

SOCIAL MEDIA, PUBLIC OPINION, AND RESOURCE IMPLICATIONS FOR THE UNITED STATES AIR FORCE

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Social media has become a powerful force. It exerts influence by shaping the public's perceptions of various issues, including defense related topics. Public opinion, in turn, has effects on war, military policies, and budgets. Thus, understanding the public discourse and associated sentiment on defense related issues and identifying the influencers in social media is important. Techniques such as text mining are a relatively inexpensive and efficient means to achieving these objectives. This study employs these techniques to empirically analyze Twitter references to the United States Air Force (USAF) over a seven month period and provide recommendations for potential changes to current USAF social media operations.

Key Words: *public affairs, social media, defense budgets, resource allocation, influencers, text mining, sentiment analysis*

INTRODUCTION

Social media has become a powerful force that not only affects the private sector, but also public sector entities such as the United States Air Force. One way social media exerts influence is by shaping the public's perceptions of various topics. Public opinion, in turn, has profound effects. In fact, research on public opinion has found the American

public's views of the Department of Defense have tangible impacts on defense spending (Hartley and Russett, 1992) and support for war (Page and Shapiro, 1983). Thus, this article explores the current dynamics of Air Force social media sentiment through textual analysis of *Twitter* data over a seven month period. The analysis focuses on two areas: 1) *Twitter* references relevant to

general Air Force searches and 2) specific *Twitter* references to the five primary “strategic vectors” (hereafter, “mission areas”) as detailed in the United States Air Force Strategic Master Plan [AFSMP] (Secretary of the Air Force, 2015). From this, recommendations for improvement are provided.

1.1. The Growth of Social Media

Social media in the early 2000s pursued a simple goal of connecting people through the internet. *Myspace*, once the most popular website in the world, was one of the first to enter the uncharted waters of social media networking. On *Myspace*, individuals could play a song over their profile page or alter the ranking of their top friends list; all revolutionary activities at the time. As a tool to simply interact with one another through music and entertainment, *Myspace* was excellent. Nevertheless, social media today has evolved to be much more. Current generation platforms such as *Twitter*, *Facebook*, and *Snapchat* have grown to be highly functional resources for news and user opinions on various matters.

Fifteen years ago, it would have been difficult to comprehend the dominance that social media has in the news domain over competing sources such as newspaper and radio. According to the Pew Research Center, two-thirds of Americans

report that they get at least some of their news on social media, while at the same time nearly 50 percent of people under the age of 50 have online sources as their primary news outlet (Mitchell et al., 2016). This impact is magnified as social media promotes human opinion more effectively than other avenues through sharing and promotional actions like *retweets* and *shares* (Bruns and Burgess, 2011). In fact, in just *one minute*, an average of 900,000 users logged into *Facebook*, 46,200 pictures were uploaded to *Instagram* feeds, and 452,000 *Twitter* tweets were posted (Desjardins, 2017).

Although using social media to promote social change is unique to the digital era, the underlying principle behind *gathering* and *associating* toward common goals is a fundamentally democratic activity. French aristocrat, Alexis de Tocqueville, recognized American democracy and its ability to gather and promote change.

Americans of all ages, all conditions, and all minds are constantly joining together in groups... Wherever there is a new undertaking, at the head of which you would expect to see in France the government and in England some great lord, in the United States you are sure to find an association. In America I came across types of associations which I confess I had no idea existed, and I frequently admired

the boundless skill of Americans in setting large numbers of people a common goal and inducing them to strive toward that goal voluntarily (De Tocqueville, 1835).

The common way to associate in the days of Tocqueville was through a town-hall. Today, the internet and social media makes it easier to associate with the potential to reach millions in a short time by going “viral.” This association has implications for the Air Force, with the potential for social media to have an effect along many dimensions including budgets and public support for military intervention (Page and Shapiro, 1983; Hartley and Russett, 1992). Therefore, it is critical to analyze the sentiment of the American public along with the views of influential persons, labeled as *influencers* in this paper, as they impact elected official’s actions in the military arena.

1.2. Opinion Formation

Humans are not born with innate opinions on the world around them. [1] Inherently, this means that humans have no preconceived stance on matters of defense such as military spending or troop levels. Rather, opinions are formed over time through *social influences* and *interactions* with other people (Moussaïd et al., 2013).

The opinions of others greatly affects how we form our opinions. In

social environments, people tend to filter and integrate information they receive and revise their own beliefs accordingly (Moussaïd et al., 2013). This is especially true in the digital era, where any place with a Wi-Fi signal can transform from a solitary to a social environment. Additionally, *other people* are not always weighted equally in terms of influencing one’s opinion (Watts and Dodds, 2007). According to the Influence Model developed by Katz, Lazarsfeld and Roper (2017), interpersonal interaction has a far stronger effect on shaping public opinion than mass media outlets. Their model demonstrates that a small minority of “stars” act as intermediaries between media and society. They find the direct exchange of information from the media to “non-stars” does not guarantee that there will be an opinion change. Rather, these “stars” or *influencers* act as trusted advisors between the two parties which help facilitate modifications to an opinion (Watts and Dodds, 2007). See Figure 1 for our version of a social media “stars” influence model.

War is a controversial topic that is often debated in the media. Research has found that people will initially develop their opinion on war through a cost-benefit analysis of factors such as lives lost, financial cost, or perhaps probability of winning the war (Kim, 2014). However, additional research shows that the

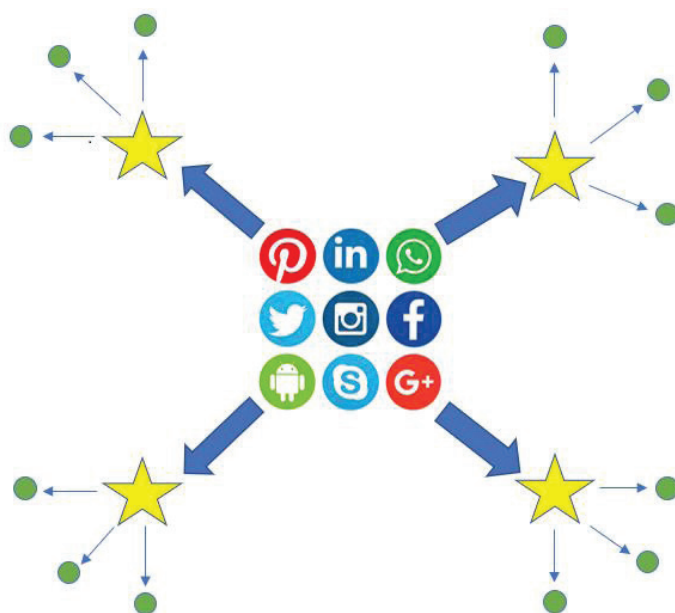


Fig. 1 Social-Media Stars Model of Influence

“star” factor plays a large role in this debate as well. Berninsky (2007) demonstrates that “elites” (analogous to “stars”) and the agreement or disagreement among other elites is the most influential factor in determining an individual’s opinion on war. Berninsky (2007) found that non-stars were more likely to support war if elites were in agreement to support. The terms “stars” and the “elites” are synonymous with the concept of *influencers* in this paper. The effect that *influencers* have on society is amplified through social media. By understanding the voice of various groups of influencers and non-influencers, one can determine if the same intermediary influence is present in the digital age.

2. CULTURAL CHANGE AND AIR FORCE SOCIAL MEDIA

The military in general reacts to sociocultural change with careful deliberation. For instance, the Air Force tattoo policy has been historically restrictive. Before the policy change in February of 2017, Airmen were not allowed to have a tattoo on their chest, back, arms and legs that was larger than 25 percent of the exposed body part. But due to increased social acceptance for tattoos outside of the military along with a need to “access more talent and retain qualified Airmen,” the Air Force adapted to sociocultural change and relaxed its policies against tattoos (Secretary of the Air Force Public Affairs, 2017).

The Army was the first U.S. military branch to implement the change. Army Chief of Staff, General Ray Odierno broke the news during his address at the Association of the U.S. Army Conference in 2015. “Society is changing its views on tattoos, and we have to change along with that... It makes sense, soldiers have grown up in an era when tattoos are much more acceptable and we have to change along with that” (Curthoys and Tan, 2015). The policy change was a milestone for both the Army and Air Force and demonstrates that the military can culturally transform. The same type of change may be needed for social media analytics to be embraced as a desired strategy to enhance the Air Force’s cyber capabilities.

Currently, the Air Force has limited engagement in the field of social media analytics. The Air Force’s uses of social media is constrained due to the amount of time and effort that is required to analyze such large amounts of information. “There’s a significant amount of that data that we collect that hits the floor and we never actually look at it because we don’t have the analytical capacity,” said Air Force Chief of Staff General Goldfein at a 2017 Air Force Association event in Washington, DC (Harper, 2017). That data is not coming from sources and methods that need protection. Rather, “it’s coming from social

media and it’s coming at a speed that’s actually faster than sometimes we can get from our exquisite intelligence-collection capabilities” (Harper, 2017).

Presently, the Air Force utilizes social media in two primary efforts. First, the Air Force uses a variety of social media platforms to communicate. *Instagram, Facebook, Flickr, Twitter, YouTube*, and the *Air Force Live Blog* are all platforms associated with an official Air Force account which is managed by the Air Force Public Affairs Agency (AFPAA). The Air Force Social Media Guide (AFSMG) defines the benefits and security concerns stemming from social media networking. This guidance, which is authored by the AFPAA, makes it clear that the role that social media plays in the Air Force is for communication, both internally and externally. “Social media not only serves as a way to communicate internally with our Airmen, but also as a means to tell the story of our Airmen to external audiences who themselves are actively engaged in social networks” (Air Force Public Affairs Agency, 2013). Although social media serves as an excellent outward communication tool, the necessary capabilities to analyze social media data is not present in the mission scope of the AFPAA.

Second, the Air Force uses social media to gather intelligence on

enemy activity. At the aforementioned Air Force Association event, General Goldfein discussed the efforts of intelligence Airmen that found the group responsible for shooting down a Malaysian commercial flight in 2014. “We were searching for the smoking gun and we found it a month later on *Facebook* when we found posted pictures on Russian blog sites that actually showed the activity” (Harper, 2017). Similar to mistakes on the battlefield, mistakes can be made by the enemy on social media, and as shown here, the Air Force exploited it. In a similar story, General “Hawk” Carlisle, Air Combat Command commander, provides an example of another intelligence gathering effort through social media. This time, a mistake was made by an ISIL soldier whose on-line post gave away the location of an Islamic State headquarters building. “So they [intelligence airmen] do some work, long story short, about 22 hours later through that very building, three JDAMS take that entire building out” (Everstine, 2015). These stories show the powerful role that social media can play when resources are allocated to analyze social media information for a specific purpose. Although social media analysis has proven exceptionally effective for the intelligence community, this remains only a fraction of its power.

This paper proposes that a third approach may be appropriate.

The approach, to be discussed more fully in subsequent sections, utilizes textual analysis (i.e. Text Mining) techniques to examine the sentiment of the public regarding Air Force references in social media. The literature shows that social media analysis has become an important proxy for public opinion, originating the field known as Online Reputation Monitoring (Dos Santos Saleiro da Cruz, 2017). Text mining, in turn, is playing a key enabling role in deriving high-quality information from online textual content about private companies’ reputations (Amigó et al., 2013). Shifting this private sector application to analysis of the public sector is straightforward. Thus, understanding sentiment on Air Force related issues along with identification of *influencers* in the social media realm is crucial to diagnosing public opinion. Public opinion, in turn, affects war, military policy and military budgets.

2.1 Brand Management

The Air Force is a brand and its missions as outlined in the AFSMP are its products to the American taxpayer. With that comes the responsibility for the Air Force to analyze and interpret what the American public is saying about it. Tim Weber, editor from British Broadcasting Company (BBC) says it best, “these days, one witty tweet, one clever blog post, one devastating video-forwarded to hundreds of friends at the click of a mouse-

can snowball and kill a product or damage a company's share price" (Weber, 2010). To counter "these days," as discussed by Weber, private sector companies are now investing resources in social media analytics to avoid these misfortunes, while concurrently gathering information on customer values. "Social media analytics provides businesses with insights into customer values, opinions, sentiments and perspectives on brands" (Kurniawati et al., 2013).

Although the nature of the Air Force is different from private companies, much can be learned through private sector examples of brand management. As Tocqueville explains, Americans voluntarily *associate* in order to drive social change. In the digital era, the primary venue for *association* is through social media. Thus, a lack of understanding public sentiment is particularly problematic for public entities such as the Air Force, as Page and Shapiro (1983) find that public opinion is often a proximate cause of policy. Neglect, ambivalence, or standing on the sidelines in the social media realm may lead to inefficient or undesirable policies regarding military affairs.

3. EXAMING AIR FORCE REFERENCES IN SOCIAL MEDIA

This analysis is scoped as an exploratory empirical examination utilizing textual analysis of United States Air Force references in

Twitter. Prior to analysis, tweets [3] were collected through a meticulous process. Over a seven month period, tweets were gathered using searches referencing 1) the general Air Force, such as "USAF" or "United States Air Force" and 2) the five United States Air Force mission areas that encapsulate Air Force service. These five mission areas were not subjectively determined, rather, they were referenced from the Air Force Strategic Master Plan (Secretary of the Air Force, 2015). The AFSMP is official guidance published by Air Force leaders in 2015 that outlines the Air Force Strategy from present time until the year 2030. At the core of the plan are the five primary mission areas that the Air Force intends to focus on:

- I. (Nuclear Deterrence) Provide Effective 21st-Century Deterrence
- II. (Intelligence, Surveillance, and Reconnaissance) The Air Force will employ agile multi-domain solutions to detect, characterize, deter, and defeat adversaries
- III. (Air Superiority) The Air Force must focus on the skills and capabilities that deliver freedom of maneuver and allow decisive action in highly-contested spaces
- IV. (Space and Cyberspace) To achieve the most effective solutions across the spectrum of military operations, we will increasingly integrate and employ capabilities operating in or through the cyberspace and space domains

V. (Maintain Technological Dominance) We must continue to pursue radical improvements in technology (Secretary of the Air Force, 2015)

Focusing the *Twitter* searches on these five mission areas was intended to capture the public perception on how well the Air Force is doing at serving the American people. In addition to mission area searches, each tweet was sorted into different *user groups* to determine who the key *influencers* are within Air Force social media.

Once the data was collected, multiple Text Mining approaches were used to find characteristics and trends among the collection of tweets. An initial dataset exploration was conducted through word frequency

analysis. The 50 most used words is portrayed in the Word Cloud in Figure 2, which exhibits frequency through font size and color. Although a word like “military” is not surprising to see as the most frequent word, “kc” (short for KC-46) was not anticipated to be the second most frequent. For this reason, further investigation of tweets mentioning the KC-46 was desired to determine public perception of the widely discussed refueler. Results of the KC-46 analysis will be discussed in a subsequent section.

3.1 Sentiment Analysis

While word frequency provides useful information, the primary Text Mining method used in this research is sentiment analysis. Sentiment



Fig. 2 Frequency Word Cloud (All Data)

analysis utilizes dictionaries of words known as *lexicons* to draw out the overall meaning and emotion behind each tweet. The three lexicons used (NRC, BING, and AFINN) [3] assign sentiment scores to individual words on a negative to positive scale, which can be summed and developed into an overall score for a sentence, tweet, mission area, or user group depending on the intent of the analysis. The NRC and BING lexicons assign sentiment scores on a -1 to 1 scale, with NRC enabling additional analysis capability by sorting each word into one of eight emotions (anger, anticipation,

than the NRC or BING lexicons.

Sentiment analysis was first conducted on the data as a whole using the NRC lexicon, which can be seen in Figure 3. As exhibited in the far right bars, positive words outpaced negative words by 681, indicating that the collection of tweets were primarily of positive sentiment. In addition, “trust” and “fear” had the highest word count within the emotional categories.

Sentiment results in Figure 3 provides summary level insight on what can be expected in the dataset. To garner more insight, sentiment analysis was conducted on various subsets of the data. The first subset

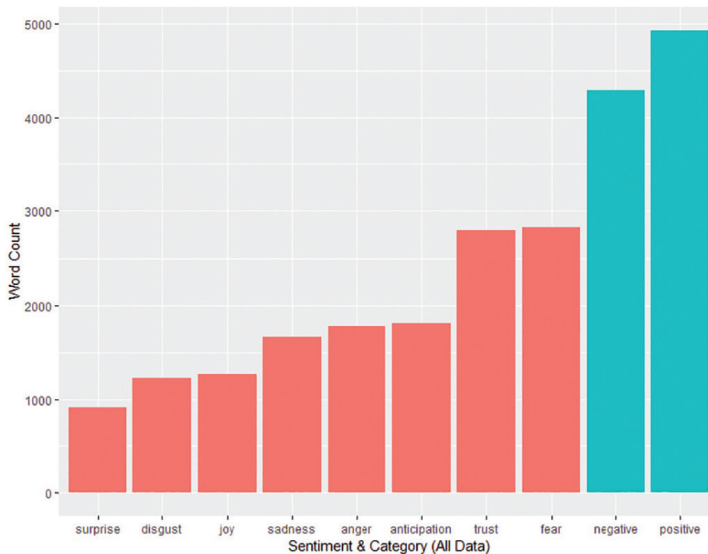


Fig. 3 NRC Sentiment Analysis (All Tweets)

disgust, fear, joy, sadness, surprise and trust). The third lexicon, AFINN, assigns sentiment scores on a -5 to 5 scale which enables greater insight into the intensity of the sentiment

includes tweets sorted by mission using the BING lexicon (-1 to 1). As exhibited in Figure 4, the *Technology* mission was extremely positive, the *Air Superiority* mission was the only

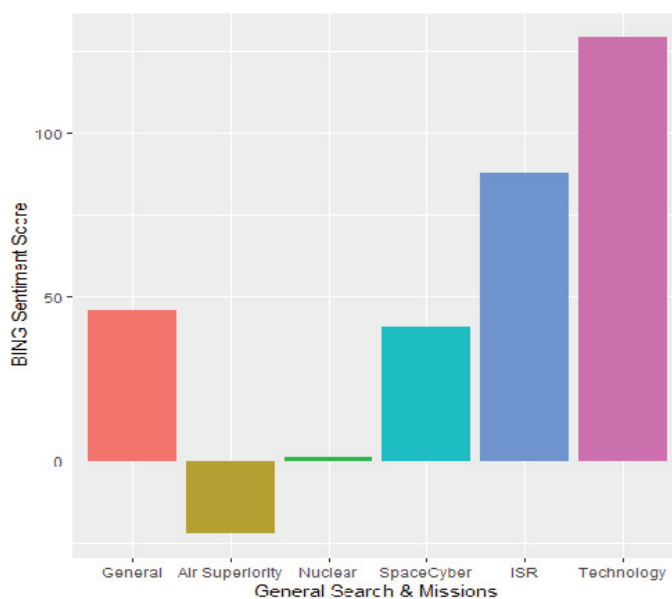


Fig. 4 BING Residual Sentiment (By Mission)

negative, and the *Nuclear Deterrence* mission was near neutral sentiment.

As the lone mission to receive more negative than positive sentiment, further investigation was warranted into tweets referencing Air Superiority. To examine, sentiment analysis using the same NRC approach from Figure 3 was conducted solely on Air Superiority tweets. Figure 5 displays a comparison of the NRC results with Air Superiority shown on the top and All tweets shown on the bottom. As exhibited, a shift in overall sentiment occurs in the Air Superiority tweets, which is consistent with the BING sentiment results found in Figure 4. In addition, the Air Superiority category dominates negative emotional categories with

a majority of the words in “disgust” (97.8%), “sadness” (73.5%), “anger” (65.7%) and “fear” (56.8%) from the full dataset attributed solely to this category. Lastly, an astounding 77.8% of *all* negative words were found in tweets referencing this mission area.

Having an understanding of Air Superiority sentiment is a crucial component, but provides limited insight without knowing the entities or “nouns/pronouns” that the sentiment is describing. To provide more context to the sentiment analysis, the top Bi-grams (pairs of words) used in Air Superiority tweets were listed and visualized in the Bi-gram map found in Figure 6. As exhibited, many of the Bi-grams include recently acquired aircraft

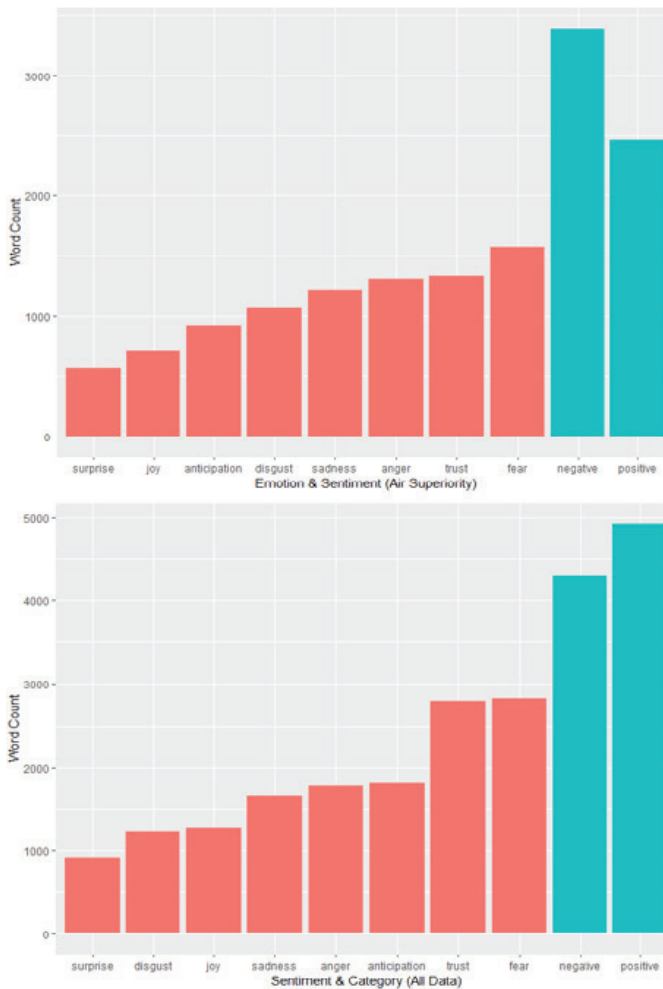


Fig. 5 NRC Sentiment Air Superiority (top) vs. All Tweets (bottom)

such as the KC-46, F-22, and F-35. A deep-dive on these aircraft platforms revealed that negative sentiment was primarily associated with tweets discussing F-35 spending, blocking the sale of F-35s to Turkey, and KC-46 delivery delays.

Figures 2 and 6 highlight the KC-46 as a highly discussed topic within the data. To expand on this

knowledge, sentiment analysis of KC-46 tweets was conducted to determine the type of sentiment being displayed by different types of users. Each tweet was assigned to a user group based on their Twitter profile. A complete list of user groups and the criteria for inclusion in each group is listed below:

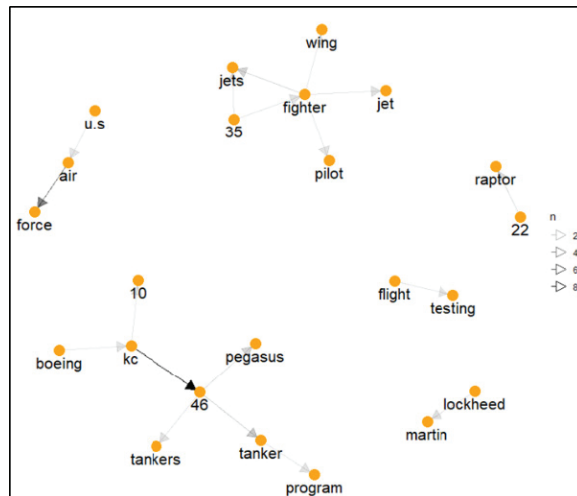


Fig. 6 Most Used Bi-grams (Air Superiority)

- *Bloggers* – fan pages, satirical pages, aircraft monitoring pages, self-identified blogger
- *Celebrities* – authors, athletes, actors/actresses, TV personalities
- *Military Leaders* – official military pages, SES, 0-6 and higher, CMSgts
- *News/Press* – agencies, magazines, individual journalists/reporters
- *Organizations (Professional)* – companies, schools/universities, sports franchises,
- *Politicians* – mayor, governor, city councilmen, congressmen
- *Regular Users* – unverified, usually a person's name.

Figure 7 displays the results using a mean AFINN sentiment score (average sentiment per word) for the

KC-46 tweets by user group (note that the user group *Celebrity* did not have any KC-46 affiliated tweets). The graph illustrates that the *Military*, *Politician*, and *Organizations* user groups all have a mean sentiment score greater than one, indicating that these are the most positive users discussing the KC-46 and its current acquisition status. The results are logical as military and politically affiliated *Twitter* accounts desire for the American taxpayer to relish the acquisition of the KC-46, while defense industry companies, which are a large subset of *Organizations* in this instance, promote their products in a positive light. The fact that no user group has a negative sentiment relating to the KC-46 may seem contradictory to the finding in the Air Superiority mission area, which included the KC-46. However, recall

that AFINN sentiment analysis is designed to measure the *intensity* of the sentiment, rather than just the raw sentiment numbers. Therefore, while the KC-46 received its share of criticism relating to delivery delays, the anticipation for the modern refueler's capability outweighed the voice of its critics.

the amount of influence that each user group carries is the most important factor when characterizing key players within Air Force social media. Who are the influencers for the Air Force? Influence can be defined in a number of ways. In this analysis, influence (for a tweet) is defined as the sum of *engagements* (favorites

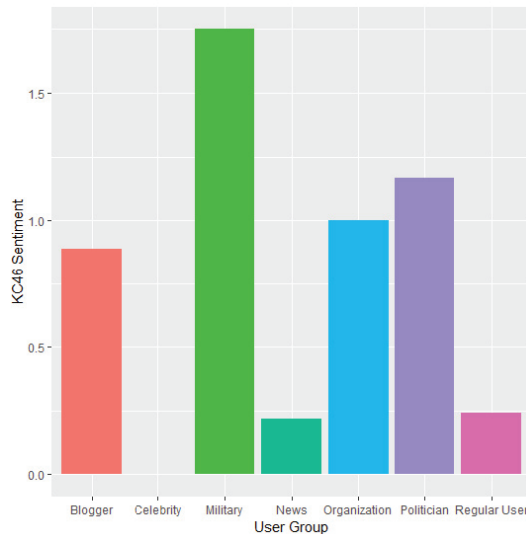


Fig. 7 KC-46 Sentiment (By User)

3.2 Influence

Recall that opinions are formed over time through *social influences* and *interactions* with other people (Moussaïd et al., 2013). As previously discussed with the Model of Influence in Figure 1, direct exchange of information from media to “non-stars” does not necessarily result in opinion change. Rather “stars” or “influencers” act as trusted advisors that facilitate modifications of opinions or sentiment. Therefore,

+ retweets + replies) divided by the number of followers that the author of the tweet possesses. The score is then aggregated with other tweets within the respective user group to calculate an average influence for each group.

The results are illustrated in Figure 8, which provide average influence scores by user group. Note that the *Regular Users* group is excluded from this part of the analysis due to their extremely low follower

counts that bias (overstate) influence. As exhibited, *Bloggers* hold by far the most influence within the data. They are the “stars” of this analysis. In other words, *Bloggers* are shown to be the most effective intermediaries between posted content and their followers. When it comes to shaping public opinion on Air Force matters, *Bloggers* are highly influential. In addition, the influence of the *News/Press* user group is impressive. That group holds the second highest average influence, while combating extremely high follower counts that diminish their influence score.

Tocqueville’s art of association. As a result, public opinion is undoubtedly shaped through this modern medium. Given what is known from prior research on the impact public opinion has on war, military policy and budgets, it is critical for the Air Force to be aware of relevant social media topics and sentiment and in some cases respond. For example, American military procurement has been portrayed as a poster-child of waste and incompetence, perhaps most infamously from the alleged purchase of \$400 hammers in the 1980s (Freedberg, 1998).

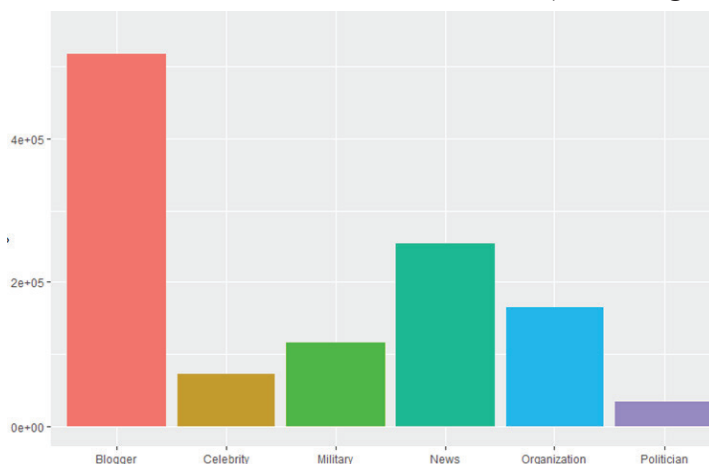


Fig. 8 Average Influence of User Groups

4. DISCUSSION

The prevalence of social media in society today is apparent. Who doesn’t have or know someone with a *Twitter*, *Facebook*, *Instagram*, or other social media account? Social media has therefore become the 21st century’s mechanism for

The \$400 hammer story was front-page headline news for newspapers and fodder for late-night comics. Former US Vice President Al Gore even instituted a “Hammer Award,” ridiculing the infamous incident, for government employees who achieved cost-cutting measures

(Weigelt, 2013). Imagine if instead of the slow-moving news cycle of paper media in the 1980s, this hammer story occurred in today's world of social media. One can envision that a viral Fyre Festival reaction would occur.[4] But there is just one problem – the \$400 (or \$600 as it was sometimes reported) hammer story was really just an accounting artifact (Mothershed, 2012). It was the result of an allocation of overhead by the contractor on a bulk purchase buy to all items equally – there was no \$400 hammer (Freedberg, 1998). Now imagine that monitoring of Air Force sentiment is occurring in social media. The Air Force could quickly get the true facts of the story out, perhaps not to avert, but to stem the tidal wave of negativity in social media. Perhaps the legend of the \$400 hammer would not exist.

Negative news is problematic. It has a tendency to be popular, as anyone who watches the nightly news knows. The intuition is corroborated

with data from this Air Force social media analysis. A correlation matrix analyzing popularity of Tweets (where popularity is measured by total number of engagements to include favorites + retweets + replies) and sentiment scores from the BING and AFINN lexicons illuminates these findings in Table 1. As expected, the two sentiment scores from the BING and AFINN lexicons display nearly perfect positive correlation at 0.93. [5] What is more interesting is the individual correlations between the engagements and the lexicons. The BING sentiment and engagements are negatively correlated at -0.62 and the AFINN sentiment and engagements are negatively correlated at -0.37. [6] The interpretation is that tweets with negative sentiment are more likely to be popular. Therefore, negative shifts in sentiment can serve as a signal that corrective action/information on the part of the Air Force may be desired before negative news becomes viral.

Table 1: Engagement and Sentiment Correlation

	Engagements	BING	AFINN
Engagements	1	-0.62	-0.37
BING	-0.62	1	0.93
AFINN	-0.37	0.93	1

As previously discussed, negative sentiment has consequences for the Air Force. Finding a mechanism to determine when sentiment about the Air Force is trending negative and identifying the influential entities in a cost-effective manner is paramount. Text mining is one inexpensive option. For example, the “R” programming language is a free software environment that is currently used for data analytics (including Text Mining) by members of the Air Force such as statisticians and operations research analysts. Text Mining can also be employed quickly and handle “big data” associated with large analyses of social media information. These features make it an attractive option.

5. CONCLUSIONS

An enhanced analysis of social media can provide benefits to the United States Air Force as it does to a private organizations. Rather than turning to polls or surveys to question consumers on their opinions, social media provides a perspective from consumers who volunteer their opinions, unedited and in real-time (Curnow, 2016). When social media is combined with the Text Mining methods used in this analysis, the results provide insight into the specific topics being discussed and help identify the key players (i.e. influencers) that are driving the viral nature of certain topics.

Specifically, this analysis revealed that while overall sentiment on the Air Force is positive, there are areas of negative sentiment. The Air Superiority mission area was found to have negative sentiment attributable to items such as F-35 spending or policies that block the sale of the F-35 to Turkey. The data shows that these negative instances are more likely to be popular and go viral. Additionally, the analysis identified those user groups who are most influential. The *Bloggers* group, followed by the *News/Press* group are the most influential in the data set examined. Awareness of the social media discussions within these groups is important for the Air Force. Developing an in-house analytic capability to quickly diagnose the discourse and respond, when appropriate, with factual based evidence to correct inaccuracies or re-vector discussions to consider key missing information is important to upholding the integrity of the Air Force brand within the American public. The alternative is to neglect social media, which may result in undesired consequences relating to war, fiscal policy or other policy matters affecting the Air Force.

Prior to implementing a change in Air Force social media operations, legal considerations must be taken into account. Air Force Public Affairs is governed by Air Force Instructions (AFIs) that delineate their duties

and responsibilities (Director of Public Affairs, 2016). Our first recommendation, which proposes growth of in-house analytic capability proficient in Text Mining techniques to monitor and analyze social media discourse, is commensurate with the current governing AFIs. Resources towards this end should first be allocated to analysis of those user groups found to be most influential. As this recommendation utilizes publicly available information, it should be uncontroversial.

Our second recommendation requires more scrutiny. This recommendation is for Public Affairs to act (i.e. inform), when appropriate, upon analysis of the information. The specific suggestion here is to act when inaccurate or missing information in the social media realm is found or public sentiment has switched in an undesirable manner.[7] The decision to provide information is only recommended when it complies with current directives and must be careful not to cross the line to targeted persuasion rather than informational messaging. Ambiguities should be vetted via thorough legal deliberation prior to action in those instances.

This study conducted an exploratory step into the utility of Text Mining in the social media realm for the United States Air Force. Resource constraints are always a consideration. Text Mining, utilizing

free software environments such as R, is an economizing tool that can provide valuable insights on public discourse at minimal cost. Future research should consider analysis on longer periods of time, different social media platforms, or other military Services. Tocqueville's art of association has shifted to the realm of social media. Now is the time for the United States Air Force to more fully employ available techniques to capitalize upon the change.

DISCLAIMER

The views expressed in this article are those of the authors and do not reflect the official policy or position of the United States Air Force, Department of Defense, or the United States Government.

ENDNOTES

[1] This idea is commensurate with philosophers such as John Locke, who originated the phrase "tabula rasa" or "blank slate" to describe the mind at birth. Locke, and later David Hume, believed that there are no innate ideas in the mind. All of our knowledge must come from experience in the physical world.

[2] A tweet is a post or message on the social media application *Twitter*

[3] The R programming language has prebuilt sentiment datasets. Three of the most popular lexicons for single words in R are AFINN (created by Finn Arup

Nielson), BING (created by Bing Liu) and NRC (created by Saif Mohammad and Peter Turney). These lexicons have been used by prior text-mining research efforts examining United States defense acquisition in the works of Amanda McGowin et al. "A Text Mining Analysis of Acquisition Reforms and Expert Views," *Defense Acquisition Research Journal* 25, no. 3 (October 2018): 288-323, <https://doi.org/10.22594/dau.18-802.25.03>

[4] The Fyre Festival was promoted as a luxury music festival concert on a remote island with tickets costing thousands of dollars. The event, however, suffered significant problems related to food, accommodations, and artist relations. A single tweet of a plain cheese sandwich in a Styrofoam container by an event attendee went viral, resulting in a media storm surrounding the event and its founders. Two documentaries (on Hulu and Netflix) were released in 2019 about the Fyre Festival.

[5] The BING and AFINN lexicons are both measuring sentiment albeit with different lexicons. As a result, it is expected that they would produce similar results and therefore be highly correlated with one another.

[6] This result was tested for significant with a resulting p-value of $2.2e-16$.

[7] Note that the recommendations are *not* intended to extend to the realm of Military Information Support Operations (MISO) as delineated in AFI 10-702.

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