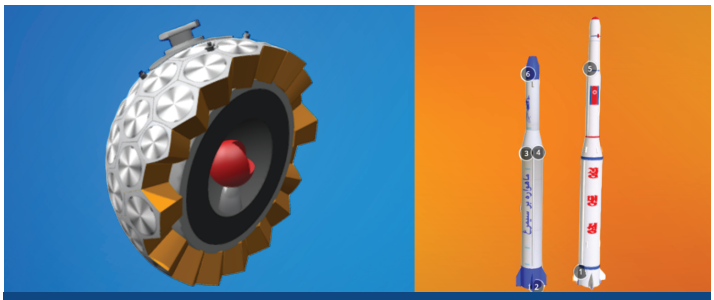
NEW TOOLS FOR NONPROLIFERATION AND DISARMAMENT RESEARCH AND TEACHING

The James Martin Center for Nonproliferation Studies (CNS) at the Middlebury Institute of International Studies (MIIS) and the Vienna Center for Disarmament and Non-Proliferation (VCDNP) are pioneering the use of open-source information and three-dimensional (3D) modeling to revolutionize nonproliferation and disarmament research and education. The creative use of satellite imagery, geospatial data, 3D models, virtual reality environments, and social media platforms provides exciting new opportunities for NGOs working on nonproliferation issues.



3D Modeling

CNS researchers create 3D models from two-dimensional images using modeling software like Blender and a variety of sources including satellite and ground imagery. CNS researchers have used 3D models to:

- Produce an in-depth analysis of North Korea's Punggye-ri nuclear test site
- Estimate the fuel capacity of North Korean and Iranian ballistic missiles
- Create 3D models of Iran's uranium centrifuges and their implications for the JCPOA

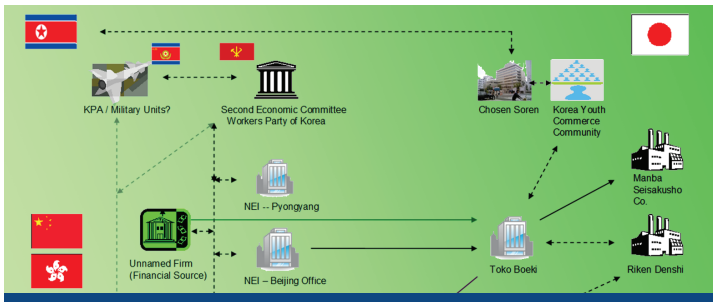
Remote Sensing and Geospatial Analysis

CNS use commercial satellite imagery and geospatial data to provide innovative solutions to nonproliferation challenges.

CNS experts use remote sensing data to:

- Host a crowdsourcing platform for analyzing satellite imagery of WMD-related facilities
- Create a database of North Korea's ballistic missile tests
- Explore how different types of remote sensing data can be used to monitor uranium mining and milling activities

In addition to training the next generation of practitioners, this work is forging close connections between technology developers like Google and Planet Labs and the nonproliferation community.

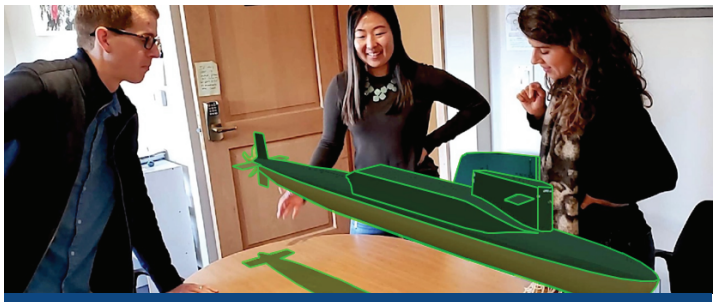


Media and Network Analysis

To answer difficult nonproliferation questions, CNS and VCDNP are using network analysis and open-source data to:

- Help the Moldovan government locate Soviet-era radioactive material by identifying current and former employees of related facilities
- Examine business-to-business marketplaces for possible transfers of dual-use goods
- Identify connections between scientists working on nuclear weapons and ballistic missiles

CNS authored a study for the U.S. Department of State identifying methods for societal verification including data mining, crowdsourcing, gaming, problem solving, and societal engagement.



Virtual and Augmented Reality

CNS researchers are exploring how virtual and augmented reality can be applied in nonproliferation research and education.

The VR option in SketchFab, coupled with Google Cardboard or other VR/AR platforms allow researchers to bring 3D models to life.

Users can now explore a North Korean missile museum by foot or project a 3D model of a nuclear bomb on a tabletop.

The Global Video Library

Facilities

CNS is creating a video library with 3D models and analysis of nuclear and missile-related facilities around the globe for the Nuclear Threat Initiative. CNS experts create the 3D models and content for these videos by analyzing current and historical satellite and ground imagery, videos, publications, and first-hand accounts.

Missiles

CNS also produces interactive 3D models of ballistic and cruise missiles for the NTI website. Visitors can rotate, zoom, and orbit the missiles as they learn more about the technology. Models are created using Blender and hosted on Sketchfab.

For more information, please contact **Grace Liu** at **gracel@miis.edu**.

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