

Shifting Frames from Policy Disagreement to Policy Adoption through Discourse: The Initial Phase of a Study from the Aviation Repair Station Industry

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Abstract

Organizational change involves moving an organization from its current state to a desired state – a discursive struggle that reframes the organization. A change in regulatory policy often affects more than one organization and may involve an entire industry comprised of thousands of diverse organizations. Stakeholder resistance is a leading cause of change failure. Similarly, industry stakeholders view regulatory change with a certain level of skepticism and naturally tend to resist – leading to policy gridlock. Through a discursive struggle, regulators may find opportunities to change the conversation and shift the stakeholder’s interpretative frames from one of policy disagreement to policy adoption. This paper discusses the methodology and initial findings of the first phase of a multi-phase discursive study that utilized action research to address a heavily debated regulatory change in the United States aviation industry, specifically, Safety Management Systems. The results of this study suggest that the use of action research to create a body of discourse in regulatory policy initiatives may help regulators shift the conversation towards policy adoption. By applying action research principles, regulators may better identify strategies that change the conversation, which may lead to a change in the groups behavior or perspective – creating discourse that may lead to innovative policy solutions.

Keywords: safety, aviation, discourse, organizational change, public policy, repair station

1. Introduction

The increasing acceleration of technological innovation, changing government regulations, political events, and a dynamic economic environment are major catalysts that require ongoing and often major organizational change (Pfeffer, 1994). These change efforts involve moving the organization in a particular direction - from a current state to a desired state (Cummings & Worley, 2014).

Recently, interventions that change or reframe organizational change initiatives have become a focus of the Organization Development (OD) practice.

“Whether used to shift attention from problem-based to more positive orientations, change the methods or topics of inquiry and dialogue, or bring more and different voices into the room, the expectation is clear: changing the conversation leads to organizational change” (Marshak & Grant, 2011, p. 411).

Organizational change may be described as a discursive struggle that reframes organizational processes and practices (Marshak & Grant, 2011). As such, a discursive approach can be a useful way to understand why organizational change fails and generate alternative ways to enable change (McClellan, 2011).

This research presents a case study in which researchers utilized an action research methodology in creating a body of discourse to address a proposed regulatory change to the domestic aviation repair station industry. This proposed regulation, Safety Management Systems (SMS), is a shift from the traditional regulatory enforcement model to a partnership model that promotes safety through self-responsibility at the industry level (AIN, 2012; Gilligan, 2016; Lercel, 2013). SMS is a comprehensive approach to managing risk in aviation and other high-consequence industries (FAA, 2018c). However, many repair station operators perceive SMS will be overly burdensome – increasing the

organizations administrative costs, while providing no safety or financial benefit. Therefore, the proposed regulation has met stiff resistance from the repair station industry (AEA, 2009; FR, 2010; SBA, 2009).

The study involved a multi-step process over a three-year period using both quantitative and qualitative methods, which included literature reviews, surveys, interviews, focus groups, interactive workshops, and attendance at industry events where SMS concepts were discussed. Study participants included Federal Aviation Administration (FAA) representatives, industry group representatives, and repair station operators; events included two National Business Aviation Association meetings, two Aircraft Electronics Association regional meetings, three FAA Info Share meetings, four FAA SMS Focus Group meetings, and two SMS Repair Station workshops. The focus of this paper is on the initial research phase involving quantitative discourse methods and findings. By using empirical data to form a body of discourse, regulators and change agents may identify strategies that may shift stakeholder's interpretive frames from policy disagreement to policy adoption.

2. Theoretical Framework

One strategy for achieving organizational change through discourse is the use of an action research methodology.

The literature suggests that qualitative methods are often the most effective when the research involves individuals (Whyte, 1991; Greenwood & Levin, 2007) and is particularly effective in explaining what is happening within organizations (Avison, Lau, Myers, Nielsen, 1999). French and Bell (1973) define organizational development as organizational improvement through action research. This approach is especially effective in complex social situations where the people whose lives or circumstances are being changed need to be involved in designing and implementing the change that affects them (Burns, 2007; Somekh, 2006; Parkin, 2009). Such is the case with a public policy change affecting a diverse industry group like aircraft repair stations. Action research creates a conversation of new ideas, processes, and procedures, thus, creating discourse and developing unique solutions to complex challenges (Little, 2012).

The primary purpose of discursive action research is to provide a safe and open environment where people can engage in a systematic inquiry and investigation to design an appropriate way of achieving the desired state (Stringer, 2007). One should not expect a comprehensive theory regarding a discursive approach as the methods and outcomes depend on many different social, political, and economic contexts (Fischer, 2003). However, action research is not focused on creating a body of research that may be applied to a large population, but instead focuses on developing mutually acceptable solutions for events effecting unique groups of people (Stringer, 2007). Action research involves professional researchers acting as designers and stakeholders, actively engaged with organizations, with the aim of improving their unique strategies and knowledge of the environments within which they practice. Researchers work with others to develop and propose solutions to problems, utilizing a trial-and-error approach to both understand and resolve practice-based problems. However, action research goes well beyond a trial and error method because it incorporates systematic procedures that combine analyses, observation, and data collection into the process. Action research is often characterized as a multi-phase cyclical process. Typically, these phases include some form of planning and exploration, action (implementing), observing (evaluating), followed by an overall analysis and reflection as a basis for the next cycle of new planning, exploring, and action (Coghlan & Brannick, 2005). Similarly, Cummings and Worley (2014) describe action research as a process involving data gathering and diagnosis before any action, along with evaluation of the results after any implemented action. The systematic use of analysis, observation, and data collection procedures gives action research the potential to achieve useful answers to practice problems (Cummings & Worley, 2014). McClellan (pp. 472, 2011) states:

“Change can be enabled if we can find ways to create open, discursive spaces for organizational participants to collaboratively generate new organizing discourses to engender alternative organizational realities. Enabling sustained organizational change centers around opportunities for free and open conversation and productive dialogue about possible organizational futures.”

Many methods of data collection are used in action research and include the following (Stringer, 2007):

- *Interviews*: conducted by the principle investigator or by another person;
- *Field notes*: notes of observations made while an event is happening;
- *Audio recordings* or *videotaping* can also be invaluable;
- *Document analysis*: such as agency records, written reports, letters, memos, published material;
- *Logs*: including records of attendance or observed data;
- *Journals*: records of a person's reflections;

- *Portfolio*: a collection of relevant materials compiled for a purpose;
- *Questionnaires*:

o *Open*: ask for opinions or information from participants;

o *Closed*: multiple-choice or direct short-answer responses;

Action research requires establishing a deep level of trust between researchers and the participants. The relationship between an action researcher and the research participants is integral to the quality of the research outcomes (Algeo, 2013). Dealtry and Zuber (2005, p. 54) describe trust in action research as "... honesty, and respect [which] are preconditions of the search for truth." Often researchers are viewed by people within the community as outsiders and therefore are viewed with a sense of skepticism and a lack of knowledge of the community's situation (Reason & Bradbury, 2008). This may be especially troublesome in professions requiring specialized training and knowledge that is unique to a specific organization or industry, such as FAA certificated repair stations.

Action research may identify areas of agreement or positive elements and may help researchers and stakeholders develop the foundational building blocks of a solution (Postholm & Skrovset, 2013). Maintaining a focus on the future is vital and often requires the ability to create a vision of the future desired state along with its potential benefits. Similarly, Galtung (2003) describes creativity as vital part of these constructive activities. An often negative consequence of discursive action research is that critical voices may often dominate the discussions. This is neither beneficial nor appropriate in this type of research (Postholm & Skrovset, 2013) and may require action researchers to intervene in order to keep the focus on the future.

The action researcher is a researcher acting to increase knowledge and understanding while simultaneously facilitating organizational change (Stringer, 2007). This implies a dual role for action researchers who must be able to strategically move between these roles at appropriate times. Ultimately, action research requires interpersonal skills to foster and manage diverse relationships, communicate and negotiate, while applying effective project management skills to maintain schedule and operate within resource constraints.

3. Case Background

The federal government is faced with a record budget deficit approaching \$1 trillion USD (Bloomberg, 2019), which naturally impacts the FAA's operating budget (DOT, 2018). In addition, a shortage of qualified aviation personnel is further straining human resources, which not only is impacting the FAA but industry as well (AIN, 2019a; FAA, 2019, FAA 2018b). Coupled with the FAA's increasing work scope, which includes the proliferation of unmanned aircraft technology, advancing commercial space operations, incorporating Next Generation technologies, growth in general and commercial aviation air traffic, and changes in the composition of the air transport fleet, the FAA's workload focus and oversight processes need to change given its limited resources (AIN, 2012; Boeing, 2019; DOT 2018; FAA, 2016; FAA, 2018b). Thus, the FAA is shifting away from a traditional enforcement model of safety oversight to a partnership model that promotes safety through self-responsibility at the industry level (AIN, 2012; Gilligan, 2016). SMS is a fundamental component of this regulatory shift (AIN, 2012; Gilligan, 2016; Lercel, 2013). Recent decades have seen that increasingly aviation accidents are attributable, in varying degrees, to organizational factors - further demonstrating a need for improved organizational safety management. The National Transportation Safety Board (NTSB) first recommended safety management systems in 1997 to improve safety in the maritime industry (NTSB, 1997). Since then, a number of NTSB investigations have cited organizational factors contributing to accidents and have recommended SMS as a way to prevent future accidents and improve safety.

In March 2006, the International Civil Aviation Organization (ICAO) adopted a requirement for member states, which includes the United States, to develop SMS for aviation service providers. ICAO established a deadline for states to adopt regulation by January 1, 2009 for commercial operators and November 18, 2010 for non-commercial operators (ICAO, 2019). However, on December 18, 2008, the FAA filed a "difference" with ICAO detailing that it was not currently in full compliance with the ICAO requirement, but was considering SMS rulemaking in the future.

More recently the European Union Aviation Safety Agency (EASA) issued a notice of proposed amendment (NPA) that would require SMS for EASA Part 145 maintenance organizations for non-general aviation aircraft and to EASA Part 21 aircraft parts and component manufacturers (AIN, 2019b). This proposed rule may significantly impact the aviation repair station industry since there are over 1000 EASA approved repair stations located in the United States (EASA, 2019) – a finding that contributes to the case for developing an SMS policy solution for the domestic repair station industry.

A large percentage of United States repair stations are small organizations; over 70% have 30 or fewer employees (FAA, 2018a). Smaller or less complex organizations are most concerned about the increased administrative burden and cost involved in complying with the new SMS regulation (AEA, 2009; AOPA, 2009; FAA, 2010). In response to the SMS advanced notice of proposed rulemaking (ANPRM), the Small Business Administration's Office of Advocacy commented that, "SMS could be especially costly and burdensome for small businesses, and recommended that the FAA consider a tiered approach that would be scalable to the size, scope, and complexity of the operation" (SBA, 2009). Considering the demographic distribution of repair stations (small versus medium/large), it would be impossible to move an SMS regulation forward without securing significant support from the small operators. Safety practitioners and regulators are challenged with addressing and moving beyond this resistance to change in order to develop pragmatic SMS compliance solutions for the domestic repair station industry. As part of an FAA research grant, the FAA sponsored this research study to explore potential SMS Compliance solutions that could be scaled across the repair station industry.

4. Methodology

Researcher's utilized a reiterative action research plan based on the literature to guide developing a body of discourse that may lead to a SMS policy solution. The plan utilized a mix of qualitative and quantitative methods. However, each phase was not clearly distinct and often blurred together. For example, during group discussions the research team often went through a reiterative process of gathering information, reflecting and assessing the information, and then developing a proposed plan of action – all during one meeting. Researchers employed a number of research assistants to help facilitate note taking during group discussions and interviews. No identifying information was collected nor was audio or video recording utilized. The research team was comprised of three aviation safety research practitioners, who collectively had over 70 years of aviation maintenance/manufacturing industry experience, and three graduate research assistants. All team members held various FAA airmen certificates with three holding FAA airframe and powerplant technician (A&P) certificates – a certificate held by a large majority of repair station industry members.

First, researchers conducted an extensive literature review, which included reviewing regulatory documents, relevant past aviation policy changes and initiatives, industry publications and economic forecasts, demographic data, and news media. Second, researchers attended industry events where proposed SMS repair station policy was discussed and debated. Attendees at these events included management representatives from the FAA SMS Program and Flight Standards Offices, industry and labor groups, and repair stations representatives. Events attended included two FAA SMS Focus Group Meeting, two FAA Aviation Safety Action Program InfoShare Events, the National Business Aviation Association's Annual Convention, and two Aircraft Electronics Association regional meetings. The research team also hosted two SMS repair station workshops. Specifically, researchers engaged in SMS presentation sessions, group discussions, and interviews with the various stakeholders to gain a deeper understanding of the various stakeholder's opinions, concerns, the perceived need, challenges and benefits of SMS. A minimum of two research team members participated in each of these activities to facilitate qualitative data gathering efforts, which also reduced the risk of investigator bias. At the two SMS Focus Group Meetings and one of the SMS InfoShare events, researchers facilitated breakout sessions specific to repair station attendees to present SMS concepts and engage in discussion. Researchers reviewed the participants' rights as research subjects prior to all group discussions and interviews. In addition, prior to the group discussions researchers reviewed the rules of discussion, which included being respectful of others' thoughts and opinions, sharing the floor, and confidentiality.

Immediately after each group discussion or individual interviews, researchers would review and compare notes, address any discrepancies, fill in any information gaps, and edit for clarification. Often, researchers would follow up with research participants to gather more insight or clarification as well. In addition, researchers would discuss their overall observations of the participant's responses, group interactions and dynamics. The researchers would then enter their notes into a shared electronic document for future analyses.

Next, researchers performed cyclic content analyses of the qualitative data to develop themes and categorize the content. Themes were created if four or more responses were similar in content and coded manually by grouping together similar responses. Responses that were not similar to others were subsumed under the label "Other." First, three domain experts assessed data and developed themes, which included a defined descriptive narrative for each theme. Next, three other domain experts coded the data to the various themes. Agreement from all experts was required for each theme or categorization. An organizational psychologist with expertise in content analyses research supervised this process. Finally, all domain experts along with the lead researchers reviewed the results from the content analyses to clarify the results and address any discrepancies between the results of the analyses and the

researchers field observations. This process enabled the content analysis to provide valuable and objective results. The consistency of results and minimal discrepancies enhanced the reliability of theme identification.

Throughout these activities, researchers continually reflected on their interactions with the various stakeholder groups and reengaged stakeholders to provide research updates, regularly obtain stakeholder feedback, and discuss and debate SMS concepts. From this cyclic process of reflections and discussions researchers developed a synopsis of the FAA reasoning behind the proposed SMS regulation, the industry's primary reasons for resisting the policy, areas of agreement or support, developing a better perspective of the group dynamics, identifying possible SMS compliance concepts and a strategy for reframing the conversation.

5. Discussion

5.1 Overview

The initial stages of this research confirmed that many repair station representatives, especially small organizations, were resistant to SMS compliance, with many strongly opposed to any such requirement. Many opponents of SMS regulation argued that the SMS regulation provides no financial benefit, is too burdensome, and will not improve safety. Most industry stakeholder groups perceive the proposed SMS regulation as a significant shift in how the industry and FAA will manage safety in the future (Lercel, 2013), which Burke (2004) suggests that organizations and individuals are especially resistant to this type of change. Through interviews, conversations, and meetings, the researchers found that many participants had framed their opinion based on past experience with the FAA and media communications. The FAA has a history of inconsistent interpretation and application of various regulations, for example the inconsistent application of repair station ratings (FAA, 2002), which often induce undue administrative burden on the industry. In addition, many industry groups were opposed to the proposed SMS regulation and advanced this message through various media outlets, such as the AEA (2009) and Aircraft Owners and Pilots Association (AOPA) (2009). A review of the literature found the overall message from various industry media outlets was dominated by a sentiment of opposition to the SMS regulation. Polsby and Wildavsky's (1988) research in the area of public opinion found that the American public often has little direct contact with many issues on the public agenda, yet public opinion greatly influences policymakers. Moreover, messages conveyed by mainstream media take on the value of public narratives about public issues. Thus, the media goes beyond influencing what people think about, it may often tell them how to think about the issues (Polsby & Wildavsky, 1988). Similarly, researchers found that the industry's factual knowledge of SMS was very low (Lercel, 2019). Several interviewees admitted to reading very little of the published guidance material and primarily formed their opinion based on media communications and viewpoints of various industry-leading organizations – a finding most prevalent among smaller organizations and supported by the FAA SMS Aviation Rulemaking Committee's (ARC) assessment of the industry's "fear of the unknown" (FAA, 2010).

Since SMS is fairly new to aviation, a review of the literature found little historical evidence regarding the financial implications of SMS. Furthermore, a review of similar type safety and quality programs across other high-consequence industries found little quantifiable financial data. Discussions with a number of repair station representatives confirmed that the aviation repair station industry generally has done a very poor job in tracking costs associated with safety related incidents and safety interventions, adding to the difficulty of estimating the potential financial impact that SMS may have on an organization. This finding is consistent with the SMS ARC Maintenance Working Group (Mx WG) report, which noted the lack of financial information due to the low number of repair stations that have implemented an SMS program (FAA, 2010).

Opponents of SMS regulation often argued that the repair station industry is safe enough and referenced the outstanding safety record of air carrier operations both domestically and internationally. The Mx WG report stated "The Mx WG does not believe that an SMS rule can be justified on safety improvements alone.... safety is at all-time high. There will be no quantum leaps made no matter what system is developed or implemented" (FAA, 2010). The Mx WG based this statement on the International Air Transport Association's (IATA) 2009 Aviation Safety Report, which the Mx WG references in its report (FAA, 2010). However, a review of the literature did not find any supporting evidence that may correlate air carrier safety performance with the repair station industry's safety performance. A large majority of repair stations do not perform maintenance on aircraft used in air carrier operations; instead, the majority of repair stations' work is performed on smaller, general aviation (GA) aircraft (Lercel et al., 2013). This finding is supported by the AEA, which stated, "The FAA fails to recognize that the vast majority of repair stations do not work on Part 121 aircraft but rather support the general aviation fleet" (AEA, 2009). According to the Bureau of Transportation Statistics (BTS), since 2010 the air carrier fatality rate per 100,000 flight hours was 0.008 (BTS, 2019a). However, over this same period the GA segment did not perform nearly as well with 3,261

fatalities, a rate of 1.93 fatalities per 100,000 flight hours (BTS, 2019b). Therefore, one cannot directly correlate air carrier safety performance with the repair station industry's safety performance.

5.2 Reframing the Conversation

The literature on organizational change illustrates the importance of creating a common purpose and developing consensus among stakeholders in order to create effective change. The organizational change literature has seldom been applied to this area of policy development (Lercel, 2019). Lewin (1958) points out that there must be a motivation for change, while Cummings and Worley (2014) also stress the importance of creating an environment of inclusion. The FAA ineffectively communicating the reason for change, a lack of factual knowledge among industry stakeholders and not including these stakeholders in the initial policy development, and a natural tendency to view regulatory change with skepticism all likely contributed to the repair station industry's opposition to SMS - leading to the framing of this issue as one of policy disagreement and creating policy gridlock.

Indeed, initial conversations and interviews with industry stakeholders found participants wanting to frame the discussion around policy disagreement. However, action research engages stakeholders and probes beyond visible public opinion in order to determine why people think the way they do and develops a better understanding of the issue. This research made a significant effort to educate industry participants on the concepts of SMS, providing practical examples of its application to a repair station organization, and explaining the reasons why the industry may need to adopt SMS.

The researchers' initial attempts to shift the discussion towards identifying potential scalable SMS solutions had limited success. Researchers were at first challenged to keep the stakeholders focused on looking toward solutions. Initial discussions most often devolved into a debate over the need for a SMS regulation and the perception that its overly burdensome.

Researchers reflected on this situation and strategized how to move the conversation beyond a debate over the need for SMS toward developing solutions. Drawing upon the literature, researchers found stakeholders had a dominate frame –one most often formed from media input – and needed to reframe the discussion in hopes of shifting the conversation (FWI, 2002; Dryzek; 1997). Researchers developed a theoretical mental model by presenting a future state where SMS is a regulatory requirement and compliance is mandatory – the debate over the need for SMS is in the past; therefore, how can we apply SMS regulation in scalable manner to the repair station industry? Researchers discussed this approach to reframing the discussion with senior representatives from the FAA and a select group of repair station representatives in order to identify any potential concerns and to ensure support for this approach. Overall, their feedback was positive and they overwhelmingly supported the reframing strategy.

5.3 Addressing the Negative Voices

Another significant challenge encountered during these initial discussions was the highly emotional arguments between industry lobbyist and FAA representatives over SMS policy. These arguments inevitably created a caustic and often intimidating environment that suppressed others participating in the discussion. This was especially challenging with small groups or larger meetings where negative voices seemed to dominate and would stifle any meaningful movement towards a solution. When researchers attempted to shift the discussions, these negative voices would determinedly steer the conversation back towards policy disagreement. When others offered differing opinions or forward looking thoughts, these negative voices often attacked and, as researchers observed, seemed to intimidate other participants. This challenge was similar to Postholm and Skrovset (2013) described consequence of action research where negative voices often dominate and are not beneficial to this type of research. Researchers attempted to address these adverse encounters with minimal success by reminding the participants to respect others' opinions and allow others to speak – at times these individuals criticized the research as a “waste of time” and often boasted “SMS will never happen.”

In parallel with the reframing effort, researchers developed an innovative plan to minimize the overall influence the negative voices were having on the conversation. This plan involved three phases and was first utilized at a SMS Repair Station Workshop attended by over 60 individuals from the various stakeholder groups. The first phase was not unique but focused on educating attendees on SMS to ensure everyone had at a basic understanding of the SMS concepts. During phase 2 and 3, breakout sessions were conducted and attendees were divided into smaller groups, which optimized attendee participation and allowed for in-depth discussions. Researchers purposely assigned the negative voices to the same group – minimizing their influence on the other groups. Each group was equally sized and comprised of members from organizations of varying size and capability.

For phase 2, attendees were divided into two groups. Group “A” first attended a session regarding Safety Risk Management, while Group “B” attended a session on Safety Assurance. Once this session was completed, the groups then switched sessions. For phase 3, attendees were divided into Groups “C”, “D”, and “E.” Each group rotated through three different breakout sessions with each session discussing a different concept of SMS Compliance. The three breakout sessions addressed the organizational attributes of complexity and customer base, documentation and recording, and compliance implementation requirements. A senior research member was assigned to lead one topic session and led all sessions regarding that specific topic. All sessions presented the same material and a research assistant was assigned to each session to facilitate note taking. At the conclusion of each session all groups came together and a representative from each group presented a summary of their group’s discussion to all attendees.

This strategy was utilized at two additional workshops. In addition, researchers conducted a number of “micro” group interviews involving two or three participants. These two methods created a more open and safe environment for participants to engage in systematic inquiry and investigation, which Stringer (2007) and Burke (2004) describe as vital to effective action research. These types of interactions were of great value as researchers established deeper relationships and greater trust among the repair station representatives. Because the researchers were also FAA A&P technicians with industry experience, they could relate and empathize with the representative’s situation – contributing further to a trusting relationship. Over the course of this study participants often commented positively regarding the researcher’s industry experience. This finding was consistent with the literature regarding the importance of trust and a researcher’s experience with a professional community.

Reframing the conversation and creating a safe environment for inquiry helped engage stakeholders in the process of exploring and developing practical solutions. As the literature suggests, the different stakeholder groups began to perceive the action as a communal effort (FWI, 2002). Simon (1976) reminds us that a top down approach to policy implementation is for the most part ineffective. Executives and leaders cannot possibly know all the alternatives; thus, the effectiveness of their policy may be limited. Leaders must communicate their goals and objectives and engage individuals in developing the plan. Once armed with a foundational knowledge about SMS and sense of empowerment to find a solution, participants then moved beyond debating SMS policy and engaged in answering the question, “How can SMS be applied to the repair station industry?” - shifting frames from policy disagreement to policy adoption. Once the participants frame shifted, they focused on developing solutions to SMS application, which led to the development of three potentially scalable SMS compliance solutions. These potential solutions are discussed next in greater detail.

5.4 Documentation and Compliance Implementation

The SMS ARC reported the industry’s concerns with potentially burdensome SMS documentation and how the FAA will regulate SMS Compliance (FAA, 2010). This research confirmed a majority of repair station operators were concerned with how the FAA will evaluate and regulate an organization’s SMS. Unknown costs and administrative requirement further contributed to these concerns. In addition, representatives are concerned with how their local FAA representatives will interpret the regulatory requirements given the FAA’s inspectors history of inconsistent policy interpretation. This is especially significant because SMS prescribes “what” is required of organizations, but does not provide a concrete methodology of “how” to meet the requirement, leaving the implementation method open to interpretation among operators and FAA personnel (AOPA, 2009). For example, several repair station representatives voiced concerns over numerous SMS document submittals to local FAA representatives before obtaining approval of their SMS. In general, representatives from larger organizations were less concerned about the documentation requirements and the potential burden than those from smaller organizations.

Most repair station operators assumed the FAA would require each organization develop a separate manual to document their SMS process – a manual who many predicted would have a high level of duplication across their existing manuals. However, during discussions the FAA representatives stated “a separate SMS manual is not necessarily a requirement...Smaller, less complex organizations could simply incorporate SMS into their existing manuals while larger organizations may find a separate manual works best.” This news seemed to mitigate many of the operator’s concerns regarding duplicative documentation. However, many operators remained skeptical given the potential for extensive and multiple revisions to these manuals – especially during the initial stages of SMS compliance.

From this research a viable SMS documentation solution emerged that utilized the existing FAA Letter of Compliance (LOC) process. This process is currently used in the repair station industry and charter operations to support organizational documentation requirements (FAA, 2018d). The LOC may provide a streamlined process to document the organization’s compliance policies and may be leveraged to document and approve an organization’s SMS.

Organizations of all sizes may simply document or reference SMS compliant processes that exist in their current manuals into one LOC. The FAA confirmed the LOC may provide an alternate means of SMS documentation but further steps would be required to formalize its application to SMS. Most participants felt the LOC process may provide a scalable solution that is not overly burdensome, especially to smaller organizations.

5.5 Organizational Attributes

The SMS ARC report documents the industry's concern over the need for SMS Compliance that can be scaled to various operation. However, the report does not provide specifics of how to address the issue. SMS Focus Group meetings and various industry publications provide further insight by discussing compliance based on organizational size and complexity, which this research found widely accepted by the stakeholders. However, specific details regarding what criteria to use and their application in developing compliance matrices have only been touched on.

A review of the FAA repair station database along with notes from the focus group discussions found that organizational attributes generally fall into three primary characteristics. The first characteristic is the size of the organization based on the number of employees. The second characteristic is the complexity of the organization based on its repair station ratings, capabilities, or level of certification activity. Examples of this would be the level of regulatory approval typically required for different types of repair work or modifications such as airframe, powerplant, instrument, alterations, or supplemental type certificate (STC) development. The third characteristic, customer base, is further broken down into the sub components of aircraft category and aircraft operation. Aircraft category refers to the customer aircraft that a repair station may service such as normal, utility, commuter, etc. Aircraft operation refers to how the customer may operate their aircraft. An example is the Federal Aviation Regulation (FAR) regulation that the customer operates the aircraft under, such as FAR part 91, 121, or 135. These may range from a small crop dusting operation to a large multi-national air carrier operation.

This research found that a majority of stakeholders generally agree that a regulation based on organizational attributes may provide viable solutions to the issue of SMS Compliance. However, when asked what size organization should be exempt from SMS Compliance, a majority responded with the current size of their own organization. In other words, most felt their organization should be exempt. Participants raised the issue of an unfair competitive advantage if the regulation is applied based solely on size. For example, two repair stations perform the same work but one repair station is large and the other is small. The large organization would be required to have an SMS, while the smaller organization may not. Additionally, operators indicated that regulation based on size alone does not adequately address other important concerns, such as organizational complexity. Factors such as temporary workers and organizations with multiple locations make regulatory enforcement based on size difficult as well. Although initial discussions indicated size as a popular way to apply SMS, there was no consensus on how to apply such a regulation and an objective enforcement criteria was difficult to define.

Additionally, a majority of participants agreed SMS should be required for repair stations conducting complex or non-standard activities such as major repairs, alterations, and certification activities. However, the application and requirements of repair station ratings are not consistent across the various FAA regions and interpreted differently by individual FAA inspectors. Therefore, repair station ratings provide no clear compliance criteria. In 2002 the Aviation Rulemaking Advisory Committee for Air Carrier and General Aviation Maintenance (FAA, 2002) supported this finding by stating:

"...it has become increasingly difficult to categorize today's aviation products into a repair station rating based on past technology. As a result, FAA inspectors and the aviation industry have made widely varying and sometimes conflicting interpretations to apply these distinctions to current applications.....the inconsistent application of ratings and classes causes problems when a repair station in one region is scrutinized by an inspector in another region who does not believe the repair station holds the appropriate rating."

Thus, the inconsistent application of repair station ratings makes it difficult to regulate SMS Compliance based on the current ratings system. Interviews with various repair station operators and FAA representatives confirmed this issue.

A review of the discussion notes and survey comments found that a majority of stakeholders agreed that repair stations working on larger, more complex aircraft should be required to have an SMS. Specifically, a majority of the participating repair station representatives agreed that SMS Compliance may apply based on the category of aircraft a repair station maintains. The Federal Aviation Regulations CFR Title 14, Part 1 (2019) clearly defines aircraft category as a grouping of aircraft based upon intended use or operating limitations. Below is a list of the common FAA aircraft categories listed in general order of complexity and maximum certified takeoff weight (CFR, 2019).

List of Aircraft Categories (sorted from most complex/largest to least complex/smallest)

1. Transport category airplanes are either: jets with 10 or more seats or a Maximum Takeoff Weight (MTOW) greater than 12,500lb, or propeller-driven airplanes with greater than 19 seats or a MTOW greater than 19,000lb.
2. Commuter category is limited to multiengine airplanes that have a seating configuration, excluding pilot seats, of 19 or less, and a maximum certificated takeoff weight of 19,000 pounds or less.
3. Normal category is limited to airplanes that have a seating configuration, excluding pilot seats, of nine or less, a maximum certificated takeoff weight of 12,500 pounds or less.
4. Utility category is limited to airplanes that have a seating configuration, excluding pilot seats, of nine or less, a maximum certificated takeoff weight of 12,500 pounds or less, and intended for limited acrobatic operation.
5. Acrobatic category is limited to airplanes that have a seating configuration, excluding pilot seats, of nine or less, a maximum certificated takeoff weight of 12,500 pounds or less, and intended for use without restrictions.
6. Experimental category aircraft do not have a type certificate or do not conform to its type certificate and is in a condition for safe operation. This category includes primary category kit-built aircraft that were assembled without the supervision and quality control of the production certificate holder.
7. Very Light category aircraft have a maximum seating capacity of 2, maximum takeoff weight of 1,654 pounds, maximum landing stall speed of 45 knots, limited to daytime visual flight rules.

The large majority of research participants from both the repair station industry and the FAA believe that repair stations servicing commuter or transport category aircraft should have an SMS. In addition, a large majority of stakeholders agreed that most organizations that perform work on commuter and transport category aircraft are inherently more complex and larger. The commuter and transport category aircraft are predominantly used in complex commercial operations, such as air carrier, commuter and cargo operations. While in contrast, the majority of less complex repair stations perform maintenance on general aviation aircraft that are lower in complexity, such as normal, utility, aerobatic, or experimental category aircraft. In general, FAA representatives and repair station operators agreed that the current FAA system for determining an aircraft's category was consistent, well defined, with little subjectivity. Thus, the category of aircraft serviced by repair stations may provide a scalable application of SMS Compliance to the repair station industry that is supported by a majority of stakeholders.

6. Conclusion

This study suggests that the use of action research to create a body of discourse in regulatory policy initiatives may help regulators shift the conversation towards policy adoption. By applying action research principles, regulators may better identify strategies that change the conversation, which may lead to a change in the groups behavior or perspective – creating discourse that may lead to innovative policy solutions (Marshak & Grant, 2011). For example, this research suggests regulators may want to shift the SMS conversation from one of “policy debate” to one focused on application – reframing the conversation by asking “how can SMS Compliance be applied to the repair station industry.”

Enabling change requires conversations that simultaneously reveal and challenge dominant organizational meaning systems (McClellan, 2011). Discourse is a process that produces various combinations of ideas and concepts (Hajer, 1995). Traditional policy analysis assumes that stakeholder preference and self-interest are fixed, while discourse analysis focuses on interpreting the foundational meaning of the stakeholder's preference and self-interest. Discourse analysis helps in understanding policy disagreement, which may help regulators to reframe the conversation and move the stakeholders towards policy adoption (Fischer, 2003).

The media, previous experiences, and prevailing belief systems about government regulation heavily influenced how stakeholders framed their opinions regarding public policy. Aviation professionals may identify issues or problems from the view of their own organization, often developing strong personal feeling and expressing criticism of any proposed policy or program that may change their organizational operations. This often leads to policy disagreement. This research found that how change agents identify or communicate the issue or problem significantly influences the stakeholder's perception and their view of potential solutions. SMS policy certainly affects people at the organizational level. However, to a much greater degree, SMS is a change to the industry, requiring community-level thinking in order to develop effective solutions. By viewing the issue from a community perspective, stakeholders may gain a broader understanding of the problem, which may help move the discussion from one of policy disagreement to one of policy adoption.

Action Research provided an effective mechanism for the exchange and transformation of ideas and values, which helped create a body of discourse, which led to creative solutions that may address SMS policy gridlock. Discourse is

a medium through which people understand the world and define how people frame the world around them (Dryzek, 1997). Only through effective communication and repeated interactions can various stakeholders address their discourse differences and develop acceptable and effective solutions. Action Research allows a transformation of perspectives, which occurs through a repetitive cycle of applied research methodology, presentation, discussion, and persuasion.

Although, the initial results of this study discovered a potentially scalable SMS compliance solution for repair stations, the overall percentage of the participating repair station population was very low. This was expected given the nature of action research, the small size of the research team and the limited financial resources in relation to a national repair station population that exceeds 4,000 organizations. Additional research across a larger sample size is required to further gauge the broader acceptance of these potential compliance solutions. This initial phase of the research utilized only qualitative methods; therefore, for the next phase, researchers propose using a quantitative survey method to gather data from a larger population and conduct statistical tests to assess the stakeholder's opinions.

In addition, this study focused on SMS compliance from an industry perspective and did not involve a large number of FAA field personnel. These FAA field personnel will be the frontline regulators regarding SMS compliance. Consequently, their opinions regarding this proposed SMS compliance solution are extremely valuable. Furthermore, by investigating the attitudes and opinions of the FAA inspectors regarding SMS, change agents can understand these forces and better develop effective SMS development and implementation strategies. Conducting research on FAA personnel is an important next step in advancing SMS adoption.

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