# The role of the media in the perception of UAVs

Dale Richards[1] and Alex Stedmon[2]

*Coventry University, United Kingdom,CV1 5FB*

**We are still some distance from seeing the routine flight of unmanned aerial vehicles (UAVs) in national airspace. Apart from issues associated with technology and regulatory requirements and constraints, a key factor will be the perceptions and acceptance of UAVs held by the general public. A number of surveys have started to examine the views and attitudes held by different sectors of the population and these begin to reveal the nature of concerns about UAV operations. However, one key aspect of how an attitude develops and forms is the manner in which information is conveyed to us. This paper examines the role that the media has in conveying information pertaining to UAV news articles and features using a survey (N=48) that examines the perception of UAVs merely by the manner in which the headline is conveyed. A sample of 60 UAV media headlines from three media sources (BBC, CNN and Shephard) were selected and tested for how the public perceived them. Results indicated that attitude towards headlines reported in both BBC and CNN were very similar, but not in comparison to the industry publication. Also, the theme within which the headline was framed appeared to influence whether it was perceived as either positive or negative. The importance of understanding public attitude and the role of the media is discussed.**

## I. Introduction

At present Unmanned Aerial Vehicles (UAVs) are allowed to operate in the national airspace system (NAS) under limited regulatory conditions, with special dispensations for such things like disaster relief, law enforcement, etc (FAA, 2013). Several studies have begun to address the attitudes/views of the general public (Kreps, 2014; VisionCritical, 2014; Office of Inspector General USPS, 2016) and also examine the attitudes of NAS stakeholders (Richards & Edgell, 2017). With a projected increase in UAV sales to treble in size over the next ten years (Teal Group Corporation, 2015), it is critical that we understand how public attitude is formed and develops as an effect of media reporting of such systems and operations. Many stories appear in the press about UAVs and to a greater or lesser extent they can often be viewed as being weighted towards more positive or negative perspectives, either in terms of the nature of the incident on which they are reporting or the language they use in conveying the article.

Unless you work within the UAV industry, or have significant exposure to this field, it is likely that the main source for information will be through the media (e,g, mainstream news sources). Media headlines are often used to grab the audience's attention in order that their information is then read. With a number of regulations and initiatives examining the use of UAVs in the short-term and long-term, we are more likely to witness stories pertaining to UAVs. These stories may discuss such regulatory or business initiatives or be related to business deals or related technology breakthroughs. From time to time there are more alarming stories that report accidents or near misses with UAVs. Clearly there is a continuing dialogue in relation to UAVs within the media, so we are regularly provided with news reports in this area. This is unsurprising as we are immersed within a rapidly growing UAV industry (Quan, 2017). With such development however, there is a need for the dialogue to focus on not just how the general public perceive UAVs, but the manner in which such stories are portrayed in the media. It is worth

---

[1] Senior Lecturer in Human Factors, Coventry University, United Kingdom, AIAA Full Member. dale.richards@coventry.ac.uk

[2] Reader in Human Factors, Coventry University, United Kingdom. alex.stedmon@coventry.ac.uk

considering the role that these articles may unwittingly be playing in the formation of the attitudes possessed by the general public.

## II.  Attitude formation towards UAVs

There are several approaches to theories of attitude, with each theory focussing on different factors and embracing various methods of gathering data. These range from Consistency theories, Learning theories, Social Judgement theories and Functional theories. So the field of studying attitudes is somewhat diverse in its approach and lacks a degree of unification. However, we tend to view an attitude as being something that is relatively fixed and stable over time and context (Hogg & Vaughan, 2005). Further to this it is often defined as "a relatively enduring organization of beliefs, feelings, and behavioral tendencies towards socially significant objects, groups, events or symbols" (Hogg & Vaughan, 2005:150). These are often perceived as beliefs along a dimension ranging from positive to negative (Fabrigar, MacDonald, & Wegener, 2005; Petty, Wegener, & Fabrigar, 1997). This description suggests that information relating towards an attitude may be stable over a period of time as well as being stored in, and retrieved from, long-term memory (Albarracín et al., 2008). However, attitudes may also be viewed as being relative to the time and context of when the individual forms it (Bohner, Erb, & Siebler, 2008); thus explaining why some attitudes vary over time. This is more pertinent when we consider an individual being exposed to information about a topic that does not readily attach itself to an existing attitude they may hold. Such an example can be when we are exposed to a new technology or event that we have no experience (or knowledge) of, and thus requires the building of an *attitude foundation*. For those individuals who may not hold a particularly strong belief (or attitude) on a particular subject, they could be susceptible to forming perceptions based on new information that is presented to them. The topic of UAVs can be used as a good example of a new immerging technology that will need to be tackled by a general public that possess a diverse knowledge on such technology. Although there is increasing interest in hobbyist uses of UAVs (CAA, 2016), and an increase in some schools using UAVs for educational purposes (Hall, 2016; Cansdale, 2016), direct experience is still relatively limited. Consequently, media sources are likely to play a more significant role in public perception and the formation of attitudes toward this technology.

Some studies have found contrasting differences in attitudes towards UAVs when comparing attitudes held by law enforcement agencies and the general public (see Saulnier & Thompson, 2016).  This would appear to reinforce the disparity of attitudes held by those who are more likely to use UAVs as opposed to the general public. Clearly an individual's attitude will play a significant role in how they perceive an emotive or sensitive topic, but attitude is not composed of a single factor.   Rather, it is a construct of cognitive (our beliefs/thoughts), affective (feelings/emotions), and behavioural (experiences) components (Rosenberg & Hovland, 1960). Furthermore attitudes are thought to be formed through conditioning and social learning, whereby attitudes are defined as possessing two different states: explicit, those that are deliberately formed and can be self-reported; and implicit, those that are automatic and unknown to us (Fazio & Olsen 2003). Attitude then is far from a simple construct, but more multifaceted and linked to an individual's beliefs, norms, values, perception, experience and personal agendas.

## III.  Attitudes and the media

We may all have a perception on how much influence the media might play in the formation of our views and attitudes. Indeed, it has been postulated that we are likely to state that we are not easily influenced by the media, but in the same breath are happy to say others are more likely to be influenced by the same source (Tiedge, Silverblatt, Havice & Rosenfeld, 1991). This is referred to as the 'third-person effect', whereby perceptions are rotated around the sense of self-control we have on our own values and beliefs, while those of others are less controlled. Thus, regardless of whatever theory of attitude formation we subscribe to we cannot ignore the effect that self-perception has on media influence; such as was reported during the 1996 US presidential campaign (Salwen, 1998). We may also see this similar effect on self-perception when the topic is particularly emotive; such as gun control and mental illness (McGinty, Webster, & Barry, 2014). Due to the tight regulation and use of UAVs, it is more likely that the general public will predominantly be exposed to such technology through the media. Therefore the manner in which

American Institute of Aeronautics and Astronautics

such technologies (and their uses) are conveyed can significantly impact public opinion and could thus shape Government policy and regulations.

In many instances we see the reporting of UAVs (often referred to as 'drones') in the media associated within the defense arena. This is heightened during periods of conflict, whereby the use of technology is often conveyed as affording a better solution in terms of accuracy and ensuring the safety of our own troops. During the period of 2009-2013 we have witnessed a marked increase in the use of armed UAVs - 400 missions versus only 50 missions during 2004-2008 (Bureau of Investigative Journalism, 2018). So it is only likely that more stories will appear in the media, which may outweigh the number of articles reporting non-military use of UAVs.

## IV.  Public attitude to media survey

In the present study we examined a number of online media stories generated from both the United Kingdom British Broadcasting Corporation (BBC) and the United States Cable News Network (CNN). A specialist industry publication was also examined (Shephard Unmanned Vehicles). Headlines from news articles, spanning the past two years (2015-2017), were collected. In some instances not many headline articles mentioned the specific use of a UAV, so headlines were only used that had the word 'drone' or 'UAV' in the title. The time period was chosen in order to collect at least twenty stories from CNN and BBC, and while there was a disproportionately high number of headlines in Shephard, twenty headlines from associated months were selected to match both CNN and BBC articles. The headlines were only selected due to the use of the word 'drone' or 'UAV', and not selected due to potential bias in attitude perception.

The title of the news articles were presented to the participants via an online survey, who were then asked to rate each of the headlines. Participants were also allowed to explain their rating if they wished to clarify the reason for assigning that particular rating. Participation was voluntary and no particular groups were targeted; thus an opportunistic sample was sought. However, participant exposure/experience to UAVs was collected in the survey.

In total forty-eight completed surveys were taken forward to be analysed. The mean age of Participants was 37.9 (SD 12.8) years old, with 36 males, 10 females, and 2 not wishing to state sex. The experience of Participants in relation to the UAV domain was roughly equal between "Fair amount of knowledge - Great deal of knowledge" and those with lesser experience ("Novice - Some - Average"). This is shown in Figure 1. A test of reliability for the 60 headlines and the attitude scale rendered a high Cronbach Alpha of 0.90,
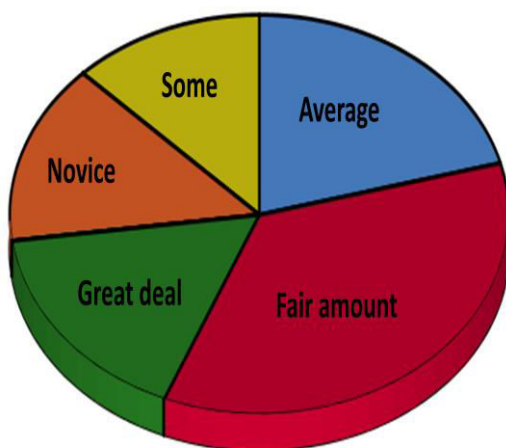


Figure 1 Participant indication of UAV knowlege

suggesting good internal consistency of the scale employed.

In general we saw an equal rating for positive/negative attitudes when we compared the two News websites (BBC and CNN), but this is somewhat different from the industry magazine website (Shephard).A paired-samples t-test was used to compare the media sources and found that Shephard presented a significant difference from the BBC headlines (t(49)=-5.62,p<.0001) and CNN (t(49)=5.42,p<.0001), but not between BBC and CNN ratings (t(49)=1.47,p>.05). As we can see in Figure 2,
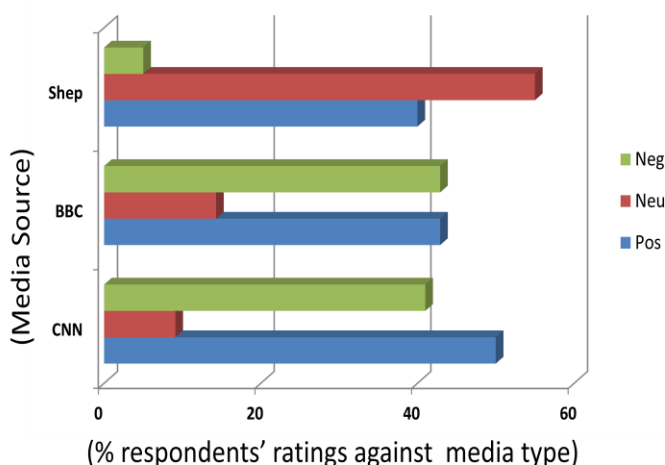


Figure 2 Attitude ratings across Media type

3

American Institute of Aeronautics and Astronautics

the industry website prompted less negative ratings and a larger proportion of neutral ratings in comparison with the news websites.

However, when we categorize participants in terms of experience (expert Vs novice), no difference in attitude rating was found against headlines from CNN (F<1), Shephard ($F(1,48)=2.29, p>.05$) or BBC ($F(1,48)=1.12, p>.05$).

Participants were asked at the beginning and end of the survey whether they felt UAVs were a force for good or not. Initial ratings against this suggested that no difference in attitude rating was effected by the exposure to the headlines in the survey (F<1). This lack of change was not seen depending on the level of experience reported by the participant either ($F(1,48)=1.11, P>.05$).

When we examined the nature of the headlines across the media sources, we can theme the stories in a number of ways. For the purpose of this study we arrived at seven themes that a single headline could be assigned to (or possess several attributes of these themes). These are shown in Table 1, and indicate the percentage of headlines that made up each of the themes across each of the media sources.

| Media Theme | CNN | BBC | Shephard |
| --- | --- | --- | --- |
| Disaster | 8 (40%) | 4 (20%) | 1 (5%) |
| Police | 1 (5%) | 4 (20%) | 1 (5%) |
| Military | 5 (25%) | 4 (20%) | 5 (25%) |
| Technology | - | 2 (10%) | 6 (30% |
| Safety/Legis | 7 (35%) | 5 (25%) | 1 (5%) |
| Business | - | - | 6 (30%) |
| Criminal | 1 (5%) | 1 (5%) | - |

**Table 1 Thematic categories within headlines**

associated with the UAV market. When we examined the use of whether countries are named in the headline, we observed a marked difference across the media sources and the twenty headlines over the period of two years, as seen in Figure 3. The BBC tended to always assign a country identifier (whether it was a name of a country, state, city or county). This was still a trend when we examined the twenty stories by CNN, but reduced when we examined the Shephard headlines.

When stories were framed within a disaster context, normally describing the operation of a UAV for humanitarian uses, the vast majority of participants responded favorably to the headline (75%), which is in
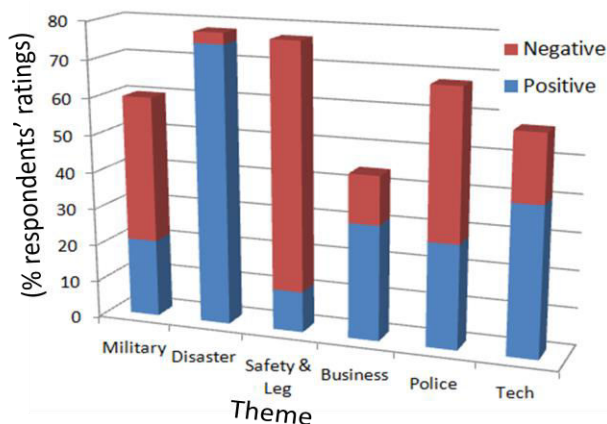


**Figure 4 Positive/Negative attitude ratings by theme**

Unsurprisingly the majority of headlines found in the industry publication are related to technology and business (60%). The US media source indicated a preponderance for reporting UAV headlines associated with disaster response operations (40%) and issues relating to safety and legislation (35%) - together totaling 75% of UAV headlines reported. The UK media source for the same themes accounted for only 45%, with a roughly equal distribution of themes across the period; but with not a single story related to business issues
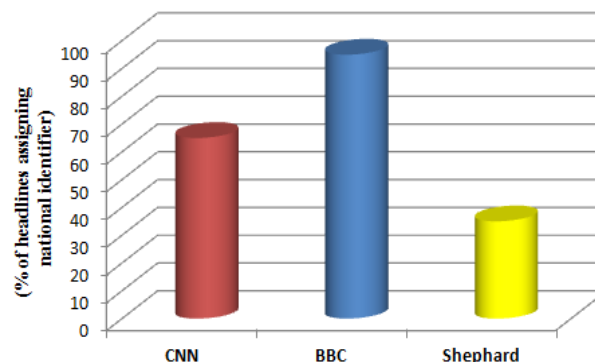


**Figure 3 Country labels across media sources**

contrast to headlines that discuss military (21%), or even safety and legislation themes (11%). These are compared across all themes in Figure 4. Both 'Neutral' and 'Other' ratings were excluded from this graph, as the focus for this evaluation was just positive and negative attitude ratings.

It is worth noting that in some instances there were a number of responses that would indicate a neutral attitude towards a heading across some of these themes. This may be due to the wording of the headline at times being ambiguous, or at least open to different interpretation. For example, the headline taken from Shephard online dated 22nd November 2017: "Novadem unveils new NX70 drone variants". This is in marked contrast to some headlines that showed a majority response to being negative ("Photos show 'weaponised commercial drones' in Iraq", as cited by BBC News

4

online dated 18th January 2017).

## V.  Conclusion

This survey was a preliminary study before further phases of experimentation would begin to define the nature of public perception of UAV stories in the media. Defining headlines by classifying different adjectives as possessing positive/neutral/negative properties lends itself somewhat to subjective bias. Therefore this initial survey provided insight into current reporting of headlines within three different sources over a defined period of time. Participants in the survey tended to rate both UK/US media website stories with an equal distribution of positive/neutral/negative attitude ratings. The industry magazine website, perhaps unsurprisingly generated far more neutral ratings, a roughly equal amount of positive ratings, and a significantly lower amount of negative attitude ratings. As an industry focus magazine, it is likely that the headline stories presented online were far less emotive or sensationalized - thus prompting the nature of attitude response. We have seen that both the BBC and CNN headlines focused predominantly on how the use of drones were being used to assist with disaster relief operations. This overwhelmingly was met with positive attitude ratings. Headlines that discussed crashes, the need for legislation and control in order to avoid accidents were assigned negative attitude ratings. However, it is worth further analysis to see if the experience is a factor in this; as one would suggest that more experienced individuals within the domain possess better knowledge of the safety/regulatory constraints imposed on UAV operations.

Previous research has shown that the manner in which stories are portrayed can have a direct influence on how we perceive the information we are presented with. Harris (1973) demonstrated that the choice of words we use in describing the same event can have a direct influence on how an individual perceived the information. For example, in Harris' study participants were show pictures of basketball players and were asked to either report "how tall" or "how short" the player was. This found that the heights guessed by participants was directly associated to the manner in which the question was posed (with the word "tall" being associated with taller estimates, as compared to the use of the word "short"). This was an important finding that would result in later studies that examined how the presentation of words (which may appear impartial and non-committal in terms of opinion or emotion) can directly influence someone's opinion. Indeed, Loftus (1975) would go on to perform seminal research that used definite versus indefinite articles in interview questions following the playback of a vehicle accident.

Past studies have also shown that stories presented in the media may have a direct influence on how partisan audiences form attitudes towards the message being conveyed (Dalton, Beck & Huckfeldt, 1998; Barker & Lawrence, 2006). If we examine the manner in which opinions and attitudes may be formed, then it has been suggested that a degree of polarization occurs that will either move the reader's attitude in one direction or the other (Kunda, 1990). Frustratingly, the nature of how individuals can be swayed in pre-defined attitude directions, based on accurate information or preferred conclusions, remains an interesting but elusive construct (Taber & Lodge, 2006). However, what is evident is that the manner in which stories are presented in the media may be seen as having some sort of influence on the population's attitude. Depending on how these stories are 'framed', in terms of the story being swayed towards a positive or negative bias, have been found to be present in how the media sometimes chooses to report an event or incident. Brinson & Stohl (2012) found that when examining media stories surrounding terrorism and international crises, the manner in which media articles were framed had a direct effect on not only how the public perceived and reacted to the event, but also the relationship this attitude formation had on judgement.

If the nature of the headlines can begin to sway the attitude of the general public then care is needed that the message within the story may be lost. This may be due to the reader being more likely to read an article that supports his or her existing attitude that they may already hold. However, when the news story presents a bias or opinion at such a very early stage of the narrative it is not surprising to suspect a reactive response in terms of how the information is processed. In order to examine this more closely in relation to this current study we would need to examine the nature of words used within the headlines themselves. By classifying word types this would enable us to examine whether the use of certain groups of words (or even themes that the headlines portray) may influence the perception of the story as possessing a negative or positive opinion. Feldman (2011) suggests that stories that contain opinionated views plays an important role in direct persuasion. The manner in which the individual processes the message is a product of how the message is phrased in the first instance. One could argue that Newspapers have somewhat made an art of attracting our attention with emotive headlines to draw us into the underlying story. Future work should attempt to manipulate different features characterized within the narrative portrayed within the news story, in order to isolate the factors that contribute to the formation of a particular

American Institute of Aeronautics and Astronautics

attitudes. This may also include the use of graphical images that in some instances could be seen to 'prime' the audience of a story prior to them reading the actual content. For example, Scharrer & Blackburn (2015) found that when participants were shown graphic visuals within new stories that involved the use of drones, this resulted in an increase in concern regarding drones in this context. However, no sensitization effect was found, nor a reduction in support for the underlying drone policy associated with the news stories without an associated graphic image.

If the general public are forming an attitude around the use of UAVs the way in which reporting news items may indeed have an impact on how attitude is formed. How the public accepts new technologies ultimately affects their strategic development, application and commercialization (Gupta et al., 2011). Therefore individual influencing factors are worthy of focused attention, with a view to a more thorough understanding of the social context. If a member of the general public is exposed to new technology for the first time, the manner in which the story is framed and conveyed is critical in terms of how this 'triggers' attitude formation. The first instance of this is the headline that we are all confronted with that reports the story and ultimately sets the scene.

# References

Albarracín, D., et al., Durantini, M.R., Earl, A., Gunnoe, J.B. & Leeper, J. (2008) Beyond the most willing audiences: A meta-intervention to increase exposure to HIV. Health Psychology, 27(5), 638-644.

Barker, D. & Lawrence, A.B. (2006) Media favoritism and presidential nominations: reviving the direct effects model. Political Communication, 23(1), 41–59.

Bohner, G., Erb, H.P. & Siebler, F. (2008) Information processing approaches to persuasion: Integrating assumptions from the dual- and single-processing perspectives.. In W.B. Crano and R. Prislin (Eds), Attitudes and Attitude Change. New York: Psychology Press, pp.161-188.

Brinson, M.E. & Stohl, M. (2012) Media framing of terrorism: Implications for public opinion, civil liberties, and counterterrorism policies. Journal of International and Intercultural Communication, 5(4), 270-290.

Bureau of Investigative Journalism (2018) Naming the dead: Shining a light on the US drone war. Report written by Jack Serle. https://www.documentcloud.org/documents/4438377-NTD-REPORT-18-April-2018.html (Accessed April 30, 2018).

CAA (2016) Consumer Drone Users: An Audience Insight Report. http://dronesafe.uk/wp-content/uploads/2016/11/CAA_Consumer_Drone_Users_report.pdf (Accessed November 26, 2017)

Cansdale, D (2016) Drones help Bundaberg school children prepare for future STEM careers. 25/8/16. Retrieved from ABC News 7/4/17 from: http://www.abc.net.au/news/2016-08-25/drones-help-bundaberg-children-prepare-for-future-stem-careers/7781208

Dalton, R.J., Beck, P.A. & Huckfeldt, R. (1998) Partisan cues and the media: Information flows in the 1992 Presidential Election. The American Political Science Review, 92(1), 111-126.

FAA. (2013) Integration of Civil Unmanned Aircraft Systems (UAS) in the National Airspace System (NAS)Roadmap (First Edition). Washington, DC: Department of Transportation.

Fabrigar, L. R., MacDonald, T. K., & Wegener, D. T. (2005). The Structure of Attitudes. In D. Albarracín, B. T. Johnson, & M. P. Zanna (Eds.), The handbook of attitudes (pp. 79-125). Mahwah, NJ, US: Lawrence Erlbaum Associates Publishers.

Fazio, R.H & Olsen, M.A. (2003) 'Implicit Measures in Social Cognition Research: Their Meaning and Use'. Annual Review of Psychology 54, 297-327.

Feldman, L. (2011) The opinion factor: The effects of opinionated news on information processing and attitude change. Political Communications, 28, 163-181.

American Institute of Aeronautics and Astronautics

Fishbein, M. & Middlestadt, S. (1995) 'Noncognitive Effects on Attitude Formation and Change: Fact or Artifcact?'*Journal of Consumer Psychology.* 4 (2), 181-202.Hall, G. (2016). Uses of Drones in Schools. Retrieved 7/11/17 from: http://garyhall.org.uk/uses-of-drones-in-schools.html

Harris, R. (1973) Answering questions containing marked and unmarked adjectives and adverbs. Journal of Experimental Psychology, 97, 399-401.

Helmreich, R.L. (1987) *Theory underlying CRM training: Psychological issues in flight crew performance and crewcoordination.* Austin: The University of Texas.

Hogg, M.A. & Vaughan, G.M (2005), *Social Psychology* (4th ed). Englewood Cliffs, NJ:Prentice Hall.

Kreps, S. (2014). Flying under the radar: A study of public attitudes towards unmanned aerial vehicles. *Research & Politics, 1*(1), 1-7.

Loftus, E. (1975) Leading questions and the eyewitness report. Cognitive Psychology, 7, 560-572.

McGinty, E.E., Webster, D.W., & Barry, C.L. (2014) Effects of news media messages about mass shootings on attitudes toward persons with serious mental illness and public support for gun control policies. American Journal of Psychiatry, 170, 494-501.

Office of Inspector General USPS (2016) Public perception of drone delivery in the United States. RARC Report - RARC-WP-17-001. https://www.uspsoig.gov/sites/default/files/document-library-files/2016/RARC_WP-17-001.pdf (Accessed January 12, 2018).

Petty, R.E., Wegener, D.T., & Fabrigar, L.R. (1997) Attitudes and attitude change. Annual Review of Psychology, 48, 609-647.

Quan, Q. (2017) *Introduction to Multicopter Design and Control.* Singapore: Springer

Richards, D. & Edgell, S. (2017) Attitudes toward UAV integration into the National Airspace System. 17th AIAA Aviation Technology, Integration, and Operations Conference, AIAA AVIATION Forum, Denver: Colarado. https://doi.org/10.2514/6.2017-3939.

Rosenberg, M.J. and Hovland, C.I. (1960) Cognitive, Affective and Behavioral Components of Attitudes. In: Rosenberg, M.J. and Hovland, C.I., Eds., Attitude Organization and Change: An Analysis of Consistency among Attitude Components, Yale University Press, New Haven.

Salwen, M.B. (1998) Perceptions of Media Influence and Support for Censorship: The third-person effect in the 1996 Presidential Election. Communication Research, 25(3), 259-285.

Saulnier, A. & Thompson, S.N. (2016) Police UAV use: institutional realities and public perceptions. Policing: An International Journal of Police Strategies & Management, Vol. 39 Issue: 4, pp.680-693, https://doi.org/10.1108/PIJPSM-11-2015-0136.

Scharrer, E. & Blackburn, G. (2015) Images of injury: Graphic news visuals' effects on attitudes toward the use of unamnned drones. Mass Communication and Society, 18, 799-820.

Taber, C.S. & Lodge, M. (2006) Motivated skepticism in the evaluation of political beliefs. American Journal of Political Science, 50(3), 755-769.

Teal Group Corporation (2015) *Teal Group Predicts Worldwide UAV Production Will Total $93 Billion in its 2015 UAV Market Profile and Forecast*, [online] available from <http://www.prnewswire.com/news-releases/teal-grouppredicts-worldwide-uav-production-will-total-93-billion-in-its-2015-uav-market-profile-and-forecast-300128745.html> (Accessed November 12 2017)

Tiedge, J.T., Silverblatt, A., Havice, M.J., & Rosenfeld, R. (1991) Discrepancy Between Perceived First-person and Third-person Mass Media Effects. Journalism Quarterly 68, 141-154.

VisionCritical (2014) Drone awareness and perceptions: A three country study, 2014. https://qspace.library.queensu.ca/handle/1974/12572 (Accessed February 2, 2018)

American Institute of Aeronautics and Astronautics