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QUANTUM BITS OF LIGHT: THE FUTURE OF SATELLITE QUANTUM KEY DISTRIBUTION UNDER EXPORT ADMINISTRATION REGULATIONS AND THE FIRST AMENDMENT OF THE UNITED STATES CONSTITUTION

Abstract

In a world held captive by constantly emerging stories cyber attacks, national security breaches, and government mass surveillance, issues involving privacy, secrecy, and communication technology are at the forefront of sociopolitical culture. Within the past several years, sensitive information gurus like Edward Snowden, Julian Assange, and hacktivist groups like Anonymous have become household names as influential players on the world's chess set. The key ingredient to these world changing events is encryption; that is, the science/art of making communications secret. For many years the export/transfer of encryption technology was closely regulated in the United States under the International Traffic in Arms Regulations (ITAR). However, this significantly changed in 1999 when President Clinton transferred commercial encryption technology from the ITAR to the Export Administration Regulations (EAR) regime. Under this system, the dissemination of encryption related codes, software, and associated information became far less regulated. Nonetheless, developers and educators of cryptography brought suits against the government to enjoin the enforcement of any regulation whatsoever on 1990's era cryptography, claiming free speech protection as enshrined in the First Amendment of the United States Constitution. Two notable plaintiffs eventually won influential holdings from both the 6th and 9th federal circuit court of appeals. Although the issue of encryption has been adjudicated in the federal court system with some positive results, the future of cryptography—specifically advances associated with satellite-to-ground quantum key distribution—remains unsecured under both federal First Amendment jurisprudence and the EAR. In order to address this issue, this article will first provide a brief history of encryption, describing how it has advanced from handwritten keys and scrambled letters to an ultra-sophisticated method of transmitting secret keys—thanks to the physics of quantum entanglement—via fiber optic cables and space satellites. Next, it will summarize key court decisions related to encryption and the first amendment. Namely, Junger v. Daley, 209 F.3d 481 (6th Cir. 2000) and Bernstein v. Department of Justice, 192 F.3d 1308 (9th Cir. 1999). This article will then analyze the current regulatory framework for the export of quantum cryptography technologies under Category 5, Part 2 of the Export Administration Regulation's Commerce Control List. Finally, this article will assess whether the potential future development and widespread public use of quantum cryptographic technology in the United States is at risk under the current export regulatory regime, and whether current First Amendment jurisprudence adequately protects it.