INTRODUCTION

This paper explores a novel form of postal services that allow messages or objects to be delivered at a future time specified by the sender. This class of potential products would leverage the ubiquity, skills and resources of the United States Postal Service, a trusted national institution.

Throughout history, individuals have relied on various means of conveying messages and physical objects of personal and sentimental value to recipients in the future. These message techniques have included: wills and last testaments, sealed envelopes, gravestones or graveyard monuments, the contents of family bibles, bank safety deposit boxes, buried jars, and private time capsules or vaults. Some individuals wish to provide ethical wills to their descendents. Other methods have included entrusting messages to a family friend, attorney or an established law firm, or using newspaper ads, internet websites, published books or articles, recorded audio or videotapes, or messages in a bottle. There is a long tradition of artisans and craftsmen leaving personal messages carved within a structure or the interior of a manufactured object.

The reliability of existing delayed message transmission systems heavily depends on a chain of circumstances that can be uncertain, and to some degree on the vagaries of fate. Delivery success may be dependent on the resolve, dedication and persistence of individuals for delivery. For these ad hoc types of delayed delivery mechanisms, not only does the reliability of

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1 The views expressed are solely those of the author. They do not represent the opinions of the Postal Regulatory Commission or any of the Commissioners. The author acknowledges useful discussions with Jodi Berenblatt, who has independently authored a paper on a similar topic.

2 Societies, governments or cultures have more substantial resources to transmit messages into the future. Such societal messaging has included forms such as pyramids, monuments, repositories such as archives or libraries, information included on spacecraft, public time capsules or some form of official publication. Policy statements in legislation can also be considered a form of national message transmission. These means are perhaps more reliable and have more bandwidth, but are more costly per message, are far beyond the means of most individuals, and most importantly, cannot be targeted to one recipient.

3 An ethical will is a document designed to transmit ethical values from one generation to the next.
delivery tend to be low, but costs tend to be quite high. The transactional costs of arranging delayed delivery on a one-off basis are high. Yet, despite the difficulties, uncertainty of reliability and cost, people appear to be interested in the idea of delayed and date certain delivery of mail.

The concept of date-certain delivery is an important factor for certain types of time-sensitive advertising mail. Delivery of certain marketing items too early can be as problematic as delivery too late. For example, call-center staffing or product supplies may not be in place, or there is too much delay between the marketing communication and the purchasing action.

While delayed sending of mail is not yet an option, many email services allow some form of delayed delivery. The use of delayed-action emails is commonplace and well-understood, and is available either as a feature in email programs, as “apps” for web-based email software, or as separate services. Moreover, social media contains examples of time-delayed communications, such as setting a Twitter feed to post certain items at designated times. A traditional “ad buy” permits placement of ads in future publications.

It is well to consider that the time-delayed mail concept provides the opportunity for transmitting not only messages but letters, photos and other tangible objects in a delayed fashion to a geographic address, and the destination can be updated if necessary during the time delay using the existing address correction features of the existing United States postal network, and possibly other postal networks.

This concept could also be expanded to a greater range of mail, including premium services for delay-specified delivery of First-Class Mail or other items. For example, some people may wish to arrange in advance to send birthday greetings to friends or family or business colleagues at the appropriate time. There are several hardcopy letter or package remailing services that emphasize anonymity and privacy protection in their marketing materials, but most also offer time-delayed mailing services.

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4 Examples of time-delay email remailers include TimeCave.com (which has been in operation since 2000 and currently permits messaging up to 12 years in the future), LetterMeLater.com (at least 10 years), EmailAlabi.com (up to 3 years), and FutureMe.org (up to 50 years). Nudgemail.com is an email reminder service. Boomerang is an example of a delayed emailing app for Gmail.

5 Personal greetings of this sort could be placed into an electronic queue, from which they could be deleted should later circumstances require.
Delayed communications can be considered a form of high value / high assurance forward logistics for individuals and others. As such, it also relates to the concept of forward logistics, the emplacement and storage of merchandise for quick deployment to recipients, a significant business area for many companies including the private delivery firms. It may also be used as a new form of remote or backup offsite storage.

VALUE OF THE SERVICE

The variety of approaches people have used to send delayed messages, and the questionable reliability of those approaches, suggests a latent need for an effective, affordable delayed messaging service. Individuals often would like to have items, cards, photos or notes arriving at a particular destination at a given future time. For example, there might be an interest in transmitting at an arbitrary time birthday or holiday greetings or other messages so that each item arrives throughout the year at the proper time.

Potential delayed communications services can be broken into four main categories.

Short term delayed-communications mail: Mail that has a relatively short delivery delay (for example, less than three months). Such mail would proceed through normal channels and is sorted by delivery date and is held in a buffer location.

Long-term delayed communications mail: Mail with a longer delivery delay (for example, longer than three months). Such mail would be sent to a secure mail location for storage and later retrieval.

Date-certain advertising mail. Advertising mail (including catalogues, political mailers, nonprofit solicitations, etc.) that is guaranteed delivery on a specific day.

Contingency mail. This is mail that would be delivered upon the occurrence of a certain contingency.
BURDEN SHIFTING

Delayed delivery is a way to shift the burden, responsibility and cost of mailing items from the originating mailer to the postal operator. This shift will be desirable in some instances but not in others. To perform a similar function internally, the mailer would be required to prepare and retain future mail on the mailer’s premises, and then release it at the proper time. This may involve the risk of loss or the risk of failing to mail the items. Some mailers may prefer to delegate these functions. If storage of future mail is simply a staging operation within the postal network, the postal operator may be able to handle these functions more reliably or simply.

SERVICE FEATURES

The functions required for time-delayed messaging are already familiar within the postal framework. Those features include: acceptance of the mail piece, initial processing, storage, retrieval, transportation, post-processing, address verification and reliable delivery. These features generally exist within the scope of postal networks. The features of delayed and date-certain messaging are described below:

Mail Piece Acceptance

Acceptance of the mail piece. The mail piece would be accepted as would any other postal item. However, particular protective packaging might be required for this service, to reduce the incidence of damage or loss.

Specification of Delay. The sender would specify the time delay within the minimum and maximum limits of the services available.

Contingency Disposition. The sender would be required to specify the preferred disposition of the mail if it proves undeliverable, i.e., whether it should be returned to the sender, sent to an alternate delivery location, held for a period of time for pickup, or else destroyed. The sender can also designate a preferred disposition in the event an undeliverable item cannot be successfully returned.
Digitizing for Redundancy. To increase the reliability of the overall process for particularly important items, the sender could be given the option of having the communications electronically scanned, digitized and stored separately. This would provide a separate opportunity for storage and transmission and would thus reduce the risk of complete loss or failure in cases where the item has a high degree of sentimental or informational value.

Initial Processing

Elapsed Time Trigger or Time Based Addressing. Each item would need to be marked with the specified delivery date, and that date could either be coded into the address using ZIP Codes or some other means, or else separately marked on the item. Mail segregated by delivery date would not require a specific elapsed-time trigger. The collected mail designated for delivery on a particular day would be entered into the mail at the appropriate assigned time.

Pre-Delivery Address Verification. The United States Postal Service (USPS) has developed substantial expertise in address correction and verification systems as a means of reducing levels of undeliverable as addressed (UAA) mail. Existing systems for determining the accuracy of addresses and redirecting the mail pieces could be used to verify the location of the recipient before final delivery. This is less challenging for shorter delay periods than for longer time periods.

Sorting. Sorting by delivery date can use existing mail processing equipment, for example with a set of ZIP Codes assigned to time delay intervals, or other suitable time delay coding. It seems likely that existing USPS mechanisms could be easily and cheaply modified to handle delayed delivery. Delayed delivery items can be sorted into time interval containers and then held for the desired time interval before reinsertion into the mailstream.

\[^6\] PARS – the Postal Addressing Redirection System – is the internal USPS address correction database used for postal redirection of mail with invalid addresses. PARS contains a number of components, including CARS - the Change of Address Record System - (the database of address changes used in the handling of Undeliverable as Addressed (UAA) mail), COARS - Change of Address Reporting System (containing images of change of address forms and historical data), and PAD – the Postal Address Database (containing the entire active change of address database). The external National Change of Address database provided to mailing service vendors is NCOAlink. See Understanding How the Change-of-Address Process Works, National Postal Forum, April 2012, published at: http://npf.org/pdfs/presentations/2012/UnderstandingtheChange-of-AddressProcess.pdf
Storage, Transportation and Retrieval

The mail piece can be sorted and compartmented by final delivery date, and then stored, transported and received as required to achieve that objective. Relatively short delays (for example, less than three months) might be handled in a way aligned with current processing channels, with local short term storage, while longer delays might require accommodation at a dedicated, secure mail storage location. Time-delayed mail pieces could be tracked using intelligent mail barcodes.\(^7\) Another option would be to add a date and color coded sticker on the envelope to indicate the delivery month.\(^8\)

Post-Delay Processing

The mail piece address is then scanned again to verify the delivery date and to assure that the delivery address is current. If the recipient has moved to a new address, this processing would update the address if possible.

Reliable Delivery

Reliability of delivery is a primary requirement for postal products including time-certain delivery. Assured delivery could be via a signature mechanism, perhaps combined with electronic notification. Another option is a general delivery system at a post office, combined with some form of paper or electronic notification.

Addressing should contain the name and location and the delivery date, and it should indicate contingency/recourse in the event of delivery failure, as noted above.

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\(^7\) While Radio Frequency Identification (RFID) tags could potentially assist in location tracking, RFID presently operates only at relatively short range.

\(^8\) This idea is related to the longstanding procedure of color-coded tagging of certain types of mail for intended delivery on a certain day.
DISCUSSION

Infrastructure

The current U.S. postal network contains many existing features that are consistent with offering a time-delayed mail product:

- An established organization with more than 230 years of operation;
- A national network serving and updating 152 million delivery addresses;
- Ready access to postal networks of other nations serving billions of addresses;
- Widely accepted mail addressing conventions;
- Postal Automated Redirection System (PARS) and similar address correction systems;
- Address updating systems such as National Change of Address (NCOA);
- Ability to use ZIP Codes and/or Intelligent Mail barcode to encode delivery date;
- Automated sorting and processing systems;
- Existing systems for handling high value or high assurance accountable mail, such as registered mail or insured mail, or express shipping;
- Employees trained in mail acceptance, mail processing and mail delivery;
- Available logistics storage space;
- The familiar system of Forever (nondenominated) postage for letters and packages;
- Last-mile delivery network and delivery employees with detailed route knowledge;
- More than 30,000 local post office facilities;
- More than 200 federal laws protecting the integrity of the mail;
- Enforcement of postal integrity by the Postal Inspection Service;
- Existing liaison with law enforcement; and
- Public confidence in the governmental postal network.

However, implementation of delayed delivery mail would likely require some additional elements such as:

- New handling and intake procedures;
- Particularized training and staff to carry out certain functions;
- Secure storage locations;
• New addressing conventions to incorporate the time delay and contingency elements;
• Envelope markings to clearly indicate time delay and aid in handling;
• Enhanced address redirection/contingency handling procedures;
• Price structure;
• Potential use of image scanning and electronic file storage for redundancy; and
• Possible use of RFID for item tracking.

Costs

Costs for a delayed and date-certain delivery service can be estimated by summing the costs for ordinary mail processing and adding additional costs from these activities: 1) acceptance; 2) processing; 3) storage; 4) retrieval; 5) reliable delivery; 6) contingency disposition including return or redelivery if necessary, and 7) insurance considerations. The costs for delayed delivery services would be high relative to ordinary mail, but would be significantly less expensive and more reliable than the types of ad hoc delayed-messaging options that may currently be available to the public. Additional costs would include those associated with storage and retrieval, additional labor, special processing, and protective envelopes.

Pricing

Delayed and date-certain delivery service is a premium product. In theory, price could vary with shape, weight and time delay. One concept would be a simplified flat fee approach with the price for a letter or package held constant whatever the time delay up to the maximum time delay permitted. Another approach would be to charge by the delay length: the longer the delay, the higher the price.
Risks

Risks of unsuccessful delivery fall into five categories, described below as a function of time. Reliability as a function of time is:

\[ \text{Reliability} (t) = (1 - r_{val}(t)) \cdot (1 - r_{loss}(t)) \cdot (1 - r_{del}(t)) \cdot (1 - r_{dis}(t)) \cdot (1 - r_{con}(t)) \]

where \( r_{val}(t) \) = risk of uncorrectable delivery address validity with respect to time;

\( r_{loss}(t) \) = risk of loss or damage with respect to time;

\( r_{del}(t) \) = risk of retrieval or delivery failure with respect to time;

\( r_{dis}(t) \) = risk of service discontinuance with respect to time; and

\( r_{con}(t) \) = risk of lack of institutional continuity with respect to time.

The risks most affected by the passage of time are address validity (because an appreciable portion of the population moves each year) and loss or damage. Estimating the reliability of such a product is beyond the scope of this overview, but none of the risk factors seem insurmountable and reliability would not seem to present an obstacle to such a product offering.

One other addressable risk is that of processing and delivery peak congestion problems – specifically, senders’ interest in designating particular days (such as Christmas Eve or Mother’s Day) for delivery of items. In the current network, parcel congestion poses challenges for the winter holiday season, but letter mail no longer presents significant challenges. In this instance, the fact that this volume is known in advance is helpful in taking steps to prevent stressing the system. Premium pricing or quotas could be used to limit the overflow on the busiest days.

Address validity. This is the risk that the delivery address is no longer valid and cannot be updated or corrected. Because the delivery location may change between the acceptance of delayed mail and its assigned delivery time, addressing and address correction take on a critical role. USPS and other postal operators have address updating software and procedures designed to correct outdated addresses with high reliability. Address verification and correction can take place at several points: 1) upon entry of the mail piece, 2) “on the fly” during the delay, and/or
3) immediately prior to delivery. There might be provision for the sender to update the delivery address or delivery time, for a fee.

*Loss of or damage to the mail piece.* This includes loss or damage due to fire, flood, accidents, pilferage, mishandling, weather events, natural disasters, civic disruption, terrorist incidents or war. The storage, sorting and transmission of items must be done in ways that minimize the possibility of damage, such as fireproof containers and special handling by postal employees. High value letters and tangible items could be subject to damage while they are in the custody of USPS. To further help reduce these risks, USPS could offer for sale protective envelopes or containers to help safeguard the mailpiece, such as acid free envelopes providing strong physical protection, in combination with the premium service, and may even require use of such protective envelopes.

Image scanning and separate remote storage of scanned images would add a measure of reliability, at an additional cost and only as an optional service. This may be useful for items of sentimental value or to increase assurance of delivery over larger delay times.

*Delivery reliability.* Assured delivery is an important aspect of time-delayed mail. Processes already used for important items such as express letters and packages, and registered mail could be adapted to this product.

*Service discontinuance.* Discontinuance of the service offering is a risk associated with this service. Purchasers could be given the choice of whether the mail piece should be delivered or returned should the service be discontinued prior to the delivery date. 3mindme, a delayed email service ceased operations in 2011 and at that time delivered all its remaining messages.9

*Institutional Continuity.* Delayed and date certain postal communications require the continued existence of the postal operator or its successor to carry out the delayed delivery function. This is not a material factor for ordinary mail, but organizational continuity becomes more vital as the time delay increases. By accepting mail for delayed delivery, particularly long-delayed delivery, the postal operator takes on both a custodial responsibility and a fiduciary responsibility to take reasonable steps to deliver the item as had been arranged. The continuity

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9 See [http://3mindme.com](http://3mindme.com).
of the postal operator is crucial because carrying out these duties require assurance during the entire time delay.

In the United States, several reasons suggest institutional continuity. First, enabling basic postal service is a governmental function, mentioned in the Constitution and embodied in federal law.\(^\text{10}\) Second, the USPS is responsible for a large portion of the national economy, supporting 1.3 trillion dollars in sales revenue, over 8.6 percent of the U.S. Gross Domestic Product (GDP).\(^\text{11}\) While some of this can be replaced with electronic substitutes, much of it cannot. Third, there must be some way to connect people with their government -- governments at all levels need to know where people actually reside, own property and work for purposes of governance, taxation, benefits, schooling, voting and civic functions. Fourth, the Postal Service is the keeper of the national address system, and administers tools such as the National Change of Address (NCOA) system, serving more than 152 million delivery addresses.

One way of overcoming organizational continuity concerns for delayed delivery services would be to purchase insurance to pay for subcontracting or residual fiduciary delivery responsibilities.

OTHER POTENTIAL APPLICATIONS

There are a number of other potential applications for delayed delivery mail, including:

- Images tagged/extracted from a photostream or social media account to be sent to a grandparent, relative or other interested persons;
- Combining into a single transaction multiple mail pieces to be sent at different times;
- Flexible offsite storage of backup data with automated return; and

\(^\text{10}\) Congress’s power to establish post offices and post roads is specified by the United States Constitution. U.S. Const. art. I, § 8, cl. 7. Most law describing USPS authority and responsibilities is contained in Title 39 of the United States Code.

\(^\text{11}\) USPS 2013 Annual Report and Comprehensive Statement at 45 (citing a study by the Envelope Manufacturers Association).
• Opportunities for serving interactive online gaming or interactive fiction markets.¹²

ADVERTISING

The concept of date certain delivery is important to many advertisers. Advertisers and other business mailers often find it useful to have their mail piece arrive at its destination on a specific day, or a specific day of the week. The phrase “in home dates” has been used to bracket desired arrival dates for delivery-date sensitive items. When such pieces arrive too early or too late, it may blunt or eliminate their usefulness, or cause difficulties in fulfillment or sales desk assistance. For example, a catalog arriving at the wrong time could cause difficulties or wastage in call center or help desk staffing. A flyer advertising a sale must be received on the correct day to be most effective. An election flyer optimally arrives immediately before the election.

The arrival date of a mail piece can substantially affect the critical factors of the open rate and the read rate for a direct mail piece, and thus impact response rates. Arrival of direct mail on certain days may be less suitable from a marketing perspective, for example on a Monday, or the Tuesday after a Monday holiday. Mistimed mail can also be affected more by “mailbox clutter”, or to a greater degree by distractions from other mail.

For these reasons, knowing which day a mailing will arrive in the home is very useful to certain mailers. Advertisers already take important (and often costly) steps to help ensure that their marketing targets receive their message at the right time. Nevertheless, an advertising mail product with date certain delivery could be of interest to some mailers.

Most advertising mail is heavily workshared and dropped to the Destinating Delivery Unit, Sectional Mail Facility or other nearby mail processing center, so the date of delivery is in some cases already well-defined. Advertising mailers and the printers and other companies that serve them attempt to accommodate known processing practices to secure the desired delivery date result. Nevertheless, desired delivery dates are not always achieved. Origin entered mail

¹² Videogames, interacting gaming, social games and massively multiplayer online role-playing games (MMORPG) had sales of $93 billion in 2013 and were expected to grow to $111 billion in 2015, according to a Gartner research study. Role playing games (RPG) have a dedicated following of millions of participants.
traverses diverse portions of the postal network, and thus the date of delivery can vary to a much greater extent.

Should the Postal Service evaluate procedures to help guarantee date certain mail delivery, it could lead to worthwhile added-value services for various types of mail.

CONCLUSIONS

A time-delayed postal communications product would provide a valuable service tapping the resources of the existing postal network, and may merit further evaluation. There appears to be both interest in and need for a reliable implementation of such a service. However, such a service may also pose several logistical and administrative challenges.

The robust existing features of a postal network would support most but not all aspects of a delayed and date-certain delivery postal product. Mail sorting equipment can distinguish items designated for future delivery and sort by delivery timeframe for storage. However, address verification and correction would require added attention to provide reliable delivery. Costs would be higher than ordinary postal products, but such a product would be highly competitive with the unsatisfactory and/or costly choice of non-postal delayed delivery solutions currently available, such as hiring a law office or relying on a third party to arrange delayed delivery.

The reliability of a time-delayed mail product can be assessed by evaluating the risk factors with respect to time. These risks can be reduced through careful planning, decentralization, packaging and possibly by adding redundancy in the form of optional digitization.

Finally, date-certain delivery of advertising mail is a different type of product altogether than time-delayed mail. Most advertisers already take measures to reduce their window of delivery. However, a USPS product specifying a narrower delivery window may be attractive to some business mailers.