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PATRIOTWATCH™

PATRIOTSHIELD™

PATRIOTSWORD™

A PROPOSED SOLUTION TO ADDRESS RISK TO U.S. CRITICAL INFRASTRUCTURE

BUILDING A NATIONAL CIVIL CAPABILITY



Patriot Watch, Patriot Shield, and Patriot Sword, as described in detail in this document, are trademarked names and concepts of Overlook Systems Technologies, Inc. Overlook grants permission to the U.S. Government to use the names Patriot Watch, Patriot Shield, and Patriot Sword in open discussions related to Civil GPS/PNT protection.



FRAMING THE CHALLENGE

The Nation's 18 critical infrastructure sectors share a critical dependency - reliance on civil GPS derived precise and stable TIME.

Overlook envisions a national capability to protect CIKR sectors from harmful interference of civil GPS services.

The U.S. Global Positioning System (GPS) has become the accepted world leader in positioning, navigation and timing (PNT) services, and a global utility serving as a critical enabling capability to both military and civilian users. The eighteen United States critical infrastructure sectors have become dependent on civil GPS precise and stable timing because, GPS is the world's standard for precise time, it is globally distributed, and most importantly, it is free.

LOOMING RISK

The vulnerability to the Nation's Critical Infrastructure and Key Resources (CIKR) sectors stems from the reliance on precise and stable time derived from civil GPS services. In today's digitally-intensive world, having access to extremely precise and stable time

is a necessary component of making CIKR function as an integrated collection of nodes, centers and networks. Such reliance makes GPS an essential link in the critical infrastructure chain, and at the same time presents a vulnerability that must be addressed at the national level. What is not fully understood is the magnitude of CIKR dependencies and cross-sector vulnerabilities to the loss of PNT services. Further, virtually no understanding exists of the potential repercussions of nefarious manipulation of both position and time inside the CIKR sectors.

GPS SERVICES – AN OPEN DOOR

This nation is severely lagging in preparations to interdict a coordinated attack on the civil GPS services. We must act quickly, but methodically. A significant amount of time and national treasure has been expended focusing on and securing the "Cyber" threat to critical infrastructure. Cyber implies and focuses on net centric and internet computer based threats. However, dependency on civil GPS services represents an open door which is very similar to the Internet based cyber threat, but without firewalls or encryption.

Widespread use, unrestricted availability as a non-proprietary government standard, and weak signal power are all factors contributing to making civil GPS signals a target. Civil GPS services are easy signals to jam and technology to spoof those signals is increasingly available. There are no locks to pick, no passwords to learn, no firewalls to breach, no encryption to crack or alarms to defeat.



PATRIOT WATCH™

BACKGROUND

Protecting CIKR sectors from harmful manipulation of civil GPS services is a national imperative directly impacting National, Homeland, and Economic Security. In 2007, Overlook devised a concept to address a civil capability gap directed in U.S. Policy. It became clear that a persistent, autonomous and automated national capability was needed to rapidly detect, locate and identify civil GPS services interference. Overlook formulated the concept called Patriot Watch¹.

Patriot Watch provides the rapid tip-off and tune-in capability. Patriot Shield provides for a defensive hardening of networks and venues on which Patriot Watch relies.

NATIONAL POLICY

Using the National Infrastructure Protection Plan's Risk formula as a guide, Risk is a combined function of Threats, Vulnerabilities and Consequences. Experts agree that CIKR sectors are 'vulnerable' and the 'threat' is growing. The U.S. Policy for Space-Based Positioning, Navigation and Timing directs the Department of Homeland Security to,

"...identify, locate, and attribute any interference within the United States that adversely affects use of the Global Positioning System and its augmentations for homeland security, civil, commercial, and scientific purposes".

CONCEPT

The Patriot Watch concept builds on the notion of reducing risk to CIKR sectors dependent on civil GPS services. A sufficient capability must be proactive, incorporating layered system-of-systems defenses, from rapid and accurate detection through deployment of response resources. The national solution resides in complementary and interdependent technologies, new or refined operational processes, and future command and control venues. However, no one knows the level of risk exposure each sector faces from dependency on civil GPS services.

¹ Patriot Watch is a trademarked name and concept of Overlook Systems Technologies, Inc when applied to protection of GPS/PNT services within U.S. Critical Infrastructure. Overlook grants permission to the U.S. Government to use the name Patriot Watch in open discussions related to CIKR sectors protection.



Patriot Watch is a comprehensive concept incorporating a systems engineering approach that addresses each of the three required tenants of a true national capability; layered technologies, robust operational processes, and clear command and control authorities.

We must further investigate the CIKR sectors' vulnerabilities and the resulting consequences of an attack. Only then can the right technologies be brought together in the proper combinations, and bring forward best practices to focus on mitigating a Risk that, to date, remains largely undefined.

As is required by the National Space-Based PNT Policy and by the DHS Interference, Detection and Mitigation Plan, a full spectrum approach must be employed to ensure a national capability to rapidly detect geo-locate, characterize and attribute any interference within the United States that adversely affects the use of GPS services and its augmentations.

A NATIONAL CAPABILITY

PATRIOT WATCH™

- ▶ A proposed solution to fill capability gaps highlighted in U.S. Policy for protecting Critical Infrastructure & Key Resources.
- ▶ Envisions a comprehensive and systematic approach (people, processes, & technologies) to reduce **RISK** to U.S. CIKR by addressing **THREATS, VULNERABILITIES** and **CONSEQUENCES**
- ▶ Provides a National Capability to rapidly **DETECT, LOCATE, REPORT** and **ATTRIBUTE** GPS interference by:
 - ◆ Merging and leveraging interdependent technologies,
 - ◆ Creating and exercising necessary ops processes, and
 - ◆ Establishing proper command and control authority

U.S. dependency on civil GPS services will be exploited. It is only a matter of time.

COMMITTED TO EXCELLENCE



BACKGROUND

As the complementary defensive component to Patriot Watch, Overlook created a concept to address an additional capability gap directed in U.S. Policy. Along with Patriot Watch, a persistent, autonomous and automated national capability is needed to persistently reside alongside and within the nation's critical infrastructure to rapidly CHARACTERIZE and MITIGATE civil GPS interference. Overlook called this concept Patriot Shield².

Patriot Shield provides defensive hardening of United States critical infrastructure that relies on civil GPS services.

NATIONAL POLICY

The U.S. Policy for Space-Based Positioning, Navigation and Timing requires federal departments and agencies to characterize and mitigate interference to the Global Positioning System and its augmentations for homeland security, civil, commercial, and scientific purposes.

CONCEPT

The Patriot Shield concept is intended to be employed in concert with a Patriot Watch and provide smarter and more robust GPS receivers, networks and nodes. A sufficient defensive capability must be widely distributed and interconnected, thereby making U.S. critical infrastructure a less desirable target for attack.

The national solution resides in the best-practices mix of better software algorithms, smarter receiver technology, modified operational employment and refined antenna designs. Through Patriot Shield, risk is reduced to the 18 U.S. Critical Infrastructure and Key Resources sectors dependent on civil GPS services.

² Patriot Shield is a trademarked name and concept of Overlook Systems Technologies, Inc when applied to protection of GPS/PNT services within U.S. Critical Infrastructure. Overlook grants permission to the U.S. Government to use the name Patriot Shield in open discussions related to CIKR sectors protection.



PATRIOT SHIELD

PATRIOT SHIELD™

- ▶ A proposed solution to fill capability gaps highlighted in U.S. Policy for protecting Critical Infrastructure & Key Resources.
- ▶ A supporting integral component to Patriot Watch to ensure proper defensive and hardening measures are in place to reduce **RISK** to U.S. Critical Infrastructure and Key Resources
- ▶ Provides a National Capability to rapidly **CHARACTERIZE** and **MITIGATE** GPS interference by:
 - ◆ developing, testing and implementing hardware and software that are more resilient against nefarious manipulation and spoofing
 - ◆ developing and implementing more resilient tactics, techniques and procedures

Provides a More Secured Infrastructure

COMMITTED TO EXCELLENCE




PATRIOT SWORD™

BACKGROUND

Overlook created a concept addressing U.S. Policy direction to create an offensive capability to deny use of GPS services in the United States to those who are intending harm to National, Homeland, or Economic Security. Overlook called this concept Patriot Sword³.

NATIONAL POLICY

The U.S. Policy for Space-Based Positioning, Navigation and Timing is clear. The Department of Homeland Security is required to work with other federal departments and agencies to:

"... identify, understand, and disseminate timely information regarding threats associated with the potential hostile use of space-based positioning, navigation, and timing services within the United States;"

"...develop, implement, and routinely exercise procedures, should it become necessary to deny hostile use of space-based position, navigation and timing services within the United States;

Patriot Sword is an offensive concept that would provide a measured and scalable response to deny civil GPS services in the U.S. to those intending harm.

CONCEPT

The Patriot Sword concept is envisioned to be employed as a method of last resort to stop those individuals intent on doing harm to the United States from using civil GPS services as an aid. There would likely be a suite of materiel solutions as well as the requisite tactics, techniques and procedures. Most importantly, the Patriot Sword concept is imagined to be a measured and scalable capability available for employment from the local to the federal levels. Obviously, the goal is to locally deny civil GPS services from harmful individuals, without undue disruption to others dependent on the service.

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PATRIOT SWORD

PATRIOT SWORD™

- ▶ A proposed solution to fill capability gaps highlighted in U.S. Policy should it become necessary to deny hostile use of space-based position, navigation and timing services within the United States;
- ▶ Envisions a measured approach to deny hostile use of civil GPS services
 - ◆ Scalable Local Response
 - ◆ Coordinated Regional Response
 - ◆ Persistent National Capability

DHS must rapidly identify, understand, and disseminate information about hostile use

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OVERLOOK SYSTEMS TECHNOLOGIES, INC.

CLEAR CHALLENGE

Overlook knows the challenges of developing a national capability to identify and geographically locate sources of interference to civil GPS signals. Since the U.S. first became dependent on civil GPS services, Overlook has been directly involved in thinking through the inherent vulnerabilities of U.S. Critical Infrastructure's dependency on civil GPS services.

Overlook Systems Technologies, Inc. is a flagship PNT professional services company, and has been working civil and military GPS issues since 1987.

BUSINESS INFORMATION

Overlook Systems Technologies, Inc. is a veteran-owned small business specializing in national policy and professional technical and engineering services for information based systems and infrastructure, with a core expertise in providing comprehensive civil and military Global Positioning System (GPS) and Positioning, Navigation and Timing (PNT) technical services to the U.S. Government since 1987.

Overlook has extensive knowledge and experience in all aspects of GPS and PNT technologies, operations, modernization and user applications, national policy implementation, as well as a deep background in DoD's Electronic and Navigation Warfare needs development and future efforts.

Overlook is headquartered in Vienna, Virginia, with regional business units in Los Angeles, California; Colorado Springs, Colorado; Albuquerque, New Mexico; and Omaha, Nebraska.

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