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# Air Traffic Safety Management: The Significance of Voluntary Reporting and Data Distribution

Xavier M. Ashley

## Abstract

This study primarily investigated inadequacies identified through the utilization of the Air Traffic Safety Action Program (ATSAP), a Voluntary Safety Reporting Program (VSRP) overseen by the U.S. Federal Aviation Administration (FAA). The primary objective of this research was to ascertain whether the FAA was properly managing the ATSAP and if the program was capable of effectively identifying safety hazards present in the national airspace. To assist in this determination, this study communicated the basic characteristics and significance of safety management and voluntary reporting in aviation. This served to clarify the intended function of the ATSAP and to articulate contributions that modern voluntary disclosure programs provide to the air traffic community and larger aviation community. It was discovered that several issues primarily relating to ATSAP data dissemination require attention from government regulators. Furthermore, due to previous scholarly research into the program being rather limited and dated, it was noted that this research was unable to fully portray the current state of the ATSAP. In response to the findings, two recommendations are provided. The first encourages the FAA to implement a more comprehensive and intuitive VSRP, one which can be utilized by both air traffic personnel and other aviation professionals. The second recommendation affirms the importance of continued research in to the ATSAP and that additional studies have the potential to reveal further improvements that can be made to the voluntary reporting process.

## Introduction

With any action or event that involves an elevated amount of hazardous risk, there is often a desire present to mitigate this risk to promote a condition of safety and security. A significant element to maintaining safety, especially in aviation, is situational awareness and making information that can be used to reveal factors contributing to risk highly accessible. The more abundant this information is, the more issues can potentially be recognized. Hence, it has proven advantageous for official safety reporting programs to be constituted. The purpose of these programs is to encourage aviation professionals who actively perceive hazards to share their experiences and reflect on safety events (DOT IG, 2012). A term commonly used to refer to these reporting programs is Voluntary Safety Reporting Programs (VSRPs), and they are an integral component of the Air Traffic Organization's (ATO) Safety Management Systems (SMS) (FAA, 2017). In general, VSRPs gather substantial and reasonably accurate information. This is because for those involved, the reporting is voluntary, non-punitive, and confidential, so long as reported issues are not a consequence of intentional negligence or illegal activity (DOT IG, 2012). Although these programs are certainly designed to improve safety, the aviation community, specifically the Air Traffic Control (ATC) community has offered limited indications of the effectiveness of its respective VSRPs. To aid this

condition, this article examines relevant research and government documents that convey the use, benefits, and shortcomings of the Air Traffic Safety Action Program (ATSAP), a VSRP utilized by those who provide air traffic services around the U.S. The study primarily addresses the question: Is there evidence that a modern VSRP such as the ATSAP is sufficient in its functionality, and if possible, can its effectiveness be enhanced? How the program is situated into the larger organization of aviation safety culture and management is evaluated through conducting a literature review of applicable studies. Regarding program effectiveness, a further review of government research and testimonies discloses the program's ability to provide air traffic personnel with access to reporting, as well as how that information is ultimately able to provide tangible improvements to air traffic safety. As a product of the study's findings, it will discuss a previously undiscovered, streamlined approach to ATSAP data distribution to Federal Aviation Administration (FAA) ATC facilities. Additionally, research methods utilized in this study ultimately reveal an apparent absence of current ATSAP related research. The overall impact of this circumstance is also a point of discussion. In response to these two outlined concerns, two recommendations are provided.

## Methods

This study primarily investigates the inadequacies present within the ATSAP, as demonstrated by its

utilization by air traffic professionals. It then ascertains whether the FAA is demonstrating proper oversight of the program by acting to correct its deficiencies. To accomplish this, this study aimed to analyze relevant scholarly research of the ATSAP depicting the program and its possible shortcomings, however it was initially discovered that this research has yet to be conducted or is generally inaccessible. This is a potential limiting factor of the study. The only sources that provide this type of criticism and insight are government documents and testimonies accessible to the public. These sources can be characterized as dated and limited in amount, which acts as another constraint. These documents as well as other scholarly research addressed in the literature review were chiefly located in the Embry-Riddle Aeronautical University library database. The articles do not directly relate to the ATSAP, rather the articles reviewed in this study relate to other relevant safety programs and systems and serve the purpose of contextualizing the necessity of a properly functioning ATSAP. They also serve to contextualize the inadequacies identified in the program, by contrasting what the ATSAP is designed to accomplish with what research suggests it has accomplished since its implementation. A total of fourteen sources were examined in this study and their information was compiled into the literature review, discussion, and recommendation section.

### **Literature Review**

A review of the literature disclosed the following themes: voluntary disclosure programs, modernized safety culture, and data distribution inadequacies. These themes will be delved into further in the following sections.

### **Voluntary Disclosure Programs**

It is often the fundamental nature of safety to be enhanced in response to an evident failure to maintain a condition of safety. This is a circumstance that remains true even concerning the creation of voluntary disclosure programs or VSRPs. Aviation accidents such as what occurred with Trans World Airlines flight 514 in 1974 where all 92 passengers and crew members perished, have had a profound impact on how aviation professionals contend with safety and accident mitigation (Stanford & Homan, 1999). It was tragic events such as these that gave rise to modern approaches to hazardous risk identification and drove the need to improve aviation safety culture overall. The creation of the National Aeronautics and Space Administration (NASA) Aviation Safety Reporting System (ASRS) in 1975, in response to

the 1974 accident, demonstrated an inevitable shift towards utilizing voluntary reporting as viable method to gain access to seemingly inaccessible safety data (Mills, 2010). Since its implementation, ASRS has served the purpose of collecting and analyzing safety reports from individuals such as pilots, air traffic controllers, and maintenance technicians. The resulting information has then been communicated to the FAA and the larger aviation community (Mills, 2010). It can be reasonably inferred that all VSRPs, including the ATSAP, originate from a comparable desire to improve operational safety. As a result, these programs are comprised of basic, essential elements that allow them to remain successful in addressing unsafe situations. These basic elements are explored in Stanford and Homan's study (1999) into the ethical dilemmas associated with voluntary reporting in aviation. History has revealed that the most basic elements of VSRPs are voluntary participation, confidential reporting, and non-punitive action against participants (Stanford & Homan, 1999). These elements are distinct but do not exist independently of one other, rather they closely support each other. These elements of VSRPs can be understood as the following: participants will only voluntarily submit information concerning safety events if their identity and involvement remains confidential or unknown from those who are not a part of the independent party conducting report analysis. Confidentiality is valued primarily because it prevents scrutiny or punitive action originating from the FAA or a private company, depending on the origin of the report and the reporting program being used. Additionally, it is worth emphasizing that these elements only apply if the program is used properly, rather than to gain personal immunity from wrong-doing or illegal activities (Mills, 2010). If any of the elements are absent from VSRPs, information becomes less plentiful, hazards to safety remain unknown, and situational awareness decreases.

In their study, Mills and Reiss (2014) convey other valuable inner workings of voluntary disclosure programs while providing a unique perspective into the secondary learning aspects of these programs. In general, voluntary disclosure programs can be characterized as a collaborative effort between regulators and regulated entities to improve safety. The efforts can be utilized in conjunction or as a replacement to traditional methods of control and oversight such as internal investigations (Mills & Reiss, 2014). This study later conducted a more substantive comparison of these new and traditional methods. Through safety reports, regulators

receive information that can assist in more targeted regulation while regulated entities, without concern for reprisal, are better able to clearly convey what regulations are more likely to lead to safer operations (Mills & Reiss, 2014). Most significantly however, the cooperation that these programs encourage, cultivates trust between the two groups and more clearly communicates their individual interests (Mills & Reiss, 2014).

For these voluntary disclosure programs to function as intended, information submitted to them must remain confidential. VSRPs utilized by the government are currently protected by Title 14 Code of Federal Regulation Part 193 from the Freedom of Information Act (FOIA) (FAA, 2017). As a result, the court-ordered release of VSRP reports must be accomplished through Protective Orders, thus preventing sensitive information, such as the individuals involved in the reporting process, from being disclosed (FAA, 2017). It is crucial to note that without the guarantee of appropriate anonymity from the FOIA, data-sharing program participants would likely be concerned about the public release of private information by the government. A lack of confidentiality and punitive action naturally renders VSRPs as largely ineffective, by reason of underreporting, and during the early formation of these types of programs, the idea of anonymity in exchange for safety-related data was met with some skepticism (Stanford & Homan, 1999). The time-period of the authors' study is a testament to workers' concerns that their disclosure could potentially self-incriminate. Although confidentiality and scrutiny are as significant of concepts to aviation safety as they were in the late 1990s, research does not suggest that these concerns are central amongst those who currently utilize the ATSAP or any other VSRPs.

In July 2008, the FAA initiated a VSRP to be utilized by personnel employed at air traffic control facilities called the Air Traffic Safety Action Program (DOT IG, 2012). The program's primary objective was and continues to be to encourage FAA air traffic employees to report either safety concerns or events (DOT IG, 2012). The significance of its use is well articulated in a notice of proposed rulemaking (Technical Operations Safety Action Program (T-SAP) and Air Traffic Safety Action Program (ATSAP), 2014) concerning the Technical Operations Safety Action Program (T-SAP) and the ATSAP. The notice affirms the importance of information submitted to voluntary disclosure programs being designated as protected from public disclosure and that regulating agencies like the FAA are able to utilize this

collected information to improve safety and efficiency through modifying rules, procedures, and regulations (Technical Operations Safety, 2014). This notice also makes a notable claim partly as a rebuttal to comments of opposition directed at the rule. It states that the FAA believes safety data has not been made available by any other means or method since the program's implementation and is therefore of great value. Although this study is inclined to demonstrate the value of voluntary disclosure programs in ATC, it is also worth noting one of its innate limitations relating to the notice's statement. This can be found in FAA Order JO 7200.20A (2017), the most updated order that oversees the ATO's policy on VSRPs. The order provides information on the inner mechanisms of VSRPs such as the ATSAP and emphasizes that data collected through them is subjective and does not necessarily incorporate all present issues occurring in the National Airspace System (NAS). This is largely characteristic of VSRP data and is a reasonable and well-understood circumstance. Also, to be straightforward, both government documents still overall outline the advantages of using voluntary disclosure programs.

### **Modernized Safety Culture**

Safety can generally be regarded as the ability to protect people, the environment, and society from harm or hazards. A contemporary understanding of safety promotion, as it pertains to an organization would be possessing a culture of safety, which includes systems, procedures, views, and practices that act to minimize safety hazards and hazardous risk (Berg & Kopisch, 2012). Although it is largely incumbent upon organization leaders or management to establish and advance desirable cultures in an organization, the strength of an organization's safety culture lies within the shared mindset of those operating within the organization (Noort et al., 2016). When safety is prioritized, people at every level possess a safety-oriented mindset that is not solely concerned with how safe operations appear to be but how safe they are (Kurt & Gereide, 2018). There is a distinct understanding that failing to continuously evaluate the effectiveness of safe practices and unknown contributing factors can lead to a breakdown in safety, thus resulting in more incidents and accidents (Berg & Kopisch, 2012). High risk industries such as aviation, including air traffic control, require a well-developed culture of safety, as well as the tools and methods to maintain it (Berg & Kopisch, 2012). Furthermore, since air traffic and aviation safety have international

implications, there is significance in developing a comprehensive understanding of management systems that effectively promote positive safety cultures within various world organizations (Noort et al., 2016).

Disclosure programs, such as the ATSAP, act as a necessary component of Safety Management Systems (SMS) utilized by the ATO (FAA, 2017). In Kurt and Gerede's (2018) recent study concerning SMS implementation and the investigation of institutional pressures driving the legitimate or ceremonial adoption of SMS, they provide international insights into these management systems and how individual organizations are able to incorporate them. SMS itself can be understood as a contemporary, performance-based approach to safety management and to maintaining a positive safety culture. The wide and increasingly necessary use of SMS demonstrates that international organizations, such as the International Civil Aviation Organization (ICAO), endeavor to promote proactivity in aviation safety (Kurt & Gerede, 2018). Through analyzing previous approaches to aviation safety, these organizations have concluded that compliance-based approaches to safety, such as solely adhering to rules and regulations, do not necessarily result in improvements and can potentially result in errors. This is the traditional method of oversight referred to in the previously mentioned study authored by Mills and Reiss (2014). These international organizations have alternatively observed that performance-based safety management reflects the safety needs of organizations involved in real-world operations (Kurt & Gerede, 2018). A comparative study conducted by Cacciabue et al. (2015) which examines strategies for risk assessment process implementation also emphasizes the importance of SMS by noting that the systems are designed to not only reflect the present-day safety needs of an organization but to also continuously evolve to address ongoing challenges.

Prior to the use of the ATSAP as a safety management system, deficiencies in controller performance were identified by means of investigating safety events (FAA Reauthorization, 2011). As revealed by former President of the FAA Managers Association, David Conley, in his U.S. House testimony (2011), anything troubling observed would at that point be addressed by facility managers. Depending on the type of event, managers might have chosen to assign skill enhancement training to struggling controllers to prevent similar discrepancies from appearing later. The change in methods used to address safety hazards can be attributed to the "FAA's efforts to [transition] from a Blame Culture into

a Just Culture" (FAA Reauthorization, 2011, p. 138). Overall, this shift means that instead of the actions of air traffic personnel being met with scrutiny and inevitable corrective actions for being inconsistent with regulation requirements, a culture of trust now encourages the voluntary divulgence of information. Protections are articulated in official documentation and are afforded to all employees whether they be a controller, or other individuals at the facility (Kováčová et al., 2019). When providing air traffic control services, safe practices aimed at mitigating hazardous risk are essential. Components of SMS, such as the ATSAP, act as a comprehensive and rational method to maintaining a robust safety culture.

### **Data Distribution Inadequacies**

In 2011, the U.S. Senate Committee on Commerce, Science, and Transportation and its Subcommittee on Aviation Operations, Safety, and Security, as well as the U.S. House Committee on Transportation and Infrastructure and its Subcommittee on Aviation requested two audits of the ATSAP through the Department of Transportation (DOT) Office of the Inspector General (OIG) (DOT IG, 2012). The IG's objective for the audit was to evaluate the FAA's progress with implementing the ATSAP and to assess the FAA's oversight of the ATSAP (DOT IG, 2012). The IG highlighted various areas of operation that required improvements, such as refining the process of effectively disseminating ATSAP data. The degree to which the issue of data dissemination is outlined, as compared to other issues that are discussed in sources such as the audit report, is a factor that effected this study's conclusions. Ultimately, this audit assists the study in determining if ATSAP data was being utilized effectively prior to the probe.

The process of information distribution to ATC facilities required refinement partly because, at the time of the audit, the ATSAP database was restricted to contractor employees, and information could not be released without prior approval from ATO Management, the Air Traffic Safety Oversight Service (AOV), and the National Air Traffic Controllers Association (NATCA) (DOT IG, 2012). To distribute program information, the FAA routinely published reports or briefing sheets, by way of the ATSAP Office. However, according to the testimony of facility managers interviewed during the probe, the published reports would seldom contain enough details to make substantial safety improvements at their facilities. Additionally, there seems to have been several concerns among the managers that the ATSAP

information provided was broadly based on the entire NAS, instead of the data being particularly suitable for utilization at local level facilities (DOT IG, 2012). At the time of the audit the FAA did, in fact, have a data request process in place that allowed facility managers to request information collected through the ATSAP, however many managers also stated that the request process was “time consuming and that they were not satisfied with the information that was provided” (DOT IG, 2012, p. 6). The lack of satisfaction can be attributed to the information being heavily redacted and lacking the potential to be effectively analyzed. This study ascertains that the testimony of these managers can reasonably be described as credible due to knowledge of the inner workings of the ATSAP being relatively limited to air traffic personnel and other government employees.

In addition to the 2012 audit report, in 2011, David Conley provided insight into matters concerning the implementation of the ATSAP while testifying before the U.S. House Transportation and Infrastructure Subcommittee on Aviation. Although a majority of his testimony related to the unintended consequences of the program and how managers had become limited in their ability to address safety issues and misconduct, Mr. Conley also articulated to the subcommittee that access to ATSAP data could also be improved. In part, he stated:

We also have an unacceptable situation where someone in a facility can report risk that the facility management may never learn about, compromising the primary purpose of the program. The critical gap then exists in turning that data into usable information for field facilities. FAA Managers Association supports the [FAA’s] intent to create a system that identifies safety deficiencies and is able to use data to correct future occurrences. However, we believe that [the] ATSAP is not widely understood among the FAA’s management team (p. 141-142).

What the audit report and the testimony of the former FAA Manager reveals overall is that the FAA attempted to effectively process and distribute information collected through the ATSAP, but the contents of those reports were mostly ineffective in improving the operations of individual facilities.

### **Discussion**

As discussed in the preceding sections, the ATSAP is a voluntary disclosure program that affords air traffic personnel voluntary, non-punitive, and confidential reporting of events or conditions hazardous to safety (DOT IG, 2012). The program is intended to be part of a modern

approach to oversight, regulation, and safety management. Furthermore, it proactively assists in recognizing hazards associated with providing air traffic services and then allows for improvements designed to prevent incidents and accidents in the NAS to be conceived (Kurt & Gereade, 2018). However, through analyzing government reports and testimony, this study has determined that the information and data that originated from accepted ATSAP reports can be characterized as unsatisfactory. Although it is true that facilities acquired information regularly disseminated by the FAA, that information was largely unable to be used by individual ATC facilities to generate meaningful safety improvements.

While considering solutions to this issue, this study also discovered in the audit report (2012) that the FAA at the time of the probe actually recognized its shortcomings in data distribution and was actually devising a method to properly address all facility data requests. The FAA seemingly attempted to initiate a new program that would allow FAA managers and controllers to access qualitative and quantitative data pertaining to individual facilities, via an online portal. This was planned to be accomplished by the end of fiscal year 2012, however from a research standpoint, there does not seem to be any current information indicating that the program was ever fully implemented. However, during the same time period, an FAA program called the Confidential Information Sharing Program (CISP) was instead in use and still is according to the most current aviation circular (2017) covering the program. Its purpose is to effectively identify root causes to aviation safety issues, and it accomplishes this by having the ATSAP and the Aviation Safety Action Programs (ASAP) of airlines linked together. The CISP analyzes data collected through the two programs and shares it with participating airlines and the FAA (FAA, 2017). Using the ATSAP along with other VSRPs, the program provides a more holistic perspective and apprehension of causal factors contributing to safety events occurring in the NAS. Yet, no scholarly or government source has indicated that ATC facilities need or have access to information provided through the CISP. Additionally, any information concerning how particular the program is with its information distribution to airlines is relatively inaccessible.

As a result of scholarly and government research into the effectiveness of the ATSAP data handling process and the program overall still being relatively limited, it cannot fully be determined to what extent the FAA adhered to the OIG’s final recommendation to “expedite

the development of a process to provide facility access to ATSAP data”, as outlined in the audit report (DOT IG, 2012, p. 13). Additionally, academic studies into previously unrecognized alternative methods to provide safety-related data to ATC facilities are seemingly unrealized.

## Recommendations

### Further VSRP Development

Since their implementation, VSRPs such as the ATSAP have provided an understanding of conditions potentially hazardous to safety. Through the analysis of safety reports, the programs identify issues present throughout the NAS. This is especially true of issues relating to human factors which, according to experts in safety, is the cause of 80-90% of industrial accidents (Berg & Kopisch, 2012). This recognition capability also pertains to other VSRPs such as ASRS, which provides a particularly valuable insight into issues that pilots experience on the flight deck (FAA Reauthorization, 2011). As is the case with the CISP, the inclusion of multiple VSRPs may provide a more comprehensive understanding of improvements that can be made to flight operation and air traffic procedures. Furthermore, the database of information from the various government VSRPs should be able to support basic accessibility and data discrimination capabilities, based on the individual needs of organizations and facilities.

The benefits and insights of information provided by such an inclusive database can be demonstrated through relevant studies such as Berry and Sawyers’ (2013) investigation of causal factors effecting Area Navigation (RNAV) procedures. RNAV is an effective and well-established method of in-flight navigation and an integral part of Next Gen goals for the U.S. Utilizing data from 68 ASRS reports and 100 ATSAP reports from April 2011 and July 2012, Berry and Sawyer (2013) identified what aspects of RNAV contained hazardous risk with factors in human performance being the point of focus. The analysis of the reports resulted in some of the following discoveries. Track Deviations as a causal factor was represented in 71% of the ATSAP reports. ATC and Flight Deck Automation as causal factors were represented in 34% of the ATSAP reports and 46% of the ASRS reports. RNAV procedures as a causal factor was represented in 54% of the ATSAP reports (Berry and Sawyer, 2013). The following determinations could have feasibly been used to address shortcomings in human performance and to improve certain RNAV procedures.

### Additional ATSAP Research

The overall purpose of the ATSAP is to provide ATC personnel with the opportunity to voluntarily and confidentially report safety hazards and for those reports to be used. Due to a lack of current research into the program, whether the program is fulfilling its purpose in its current state is still widely unknown. The most recent analysis of the ATSAP was revealed in an audit report and congressional testimony from the early 2010s. Additional research into the program would further disclose developments that have yet to have been made to the program, since the previous decade. An appropriate format for such research may be similar to the methodology used by Mills (2010) in his study concerning collaborative governance and Voluntary Regulatory Partnerships Programs (VRPPs), which is a term similar to VSRP that encompasses government disclosure programs. In his study, Mills (2010) notably provides a case study of VRPPs at the FAA, including ASRS, and then articulates administrative, regulatory, and data technology lessons learned from the implementation and utilization of these programs. Similar research into the ATSAP would clarify the current state the program is in and what recommendations from the DOT IG the FAA has followed through on.

### Conclusion

In order to prevent events where safety has been compromised, it is worthwhile to become familiar with relevant hazards and risks to safety. Such familiarization can be a challenge when safety hazards are not shared or reported on a regular basis. That is why VSRPs, which encourage voluntary reporting with guaranteed confidentiality and non-punitive action, are beneficial. Although there are various kinds of VSRPs and SMS currently in use in aviation, they are all a means by which apparent hazards to safety can be proactively identified and addressed. This includes the ATSAP, a program that extends voluntary reporting to individuals who work in air traffic control. Since its implementation in 2008, it has collected numerous safety reports and has, thus, resulted in a number of safety improvements. However, while also recognizing that the particular effectiveness of this program is still largely unknown, this study investigates this matter and considers how it can be improved if necessary. A study of the relevant literature relating to the ATSAP has observed that, to an extent, aspects of the program are deficient and in need of adjustments, specifically in the area of safety data distribution. The

preceding research outlined the functionality and significance that safety systems and VSRPs, such as the ATSAP, have to aviation safety. It found that although the program does provide air traffic facilities with some information, the amount and relevancy of that information can be characterized as inadequate. It also determined that current research into the ATSAP is lacking and that although the program certainly demonstrated a need for corrections in past research, the extent that those corrections have been addressed by the FAA in the past decade is unknown. In response to these concerns, this report provides two recommendations primarily directed at the U.S. FAA. The first conveys the potential benefits of initiating a government program designed to compile and disseminate the data of multiple VSRPs. The second recommends additional research into the overall effectiveness of the ATSAP and possible alternative methods to distributing much needed VSRP data. In the end, utilizing voluntary reporting and the ATSAP to the fullest extent can only result in an operationally safer air traffic system for both controllers and aviators.

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