U.S. AIR FORCE MAINTENANCE GROUP AERIAL PORTS: STRENGTHS, CHALLENGES, OPPORTUNITIES, AND THREATS

THESIS

Parker H. Alford, Captain, USAF

AFIT-ENS-MS-19-M-098

DEPARTMENT OF THE AIR FORCE
AIR UNIVERSITY

AIR FORCE INSTITUTE OF TECHNOLOGY

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Parker H. Alford, BA
Captain, USAF

Committee Membership:

Major Benjamin T. Hazen, PhD
Chair

Mrs. Erin B. Lunday, MA
Member

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Abstract

In 2005 the Base Closure Realignment Commission and Secretary of Defense recommended joint basing; as an indirect result starting in 2009 and culminating the following year, Charleston, Dover, McChord, McGuire, and Travis maintenance groups (MXG) took command of aerial port squadrons (APS). Various entities have discussed at length the impact; however, there did not appear to be a documented hard look into the strengths, challenges, opportunities, and threats (SCOTs) which emerged. This study utilized the Delphi method to flesh out MXG APS SCOTs by anonymously surveying MXG and APS experts through three panel rounds. This study discovered and documented 24 SCOTs and viewed them through the Competing Values Framework (CVF) theoretical lens. The majority of the panel's inputs concerning maintenance and aerial port entities fell on opposing sides of the CVF; which may explain why the panel, consisting of maintenance and APS leaders, did not reach strong consensus in two out of four SCOT categories. This study proposes creating a wing or standalone group to house the five aerial ports or altering the MXG title to be more representative of all squadrons assigned and ensuring at least one logistics readiness officer or aerial porter is on each MXG leadership team.

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U.S. AIR FORCE MAINTENANCE GROUP AERIAL PORTS:

STRENGTHS, CHALLENGES, OPPORTUNITIES, AND THREATS

I. Introduction

Background

Starting in 2009 and culminating the following year, five stateside Air Force mission support groups (MSG) relinquished command of their aerial port squadrons (APS) to maintenance groups (MXG) at the following Air Force bases (AFB): Charleston, Dover, McChord, McGuire, and Travis (Robertson, 2014; Scales, 2014; Weaver, 2014a, 2014b, 2015). The reorganization came in part to ensure Air Mobility Command (AMC) maintained control over the aerial ports, as several of the bases became joint bases following 2005 Secretary of Defense and Base Closure and Realignment Commission (BRAC) recommendations (BRAC, 2005; Hubby, 2010). Almost a decade has passed since MXGs took command of the aforementioned APSs, however the implications of this reorganization are largely undocumented.

Problem Statement

What are the strengths, challenges, opportunities, and threats, hereafter referred to as SCOTs, of the current stateside MXG/APS organizational construct? For the purpose of this study, strengths are defined as factors that enhance the group and/or aerial port. Challenges are unique problems the group and/or aerial port encounter. Opportunities are favorable situations that positively affect the group and/or aerial port. Threats are unfavorable conditions that may negatively affect the group and/or aerial port.

Purpose Statement

The purpose of this study is to discover the primary SCOTs that emerged in the wake of the reorganization placing aerial ports within the MXG organizational structure at Joint Base (JB) Charleston, Dover AFB, JB Lewis-McChord, JB McGuire-Dix-Lakehurst, and Travis AFB. The study's intent is to provide AMC, MXG, and APS leaders with actionable insights to be considered as they shape future MXG and aerial port organizational structures and policies.

Research Focus and Question

Using a Delphi panel of MXG and APS experts, this study sought to uncover the unique advantages and challenges MXGs with APSs and MXG-led APSs experience. To that end, the principal research question was: What are the primary SCOTs of the current MXG/APS organizational construct? In order to determine the primary SCOTs, this study deconstructed the research question into four separate investigative questions:

- What are the strengths of housing aerial ports within maintenance groups?
- What are the challenges of housing aerial ports within maintenance groups?
- What are the opportunities of housing aerial ports within maintenance groups?
- What are the threats of housing aerial ports within maintenance groups?

Scope

As there are only five bases with MXG-led aerial ports, this study will only explore MXG-led aerial ports at the following installations: JB Charleston, Dover AFB, JB Lewis-McChord, JB McGuire-Dix-Lakehurst, and Travis AFB. Additionally, this study solicited panelists from the following population: current or graduated MXG

commanders (CC), deputy commanders (CD), and senior enlisted managers (SEM), as well as APS CCs, operation officers (OpsO), and SEMs with at least one year experience working in MXG with an APS or an MXG-led APS.

Assumptions

The researcher made the following assumptions for this study:

- MXGs with aerial ports and MXG-led aerial ports experience different advantages and challenges versus the traditional MSG or air mobility operations group (AMOG) structure.
- The panelists adequately represent the general perceptions of MXG with APS and MXG-led APS personnel overall.
- To be fair and balanced, maintainers, logistics readiness officers (LROs), and enlisted aerial porters (2T2s) should be invited to participate.

Limitations

This study likely has the following limitations:

- The non-homogenous composition of the sample population of participants produced mixed results.
- The online survey method allows participants to share the survey link; which could allow ineligible participants to participate.
- The anonymity of the method did not allow the researcher to ensure the same population participated throughout the duration of the study.
- Although the researcher is an LRO and the advisor is a maintainer, the researcher may have a positive bias towards the aerial port given the researcher's 13 year enlisted aerial porter (2T2) background.

Implications

If the primary SCOTs of having aerial ports within the MXG can be successfully discovered via this study, AMC, MXG, and APS leaders may be able to develop and implement strategies to leverage the strengths and opportunities while mitigating the

challenges and threats. Effectively implementing such strategies may in turn increase maintenance and aerial port cohesion and morale as a team. Conversely, if the challenges and threats gleaned from this study are too great to overcome, AMC may see fit to reorganize the five aerial ports under a different command structure.

Overview

Chapter two of this study delves into a sample of the literature surrounding integration, differentiation, and organizational identity followed by a synopsis of the Competing Values Framework theory and strengths, challenges, opportunities, and threats (SCOT) analysis. Chapter three describes the Delphi Method and how this study implemented the method, along with panel selection procedures and demographics. Chapter four discusses the Delphi panel round findings and the expert recommendations. The final chapter views the SCOTs through the Competing Values Framework lens and presents the researcher's conclusions, inferences, and recommendations grounded on the results of this study.

II. Literature Review

Chapter Overview

The purpose of this chapter is to explore relevant literature pertinent to organizational integration, differentiation, identity, and differing values. The first section reviews related unit integration and differentiation studies and includes a subsection detailing stateside aerial port squadron lineage. The next section describes the Competing Values Framework theory and the questions the model prompts. The final section provides the background of strengths, challenges, opportunities, and threats (SWOT) analysis, as well as the decision to conduct a SCOT versus a SWOT analysis.

Integration and Differentiation

Before discussing integration and differentiation, it is important to define the terms. Organizational behavior pioneers Paul Lawrence and Jay Lorsch (1967) defined *integration* "as the process of achieving unity of effort among the various subsystems in the accomplishment of the organization's task" (p. 4). The pair defined *differentiation* as "the state of segmentation of the organizational system into subsystems, each of which tends to develop particular attributes in relation to the requirements posed by its relevant external environment" (Lawrence & Lorsch, 1967, p. 3).

Over the past sixty years, four out of the five stateside aerial ports experienced at least four organizational restructuring and integration efforts (Robertson, 2014; Scales, 2014; Weaver, 2014b, 2015). Travis AFB's 60 APS has gone through six, while McGuire's 305 APS experienced three in the squadron's 25-year existence (Weaver, 2014a, 2015). According to the Headquarters AMC Office of History, the majority of

stateside APSs moved from military airlift wings (MAW), to operations groups (OG), to mission support groups (MSG), and finally to maintenance groups (MXG), as shown in Table 1 (Robertson, 2014; Scales, 2014; Weaver, 2014a, 2014b, 2015). Of note, the aerial ports only spent about a decade in the operations and mission support groups, respectively.

Table 1, APS Lineage (Robertson, 2014; Scales, 2014; Weaver, 2014a, 2014b, 2015)

APS	Activated	Lineage					
60	1965	MAW 66 - 78	MAG 78	MAW 79 - 91	OG 91 - 2002	MSG 02 - 10	MXG 10 - present
62	1960	MAW* 60 - 91	–	–	OG 91 - 2002	MSG 02 - 10	MXG 10 - pres.
436	1965	MAW 66 - 91	–	–	OG 91 - 2002	MSG 02 - 10	MXG 10 - pres.
437	1965	MAW 66 - 91	–	–	OG 91 - 2002	MSG 02 - 10	MXG 10 - pres.
305	1994	–	–	–	OG 94 - 2002	MSG 02 - 09	MXG 09 - pres.

* or equivalent

APS (Aerial Port Squadron); MAG (Military Airlift Group); MAW (Military Airlift Wing); MSG (Mission Support Group); MXG (Maintenance Group); OG (Operations Group)

Naturally, most of the units who reported directly to the MAW were highly differentiated. When transferred to the OGs, the aerial ports were likely one of the only differentiated squadrons assigned; as OGs primarily consist of flying units. Transferred again in the early 2000s to MSGs, the aerial ports were one of six highly differentiated squadrons whose bind, one might reason, was each squadron provided unique services and support to the bases' overall mission. For example, APSs provided passenger and cargo processing and loading services, communication squadrons provided computer support, civil engineer squadrons maintained the base infrastructure, and so on. The last aerial port reorganization positioned stateside APSs within the MXG organizational structure to ensure AMC retained control of the stateside ports prior to joint basing MSG reorganizations (Hubby, 2010; Robertson, 2014; Scales, 2014; Weaver, 2014a, 2014b,

2015). This once again resulted in the aerial ports being the only highly differentiated unit within their assigned groups, as highlighted in Figure 1.

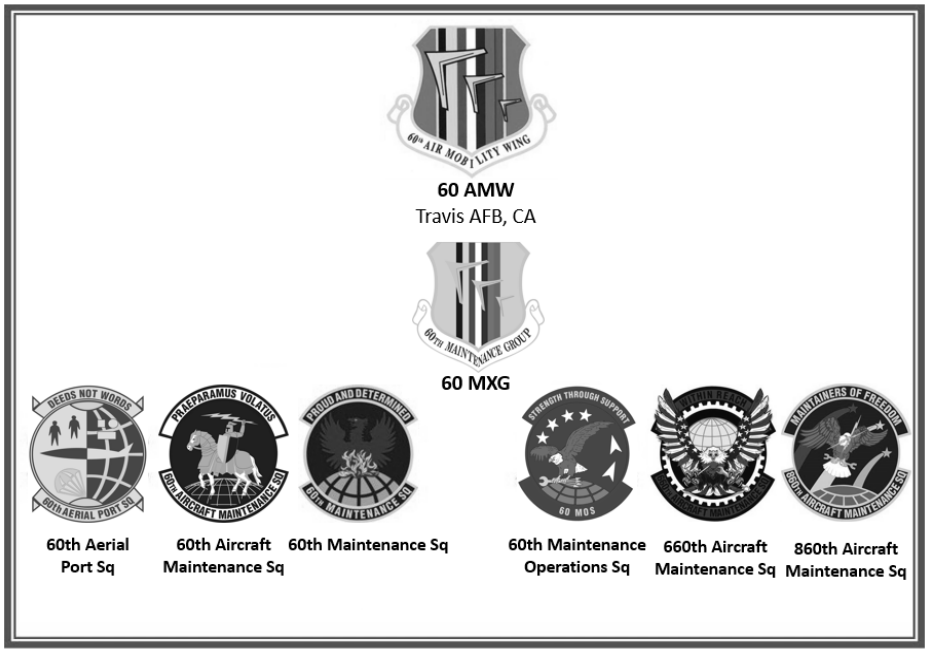

Figure 1, MXG Structure (adapted from 60 AMW/PA, 2006, 2007, 2008a, 2008b, 2008c, 2011, 2016; 660 AMXS, 2017)

Organizational behavior scholars note the difficulty of integrating diverse units with dissimilar responsibilities, goals, perceptions, and consequent behaviors. Celebrated sociologist James March and equally renowned political scientist Herbert Simon stated several conditions typically present during intergroup conflict; (1) the "felt need for joint decision-making," (2) differing objectives, and 3) varying "perceptions of reality" (March & Simon, 1993, p. 141). Others specified differing baselines or assumptions as barriers to effectively achieving integration (Lawrence & Lorsch, 1967). Contrasting skillsets, and in turn mindsets, required to perform differentiated mission sets are also difficulties to realizing unit integration (Lawrence & Lorsch, 1967). Early work in the organizational behavior field found positive correlation between the levels of differentiation and

integration difficulty (Lawrence & Lorsch, 1967). Conversely, sharing common standards, values, and objectives (that cannot be accomplished singularly) increases unit integration levels (Lawrence & Lorsch, 1967, 2011; March & Simon, 1993; Sherif, 1958).

Organizational Identification

As previously stated, the aerial ports only spent about a decade in both the OGs and MSGs singly. Which may suggest higher headquarters concluded APSs did not fit well within the OG construct and thus transferred them to MSGs. One might argue MSGs were a good fit for the ports; however, AMC was in a sense forced to transfer the ports again in order to retain AF control of the APSs as some bases were transitioning to be led by other services, (i.e.: McChord is now Army-led) (BRAC, 2005; Hubby, 2010). Three organizational moves within less than two decades may have led to aerial port identity issues. Ullrich, Wieseke, and Van Dick (2005) mentioned the idea of *organizational identification*, in which organization members proudly identify the organization's identity with their own. In the aerial ports' case, one might surmise the ports look exclusively within to define their identities versus identifying as part of a larger organization. Ullrich et al. (2005) continued on to cite Haslam and Van Dick (2001) who denoted members who strongly identify with their organizations report higher levels of overall job satisfaction and motivation, which consequently increases the overall health of the organization. Van Dick (2001) cited numerous studies showing member commitment to their organization reduced turnover and absenteeism and increased performance and civic altruism. When translated to the AF, this could mean higher retention levels and more

well-rounded Airmen overall.

Competing Values Theory

This study required a tool capable of comparing the aerial port identity to the maintenance identity. After reviewing the pertinent organizational behavior literature, Robert Quinn and John Rohrbaugh's (1983) Competing Values Theory emerged as promising candidate. The theory's framework enables one to visually compare and contrast organizational structures, focus areas, objectives, and processes. Illustrating the similarities and differences may provide insight into whether or not aerial port and maintenance identities align.

Quinn and Rohrbaugh (1983) developed the Competing Values Theory in an effort to synthesize the existing deluge of organizational research findings. Their Competing Values Framework (CVF) visually depicts two dimensions of organizational efficacy: (1) the organization's focus and (2) the organization's structure (for an illustration see Figure 2) (Cameron, Quinn, DeGraff, & Thakor, 2006; Quinn & Rohrbaugh, 1983). Notice how each quadrant represents a set of values that may conflict with other quadrant values and focus areas (Cameron, 2006).

Buenger, Daft, Conlon, and Austin (1996) conducted a study using the CVF where they anonymously surveyed and/or interviewed 545 USAF senior leaders (e.g., squadron commanders and above). They queried the leaders regarding organizational values and structure, along with atmosphere and technology. Their study confirmed differing values from unit to unit and reinforced the CVF theory as it pertains to USAF units. Furthermore, their work suggested interchanges between values; in other words,

when leaders give one cultural type of values prominence over others, the values at the other end of the spectrum often suffer.

Long-term change — Individuality flexibility — New change

Culture type:	**GROUP**	Culture type:	**ADHOCRACY**
Orientation:	COLLABORATE	Orientation:	CREATE
Leader type:	Facilitator Mentor Team builder	Leader type:	Innovator Entrepreneur Visionary
Value drivers:	Commitment Communication Development	Value drivers:	Innovative outputs Transformation Agility
Theory of effectiveness:	Human development & high commitment produce effectiveness	Theory of effectiveness:	Innovativeness, vision, & constant change produce effectiveness
Culture type:	**HIERARCHY**	Culture type:	**RATIONAL**
Orientation:	CONTROL	Orientation:	COMPETE
Leader type:	Coordinator Monitor Organizer	Leader type:	Hard-driver Competitor Producer
Value drivers:	Efficiency Timeliness Consistency & uniformity	Value drivers:	Market share Goal achievement Profitability
Theory of effectiveness:	Control & efficiency with capable processes produce effectiveness	Theory of effectiveness:	Aggressively competing & customer focus produce effectiveness

Internal focus — External focus

Incremental change — Stability control — Fast change

Figure 2, The Competing Values Framework (adapted from Cameron, Quinn, DeGraff, & Thakor, 2006, p. 32 & Goodman, Zammuto, & Gifford, 2001, p. 60)

In another CVF study, Goodman et al. (2001) surveyed 276 hospital nurses with the intent to discover how organizational cultures might be coupled to organizational commitment, job satisfaction and involvement, employee empowerment, and intent to seek other employment. Their results showed *hierarchal* cultural values appear negatively correlated with *adhocratic* values. Furthermore, their study positively correlated *group* culture values to organizational loyalty and job empowerment,

involvement, and satisfaction; the study negatively correlated *group* culture with employees' intent to seek a different employer. Goodman et al. (2001) discovered the exact opposite for *hierarchical* cultures, in that they negatively correlated organizational loyalty and job empowerment, involvement, and satisfaction while positively correlating employees' intent to seek other employment.

Examining the aerial port reorganization through the CVF lens leads one to several questions. Which quadrant do the aerial ports typically identify with? Which quadrant do maintenance groups operate from? Do the aerial ports and maintenance groups have competing values; if so, how did the reorganization impact both entities? Prior to this study, little to no official publicly available research existed on the topic. A SWOT analysis appeared appropriate for the situation.

SWOT vs. SCOT Analysis

SWOT stands for strengths, weaknesses, opportunities, and threats. Scholars indicate the SWOT analysis concept emerged from several sources. Several credit Harvard Business School research beginning in the 1950s and concluding in the mid-1960s with developing the SWOT framework (Chermack & Kasshanna, 2007; Hill & Westbrook, 1997; Learned, Andrews, Christenson, & Guth, 1965). However, others claim SWOT originated from research held at the Stanford Research Institute (SRI) during the 1960s in which SRI researchers developed and utilized the SOFT analysis framework to survey over 5,000 Fortune 500 company executives. SOFT stood for satisfactory, opportunity, fault, and threat; which eventually evolved to SWOT (Chermack & Kasshanna, 2007; Humprey, 2005).

The researcher opted to conduct a SCOT (strengths, challenges, opportunities, and threats) analysis versus a SWOT analysis in order to avoid alienating potential participants due to word choice. Some panelists may have viewed the term “weaknesses” as a provocation. Discussions regarding the impacts of placing stateside aerial ports within the MXG organizational structure occasionally arouses conflict and incites the parties involved. Therefore, this study opted to gather an anonymous panel of experts and employ the Delphi Method to truss the research effort in its entirety. The following chapter provides a description of the Delphi Method and how this study exercised the method to collect data.

Summary

This chapter explored the literature pertinent to this study. The first section reviewed related unit integration and differentiation studies and included a subsection detailing stateside aerial port squadron lineage. The next section detailed organizational identity literature and how it might apply to APSs, followed by a description of the Competing Values Theory and the questions the theory’s framework prompted. The final section provided the background of SCOT analysis, as well as the reasoning behind conducting a SCOT as opposed to a SWOT analysis.

III. Methodology

Chapter Overview

The purpose of this chapter is to describe the Delphi Method as a data collection tool and explain how and why this study utilized this particular method. Additionally, this chapter explains the study participant selection process, participant inclusion and exclusion criteria, and their demographics. To conclude the chapter, the last section lists the initial exploratory SCOT questions posed to the panelists. These questions enabled the discovery of the primary SCOTs that emerged following the aerial port reorganization into the MXG organizational structure.

Method Overview

The Delphi Method originated from the RAND Corporation during the 1950s. The method involves soliciting expert perspectives regarding a specific topic via anonymous questionnaires, compiling the responses, forwarding the cumulative descriptive statistics data back to the experts, and allowing the experts to adjust their responses based on other aggregated expert input (Helmer, 1967; Okoli & Pawlowski, 2004; RAND, 2018). For an illustration of the Delphi method in the context of this MXG aerial port SCOT research refer to Figure 3.

Method Attributes.

The researcher selected the Delphi method in order to glean candid feedback from maintenance and aerial port experts regarding the SCOTs of housing aerial ports within MXGs. The inherent anonymity of this type of study enables participants to provide honest feedback without pressure from higher ranking individuals or assertive peers

(Dalkey, 1969; Okoli & Pawlowski, 2004; Paliwoda, 1983). The method encourages panelists to think independently and provide honest perspectives versus restating conventionally accepted positions in order to avoid possible embarrassment or the consequences of presenting conflicting views. Furthermore, Delphi studies give panelists the opportunity to adjust previous responses after viewing aggregated expert panel inputs, devoid of the stigma often associated with changing one's position (Dalkey & Helmer, 1963; Gupta & Clarke, 1996; Masser & Foley, 1987; Paliwoda, 1983; Turoff, 1975). For these reasons, the Delphi method appeared to be the best available option to flesh out the SCOTs that emerged following the reorganization.

Round I: Identify prevailing strengths, challenges, opportunities, & threats (SCOTs)	• First survey: Query SMEs to identify SCOTs of having aerial ports within MXGs • Consolidate identified SCOTs, merge synonymous SCOTs
⬇	
Round II: Rank SCOTs	• Second survey: Ask panelists to rank order previously identified SCOTs in order of significance • Calculate descriptive statistics (mean, standard deviation, & median) for each SCOT • Measure current consensus for each SCOT via Kendall's W calculation
⬇	
Round III: Determine prevailing SCOTs	• Third survey: Provide panelists with round II's descriptive stats • Allow panelists to reorder SCOTs based on panel stats. • Calculate descriptive stats • Measure consensus using Kendall's W calculation

Figure 3, Delphi Method Process (adapted from Okoli & Pawlowski, 2004, p. 24)

Delphi Panel Selection

In order to conduct a Delphi study one must establish a panel of experts to answer the research questions. The definition of an expert in this context is an individual with at

least one year experience as an MXG commander (CC), deputy commander (CD), or senior enlisted manager (SEM) or an APS CC, operations officer (OpsO), or SEM. Moreover, the MXG must have or had an aerial port or, in the case of logistics readiness officers and aerial port personnel, the aerial port is or was assigned to an MXG. One year in any of these leadership positions qualifies an individual to participate, given the individual's direct experience leading and managing within the requisite environment.

There are only five MXGs with embedded aerial ports in the Air Force, and each has one respective CC, CD, and SEM, along with each APS having one CC, OpsO, and SEM. As such, the potential panelists from this population is limited to 30; that is, if each of the 30 Airmen have been in their respective positions for at least a year, an unlikely situation. Therefore, the researcher opted to include graduated CCs, CDs, OpsOs, and SEMs as an additional source of panelists. Based on correspondence from the APSs, MXGs, and available on-line change-of-command information, the researcher developed a list of 28 Airmen who met the study's definition of an MXG/APS expert.

Scholars indicate Delphi panels should have at least 10 panelists (Johnson, 1976; Okoli & Pawlowski, 2004; Paliwoda, 1983). Research conducted by Dalkey (1969) supports this number as median responses from differing panel sizes to the same series of 20 questions became about 80% consistent around the 11 panel member mark as illustrated in Figure 4. Response consistency reaching 1.0 would indicate each panel returned the exact same responses. Additionally, Delphi Method developers and method practitioners noted decreases in panel error rates plateau at the 10 to 15 panel member point and decrease diminutively afterwards (see Figure 5) (Dalkey, 1969; Okoli & Pawlowski, 2004; Paliwoda, 1983). Therefore, the researcher initially invited active-duty

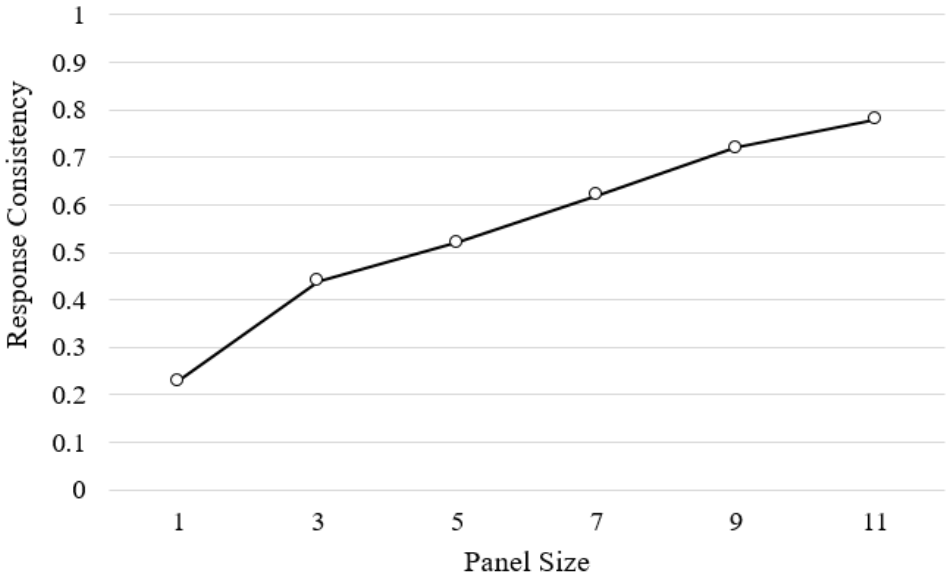

Figure 4, Response Consistency vs. Panel Size
(adapted from Dalkey, 1969; Johnson, 1976, p. 47)

Airmen who met the aforementioned definition of an expert to participate, with the intent of retaining at least 10 panelists throughout the duration of the study. It is worth noting, other Delphi studies have experienced panelist participation drops between rounds; thus, some attrition is inherent and expected (Johnson, 1976; Okoli & Pawlowski, 2004; Weigel & Hazen, 2014).

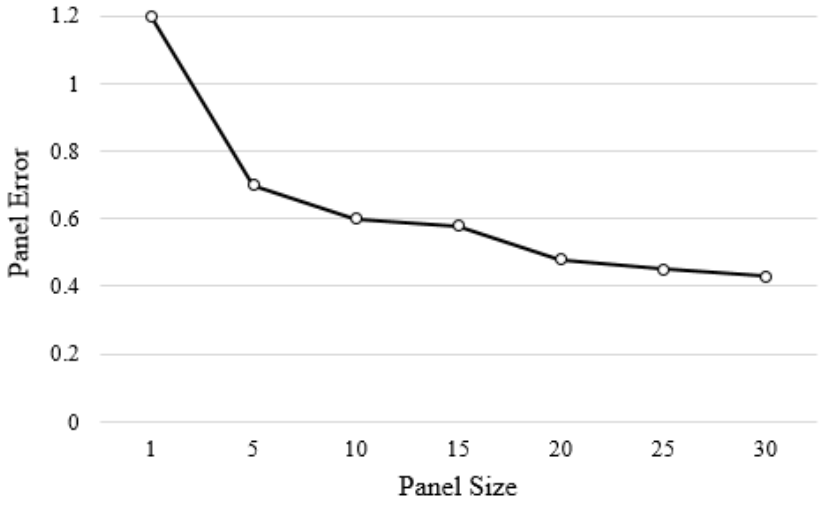

Figure 5, Panel Error vs. Panel Size
(adapted from Dalkey, 1969, p. 11)

Panelists.

Of the 28 experts initially invited, 14 opted to participate during Round One. The study concluded with nine panelists remaining at the end of the Third Round. In order to preserve the panelists' anonymity, specific bases of assignment were not requested. As an added anonymity measure, the researcher refrained from collecting names, ranks, or duty titles from the panelists. However, the researcher did collect the following general demographics: age, gender, general specialty, and education level (see Table 2).

Table 2, Panel General Demographics

Age range	*N*	Gender		Self-identified specialty		Education Level		Percentage of SMEs in ea. age range
		# of males	# of females	AP SME	Mx SME	Bachelor's	Master's	
30-34	1	1	0	1	0	0	1	7.14
35-39	3	2	1	3	0	0	3	21.43
40-44	3	3	0	2	1	1	2	21.43
45-49	7	7	0	4	3	2	5	50
Total	14	13	1	10	4	3	11	

To validate the panelists met the definition of an MXG APS expert, the researcher requested and received each panelist's time in service (TIS) and time in an MXG with an APS (TIMA) or in an APS within an MXG data (see Table 3). In total, the SCOT themes garnered from this Delphi study were built upon 306 years of military service and over 27 years (325 months ÷ 12 mos.) of MXG with an APS experience or vice versa. Two panelists did report only three months' TIMA; however, for Round One Question 1, both panelists indicated assignment to an MXG with an APS for over a year. The two panelists may have inadvertently reported their cumulative number of years in an MXG with an

Table 3, Panel Experience Demographics

	TIS	TIMA
Min.	12	3
Max.	28	72
Median	23	21
Mean	21.85	23.21
Totals	306 yrs	325 mos.

TIMA: time in a MXG w/an APS or APS w/in a MXG

APS versus the number of months requested; thus, the study retained the two panelists' responses. This assumption increases the panel's TIMA experience to over 32 years (391 mos. ÷ 12 mos.) (see Table 4). Lastly, another panelist did indicate only 11 months TIMA; however, due to the panelist's responses falling in line with the majority of the other panel members, the researcher retained the panelist's inputs.

Table 4, Revised Panel Experience Demographics

	TIS	TIMA
Min.	12	11
Max.	28	72
Median	23	25.5
Mean	21.85	27.93
Totals	306 yrs	391 mos.

TIMA: time in a MXG w/an APS or APS w/in a MXG

Surveys

The overall purpose of this study was to determine the SCOTs that emerged following the aerial port reorganization under MXGs; therefore, the researcher initially

posed a series of open-ended questions to the panelists intended to identify the primary SCOTs present following the reorganization.

Round One Survey.

Round One questions were as follows:

1. Throughout your entire career, have you been assigned to an MXG with an aerial port or an MXG-led APS for a cumulative total of at least one year?
   Yes – Please continue to the next question
   No – Thank you for your time, please do NOT take the rest of the survey
2. What are the primary strengths*, if any, of having aerial ports within maintenance groups?
   *S**trengths** are defined as factors that enhance the group and/or aerial port.
3. What are the challenges*, if any, of having aerial ports within maintenance groups?
   ***Challenges** are unique problems the group and/or aerial port encounter.
4. What are the opportunities*, if any, of having aerial ports within maintenance groups?
   ***Opportunities** are favorable situations that may positively affect the group and/or aerial port.
5. What are the threats*, if any, of having aerial ports within maintenance groups?
   ***Threats** are unfavorable conditions that may negatively affect the group and/or aerial port.
6. What is your gender?
7. What is your age?
8. What is the highest level of education you have completed?
9. How many years have you been in the Air Force? Please enter a whole number for example: 18

10. Throughout your entire career, how many months have you been assigned to an MXG with an aerial port or an APS assigned to an MXG? Please enter a whole number for example: 12
11. Which area best describes where you typically work?
    OPTIONS: Maintenance
    Aerial Port

The initial SCOT discovery survey remained open for a seven day period and garnered 14 individual SME responses out of the 28 SMEs invited. The researcher analyzed the panelists' inputs and utilized the panel's aggregate responses to develop themes for each SCOT. The researcher then rank ordered the themes based on the frequency the panel members mentioned each theme during the first round.

Round Two Survey.

Round Two's survey was created based on Round One panelists' responses. Due to the anonymity measures taken during the previous round, it was impossible to determine who out of the 28 SMEs initially invited actually participated during Round One. Therefore, the researcher invited the same 28 SMEs to participate in Round Two's panel. Round Two asked the panelists to rank order the SCOT themes that emerged in Round One in order of importance. The subsequent Results and Analysis chapter will discuss the themes in greater depth. Round Two's panel directions were as follows:

1. The following lists of strengths, challenges, opportunities, & threats were developed utilizing Round One panel participant responses. Please rank order the strengths in terms of significance, 1 being the most significant and 8 being the least significant.

*NOTE -- the numbers following each theme indicate the number of panel members who mentioned the theme during Round One (i.e. (6/14) indicates 6 out of 14 panel members mentioned it)

2. Please rank order the challenges in terms of significance, 1 being the most significant and 6 being the least significant.
3. Please rank order the opportunities in terms of significance, 1 being the most significant and 5 being the least significant.
4. Please rank order the threats in terms of significance, 1 being the most significant and 5 being the least significant.
5. Are your Round One questionnaire comments accurately captured within the emerging themes listed above? If not, please provide clarifying comments below. Additionally, if you have any other strengths, challenges, opportunities, or threats you would like to provide, please do so; examples are encouraged.
6. Did you complete the Round One questionnaire which closed on 30 October?

Round Two remained open for eight days, garnered 12 individual SME responses, provided SME rank ordered SCOT themes, and descriptive statistics. The study calculated Kendall's W consensus coefficient, for each category (strengths, challenges, opportunities, and threats) based on the panel's Round Two aggregated responses.

Round Three Survey.

The researcher built Round Three's survey based on panelist responses gleaned from Round Two. This round enabled panelists to view the panel's aggregated SCOT theme rankings from Round Two and adjust their individual rankings in light of the panel's rankings. Round Three's panel directions were as follows:

1. In light of the panel's overall rankings [from Round Two], please rank order the strengths in terms of significance, 1 being the most significant and 8 being the least significant.
2. Given the strengths identified above, how would you recommend best leveraging these factors, or one in particular, to further enhance the group and/or aerial port?
3. Are there any other strengths you would like to provide? Examples are encouraged.
4. Please rank order the challenges in terms of significance, 1 being the most significant and 6 being the least significant.
5. Given the challenges identified above, how would you recommend resolving them, or one in particular, to best remedy these unique problems the group and/or aerial port encounter?
6. Are there any other challenges you would like to provide? Examples are encouraged.
7. Please rank order the opportunities in terms of significance, 1 being the most significant and 5 being the least significant.
8. Given the opportunities identified above, how would you recommend leveraging these favorable situations, or one in particular, to further positively impact the group and/or aerial port?
9. Are there any other opportunities you would like to provide? Examples are encouraged.
10. Please rank order the threats in terms of significance, 1 being the most significant and 5 being the least significant.
11. Given the threats identified above, how would you recommend countering them, or one in particular, to avoid negatively impacting the group and/or aerial port?

12. Are there any other threats you would like to provide? Examples are encouraged.
13. Did you complete Round One and Round Two surveys?

Open for seven days, Round Three yielded nine individual SME responses, provided the final panel aggregated rank ordered SCOT themes, and descriptive statistics. The round also provided the final concurrence measurements, once again via Kendall's W, for each category (strengths, challenges, opportunities, and threats).

Summary

This chapter described the Delphi Method and how it was adapted and used in this study. The first subsection illustrated the methodological overview, to include the steps the researcher took during each round. The following subsection described the method attributes. The next section detailed panel selection methods, to include this study's definition of an APS/MXG expert, and the panel's demographics. Lastly, this chapter listed the questions posed to the SME panelists during each Delphi round, as well a brief description of the data gleaned from each round. The following chapter will provide a more detailed description of the data.

IV. Results and Analysis

Chapter Overview

This chapter delves into the Delphi panel results. The first section presents Round One results along with the SME input derived themes and theme definitions. The next section presents Round Two results, to include the initial aggregated panel theme rankings and SCOT category concurrence levels. The subsequent section showcases Round Three's results, which include the final panel theme rank orders and category concurrence levels. The second to last section presents the reasoning behind the decision to conclude the Delphi panel. Lastly, this chapter lists the SME panel recommendations to leverage the strengths and opportunities as well as mitigate the challenges and threats of housing the aerial ports within the MXG organizational construct.

Round One Results: Delphi Panel Themes

The goal of Round One was to conduct an anonymous SCOT analysis identifying the SCOTs of having aerial ports within maintenance groups from their respective leaders' perspectives. To this end, the study's on-line survey asked each panelist the same series of open-ended questions intended to discover and capture the primary SCOTs. For the question list, refer to Chapter Three. The panelists averaged approximately 16 minutes each to complete Round One's 11-question survey.

Strength Themes.

As a reminder, *strengths* are factors that enhance the group and/or aerial port. Table 5 lists the strength themes developed based on the inputs the expert panelists provided during Round One. The second column indicates the number of expert panelists

who mentioned the theme during Round One. For example, six experts listed "Increased Flight-line/Mission Focus" as a strength of having APSs within MXGs.

Table 5, Strength Themes

Theme	# of SME who referenced as a strength
Data-driven Decisions	1
Enhanced Perspective	1
Greater Advocacy	4
Increased Communication	3
Increased Compliance	5
Increased Flight-line/Mission Focus	6
Leaders Who Understand Flight-line Ops	3
Synchronized Mission Generation	3

Strength Theme Definitions.

Panel input derived strength theme definitions are as follows:

Data-driven Decisions – encouraged data-driven decision making process

Enhanced Perspective – maintenance & aerial port provide outside perspectives of each other's operations giving each other a better understanding of mobility operations as a whole

Greater Advocacy – MXGs have credible voice at wing & A4; usually largest group on base, equates to advocacy by numbers; provides greater support for flight-line workers (i.e.: resolving medical group & mission support group issues)

Increased Communication – ease of cross communication between maintenance & aerial port entities; single higher headquarters (A4) communication point

Increased Compliance – safety, by the book emphasis throughout the group

Increased Flight-line/Mission Focus – enhanced focus on flight-line operations & the mission

Leaders Who Understand Flight-line Ops – leaders with a greater understanding of flight-line operations & the aerial ports' role as opposed to civil engineer, communications, personnelist, or security force leaders

Synchronized Mission Generation – coordinated maintenance & aerial port effort to launch missions

Challenge Themes.

Once again, *challenges* as they pertain to this study are unique problems the group and/or aerial port encounter. Table 6 lists the challenge themes derived from Round One panelist inputs. Again, the second column indicates the number of experts who mentioned the theme during Round One.

Table 6, Challenge Themes

Theme	# of SME who referenced as a challenge
AFSC Misunderstandings	4
Differing Cultures	11
Differing QA Programs	3
HHQ Direct-to-Port Communication	2
Multiple C2 Nodes	1
Perceived APS Disenfranchisement	7

AFSC: AF specialty code C2: command & control
HHQ: higher headquarters QA: quality assurance

Challenge Theme Definitions.

Panel input derived challenge theme definitions are as follows:

AFSC Misunderstandings – differing maintenance & aerial port tactics, techniques, & procedures creates friction between career fields due to misunderstanding each other

Differing Cultures – maintenance likened to a science, by the technical order operation whereas aerial port operations more of an art guided by AMC instructions; two conflicting approaches to accomplishing the mission

Differing QA Programs – different rulebooks & standards for maintenance & aerial port personnel may incite conflict

HHQ Direct-to-Port Communication – bypassing MXG suggests lack of trust in MXG leadership

Multiple C2 Nodes – separate entities with different functions; Air Terminal Operations Center treated as though they work for Maintenance Operations Control Center

Perceived APS Disenfranchisement – possibly attributed to frequent group moves (OG, MSG, MXG); "Maintenance" Group designation not inclusive of aerial port; attempts to make port look/act like maintenance; AMXS (aircraft maintenance squadron) & MXS (maintenance squadron) perceived as having priority over APS; lack of civilian buy-in

Opportunity Themes.

This study defined *opportunities* of housing aerial ports within MXGs as favorable situations that may positively affect the group and/or aerial port. Table 7 lists the opportunity themes gleaned from Round One aggregated panel responses. Opportunity theme definitions are listed in the following subsection.

Table 7, Opportunity Themes

Theme	# of SME who referenced as an opportunity
Best Practice Sharing	4
Enhanced 2T2 & 21X Development	5
Improved Aircraft Access	2
One Quality Assurance	1
Readiness Collaboration	3

21X: logistics readiness, maintenance, & munitions officers 2T2: enlisted air transporters

Opportunity Theme Definitions.

Panel input derived opportunity theme definitions are as follows:

Best Practice Sharing – opportunity to share knowledge, crosstalk, best practices (i.e. Health of the Fleet leading to Health of the Port meetings)

Enhanced 2T2 & 21X Development – MXG leadership position opportunities; potential to develop well-rounded future en-route & contingency readiness squadron, group, & wing leaders as well as A4 leaders; Base Level Broadening Program (21Xs)

Improved Aircraft Access – faster Aerial Port Expeditor (APEX) aircraft access & ground power/aircraft power unit start-ups; increased access to static aircraft for training purposes; quicker tail-swaps

One Quality Assurance – opportunity to merge maintenance & aerial port quality assurance programs at the group level

Readiness Collaboration - having aerial ports within MXGs gives maintainers & aerial porters the opportunity to better understand mobility operations utilizing each other's perspective

Threat Themes.

Threats of having APSs within MXGs are unfavorable conditions that may negatively affect the group and/or aerial port. Table 8 lists the threat themes, again developed based upon consolidated panel inputs. The threat theme definitions are listed in the below subsection.

Table 8, Threat Themes

Theme	# of SME who referenced as a threat
Divergent Transportation Philosophies	3
Group Leadership Composition	4
Inflexible Viewpoints	3
Quality Assurance Merger	2
Tactical vs. Operational Leadership Styles	4

Threat Theme Definitions.

Panel input derived threat theme definitions are as follows:

Divergent Transportation Philosophies – leadership attempts to apply technical order checklist philosophy to aerial port operations; impacts agility, creates aerial port

operational difficulties

Group Leadership Composition – with few exceptions, MXG leadership team typically consists of maintainers; creates perception of lack of aerial port perspective

Inflexible Viewpoints – leadership lacking the time or training to fully understand/consider other career field's culture or operational practices as viable

Quality Assurance Merger – maintenance QA & Air Transportation Standardization & Evaluation Program (ATSEP) similar but not the same; governed by different directives; QA is responsible to the MXG/CC whereas ATSEP is responsible to the APS/CC

Tactical vs. Operational Leadership Styles – deep-dive leadership approach creates perception MXG does not fully trust APS leadership to accomplish the mission

Kendall's W

Rounds Two and Three used a consensus measurement known as Kendall's W or, in unabbreviated format, Kendall's coefficient of concordance. The formula for Kendall's W is $\boldsymbol{W = \frac{12S}{p^2(n^3 - n)}}$. The number 12 is a static number within the formula, *S* represents the sum of squares of deviations for the theme rankings from their sample means, *p* represents the number of panelists, and *n* represents the number of themes within each individual SCOT category (Kendall & Gibbons, 1990; Zaiontz, 2014). Kendall's W is expressed numerically and can be any value between zero and one. Zero indicates no concurrence, whereas a value of one indicates all panelists agree (Kendall & Gibbons, 1990; Schmidt, 1997; Zaiontz, 2018). For the purpose of this study, Kendall's W measures the overall panel consensus levels of the four categories examined: strengths,

challenges, opportunities, and threats. Table 9 depicts how to interpret Kendall's W values in terms of panel concurrence.

Table 9, Kendall's W Interpretation (adapted from Schimdt, 1997, p. 767)

W	Concurrence Interpretation	Confidence Level
0.1	Very weak agreement	None
0.3	Weak agreement	Low
0.5	Moderate agreement	Fair
0.7	Strong agreement	High
0.9	Unusually strong agreement	Very High

Round Two Results

12 experts opted to participate in the second Delphi panel round; eight of which indicated Round One participation, one indicated he/she had not participated during Round One, and three declined to answer. The researcher deemed all panelists as experts in the field and thus opted to retain all Round Two responses. Each panelist took an average of 10 minutes to complete Round Two's six-question survey.

Round Two Category Theme Rankings.

Round Two asked the panelists to rank order the themes within each of the four categories (strengths, challenges, opportunities, and threats) in order of importance. For example, ranking a theme as number one indicates a panelist viewed the theme as the most important category factor of having aerial ports within MXGs. The goal of this round was to garner initial theme importance rankings and concurrence measurements.

Initial Strength Theme Rankings and Concurrence Level.

Table 10 lists the initial strength theme rankings from Round Two. The lower the mean value, the higher the Delphi panel aggregately ranked the theme. For example, six

Table 10, Initial Strength Rankings from Round Two

Rank	Strengths	Mean	Std. Dev.	Median
1	Increased Flight-line/Mission Focus	2.0	1.3	1.5
2	Greater Advocacy	3.8	2.1	4.0
3	Increased Compliance	3.8	2.2	3.5
4	Synchronized Mission Generation	3.9	2.2	3.5
5	Leaders Who Understand Flight-line Ops	5.0	2.1	6.0
6	Increased Communication	5.4	1.6	5.0
7	Enhanced Perspective	5.4	2.3	6.0
8	Data-driven Decisions	6.7	1.6	7.0

panelists ranked the "Increased Flight-line/Mission Focus" theme as the #1 strength, two panelists ranked it #2, three ranked it #3, and one panelist ranked it as #5; which equated to an overall mean of 2.0. Which was the lowest mean value returned for the strength category and thus the most highly ranked strength in terms of importance. However, the Kendall's coefficient of concordance level, hereafter referred to as Kendall's W, for the strength category came in at 0.34; which indicated weak panel agreement. As a reminder, a value of one indicates perfect agreement whereas a value of zero indicates no agreement, refer back to Table 9 for further explanation.

Initial Challenge Theme Rankings and Concurrence Level.

Table 11, lists the initial challenge theme rankings gleaned from Round Two panel responses. Panel concurrence for the challenges category was weak to moderate returning a Kendall's W value of 0.39. Of note, Round Two posed an open ended question allowing the panelist to reflect on the emerging themes. One panelist indicted "HHQ Direct-to-Port Communication" as one of the leading issues; whereas, another panelist argued HHQ contacts the APS directly because the aerial port is the installation's transportation expert. Additionally, the panelist likened the direct communication to the

Logistics Readiness Division contacting logistics readiness squadrons directly or the Security Forces Division reaching out to security forces squadrons and so on. Per the panelist, these entities are the respective experts in their areas; therefore, direct HHQ communication is expected and acceptable. “Not a question of trust…question of expertise. Let us be your experts.” These divergent views, as well as others may explain the weak to moderate panel agreement in this category.

Table 11, Initial Challenge Rankings from Rd. Two

Rank	Challenges	Mean	Std. Dev.	Median
1	Differing Cultures	1.6	1.4	1.0
2	Perceived APS Disenfranchisement	2.8	1.7	2.0
3	Differing QA Programs	3.5	1.0	3.5
4	AFSC Misunderstandings	4.0	1.4	3.5
5	HHQ Direct-to-Port Communication	4.5	1.2	5.0
6	Multiple C2 Nodes	4.7	1.6	5.0

Initial Opportunity Theme Rankings and Concurrence Level.

Table 12 shows the initial aggregated opportunity category panel rankings. The opportunity category concurrence levels were higher than the other categories with a value of 0.52W; which indicated moderate panel agreement.

Table 12, Initial Opportunities Rankings from Rd. Two

Rank	Opportunities	Mean	Std. Dev.	Median
1	Best Practice Sharing	2.0	0.9	2.0
2	Readiness Collaboration	2.3	1.1	2.0
3	Enhanced 2T2 & 21X Development	2.6	1.2	2.5
4	Improved Aircraft Access	3.3	1.3	4.0
5	One Quality Assurance	4.8	0.4	5.0

Initial Threat Theme Rankings and Concurrence Level.

Table 13 depicts the panel’s initial threat category theme importance rankings. The Kendall’s W calculation returned a value of 0.17, which indicated very weak panel

agreement in terms of the threat category rank order of importance.

Table 13, Initial Threats Rankings from Rd. Two

Rank	Threats	Mean	Std. Dev.	Median
1	Divergent Transportation Philosophies	2.3	0.9	2.0
2	Inflexible Viewpoints	2.8	1.5	2.5
3	Group Leadership Composition	2.8	1.6	3.0
4	Tactical vs. Operational Leadership Styles	2.9	1.4	3.0
5	Quality Assurance Merger	4.1	1.3	4.5

Round Two Category Concurrence.

Numerous scholars indicate the following Delphi panel stopping standards. The first indicator a researcher should conclude a Delphi panel is strong panel consensus; equating to about 70% agreement, which is ~0.7 Kendall's W. The second indicator a researcher should conclude the panel occurs when consensus between rounds plateaus (Gupta & Clarke, 1996; Okoli & Pawlowski, 2004; Schmidt, 1997). As all four categories returned consensus levels below the strong consensus level and this was the first ranking round, the study continued on to Round Three.

Round Three Results

Once again, due to the anonymity of the first and second rounds, the researcher had no way of knowing which of the 28 experts participated during the preceding rounds. Therefore, the study invited all 28 SMEs to participate in Round Three. Nine experts participated in the third Delphi panel round; eight of which indicated Round One and Two participation, the remaining panelist declined to respond to the previous round participation question. Each panelist took an average of 14 minutes to complete Round Three's 13-question survey.

Round Three Category Theme Rankings.

Round Two yielded aggregate SCOT panel rankings in terms of significance based on the themes that emerged during Round One. Round Three gave the Delphi panelists the opportunity to review the overall panel rankings from the previous round and adjust their individual rankings in light of the aggregated panel rankings. The goal of this round was to move closer to panel concurrence and uncover potential strategies to leverage the strengths and opportunities, while mitigating the challenges and threats of housing aerial ports within MXGs.

Final Strength Theme Rankings and Concurrence Level.

Table 14 contains the final panel MXG APS strength category aggregated rankings. The rankings remained unchanged from the previous round, with the exception of the "Increased Compliance" and "Synchronized Mission Generation" themes exchanging rank orders. Notably, some of the themes still had elevated standard deviations which indicated a few of the panel members still did not quite agree on the importance levels of several of the themes. The "Increased Compliance" theme for example, of the nine panelists, only one ranked the theme #1, one ranked it #2, three

Table 14, Final Strength Rankings

Rank	Strengths	Mean	Std. Dev.	Median
1	Increased Flight-line/Mission Focus	1.4	1.0	1.0
2	Greater Advocacy	2.8	0.7	3.0
3	Synchronized Mission Generation	4.0	2.1	4.0
4	Increased Compliance	4.2	2.3	3.0
5	Leaders Who Understand Flight-line Ops	4.4	1.9	4.0
6	Increased Communication	5.3	1.6	5.0
7	Enhanced Perspective	6.6	0.9	7.0
8	Data-driven Decisions	7.2	1.0	8.0

ranked it as #3, three ranked it as #6, and one panelist ranked it as #8 in terms of importance. Hence, making it the fourth ranked overall strength theme, albeit with a standard deviation of 2.3. Nevertheless, this round saw standard deviations drop in six of the eight themes, remain constant in one theme, and increase by 0.1 in the remaining theme. The panel's strength category concurrence level increased to a Kendall's W of 0.59. This measure indicated the panel reached moderate to approaching strong agreement levels in this category.

Final Challenge Theme Rankings and Concurrence Level.

Table 15 lists the final challenge theme rankings. The rank order remained consistent with Round Two. Here, once again, there are slightly elevated standard deviation levels, indicative that the panel still did not quite agree on the rank order of several of the themes such as the "Perceived APS Disenfranchisement" and "AFSC Misunderstandings" themes. The standard deviations for these two themes remained consistent with the second round's measurements. However, the standard deviations decreased for all other themes leading to the concurrence levels for the challenge category increasing from the previous round to 0.68 Kendall's W and signified the panel strongly agreed on the overall challenge importance rankings.

Table 15, Final Challenge Rankings

Rank	Challenges	Mean	Std. Dev.	Median
1	Differing Cultures	1.3	0.5	1.0
2	Perceived APS Disenfranchisement	2.3	1.7	2.0
3	Differing QA Programs	3.2	0.4	3.0
4	AFSC Misunderstandings	3.8	1.4	4.0
5	HHQ Direct-to-Port Communication	4.9	0.8	5.0
6	Multiple C2 Nodes	5.4	0.7	6.0

Final Opportunity Theme Rankings and Concurrence Level.

Table 16 shows the final panel opportunity importance rankings. The rankings remained consistent with Round Two's rankings with the exception of the "Readiness Collaboration" and "Best Practice Sharing" themes exchanging rank orders. The panel results returned several themes with slightly higher standard deviations. Furthermore, each opportunity theme saw a slight standard deviation increase. Unfortunately, the panel's overall opportunities category concurrence decreased by 0.08 from the previous round to finish at 0.44 Kendall's W, a measure which retains the moderate agreeance level from the previous round.

Table 16, Final Opportunity Rankings

Rank	Opportunities	Mean	Std. Dev.	Median
1	Readiness Collaboration	2.0	1.3	2.0
2	Best Practice Sharing	2.2	1.4	2.0
3	Enhanced 2T2 & 21X Development	2.9	1.2	3.0
4	Improved Aircraft Access	3.2	0.8	3.0
5	One Quality Assurance	4.7	0.7	5.0

Final Threat Theme Rankings and Concurrence Level.

Table 17 depicts the final panel rankings in terms of threat theme importance. Of note, the panel retained the same aggregated rank order from the previous round; however, the standard deviations slightly increased for four out of the five themes. While the "Tactical vs. Operational Leadership Styles" theme's standard deviation remained consistent with Round Two's. Regrettably, the concurrence measurement also worsened slightly with a 0.01 drop to 0.16 Kendall's W; therefore, maintaining a very weak panel agreement level. Additionally, this round asked the panel if there were any other threats

not listed they would like to provide, only one panelist responded. The panelist pointed to the “loss of fidelity on sortie generation due to MXG leadership’s increased scope” as a

Table 17, Final Threat Rankings

Rank	Threats	Mean	Std. Dev.	Median
1	Divergent Transportation Philosophies	2.3	1.4	2.0
2	Inflexible Viewpoints	2.8	1.3	2.5
3	Group Leadership Composition	2.8	1.3	3.0
4	Tactical vs. Operational Leadership Styles	3.4	1.4	3.5
5	Quality Assurance Merger	3.9	1.6	4.5

threat of housing the aerial ports within the MXG.

Decision to Conclude Panel.

As previously annotated, Delphi method scholars specify there are several indicators that signal appropriate Delphi panel conclusion points. Strong panel consensus, typically present when panels begin returning Kendall’s W concurrence measurements close to or above 0.7, is one of the indicators. Additionally, if panel consensus plateaus between rounds the Delphi panel should likely conclude (Gupta & Clarke, 1996; Okoli & Pawlowski, 2004; Schmidt, 1997). Round Three provided moderate to strong consensus levels for the strengths category, as well as strong consensus levels for the challenges category. Unfortunately, the consensus levels in the opportunities and threats categories plateaued at moderate and very weak levels respectively. Therefore, the researcher opted to conclude the Delphi panel portion of the study.

Validity

According to research specialists there are numerous strategies to validate qualitative research. Creswell (2014) and Leedy and Ormrod (2016) recommend implementing several strategies in order to ensure validity. Once such strategy utilized in

this study was *triangulation*, which essentially means data compilation from various sources versus a single source. This study did so by collecting data from all five stateside MXGs with APSs as well as from all five MXG-led APSs. Additionally, in order to garner a balanced perspective, the researcher included maintainer, logistics readiness officer, and aerial port personnel as participants. *Member checking* or *respondent validation* is another strategy used to ensure validity. Employing this strategy, the researcher checks back with the study participants to verify the accuracy of the aggregated data or themes (Creswell, 2014; Leedy & Ormrod, 2016). This study *member checked* by sending the aggregated SCOT themes back to the panelists and specifically asking them if the themes accurately captured their Round One comments. Of the 12 Round Two panelists, only one indicated a discrepancy. The panelist identified the Threat Themes as not representative of his or her Round One inputs, specifically the "Quality Assurance Merger" theme. However, two panelists distinctively identified it as a threat during Round One; therefore, the study retained the theme. Seven of the other panelists indicated Round Two themes accurately captured their comments and the four remaining panelists refrained from answering. Lastly, this study's reader provided an outside look or what Creswell (2014) denoted an external audit of the work from an outside entity not familiar with the participants or research.

SME Recommendations

Round Three's survey asked the panelists how they would recommend best leveraging the strengths and opportunities in order to further enhance and positively

impact the group and/or aerial port. The panelists who responded, recommended the following actions:

- MXGs and aerial ports should work together to control the narrative and mission flow in an effort to protect flight-line workers from burn out.
- Give MXGs more opportunities to rotate maintenance and logistics readiness officers between maintenance and APS operations.
- Utilize maintenance data management sections to provide aerial ports with valuable analysis data.
- Move the APS quality assurance program to the MXG in order to give the program credibility and increase MXG involvement in aerial port operations.

Round Three also asked the panelists how they would recommend resolving the challenges or best remedying the unique problems the group and or aerial ports encounter. Additionally, the round asked the panel how they recommend countering the threats to avoid negatively impacting the group and/or aerial port. Their recommendations are as follows:

- In order to be more inclusive and mitigate APS disenfranchisement, recommend changing the name of the MXG to the Logistics Group or Mission Generation Group.
- Encourage the logistics readiness officer (LRO) community to allow more LROs to compete for deputy MXG commander positions.
- Encourage LROs and air transporters (2T2s) to seek MXG leadership positions.
- Allow more time for aerial ports to meld with MXG or move APSs back to MSGs.
- As an extension of U.S. Transportation Command (TRANSCOM), make APSs tenant units who report directly to TRANSCOM.
- Respect differences between maintenance and aerial port cultures and compromise to make differences manageable.

- Physically relocate air terminal operations centers to command posts.
- In order to maintain existing levels of trust, leave aerial port quality assurance programs at the squadron.

Summary

This chapter presented Round One results including SCOT themes and definitions. The subsequent section described how the study obtained concurrence levels via Kendall's W. The succeeding section presented Round Two results, which included the initial panel theme rankings and SCOT category concurrence levels. Followed by the third and final round's results, which included the final theme rank orders and category concurrence levels. Last, the chapter listed the SME panel recommendations to leverage the strengths and opportunities as well as mitigate the challenges and threats of housing the aerial ports within the MXG organizational structure.

V. Conclusion and Recommendations

Chapter Overview

The first section of this chapter discusses the successfulness of the study in unearthing the SCOTs of housing aerial ports within MXGs along with some of the unexpected results. The next section analyzes the deconstructed themes through the Competing Values Theory's framework lens. The subsequent section presents the author's primary and secondary recommendations to leverage and mitigate the SCOTs discovered during this research effort. Last, this chapter provides several avenues of future research.

Conclusion

Discovering the SCOTs of having aerial ports within the MXG organizational structure from the perspective of impacted APS and MXG experts was the original goal of this study. Based on the panel's Round Two feedback, one could safely conclude the study succeeded in capturing and documenting the SCOTs from the SME perspective. As an unexpected dividend, the study garnered ideas from the expert panel on how to best leverage the strengths and opportunities as well as mitigate the challenges and threats of housing aerial ports within the MXG structure.

On the SCOT concurrence levels front, the panel reached moderate to strong agreement in the strengths category and strong agreeance in the challenges category. However, the other panel agreement levels were disappointing, specifically the very weak agreement level the panel reached in the threat themes category and the moderate concurrence reached in the opportunities category. These lower levels of concurrence

may be attributed to the nonhomogeneous composition of the panel (Okoli & Pawlowski, 2004). However, one panelist did mention struggling to rank order certain themes as the panelist "found many of the options extremely significant." Following this line of thought, other panelists may have likewise struggled to rank order themes due to perceiving many as proportionately significant.

Competing Values Framework Lens.

If one deconstructs the applicable panel derived themes and views them through the Competing Values theoretical lens, one may be able to see why the panel identified tension exists among aerial port and maintenance entities. Figure 6 deconstructs the SCOT themes the study derived from Round One panel inputs. While the attributes listed within Figure 6 are certainly not all inclusive, as they are only representative of this study's sample population, the figure is informative. If one references Chapter Two's Figure 2, one sees maintenance primarily falls into the hierarchy culture type oriented towards control. The leaders within this quadrant are coordinators, monitors, and organizers. According to Cameron et al. (2006), hierarchical leaders are detail oriented, by-the-book, conservative, and methodical. They carefully analyze each situation and actively seek out additional data points. They strive to obtain control of available information and many are technical experts or highly knowledgeable in their respective fields. "MXGs are run by the numbers," anonymous Delphi panelists, "maintainers live and breathe by technical orders and checklists."

Whereas based on panel inputs, the aerial ports reside primarily in the upper two quadrants particularly within the group culture collaboration-oriented quadrant (see Chapter 2, Figure 2). Leaders within this quadrant typically focus on facilitating,

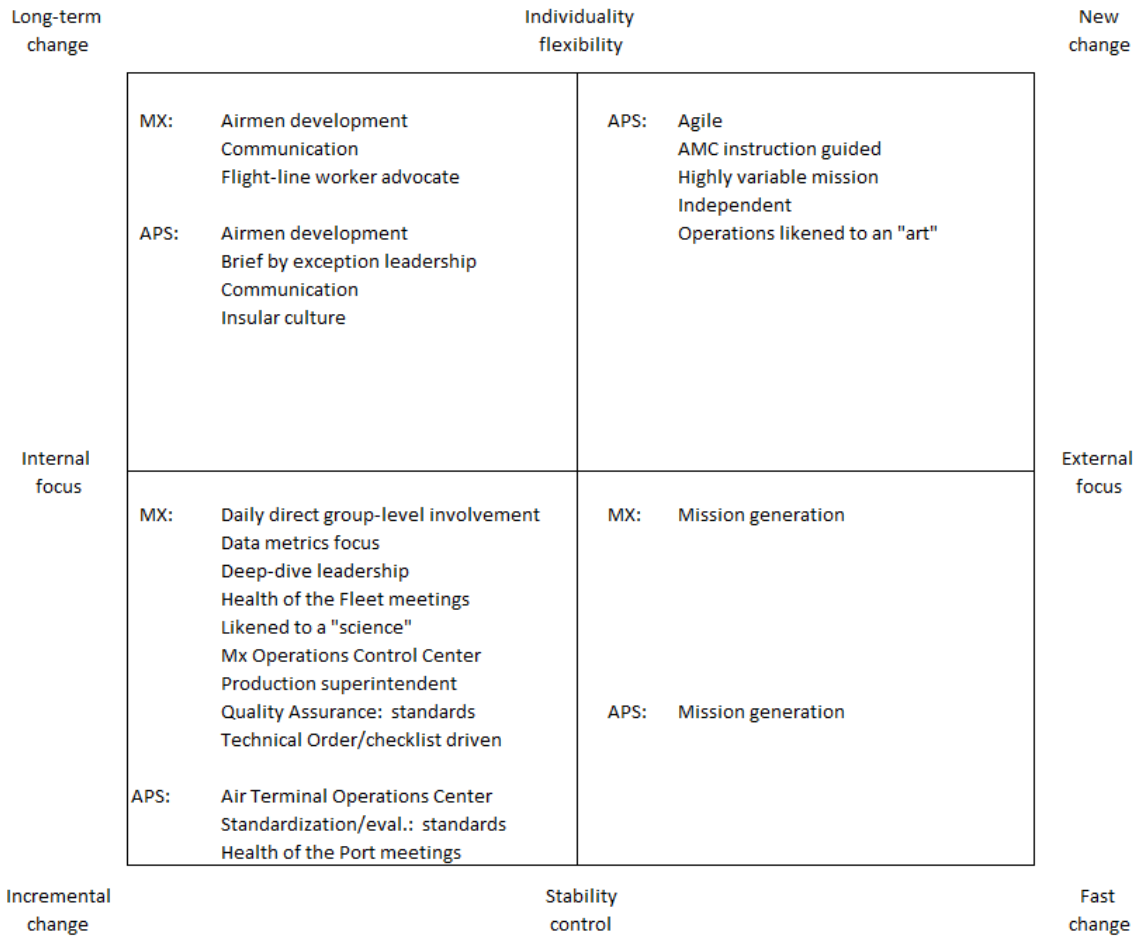

Figure 6, Deconstructed Themes (adapted from Cameron et al., 2006, p. 32)

mentoring, and team building. One panelist suggested: "LROs are much broader in scope and are brought up to trust their SNCOs and civilians, allow them to run the mission and work on a higher, though still tactical, level of decision making." As for the upper right adhocracy quadrant, these leaders accept risk and are not overly concerned with a lack of certainty (Cameron et al., 2006). "The APS is constantly adapting to a dynamic schedule and the cascading effects of unpredictable inputs and their interaction…much of what makes an APS successful is mastering the "art" of logistics to address dynamic changes," as suggested by a panelist. As one can see, many of the traits this study's Delphi panel

mentioned regarding aerial ports and maintenance entities are on opposing sides of the Competing Values Theory's framework. Which may explain why the panel, consisting of both aerial port and maintenance leaders, did not reach strong consensus in two out of four SCOT categories. The populated framework (Figure 6) may also explain some of the challenges and threats this study uncovered.

Recommendations

Due to the ever-changing nature of aerial port operations in general, aerial porters often operate in grey areas with an inherent degree of flexibility that runs counter to most maintenance units' controlled, focused by the technical order, nature. In order to alleviate the tension these conflicting values exacerbate; this study proposes AMC create a new stateside wing similar to overseas en-route air mobility operations wings (AMOWs) to house the five stateside aerial ports (see Figure 7). Doing so will enable maintenance

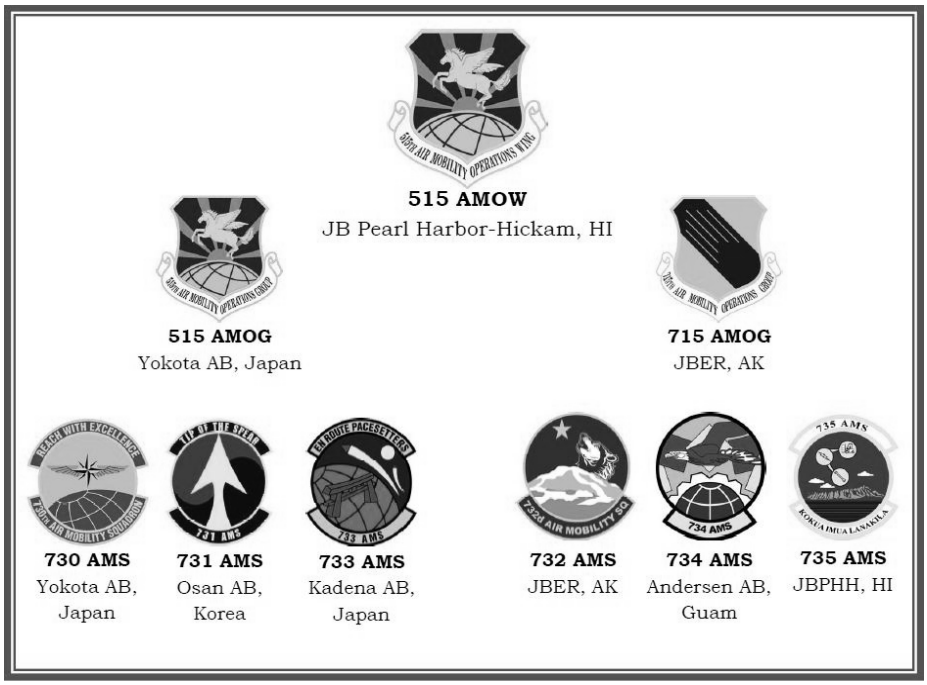

Figure 7, En-route Structure (515 AMOW, 2018)

leaders to focus on what they do best and provide aerial ports with a leadership team focused directly on aerial port functions. Furthermore, the new wing will create additional leadership billets for aerial port and LROs to fill; as well as, free up maintenance billets in the MXG for maintenance professionals to fill. Conversely, if creating a new wing is not a viable option, this study recommends changing the MXG name to a title more representative of all of the squadrons within the MXG organizational structure. Lastly, if aerial ports remain within MXGs, this study recommends ensuring at least one LRO or aerial porter is on each MXG leadership team. Having an LRO or 2T2 on the MXG leadership team adds an invaluable aerial port perspective to the team and enhances the degree of understanding between the two conflicting cultures.

Recommendations for Future Research

Future research could include duplicating this study with a homogeneous Delphi panel consisting solely of either maintainers or 2T2s and LROs, in order to better parse out the differing perspectives and reach higher concurrence levels regarding the SCOTs. Another approach might entail utilizing the same methodology to explore the SCOTs from the vantage point of the overseas en-route air mobility squadrons (see Figure 7). What are the SCOTs of being in a group and wing who command, in the Pacific region en-route's case, six squadrons who all perform the same mission? Such a study may add credence to this study's proposal to create a stateside wing similar to the en-route construct.

Summary

This chapter discussed the utility of this study in capturing the SCOTs of housing

aerial ports within the MXG construct and the results the study yielded. The subsequent section viewed the deconstructed themes through the Competing Values Theory's framework theoretical lens. The author presented primary and secondary recommendations to leverage and mitigate the SCOTs. Lastly, this chapter offered several future research recommendations related to this study.

Appendix: IRB Review Approval

DEPARTMENT OF THE AIR FORCE
AIR FORCE INSTITUTE OF TECHNOLOGY
WRIGHT-PATTERSON AIR FORCE BASE OHIO

4 October 2018

MEMORANDUM FOR MAJ BENJAMIN HAZEN, PHD

FROM: William A. Cunningham, Ph.D.
AFIT IRB Research Reviewer
2950 Hobson Way
Wright-Patterson AFB, OH 45433-7765

SUBJECT: Approval for exemption request from human experimentation requirements (32 CFR 219, DoD 3216.2 and AFI 40-402) for your study on U.S. Air Force Maintenance Group Aerial Port Squadron study, package number REN2018037R Hazen (Alford).

1. Your request was based on the Code of Federal Regulations, title 32, part 219, section 101, paragraph (b) (2) Research activities that involve the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of public behavior unless: (i) Information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects; and (ii) Any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, or reputation.

2. Your study qualifies for this exemption because you are not collecting sensitive data, which could reasonably damage the subjects' financial standing, employability, or reputation. Further, the demographic data you are utilizing and the way that you plan to report it cannot realistically be expected to map a given response to a specific subject.

3. This determination pertains only to the Federal, Department of Defense, and Air Force regulations that govern the use of human subjects in research. Further, if a subject's future response reasonably places them at risk of criminal or civil liability or is damaging to their financial standing, employability, or reputation, you are required to file an adverse event report with this office immediately.

WILLIAM A CUNNINGHAM, PH.D.
AFIT Exempt Determination Official

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Vita

Captain Parker H. Alford enlisted in 2001 as an air transporter and worked his way through a bachelor's degree via the Community College of the Air Force's Associate to Baccalaureate Cooperative program between three duty stations and four deployments. In 2014, he completed his degree in transportation and logistics management and earned his commission as a Distinguished Graduate and Lt Col Dick Scobee Award recipient through Officer Training School at Maxwell Air Force Base.

His first assignment, as an officer, was to Joint Base Lewis-McChord as the 627th Logistics Readiness Squadron's Asset Management Officer-in-Charge. In 2015, the 627th Air Base Group commander selected him to be the group's Executive Officer. The following year, he became the 62d Aerial Port Squadron's Air Freight Flight Commander. In September 2017, he entered the Air Force Institute of Technology's Graduate School of Engineering and Management. Upon graduation, he will transition to Air Mobility Command's 618th Air Operations Center at Scott Air Force Base.

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14. ABSTRACT
In 2005 the Base Closure Realignment Commission and Secretary of Defense recommended joint basing; as an indirect result starting in 2009 and culminating the following year, Charleston, Dover, McChord, McGuire, and Travis maintenance groups (MXG) took command of aerial port squadrons (APS). Various entities have discussed at length the impact; however, there did not appear to be a documented hard look into the strengths, challenges, opportunities, and threats (SCOTs) which emerged. This study utilized the Delphi method to flesh out MXG APS SCOTs by anonymously surveying MXG and APS experts through three panel rounds. This study discovered and documented 24 SCOTs and viewed them through the Competing Values Framework (CVF) theoretical lens. The majority of the panel's inputs concerning maintenance and aerial port entities fell on opposing sides of the CVF; which may explain why the panel, consisting of maintenance and APS leaders, did not reach strong consensus in two out of four SCOT categories. This study proposes creating a wing or standalone group to house the five aerial ports or altering the MXG title to be more representative of all squadrons assigned and ensuring at least one logistics readiness officer or aerial porter is on each MXG leadership team.

15. SUBJECT TERMS
2T2, Aerial Port, Competing Values Framework, Differentiation, Integration, Logistics, LRO, Maintenance, SCOT, SWOT

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