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Runway Incursions: Examining Airport Managers' Perspectives of the Challenges Related to Vehicle/Pedestrian Deviations

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Runway Incursions: Examining Airport Managers' Perspectives of the Challenges Related to Vehicle/Pedestrian Deviations

by

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A dissertation
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as part of the degree requirements for a

Doctor of Philosophy
in
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Melbourne, Florida
December 2019

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ABSTRACT

TITLE: Runway Incursions: Examining Airport Managers' Perspectives of the Challenges Related to Vehicle/Pedestrian Deviations

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The purpose of the current study was twofold: (a) to describe the contributing factors of vehicle and pedestrian deviation (V/PD) runway incursions (RIs) nationally, and (b) to describe what mitigation approaches/strategies airport managers recommend or find to be effective. The current study used a content analysis in identifying airports with more than 10 V/PD RIs within Fiscal Years (FY) 2011 to FY 2016. After the study population was identified, phenomenological design was used to poll airport executives of the previously identified airports. The 11 participants elected to either complete an anonymous survey or participate in a telephone interview.

Spradley's (2016) domain analysis was used to determine common themes and conjectures from domains, cover terms, and included terms from participants' responses. The domains that emerged from the contextual analysis were: (a) contributing factors of V/PD RIs, and (b) airport managers' recommended V/PD RI mitigation approaches/strategies. Findings suggest that a multipronged approach consisting of management, planning, security, human behavior, situation awareness, human resources, and training should be utilized by airport executives in mitigating V/PD RIs. Findings are also beneficial to new hire and experienced

airport executives and managers in creating or augmenting their existing V/PD RI mitigation practices.

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List of Abbreviations

A-SMGS	Advanced Surface Movement Guidance and Control System
AAAE	American Association of Airport Executives
AAL	American Airlines
ACRP	Airport Cooperative Research Program
AIP	Airport Improvement Program
ANTN	Affiliated New Thought Network
AOA	Airport Operations Area
ARFF	Aircraft Rescue and Firefighting
ASDE-3	Airport Surface Detection Equipment Model 3
ASDE-X	Airport Surface Detection Equipment Model X
ASRS	Aviation Safety Reporting System
ATC	Air Traffic Control
ATCT	Air Traffic Control Tower
ATL	Atlanta
BAMOT	Baseline Moving Map Traffic Display Audible Alert and Graphical
BMO	Baseline with Moving Map and Own Ship
BMOT	Baseline with Moving Map and Own Ship and Traffic Display

BOS	Boston
CITI	Collaborative Institutional Training Initiative
DOT	Department of Transportation
EFB	Electronic Flight Bag
FAA	Federal Aviation Administration
FAR	Federal Aviation Regulation
FAROS	Final Approach runway Occupancy Signal
FBO	Fuel Base Operations
FXE	Fort Lauderdale Executive
FY	Fiscal Year
GA	General Aviation
GAO	Government Accountability Office
GC	Ground Control
HF	Human Factors
ICAO	International Civil Aviation Organization
ID	Identification
IFR	Instrument Flight Rules
IMC	Instrument Meteorological Conditions
IRB	Institutional Review Board
L	Left
LAX	Los Angeles

LGB	Long Beach
LOA	Letter of Agreement
LRSAT	Local Runway Safety Action Team
M	Mean
MANOVA	Multivariate Analysis of Variance
MD	McDonnel Douglas
Mdn	Median
NAS	National Airspace System
NASA	National Air and Space Administration
NPIAS	National Plan of Integrated Airport Systems
NTSB	National Transportation Safety Board
OEP	Operational Evolutional Plan
OJT	On-the-Job-Training
OPS	Operations
P1	Participant 1
P2	Participant 2
P3	Participant 3
P4	Participant 4
P5	Participant 5
P6	Participant 6
P7	Participant 7

P8	Participant 8
P9	Participant 9
P10	Participant 10
P11	Participant 11
PDK	Dekalb Peachtree
Ph.D.	Doctor of Philosophy
PRC	Ernest Love Field
R	Right
RI	Runway Incursion
RIM	Runway Incursion Mitigation
RIPS	Runway Incursion Prevention Systems
RIPSA	Runway Incursion Prevention Shortfall Analysis
RQ	Research Question
RSA	Runway Safety Area
RSAT	Runway Safety Action Team
RSO	Runway Safety Office
RWS	Runway Incursion Database
RWY	Runway
SAT	San Antonio
SD	Standard Deviation
SMS	Safety Management System

SNA	Orange County
Txy	Taxiway
U.S.	United States
V/PD RI	Vehicle and Pedestrian Deviation Runway Incursion
VGT	North Las Vegas
VMC	Visual Meteorological Conditions

Acknowledgments

This dissertation would not have been possible without the support I received from different individuals along the way. In my 15-year collegiate career, certain individuals have left indelible markings on me. In my educational career, I have had several mentors in my life who have genuinely impacted me in ways words cannot accurately describe. My dissertation committee chair Dr. Deborah Carstens has been an inspiration of what I hope to aspire to be. If I turn out to be just half the person she is, then I'll be just fine. Without her guidance and friendship, I would have never made it this far into my doctoral program.

I would like to thank my committee members, Dr. Michael Gallo, Dr. John Deaton, and Dr. Alex Vamosi, for their time and their understanding during the dissertation process. I would also like to thank Dr. Steve Cusick and Dr. Donna Wilt for their assistance as well in this process. Lastly, I would like to thank Lauren at the Federal Aviation Administration because without her, this dissertation would have never gotten off the ground.

Last but not least, I would like to acknowledge those who were mentors in my life before coming to Florida Institute of Technology: Dr. Wendy Beckman, Dr. Andrea Georgiou, Dr. Paul Craig, Gail Zlotky, Tyler Babb, and Capt. Jonathon Barksdale. All of these mentioned names have left marks on me in my educational career, either flying or academia; their impacts on me are still present to this day.

Dedication

I dedicate this dissertation to my family: Brodie, Marie, Sandy, Dang, Mark, Holly, Nancy, Reba, Reva, Dustin, Emily, Libby, Harvey, and Nancy. To my parents, Vickie and John Sr., without your unwavering support through the years, this achievement would not have been possible.

Chapter 1

Introduction

Background and Purpose

Background. There have been 1,832 reported runway incursions (RIs) in the United States (U.S.), a 25.6% increase from the reported 1,458 RIs reported in 2015 by the Federal Aviation Administration (FAA) (2018c). The primary focus of my study is V/PD RIs and I chose to include RIs in general because RIs involving aircraft still follow the same rules and regulations associated with V/PD RIs. In the context of the current study, RIs are defined by the FAA (2018a) as "any occurrence at an aerodrome involving the incorrect presence of an aircraft, vehicle or person on the protected area of a surface designated for the landing and takeoff of aircraft" (para. 1). The FAA classifies RIs into three types: operational errors (OEs), PDs, and V/PDs. According to the FAA (2005), OEs are defined as "an action of an air traffic controller [ATC] that results in: less than the required minimum separation between two or more aircraft, or between an aircraft and obstacles (e.g., vehicles, equipment, personnel on runways)" and "An aircraft landing or departing on a runway closed to aircraft" (p. 12). PDs are defined by the FAA (2005) as "an action of a pilot that violates any Federal Aviation Regulation" (p. 12). V/PD RIs are defined by the FAA (2018b) as "when a vehicle or pedestrian has entered the runway safety area without authorization from air traffic control" (p. 2). The current study focused on V/PD RIs from an airport safety context.

Adam, Lentz, and Bair (1992) performed a multi-faceted study examining real-time data from questionnaires, interviews, observations, and governmental reports that were all compiled into a cohesive study report. Their objective was to "understand how the surface movement systems works and how it fails, by investigating all topics that appear relevant to human error occurrence and avoidance" (p. 540). Adam et al. identified the following human factors as contributors to RIs: airport navigation by pilots and vehicle drivers, signage identification, communication, memory, situational awareness, rules and procedures, lack of standardization, and variability in training. Adam et al. concluded there is not a one-way answer to fix all the problems associated with contributory factors to RIs. Many solutions will need to be collected to minimize the occurrences of RIs as time continues. However, Adam et al. did not disclose limitations, generalizability, and flaws associated with their study.

A pivotal testimony was brought forth to the Subcommittee on Aviation, Committee on Transportation and Infrastructure, and the House of Representatives to highlight the health of the National Airspace System (NAS) with a special emphasis on RIs. The Government Accountability Office (GAO) (2008) report discussed past and present information about RIs in the NAS. The GAO report was in response to the recent adoption of newer, more stringent guidelines on RIs at the nation's airports. The GAO report cited FAA's message to encourage technological

advances in the realm of aviation safety centered on reducing human factor errors. Before 2007, a RI was defined exclusively by the FAA (as cited in GAO, 2008) as:

> Any occurrence in the runway environment involving an aircraft, vehicle, person, or object on the ground that creates a collision hazard or results in a loss of required separation when an aircraft is taking off, intending to take off, landing, or intending to land. (p. 4)

After 2007, the FAA adopted the International Civil Aviation Organization's (ICAO) all-encompassing definition where "any occurrence at an airport involving the incorrect presence of an aircraft, vehicle, or person on the protected area of a surface designated for the landing or takeoff of aircraft" (GAO, 2008, p. 4). Under the old classification system that existed in 2007, RIs were identified as decreasing. Under the new classification system and in reviewing the current findings from the FAA's Runway Safety Office Runway Incursion Database (RWS) (2019), all types of RIs are increasing. The three main causes of RIs found in the GAO report were 57% pilot errors, 28% controller errors, and 15% V/PDs. The GAO report stated that the FAA has taken some measures to help mitigate RIs, and those included: less ambiguous ATC protocols, conduction of safety reviews at the top 42 offending airports, adoption of a Runway Safety Council, and creation of an ATC safety reporting program. The RI data reported between 1998 and 2008 in the GAO report (2008, p. 21) can be found in Figure 1.1 (see Appendix B). The year 2008 coincides with the new ICAO definition classification that now encompasses

surface incidents and pre-2007 classification RIs. The congressional testimony had an absence of limitations, generalizability, and flaws. The GAO (2008) and Adam et al. (1992) stated that there is not a catch-all approach, but it will take several approaches to solve the problem of RIs. In closing, the GAO report stated that the FAA must continue to keep pressure on the NAS to continue to improve and help mitigate RIs at the nation's airports.

Since the call to action by the FAA (2015a), there have been multiple within-agency studies compiled into the National Runway Safety Plan of 2015–2017 (FAA, 2015b). This safety report highlighted details about RIs as a whole for the NAS since 2000. It is reported there was a 90% reduction of RIs in the U.S. over the last 10 years. However, there are not a lot of details about V/PD RIs contained in this safety report. The only information pertaining specifically to V/PD RIs is that the amount of V/PD RIs are construction-related and found to be significant. The limited information about V/PD RIs prompted my interest to gain more information as to why V/PD RIs are increasing.

There is a specific protocol outlined by the FAA (2007) that is presumed to take place every time a V/PD RI occurs at an airport. The protocol used by the FAA is:

1. The Air Traffic Control Tower (ATCT) completes FAA Form 8020-24, *Preliminary V/PD Deviation Report*.

2. FAA Airport Division issues a Letter of Investigation to the airport operator.
3. The airport operator investigates the incident, initiates corrective actions as appropriate, and sends a report to the FAA Airports Division.
4. The FAA Airports Division also investigates the incident, reviews the airport's ground vehicle program and incident report on the V/PD RI.
5. The Airport Certification Inspector determines appropriate action and issues a closeout letter, Warning Letter, Letter of Correction, or initiates civil penalty action because of the FAA's investigation.
6. The Airport Certification Inspector completes FAA Form 8020-25, *Investigation of V/PD Report.* (p. 9)

This is the published process of how a V/PD RI goes from an undocumented action to a formalized report with data found in online databases (e.g., RWS). The FAA also highlights actions they have identified to reduce the potential for V/PDs.

In a series of pages with corresponding pictures, the FAA (2007) aimed to heighten awareness for airport managers and operators of the dangers of V/PD RIs. The first recommendation to airport operators on mitigating V/PD RIs was to limit access to areas for only vehicles and pedestrians essential to operations. Second, it stated that limits needed to be placed on those who have access to vehicles with clearance and escorting those who needed only occasional access. Third, there should be extra emphasis on recurrent training for employees hired on a seasonal

basis (e.g., snowplow winter operations employees). Fourth, the usage of service roads on airport property should be a priority instead of allowing vehicles to mingle with aircraft traffic. Fifth, priority should be placed on construction of more service roads to mitigate the chance of a V/PD RI. Sixth, navigational aids (e.g., very high-frequency omnidirectional beacons for aircraft navigational tracking) should be placed near service roads and away from the runway environment to reduce the chance of a V/PD RI. Seventh, if a service road is required to intersect with a runway, there should be explicit markings and signage to assist drivers of vehicles that encroach on the runway environment. Eighth, if gates are required for successful operation of the airport, a system is needed to securely close and lock them to keep unauthorized vehicles and pedestrians from crossing onto the airport environment. Ninth, if vehicles are required to operate in the airport environment, they need obvious lighting and beacons should be used throughout operations. Tenth, if a construction project is necessary for an airport, there needs to be many signs to notify the construction crew when they are not authorized access. Lastly, if there is an airshow, there needs to be heightened security measures in place to reduce the likelihood of a V/PD RI from a spectator. These methods of V/PD RI mitigation by the FAA related to the current study in that they constituted some of the V/PD RIs mitigation practices that airport executives might currently be practicing or might suggest.

The FAA has the most current information about V/PD RIs contained in the RWS (2019). Data found in the RWS between FY 2011 and 2016 are located in Figure 1.2 (See Appendix B). There was a gradual increase in V/PD RIs, which peaked at 39.6%, between FY 2011 and FY 2016. In the context of the current study, V/PD RIs were exclusively studied. Although it could be postulated that the increase in V/PD RIs could be a function of the change in RI definition in 2007, the frequencies of RIs continue to be gradually increasing.

The International Civil Aviation Organization (ICAO) is an internationally agreed on rulemaking body, and the U.S. is one of the nations that has agreed to follow ICAO rules and guidance. Within the ICAO (2007) manual on RIs, V/PD RIs are highlighted as a problem for all airports. ICAO stated that many factors have been identified as contributing causes of V/PD RIs, and those are:

a) failure to obtain clearance to enter the runway

b) failure to comply with ATC instructions

c) inaccurate reporting of position to ATC

d) communication errors

e) inadequate training of airside vehicle drivers

f) absence of radiotelephony equipment

g) absence of radiotelephony training

h) lack of familiarization with the aerodrome

i) lack of knowledge of aerodrome signs and markings; and

j) lack of aerodrome maps for reference in vehicles. (ICAO, 2007, p. 2.5)

Within the same manual on RIs, ICAO created a framework for all respective aviation authorities to follow for developing an airside vehicle driver training program addressing the necessary knowledge and components. Next, it addressed the rules and regulations that should be in place for airside vehicle drivers. Lastly, it contained a section about the applicable radiotelephony words, phrases, and operations that must be understood and transmitted by international standards.

The FAA (2018e; f) designed two placards to remind vehicle drivers of different airport markings and signage (see Figures 1.3 and 1.4). These are designed to reduce the ambiguity of potentially confusing airfield markings and signage. These placards created by the FAA contributed to the current study as mechanisms in place to mitigate V/PD RIs.

Efforts to mitigate aviation-related accidents and incidents are not exclusive to aircraft but also contain a focus on pilot deviations (PDs) that occur on airport property. Mitigation efforts are important for airports and airport executives because actions can be taken by management to assist in lowering the occurrences of dangerous actions or violations. V/PD RIs are treated the same as aircraft in terms of accident deviations and incident mitigation procedures. V/PD RI mitigation activities are a necessary part of safety management for airport property. V/PD RIs constituted one type of report that makes up the overarching Safety Management System (SMS). These SMSs have matured into a necessary and

informative component of aviation-related accident and incident mitigation. Mature SMSs are comprised of many different mechanisms all working simultaneously to improve the safety of the NAS in the U.S. Within the RWS, the numbers of V/PD RIs were found to be increasing, and this demonstrated a need for RI mitigation. This dissertation research was heeded by a call to action by the FAA (2015a).

To gain a full perspective of what is occurring with the rate of V/PD RIs, it was necessary to examine the period leading up to the increase in V/PD RIs. In Figure 1.5, the RWS (2019) provided the archival data from 2008 to 2010 (see Appendix B). Data were absent before 2008 because the FAA changed the definition of RIs during 2007. The rate of V/PD RIs had been decreasing up until 2011 but gradually increased from 183 to 285 in FY 2016. When examining literature from the FAA's (2015a; b) Call to Action and National Runway Safety Plan, there are limited details about V/PD RIs aside from V/PDs definitions.

In the aviation industry, errors can be identified immediately and follow a standard protocol, or an offender can voluntary admit to an error (FAA, 2011). In the U.S., a program called the Aviation Safety Reporting System (ASRS), added considerable information on errors and error reporting that otherwise would not have been captured if the event was not reported. Advisory Circular *AC-00-46E* provided all of the pertinent information, responsibility, protocol, and enforcement details of the ASRS (FAA). The ASRS is a reporting system organized by National Aeronautics and Space Administration (NASA) where members of the aviation

community can voluntarily submit errors. However, if participants choose to do so, they can also mail in their report through the post office to NASA. NASA was given the responsibility of overseeing the operation of the ASRS because NASA was seen by the public and from members of the aviation community as a positive, neutral party. The rationale behind the ASRS is that the FAA identified that humans are inherently flawed and will make mistakes. In aviation, mistakes, or errors, can be costly or potentially life-threatening, hence controlling them is a top priority (FAA, 2011). The FAA is the police authority of the sky for the NAS and enforces the Federal Aviation Regulations (FAR). In enforcing the regulations, they also hand out punishments accordingly to industry operators, which is also outlined in the FAR. The FAA stated that the ASRS allows people to admit fault voluntarily and, if within 10 days of making an error, regardless of how severe the action, it will result in no punitive reaction from the FAA. An ASRS report can be filed even if the perpetrator is not a pilot. Anyone in the aviation community who is associated with the industry can file an ASRS report. The FAA has the attitude that if individuals admit fault, they are proactive, demonstrating they are bettering themselves, and this behavior will become less likely in the future. An example of punitive action from the FAA is revoking a pilot's flying certificate or airport drivers' privileges based on an error or mistake. Advisory Circular *AC-00-46E* related to the current study in that it provided information about another error

reporting system that can be used alongside V/PD RI reports in explaining a particular incident.

The current study endeavored to understand this phenomenon of increasing V/PD RIs in the NAS. There is a lack of extensive published literature on the subject of V/PD RIs. In the published literature that does exist, a foundation was created that guided this dissertation research. This foundation is more thoroughly discussed in the literature review chapter. The findings from the current study will help fill in the gaps of published literature and provide information in explaining the reported increase of V/PD RIs.

Purpose. The purpose of the current study was twofold: (a) to describe the contributing factors of V/PD RIs nationally, and (b) to describe V/PD RI mitigation approaches/strategies airport managers recommend or find to be effective.

Definition of Terms

The following definitions are fundamental to understanding the current study:

1. *Airports* were defined as "any area of land or water used or intended for landing or takeoff of aircraft including appurtenant area used or intended for airport buildings, facilities, as well as rights of way together with the buildings and facilities" (FAA, 2018h, para. 1). Airports that had V/PD RIs of more than 10 occurrences between FY 2011 and FY 2016 were targeted. The FAA (2018h) classifies airports

by activities as: large hub, medium hub, small hub, nonhub primary, nonprimary commercial service, and reliever (para. 2). The current study targeted all the previously mentioned types of airports.

2. *Airport executive* was defined as the senior member of an airport's formal controlling organization or senior member of the managerial staff at a specific airport. Typical titles of airport executives consist of Director of Operations, Assistant Director, and Director. This was also the sampling unit for the primary research component. A representative appointed by airport management was also acceptable when a member of upper management was unavailable.
3. *Aviation safety reporting system* (ASRS) refers to the voluntary database that received reports from all members of the aviation community related to safety within its operation. As cited by NASA (2018), the ASRS is defined as:

> The ASRS is an important facet of the continuing effort by government, industry, and individuals to maintain and improve aviation safety. The ASRS collects voluntarily submitted aviation safety incident/situation reports from pilots, controllers, and others. The ASRS acts on the information these reports contain. It identifies system deficiencies and issues alerting messages to persons in a position to correct them. (para. 1)

4. *Federal Aviation Administration* (FAA) refers to the regulatory body within the Department of Transportation that is tasked with ensuring, promoting, and enforcing the FAR in the U.S. and its territories (FAA, 2018d).
5. *Federal aviation regulations* (FARs) are defined as Titles 14 and 49 of the Code of Federal Regulations in the U.S. about and limited to aviation and aviation-related activities.
6. *National airspace system* (NAS) is defined by the Department of Transportation (2017) as:

    > the common network of U.S. airspace; air navigation facilities, equipment, and services, airports or landing areas; aeronautical charts, information, and services; rules, regulations and procedures, technical information, and manpower and material. Included are system components shared jointly with the military. (p. 1094)

7. *Runway incursions* (RIs) are defined by the FAA (2018b) as "any occurrence at an aerodrome involving the incorrect presence of an aircraft, vehicle or person on the protected area of a surface designated for the landing and takeoff of aircraft" (p. 2). The current study's use of this term was based on the FAA's definition. There are three major types of RIs, OEs, PDs, and V/PDs explained at the beginning of this chapter.

8. *Runway safety office runway incursion database* (RWS) refers to the database used as a preliminary component to inform the primary qualitative component of the current study. This public database is administered by the FAA (2019).
9. *Safety management system* (SMS) refers to "an organization-wide comprehensive and preventive approach to managing safety" (FAA, 2015c, p. 1). A SMS is comprised of four main components: safety policy, safety risk management, safety assurance, and safety promotion.
10. *Vehicle and pedestrian deviation runway incursions* (V/PD RIs) are defined by the FAA (2018b) as "when a vehicle or pedestrian has entered the runway safety area without authorization from air traffic control" (p. 2). The current study's use of this term was based on the FAA's definition. A narrative example of a reported V/PD RI from the FAA (2007) is as follows:

    > Ground Control instructed Truck 46 (ARFF [Aircraft Rescue and Fire Fighting] Vehicle) to cross 30R [right], turn right on Papa and hold short 30L [left] on Taxiway Bravo. Truck 46 crossed 30R but failed to turn right on Papa and crossed the hold short line for Runway 30L at Hotel. A Jetstream 41 cleared for take-off 30L rolled about 2,400 feet and turned off at Romeo after Local Control canceled take-off clearance. (p. 51)

Another example of a V/PD RI from FAA (2007) is:

> ATC [Air Traffic Control] cleared AAL [American Airlines] MD80 [McDonald Douglas] for takeoff Rwy 12R. GC [Ground Control] instructed Car 17 (Ops [Operations] Vehicle) to hold short Runway 12R at Taxiway B1. Car 17 incorrectly read back hold short Rwy [runway] 12L at Twy [taxiway] Bravo. GC immediately corrected Car 17 with no response. GC instructed Car 17 to stop, while Car 17 reported 'crossing 12R at Bravo One'. GC yelled at Car 17 a second time to STOP. Car 17 was then observed braking to a stop past the holdline but short of the runway edge as AAL MD80 was accelerating on takeoff at the Echo intersection. AAL MD80 was still on the ground when he passed B1. (p. 54)

Research Questions

The research questions (RQs) that guided the current study are as follows:

RQ1: What are the contributing factors of V/PD RIs relative to airport operations?

RQ2: What are the contributing factors of V/PD RIs relative to human factors?

RQ3: What are the contributing factors of V/PD RIs relative to staff/personnel?

RQ4: What mitigation approaches/strategies do airport managers recommend or find to be effective?

Study Designs

The current study utilized a phenomenological approach to answer the RQs. First, a content analysis was conducted as a preliminary research strategy to inform the qualitative research component. The qualitative research component was the primary research component that made up the current study. The target population was all airport executives from airports in the U.S. that have experienced V/PD RIs within the current study's parameters. The accessible population was the airport executives from the 41 airports in the U.S. that have experienced at least 10 reported occurrences of V/PD RIs between FY 2011 and FY 2016 as identified by the RWS (2019). A convenient nonprobability sampling strategy was used to create the sample from the accessible population. The sample consisted of airport executives who agreed to participate.

The first step in data collection was to access the publicly available information relative to the targeted airports that were managed by the airport executives who agreed to participate. The participants then indicated if they preferred an interview or an online survey. Personal interviews were conducted by telephone. The online questionnaire was provided electronically via the e-host website *SurveyMonkey*.

Significance of the Study

The current study was initially conceived after analyzing RWS (2019) data, which resulted in the identification of V/PDs increasing throughout the U.S. It should be noted that V/PDs have not been methodically studied before, so the current study was considered seminal within aviation safety. The knowledge gained from the current study was valuable in identifying contributing factors of V/PD RIs, and mitigation factors to address the identified contributing factors. The contributing factors identified were V/PD RIs concerning airport operations, human factors, and staff/personnel. Mitigation strategies were identified from the sampled airports on what has or has not assisted airports regarding V/PDs.

Study Limitations and Delimitations

Limitations of a study are conditions, events, or circumstances that are outside the control of the researcher and henceforth could affect generalizability. Delimitations are researcher-imposed limitations placed on the study that could further limit generalizability. The limitations and delimitations of the current study follow.

Limitations

The limitations are as follows

1. ***Airport personnel.*** I had no control over who served as the airport manager of the targeted airports. Therefore, if the current study was

to be replicated using the same airports but a different executive in charge, the results might be different.

2. ***Authenticity of responses***. I had no control over the authenticity of participant responses. There is a possibility that the answers supplied by participants were not be truthful.
3. ***Detail of responses***. I had no control over the detail of responses from participants. There was no ability to control the details or rich elaborative responses of the participants.
4. ***FAA regions***. The FAA regions are: (a) Alaskan, (b) Central, (c) Eastern, (d) Great-Lakes, (e) Northwest-Mountain, (f) Southern, (g) Southwest, (h) Western-Pacific. The makeup of the regions represented in the study can be found in Chapter 3. Represented studied regions could not be controlled because airport executives had to agree to be a part of the study. Therefore, subsequent studies that use different regions, even from the same accessible population, could yield different results.
5. ***Targeted airports***. The airports that were flagged in my study were flagged because they had the highest frequency of V/PD RIs. In a subsequent study, different airports might be flagged and hence the results might be different.

Delimitations

The delimitations are as follows:

1. ***Conjectures***. With the low number of participants ($N = 11$), two examples constituted enough information for the formation of a conjecture based on that information. If more participants' examples were required to create conjectures, this would yield different results.
2. ***Data collection***. I chose to collect data over a 1-month period (2/11/2019 to 3/10/2019). If a subsequent study had a longer data collection period, which would have promoted "prolonged engagement" and "member checking," two activities to promote credibility, then the results might be different
3. ***Data time period.*** I chose to conduct the current study by focusing on data from FY 2011 to FY 2016. The FY used for the RWS was between October 1st of each year and ending on September 30th of the following calendar year. If a different time period (e.g., from 2015 to 2019) of RWS data was selected for subsequent studies, this might yield different results.
4. ***Interviews***. Interviews were selected as the primary data collection method during the primary research component because they have the potential to provide the richest information necessary in

answering the RQs. However, only 3 of the 11 participants opted for an interview. Therefore, subsequent studies might yield different results if a different data collection method was utilized or if more participants choose to be interviewed.

5. ***Interviewer experience***. I performed the interviews for this research and completed the appropriate Collaborate Institute Training Initiative (CITI) training modules in preparation for these interviews. Therefore, subsequent studies that employ a researcher who has not completed the CITI training modules, or that employ an experienced interviewer, could yield different results.
6. ***Probing***. Probing, which refers to follow-up questions asked of participants to coax more detailed responses was not used in the current study. Therefore, if subsequent studies engage in a probing strategy, then the results might be different.
7. ***Researcher-developed questionnaire.*** I chose to use a researcher-developed questionnaire. The use of a different questionnaire in subsequent studies might yield different results.
8. ***RWS* (FAA, 2019)**. I elected to exclusively use the RWS (2019) database as the preliminary research strategy to determine the targeted airports. Subsequent studies that use a different database

would yield different airports for their accessible population; this could yield different results.

9. ***Sample airports***. The airports targeted for the sample cannot be altered because they were specifically identified during the study's parameters by the RWS (2019) as having more than 10 V/PD RIs between FY 2011 and FY 2016. This is a delimitation because I picked the parameters for the sample. Therefore, if other airport executives were selected from other airports with fewer V/PD RIs, the study might yield different results.
10. ***Sampling unit***. Airport executives from the 41 airports having 10 or more occurrences of V/PDs during FY 2011 to FY 2016 were chosen for the study's sample. Therefore, if airport executives from airports with a different number of V/PDs were chosen, this would yield different results.
11. ***Single point-of-contact.*** For the current study, I focused as the single point-of-contact consisting of the publicly available contact information found online at each airport. Subsequent studies that involve more than a single point-of-contact at each airport might get different results.
12. ***SurveyMonkey***. Aside from the interview version of the questionnaire, an e-host version of the questionnaire was also

included in the current study. If paper questionnaires were mailed to each airport manager directly or if a different e-host site was used, subsequent studies might yield different results.

Chapter 2

Review of Related Literature

Introduction

This chapter is comprised of three primary sections. The first section contains the philosophical underpinnings coupled with the role philosophy plays in qualitative studies relative to the current study. The second section is focused on a comprehensive review of past research and literature related to V/PD RIs. This section contains information pertaining to: (a) aircraft RIs and (b) V/PD RIs. The third section is a summary of all the previously identified literature and their implications for the current study.

Philosophical Underpinnings

Philosophy is a necessary component of qualitative research (Creswell, 2013). Creswell (2013) reported that philosophy "shapes how we formulate our problem and RQs to study and how we seek information to answer the questions" (p. 18). The current study was guided by both a philosophical assumption and an interpretative framework. Creswell indicated that it is important for researchers of qualitative studies to expose all the biases that might exist, and the philosophical underpinnings of the study are critical in grasping where the researchers are basing their inferences. Not only is the aim at expanding on thought processes, but fully reducing ambiguity that might exist about the thought process for answering RQs.

Philosophical assumption. The current study was guided by the ontological assumption. Creswell (2013) wrote that when researchers use ontological assumption, they are accepting a world where multiple realities can exist. This means different airport executives will have different ways or views to solve the potential problems of dealing with V/PD RI mitigation efforts at their respective airports. Executives viewed each V/PD RI problem from their unique world, and this context may or may not be applicable to different airports. As a result, the findings of the current study were relative to the different realities of study participants. The ontological assumption informs the current study by providing a perspective that there is not one single answer, and in answering the RQs, multiple answers could be given.

Interpretative framework. The interpretative framework that guided the current study was social constructivism. As Creswell (2013) stated, "individuals seek understanding of the world in which they live and work. They develop subjective meanings of their experiences" (p. 24) socially, where these are learned from interactions with others and years of experience in this field. In answering the RQs, the most valuable information is the participants' points of view from their experiences and insights as leaders of their respective airports. Creswell said that this interpretative framework is often seen guiding phenomenological studies. The focal point of social constructivism is to "rely as much as possible on the participants' views of the situation" (p. 25) because their knowledge is gained

socially through interactions with others (e.g., ATC, pilots, airport vehicle drivers, et cetera.) over a tenure as leadership of an airport. Social constructivism informed the current study by being the theory of knowledge acquisition by participants where their complex views could be captured to answer the RQs. These philosophical underpinnings were pivotal in receiving, analyzing, and reporting data gathered for the current study based on the following previous literature.

Review of Past Research Studies

Literature review sections require a comprehensive literature search to identify previous studies and pertinent articles related to the subject matter. The purpose of this section is to provide a foundation of knowledge and to inform the current research on data expectations from participants. Published literature on aircraft RIs are as follows.

Aircraft runway incursions. In a post-hoc analysis by Hooey and Foyle (2006), two previous studies' data were reanalyzed utilizing a different format of error classification for RI data. The first study occurred in 1998 and the second study occurred in 2000. Hooey and Foyle reexamined 150 cases across both previous studies and picked 26 cases to reexamine relative to their new error classification system. Of the 26 cases, the classification system had the following distribution: planning error (6), decision error (11), or execution error (9). A planning error is when a pilot is about to make a decision but makes an error in original judgement formulated during the planning phase of making an action. A

decision error is defined as “when the clearance has been properly received, communicated, and planned, but a pilot makes an erroneous choice at a decision point along the route” (p. 56). Lastly, an execution error is when everything else goes according to plan, but the pilot still makes a mistake although being fully cognizant of the correct action. Each case contained simulation data as well as a video of each flight as if it were occurring in real-time. Hooey and Foyle used a multinomial Bayesian statistical analysis and reported no statistical differences among the three error classifications. After analyzing the data, Hooey and Foyle compiled a list of conjectures about the error classification taxonomy, which consisted of ways to mitigate these error types.

In mitigating planning errors, Hooey and Foyle (2006) reported that planning errors could have been avoided if, during the time of the original two studies, contextual or graphical clearance systems (e.g., a datalink or a heads-up display) would have allowed pilots the ability to enhance their understanding of the taxi clearance given by ATC. It was noted that none of the original cases that had graphical or contextual assistance systems experienced planning errors. This section of Hooey and Foyle’s study adds to the current study by bolstering the idea that technology is an integral part of effective RI mitigation practices.

In mitigating decision errors, Hooey and Foyle (2006) reported that errors could have been mitigated by technology to decrease workload. Hooey and Foyle cited a typical occurrence when the First Officer is occupied with other duties of

the flight deck and the Captain makes an erroneous decision. Examples of duties members of the flight crew might be preoccupied with are checking weather frequency to determine current weather conditions and actively talking with ATC. It was reported that if the First Officer was available as a resource, the error could have been avoided. Hooey and Foyle added that if the cockpit were equipped with a global position system, situation awareness could have increased for the pilot taxiing. In the current study, human factors category was listed as one of the RQs.

Lastly, in mitigating execution errors, Hooey and Foyle (2006) reported that execution errors are usually caused by getting lost on the airfield. Hooey and Foyle indicated that this phenomenon is often called a "sea of blue lights" (p. 67). Pilots have the potential to experience difficulty in determining which line of lights to follow for the clearance given by ATC at night or in periods of inclement weather. Hooey and Foyle reported that in cases where the pilots used a heads-up display, execution errors were nonexistent.

Hooey and Foyle (2006) reported that among the 26 cases examined, causal factors were extracted from the data and provided insight into what occurred. The reported causal factors were miscommunication, erroneous expectations, inadequate situation awareness, excessive workload, and confusing environmental cues. In closing, Hooey and Foyle concluded that "both procedural solutions and advanced cockpit technologies that can be used to augment pilots' cognition, decision making, and perceptual abilities" should be utilized to mitigate RIs (p. 75).

Hooey and Foyle (2006) stated that their study utilized high-fidelity simulations, which could affect generalizability because the controllers working with each of the pilots were identified as being highly skilled and were following a script. The current study also was high-fidelity because it was based on real-life experiences told by the participants instead of following a script. The current study was not being read from a script and occurred in real-time, so the generalizability was more suited for readers to decide if the results are applicable to them. Also, considering generalizability, instead of utilizing the more likely one-person general aviation pilot setting, Hooey and Foyle stated that their simulations were completed under commercial two-person flying crews. Lastly, to affect generalizability, Hooey and Foyle stated that simulations only involved arrival taxi operations. Hooey and Foyle provided two limitations to their study and both involved using the χ^2 analysis. The χ^2 distribution assumption was reported as a limitation, and the χ^2 independence test itself was also cited as a limitation. The primary research component of the current study was qualitative, so this was not a factor.

In a study by Prinzel and Jones (2007), 16 general aviation pilots were used in an intervention study to test different RI prevention systems. These RI prevention systems (RIPS) centered primarily on enhancing pilots' situation awareness in the cockpit by providing additional technology screens and audible cues about the surroundings and impending events. The stated objective was to "evaluate several candidate RIPS elements, adapted for GA [general aviation]

operations, and compare them to current electronic flight bag [EFB] capability for prevention of GA RIs" (p. 3). Four types of concepts were evaluated during the experiment: "baseline with a moving map and own-ship (BMO), BMO + traffic display (BMOT), BMO + audible RI alerting (BAMO), BMOT + audible and graphical RI alerting (BAMOT)" (p. 3). Each participant was given 19 approaches to fly using a different concept for evaluation. Care was given to group equivalency and each participant was screened to fall into one of four categories: low-time, high-time, low-time instrument rated, and high-time instrument rated.

Prinzel and Jones (2007) reported large differences between each pilot during each RI situation event. Only one pilot was actually in an event that could have been classified as a serious RI event for collision. It was found that audible cues from the technology used for each respective concept enhanced RI detection by each participant. After the study concluded, each pilot participated in a debriefing, and it was found that "a surface map with own-ship and traffic along with audible alerts was considered an optimal incursion prevention display for GA aircraft" (Prinzel & Jones, p. 6). Technological considerations were used as contributing factors and mitigating factors to better answer the current study's RQs. Prinzel and Jones stated that their study "results generally match past research on commercial and business aircraft operations" but does not include any other elaborating information about generalizability to other studies (p. 6). The current study provides information pertaining to generalizability. However, it should be

disclosed that Prinzel and Jones elected to not include limitations and flaws of their study. The current study includes limitations. Prinzel and Jones' findings were consistent with those of Hooey and Foyle (2006) and confirms GAO (2008). Prinzel and Jones' study also informed the current study on providing information to the creation of the RQs, specifically contributing factors and mitigation factors. Prinzel and Jones concluded that further examination of future systems needs to continue with assistance from NASA, which will reportedly benefit all aviation.

Feigh and Bruneau (2009) compared and contrasted different aspects of RI prevention systems and listed a table that contained a catalog of all the typical RI contributing factors. This list had four main types of RIs: operational errors, operational deviations, pilot deviations, and V/PDs. The current research was focused on V/PD RIs. The typical contributing factors for operational errors included "forgetting about [a] closed runway or previously given clearance, failure to anticipate required separation distance, and errors in communication" (p. 4). Typical contributing factors to operational deviations included "forgetting about other aircraft, closed runway or previously given clearance, inadequate coordination between controllers, and errors in communication" (p. 4). Typical contributing factors for pilot deviations included "inadequate signage/markings, pilots having to perform mandatory head down tasks leading to loss of situation awareness, incomplete, non-standard, or obsolete taxing instructions" (p. 4). Lastly, typical contributing factors for V/PDs included "failure to obtain clearance, errors

in communication, failure to report correct current positions, and inadequate training" (p. 4). These factors provided a base for the types of contributing factors to V/PD RIs that could manifest from participant responses to the current study. Feigh and Bruneau also provided a comprehensive list of all the FAA programs designed to mitigate RIs.

Feigh and Bruneau (2009) next discussed different FAA programs that aimed at mitigating RIs currently implemented across the NAS. The first program listed was called Runway Marking Standardization, which consisted of standardized marking and signage to assist in fostering familiarity within the system for operators. If an operator learns the marking and signage at one airport, that knowledge will transfer over as knowledge of a different airport with subtle, if any, differences. The second program listed by Feigh and Bruneau was Airport Surface Detection Equipment Model 3 (ASDE-3) Radar System. This system is a method of radar that tracks aircraft and vehicles on the ground, but it does not specify if it had the capability of tracking pedestrians on the runway safety area. The third program was called the Sterile Cockpit Policy, which required all flight crews to maintain a sterile cockpit, or only talk about pertinent information about the flight during take-off or landing procedures. The fourth program was the Airport Surface Detection Equipment Model X (ASDE-X). This program was listed as an upgrade of the previous ASDE system but included the addition of a global positioning system and transponder usage. The fifth program was called the

Advanced Surface Movement Guidance and Control System (A-SMGS). This system was an arrangement of lights on the airport surface that assist or guide the aircraft or vehicle to the correct path it was cleared for or intended to follow. The sixth program was the Taxi Centerline Enhancement System. This system has alternating green and yellow lights to inform the operator that a protected area is about to be entered. The seventh and final program listed by Feigh and Bruneau was the Final Approach Runway Occupancy Signal (FAROS). This program consisted of indicators for pilots if the landing runway suddenly becomes unsafe, obstructed, or a RI just occurred by another vehicle or aircraft. All of these programs are currently being used in the NAS to prevent and mitigate all of the different types of RIs. However, not all airports have the necessary funding or resources to have all of these systems installed.

In a quantitative study by Torres, Metscher, and Smith (2011), a correlational research methodology was utilized to study the relationship between human factor errors and RIs. Torres et al. utilized archival data of 274 ASRS and NTSB reports between 2005 and 2009 that were primarily focused on pilot deviations and operational errors. In contrast, the reader is reminded that the current study utilized archival data found in the RWS (2019) as a preliminary component, instead of the ASRS and NTSB as a primary component. Torres et al. presented two hypotheses. The first hypothesis was "that an analysis of NTSB and ASRS reports of RIs would reveal a statistically significant relationship between RIs and

human factor errors" (p. 9). The second hypothesis was "that no statistically significant relationship existed between inclement weather and the occurrence of RIs" (p. 9). Three statistical tests were completed with the data from the ASRS and the NTSB.

With respect to the first hypothesis, Torres et al. (2011) reported a significant relationship between human factor errors and RIs, χ^2 (274, N = 253) = 311.452, $p < .01$. The factors with the highest frequency were reported as situation awareness 34%, miscommunication 27%, and distraction 16%. These types of instances were categorized as human factors in the current study. The other factors listed were airport markings, complex taxiways, airport signage, non-human factor issues, rushed, fatigue, blocked transmission, disruption in routine, and frequency congestion.

With respect to the second hypothesis, Torres et al. (2011) determined "if there was a difference in causal factors between ATC and pilots and between VMC and IMC" (p. 18). They reported that situation awareness and pilot and ATC errors were significant, χ^2 (93, N = 253) = 23.891, $p < .01$, airport markings and pilot errors were significant, χ^2 (34, N = 253) = 7.426, $p < .01$, and lastly, complex taxiways and pilot errors were significant, χ^2 (23, N = 253) = 4.803, $p < .05$. In another χ^2 test of independence, Torres et al. reported that between VMC and IMC, a significant relationship existed between IMC and non-human factors, χ^2 (17, N = 253) = 10.920, $p < .01$, and weather and fatigue, χ^2 (11, N = 253) = 8.350, $p < .05$.

Torres et al. (2011) also reported that "no statistically significant relationship exists between inclement weather and the chances of RIs" (p. 19). They also reported that based on the Pearson *r* there was an absence of significance between visual meteorological conditions (VMC) or instrument meteorological conditions (IMC) and any of the previously listed causal factors to RIs. As a result, Torres et al. failed to reject the null hypothesis of no significant difference between inclement weather and the occurrences of RIs. Torres et al. also reported that their findings supported the claim that "inclement weather does not affect the occurrence rate of RIs" (p. 19).

The initial hypotheses by Torres et al. (2011) was supported by the data. They also concluded by providing additional information about how situation awareness is paramount for controllers and pilots who operate at airfields. Torres et al. reiterated how weather was not a factor for increasing RIs, and how VMC conditions prevailed for the majority of RIs. In the current study, weather conditions were not segregated, and all conditions were accepted. Torres et al. stated how their data were only collected from airports that had an operating control tower. The current study also contains data from control towers because ATC personnel are typically the actors in identifying and reporting V/PD RIs. Torres et al. also stated that their data found in the ASRS is voluntarily reported, and unreported RI data could exist. The current study used data found in the RWS (2019) and accepted the same situation that unreported V/PD RI data could exist.

However, ASRS reports were written by individuals involved in the incidents and may be conducive to bias. RWS reports used in the current study were created by controllers or management and are generally unbiased. Lastly, Torres et al. stated that the NTSB data they examined only contained trend data and lacked significant elaboration of the potential causes. However, there is a lack of information about potential flaws in Torres et al.'s research. Torres et al. concluded that future studies should scrutinize the differences between VMC and IMC RIs and ways of reducing them by improving practices for both pilots and ATC personnel. The current study strived to improve practices for airport personnel in mitigating V/PD RIs. Torres et al. added that future studies "need to be conducted to determine how situational awareness is lost and why does the loss of situational awareness occur" (p. 24).

In a study by Joslin, Goodheart, and Tuccio (2011), a mixed methods methodology was utilized consisting of a descriptive methodology and an unnamed qualitative methodology. Joslin et al.'s study had the following corresponding research hypotheses: "a) a significant difference exists between the RI severity classification from FAA RSO [Runway Safety Office] reports and ASRS pilot reports, and b) thematic constructs extracted from the ASRS narratives inform a greater understand[ing] of FAA RSO reports" (p. 16). Data were supplied through two publicly available data sources and were purposively sampled from both the FAA RSO and the ASRS. The cases from the FAA RSO were between the years 2000 and 2010 and consisted of 484 RI reports at the reported top 10 airports with

the highest frequency of RIs: North Las Vegas Airport (VGT), Los Angeles International Airport (LAX), John Wayne Orange County Airport (SNA), Fort Lauderdale Executive Airport (FXE), Boston Logan International Airport (BOS), Long Beach Airport (LGB), Dekalb Peachtree Airport (PDK), San Antonio International Airport (SAT), Ernest Love Field (PRC), and Atlanta Hartsfield International Airport (ATL). The data collection instrument was a worksheet used by three different raters to score each case identified.

In testing Joslin et al.'s (2011) first hypothesis, an independent sample means *t*-test was used on the data between the two databases. In answering the first hypothesis, the severity codes of each RI incident were analyzed among the three raters of each case within the two databases. Each case was classified on a scale to determine how severe it was, from A, B, C, D, E, or not defined. Each level of severity increased in intensity from E being considered inconclusive, to A being a near miss from a catastrophic event. The following data were reported by Joslin et al. pertaining to testing the first hypothesis:

> The *t*-test revealed the code assigned by expert raters on average indicated a greater severity level ($M = 2.07$, $SD = .73$) than did FAA RI ratings ($M = 3.54$, $SD = .66$), with $M = 1$ corresponding to the most severe level. The difference was significant $t\ (523) = 13.53$, $p < .01$, and represented a calculated medium-sized effect of $r = .51$. (p. 23)

Joslin et al. reported that there was a statistically significant difference between the severity of the FAA RSO cases and the cases studied in the ASRS. Joslin et al. reported that this significance was due to the fact that the requirements for an FAA RSO report and a standard ASRS report were drastically different and usually required an aircraft to be in the vicinity to cause an event, otherwise it would have been a non-event.

In answering the second hypotheses posed by Joslin et al. (2011), the top six thematic codes were as follows:

> Entered the runway after being instructed to 'hold short', crew coordination, misunderstood clearance conditional follow other, flight crew did not ask for clarification when they did not understand a clearance or instruction, unfamiliar with the aerodrome layout, and crew conducting checklists while taxiing. (p. 26)

The frequencies of each of the reported top six thematic codes were: 77, 52, 48, 30, 23, and 22, respectively. These codes were the top six occurrences during the qualitative analysis, and descriptors were used in the explanation by Joslin et al.

Joslin et al. (2011) concluded that more training would be the best mitigation strategy for decreasing RIs. It was also reported that communication and coordination needed to be focused on as well. Communication is a component of human factors as contributing factors. Joslin et al. also reported a flaw in their study, namely, airport layout. Joslin et al. stated that certain airports were designed

without “future-proofing” because of the design being for smaller aircraft in mind and not the larger aircraft that operate today. This also could be interpreted as the airport was not designed for the growth of the surrounding area, and the airport property had to handle increased traffic without room to expand appropriately. Airports without adequate room for larger aircraft can inadvertently cause “hot spots,” or areas where pilots and controllers need to be extra vigilant. One limitation given by Joslin et al. was the use of archival databases and no possible interaction with the initial individual study cases. The current study utilized archival data found in the RWS (2019), and no interaction with these original cases could be made as well. However, it should be noted that Joslin et al. did not address generalizability of the study. Joslin et al. concluded that their emergent coded themes could be used as the basis of more methodical research into each RI narrative.

Vehicle and pedestrian deviation runway incursions. In one of the few V/PD RI studies in the published literature, Rankin and Cokley (2009), used a quantitative correlational design and a qualitative design to determine if personological demographics were significant in vehicle drivers at towered airports. A sample of 390 participants was acquired from airport driver operators sourced from 18 different airports. Rankin and Cokley used the following independent variables for their study of two airport movement area driver training methods: American Association of Airport Executives (AAAE) interactive driver training

education course and a traditional driver training education course, race, age, education, income, and marital status. The dependent variables used were the RI categories A, B, C, and D. To test the reliability of the survey instrument, Rankin and Cokley calculated a Cronbach's α of the instrument that produced a reliability of .864.

Rankin and Cokley (2009) utilized a multivariate analysis of variance (MANOVA) for the statistical analysis. The study failed to find statistical significance with regards to race and marital status. Age, education, and income were found to be statistically significant when compared to the dependent variable, driver training effectiveness. South Florida was also statistically analyzed using MANOVA, *M* and *SD* were not reported and the only variable that was found to be significant was race, F (1, 55) = 10.436, p = .002 (Rankin & Cokley, p. 17).

The qualitative aspects of the study, as Rankin and Cokley (2009) stated, were grouped into typical comments and was a "limited qualitative methodology" (p. 10). Four typical comments were given by Rankin and Cokley that were suggested by participants during the study. The first typical comment centered on how using computers in training was perceived as good and user friendly as the participants' favorite aspects of training. The second typical comment was centered on lack of staffing, and reports that funding was suggested by participants. The third typical comment was based on improvements to the system of driver training where more interactive computers could be used, and a standardized airport driver

license would be beneficial to all parties. The fourth and last typical comment centered on ethnic and cultural diversity. It was reported that multilingual participants had difficulties with ATC instructions.

In summarizing the study by Rankin and Cokley (2009), it was found that in non-movement areas, where lower wages and lower educated individuals work, problems can occur. These areas were reported to have high turnover rates; thus, those working in these areas have not received a significant amount of training over a period of years. In movement areas where demographics were found to be significant in all towered U.S. airports, these employees were found to be more educated and had received more training over the years because of a requirement to complete recurrent training more frequently. However, Rankin and Cokley stated that in South Florida, race was found to be the only significant demographic because the population in South Florida has a higher proportion of Hispanic people to other parts of the U.S. Rankin and Cokley stated that this finding was problematic because English is the adopted industry language of the world, not just the U.S. Recommendations drawn from Rankin and Cokley were to support a replication study to examine other geographical regions aside from South Florida, to alter the driver education program to reflect the ethnic diversity of its participants, and increasing recurrent training. Limitations given by Rankin and Cokley were only able to utilize data from towered airports, limited to V/PDs that caused RIs, and "effective sample size of participants, the accuracy of the data

provided by the participants, and the pitfall of correlation versus causation for forming conclusions" (p. 8). Data of reported V/PD RIs were exclusive to towered airports that generally report V/PD RIs. Hence, airports without towers have no over-watching authority to spot V/PD RI instances. However, generalizability and flaws were not given by Rankin and Cokley.

Summary and Study Implications

Summary. This section summarizes the collective findings from the literature. The ontological philosophical assumption was applied to the current study because participants had their own realities and I accepted there is not one single way to solve this phenomenon of increasing V/PD RIs. The corresponding interpretative framework for this current study is social constructivism where the participants' experiences were created through interactions in their professional career and taken to supply the necessary information pertaining to the study's phenomenon to answer the RQs.

Hooey and Foyle (2006), Prinzel and Jones (2007), Joslin et al. (2011), Torres et al. (2011), and Rankin and Cokley (2009) all supported multifaceted approaches to RI mitigation involving technological solutions. Hooey et al. (2006), Prinzel and Jones (2007), Feigh and Bruneau (2009), Torres et al. (2011), and Joslin et al. (2011) supported the notion that human factors are contributing factors of RIs. Feigh and Bruneau (2009), Joslin et al. (2011), and Rankin and Cokley (2009) suggested that improved training would help mitigate RIs and V/PD RIs.

Elements of the data collection instrument that were based on previous literature include questions centered on: human resources, technology, managerial considerations, and training.

Study implications. The implications that can be taken from the reviewed literature unearthed several overarching themes that were examined during the current study's implementation. First, technology was identified as a major theme as to the contributing factors or mitigations of both aircraft RIs and V/PD RIs. Second, human factor contributors such as situation awareness, miscommunication, misunderstanding, and confusion have been identified as high correlates of RIs and V/PD RIs. Third, training has been repeatedly cited as a lack of or problem solver of issues related to RIs and V/PD RIs. Managerial considerations were also identified, including lack of funding or workers not speaking the correct language. In Hooey and Foyle (2006), Prinzel and Jones (2007), Joslin et al. (2011), Torres et al. (2011), and Rankin and Cokley's (2009) studies, a multi-faceted approach consisting of technology, human factors, managerial considerations, and training were identified main themes, possible causes, or successes to RIs and V/PD RIs.

Conclusion

This current research was based on a need recognized by the increase of V/PD RIs identified in the RWS (2019). After examining the limited published literature on the subject of RIs and V/PD RIs, it is plausible to ascertain that the current study will facilitate in bolstering the knowledge of what the contributing

factors of V/PD RIs are as perceived by airport executives' airports with the highest number of V/PD RIs in the nation. However, the literature that does exist on the subject of RIs and V/PD RIs provides some guidelines on the foundation of error, human factors, and contributing factors that were utilized to conduct this current research. Human factors, lack of training, and lack of technology were identified as themes across all literature. The literature also suggests that an amalgam of the above emergent themes should be used in conjunction for mitigating RIs and V/PD RIs. After examining the related literature, themes on technology, human factors, and training should be identified among the participant's own unique experience of the phenomenon of V/PD RIs.

Two themes were discussed in this chapter consisting of RIs, and V/PD RIs. These two themes informed my study by creating a literature foundation as to generate this current research. RIs from an aircraft context were examined because RIs from aircraft parallel V/PD RIs due to the same rules and regulations that govern both. Lastly, V/PD RIs were examined in the previous literature to create a basis as to what was to be expected during this current research's implementation.

Chapter 3

Methodology

Population and Sample

Population. The target population of the current study consisted of all the airport executives located within the U.S. and its territories. Each airport executive was a member of leadership at an airport that was either Part 139 certificated, further distinguished as Class I, II, III, and IV, or was not Part 139 certificated. Table 3.1 shows the differences among the four classes of Part 139 airport classification. However, airports that do not have air carrier services and only service smaller aircraft are not required to be Part 139 certificated. The airport executives were at airports located in the following nine FAA regions: Alaskan, Central, Eastern, Great-Lakes, New-England, Northwest-Mountain, Southwest, Southern, and Western-Pacific. The accessible population consisted of airport executives at airports with more than 10 V/PD RIs between FY 2011 and FY 2016 according to publicly available information found in the RWS (2019).

Sample. The sample for the preliminary research component consisted of the purposively selected 41 airports that had more than 10 reported instances of V/PD RIs during FY 2011 to FY 2016. The sample for the primary research component was comprised of airport executives who voluntarily participated in the study found in the accessible population. The corresponding sampling unit was airport executives working at one of the targeted airports. A convenient

nonprobability sampling strategy was utilized because interviewing the airport executives at the targeted airports yielded the data required to answer the RQs. Airport executives, managers, and management appointed representatives represented the targeted airports. Airport executives are the most senior members located at each airport who have the experience and training necessary to operate and oversee their respective airports.

Demographics. Demographic data from the current study's participants consisted of: (a) number of years of overall aviation experience, (b) number of years working as an airport manager or executive, (c) current professional title, (d) AAAE member status, (e) age, (f) gender, and (g) FAA region if available. For a complete demographic summary, see Table 3.2. FAA region is the only demographic data that was inferred from participants. Phone interviews with three participants determined FAA region location. One participant provided airport identifying information, this was removed, but the FAA region was identified for demographics. For the remainder of this current study, participants will be labeled given the unique titles of P1 through P11. However, it should be disclosed that with potential sensitivity to data gathered for this current study, participants were given the option to not answer the question on region location. P6 elected to not provide demographic data, and that is reflected in the demographic data summary. The demographic data for the participants are as follows:

- P1 had 11 overall years of aviation experience, and 2 years in the current position as an airport manager. P1 was a member of AAAE at the time of data collection, however, elected to not provide information pertaining to current age. This participant provided a location in the anonymous *SurveyMonkey* questionnaire and was located in the Western-Pacific FAA region. Specific airport identifying information was removed from this document to ensure participant anonymity.
- P2 had 20 years of aviation experience, and 11 years in the current position as an airport manager. P2 was a member of AAAE at the time of data collection. This participant's age was between 51 and 60 years. The FAA region location was not possible to determine from the *SurveyMonkey* questionnaire.
- P3 had 15 years of aviation experience, and 15 years in the current position as airport manager. P3 was a member of AAAE at the time of data collection. This participant's age was between 41 and 50 years. FAA region location was not possible to determine from the *SurveyMonkey* questionnaire.
- P4 had 25 years of aviation experience, and 24 years in the current position as airport executive. P4 was a member of AAAE at the time of data collection. This participant's age was between 51 and 60

years. FAA region location was not possible to determine from the *SurveyMonkey* questionnaire.

- P5 had 7 years of aviation experience, and 1 year in the current position as an airport manager. P5 was a member of AAAE at the time of data collection. This participant's age was between 18 and 30 years. FAA region location was not possible to determine from the *SurveyMonkey* questionnaire.
- P6 elected to not provide demographic data.
- P7 had 30 years of aviation experience, and 18 years in the current position with the title of other. P7 was not a member of AAAE at the time of data collection. This participant's age was between 51 and 60 years. FAA region location was not possible to determine from the *SurveyMonkey* questionnaire.
- P8 had 37 years of aviation experience, and 5 years in the current position as an airport manager. P8 was a member of AAAE at the time of data collection. This participant's age was between 51 and 60 years. FAA region location was not possible to determine from the *SurveyMonkey* questionnaire.
- P9 had 6 years of aviation experience, and 20 years in the current position as an airport manager. The overall years-experience and current position years are not a typo. This airport's controlling

organization is over a major seaport as well, and this participant was a seaport manager before being transferred to the aviation division. P9 was a member of AAAE at the time of data collection. This participant's age was between 51 and 60 years. This participant elected for a phone interview, hence the exact identifiable information. This participant was located in the Northwest-Mountain FAA region. All identifying information was removed to ensure participant anonymity.

- P10 had 30 years of aviation experience, and 16 years in the current position as an airport manager. P10 was a member of AAAE at the time of data collection. This participant's age was between 51 and 60 years. This participant elected for a phone interview, hence the exact identifiable information. This participant was located in the Northwest-Mountain FAA region. All identifying information was removed to ensure participant anonymity.
- P11 had 12 years of aviation experience, and 12 years in the current position as airport manager. P11 was a member of AAAE at the time of data collection. This participant's age was between 41 and 50 years. This participant elected for a phone interview, hence the exact identifiable information. This participant was located in the

Great-Lakes FAA region. All identifying information was removed to ensure participant anonymity.

Participants' overall years of aviation experience was as follows (see Table 3.3): $M = 19.3$, $SD = 10.77$, $Mdn = 17.5$, Range = 6-37. The summary of the years in current position as manager or executive was as follows: $M = 12.4$, $SD = 7.73$, $Mdn = 13.5$, Range = 1-24.

The FAA regions represented and identified in the sample were (see Table 3.4): 1 Great-Lakes (25%), 2 Northwest-Mountain (50%), and 1 Western-Pacific (25%). It should be disclosed and reiterated that only 4 of the 11 airports' regions could be identified ($N = 4$). The overall percentages of regions that had V/PD RIs of more than 10 within the study period were: Alaskan (7.3%), Central (0.0%), Eastern (9.8%), Great-Lakes (7.3%), New England (0.0%), Northwest-Mountain (12.2%), Southern (12.2%), Southwest (17.1%), Western-Pacific (34.1%).

The relative *f* of V/PD RIs incident numbers were as follows: 0-10 (0%), 11-20 (25%), 21-30 (75%), and > 30 (0%) (see Table 3.5). Only four airport executives who could be identified supplied information for the relative *f*. One airport that could be identified was within the 11-20 number of V/PD RIs, three airports were within the 21-30 number of V/PD RIs, and no airports experienced more than 30 V/PD RIs within the study period.

The relative *f* of participant age was as follows: 18-30 (9%), 31-40 (9%), 41-50 (18%), 51-60 (45%), 61+ (0%), and did not answer (18%) (see Table 3.6). Of the participants who provided demographic data, all were male.

Instrumentation

After consulting the literature and referencing data from the RWS (2019), a primary research component that examined factors pertaining to V/PD RIs was warranted. After a consultation, an instrument was provided by M. A. Gallo (personal communication, February 13, 2018) that was modified to measure V/PD RIs instead of general aviation RIs. A qualitative questionnaire instrument was used to gather data from participants (See Appendix C). For the current study, this instrument was titled Qualitative V/PD RI Contributing Factors and Mitigation Instrument. Face and content validity of the instrument was performed by three university aviation professors, three doctoral candidates, and one senior airline pilot. I also conducted a preliminary study with these aviation professionals about the instrument's structure and time it took to respond to the items. This resulted in adjustments to the instrument consisting of altering the context from a general aviation RI perspective to a V/PD RI perspective. There are both advantages and disadvantages to utilizing questionnaires as the major data collection instrument for qualitative studies. According to Ravitch and Carl (2016, pp. 172-173), advantages consist of:

- A questionnaire can be an efficient way to collect data from a range of people across locations.
- Responses can be easier to compile and analyze than other forms of data.
- Significant amounts of information can be collected from a large number of people in a short period of time.
- It is relatively cost and resource effective;
- Individuals can remain anonymous.
- A questionnaire can be carried out by the researcher or by any number of people with limited effects on their validity and reliability.
- The results of a questionnaire can usually be quickly and easily quantified by either a researcher or through the use of a software package.

Disadvantages include (Ravitch & Carl, 2016, p. 173):

- Responses provide only a limited amount of information without explanation and contextualization.
- A questionnaire works best when the questions (or items) are objective (e.g., one's age) rather than subjective (e.g., one's feelings about an event, changes in perspective over time) (Patten, as cited in Ravitch & Carl, 2001).

- A questionnaire does not tend to generate rich or contextualized data, and therefore responses can be hard to analyze.
- A questionnaire can be inaccurate because people tend to give socially acceptable responses even when the questionnaire is anonymous (Patten, as cited in Ravitch & Carl, 2001).
- There is no way to know if a respondent is being truthful.
- It can be difficult to tell how much thought has gone into responses, which can affect accuracy.
- People may read and understand questions differently and therefore reply based on their own interpretation of the question (and there is no mechanism to know).
- There is a level of researcher imposition in the design of questionnaires, which means that there is much that researchers are not able to learn.
- A questionnaire can restrict access if disseminated [through] the Internet because that requires a networked computer.
- A questionnaire requires literacy and therefore might marginalize those who are not literate.

A questionnaire was appropriate for the current study because it allowed for an efficient means of data collection. However, the reader is cautioned that the

disadvantages listed by Ravitch and Carl (2016) still hold, and this needs to be taken into consideration when making interpretations from the study's findings.

The V/PD RI cases found in the RWS (FAA, 2019) between FY 2011 and FY 2016 were used to determine the identified airports. Each case located within the RWS was comprised of details about each event that occurred. Time of event, weather, aircraft involvement, vehicle and pedestrian involvement, and case narrative, are examples of data found within in the RWS cases. The main advantage of using this archival data is that it contains the publicly available information maintained by the FAA about each V/PD RI case. However, one disadvantage about archival data is the accuracy of cases within the database being potentially erroneous because data were entered manually. However, it can be presumed that data contained in the RWS are valid because it is a federal government database.

Procedures

Research methodologies. The current study consisted of a preliminary content analysis followed by a primary qualitative phenomenological design. The purpose of the first approach was to determine the identified airports. The purpose of the second approach was to answer the RQs that were inductively derived from participant responses.

The primary research component utilized a qualitative phenomenological methodology with a questionnaire instrument design. According to Creswell (2013), a phenomenological research study "describes the common meaning for

several individuals of their lived experiences of a concept or a phenomenon" (p. 76). Bernard, Wutich, and Ryan (2017) state that there are six steps in implementing a phenomenological study:

> (1) identifying a phenomenon whose essence you want to understand; (2) identifying your biases and bracketing them – doing as much as you can to put them aside; (3) collecting narratives about the phenomenon from people who are experiencing it; (4) using your after bracketing intuition to identify the essentials of the phenomenon; (5) laying out those essentials in writing with exemplary quotes from the narratives; and (6) repeating steps 4 and 5 until you are sure that there is no more to learn about the lived experience of the person you're studying. (p. 302)

In the current study, experiences and professional insight were gathered from the sample of airport executives pertaining to V/PD RIs. Each airport executive is the highest member of each targeted airport organization; hence, it can be presumed that each executive share similar traits, backgrounds, and education.

Human subject research. The study involved the use of human subjects. I followed proper protocol relative to human subject research issues. Prior to data collection, I applied to Florida Tech's Institutional Review Board (IRB). The application included a description of the study, study protocols, and how the study met the IRB's exempt criteria. My application was approved on October 30, 2018. Revision paperwork was also filed with the IRB after the adjustments to the

instrument were made. Copies of the IRB approval documentation can be found in Appendix D.

Study implementation. After committee approval and IRB approval were obtained, the first step in implementing the primary part of the study was to recruit participants. I contacted each targeted airports' controlling organization with the recruitment email template found in Appendix C. After initial contact was made, I invited each airport's organization to participate in the study with the recruitment email in Appendix C. Participation was voluntary, and participants could choose to withdraw at any time during the course of the study. No participants withdrew from the current study. The informed consent form and interview protocol are provided with the instrument in Appendix C. Participants' were given a choice to either complete the online questionnaire or via a phone interview where I asked questions and they responded to the same questions given on the questionnaire. The questionnaire took participants no longer than 30 minutes to complete and contained 28 items. Interviews were conducted by me via phone, or participants opted to complete an online questionnaire through *SurveyMonkey,* that contained the same phone interview questions in written format. If participants requested a phone interview, their responses to the interview questions were typed verbatim by me. I elected to not record conversations to ensure participant anonymity. If participants elected to complete the online questionnaire through *SurveyMonkey,* it required them to access and use a computer (See Appendix C). The advantage of

SurveyMonkey is that participants may have preferred this due to time constraints and/or prior commitments. I was the sole data collector and all information passed through me. Being the sole data collector has the potential to be problematic because unchecked mistakes can be made, or information could be lost. To ensure information was not lost, data from *SurveyMonkey* was uploaded into *Nvivo* for immediate qualitative analysis. Within the *SurveyMonkey* website, there is an option to download every question from the website into a portable document format, that can be read by *Nvivo* for categorization. Data that was downloaded from *SurveyMonkey* was saved on a backup USB stick and subsequently deleted after the data analysis.

Standards of rigor. This section provides the steps taken to ensure a robust qualitative methodology was used for the research. The standards of rigor for qualitative methodology follow.

Reflexivity. In addressing reflexivity for the qualitative phenomenological methodology phase, this section contains my biases and how I controlled them. First and foremost, I have an aviation background, and this might potentially harbor subconscious opinions as to how I think airport personnel may or may not mitigate V/PD RIs. My professional aviation background comes from having a certified flight instructor certificate and commercial pilot's license. Academically, I have a M.S. in Aviation Administration. I am currently in a Ph.D. in Aviation Sciences program. It can be assumed that I have gained knowledge and background of V/PD

RIs during my professional and academic aviation career. To control for this, I utilized the bracketing technique and compartmentalized my thoughts and feelings on this topic during data analysis to see the research as an unbiased researcher. In supplementing my bracketing technique, I maintained a journal where I documented the events of the day and during data analysis (See Appendix E). Lastly, my dissertation committee chair asked me questions and served as a peer debriefer in not only enhancing the credibility of the study, but also assisted in addressing any potential biases that may or may not materialize during my analysis.

Credibility. According to Ary et al. (2010), credibility is defined as "the accuracy or truthfulness of the findings; similar in concept to internal validity in quantitative research" (p. 639). In enhancing credibility of the current study, my dissertation committee chair served as a peer debriefer to "check [my] work and look for evidence of bias" (Ary et al., p. 647). Additionally, in boosting credibility, my dissertation chair independently coded three participants' data after I coded and recoded the same data. The coding was in agreement with the categorizations of the participant data. Descriptors were used to enhance the domains and conjectures created from the data. Lastly, to enhance the credibility of the study, I utilized reflexivity through the use of bracketing. Bracketing "involves the researcher intentionally setting aside his or her own experiences, suspending his or her beliefs in order to take a fresh perspective based on data collected from persons who have experienced the phenomenon" (Ary et al., p. 473). This highlighted my own biases

that could potentially impact the study because the data were interpreted ideographically through me. All of these mechanisms were employed to enhance the credibility, or truthfulness, of the data and results. However, it should be disclosed to the reader that member-checking would have boosted the credibility of the current study further, but the anonymous nature of the online survey instrument did not allow for this. Member-checking involves, after the qualitative data were analyzed, seeking the approval of participants to ensure that their essence was captured in the report. As a result, because member-checking was absent from the current study, the validity of my interpretations of participants is problematic.

Transferability. Transferability refers to the generalizability of the study from a qualitative perspective (Ary et al., 2010). In enhancing the transferability, a thick description was created, limitations were disclosed, and a reflective statement was created. The description was created from the responses of the qualitative data collection instrument filled with direct quotes from participants found in Chapter 4. The purpose of the description creation was to provide an adequate sending context for external readers to be able to determine if the receiving context is appropriate for them. Limitations and delimitations were disclosed to enhance transferability. Lastly, a reflective statement was created to identify my potential biases and feelings that could potentially affect my analysis.

Dependability. Dependability is similar to the idea of consistency and the ability to reproduce a study's methods and procedures (Ary et al., 2010). In

enhancing the dependability, an audit trail was created, and intra-rater agreement was achieved. An audit trail was maintained in my journal filled with notes documenting every step taken during the study's implementation (see Appendix E). An intra-rater agreement spanning 2 weeks was conducted to ensure consistency in coding the domains of the qualitative data from the questionnaire. A second 2-week span of coding was conducted to determine the child nodes and conjecture creations to boost intra-rater reliability.

Confirmability. Confirmability is the ability of the study to be neutral where "the research is free of bias in the procedure and the interpretation of the results" (Ary et al., 2010, p. 504). This neutrality is achieved through audit trails, and reflexivity. As stated for dependability, an audit trail is the journal I created that documented every step taken during the study (see Appendix E).

Data Analysis

The data analysis for the study was conducted with the assistance of *Nvivo*, a qualitative analysis software program that allows for highlighting and tagging sentences or words from uploaded files for categorization. After uploading the raw data into *Nvivo*, major nodes or domains, were created from participants' responses. After a period of 2 weeks passed, the results were coded again. Then, the nodes were further defined into child nodes as included terms and cover terms to align with Spradley's (2016) domain analysis. These new defined nodes were also coded after a period of 2 weeks. Descriptive statistics were created from the data

without compromising participants' anonymity. The results of the data analysis can be found in Chapter 4.

Chapter 4

Results

Introduction

This chapter is comprised of one main section. Identifying information was removed to ensure participant anonymity. Spradley's (2016) domain analysis was used to categorize the qualitative data to provide the formation of common themes and corresponding conjectures that emerged from the data. Four domains emerged consisting of: (1) airport operations as contributing factors, (2) human factors as contributing factors, (3) staff/personnel as contributing factors, and (4) recommended or effective mitigation approaches/strategies.

Results of Qualitative Phenomenological Analysis

The researcher-modified V/PD RI questionnaire consisted of 28-items administered through a phone interview or *SurveyMonkey* for 1-month beginning on February 11, 2019, and concluding on March 10, 2019. During that time, there were 11 participants. Phone interviews were given to 3 participants and the remaining 8 participants elected for the *SurveyMonkey* version. Of the 11 total participants, 9 provided complete responses with the remaining 2 participants giving near-complete responses (82% completion rate). It should be disclosed that the sample of airport executives and managers were informed to leave information blank when responding as they deemed appropriate. It should also be disclosed that one phone interview participant asked to receive a copy of the questions before the

phone interview. This was granted because the *SurveyMonkey* version did not have a time limit to review and respond to questions. Of the three phone interview participants, one participant received an advanced copy of the questions and two did not receive an advanced copy of the questions prior to the phone interview. An advanced copy of the questions would have also been provided to the other two interview participants if it was requested.

In categorizing the themes and patterns, Spradley's (2016) domain analysis was applied. Four major domains emerged from the data: airport operations as contributing factors, human factors as contributing factors, staff/personnel as contributing factors, and recommended or effective mitigation approaches/strategies. These major domains were further partitioned into sections and subsections referred to by Spradley (2016) as cover terms and included terms, respectively. These could read as "domain-cover term" or "domain-cover term-included term." However, every conjecture has a cover term, but not every conjecture has a corresponding included term. Tables 4.1 through 4.4 contain a summary of this process. An example (see Table 4.1) of how this information should be read is for Conjecture 1.4 in Table 4.1 for Domain 1, "Airport Operations." This sequence and corresponding conjecture should be read as "Contributing factors to V/PD RIs with respect to airport operations *covered* management and *included* technology"; therefore, "With respect to contributing factors of V/PD RIs, violations of this nature are contributed by inadequate signage

and markings." A discussion of each domain and its corresponding cover/included terms follows.

Domain 1: Airport operations. Domain 1 (see Table 4.1) was associated with RQ1: What are the contributing factors of V/PD RIs with respect to airport operations? Within the questionnaire, multiple items provided data categorized into this domain. The cover terms management, planning, and security emerged from the contextual data analysis. Management was further defined under included terms as administration, and technology.

Management. The management cover term within Domain 1 comprised three included terms: administration, technology, and transparency.

Administration. Based on their comments, airport administration itself was identified as a contributing factor of V/PD RIs. For example: P7 reported, "more rules or issues to comply with," and P11 reported, "FAA rules and regulations." Although ambiguous, FAA rules and regulations are all-encompassing terms that could mean any collection of rules or regulations that airports are required to comply with including or not including Part 139 certification.

Based on participants' comments, funding was identified as one of the barriers to addressing V/PD RIs at participants' airports. P2 reported, "1. lack of grant funding to improve access controls 2. lack of grant funding to improve access controls 3. lack of grant funding to improve access controls;" P4 reported, "Cost of radio equipment needed to adequately communicate with ATC"; and P8 stated,

"Cost of [V/PD RI] mitigation" as barriers to prevent V/PD RIs. Based on responses from participants, funding appeared to be an issue in addressing V/PD RIs at their respective airports. Based on these responses, it appeared that the systems the participants had in place were inadequate to prevent V/PD RIs, so it can be presumed that the lack of funding was a contributing factor of V/PD RIs.

These comments about what the participants believed are contributing factors of V/PD RIs with respect to the administration led to the following conjecture: With respect to contributing airport operations factors of V/PD RIs, violations of this nature are contributed by (a) FAA rules and regulations, (b) lack of funding, and (c) poor safety promotion and a poor safety culture.

Technology. Based on participants' responses, technological shortcomings, both low-tech and hi-tech, at an airport contributed to V/PD RIs. However, a lack of technology was also cited as a contributing factor to V/PD RIs at airports. For example: P1 said, "I would say the lack of technology can lead to V/PD RIs"; P2 reported, "It's more a lack of technology"; and P11 said, "Technology, cameras to have a better view of the runways and taxiways, so far that has not been approved by the FAA," and P11 stated "The lack of technology." However, it should be stated for the reader that probing participants further regarding these comments would have yielded more specific responses related to a lack of technology. However, this was not done because of my level of skill pertaining to interviewing. Hi-tech contributing factors consisted of lack of or malfunctioning complicated

systems and circuitry that could be considered modern. For example: P4 reported, "substandard or malfunctioning equipment such as radios"; P5 stated, "technology has been a letdown for some airports. RIs Warning programs are not as efficient as they seem to be and are also costly." These responses support the notion that a lack of adequate technology can contribute to V/PD RIs. Poor low-tech implementations were also cited as contributing factors of V/PD RIs.

Low-tech contributing factors consisted of airport signs and markings. Although not typically thought of as technology, they were developed at one point-in-time. For example: P2 reported, "inadequate signage"; and P8 reported, "airport marking[s]." These low-tech contributing factors are typically management's job to maintain and keep in acceptable condition to allow for safe operation on the airfield for all users. On the other hand, hi-tech contributing factors are more traditionally in-line with the concept of technology.

These comments about what participants believed to be contributing factors of V/PD RIs with respect to technology led to the following conjecture: With respect to contributing airport operations factors of V/PD RIs, violations of this nature are contributed by (a) inadequate signage and markings and (b) lack of adequate technology.

Planning. Based on participants' comments, the airport itself can be designed in such a way that it inadvertently lends itself to V/PD RIs. This included term consisted of planning for events at the airport property as well. Examples from

participants of how the airport itself can inadvertently produce V/PD RIs are: P2 reported, “confusing geometry,” and stated:

> Yes, airport geometry is a huge factor. Our airport is very compact; many aircraft parking ramps are so close to the runway that they impinge on the Primary Surface. Between the ramps and the primary parallel taxiway is a vehicle service road which is too close to the taxiway, and the taxiway itself is too close (per FAA standards) to the runway.

P6 stated, “confusing orientation of airfield complex (i.e., don’t meet the new design standards)”; P8 reported, “airport geometry”, P10 stated, “airport design, how it’s laid out” and reported:

> It could be the design of the airport, if you have vehicle access from the road to the airport, once they cross a certain point, they have access to the apron…airport design could contribute to V/PD’s as well.

P11 stated:

> Tower location and parallax, it’s a pretty low elevation and a bit a way’s back from the runways, the tower can’t tell if someone is landing on the eastside, they can’t tell which side they are landing on, if they flare too {sic} high, it looks like they are landing at the wrong airport.

P11 also reported, “visibility of the tower to see the runway someone is lined up on.” Based on the responses from the participants, there appeared to be a consensus that airports can be designed in such a way that would inadvertently promote for

the proliferation of V/PD RIs. Airport executives do try and improve their RI mitigation practices through construction, but construction adds more possibilities of V/PD RIs from workers and those who are not familiar with airport procedures.

Based on participants' comments, construction on the airfield was cited as a contributing airport operations factor of V/PD RIs. In the context of airport operations, construction was generally a planned activity to improve or better the airport. For example: P5 reported, "Construction on Airfields"; and P6 stated, "Construction and change in airfield environment." Construction on the airport property does allow several out-of-the-ordinary circumstances to occur that must be considered for each airport user. There are workers who might not possess an aviation background and are unfamiliar with the rules and regulations associated with airports. Traffic patterns and procedures are temporarily altered during construction times, whereas times that otherwise might be considered normal have the potential to produce V/PD RIs although changing routines.

Construction was not the only way the airfield can be modified that could produce V/PD RIs; mother nature or environmental changes can also be a contributing factor. Participants' responses highlighted environmental changes to the airfield that could contribute to V/PD RIs. This cover term included responses consisting of weather and mother nature. For example: P5 and P6 both stated, "environmental changes"; and P7 reported, "possibly weather." Blizzards and torrential downpours could produce conditions where visibility has the potential to

be zero, and those who are on the airport environment could commit a V/PD RI. Poor procedures implemented by management about weather and environmental changes can be considered contributing factors in V/PD RIs.

These comments about what the participants believe to be contributing airport operations factors of V/PD RIs with respect to planning led to the following conjecture: With respect to contributing airport operations factors of V/PD RIs, violations of this nature are contributed by (a) airport design and geometry, (b) construction on the airfield, and (c) environmental changes.

Security. Based on participants' responses, security-related contributing factors are categorized under the Airport Operations domain. For example: P2 reported, "untrained/unauthorized personnel gaining access to the [airport operations area] AOA," and reported:

> We have had numerous instances of tenants supplying 'friends' or service providers (aircraft detailers or mechanics, for example) -- unauthorized, untrained personnel -- with the gate codes to gain access to the AOA and V/PDs have occasionally resulted from that practice.

P3 stated, "our issues are almost always related to a lack of escorting or improper gate practices"; P4 reported, "mitigating the multiple access points available on the airport and controlling who has access to use them"; and P12 said, "somebody [is] giving a code to a gate out to someone then (sic) that other person is unfamiliar with the airport." Security-related contributing factors centered on several themes

within the cover term of security. Users or tenants gave out security codes to those who did not originally apply or were properly trained by airport personnel on the appropriate procedures of an airport, hence, committed V/PD RIs. Lack of adequate gate controls to mitigate those who otherwise would not have gained access to the airport environment were a problem as well.

These comments about what participants believe to be contributing airport operations factors of V/PD RIs with respect to security led to the following conjecture: With respect to contributing airport operations factors of V/PD RIs, violations of this nature are contributed by (a) lack of adequate gate controls and (b) untrained and unauthorized persons gaining access to movement areas.

Domain 2: Human factors. Domain 2 (see Table 4.2) was associated with RQ2: What are the contributing factors of V/PD RIs with respect to human factors? Within the questionnaire, multiple questions provided data that were categorized into this domain. The cover terms behavior and situation awareness emerged from the contextual data analysis. Situation awareness was further defined by the included terms of communication issues and inattention.

Behavior. Based on participants' responses, human behavior was identified as a common theme with respect to being a contributing human factor of V/PD RIs. Within behavior, complacency in the workplace has the potential to be very dangerous. Errors can be committed, and mistakes have the potential to be made. Participants' responses supported complacency as a component of behavior that

could contribute to V/PD RIs. For example: P3 stated, “people get complacent which is why we do recurrent training”; P5 said, “Complacency within the airport environment is also an issue” and “Active Listening and complacency have been the recent issue”; P6 said, “sometimes this is caused by complacency or lack of active listening”; and P8 reported, “complacent.” Complacency is related to disregarding rules and procedures as P2 reported, “authorized person disregarding rules/procedures.” These comments about complacency and the number of times the phrase appeared in participants’ comments supported employee complacency as a real problem to the airport environment.

In the context of the current study, mental health was also listed by participants as a contributing human factor of V/PD RIs. For example: P8 said, “Tired” or what was commonly called fatigue, and P9 reported, “yes, fence jumper, mental health category.” It appeared that what P9 was trying to say was that an unauthorized person scaled the perimeter fence at the airport and the reasoning for this action was because he/she had mental health issues. The health and related mental health of the individual on the airport environment can be a contributing factor of V/PD RIs. Humans can be inherently unpredictable. For example, P2 reported:

> Unpredictable human behavior. (and this is at a busy urban Reliever airport): A woman who resided east of the airport was headed to an auto repair business west of the airport to pick up her car. She decided to take a

> ‘short cut’ across the airfield; she scaled a perimeter fence, crossed a ramp, a taxiway, and a runway - causing aircraft to go around - before she was apprehended (arrested).

P2 continued with another example:

> A contractor using a vacuum truck to pump out portable toilets at a hangar construction site saw additional portable toilets at another construction staging area on the opposite side of the airport. Believing those other toilets were next on his route, the contractor dismantled a section of construction fence, entered the AOA, drove onto a taxiway and then onto a runway, proceeding 2,000 feet down the runway before exiting on another taxiway (and being welcomed by a multitude of police, fire, and airport operations vehicles). Fortunately, the closest aircraft was approximately 4 miles away on approach.

Humans are inherently unpredictable with regards to behavior. It was unclear what was going on inside their minds in terms of whether there was intelligent or irrational thought. Participants’ comments with regards to these as contributing factors of V/PD RIs led to the following conjecture: With respect to contributing factors of V/PD RIs, violations of this nature are contributed by (a) becoming complacent, and (b) health and mental health.

Situation awareness. The situation awareness cover term within Domain 2 contained two included terms: communication issues and inattention.

Communication issues. Communication issues constituted both oral and written communications. Examples of oral communication issues consisted of spoken language on the radio or speaking a foreign language. Examples of written communication issues consisted of signage and markings on the airport environment that would require reading and comprehending.

Based on participants' responses, there appeared to be instances of a lack of active listening by drivers who have been identified as those who committed V/PD RIs. For example: P5 reported, "Active listening is a major issue when people hear what they want to hear and not what is actually said" and "Active Listening and complacency have been the recent issue," and P6 reported:

> Yes, there are so many distractions that can lead to a V/PD such as someone listening to the vehicle radio (music) and not hearing the instructions from ATC. Another example of HF [human factors] is someone who is used to going a particular route will anticipate the controller giving them those instructions when in reality the controller gives them a different route (sometimes this is caused by complacency or lack of active listening).

Lack of active listening can occur when a driver was driving on the airport environment, received a modified clearance, ignored the new clearance, and traveled the previous clearance resulting in a V/PD RI. This can be further problematic if fuel trucks entered the runway. Based on participants' comments, a driver may get distracted when listening to something other than communication

messages over the radio. Therefore, different types of communication issues contributed to V/PD RIs related to miscommunication.

Based on participants' comments, miscommunication had been shown to contribute to V/PD RIs. For example: P6 and P7 reported, "miscommunication," P7 also reported, "Possibly....airfield mx [maintenance] personnel (non-aeronautical background) not being aware of air traffic language or phraseology. Misunderstanding an air traffic clearance," and P8 said, "Miscommunication between pilots, airport staff and ATC." Miscommunication issues can also be nonverbal, such as misinterpreting signage. For example: P10 reported, "Human factors. And a form of communication, they don't read signs, so I have to come up with new ways to communicate that there's an issue and do not go beyond a certain point." Participants have identified this type of human factor problem at their airports.

These comments about contributing factors of V/PD RIs with respect to communication issues led to the following conjecture: With respect to contributing factors of V/PD RIs, violations of this nature are contributed by (a) lack of active listening and (b) miscommunication.

Inattention. The second included term within situation awareness was inattention, and participants' provided, many examples. The first example of inattention was getting distracted. P1 reported, "People may know the rules and simply not be concentrating or lose focus," P2 said, "loss of situational awareness

by trained and authorized personnel," and P6 reported, "there are so many distractions that can lead to a V/PD such as someone listening to the vehicle radio (music) and not hearing the instructions from ATC." Being distracted can be dangerous, especially on the airport environment, where all it takes was not paying attention to one's surroundings that could lead to a fuel truck collision. Another inattention contributing factor to V/PD RIs was lack of familiarity with airport geography.

According to participants, lack of familiarity with airport geography was found to be a contributing factor of V/PD RIs within human factors. For example: P4 reported, "Contractors driving where they are not supposed to be," P8 said, "Ground staff not paying attention to their location," and P9 reported, "a leading cause, intentionally turning the wrong way on a taxiway thinking they knew where they were, totally lost." It appeared that ground personnel, either construction or normal ground operations, got lost on the airfield, and this contributed to V/PD RIs. The remaining contributing factor within inattention was inattention to detail. For example: P8 reported, "Inattention to detail by pilots and non-airport [personnel] inappropriately escorted," and P10 reported:

> Both pilot group and non-flying group seems to gain access to apron area, and not reading signs. Signs all over the place, that say do not go here without approval, think they can make wide turns, or passengers making

wide turns, and not paying attention to non-movement lines and people are the key element that we found.

P11 said, "crossing over the parallel to get to the other runway without having clearance." Not reading a sign thoroughly or not paying attention to where one was on the airport environment are identified as contributing factors of V/PD RIs. The previous examples supplied by participants lend credence that inattention by personnel on the ground contributed to V/PD RIs.

These comments about what the participants believe were contributing factors of V/PD RIs with respect to inattention led to the following conjecture: With respect to contributing factors of V/PD RIs, violations of this nature are contributed by (a) being distracted, (b) lack of familiarity of airport geography, and (c) inattention to detail.

Domain 3: Staff/Personnel. Domain 3 (see Table 4.3) was associated with RQ3: What are the contributing factors of V/PD RIs with respect to staff/personnel? Within the questionnaire, multiple questions provided data that were categorized into this domain. The cover terms human resources and training emerged from the contextual data analysis. Training was further defined with the included terms of initial and recurrent.

Human resources. In organizations, considerations need to be made about personnel and employees, and this was typically called human resources. Based on participants' responses, human resources were cited as a contributing factor to

V/PD RIs. Employee attitudes and morale were critical in any business organization, especially the airport environment. Poor attitudes and morale could be contributing factors of V/PD RIs. For example: P3 reported, “Attitudes are difficult to change; some people with bad attitudes should either be terminated or otherwise denied access to the AOA”; P7 said, “fear of loss of employment”; and P8 reported, “Personal attitudes.” These examples highlight that employee attitudes and morale are important to the airport environment as they are with any business organization. Based on participants’ responses, there appeared to be another human resource problem within the airport environment system itself.

There was a high employee turnover rate among ground personnel, and this phenomenon brought with it some problems. For example: P2 said, “high turnover of personnel/employees” and stated again, “high employee turnover”; and P9 reported “large diverse high turnover.” Having a large turnover rate at an organization allowed for a multitude of fresh employees with a lack of experience and know-how that older, more experienced employees possessed. Participants’ responses supported the notion that this aspect of human resources was a contributing factor to V/PD RIs.

These comments about what the participants believed are contributing factors of V/PD RIs with respect to human resources led to the following conjecture: With respect to contributing factors of V/PD RIs, violations of this

nature are contributed by (a) employee attitudes and employee and morale and (b) a high employee turnover rate.

Training. In the aviation industry, training was a necessary and required activity. Onboard training, also known as initial training, was an essential activity for any new hire. However, that was not the end of the training. Within the aviation industry, recurrent training may be required for different jobs or occupations depending on the level of required knowledge or job responsibility held by the employee in the airport environment. The cover term training was further defined by the included terms initial and recurrent training.

Initial training. Based on participants' comments, initial training was emphasized by many participants, and for ease of reading, it has been broken up into three conjectures. The first conjecture was lack of adequate airport-specific rules training. For example: P1 reported, "unescorted access and proper driver training"; P2 said, "1. untrained/unauthorized personnel gaining access to the AOA 2. authorized personnel failing to provide proper escort to guests/visitors"; P4 said, "Without the proper training, employees are left on their own to decide if they are doing something correctly," and also said, "Untrained airport/FBO staff not following proper procedures"; P4 continued, "Educating airport tenants and the public what access is allowed and what access is not"; and P5 said, "If an individual is not trained to know what the Movement Area is, then it can easily be misunderstood and cause an issue where they navigate somewhere they are not

suppose[d] to be." Each of these examples highlights instances where lack of training on airport rules led to V/PD RIs. Participants' responses on lack of training in airport familiarization training on the airport were recognized as a contributing factor to V/PD RIs.

Another conjecture where lack of training was identified as a contributing factor of V/PD RIs was lack of airport familiarization training for changes in the airport environment. Participants' reported a lack of training in airport familiarization training on the airport as a contributing factor to V/PD RIs. For example: P1 reported, "tenants need to be responsible for escorting their guests properly and the museum needed to train their workers and guests on the restrictions of working on an airport"; P3 said, "Lack of escorting of guests, lack of gate controls, [and] lack of familiarity with airport geography"; P5 reported, "V/PDs are often caused by those who do not understand the principles of a runway environment. This can often lead to them having [committing] mistakes"; and P7 said, "yes.... airfield users not knowing the meaning of an air traffic response or term." A lack of airport familiarization training and a lack of airport familiarization training were identified as contributing factor of V/PD RIs.

The third conjecture within initial training was a lack of initial education and training on a specific job or role at the airport. Based on participants' responses, a lack of initial education and training on a specific job or role at the airport was a contributing factor of V/PD RIs. For example: P2 reported,

"authorized personnel failing to provide proper escort to guests/visitors"; and P2 also said:

> We have had numerous instances of tenants supplying 'friends' or service providers (aircraft detailers or mechanics, for example) -- unauthorized, untrained personnel – with the gate codes to gain access to the AOA and V/PDs have occasionally resulted from that practice.

P4 stated, "Inadequately trained employees and contractors having access to the movement areas," and stated "Educating airport tenants and the public what access is allowed and what access is not"; and P11 reported, "lack of understanding what the airfield is, [and] confusion of airfield layouts." Each example supports the notion that lack of education and training on a specific job or role at the airport can be a contributing factor of V/PD RIs. The public, although not inherently part of the airport environment, can gain access to the airport environment by authorized personnel or during a special event. It was up to the airport executives to make sure these people are also adequately trained, or at least informed, so they do not commit a V/PD RI.

These comments about what participants believed are contributing factors of V/PD RIs with respect to initial training led to the following conjecture: With respect to contributing factors of V/PD RIs, violations of this nature are contributed by (a) lack of adequate airport specific rules training, (b) lack of airport

familiarization training on airport environment, and (c) lack of initial education and training on specific jobs or roles at the airport.

Recurrent training. Training that typically occurs after an employee or a user has been initially trained was called recurrent training. This training could be annual, biannual, or more frequently such as monthly or bi-monthly. The conjecture labeled under the included term of recurrent training was a need for recurrent training for existing employees and stakeholders. For example: P2 reported, "a lack of recurrent training"; P3 said, "people get complacent which is why we do recurrent training"; P8 reported, "Airport changes without education"; P11 said, "recurrent training, yes"; and P11 further qualified, "there's not enough in the recurrent training especially in this region for more complicated airfield layouts, they could add those in the training program." These comments add support that recurrent training or need for recurrent training was a contributing factor of V/PD RIs.

These comments about what participants believed are contributing factors of V/PD RIs with respect to recurrent training led to the following conjecture: With respect to contributing factors of V/PD RIs, violations of this nature are contributed by a lack of recurrent training for existing employees and stakeholders.

Domain 4: Recommended or effective mitigation approaches/strategies. Domain 4 (see Table 4.4) was associated with RQ4: What mitigation approaches/strategies do airport managers recommend or find to be effective?

Within the questionnaire, multiple questions provided data that were categorized into this domain. The cover terms education/training issues and safety issues emerged from the contextual data analysis. Education/training issues was further defined under the included terms of management/administration related and staff/personnel related.

Education/training issues. The education/training issues cover term within Domain 4 was comprised of the included terms management/administration related, and staff/personnel related.

Management/administration related. Based on participants' responses, actions within the administration itself have the potential to reduce V/PD RIs. The first conjecture that emerged from participants' responses was better tracking of V/PD RIs at all levels. For example: P2 reported, "Investigations identifying corrective actions, education, and other follow-up is also crucial"; P5 said, "It would be helpful if the FAA also took a hard stance and had a penalty system that was consistent around the United States"; and P9 reported, "Better tracking of V/PDs at different levels within the system would be helpful." Participants' responses support the notion that tracking V/PD RI occurrences throughout all levels of the system would help to mitigate future V/PD RIs. These levels included the airport itself, the region, and to the NAS as a whole.

Another conjecture that emerged from participants' responses within the management/administration related included term was comprised of building

positive relationships with all stakeholders. Examples are: P3 stated, "community/tenant involvement;" P7 said, "creating a positive dialogue between airfield users and air traffic;" P8 stated, "Briefings with major users before events;" P9 said, "Facilitated structure so people feel safe to share information was very important. Not wanting to shame people for volunteering information so people can share more," "building relationships with stakeholders, [and] having open and honest lines of communication, being able to talk to people;" P10 reported, "reaching out individually to all the businesses and operators at the airport and explaining their responsibility and why this has become an issue since the control tower was built and what we expect out of them;" and P11 stated, "We've had several pilot meetings, and distributed flyers and FBO's to see what is confusing to them." Building positive relationships with all stakeholders on airport property was cited repeatedly by participants as a recommendation to mitigate V/PD RIs.

The last conjecture that emerged from participants' responses within the management/administration related included term was to make changes to signage and markings on the airfield. Based on participants' comments, examples are: P2 stated, "improvements in signage, markings, technology to assist with situational awareness;" P10 said, "Signs all over the place, that say do not go here without approval;" P11 reported, "Installed large block letters on the end of the taxiways so people can see that," and "We added reels at the ends of the runways, we leave those on while the tower is open," and "We added runway guard lights to all of the

taxiway end connectors and runway hold position markings to all the connecting runways." These changes to the signage and markings on the airfield environment were given as recommendations to help mitigate V/PD RIs.

The participants' responses on recommended or effective mitigation approaches/strategies to mitigate V/PD RIs are: With respect to V/PD RI mitigation approaches/strategies, airport managers recommended (a) better tracking of V/PD RIs at all levels, (b) building positive relationships with stakeholders, and (c) improving signage and markings.

Staff/personnel related. Based on participants' comments, staff/personnel related emerged as an included term within the education/training issues cover term. Conjectures emerged from participants' comments with the first being continuing education programs. Examples are: P1 stated, "The time to properly train existing tenants;" P2 stated, "aggressive training program for airfield access; annual renewal/refresher training required for Movement Area access, bi-annual renewal/refresher training required for Non-Movement Area access," "follow-up investigation of every V/PD RI event to determine causes and contributing factors, followed by corrective action / improvements in training programs," "development of graphical training materials disseminated to airport users and posted on the airport website;" P4 said when a V/PD RI offender was being retrained, "The individual goes through the retraining process from the start;" P4 also reported, "Educating the public that airports have much stricter access controls now than in

the past;" P5 stated, "Airports have to do their best to train and promote safety awareness;" P6 reported, "Review and audit of airfield training program[s];" P7 stated, "We have added sections to our training program based upon actual events and situations," P7 also reported "increased education in situational awareness;" P10 stated, "the adage of both communicating and educating;" and P11 stated, "there's not enough in the recurrent training especially in this region for more complicated airfield layouts, they could add those in the training program." Continuing education programs were found to be a repeating theme among participants' responses.

Another conjecture that emerged amongst participants' responses was continuing safety meeting among employees and stakeholders. For example: P6 said, "Sharing of V/PD RI at other airports to raise awareness;" P8 said, "LRSAT [Local Runway Safety Action Team] meetings and addressing pilots directly at safety meetings;" P8 also stated, "Continue briefings at pilot safety meetings;" and P9 reported, "Shared best practices." The presence of transparency with all related parties within management has the potential to help mitigate V/PD RIs at airports. The V/PD RIs at one airport might be similar to another V/PD RI at a different airport. Corrective action could take place to prevent the V/PD RI from occurring through the sharing of information between airport management.

Based on participants' responses, more in-depth training emerged as an aspect to mitigate V/PD RIs. For example: P1 stated, "more in-depth training for all

contractors and meet regularly with the museum on all events that will be on or close to the movement area;" P3 reported, "Required training for anyone that accesses the airport unescorted" and:

> Training needs to be more than just the do's and don'ts. Any airport can write those in a handout and pass them out, but they will always be insufficient. People need to hear about the dangers from lack of escorting or improper gate practices. They need to hear examples from when lack of escorting and gate practices caused a deviation. They need to relate deviations to potential aircraft accidents.

P4 stated, "Adequate Airport familiarization training of employees and contractors" and "Specific training in airport familiarization is needed, and it needs to be done annually, at a minimum;" P7 stated, "more time spent on [on-the-job-training] OJT and familiarization, safety briefings/ discussions;" and P11 reported, "Adding vignettes, case studies on wrong runway, recurrent training programs." Participants' responses appear to support the notion that more in-depth training utilizing high-fidelity measures needs to be implemented to mitigate V/PD RIs. All users in the airport environment would benefit from more in-depth training.

Based on participants' responses, continuing safety meetings emerged as a conjecture. Examples are: P5 said, "Airports have to do their best to train and promote safety awareness;" P7 stated, "more time spent on OJT [on-the-job-training] and familiarization, safety briefings/ discussions;" P9 reported, "sponsor

has direct accountability V/PD direct response," and P9 reported, "Runway safety summit workshops are very helpful, creating time and structured discussion around these issues are very important with peer airports and the FAA." The participants' responses support the conjecture that regular safety meetings with staff/personnel can be important.

Participants' responses on recommendations or effective mitigation approaches/strategies to mitigate V/PD RIs are: With respect to V/PD RI mitigation approaches/strategies, airport managers recommended: (a) continuing education programs, (b) continuing safety meetings, and (c) more in-depth training for everyone in the airport environment.

Safety issues. The safety issues cover term within Domain 4 emerged from participants' comments. Enforcement activities by management were found to be recommended in mitigating V/PD RIs at their respective airports. For example: P2 stated, "diligent enforcement (police presence, action);" and P2 reported, "zero tolerance policies with significant penalties for violations; diligent enforcement (police presence, action)," "aggressive enforcement including imposition of fines and revocation of privileges for violations," "in such cases [V/PD RIs], the stick of enforcement – issuing citations – sends the appropriate message that this is a serious safety issue," "Our police have full authority to stop anyone inside the fence to check for proper ID and vehicle hang tag especially if they can't see it displayed;" P3 reported, "enforcement of violations," "enforcement capability,"

and “more police enforcement;” P5 reported, “Our airport has a firm policy for disciplinary action for those who have runway incursion. Although this was a strict approach it holds all drivers accountable for their actions;” and P10 reported, “After having an educational piece [for] property owners and drivers, and explaining the risks of crossing that line, our trend is dropping, what we’re doing and how we’re handling it is effective. Threatening a revoking of property owners’ [access privileges].” The participants’ responses highlighted the importance of having enforcement capability of the rules and regulations of airports in ensuring that V/PD RIs do not occur.

The second conjecture that emerged from participants’ responses within the safety issues cover term was upgrading gate access controls and security systems. Examples are: P1 stated, “secure access control system” and “upgrading our security access system to reduce the number of unauthorized persons that are on the airport in the future;” and P1 reported, “upgrading our security access system to reduce the number of unauthorized persons that are on the airport in the future;” P2 reported:

> The specific technology we are seeking for access control improvements is card reader in/out on all of our automated vehicle gates and key pedestrian access gates, with cameras to be added if/as funding becomes available. We currently have a keypad system that is not secure ... two days after we

change the entry codes, numerous unauthorized personnel are likely to be in possession of the new codes.

P3 stated, “People need to be convinced of the importance of escorting and proper gate practices,” “Physical barriers to reduce/stop unauthorized access,” and P3 stated, “Better gate controls” and P10 reported “additional fencing with security gates in place.” These are recommended tangible and intangible improvements from participants’ responses that highlight the need for heightened security systems around the airport environment.

Based on participants’ comments of recommended or effective mitigation approaches/strategies, the following conjecture emerged: With respect to V/PD RI mitigation approaches/strategies, airport managers recommended (a) aggressive enforcement capability and (b) upgrading gate access controls and security.

Chapter 5

Conclusions, Implications, and Recommendations

Summary of Study

The purpose of the current study was twofold: (a) to describe the contributing factors of V/PD RIs nationally, and (b) to describe what mitigation approaches/strategies airport managers recommend or find to be effective.

The current study consisted of two parts: a preliminary and primary. The preliminary component was a content analysis of the runway incursion database (RWS) to determine what airports had a high frequency of V/PD RIs. The results of this content analysis yielded the accessible population. From this accessible population, a nonprobability convenient sampling strategy was used to create a sample of airports, which were used for the primary component of the current study. The airport executives at these targeted airports then served as the source of data collection. The research design for the primary = component was a qualitative phenomenological methodology.

A single data collection instrument was made available to participants in two forms: an interview method and an online method via *SurveyMonkey*. Whether participants provided responses via a phone interview or *SurveyMonkey*, the same questions were asked in the same order and no probing was conducted with the phone participants. The instrument consisted of 28 items and members of the professional aviation community consisting of aviation university professors,

doctoral students, and an airline pilot helped me give attention to face validity and content validity of the instrument. After a month-long recruitment effort, the final number of participants was $N = 11$. Demographic information about the sample is provided in Chapter 3. Contextual analysis of participants' responses was performed using Spradley's (2016) domain analysis and structured via domains, cover terms, and included terms as a way to organize emergent themes and conjectures. The current study began with an initial set of RQs, which were ultimately augmented inductively based on the common themes and patterns that emerged from the participants' responses. The final set of RQs are given in Chapter 1 and later presented in this chapter.

Summary of Findings

This section is comprised of two subsections. The first subsection summarizes key findings relative to participants' demographics. The second subsection summarizes the key findings relative to each domain.

Key findings from demographics. Participants self-reported the following personological characteristics: (a) Number of years of overall aviation experience, (b) number of years working as an airport manager or executive, (c) current professional title, (d) AAAE member status, (e) age, and (f) gender. FAA region was inferred if enough identifying data were provided regarding the participant's FAA region location. The overall years of aviation experience for the participants were (see Table 3.3 in Chapter 3): $M = 19.3$ ($SD = 10.77$), $Mdn = 17.5$, Range = 6-

37. The summary of years in current position as manager or executive were: *M* = 12.4 (*SD* = 7.73), *Mdn* = 13.5, Range = 1-24. The FAA regions represented were (see Table 3.4 in Chapter 3): Great-Lakes = 1 (25%), Northwest-Mountain = 1 (50%), and Western-Pacific = 1(25%). The relative frequencies of V/PD RIs incident numbers were: 0–10 (0%), 11–20 (25%), 21–30 (75%), and > 30 (0%) (see Table 3.5 in Chapter 3). The relative frequencies of participants' ages were: 18–30 (9%), 31–-40 (9%), 41–50 (18%), 51–60 (45%), and 61+ (0%). The reader will note that all participants did not report their age (see Table 3.6 in Chapter 3). Of the 11 participants, 10 self-reported their gender as male and 1 elected to not respond.

Key findings from qualitative analysis. As reported in Chapter 4, participants' responses were coded and recoded using the *Nvivo* qualitative analysis software, and the data were then structured into domains, cover terms, and included terms via Spradley's (2016) domain analysis scheme. The reader is reminded that the domains corresponded to the study's RQs. Key findings from the contextual analysis are as follows.

Domain 1: Airport operations. Concerning Domain 1, Contributing Airport Operation Factors to V/PD RIs (see Table 4.1 in Chapter 4), each participant provided data for this domain. Within airport operations, management, planning, and security were key findings that were expressed as common themes/patterns. Management was found to be a contributing factor of V/PD RIs among

participants. This key finding was further defined by the included terms administration, and technology.

Based on participants' responses the following conjectures were derived from contextual analysis: (a) FAA rules and regulations (b) lack of funding, and (c) poor safety promotion and a poor safety culture that could lead to V/PD RIs. Technology was found to be a contributing factor to V/PD RIs. Based on participants' responses the following conjectures were derived from contextual analysis: (a) inadequate signage and markings, and (b) lack of adequate technology could lead to V/PD RIs. Planning was found to be a contributing factor of V/PD RIs. Based on participants' comments the following conjectures were derived from contextual analysis: (a) airport design and geometry, (b) construction on the airfield, and (c) environmental changes that could lead to V/PD RIs. Security was found to be a contributing factor of V/PD RIs. Based on participants' comments the following conjectures were derived from contextual analysis: (a) lack of adequate gate controls, and (b) untrained and unauthorized persons gaining access to movement areas that could lead to V/PD RIs.

Domain 2: Human factors. Concerning Domain 2, Contributing Human Factors of V/PD RIs (see Table 4.2), each participant provided data for this domain. Within human factors, behavior and situation awareness were found to be key findings that were expressed as common themes/patterns. Behavior was found to be a contributing factor of V/PD RIs.

Based on participants' comments the following conjectures were derived from contextual analysis: (a) becoming complacent, and (b) health and mental health that could lead to V/PD RIs. Situation awareness was found to be a key finding within the human factor's domain. However, situation awareness was further defined as communication issues and inattention. Communication issues were found to be contributing factors of V/PD RIs based on participants' comments the following conjectures were derived from contextual analysis: (a) lack of active listening and (b) miscommunication that could lead to V/PD RIs. Inattention was found to be a contributing factor of V/PD RIs. Based on participants' comments the following conjectures were derived from contextual analysis: (a) being distracted, (b) lack of familiarity of airport geography, and (c) inattention to detail that could lead to V/PD RIs.

Domain 3: Staff/personnel. Concerning Domain 3, Contributing Staff/Personnel Factors of V/PD RIs (see Table 4.3), each participant provided data for this domain. Within Staff/Personnel, human resources and training were found to be key findings that were expressed as common themes/patterns. Human resources were found to be a contributing factor to V/PD RIs.

Based on participants' comments the following conjectures were derived from contextual analysis: (a) employee attitudes and morale and (b) high employee turnover rate that could lead to V/PD RIs. Training was found to be a contributing factor of V/PD RIs. However, it was further defined as both initial and recurrent.

Based on participants' comments following conjectures were derived from contextual analysis: (a) lack of adequate airport specific rules training, (b) lack of airport familiarization training for changes on the airport environment, and (c) lack of initial education and training on specific job or role at the airport that could lead to V/PD RIs. Recurrent training was found to be a contributing factor of V/PD RIs. Based on participants' comments the following conjecture was derived from contextual analysis: (a) lack of recurrent training for existing employees and stakeholders could lead to V/PD RIs.

Domain 4: Recommended or effective mitigation approaches/strategies. Concerning Domain 4, Recommended or Effective V/PD RI Mitigation Approaches/Strategies (see Table 4.4), all participants provided recommended V/PD RI mitigation approaches/strategies in this domain. Within recommended or effective mitigation approaches/strategies, education/training issues and safety issues were key findings that were expressed as common themes/patterns. However, education/training was further defined as management/administration related and staff/personnel related.

Based on participants' comments, the following conjectures was derived from contextual analysis of recommended approaches/strategies for management/administration: (a) better tracking of V/PD RIs at all levels, (b) building positive relationships with stakeholders, and (c) improving signage and markings. Based on participants' comments, the following conjectures were

derived from contextual analysis of recommended approaches/strategies for staff/personnel: (a) continuing education programs, (b) continuing safety meetings, and (c) more in-depth training for everyone on the airport environment. Safety issues were also found to be key findings within the recommended or effective mitigation approaches/strategies domain. Based on participants' comments, the following conjectures were derived from contextual analysis of recommended approaches/strategies for safety related: (a) aggressive enforcement capability, and (b) upgrading gate access controls and security.

Conclusions and Inferences

In this section, I discuss the current study's findings relative to the four research questions presented in Chapter 1. In this discussion I present an interpretation of the results within the context of the research setting, as well as plausible explanations for the results.

Research question 1: What are the contributing factors of V/PD RIs concerning airport operations? As reported in Table 4.1 and summarized in the previous section, RQ1 corresponded to Doman 1 and three primary themes (cover terms) for contributing airport operations factors to V/PD RIs emerged from the data: (a) management, which included the administration and technology; (b) planning; and (c) security. A separate discussion for each of the cover terms follows.

Management. A plausible explanation for participants citing management as a contributing factor of V/PD RIs is related to a lack of funding. Airport executives have to do their best with the budgets at their disposal for affordable and successful implementations, because infinite budgets do not exist. Having a larger budget would allow for more sophisticated safety promotion that would foster a more positive safety culture at their airfields. Therefore, it is reasonable to surmise that participants would cite the administration and technology to be associated with management as contributing factors of V/PD RIs.

Planning. A common refrain among participants was planning. A plausible explanation for these participants responses were airports can be designed poorly and certain intersections, hot spots, are more conducive to producing incursion events. A second plausible explanation for citing planning were, current construction events, (e.g., adding a new runway). This type of airfield activity allows workers on the airfield which may not be familiar with aeronautical regulations and herein lies the potential for V/PD RIs. These examples infer a lack of adequate planning has the ability to contribute to V/PD RIs from a management perspective.

Security. A plausible explanation for participants citing security as a contributing factor of V/PD RIs is related to a lack of funding. A lack of proper and/or technologically advanced gates and fencing have the potential to allow for unlawful entry onto an airfield. This could be remedied with an infinite budget, but

as mentioned earlier, that does not exist, and it is up to the airport executive to work with the budget that they have. Thus, it is reasonable to conclude that in the absence of additional funding, security was a contributing factor of V/PD RIs.

Summarizing. When the findings of Domain 1 are considered collectively, it appears that the reasons for V/PD RIs can be attributed to two aspects. These are: a lack of funding for adequate airfield improvements, and appropriate planning of an airfield. These findings infer that the contributing factors of V/PD RIs with respect to airport operations are grounded in those factors, and airport executives must make efficient decisions when addressing V/PD RIs.

Research question 2: What are the contributing factors of V/PD RIs concerning human factors? As reported in Table 4.2 and summarized in the previous section, RQ2 corresponded to Domain 2 and two primary themes (cover terms) for contributing human factors to V/PD RIs emerged from the data: (a) behavior; and (b) situation awareness, which included communication issues, and inattention. A separate discussion for each of the cover terms follows.

***Behavior*.** A plausible explanation for participants citing behavior as a contributing factor of V/PD RIs is related to a lack of required medical examinations for ground personnel. Pilots and air traffic controllers are required to take initial and recurring mental and physical health examinations periodically. This industry standard of health and mental health examinations for pilots and air traffic controllers could benefit ground personnel as well. Therefore, it is

reasonable to surmise that a lack of periodically required health and mental health examinations could contribute to V/PD RIs.

***Situation awareness*.** A plausible explanation for participants citing situation awareness as a contributing factor of V/PD RIs is a lack of training. Pilots are required to practice the same procedures constantly throughout their career and are held to FAA retraining standards (e.g., ATP currency requirements). Ground personnel could greatly benefit from having required retraining standards because of their proximity to aircraft. Thus, it is plausible to ascertain that participants would cite communication issues and inattention as contributing factors of V/PD RIs.

***Summarizing*.** When the findings of Domain 2 are considered collectively, it appears that the reasons for V/PD RIs can be attributed to two aspects. These are: a lack of required health examinations, and a lack of recurrent training. These findings infer that the contributing factors of V/PD RIs with respect to human factors are grounded in those factors, and airport executives must be made aware of the potential of laborers on the airfields' shortcomings.

Research question 3: What are the contributing factors of V/PD RIs concerning staff/personnel? As reported in Table 4.3 and summarized in the previous section, RQ3 corresponded to Domain 3 and two primary themes (cover terms) for contributing staff/personnel factors of V/PD RIs emerged from the data:

(a) human resources; (b) training, which included initial, and recurrent. A separate discussion for each of the cover terms follows.

Human resources. A plausible explanation for participants citing human resources as a contributing factor of V/PD RIs is related to a company's culture. If employees are compensated adequately and feel appreciated, logically; they would find more meaningful work experiences and exhibit pride of where they work. Having a good culture at a workplace, even amongst ground personnel, would be beneficial to everyone else on the airfield. However, unskilled laborers cannot be given high salaries, but a balance could be maintained by airport executives. Therefore, it is reasonable to surmise that participants would cite human resources as a contributing factor to V/PD RIs.

Training. A plausible explanation for participants citing training as a contributing factor of V/PD RIs is related to a lack of funding. Training programs cost money, and airport executives might not have the funds necessary to conduct specific initial and recurring training of airport employees. Budgetary concerns might be a real problem for airport executives and the additional funds might not exist for training programs that would make the airfield safer. Therefore, it is plausible to ascertain that participants would cite initial and recurrent associated with training as contributing factors of V/PD RIs.

Summarizing. When the findings of Domain 3 are considered collectively, it appears that the contributing factors V/PD RIs from airport executives can be

attributed to two aspects. These include: a lack of a positive company culture among ground personnel, and a lack of funding for additional initial and recurrent training of ground personnel. These findings infer that the reasons for V/PD RIs at airports are grounded in the idea that it is up to the airport executive to make efficient budgetary decisions about their particular airport.

Research question 4: What mitigation approaches/strategies do airport managers recommend or find to be effective? As reported in Table 4.4 and summarized in the previous section, RQ4 corresponded to Domain 4 and two primary themes (cover terms) for recommended mitigation approaches/strategies of V/PD RIs emerged from the data: (a) education/training issues; (b) safety issues, which included management/administration related, and staff/personnel related. A separate discussion for each of the cover terms follows.

***Education/training issues*.** A plausible explanation for participants citing education/training issues as recommended mitigation approaches/strategies to V/PD RIs are related to having better transparency with stakeholders. Being open and collaborative with all those within the workplace can be beneficial, especially on an airfield around dangerous machines. A second plausible explanation is having more funding available for improvements to the airfield and its personnel. Having more funding to add or upgrade signage and markings can be beneficial for all ground personnel. Also, having more funding can allow for more training programs to bolster ground personnel and employee knowledge of the airfield and

it's specific regulations. Therefore, it is reasonable to surmise that participants would cite management/administration related, and staff/personnel related as recommended V/PD RI mitigation practices.

Safety issues. A plausible explanation for participants citing safety issues as recommended mitigation approaches/strategies to V/PD RIs are related to having more funding available. Additional funding availability to airport executives would mean that could emphasize on more sophisticated and technologically advanced gates and fencing to protect the airfield. Crime cannot be totally removed from the equation, but strong deterrents could be in place to deter potential would-be criminals to think again before attempting to enter airfield property. However, airport executives have to work with what budget they have at their disposal and make the best decisions they can pertaining to airfield safety. Therefore, it is reasonable to surmise that participants would cite safety issues as a recommended V/PD RI mitigation approach/strategy.

Summarizing. When the findings of Domain 4 are considered collectively, it appears that the recommended approaches/strategies of V/PD RIs from airport executives are centered on two themes. These include being more transparent with all stakeholders on airport property and having more funding available for improvements. Transparency has the ability to have everyone on the airport to be a part of the conversation on V/PD RI mitigation and allows for participants to by-in to the plan to decrease these violation occurrences. Also, having a larger budget

available for airport executives to implement more improvements, both tangible (e.g., upgraded fencing), and intangible (more training). These findings infer that the recommended approaches/strategies toward V/PD RI mitigations are grounded in several factors and airport executives would be wise in addressing these.

Implications

The implications relative to philosophical assumptions, previous research, and aviation practice are as follows.

Implications relative to philosophical assumptions. In the present study, the philosophical assumption that guided the study was the ontological assumption. As Creswell (2013) stated, researchers are accepting a world where multiple realities exist. In the current study, I accepted a world where numerous realities existed from all the participants. There was an absence of a single approach/strategy to solve the problem, increasing V/PD RIs, at participant airports. Findings from the study support the ontological assumption because each participant provided responses to the questions based on past experiences and life as an airport executive.

In the present study, the participants created their knowledge and expertise about the studied phenomenon in the interpretive framework, social constructivism. As Creswell (2013) stated, "individuals seek understanding of the world in which they live and work. They develop personal meanings of their experiences" socially from interactions of everyone they have ever met or have worked with within each

airport executive's aviation career (p. 24). The findings from this study support the notion that participants gained their knowledge about V/PD RIs through knowledge acquisition with other people or workers. Participants stated they work with different positions of airport leadership or members of the federal government daily when handling violations and violation mitigation practices. Also, it was presumed that a member of leadership at an airport has had interactions over a career to some varying degree. Also, members of leadership were chosen to lead the airport in the first place.

Implications relative to prior research. The current study was based on previous research, including aircraft RIs and V/PD RIs. A discussion about the implications related to previous research was as follows. Previous research looked at RI mitigations from one or two domains, where the current study looked at all the applicable domains. Findings from the current research were found to be consistent with previous research.

Aircraft runway incursions. In Hooey and Foyle's (2006) study, their data were reanalyzed using a different data classification system, found in Chapter 2. Hooey and Foyle concluded that technological solutions assist in mitigating all types of RIs by providing enhanced situation awareness of the airport environment through different types of technologies (e.g., BAMO). In the current study, technology and human factors were also found to be contributing factors of V/PD RIs. The current study's findings were consistent with Hooey and Foyle's study. I

conclude that human factors are an important contributing factor to V/PD RIs, and it would behoove airport executives to place an emphasis on human factors.

In Prinzel and Jones' (2007) study, they concluded that a lack of technology could contribute to RIs with a lack of maps with real-time location tracking on the airport environment. Audible cues were also used in Prinzel and Jones' study as enhancing the participants' situation awareness. These technological devices were used in their study and were found to be successful in RI mitigation and detection systems. In the current study, technology was listed as a contributing factor to V/PD RIs. Unfortunately, participants in the current research did not further qualify what specific types of technology they were lacking. However, technology in general was found to be an important contributing factor. I conclude that technological considerations are an important contributing factor to V/PD RIs, and it would be wise for airport executives to give importance to technology.

In Feigh and Bruneau's (2009) study, they reported different types of RI mitigation technologies currently available for airports to install. Technological programs outlined by Feigh and Bruneau would not be successful without proper funding channels for airport executives to utilize. However, in the current study, the participants did not go into elaborative detail about specific RI mitigation technologies. Findings relative to this previous literature was inconclusive. It could be presumed that when a participant stated "technology" in general, the participant could have implied one of these technological programs but based on the findings,

this was unknown. In the current study, technology was found to be a contributing factor theme. The current study's findings were consistent with Feigh and Bruneau's study in that they both found technology, but their study was more elaborative as to specific technological programs. I conclude that technological considerations are an important contributing factor to V/PD RIs, and as stated before, it would be wise for airport executives to give importance to technology.

In Torres et al.'s (2011) study, archival data found in the ASRS and NTSB were analyzed using several statistical methods. The current study utilized a qualitative methodology, but the findings are still notable. Torres et al. found human factors to be significant in contributing to RIs. Controllers can have a loss of situation awareness, and this can contribute in producing a RI through human factors. Weather was reported as playing a minor role in Torres et al. study, but in the current study it was encompassed within a more global descriptor called environmental changes that would include weather. Weather was part of environmental changes and based on the fact that the environment was part of RIs, this gives additional emphasis to all aspects of weather. However, Torres et al's findings did not have many participants' responses to support weather as a significant finding. The current study's findings relate to Torres et al.'s findings in that they both found human factors to be notable. I conclude that human factors are an important contributing factor to V/PD RIs, and as stated before, it would behoove airport executives to place an emphasis on human factors.

In Joslin et al.'s (2011) study, a mixed methods methodology was used to analyze FAA RSO data. It was found that more training would be the best mitigation strategy of RIs but also included human factor issues as contributing factors as well. Communication issues were found by Joslin et al. as a contributing factor of RIs. In the current study's findings, human factors were found to be a contributing factor of V/PD RIs. Within the context of the current study, communication issues fall into the more global domain of human factors. Communication issues were a part of human factors and this provides additional emphasis to all aspects of human factors. The current study's findings were consistent with Joslin et al.'s study in that human factors were found as a contributing factor. I conclude that human factors are an important contributing factor to V/PD RIs, as stated before, it would behoove airport executives to place an emphasis on human factors.

Vehicle and pedestrian deviation runway incursions. In a study by Rankin and Cokley (2009), a mixed methodology was used to determine causal factors of V/PD RIs. Demographics were given by Rankin and Cokley, and human resource considerations were studied as well. Findings from Rankin and Cokley highlighted different aspects of operating an airport, and in the current study, these instances were grouped under the staff/personnel domain. Rankin and Cokley found human resource issues such as training and high turnover rates as contributing factors of V/PD RIs. In the current study's findings, human resources were encompassed

within the staff/personnel global category and were found to be a significant. Human resources were part of staff/personnel and the fact that staff/personnel were found to be contributing factors of V/PD RIs, this gives additional emphasis on all aspects of staff/personnel. The current study's findings were consistent with Rankin and Cokley's study in that they both found staff/personnel issues to be contributing factors of V/PD RIs. I conclude that staff/personnel issues are an important contributing factor to V/PD RIs, and it would be wise for airport executives to give attention to this area.

Implications for aviation practice. Findings from the current study have implications to practice from both a new-hire airport executive perspective and an experienced airport executive perspective. A new-hire airport executive would receive a different context from the current study than an existing airport executive would receive. However, before any changes are implemented for an airport's V/PD RI mitigation program, an audit would need to be initially conducted. An external V/PD RI program audit would be ideal to control for biases within the organization. However, external audits are costly for a budget-minded GA airport. Therefore, if an internal audit were to be conducted instead of an external one, it would consist of interviewing V/PD RI offenders and conducting nonpunitive V/PD RI seminars with employees. According to P2 "we have been intensely focused on this issue for many years, mainly focused on low-cost, human-centered solutions" highlighted the need for cost-effective V/PD RI mitigation. Although, it

needs to be disclosed that responses to the current study were a response to higher frequencies of V/PD RI instances. The V/PD RI mitigation practices they are implementing have the potential to yield different results with respect to other executives and managers based on responding to their high numbers. Other airport executives with lower numbers might in fact have a different point of view on V/PD RI mitigation and an extension study would be best to research their V/PD RI mitigation practices and strategies. Once an audit was completed (either internal or external) and the areas to concentrate on were identified, the actual V/PD RI mitigation implementations could be monitored to determine if they were successful or not.

An experienced airport executive would receive a different context from the current study. For example, an experienced airport executive could be faced with increasing numbers of V/PD RIs at their airport and are looking for some guidance from their peers on what they can do within their budgetary means. Study's akin to this one provides valuable information to airport executives that are looking for different takeaways or new and fresh ideas for V/PD RI mitigation. First and foremost, an audit would need to be conducted, and ideally an external audit. However, an internal audit consisting of talking to V/PD RI offenders in an interview format, nonpunitive, could yield positive information. An internal audit consisting of seminars on V/PD RIs could be beneficial in determining areas where mitigation practices are lacking. Both an internal and an external audit was ideal if

a budget was large enough. Then, airport executives can focus on V/PD mitigation implementations within their budget constraints on areas that were found to be lacking.

Findings from the current study provides implications to practice for the FAA by highlighting the shortcomings within the NAS. Implications from the current study demonstrated that there was a complex problem to solving V/PD RIs at airport executives' airports and it would behoove the FAA to assist in their mitigation practices. One such way to assist in mitigation assistance would be to have more readily available funding mechanisms for airport executives to utilize in implementing mitigation practices based on the domains from the current study.

Generalizability, Limitations, and Delimitations

Generalizability. In qualitative studies, generalizability was referred as transferability and the current study endeavored to provide ample evidence to support robust transferability. As stated in Chapter 3, transferability was enhanced through the usage of a thick description, disclosing limitations and delimitations, and providing a reflective statement. In Chapter 4, descriptors were given for every domain, cover-term, and included-term of every item throughout the chapter. This was also the process of creating an adequate thick description where direct quotes were used from participants to answer the RQs. Limitations and delimitations were given in Chapter 1 and will be reiterated in the next section. A reflective statement was included in Chapter 3 utilizing the idea of bracketing my previous knowledge

of aviation within the study's duration. In every instance of data collection, I did not impede my views and opinions on the participants were withheld allowing them to answer questions without any of my potential bias. The purpose of creating a thick description, disclosing limitations and delimitations, and providing a reflective statement was to create an adequate sending context to readers. It is up to the reader to determine if this information was indeed pertinent to them within the receiving context.

Limitations and delimitations. The limitations and delimitations are replicated here for the convenience of the reader to segue into the final part of this chapter. The limitations and delimitations were as follows.

Limitations. Limitations of a study are conditions, events, or circumstances that are outside the control of the researcher and henceforth could affect generalizability. The limitations of the study were as follows.

1. *Airport personnel.* I had no control over who served as the airport manager of the targeted airports. Therefore, if the current study was to be replicated using the same airports but a different executive in charge, the results might be different.
2. *Authenticity of responses*. I had no control over the authenticity of participant responses. There was a possibility that the answers supplied by participants were not be truthful.

3. *Detail of responses*. I had no control over the detail of responses from participants. There was no ability to control the details or rich elaborative responses of the participants.
4. *FAA regions*. The FAA regions are: (a) Alaskan, (b) Central, (c) Eastern, (d) Great-Lakes, (e) Northwest-Mountain, (f) Southern, (g) Southwest, (h) Western-Pacific. The makeup of the regions represented in the study can be found in Chapter 3. Represented studied regions could not be controlled because airport executives had to agree to be a part of the study. Therefore, subsequent studies that use different regions, even from the same accessible population, could yield different results.
5. *Targeted airports*. The airports that were flagged in my study were flagged because they had the highest frequency of V/PD RIs. In a subsequent study, different airports might be flagged and hence the results might be different.

Delimitations. Delimitations are researcher-imposed limitations placed on the study that could further limit generalizability. The delimitations of the study follow.

1. *Conjectures.* With the low number of participants ($N = 11$), two examples constituted enough information for the formation of a conjecture based on that information. If more participants' examples

were required to create conjectures, this would yield different results.

2. *Data collection.* I chose to collect data over a 1-month period (2/11/2019 to 3/10/2019). If a subsequent study had a longer data collection period, which would have promoted "prolonged engagement" and "member checking," two activities to promote credibility, then the results might be different
3. *Data time period.* I chose to conduct the current study by focusing on data from FY 2011 to FY 2016. The FY used for the RWS was between October 1st of each year and ending on September 30th of the following calendar year. If a different time period (e.g., from 2015 to 2019) of RWS data was selected for subsequent studies, this might yield different results.
4. *Interviews.* Interviews were selected as the primary data collection method during the primary research component because they have the potential to provide the richest information necessary in answering the RQs. However, only 3 of the 11 participants opted for an interview. Therefore, subsequent studies might yield different results if a different data collection method was utilized or if more participants choose to be interviewed.

5. *Interviewer experience*. I performed the interviews for this research and completed the appropriate Collaborate Institute Training Initiative (CITI) training modules in preparation for these interviews. Therefore, subsequent studies that employ a researcher who has not completed the CITI training modules, or that employ an experienced interviewer, could yield different results.
6. *Probing.* Probing, which refers to follow-up questions asked of participants to coax more detailed responses was not used in the current study. Therefore, if subsequent studies engage in a probing strategy, then the results might be different.
7. *Researcher-developed questionnaire.* I chose to use a researcher-developed questionnaire. The use of a different questionnaire in subsequent studies might yield different results.
8. *RWS* (FAA, 2019). I elected to exclusively use the RWS (2019) database as the preliminary research strategy to determine the targeted airports. Subsequent studies that use a different database would yield different airports for their accessible population, this could yield different results.
9. *Sample airports*. The airports targeted for the sample cannot be altered because they were specifically identified during the study's parameters by the RWS (2019) as having more than 10 V/PD RIs

between FY 2011 and FY 2016. This was a delimitation because I picked the parameters for the sample. Therefore, if other airport executives were selected from other airports with fewer V/PD RIs, the study might yield different results.

10. *Sampling unit*. Airport executives from the 41 airports having 10 or more occurrences of V/PDs during FY 2011 to FY 2016 were chosen for the study's sample. Therefore, if airport executives from airports with a different number of V/PDs were chosen, this would yield different results.
11. *Single point-of-contact.* For the current study, I focused as the single point-of-contact consisting of the publicly available contact information found online at each airport. Subsequent studies that involve more than a single point-of-contact at each airport might get different results.
12. *SurveyMonkey.* Aside from the interview version of the questionnaire, an e-host version of the questionnaire was also included in the current study. If paper questionnaires were mailed to each airport manager directly or if a different e-host site was used, subsequent studies might yield different results.

Recommendations for Research and Practice

The following are recommendations based on limitations, delimitations, future research, and practice.

Recommendations for research relative to study limitations.

1. The airport personnel employed at an airport were listed as a limitation because there was no control over who was employed at an airport. I recommend conducting an interview before implementing a study similar to the current study. This would allow the researcher to choose who will be a participant based on who would provide the richest contextual data.

2. Authenticity of responses were given as a limitation there isn't a way to verify if a participant was being truthful. I recommend interviewing potential participants before conducting a study to make a judgement call on if they are honest or not.

3. Detail of responses were identified as a limitation of the current study because it was up to the discretion of the participant to determine what they felt was appropriate for each response. I recommend utilizing the interview strategy of probing to coerce rich detailed responses from participants.

4. FAA regions were identified as a limitation of this current study because participants have to agree to be participate in the study. I recommend creating a robust sample of airports from all of the regions before conducting a study.

5. Targeted airports were identified as a limitation for the current study because there wasn't a way to impact the number of V/PD RIs an airport incurs during a particular period of time. I recommend sampling all airports with a variety of numbers of V/PD RIs and not just ones who had high numbers of reported incidents.

Recommendations for future research relative to study delimitations.

1. If at least two or more participants expressed a similar expression or stated the same idea, this served as the basis to derive a conjecture. A recommendation based on this delimitation would involve increasing the number statements to create conjectures (e.g., moving from two to four) would decrease the number of conjectures created.

2. Data collection was held to a 1-month period for the current study. However, I recommend a longer period of data collection could be used would promote "prolonged engagement" with the participants. This would also promote the usage of "member-checking" where the participants could be involved in the final writing process and apply their input to determine that their response was captured adequately. However, it should be disclosed that by doing this removes anonymity of participants and they may or may not be willing to be completely upfront about their answers if they were anonymous.

3. Data time period was held between FY 2011 to FY2016. If a different time period was selected, or even expanded on, this would produce different

results. Recommendations based on this delimitation are centered on altering the current study data time period to a larger period. This potentially would allow for a larger accessible population to be able to create a sample from.

4. Interviews were selected as the primary data collection method for the current study. I recommend conducting face-to-face interviews if at all possible. Although, telephone interviews did provide information, a face-to-face interview would allow context-sensitive emotions and nonverbal actions to be used as data as well. Inflection and posture could potentially be used in determining appropriate intonation about specific issues and responses participants may or may not have about a particular question.

5. Interviewer experience was listed as a delimitation for the study despite accomplishing the required CITI training per research and graduate policy. Recommendations related to this delimitation include having more experience, or if money was not an option, hiring a trained interviewer to conduct the interviews.

6. Probing was not utilized in the current study for the telephone interviews. This action would have had the potential to have gathered more information from participants. I recommend utilizing a more experienced interviewer where probing could have been employed effectively. This would have the potential to gather more information from participants and would have potentially yielded different results.

7. A researcher-developed questionnaire was used for the current study. Recommendations based on this delimitation are centered on using a different questionnaire to gather data from participants would yield different results. This researcher-developed questionnaire went through validity testing using a small number of professionals to validate the questionnaire. Another questionnaire with a larger pool of validators could be ideal in answering RQs similar to the ones within this current study. Also, conducting a pilot-study with airport executives that were not going to be questioned for the study would be beneficial as well in creating of the researcher-developed questionnaire, but this would also be time-consuming.

8. The RWS was used to identify airports that would lead to represented airport executives sampled for the study. Recommendations based on this delimitation would be to use another database in conjunction with the RWS, like the ASRS to add additional information on airports that might be experiencing different instances, but these instances constituted close calls or instances of V/PD RIs that were unreported.

9. The sample airports were identified from the RWS (2019). Recommendations for future research with respect to the sample airports are based on expanding on the databases used for sample identification. Utilizing other databases together with the RWS would yield a different selection of sample airports to gather data from.

10. The sampling unit was airport executives at 41 airports with occurrences of more than 10 V/PD RIs during the study's parameters. Recommendations for future research concerning the sampling unit were based on expanding the parameters to include the rest of management. Although it can be presumed airport executives are experts at their respective airports, they are at the top of the controlling organizational hierarchy. Augmenting the sampling unit to include more operations personnel or managers might yield more "boots on the ground" type of information to expand on data airport executives provide.

11. A single point-of-contact was used in the current study to secure participants from targeted airports. This information was found through publicly available contact information for the targeted airport found at airport's corresponding websites. A recommendation based on this delimitation was if a researcher had access to the AAAE member database, then this would allow for a second point-of-contact with potential participants.

12. The e-host website *SurveyMonkey* was used as the host for the online questionnaire. A recommendation based on this delimitation was based on other forms of sending the questionnaire (e.g., physically mailing). This would allow for the participant to have prolonged exposure to the questions and be removed from having to use a computer. Changing the delivery of the questionnaire has the potential to yield different results.

Recommendations for future research relative to implications. This section highlights the recommendations for future research concerning implications to prior research and philosophical assumptions.

The ontological assumption and social constructivism interpretative framework provided ample guidance for the current research. However, having a grounded theory approach would also be appropriate because the participants' responses were inductively derived from their experiences. This would provide a more robust theoretical backbone for a study similar to this one.

Regarding Hooey and Foyle (2006), Prinzel and Jones (2007), and Feigh and Bruneau (2009), technology needs to be expanded at airports. Recommendations based on their studies need to be centered on more elements of technology besides hi-tech technology. Hi-tech technology consists of next-generation radars and detection systems. Low-tech technologies can be just as effective as hi-tech technologies in mitigating V/PD RIs as participants in the current study identified in their responses. Recommendations also can be made that their scope needs to include other facets of V/PD RI mitigation that center on more than just technology because, as the present study showed, it was a multifaceted or multipronged approach that was best at mitigating V/PD RIs.

Regarding Torres et al. (2011), Joslin et al. (2011), and Rankin and Cokley (2009), human factors can lead to RIs and V/PD RIs. Additionally, according to Joslin et al. (2011), and Rankin and Cokley (2009) they also found training to be a

contributing factor of RIs and V/PD RIs. Recommendations based on their research need to center on applying a more multifaceted approach from all angles, such as training, technology, and airport operations considerations to mitigate RIs and V/PD RIs.

Recommendations for practice relative to implications.

Recommendations relative to aviation practice are centered on quantifying V/PD RI mitigation and success. Being able to place a quantitative value on V/PD RI mitigation would allow for airport executives to determine success in both V/PD RI mitigation and budgetary concerns. According to Byers (2016), a cost-benefit analysis can be conducted for operational safety concerns, in the current study's context, V/PD RIs. A gap-analysis can also be conducted on V/PD RI mitigation after having placed quantitative values to V/PD RI mitigation. Being able to measure the success of V/PD RI mitigations would be beneficial to airport executives. This would allow for more budget-minded GA airports to focus on fewer mitigation practices maximizing their effectiveness.

Summary

The current study provided aviation professionals with an understanding of the challenges airport executives face in combating increasing V/PD RIs at U.S. airports. This investigation provided details as to the contributing factors and recommended or effective mitigation approaches/strategies of V/PD RIs. Aviation professionals and other interested parties have much to learn from their peers on

what works and doesn't work for V/PD RI mitigation. Findings suggest that a multipronged approach consisting of: management, planning, security, human behavior, situation awareness, human resources and training would have the potential to yield the best results in mitigating V/PD RIs. These findings can be used not only for new-hire airport executives and experienced airport executives to either augment their existing V/PD RI mitigation plan or develop a new one.

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Appendix A

Tables

Table 3.1
Part 139 Airport Classification

Air Carrier Operation/ Class	Class I	Class II	Class III	Class IV
Scheduled Large Air Carrier Aircraft (30+ Seats)	X			
Unscheduled Large Air Carrier Aircraft (30+ Seats)	X	X		X
Scheduled Small Air Carrier Aircraft (10 – 30 Seats)	X	X	X	

Note. Part 139 airport classifications. Adapted from https://www.faa.gov/airports/airport_safety /part139_cert/classes-of-airports/ (FAA, Classes of Airports, 2018g).

Table 3.2
Summary of Participants' Demographics

	Years' Experience in Aviation				
Participant	**Overall**	**In Current Position as Manager or Executive**	**Title[a]**	**AAAE Member**	**FAA Region[b]**
1	11	2	AM	Y	WP
2	20	11	AM	Y	-
3	15	15	AM	Y	-
4	25	24	AE	Y	-
5	7	1	AM	Y	-
6	-	-	-	-	-
7	30	18	O	N	-
8	37	5	AM	Y	-
9	6	20	AM	Y	NM
10	30	16	O	Y	NM
11	12	12	AM	Y	GL

Note: [a]AM = Airport Manager, AE = Airport Executive, O = Other, Participant 6 did not report demographic information. [b] GL = Great Lakes (IL, IN, MI, MN, ND, OH, SD, WI), NM = Northwest Mountain (CO, ID, MT, OR, UT, WA, WY), WP = Western-Pacific (AZ, CA, HI, NV, GU, AS, MH). Participants 2 through 8 did not supply any data that could be used for region identification.

Table 3.3
Summary of Participants' Years Experience

Item	*M*	*SD*	*Mdn*	*Range*
Overall1 Years' Experience in Aviation	19.3	10.77	17.5	6–37
Years in Current Position as Manager or Executive	12.4	7.73	13.5	1–24

Table 3.4
FAA Airport Regions Represented

Region	*N*	Percent (Sample)[a]	Percent (Overall)[b]
Alaskan	0		7.3%
Central (IA, KS, MO, NE)	0		0.0%
Eastern (DC, DE, MD, NJ, NY, PA, VA, WV)	0		9.8%
Great Lakes (IL, IN, MI, MN, ND, OH, (SD, WI)	1	25%	7.3%
New England (CT, ME, MA, NH, RI, VT)	0		0.0%
Northwest Mountain (CO, ID, MT, OR, UT, WA, WY)	2	50%	12.2%
Southern (AL, FL, GA, KY, MS, NC, PR, SC, TN, VI)	0		12.2%
Southwest (AR, LA, NM, OK, TX).	0		17.1%
Western-Pacific (AZ, CA, HI, NV, GU, AS, MH)	1	25%	34.1%

Note. [a]Only four of the nine FAA regions were represented and identified in the sample. Therefore, the base is 4. [b]Base is 9.

Table 3.5
Runway Incursions Experienced

Number of V/PD RIs	*f*	Relative *f*
0–10	0	0%
11–20	1	25%
21–30	3	75%
> 30	0	0%

Note. Only the four airports that could be identified are represented.

Table 3.6
Participant Age

Age	*f*	Relative *f*
18-30	1	9%
31-40	1	9%
41-50	2	18%
51-60	5	45%
61 and older	0	0%
Did not Answer	2	18%

Note. Percentages equal 99% because relative *f* percentages were rounded to the hundredths place.

Table 4.1
Contributing Airport Operation Factors to V/PD RIs

Domain 1	Cover Term	Included Term	Conjectures *With respect to contributing factors of V/PD RIs, violations of this nature are contributed by …*
Airport Operations	Management	Administration	
			1.1. FAA rules and regulations.
			1.2. lack of funding.
			1.3. poor safety promotion and a poor safety culture.
		Technology	1.4. inadequate signage and markings.
			1.5. lack of adequate technology.
	Planning	-	1.6. airport design and geometry.
		-	1.7. construction on the airfield.
		-	1.8. environmental changes.
	Security	-	1.9 lack of adequate gate controls.
		-	1.10. untrained and unauthorized persons gaining access to movement areas.

Table 4.2
Contributing Human Factors of V/PD RIs

Domain 2	Cover Term	Included Term	Conjectures *With respect to contributing factors of V/PD RIs, violations of this nature are contributed by …*
Human Factors	Behavior	-	
			2.1. becoming complacent
		-	2.2. health and mental health.
	Situation Awareness	Communication Issues	2.3. lack of active listening.
			2.4. miscommunication.
		Inattention	2.5. being distracted.
			2.6. lack of familiarity of airport geography.
			2.7. inattention to detail.

Table 4.3
Contributing Staff/Personnel Factors of V/PD RIs

Domain 3	Cover Term	Included Term	Conjectures *With respect to contributing factors of V/PD RIs, violations of this nature are contributed by …*
Staff/Personnel	Human Resources	-	3.1. employee attitudes and morale.
		-	3.2. high employee turnover rate.
	Training	Initial	3.3. lack of adequate airport specific rules training.
			3.4. lack of airport familiarization training for changes on airport environment.
			3.5. lack of initial education, and training on specific job or role at airport.
		Recurrent	3.6. lack of recurrent training for existing employees and stakeholders.

Table 4.4
Recommended or Effective V/PD RI Mitigation Approaches/Strategies

Domain 4	Cover Term	Included Term	Conjectures *With respect to V/PD RI mitigation approaches/ strategies, airport managers recommend …*	
Recommended or Effective Mitigation Approaches/ Strategies	Education/ Training Issues	Management/ Administration Related	4.1	better tracking of V/PD RIs at all levels.
			4.2.	building positive relationships with stakeholders.
			4.3.	improving signage and markings.
		Staff/ Personnel Related	4.4.	continuing education programs.
			4.5.	continuing safety meetings.
			4.6.	more in-depth training for everyone on the airport environment.
	Safety Issues	-	4.7.	aggressive enforcement capability.
		-	4.8.	upgrading gate access controls and security.

Appendix B

Figures

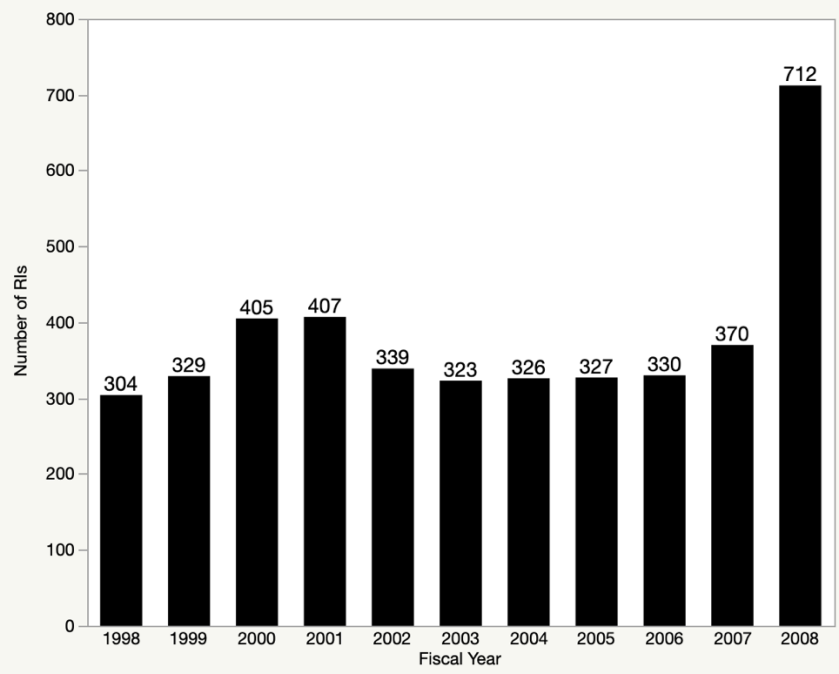


Figure 1.1. **Frequency of RIs 1998 through 2008. The data for years 1998 to 2007 were calculated under the original FAA definition of RIs and the year 2008 coincide with the new ICAO definition that now encompasses surface incidents and pre-2008 classification RIs.**

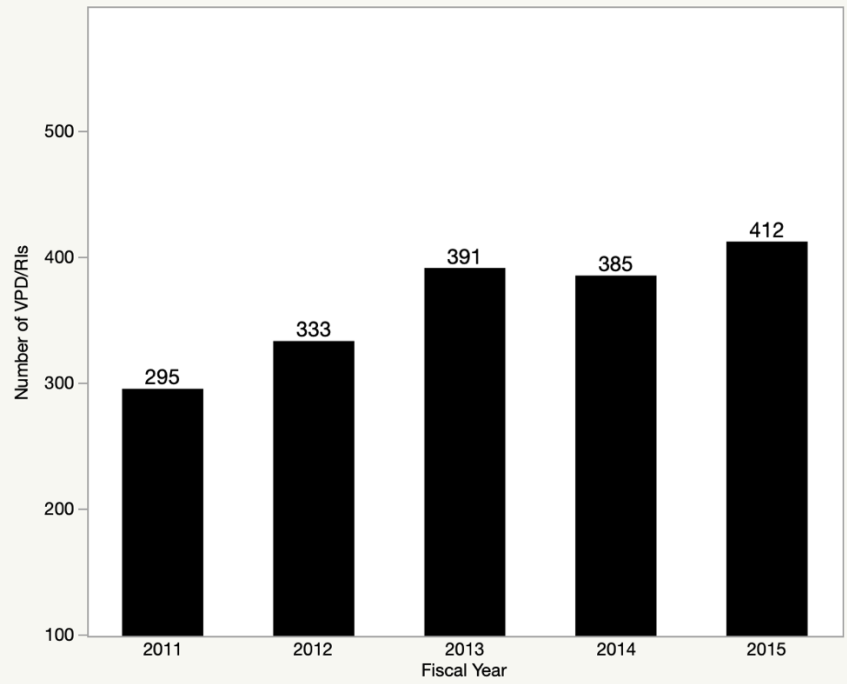


Figure 1.2. **Frequency of V/PD RIs data from FY 2011 to FY 2015 found in the RWS (2019).**

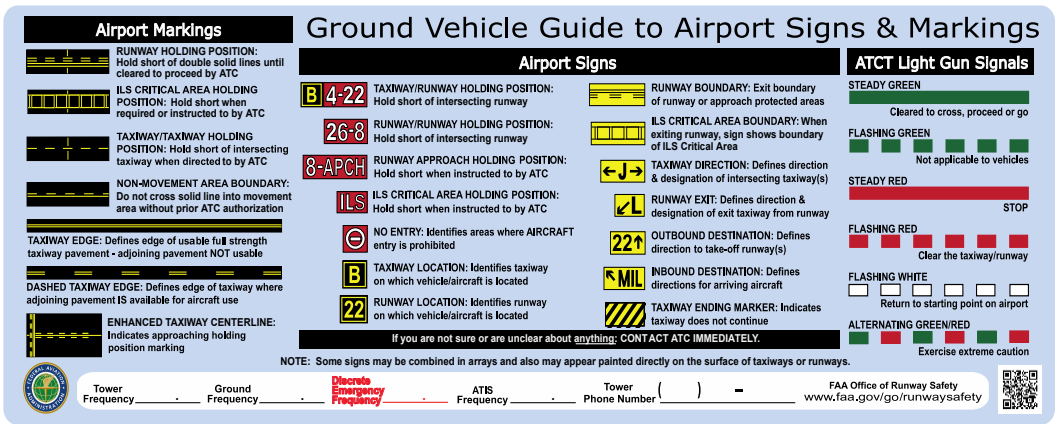


Figure 1.3. **FAA (2018e) Ground Vehicle Guide to Airport Signs and Markings typically found on dashboards or visors.**

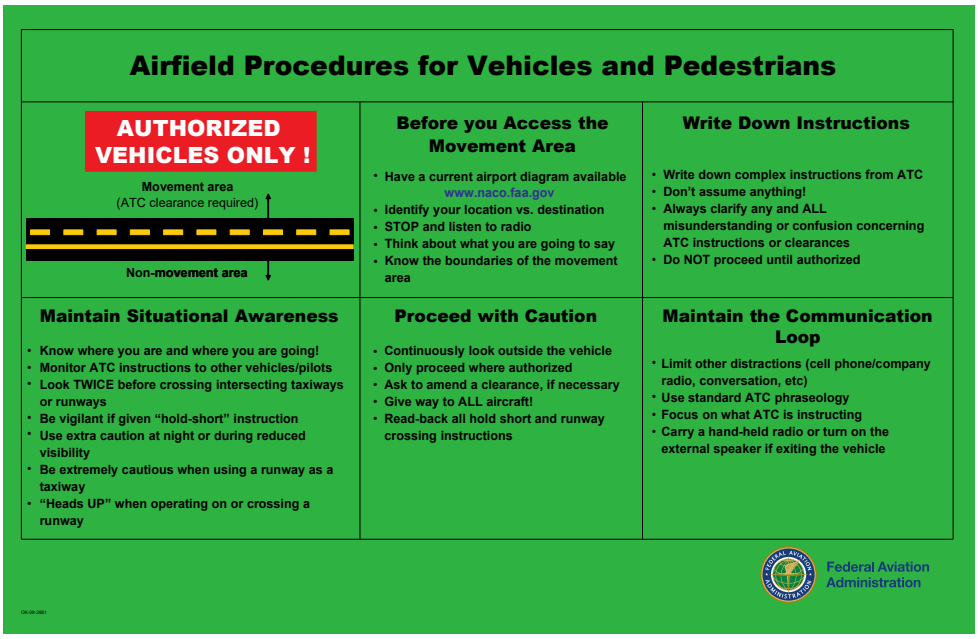


Figure 1.4. **FAA (2018f) poster for airfield procedures for vehicles and pedestrians.**

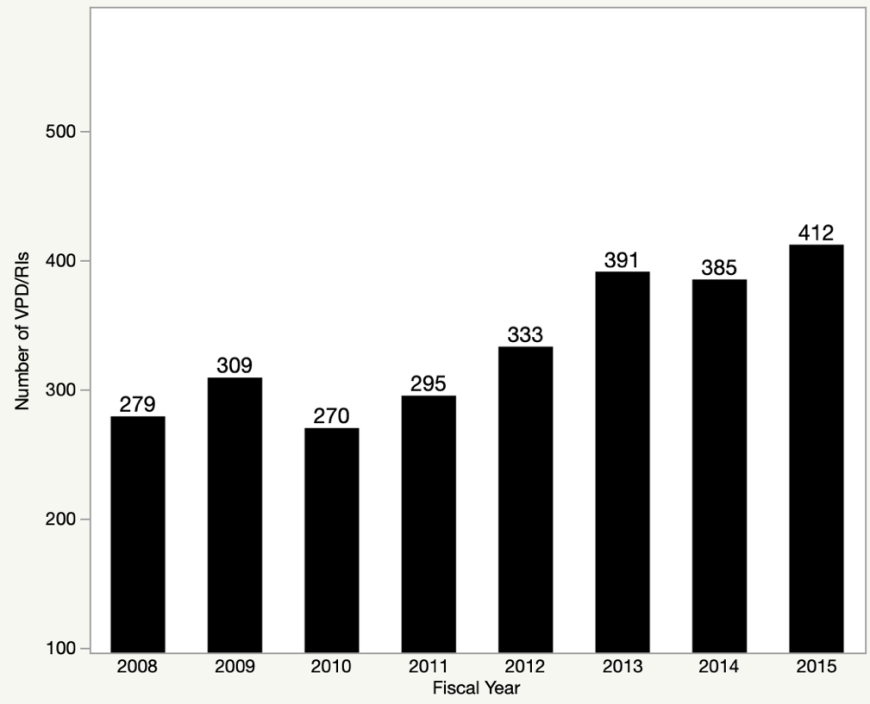


Figure 1.5. **V/PD RI data from FY 2008 to FY 2015 found in the RWS (2019).**

Appendix C

Instruments

Hello,

My name is John Mahlman. I'm a Ph.D. in Aviation Sciences candidate at Florida Institute of Technology's College of Aeronautics. I am performing doctoral research on the nations reported rise in vehicle and pedestrian deviation runway incursions (V/PD RIs) between 2011 and 2016. Therefore, I am interviewing airport executives within different regions across the United States. The purpose of this research was twofold: (a) to describe the contributing factors of V/PD RIs nationally, and (b) to describe what mitigation approaches/strategies airport managers recommend or find to be effective. Your responses will be treated as confidential and will be accessible only by the research team, which consists of my committee members and me. No identifying information such as your airport name or your name will be stored. Therefore, no airport or name will be connected to my study. If you begin responding to any of the questions and decide to discontinue, all previous answers will be destroyed. If you have any questions, you may contact me directly (John Mahlman: email address, phone number), or my major advisor (Dr. Deborah Carstens: email address, phone number). If you would like to participate in this doctoral research study, please respond at your convenience with a preference of either a telephone interview or an online questionnaire. I look forward to hearing from you or a member of your airport's controlling organization.

Sincerely,

John Mahlman
Principal Investigator
Email Address
Phone Number

Informed Consent

Please read this consent document carefully before you decide to participate in this study. The researcher will answer any questions before you sign this form.

Study Title:

Runway Incursions: A Phenomenological Approach to Understanding the Challenges in Mitigating Vehicle and Pedestrian Runway Incursions

Purpose of the Study:

The purpose of this research was twofold: (a) to describe the contributing factors of V/PD RIs nationally, and (b) to describe what mitigation approaches/strategies airport managers recommend or find to be effective.

Procedures:

Participants are asked to complete a 28-item phone interview or may elect to complete an online questionnaire version of the same 28-items. The interview/questionnaire should take no longer than 20 minutes to complete.

Potential Risks of Participating:

Minimal risk. There will be no more risk associated outside of normal interactions contained through either a phone conversation or interacting through a computer to participate in this study.

Potential Benefits of Participating:

This research will benefit the scientific and aviation community through understanding why V/PD RIs are increasing in the United States. This study is also part of doctoral research being conducted at Florida Institute of Technology's College of Aeronautics.

Confidentiality:

Your identity will be kept confidential to the extent provided by law. Data you provide will be deidentified, and no identifying marks will remain to link you or your airport's organization with your data. The informed consent form containing your name will be kept in a locked file found in Dr. Deborah Carstens' office for three years at Florida Institute of Technology's College of Aeronautics, and will not be located together with your data. Data collected from this study will be kept separately on a password protected personal computer for three years separated from the informed consent forms. Your name, or airport organization will not be linked to any specific information in the final report.

Voluntary participation:

Your participation in this study is completely voluntary. There is no penalty for not participating. You may also refuse to answer any of the questions we ask you.

Right to withdraw from the study:

You have the right to withdraw from the study at any time without consequence.

Whom to contact if you have questions about the study:

John Mahlman, Principal Investigator
150 West University Blvd.
Melbourne, FL 32901
Email: Email Address Phone: Phone Number

Dr. Deborah Carstens, Dissertation Committee Chairperson
150 West University Blvd.
Melbourne, FL 32901
Email: Email Address Phone: Phone Number

Whom to contact about your rights as a research participant in the study:

Dr. Lisa Steelman, IRB Chairperson
150 West University Blvd.
Melbourne, FL 32901
Email: Email Address Phone: Phone Number

Agreement:

I have read the procedure described above. I voluntarily agree to participate in the procedure and I have received a copy of this description. This page may be printed for your records.

Participant: _____ Date: _____

Principal Investigator: _____ Date: _____

Hello,

You are invited to participate in a research study that is twofold: (a) to describe the contributing factors of V/PD RIs nationally, and (b) to describe what mitigation approaches/strategies airport managers recommend or find to be effective. As part of the study, I am requesting your participation in completing this questionnaire, which is comprised of two parts: (a) a set of questions and (b) a set of professional demographic questions. To accomplish my purpose, I am asking that you provide as much detailed information as possible when responding to the interview questions. Please note that the study is part of a doctoral dissertation research being conducted at Florida Institute of Technology's College of Aeronautics and has been approved by the university's Institutional Research Board (IRB).

Before continuing, it is important for you to understand the following:

1. Your responses will be treated as strictly confidential and will be accessible only by the research team, which consists of my committee members and me.
2. No identifying information will be collected from your responses.
3. No references will be made in oral or written reports that could connect you in any way to the study.
4. Your participation is completely voluntary, and you are not required to participate in the study.
5. If you begin responding to any of the questions and opt not to continue, you may simply hang up the phone and all responses will be immediately destroyed.
6. By saying you consent, you are indicating that you are at least 18 years old and have agreed to voluntarily participate in the study.
7. If you have any questions you may contact me directly (John Mahlman: email address, phone number), or my major advisor (Dr. Deborah Carstens: email address, phone number).

Thank you in advance for your time, cooperation, and support.

Questionnaire Part 1 of 3

Questions on this page address V/PD RIs at <u>airports in general</u>.

If you prefer not to answer, please leave answer blank.

1. According to the FAA, V/PD RIs have increased nationally by 55.7% between Fiscal Year 2011 and Fiscal Year 2016. Please describe the top three common reasons for V/PD RIs at airports in general.
2. Please describe the top three most common barriers to addressing V/PD RIs at airports in general.
3. What are the successful attempts made to mitigate V/PD RIs at airports in general?
4. What are the least successful attempts made to mitigate V/PD RIs at airports in general?
5. What improvements need to be made in the processes involved in addressing V/PD RIs at airports in general?
6. Is technology a leading cause of V/PD RIs at airports in general? Please explain. Please provide two examples?
7. Is lack of training or inadequate training a leading cause of V/PD RIs at airports in general? Please explain. Please provide two examples?
8. Is human factors a contributing factor of V/PD RIs at airports in general? Please explain. Please provide two examples?

9. Are there any other contributing factors of V/PD RIs at airports in general? Please explain. Please provide examples.

Questionnaire Part 2 of 3

Questions on this page address V/PD RIs at your <u>specific airport.</u>

If you prefer not to answer, please leave answer blank.

10. Please describe the top three common reasons for V/PD RIs at your specific airport.
11. Please describe the top three most common barriers to addressing V/PD RIs at your specific airport.
12. What are the successful attempts made to mitigate V/PD RIs at your specific airport?
13. What are the least successful attempts made to mitigate V/PD RIs at your specific airport?
14. What improvements need to be made in the processes involved in addressing V/PD RIs at your specific airport? How should this be accomplished?
15. Please describe any related policies, reporting mechanisms, available resources, enforcement activities, personnel training, and so forth that could improve addressing V/PD RIs at your specific airport.
16. When an individual is responsible for a V/PD RI, how was he/she guided or trained so a similar V/PD RI was not committed again at your

specific airport? Was this helpful or beneficial in preventing or mitigating future occurrences?

17. What are the lessons learned from addressing V/PD RIs at your specific airport? How have these experiences influenced the handling of subsequent V/PD RIs?
18. Is technology a leading cause of V/PD RIs at your specific airport? Please explain. Please provide two examples?
19. Is lack of training or inadequate training a leading cause of V/PD RIs at your specific airport? Please explain. Please provide two examples?
20. Is human factors a contributing factor of V/PD RIs at your specific airport? Please explain. Please provide two examples?
21. Are there any other contributing factors of V/PD RIs at your specific airport? Please explain. Please provide examples.

Personal Demographics Part 3 of 3

Questions on this page address demographics.

If you prefer not to answer, please leave answer blank or if applicable, select prefer not to answer.

22. Please enter the total number of years overall experience you have working in the aviation profession.
23. Please enter the total number of years you have working as an airport manager or executive.

24. What is your current professional title or position.

    Executive__

    Manager__

    Other__

    Prefer not to answer__

25. Are you a currently a member of AAAE?

    Yes___

    No____

    Prefer not to answer____

26. How old are you?

    18-30__

    31-40__

    41-50__

    51-60__

    61-70__

    71 and older__

    Prefer not to answer__

27. What is your gender?

    Male___

    Female___

    Other___

Prefer not to answer___

Thank you for your time and cooperation.

SurveyMonkey Protocol

Introduction and Consent Part 1 of 2

Informed Consent:
Please read this consent document carefully before you decide to participate in this study. The researcher will answer any questions before you sign this form.

Study Title:
Runway Incursions: A Phenomenological Approach to Understanding the Challenges in Mitigating Vehicle and Pedestrian Deviation Runway Incursions (V/PD RIs)

Purpose of the Study:
The purpose of this research was twofold: (a) to describe the contributing factors of V/PD RIs nationally, and (b) to describe what mitigation approaches/strategies airport managers recommend or find to be effective.

Procedures:
Participants are asked to complete a 28-item phone interview or may elect to complete an online questionnaire version of the same 28-items. The interview/questionnaire should take no longer than 20 minutes to complete.

Potential Risks of Participating:
Minimal risk. There will be no more risk associated outside of normal interactions contained through either a phone conversation or interacting through a computer to participate in this study.

Potential Benefits of Participating:
This research will benefit the scientific and aviation community through understanding why V/PD RIs are increasing in the United States. This study is also part of doctoral research being conducted at Florida Institute of Technology's College of Aeronautics.

Confidentiality:

Your identity will be kept confidential to the extent provided by law. Data you provide will be deidentified, and no identifying marks will remain to link you or your airport's organization with your data. The informed consent form containing your name will be kept in a locked file found in Dr. Deborah Carstens' office for three years at Florida Institute of Technology's College of Aeronautics and will not be located together with your data. Data collected from this study will be kept separately on a password protected personal computer for three years separated from the informed consent forms. Your name, or airport organization will not be linked to any specific information in the final report.

Voluntary Participation:

Your participation in this study is completely voluntary. There is no penalty for not participating. You may also refuse to answer any of the questions we ask you. You have the right to withdraw from the study at any time without consequence.

Whom to Contact if you Have Questions About the Study:
John Mahlman, Principal Investigator
150 West University Blvd.
Melbourne, FL 32901
Email: Phone:

Dr. Deborah Carstens, Dissertation Committee Chairperson
150 West University Blvd.
Melbourne, FL 32901
Email: Phone:

Whom to Contact About Your Rights as a Research Participant in the Study:
Dr. Lisa Steelman, IRB Chairperson
150 West University Blvd.
Melbourne, FL 32901
Email: Phone:
Approval #: 18-159

Agreement:

I have read the procedure described above. I voluntarily agree to participate in the procedure, and I have received a copy of this description. This page may be printed for your records. By clicking next, you are consenting to participate in this study.

Introduction and Consent Part 2 of 2

* 1. You are invited to participate in a research study that is twofold: (a) to describe the contributing factors of V/PD RIs nationally, and (b) to describe what mitigation approaches/strategies airport managers recommend or find to be effective. As part of the study, I am requesting your participation in completing this questionnaire, which is comprised of two parts: (a) a set of questions and (b) a set of professional demographic questions. To accomplish my purpose, I am asking that you provide as much detailed information as possible when responding to the interview questions. Please note that the study is part of a doctoral dissertation research being conducted at Florida Institute of Technology's College of Aeronautics and has been approved by the university's Institutional Research Board (IRB).

Before clicking next, it is important for you to understand the following:

1. Your responses will be treated as strictly confidential and will be accessible only by the research team, which consists of my committee members and me.

2. No identifying information will be collected from your responses.

3. No references will be made in oral or written reports that could connect you in any way to the study.

4. Your participation is completely voluntary, and you are not required to participate in the study.

5. If you begin responding to any of the questions and opt not to continue, you may simply close your browser's window to close your session. This action will delete your responses and eliminate you as a participant.

6. By clicking next you consent, you are indicating that you are at least 18 years old and have agreed to voluntarily participate in the study.

7. If you have any questions you may contact me directly (John Mahlman: email address, phone number), or my major advisor (Dr. Deborah Carstens: email address, phone number).

Thank you in advance for your time, cooperation, and support.

◯ **Next**

◯ **I Do Not Consent**

Questionnaire Part 1 of 3

Questions on this page address V/PD RIs at airports in general. If you prefer not to answer, please leave answer blank.

2. According to the FAA, V/PD RIs have increased nationally by 55.7% between Fiscal Year 2011 and Fiscal Year 2016. Please describe the top three common reasons for V/PD RIs at airports in general.
3. Please describe the top three most common barriers to addressing V/PD RIs at airports in general.
4. What are the successful attempts made to mitigate V/PD RIs at airports in general?
5. What are the least successful attempts made to mitigate V/PD RIs at airports in general?
6. What improvements need to be made in the processes involved in addressing V/PD RIs at airports in general?
7. Is technology a leading cause of V/PD RIs at airports in general? Please explain.

   Please provide two examples?
8. Is lack of training or inadequate training a leading cause of V/PD RIs at airports in general? Please explain. Please provide two examples?
9. Is human factors a contributing factor of V/PD RIs at airports in general? Please explain. Please provide two examples?
10. Are there any other contributing factors of V/PD RIs at airports in general? Please explain. Please provide examples?

Questionnaire Part 2 of 3

Questions on this page address V/PD RIs at your specific airport. If you prefer not to answer, please leave answer blank.

11. Please describe the top three common reasons for V/PD RIs at your specific airport.

12. Please describe the top three most common barriers to addressing V/PD RIs at your specific airport.

13. What are the successful attempts made to mitigate V/PD RIs at your specific airport?

14. What are the least successful attempts made to mitigate V/PD RIs at your specific airport?

15. What improvements need to be made in the processes involved in addressing V/PD RIs at your specific airport? How should this be accomplished?

16. Please describe any related policies, reporting mechanisms, available resources, enforcement activities, personnel training, and so forth that could improve addressing V/PD RIs at your specific airport.

17. When an individual is responsible for a V/PD RI, how was he/she guided or trained so a similar V/PD RI was not committed again at your specific airport? Was this helpful or beneficial in preventing or mitigating future occurrences?

18. What are the lessons learned from addressing V/PD RIs at your specific airport? How have these experiences influenced the handling of subsequent V/PD RIs?

19. Is technology a leading cause of V/PD RIs at your specific airport? Please explain. Please provide two examples?

20. Is lack of training or inadequate training a leading cause of V/PD RIs at your specific airport? Please explain. Please provide two examples?

21. Is human factors a contributing factor of V/PD RIs at your specific airport? Please explain. Please provide two examples?

22. Are there any other contributing factors of V/PD RIs at your specific airport? Please explain. Please provide examples?

Personal Demographics Part 3 of 3

Questions on this page address demographics.

If you prefer not to answer, please leave answer blank or if applicable, select prefer not to answer.

23. Please enter the total number of years overall experience you have working in the aviation profession.

24. Please enter the total number of years you have working as an airport manager or executive.

25. What is your current professional title or position?
    Executive, Manager, Other, Prefer to Not Answer

26. Are you currently a member of AAAE?
    Yes, No, Prefer to Not Answer

27. How old are you?
    18-30, 31-40, 41-50, 51-60, 61-70, 71 or older, prefer to not answer.

28. What is your gender?
    Male, Female, Other, Prefer to Not Answer.

Thank you for your time and cooperation.

Appendix D

IRB Approval

Notice of Exempt Review Status
Certificate of Clearance for Human Participants Research

Principal Investigator:	John Mahlman
Date:	October 30, 2018
IRB Number:	18-159
Study Title:	Runway Incursions: A Multimethod Approach to Understanding the Challenges in Mitigating Vehicle and Pedestrian Runway Incursions

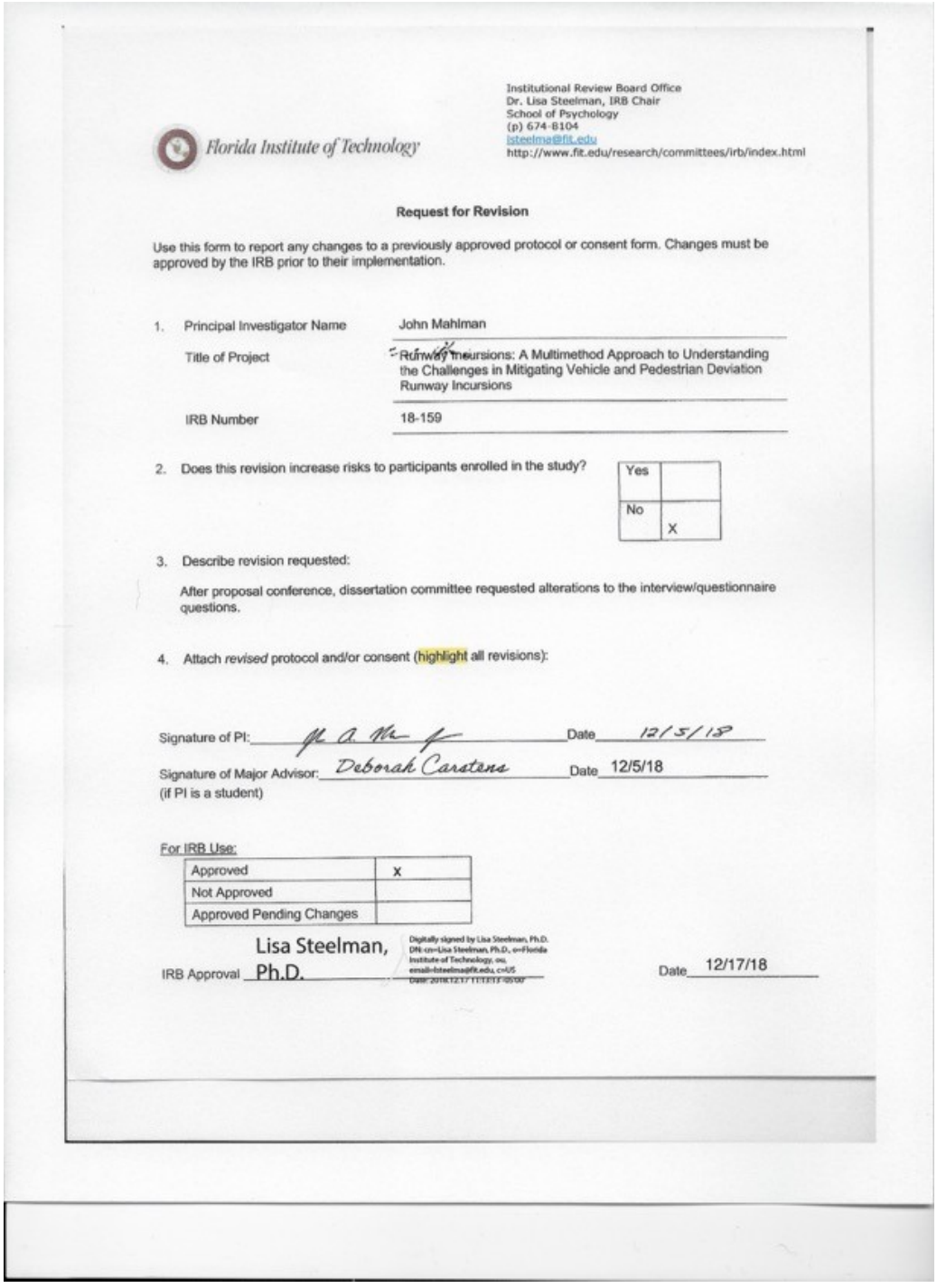
Your research protocol was reviewed and approved by the IRB Chairperson. Per federal regulations, 45 CFR 46.101, your study has been determined to be minimal risk for human subjects and exempt from 45 CFR46 federal regulations. The Exempt determination is valid indefinitely. Substantive changes to the approved exempt research must be requested and approved prior to their initiation. Investigators may request proposed changes by submitting a Revision Request form found on the IRB website.

Acceptance of this study is based on your agreement to abide by the policies and procedures of Florida Institute of Technology's Human Research Protection Program (http://web2.fit.edu/crm/irb/) and does not replace any other approvals that may be required.

All data, which may include signed consent form documents, must be retained in a secure location for a minimum of three years (six if HIPAA applies) past the completion of this research. Any links to the identification of participants should be maintained on a password-protected computer if electronic information is used. Access to data is limited to authorized individuals listed as key study personnel.

The category for which exempt status has been determined for this protocol is as follows:

2. Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of public behavior so long as confidentiality is maintained.
   a. Information is recorded in such a manner that the subject cannot be identified, directly or through identifiers linked to the participant and/or
   b. Subject's responses, if know outside the research would not reasonably place the subject at risk of criminal or civil liability or be damaging to the subject's financial standing, employability, or reputation.



Florida Institute of Technology

Institutional Review Board Office
Dr. Lisa Steelman, IRB Chair
School of Psychology
(p) 674-8104
lsteelma@fit.edu
http://www.fit.edu/research/committees/irb/index.html

Request for Revision

Use this form to report any changes to a previously approved protocol or consent form. Changes must be approved by the IRB prior to their implementation.

1. Principal Investigator Name: John Mahlman

   Title of Project: Runway Incursions: A Multimethod Approach to Understanding the Challenges in Mitigating Vehicle and Pedestrian Deviation Runway Incursions

   IRB Number: 18-159

2. Does this revision increase risks to participants enrolled in the study?

Yes	
No	X

3. Describe revision requested:

   After proposal conference, dissertation committee requested alterations to the interview/questionnaire questions.

4. Attach *revised* protocol and/or consent (highlight all revisions):

Signature of PI: [signature] Date 12/5/18

Signature of Major Advisor: Deborah Carstens Date 12/5/18
(if PI is a student)

For IRB Use:

Approved	X
Not Approved	
Approved Pending Changes	

IRB Approval Lisa Steelman, Ph.D. Digitally signed by Lisa Steelman, Ph.D. DN: cn=Lisa Steelman, Ph.D., o=Florida Institute of Technology, ou, email=lsteelma@fit.edu, c=US Date: 2018.12.17 11:13:13 -05'00' Date 12/17/18

Appendix E

Journal

All names and identifying information have been removed to ensure anonymity.

January 2, 2019, Looking online for all of the applicable contact information for each of the sample airports. Government shutdown.

January 4, 2019, continuing with securing contact information for each of the sample airports. Government shutdown continues. With the amount of government owned airports at a larger proportion, I feel that waiting until the government shutdown concludes to contact sample airports. My reluctance to wait until the right time comes from making sure that recruitment email does not fall on deaf ears or gets buried under a mountain of emails, or worse ignored all together because of the potential chaos of the government shutdown.

January 6, 2019, worked on polishing up the original proposal, redid the graphs so they had counts reflected on each of the bars for chapter 1. Did some basic cleanup work like realigning the whole proposal and making sure the numbers on the table of contents were accurate. Tomorrow at 3:00 is a teleconference with our contact at the FAA, and my dissertation advisor. I hope FAA contact is not furloughed and is available, the government shutdown continues.

January 7, 2019, teleconference with FAA contact and dissertation advisor. FAA contact suggested that I contact someone within the operations department of each airport, where I use email first, then follow up with a phone call. Mentioned using the ASIAS database. FAA contact requested a monthly update from here on out on what is happening with the project. Lastly, FAA contact requested a copy of the proposal. Meeting with dissertation advisor, we went over which person to contact out of all the above contact information.

January 16, 2019, today I created a SurveyMonkey account and started to put together the online questionnaire.

January 22, 2019, made grammatical changes to survey. Email from dissertation advisor is below. Dissertation advisor asked me to pilot the study with two students, I picked Ph.D. student 1 and Ph.D. student 2. I emailed both Ph.D.1, Ph.D.2 and asked them to look over the survey and provide feedback. Both of these two students are/were members of my cohort and I have (at least to me) good rapport with both of them. Received feedback from Ph.D.1.

January 24, 2019, today I received feedback from Ph.D.2. Emailed another Ph.D. student and requested feedback, Ph.D.3.

January 29, 2019, Ph.D.3 has not responded back yet to the request for feedback on the survey. Meeting with dissertation advisor, decided to ask two professors, Prof1 and Prof2 for their input and feedback. Also going to ask several airline pilots to also see if they are willing to look over survey as well. Sent survey to a pilot with 30 years of experience to get feedback as well. Prof1 provided feedback and plan on meeting with dissertation advisor tomorrow after meeting with Prof2 to go over their feedback.

January 30, 2019, Met with Prof2 who had some great feedback and provided an electronic copy of their book on safety management. They also offered his future assistance if it was ever needed. Afterwards, met with dissertation advisor to word-smith every problem incorporating all the feedback we had secured through piloting the survey with many people. After reworking the entire survey to reflect all of the feedback. Double checked the recruitment email to make sure it accurately reflected the new changes. After that, applied all of the altered changes into the SurveyMonkey itself.

January 31, 2019, Spoke with dissertation advisor over the phone. They gave me back the recruitment email with some minor edits. Meeting with dissertation advisor tomorrow morning to show them my copy of the survey through my admin link. Recruitment emails have been sent out.

February 1, 2019, met with dissertation advisor and reworked the survey questions again. I believe they are finally in an acceptable state. Sent emails to Prof1 and Prof2 providing them the most up to date version. Prof1 sent an email back and stated a few grammar mistakes, I cleaned those up. Sent recruitment emails to airports. Dissertation advisor initially made contact from *airport 1* where they wanted to verify that this study was indeed legitimate and that expressed interest in being a part of this study. Dissertation advisor emailed airport 1 (Airport Operations Manager) at *somewhere.*

February 6, 2019, Sent out second emails to ten airports.

February 8, 2019, received emails from participant2 at airport, and participant 3 at airport agreeing to participate. Sent them both emails thanking them for agreeing to take my survey along with the link to the SurveyMonkey. So far, we have contacted four airports.

February 12, 2019, participant3 took the survey as a representative of airport. Sent out more emails to the other 11 airports. Trying a new tactic to get to managers, for those emails that have been exhausted at particular airports with no responses. I'm sending emails to the Fuel Base Operators as an "in" to the managers.

February 13, 2019, participant 4 scheduled a phone interview with me on February 21, 2019, at 5:30. Participant 5 assigned someone else to take the survey at their airport and completed the survey today. Current count is two completed online surveys and one scheduled phone interview. Going to reach out to airport on Friday.

February 16, 2019, spoke with dissertation advisor yesterday through text and informed her that we had two responses potentially come from airport, and they said that is fine because since the responses are anonymous there is no way to tell which one the duplicate from that particular airport is. Dissertation advisor also told me that I need to get between 6 and 8 more responses. I went back into the runway incursion database, the public one, and pulled data from every airport that had 10 or more runway incursions during our study period found in the public database, so I am ready to answer the question of why we were picked, so I have that information ready at hand.

February 18, 2019, emailed all of the airports above that I was able to find contact information for.

February 20, 2019, emailed 14 more airports who have not responded yet. Participant 6 has responded and took the survey. Still waiting to hear back from decisions from airports. will email them Friday to touch base. So far, I have completed online surveys from: airports. Tomorrow I have a phone interview with at 5:30pm, and I have to call him. Looking forward to getting some actual interview time.

February 21, 2019, first phone interview today with participant. They have signed consent form as well, I sent it out this morning. Also received acceptance at participant 7 for a phone interview, he has already signed consent form and just working out a good time either Monday or Tuesday next week. Also, sent a copy of interview questions so participant 7 can “prepare” responses.

February 22, 2019, today contacted airports. participant 8 said they would love to participate, and I sent them the survey link. Another airport stated they would table the participation request. Did not hear anything from participant 7 so I will call them on Monday morning at 11:00am at one of the two times their representative gave to me. Next week, on Monday am going to send touch base emails to airports.

February 25, 2019, has an interview this morning with participant 7, it went very well. The participant I interviewed was very helpful, but once again did not answer the questions as well as I would have liked to. He answered the general questions

as if they were to his specific airport and just repeated his self on the second half. Sent four emails to the airports that were being tabled. Going to send out another recruitment batch of emails to other airports again. Airport 8 responded, and I sent them the survey link. airport responded and said they were going to review request. Received a response from airport, they outright said "we'll pass on this one". Airport said, "we cannot accommodate your request at this time".

February 27, 2019, two participants completed the survey and I have no idea who they were because no "I completed it emails were sent". Participant 8 contacted me and stated they were a Florida Tech alum and were happy to assist. participant 9 contacted me and claimed they could not get the "link" to work correctly and I sent them another link.

March 1, 2019, sent touch base emails to airports and also sent out another batch of emails. Participant 8 emailed back stating that they had completed it and were done. Participant 9 emailed me and said they wanted to have a telephone interview. airport said thanks but no thanks.

March 4, 2019, participant 10 sent me an email and scheduled a phone interview for tomorrow at 11:30am CST. Sent touch base emails to airports.

March 5, 2019, third telephone interview with participant 10 went well.

March 6, 2019, sent a touch base email to airport. Participant 11 completed the online survey. One response was deleted because they only clicked on "I consent" on the first page then preceded to skip every other question on the survey.

March 11, 2019, sent touch base emails to airports. Still no response from either of those three. Dissertation advisor called and stated that 11 should be enough and wanted to schedule a meeting with committee member. Wants me to prepare a spreadsheet that has all the questions and the data separated out by region and type.

March 12, 2019, started working on separating out the data into regions and type. 4 of the original 12 participated.

March 15, 2019, Today I completed the first code of all of the data and produced the following distributions:

Human Factors 74, 12.63%
Managerial Considerations 169, 23.38%
Technology 31, 4.33%
Training 91, 16.95%

I also cleaned up the data in the spreadsheet utilizing an average for the three instances of missing data. On the other instances I placed prefer to not answer where applicable. I created a second document to recode again in two weeks from today.

March 25, 2019, reacquainted me with the entire proposal and began addressing all of committee member comments on the proposal, did a cursory cleanup of chapters one and two.

March 27, 2019, continued reacquainting me with the proposal and began addressing the comments on chapter three and the back matter. Still need to address: changing to the RWS, insert all 41 airports that were queried, social constructivism and individual constructivism, byers sample and population, add in a person example and a system example, rework population and sample in chapter 3. Chapter 2 needs rework for how each other the articles informed the study. Scheduled a meeting with committee member for next Monday to discuss the data collected.

March 29, 2019, started the second code of the qualitative data. The second coding session produced the following distributions:

Human Factors = 63, 10.71%
Managerial Considerations = 21.74%
Technology = 55, 7.66%
Training = 93, 17.68%

April 1, 2019, Meeting with dissertation advisor and committee member today at 2:30pm. Went over data in *NVIVO*, was given some guidance by committee member on how to make the tables to display all of the data and the creation of 4 RQs three RQs related to contributing factors and one related to mitigation factors. Was told to use Gallo et al. article from 2016 as a guide on how to display data. Committee member also provided guidance on how to display the demographic data gathered from the participants including de identified data and anonymous data.

April 4, 2019, coded data to child nodes within *NVIVO* software.

April 8, 2019, created tables for contributing factors RQs and emailed them to committee member.

April 9, 2019, applied all changes to chapter 1 and 2 from proposal defense, started on chapter 3. Cleaned up references' pages. Completed changed to the RWS.

April 10, 2019, continued applying all changes to chapter 1 and 2 from proposal defense, started on chapter 3. Cleaned up references' pages. Changed to the RWS. Created charts in JMP for archival data.

April 15, 2019, met with dissertation advisor and committee member and redesigned the original batch of tables to be more condensed.

April 17, 2019, met with dissertation advisor and they coded the first two participants data with my *NVIVO* software, and we were in mostly agreement with all of the coding, there were only 3 coded areas of disagreement. Sent out April update email to FAA contact.

April 18, 2019, applied three additions dissertation advisor requested and condensed the remaining tables for the mitigation RQ. Also, cleaned up the contributing factors tables.

April 19, 2019, recoded the data with the new child nodes that were created since last coding.

April 20, 2019, phone meeting with dissertation advisor at 11:00am. Went over each and every table for chapter 4.

April 24, 2019, meeting with dissertation advisor and we completed one last validity purposed coding session and we agreed in 19 out of 20 pieces of coded material. I was giving their blessing to start writing chapter 4. Wrote 3 pages of chapter 4.

April 25, 2019, wrote nine pages of chapter 4

April 26, 2019, went through each and every item on the tables and provided reference to each and every like item.

April 27, 2019, wrote pages for chapter 4. Redacted all contact information and identifying information from this journal.

April 28, 2019, wrote pages for chapter 4.

April 29, 2019, wrote pages for chapter 4.

April 30, 2019, edited chapter 4.

May 3, 2019, turned chapter 4 in to dissertation advisor.

May 7, 2019, meeting with dissertation advisor and began chapter 5, and did chapter 4 edits.

May 8, 2019, worked on chapter 5 and appendix formatting

May 9, 2019, Worked on chapter 5

May 10, 2019, to June 8, 2019, Fine Tuned and Completed Dissertation Write-up

Appendix F

Raw Data

Participant 1

Q1 Consent Question.

Q2 According to the FAA, V/PD RIs have increased nationally by 55.7% between Fiscal Year 2011 and Fiscal Year 2016. Please describe the top three common reasons for V/PD RIs at airports in general.

> *At our airports, the top three reasons for V/PD were insufficient event coordination, unescorted access and proper drivers training*

Q3 Please describe the top three most common barriers to addressing V/PD RIs at airports in general.

> *The time to properly train existing tenants and a secure access control system*

Q4 What are the successful attempts made to mitigate V/PD RIs at airports in general?

> *Since out last V/PD, in 2013 or so, we have a more in-depth training for all contractors and meet regularly with the museum on all events that will be on or close to the movement area.*

Q5 What are the least successful attempts made to mitigate V/PD RIs at airports in general?

> Participant skipped this question

Q6 What improvements need to be made in the processes involved in addressing V/PD RIs at airports in general?

> *Our training is continually evolving to better suit or environment. We are also in the process of upgrading our security access system to reduce the number of unauthorized persons that are on the airport in the future.*

Q7 Is technology a leading cause of V/PD RIs at airports in general? Please explain. Please provide two examples?

> *I would not say technology is, I would say the lack of technology can lead to V/PD RIs. There is a lot of new tech out there that can prevent unauthorized people from entering the airport to begin with.*

Q8 Is lack of training or inadequate training a leading cause of V/PD RIs at airports in general? Please explain. Please provide two examples?

> *Yes. As stated before, tenants need to be responsible for escorting their guests properly and the museum needed to train their workers and guests on the restrictions of working on an airport*

Q9 Is human factors a contributing factor of V/PD RIs at airports in general? Please explain. Please provide two examples?

> *Always. Human factors play a part in most aviation related accidents weather that is an accident of a V/PD. People may know the rules and simply not be concentrating or lose focus.*

Q10 Are there any other contributing factors of V/PD RIs at airports in general? Please explain. Please provide examples?

> Participant skipped this question

Q11 Please describe the top three common reasons for V/PD RIs at your specific airport.

> Participant skipped this question

Q12 Please describe the top three most common barriers to addressing V/PD RIs at your specific airport.

> Participant skipped this question

Q13 What are the successful attempts made to mitigate V/PD RIs at your specific airport?

Participant skipped this question

Q14 What are the least successful attempts made to mitigate V/PD RIs at your specific airport?

Participant skipped this question

Q15 What improvements need to be made in the processes involved in addressing V/PD RIs at your specific airport? How should this be accomplished?

Participant skipped this question

Q16 Please describe any related policies, reporting mechanisms, available resources, enforcement activities, personnel training, and so forth that could improve addressing V/PD RIs at your specific airport.

Participant skipped this question

Q17 When an individual is responsible for a V/PD RI, how was he/she guided or trained so a similar V/PD RI was not committed again at your specific airport? Was this helpful or beneficial in preventing or mitigating future occurrences?

Participant skipped this question

Q18 What are the lessons learned from addressing V/PD RIs at your specific airport? How have these experiences influenced the handling of subsequent V/PD RIs?

Participant skipped this question

Q19 Is technology a leading cause of V/PD RIs at your specific airport? Please explain. Please provide two examples?

Participant skipped this question

Q20 Is lack of training or inadequate training a leading cause of V/PD RIs at your specific airport? Please explain. Please provide two examples?

Participant skipped this question

Q21 Is human factors a contributing factor of V/PD RIs at your specific airport? Please explain. Please provide two examples?

Participant skipped this question

Q22 Are there any other contributing factors of V/PD RIs at your specific airport? Please explain. Please provide examples?

Participant skipped this question

Q23 Please enter the total number of years overall experience you have working in the aviation profession.

11 years

Q24 Please enter the total number of years you have working as an airport manager or executive.

2

Q25 What is your current professional title or position?

Manager

Q26 Are you a currently a member of AAAE?

Yes

Q27 How old are you?

Prefer to not Answer

Q28 What is your gender?

Male

Participant 2

Q1 Consent Question

Q2 According to the FAA, V/PD RIs have increased nationally by 55.7% between Fiscal Year 2011 and Fiscal Year 2016. Please describe the top three common reasons for V/PD RIs at airports in general.

1. untrained/unauthorized personnel gaining access to the AOA
2. authorized personnel failing to provide proper escort to guests / visitors
3. loss of situational awareness by trained and authorized personnel

Q3 Please describe the top three most common barriers to addressing V/PD RIs at airports in general.

1. high turnover of personnel / employees
2. funding for access control improvements
3. attitudes towards compliance from tenants and employees

Q4 What are the successful attempts made to mitigate V/PD RIs at airports in general?

1.emphasis from top management on the importance of V/PD RI prevention, with follow-through (culture change)
2.zero tolerance policies with significant penalties for violations; diligent enforcement (police presence, action)
3.improvements in signage, markings, technology to assist with situational awareness education and training programs (continuing) for all personnel who have access to the AOA

4.improvements in access controls to help prevent unauthorized / untrained personnel accessing the AOA
5. diligent reporting of V/PD RI events; this is actually the first step as the problems cannot be addressed if they are being ignored, they need to be accurately measured
6. follow-up investigation of every V/PD RI event to determine causes and contributing factors, followed by corrective action / improvements in training programs

Q5 What are the least successful attempts made to mitigate V/PD RIs at airports in general?

any action (or inaction) that conveys the message (whether intended or not) that the problem is not taken seriously; for example, simply posting a "prevent runway incursions" sign in the FBO or flight school lounge with no actual V/PD RI prevention program in place

Q6 What improvements need to be made in the processes involved in addressing V/PD RIs at airports in general?

management involvement/emphasis on the issue drives the culture; in many cases the lack of a strong safety culture not just among airport employees but among airport tenants and users as well is the most serious impediment to improvements. This is where enforcement fits in. Investigations identifying corrective actions, education, and other follow-up is also crucial.

Q7 Is technology a leading cause of V/PD RIs at airports in general? Please explain. Please provide two examples?

No. V/PD RI incidents are primarily a human factors issue. Technological improvements can help improve the performance of humans, but the power of stupid human tricks defeating technology should never be underestimated.

Q8 Is lack of training or inadequate training a leading cause of V/PD RIs at airports in general? Please explain. Please provide two examples?

Yes, it can be, and it can be exacerbated by high employee turnover and/or a lack of recurrent training. Unauthorized or untrained personnel accessing the AOA is a very common cause or contributing factor to V/PD RI incidents. Ex.#1: a tenant allowed a taco truck to piggy-back through an AOA gate; the taco truck drove subsequently across a runway. Ex.#2: a

landscaping maintenance crew was trimming grass on the airside of a tenant hangar; a landscaping employee inadvertently exited the tenant leasehold and was observed weed-eating along a taxiway edge (movement area).

Q9 Is human factors a contributing factor of V/PD RIs at airports in general? Please explain. Please provide two examples?

Yes, yes, yes, absolutely. A strong safety culture emphasizing good attitudes towards safety and the need to follow procedures is often what is lacking. Attitudes are difficult to change; some people with bad attitudes should either be terminated or otherwise denied access to the AOA. In other cases, confusing geometry, inadequate signage, or poor procedures can contribute to V/PD RI events. Ex.#1: unknown to the airport, an ATC manager arranged a "letter of agreement" with an airport tenant allowing the tenant to drive on a little- used taxiway without contacting ATC. The practice was discovered - and quickly stopped - after the ATC manager retired and a V/PD resulted. Ex.#2: an FBO employee towing an aircraft (westward) across a runway at sunset drove past hold lines that were difficult to see because of the low angle of the sun and associated glare. The holding position is also unusually close to the parallel taxiway. The employee had just gone through recurrent training 30 days prior. The holding position was subsequently improved with elevated runway guard lights.

Q10 Are there any other contributing factors of V/PD RIs at airports in general? Please explain. Please provide examples?

Unpredictable human behavior. Ex.#1 (and this is at a busy urban Reliever airport): a woman who resided east of the airport was headed to an auto repair business west of the airport to pick up her car. She decided to take a "short cut" across the airfield; she scaled a perimeter fence, crossed a ramp, a taxiway, and a runway – causing aircraft to go around - before she was apprehended (arrested). Ex.#2 (same airport): a contractor using a vacuum truck to pump out portable toilets at a hangar construction site saw additional portable toilets at another construction staging area on the opposite side of the airport. Believing those other toilets were next on his route, the contractor dismantled a section of construction fence, entered the AOA, drove onto a taxiway and then onto a runway, proceeding 2,000 feet down the runway before exiting on another taxiway (and being welcomed by a multitude of police, fire, and airport operations vehicles). Fortunately, the closest aircraft was approximately 4 miles away on approach.

Q11 Please describe the top three common reasons for V/PD RIs at your specific airport.

1. unauthorized person gaining access to the AOA
2. authorized person disregarding rules / procedures
3. human error / loss of situational awareness

Q12 Please describe the top three most common barriers to addressing V/PD RIs at your specific airport.

1. lack of grant funding to improve access controls
2. lack of grant funding to improve access controls
3. lack of grant funding to improve access controls

Q13 What are the successful attempts made to mitigate V/PD RIs at your specific airport?

NOT in order of importance or success:
1. airport rules & regulations codified into municipal ordinance, enabling local police enforcement
2. assignment of a full-time police officer to the airport, liaising directly with airport admin/operations
3. installation of warning signs (in Spanish and English) at Movement Area boundaries
4. repainting all Movement Area boundary markings to the 12-inch standard
5. painting 'zipper markings' for vehicle service roads to indicate where ground vehicles can/should be driven
6. aggressive training program for airfield access; annual renewal/refresher training required for Movement Area access, bi-annual renewal/refresher training
required for Non-Movement Area access
7. development of graphical training materials disseminated to airport users and posted on the airport website
8. aggressive enforcement including imposition of fines and revocation of privileges for violations
9. continued emphasis on eliminating causal factors at annual RSAT meetings
10. investigation of every V/PD occurrence to determine causes and contributing factors; information gained from investigations then used to improve training and enforcement
11. cooperation between FAA Tower Manager and Airport Administration to

implement a zero-tolerance policy and record every V/PD incident that occurs, no matter how 'minor' it may appear
12. top management attitude conveyed that NO incidences of V/PDs are acceptable; imposed a culture change on the airport tenants and user community (took years of sustained effort and must be maintained); eventually we achieved near-uniform stakeholder buy-in
13. identification of "hot spots" on airfield diagram
14. extreme focus on V/PD prevention in the course of construction projects (focused on contractor personnel as well as alerting tenants/users of changing conditions due to construction activity)
15. I'm sure I've overlooked something; we have been intensely focused on this issue for many years, mainly focused on low-cost, human-centered solutions (because we can't get funding for the technology improvements we need)

Q14 What are the least successful attempts made to mitigate V/PD RIs at your specific airport?

1. asking tenants/visitors nicely to comply with rules & regulations: you can be nice, but it is essential to be firm and convey that compliance is EXPECTED and non-compliance will not be tolerated (regardless of length of tenancy and how things 'used to be')
2. participation in the FAA's RIM study ... the airport expended matching funds for the RIM study grant, more as a favor to FAA in the hopes that the airport would see some benefit, particularly AIP funding for better access controls, but very little benefit was realized
3. request to participate in FAA's planned RIPSA (runway incursion prevention shortfall analysis) program as a 'beta test' site for RI prevention technology ... as far as I know, nothing has ever come of that

Q15 What improvements need to be made in the processes involved in addressing V/PD RIs at your specific airport? How should this be accomplished?

We have been successful in addressing the V/PD RI issues at our airport, so much so that we have in one very important sense been victimized by our own success: because we have reduced V/PDs to zero (from double digits years ago) our requests for AIP funding to improve our access controls are not being given the priority we believe they deserve. We're standing here with our fingers in the dike, waiting for someone to fund a fix for the leaks ... if we lose focus, we'll be right back to where we started. We're in a very dense urban environment and it is a very short strip from the perimeter fence to the runway ... and our perimeter access controls are not adequate.

We are also in a "Block Grant" state, where the state DOT acts as FAA's agent in managing AIP funding for projects for all of the state's GA airports ... we are a National category GA Reliever and it has hurt us being in the State Block Grant Program with respect to competition for AIP grant funding in our region.

Q16 Please describe any related policies, reporting mechanisms, available resources, enforcement activities, personnel training, and so forth that could improve addressing V/PD RIs at your specific airport.

Our airport is entering an active redevelopment phase and we will need to continuously review or procedures and policies in this area to ensure that changes arising from redevelopment don't result in an increased risk for V/PDs. Also, the specific technology we are seeking for access control improvements is card reader in/out on all of our automated vehicle gates and key pedestrian access gates, with cameras to be added if/as funding becomes available. We currently have a keypad system that is not secure ... two days after we change the entry codes, numerous unauthorized personnel are likely to be in possession of the new codes. There are additional security issues that I will not detail here, but in a nutshell, it is very easy to gain access even without a gate code.

Q17 When an individual is responsible for a V/PD RI, how was he/she guided or trained so a similar V/PD RI was not committed again at your specific airport? Was this helpful or beneficial in preventing or mitigating future occurrences?

Typically, a citation will be issued -- with a fine up to $500 plus court costs -- and access privileges will be suspended until remedial training (usually one-on-one with our Operations Manager) has been completed. In severe cases, access privileges may be revoked entirely (willful misconduct). Yes, this is very effective in preventing future occurrences.

Q18 What are the lessons learned from addressing V/PD RIs at your specific airport? How have these experiences influenced the handling of subsequent V/PD RIs?

Changing the attitudes and culture of the users and tenants was essential ... some offenders felt that Movement Area incursions were no more serious than jaywalking across a quiet residential street. In such cases, the stick of enforcement -- issuing citations -- sends the appropriate message that this is a serious safety issue. Our process of investigating incidents has effectively informed our responses and training programs for many years now.

Q19 Is technology a leading cause of V/PD RIs at your specific airport? Please explain. Please provide two examples?

No, not really. It's more a lack of technology -- card reader access controls on our perimeter gates -- that has contributed to unauthorized personnel accessing the AOA. We have had numerous instances of tenants supplying 'friends' or service providers (aircraft detailers or mechanics, for example)
- - unauthorized, untrained personnel -- with the gate codes to gain access to the AOA and V/PDs have occasionally resulted from that practice.

Q20 Is lack of training or inadequate training a leading cause of V/PD RIs at your specific airport? Please explain. Please provide two examples?

Not anymore, not for over 10 years now. Every person on the AOA is required to display some form of ID indicating that they are authorized to be where they are. The only way they get that ID badge and/or vehicle hang tag is to go through our required training program. Our police have full authority to stop anyone inside the fence to check for proper ID and vehicle hang tag especially if they can't see it displayed.

Q21 Is human factors a contributing factor of V/PD RIs at your specific airport? Please explain. Please provide two examples?

Yes, it has on occasion, and we have taken steps to mitigate the risks identified from past incidents. Ex.#1: we had an aircraft disabled on the runway due to a flat tire. While the runway was temporarily closed as a result, the taxiways were not. An FAA inspector (PMI for some of our tenant businesses) observed the aircraft and decided to investigate in spite of the fact that he had no ATC radio and no escort. He crossed an active taxiway without clearance and was subsequently stopped (and cited) by our police. The FAA employee assumed two incorrect things: first, that a flat tire constituted an 'accident' that warranted investigation, and second, that the entire airfield was closed as a result of the 'accident'. [The citation was eventually dismissed; the guy was just trying to do his job. We amended our ordinance to allow that as a defense for official personnel.] Ex.#2: we have a vehicle service road that cuts through the north RSA. Prior to an improvement that gave us a full, compliant RSA in that area, the road was outside the RSA and airport personnel only called Ground for access during night IMC. An FAA Tech Ops person who had worked at the airport prior to the RSA improvement crossed the north RSA on the service road in IMC without clearance, disrupting the ILS signal for an aircraft on approach. As

a result of this incident, we revised our Movement Areas LOA and added signage on the service road indicating that ATC permission is required for entry into the RSA.

Q22 Are there any other contributing factors of V/PD RIs at your specific airport? Please explain. Please provide examples?

Yes, airport geometry is a huge factor. Our airport is very compact; many aircraft parking ramps are so close to the runway that they impinge on the Primary Surface. Between the ramps and the primary parallel taxiway is a vehicle service road which is too close to the taxiway, and the taxiway itself is too close (per FAA standards) to the runway. So the Movement Area boundary lines are right between the service road and the taxiway and the runway holding positions are unusually close to the edge of the taxiway. Bottom line, it's less than 500 feet from the ramps to the runway and less than 100 feet from the ramps to the taxiway (Movement Area) ... and one wrong turn can very rapidly result in a serious incursion. There is no way to fix this; the risk has to be mitigated in other ways (signage, markings, training/education, etc.) but this is clearly a contributing factor in many of out V/PDs ... you don't have to cross much ground to cause one here.

Q23 Please enter the total number of years overall experience you have working in the aviation profession.

20

Q24 Please enter the total number of years you have working as an airport manager or executive.

11

Q25 What is your current professional title or position?

Manager

Q26 Are you a currently a member of AAAE?

Yes

Q27 How old are you?

51 – 60

Q28 What is your gender?

Male

Participant 3

Q1 Consent Question

Q2 According to the FAA, V/PD RIs have increased nationally by 55.7% between Fiscal Year 2011 and Fiscal Year 2016. Please describe the top three common reasons for V/PD RIs at airports in general.

Lack of escorting of guests, lack of gate controls, lack of familiarity with airport geography

Q3 Please describe the top three most common barriers to addressing V/PD RIs at airports in general.

Money to make improvements, political or local influence to make policy change and enforcement of violations

Q4 What are the successful attempts made to mitigate V/PD RIs at airports in general?

Training, community/tenant involvement, enforcement capability

Q5 What are the least successful attempts made to mitigate V/PD RIs at airports in general?

signage, complacency, markings.

Q6 What improvements need to be made in the processes involved in addressing V/PD RIs at airports in general?

Required training for anyone that accesses the airport unescorted. People need to be convinced of the importance of escorting and proper gate practices.

Q7 Is technology a leading cause of V/PD RIs at airports in general? Please explain. Please provide two examples?

I don't think so.

Q8 Is lack of training or inadequate training a leading cause of V/PD RIs at airports in general? Please explain. Please provide two examples?

Yes, very much. Training needs to be more than just the do's and don'ts. Any airport can write those in a hand out and pass them out but they will always be insufficient. People need to hear about the dangers from lack of escorting or improper gate practices. They need to hear examples from when lack of escorting and gate practices caused a deviation. They need to relate deviations to potential aircraft accidents.

Q9 Is human factors a contributing factor of V/PD RIs at airports in general? Please explain. Please provide two examples?

Yes, only to the extent that people get complacent which is why we do recurrent training.

Q10 Are there any other contributing factors of V/PD RIs at airports in general? Please explain. Please provide examples?

Not that I can think of

Q11 Please describe the top three common reasons for V/PD RIs at your specific airport.

escorting, gate practices, lack of responsibility for others that come onto the airport

Q12 Please describe the top three most common barriers to addressing V/PD RIs at your specific airport.

enforcement, training, complacency

Q13 What are the successful attempts made to mitigate V/PD RIs at your specific airport?

Permitted process and access training course

Q14 What are the least successful attempts made to mitigate V/PD RIs at your specific airport?

painting a service road in the common area

Q15 What improvements need to be made in the processes involved in addressing V/PD RIs at your specific airport? How should this be accomplished?

Better gate controls. Right now, we have a 5-digit gate control system. Very unsecure and inefficient.

Q16 Please describe any related policies, reporting mechanisms, available resources, enforcement activities, personnel training, and so forth that could improve addressing V/PD RIs at your specific airport.

more police enforcement probably.

Q17 When an individual is responsible for a V/PD RI, how was he/she guided or trained so a similar V/PD RI was not committed again at your specific airport? Was this helpful or beneficial in preventing or mitigating future occurrences?

We have an access training program.

Q18 What are the lessons learned from addressing V/PD RIs at your specific airport? How have these experiences influenced the handling of subsequent V/PD RIs?

We use those instances to emphasize better control of your guests. Our issues are almost always related to a lack of escorting or improper gate practices. Our tenants don't create deviations directly but allow their guests to enter into the restricted areas.

Q19 Is technology a leading cause of V/PD RIs at your specific airport? Please explain. Please provide two examples?

No

Q20 Is lack of training or inadequate training a leading cause of V/PD RIs at your specific airport? Please explain. Please provide two examples?

In the past it was, but we have a pretty robust training program now and have almost completely eliminated V/PDs.

Q21 Is human factors a contributing factor of V/PD RIs at your specific airport? Please explain. Please provide two examples?

Only related to complacency

Q22 Are there any other contributing factors of V/PD RIs at your specific airport? Please explain. Please provide examples?

No

Q23 Please enter the total number of years overall experience you have working in the aviation profession.

15

Q24 Please enter the total number of years you have working as an airport manager or executive.

15

Q25 What is your current professional title or position?

Manager

Q26 Are you a currently a member of AAAE?

Yes

Q27 How old are you?

41 – 50

Q28 What is your gender?

Male

Participant 4

Q1 Consent Question

Q2 According to the FAA, V/PD RIs have increased nationally by 55.7% between Fiscal Year 2011 and Fiscal Year 2016. Please describe the top three common reasons for V/PD RIs at airports in general.

1. *Inadequately trained employees and contractors having access to the movement areas*
2. *Substandard or malfunctioning equipment such as radios*
3. *Unauthorized access*

Q3 Please describe the top three most common barriers to addressing V/PD RIs at airports in general.

1. *Adequate Airport familiarization training of employees and contractors*
2. *Physical barriers to reduce/stop unauthorized access*
3. *Educating the public that airports have much stricter access controls now, than in the past*

Q4 What are the successful attempts made to mitigate V/PD RIs at airports in general?

Physical barriers such as fencing, gates with access badges and signage is the most effective to keeping the public out of the movement areas. Easy to understand computer aided training really helps the airport staff and contractors to understand the airport environment and proper procedures in communicating with ATC.

Q5 What are the least successful attempts made to mitigate V/PD RIs at airports in general?

Signage without some sort of physical barrier to stop access.
Having current employees training new employees without training goals .

Q6 What improvements need to be made in the processes involved in addressing V/PD RIs at airports in general?

Participant skipped this question

Q7 Is technology a leading cause of V/PD RIs at airports in general? Please explain. Please provide two examples?

No, I don't think so.

Q8 Is lack of training or inadequate training a leading cause of V/PD RIs at airports in general? Please explain. Please provide two examples?

> *Yes, absolutely. Without the proper training, employees are left on their own to decide if they are doing something correctly.*
> *First example, FBO employee who had no formal training other than in the military, thought it was okay to drive out next to the runway and look for a missing gas cap. He thought as long as he wasn't on the pavement, he was okay. This resulted in an incursion.*
> *Second example, during a construction project, the person in charge of stopping vehicles and getting clearance before they crossed the runway decided it was okay to let them pass as long as they didn't see any aircraft on final. Multiple incursions occurred before getting them stopped.*

Q9 Is human factors a contributing factor of V/PD RIs at airports in general? Please explain. Please provide two examples?

> *Yes. Even with proper training and experience, events happen that lead to incursions.*
> *First example. Airport maintenance is operating in the movement area. They requested clearance for Runway 18, but was given clearance for Runway X. They entered Runway 18, thinking they had been cleared for that runway. During the investigation, they were positive they received clearance for Runway 18, but the ATCT recording confirmed the clearance was for Runway X not 18. Airport maintenance was expecting the clearance they requested not the clearance that was given to them.*
> *Second example. During an airport fence project, the Resident Project Representative was given the approval to drive the fence line without obtaining clearance from the ATC. Several months later, he followed the same procedure to inspect a taxiway that was in close proximity of the fence. He followed a previously approved procedure, that no longer was allowed. ATC did not know who was driving along the fence line and contacted Airport management to investigate. Same procedure, different circumstances let to an incursion.*

Q10 Are there any other contributing factors of V/PD RIs at airports in general? Please explain. Please provide examples?

> Participant skipped this question

Q11 Please describe the top three common reasons for V/PD RIs at your specific airport.

1. *Contractor's driving where they are not supposed to be.*
2. *Spectators walking out near the runway/taxiway to take photos.*
3. *Untrained airport/FBO staff not following proper procedures.*

Q12 Please describe the top three most common barriers to addressing V/PD RIs at your specific airport.

> *Cost of radio equipment needed to adequately communicate with ATC. Mitigating the multiple access points available on the airport and controlling who has access to use them. Educating airport tenants and the public what access is allowed and what access is not.*

Q13 What are the successful attempts made to mitigate V/PD RIs at your specific airport?

> *Utilizing the ANTN Digicast training system, we enacted mandatory annual training for all Airport and FBO staff that includes airport familiarization, signage and lights, safety and incursion prevention, and driver training.*

Q14 What are the least successful attempts made to mitigate V/PD RIs at your specific airport?

> *On the job training that does not involve set goals or testing.*

Q15 What improvements need to be made in the processes involved in addressing V/PD RIs at your specific airport? How should this be accomplished?

> *Right now, not much is needed. We have not had any significant issues since putting the mandatory training in place.*

Q16 Please describe any related policies, reporting mechanisms, available resources, enforcement activities, personnel training, and so forth that could improve addressing V/PD RIs at your specific airport.

> Participant skipped this question

Q17 When an individual is responsible for a V/PD RI, how was he/she guided or trained so a similar V/PD RI was not committed again at your specific airport? Was this helpful or beneficial in preventing or mitigating future occurrences?

The individual goes through the retraining process from the start.

Q18 What are the lessons learned from addressing V/PD RIs at your specific airport? How have these experiences influenced the handling of subsequent V/PD RIs?

Specific training in airport familiarization is needed and it needs to be done annually, at a minimum.

Q19 Is technology a leading cause of V/PD RIs at your specific airport? Please explain. Please provide two examples?

No, I don't think so.

Q20 Is lack of training or inadequate training a leading cause of V/PD RIs at your specific airport? Please explain. Please provide two examples?

Yes, both were true before we enacted our specific training. Since then, we have had only one V/PD RI.

Q21 Is human factors a contributing factor of V/PD RIs at your specific airport? Please explain. Please provide two examples?

Yes, please refer to answers to question 9.

Q22 Are there any other contributing factors of V/PD RIs at your specific airport? Please explain. Please provide examples?

Participant skipped this question

Q23 Please enter the total number of years overall experience you have working in the aviation profession.

25 years

Q24 Please enter the total number of years you have working as an airport manager or executive.

24 years

Q25 What is your current professional title or position?

Executive

Q26 Are you a currently a member of AAAE?

Yes

Q27 How old are you?

51 – 60

Q28 What is your gender?

Male

Participant 5

Q1 Consent Question

Q2 According to the FAA, V/PD RIs have increased nationally by 55.7% between Fiscal Year 2011 and Fiscal Year 2016. Please describe the top three common reasons for V/PD RIs at airports in general.

1. Human Factors
2. Environmental Change
3. Lack of Education

Q3 Please describe the top three most common barriers to addressing V/PD RIs at airports in general.

It is difficult to prevent Human Factors from affecting V/PDs. people are not perfect and never will be. Airports have to do their best to train and promote safety awareness. Construction is also a prevalent issue on airfields. When your environment changes it is sometimes difficult for AMA drivers to adapt.

V/PDs are often caused by those who do not understand the principles of a runway environment. This can often lead to them having mistakes.

Q4 What are the successful attempts made to mitigate V/PD RIs at airports in general?

Updated training programs and requirements.

Q5 What are the least successful attempts made to mitigate V/PD RIs at airports in general?

Technology has been a letdown for some airports. Runway Incursions Warning programs are not as efficient as they seem to be and are also costly.

Q6 What improvements need to be made in the processes involved in addressing V/PD RIs at airports in general?

V/PDs should not be taken lightly and Airports have their own disciplinary systems when they occur. It would be helpful if the FAA also took a hard stance and had a penalty system that was consistent around the United States.

Q7 Is technology a leading cause of V/PD RIs at airports in general? Please explain. Please provide two examples?

No.

Q8 Is lack of training or inadequate training a leading cause of V/PD RIs at airports in general? Please explain. Please provide two examples?

Yes. If an individual is not trained to know what the Movement Area is then it can easily be misunderstood and cause an issue where they navigate somewhere they are not supposed to be.

Q9 Is human factors a contributing factor of V/PD RIs at airports in general? Please explain. Please provide two examples?

Yes, this is the leading cause for runway incursions. Active listening is a major issue when people hear what they want to hear and not what is actually said. Complacency within the airport environment is also an issue. AMA drivers should always operate with the highest situational awareness.

Q10 Are there any other contributing factors of V/PD RIs at airports in general? Please explain. Please provide examples?

N/A

Q11 Please describe the top three common reasons for V/PD RIs at your specific airport.

Human Factors, Education, and Environment Changes.

Q12 Please describe the top three most common barriers to addressing V/PD RIs at your specific airport.

1. The amount of AMA drivers
2. Construction on Airfields
3. Education

Q13 What are the successful attempts made to mitigate V/PD RIs at your specific airport?

1. Safety Promotion
2. Specialized Training
3. Technology

Q14 What are the least successful attempts made to mitigate V/PD RIs at your specific airport?

N/A

Q15 What improvements need to be made in the processes involved in addressing V/PD RIs at your specific airport? How should this be accomplished?

Continued development of training and technology to help prevent runway incursions.

Q16 Please describe any related policies, reporting mechanisms, available resources, enforcement activities, personnel training, and so forth that could improve addressing V/PD RIs at your specific airport.

N/A

Q17 When an individual is responsible for a V/PD RI, how was he/she guided or trained so a similar V/PD RI was not committed again at your specific airport? Was this helpful or beneficial in preventing or mitigating future occurrences?

Our airport has a firm policy for disciplinary action for those who have runway incursion. Although this is a strict approach it holds all AMA drivers accountable for their actions.

Q18 What are the lessons learned from addressing V/PD RIs at your specific airport? How have these experiences influenced the handling of subsequent V/PD RIs?

Lessons learned are a big part of our training. We review all recent runway incursions so that other drivers don't make the same mistakes.

Q19 Is technology a leading cause of V/PD RIs at your specific airport? Please explain. Please provide two examples?

N/A

Q20 Is lack of training or inadequate training a leading cause of V/PD RIs at your specific airport? Please explain. Please provide two examples?

N/A

Q21 Is human factors a contributing factor of V/PD RIs at your specific airport? Please explain. Please provide two examples?

Yes, this is the leading cause for runway incursions at our airport. Active Listening and complacency have been the recent issue.

Q22 Are there any other contributing factors of V/PD RIs at your specific airport? Please explain. Please provide examples?

N/A

Q23 Please enter the total number of years overall experience you have working in the aviation profession.

7

Q24 Please enter the total number of years you have working as an airport manager or executive.

1

Q25 What is your current professional title or position?

Manager

Q26 Are you a currently a member of AAAE?

Yes

Q27 How old are you?

18 - 30

Q28 What is your gender?

Male

Participant 6

Q1 Consent Question

Q2 According to the FAA, V/PD RIs have increased nationally by 55.7% between Fiscal Year 2011 and Fiscal Year 2016. Please describe the top three common reasons for V/PD RIs at airports in general.

Miscommunication
Airfield unfamiliarity
Situational awareness

Q3 Please describe the top three most common barriers to addressing V/PD RIs at airports in general.

Complacency
Ignorance/uneducated on runway safety environments
Construction and change in airfield environment

Q4 What are the successful attempts made to mitigate V/PD RIs at airports in general?

Re-training
Review and audit of airfield training program
More stringent requirements to obtain Movement area drivers privileges

Q5 What are the least successful attempts made to mitigate V/PD RIs at airports in general?

Restricting the number of drivers (if there is a successful comprehensive program) Some technologies

Q6 What improvements need to be made in the processes involved in addressing V/PD RIs at airports in general?

Sharing of V/PD RI at other airports to raise awareness improvements in technology (warning systems)

Q7 Is technology a leading cause of V/PD RIs at airports in general? Please explain. Please provide two examples?

Not particularly.

Q8 Is lack of training or inadequate training a leading cause of V/PD RIs at airports in general? Please explain. Please provide two examples?

In some cases, not having an in-depth training program and continuously auditing that program can lead to V/PD RI. An example would be the airport changing its environment (adding/removing taxiways, changing orientations, etc).

Q9 Is human factors a contributing factor of V/PD RIs at airports in general? Please explain. Please provide two examples?

Yes, there are so many distractions that can lead to a V/PD such as someone listening to the vehicle radio (music) and not hearing the instructions from ATC. Another example of HF is someone who is used to going a particular route will anticipate the controller giving them those instructions when in reality the controller gives them a different route (sometimes this is caused by complacency or lack of active listening).

Q10 Are there any other contributing factors of V/PD RIs at airports in general? Please explain. Please provide examples?

Confusing orientation of airfield complex (i.e. don't meet the new design standards).

Q11 Please describe the top three common reasons for V/PD RIs at your specific airport.

Participant skipped this question

Q12 Please describe the top three most common barriers to addressing V/PD RIs at your specific airport.

Participant skipped this question

Q13 What are the successful attempts made to mitigate V/PD RIs at your specific airport?

Participant skipped this question

Q14 What are the least successful attempts made to mitigate V/PD RIs at your specific airport?

Participant skipped this question

Q15 What improvements need to be made in the processes involved in addressing V/PD RIs at your specific airport? How should this be accomplished?

Participant skipped this question

Q16 Please describe any related policies, reporting mechanisms, available resources, enforcement activities, personnel training, and so forth that could improve addressing V/PD RIs at your specific airport.

Participant skipped this question

Q17 When an individual is responsible for a V/PD RI, how was he/she guided or trained so a similar V/PD RI was not committed again at your specific airport? Was this helpful or beneficial in preventing or mitigating future occurrences?

Participant skipped this question

Q18 What are the lessons learned from addressing V/PD RIs at your specific airport? How have these experiences influenced the handling of subsequent V/PD RIs?

Participant skipped this question

Q19 Is technology a leading cause of V/PD RIs at your specific airport? Please explain. Please provide two examples?

Participant skipped this question

Q20 Is lack of training or inadequate training a leading cause of V/PD RIs at your specific airport? Please explain. Please provide two examples?

Participant skipped this question

Q21 Is human factors a contributing factor of V/PD RIs at your specific airport? Please explain. Please provide two examples?

Participant skipped this question

Q22 Are there any other contributing factors of V/PD RIs at your specific airport? Please explain. Please provide examples?

Participant skipped this question

Q23 Please enter the total number of years overall experience you have working in the aviation profession.

Participant skipped this question

Q24 Please enter the total number of years you have working as an airport manager or executive.

Participant skipped this question

Q25 What is your current professional title or position?

Participant skipped this question

Q26 Are you a currently a member of AAAE?

Participant skipped this question

Q27 How old are you?

Participant skipped this question

Q28 What is your gender?

Participant skipped this question

Participant 7

Q1 Consent Question

Q2 According to the FAA, V/PD RIs have increased nationally by 55.7% between Fiscal Year 2011 and Fiscal Year 2016. Please describe the top three common reasons for V/PD RIs at airports in general.

Language barrier, Miscommunication, complacency

Q3 Please describe the top three most common barriers to addressing V/PD RIs at airports in general.

Afraid airport will be seen in an unfavorable light, unwilling to admit a problem exists, fear of loss of employment

Q4 What are the successful attempts made to mitigate V/PD RIs at airports in general?

education, admitting a problem exists, creating a positive dialogue between airfield users and air traffic

Q5 What are the least successful attempts made to mitigate V/PD RIs at airports in general?

punishment, ignoring or not admitting a problem exists, more rules or issues to comply with

Q6 What improvements need to be made in the processes involved in addressing V/PD RIs at airports in general?

A deeper or more thorough understanding of the airport environment, increased education in situational awareness

Q7 Is technology a leading cause of V/PD RIs at airports in general? Please explain. Please provide two examples?

No,

Q8 Is lack of training or inadequate training a leading cause of V/PD RIs at airports in general? Please explain. Please provide two examples?

Yes, airfield users not knowing the meaning of an air traffic response or term. Not insuring personnel are trained adequately in situational awareness

Q9 Is human factors a contributing factor of V/PD RIs at airports in general? Please explain. Please provide two examples?

Yes, Tired, distracted, complacent

Q10 Are there any other contributing factors of V/PD RIs at airports in general? Please explain. Please provide examples?

possible weather

Q11 Please describe the top three common reasons for V/PD RIs at your specific airport.

Miscommunication
loss of situational awareness
complacency

Q12 Please describe the top three most common barriers to addressing V/PD RIs at your specific airport.

I don't believe I have encountered any barriers to addressing this issue

Q13 What are the successful attempts made to mitigate V/PD RIs at your specific airport?

Training, airfield familiarization

Q14 What are the least successful attempts made to mitigate V/PD RIs at your specific airport?

punishment, threats of job loss

Q15 What improvements need to be made in the processes involved in addressing V/PD RIs at your specific airport? How should this be accomplished?

I believe we are doing all we can the best we can presently

Q16 Please describe any related policies, reporting mechanisms, available resources, enforcement activities, personnel training, and so forth that could improve addressing V/PD RIs at your specific airport.

more time spent on ojt and familiarization, safety briefings/discussions

Q17 When an individual is responsible for a V/PD RI, how was he/she guided or trained so a similar V/PD RI was not committed again at your specific airport? Was this helpful or beneficial in preventing or mitigating future occurrences?

Offender is scheduled for a airfield ride along to discuss markings, lighting and signage in general. An informal discussion of the specific cause of the offense

Q18 What are the lessons learned from addressing V/PD RIs at your specific airport? How have these experiences influenced the handling of subsequent V/PD RIs?

We have added sections to our training program based upon actual events and situations

Q19 Is technology a leading cause of V/PD RIs at your specific airport? Please explain. Please provide two examples?

No, I'm not sure what technology you are referring to

Q20 Is lack of training or inadequate training a leading cause of V/PD RIs at your specific airport? Please explain. Please provide two examples?

Possibly airfield mx personnel (non-aeronautical background) not being aware of air traffic language or phraseology. Misunderstanding an air traffic clearance

Q21 Is human factors a contributing factor of V/PD RIs at your specific airport? Please explain. Please provide two examples?

No

Q22 Are there any other contributing factors of V/PD RIs at your specific airport? Please explain. Please provide examples?

No, all instances as far as the ones I'm involved with have been straightforward and the cause clear

Q23 Please enter the total number of years overall experience you have working in the aviation profession.

30

Q24 Please enter the total number of years you have working as an airport manager or executive.

18

Q25 What is your current professional title or position?

Other

Q26 Are you a currently a member of AAAE?

No

Q27 How old are you?

51 - 60

Q28 What is your gender?

Male

Participant 8

Q1 Consent Question

Q2 According to the FAA, V/PD RIs have increased nationally by 55.7% between Fiscal Year 2011 and Fiscal Year 2016. Please describe the top three common reasons for V/PD RIs at airports in general.

1. *Miscommunication between pilots, airport staff and ATC*
2. *Airport geometry.*
3. *Airport marking.*

Q3 Please describe the top three most common barriers to addressing V/PD RIs at airports in general.

1. *Pilot attitudes.*
2. *ATC non-reporting.*
3. *Cost of mitigation.*

Q4 What are the successful attempts made to mitigate V/PD RIs at airports in general?

1. *Pilot, ground operator and ATC education.*
2. *Specific lighting and markings*

Q5 What are the least successful attempts made to mitigate V/PD RIs at airports in general?

1. *Airport changes without education.*

Q6 What improvements need to be made in the processes involved in addressing V/PD RIs at airports in general?

1. *Constant education.*

Q7 Is technology a leading cause of V/PD RIs at airports in general? Please explain. Please provide two examples?

No. Human factors are the leading cause. Inattention to detail.

Q8 Is lack of training or inadequate training a leading cause of V/PD RIs at airports in general? Please explain. Please provide two examples?

Not a lack of training. Inattention to detail. Pilots taking direction for the wrong callsign.

Q9 Is human factors a contributing factor of V/PD RIs at airports in general? Please explain. Please provide two examples?

Yes, number one. Pilots taking direction for the wrong callsign. Ground staff not paying attention to their location.

Q10 Are there any other contributing factors of V/PD RIs at airports in general? Please explain. Please provide examples?

No

Q11 Please describe the top three common reasons for V/PD RIs at your specific airport.

Inattention to detail by pilots and non-airport inappropriately escorted.

Q12 Please describe the top three most common barriers to addressing V/PD RIs at your specific airport.

Personal attitudes.

Q13 What are the successful attempts made to mitigate V/PD RIs at your specific airport?

Briefings with major users before events. Continuous education/training of all users.

Q14 What are the least successful attempts made to mitigate V/PD RIs at your specific airport?

Airport changes without education.

Q15 What improvements need to be made in the processes involved in addressing V/PD RIs at your specific airport? How should this be accomplished?

Increased pilot awareness. Continue briefings at pilot safety meetings.

Q16 Please describe any related policies, reporting mechanisms, available resources, enforcement activities, personnel training, and so forth that could improve addressing V/PD RIs at your specific airport.

LRSAT meetings and addressing pilots directly at safety meetings.

Q17 When an individual is responsible for a V/PD RI, how was he/she guided or trained so a similar V/PD RI was not committed again at your specific airport? Was this helpful or beneficial in preventing or mitigating future occurrences?

Counseling occurred, yes V/PD RI have been reduced.

Q18 What are the lessons learned from addressing V/PD RIs at your specific airport? How have these experiences influenced the handling of subsequent V/PD RIs?

They should be reported immediately so they can be handled effectively.

Q19 Is technology a leading cause of V/PD RIs at your specific airport? Please explain. Please provide two examples?

No. Pilot error.

Q20 Is lack of training or inadequate training a leading cause of V/PD RIs at your specific airport? Please explain. Please provide two examples?

No.

Q21 Is human factors a contributing factor of V/PD RIs at your specific airport? Please explain. Please provide two examples?

Yes, pilots not listening to ATC.

Q22 Are there any other contributing factors of V/PD RIs at your specific airport? Please explain. Please provide examples?

No.

Q23 Please enter the total number of years overall experience you have working in the aviation profession.

37

Q24 Please enter the total number of years you have working as an airport manager or executive.

5

Q25 What is your current professional title or position?

Manager

Q26 Are you a currently a member of AAAE?

Yes

Q27 How old are you?

51 – 60

Q28 What is your gender?

Male

Participant 9

Q1 Consent Question

Q2 According to the FAA, V/PD RIs have increased nationally by 55.7% between Fiscal Year 2011 and Fiscal Year 2016. Please describe the top three common reasons for V/PD RIs at airports in general.

movement area training deficiencies, airfield orientation sort of training, lack of situational awareness.

Q3 Please describe the top three most common barriers to addressing V/PD RIs at airports in general.

large diverse high turnover, sponsor has direct accountability V/PD direct response, indirect linkage problem.

Q4 What are the successful attempts made to mitigate V/PD RIs at airports in general?

building relationships with stakeholders, having open and honest lines of communication, being able to talk to people.

Q5 What are the least successful attempts made to mitigate V/PD RIs at airports in general?

rulesets that don't provide flexibility to airport sponsors, the more flexibility and latitude, being able to identify specific root causes, geometry problem. Realignment of a surface, or a reworking of something, cultural fixes are harder and much deeper to identify and require a more person to person relationship.

Q6 What improvements need to be made in the processes involved in addressing V/PD RIs at airports in general?

Better tracking of V/PDs at different levels within the system would be helpful. Shared best practices. V/PD is an inferior cousin to RI's when it comes to technical areas.

Q7 Is technology a leading cause of V/PD RIs at airports in general? Please explain. Please provide two examples?

I don't think it is.

Q8 Is lack of training or inadequate training a leading cause of V/PD RIs at airports in general? Please explain. Please provide two examples?

a leading cause, intentionally turning the wrong way on a taxiway thinking they knew where they were, totally lost.

Q9 Is human factors a contributing factor of V/PD RIs at airports in general? Please explain. Please provide two examples?

yes, fence jumper, mental health category

Q10 Are there any other contributing factors of V/PD RIs at airports in general? Please explain. Please provide examples?

culture of urgency is a contributing factor, wing walker and those people gotta do what they gotta do within the movement areas.

Q11 Please describe the top three common reasons for V/PD RIs at your specific airport.

Participant skipped this question

Q12 Please describe the top three most common barriers to addressing V/PD RIs at your specific airport.

Participant skipped this question

Q13 What are the successful attempts made to mitigate V/PD RIs at your specific airport?

Participant skipped this question

Q14 What are the least successful attempts made to mitigate V/PD RIs at your specific airport?

Participant skipped this question

Q15 What improvements need to be made in the processes involved in addressing V/PD RIs at your specific airport? How should this be accomplished?

it is not always clear what the process is. Communicating to stakeholders

and sponsors what is the process, FAA perspective, unclear as to whether a V/PD has even occurred. Only see tower reports or a letter of investigation. Inquiries after the fact are a problem. Transparency. Shaming in front of airport peers is a problem, instead of a more proactive safety response. Disclosure of more V/PDs.

Q16 Please describe any related policies, reporting mechanisms, available resources, enforcement activities, personnel training, and so forth that could improve addressing V/PD RIs at your specific airport.

there probably is an ACRP report, make types of resources like ACRP reports available to the airport community. Runway safety summit workshops are very helpful, creating time and structured discussion around these issues are very important with peer airports and the FAA. Facilitated structure so people feel safe to share information is very important. Not wanting to shame people for volunteering information so people can share more.

Q17 When an individual is responsible for a V/PD RI, how was he/she guided or trained so a similar V/PD RI was not committed again at your specific airport? Was this helpful or beneficial in preventing or mitigating future occurrences?

Participant skipped this question

Q18 What are the lessons learned from addressing V/PD RIs at your specific airport? How have these experiences influenced the handling of subsequent V/PD RIs?

Participant skipped this question

Q19 Is technology a leading cause of V/PD RIs at your specific airport? Please explain. Please provide two examples?

Participant skipped this question

Q20 Is lack of training or inadequate training a leading cause of V/PD RIs at your specific airport? Please explain. Please provide two examples?

Participant skipped this question

Q21 Is human factors a contributing factor of V/PD RIs at your specific airport? Please explain. Please provide two examples?

Participant skipped this question

Q22 Are there any other contributing factors of V/PD RIs at your specific airport? Please explain. Please provide examples?

Participant skipped this question

Q23 Please enter the total number of years overall experience you have working in the aviation profession.

6

Q24 Please enter the total number of years you have working as an airport manager or executive.

20

Q25 What is your current professional title or position?

Manager

Q26 Are you a currently a member of AAAE?

Yes

Q27 How old are you?

41 – 50

Q28 What is your gender?

Male

Participant 10

Q1 Consent Question

Q2 According to the FAA, V/PD RIs have increased nationally by 55.7% between Fiscal Year 2011 and Fiscal Year 2016. Please describe the top three common reasons for V/PD RIs at airports in general.

> *we constructed a new tower. That's what our problem was. Our trend has been dropping*

Q3 Please describe the top three most common barriers to addressing V/PD RIs at airports in general.

> *education, both pilot group and non-flying group seems to gain access to apron area, and not reading signs. Signs all over the place, that say do not go here without approval, think they can make wide turns, or passengers making wide turns, and not paying attention to non-movement lines and people are the key element that we found.*

Q4 What are the successful attempts made to mitigate V/PD RIs at airports in general?

> *communication, education, and a citation were the third end product. Educating the base pilots, for example a chief pilot crossed the line in his vehicle, "it didn't go over that bad", "well did you cross that line" he denied it. A car and an airplane don't matter, you still need approval. You need everyone based at the airport and company, you are responsible for guests and delivery trucks. You need to educate those people. Control tower chief needs to report true V/PD's, being close does not count, there needs to be more education.*

Q5 What are the least successful attempts made to mitigate V/PD RIs at airports in general?

> *signage, I've spent thousand dollars in signage and people think that is the cure. If people don't read one sign, they won't read the rest. Signage has shown to be the least effective.*

Q6 What improvements need to be made in the processes involved in addressing V/PD RIs at airports in general?

> *the adage of both communicating and educating, even though our trends are dropping, I have to continue every year sending emails about how we are continuing to do a good job, the continuing education piece needs to continue to evolve.*

Q7 Is technology a leading cause of V/PD RIs at airports in general? Please explain. Please provide two examples?

no, I would say technology is a help. Foreflight is a huge help, it has and can improve that aspect.

Q8 Is lack of training or inadequate training a leading cause of V/PD RIs at airports in general? Please explain. Please provide two examples?

yes, at my airport, we put the onus on the operators or businesses at our airport to those who have access to the apron and taxiways that they are responsible for guests and deliveries and emphasis that.

Q9 Is human factors a contributing factor of V/PD RIs at airports in general? Please explain. Please provide two examples?

Yes

Q10 Are there any other contributing factors of V/PD RIs at airports in general? Please explain. Please provide examples?

it could be the design of the airport, if you have vehicle access from the road to the airport, once they cross a certain point, they have access to the apron. Making sure the access is well gated, airport design could contribute to V/PD's as well.

Q11 Please describe the top three common reasons for V/PD RIs at your specific airport.

lack of awareness, human factor, and education

Q12 Please describe the top three most common barriers to addressing V/PD RIs at your specific airport.

airport design, how it's laid out. Human factors. And a form of communication, they don't read signs, so I have to come up with new ways to communicate that there's an issue and do not go beyond a certain point.

Q13 What are the successful attempts made to mitigate V/PD RIs at your specific airport?

reaching out individually to all the businesses and operators at the airport and explaining their responsibility and why this has become an issue since the control tower was built and what we expect out of them.

Q14 What are the least successful attempts made to mitigate V/PD RIs at your specific airport?

signage

Q15 What improvements need to be made in the processes involved in addressing V/PD RIs at your specific airport? How should this be accomplished?

twofold, airport design should be adjusted so vehicle don't have direct access to the apron, additionally fencing with security gates in place.

Q16 Please describe any related policies, reporting mechanisms, available resources, enforcement activities, personnel training, and so forth that could improve addressing V/PD RIs at your specific airport.

we reach out to each operator and business owner with a video slide, using FAA driver's safety program legislatively, using a citation authority of those who cross the nonmovement line, looking into software to better capture the incident to better improve each and every one.

Q17 When an individual is responsible for a V/PD RI, how was he/she guided or trained so a similar V/PD RI was not committed again at your specific airport? Was this helpful or beneficial in preventing or mitigating future occurrences?

individually it is my operations responsibly to contact individual to gather as much info as I can, what has been better helpful is we capture it on video, so we can have a sit down and have an educational piece about why the FARs are important and give first occurrence a warning, then a citation, and informing the FAA. "Through the fence" contacting the property owner and saying that they could have their rights revoked.

Q18 What are the lessons learned from addressing V/PD RIs at your specific airport? How have these experiences influenced the handling of subsequent V/PD RIs?

it's worked out in a positive way, the days of before a control tower are long gone. After having an educational piece of property owners, and drivers, and explaining the risks of crossing that line, our trend is dropping.

What we're doing and how were handling it is effective. Threating a revoking of property owners.

Q19 Is technology a leading cause of V/PD RIs at your specific airport? Please explain. Please provide two examples?

No. It is a help, not a cause. Old fashion face to face time is the best effective.

Q20 Is lack of training or inadequate training a leading cause of V/PD RIs at your specific airport? Please explain. Please provide two examples?

It was. But it isn't today. It is the leading reason why our trend is dropping.

Q21 Is human factors a contributing factor of V/PD RIs at your specific airport? Please explain. Please provide two examples?

Yes.

Q22 Are there any other contributing factors of V/PD RIs at your specific airport? Please explain. Please provide examples?

no, I think everything was covered in the questionnaire covers all of our issues.

Q23 Please enter the total number of years overall experience you have working in the aviation profession.

30 years

Q24 Please enter the total number of years you have working as an airport manager or executive.

16

Q25 What is your current professional title or position?

Other

Q26 Are you a currently a member of AAAE?

Yes

Q27 How old are you?

51 – 60

Q28 What is your gender?

Male

Participant 11

Q1 Consent Question

Q2 According to the FAA, V/PD RIs have increased nationally by 55.7% between Fiscal Year 2011 and Fiscal Year 2016. Please describe the top three common reasons for V/PD RIs at airports in general.

lack of understanding what the airfield is, confusion of airfield layouts, parallel runways.

Q3 Please describe the top three most common barriers to addressing V/PD RIs at airports in general.

FAA funding, FAA rules and regulations, and number of users.

Q4 What are the successful attempts made to mitigate V/PD RIs at airports in general?

R.I.M. program has been successful in changing airfields, FAA attempts at closely aligned runway ends and increase emphasis on runway incursions and V/PD's.

Q5 What are the least successful attempts made to mitigate V/PD RIs at airports in general?

construction changes the airfield layout, user meetings, you don't always get the people to participate in the meetings who actually caused the incursions. Pushes to make changes to the airfield instead of addressing FAA items, lack of use of technology.

Q6 What improvements need to be made in the processes involved in addressing V/PD RIs at airports in general?

streaming lining integration of technologies in reducing V/PD RIs, probably open up the rules a little bit for the funding mechanisms for the items that could correct them. Fast track money to the R.I.M. program and other projects.

Q7 Is technology a leading cause of V/PD RIs at airports in general? Please explain. Please provide two examples?

Yes

Q8 Is lack of training or inadequate training a leading cause of V/PD RIs at airports in general? Please explain. Please provide two examples?

Possibly recurrent training, yes.

Q9 Is human factors a contributing factor of V/PD RIs at airports in general? Please explain. Please provide two examples?

Yes, expectation bias, where one person expects to go to a certain runway (say flight training always uses one runway, but if there's a change, they will expect to go to the original one.), they go to the original runway instead of the newly assigned one.

Q10 Are there any other contributing factors of V/PD RIs at airports in general? Please explain. Please provide examples?

somebody giving a code to a gate out to someone then that other person is unfamiliar with the airport, expectation bias, airfield layout, if one surface is more pronounced, i.e. if a runway looks like a taxiway. Technology in the aircraft if the flight crew is looking down at something else in the aircraft and they turn on the wrong surface, visibility to the airport of the tower.

Q11 Please describe the top three common reasons for V/PD RIs at your specific airport.

wrong runway landings, crossing over the parallel to get to the other runway without having clearance, wrong surface landings, visibility of the tower to see the runway someone is lined up on. Parallax.

Q12 Please describe the top three most common barriers to addressing V/PD RIs at your specific airport.

> *FAA changed the tower replacement program in 2013-2014 and they no longer looked at the safety aspect, and just looked at condition of tower, actual physical condition of the tower, we were knocked off the list. Technology, cameras to have a better view of the runways and taxiways, so far that has not been approved by the FAA. We attempted to purchase a scope, but the FAA does not allow the sponsor to buy a scope for an FAA tower, but it took six years to get it, but it still didn't correct the issue.*

Q13 What are the successful attempts made to mitigate V/PD RIs at your specific airport?

> *for the V/PD side, there were several vehicles that went into the wrong side of the airport, installed separate gate codes for different parts of the airports. Installed large block letters on the end of the taxiways so people can see that. We added reels at the ends of the runways, we leave those on while the tower is open, if you see something flashing on the left, then you are not clear of the runway. We reconstructed the runway out here back to black, it looked camouflaged, because it was difficult to see. We've had several pilot meetings, and distributed flyers and FBO's to see what is confusing to them. We added runway guard lights to all of the taxiway end connectors and runway hold position markingsto all the connecting runways.*

Q14 What are the least successful attempts made to mitigate V/PD RIs at your specific airport?

> *The second scope installed in the tower, it works when someone is straight and lined up, if someone is not lined up exactly, it can look like someone is lined up on the wrong runway 50 jumps to 400 feet. It's hard to say if the guard lights are working or not. Don't know if all the signage is working as well as intended because someone is distracted. Not moving the tower to a better location to pick out incursions before the happen. We do a lot of things out here by not correcting the issue of not moving the tower.*

Q15 What improvements need to be made in the processes involved in addressing V/PD RIs at your specific airport? How should this be accomplished?

The tower funding and the FAA improvement program will only allow 2 million bucks to approve a new tower so they can only approve a fifth the cost of the new tower. They only look at the condition of the tower and not as much as the safety aspect. There needs to be more pull on the safety side, along with the air traffic group. There can be a lot of money, spent to change the airfield to mitigate the runway incursions except when concerning the tower for funding improvements.

Q16 Please describe any related policies, reporting mechanisms, available resources, enforcement activities, personnel training, and so forth that could improve addressing V/PD RIs at your specific airport.

the policy would be the changes in the policy of funding new towers. Adding something in the BFR to specify runway incursions. Adding vignettes, case studies on wrong runway, recurrent training programs for pilots.

Q17 When an individual is responsible for a V/PD RI, how was he/she guided or trained so a similar V/PD RI was not committed again at your specific airport? Was this helpful or beneficial in preventing or mitigating future occurrences?

It depends on how serious the V/PD runway incursion was, for example if it was a vehicle operator, I will talk to them and they will receive a letter. I will talk to them about the seriousness. If the tower reaches out to them, they will explain why they did what they did, was it a distraction, or an expectation bias. So, we can stop them and try to figure out why the runway incursions were occurring so we can prevent them in the future. The vehicles that crossed the runway, when we talked to them, a tenant gave them a gate code, and they crossed runways without realizing it, they had never been on a runway before. Separating gate codes so a person could not go to the wrong area of an airport.

Q18 What are the lessons learned from addressing V/PD RIs at your specific airport? How have these experiences influenced the handling of subsequent V/PD RIs?

We have done some things that have done quite a bit, marking on the taxiways, thinking outside the box, people thought it was funny to see the words taxi written on the taxiways, getting creative with solutions. If they don't land on that taxiway, pilots land on other surfaces you didn't expect them to. Being proactive and working with the FAA, digging in and finding a root cause to correct them in the future.

Q19 Is technology a leading cause of V/PD RIs at your specific airport? Please explain. Please provide two examples?

> *Some of them are caused by to much distraction in the cockpit, someone missed their taxiway the other day, if they were heads up that wouldn't have happened. The second scope placed in the tower is pretty archaic technology. The lack of technology, we have been asking for cameras, so the tower can tell if the aircraft is on the left or the right of the runway. Looking at areas further from the tower, so to be able to tell where the aircraft actually is before they make a wrong turn. It could also add to distractions in the tower if you have to many cameras up there.*

Q20 Is lack of training or inadequate training a leading cause of V/PD RIs at your specific airport? Please explain. Please provide two examples?

> *probably, we've had some aircraft, even corporate aircraft that cross over runways or land on the wrong one, there's not enough in the recurrent training especially in this region for more complicated airfield layouts, they could add those in the training program.*

Q21 Is human factors a contributing factor of V/PD RIs at your specific airport? Please explain. Please provide two examples?

> *definitely, expectation bias, one of the biggest ones. Using a runway for a long time, then suddenly changing, they take off on the wrong runway. People thinking 1-0 left is right and vice versa and is in fact a parallel taxiway.*

Q22 Are there any other contributing factors of V/PD RIs at your specific airport? Please explain. Please provide examples?

> *Tower location and parallax, it's a pretty low elevation and a bit a way's back from the runways, the tower can't tell if someone is landing on the eastside, they can't tell which side they are landing on, if they flare to high, it looks like they are landing at the wrong airport. They are trained to look for shadows, sometimes requires pilots to announce of final to verify which runway they are using, and even after they have touched down, they might have not landed on the right runway.*

Q23 Please enter the total number of years overall experience you have working in the aviation profession.

12

Q24 Please enter the total number of years you have working as an airport manager or executive.

12

Q25 What is your current professional title or position?

Manager

Q26 Are you a currently a member of AAAE?

Yes

Q27 How old are you?

31 – 40

Q28 What is your gender?

Male