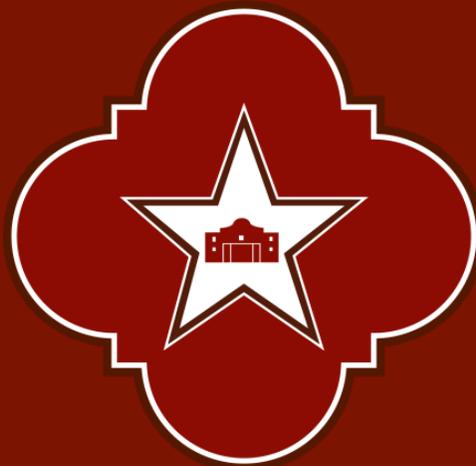

SAN ANTONIO MILITARY LIFE SCIENCE COMMERCIALIZATION ACTION PLAN

FOR PUBLIC RELEASE

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1. Background

“We’re not interested in something that’s kind of a whiz-bang thing that’s not connected to a plausible deployment or not nestled within operational concepts... We do want to encourage breakthrough and creative, kind of, activity and investment in technology, but it’s got to be something that we can actually use in a viable way to serve our strategic approach.”¹

— **Elbridge Colby**
Deputy Assistant Secretary of Defense
For Strategy and Force Development

¹ https://www.defensenews.com/pentagon/2018/03/21/dod-doesnt-want-whiz-bang-tech-if-its-no-good-for-operations/?utm_source=Sailthru&utm_medium=email&utm_campaign=Defense%20DNR%2003-21-18&utm_term=Editorial%20-%20Daily%20News%20Roundup

1.1 Executive Summary

The Objective of this study was to evaluate the San Antonio Military Life Science landscape and establish the feasibility of facilitating the growth of pipelines for collaborative innovation, development, and commercialization.

The Goals were to:

- Identify local military life science innovation opportunities and assess the potential for commercial viability of such opportunities.
- Determine viability of creating a San Antonio Military Medical Innovation Specialist (SAMMI Specialist) and, if viable, define a SAMMI Specialist job description and propose an optimal environment for success.

Ecosystem Knowledge Gap:

This study uncovered that despite the immense significance of the military medical research ongoing in San Antonio, the community, at large, still exhibits an inhibitory gap in the understanding of the military medical research system. While the majority of interviewees indicated that they agreed that San Antonio has the resources needed to promote and leverage military medical innovation, when asked about their knowledge of the process, most said they did not understand how to build cross industry and public-private partnerships. This lack of understanding is a key Knowledge Gap that the current study identified. Despite this short-coming, our data optimistically showed strong agreement across the community that Military Medical Innovation Commercialization was still essential to the growth of San Antonio's Entrepreneurial Landscape (Figure below) and Life Science industry and ecosystem.

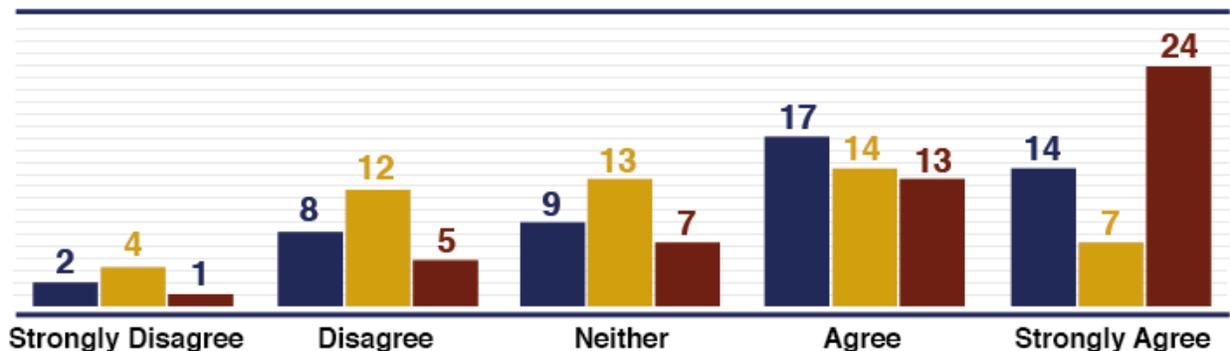


Figure 1. The Data above show the results from asking all interviewees the below questions. Each bar is colored to reflect the question that it pertains to:

1. **Resources: San Antonio currently has the necessary resources to promote military innovations**
2. **Knowledge: I understand how to build cross industry partnerships that include the SA Military Life Science Research Community**
3. **Essential: Military Innovation Commercialization is essential to the growth of San Antonio entrepreneurial landscape**

The Solution:

This data supports the recommendation for a San Antonio Military Medical Innovation Specialist (SAMMI) who will serve as conduit between the military and community to catalyze life science innovation and commercialization. The SAMMI Specialist should be aligned with the military medical missions to meet the specific needs of our war fighters as this provides unique value to the proposed San Antonio military partnership and increases the potential for commercialization of military relevant innovations.

1.2 Overview San Antonio Military Life Science Commercialization Project

Mission is to maximize San Antonio's military and civilian expertise in life science innovation to catalyze partnerships that promote commercialization and economic development.

KEY QUESTIONS

1

What military innovation opportunities and assets exist?

2

How do we **effectively facilitate commercialization** using local resources and military pipelines?

3

How do we entrench this ***Military Life Science Commercialization Strategy*** into a **sustainable position** within San Antonio?

GOALS

Implement plan to support "**best practices**" toward the growth of viable commercialization opportunities

Establish a **roadmap** of military life science commercialization

1.3 San Antonio Military Life Science Commercialization Competitive Advantage

Landscape Overview

San Antonio Research & Life Sciences Strengths:

The research and innovation landscape of San Antonio includes an abundance of universities such as the two state universities the University of Texas San Antonio, home to the nation's top cyber security degree program, and the UT Health San Antonio, a key stakeholder in the advancement of life science and medical device patents in the region. Additionally, San Antonio has several private universities such as the University of Incarnate Word, Trinity University, and St. Mary's College. San Antonio is also home to leading research institutions such as the Southwest Research Institute (SwRI) and the Texas Biomedical Research Institute (TBRI). The life science industry in San Antonio has an economic impact of more than \$37 billion (2015), a healthy 51% growth since 2009². These academic strengths along with the strengths of the military research enterprise position San Antonio to be a leader in life science innovation.

Perhaps one of the most significant potential impacts for growth of San Antonio's life science ecosystem involves the Department of Defense (DoD) Life Science Industry. As one of the largest military concentrations in the country, San Antonio is home to almost one-quarter of the total active duty service members in Texas, which is already the 3rd largest population of active duty service members nationwide³. Joint Base San Antonio (JBSA) includes Fort Sam Houston, Lackland Air Force Base, and Randolph Air Force base and account for over \$48 Billion in economic output as well as approximately 7,000 active duty services members that transition to civilian life annually³. In addition to active duty population, almost 13% of the adult San Antonio population is comprised of veterans³.

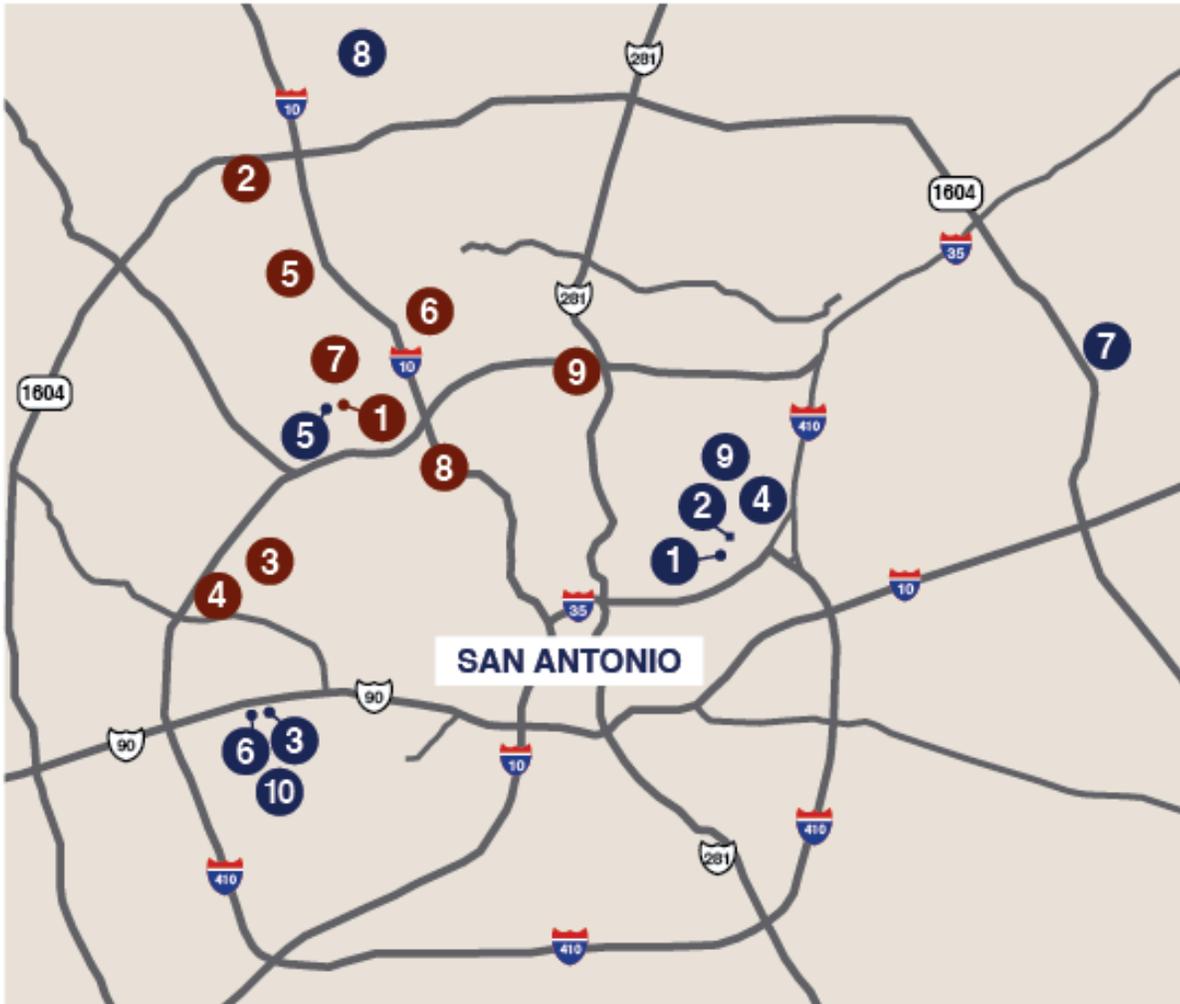
In addition to San Antonio's overall military volume, JBSA also possess a strong Military Medicine influence through the US Army Institute of Surgical Research (USAISR), the 59th Medical Wing (59MDW), and the Naval Medical Research Unit San Antonio (NAMRU-SA). These research institutions house specific and unique national advantages in the trauma, critical care, and clinical training space. Alongside these research institutions, San Antonio is home to Wilfred Hall Ambulatory Surgical Center (WHASC), one of the Air Force's premier training hospitals, and the DoD's only Level 1 Trauma center, San Antonio Military Medical Center (SAMMC) formerly "Brooke Army Medical Center" (BAMC). The juxtaposition of the research, clinical infrastructure, high throughput, and strong DoD funding provides a strategic advantage for San Antonio to capitalize on the unique overlap of military and life sciences cultures. Additionally, the strong interagency alliances possessed by USAISR, 59MDW, and NAMRU-SA serve as a key window of opportunity to facilitate branching out into other government agencies with parallel interests (i.e. DHA, NASA, DHP).

² 2016 San Antonio Healthcare and Bioscience Economic Impact Study, http://biomedsa.org/pdf/economic_impact_study16.pdf

³ <http://mvcc-sa.org/images/upload/2016%20MVCC%20Needs%20Assessment.pdf>

Key Stakeholders & Support Infrastructure

Online Map Here: <https://tinyurl.com/MLmapHERE>



MILITARY LIFE SCIENCE STAKEHOLDERS
(See Appendix For Detailed Descriptions)

- 1 San Antonio Military Medical Center (SAMMC)
- 2 U.S. Army Institute of Surgical Research (USAISR)
- 3 59th Medical Wing
- 4 Naval Medical Research Unit San Antonio (NAMRU-SA)
- 5 Audie L. Murphy Memorial Veterans Hospital
- 6 Wilfred Hall Ambulatory Surgical Center (WHASC)
- 7 Randolph Air Force Base
- 8 Camp Bullis
- 9 JBSA – Fort Sam Houston
- 10 JBSA – Lackland AFB

SAN ANTONIO RESEARCH & LIFE SCIENCES

- 1 UT Health San Antonio (UT Health SA)
- 2 The University of Texas at San Antonio (UTSA)
- 3 Southwest Research Institute (SwRI)
- 4 Texas Biomedical Research Institute (Texas Biomed)
- 5 Texas Research & Technology Foundation
- 6 Metis Foundation
- 7 San Antonio Medical Foundation (SAMF)
- 8 BioBridge Global
- 9 Cherokee Nation

San Antonio Value Proposition and Advantages

The Value Proposition:

The long-term goal is to create the environment with the appropriate tools and processes to promote military life science innovation and bring these innovations to market quickly. In order to do this, the ecosystem and its stakeholders must strive for execution excellence and the highest quality innovation(s). Based on our data collected through interviews and focus groups, our community partners in military, academia, and industry all emphasized strong desires to collaborate across the ecosystem more effectively. The top 5 enablers and detractors (Table 1) identified through our data collection methodology (see Appendix – Data Collection) clearly exhibit the catalyzers and pain points felt by the ecosystem stakeholders. For the purposes of this study, enablers were defined as terms mentioned in association with promoting innovation and those terms associated with the lack of innovation or contributing to reduced innovation were considered as detractors.

Table 1: Top 5 Enablers and Detractors of Successful Partnerships and Commercialization Pathways

	Enablers	Detractors
1	Communication	Lack of Knowledge
2	Connections	Lack of Alignment
3	Alignment	Government Regulations
4	Collaboration	People Support
5	Market Fit/Need	Lack of Funding

Table 1. The above table highlights the enablers and detractors deduced from the comprehensive interviews conducted. Of particular importance in igniting the move from a research focused ecosystem into a commercialization driven one will be a keen focus on maximization of the enablers and minimization of the detractors.

Recommendation 1.3.3: The City must ensure *alignment of the Action Plan with the Military Medical Missions* to meet the specific needs of our war fighters as this provides *unique value* to the proposed San Antonio military partnership and increases the potential for commercialization of military relevant innovations.

SAN ANTONIO'S ADVANTAGES

HEALTHCARE AND LIFE SCIENCE

- Economic impact of the healthcare and Life Science industry in San Antonio is \$37 billion.
- The comprehensive estimate for 2015 is a healthy 25% above that for 2011, and 51% above the 2009 level.
- Healthcare and Life Science is more than 1/6th of the San Antonio workforce.
- Approximately 15,000 uniformed military personnel support the Healthcare and Life Science Industry in San Antonio.

MILITARY PRESENCE

- Joint Base San Antonio (JBSA) is the **largest joint base** in the US Department of Defense and includes: Fort Sam Houston, Lackland AFB, Randolph AFB.
- Nearly 1 out of 8 in Bexar County are affiliated with JBSA which contributes at least \$48.7 BILLION to the Texas economy.

INDUSTRY PARTNERS

- San Antonio houses a range of biomedical companies in the pharmaceutical, medical device, and regenerative medicine fields.
- Large firms such as Medtronic, Acelity, Mission Pharmaceutical, and DPT Laboratories have San Antonio hubs alongside broad, global reach.
- BioBridge Global and Kinetic Concepts, Inc (now part of Acelity) both attribute their origin to visionary San Antonio physicians and have grown to serve global missions in health.
- Startup initiatives such as InCube Labs and VelocityTX are working to spur and support the development of biomedical innovations toward commercial impact.

MILITARY COMPETITIVE ADVANTAGES

KEY MILITARY LIFE SCIENCE RESOURCES

- Co-location of the Navy, Army, and Air Force institutions presents a unique confluence of the Tri-Services in the realms of medical research and clinical care.
- USAISR, 59MDW, and NAMRU-SA have established animal models and recognized researchers for mission-relevant validation testing.
- San Antonio's Military Life Science Ecosystem provides a unique test bed and application proving ground for mission-relevant products in trauma and critical care
- Military has a streamlined Food and Drug Administration (FDA) relationship and can provide regulatory guidance.
- The DoD has several mechanisms for non-dilutive funding to directly and indirectly support the development and testing of commercially viable products that meet military medical needs.
- Strong interagency ties enable pathways to develop products of mutual interest with other government agencies

TRAUMA, CRITICAL CARE, AND CLINICAL TRAINING

- The Burn Center at USAISR provides a unique joint mission of clinical care and research to serve as the front line of innovative care for burn patients.
- The Center for the Intrepid (CFI) is an exceptionally powerful facility positioned on Fort Sam Houston, juxtaposed to SAMMC and USAISR, designed to provide a full spectrum of care to amputees from OIF/OEF.
- 59th Medical Wing is the largest of the 15 Air Force Clinical Training sites and Clinical Investigations Program, standing as the lead platform for clinical research in the Air Force Medical Services (AFMS).
- With each of the Tri-Services leading their respective branches in trauma and critical care research, these areas of research represent the **specific strategic advantage** of the San Antonio Military Life Science Ecosystem.

Funding Landscape

This study resulted in the collection of data that support the need for further investigation of the available funding to promote commercialization in San Antonio, particularly in partnership with the DoD (Figure 2). Funding for early stages of innovation, such as angel investment, were mentioned as a key barrier to success within Focus Group 1 (see appendix, Focus Group 1) as well as in one-on-one interviews and surveys.

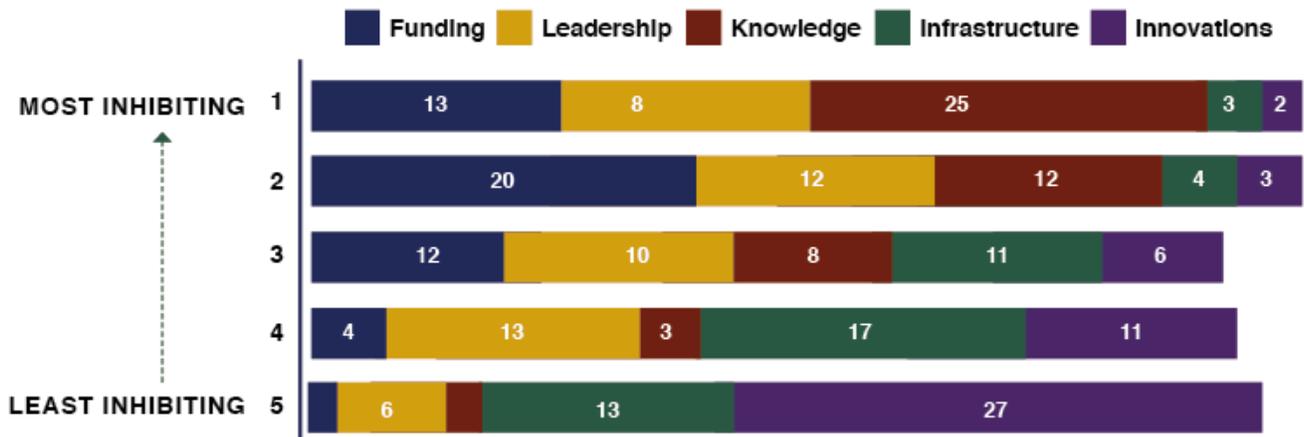


Figure 2. The Data above reflect the ranking of Funding, Leadership, Knowledge, Infrastructure, and Innovations from most to least inhibiting of commercialization. The results show that Funding and Knowledge are most often listed as most inhibiting, while Innovations and Leadership are most often listed as least inhibiting by those surveyed.

Recommendation 1.3.4(a): The city should investigate the feasibility of and investor interest in raising a community Fund to support local life science companies and recruit such companies to locate in San Antonio.

Overview of Non-Dilutive Funding Opportunities:

Capital is a critical backbone to early stage innovations in order to support its development and scaling. “Non-dilutive” funding poses a significant benefit to these such opportunities as it aids the transition of the technology toward commercialization by allowing company formation without taking equity from the founders’ shares. Below are a few available mechanisms that can be leveraged to support the evaluation and development of early stage innovations.

1.3.1.1 Small Business Innovative Research (SBIR)/Small Business Technology Transfer (STTR)

Known as “America’s Seed Fund,” the SBIR/STTR programs are highly competitive, federally funded programs that provide non-dilutive capital to small businesses looking to develop products relevant to eleven governmental agencies for the SBIR and five agencies for STTR. The primary difference between the two programs stems from eligibility and targeted application. The SBIR targets the entrepreneurial and start-up sector, while STTR targets the translation of technology from institutions to industry. Both programs have three phases to the funding of the selected projects:

Phase I – The primary objective is to evaluate and demonstrate technical merit, with funds for up to \$150,000 over a 6-month period. Often, agencies may fund several Phase I projects to allow opportunities for a few companies to demonstrate their proposed solution.

Phase II – Upon successful completion of Phase I, an agency may choose to continue a project for Phase II funding that can include up to \$1,000,000 over a two-year period of

performance. The primary objective is to continue research and development on the demonstrated concept from Phase I, working toward commercial application.

Phase III – While not directly funded by the SBIR/STTR program, the agency may choose to contribute non-SBIR funds and/or other support to help the business in translation to commercial market.

The Potential:

With the DoD as one of the largest investors in medical research and development for the SBIR/STTR program, San Antonio is extremely advantageously positioned to leverage this non-dilutive funding mechanism. Many SBIRs/STTRs are sponsored annually by the local branches that could be potentially awarded to local companies or bring external companies to San Antonio through the visibility and incentive of proximity to research. Since one of the primary purposes of the SBIR/STTR program is to meet military medical needs, it is viewed highly favorably if applying companies have an existing DoD relationship or propose to work closely with the sponsoring department as a part of the work.

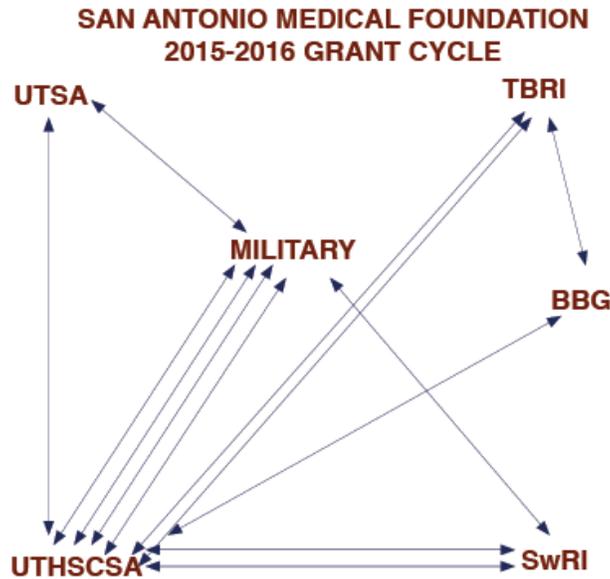
The Barrier:

Exhibited by the annual growth in budget percentage of each agency, the SBIR/STTR has recently become an extremely competitive environment for small businesses. Since the requirement for a “small business” is less than 500 employees, there are still moderately sized companies with access to more skilled leadership, personnel, and resources that can out-compete the traditional “start-up”. Furthermore, the timeline of award to investment (which can take several months) is not favorable to the burn-rate of a small start-up company that is trying to pay employees or meet a demand.

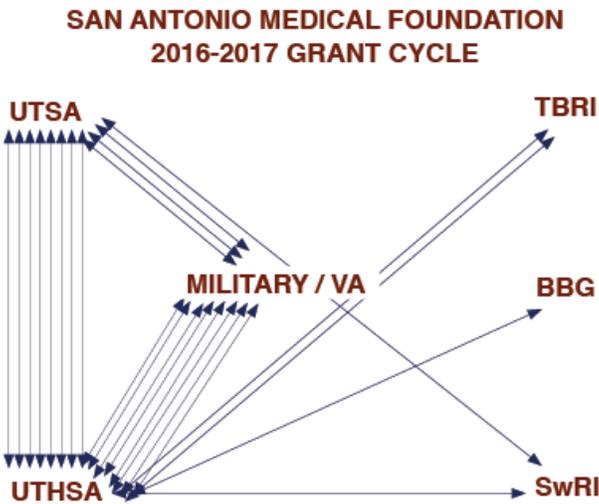
Recommendation 1.3.4(b): There are sources of and mechanisms for non-dilutive funding that the City should work with the proposed SAMMI Specialist to promote in the community.

1.3.1.2 San Antonio Mechanisms to Promote Research Collaborations

1.3.1.2.1 San Antonio Medical Foundation Collaborative Grant Award



9 Grant applications Involving the "BIG 6"
(12 Grant applications received in total)



21 Grant applications Involving the "BIG 6"
(27 Grant applications received in total)

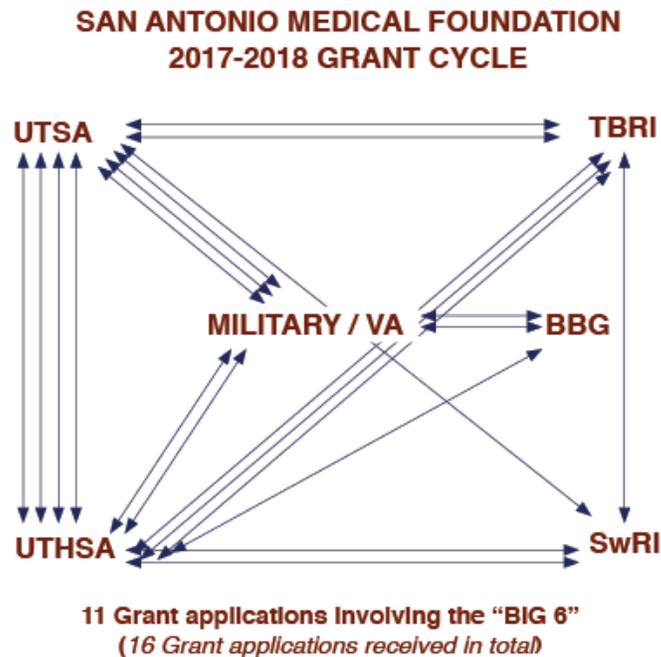


Figure 4: Arrows indicate collaborations between entities in the phase 1 (A) and phase 2 (B) of the San Antonio Medical Foundation grant application program. There was an increase in grant applications from 9 the first year to 21 the second year, with a continuation of engagement with the Military and VA.

The San Antonio Medical Foundation (SAMF) has historically provided ground leases to much of the hospital and research institutions around the Medical Center area in San Antonio. Recently, they have transitioned their investment in the community to provide seed-funding in the form of local collaboration grants for up to \$200,000 per year, renewable for up to 3 years. The thrust of their grant application heavily weighs on the emphasis of local collaboration and commercially-applicable technology developments. The applications first go through a scientific review to narrow the applicant pool, after which the finalists are selected to “pitch” their proposal to the board during which the team dynamics are heavily considered and evaluated.

The Potential:

With the local and collaborative emphasis on grant applications, the SAMF Grant Award provides an ideal competition environment to incentivize local collaborations and start-ups. Since SAMF takes no equity in the process, the mechanism is an ideal non-dilutive funding for local start-ups to get a proof of concept idea with the potential to renew if development continues. Furthermore, SAMF favors military-relevant projects thereby encouraging both mission-driven solutions and military collaborations.

The Barrier:

Since the grant mechanism is only in its 3rd year of funding, the process from both the applicant and reviewing side is still working through the growing pains of a new mechanism. The greatest challenge that SAMF faces is the marketing aspect alongside efficient collection and review of applications. With only two full time employees of the foundation, Jim Reed and Pam Leissner, their bandwidth is a limiting factor in the number of applications that the organization can handle. Additionally, the advertisement process is currently by word of mouth and therefore a less well-known resource among the community.

Recommendation 1.3.4(c): Raise awareness for local funding opportunities through broad advertising and communication across DoD, industry and community partners.

1.3.1.2.2 Cooperative Research and Development Agreement (CRADA)

A “CRADA” is a commonly used mechanism by the DoD to facilitate a formal pathway for collaboration with another academic, industry or non-profit entity. This binding, legal document is signed by both parties and outlines the parameters for collaboration, which typically include the ability to share data, resources, and materials; however, the DoD cannot directly transfer funds to the outside entity under the scope of the CRADA. Each CRADA has a Statement of Work (SoW) that further details the scope of work that the CRADA covers.

“Master CRADA” is a term given to an overarching CRADA that has been signed by the DoD party and another outside entity that provides the broad legal framework under which multiple SoW’s can be assigned depending upon collaborations that may arise involving only the defined entities. The ability to execute Master CRADAs differs across services which should be taken into account.

Entities with Master CRADAs with the USAISR⁴:

- UT Health San Antonio
- Metis Foundation

The Potential:

CRADAs provide an easy mechanism for community, academic, and industry partners to work more effectively with the DoD entities. While no funds may be transferred, cost-saving can occur for the outside entities by having pre-clinical or validation studies conducted under a DoD protocol and access to the experienced researchers as collaborative partners. Furthermore, CRADAs provide the framework through which a personal relationship can be cultivated to beget future collaborative partnerships as new potentials arise.

The Barrier:

Entities not familiar with the CRADA often spend months to years going back-and-forth debating the legal language of the agreement. Much of this comes from a lack of understanding rather than a significant legal hurdle. This can severely detract timelines of research as well as cost smaller entities substantial legal fees, both posing considerable barriers to entry. This is also why the Master CRADA mechanism is useful, since the legal portion of the document is pre-negotiated and each new project adds a new Statement of Work to the existing legal CRADA framework. However, the limited availability of Master CRADAs is a significant barrier and additional pathways should be explored by working closely with each branch.

Recommendation 1.3.4(d): Provide a community-supported legal counsel that can explain the legal language of DoD agreements and advise interested non-DoD entities. This will help to address questions quickly and expedite the document formalization process to allow the research to continue effectively and efficiently.

⁴ At the time of this document, USAISR is the only known local DoD entity to have initiated Master CRADAs

Existing Models of DoD Partnership Infrastructure

1.3.1.3 MTEC – Medical Technology Enterprise Consortium

Structure: Membership based 501(c)(3) comprising of Small and Large Businesses, Academic Research Organizations, Not-for-Profit Organizations, ‘Non-Traditional’ Government Contractors.

Origin: Initiated by a 10-year renewable Other Transaction Authority (OTA) with the US Army Medical Research and Materiel Command (USAMRMC)

Mission: MTEC fosters integrated research partnerships and speeds the availability of solutions to the military, veterans, and the civilian population.

Competitive Advantages:

- Mechanism for rapid collaboration among industry, academia, and nonprofit sectors
- Encourages innovative and bold approaches to military medical needs
- Increased chances of funding within member-limited applicant pool

What can San Antonio Learn? Consortium cost-sharing models with defined project interests encourage and incentivize cross-sector, large-scale initiatives that push innovation and commercialization. The San Antonio MTEC award granted to BioBridge Global and StemBioSys are described in as a Case Study (Section 2.2).



1.3.1.4 ARMI – Advanced Regenerative Manufacturing Institute (headquartered in Manchester, NH)

Structure: Membership based 501(c)(3) comprising of industry, academia, non-profits and government entities. BioFabUSA has been initiated as a Manufacturing Innovation Institute (MII) within the ManufacturingUSA⁵ network and will be sustained by the Advanced Regenerative Manufacturing Institute (ARMI).

Origin: Federally-funded by Department of Defense, awarding \$80M in funding to ARMI through BioFabUSA. Industry partners pledged an additional \$214M to the consortium.

Mission: ARMI's mission is make practical the large-scale manufacturing of engineered tissues and tissue-related technologies, to benefit existing industries and grow new ones. To that end, the technical scope for BioFabUSA work includes innovations across five thrust areas: (1) Cell Selection, Culture and Scale-up, (2) Biomaterial Selection and Scale-up, (3) Tissue Process Automation and Monitoring, (4) Tissue Maturing Technologies, and (5) Tissue Preservation and Transport.

Competitive Advantages:

- Access to regulatory, intellectual property, and business expertise
- Opportunities to participate in technical innovation and education/workforce development projects
- Access to reports, research, results and information about BioFabUSA projects
- “Preferred Membership” Levels enabling greater access to institute-developed IP

What can San Antonio Learn? Aligning with a DoD-interested mission can initiate funding and incentivize industry contributions. Shared IP and resources within a consortium can be a valuable proposition for members.



⁵ <https://www.manufacturingusa.com/>

1.3.1.5 MD5 – National Security Technology Accelerator

Structure: Small team - experienced, serial entrepreneurs and long-time, national security intrapreneurs; Community - people from the Department of Defense, the venture community and academia; MD5 operates both from its DC headquarters and through a network of national research universities



Origin: Outcome recommendation from a feasibility study commissioned by National Defense University (NDU), carried out by New York University (NYU) in the summer of 2015

Mission: To create new communities of innovators that solve national security problems

Competitive Advantages:

- Education, Collaboration and Acceleration programs, MD5 helps the Military Services and other Department of Defense customers respond to unmet, operational needs
- Collaboratively interact with non-traditional partners like academia and the early-stage, venture community to help identify new solutions or applications to those problems

What can San Antonio Learn? Several keys to launching a successful, centralized initiative involve (a) well-defined branding and mission statements (b) clear hierarchal structure and responsibilities (c) dedicated, full-time personnel working on the deliverables and mission

1.3.1.6 San Diego Defense Ecosystem

Structure: An informal cluster of industry, academia, non-profit and government partners in the greater San Diego area



Origin: Since 1846, San Diego has been a major defense asset for the U.S. Navy, situated on the Pacific Coast. In July 2016, the City of San Diego was awarded a \$1.7 million grant from Office of Economic Adjustment (OEA) through their Defense Industry Adjustment (DIA) program

Mission: Propel San Diego – the regional initiative born out of the OEA grant awarded to the City - is a multiphase effort undertaken by a regional collaborative of six key partner organizations with the goal of increasing the strength and resilience of regional defense firms.

Competitive Advantages:

- Alignment of Regional Collaborative Programs: the City of San Diego, San Diego Regional Economic Development Corporation, San Diego East County Economic Development Council, South County Economic Development Council, San Diego Military Advisory Council, and San Diego Workforce Partnership
- Military accounts for 20% of the metro's GRP, and only Fairfax, Virginia, receives more federal defense funding⁶
- Co-location of strong defense and life science establishments
- Extensive R&D space for life sciences

What can San Antonio Learn? Alignment of City and Regional Economic Development Entities enables clear and effective communication of regional assets to attract jobs, companies, and investment.

⁶ <http://www.economicmodeling.com/2018/03/12/supporting-san-diegos-defense-ecosystem/>

1.3.1.7 NCMBC – North Carolina Military Business Center

Structure: A business development entity of the North Carolina Community College System, headquartered at Fayetteville Technical Community College (FTCC) and funded by the State of North Carolina's General Assembly.



Origin: Initiated in 2005, the State of North Carolina created the NCMBC to leverage the opportunities and capture the economic impact of the six major military and fourth highest population of military personnel in the country. From its opening in 2005 to September 2017, NCMBC has assisted firms in winning 2,749 contracts.

Mission: To leverage military and other federal business opportunities to expand the economy, grow jobs and improve quality of life in North Carolina

Competitive Advantages:

- MatchForce.org – A state-sponsored, free web portal for federal contracting opportunities to connect North Carolina businesses with all federal opportunities, including local opportunities at bases in the state. Firms identifying contract opportunities through MatchForce can then contact the NCMBC business development team for one-on-one assistance.
- Strategic Initiative Program – support NC businesses and interested partners in activities such as (a) Market intelligence – identifying future business opportunities in key sectors (b) Pre-positioning and training – for future and current opportunities (c) Current business development – connecting businesses to contract opportunities (d) Solicitation and proposal support – assisting businesses to compete and win (e) Training and resources – providing tools to overcome contracting obstacles (f) Events and networking – focused on target sectors
- Employment programs to support the integration of highly skilled, transitioning military personnel, family members and veterans into the state workforce, and supports economic developers in recruiting defense-related businesses to North Carolina
- Maintains a searchable, historical database of transitioning military personnel to help economic developers quantify this potential workforce for businesses locating in North Carolina

What can San Antonio Learn? Providing easily-accessible business development resources and tools to local businesses, veterans, and interested partnerships increases DoD contracts and funding opportunities.

2. San Antonio Military Medical Innovation (SAMMI) Specialist



Word Clouds have been created from the interviews conducted across the study. These interviews are of almost 60 individuals across industry, community, and military stakeholders. The word clouds showcase the most commonly used words by stakeholders throughout our interviews. The top image displays the terms that were most highly associated as “enablers” of success while the bottom image displays the terms most often used in the context of “detracting” from success (see Appendix – Data for full enabler/detractor descriptions). These data serve as the evidence-based rationale for the following recommendations for the SAMMI Specialist so that he or she may be an effective steward of innovation and the military medical mission in our San Antonio Military Life Science Ecosystem.

2.1 Job Description

San Antonio Military Medical Innovation (SAMMI) Specialist DRAFT Job Description

The San Antonio Military Medical Innovation (SAMMI) Specialist supports the growing military life science ecosystem in San Antonio by facilitating partnerships and innovations that help achieve the military medical mission. This individual ideally possesses experience navigating the structure of the military branches, the pathways to commercialization within them, and the research that exists across the life science industry. To effectively promote the growth of this ecosystem the SAMMI specialist must show dedication to the military mission and commitment to helping other innovators realize their medical products.

Responsibilities of the SAMMI Specialist may include:

- Identify mission-relevant needs and facilitate connections with potential community partnerships that could yield viable solutions
- Attend community and DoD workshops, conferences, and networking events
- Advise early stage entrepreneurs by guiding business strategy and making connections
- Engage with stakeholders in strategic planning and implementation of long-term goals
- Provide navigational knowledge to innovators and community partners regarding the various institutional pathways of communication
- Serve as a bridge across life science sectors (military, academic, institutional, industry, etc) to set up meetings between a community partners
- Advocate for the military medical mission and the San Antonio Military Life Science Ecosystem on a local and national level
- Meet and work closely with the local military tech transfer offices for the Army, Navy and Air Force in San Antonio and at their higher headquarters.
- Develop and maintain up-to-date knowledge of tri-service missions, ongoing initiatives and programmatic directives

A top performer in this position will have:

1. Knowledge of:
 - The structure and activities of each local Military medical research branch.
 - Early stage collaboration and commercialization pathways within the DoD.
 - Military medical mission task areas and ongoing military medical research.
2. Knowledge of and connections with key personnel in the San Antonio Military and Community Life Science Ecosystem.
3. Exceptional communication skills with the ability to translate across military, academia, and industry.
4. Understanding of the sources of funding for startups both locally and nationally.

The right person for this position will:

- Have an open mind for solving problems and developing alternatives
- Enjoy working with a variety of people and participating in social environments
- Prefer to take on difficult challenges and find creative solutions
- Remain independent of any one technology or product solution
- Have a deep commitment and dedication to the military medical missions of supporting the war fighter
- Strive for synergy with whom they work, specifically having the ability to effectively engage with the military environment and personnel.
- Demonstrate an understanding of and willingness to continue to learn navigational strategies within DoD processes (i.e. IP, Advanced Development, Requirements)

To become the founding SAMMI Specialist, extensive experience in the life science industry with connections in San Antonio and at least a master's degree in a life science or engineering field are preferred. Some experience in helping others and/or themselves to commercialize life science products is needed. With the ultimate expectation that the SAMMI will catalyze the growth of the military medical and life science industry, the ideal candidate must be very comfortable presenting, networking, and maintaining strong relationships.

2.2 Metrics

Traditional positions within the City's economic development department are measured by the number of jobs created as well as the number of companies that the position facilitates coming to San Antonio. However, much of the initial mission of the SAMMI will involve the generation of momentum for the San Antonio Military Life Science Ecosystem.

Recommendation 3.2: For the SAMMI Position we propose a graduated model of tracking metrics that attribute credit for early stage wins as well as long term outcomes.

1. Early stage wins measured by:

Collaborations:

Collaborations should be measured by the SAMMI Specialist including connections made to promote the future commercialization of military life science innovations. These collaborations should be stratified to include research and industry collaborations.

Community Involvement:

Since part of the SAMMI's early goal will be to encourage more involvement from the community in Life Sciences professional and networking events, another early metric should include the number of events that the SAMMI Specialists supports that promote DoD/Community Collaborations.

Funding:

Increased Collaborative Funding as an indicator of increased collaborative research. This metric can be initially compared against the current Funding Landscape (Section I.C.4 above) as a baseline. Private investment or grant funding secured by connections or collaborations that the SAMMI facilitated shall be counted toward the SAMMI's funding metric.

Support:

The SAMMI Specialist should keep track of the support they are providing Innovators and Community Stakeholders that aligns with the DoD mission, such as facilitating joint meetings, networking, team development, mentorship, etc. These are indicators that the SAMMI Specialist is aligned with the key stakeholders.

2. Long Term Outcomes Measured by:

Startups:

The number of startups that result from Military/Civilian collaborations facilitated by SAMMI Specialist. Additionally, the successful exit of these companies should also be tracked as a success.

Contracts:

Contracts with the DoD are a strong source of income that can be further capitalized on. The SAMMI Specialists efforts can further support the growth of these contracts which should be monitored.

Jobs and Companies:

Just like other EDD employees the SAMMI Specialist, in the long term should be measured by the number of Jobs and Companies created or attracted to San Antonio as a result of the above metrics.

Technologies Facilitated:

Technologies progressing along the timeline of development toward commercialization and fielding involve many different stages. The continual progression of these initiatives through various milestones such as license agreements, patents filed, FDA milestones, or advanced development milestones will stand as strong, quantitative representation of the SAMMI's facilitation of commercialization.

2.3 Responsibilities/Deliverables/Potential Functions

Responsibilities and Deliverables Report Card:

Metric	Sub-Category	Rating
Collaborations	Formal collaborations initiated [#] <i>(as defined by number of submissions of grant applications, CRADAs, or other agreements)</i>	
	Facilitated connections across sectors [E,S,NI,P]*	
Commercialization	Intellectual Property Facilitated [#] <i>(patents, licensing agreements)</i>	
	Technology Development Milestones [#] <i>(FDA milestones, Advanced Development milestones, TRL advancement)</i>	
Community Involvement	Number of community events attended [#]	
	Attendance of community at events sponsored by SAMMI [E,S,NI,P]*	
Funding	Identified and communicated relevant opportunities [E,S,NI,P]*	
	Grant applications awarded from SAMMI facilitation/guidance [#]	
	Private Investment awarded from SAMMI facilitation/guidance [#]	
Support/Guidance	Team Building around military-relevant products [E,S,NI,P]*	
	Reliability of SAMMI as assessed by clients [E,S,NI,P]*	
	Availability of SAMMI through office hours, site visits, or other means [E,S,NI,P]*	

***Suggested Ratings: E = Excellent; S = Satisfactory; NI = Needs Improvement; P = Poor**
Suggested ratings are a recommended starting point and future discussions with the steering committee will further define quantifiable measures for each metric.

Potential Functions

- 1. Military/Clinical Liaison:** The ability to identify and facilitate military collaboration(s) will be one of the core, defining attributes of the SAMMI. With this ability they will be able to support and navigate military partnerships and provide a much needed and requested “roadmap” to commercialization. For this reason, the SAMMI must have access to military bases/posts as well as travel funds to lobby in DC. These activities will all require administrative and coordination support, included in budget below.
- 2. Rapid Concept Development:** The SAMMI Specialist would be able to develop a network of individuals and institutions specialized to “accelerate” the military commercialization pipeline and rapidly determine the viability of business models and concept market potential. With their specialized expertise, the SAMMI Specialist will work closely with the Tri-Services’ tech transfer personnel as necessary.
- 3. Funding Identification:** With funding being vital to the development of commercially viable products, the SAMMI Specialist will stay up to date on the latest funding opportunities and support entrepreneurs’ awareness of applicable options. Additionally, the SAMMI will be able to identify and support the facilitation of collaborations to develop teams with greater success of DoD or other funding opportunities.
- 4. Engineering & Science Expertise:** The SAMMI Specialist preferably requires a background in a Science or Engineering Life Science field with experience in commercialization of products, preferably with the DoD, in order to be able to serve as an effective clearinghouse for potential technologies or products. With this expertise, they will be able to determine scientific/engineering legitimacy, applicability (i.e. military-relevance) and/or a development pathway. Further, the understanding of the field will allow the SAMMI to support effective team development and resourcing in order to aid the innovation.

Candidate Evaluation Document

Characteristic	Sub-Category	Rating [E,S,NI,P]*
Knowledge	Military <ul style="list-style-type: none"> ▪ Familiar with branch structure and comfortable navigating ▪ Displays understanding of programmatic research and military-mission relevance 	
	Science/Engineering Background <ul style="list-style-type: none"> ▪ Experience in medically relevant scientific/engineering field ▪ Exhibits working knowledge of broad spectrum of life science fields 	
	Business Development <ul style="list-style-type: none"> ▪ Demonstrates understanding of market validation and lean startup principles ▪ Has experience working with early-stage entrepreneurs ▪ Can articulate high-level business model/plan projection for example technologies 	
Communication	Cross-Sector Translation <ul style="list-style-type: none"> ▪ Can articulate specific examples of translational activities among military/academic/industry projects ▪ Readily relates connections in each of the three sectors 	
	Speaking/Presenting <ul style="list-style-type: none"> ▪ Experience presenting with seminars, podium presentations, etc ▪ Speaks eloquently and easily holds conversation with casual air 	
Personal Qualities	Resiliency <ul style="list-style-type: none"> ▪ Articulates example(s) of rebounds from “failure” ▪ Can anticipate potential hurdles and formulate possible ways of overcoming 	
	Team-Player <ul style="list-style-type: none"> ▪ Expresses experience leading multi-disciplinary teams ▪ “Greatest Accomplishment” includes a story about a team success ▪ Exhibits selflessness 	
	Dedication to the Military Mission	

***Suggested Ratings: E = Excellent; S = Satisfactory; NI = Needs Improvement; P = Poor**
 Suggested ratings are a recommended starting point and future discussions with the steering committee will further define quantifiable measures for each metric.

2.4 Budget

SAMMI Position Pro Forma Budget	Phase 1	Year 1	Year 2	Year 3
Launch Team Phase 1 Contract*	50,000			
SAMMI Specialist Salary Only		100,000	103,000	106,090
Part-Time Administration Salary Only		32,000	32,960	33,949
Total Salaries and Benefits	0	171,600	176,748	182,050
Office supplies		2,000	2,300	2,645
Finance/Accounting & Legal		5,000	5,150	5,305
Web Site Development		5,000	0	1,000
Catering/Events		2,000	2,075	2,151
Training & Travel		8,000	8,250	8,513
Total Operating Expenses	50,000	193,600	194,523	201,664
Contingency/Reserve		16,656	17,920	21,182
TOTAL EXPENSES	50,000	210,256	212,443	222,846

*Launch Team for Phase 1 is to fund a consultant to execute the first six months of the Action Plan outlined within this document. This consultant will be essential to ensuring that the foundation for success is in place for the SAMMI Specialists in Year 1.

2.5 Structural Recommendations

Government Alignment

The interview process uncovered a clear initial path forward to ensure success of the SAMMI Specialist. In order to allow for effective and efficient communication with our DoD partners, it would need to be aligned with a government entity. Most notably seen in the word clouds, above, and the top enablers and detractors, below, Alignment is in the top three of both and “Government Regulations” falling as the 3rd most emphasized detractor.

	Enablers		Detractors	
1	Communication	11.2%	Lack of Knowledge	13.6%
2	Connections	11%	Lack of Alignment	9.9%
3	Alignment	6.3%	Government Regulations	8.6%

Given these findings, in order for a position such as the SAMMI Specialist to succeed at facilitating military communication and connections (listed as the 1st and 2nd greatest enablers of success), the position must therefore align with our Military partners. DoD entities, such as the Tri-Services, must adhere to strict regulations insuring that they do not participate in or are perceived as participating in favoritism toward any one entity according to the Federal Acquisition Regulation (FAR), quoted below⁷:

“Government business shall be conducted in a manner above reproach and, except as authorized by statute or regulation, with complete impartiality and with preferential treatment for none. Transactions relating to the expenditure of public funds require the highest degree of public trust and an impeccable standard of conduct. The general rule is to avoid strictly any conflict of interest or even the appearance of a conflict of interest in Government-contractor relationships”

Thus, the SAMMI Specialist’s initial existence within another government entity will serve to circumvent this barrier so that they may effectively achieve their responsibilities and mission. Furthermore, during Focus Group #2 (See Appendix), leadership from the military tri-services unanimously agreed that this governmental alignment of the SAMMI Specialist would be crucial to its successful launch.

Recommendation 3.5.1: The City initially house and help fund the SAMMI Specialist position for the first 1-3 years until long term structure and funding mechanism are determined.

⁷ <https://acquisition.gov/sites/default/files/current/far/pdf/FAR.pdf>

Public Private Partnership

The results of this feasibility study also suggest that the City should investigate pathways toward a Public Private Partnership (PPP) for a potential long-term sustainability structure of the SAMMI Specialist and the surrounding ecosystem. Based on community conversations, many key stakeholders have expressed strong alignment of strategic initiatives (Focus Group #2) for each of their institutions. This alignment would facilitate mutually beneficial conversations, with some Potential partners for continued discussion include entities within the city that are aligned with the military and economic development missions of the SAMMI. A possible structure of this PPP is outlined below with the Private sector leading the financing, Real Estate, and Operations of the position. The value of this opportunity is that the Public enterprise that partners with the City will be able to capitalize on the output of the SAMMI Specialist without jeopardizing the ability of the SAMMI Specialist to work in a non-biased fashion with DoD Partners.

Recommendation 3.5.2: The City pursue ongoing investigations into evaluating the potential for a Public Private Partnership with non-DoD community partners in order to share financing costs. With the goal of maintaining the SAMMI alignment with a governmental entity required by the DoD.

Overview of Public Private Partnership Structure:

Public Partner Will Take the Lead On:

- Identify Infrastructure Needed
- Propose Solution
- Project Design
- Ownership

Private Partner Will Take the Lead On:

- Project Financing
- Construction/Real Estate As needed
- Operations

Alliance

Defined as “a union or association formed for mutual benefit”, the formation of an outlined alliance would serve to align stakeholders and highlight individual strengths and capabilities to ensure that the life science ecosystem has a shared “true north”.

Why a San Antonio Military Life Sciences Alliance? Recently, the DoD has been initiating and/or exploring innovative mechanisms, such as MTEC and ManufacturingUSA (examples detailed in section 1.3.5, above), to balance the need to achieve their mission with the rapid ever-changing nature of the current global landscape. These contemporary approaches have enabled more expeditious and innovative research and development toward the military medical mission. Thus, a local alliance is a way to jointly leverage these mechanisms by aligning stakeholders and resources to develop and foster mission-relevant commercialization.

The San Antonio Life Science Community is frequently touted as a “collaborative environment”. The level of collaboration was described as an asset by most that were interviewed and ranked 4th as an enabler of success. However, given the importance of funding and mechanistic infrastructure, both as enablers in the positive sense and detractors in the “lack of” sense, informal collaboration “in good faith” does not maximize the resulting benefit of sharing capabilities. Therefore, outlining pathways and defining roles within a mutual alliance would facilitate more formal mechanisms of collaboration, such as CRADAs and OTAs, to support ongoing relationships that may progress to a broader scale visible locally, nationally, and internationally. Following on the momentum created by the City with the current feasibility study, it would be ideal timing to capitalize on the expressed interest and alignment from current institutional leaders (See Focus Group 2 in Appendix) as proposed in the continuing investigational recommendations.

Recommendation 3.5.3: Evaluate an alliance as a long-range sustainability model.**Alliance Value Propositions:****Access to Partner Researchers**

- Pre-negotiated collaboration mechanisms
- CRADA/MOU/OTA

Access to Facilities

- Military = animal models; product testing & evaluation
- SAMMC = burn unit, patients, clinical training
- WHASC = clinical training platform
- SwRI = manufacturing (mechanical/drug)
- BioBridge = manufacturing (cell therapy, tissue processing)
- UTSA = rapid prototyping; students
- UT Health = clinical training
- TRTF = incubator space

Access to Capital/Funding

- DoD Collaborations = well-funded
- Alliance = stronger grant applications
- Cost-savings through access to researchers/facilities
→ decrease cost of hiring expertise (ex: FDA, clinician), funded animal studies, no need to set up own manufacturing
- Strong national, interagency relationships to develop products of mutual interest

Expedited Timeline

- Pre-negotiated mechanisms
- Decrease Time = decreased burn rate
- Military's relationship & expertise w/ FDA

2.6 Embedding in Military Life Science Infrastructure

In order to embed the SAMMI Specialist into the Military Life Science Infrastructure, there are key logistical recommendations that must be considered prior to onboarding. They are listed below:

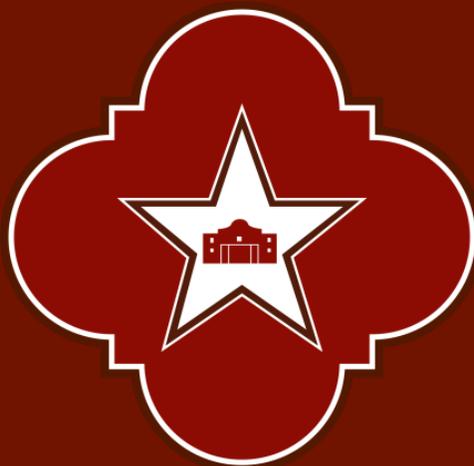
Must have Access to Military Bases: Base access will ensure the SAMMI Specialist is able to obtain and maintain contact with key military stakeholders. For example, base access can be constructed in such a way to ensure that the SAMMI has access to contact information within the tri-services via access the DoD email lists referred to internally as “the global”. Additionally, base access will enable the SAMMI to attend seminar series and lab meetings to stay updated on the DoD priorities and potential military-relevant innovations. Access can be granted in partnership with the leadership of the life sciences research units in the Tri-Services.

Recommendation 3.6(a): The City should begin discussions with Military leadership now to ensure that the SAMMI, when hired, can gain or maintain access without delay.

Office Hours: In order to promote the exchange of information across the community and Military Life Science Ecosystem the working group as well as and Tri-Service leadership have suggested that representatives from the Tri-Services technology commercialization programs join the SAMMI Specialist for office hours in the community at specified time slots and locations within partnering institutions. These institutions may include San Antonio Economic Development Department, TRTF, Texas Biomed, and Southwest Research Institute.

Recommendation 3.6(b): The City should begin discussions with Military leadership now to facilitate and establish office space within the City and partnering institutions for regular office hours.

3. Action Plan Implementation



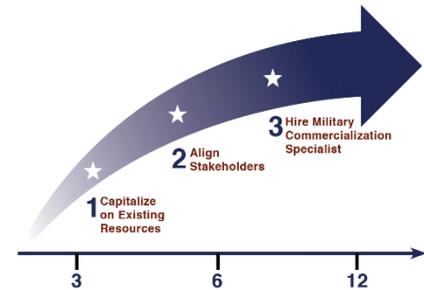
Phase 1 (6 months, Launch Phase with Consultation Team)

(Months 1-3):

Build Bridge between military and community life science research ecosystems

- Design a comprehensive communication strategy to ensure effective connections within DoD, startup, industry, and research ecosystems
- Create registry of military life science task areas and associated DoD and Civilian researchers
- Encourage collision opportunities at existing life science events (i.e. Grand Rounds, Seminars, Metis Foundation Mixers, etc.)
- Launch Think Tank Program aligned with DoD mission objectives and requirements.
- Generate white paper in collaboration with DoD leadership outlining successes and failures of past and/or present DoD and Community Partnerships

3 Steps to Start Journey



Align Key Government and City Stakeholders

- Embed Working Group into Long Term steering committee for position/program.
- Foster working relationships with Commercialization and Tech Transfer Leaders and Offices at each of the Local Military Branches (USAISR, 59th Medical Wing (USAF), NAMRU)
- Facilitate and establish mechanisms for local DoD leadership to routinely meet with top leadership of life science ecosystem (UTSA, UT Health, SwRI, Texas Biomed).
- Engage Industry Partners (USAA, BioBridge Global, Acclivity) in support of developing a DoD/Community Commercialization Pipeline
- Develop roadmap within City Offices and Chambers for effective navigation of eventual Position and aligned marketing strategy

(Months 3-6):

Evaluate Long Term Structures for Charter

- Charter will be a document outlining strategic execution plan for long term structure and provide platform for expressed support
- Charter will be informed through connecting and alignment activities
- Involve Working Group as Steering Committee
- Engage appropriate levels of Military Leadership Hierarchy in DC to involve necessary decision makers in structural determinations
- Gather letters of support from key stakeholders
- Funding Structure and Sustainability Plan Development

Phase 2 (Months 6+, Execution Phase with SAMMI Specialist):

San Antonio Military Life Science Charter

- Complete strategic execution plan for long term structure
- Include letters of support from community partners
- Roles and responsibilities of invested parties clearly outlined for phased execution

Hire San Antonio Military Medical Innovation (SAMMI) Specialist

- First activity of Charter initiation
- Facilitate and oversee execution of Charter along with guidance from Steering Committee
- SAMMI Specialist will begin execution of duties outlined here, (See Section 3.3)

Implement Charter

- Overseen and facilitated by SAMMI
- Continue ecosystem connecting and aligning activities
- Quarterly meeting with Steering Committee to evaluate progression

3.2 Impact

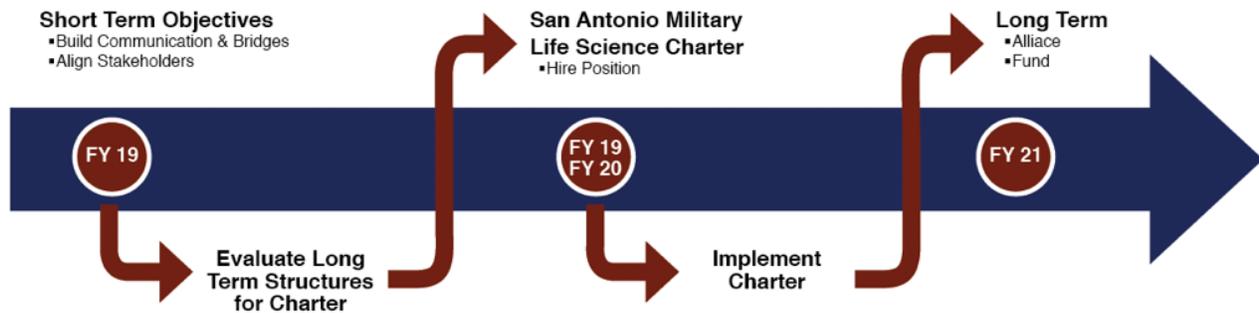
Short Term (6-12 months)

- Increased community knowledge about military life science capacity and missions
- Increased DoD awareness of community resources that are aligned with their mission
- Effective engagement among ecosystem researchers and partners through marketing strategy
- Established DoD/Community Partnerships yielding increased grant submissions and success rate to local (SAMF) and DoD funding avenues (CDMRP, MTEC, BAA, SBIR/STTR)
- Increased visibility and engagement of mentors for DoD and Community entrepreneurs
- Alignment of San Antonio messaging and initiatives on a National Level
- Stronger relationships with other government agencies through the development of products of mutual interest with local DoD partners
- Business formation in sectors supporting life science

Mid-Range (1-3 years)

- Retainment of Military Medical Missions in San Antonio
- More funded DoD/Community collaborations within San Antonio
- Greater IP generation
- Increased knowledge of Commercialization Pipeline by both DoD and Community innovators.
- More life science and entrepreneurial leaders in San Antonio
- Creation of startup companies leveraging and partnering with the military medical community.
- Recruitment of companies or company satellite offices to San Antonio
- Establishment of San Antonio as a recognized hub of innovation and commercialization pertaining to trauma, critical care and clinical training

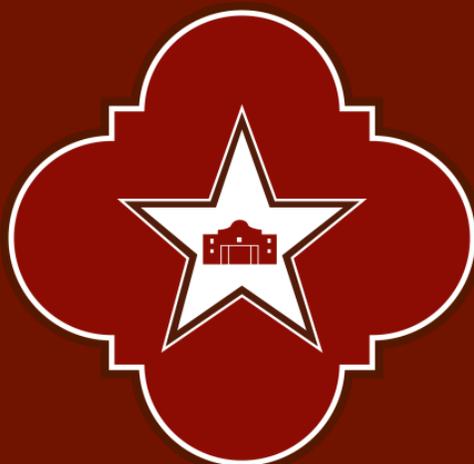
3.3 Action Plan Implementation Timeline:



3.4 Evaluation of Phase I Implementation Options:

	Cost	Benefit
Hire Full Time Person (SAMMI)	\$150,000 - \$200,000	Will have to find/hire team member. Will need to train them. Will not have foundation of operating procedures in place. Strong chance of facing significant hurdles as a result.
Hire Temporary Person	\$100,000 - \$150,000	Will need to identify a temporary staff member within city. Will need to train them. Will not have foundation of operating procedures in place. Strong chance of facing hurdles as a result. Once hurdles are overcome then will have turnover of position.
Launch Team Consultation	\$50,000	Team already familiar with plan and ecosystem. Time to completion efficient. No lag in productivity.

4. Appendix



4.1 Stakeholder Overview

1. San Antonio Military Medical Center (SAMMC)

Commonly known as Brooke Army Medical Center (BAMC), SAMMC is the sole Level 1 Trauma Center within the DoD and provides care to military service members and their dependents. Additionally, the facility serves as a medical readiness training platform for physicians within all service branches. With the juxtaposition of USAISR and the co-location of the world renowned USAISR Burn Center, BAMC represents a unique opportunity for research and innovation within Military Medicine.

2. U.S. Army Institute of Surgical Research (USAISR)

USAISR is housed alongside SAMMC, and is the primary Army medical research institution within San Antonio and one of the foremost leaders in the nation on research pertaining to battlefield care and warfighter welfare management. As a research institute under the arm of USAMRMC, the various research programs are embodied through the formation of “Task Areas” within USAISR that execute on the missions of the respective tasks as determined by the overseeing Medical Command (MEDCOM).

3. 59th Medical Wing

As an integrated part of Joint Base San Antonio (JBSA), the 59th Medical Wing represents the Air Force Medical Service (AFMS) within San Antonio, with the primary Military Treatment Facility (MTF) located at Wilfred Hall Ambulatory Surgical Center (WHASC). WHASC provides comprehensive outpatient healthcare to military service members and their dependents as well as serving as a medical readiness training facility for the Air Force. In particular, research efforts focus primarily on serving the needs of pararescuemen (PJs) and Critical Care Air Transport Units.

4. Naval Medical Research Unit San Antonio (NAMRU-SA)

While the principal Naval Medical Research Center (NMRC) is located at Walter Reed Army Institute of Research in Silver Spring, MD, there is a subdivision Naval Medical Research Unit – San Antonio (NAMRU-SA). Located on the SAMMC campus with USAISR and within the Tri-Service Research Lab at JBSA-Fort Sam Houston, NAMRU-SA represents a link to the third major arm of military medical research and another crucial link to the core of DoD research within San Antonio.

5. Audie L. Murphy Memorial Veterans Hospital

The Audie L. Murphy Memorial Veterans Hospital (ALMMVH), is a quaternary care facility, which is affiliated with the University of Texas Health Science Center at San Antonio (UTHSCSA). The ALMMVH provides acute medical, surgical, mental health, physical medicine and rehabilitation, geriatric, and primary care services. Comprised of a Spinal Cord Injury Center, a Community Living Center, a Domiciliary, and a Substance Abuse Residential Rehabilitation Treatment Program (SARRTP). ALMMVH is a Level II Research facility and has projects that include aging, cardiac surgery, cancer, diabetes and HIV. The facility has one of three National Institutes of Health sponsored clinical research centers in the VA. In addition, the Geriatric Research, Education & Clinical Center (GRECC) is a “Center of Excellence.”

5.1. The Foundation for Advancing Veterans Health Research (FAVHR)

The Foundation for Advancing Veterans’ Health Research (FAVHR) is an independent Non-Profit Corporation (NPC) established in 1988 and affiliated with South Texas Veterans Healthcare Systems (STVCHS) VA Medical Center (VAMC) in San Antonio, TX. Currently FAVHR employs four (4) administrative staff and 35 individuals engaged in research or education. the administrative offices for the Foundation are located in the Research Wing of the Audie L Murphy VA Hospital.

San Antonio Research & Life Sciences

1. U.T. Health San Antonio (UT Health SA)

Previously called The University of Texas Health Science Center at San Antonio, the newly branded UT Health San Antonio is one of 14 UT System institutions, and one of six academic health science centers. UT Health's schools of medicine, nursing, dentistry, health professions and graduate biomedical sciences have produced more than 33,000 alumni who are advancing their fields in South Texas and beyond. With four campuses in San Antonio and Laredo, UT Health has a FY 2017 revenue operating budget of \$806.6 million and is the primary driver of the city's \$37 billion bioscience and health care industry. Since the Bayh-Dole Act of 1980, UT Health San Antonio's commercialization program has evolved along with the rest of the UT System institutions. In 2015, UT System averaged \$2.5 Billion in total sponsored research programs (federal, state and private grants and contracts), a U.S. patent issued every two days, a commercialization agreement executed every three days, and a new company started every fourteen days

2. The University of Texas at San Antonio (UTSA)

UTSA has a growing student body of over twenty-eight thousand students and is the largest university in San Antonio. UTSA's main campus is the largest in the University of Texas System and is home to the Center for Innovation, Technology and Entrepreneurship (CITE), the Office of Commercialization and Innovation (OCI), which support and sustain development in the life sciences. Through with a focus on academic funding, the university devoted over \$56 million to research in 2011. Resulting in a clear growth in both innovation and commercialization potential.

3. Southwest Research Institute (SwRI)

The Southwest Research Institute (SwRI), has a deep history as one of the oldest and largest independent non-profit applied research and development institute in the U.S. making it an asset to the STEM community of San Antonio. SwRI was founded in the 1970s and has since provided contract research and development services to government and industrial clients. There are a number of technical divisions within the institute focused on multidisciplinary, problem-solving approached in a variety of areas in engineering and the physical sciences. These include: Applied Physics, Applied Power, Intelligent Systems, Chemistry and Chemical Engineering, Geosciences and Engineering, Mechanical Engineering, Office of Automotive Engineering (Engine, Emissions, and Vehicle Research and Fuels and Lubricants Research), Defense and Intelligence Solutions, Space Science and Engineering. SwRI is home to more than 4,000 projects at any time that are funded equally between the government and commercial sectors. At the close of fiscal year 2015, the SwRI staff numbered 2,708 employees and total revenue was \$592 million. The institute provided \$7.2 million to fund innovative research through its internally sponsored R&D program.

3.1.1. BioMed SA

BioMed SA is currently housed at Southwest Research and was formed by community and bioscience industry leaders in 2005 as a non-profit corporation with the goal of expanding on the city's biomedical assets to increase visibility on a broader scale. Currently, its mission states "To accelerate growth of the healthcare and bioscience sector, create regional economic benefit, and contribute to the health of San Antonio and beyond by establishing San Antonio as a leader in healthcare and bioscience." With our proposal to gather information from various hubs around the nation, BioMed SA and its supporters will be an essential player in our outreach efforts. Additionally, we anticipate that their involvement could be integral to the ultimate position whose job will likely entail working in a similar outreach landscape to broadcast and commercialize San Antonio Innovations.

4. Texas Biomedical Research Institute (Texas Biomed)

The Texas Biomedical Research Institute (Texas Biomed) represents a nearby private, nonprofit scientific institution with over 400 employees and 480,000 square feet of space that includes

laboratories and a biosafety level 4 facilities, offices, an animal hospital, a library, and specially designed animal facilities. This infrastructure supports numerous NIH-sponsored biomedical studies in infectious disease, cancer research, heart disease and neonatal disorders. In 2011, Texas Biomed formed a partnership with the San Antonio Vaccine Development Center (SAVE), to coordinate vaccine development activities across San Antonio and serve as the regional center for international collaborations. The Texas Biomed is home to the Southwest National Primate Research Center (SNPRC) which sustains the world's largest captive baboon population, the largest chimpanzee census of any NRPC, has the capacity for nonhuman primate studies in, and a veterinary technical staff experienced in the management and use of nonhuman primates. Institute scientists have also developed a fully pedigreed colony of 2,200 laboratory opossums, which are increasingly recognized as an important animal model to carry out research in a broad range of areas including human development, physiology, and disease susceptibility. The Texas Biomed also has the world's largest computer cluster devoted to statistical genetic/genomic analyses (in support of several human genetic epidemiological studies). Most investigators at the Texas Biomed are cross-appointed to various academic departments within the UT Health SA. Thus, there is a rich scientific interchange via these partnership programs that benefit and contribute to the overall scientific excellence of the South Texas area.

5. Texas Research & Technology Foundation

TRTF has invested millions of dollars over the last five years in several companies in the Biosciences, none of which were companies started through the licensing of technology from universities or institutions. We are aware that TRTF has recognized the need for increased early stage investment in University and Institution based research commercialization and has pledged to provide the support needed to launch research from these entities into startups that will grow the life science and technology sectors of San Antonio. Further, in addition to providing the critical early stage funding, TRTF will lead the creation of a variety of programs and support tools for early stage startups that are sure to fuel the ecosystem's growth, such as the recently announced VelocityTX. In this way, TRTF will be an essential partner in the advancement of military innovation.

6. Metis Foundation

The Metis Foundation is a non-profit organization with the goal of promoting clinically relevant scientific research in the medical community, especially within the US Department of Defense. Through scientific, educational, financial and project management support they help individuals to conduct federally and privately sponsored research, clinical trials and education. With Metis' central focus of serving as a programmatic support hub for research grants and other funding mechanisms for the military medical research community, they stand as an important stakeholder in our assessment of the military commercialization and research space.

7. San Antonio Medical Foundation (SAMF)

The mission of SAMF is "To provide leadership and active stewardship of our land and other assets to improve health care, advance biomedical science and enhance community well-being." The organization has done so through initiatives such as economic impact reports and the creation of a state of the art bioscience research database. The Foundation has acquired over 600 acres since the 1950's in what is now the South Texas Medical Center, and has given over 180 acres to the University of Texas Health Science Center at San Antonio. As an integral member that has already shown great support for San Antonio Life Sciences, we plan to engage with SAMF, especially to discuss potential viable structures for the ultimate job assessment.

8. BioBridge Global

BioBridge Global (BBG) is a nonprofit company that oversees and supports the South Texas Blood & Tissue Center, QualTex Laboratories, GenCure, and The Blood and Tissue Center Foundation. For over 35 years, our team of dedicated professionals has made life-saving connections. BioBridge is uniquely positioned to bridge the DoD Life Science Missions with that of the civilian commercialization pipeline.

9. Cherokee Nation

Cherokee Nation Businesses is a conglomerate holding company, headquartered in Oklahoma, that oversees and manages subsidiary companies involved in a vast array of federal businesses and sectors. As it pertains to this project, one of the Cherokee Nation Businesses is a common contracting mediator for researchers and clinical needs at the DoD entities due to long standing contract relationships. A more recent evolution in one of the Cherokee Nation-held businesses involves Cherokee Nation Diagnostic Innovations (CNDI) that have local offices here in San Antonio. Originating from their strong government relationship roots, CNDI helps accelerate the commercialization of new technologies and products coming from the DoD and other clients. They can provide support from concept development to licensing or commercial/market application.

Washington DC Counterparts to DoD Life Science Innovation (Not pictured in Map)

1. U.S. Army Medical Research and Materiel Command (USAMRMC)

USAMRMC Headquarters is located up in Ft. Detrick, MD and serves as the overseeing body of military medical research and commercialization. They provide programmatic directive to the research institutes across the country, such as USAISR, through Congressionally Directed Medical Research Programs (CDMRP) which provides program management and execution of six core managed research programs through Joint Program Committees (JPC). Additionally, USAMRMC also oversees the technology transfer and medical product acquisition to and from the military.

2. U.S. Army Research Laboratory (USARL)

The U.S. Army Research Laboratory (ARL) is within the U.S. Army Research Development and Engineering Command (RDECOM) and involves several facilities throughout the country that serve as the Army's technology development centers. These institutions represent the primary hubs of engineering and development for both medical and non-medical technologies for the warfighter with congressionally legislated directives and opportunities allowing collaboration with industry partners through mechanism such as Broad Agency Announcements (BAA), Small Business Innovation Research (SBIR) Program, Collaborative Technology Alliances (CTAs) and Cooperative Research and Development Agreements (CRADAs).

3. The Navy Medical Research Center (NMRC)

The Naval Medical Research Center (NMRC) is a Navy agency that's mission is to perform basic and applied biomedical research to meet the needs of the United States Navy and United States Marine Corps. The main fields of study include: infectious diseases, biodefense, military medicine, battlefield medicine, and bone marrow research. In 1998, the Naval Medical Research Center was established as an umbrella organization for other commands across the nation and abroad. Since 1999, it has been located in the Forest Glen Annex in Silver Spring, Maryland. The Forest Glen Annex was originally an annex of the Walter Reed Army Medical Center, but as a result of the Base Realignment and Closure process the facility was transferred to the command of Fort Detrick in 2008.

4. United States Naval Research Lab (NRL)

NRL is the corporate research laboratory for the United States Navy and the United States Marine Corps. It conducts basic scientific research, applied research, technological development and prototyping. The laboratory's specialties include plasma physics, space physics, materials science, and tactical electronic warfare. NRL's research expenditures are approximately \$1 billion per year.

4.2 Innotech Overview

Emerging Medical Technology Conference

Purpose: Hosted 2 panels. 1.) Military Collaborations 2.) San Antonio Ecosystem

Attendees:

- David Spencer
- George Peoples
- Christine Burke
- John Gebhard
- Ed Davis
- Charlie Whelan

Goal of Panel 1:

Establish the importance of the DOD to the San Antonio Life Science Ecosystem. Expose the audience to case studies of both inside out (Peoples) and outside in (Spencer) innovation and the steps to overcome barriers and initiate partnerships.

Goal of Panel 2:

This panel will focus on the Strengths of the City of San Antonio and how each panelist views the future healthcare innovation aligning with those strengths. We will also discuss the barriers faced and the potential strategies to overcome them as our City's Ecosystem pursues growth.

Key Takeaways:

Audience was highly engaged in both Panels and were exposed to information they did not previously know about.

Panel 1 revealed interest from across a variety of community sectors in building relationships with the DOD to promote innovation. Further, clear patterns of a need for more communication, alignment and a road map were further established.

Panel 2 showcased the work being done by the academic and non-profit institutions of San Antonio, highlighting some of the potential synergies in the work by BioMed SA and Charlie Whelan. Additionally, discussion about the roles of both UT institutions revealed a need for an effort to educate universities about the needs of industry and DOD entrepreneurs in order to facilitate successful commercialization and robust ecosystem development.

4.3 List of Recommendations

- **Recommendation 1.3.3:** The City must ensure alignment of the Action Plan with the Military Medical Mission to meet the specific needs of our war fighters as this provides unique value to the proposed San Antonio military partnership and increases the potential for commercialization of military relevant innovations.
- **Recommendation 1.3.4(a):** The city should investigate the feasibility of and investor interest in raising a Community Fund to support life science companies and recruit such companies to locate in San Antonio.
- **Recommendation 1.3.4(b):** There are sources of and mechanisms for non-dilutive funding that the City should work with the proposed SAMMI Specialist to promote in the community.
- **Recommendation 1.3.4(c):** Raise awareness for local funding opportunities through broad advertising and communication across DoD, industry and community partners.
- **Recommendation 1.3.4(d):** Provide a community-supported legal counsel that can explain the CRADA legal language and advise interested non-DoD entities. This will help to address questions quickly and expedite the document formalization process to allow the research to continue effectively and efficiently.
- **Recommendation 3.2:** For the SAMMI Position we propose a graduated model of tracking metrics that attribute credit for early stage wins as well as long term outcomes.
- **Recommendation 3.5.1:** The City house and help fund the SAMMI Specialist position for the first 1-3 years until long term structure and funding mechanism are determined.
- **Recommendation 3.5.2:** The City pursue ongoing investigations into evaluating the potential for a Public Private Partnership with non-DoD community partners in order to share financing costs. With the goal of maintaining the SAMMI alignment with a governmental entity required by the DoD.
- **Recommendation 3.5.3:** Evaluate an alliance as a long-range sustainability model.
- **Recommendation 3.6(a):** The City should begin discussions with Military leadership now to ensure that the SAMMI, when hired, can gain or maintain access without delay.
- **Recommendation 3.6(b):** The City should begin discussions with Military leadership now to facilitate and establish office space within the City and partnering institutions for regular office hours.