AMC PHOENIX SPARK

TRAVIS AFB INNOVATION REPORT

FEBRUARY 2019

SPARK

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SPARK OVERVIEW

Mission

Developing and connecting the best and brightest innovators to solve everyday problems our Airmen face.

Vision

Fully empowered Airmen innovating at the speed of relevance to enhance the Team Travis mission.

SPARK FOCUS AREAS

Problem Statement

Since the 1960s, industry and academia have outpaced the federal government in research and development by a factor of four (National Science Foundation). In addition, rigid requirements set by higher headquarters often lead to clunky programs delivered in a multi-year effort that doesn't adequately keep pace with innovation. The Warfighter has relatively minimal say on the end product and may receive the technology after it's already irrelevant. The defense establishment must immediately shift this paradigm if it wants to succeed in the era of great power competition and advance beyond our adversaries' capabilities. Travis Air Force Base's Phoenix Spark Hub sets out to be the leader in bridging the gap between the operator and agile organizations/companies who are motivated to rapidly develop capabilities the Warfighter deserves.

Agile Manufacturing

Additive manufacturing, or 3D printing, has proven that it can enable the Warfighter to print material at the point of need versus having to operate under restricted time schedules. Airmen are able to enhance their sustainment capabilities, minimizing costs associated with having to contract, purchase, transport, and store additional resources. It has demonstrated the capability to increase operational flexibility in garrison and in deployed environments. 3D printing is also an important avenue for Airmen to rapidly prototype a solution for a localized problem. The real world impact of an additive manufacturing capability at Travis Air Force Base has no bounds.

Data and Digital Environments

Flying is a complicated business with complex data structures underpinning the way units resource their missions. From flying units scheduling aircrew members to maintenance squadrons scheduling their technicians for any given mission, leadership must manually identify interconnected dependencies to arrive at the most optimal solution. Until recent advancements in artificial intelligence and machine learning, operators have had to use primitive methods to approach data access and analysis across disparate sources. The ability to use artificial intelligence in gaining a holistic view of data across infinite data sources, agnostic of format or location, then using machine learning to identify interconnected relationships between data across silos is transformational for the Warfighter. This capability can return Airmen to the Warfighting roles they were originally trained for

Augmented, Virtual and Mixed Reality

Traditional training and workflows in the military are conducted using legacy products in the form of a specific technical order, instruction manual, tactics/techniques/procedures publication, or checklist. Ground training is limited to the use of photos, schematics, and hand-drawn teaching aids which lack realism, portability, and risk-free training reinforcement. Workflows rely heavily on the use of checklists and laptops which are cumbersome to use and often interrupt an otherwise smooth workflow. These training and workflow formats have been used for decades but are now antiquated with the proliferation of cost-effective high-definition cameras and augmented/virtual reality devices. Virtual reality is an emergent technology that will allow the operators to fully immerse themselves in various training scenarios. AR/VR/XR solutions have wide applicability across every unit at Travis Air Force Base.

Small Unmanned Aerial Systems

Small UAS tactics, techniques and procedures are not keeping pace with innovation, the demand for capability, or the growing threats emerging from malignant actors. Aviation has fundamentally changed. The massive proliferation of extreme-low-cost and autonomous aviation technologies, commonly referred to as sUAS or "drones," creates a paradigm shift in the way global mobility operations are conducted. Failing to participate in this rapid growth will increase the vulnerability of our Nation's Airmen to unknown malignant actors. Five major lines of effort for the Travis Air Force Base sUAS Innovation Sandbox are: 1) promote a cooperative UAS environment 2) deter and defend against UAS threats 3) drive enabling regulatory climate 4) establish Travis Air Force Base as a sUAS center of excellence 5) educate and communicate with UAS partners. This coordinated forward leap into developing state of the art of counter UAS technology will guarantee global air mobility operations –without bounds.

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KEY ENGAGEMENTS

DECEMBER

02-03 AF Global Strike Command A9 Director Col Hart & CMSgt (ret.) Neris Visit: Referred by former AMC Chief Scientist, Dr. Senft, the Spark team hosted AFGSC/A9 leadership for a full Spark immersion. Discussed: Spark Roots, Travis Innovation Culture, Airmen-led innovations, SBIR program and projects, Travis Spark Focus Areas, partnerships in industry and academia, innovation education, Squadron Innovation Funds, local project management, innovation outreach, West Coast Center for Innovation, and VR/AR/agile manufacturing demos.

04-05 AFWERX Spark General Assembly Workshop: Brought together the most mature Spark cells AF-wide for a workshop on sharing the best practices, and collaborating on the best way forward. Team developed 17 how-to guides to aid start-up spark cells.

17 AMC/A4 Deputy Ms. Leigh Method visit and Spark Tour. Followed up on discussions from ATA in November 19' about empowering Airmen on their projects.

JANUARY

10-12 Bunker Brews @ Heretic Tap Room hosted by Bunker Labs Bay Area. Non-profit company for veterans and transitioning Airman starting their own businesses.

28-30 SLICC (Spark Leadership Innovation Course & Collider) in SF Bay Area. 34 Airman attended the event, from SrA to Col.

31 General McNabb and team visited the Spark Lab for A/TA. Greeted by SMSgt Phil Edwards and Capt Chris Williston. Presented recent innovations from the lab, weekly scheduled spark education courses, and SLICC '20.

FEBRUARY

4-5 AFMCLO/JAZ Visit: Formally establish 60 AMW Phoenix Spark as a technical activity/laboratory to drive process efficiencies, enhance research and technology development, placing Phoenix Spark on par with larger AFMS research platforms.

MARCH

9-13 AFWERX Spark Collider Austin Texas: Strategic SBIR and Pitch Event. Visitors are Secretary Barrett, Gen Wilson, Dr. Roper, and other senior leaders.

24-27 Travis Innovation Week: National Security Innovation Network (NSIN) Boot camp for Commanders. Educating our Airmen on the innovation ecosystem Spark Collider 3.0. The purpose is to partner best-in-class startups with the world's best Airmen at Spark Tank & Travis Pitch Day. This is FY20 SIF execution utilizing traditional & new commercial solutions opening West Coast Center for Innovation Grand Opening.

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BY THE NUMBERS

Small Business Innovation Research (SBIR) Funded Projects at Travis

8 active phase II projects totaling $7M

Innovation Projects Under Active Management

23

Total Cost Savings (FY 19')

$1.9M

(Based on work hours and actual cost)

Airmen Inspired

500+ through FTAC/ALS/NCOA/Chief's Chats/SLICC '20

INNOVATION PIPELINE

Squadron Innovation Funds FY19 Project Spotlight

KC-10 Formal Training Unit
Virtual Reality Aircrew Training

Problem: Current aircrew ground training methods are antiquated requiring extensive aircraft availability and class-room time using valuable human resources that are growingly increasingly rare.

Solution: Purchased $6K of VR/Video Training equipment to record 360° video of in-flight training procedures with instructors narrating it. By using VR headsets, students review the procedures via video instead of just through text book instruction, increasing proficiency of the task. To capture corporate knowledge of events in flight, green screen equipment was purchased to interview pilots to talk about what they saw, did, etc. during an in-flight event.

Impact: Seeing video of a procedure in virtual reality while sitting on the ground gets the student comfortable with the procedure before doing it in the real world.

60th Logistics Readiness Squadron
POL Paperless Process

Problem: POL uses paper forms which are manually filled out while transporting fuel to aircraft. These forms have been blown around the flight line (possibly creating a FOD hazard), can be unreadable, and have had mistaken data on them due to human error.

Solution: POL acquired iPads through DRMO for $16K. Utilizing Apple computers, Adobe Acrobat, and Microsoft Office, they have taken their paper process and converted it to an electronic process.

Impact: Reduced human errors and illegible handwriting on the forms which saves time and increases efficiency in the work center.

60th Maintenance Squadron
Automated Generation for Calibration Labels

Problem: Generating calibration labels for 10,000 pieces of equipment was very time consuming.

Solution: Purchased label printers.

Impact: Since implementation, there has been a dramatic increase in productivity within the PMEL. Production has climbed from 70% inside a two-week window to 92.5%. Customers are getting equipment turned back around to them faster. There have also been fewer documentation errors, which were also in line with projections. This has cut the turn time of some items in half (30 min to 15 min).

60th Force Support Squadron
Handheld Scanners for Inventory at Fitness Center

Problem: Identifying over 300 pieces of equipment with an internal inventory number used to take 6 hours a week due to the requirement of matching the inventory number to the correct asset and serial number.

Solution: Purchased equipment and training from Wasp Barcode Technologies and received training on 11 July 19.

Impact: Brought inventory time from 312 to 52 hrs per year saving 260 hours per year. Equivalent money savings based on $40 per hour is $10,400 per year.

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INNOVATION PIPELINE

Squadron Innovation Funds FY20 Execution Plan

The Chief of Staff of the Air Force's establishment of Squadron Innovation Funds is aimed at Airmen-led solutions that increase readiness, reduce cost, return time back to Airmen, or enhance the lethality of the force. Travis' #NoBounds innovation campaign motivates our best and brightest Airmen to think and act like a startup delivering solutions to their problem statements at the speed of relevance. Submitted ideas will be vetted by your peers, the Spark team, and leaders across the installation. No idea is too big or too small, Termini Non Existent…There are No Bounds!

The Travis #NoBounds Innovation Campaign seeks to collect problem statements and ideas from Airmen across the Wing with the goal of finding relevant solutions for funding through Squadron Innovation Funds. Airmen who submit their idea will be asked a series of refining questions to gather data and information about the problem they face or the idea they have. Sq/CCs will review applicable problems in their unit and determine validity for allocation of funding. Spark staff members will aid throughout the process by providing problem curation opportunities, resources in contracting and finance, member educational opportunities, and technology evaluations as required.

**Note for Sq/CCs: Funding was allocated to your units based off of Wing criteria. You can share funding across organizations, pool funding with other organizations for similar problem sets, or request extra funding from the Wing if your funding is not adequate to complete the project. 40% of the total SIF at Travis will be available for this campaign like previous year's with the remaining available to you via a Travis Pitch Day (Commercial Solutions Opening) to be held on 26 March 2020. A CSO is an opportunity for squadrons to identify a problem and find a company to solve it through a rapid contracting process.

Timeline

14 Feb 2020	Meet with Sq's if interested in SIF/IdeaScale
28 Feb 2020	Idea Submissions Completed and routed through Sq/CC
13 Mar 2020	Idea Submissions routed through Wing Leadership
27 Mar 2020	Travis Spark Tank Finalists Selected
22 Apr 2020	Travis Spark Tank/Project Execution
29 Apr 2020	Project Execution Working Group
1 Jul 2020	Funds in Final Execution
18 Sep 2020	All Funds Obligated

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INNOVATION PIPELINE

Small Business Innovation Research (SBIR) Projects

Improved Search Capabilities Using MaxSearch

60th Communications Squadron & MaxSet Inc.

Purpose: Measurably improve operational efficiency with multiple sets of large documents and the ability to extract key information in a more timely and accurate manner. The impact of this project will be to provide test data that shows improvements that deliver 10x to 100x the return on investment for small and secure applications for the Windows PC of this type.

Advanced Perimeter Security and Situational Awareness Using Autonomous UAS

60th Security Forces Squadron & Easy Aerial

Purpose: Working w/Easy Aerial in testing and developing a prototype autonomous aerial monitoring system that deliver advanced perimeter security and situational awareness using autonomous self-deployed drones.

Update: 3 autonomous, 2 tethered units.
Autonomous: auto hover, predefined tracks
Tethered: 12hrs aloft, encrypted feed.
Operational: 01 Jul 20

Expeditionary & Agilely Deployable Additive Manufacturing

821st Contingency Response Squadron & Origin Laboratories

Purpose: Iterate and evolve candidate 3D printed components that enable the CRS to better perform their job when in the field. The impact of this project will be a more agile response to needs in the field, improved efficiency of component supply chains in expeditionary situations, and increased adaptability to required repairs.

Improving Base Physical Security Assessments

60th Security Forces Squadron & ARES Security

Purpose: Develop, install and demonstrate a prototype AVERT Virtual Tabletop and AVERT Virtual Reality Training solution at Travis AFB. Evaluate the use of AVERT Virtual Tabletop and AVERT Virtual Reality Training to improve security training effectiveness and fit to Travis AFB Security Squadron needs.

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INNOVATION PIPELINE

Small Business Innovation Research (SBIR) Projects

Maintainer Workflows & Field Support in Augmented Reality

60th Maintenance Group & Mira Labs

Purpose: The impact of this project will be enhanced operational functionality by providing Airmen with a mobile platform to deliver improved AR (Augmented Reality) training and support. Utilizing AR in the field will allow for hands free servicing, maintenance, and operations. It will also allow for direct connectivity and visuals with supervisors while on site.

Aircrew Training in Virtual Reality

22d Airlift Squadron/KC-10 Formal Training Unit & Sketchbox 3D

Purpose: Increased AR/VR design capabilities to provide Airmen with an advanced platform to design and execute complex AR/VR training simulations. They have developed an emergency escape testing program, virtual walkthrough preflight checklist and a 360 degree AR (Air Refueling) instructional video.

Mapping for Disaster Response

821st Contingency Response Squadron & Enview

Purpose: Augmenting an analysts' ability to filter information and proving out the applicability of Natural Language Processing to increased discoverability in classified datasets. The mission impact of this project on the Air Force and the Department of Defense will be to enable analysts to exploit 2,500 intelligence reports in the time it would normally take to read, digest, and comprehend one report.

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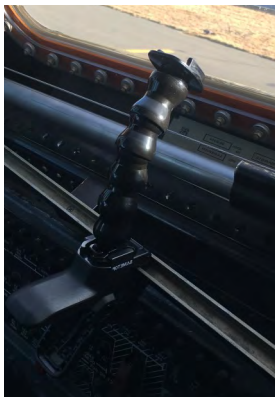
INNOVATION PIPELINE

Airmen-Led Innovation Projects

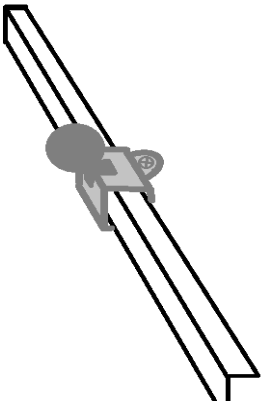
Stratus GPS Mount for C-5M & KC-10A
MSgt Whitney Moore, 60 OSS/OSK

- GPS receivers are being returned with significant damage to the USB-C charging port.
- A mount was 3D printed and is being actively prototyped on aircraft.



iPad Mount for C-5M Jump Seat
Capt Millie Hale, 22 AS/DS

- There is no iPad mounting solution for the C-5M jump seat position.
- A mount was 3D modeled/printed by the Spark team.
- 1st operational test complete

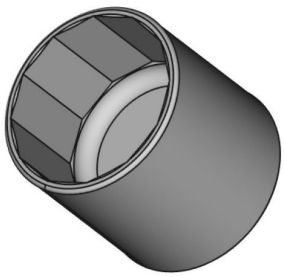


C-17 Engine Exhaust Cover Replacement
SrA Evan Leclair, 60 MXS

- Current C-17 engine exhaust covers are cracking and do not have replacements identified in the supply system.
- A foam plug was developed by a local company and is being actively prototyped by maintainers.

C-17 Liquid Oxygen (LOX) Servicing Tool
SrA Evan LeClair, 60 MXS

- Currently the LOX Cap is difficult to remove due to multiple layers of gloves with the freezing metal.
- Developing an attachment to fit over the cap that can be removed with a handle.



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INNOVATOR SPOTLIGHT

Senior Airman Evan LeClair

Airlift/Special Missions & Debrief Specialist

&

Airman 1st Class Caleb Foster

C-17 Hydraulics System Apprentice

Evan and Caleb identified a pain point during C-17 Liquid Oxygen (LOX) servicing. When relieving system pressure, a small cap must be inserted overhead while wearing multiple layers of thick gloves and a full protective suit. The process involves overcoming 50 lbs of spring pressure with extremely cold gasses venting near the cap which has inadequate exterior grip. This exposes our maintainers to back and neck strain, and makes a small step in the servicing checklist cumbersome and time consuming. Their idea: 3D print a simple tool to increase leverage on the cap and avoid a lengthy process to have the contractor modify the cap. Evan and Caleb are working with Travis Phoenix Spark to develop and test the tool to add to the C-17 & C-5 LOX kits.

Earlier this year, Evan worked directly with a California Company to develop replacement C-17 Nacelle plugs to replace the deteriorated and ineffective original plastic plugs with a more durable foam type version. His project is being implemented across Travis's C-17s and has the potential to spread to the entire MAF fleet of 220 C-17s!

SLICC (Spark Leadership Innovation Course & Collider)

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Overview:

Travis Phoenix Spark hosted the first-ever Airman innovation course with UC Berkeley and Bay Area Industry Partners. 34 Airmen were selected by the SQ /CCs from across the wing to attend the course, from SrA to Col. The course included education in Design Thinking and Rapid Prototyping at the Jacobs Institute for Design Thinking, and tours of leading innovative companies from Silicon Valley. SLICC will culminated in a Collider Event introducing Travis Airmen to best-in-class startup companies, with possible technical solutions to real problems our units are trying to overcome.

Results:

During the 3 day course, the Airmen traveled across the Bay Area focusing on the SLICC Theme of "Inspire, Educate, Collaborate".

The course started by visiting local industry partner the Wiseman Company, where they received inspiring words from Colonel Nelson and Chief Crowder. This led the way for their Innovation Tour of August Home HQ and Tesla in the Bay Area.

When they visited Bunker Labs the next day to hear from guest speakers, such as John O'Duinn, they were educated on how to think and work like fast-growing distributed companies. At UC Berkeley's Jacob's Institute for Design Innovation, they were able to apply design thinking and rapid prototyping via small teams with top professors from the university.

The course culminated with a lesson on Lean Canvasing taught by John Bartlett, and a wrap up session with the Chief of Bay Area Bunker Labs Ronnie. Armed with an understanding of working with smaller companies, they attended a pitch session from Harpoon based companies, offering possible solutions to pain points on the base.

OUTREACH

NCO Professional Enhancement Seminar

16 Mar 20

FTAC Spark Immersion

21 Feb 20
6 Mar 20
20 Mar 20

AFWERX Spark Collider Austin, TX

9-13 Mar 20

Spark Revolution Podcast Launch

Feb-Mar 20

SOCIAL MEDIA

Instagram

@PhoenixSparkTravis

LinkedIn

linkedin.com/company/PhoenixSparkTravis

Website

www.TravisSpark.org

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