PROBLEM TITLE

Flight Line Maintenance
(US Marine Corps)

BACKGROUND

Maintainers on the flight line are responsible for capturing the process and repairs for aviation maintenance. Currently, maintainers collect all data manually in logbooks, which is a long and arduous process. They spend approximately 1-2 hours conducting checks and filling out paperwork for an aircraft, after which they must spend another hour inputting the maintenance data. Unfortunately, data collection is not a priority on the flight line. Maintainers are entirely focused on getting the aircraft back in the air in a timely manner, and as a result, many keep the minimum amount of required records.

Simultaneously, there is a need to assess if the data collected is the most appropriate data to capture a repair effort or specific issue. For example, when an Osprey aircraft fails a check, the Osprey is given the code MV22-1. However, MV22-1 only means that the aircraft in need of a repair is an Osprey, but does not capture the type or severity of the damage. For this reason, there is a need for both increased fidelity regarding data capture as well as improved ways of capturing and inputting required data for predictive maintenance.

CHALLENGE

Maintainers on the flight line need an intuitive and effective way to keep records in order to alleviate the burdens of data collection.

PROBLEM TITLE

"Unready for Takeoff" – Air Force Software Accreditation

BACKGROUND

When Airmen need new capabilities or software on the Air Force network, they must undergo a lengthy and painful security accreditation process prior to installation, which typically extends between four and eight months. The current security accreditation process involves three steps with multiple "sub-steps" within each step in the process. After submitting a request, a lengthy information gathering process begins, the software is scanned for vulnerabilities, and an impact analysis is performed on the proposed network where the software will go. The process is difficult, confusing, and slow, with extensive requirements for the package submission. The Air Force currently does not accept accreditation from any outside Department of Defense entities, making the process extremely redundant. As a result, the extensive security accreditation process limits performance on mission-critical tasks and often makes support tasks inefficient.

CHALLENGE

480th Intelligence, Surveillance, and Reconnaissance Wing personnel need to rapidly access software tools that have been previously accredited by other services or agencies in order to effectively complete mission-critical tasks.

PROBLEM TITLE

Patching Cybersecurity Vulnerabilities More Efficiently
(Defense Logistics Agency)

BACKGROUND

Vulnerability management is a losing battle. The Defense Logistics Agency (DLA) patches and remediates vulnerabilities at a much slower pace than they are discovered. This causes hundreds of thousands of unaddressed vulnerabilities, leaving DLA IT systems susceptible to foreign adversaries and potential hackers. The current vulnerability management process is to scan and use Computer Emergency Response Team (CERT) notifications to identify potential vulnerabilities, catalog vulnerabilities, set up test environments, test patches, and deploy patches. This process takes weeks and leaves systems with publicly known open vulnerabilities. At any given time, there may be thousands of open vulnerabilities across a system before patches can be deployed through current processes. Cybersecurity analysts spend an inordinate amount of time remediating and patching vulnerabilities on IT systems instead of other more important tasks.

CHALLENGE

Cybersecurity analysts need an efficient and fast way to remediate open vulnerabilities in order to keep systems more secure and reduce the time spent on vulnerability management.

PROBLEM TITLE

Threat Identification
(Joint Task Force Empire Shield)

BACKGROUND

In August 2016, crowds were gathered around TVs at John F. Kennedy Airport in New York City to watch Usain Bolt run the 100-meter dash at the Olympic games in Rio de Janeiro. Upon Usain Bolt winning the gold medal, crowds erupted in celebration and applause. However, the sound of celebration and people banging caused chaos in the airport. The New York Police Department received reports of gunfire, which caused panicked passengers to run out of the terminal. Several terminals were evacuated and police from the NYPD and Port Authority as well as service members from Joint Task Force Empire Shield investigated the situation. This event proved that in large/high-ceiling areas, loud noises could often be mistaken for gunfire, which can cause panic and confusion for both civilians and service members. In order to assess the level of risk and be able to respond both faster and more accurately to a perceived threat, service members need a way to better identify the point of origin of a noise. Once they determine the point of origin, service members can decide where to best focus their resources in order to respond.

CHALLENGE

Joint Task Force Empire Shield service members need a better way to identify the point of origin of a noise in order to assess the level of threat and respond faster and more accurately.

PROBLEM TITLE
Threat Marking
(Joint Task Force Empire Shield)

BACKGROUND

The mission of Joint Task Force Empire Shield (JTFES) is to deter and detect terrorism in and around the New York Metropolitan area. Service members from JTFES support law enforcement partners by conducting preventative patrols in major transportation hubs including Penn Station, Grand Central Terminal, and LaGuardia Airport. Since JTFES was set up post 9/11, service members serve as a second set of ears and eyes and are some of the first responders to major and minor incidents in New York.

When a threat arises, service members must evaluate potential targets and communicate clearly and succinctly to their partners. However, sometimes, service members can lose track of targets because they put on or take off a coat or walk too quickly. As a result, the information they have on a person of interest quickly becomes obsolete. In order to more accurately and timely respond and communicate with law enforcement partners, JTFES service members need a more effective means of positively identifying and tracking persons of interest in real-time. If they have such a way, service members can better direct and coordinate with law enforcement partners and be a force multiplier.

CHALLENGE

Joint Task Force Empire Shield service members need a more effective way to positively identify and track a person of interest in real-time in order respond faster and better communicate information to law enforcement partners.

PROBLEM TITLE

Watch and Sort
(United States Marine Corps Forces Special Operations Command)

BACKGROUND

The United States Marine Corps Forces Special Operations Command collects data from video feeds, reports, and a multitude of other sources in order to enhance mission capabilities. The data collection process is currently prioritized as much as possible so that only the most critical data is being collected. However, once the data is collected, it must be sorted to pull the most relevant information to make critical decisions during missions. Marine Special Operations Teams in the field have very few team members and when they deploy an unmanned aerial vehicle to gather video feed, they are not able to spend adequate time viewing the feed to make actionable decisions. Members have both the technical and informational background to make operational decisions but are simply unable to efficiently sort through the data. In the field, data sorting is done on an ad hoc basis and is often treated as an additional job that members must take on in any extra time they may have.

CHALLENGE

Marine Special Operations Teams in the field need a process to sort video feed data more quickly in order to efficiently make strategic and tactical decisions during missions.

PROBLEM TITLE

Meeting Water Needs
(United States Marine Corps Forces Special Operations Command)

BACKGROUND

Marine Special Operations Teams have difficulty operating against near-peer adversaries because such adversaries' surface-to-air capabilities threaten resupply of critical needs such as water. Because Marine Special Operations teams conduct low signature missions (missions where their presence must be almost undetectable), they are mostly on foot and carry their equipment. Without being able to resupply water, teams can only be in the field for a day and a half in locations experiencing extreme heat or where water cannot be replenished naturally. For extended missions which last between 5 and 7 days, these constraints have meant that critical missions could not be initiated. MARSOC has considered using unmanned aerial vehicles (UAVs) to resupply team's water supplies, but the water's weight might overburden the vehicle and the UAVs were not able to maintain a low signature. They have also considered pulling water from the atmosphere or improving human water absorption rates but no technology has been developed as of yet.

CHALLENGE

Marine Special Operations Teams in the field need a way to have enough water for extended missions in locations experiencing extreme heat and/or where water cannot be resupplied in order to defend against adversaries using surface-to-air capabilities.

PROBLEM TITLE

Better Planning for Fuel Logistics
(US Air Force)

BACKGROUND

The United States Air Force consumes approximately two billion gallons of jet fuel per year to generate an average of 800,000 missions. Fuel logistics, which is the coordination and organization of moving, housing, and supplying fuel, are critical to sustaining operations in both contested and uncontested environments. However, the planning aspect of fuel logistics has become more challenging as a result of the constantly changing battlefield landscape. Current modeling and simulation tools to create operational energy resiliency plans for fuel logistics are not agile or conducive to multiple iterations. As a result, logistics planners need an easier, faster, and more flexible way to develop operational energy resilience strategies. The improved ability to develop logistics plans would inform operations, reduce operational risk, and advance investment in fuel infrastructure.

CHALLENGE

Logistics planners need a faster and more flexible method for developing operational energy resilience strategies in order to reduce operational, financial, and investment risk.

PROBLEM TITLE
Common Operating Picture (US Air Force)

BACKGROUND
Many U.S. Air Force members use the Graduated Training Integrated Management System (GTIMS) to track the various certificates, mission qualification trainings and other requirements needed to ensure they are mission- and deployment-ready. GTIMS was intended for use primarily by aircrew, including pilots and navigators, and was not designed to pull data and information from the 10-15 other tracking systems non-aircrew GTIMS users utilize.

GTIMS is a non-intuitive system that takes several months to learn and requires user-level access, meaning only a small number of people can actually update the system; all other users have view-only rights. Unit Deployment Managers (UDMs) are tasked with updating the system for the personnel in their squadron, which has become a full time commitment as the number of tracked items has increased. Something as simple as receiving a flu shot must be updated across no less than three different databases. As a result, UDMs spend a significant time updating the various systems and translating data from one database to another. For this reason, Unit Deployment Monitors seek a reliable and intuitive system which quickly and accurately updates and synchronizes information from authoritative databases.

CHALLENGE
Unit Deployment Managers and users need a way to quickly and accurately pull personnel information from disparate authoritative databases in order to have awareness of which personnel are ready to deploy

PROBLEM TITLE
Managing Logistics Systems
(US Air Force)

BACKGROUND
Certain Air Force units are told on short notice to deploy and typically within 12 hours before they need to deploy. However, for a deployment to take place, there are very specific resource, equipment, and personnel requirements that must be fulfilled and squadrons aren't notified of these requirements until the notice is given. Currently, tracking equipment status relies on a manual process and hand count inventories, as well as multiple spreadsheets and antiquated systems. Before deploying equipment, it must be inventoried, inspected and prepared for transportation. Once equipment is selected to deploy, all preparation efforts require manual data entry to manage the equipment and other resources used as well as track status and choke points through preparation for airlift, inspection, processing, and aircraft loading. For this reason, Logistics Managers need a way to fuse information from and across multiple logistics systems to enable management and rapid selection of a large amount of personnel and equipment for deployments.

CHALLENGE
Logistics Managers need a way to rapidly take inventory, update, and track deployable assets on the warehouse floor in order to ensure efficient selection of a large number of personnel and equipment.

To Enroll

- Apply to the course at the link **
- Pull together a team to address one of the problems shown in this slide deck. Note: teams that include one or more disciplines (e.g. multiple engineering departments, computer science, information science, business) are highly encouraged.
- To find teammates, look at **