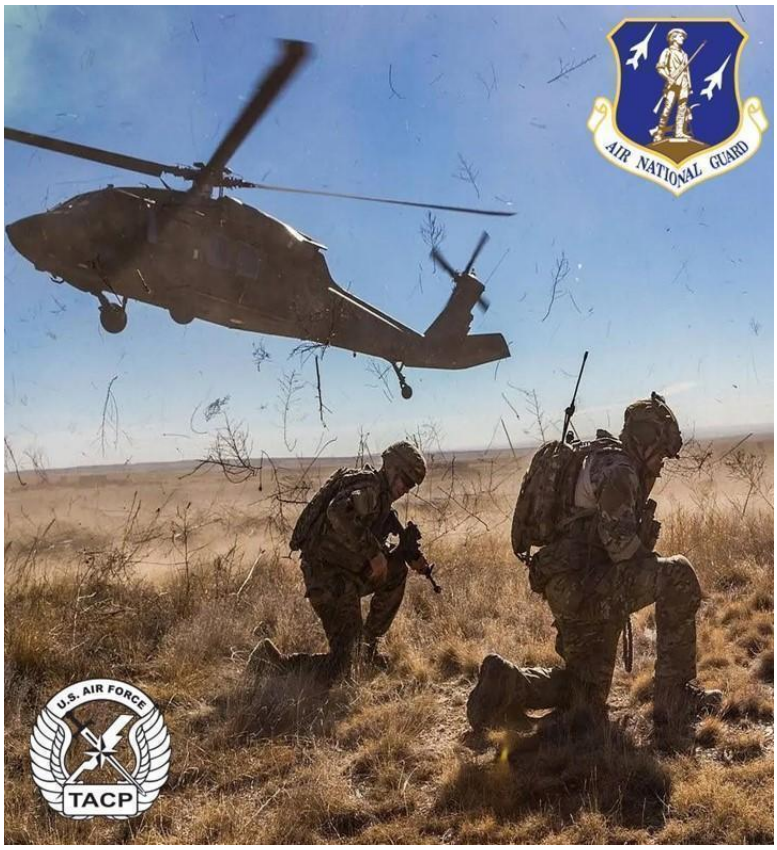
Reducing Tier-II Operator Fitness Test Failure Rates for ANG TACP



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Prepared for:

Air National Guard Bureau, Tactical Air Control Party Branch

OPWL 529 Needs Assessment – Final Report

Boise State University

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BOISE STATE UNIVERSITY

DISCLAIMER

This document has not been subject to review and approval through the official United States Air Force or the Air National Guard publications channels. The opinions herein are those of the authors and do not necessarily represent the views of the United States Air Force or the Air National Guard.

The information contained herein was obtained through interviews and extant data reviews of current Air National Guard Tactical Air Control Party Airmen, Subject Matter Experts, and policy documents that exist within the United States Air Force and the Air National Guard. This project and the data contained within were verified and validated with our military sponsor and client, CMSgt Larry Mansell, ANG TACP Functional Area Manager within the National Guard Bureau.

Throughout this document the term Guardsman and Airman are used interchangeably. In addition, the terms drill status guardsman (DSG), drill status Airman are used interchangeably with traditional guardsman and Airman.

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SNAPSHOT SUMMARY

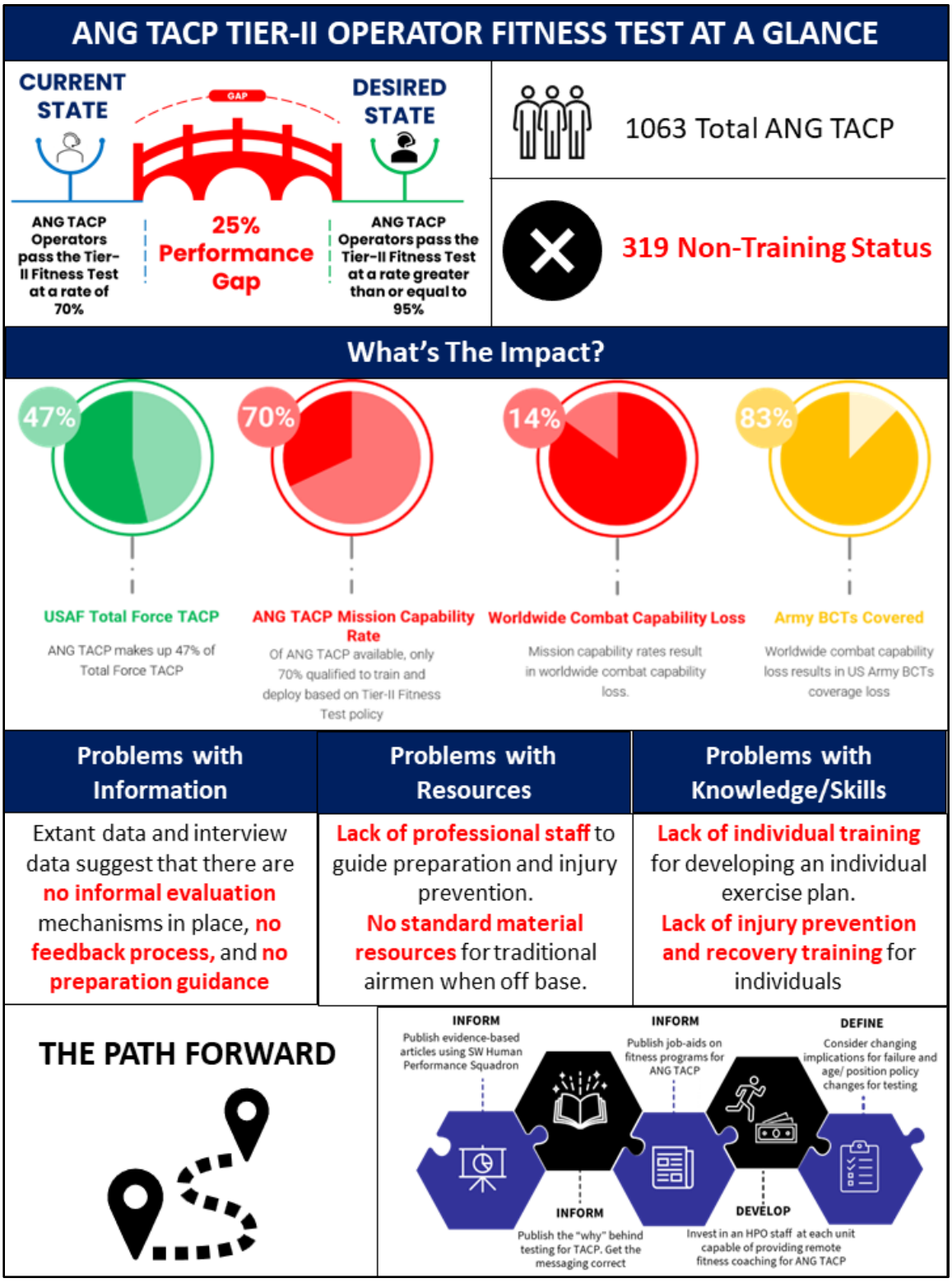

FIGURE 1. EXECUTIVE OVERVIEW

EXECUTIVE SUMMARY

BACKGROUND

Air National Guard (ANG) Tactical Air Control Party (TACP) is an Air Force Weapon System within the Air Force Special Warfare (AFSPECWAR) Directorate of the United States Air Force (USAF). Their primary mission is to command and control (C2) strike assets against surface targets in order to meet the overall commander's intent for an operation. The Airmen within this specialty are often the sole USAF representative to joint and coalition service partners. Their primary job is physically demanding and requires the Airmen to be in a consistent state of readiness in order to face the enemies of the United States, worldwide, at a moment's notice.

That high state of mission readiness comes with increased standards for their physical fitness assessments each year. ANG TACP are required to complete a Tier-II Operator Fitness Test (OFT) in lieu of the normal USAF Fitness Assessment each year. The Tier-II OFT comprises 9 graded areas across several fitness domains that were deemed critical for specific mission areas by the Human Performance Optimization professionals and leadership within AFSPECWAR. In comparison, the normal USAF Fitness Assessment currently has three graded areas that cover muscular and cardiovascular endurance only (Robson S., et al, 2021).

PURPOSE

A team of graduate students from Boise State's Organizational Performance and Workplace Learning (OPWL) program worked directly with Air National Guard (ANG) Tactical Air Control Party (TACP) to conduct a needs assessment on the impact of the new requirement to complete and pass a Tier-II Operator Fitness Test (OFT) on ANG TACP mission readiness. Specifically, the client desired to find ways to increase passing rates within the ANG TACP formation. In addition to the increase in passing rates, the client also desired to learn more about the overall impact on mission readiness and suggestions on ways to improve those factors as well.

Pass rates for the Tier-II operator fitness test within the ANG TACP, are currently 70%. The client's desired performance was an increase in pass rates to ≥95%. **This 25% gap creates a 10% loss in combat capability for TACP Airmen, across the entire USAF TACP community.** The goal of this assessment was to research performance gap areas, probable causes for those gaps, and provide possible interventions solutions to the client for implementation.

METHODOLOGY

The needs assessment team conducted a systematic needs assessment using evidence-based practices for determining gap areas, probable causes, and selecting appropriate interventions to resolve performance gap issues within an organization and individual performers. The process utilized components from multiple frameworks and models which were applied into a six phase needs assessment: (1) Problem Identification; (2) Organization Analysis; (3) Environmental Analysis; (4) Gap Analysis; (5) Cause Analysis; and (6) Intervention Options. (Stefaniak, 2020).

DATA GATHERING

The Needs assessment team conducted extant data reviews of policy documents and guidance memorandums. Semi-structured interviews in-person, via telephone, and video teleconferences over Zoom. Finally, they conducted a thorough literature review with peer-reviewed articles and journal entries related to the topics of: active duty versus reserve component fitness assessments; physical fitness data for AFSPECWAR specialties; musculoskeletal injury rates as it relates to AFSPECWAR Airmen; and injury prevention data.

Stakeholders were identified and categorized in order to get a broad sampling across the entire ANG TACP formation. The stakeholder categories encompassed; upstream stakeholders from Headquarters elements within the organization; midstream stakeholders that were responsible for managing and leading individual units while also having to meet the same performance standards; direct impactees who are required to perform the fitness test as well as the majority of the mission areas for ANG TACP; and finally, subject matter experts who concentrated on AFSPECWAR strength and conditioning.

PERFORMANCE GAP AND CAUSE ANALYSIS RESULTS

Using Chevalier's updated Behavior Engineering Model (BEM) the team was able to interpret performance gaps into actionable areas to apply interventions. Ultimately, ANG TACP has three primary causal areas that are contributing to the overall performance gap.

Environment-Resources

Within this area ANG TACP is seeing a lack in both material and personnel resources. On the material side, ANG TACP does not possess standard equipment at each location for both strength training and conditioning as well as injury prevention and recovery. ANG TACP also lacks trained professional staff that can coach and mentor individual Airmen throughout their training cycles. Those personnel could also assist in solving the next two causal areas.

Environment-Information

ANG TACP has inconsistent and sometimes non-existent messaging as it relates to the Tier-II OFT. The Airmen do not have applicable job aids to assist them in fitness preparation nor do they have literature on appropriate fitness topics that are produced for them. The lack of information across the formation appears to be causing gaps in evaluation and feedback methodologies.

INDIVIDUAL-KNOWLEDGE/SKILLS

ANG TACP Airmen have an appropriate amount of motivation and capacity to complete and pass the Tier-II OFT. Their primary area of concern within the knowledge and skills are linked to fitness programming and injury prevention and recovery. The Airmen are not fitness professionals. Oftentimes they find themselves accessing publicly available resources and fending for themselves for those topic areas. This has led to some anecdotal evidence of increased injury rates within individual units across the formation.

INTERVENTION OPTIONS

In an effort to address the causal areas, the needs assessment team has offered five intervention areas to apply to the different causal areas using Hale's intervention types (Hale, 2006).

INFORM

Interventions that inform ensure that the people who need to know do know. It is not enough just to define the purpose, responsibilities, and other attributes; the information must be communicated as well.

DEFINE

Interventions that define are used to gain clarity. They are meant to contribute definition and dimension; help people find out what they agree or disagree about regarding their sphere of responsibility; where they are going as an individual, work group, or company; and what they are about, that is, their mission.

MEASURE

Interventions that measure compare actual behaviors or results to some identified standards, criteria, or expectations. Measuring emphasizes the organization's commitment to meeting its expectations and goals. What organizations measure, when they measure, and the measurement criteria they use make public what the organization thinks is important.

STANDARDIZE

Interventions that standardize address the design of equipment, materials, procedures, and workspace. Their goal is to achieve consistent performance, allow for interchangeability, or increase product flexibility and longevity.

DEVELOP

Interventions that develop, improve, or expand people's knowledge and skills. Examples are training programs, mentoring programs, job swapping, cross-functional teams, community college programs, continuing education courses, conferences, and seminars.

BACKGROUND

CLIENT ORGANIZATION

UNITED STATES AIR FORCE (USAF) TACTICAL AIR CONTROL PARTY (TACP)

TACP is an Air Force Special Warfare (AFSPECWAR) specialty whose primary mission is to command and control (C2) strike assets against surface (land and/or maritime) targets to meet the overall commander's intent for an operation (HAF/A3S, 2021). Oftentimes, this Air Force specialty directs Close Air Support (CAS) within proximity to friendly positions on the ground while also being a member of that same ground team (HAF/A3S, 2021). These professionals are charged with being the face of the USAF to joint organizations (Mansell, 2022). They often train and deploy with those joint forces as the sole USAF Airman on the team (Mansell, 2022).

Mission. *The TACP Weapon System executes the kill chain through command and control, joint integration, and precision strike redundancy at the forward edge.* (HAF/A3S, 2021)

Vision. *Air Force mission command forward, for the Joint Force.* (HAF/A3S, 2021)

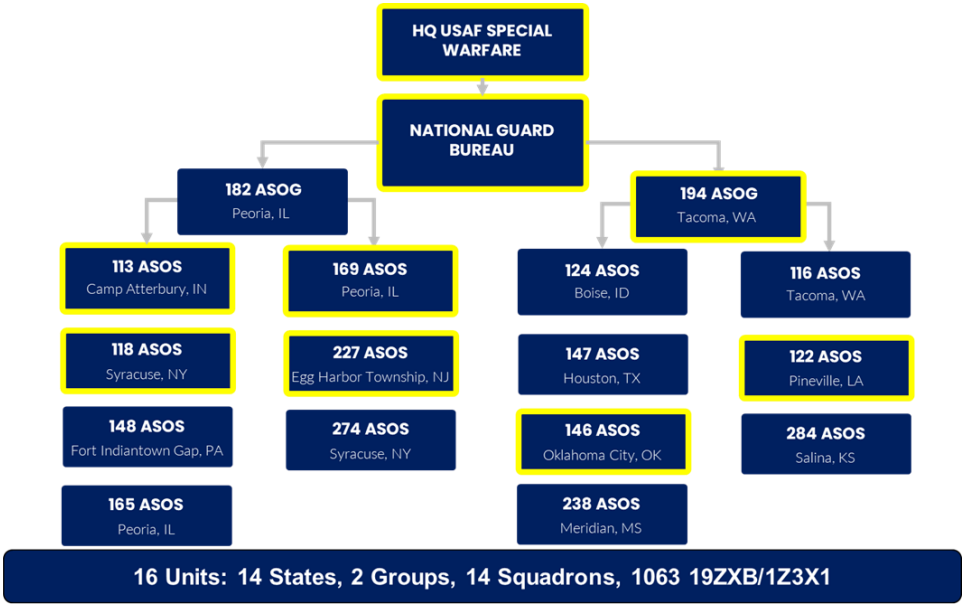

FIGURE 2. ANG TACP ORGANIZATION CHART

AIR NATIONAL GUARD (ANG) TACP ENVIRONMENT

The TACP specialty is spread between the Active and Reserve Components of the USAF totaling roughly 3,000 Airmen. Within the ANG, TACP are around 1500 Airmen total across the Continental United States (CONUS). Specifically, they are in 14 states and dispersed across 18 units in those 14 states.

The Air National Guard, as a part-time, operational reserve to the Active Component of the USAF, has a common force presentation where roughly 80% of their 1500 Airmen force are part-time or "Traditional" Guardsmen. Those Traditional Guardsmen are regulated by United States Law for their minimal participation to protect both the guardsmen themselves and their civilian employers through the Uniformed Services Employment and Reemployment Rights Act (USERRA). The current minimum requirement for military duty within the ANG equates to 39-days each calendar year (1 weekend a month, 2 weeks per year). As long as an Airman achieves this 39-day mark they receive what is known as a "good year" which is annotated on their records towards an ANG retirement where they must accumulate 20 good years of service in order to collect their pension.

Within the ANG TACP specialty however, these professionals often give the ANG at least 80-days per year to satisfy their various currency training requirements to keep their qualifications as a TACP Airman. One of those currencies is the AFSPECWAR Tier-II Physical Fitness Test which is a combat focused, physical fitness test performed in lieu of the "normal" USAF Physical Fitness Assessment which all other Airmen are required to take in the USAF.

It should be noted that AFSPECWAR Airmen as a whole, are more susceptible to Musculoskeletal (MSK) injuries over other USAF specialties. MSK injuries continue to be costly and the leading cause of medical visits and disability in the U.S. military (Butler et al., 2022). These injuries are more prevalent with this group of Airmen since they often operate in hostile environments for prolonged periods of time while carrying a large amount of support equipment weighing 100 pounds or more (Warha et al., 2009). There is not currently any data to validate if ANG TACP are at an even greater risk of MSK injuries due to the part-time nature of their jobs.

The Active Component, in contrast to the Reserve Component, has access to their personnel in this specialty 365 days a year. They also receive support for their Airmen via a program called Human Performance Optimization

(HPO). This HPO team is responsible for ensuring continued mission availability (maintenance) on the Airmen themselves much like a maintenance team would maintain an aircraft to ensure its mission availability. These teams currently consist of: 1x Strength and Conditioning Coach, 1x Physical Therapist, 1x Operational Psychologist, and 1x Flight Doctor. These positions are all paid for under a government contract from the Active Component. At present, the active component TACP has roughly an 85% passing rate for the Tier-II operator fitness test.

ANG TACP does not currently have this same program in place. However, they do have the exact same requirements as the active component in regard to currencies required to maintain a mission ready status for their Airmen.

STAKEHOLDERS

UPSTREAM STAKEHOLDERS

- Chief of Staff
- Chief, National Guard Bureau
- Director, Air National Guard (DANG)
- Commander, Air Combat Command (ACC)
- Commander, United States Air Forces Europe (USAFE)
- Commander, Pacific Air Force (PACAF)
- Major Command Functional Area Managers

The upstream stakeholders are the top-level leadership within the USAF and ANG that are in charge of organizing, training, and equipping the TACP weapon system at the Operational and Strategic level. Specifically, they will plan for these Airmen's capabilities to be used in operational plans for future conflicts as well as ordering them to participate in current or emerging conflicts against enemies of the United States and her Allies.

MID-STREAM STAKEHOLDERS

- Squadron Commanders
- Squadron Senior Enlisted Leaders

These mid-stream stakeholders represent the ANG TACP Unit Leadership. They are in a unique position to not only uphold the standards and policy of the test, they also must take and pass the fitness test themselves as a qualified

AFSPECWAR leader. The unique position means that they are held responsible for the pass rates of their Airmen and ensure that their individual unit utilizes the resources they have available to them. They report directly to the upstream stakeholders.

Subject Matter Experts

- Physical Therapist
- Strength and Conditioning Coaches
- Operational Psychologist

These subject matter experts represent the personnel responsible for employment and maintenance of the TACP Airmen. They report to both up and midstream stakeholders and ensure that their Airmen can be ready for any mission at the time of need.

Direct Impactees

- ANG TACP Airmen
- ANG TACP Airmen's Family

ANG TACP Airmen and their families are directly impacted by the results of a successful human performance optimization program. Specifically, for those Airmen that wish to remain a member of TACP, the quality of life of the Airman and their family will be directly affected by the ability of the Airmen to complete and pass the AFSPECWAR Tier-II operator fitness test. If they fail this test more than twice in a 24-month period, they will be forced to resign their position as an AFSPECWAR Airman and seek another opportunity in the USAF or possibly face a discharge from the USAF.

Client

Chief Master Sergeant (CMSgt) Larry Mansell ANG TACP Functional Area Manager (FAM)

CMSgt Mansell was able to provide the team direct access to relevant information and participants during the needs assessment. In addition, the client provided introductions and scheduled some time with various upstream stakeholders to gain insight and perspectives from their level.

PERFORMANCE GAP

Currently, pass rates for the Tier-II operator fitness test within the ANG TACP, sit at 70%. The client's desired performance is an increase in pass rates to ≥95%. This 25% gap creates a 10% loss in combat capability for TACP Airmen, across the entire USAF TACP community.

PROBLEM AND IMPACT

Harless' Front-End Analysis (FEA) was used to gain awareness of the perceived problem from the upstream stakeholders. Through an extant data review and semi-structured interviews, we validated that a performance problem existed. Table 1 below illustrates the key questions from the performance analysis portion of Harless' FEA that were answered using the supplied data sources from the client (Bartley, 2021).

TABLE 1. FRONT-END ANALYSIS

Key Questions	Framework / Model	Data Sources
- Do we have a problem? (Based on what evidence can you say you have a problem?) - Do we have a performance problem? - How will we know when the problem is solved? (When indicators from the first question are the exception.) - What is the performance problem? - Should we allocate resources to solve it? (Do the benefits of solving the problem outweigh the costs?)	Harless FEA	**Upstream Stakeholders:** - CMSgt Larry Mansell, NGB/A3JB - Col David Stilli, 194 ASOG/CC **Other:** - Previous RAND Study - Policy Documents - Guidance on Test - Completed Test Data Review

Passing the Tier-II operator fitness test is a currency requirement for these Airmen that directly affects their mission readiness status to the Department of Defense.

The client is concerned with the Air National Guard's current passing rate and its potential impact on overall readiness for the USAF TACP formation. Specifically, the client believes that their Airmen are going to sustain higher injury rates in addition to higher failure rates for the Tier-II operator fitness test due to the lack of training and resources within the ANG.

Military readiness cannot be understated as a primary concern within this problem set. Military readiness is described as the capacity to engage in combat and fulfill assigned missions and tasks (Institute for Defense and Business, 2022). This aspect of the United States security strategy ensures that our department of defense personnel are sufficiently prepared to respond to orders or attacks at any time, anywhere around the globe. Since military readiness is greatly affected by the defense budget outlined by Congress, military personnel and leaders must constantly seek innovative ways to keep training and equipment maintenance as up to date as possible for their individual equipment and people (Institute for Defense and Business, 2022).

The client believes that a major barrier to success for their Airmen could be the minimum time required by law for the Airmen to participate in military duty. For approximately 80% of ANG TACP, they are only required to participate in military duty 39-days per year (1 weekend a month and 2-weeks a year). Those Airmen are usually referred to as "traditional airmen." While the minimum requirement is 39-days per year, traditional airmen, on average, perform around 80-days per year to complete their job qualification training and their minimal ANG military duty. During this very minimal time, those Airmen must meet the same requirements as their Active Component counterparts as it relates to job proficiency and the Tier-II operator fitness test. The Active Component has an entire Human-Performance Optimization staff that assists these professionals in not only meeting their physical fitness standards but ensures they are conducting injury prevention and long-term maintenance plans. The Air National Guard has not programmed this type of assistance into their budget as it was perceived as a "waste of resources" to have a full-time strength and conditioning coach and physical therapist at each of the 18-units when 80% of their force is only there for, on average, 80 days (Mansell, 2022).

Although the Tier-II operator fitness test has been developed and utilized over the last five years, there have not been any consequences for failure up to this point. When it is fully implemented in six months, those who fail the test will be deemed unable to train or deploy. It is taken every year and ANG TACP members must pass each year. The consequence for failing twice in a 24-month period is possible removal from the career field and Air National Guard. For additional context, USAF TACP, including the ANG, has been in what has been referred to as an "acclimation period" for the last 60-months (Guthrie, 2022). During this acclimation period, USAF TACP have not had

any disciplinary action for failing the Tier-II operator fitness test (Guthrie, 2022). In addition to that, there has not been any mechanism for requiring ANG TACP to pass the USAF Fitness Examination either (Guthrie, 2022). This extended acclimation period has potentially caused a substantial loss of influence over USAF TACP and ANG TACP with regards to incentives and motives to pass the test (Guthrie, 2022).

NEEDS ASSESSMENT

TEAM MEMBERS

Team Member Name	Role
John Robertson	Client Facing Point of Contact
Brittany Fifer	Lead Interviewer
Osemome Ndebbio	Interview Design Lead
Misha Thoma	Lead Editor

PLANNING

Throughout this needs assessment the team has selected various models and frameworks that guide each phase of our needs assessment. Overall, the team's methodology is to coalesce data using evidence-based practices for needs assessment and human performance improvement problems. The needs assessment team will follow a systematic process to collect and analyze data to determine the actual and desired performance state for our client. The data collected will be used to determine what is causing the gap in performance for ANG TACP (Stefaniak, 2020). The Needs Assessment team will conduct a thorough assessment utilizing components from multiple frameworks and outlined in the tables below and broken down into six phases: (1) Problem Identification; (2) Organization Analysis; (3) Environmental Analysis; (4) Gap Analysis; (5) Cause Analysis; and (6) Intervention Options (Stefaniak, 2020).

DATA COLLECTION

METHODOLOGY

Both qualitative and quantitative data were collected. Through each phase of our needs assessment our team utilized an evidence-based model or framework to guide data collection and analysis while concurrently allowing those fundamental components of a needs assessment to be addressed (Rothwell, 2011).

HARLESS FRONT-END ANALYSIS MODEL

The needs assessment team will use the performance analysis portion of the Harless model to assist in clearly defining the problem. The Harless Model's smart questions (illustrated in table 1 as our key questions)

provides our team with a series of questions for the client and for upstream stakeholders that assist in clearly defining the current state and desired future state.

Rummler & Brache's 9-Box Model

During this needs assessment our team will utilize Rummler & Brache's (R&B) 9-Box Model to assist with analysis and organization of extant data, semi-structured interview responses, and possibly survey inputs. R&B's systems focus on the three, interconnected levels of performance will assist our team with a thorough investigation of the client's problem with a focus on the organization, process, and performer levels (Rummler-Brache Group, 2022). The R&B model is illustrated in Appendix B.

Chevalier's Updated Behavior Engineering Model (BEM)

Chevalier's Updated BEM allows our team to focus our attention on the distinction between environmental and individual factors that impact performance (Chevalier, 2003). Our team will use the BEM as an additional, second-layer analysis of identified gaps in this needs assessment. Using the BEM as a second-layer analysis provides a structure to assist with identification of causes for performance gaps through the six factors, information, resources, incentives, motives, capacity, and knowledge and skills (Chevalier, 2003). The BEM is illustrated in Appendix B.

Coding Data

Coding is considered a fundamental part of the analytical process and provides practitioners a method for combining data in a meaningful way (Elliot, 2018). To code the data, the team grouped interview and extant data into the categories provided in Rummler and Brache's nine-box model and Chevalier's updated BEM. Second-order codes were created to identify similarities between the data points, and finally subcategories and themes helped the team analyze the implications of this information. As a second-layer analysis of Rummler and Brache, the team used Chevalier's updated BEM to further code extant data and interviews. The conclusions we arrived at were then color coded green for driving force and red for restraining forces, which can be found in the gap and cause analysis sections of this report. To maintain the privacy of interviewees, the team has kept their identities confidential throughout this report and within the codebook. This process is illustrated in the codebook found in Appendix A.

LITERATURE REVIEW

The team focused a literature review on policy documents, and articles related to our scope and focus for this needs assessment. The first goal of our literature review was to gain information and insight on the current organization policy, messaging, and strategies for the Tier-II operator fitness test. The second goal was to gain insight on additional perspectives from peer-reviewed/evidence-based articles similar to our scope and focus for this needs assessment that may assist with identifying gaps, causes, and possible intervention options. A full account of our literature review results can be found in Appendix E.

GAP ANALYSIS

ORGANIZATION FACTORS

TABLE 2. ORGANIZATION FACTORS

Organization Goals	Organization Design	Organization Management
Strategy, operating plans, and metrics	Organization structure and overall business model	Performance review practices and management culture

Note. Reprinted from "Rummler Brache 9 Boxes Model", (n.d.). Retrieved from https://sites.google.com/view/htp7150-t3/models/rummler-brache-9-boxes-model

ORGANIZATION - GOALS

The AFSPECWAR Tier-II OFT Guidance V3 document outlines the purpose for trainers and Airmen alike on the what, how, and why the test exists. The organization has clearly communicated a viable strategy and appropriate organization-wide goals through the AFMAN 10-3500v1 where they state that the requirement is to pass this test annually for each AFSPECWAR AFSC. The same AFMAN also articulates the implications of not passing the test and the waiver authorities to contact for issues regarding the current policy as it stands. Our team did not find any issues with the current organization goals as it relates to the AFSPECWAR operator fitness test.

ORGANIZATION - DESIGN

The organization's structure and business model facilitate the accomplishment of passing the Tier-II operator fitness test while also ensuring that the goals of the organization and the process are met. The

organization's structure is adequate from an extant data review as well as interviews with upstream and midstream stakeholders.

Organization - Management

The organization's management has planned and allocated resources for testing, monitoring, and diagnosis to ensure that organization itself is a system of integrated processes. Our team did not find performance gaps within the organization management as it is laid out in current policy documents and through interview data from upstream stakeholders.

Process Factors

TABLE 3. PROCESS FACTORS

Process Goals	Process Design	Process Management
Customer and business requirements	Process design, systems design, and workspace design	Process ownership, process management, and continuous improvement

Note. Reprinted from "Rummler Brache 9 Boxes Model", (n.d.). Retrieved from https://sites.google.com/view/htp7150-t3/models/rummler-brache-9-boxes-model

Process - Goals

The guidance exists to link the process itself to the overall organization goals and also ties each of the events for the operator fitness test back to realistic job performance areas. Our team did not find clear gaps within the process goals itself during this needs assessment.

Process - Design

The design of the process does not support the organization or process goals at this time. At present there exist no documentation on how to prepare an Airman for the operator fitness test. While the organization design alludes to the ability of individual managers and supervisors being capable of providing and setting individual goals for their Airmen in accordance with AFI—36—2618, specific guidance does not currently exist for this process. Whether or not these goals or milestones are set is dependent on the unit leaders. There is no requirement that they are set to prepare Airmen for the Tier-II operator fitness test. This gap has left unit leaders to fend for

themselves on planning, preparing, and executing fitness plans for their individual Airmen. The preparation, at present, is completely on an individual basis. As one direct impactee stated, test preparation is "definitely an on-your-own basis. [This is a direct correlation to the fact that] we don't have that resource of the strength coach there to build those workouts for us like an active [duty] unit." A midstream stakeholder also stated: "when I was active-duty, we had the workouts available because they're built every week by the strength coach. We were able to track our progress. We had an app for Pete's sake!" It is clear that this Airman, like many others who went from active duty to guard, acutely feel the loss of coaches and other resources that used to help them maintain their fitness.

The current process design also does not account for traditional guardsman's time spent with the organization itself. For example, traditional guardsmen who don't live close to a unit are unable to take advantage of the organization's resources based on the current design of only having resources at the unit itself. As one midstream stakeholder put it, "Eighty percent of my members are part time employees, and I get to see them maybe once a quarter." This contrasts greatly with the amount of access fulltime guardsmen have to resources who are seen more often such as "twice a week for the past year." Additionally, Airmen who do not pass the Tier-II operator fitness test are placed in non-training status. If they fail twice within a 24-month period, they are to be evaluated for removal from the career field (AFMAN10-3500v1). For a traditional guardsman, this non-training status will prevent them from maintaining their other currencies within their specialties which will likely cause a large backlog of training overall.

PROCESS - MANAGEMENT

Although specific data on impact of injuries could not be obtained as part of this study, injuries may be a contributing factor to Airmen not passing the test. However, the process to manage these injuries was an area of concern and could further prevent Airmen from recovering from injuries in time to prepare for and take the test. One upstream stakeholder gave an example of an Airmen who injured himself while not on orders and who did not have health insurance. That Airmen was unable to get the necessary medical care to heal appropriately and in a timely way. Had the Airmen had access to timely medical care through an on-site physician or HPO professional, his downtime would have been greatly reduced. Changing this system to better respond to injuries would be positive

but costly, whereas preventing injuries would reduce the need for a change in this system, and this can be done with an HPO professional. Elaboration of the costs of HPO professionals can be found in the intervention selection section.

Additionally, there is no published guidance on how to report data, nor is it clear at what frequency unit leaders are required to do so. Little or no data is collected and tracked, and when data is collected, it is not used to modify future preparation or training for the Tier-II operator fitness test. An example is that some units possess the InBody machines that are meant to give body mass index information, muscle density and a few other health variables to the members. The data this machine provides to the individual has no method to interpret and use to aid in future performance without seeking out outside entities on their personal time to help interpret the data as it relates to their own performance. All ANG TACP units also have a Sparta Force Plate that was purchased and distributed by the National Guard Bureau. There is no guidance for units on how, when, and what to report as it relates to the force plates. A direct impactee stated that "that just sits in the corner actually. It showed up one day, nobody really knew what it was, so we left it there. We received training on how to use it but never got the "why" behind it. Eventually, guys that figured it out on their own started using the programs it produced for them with little to no positive results, so they just abandoned it completely. It is a very expensive door stop for us now."

Performer Factors

TABLE 4. PERFORMER FACTORS

Performer Goals	Performer Design	Performer Management
Job specifications, performance metrics, and individual development plans.	Job roles and responsibilities, skill requirements, procedures, tools, and training.	Performance feedback, consequences, coaching and support.

Note. Reprinted from "Rummler Brache 9 Boxes Model", (n.d.). Retrieved from https://sites.google.com/view/htp7150-t3/models/rummler-brache-9-boxes-model

Performer - Goals

Job specifications for Airmen are clear. However, performance metrics are inadequate and there are not standard individual development plans. Additionally, there is no scale or accommodation made for those older Airmen with significant institutional knowledge who have sustained injuries in previous deployments. As one direct

impactee stated, “I'm still in the process of trying to figure out how to deal with those injuries [sustained on deployment], and push out the same level of performance as I had when I was younger.”

Performer - Design

Roles, responsibilities and skills are clear for the Airmen. The procedures for the annual requirement are also clear. Tools and training are, however, inadequate. The limited amount of time unit leadership has with traditional Airmen on post inhibits their ability to encourage and inform their fitness training. While full-time Airmen can take advantage of fitness resources on base, it is difficult to accommodate physical training into drill weekends. As one full-time Airmen stated, “We all encourage each other, and we do the group workouts like with the full-time staff. And then, when the traditional guys are here, we try to get a workout or two in, but time is limited.”

PERFORMER - MANAGEMENT

There is no published or practiced performance feedback mechanism or coaching program for the Airmen. Consequences for failure are however published within AFMAN 10-3500.

GAP ANALYSIS CONCLUSIONS

Overlaying all our data against Rummler and Brache’s 9-box model we can clearly see the performance gap areas of concern, seen in figure 3. When our team looked at common themes between the gaps, we could see that the process management was directly affecting the entire performance row. While the organization itself did not show any clear performance gaps we fully understood that the management of the process was directly correlating to the gaps we were seeing at the performer level. Improper process management, for example, directly results in the performer not having clear mechanisms for feedback and also doesn’t allow them to have a standard coaching program. That same process management gap does not allow the performer to have adequate tools or training which also directly affects their individual goals. The design of the process affects how the process is managed and the management affects how the process is designed so those two deficiencies cause a loop of gaps that need to be addressed.

When looking forward to our cause analysis and using the data from this gap analysis, our team identified that Chevalier's Updated BEM would allow us to focus our attention on the distinction between environmental and

individual factors that impact performance (Chevalier, 2003). We would bring these five gap areas forward into our cause analysis to assist in identifying root causes and eventually apply intervention types to those causal areas.

	Goals	Design	Management
Organization	- Organization published implementation guidance and expectations for annual testing.	- The design of the organization is appropriate for issuing guidance, strategy, policy and vision.	- Guidance is published within AFMAN 10 -3500 for performance review and program management.
Process	- Annual requirement to pass is clearly published	- Some units have designed fitness programs - Use of these programs are entirely on the individual. - No standard or published process design for unit programs	-No guidance how to report data and at what frequency - Very little data is collected/tracked - If data is collected, it is not used to modify future prep/training.
Performer	- Job specifications are clear - Performance Metrics are inadequate - There are no standard individual development Plans	- Roles/responsibilities, and skil are clear - Procedures for the annual requirement is clear. - Tools are inadequate - Training is inadequate.	- There is no published or practiced performance feedback mechanism - Consequences for failure is published within AFMAN 10-3500. - ANG does not have any standard coaching program.

FIGURE 3. R&B DIFFUSION OF EFFECT

CAUSE ANALYSIS

ENVIRONMENTAL FACTORS

TABLE 5. ENVIRONMENTAL FACTORS

Environment - Information	Environment - Resources	Environment - Incentives
1. Roles and performance expectations are clearly defined; employees are given relevant and frequent feedback about the adequacy of performance. 2. Clear and relevant guides are used to describe the work process. 3. The performance management system guides employee performance and development.	1. Materials, tools and time needed to do the job are present. 2. Processes and procedures are clearly defined and enhance individual performance if followed. 3. Overall physical and psychological work environment contributes to improved performance; work conditions are safe, clean, organized, and conducive to performance.	1. Financial and nonfinancial incentives are present; measurement and reward systems reinforce positive performance. 2. Jobs are enriched to allow for fulfillment of employee needs. 3. Overall work environment is positive, where employees believe they have an opportunity to succeed; career development opportunities are present.

Note. Reprinted from "Updating the Behavior Engineering Model", Chevalier, R., 2003, *Performance Improvement*, *42*, p. 10

ENVIRONMENT - INFORMATION

In interviews with Airmen who are required to take the test, they consistently said that if they received any feedback at all it was just their scores on individual events. Review of extant data with corroboration from upstream stakeholders revealed that there is no published requirement for practice tests or any kind of check-in throughout the year prior to the final test, which means Airmen do not receive frequent feedback. According to midstream stakeholders who were previously active duty, active duty units that are successfully passing the test receive informal feedback from a coach, which many traditional Airmen identified as a need. Only being able to "compar[e] previous scores to recent scores," as one direct impactee stated, without further guidance and current failure rates means the access to these numbers as feedback is not helping Airmen improve their performance.

The AFSPECWAR Tier II OFT Guidance V3 document describes the Tier-II operator fitness test and how to administer it, but, as stated before, there is no published guidance on how to prepare for the test. As one direct impactee stated, "Everybody is doing their own thing." Other direct impactees, who are not trained to create fitness plans, identified what they called "stop gaps'' people use to prepare including relying on fitness enthusiasts within

their unit to develop plans for them (They have no formal training in developing plans for others, and many stopped using these plans because they weren't tailored to individuals.) or spend their own money on apps.

ENVIRONMENT - RESOURCES

One of the units interviewed said they had "built their own gym," another said they purchased their own "maintenance equipment," and multiple units said they had purchased an "ongoing pool membership," but as one direct impactee stated, "Traditional guardsmen lack access [to these tools] until drill," so they have to use whatever is available to them at home in the meantime. One direct impactee was quick to point out that "civilian gyms don't have the right equipment." This means Airmen have to use less than ideal tools in public gyms or in their own homes that do not adequately prepare them for the test. Traditional Airmen also have to juggle time between their home lives, civilian jobs, and the guard, so finding time to workout or plan an appropriate workout is difficult to find.

Units are provided with tools like the Sparta Science™ Force Plate System and InBody Machine, but one direct impactee described information from the In-Body Machine as "just a bunch of data points," and Scott, et al. (2022) showed that the Sparta Science™ Force Plate System isn't effective in improving performance. More information on the Sparta Science™ Force Plate System can be found in the literature review Appendix E.

Finally, the psychological environment affects injury reporting. As one subject matter expert put it, "There's a lot of pride within the unit. So some guys like, you know, I could tell they're struggling, they, you know, brush it off and act like they're fine."

ENVIRONMENT - INCENTIVES

According to an upstream stakeholder, financial incentives for Airmen include a $20-$40k sign-on bonus, a 4.5 times multiplier reenlistment bonus, a Special Warfare Skills incentive pay of approximately $250 per month, and special duty pay of $450 per month. Units could also take advantage of Additional Training Period (ATP) duty days for their Airmen in order to provide an allowance for gym memberships. While this duty status is not specifically for a gym membership it is a duty status that provides 4-hours of pay to an Airman. One midstream stakeholder stated that they use this status for their members that are remote and desire to workout in a gym near their home of record since the facility at the installation was not conducive for the member to travel to on a daily basis. When

our team inquired about the "checks and balances" for that privilege they replied "if the member fails the test or shows us that they are obviously not keeping fit when they show for duty, we would just remove them from that status for the future. Luckily, that hasn't happened yet." One non-financial incentive that Airmen identified in interviews was the ability to promote, which they lost if they did not pass the test.

The work environment is competitive as evidenced by comments from individual Airmen in interviews such as, "the mindset that guys have when they go into this test is 'I've got to get the highest score I can get,'" and it is also positive as evidenced in multiple interviews where direct impactees commented that they or members within their units have offered or are open to assisting their colleagues in preparing for the test.

INDIVIDUAL FACTORS

TABLE 6. INDIVIDUAL FACTORS

Individual - Motives	Individual - Capacity	Individual - Knowledge/Skills
1. Motives of employees are aligned with the work and the work environment. 2. Employees desire to perform the required jobs. 3. Employees are recruited and selected to match the realities of the work situation.	1. Employees have the capacity to learn and do what is needed to perform successfully. 2. Employees are recruited and selected to match the realities of the work situation. 3. Employees are free of emotional limitations that would interfere with their performance.	1. Employees have the necessary knowledge, experience and skills to do the desired behaviors 2. Employees with the necessary knowledge, experience and skills are properly placed to use and share what they know. 3. Employees are crosstrained to understand each other's roles.

Note. Reprinted from "Updating the Behavior Engineering Model", Chevalier, R., 2003, *Performance Improvement*, *42*, p. 10

INDIVIDUAL - MOTIVES

According to one subject matter expert, "The traditional guardsmen chose this lifestyle, and they know that passing [the Tier-II operator fitness test] is expected of them." According to subject matter experts and direct impactees "there's a lot of pride" among the Airmen even to the extent that they are willing to hide injuries because they "[want] to be part of the team," all of which suggest a high level of motivation.

This is further supported by Lytell et al. (2018) in a RAND study that explored recruitment and ways the Air National Guard is actively working to align the right recruit with the right position.

INDIVIDUAL - CAPACITY

Direct impactees agreed that "out of the schoolhouse, those Airmen are ready." There is concern among direct impactees, however, that this is not as true for older members because they lack the same schoolhouse training, and they've sustained injuries over time. This is not to say that older members are not capable, but to highlight that they have unique challenges.

As seen in the environment-resources section, traditional Airmen struggle to find the necessary time in their civilian lives to workout, and they feel a sense of pressure to hide injuries so that they can continue to train and do their jobs.

INDIVIDUAL - KNOWLEDGE/SKILLS

There is enough guidance that Airmen are able to complete the Tier-II operator fitness test, but they do not individually have the knowledge to develop their own preparation plans.

Very few Airmen have any formalized training in developing exercise programs. Those that are trained did not receive this training from the military but instead invested their own time and energy into this "passion." Some direct impactees stated that they will sometimes share their fitness knowledge, but there is no structure for this. Even in one case where an Airmen developed plans for members of his unit, those people stopped using the plans because they weren't tailored to the individual.

When interviewing a subject matter expert that has worked with ANG TACPs in a human performance capacity they stated that; "In general, traditional guardsmen lack knowledge of how to increase their overall capacity, perform body weight movements correctly and improve mobility in their hips and shoulders. Furthermore, they don't realize they lack mobility.

CAUSE ANALYSIS CONCLUSIONS

Our needs assessment team saw three clear causal areas and again applied critical thought to what the commonalities were between the areas just as we did with our gap analysis. The conclusion was that our main issue could be narrowed down to the environment-resources. If we had to pick a single root cause for the performance gap the resources area directly contributes to a lack of both environment-information and individual-knowledge/skills. While the environment-information can be a contributing factor as well, the literature reviews and

interviews with subject matter experts all agreed that resourcing should be the first step in addressing not only passing rates but overall mission readiness of the force. In addition, we did not see a clear delineation pointing to the individual-knowledge as a root cause. Rather, that casual area appears to be directly influenced by both the environment-information and the environment-resources.

	Information	Resources	Incentives
Environment	No informal evaluation, feedback, or preparation guidance	No personnel to guide prep. No consistent materials for traditional airmen when off base.	Financial & nonfinancial incentives exist and are effective. Work environment is positive and competitive
	Knowledge/Skills	**Capacity**	**Motives**
Individual	No formal training for developing an individual exercise plan No structure for sharing individual knowledge	Airmen have the ability to learn. Traditional Airmen life conflicts make preparation more difficult "Older" TACP with multiple combat deployments appear to have more chronic injuries	Airmen want to do their job, train and perform well on fitness test. Highly motivated to remain mission ready.

FIGURE 4. CAUSE ANALYSIS DIFFUSION OF EFFECT

INTERVENTION SELECTION

METHODOLOGY

To identify interventions, the team began by linking performance gaps from Rummler and Brache's 9-boxes with the causal areas (environmental- information, resources and individual-knowledge/skills) from Chevalier's Updated BEM. From there, the team utilized Hale's intervention types to align possible intervention types with those root causes (Hale, 2006). Once the team identified the types of interventions, we then referenced our data collection to provide specific examples that could be applicable to each intervention type so the client received actionable data. When we were complete with matching Hale's intervention types with specific interventions, we consulted with the client on a multi-criteria analysis for the types of interventions in order to provide a prioritized list of interventions.

SELECTED INTERVENTION TYPES

INFORM

Interventions that inform ensure that everyone is being given or is able to access all necessary information (Hale, 2006). This intervention type relates directly to gaps in environmental-information including a lack of clear guidance on the importance of and how to prepare for the Tier-II operator fitness test, and a lack of data supporting the "why" behind different components and the reasoning for the focus on the fitness testing now. It should be noted that this intervention type includes producing several documents and job aids for the ANG TACP formation that would be relatively low cost with a reasonably high impact with the entire ANG TACP formation. Utilizing subject matter experts that already exist within AFSPECWAR that reside within the Special Warfare Training Wing (SWTW) in San Antonio, TX would provide the best starting point for these types of documents outlined below. In addition, the SWTW has an entire Human Performance Squadron that is the Air Force's lead for human performance. That unit can be leveraged for its expertise and large data pool in order to inform the ANG TACP formation. Potential interventions include:

- Publishing cyclical peer-reviewed and evidence-based articles to support a change in fitness culture

- Publishing evidence on the "why" behind Tier-II operator fitness testing linked to job performance over time
- Publishing cyclical job-aids on fitness guides for ANG TACP fitness options while not on active orders
- Publishing ANG Specific Command Guidance on fitness culture and preparation expectations

DEFINE

Interventions that define provide clarity to individuals on their roles and responsibilities within an organization and the overall mission of the organization (Hale, 2006)**.** These interventions address the lack of clarity when it comes to the implications for failures and the reasoning behind the field's perceived age and position disparity that was revealed with the interviews of both midstream stakeholders and direct impactees. These intervention types would allow an opportunity to either define the reasoning behind there not being a difference for age and positions or it could allow an opportunity to consider looking at data to redefine position and age requirements.

- Consider redefining position and age standards for Tier-II operator fitness test
- Consider redefining implications of failures

The largest concern for ANG TACP, again revealed in the interviews, was that the ANG TACP seems to be a more mature force as compared to the active component. If data supports that the older TACP are actually performing at a lower rate, the considerations could be made to normalize the data based on age. This was not the most popular decision with all interviewees at the direct impactee level but was a concern for the midstream stakeholders that were interviewed.

In addition to age, all interviewees seemed to support at least a consideration for redefining the need to take the Tier-II operator fitness test based on position. That is, a popular opinion was that a TACP that was performing a staff role instead of an operator role should be considered to only be required to complete the normal Air Force fitness assessment. Some interviewees noted that the active component staff agencies were already requesting a waiver to the AFMAN 10-3500v1 requirement to complete the Tier-II operator fitness test annually.

Finally, it was almost unanimously agreed that the implications for failure needed to be reconsidered to remove the "non-training" status defined in AFMAN 10-3500v1 currently and replace it with a "Non-Combat Mission Ready (NCMR)" status instead. The impact of a failure right now for ANG TACP will likely place the Airman in a training

deficit that will end up costing a considerable amount more in training dollars to get them back to current. Considering that the idea is to increase mission readiness rates, the idea of redefining that implication, supports the idea that the Airmen could still train in their primary duties while also allowing them to rehabilitate to a passing Tier-II operator fitness test score prior to a contingency deployment where they would be required to be combat mission ready prior to employment.

MEASURE

Interventions that measure allow organizations to compare actual performance to desired performance, and in so doing, they communicate what is important to the organization (Hale, 2006)**.** These interventions address the causes of unclear goals and objectives and a lack of tracking and reporting systems for Tier-II operator fitness test results thus closing a gap in environmental-information. Potential interventions include:

- Clearly define and collect data to inform future decisions: injury, downtime, scores, etc.

At present, there are no clear points of performance or data standards for ANG TACP or USAF TACP as a whole. In order to inform future decisions regarding not only the test but training needs and development of the human weapon system within AFSPECWAR, data points like heart-rate variability, body mass index, VO2-max, fitness category scores, training down-time, etc. are all needed. ANG TACP should work in collaboration with Headquarters Air Force Special Warfare to establish the standard data points that need to be measured in order to inform decisions over time. This measurement need, linked to standardization of the data reporting frequency will be value added to future studies of this kind.

STANDARDIZE

Interventions that standardize address the design of equipment, materials, procedures, and workspace. Their goal is to achieve consistent performance, allow for interchangeability, or increase product flexibility and longevity (Hale, 2006)**.** These interventions will further address issues of environmental-information by dealing with the lack of a reporting or tracking system when it comes to Tier-II operator fitness test data. Potential interventions include:

- Procure standard equipment for each HPO facility
- Standardize reporting systems and timelines (i.e., semi-annual practice tests)

Standardizing the equipment at each HPO facility allows the organization to guide job aid and information flow based on the known standard equipment at each location. If there is no standardized baseline there is an increased risk that a sub-unit will not receive the best information regarding equipment use and procedures.

In addition to the equipment, and along the lines of the defined data to measure, there should be standardized reporting systems and timelines to have information in those systems. ANG TACP is unique with its part-time force as well as each unit having a slightly different schedule for their Airmen to report for duty. With that in mind, each unit across the interviewed units, seem to at least report quarterly for duty. The quarterly timeline may be the best for data collection in lieu of remote reporting systems. Whatever reporting timeline is selected, ANG TACP must clearly follow the goals outlined in interventions that measure to ensure they are collecting the data they value most on the most frequent timeline.

DEVELOP

Finally, interventions that develop are those that improve or expand people's knowledge or skills. These interventions address gaps in environmental resources and individual knowledge/skills by standardizing the material resources Airmen have access to and providing personnel who address the lack of professional coaching resources (Hale, 2006). Potential interventions include:

- Invest in HPO staff to be available at each unit capable of remote fitness coaching

When interviewing the Subject Matter Experts for this needs assessment it was undeniable at the value those professionals brought to their organizations. This single intervention area has a direct link to all causes, and it is highly probable that fixing this one resource issue could result in closing the overall performance gap. Our team was able to view two separate Human Performance Optimization contracts from a government source that priced a single strength and conditioning coach at a single organization at $75,000 per year. That cost did not include a remote coaching application subscription and our team was unable to fully assess various applications that could perform this function. Our recommendation would be to allow an HPO SME to develop those requirements for ANG TACP or coordinate with Headquarters Air Force in order to add the application to the list of interventions that standardize.

Prioritizing Interventions with Multi-Criteria Analysis

In collaboration with the client, four criteria were considered in a multi-criteria analysis to prioritize interventions: cost of implementation, ease of implementation, potential to reduce injury rate/downtime, and potential to increase pass rate.

Cost of Implementation: This criterion was a high area of concern with the client as it seems to be a large barrier to implementation within the Air National Guard. Since ANG TACP is resource limited, the intent was to attempt to keep cost as low as possible as it would directly relate to the speed at which the intervention could be implemented.

Ease of implementation: This was a subjective area of concert for the client and was the lowest weighted score. While several other factors tie into this criterion such as cost, policy changes, and what the client described as “corporate processes,” they were concerned with getting interventions applied as soon as possible to start closing the performance gap faster.

Potential to reduce Injury Rate/Downtime: Our client’s concern with injuries was directly related to mission readiness rates. The longer an Airmen was down for an injury the worse the mission readiness rate would be for ANG TACP. For that reason, the client wanted to focus on interventions that had a high potential to reduce injury rates and downtime. As such, they weighted this criterion extremely high.

Potential to Increase Pass Rates: Since the overall reasoning for the needs assessment was to close the performance gap identified with the passing rates, the client wanted to ensure that our interventions had high potential to increase those passing rates. They weighted this category extremely high for that very reason.

The results of the multi-criteria analysis can be found in the tables below:

TABLE 7. MULTI-CRITERIA ANALYSIS

Criteria	Weight	1	2	3
Cost of Implementation	3	>$1M	>$500k	Less Than $500k
Ease of Implementation	1	Will require > 1-year to implement	6-12 Months	< 6-months
Potential to Reduce Injury Rate/Downtime	3	No potential to decrease	Marginal Potential to Decrease	High Potential to Decrease
Potential to Increase Pass Rate	3	No Potential to Increase	Marginal Potential to Increase	High Potential to Increase

Using the table 7 above, each intervention was given a raw score and a weighted score, which was verified with the client. This resulted in the following table:

TABLE 8. MULTI-CRITERIA ANALYSIS RESULTS

Criteria	RAW SCORE	WEIGHTED SCORE
INFORM	10	24
DEVELOP	8	22
DEFINE	8	22
MEASURE	7	19
STANDARDIZE	7	15

As table 8 suggests, the inform and develop interventions have the greatest potential for impacting the problem. This is in line with the cause analysis which identified specific problems in the environmental-information, environment resources, and individual knowledge/skill areas as root causes of the problem as interventions that inform will fill in information gaps and interventions that develop with provide both necessary knowledge and skills through proper resourcing with HPO professionals.

Suggestions for Implementation and Evaluation

A combination of informative and developmental interventions is suggested based on the multi-criteria analysis. Using these interventions sequentially will allow ANG TACP the necessary time to work towards the final step of development while ensuring clear messaging using resources that are already available.

1. Inform: Publish evidence-based articles using SW Human Performance Squadron.
2. Inform: Publish the "why" behind testing for TACP. Get the messaging correct.
3. Inform: Publish job-aids on fitness programs for ANG TACP.
4. Inform: Give specific command guidance from NGB to show support for culture change and proper preparation.
5. Develop: Invest in an HPO staff at each unit capable of providing remote fitness coaching for ANG TACP.

Interventions one through four are the cheapest and easiest interventions to implement, but, by themselves, they will not completely address the problem of Airmen having to create their own fitness plans without the proper knowledge to adequately address areas of weakness and prevent injury. Intervention five addresses this problem head on.

During interviews and extant data review, the team discovered hesitation to invest in HPO staff due to cost. As we looked at the cost comparison the following is what we discovered. The USAF makes an initial investment of $450,000 per Airmen and graduates 270 Airmen annually. Annual training and currency maintenance costs roughly another $100,000 per Airmen. If failure rates remain at 30%, and ANG TACP is forced to discharge these Airmen, the USAF will have lost $143.5 million dollars along with invaluable institutional knowledge that could have been used to improve the next generation of TACP.

Conversely, employing a single human performance professional cost between $75,000 and $80,000 per unit annually. This is the price that one ANG unit who, with the help of the HPO professional, has 80% of its Airmen passing the test. This means that with only an additional $1,000 per Airmen, ANG TACP could increase their mission readiness rates across their current force. These numbers illustrate that it would cost less to maintain an entire squadron with an HPO professional, than what it would cost that same unit to lose one Airman and must rebuild one from recruitment through initial qualification at that same unit.

Not only is the cost worth it, but intervention number five also helps to reduce injury rate and downtime in a way that is easier to implement than changing processes around responding to injuries after they occur. This is because an HPO professional will provide Airmen with the correct information from the very beginning to safely implement fitness practices on their own, so they don't sustain injuries. If Airmen are injured, however, HPO

professionals will be able to respond to injuries with a modified course of training and proper rest practices to allow the injury time to heal.

With an HPO professional, Airmen will have personalized fitness plans and consistent feedback that will allow them to maintain areas of strength and improve areas of weakness safely so that more of them pass the Tier-II operator fitness test.

LIMITATIONS

Our needs assessment team did encounter limitations associated with this project. There are currently no limitations addressed below that degrade the validity of the data presented nor do they negate the reliability of the interventions we have recommended. In addition, our team did not encounter any significant changes between our presented project plan and the final project as executed and presented in this report. The following limitations are all presented with opportunities to expand on the data we have presented and should be considered additive vice degrading to this report.

LIMITATION AREA 1: RECENCY

The Tier-II operator fitness test is a relatively new test requirement, and it has not been fully implemented as of this needs assessment, so there is limited data on the actual effect passing or failing has on mission readiness. With this in mind, there is an opportunity to get ahead of the readiness problem before full implementation leads to issues that are harder to resolve.

At this time, it was not possible to quantify the potential loss of institutional knowledge that may occur if Airmen are in fact discharged for not passing the test two years in a row. This is due to a limited data pool, but there is the potential to expand research that gathers additional data points for future test policy decisions.

LIMITATION AREA 2: SNAPSHOT

Although the team was able to speak to a wide variety of stakeholders across multiple units and levels of the organization, the research pool was still limited and there was not time to conduct surveys that would show how information from interviews reflected the perspectives of a larger segment of the target population. It would be beneficial to survey the force based on this report to better determine the concurrence of this information with the larger population.

LIMITATION AREA 3: LONG-TERM INJURY PREVENTION

Due to privacy laws, there is limited data on injuries within ANG TACP related to Tier-II testing (i.e., injuries sustained while preparing for vs. taking the test). Developing a data collection system for assessing the impact of the test on injury rates would help determine what interventions might reduce long-term injury whether in preparation for or the taking of the Tier-II operator fitness test.

REFERENCES

Bartley, J. (2021, August 30). *Navigating Front-End Analysis.* From Learning Solutions: https://learningsolutionsmag.com/articles/navigating-front-end-analysis

Chevalier, R. (2003). Updating the behavior engineering model. *Performance Improvement*, 8-14.

Code of Ethics. (2022, October 10). From International Society for Perofrmance Improvement: https://ispi.org/page/CodeofEthics

Cody R. Butler, P., Lauren e. haydu, P., Jacob F. Bryant, B., John D. Mata, M., Juste Tchandja, P., Kathleen K. Hogan, M., & Ben R. Hando, D. (2022, August). Musculoskeletal injuries during U.S. Air Force special warfare training assesment and selection, fiscal years 2019-2021. *Medical Surveillance Monthly Report, 29*(8).

Dale W. Russell, P., Joshua Kazman, M., & Cristel Antonia Russell, P. (2019). Body Composition and Physical Fitness Tests Among US Army Soldiers: A Comparison of the Active and Reserve Components. *Public Health Reports, 134*(5), pp. 502-513.

Elliot, V. (2018). *Thinking about the coding process in qualitative data analysis.* From https://nsuworks.nova.edu/tqr/vol23/iss11/14/

Force, U. S. (2018, July 5). The Enlisted Force Structure. *AFI 36-2618*. Washington D.C.: United States Air Force.

Guthrie, L. C. (2022, October 27). Human Performance Branch Chief, AFSPECWAR. (M. J. Robertson, Interviewer)

HAF/A3S. (2021, March 15). TACP Strategic Communications Card. Washington D.C., USA: USAF.

Hale, J. (2006). *The performance consultants fieldbook: Tools and techniques for imporving organizaitons and people* (2nd Ed. ed.). Pfeiffer.

Institute for Defense and Business. (2022, November 6). *What is Military Readiness*. From Institute for Defense adn Business: https://www.idb.org/what-is-military-readiness/#:~:text=Military%20readiness%20serves%20a%20key,on%20the%20focus%20of%20preparation.

Lytell, M. C., Robson, S., Schulker, D., McCouland, T. C., Matthews, M., Mariana, L. T., & Robbert, A. A. (2018). *Training Success for U.S. Air Force Special Operations and Combat Support Specialties: An analysis of Recruiting, Screening and Development Processes.* Santa Monica: RAND.

Mansell, L. (2022, October 13). ANG TACP Functional Area Manager. (J. Roberston, Interviewer)

RummlerBrache Group. (2022, October 20). *Process Improvement Certification Training*. From RummlerBrache Group: https://www.rummlerbrache.com/

Rummler-Brache Group. (2022, November 6). *Three Levels Of Performance.* From RummlerBrache Group: https://www.rummlerbrache.com/sites/default/files/Overview%20Three%20levels%20of%20Performance.pdf

Scott, W. C., Hando, B. R., Butler, C. R., Mata, J. D., Bryant, J. F., & Angadi, S. S. (2022, November 16). Force plate vertical jump scans are not a valid proxy for physical fitness in US special warfare trainees. *Frontiers in Physiology*.

Stefaniak, J. E. (2020). *Needs Assessment for Learning and Performance: Theory, PKorcess, and Practice.* New York: Routledge.

USERRA Overview. (2022, November 22). From U.S. Office of Special Counsel: https://osc.gov/Services/Pages/USERRA.aspx

Warha D, W. T. (2009). Illness and injury risk and healthcare utilization, United States Air Force battlefield airmen and security forces, 2000-2005. *Military Medicine, 174*(9), pp. 892-898.

William J. Rothwell, C. K. (2011). *Human Performance Improvement* (Second ed.). London and New York: Taylor & Francis Group.

APPENDICES

APPENDIX A – CODEBOOK AND GLOSSARY

A.1 CODEBOOK KEY

Key For Coding Interview Responses in the Interview Transcripts

Rummler and Brache Code Book

Organization Goals	Organization Design	Organization Management
Process Goals	Process Design	Process Management
Performer Goals	Performer Design	Performer Management

Chevalier's Updated BEM Codebook

Environment Information
Environment Resources
Enviroment Incentives
Individual Knowledge and Skill
Individual Capacity
Individual Motives

A.2 Codebook 1 – R&B – Gap Analysis

	First-order code	Second-order code	Subcategory	Theme
Organizational Goals (Strategy, operating plans, and metrics.)	"The goal is to to have guys retire without disability." Folks who are physically fit uh, at "a more top level, continue through their continually through their career" "It kind of developed as a need, as a as an operational need to see how we can keep our folks in better shape physically uh to do the job." "Uh, yeah, do the job better for sure. But then also, I think injury prevention. So, because, as we know, I mean, if you're not physically fit, and you're able to push through some of those things, injury is a lot more likely to happen," "We can do the mission now, like I said earlier, I think long term I think it will save: airmen's backs and knees, and things that end up going bad whenever you do things incorrectly, and you don't train correctly." "I…This will be a great tool for airmen and commanders in the Air Force to have um have their peak performance for a longer amount of time."	Airmen were able to do their jobs prior to taking the tier-II test that is now being used to determine mission readiness. The focus goes beyond being mission ready in the moment to remain mission ready over the long term by training correctly and maintaining fitness that reduces the risk of injury. The organization sees the Tier-II test as a tool to keep airmen in top shape to do their jobs for their entire career as folks who are physically fit at a top level can better maintain their career.	Strategy and metrics Operating plans	Injury Prevention

Organizational Design (Structure and overall business model)	"... when we take a test and we say, Okay, it's an operational fit test, which means there is no adjustment for age, right? And and or whatever you know uh mileage that you have on your body From being in this job for a long time. I think there's absolutely a main concern of mine at my level that I have." "if I have a chief chief master sergeant, with twenty plus years, with six combat deployments under their belt, …where they're not going to be required to put a rock on their back. They're not required to jump out of an airplane …., so why do I need them to have the same level of fitness in terms of an operational fitness Test? that I require my twenty-three old five level uh internal attack Controller." "My main concern is losing quality folks for sure. Um! And it should be." "Yeah. So I'd say in the guard we have none except for two locations," "So we have an exercise, strength, coach, and a physical therapist on staff for a year here in Washington State, and so, uh, but the only other location to have this is the 118 Asos in North Carolina, so uh enterprise-wide they do not provide us the resource that I think is needed to ensure our airmen have the best possible tools to pass this test on a consistent basis." "I believe there's a couple reasons, but I think the most pertinent reason is, they active duty is. It's on site all day, every day, and they have funded human performance optimization programs within the squadron. Since I went to the Fifth, ASOS in Washington State Active duty. They're a joint base, Lewis Mccord. They had a full staff of personnel there that did strength conditioning coaching. They did. They had a physiologist uh exercise physiologist, and then they also had a um, the massage therapist there that worked on the guys as they would come in with minor aches and pains," "I don't think there needs to be a different standard, per say, between active duty and air guards. But we actually need to give more resources to the airmen like V and HPO program, and whatnot."	There is no adjustment for age for test-takers. Older test takers usually have more mileage on their bodies from having been airmen for a longer time. Older test-takers are expected to have the same level of operational fitness as younger test-takers with less mileage on their bodies. The organization stands the risk of losing quality folk. Personnel are distributed unevenly throughout the national guard. The organization provides more resources for full time/active duty air and not enough resources for traditional airmen. The organization holds fulltime and traditional airmen to the same standards despite the disparity in resource allocation and time commitments.	Structure Business Model	Loss of Institutional Knowledge Uneven distribution of resources and personnel and time.

Organization Management (Performance review practices and management culture)	"... I'm very proud of this that we actually just had a year unfunded request funded from our wing, which identified us as number one. So then, the guard bureau funded it for an HPO program. So we have an exercise, strength coach, and a physical therapist on staff for a year here in Washington State, and so, uh, but the only other location to have this is the 118 Asos in North Carolina, so uh enterprise-wide. "They do not provide us the resource that I think is needed to ensure our airmen have the best possible tools to pass this test on a consistent basis" "They They went out and got an unfunded request and have funded a an HPO program there inside the State, and I know the one hundred and ninety-four that of Washington is they they just got an unfunded request filled, and they have now a filled and they now have person on staff for the one hundred and ninety four, and the one sixteen. I think that those are uh some success stories" "But as far as like fitness goes, the base gym is woof. It's like termite ridden. The roof leaks. You know it's hot in the summer, cold in the winter, and our fitness facility here at the Asos. It's, you know. When we had Congressman ***** here, he was just like he was shocked and mortified to see like, Wow! This is your fitness facility. I was expecting more. That was an exact quote." "We have been working with anyone who would listen to get funding for a, you know, unfunded requests for the I'd say the past five, six years to build a fitness, facility here on base to support this. Um, But uh, we've we've failed the member greatly by not having a proper HPO."	Some units have been able to acquire their own funding to support HPOs and other professionals. Even if a unit does prioritize fitness, they might not get the funding they seek to improve their facilities. Airmen in those units might not have access to resources that other teams have access to.	Practices	Lack of standardized practices Differences in available resources

	Um! And so whatever workout equipment the squadron has is what they is, the resources that they would get, and it's different between all the um all the States " in Oklahoma, where I came from. We we had. We had secured an unfunded request and put in a one point four million dollars uh human performance optimization center … But I know other units that sixteenth, their gym is no bigger than a than a garage that you know. Maybe maybe ten people could fit in Max, and they've got a ninety five-person squadron, so i'm sure they have to juggle those resources quite a bit when they're, you know, full up on drill status. " "that's a tough one? Um, you know like at the one sixteenth, which is here on. It's on Camp Murray, Washington. So it falls under my group. Um! They have a pretty they had to give like an eighty percent pass rate, and I think they're one of the highest in the guard." "... Essentially those those guys are on their own. Ah! To either work out on in their own gym, or at their house, or with whatever equipment they have. I would say that's probably the biggest glaring issue, the equipment and the personnel, and then the time is the second secondary issue."	Exemplary teams that had a high success rate at 80% had HPOs. Airmen are on their own when it comes to working out .	Management Culture	Lack of cohesive practices

	"I think we've got to maximize the time that they do have um and work very focused and specific movements and exercises and programs that tailors specifically to what they need to do in order to pass the test … instead of kind of, leaving them to their own devices."	There is no tailored plan with specific movements and exercises tailored to help airmen pass the test despite their limited preparation time. Age isn't the only reason some of the older airmen struggle. Some of the organization's performance requirements and best practices have evolved.	Performance Review	Lack of focus and specificity. Risk for injury.
	" A lot of guys that I've talked to or or seen or worked out with typically, do things that they're comfortable doing which kind of leads to their own personal ruts or their own personal plateaus, … if we can maximize the little amount of time in the the equipment that they do have, in order to efficiently do movements that complement the tier-IIs then I think that they would have the same passing rate as an active duty person, in my opinion."			
	"... with the finite amount of time that we have with them in a drill status or a different training status. We tend not to focus on the physical fitness portion of it, because there is a whole host of other things that we have to train them. So I would say most of the things that we need and need to provide them will be off that status or away from the guard base."			
	"... I think that students that are passing technical school today Um. Are going to have a higher success rate. … because of the the way they are going through tech school, and the amount of physical fitness and the type of physical fitness that they get back. When we went through tech school. It was very calisthenics led : not a lot of weightlifting, or, you know. So I think this test will keep us um tactically and uh			

	tactically relevant um and future relevant for future endeavors that we want to do with this." "the tactical side of our job, and the proficiency of our job was the focus. …and now this is going to push them outside of that comfort zone… because it hasn't been at the forefront of their training." "it depends on what status you get hurt in. … For instance, in Oklahoma I had a tile layer self-employed guy that that wanted to be a TACP.He did all the he did. Everything you do, went down to tech school, came back, got, you know, got qualified, and everything. And then he went out on his own to be a tile layer again twenty-eight days out of the month,... he hurt himself doing deadlifts, called me, and	Some older airmen despite passing test school may struggle with the tier II because there was a different bar to entry. The focus for older airmen (does who have been in the guard for 13 years and above was on calisthenics and they didn't get to do a lot of weightlifting. No provision for injuries sustained for off-duty airmen even if the injuries are sustained while trying to remain mission ready. Lack of knowledge on how to prevent injuries for even amongst airmen who are motivated enough to train on their own.		Non-beneficial utilization of time available. Lack of focus and specificity. Risk for injury. Growing pains in the

	said, Hey, I hurt myself doing deadlifts…and everyone told me there's nothing they can do if he wasn't in the status. "the mindset that guys have when they go into this test is I've got to get the highest score I can get when in, … I've got to get a ten in every event. …but guys need to realize that it's all about the the efficiency of the movements and ensuring that you pass each event."			face of change. Discrepancy between the organization's goals of injury prevention and how they treat off-duty airmen.

Process Goals Customer and Business Requirements	"If a member doesn't pass the tier, two They'reThey're not going to be able to keep their currencies while they keep the currency. But they're not going to be able to train in any other area until they pass, basically not mission ready." "You know this, this program and this fitness test is to measure capabilities for this job, and in the way you work out, and everything kind of involves a longevity goal versus back in the day. We just got it out. But you know I mean it was just the full muscle failure, you know, with the special forces, and then you'd roll into something else, and you. Then it was full muscle for the next day, and not necessarily a smart way to work out." "…this particular career field comes with a great amount of physical requirements, physical, you know strength, requirements, which is why, uh, we have the tier two of . If a member does not pass any section that member is no longer able to train any other areas that we that he would need to be trained and current, and qualified in to Uh to maintain all of his deployment requirements "if somebody, for instance…goes over the runtime by fifteen seconds, or can only do nine. Pull up instead of ten. Pull ups. Does that mean? He can't be an effective J. Tech and um, and direct the airplanes where to drop the bombs, you know. Then I would say no. But there could be times where they are marching in over ten kilometers in rough terrain in the middle of the night, at at nine thousand feet elevation carrying one hundred pounds on their back, including their weapon, and they have to, and that's just to get to the target, I would say yes uh everything that the tier two oft demands of their bodies prepares them for something like that." "Does the Pt. Tests limit their ability to be a a good TACP garrison like Supervisor's, or do some of the administrative stuff that we expected them? No, but I think, um, we would be doing the community a disservice, and our servicing customer a disservice if we weren't, giving them a capability that we knew is not going to be a potential burden for them, in whatever combat situation may arise."	Airmen are still able to perform their job for the most part even without passing the test. There are however times when their jobs will require them to be in top shape and one way to ensure that this is always the case is by ensuring they are fit enough to pass the tier-II	Process Goals	Longevity, future-proofing the organization. Preparedness.

Process Design process design, systems design and workspace design	"So support wise um! We have the facilities, the actual gym uh, we do have a tac p gym specific uh outfitted with about two million dollars worth of equipment…members essentially have two hours built into the duty day uh dedicated to personal fitness." "So, we got a um like uh Jt said. We have a a nice facility that still recently um! He's like one point Seven million dollars. It's got plenty of spot racks, all all the equipment necessary uh for the most part for people to train um as far as the um the recovery aspect Um, that's non-existent um at the one hundred and forty-six." "…we don't have a a contracted exercise physiologist… and when you say recovery, those are the things you're talking about, the after workout or injury, prevention and uh injury rehabilitation, recovery." "TACPs) are part time. They have civilian jobs that do other things. Uh, they may not be as fitness focused. They They held a standard They've held a basic physical standard. But uh, but maybe Don't have the resources or time with their civilian lives. You know they're only showing up here once a quarter or come into an exercise or something like that. Um, honestly, I'm not quite sure how that's going to work out for where the majority of our failures would be. But I don't know that it's going to be a hundred percent." "So so when I, when I first got to the one hundred and forty-six um I think the very first drill we did in July. Um! We ran some of the guys through the tier two um there wasn't the pass rate that I was used to seeing coming from my previous active duty Squadron. Um! So me and a couple of guys just sort of round Table. They talked about. You	The airmen have the facilities and equipment necessary to be successful. They are however missing - recovery, injury prevention and rehabilitation resources in the form of personnel. Traditional airmen have to prioritize their civilian jobs and lives which leaves them with less time and less access to resources that will enable them to focus on fitness.	Systems Design Workspace Design. Systems Design Process Design	Lack of resources that shift the needle. Effect of status on the capacity to prioritize fitness.

	know what could be some of the some of the causes? Um, it's not access to they have that. Um, so it's either a a lack of knowledge."	Differences in the pass rate between active-duty and traditional guardsmen due to a lack of knowledge.	Work Design	
	"But the facts of the matter is, they have no idea a lot of them are using um uh outdated training methods. Um Inefficient training methods. Unsafe training methods.			
	"I think most of the guys are capable. Um, with with the right of the um um with the right amount of time focus in the right areas training properly, I think most are capable of it."	Inefficient, outdated and unsafe training methods due to a lack of knowledge.	Work Design	Knowledge and Resources
		Unit commanders are positive that with the right training and focus on specific areas, most traditional airmen are capable of passing the test.	Process Design	Targeted Approach

Process Management process ownership, process management and continuous improvement	"if a member is injured, then they would go to uh the medical treatment facility. Uh, if it's during a drill weekend. It would be here potentially on base. Otherwise ...it would probably just be a a local um emergency care kind of place if they, if they had some injury,...if it went into physical therapy…everything would flow through tricare here uh, or depending on their status…We would look at a line of duty determination , and then decide what the treatment plan would be from there." "...we have a daily workout posted in a signal chat. Um! In which one of the leaders from the squadron, you know there's a couple of guys that step forward and post their workouts…but it's more, I would say, individualized...guys completing their own workouts uh to prepare. itself....so like a targeted approach to uh, we leave that primarily to the member." "I think we will see a majority like greater than fifty percent pass it. Uh, we did a practice test for the whole unit back in August, and it was it was about a fifty percent pass fail." "The last one was in August which I wasn't I wasn't in town for and uh, so this current one. We'll see what the progress looks like. And uh, and then we'll we'll test again in February."	There is a very clear process for activity-duty men who sustain injuries. Airmen's access to resources such as daily posted workouts is dependent on the unit they belong to. Completing the workouts is still dependent on the airman. Performance is measured to an extent. There isn't a feedback loop in place to inform airmen about the areas they need to work on or to ensure that training is targeted. No adjustments for pre-existing medical conditions, and previous injury amongst members (if they take the test) may prevent a unit	Process management Process Ownership	Discrepancy between the organization's goals of injury prevention and how they treat off-duty airmen. Standardization of processes. Insufficient processes in place.

	"Unless there are… pre-existing medical conditions, problems with torn ligaments, or you know whatever it is, somebody may have a previous injury or something. Um, that's properly documented of the pool of guys who are healthy, and um, you know, required to take the test. My hope is that will be a hundred.But still that skeptic in me says it's you know It's probably not going to be a hundred percent."	as a whole from meeting the pass mark for passing the Tier-II.	Process Management	Adjustments for pre-existing conditions
Performer Goals(Job specifications, performance metrics, and individual development plans.)	"Now we're supposed to pass uh once, you know, pass our tests once a year Um! And uh so I mean that that's the expectation. Um, I think there's a little bit of gray area because I mean It's It's a new new roll out…but the the expectation currently is to pass it every year." "But the preparation for the test is is really uh on the individual. Um, there's, you know …we've got uh active duty, you know, guys that work full time for the unit. And then we have, you know, traditional guys like myself …but uh,at at the unit level." Um, i'm a big fan of the tier. Two fitness test. I think it's a much better Uh um! "But our our drill weekends. We have a four day drill once every other month.Um, So it's kind of a non-factor per se. The focus is more on other things. Not so much on preparing for the test." What's the word here? Much better test to to to gauge fitness um with this with this career field that we're in? Um, I think. Prior to this, we're doing the Air Force fitness test, which is just, you know. Push up, set ups, and mount and half run um, which really didn't gauge an individual's capacity to to do to do the extra rigors of of our job that's required of us on a day to day basis.	Clear expectations on when to pass the test. However, there are no specifications, metrics or tailored plans on how to prepare for and pass the test. the test. Clear understanding that the test is to gauge fitness.	Performer goals Performer goals.	Insufficient preparation. Unclear goals. Unawareness of the goal of injury prevention.

Performer Design(Job roles and responsibilities, skill requirements, procedures, tools, and training.)	"I think injuries uh come more from, you know. Maybe job duty is like a like an airborne jump, or something like that. Um! And I I've seen guys use the athletic trainer and had really good success. Um! And and overcoming injuries that way. Um, but uh, like I said. You know, being dislocated, I don't I don't see everybody on a regular basis." Um for guys who are there full time, you know they recently got a new gym in um, which I think came as part of the package a couple of years ago. Um! As well as a a trainer. Um! And and so we have those resources at the unit. Uh, however, those resources really don't do much in way of benefiting the uh the traditional guardsman, who isn't at the unit or close to the unit on a regular basis. Uh So for those guys, it's really self preparation." " you know, the the the differentiating factors between the the full time guys and having resources. Um, you know, like the guys you guys that are full time at the unit. They've got access to the gym and the athletic trainer. Um. And so for traditional guys having to maintain that standard, um, you know, and not having that resources, all of those things. If I wanted to access to those have to come out of pocket, or you know it's gonna cost me one hundred dollars to drive four hours to go see the athletic trainer..." Um for guys who are there full time, you know they recently got a new gym in um, which I think came as part of the package a couple of years ago. Um! As well as a a trainer. Um! And and so we have those resources at the unit. Uh, however, those resources really don't do much in way of benefiting the uh the traditional guardsman, who isn't at the unit or close to the unit on a regular basis. Uh So for those guys, it's really self preparation." " I don't sign up for the job to to gripe or I do anything but uh, you know. I think we all come into the career field expecting to put forth a little bit a little bit more. Um, you know it's definitely not a part time,	Resources are available, however, traditional guardsmen are not able to access them if they don't live close by. Airmen who don't live close by rely on self-preparation.	Performer tools and training.	Lack of access to available resources.

	part time, job, even as a guard Guardsman. Um! But seeing seeing resources uh worked out that way uh for traditional guardsmen would be a really cool thing to see in the future. " Um, I would say. No, not through the National Guard. Um in in a formal sense. Um, When we start our training pipeline, our our career progression as as new individuals. Um, a lot of that knowledge we get from other service members and more senior guys. Um! And then once you get to the Uh Taxi School House Um, they do a really good job of of teaching you how to recover, and they've got the full suite of trainers and equipment and everything to uh to really help guys there. So I would say, Um, most of that knowledge comes from um training in the pipeline. Um, and then you bring it back. Um! But we, you know a lot of our guys are are really into fitness. "So we've got a a large breadth of knowledge um amongst the individuals. But again, nothing formal from the guard sense. Um. Obviously the athletic trainer is always there, even asking questions and and what not, and and he'll help um. But that's that's the only only formal formal thing."	There is no formal training or instruction on recovery after workouts. Airmen take advantage of institutional knowledge from more senior guys and service members in the way of preparation and recovery. As such there is a large breadth of knowledge available if the knowledge providers actually possess accurate knowledge.	Responsibilities, skill requirements, tools and training.	Benefits of institutional knowledge.

Performer Management (Performance feedback, consequences, coaching and support.)	"No, I would say, if there's feedback for the test specifically it would be comparing scores to your last test. Um, you know. And like I said I, I don't have any problem passing the test. So it's not something that I necessarily go back and look at. I I I could go back and and look or test myself multiple times throughout the year, and then compare scores. Um, But that would be the only real feedback on on progression when it comes to the test." "The only real uh resource that the guard provides in terms of injury. Um, or you know, working through some of those strains that come with, uh, you know, working out, and and fitness would be the athletic trainer. Um! Who is our unit? Um, and very accessible. Um! That being said, I've got a four hour drive to the unit. So um! If if I were to have an injury driving to the unit to go see the athletic trainer is not necessarily a a viable option for me. Um! And that comes into that, you know, differentiating between the the full time uh crew at the shop, and then you know the traditional Guardsman. Um, I know our units specifically. We've got guardsmen that are all over the country that come into North Carolina for uh for drills. So we we kind of miss out on that that resource." "… our own um, our athletic trainers? They're more for the um, the physical, you know the recovery portion. Um, Not necessarily for fitness planning. Um. So we don't have any any workouts or or plan programs that come from our athletic trainer. Um, not really on this with our department. Um, but they they do a great job at at the rest of the recovery."	There is no feedback relevant to how airmen performed on the individual components of the test. Traditional airmen do not benefit from the support provided to help with injuries or strains because they live far away from the resources. The resources (personnel) focus on recovery and not fitness planning or preparation.	Performer Feedback Coaching and Support	Inadequate feedback. Lack of access to available coaching and support.

A.3 Codebook 2 – BEM – Cause Analysis

	First-order code	Second-order code	Conclusion
Environment - Information	Yeah, I mean, the expectations are always clear. That's not necessarily an issue. It's just like, hey? Either your pass, it or you don't pass it. "Whenever we have our your weekends and kind of the contract to that, because, like I say, we have so many currencies and things and skill sets that we have to maintain. Um that time is extremely precious, so it's literally just balls of the wall from morning till evening. Just straight training. Um, you know all the the you know, so we'll like we won't go to a rock marsh. But we're rocking because it's part of the mission and part of the plan and part of the training event. So there are things within the test that are obviously touched on because the nature of the job. But we're just jobbing it.I'm not necessarily focusing on like, hey? We're doing a rough march this morning like um. The time is a lot more precious, so we have to cram as much as we can into a single day uh for the entire uh higher zero period." "Hasn't been a whole lot of like strategic messaging from anywhere about. Why, the test exists in the state that it does. There's a lot of messaging that says a lot of detail, and studies have gone into the development of the test that the intent early on was to um. So when when they first started the tier two fitness test, they said that the idea was to gain data points so that we could go after um HPO efforts to get things like money for physical therapists and nutritionists and um like exercise physiologists and those types of things at each unit which active duties got a lot of that. So far ANG has not seen any of it. Um! That was initially what the messaging was to essentially make a healthier, more well-rounded longer lasting operator at each unit,	Expectations about passing the test. Airmen have a lot of currencies and skill sets to maintain so they aren't able to focus specifically on training to pass the test during the drill weekends when they meet. Airmen understand the purpose of the test.	No informal evaluation, feedback, preparation or guidance on how to prepare for and pass the test.

Environment – Resources	"Now, you can use them on or off duty, the issue with some of our guys is They're out of state, so it wouldn't make sense for them to travel to where we are, to utilize those facilities for our active duty personnel that are there, Peoria. They have access to them all the time. But for the other guys that are traditional guardsmen, they don't have access to that stuff until they come to drill. "I have to find um those resources on my own and uh tied to gym like. For example, we have an apartment Gym: A lot of that stuff is um like rope machines and what won't cause a liability. You know. Type of machine equipment. It's not like a legit, you know, free weight systems or anything like that. So, um that is something that I think is a prohibiting factor. Uh, when there are requirements on the test to have um those types of equipment. Um. So I think one of the challenges, I think, is just trying to find similar exercises and movements, to be able to do at home in preparation for that type of test. " I mean not necessarily any feedback other than like, uh, hey? You know you didn't pass this section so. Um! It was interesting. It's like, and it's not a a disk on the on the test proctor. But I found out that I had failed The test, you know, several days later. So it was like, Hey, If you had told me that prior to the event you passed every event. Okay, here's his next event. This is the standard. And then, as soon as I fail an event, um, you know you need to pass, and I think something that I wish was, hey? You failed the time cap, minimum, or the the minimum to.	Traditional airmen don't have access to resources except during drill weekend. There are no personnel to guide traditional airmen on how to use the resources as they live far from the base.	No personnel to guide prep. No consistent materials for traditional airmen when off base.
Environment - Incentives	I think it has a lot to do with an old school mindset in the past of "in our career field, We used to get special duty pay. We still get special duty pay, but if you were to get injured you would go on a status basically called the Nick, which didn't allow you to do your job, and you would lose that special duty pay So the mindset of I can't report an injury, otherwise i'm going to lose this pay for the month until i'm healed, and then just the mindset of being injured. So nobody wants to not be able to train, not to be able to do the job and be down for a certain amount of time, so they'll just tough it out just to get it done	Members get paid even if they have to go off duty status when injured	Financial and non-financial incentives exist and are effective. Work environment is positive and competitive.

Individual – Knowledge/Skills	" We don't receive any feedback besides the guys heckling each other in the gym. That's about it. " Um, I would say. No, not through the National Guard. Um in a formal sense. Um, When we start our training pipeline, our career progression as new individuals. Um, a lot of that knowledge we get from other service members and more senior guys. Um! And then once you get to the Uh Taxi School House Um, they do a really good job of teaching you how to recover, and they've got the full suite of trainers and equipment and everything to really help guys there. So I would say, Um, most of that knowledge comes from um training in the pipeline. Um, and then you bring it back. Um! But we, you know a lot of our guys are really into fitness. "So we've got a large breadth of knowledge among the individuals. But again, nothing formal from the guard sense. Um. Obviously the athletic trainer is always there, even asking questions and what not, and and he'll help um. But that's that's the only only formal formal thing."	Airmen receive tips for training and recovery from other service members and more senior airmen. However, it is informal, varies from unit to unit, and depends on the service members and senior airman's knowledge and skill set.	No formal training or developing an individual exercise plan. No structure for sharing individual knowledge.
Individual - Capacity	" I think the tier two program is good because it helps maintain that fitness level. Um, but it's almost like an accountability system to make sure that you can still function doing the job like, you know. You have to maintain some currency, Same fitness standards, all that type of stuff while juggling life and doing it part time, whereas active guys that is their whole life. It was my whole life to maintain that level. Um,so it's it's just It's just more of a challenge trying to juggle it. Um, The biggest thing is, I think, just juggling injuries from active duty Christopher Roscher: and trying to.Uh, i'm! Still, i'm still in the process of trying to figure out how to deal with those injuries, and um push out the same level of performance as I had when I was younger.		Airmen have the ability to learn. Traditional airmen life conflicts make preparation more difficult. Older TACP with multiple combat deployments appear to have more combat injuries that might affect their performance.

Individual - Motives	"I would say the biggest one of the bigger proponents of hiding injuries…you know, not wanting to be left out wanting to be part of the team …and then I would just say doing the mission that they want to do. If you get, you know, certain injuries may um take you out of the career field altogether, and you know I know I know pilots who have hidden several injuries because they want to fly." Uh for active you'd be put on, you know you'd be taking off a status which is every tech's worst nightmare. Um. And so most guys usually don't speak up about injuries. Um, So I would say like, now I've got a lot better about it, just because "for the guard if I go in in April, and i'm like, hey? This hurts that whatever, and they take me off of jump status and uh controlling, or whatever it could be. December. By the time i'm able to make it back to medical and sync up the Times that they're open because they're also in the guard uh to get me back on status, so I mean I could be out for not because of my body entries or not being healed and fixed, but just because of admin scheduling uh, I could be off status for a year. So um yeah, as just the one that's hurdles with the guard..	Airman's motive for hiding injuries is that they want to continue to perform their job.	Airmen want to do their job, train and perform well on the fitness test. Highly motivated to remain fitness ready.

APPENDIX B – TOOLS AND METHODOLOGY

B.1 RUMMLER AND BRACHE NINE BOX MODEL

Performance Dimensions

Performance Levels

	Goals	Design	Management
Organization	***Strategy, operating plans, & metrics*** Have you developed and communicated a viable strategy and appropriate organization-wide goals?	***Organization structure & business model*** Does the organization structure and business model actually facilitate accomplishment of the strategy?	***Performance review practices & management culture*** Have we planned, allocated, monitored, and diagnosed the organization as a system of integrated processes?
Process	***Customer and business requirements*** Have we established a manageable number of end-of-process and upstream goals that link to the organization goals and reflect customer and financial needs?	***Process & systems design, workplace design*** Have we designed processes which enable the process goals to be met?	***Process ownership, process management, & continuous improvement*** Have we installed an infrastructure for continuously monitoring and improving our core processes?
Performer	***Job specifications, performance metrics, & individual development plans*** Have we established individual/team goals which are linked to process goals?	***Job roles & responsibilities, skill requirements, procedure, tools, & training*** Have we designed jobs which will enable the job goals to be met?	***Performance feedback, consequences, coaching, & support*** Have we selected the right people, and provided the training resources, feedback, and rewards which will enable job goals to be met?

Note: Reprinted from "Rummler Brache 9 Boxes Model", (n.d.). https://www.rummlerbrache.com/

B.2 Chevalier's Updated BEM

TABLE 4 UPDATED BEHAVIOR ENGINEERING

Environment	Information 1. Roles and performance expectations are clearly defined; employees are given relevant and frequent feedback about the adequacy of performance. 2. Clear and relevant guides are used to describe the work process. 3. The performance management system guides employee performance and development.	Resources 1. Materials, tools, and time needed to do the job are present. 2. Processes and procedures are clearly defined and enhance individual performance if followed. 3. Overall physical and psychological work environment contributes to improved performance; work conditions are safe, clean, organized, and conducive to performance.	Incentives 1. Financial and nonfinancial incentives are present; measurement and reward systems reinforce positive performance. 2. Jobs are enriched to allow for fulfillment of employee needs. 3. Overall work environment is positive, where employees believe they have an opportunity to succeed; career development opportunities are present.
Individual	Knowledge/skills 1. Employees have the necessary knowledge, experience, and skills to do the desired behaviors. 2. Employees with the necessary knowledge, experience, and skills are properly placed to use and share what they know. 3. Employees are cross-trained to understand each other's roles.	Capacity 1. Employees have the capacity to learn and do what is needed to perform successfully. 2. Employees are recruited and selected to match the realities of the work situation. 3. Employees are free of emotional limitations that would interfere with their performance.	Motives 1. Motives of employees are aligned with the work and the work environment. 2. Employees desire to perform the required jobs. 3. Employees are recruited and selected to match the realities of the work situation.

Note. Reprinted from "Updating the Behavior Engineering Model", Chevalier, R., 2003, *Performance Improvement*, *42*, p. 10

APPENDIX C – INTERVIEW SCRIPTS AND CONSENT FORMS

C.1 INITIAL CONTACT SCRIPT

Delivered Via Email

Good Afternoon,

On behalf of our Boise State Needs Assessment Team I would first like to say thank you for volunteering your time and expertise with this project. As you may be aware, our team is attempting to establish evidence-based, data-driven solutions for the AFSPECWAR Tier-II Fitness Test as it relates to the ANG TACP Enterprise. Part of this research is to gather qualitative data from those closest to the problem set itself.

Our team is gathering data from selected Squadron Commander's and SELs, Squadron DOs and Ops Supts, as well as from the Airmen themselves. These individuals are selected by our Client, CMSgt Larry Mansell.

Our team will need ~30-minutes of your time to take you through a semi-structured interview via Zoom. Once we have confirmed a time that works best for you, we will send a zoom link to your preferred e-mail account so that we can complete the interview process.

Please reply to all on this email with the best time for you.

C.2 Informed Consent Document

Project Title: Reducing Tier-II operator fitness test Failure Rates for ANG TACP

Student Team Members: Brittany Fifer, Osemome Ndebbio, John Robertson, Misha Thoma

Course: OPWL 529 Needs Assessment

This consent form provides information about why this needs assessment is being done and why you are being invited to participate. It will also describe what you will need to do to participate as well as any known risks, inconveniences, or discomforts that you may have while participating. We encourage you to ask questions at any time. If you decide to participate, you will be asked to express your consent to participate, which will be recorded. You may withdraw this consent at any time. You will be given a copy of this form to keep.

Purpose and Background

You are invited to participate in a research study gathering data on the ANG Tier-II operator fitness test. The research project includes a needs assessment to evaluate mission readiness and the ANG fitness program. If you agree to be in the study, you will participate in an:

☐ Individual interview about your job.

Mansell, Larry L JR CMSgt has suggested you participate and approved the time for you to participate. It is estimated that participating in this needs assessment should take no more than 30 minutes of your time.

Procedures

The needs assessment participation will involve a one-on-one interview session. Topics that may be covered include how you prepare for the test and what kind of feedback you receive during preparation.

Interviews will be pre-scheduled for your convenience and are anticipated to take no longer than 30 minutes. Interviews will be recorded only with your permission. Recordings will assist us greatly in our analysis of the information you provide.

Risks

Although interview questions are primarily meant to collect general information, you may feel uncomfortable answering items asking about your personal opinions, lifestyle, or feelings. You are always free to decline to answer any question or to stop your participation at any time. Should you feel any discomfort after participating, you may contact John Robertson.

Benefits

There will be no direct benefit to you from participating in this study. However, the data collected from this needs assessment will be used to gain a deeper understanding regarding the challenges associated with passing the Tier-II operator fitness test and may help the organization better fulfill its mission to improve the passing rate and maintain fitness readiness through improved processes.

Extent of Confidentiality

Reasonable efforts will be made to keep the personal information in your research record private and

confidential. Any identifiable information obtained in connection with this study will remain confidential and will be disclosed only with your permission or as required by law. Under normal conditions, only members of the needs assessment project team and the course instructor will have access to data. The needs assessment team will not use personal names or will use pseudonyms in place of personal names and the name of the organization.

Interview notes and recordings will be stored in a database and electronic files accessible only to members of the needs assessment project team and the course instructor.

Your name will not be used in any written reports or publications which result from this project.

All data will be reported in aggregated form rather than any direct quotes attributable to a specific person.

Payment/Compensation

There is no compensation for your participation in this project.

Participation Is Voluntary

You do not have to be involved in this project if you do not want to be. If you volunteer to contribute to this project, you may withdraw from it at any time without consequences of any kind or loss of benefits to which you are otherwise entitled.

Questions

If you have any questions or concerns about your participation in this study, you should first contact the project leader - John Robertson using the following email address: johnrobertson@u.boisestate.edu

Documentation of Consent

You will be asked to agree and consent to the following statement, which will be recorded.

> ***"I have read this form and decided that I will participate in the project described above. Its general purposes, the particulars of involvement and possible risks have been explained to my satisfaction. I understand I can withdraw at any time."***

C. 3 Interview Scripts

Interviewee	Questions
Client	
	1. What is the mission and vision of the organization? 2. If a 0% failure rate is impossible, what failure rate can you live with and still be successful? 3. Is the fitness test a good metric of an ANG Airmen's mission readiness? 4. In your opinion, would a reservist be capable of completing the mission having failed the fitness test?
Upstream Stakeholders & SMEs	
	1. Why is there a difference in pass rates for the Tier – II fitness test between the active duty and ANG Airmen who serve in the Air National Guard? 2. In light of their time commitment, what are the chances of TACP ANG passing the Tier - II fitness test? 3. What measures does the organization take to ensure the ANG pass the fitness test? 4. What resources are available to the ANG Airmen to prepare for the test? 5. What resources do the active duty Airmen have access to? 6. Why are ANG Airmen who met the technical training graduation requirement unable to pass subsequent fitness tests like the Tier – II fitness test? 7. Is the fitness test a good metric of an ANG Airmen's mission readiness? 8. In your opinion, would a ANG TACP be capable of completing the mission having failed the fitness test?

	1. Why is there a difference in pass rates for the Tier – II fitness test between the active duty and ANG Airmen who serve in the Air National Guard? 2. In light of their time commitment, what are the chances of TACP ANG passing the Tier - II fitness test? 3. What measures does the organization take to ensure the ANG pass the fitness test? 4. What resources are available to the ANG Airmen to prepare for the test? 5. What resources do the active duty Airmen have access to? 6. Why are ANG Airmen who met the technical training graduation requirement unable to pass subsequent fitness tests like the Tier – II fitness test? 7. Is the fitness test a good metric of an ANG Airmen's mission readiness? 8. In your opinion, would a ANG TACP be capable of completing the mission having failed the fitness test? 9. If full implementation of the test means an Airmen could be removed from the guard, is there concern about losing institutional knowledge since older members may have greater difficulty passing?
Squadron Commanders	1. What support do you have to prepare for the Tier-II operator fitness test? a. What support do you have for injury prevention and recovery? 2. How much preparation do you put into preparing for the test? a. What about your unit? 3. Do you feel capable of passing the Tier – II fitness test? a. What about your unit? 4. What effect does failing the test have on your unit? 5. Are members who failed the fitness test still able to perform their duties? 6. What resources are available to the ANG Airmen to prepare for the test? 7. In light of their time commitment, what are the chances of TACP ANG reserves passing the Tier - II fitness test?
Squadron Senior Enlisted Leaders	1. What effect does failing the test have on your unit?

	2. Are members who failed the fitness test still able to perform their duties? 3. What resources are available to the ANG Airmen to prepare for the test? 4. In light of their time commitment, what are the chances of TACP ANG reserves passing the Tier - II fitness test? 5. What support do you have to prepare for the Tier-II operator fitness test? 6. How much preparation do you put into preparing for the test? 7. Do you feel capable of passing the Tier – II fitness test?
Direct Impactees	
Exemplar Unit ANG TACP Airmen	1. What does your unit do to help you prepare for the test? 2. How much preparation do you put into preparing for the test? 3. Do you feel capable of passing the Tier – II fitness test? 4. What are you expected to do to pass the test? **clear expectations? 5. What kind of feedback do you get on your performance during training? 6. What do you do if you sustain an injury that would affect your ability to complete the test? 7. What kind of support do you get after you sustain an injury? 8. What happens if you pass the test? 9. What happens if you fail the test? 10. How does your experience with the Tier II fitness test compare to how you prepared for and passed your technical training graduation fitness test?
Non-exemplar Unit ANG TACP Airmen	1. What does your unit do to help you prepare for the Tier-II operator fitness test? 2. How much preparation do you put into preparing for the test? 3. Do you feel capable of passing the Tier – II fitness test? 4. What are you expected to do to pass the test? 5. What kind of feedback do you get on your performance during training? 6. What do you do if you sustain an injury that would affect your ability to complete the test? 7. What kind of support do you get after you sustain an injury? 8. What happens if you pass the test? 9. What happens if you fail the test?

	10. How does your experience with the Tier II fitness test compare to how you prepared for and passed your technical training graduation fitness test?
HPO Staff	1. What role do you play in preparing the ANG for the Tier-II operator fitness test? 2. How frequently do you work with the ANG? 3. How do you prepare the full-time ANG for the test? 4. What do you do to ensure that they are successful?
MidStream Stakeholders / Direct Impactees	
Exemplary – Unit Director of Operations	1. Why is your unit able to pass the Tier-II operator fitness test? 2. What do you do to prepare your unit for the test? 3. What happens when someone fails the test in your unit? 4. What happens when someone passes the test in your unit? 5. What happens when someone is injured? 6. How would you describe your unit?
Non-exemplary – Unit Director of Operations	1. Why isn't your unit able to pass the Tier-II operator fitness test? 2. What do you do to prepare your unit for the test? 3. What happens if someone in your unit fails the test? 4. What happens when someone in your unit passes the test? 5. What happens when someone is injured? 6. How would you describe your unit?
Exemplary – Unit Operations Superintendents	1. What support do ANG Airmen have to prepare for the Tier-II operator fitness test? 2. Is there anyone in the unit that encourages people in a way that makes the ANG Airmen successful? 3. How do you describe what performance is expected of ANG Airmen to them? 4. How often do ANG Airmen feedback on their training performance? 5. What kind of feedback do you provide to ANG Airmen during training? 6. How do you support ANG Airmen who sustain injuries during training?
Non-exemplary – Unit Operations Superintendents	1. What support do ANG Airmen have to prepare for the Tier-II operator fitness test?

	2. Is there anyone in the unit that encourages people in a way that makes the ANG Airmen successful? 3. How do you describe what performance is expected of ANG Airmen to them? 4. How often do ANG Airmen feedback on their training performance? 5. What kind of feedback do you provide to ANG Airmen during training? 6. How do you support ANG Airmen who sustain injuries during training?

APPENDIX D – NEEDS ASSESSMENT PLANNING TABLE

Key Questions	Framework / Model	Data Sources	Data Collection Methods	Dates
PRESENTED PROBLEM				
- Do we have a problem? (Based on what evidence can you say you have a problem?) - Do we have a performance problem? - How will we know when the problem is solved? (When indicators from the first question are the exception.) - What is the performance problem? - Should we allocate resources to solve it? (Do the benefits of solving the problem outweigh the costs?)	Harless FEA	**Upstream Stakeholders:** - CMSgt Larry Mansell, NGB/A3JB - Col David Stilli, 194 ASOG/CC **Extant Data Documents:** - Previous RAND Studies - Policy Documents - Testing Guidance - Completed Test Data Review	Extant Data Review Semi-structured interviews	10-28 Oct 22
ORGANIZATION ANALYSIS				
- Have you developed and communicated a viable strategy and appropriate organization-wide goals? - Have you established an organization structure which enables the organization and process goals to be met? - Have you planned, allocated resources, monitored and diagnosed the organization as a system of integrated processes? - Have you installed an infrastructure for continuously monitoring and improving our core processes? - Have you designed processes which enable the process goals to be met? - Have you established a manageable number of end-of-process and upstream goals that link to the organization goals and reflect customer and financial needs?	Rummler & Brache's 9-Boxes	**Upstream Stakeholders:** - CMSgt Larry Mansell, NGB/A3JB - Col David Stilli, 194 ASOG/CC **MidStream Stakeholders** - Squadron Commanders - Squadron Senior Enlisted Leaders **Extant Data Documents:** - Previous RAND Studies - Policy Documents - Testing Guidance - Completed Test Data Review	Extant Data Review Semi-structured interviews	10-28 Oct 22

ENVIRONMENT ANALYSIS				
- Are there established individual /team goals which are linked to process goals? - Are jobs designed in a way that will enable the job goals to be met? - Has the organization selected the right people and provided the training resources, feedback, and rewards which will enable job goals to be met?	Rummler & Brache's 9-Boxes	**Direct Impactees** - Unit Traditional Airmen (Part-Time) - Unit Full-Time Airmen - Exemplar Unit Airmen (>85% passing rate) - Non-Exemplar Unit Airmen (<85% passing rate) **MidStream Stakeholders** - Squadron Commanders - Squadron Senior Enlisted Leaders **SMEs:** - Human Perforamnce Optimazation Team Members	Semi-Structured Interviews *Online Surveys* *These will be used as an option if desired/required based on data received from semi-structured interviews.*	21 Oct - 4 Nov 22
GAP ANALYSIS				
- What is the desired performance? - What is the actual performance?	- Rummler and Braches' 9-Box Model	Data from problem, organization, and gap analysis	**Extant Data Review** - Codify gaps in the 9-box model - Utilize codebook to place data in the 9-box model - Annotate box with red if gap exists - Annotate box with green if no gap exists	5-12 Nov 22

CAUSE ANALYSIS				
Environment-Information: - Are the roles and performance clearly defined and are employees given relevant and frequent feedback about the adequacy of performance? - Are clear and relevant guides used to describe the work process? - Is the performance management system guiding employee performance and development? **Environment-Resources:** - Are the materials, tools, and time needed to do the job present? - Are processes and procedures clearly defined and do they enhance individual performance if followed? - Is the overall physical and psychological work environment contributing to improved performance? **Environment-Incentives:** - Are there financial and on-financial incentives present and does it reward positive performance? - Are jobs enriched to allow fulfillment of employee needs? - Is the overall work Environment positive where employees believe they have an opportunity to succeed? **Individual- Motives:** - Are the motives of employees aligned with the work and the work environment? - Do employees desire to perform the required jobs? - Are employees recruited and selected to match the realities of the work situation? **Individual-Capacity:** - Do employees have the capacity to learn and do what tis needed to perform successfully? - Are employees required and selected to match the realities of work? - Are employees free of emotional limitations that would interfere with their performance? **Individual-Knowledge/Skills:** - Do employees have the necessary knowledge, experience and skills to do the desired behaviors? - Do employees possess the necessary knowledge, experience, and skills and are the properly placed to use what they know? - Are employees cross-trained to understand each others roles?	- Chevalier's Updated Behavior Engineering Model (BEM)	Previous data from all phases	2nd layer analysis based on identified gaps from R&B	13-19 Nov 22

INTERVENTION OPTIONS				
Utilize Hale's "if-then" table to determine intervention types that are applicable to causal areas	Hale's Intervention Types	Previous data from all phases	Review and apply Hale's intervention types with the if-then table	20 Nov - 2 Dec 22
- How much will it cost to implement - How quickly can the intervention be implemented - what is the probabilty that the intervention will increase pass rates? - what is the probaility that the intervention will reduce injuries?	Multi-Criteria Analysis	Client: CMSgt Larry Mansell	Conduct semi-structured interview with client to collaborate on multi-criteria analysis elements	

APPENDIX E – LITERATURE REVIEW

ORGANIZATION POLICY

The governing policy that currently exists for AFSPECWAR Airmen with regard to the Tier-II operator fitness test, is the Air Force Manual (AFMAN) 10-3500 Volume 1, dated 1 June 2022. This manual Air Force Manual provides guidance and procedures on training for AFSPECWAR Airmen. It prescribes the currency requirements for these Airmen to include their physical fitness requirements. As far as policy from the organization level down, this document provides clear guidance on medically restricted training requirements, waiver authorities to the procedures outlined within, and roles and responsibilities for each level of the organization from the top-tier to the lowest level performer.

The content within AFMAN 10-3500v1 outlines the organization's expectation with regards to recurring training for all AFSPECWAR Airmen. Specifically, and in relation to this needs assessment, table A2.1 prescribes AFSPECWAR Airmen to a 12-month currency requirement for the AFSPECWAR Tier-II Operator Fitness test. It also defines that the Airman's status if they are non-current on the Tier-II operator fitness test, they will be placed in a "Non-Training" status. Paragraph 4.1.4 details that an Airman in a Non-Training status will not conduct any training until they are out of that status.

ORGANIZATION MESSAGING AND STRATEGY

During a number of our interviews with direct Impactees it was apparent that messaging could be an issue from the top-level of the organization to the bottom level with the performers. The Needs Assessment team requested any documentation that was readily available to or had been distributed to the subordinate units about the Tier-II operator fitness test. Attachment 1, AFSPECWAR Tier 2 OFT Guidance V3, dated 29 September 2021 was distributed via e-mail to Major Command and Group Command teams for further dissemination to their subordinate units in October of 2021.

The overall purpose of the document was to provide the execution guidance for the Tier 2 OFT. This was published during the adaptation period of the Tier 2 OFT as a tool for both administrators and executers of the test itself. It outlines the overall purpose of the Tier 2 fitness test and how it is different than the tier 1 fitness assessment. It provides the minimum scores for each of the nine components, how the components are to be administered, and even provides the reasoning "tactical relevance" for each of the components. The attachment also provided a job aid for test administrators and performers to record data for each component of the fitness examination.

The largest gap discovered for this portion of the literature review was with the specific execution of how units are required to record, report, and utilize data from their Tier-II fitness results. AFMAN 10-3500v1 prescribed units to track training, including the Tier 2 Fitness Test, in the electronic system of record however, it did not detail any other use of the data or a reporting frequency timeline (AFMAN 10-3500, 1 Jun 22).

NEED FOR SPECIFIC RELIABLE FITNESS SUBJECT MATTER EXPERTISE

Overall fitness knowledge, injury prevention and recovery were three major areas of concern based on interview data. The needs assessment team focused some of our literature review on studies and peer reviewed articles related to this subject to assist our client and our team with refining performance gaps and causes as well as providing evidence-based methods to close those gaps with possible interventions.

Musculoskeletal (MSK) injuries are a common occurrence among AFSPECWAR professionals. The knowledge and subject matter expertise to help reduce, prevent, and recover from those injuries can help increase mission readiness of AFSPECWAR Airmen. MSK injuries continue to be costly and the leading cause of medical visits and disability in the U.S. military (Cody R. Butler, et al., 2022). These injuries are more prevalent in AFSPECWAR units among the USAF as they often operate in hostile environments for prolonged periods of time while carrying a large amount of support equipment weighing 100 pounds or more (Warha D, 2009).

Research articles related to the injury subject highlight the increased risk of MSK injury to the AFSPECWAR Airmen population and provide evidence that there needs to be science-based solutions available for them. The evidence suggests that there should exist a requirement for the development of appropriate prevention, screening, and rehabilitative strategies to reduce the risk and increase the health and readiness of members within the AFSPECWAR community (Cody R. Butler, et al., 2022).

A briefing provided to our team by the Headquarters Air Force Special Warfare, Human Performance Optimization team, provided survey data for positive outcomes directly to Airmen by having on-site HPO professionals within their organizations. In fact, a survey conducted by that same team resulted in data points stating that; 70% of the data pool felt that having HPO service available to them influenced their decision to stay in the USAF; 90% agreed that the presence of embedded experts actually influenced their decision to seek care instead of hiding injuries; **82% reported that they had a sense of connection with their HPO team (*Note* A sense of connection is the #1 contributor to reducing suicides);** and finally 83% reported that they felt confident in their ability to return to duty after injuries (Guthrie, 2022).

TECHNOLOGY SUPPORTING INJURY PREVENTION AND RECOVERY

Each ANG TACP unit has received a Sparta Science™ Force Plate System to assist with injury prevention and recovery efforts post injury. While researching the validity of this tool our team was directed to a recently published article that purportedly invalidated the efficacy of the system for reducing injuries. While this study did not rule out the system as a valid injury prevention tool, it did provide insight as to the validity of the system being used to increase performance in the 8 component areas of the entry candidate fitness test for AFSEPCWAR Airmen.

The Sparta Science™ system utilizes proprietary software to analyze the force-time curve of a vertical jump and purports to serve as a proxy for traditional military fitness tests. The Sparta Science™ system produces four proprietary metrics, including the Sparta™ Score, which is correlated to high magnitudes of performance (Scott, et al., 2022).

The conclusion of the study showed an actual decline in Sparta™ Jump Scan metrics and no direct correlation to following the systems prescribed plan and improved test scores for the candidate fitness test (CFT). The CFT is the entry standard for AFSPECWAR Airmen and has similar components to the Tier-II operator fitness test. Both test however, cover the same fitness domains, including: strength, power, muscular endurance, swimming proficiency, and cardiovascular fitness (Scott, et al., 2022).

RESERVE FORCES VS ACTIVE DUTY FORCES' FITNESS DATA

This needs assessment involved members of the Air National Guard, a reserve component of the United States Air Force, we needed to assess the differences in fitness levels. The best article the team could find comparing the two different categories of Military Professionals was this article. While it compares US Army Soldiers vice Air Force

Special Warfare Airmen, the correlations derived between both demographics were comparable when we analyzed the data points contained therein with those from semi-structured interviews with direct Impactees.

The research concluded that reservists had higher odds of failure for their fitness test components than active-duty soldiers (Dale W. Russell, Joshua Kazman, & Cristel Antonia Russell, 2019). This was further discussed as possibly reflecting the difference between the 2 populations in everyday job demands. Although both groups are required to adhere to the same military standards, active-duty soldiers are routinely afforded time at work to maintain fitness preparedness, whereas reservists are less likely to receive the same accommodations from their civilian employers.

The data also showed that reservists fare worse than active-duty soldiers post-deployment, particularly in the area of health behaviors. The findings on physical test performance in this study suggest that reservists may struggle more than active-duty soldiers not just after deployment but also in their everyday health and well-being (Dale W. Russell, Joshua Kazman, & Cristel Antonia Russell, 2019).

APPENDIX F – TERMS AND DEFINITIONS

United States Air Force Terms	
Word/Acronym	**Definition**
Air Force Special Warfare / AFSPECWAR	Is the United States Air Force's offensive ground capability that enables air and space power integration through strike, access, recovery and C2.
Tactical Air Control Party / TACP	An AFSPECWAR specialty whose primary mission is to command and control (C2) stirk assets against surface (land and/or maritime) targets in order ot meet the overall commander's intent for an operation.
Air National Guard / ANG	A federal military reserve force of the United States Air Force, as well as the air militia of each U.S. state, the district of Columbia, the Commonwealth of Puerto Rico, and the territories of Guam and the U.S. Virgin Islands.
Drill Status or "Traditional" Guardsman (DSG)	A service member who performs duty under Title 32 U.S. Code. They are only on duty, in uniform, when ordered for training or operations, the rest of their time they are considered a civilian. Their time requirement equates to approximately 39-days annually that they must serve in order to receive entitlements that count towards an ANG retirement plan.
Full-Time Airman/Guardsman	This term refers to an ANG Airman that is performing duty under Title 32 U.S. Code. The difference in their performance of duty is that they are performing this duty as their full-time job and not on a part time status like a traditional Airman.
Active Duty Airman	This term refers to a USAF Airman that is performing duty under Title 10 U.S. Code. They're considered a part of the active component of the USAF and not a member of the reserve component.

Human Performance Optimization / HPO	This is a newer concept within the United States Air Force. It is a collaborative team of specialists focusing on the physical and spiritual aspects of the human weapon system. Their goal is to be on site to reduce downtimes for Airmen, rehabilitate them as needed from injuries, and to focus on programming for their strength and conditioning to meet performance goals and mission requirements.
Human Performance Technology Models, Terms, & People	
Harless' Front-End Analysis Model	Joe Harless developed a series of "smart questions" to assist human performance teams in defining the performance gap. The front-end analysis consists of five questions: 1) Based on what evidence can you say that you have a problem? 2) Do we have a performance problem? 3) How will we know when the problem is solved? 4) What is the performance problem (Current vs Desired state)? 5) Should we allocate resources to solve it? (Bartley, 2021)
Chevalier's Updated Behavior Engineering Model	Roger Chevalier's Updated Behavior Engineering Model (BEM) is an adaptation of Thomas Gilbert's BEM (Chevalier, 2003). The updated BEM is used to "identify the more important opportunities for improving individual or work group performance," by providing "a framework for discovering the underlying causes"(Chevalier, 2003).
Rummler and Brache's 9-Boxes	Rummler & Brache's (R&B) 9-Box Model is a systems focused model on the three, interconnected levels of performance from the organization, process, through the performer that look at the goals, design, and management at each level. (Rummler-Brache Group, 2022).
Hale's Intervention Types	Judith Hale categorized different types of interventions into fifteen different families of interventions that are broken down into five groups. Each intervention family has a unique activity or program that the various interventions within should help one accomplish. She also provided an "if-then" job aid to further assist human performance professionals in selecting and applying appropriate interventions to root causes. (Hale, 2006)

Roger Chevalier	Dr. Roger Chevalier is the author of the award-winning book, *A Manager's Guide to Improving Workplace Performance*, published by the American Management Association (AMACOM Books, 2007). He is an independent consultant who specializes in embedded training into comprehensive performance improvement solutions. He has personally trained more than 30,000 managers, supervisors, and salespeople in performance improvement, leadership, coaching, change management, and sales programs in hundreds of workshops. He is a former director of training for the Coast Guard's west coast training center and a former vice president of Century 21 Real Estate's performance division.
Geary Rummler	Geary A. Rummler is the co-founder of The Rummler-Brache Group (RBG) and co-author of Improving Performance: How to Manage the White Space on the Organization Chart. He helped developed the world-class performance improvement methodology taught in the Process Improvement Certification Workshop. He received his B.A. degree, his M.B.A. degree, and his Ph.D. degree from the University of Michigan. Prior to founding RBG, Rummler served as president of the Kepner-Tregoe Strategy Group, co-founded Praxis Corporation, and was director of the University of Michigan's Center for Programmed Learning for Business. He also authored the books, White Space Revisited, Serious Performance Consulting, and Rediscovering Value.(RummlerBrache Group, 2022)
Alan Brache	Alan is co-founder of The Rummler-Brache Group and co-author of Improving Performance: How to Manage the White Space on the Organization Chart. He has also authored two additional books including Implementation: How to Transform Strategic Initiatives into Blockbuster Results and How Organizations Work: Taking a Holistic Approach to Enterprise Health. His consulting, training, and writing has focused on resolving critical issues through the identification, documentation, analysis, design, measurement, and continuous improvement of business processes. (RummlerBrache Group, 2022)

Judith Hale	Judith Hale, Ph.D., has been a consultant to management in the public and private sectors for over 25 years. She specializes in needs assessments, certification programs, evaluation protocols, training outsourcing, and the implementation of major interventions. She has dedicated her professional career to helping management develop effective yet practical ways to improve individual and organizational performance. She is known for making sense out of confusion and helping people stay focused on what matters and has developed useful models for identifying organizational needs, defining and assessing competencies, and developing performance management systems. She is the author of nearly 10 books, dozens of chapters, and hundreds of articles. She is a past-president of ISPI and is on the faculty of ISPI's HPT Institute and Boise State's School of Engineering. She lives near Chicago.