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Contribution of Space Activities to Solving Global Societal Issues (2)

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CONTRIBUTION OF SATELLITE IMAGERY TO GLOBAL SECURITY: THE CASE STUDY ON
THE USABILITY OF SPACE TECHNOLOGY IN NUCLEAR NONPROLIFERATION VERIFICATION
REGIME

Abstract

Nuclear proliferation has long been recognized as a major global security challenge for the past decades. There is no doubt about the usefulness of satellite technology to monitor nuclear activities on a global scale. Since 1960s, superpowers have launched reconnaissance satellites and incorporated them into their nuclear non-proliferation and arms control policies as national technical means of verification. However, satellite imagery derived from military reconnaissance satellites was highly-classified information and therefore was difficult to make such confidential information available to international society in order to support international non-proliferation efforts in the cold war years. The advent of civil remote sensing satellites, such as LANDSAT and SPOT, opened the way to use commercially-available satellite imagery. As international nuclear proliferation risk became a growing concern in 1990s, International Atomic Energy Agency (IAEA) examined the potentials of satellite imagery in enhancing its safeguard measures. Although IAEA recognized its future potentials, it was not in the situation to promptly take full advantage of satellite imagery in its safeguard measures because of budgetary and operational issues. The potential of satellite imagery was also considered as one of the future verification techniques in the negotiating process of Comprehensive Nuclear Test Ban Treaty (CTBT). However, due to the uncertain technological reliability and budgetary problem, satellite technology was not employed as an established system in CTBT verification regimes at that time.

The situation has been rapidly changing in recent years. High-resolution satellite imagery is available internationally and commercially. Space agencies in many nations are operating various civil remote sensing satellites. Today private enterprises like DigitalGlobe also provide earth observation services. The emergence of cubesat technology will have potentials in providing cost-effective alternatives to expensive high-resolution satellite imagery. The United States and European Union have also adapted open and free data policy for Landsat program and Copernicus program, respectively.

These new trends and emerging technologies make it meaningful to re-examine the usability of satellite imagery within the international nuclear non-proliferation efforts. In fact, IAEA has come to occasionally use satellite imagery to support its safeguard measures. With these recent trends in mind, this study will examine the possibility of applying emerging space technology to the future nuclear nonproliferation verification regime and identify the challenges in this process from technological, institutional, political perspectives. This study will be able to provide a good model of how emerging space technologies can contribute to international efforts in addressing global issues.