

LA-UR-16-26273

Approved for public release; distribution is unlimited.

Title: The Efficient Utilization of Open Source Information

Author(s): Baty, Samuel R.

Intended for: LANL ADX Hydro Working Group

Issued: 2016-08-23 (rev.1)

Disclaimer:

Los Alamos National Laboratory, an affirmative action/equal opportunity employer, is operated by the Los Alamos National Security, LLC for the National Nuclear Security Administration of the U.S. Department of Energy under contract DE-AC52-06NA25396. By approving this article, the publisher recognizes that the U.S. Government retains nonexclusive, royalty-free license to publish or reproduce the published form of this contribution, or to allow others to do so, for U.S. Government purposes. Los Alamos National Laboratory requests that the publisher identify this article as work performed under the auspices of the U.S. Department of Energy. Los Alamos National Laboratory strongly supports academic freedom and a researcher's right to publish; as an institution, however, the Laboratory does not endorse the viewpoint of a publication or guarantee its technical correctness.

LA-UR-16-26273



The Efficient Utilization of Open Source Information

Samuel R. Baty

A-2, Intelligence & Systems Analysis

August 11, 2016

UNCLASSIFIED



Primary Considerations

- Open source information consists of a vast set of information from a variety of sources.
 - World news
 - Unclassified documents and reports
 - Maps and Satellite imagery
 - Patents, scientific papers etc.
- Not only does the quantity of open source information pose a problem, the *quality* of such information can hinder efforts.
 - Usually difficult to verify

UNCLASSIFIED

The Method of Solving Problems

- In many cases, limitations in content prevents analysts from finding an exact answer to a question.
- One important problem solving strategy is to bound a system's capability or technologies.
- By using additional valuable information, more refined bounds can be built, allowing for more precise estimates.
- Two example problems are found in examinations of Iran and North Korea

UNCLASSIFIED

Case Study: Iran

- Consider the Iranian space program.
- Iran has demonstrated a satellite launch capability using the domestically produced Safir rocket family.



Images: Safir
Rockets (1, 2).



UNCLASSIFIED

Case Study: Iran (Cont.)

- Given the success of Safir launches, could Iran utilize or modify existing satellite launch vehicles (SLVs) into ICBMs?
- What are key factors to consider when analyzing a ballistic missile?
 - Size of deliverable
 - Range
- Using these parameters, a Δv for the missile system can be defined for a given mass.

UNCLASSIFIED

Case Study: Iran (Cont.)

- What is a good estimate for the mass of a reentry vehicle (RV)?
- How can we arrive at that estimation?

UNCLASSIFIED

Case Study: Iran (Cont.)



Selection of US RVs (L to R: Mk 6, Mk 12a, Mk 21).
Not great analogies for a first Iranian RV (3,4,5).

UNCLASSIFIED

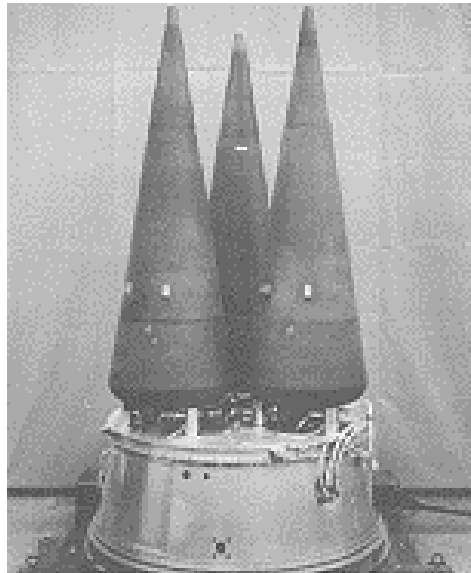
Case Study: Iran (Cont.)

- We can estimate materials and sub-systems, using relatively small (in volume) US systems.
 - Safing, arming, fuzing, firing (SAFF)
 - Special nuclear material
 - High explosives
 - RV shell
 - plastics/foams/etc.
 - Others?
- Using these, and weighting by volume, a lower mass bound was estimated at 740-1150 lbs.

UNCLASSIFIED

Case Study: Iran (Cont.)

- Minuteman III throw weight is ~2400 lbs



Minuteman III
with 3 Mk 12a
RVs (6)

UNCLASSIFIED

Case Study: Iran (Cont.)

- Using this mass, a Safir system does not have the required Δv needed to reach necessary apogee to be considered an ICBM.
- A comparison with western missiles of the same capability yields a bounded estimate (in time) of when Iran could have a nuclear capable ICBM.

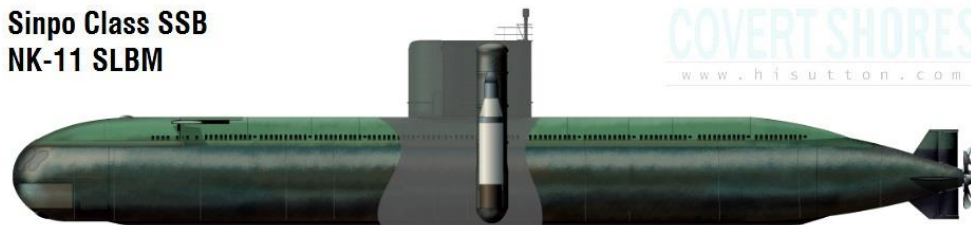
UNCLASSIFIED

Case Study: North Korea

- Consider the naval capabilities of the DPRK.
- How long would it take for the DPRK to successfully develop a reliable SLBM capability?



Sinpo Class SSB
NK-11 SLBM



NK-11 Missile ejection and estimate of Sinpo-Class SSB (7,8).

UNCLASSIFIED

Case Study: North Korea (Cont.)

- In similar fashion to the Iran case, what does the DPRK need to achieve its goal?
 - A nuclear weapon. (Deliverable/miniaturized)
 - Reliable SLBM system
 - SSB(N)
 - Supporting technology for SLBMs and SSB(N)s
- How long would it take for the DPRK to successfully develop a reliable SLBM capability?

UNCLASSIFIED

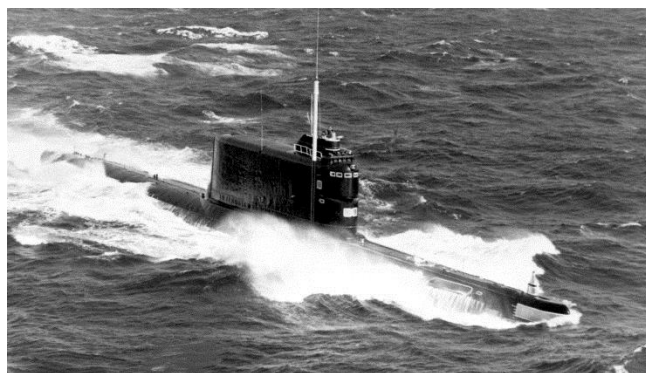
Case Study: North Korea (Cont.)

- North Korea has made some fairly substantial claims...
 - Claim of “Hydrogen Bomb” test, Jan 2016 (BBC).
 - Claim of being about to fully “cope with America with nuclear weapons at any time” (CNN).
- North Korean rhetoric alone will not provide an accurate understanding of capabilities.
- Important to consider that posturing can be geared both for domestic propaganda or foreign intimidation.

UNCLASSIFIED

Case Study: North Korea (Cont.)

- Reality: Primarily using maps and satellite imagery as the source of information:
 - ~ One Sinpo Class submarine (assumed operational)
 - Testing of SLBMs initially only platform based.
- Check through tracking tech transfers (Golf II, R-27)



Golf II class
submarine
(USSR) (9)

UNCLASSIFIED

Case Study: North Korea (Cont.)

- Similarly to the Iran case, a comparison to Western development provides a minimum bound for the time needed to have a credible SLBM capability.
 - What is the difference between a “usable” capability and a “reliable” capability?

UNCLASSIFIED

Case Study: North Korea (Cont.)

- SSBNs, instead of SSBs, allow for a more flexible deterrent for several reasons
 - Quiet
 - Long(er) deployment times
 - Longer effective range
- However, all of the required infrastructure for a naval nuclear reactor is certainly not trivial.
- The domestic production timeframe on an SSBN class likely exceeds a decade.

UNCLASSIFIED

Conclusions

- The huge breadth and depth of open source information can complicate an analysis, especially because open information has no guarantee of accuracy
- Open source information can provide key insights either directly or indirectly:
 - Looking at supporting factors (flow of scientists, products and waste from mines, government budgets, etc.)
 - Direct factors (statements, tests, deployments)

UNCLASSIFIED

Conclusions (Cont.)

- Fundamentally, it is the independent verification of information that allows for a more complete picture to be formed.
- Overlapping sources allow for more precise bounds on times, weights, temperatures, yields or other issues of interest in order to determine capability.
- Ultimately, a “good” answer almost never comes from an individual, but rather requires the utilization of a wide range of skill sets held by a team of people.

UNCLASSIFIED

Picture and Graph Credits

1. <http://www.spacelaunchreport.com/slr2015q1.html>
2. <http://www.spaceflight101.net/irans-safir-rocket-successfully-launches-fajr-satellite-into-orbit.html>
3. <http://defenceforumindia.com/forum/threads/agni-v-missile-test-launch.33457/page-20>
4. https://commons.wikimedia.org/wiki/File:Titan_II_Reentry_Vehicle_and_Warhead_Casing_%288562940163%29.jpg
5. https://en.wikipedia.org/wiki/LGM-118_Peacekeeper
6. <http://nsarchive.gwu.edu/nsa/NC/mirv/mirv.html>
7. <http://www.hisutton.com/Analysis%20-%20Sinpo%20Class%20Ballistic%20Missile%20Sub.html>
8. <http://www.ncnk.org/resources/briefing-papers/all-briefing-papers/an-overview-of-north-korea-s-ballistic-missiles>
9. https://en.wikipedia.org/wiki/Golf-class_submarine

UNCLASSIFIED

Additional References

- A. <http://www.bbc.com/news/world-asia-pacific-11813699>
- B. <http://www.cnn.com/2015/09/15/asia/north-korea-nuclear-program/>

UNCLASSIFIED