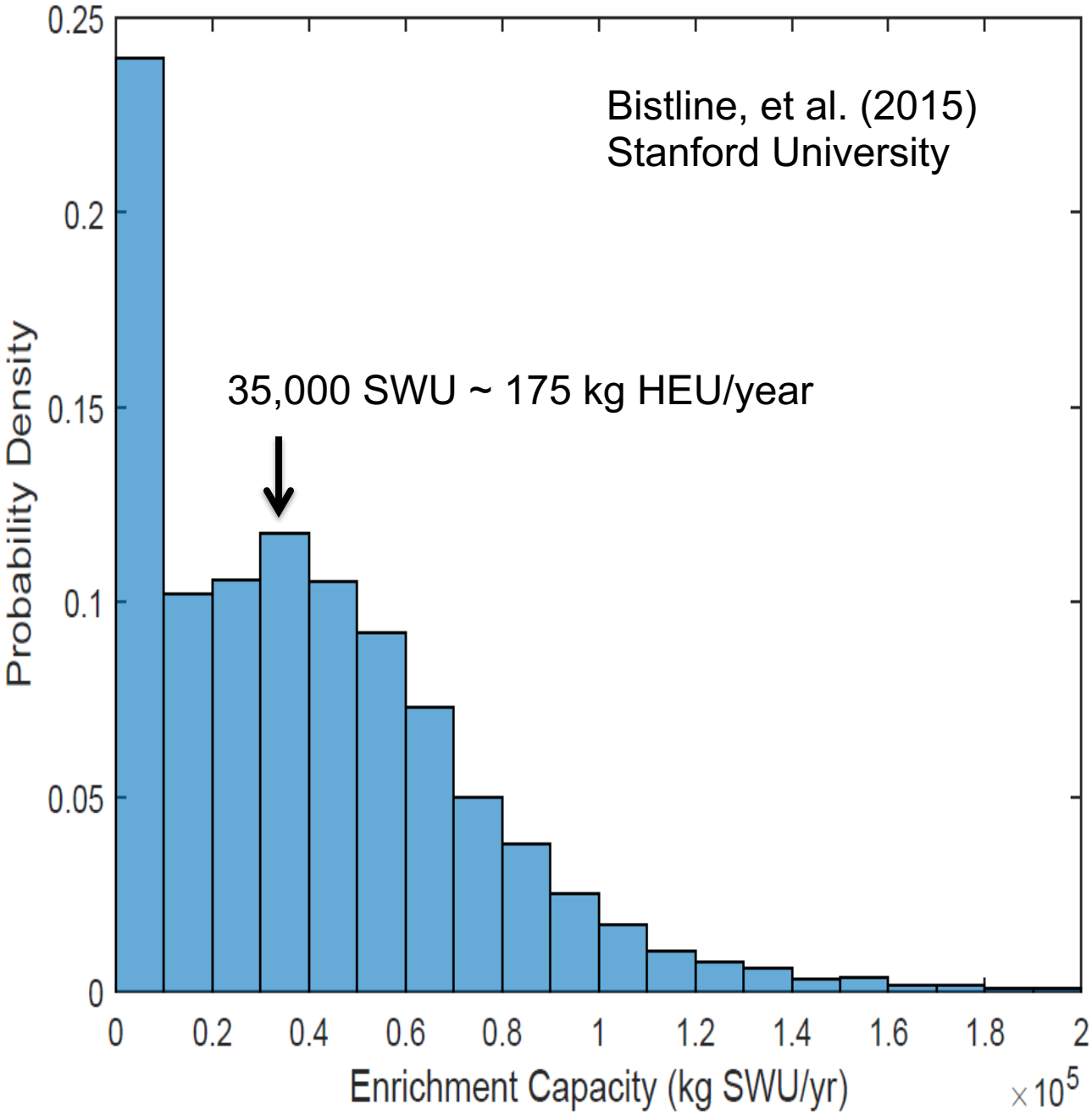
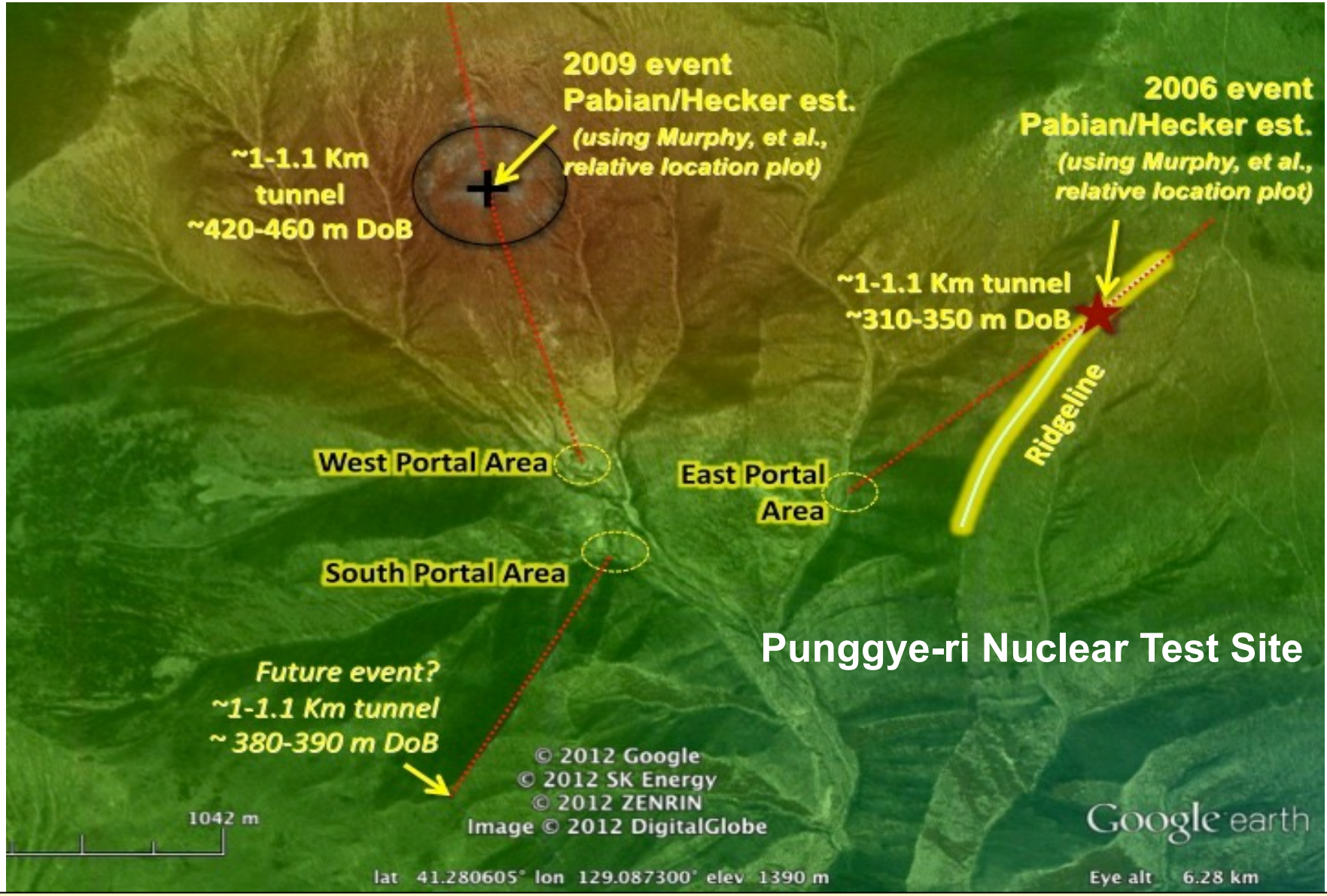
IHS **Jane's Satellite Imagery Analysis**

Yongbyon, North Korea
39.770027 N 125.750307 E
Image Date: 3 February 2014 / Pleiades Satellite

The fuel fabrication facility is the largest of the functional areas in the southern half of the Centre. Visible is a new centrifuge building with an expected capacity of 2,000 centrifuges.


Bistline, et al. (2015)
Stanford University
35,000 SWU ~ 175 kg HEU/year
Probability Density
0.25
0.2
0.15
0.1
0.05
0
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2
Enrichment Capacity (kg SWU/yr)
×10^5

Better bombs? North Korea would require another test



Testing is still an area of restraint

DPRK delivery systems

- SCUD (mobile, liquid fueled) 300 – 600 km
- KN-02 Toksa SRBM (solid fueled, like SS-21)
- Nodong IRBM (mobile, liquid fueled) 1200 – 1500 km
- 60 Il-28 light bombers
- **Future**: Long-range Taepodong ICBM (based on Unha SLV)
- Road mobile Musudan IRBM
- KN-08 ICBM (~ 9000 km)
- Short-range, sea-based land-attack missiles

Pyongyang's inventory of older liquid-fueled missiles is impressive, but its history shows a striking lack of progress compared to Pakistan and Iran.
John Schilling and Henry Kan, US-Korea Institute at SAIS, 2015