CSG **Overseas Voting Initiative**
THE COUNCIL OF STATE GOVERNMENTS

ACCESS TO AND USAGE OF FAXING BY MILITARY & OVERSEAS VOTERS

EXECUTIVE SUMMARY

The year 2020 saw a rapidly changing environment and circumstances under which election officials had to conduct a presidential election. While navigating an increase in by-mail voting and conducting safe, socially distanced, in-person voting, election officials also had to navigate continuous disruption to the global mail system.

Thirty-one states allow for some method of electronic ballot return, while seven of these limit the electronic return method to facsimile, or fax. By limiting the electronic return method to fax only, states are both limiting flexibility during crises such as the COVID-19 pandemic and forcing local jurisdictions to outdated technology. In 2016, these seven states accounted for 36% of the total transmitted military and overseas citizen ballots.

The Council of State Governments (CSG) Overseas Voting Initiative (OVI) conducted a review of data from the 2010-18 Post Election Voting Survey for Active Duty Military (PEVS-ADM) administered by the Federal Voting Assistance Program (FVAP). The PEVS-ADM is a biennial survey that reveals insights into what military voters know about voting, how they feel about it, and the steps they take in the voting process. The results of these surveys indicated that access to fax machines for military service members dropped from 68% in 2010 to 23% in 2012. There is no available quantitative data to suggest any change in this downward trend of access to fax by service members from 2012 to today. However, there is overwhelming anecdotal data from our own life experiences, especially in the commercial sector, to show a decrease in how often any of us see, let alone use, a fax machine today.

In addition to a decrease in access to fax, there is a decrease in usage of fax. We have not observed one of these trends to be the cause of the other, but both combined show a lack of interest in fax and a preference for other technologies. Based on FVAP's PEVS-ADM data, OVI notes that the already minimal usage of fax by military voters decreased from 2% in 2010 to 0.8% in 2018. It is important to note both the lack of access to fax by military voters, and the minimal usage of fax by these voters to return their voted ballots to their local election offices in states where electronic ballot return via fax is allowed by state law. Fax usage for returning military absentee ballots to local election offices in the U.S. has not been significant over the past decade regardless of the level of fax access by service members. In 2010, just 2% of PEVS-ADM respondents used fax to return voted absentee ballots. By 2018, that number decreased to 0.8%. Thus, the data suggests that, regardless of access, military voters do not return their ballots by fax.

Fax technology has been in existence in some form for over 175 years and has contributed much to society, including to military voting. However, the availability and usage of this communication method is a fraction of what it was in its heyday during the 1980s. This necessitates exploration and evaluation of additional communication channel options to aid our nation's military and overseas voters in casting their absentee ballots.

How did you complete and return your regular absentee ballot?

—— Mail
(including USPS Express, certified mail, FedEx, UPS, DHL)

—— FVAP Electronic Trasmission System

—— Fax

—— Email
(e.g., as an attachment)

—— Online
(e.g., through a secure website)

—— Other
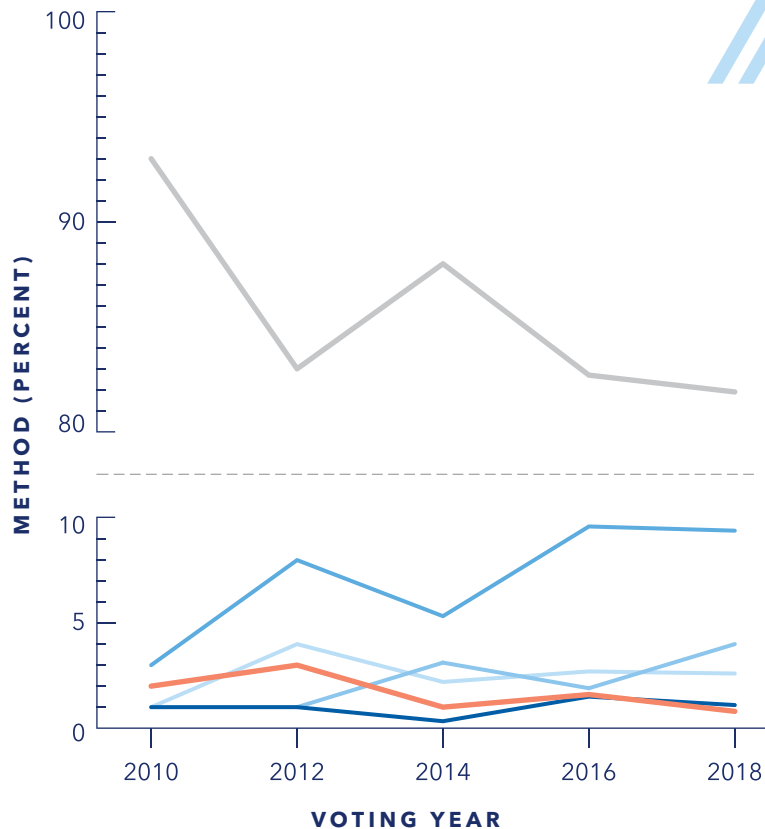
This graphic was created through analysis of the FVAP-administered PEVS-ADM reports from years 2010 - 2018 in which respondents were asked "How did you complete and return your regular absentee ballot?" Responses were categorized as: Mail FVAP Electronic Transmission Service, Fax, E-mail (e.g., as an attachment), Online (e.g., through a secure website), and Other and were compared over time for these five surveys.

The following are the key takeaways from the OVI's study of the ways UOCAVA voters use and access fax technology, with a special focus on U.S. military voters overseas:

- In spite of evidence of the dwindling usage of fax since the 2009 inception of the Military and Overseas Voter Empowerment (MOVE) Act, there remain seven states that only allow electronic ballot return via fax for UOCAVA voters, and often under limited conditions.

- Through a review of state legislation, OVI found that legal language is often limiting, specifically using either the term "fax" or "facsimile" rather than wording inclusive of evolving technology.

- The use of fax for transmitting UOCAVA ballots traces its origins to the early 1990s during Operations Desert Shield/Storm when FVAP initiated the Electronic Transmission Service (ETS) to help UOCAVA voters overcome potential barriers posed by lengthy mail delivery to and from the Middle East.

- Through analyzing FVAP-administered PEVS-ADM reports from 2010 and 2012, OVI found that fax technology access and usage for the purposes of ballot transmission were low and decreased significantly over the time periods studied. The 2012 data indicated that military service members had less access to faxing capability compared to other technologies. The 2012 PEVS-ADM shows that of all possible ballot return options, 24% of respondents reported that they did not have access to fax technology. This number is significantly higher than for any other voted ballot return method listed in the survey. Additionally, in the 2012 survey, only 23% of respondents reported that they had access to fax 100% of the time. This number is significantly lower than for any other ballot return method.

Anecdotally, we know the use of fax technology amongst the general population has decreased. As noted in this report, the use of fax among military and overseas citizen voters has decreased in the same manner, as evidenced by the included survey data analysis. Therefore, it is important that states keep abreast of new and emerging technology innovations so that voters covered by UOCAVA continue to have multiple channels available for returning their ballots to be counted.

INTRODUCTION

With roots in the mid-19th century, fax technology was used heavily in the late 1900s through the start of the new millennium. However, faxing was increasingly tossed aside during the past decade with society's ever-increasing reliance on the internet, smartphones and other wireless communications technologies. Fax technology is increasingly outdated, but it's necessary to discuss because transmission via fax machine remains a permissible ballot return option for military and overseas citizens in many states. In fact, fax is the only electronic option in seven states.

In 2016, OVI researched the use of fax technology by U.S. military and overseas citizen voters covered under UOCAVA. OVI is a collaboration between CSG and the U.S. Department of Defense (DoD) Federal Voting Assistance Program to educate state policymakers, election officials and other election community stakeholders about unique voting challenges faced by uniformed services personnel and other U.S. citizens overseas, and methods for improving the voting process for these individuals.[1]

Furthermore, the most recent publicly available survey of states focused on electronic ballot transmission was published in September 2019 by the National Conference of State Legislatures. It notes that 31 states plus the District of Columbia allow some form of electronic ballot return of voted ballots by UOCAVA voters (including fax, email, portal or mobile voting). Nineteen states do not allow any type of electronic transmission of voted ballots, while seven states only allow electronic ballot return via fax for at least some UOCAVA voters, often under limited conditions.[2]

Members of the OVI Working Group — a nonpartisan group of state and local election official experts from all over the country — were interested in further researching the use of fax technology in the voting process. During the drafting of the December 2019 OVI report, "Examining the Sustainability of Balloting Solutions for Military & Overseas Voting," they noted that states limiting electronic ballot return to fax may limit access to the ballot box for military and overseas voters.[3]

The COVID-19 pandemic brought about temporary changes to some states' election laws and practices via emergency legislation or state executive order to ensure voters could return their absentee ballots and not be disenfranchised. Many of those changes were strictly for the 2020 election cycle, thus will not continue for future elections.

Looking forward to the 2022 midterm elections, it is notable that traditional fax machine access and usage has dwindled significantly since the MOVE Act's inception in 2009. This report will examine existing data regarding fax machine access and usage by military voters, as well as overall usage of this technology in non-military contexts today.

WHAT IS FAXING?

The term *fax* is both a noun and a verb. As a noun, the word describes both a piece of equipment and the transmission or document the machine produces. The verb describes the process of sending or receiving the transmission or document.

> A **fax** (noun), or a **fax machine** is a piece of equipment that electronically sends and re-ceives, or **faxes** (verb), communications or documents also known as **faxes** (noun) over a telephone line or other electronic network.

More specifically, a fax is the telephonic or electronic transmission of text or images, usually, but not always, to a telephone number associated with a printer or other output device. The original document is digitized by a fax or fax machine, which treats the text or picture as a single fixed graphic image, converting it into a bitmap file. In this digital form, the information is transmitted as electrical signals through the telephone system or other networks. Then the fax or fax machine on the receiving end reconverts the coded image and prints a paper copy of the document or fax.

Fax & Facsimile: Words that are often Interchangeable, but Not Exact Copies

In the 1800s, technology was developed that could reproduce printed material via telegraph. This technology was called the electric printing telegraph, and it produced a facsimile. Thus, this technology became known as the facsimile machine. This term was later shortened to fax machine or simply fax, with the first usage of the word fax dating back to 1937. Today, we also call the resulting image, or facsimile, a fax.

As part of our research on electronic transmission of ballots, we reviewed state legislation focused on the topic. We found that extremely specific — and therefore extremely limiting — terminology is often used in the legal language that describes the allowable methods of electronic transmission of ballots in each state. Regarding fax transmission of ballots, state legislation usually refers to transmission via "*facsimile*," or in the case of Florida, "*secure facsimile*." However, on the corresponding state election website, officials refer to transmission via "*fax*." Whether "facsimile" or "fax" is used in state legislation, the unfortunate result is limiting wording rather than wording that takes into consideration the evolutionary nature of technology.

> **[…] laws and institutions must go hand in hand with the progress of the human mind. As that becomes more developed, more enlightened, as new discoveries are made, new truths discovered and manners and opinions change, with the change of circumstances, institutions must advance also to keep pace with the times." THOMAS JEFFERSON**

Thomas Jefferson spoke eloquently about the need for laws and institutions to adapt with changing times:

"I am not an advocate for frequent changes in laws and constitutions, but laws and institutions must go hand in hand with the progress of the human mind," he wrote. "As that becomes more developed, more enlightened, as new discoveries are made, new truths discovered and manners and opinions change, with the change of circumstances, institutions must advance also to keep pace with the times."[4]

Laws around faxing and UOCAVA ballots have not changed along the technology. Therefore, we recommend that all new or modified election laws be created with the future in mind. As Jefferson intimated, reliance on specific legacy technology in our laws should be reviewed and revised with an eye to the future and discoveries not yet made.

HISTORY OF FAX DEVELOPMENT
Significant Inventors & Inventions

Faxing has a long, rich history with many twists and turns along the way. The following highlights are not all-encompassing of fax development, but some of the most notable and relatable points.

Over the course of the 20th century, the fax machine continued to gain momentum, inspired by commercial competition that led to several companies and organizations — including the military — improving upon the technology until it became a household item.[5]

1843

Scottish inventor and engineer Alexander Bain patented the "Electric Printing Telegraph," the first precursor to modern fax technology. His device used an electric clock (another Bain invention) to synchronize the movement of two pendulums, which scanned each line of a message in the process. This message was then sent to the receiver on electrochemically sensitive paper using a chemical solution. The message was then sent over a series of wires and reproduced on the receiver's end.
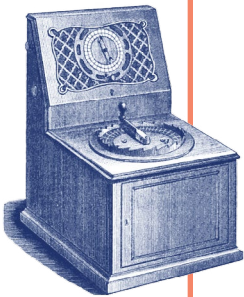
1861

Giovanni Caselli, an Italian priest who moonlighted as an inventor and physicist, invented the first practical, operating and commercially promoted electro-mechanical fax machine. Called the Pantelegraph or Universal Telegraph, the device was used for communications between Paris and Lyon, France from 1865-70.

1887

Elisha Gray, an American electrical engineer from Illinois, invented the Telautograph, a device that could remotely transmit handwriting through telegraph systems. This allowed users to send signatures over long distances, thus allowing the verification of identification or ownership. Commercially, Gray's telautograph machines were used by banks for signing documents at a distance as well as by train stations to communicate schedule changes.
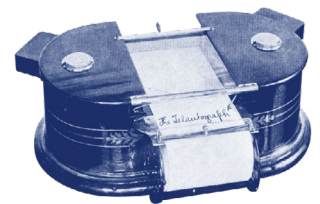
1906

German physicist and mathematician Arthur Korn invented a method of sending a photo via fax known as "telephotography." His method used light-sensitive selenium cells and an early form of incandescent lamp as a light source. Korn demonstrated telephotography by transmitting a photo of German Crown Prince William over 1,800 kilometers.

1922

More than 10,000 telautographs and telephotography devices provided internal communications for banks, businesses, and governments by 1922. (Fax machines did not reach that level of adoption until the 1950s). Still, neither the telautograph nor telephotography devices were meant to be long-term solutions. They were important intermediary steps in the technological development of worldwide fax communications.

1924

After working on telephone fax technology for a few years, the American Telephone & Telegraph Company (AT&T) used its version of the fax machine to send pictures from political conventions in Cleveland and Chicago to New York City for publication in newspapers. This spawned the "AT&T Wirephoto Service," which allowed users, mainly photographers and journalists, to send and receive photos. The service was slow by today's standards, taking several minutes to send a photo. It was expensive, too — it cost $15 to send a 5 x 7 photo (more than $150 in 2012 dollars).
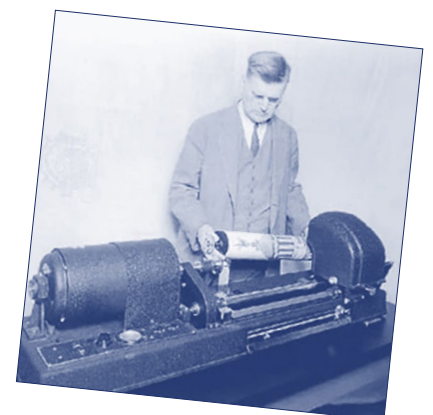
1935

In the mid-1930s, the Associated Press began to use a version of the fax machine called "AP Wirephoto," which was used to transmit photographs with never-before-seen speed and efficiency. The first AP photo sent by wire depicted the crash of a small plane in New York's Adirondack Mountains. Previously, it could have taken days for a photograph to arrive by other means, but using AP Wirephoto, photographers could have their images in the hands of newspaper editors within minutes.
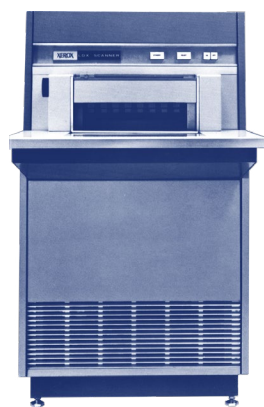
1964

Even though some form of the fax machine had been in use since the 19th century, Xerox became the first company to make the fax machine a commercially viable product with its introduction Long Distance Xerography, or LDX. A 1,100-pound faxing behemoth, LDX worked well but its size made it unrealistic to implement. Next, Xerox introduced the Magnafax Telecopier, a 46-pound version of the fax machine that was smaller and easier to use than its predecessors. It could be connected to any telephone line and could transmit a letter-sized document in approximately six minutes.

1985

During the next three decades of innovation, fax usage increased dramatically, spurred by demand from Japan. In 1985, U.S. company GammaLink invented the first-ever PC-to-fax technology which they named "GammaFax." The development of GammaFax coincided with Xerox integrating ethernet technolgy into its fax machines, making the connection between fax technology and computer-based technology. In 1983, when the internet came into being, 300,000 fax machines were in U.S. offices. By 1989, this number had risen to 4 million.

1991

Though the fax was still common in the workplace, the explosive adoption of the internet along with faster, more efficient computing technology began to make the fax machine look outdated by comparison. With the launch of the first website in 1991, companies such as AT&T and America Online (AOL) were setting themselves up as Internet Service Providers, offering email services that would soon all but eliminate the traditional fax machine. As a result, fax machines were on the edge of irrelevance just as their popularity erupted in the 1990s.
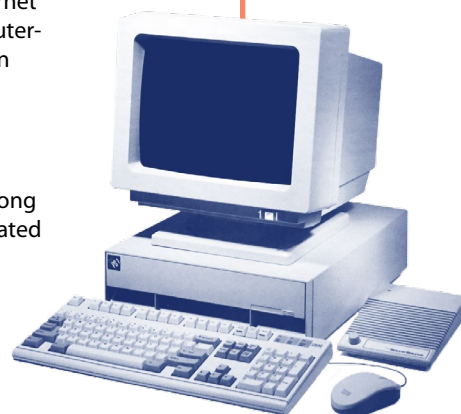
FAX DEVELOPMENT & USAGE IN THE COMMERCIAL MARKETPLACE

As fax development expanded beyond individual inventors and one-off efforts to producing the fax machine for commercial use, there are many notable marks on the timeline of the fax machine's development by U.S. corporate entities with familiar names such as:

- **1924** American Telephone & Telegraph Company, or AT&T
- **1926** Radio Corporation of America, or RCA
- **1935** The Associated Press, or AP
- **1964** Xerox

With the rapid evolution of technology in the 2000s that brought us smartphones and other mobile devices, most fax machines became — and remain today — part of a larger multi-purpose piece of equipment, such as a copier, scanner and printer. Additionally, some current fax technologies transmit via the Internet and thus faxing is no longer completely reliant on telephone networks as it was in the decades prior.[6]

Online fax services have grown in popularity throughout the last decade as society becomes increasingly mobile and less dependent on analog telephone lines or traditional landlines. In 2020, as a result of the COVID-19 pandemic, more people were working remotely and away from the traditional office environment and thus used Voice over Internet Protocol, or VoIP. VoIP is a method and group of technologies for the delivery of voice communications and multimedia sessions over Internet Protocol networks, such as the internet.[7] More companies are moving away from conventional fax machines that use analog phone lines in favor of an automated, scalable and cost-effective option.

FAXING IN THE MILITARY

The evolutionary timeline of the fax machine is not linear. There were many parallel and offshoot inventions and development efforts in the commercial business environment that corresponded with the fax machine's use in the military. The following serve as just a few examples.

Before and During World War I

Faxing became part of the U.S. military's infrastructure just prior to World War I. This began with the use of the "telautograph," a precursor to analog faxing capability developed by Elisha Gray. The military proved a small but important marketplace for the "telautographs" as the U.S. Army began employing them in the 1890s for the specific purpose of fire control communications in coastal forts. Additionally, the U.S. Navy used telautographs for onboard ship communications. Throughout the military branches, telautographs were also used to send written commands during gun tests when the deafening noise from the guns made spoken orders on the telephone virtually impossible to hear.[8]

World War II

In the late 1930s, the use of fax for news photos grew rapidly in the United States. News stories from Europe became more graphic and attracted greater public attention, causing greater stress among Americans. Americans saw pictures from Europe alongside news stories thanks to the fax machine and its news photo capabilities.

In addition to enabling the war to be visualized by Americans back home and others throughout the world, faxing also became an important focus for internal operations in the U.S. military. In 1940, the U.S. military decided it wanted a small, portable fax transceiver for its internal communication purposes. Signal Corps Laboratories of Ft. Monmouth, New Jersey received an order from the military to test all available commercial fax equipment and select the best option for the military, with instructions to order 250 of the most appropriate devices. This 250-unit order launched what would become the military's huge fax development and production program. A Facsimile Section was established as part of the U.S. military's Wire Branch. The Facsimile Section personnel

gathered all the available information possible on fax technology, acquired machines from existing providers of the era, which included Acme Teletronix, the Associated Press and the *New York Times*, and then studied them. However, they found these machines much too big and clunky for military use. As a result, the *New York Times* offered to build a special small, portable fax machine affixed inside a special suitcase exclusively for the military. This specially designed fax unit would be designed to send photographs or messages, receive positives on photographic paper, receive negatives on film, or receive other data on a direct recording paper made by Western Union helping to facilitate secure communications within the military during the war.[9]

Gulf War

As the Gulf War raged on in the early 1990s, faxing was a surprising resource for many Americans with family members and friends stationed in the Persian Gulf, revolutionizing communications from home to U.S. service members. AT&T launched Operation Desert Fax in late 1990 as a quicker alternative to sending a letter via the military mail service. Through Operation Desert Fax, AT&T facilitated free one-way fax transmissions — including optional pictures — to service members in the Middle East from 400 of their phone centers nationwide. During the program, family members and loved ones sent service members between 5,000 and 10,000 faxes per week. AT&T allowed an individual to send a free one-page fax per day. At that time, the commercial price of sending a one-page fax was $3.19 (or roughly $6.25 today).[10]

While Operation Desert Fax describes one-way fax facilitated communication between civilians and service members, there was also significant use of faxing within the military itself at this time. During the Gulf War, the U.S. military's secure fax and telephone systems were credited with concealing information from opposing forces and allowing direct access for the first time between U.S. based military and the theater of operations.[11]

FAXING & UOCAVA VOTING

FVAP currently offers its "DoD Fax Service" to voters covered under UOCAVA. This service allows election officials to transmit and receive election materials via toll-free fax to and from service members, their eligible family members and overseas citizens.[12]

Prior to FVAP's current DoD Fax Service, a similar FVAP offering – the ETS – was available beginning in 1990 to support military members in Operation Desert Shield. At that time, it was not possible to use the normal procedures for absentee voting for all military personnel since round trip transit time for mail delivery of election materials exceeded the time available to vote absentee in that election. Initially, FVAP's program was established to enable election officials in states and U.S. territories to transmit and receive election materials via fax to and from deployed citizens in the Persian Gulf at no cost to them. Election officials would fax the materials to FVAP's toll-free fax number and FVAP would fax the election materials to the UOCAVA citizen.[13] During a two-month period in 1990, ETS allowed for the transmission of 1,675 blank ballots to military personnel serving in the Middle East. From that point on, FVAP continued its use of the ETS, and many states and territories legislatively or administratively made changes in their election laws to provide for this method of transmitting election materials for UOCAVA citizens.[14]

In January 2018, FVAP introduced changes to its ETS system – and a name change to the DoD Fax Service – due to the diminished use of traditional fax capabilities by UOCAVA voters, but also due to process changes in states that authorize email acceptance. FVAP announced that it would still provide a no-cost email-to-fax conversion service for voters who have difficulty sending election materials to states that do not accept emailed documents. However, they announced that voters in states that allow for email submission of registration requests and voted ballots should send those materials directly to their election officials. In the past, FVAP has forwarded email-to-email transmissions, but FVAP advised that when direct communication is possible, there is no benefit or purpose for FVAP to be included in a transaction between the voter and election office.[15]

Military Access and Usage of Fax Capabilities: Analysis of FVAP PEVS-ADM Surveys

To learn more about the availability and usage of traditional fax capabilities by members of the U.S. military, OVI analyzed existing data from relevant questions and responses from the 2010-18 biennial, FVAP-administered Post Election Voting Survey for Active Duty Military (PEVS-ADM). This survey is administered every two years to aid in the compilation of information on the effectiveness of their programs for their UOCAVA-required report to Congress. Specifically, the PEVS-ADM is used to:

1) determine participation in the electoral process by citizens covered by UOCAVA,

2) assess the impact of FVAP's efforts to simplify and ease the process of voting absentee,

3) evaluate other progress made to facilitate absentee voting participation, and

4) identify any remaining obstacles to voting experienced by these citizens.[16]

To begin our research regarding service members' access to faxing capabilities, OVI initially focused on the 2010 and 2012 PEVS-ADM reports due to the specificity of questions related to overall fax accessibility for service members and fax usage in the voting process.[17] These fax access questions did not appear in surveys after 2012, but we do examine other questions and responses surrounding fax usage from the 2010 – 2018 PEVS-ADM reports later in this report.

Question 78c of the 2010 PEVS-ADM asks the following regarding service member access to fax capabilities:

"Considering your location and working conditions, approximately how many days, from September 13 to November 2, 2010, did you have access to each of the following (fax)?"

A majority – 68% – of service members replied "every day" in response to this question while 6% reported they had no access to this resource.

The same question was posed in question 74c of the 2012 PEVS-ADM, which asks the following regarding service member access to fax capabilities:

"Considering your location and working conditions, approximately how often, from Labor Day to November 6, 2012, did you have access to each of the following (fax)?"

Only 23% of service members responded "every day," which represents a 45% decrease in fax access by members of the military in only two years. Additionally, 24% of service members reported that they had no access to this resource, an increase of 18% in lack of access over the same two-year period.

The 23% of service members who reported having access to fax "every day" is more than double the percentage of service members who did not have access to other communication channels such as government websites, non-government websites, DoD email or personal email. Furthermore, a review of the combined 2012 data on all service members, regardless of age, branch or other demographics, shows that faxing capability was the least accessible technology in the military when compared to technologies such as government websites, non-government websites, DoD email, personal email, printers and scanners.

How many days did you have access to fax capabilities?

	2010		2012
68%		23%	24%
	6%		

■ Every day access
■ No access

This graphic was created through analysis of the FVAP-administered PEVS-ADM reports for years 2010 and 2012 in which respondents were asked "How many days did you have access to fax capabilities?" The response selections of "every day access" and "no access" were compared over time for these two surveys.

OVI reviewed responses to questions 79a-e of the 2010 PEVS-ADM and questions 75a-e of the 2012 PEVS-ADM, both of which asked whether service members faxed any of five different types of voting materials (Federal Post Card Application for absentee ballot, other non-Federal Post Card Application request for absentee ballot, voted Federal Write-In Absentee Ballot, voted regular absentee ballot, or other voting materials).

An average of 93.6% of all service members, regardless of age, branch or other demographics, stated they did not use a fax to transmit any voting materials, and 93% also stated they did not fax a voted ballot.

OVI also reviewed the data on service members who strictly used fax for ballot return since 2010. The average usage of fax was 1.69%, but when last surveyed in 2018, only 0.8% of service members reported that they used fax to return their voted ballot.

Among service members who strictly used fax to return their Federal Post Card Applications since 2010, 2.27% was the average usage. When last surveyed in 2018, however, only .03% of service members reported that they used fax to return their Federal Post Card Applications.

CONCLUSION

In conclusion, it is important to reiterate the key points realized from the OVI's study of fax accessibility and usage by the nation's UOCAVA voters, with special focus on U.S. citizen voters serving overseas in the military:

• Despite quantitative, qualitative and anecdotal evidence of the dwindling usage of fax since the 2009 inception of the Military and Overseas Voter Empowerment (MOVE) Act, there remain seven states that only allow electronic ballot return via fax for UOCAVA voters, and often under limited conditions.

• Through a review of state legislation, OVI found that legal language is often limiting, specifically using either the term "fax" or "facsimile" rather than wording that includes evolving technology.

• The use of fax for transmitting UOCAVA ballots traces its origins to the early 1990s during Operations Desert Shield/Storm when FVAP initiated the Electronic Transmission Service (ETS) to help UOCAVA voters overcome potential barriers posed by lengthy mail delivery to and from the Middle East.

• Through analyzing FVAP-administered PEVS-ADM reports from 2010 and 2012, OVI found that access to and usage of fax technology for the purposes of ballot transmission was low and decreased significantly over the time periods studied.

As the use of fax technology among the general population has decreased, so has its use among military and overseas citizen voters. Additionally, stakeholders should be aware that access to fax, usage of fax, and even operational knowledge of fax has waned as other technologies have developed. As fax continues to decline, it is important that states keep abreast of new and emerging technology innovations so that UOCAVA voters continue to have multiple channels available to return their ballots for counting.

1 *https://ovi.csg.org/who-we-are/*

2 *https://www.ncsl.org/research/elections-and-campaigns/internet-voting.aspx* (9/5/2019 update)

3 *https://ovi.csg.org/wp-content/uploads/2020/03/2019-Examining-Sustainability-of-Balloting-Solutions.pdf*

4 *https://www.monticello.org/site/research-and-collections/quotations-jefferson-memorial*, Panel Four of the Jefferson Memorial taken from a letter from Thomas Jefferson to H. Tompkinson (AKA Samuel Kercheval), July 12, 1816

5 *https://www.mandatory.com/living/1285087-fax-machine-history*

6 *https://www.merriam-webster.com/dictionary/fax#h1*

7 *https://www.fcc.gov/general/voice-over-internet-protocol-voip*

8 Faxed: The Rise and Fall of the Fax Machine, Johns Hopkins Studies in the History of Technology, 2016, Jonathan Coopersmith

9 Fax: Facsimile Technology and Systems (Artech House Telecommunications Library) 3rd ed. Edition, 1999, Kenneth R McConnel

10 *https://www.latimes.com/archives/la-xpm-1991-01-19-mn-215-story.html*

11 *https://media.defense.gov/2010/May/26/2001330261/-1/-1/0/AFD-100526-02.pdf* p. 14

12 *https://www.fvap.gov/eo/overview/sending-ballots/fax-email*

13 *https://www.fvap.gov/uploads/FVAP/EO/FAQsEOWebsite-Jan8th2014FINAL.pdf*

14 *https://www.fvap.gov/uploads/FVAP/Reports/ivas2007.pdf*

15 *https://www.fvap.gov/info/news/2017/12/5/fvap-announces-changes-to-ets-system-for-2018*

16 *https://www.fvap.gov/info/reports-surveys/search-reports-surveys/post-election-voting-survey-program*

17 *https://www.fvap.gov/uploads/FVAP/Surveys/2012admsummary.pdf*

APPENDIX

2010 PEVS-ADM Survey Instrument: Excerpted Fax Related Questions (*& Answers)

From: *https://www.fvap.gov/uploads/FVAP/Surveys/admsummarydata.pdf*

Q20. **In the election held on November 2, 2010, did you definitely vote in person on election day, definitely complete an absentee ballot by mail, e-mail/fax, or online on or before November 2, 2010, definitely not vote, or are you not completely sure whether you voted in that election?** (Page 62 of PDF)

- a. Definitely voted in person – 11%
- b. Definitely voted by mail – 16%
- c. Definitely voted by e-mail/fax – 1%
- d. Definitely voted online – 1%
- e. Definitely did not vote – 64%
- f. Not sure – 7%
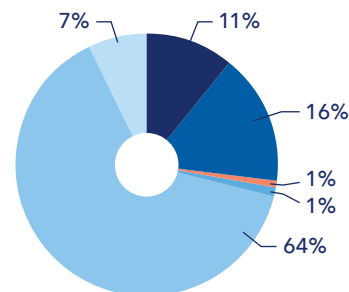
Q27. **How did you obtain your regular absentee ballot in 2010?** (Page 78 of PDF)

- 1. Mail – 86%
- 2. Fax – 0%
- 3. E-mail – 6%
- 4. Downloaded ballot from state voting Web site – 3%
- 5. Downloaded ballot from state link on the Federal Voting Assistance Program (FVAP) Web site – 3%
- 6. Downloaded ballot from state link at another website – 0%
- 7. Other – 2%
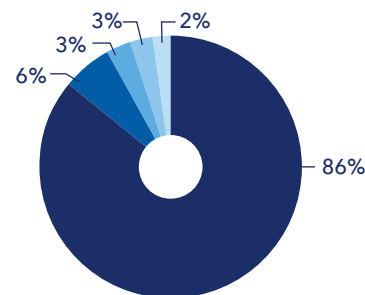
Q30. **How did you complete and return your regular absentee ballot for the November 2, 2010 election?** (Page 84 of PDF)

- 1. Mail – 90%
- 2. USPS Express/Certified mail – 3%
- 3. Fax – 2%
- 4. E-mail -3%
- 5. Embassy/consulate mail pouch – 0%
- 6. Federal Voting Assistance Program (FVAP) Electronic Delivery System – 1%
- 7. FedEx, UPS, DHL or other delivery carrier – 0%
- 8. Other – 1%
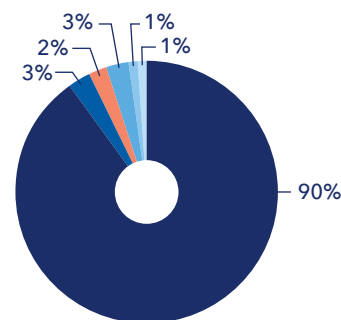
Q39. **Did you return your Federal Post Card Application (FPCA) for the November 2, 2010 election using any of the following sources?** (Page 110 of PDF)

- 1. Mail – 78%
- 2. USPS Express/Certified mail – 3%
- 3. Fax- 2%
- 4. E-mail – 8%
- 5. Embassy/consulate mail pouch – 0%
- 6. Federal Voting Assistance Program (FVAP) Electronic Delivery System – 2%
- 7. FedEx, UPS, DHL or other delivery carrier – 0%
- 8. Other – 7%
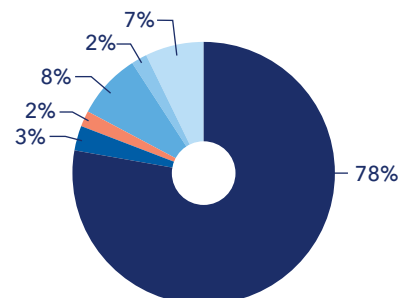
Q49. **If you were to vote using an absentee ballot in a future election, how would you prefer to receive the absentee ballot?** (Page 134 of PDF)

- ● 1. By postal mail – 37%
- ● 2. From a Web site – 17%
- ● 3. By e-mail- 45%
- ● 4. By fax – 1%
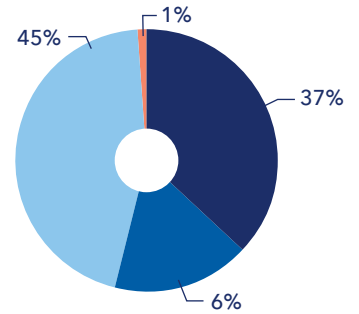
Q50. **If you were to vote using an absentee ballot in a future election, how would you prefer to return the absentee ballot?** (Page 136 of PDF)

- ● 1. Return by mail – 36%
- ● 2. Return online – 62%
- ● 3. Return by fax – 2%
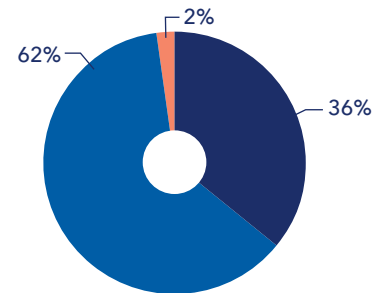
Q77. **Some states allow potential voters to check their voting eligibility status, to obtain voting materials such as absentee ballots from their Web sites, and/or to fax or e-mail voting materials including absentee ballots. Between September 13 and November 2, 2010, did you have access to the following?** (Page 222 of PDF)

- ● a. Government Web sites other than the Federal Voting Assistance Program (e.g., state or Federal *.gov* or *.mil* sites) – 73%
- ● b. Non-government Web sites (e.g., *.com* sites) – 72%
- ● c. Fax – 49%
- ● d. DoD e-mail address – 73%
- ● e. Personal e-mail address – 74%
- ● f. Printers – 72%
- ● g. Scanners – 64%
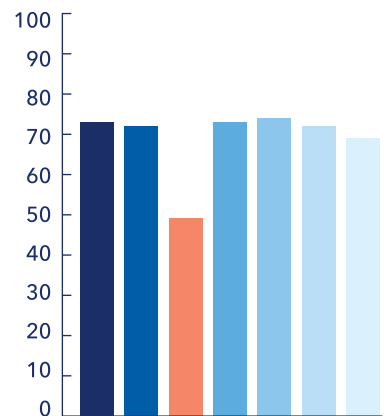
Q79. **During 2010, did you fax any of the following materials?**
(Page 238-247 of PDF)

a. Federal Post Card Application (FPCA) for absentee ballot

● 1. Yes, using the Federal Voting Assistance Program (FVAP) toll-free faxing service – 3%
● 2. Yes, but not using the FVAP toll-free faxing service – 4%
● 3. No – 93%

- 3%
- 4%
- 93%
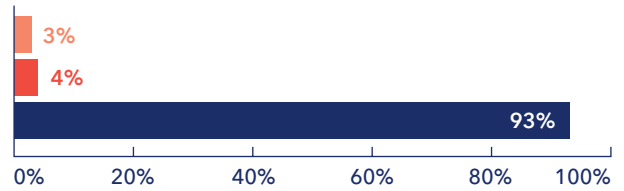
b. Other request for absentee ballot

● 1. Yes, using the Federal Voting Assistance Program (FVAP) toll-free faxing service – 3%
● 2. Yes, but not using the FVAP toll-free faxing service – 4%
● 3. No – 93%

- 3%
- 4%
- 93%
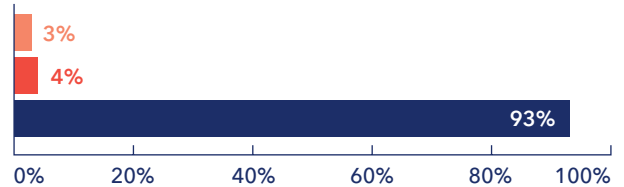
c. Ballot

● 1. Yes, using the Federal Voting Assistance Program (FVAP) toll-free faxing service – 2%
● 2. Yes, but not using the FVAP toll-free faxing service – 4%
● 3. No – 93%

- 2%
- 4%
- 93%

d. Federal Write-In Absentee Ballot (FWAB)

● 1. Yes, using the Federal Voting Assistance Program (FVAP) toll-free faxing service – 2%
● 2. Yes, but not using the FVAP toll-free faxing service – 3%
● 3. No – 94%

- 2%
- 3%
- 94%
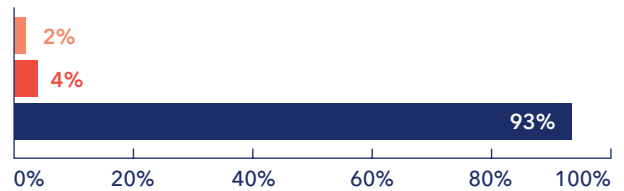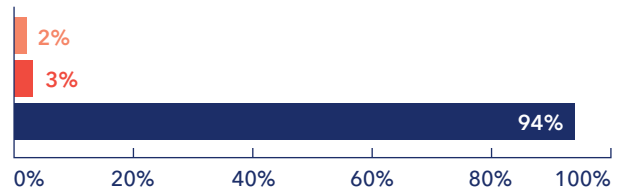
e. Other voting materials

● 1. Yes, using the Federal Voting Assistance Program (FVAP) toll-free faxing service – 2%
● 2. Yes, but not using the FVAP toll-free faxing service – 3%
● 3. No – 95%

- 2%
- 3%
- 95%

2012 PEVS-ADM Survey Instrument: Excerpted Fax Related Questions (*& Answers)

From: *https://www.fvap.gov/uploads/FVAP/Surveys/2012admsummary.pdf*

Q25. **How did you obtain your regular absentee ballot in 2012?** (Page 47 of PDF)

- ● 1. Mail – 62%
- ● 2. Fax – 0%
- ● 3. E-mail – 25%
- ● 4. In person – 2%
- ● 5. Downloaded ballot from a website – 9%
- ● 6. Other – 0%
- ● 7. Do not recall – 1%
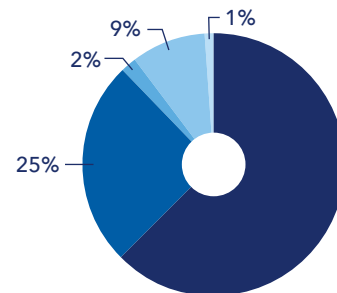
Q29. **How did you complete and return your regular absentee ballot for the November 6, 2012, election?** (Page 51 of PDF)

- ● 1. Mail – 78%
- ● 2. USPS Express/Certified mail – 5%
- ● 3. FedEx, UPS, DHL, or other delivery carrier – 0%
- ● 4. Embassy/consulate mail pouch – 0%
- ● 5. Federal Voting Assistance Program (FVAP) Electronic Transmission System – 1%
- ● 6. Fax – 3%
- ● 7. E-mail (e.g., as an attachment) – 8%
- ● 8. Online (e.g., through a website) – 1%
- ● 9. In person – 4%
- ● 10. Other – 0%
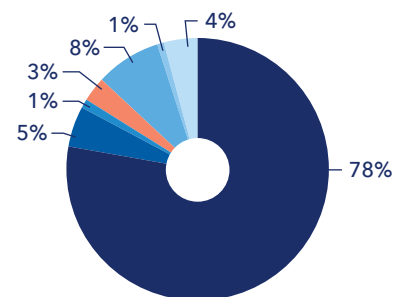
Q31. **Did you return your Federal Post Card Application (FPCA) for the November 6, 2012, election using any of the following sources?** (Page 53 of PDF)

- ● 1. Mail – 63%
- ● 2. USPS Express/Certified mail – 4%
- ● 3. FedEx, UPS, DHL, or other delivery carrier – 0%
- ● 4. Embassy/consulate mail pouch – 0%
- ● 5. Federal Voting Assistance Program (FVAP) Electronic Transmission System – 3%
- ● 6. Fax – 5%
- ● 7. E-mail (e.g., as an attachment) – 10%
- ● 8. Online (e.g., through a secure website) – 6%
- ● 9. In person – 2%
- ● 10. Other – 7%
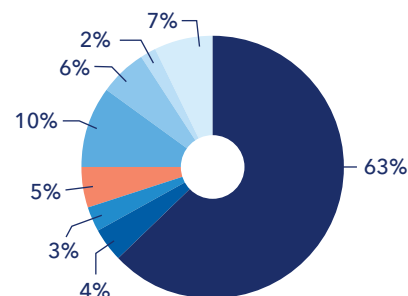
Q34. **If you were to vote using an absentee ballot in a future election, how would you prefer to receive the absentee ballot?** (Page 60 of PDF)

- ● 1. By postal mail – 37%
- ● 2. From a website – 18%
- ● 3. By e-mail – 45%
- ● 4. By fax – 0%
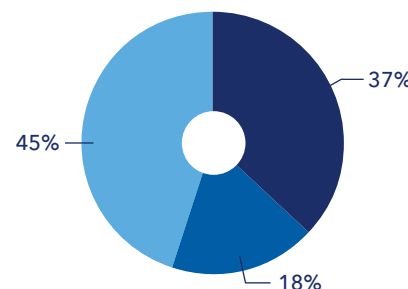
Q35. **If you were to vote using an absentee ballot in a future election, how would you prefer to return the absentee ballot?** (Page 61 of PDF)

- 1. By postal mail – 37%
- 2. Through a website – 22%
- 3. By e-mail – 40%
- 4. By fax – 1%
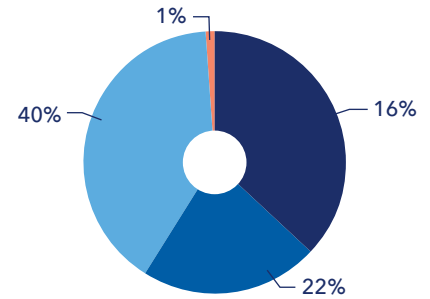
Q40. **In the election held on November 6, 2012, did you definitely vote in person on election day, definitely complete an absentee ballot by mail, e-mail, fax, or online on or before November 6, 2012, definitely not vote, or are you not completely sure whether you voted in that election?** (Page 66 of PDF)

- 1. Definitely voted in person – 19%
- 2. Definitely voted by mail – 30%
- 3. Definitely voted by e-mail – 4%
- 4. Definitely voted at an online website – 1%
- 5. Definitely voted by fax – 1%
- 6. Definitely did not vote – 40%
- 7. Not sure – 5%
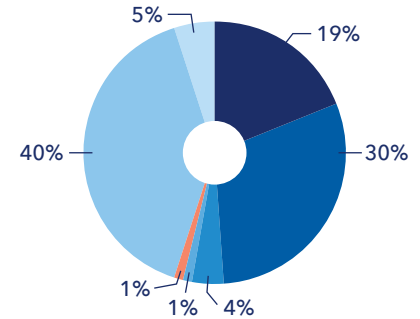
Q74. **Considering your location and working conditions, approximately how often, from Labor Day to November 6, 2012, did you have access to each of the following?**
(Pages 106-112, Q. 74 (a-g) of PDF)

a. Government websites other than FVAP (e.g., state or Federal *.gov* or *.mil* sites)
- 1. 1% - 15% of the time - 13%
- 2. 16% - 30% of the time - 5%
- 3. 31% - 50% of the time - 7%
- 4. 51% - 70% of the time - 10%
- 5. 71% - 99% of the time - 16%
- 6. 100% of the time - 39%
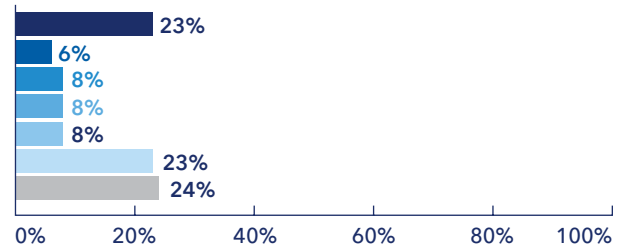- 7. Does not apply; I did not have access to this resource - 9%
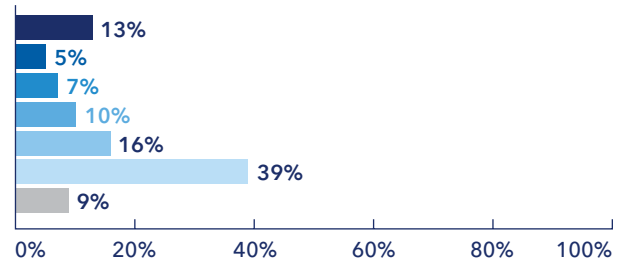
b. Non-government websites (e.g., *.com* sites)
- 1. 1% - 15% of the time - 11%
- 2. 16% - 30% of the time - 6%
- 3. 31% - 50% of the time - 9%
- 4. 51% - 70% of the time - 10%
- 5. 71% - 99% of the time - 16%
- 6. 100% of the time - 40%
- 7. Does not apply; I did not have access to this resource - 8%
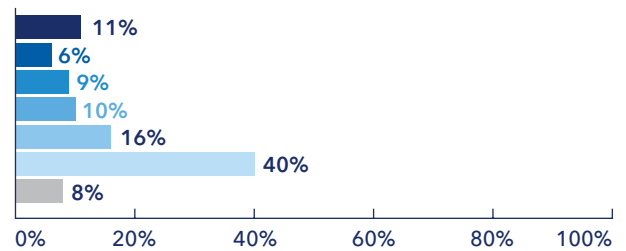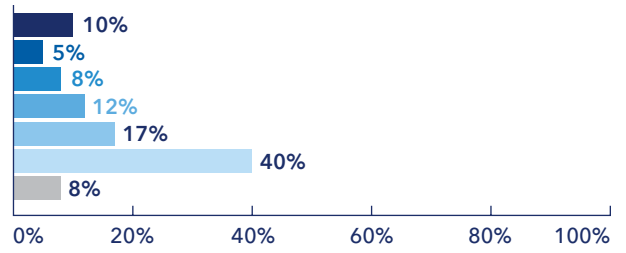

c. Fax
- 1. 1% - 15% of the time - 23%
- 2. 16% - 30% of the time - 6%
- 3. 31% - 50% of the time - 8%
- 4. 51% - 70% of the time - 8%
- 5. 71% - 99% of the time - 8%
- 6. 100% of the time - 23%
- 7. Does not apply; I did not have access to this resource - 24%
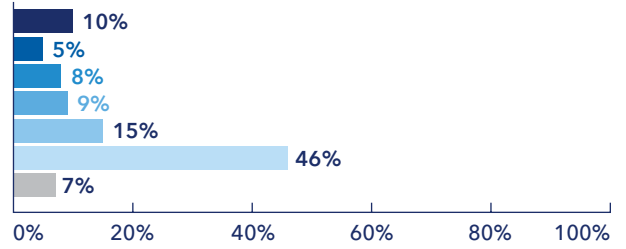

18

d. DoD e-mail account
- 1. 1% – 15% of the time - 10%
- 2. 16% – 30% of the time - 5%
- 3. 31% – 50% of the time - 8%
- 4. 51% – 70% of the time - 12%
- 5. 71% – 99% of the time - 17%
- 6. 100% of the time - 40%
- 7. Does not apply; I did not have access to this resource - 8%

Chart values: 10%, 5%, 8%, 12%, 17%, 40%, 8%

e. Personal e-mail account
- 1. 1% – 15% of the time - 10%
- 2. 16% – 30% of the time - 5%
- 3. 31% – 50% of the time - 8%
- 4. 51% – 70% of the time - 9%
- 5. 71% – 99% of the time - 15%
- 6. 100% of the time - 46%
- 7. Does not apply; I did not have access to this resource - 7%

Chart values: 10%, 5%, 8%, 9%, 15%, 46%, 7%

f. Printers
- 1. 1% – 15% of the time - 12%
- 2. 16% – 30% of the time - 5%
- 3. 31% – 50% of the time - 8%
- 4. 51% – 70% of the time - 10%
- 5. 71% – 99% of the time - 16%
- 6. 100% of the time - 40%
- 7. Does not apply; I did not have access to this resource - 10%

Chart values: 12%, 5%, 8%, 10%, 16%, 40%, 10%
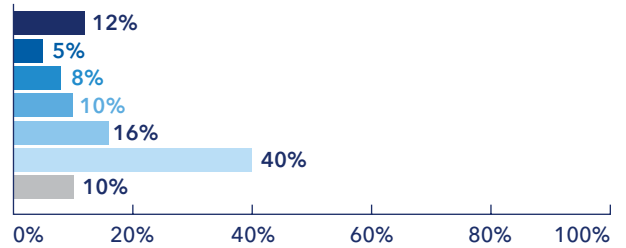
g. Scanners
- 1. 1% – 15% of the time - 16%
- 2. 16% – 30% of the time - 6%
- 3. 31% – 50% of the time - 8%
- 4. 51% – 70% of the time - 9%
- 5. 71% – 99% of the time - 13%
- 6. 100% of the time - 34%
- 7. Does not apply; I did not have access to this resource - 13%

Chart values: 16%, 6%, 8%, 9%, 13%, 34%, 13%
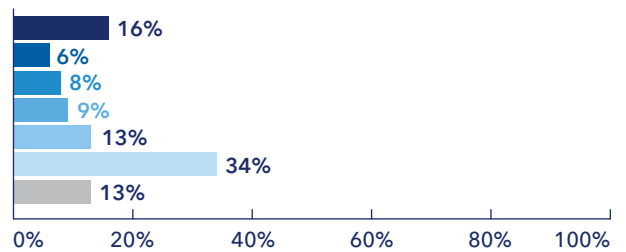
Q75. During 2012, did you fax any of the following materials? (Choices: 1) Yes, using the Federal Voting Assistance Program (FVAP) toll-free faxing service, 2) Yes, but not using the FVAP toll-free faxing service, and 3) No) (Pages 113 - 117, Q75 (a-e) of PDF)
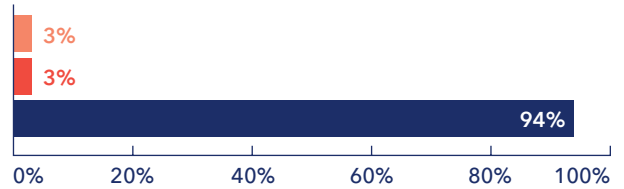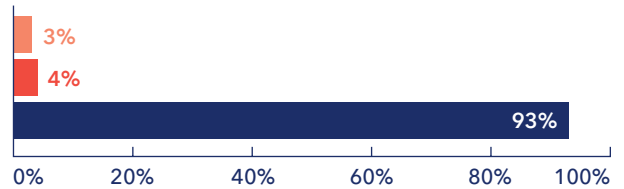
a. Federal Post Card Application (FPCA) for absentee ballot
- 1. Yes, using the Federal Voting Assistance Program toll-free faxing service - 4%
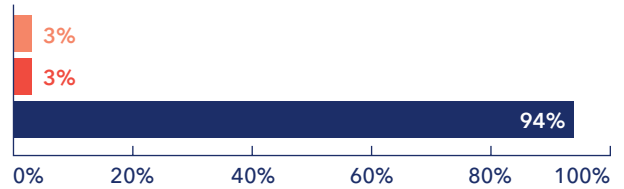- 2. Yes, but not using the FVAP toll-free faxing service - 3%
- 3. No - 92%

4%
3%
92%
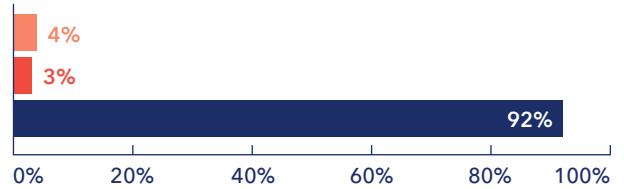
b. Other non-Federal Post Card Application (FPCA) request for absentee ballot
- 1. Yes, using the Federal Voting Assistance Program toll-free faxing service - 3%
- 2. Yes, but not using the FVAP toll-free faxing service - 3%
- 3. No - 94%

3%
3%
94%

c. Voted regular absentee ballot
- 1. Yes, using the Federal Voting Assistance Program toll-free faxing service - 3%
- 2. Yes, but not using the FVAP toll-free faxing service - 4%
- 3. No - 93%

3%
4%
93%

d. Voted Federal Write-In Absentee Ballot (FWAB)
- 1. Yes, using the Federal Voting Assistance Program toll-free faxing service - 3%
- 2. Yes, but not using the FVAP toll-free faxing service - 3%
- 3. No - 94%

3%
3%
94%

e. Other voting materials
- 1. Yes, using the Federal Voting Assistance Program toll-free faxing service - 3%
- 2. Yes, but not using the FVAP toll-free faxing service - 3%
- 3. No - 95%

3%
3%
95%
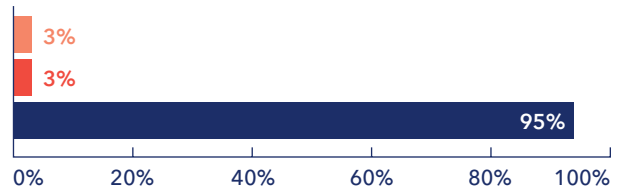
Q77. Did you vote in the 2010 elections for the U.S. Senate and U.S. House of Representatives? (Page 119, Q77 (1-7) of PDF)

- 1. Definitely voted in person – 17%
- 2. Definitely voted by mail – 21%
- 3. Definitely voted by e-mail – 2%
- 4. Definitely voted at an online website – 1%
- 5. Definitely voted by fax – 1%
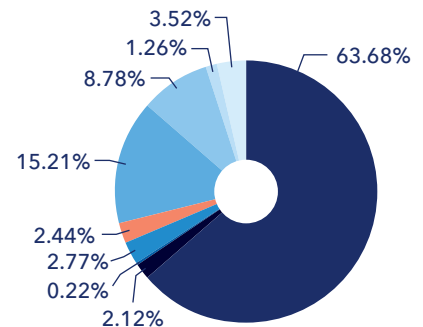- 6. Definitely did not vote – 51%
- 7. Not sure – 8%

17%
21%
2%
1%
1%
51%
8%
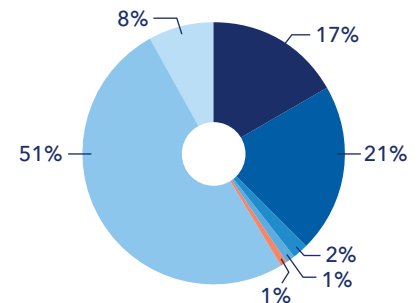
2014 PEVS-ADM Survey Instrument: Excerpted Fax Related Questions

From: *https://www.fvap.gov/uploads/FVAP/Surveys/DMDC_2015_009_Codebook.pdf*

Q22. **How did you complete and return your Federal Post Card Application (FPCA)? Mark one.** (Page 48 of PDF)

1. Mail – 63.68%
2. USPS Express/Certified mail—2.12%
3. FedEx, UPS, DHL, or other delivery carrier—0.22%
4. Federal Voting Assistance Program (FVAP) Electronic Transmission System—2.77%
5. Fax—2.44%
6. E-mail (e.g., as an attachment)—15.21%
7. Online (e.g., through a secure website)—8.78%
8. Installation Voter Assistance (IVA) Office—1.26%
9. Other—3.52%

Pie chart values: 3.52%, 1.26%, 8.78%, 63.68%, 15.21%, 2.44%, 2.77%, 0.22%, 2.12%

Q28. **How did you complete and return your regular absentee ballot?** (Page 50 of PDF)

1. Mail—85.12%
2. USPS Express/Certified mail—2.91%
3. FedEx, UPS, DHL, or other delivery carrier—0.01%
4. Federal Voting Assistance Program (FVAP) Electronic Transmission System—0.33%
5. Fax—0.99%
6. E-mail (e.g., as an attachment)—5.33%
7. Online (e.g., through a secure website)—3.12%
8. Installation Voter Assistance (IVA) Office—0.79%
9. Other—1.41%

*Pie chart values: 3.12%, 5.33%, 0.79%, 1.41%, 0.99%, 0.33%, 2.91%, 85.12%*
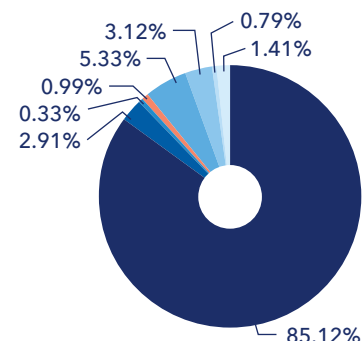
2016 PEVS-ADM Survey Instrument: Excerpted Fax Related Questions (*& Answers)

From: *https://www.fvap.gov/uploads/FVAP/Reports/PEVS_ADM_TechReport_Final.pdf*

Q17. **How did you return your Federal Post Card Application (FPCA) for the November 8, 2016 election?** (Page 168 of PDF)
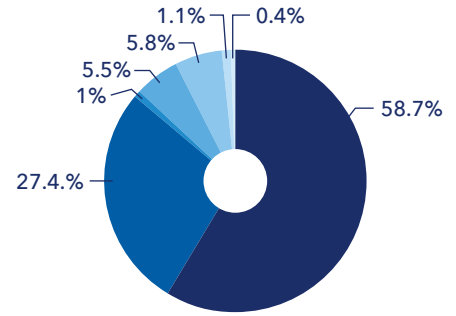
1. Regular mail – 62.8%
2. USPS Express/Certified mail – 6.1%
3. FedEx, UPS, DHL, or other commercial delivery carrier – 0.2%
4. FVAP Electronic Transmission System (ETS) – 4.4%
5. Fax, but not using FVAP ETS – 1.6%
6. Email (e.g., as an attachment), but not using FVAP ETS – 12.8%
7. Online (e.g., through a secure website) – 5.3%
8. Installation Voter Assistance (IVA) Office – 2%
9. Other – 4.7%
10. Refused – 0.1%

Pie chart values: 4.7%, 2%, 5.3%, 0.1%, 62.8%, 12.8%, 1.6%, 4.4%, 0.2%, 6.1%
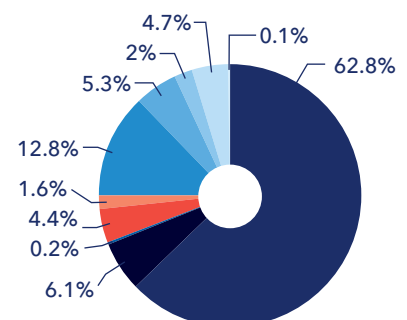
Q20. **How did you obtain your absentee ballot for the November 8, 2016, election?**
(Page 171 of PDF)

- 1. Regular mail – 58.7%
- 2. Fax – 0%
- 3. Email (e.g., as an attachment) – 27.4%
- 4. In person – 1%
- 5. Downloaded ballot from State link on FVAP.gov – 5.5%
- 6. Downloaded ballot from State voting website – 5.8%
- 7. Downloaded ballot from State link at another website – 1.1%
- 8. Other – 0.4%
- 9. Refused – 0%

Q23. **How did you return your absentee ballot for the November 8, 2016, election?**
(Page 172 of PDF)

- 1. Regular mail – 76.3%
- 2. USPS Express/Certified mail – 5.9%
- 3. FedEx, UPS, DHL, or other commercial delivery carrier – 0.5%
- 4. FVAP Electronic Transmission System (ETS) including ETS by Fax and email – 1.5%
- 5. Fax, excluding FVAP ETS – 1.6%
- 6. Email (e.g., as an attachment) – 9.6%
- 7. Online (e.g., through a secure website) – 1.9%
- 8. Installation Voter Assistance (IVA) Office – 0.8%
- 9. Other – 1.9%
- 10. Refused – 0.0%
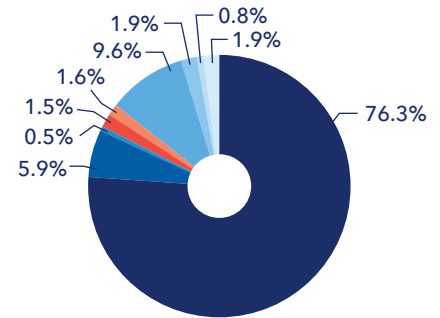
Q32. **In the election held on November 8, 2016, did you definitely vote in person on election day; definitely complete an absentee ballot by mail, email, fax, or online on or before November 8, 2016; definitely not vote; or are you not completely sure whether you voted in that election?** (Page 178 of PDF)

- 1. Definitely voted in person – 12.3%
- 2. Definitely voted by mail – 26.2%
- 3. Definitely voted by e-mail – 3.2%
- 4. Definitely voted at an online website – 1.1%
- 5. Definitely voted by fax – 0.6%
- 6. Definitely did not vote – 49.9%
- 7. Not sure – 6.6%
- 8. Refused – 0.2%
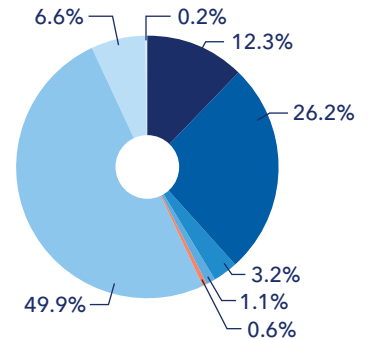
Q46. **How about you—did you vote in the November 4, 2014, election?** (Page 185 of PDF)

- 1. Definitely voted in person – 11.2%
- 2. Definitely voted by mail – 14.8%
- 3. Definitely voted by e-mail – 1.1.%
- 4. Definitely voted at an online website – 0.4%
- 5. Definitely voted by fax – 0.2%
- 6. Definitely did not vote – 61.9%
- 7. Not sure – 10.3%
- 8. Refused – 0.2%
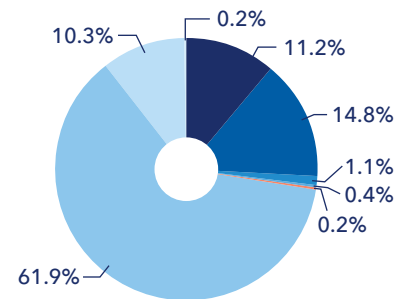
2018 PEVS-ADM Survey Instrument: Excerpted Fax Related Questions (*& Answers)

From: *https://www.fvap.gov/uploads/FVAP/Surveys/FVAP_ADM-Technical-Report-2018.pdf*

Q18. **How did you return your Federal Post Card Application (FPCA) for the November 6, 2018, election?** (Page 181 of PDF)

- ● 1. Mail – 72.8%
- ● 2. FVAP Electronic Transmission System (ETS) - 6.8%
- ● 3. Fax, but not using FVAP ETS – 0.3%
- ● 4. E-mail (e.g., as an attachment), but not using FVAP ETS – 11.6%
- ● 5. Online (e.g., through a secure website) – 4.8%
- ● 6. Installation Voter Assistance (IVA) Office – 0.7%
- ● 7. Other—2.7%
- ● 8.   Refused – 0.2%

Pie chart values: 2.7%, 0.2%, 0.7%, 4.8%, 11.6%, 0.3%, 6.8%, 72.8%
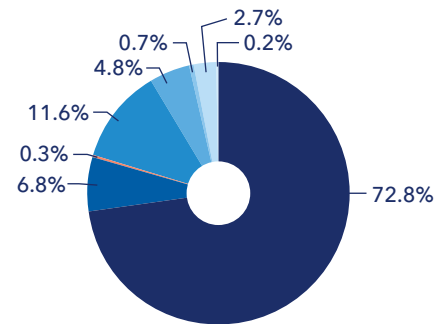
Q21. **How did you obtain your absentee ballot for the November 6, 2018, election?** (Page 184 of PDF)

- ● 1. Mail – 67.4%
- ● 2. Fax – 0%
- ● 3. E-mail (e.g., as an attachment) – 20.6%
- ● 4. In person – 1.7%
- ● 5. Downloaded ballot from State link on FVAP.gov – 4.1%
- ● 6. Downloaded ballot from State voting website – 4.1%
- ● 7. Downloaded ballot from State link on another website – 0.4%
- ● 8. Other – 1.5%
- ● 9. Refused – 0.1%

Pie chart values: 0.4%, 1.5%, 4.1%, 0.1%, 4.1%, 1.7%, 20.6%, 67.4%
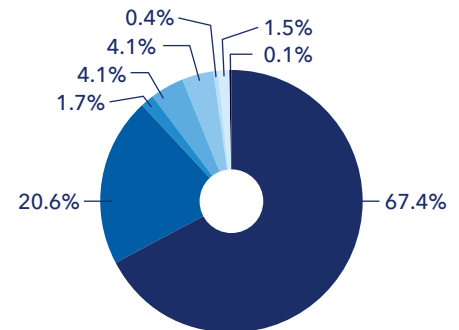
Q24. **How did you return your absentee ballot for the November 6, 2018, election?** (Page 185 of PDF)

- ● 1. Mail – 81.9%
- ● 2. FVAP Electronic Transmission System (ETS) – 1.1%
- ● 3. Fax, excluding Electronic Transmission System (ETS) – 0.8%
- ● 4. E-mail (e.g., as an attachment) – 9.4%
- ● 5. Online (e.g., through a secure website) – 4.0%
- ● 6. Installation Voter Assistance (IVA) Office – 0.5%
- ● 7. Other – 2.1%
- ● 8. Refused – 0.2%

Pie chart values: 0.5%, 2.1%, 4.0%, 0.2%, 9.4%, 0.8%, 1.1%, 81.9%
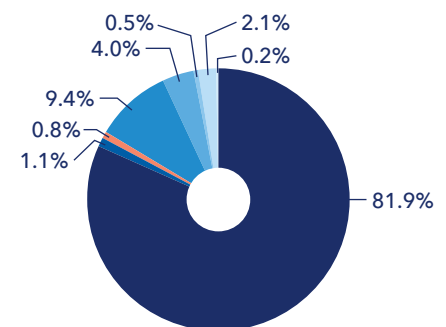
Q32. **In the election held on November 6, 2018, did you definitely vote in person on election day; definitely complete an absentee ballot by mail, e-mail, fax, or online on or before November 6, 2018; definitely not vote; or are you not completely sure whether you voted in that election?** (Page 191 of PDF)

- ● 1. Definitely voted in person – 7.2%
- ● 2. Definitely voted by mail – 13.3%
- ● 3. Definitely voted by email – 1.9%
- ● 4. Definitely voted at an online website – 0.9%
- ● 5. Definitely voted by fax – 0.2%
- ● 6. Definitely did not vote – 67.1%
- ● 7. Not sure – 9.2%
- ● 8. Refused – 0.2%

Pie chart values: 0.2%, 9.2%, 7.2%, 13.3%, 1.9%, 0.9%, 0.2%, 67.1%