# DATA DRIVEN INNOVATION AT SCALE

## Applied Data Science Use Cases

## NTIS FEDERAL-PRIVATE SECTOR PARTNERSHIP


# NTIS Innovation Framework

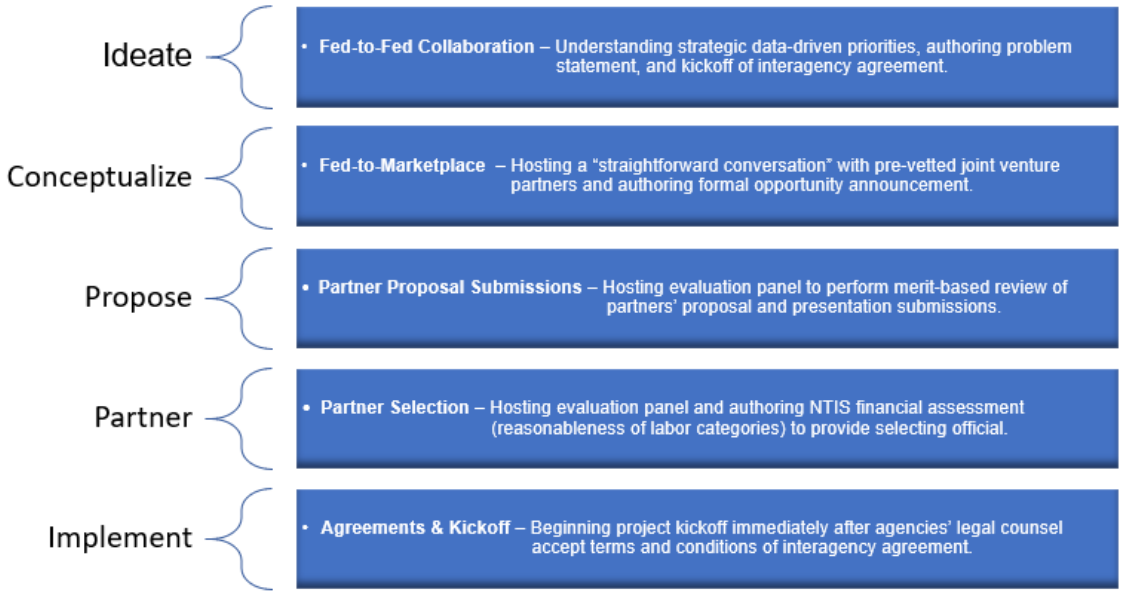
## The Innovation Challenge

Driving the transformation of the federal enterprise through innovation is essential to achieve mission outcome. Emerging and innovative technologies provide unprecedented opportunities to address mission-critical challenges and provide customer-driven services delivered efficiently, effectively, faster, and at lower cost. However, innovation is a hard journey. It requires any organization to transform itself and change its processes, services, business models while integrating risk and change management efforts. To succeed, a federal agency should proceed with an operating framework that enables it to explore innovative projects with tangible, immediate impact congruent with its national mission.

## NTIS Data Driven Innovation

The Department of Commerce's National Technical Information Service (NTIS) accelerates results across the Federal Government by leveraging data as a strategic asset to achieve mission outcomes. As a trusted Fed-to-Fed advisor, NTIS applies its unique joint venture partnership (JVP) authority (15 U.S. Code 3704b) leveraging leading, innovative companies to help federal agencies solve their complex data challenges. Our efforts promote operational excellence through applied data science innovation in areas such as artificial intelligence, machine learning, predictive analytics and blockchain.

## NTIS Framework




## NTIS Framework Innovation Drivers

The NTIS framework provides a unique innovation value proposition for federal agencies:

- It is anchored in NTIS and the federal agency embarking on an innovation journey that leverages the agile methodology to continuously tailor the solution to customer needs and deliver innovation through proof points and transformative and scalable business operations.
- The private sector is engaged very early in the process ("pre-solicitation") of problem formulation (not the solution) with the goal of understanding the mission and vision of the agency. A trusted relationship is established to discuss pain points and root causes, and collaboratively develop an initial problem statement.
- The NTIS approach is not an acquisition or procurement. The NTIS private sector venture authority offers federal agencies a unique business model to solve national/global data centric challenges. NTIS provides quick access to private sector ingenuity to achieve a capacity to scale and time to market/value, which is critical in ultimately solving the right problem while mitigating risk.

# NTIS Joint Venture Partnership Projects

**Project Name: Technology and Data Innovation Initiative**

**Organization Supported: U.S. Department of Homeland Security (DHS)**
**National Risk Management Center (NRMC)**

The Department of Homeland Security (DHS), National Risk Management Center (NRMC) is focused on identifying, analyzing, prioritizing, and managing the most significant risks to the nation's critical infrastructure. A major challenge facing the NRMC is identifying and collating various data sources across 16 critical infrastructure sectors whose incapacitation or destruction would have a debilitating effect on security, national economic security, national public health or safety. This project aims to develop innovative solutions in data analytics and artificial intelligence, focusing on systems integration and transition-to-use, to enhance the security and resiliency of the nation's critical infrastructure community. This would include assessment of methodologies to systematically measure, analyze and report on the risk exposure of the National Critical Functions (NCFs) and the nation's overall NCF risk reduction results over time. The project will develop a coherent approach to managing data and enabling authorized users to leverage a consistent set of analysis and reporting tools while maintaining strict controls over data access and security. As a result of this project, the NRMC will be better positioned to carry out more accurate risk modelling and assessment, understand better the inter-dependence and cascading effects between various sectors, including, for example, the disruption in supply chains as a result of major disasters such as the Coronavirus Pandemic, and foster effective coordination and collaboration among a broad spectrum of government and private sector organizations.

**Project Name: Evidence-Based Decision-Making Capabilities for Acquisition Program Portfolio Management**

**Organization Supported: U.S. Department of Homeland Security (DHS)**
**Office of Program Accountability and Risk Management (PARM)**

The Department of Homeland Security Program Accountability and Risk Management (PARM) is the DHS Management Directorate's executive office for program execution in support of the Chief Acquisition Office (CAO). PARM, as both a governance, oversight and support agency, maintains responsibilities to mature insights and efficiencies into DHS's program acquisition performance. A major challenge is leveraging resources to provide accurate assessments to provide to DHS leadership for decision support, knowledge management, and business intelligence, including analyses on returns-on-investments. The objective of this project is to integrate data from the various PARM components into a PARM knowledge-base management (KM) store capability focused on improving the acquisition lifecycle framework (ALF) governance, oversight reporting, risk management and decisional insights on program acquisitions. The project aims to deliver innovative data and processing capabilities to build, monitor, evaluate and improve on the quality, accuracy and predictiveness of acquisition program management capabilities and seamlessly unify data and innovation on digital content and business activities to improve on overall performance efficiencies, productivity and quality. As a result of this project, the interoperation of all technology and view of data across PARM divisions and its DHS partners will be vital to ensure PARM keeps pace with surging demands and has the capacity and capabilities to optimize performance and adapt to a fluid and rapidly evolving acquisition environment that holistically enable continuous improvement to the fulfillment of PARM's mission.

**Project Name: Scaling AI and its Impact Across the DoD**

**Organization Supported: U.S. Department of Defense (DoD)**
**Joint Artificial Intelligence Center (JAIC)**

The DoD's development of AI-enabled capabilities has historically been decentralized, resulting in limited ability to create synergies and build off the lessons learned. In 2018, Congress established the JAIC to help focus DoD's AI activities, drive the Defense Department AI Strategy, and accelerate the delivery of AI-enabled capabilities. Given the pace of change in enabling technologies and the rapidly changing nature of adversaries, the JAIC prioritizes bridging the traditional gap between research and operations to better enable the DoD to fulfill its missions and strengthen current military advantages. The objective of this project is to empower the JAIC to meet its mission through the agile development of: 1) Joint Information Warfare (JIW) capabilities that enable AI-based enterprise-level cybersecurity operations that include network event detection, user activity monitoring, and network mapping; 2) AI-enabled Intelligent Business Automation, Augmentation, and Analytics (IBA3) capabilities that automate manual, high volume, error-prone, and repetitive tasks; 3) Products that enable the Joint Warfighter (JW) solve current and future strategic, operational, and tactical problems though AI; and 4) A Joint Common Foundation (JCF) that establishes and operates a development and testing environment for AI products that can be integrated with existing military systems across the DoD. As a result of this project, JAIC will better enable the DoD to meet its key missions and accelerate the DoD adoption and acceleration of AI to achieve mission impact at scale.

**Project Name: Safety Analytics, Forecasting and Evaluation Reporting (SAFER)**

**Organization Supported: U.S. Department of Energy (DOE)**
**National Nuclear Security Administration (NNSA)**

The Department of Energy (DOE), National Nuclear Security Administration (NNSA)'s enduring mission is to protect the nation by maintaining and improving a safe, secure, and effective nuclear weapons stockpile, reducing global nuclear threats, and providing submarines and aircrafts carriers with military effective nuclear propulsion. A major challenge facing the NNSA is the ability to share information across the nuclear security enterprise. With over 50,000 federal and contractor employees, getting the right information, to the right person, at the right time is a formidable task. At the same time, the NNSA mission is growing in complexity, while facing attrition of an aging workforce. NNSA needs the capability to share information and foster knowledge management enabling our workforce to meet mission demands. This project will mature organizational strategies to more efficiently and effectively collect, process, analyze, and disseminate data and develop a data driven decision making capability to capture, utilize, and share data information related to subject matter areas of expertise. The objective is to provide NNSA with a capability that will deliver data driven decision making support with comprehensive data management, analysis, reporting and archiving solutions with well-defined operational activities and an underlying technology solution to safely achieve the mission, while maintaining strict controls over data access and security. The NNSA envisions a future state where safety management uses real-time information to inform decisions, operate from a single source of truth, increase the data maturity model, and direct resources where they can make the most substantial impact on the health of NNSA's safety programs. As a result of this project, NNSA will be better positioned to embrace a next-generation enterprise to meet mission requirements and respond to current and future challenges.

**Project Name: Development of Comprehensive Data Integration Management Analysis and Reporting Capabilities**

**Organization Supported: U.S. Department of Labor (DOL)**
**Office of the Chief Information Officer (OCIO)**

The Department of Labor's (DOL) mission is to foster, promote and develop the welfare of the wage earners, job seekers and retirees of the United States; improve working conditions; advance opportunities for profitable employment; and assure work-related benefits and rights. A major challenge facing the DOL is the vast volume of disconnected and siloed data across at least 15 different systems, spanning multiple bureaus, impeding on DOL's ability to utilize the full potential of this unique data in the execution of its mission. This project delivers a foundation for a consolidated and streamlined approach for DOL data collection processing and dissemination that includes policy security data standards and collaboration among all DOL stakeholders to achieve accountability, transparency, and evidence-based decision making. It seeks to establish a Data Analytics Capability (DAC) Platform within its information technology (IT) platform to effectively integrate, analyze, and share data internally and externally. DAC employs an open architecture approach and is designed with loosely coupled interoperable commercial off the shelf (COTS); government off the shelf (GOTS); open-source products, tools, and infrastructure services; data abstraction services; core middleware analytic services; and interaction services. As a result of this project, DOL will rely on a Department wide analytic platform and a rigorous governance process with the capability to integrate diverse data, provide evidence-based decisions, reduce operations and maintenance costs, enhance cybersecurity posture, and deliver various and augmented current or future economic and labor indicators.

**Project Name: Development of Digital Solutions (DDS)/ Grants Analytical Portal (GAP)**

**Organization Supported: U.S. Department of Health and Human Service (HHS)**
**Office of Inspector General (OIG), Office of Chief Data Office (OCDO)**

The Department of Health and Human Services (HHS), Office of Inspector General (OIG) is the largest inspector general's office in the Federal Government, with a trillion-dollar portfolio and a workforce of approximately 1,600 dedicated to combating fraud, waste and abuse to protect the integrity of HHS programs. Most of HHS OIG's resources go toward the oversight of Medicare and Medicaid — programs that represent a significant part of the Federal budget and that affect some of this country's most vulnerable citizens. HHS OIG's oversight extends to programs under other HHS institutions, including the Centers for Disease Control and Prevention, National Institutes of Health, and the Food and Drug Administration. Major challenges facing the largest US OIG office have been inadequate data sharing, inefficient analytical tools to drive insights from data across the agency, and the need to accelerate the process to access and analyze data to identify and target potential fraud schemes and areas of program waste and abuse in a multi-disciplinary, geographically dispersed ecosystem. The objective of this project is to modernize OIG's legacy platforms; provide mobile and remote access for a dispersed workforce across nine regions; provide geospatial capabilities within applications to better analyze localized trends for improper payment recovery efforts; create a flexible predictive and threat analytics platform that keeps pace with dynamic caseloads and supports OIG prevention or enforcement activities; and incorporate information security to protect restrictive and personal data while insuring compliance with the Health Insurance Portability and Accountability Act and Federal policies related to the protection of personally identifiable information (PII). This includes an enterprise resources dashboard that aids in the allocation and coordination of HHS OIG resources to improve decision-making capabilities agency wide; and a Grants Analytics Portal (GAP) tool that leverages advanced data analytics to expand discovery and analysis of data sources related to NIH grants data and perform network analyses of Principal Investigators (PI's) and organizations, NIH researchers, and grant receiving organizations. The project has enabled HHS OIG operatives to augment on-going audits, investigations, and evaluations. GAP has transformed NIH grants oversight, including the goal to ensure that grantees did not receive duplicate funding. As a result of this multiphase project, HHS OIG OCDO will enable the organization to identify emerging issues through data and automated risk assessments, effectively prioritize

the activities of OIG oversight and enforcement resources, and accelerate the process to identify and target program fraud, waste and abuse, and support key mission objectives.

**Project Name: Malaria Data Integration and Visualization for Eradication (M-DIVE)**

**Organization Supported: U.S. Agency for International Development (USAID)**
**President's Malaria Initiative (PMI)**

USAID leads the U.S. Government's international development and humanitarian efforts to save lives, reduce poverty, strengthen democratic governance, and help people emerge from humanitarian crises. Malaria prevention and control remains an important U.S. foreign assistance priority. In 2018, there were 228 million cases of malaria worldwide, resulting in an estimated 405,000 deaths. USAID is committed to evidence-based and data-driven approaches that reduce malaria transmission, deaths and illnesses, leading to country-by-country eliminations and a world without malaria. While millions of lives have been saved since PMI's inception in 2005, USAID needed new capabilities to create innovative, breakthrough solutions to build USAID and USAID partners' capacity to leverage data in the 27 focus countries that PMI operates in order to achieve the global target of malaria eradication by 2040 - 2050. With this project, USAID developed an agile-delivered application in a secure cloud-based Malaria Data Integration and Visualization for Eradication (M-DIVE) platform. The M-DIVE platform enables USAID to access and synthesize over 20 heterogenous data sources (e.g., epidemiological, supply chain, climate, financial, programmatic, demographic, economic development) to answer complex programmatic questions. The data sources were previously siloed and difficult to synthesize. These innovative capabilities located in one virtual space provide USAID with the ability to make more accurate monitoring and evaluation determinations, enabling USAID to improve malaria prevention, treatment, and control strategies. As a result of this project, USAID's malaria strengthened and AI-enabled control efforts will help save lives, protect the people most vulnerable to the disease, and promote economic stability.

**Project Name: Development Data Commons (DDC)**

**Organization Supported: U.S. Agency for International Development (USAID)**
**The Office of HIV-AIDS (OHA) and the Chief Information Office (CIO)**

USAID's work delivers development and disaster assistance to over 80 countries around the world and spans the sectors of food security, democracy, human rights, education, climate change, gender equality, global health, and crisis and conflict. These operations presented staff with siloed enterprise, programmatic, and field-based data sources and a large diversity of sources. To better meet its mission, USAID is developing a Development Data Commons (DDC) to empower USAID staff and partners to address cross-program, cross-sector, and interdisciplinary questions with diverse data sources through efficient data synthesis at a global scale. The DDC will deliver timely access to heterogeneous data and digital tools to combine, merge, use and re-use those data in one virtual space that will allow USAID to answer complex programmatic questions and support decision-making across all sectors. As a first step, the DDC is focusing on USAID's HIV and AIDS (USAID OHA) Program. USAID is a key implementing partner under the U.S. President's Emergency Plan for AIDS Relief (PEPFAR), the largest and most diverse HIV and AIDS prevention, care, and treatment initiative in the world. The DDC will allow USAID OHA to manage and use High Frequency Reporting information, which collects program performance data from implementing partners on a weekly basis, in combination with other program performance and evaluation, operational, and financial data. As a result of this project, USAID-DDC will support USAID's global mission by supporting evidence-based and data-driven capabilities that empowers development program performance and outcome trends at individual activity sites, across sites, and among beneficiary sub-populations and to derive key lessons across past results and impacts.

**Project Name: Bioresearch Monitoring Program (BIMO) – Information Tracking Environment (CBITE)**

**Organization Supported: U.S. Food and Drug Administration (FDA)**
**Center for Drug Evaluation and Research (CDER)**

The mission of the food and Drug Administration (FDA)'s Center for Drug Evaluation and Research (CDER) is to assess the reliability and interpretability of data submitted in support of applications for new drugs, biologics licensing, biosimilar and investigational new drugs, and oversee the clinical inspection process related to these applications. As such, CDER must perform on-site inspections of clinical investigator sites and other regulated entities, such as sponsors, in-vivo bioequivalence facilities, institutional review boards, and nonclinical laboratories. This project improves CDER's data management and its analytic processes to ingest, access, and interpret heterogeneous data from multiple channels and prescribe the appropriate actions within its monitoring and reviewing framework. The outcome of this project will be a modern system and set of more efficient processes to improve bioresearch monitoring compliance and automation to enhance effectiveness of drug site assessments. As a result of this project, CDER's capabilities will be extended and enhanced in order to keep up with the dramatic growth in size, complexity, and geographical expansion of the clinical trial enterprise and provide first-class business intelligence capabilities and data visualization for evidence-based decisions.

**Project Name: Predictive Data Analytics and Modeling Program (PDAMP)**

**Organization Supported: U.S. Department of Veterans Affairs (VA)**
**Office of Inspector General (OIG)**

The mission of the Department of Veteran Affairs (VA) Office of Inspector General (OIG) is to provide effective oversight of the programs and operations of the VA. The VA OIG accomplishes this mission by conducting independent audits, inspections, and investigations designed to prevent and detect fraud, waste, and abuse across the VA's healthcare, benefits, finance, construction, facilities, acquisition, and information technology programs. The VA OIG maintains a data warehouse with approximately 25 terabytes (TB) of historical data from 87 VA data sources and additional state and local data sources, which includes transactional data from 1973 to the present spanning the VA programs noted above. This project will provide VA OIG with the capability to be more proactive, collaborative, and strategic in making data-driven decisions and conducting effective oversight to prevent and detect waste, fraud, and abuse across the VA's healthcare, benefits, finance, construction, facilities, acquisition, and information technology programs. As a result of this project, through the VA OIG dedicated analytics team comprised of data scientists, statisticians, data engineers, and advanced data analysts, the agency will leverage modern analytic technologies and methodologies to proactively detect areas at high risk for fraud, waste, and abuse.

**Project Name: USAJOBs**

**Organization Supported: The Office of Personnel Management (OPM)**

The Office of Personnel Management (OPM) is the United States focal point for recruiting, retaining and honoring a world-class workforce for the American people. The U.S. Federal Government relies on more than two million Americans and foreign nationals to work in the civil service. USAJOBS connects job seekers with federal employment opportunities across the United States and around the world. Federal agencies use USAJOBS to facilitate their hiring processes and match qualified applicants to job openings. With over 11 million account holders and 40 thousand opportunity announcements per month, USAJOBS serves as the central location to find career opportunities within hundreds of federal agencies and organizations. An increasingly important challenge is connecting qualified applicants to the right jobs, while also providing agencies actionable data and tools to inform targeted recruitment efforts. This project objective is to improve the customers' end-to-end recruitment and hiring experience. It will provide OPM and, by extension,

federal agencies with the augmented ability for data exchange and governance when integrating into hiring, assessment, and onboarding systems. It aims to support OPM in developing an OPM Federal Staffing Center operational dashboard to report and monitor USAJOBS and USA Staffing key performance indicators and satisfaction metrics. It will improve the USAJOBS.gov search through AI based natural language parsing of job opportunity announcements for skills and similar attributes using advanced analytic techniques. Agencies will benefit from USAJOBS strategic recruitment tools and research findings to make data-driven decisions and anticipate skills trends. As a result of this project, OPM will benefit from an improved ability to create actionable information from user profiles to empower job matching based on skills and competencies from resumes, profiles and job announcements.

**Project Name: Special Notice Option (SNO)**

**Organization Supported: Social Security Administration (SSA)**

The mission of the Social Security Administration (SSA) is to administer national Social Security programs as prescribed by legislation in an equitable, effective, efficient, and caring manner. The SSA needs to fulfill its mandated requirement to offer accessible data to the American public with special needs (Section 508 of the Rehabilitation Act of 1973). This project is supported by the Data Transformation and Access (DTA) Office of the National Technical Information Service (NTIS). The DTA provides state of the art creative solutions for data challenges faced by federal agencies who serve and must reach the public and individuals with disabilities. This project provides solutions and services to allow the transformation of raw data into various alternative formats using assistive technologies and business intelligence techniques and tools, such as Quality Control/Quality Assurance procedures to ensure the integrity and security of data throughout the process. Specific formats produced within this project are Braille, Large Print Format, Data CD and Audio CD. The entire process is performed in an environment which guarantees the security of personally identifiable information (PII). Over 400,000 visually and hearing-impaired social security beneficiaries are dependent upon this critical data dissemination function.

**Project Name: Limited Access Death Master File (LADMF)**

**Organization Supported: Social Security Administration (SSA)**

The mission of the Social Security Administration (SSA) is to administer national Social Security programs as prescribed by legislation in an equitable, effective, efficient, and caring manner. The National Technical Information Service (NTIS) established a certification program for access to the Limited Access Death Master File (LADMF) pursuant to Section 203 of the Bipartisan Budget Act of 2013 (Pub. L. 113-67). NTIS provides authorized access of the LADMF data file as raw data and an online search database that list deceased individuals and their Social Security numbers, dates of birth, and dates of death. Currently more than 90 million records of deaths from 1936 to present are contained in the Social Security Administration file, NTIS provides program management of the certified access to data for a three-year period beginning on the date of an individual's death. Leading government agencies, financial institutions, investigative firms, credit reporting organizations, medical researchers, and other industries use the LADMF online interactive search application to verify death for the prevention of fraud, waste and abuse. This project enables to support the President's Management Agenda (PMA), including preventing misuse and protecting the public though Cross Agency Priority (CAP) Goal 2 - Leveraging Data as a Strategic Asset, as well as improving customer experience and accessibility towards CAP Goal 4 - Improving Customer Experience with Federal Services.

**Project Name: Drug Enforcement Administration Controlled Substances Act Database (DEA CSA)**

**Organization Supported: Drug Enforcement Administration (DEA)**

The mission of the Drug Enforcement Administration (DEA) is to enforce the controlled substances laws and regulations of the United States and bring to the criminal and civil justice system of the United States, or any other competent jurisdiction, those organizations and principal members of organizations, involved in the growing, manufacture, or distribution of controlled substances appearing in or destined for illicit traffic in the United States; and to recommend and support non-enforcement programs aimed at reducing the availability of illicit controlled substances on the domestic and international markets. A major challenge facing the DEA is to control the abuse and misuse of controlled substances and chemicals used in producing some over-the-counter drugs while maintaining databases of persons and organizations certified to handle controlled substances under the Controlled Substances Act (CSA). The objective of this project is to support that goal by enabling certified use of the CSA database. DEA authorizes the content of this database, and the inclusion of any individual or organization in the database, as proof of that entity's registration with the DEA. Pharmacies are required to verify this registration before filling prescriptions. This project enables the DEA to leverage data dealing with controlled substances and provide controlled access to prevent misuse.

**Project Name: Alternate Format (AF)**

**Organization Supported: U.S. Department of Education (DoED)**
**Federal Student Aid**

The mission of the Department of Education (DoED) is to promote student achievement and preparation for global competitiveness by fostering educational excellence and ensuring equal access. The DoED needs to fulfill its mandated requirement to offer accessible data to the American public with special needs (Section 508 of the Rehabilitation Act of 1973). This project is supported by the Data Transformation and Access (DTA) Office of the National Technical Information Service (NTIS). The DTA provides state of the art creative solutions for data challenges faced by federal agencies who serve and must reach the public and individuals with disabilities. This project provides solutions and services to allow the transformation of raw data into various alternative formats using assistive technologies and business intelligence techniques and tools, such as Quality Control/Quality Assurance procedures to ensure the integrity and security of data throughout the process. Specific formats produced within this project are Braille, Large Print Format, Data CD and Audio CD. The entire process is performed in an environment which guarantees the security of personally identifiable information (PII).

**Project Name: Veteran Affairs Technology Transfer Protocol (VA-TTP) and Veterans Affairs Electronic Determination Aide (VAEDA)**

**Organization Supported: U.S. Department of Veterans Affairs (VA)**
**Office of Research and Development (ORD)**

The VA provides approximately $700,000,000 annually to support research for medical and clinical care improvement, leading to inventions that have the potential to benefit veterans as well as the public. The VA-TTP is tasked to identify inventions and when eligible, make the inventions available to the veteran community and public at a reasonable cost. VA-TTP also collects royalties from commercialized VA-funded inventions and redistributes payments back into the research and inventors. One of the critical challenges facing the agency was the underreporting of VA-funded inventions. This error prone process was due to an intensive invention disclosure workflow, which is voluntary and manual and is hindering the VA's ability to commercialize VA-funded inventions. The objective of the project is to develop a web-based platform that automates the data collection and integration processes for invention disclosures, allowing VA-TTP staff to make more informed decisions on

patenting, commercialization of VA-owned technologies and/or inventions, and identification of potential licensees. The VAEDA was added to this effort to enable VA to modernize a previously manual, intensive, paper-driven process to determine if VA-funded research could be exempt from going through an Institutional Review Board (IRB) and evaluate the ethics associated with research conducted on humans. As a result of these projects, VA will be able to streamline its processes, be compliant with Federal Regulations, reduce human error, save resources, increase return-on-investment (ROI) for VA-funded research and apply the benefits (time, funds, etc.) to further help Veterans and the public.