BEFORE THE
POSTAL REGULATORY COMMISSION
WASHINGTON, D.C. 20268–0001

SERVICE PERFORMANCE MEASUREMENT SYSTEMS FOR MARKET DOMINANT PRODUCTS	Docket No. PI2015-1

RESPONSES OF THE UNITED STATES POSTAL SERVICE TO QUESTIONS 1-14 OF CHAIRMAN'S INFORMATION REQUEST NO. 4

The United States Postal Service hereby provides its responses to the above-listed questions of Chairman's Information Request No. 4, issued on November 18, 2015. Each question is stated verbatim and followed by the response. The Postal Service also provides an Excel worksheet in response to question 10 of Chairman's Information Request No. 4.

Respectfully submitted,

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1. **Please refer to the Revised Response of the United States Postal Service to Question 4 of Chairman's Information Request No. 3, October 7, 2015, at 2. With respect to measuring service performance of commercial mail, the Postal Service refers to Seamless Acceptance Service Performance (SASP), Business Information Data Store (BIDS), and Intelligent Mail Accuracy and Performance Systems (IMAPS).**

   a. **Please identify the commercial mail, market dominant, products (or components of a product) that uses SASP, BIDS, and/or IMAPS.**

   b. **Please provide a description of SASP and BIDS. Include operation manuals, cites to publicly available information, or other descriptive material as appropriate.**

   c. **Please discuss whether or not the Postal Service Plan will replace (partially or fully) SASP and/or BIDS?**

RESPONSE

a. The following groups (classes, sub-classes) of commercial mail are covered by Seamless Acceptance and Service Performance (SASP), Business Intelligence Data Store (BIDS), and Intelligent Mail Accuracy and Performance System (IMAPS): Presort First-Class Mail letters/cards and flats, Periodicals, Bound Printed Matter Flats, and all Standard Mail products except Parcels.

b. Seamless Acceptance and Service Performance (SASP) is an application that integrates mailer manifest data with mail processing operational data enabling calculation of commercial mail service performance (Full Service only). After matching manifest data (eDoc) with operational data (Appointments, Container scans, Bundle Scans, Piece Scans), SASP applies service measurement business rules to calculate Start-the-Clock, Expected Delivery Date, Anticipated Delivery Date, and Service Variance. Business rules are also applied to exclude mail from measurement when there is inaccurate mailer-provided manifest data

or lack of mail visibility data that would impact the accuracy of the measurement calculations.

Service Measurement results are transmitted from SASP to the Business Intelligence Data Store (BIDS) to enable service reporting to the Commission and internal diagnostics by postal management. BIDS aggregates data received from SASP on the basis of year, quarter, month, week, delivery day, area and district. Data also are aggregated by mail class, shape, and other business attributes. Actionable data for mailpieces that did not meet service expectations are provided to postal field managers to enable diagnosis of root cause and potential remediation. Postal managers access data from BIDS through web reports.

Automated quality checks are employed to ensure integrity of data that are calculated in SASP, fed into BIDS, and subsequently aggregated within BIDS. Third-party quality checks provide an additional level of control to ensure data accuracy.

c.   The proposed internal Service Performance Measurement system is intended to partially replace SASP and BIDS. If the proposed SPM Plan is approved by the Postal Regulatory Commission, then the proposed system will only replace the service performance measurement portion of SASP and BIDS.

2.   **Please refer to the Revised Response of the United States Postal Service to Question 4 of Chairman's Information Request No. 3, October 7, 2015, at 2. The Postal Service states: "[t]here are significant differences between the current external and hybrid systems and the proposed internal SPM system. Therefore, there is no expectation that the service scores generated by the current and proposed systems will be identical." Please explain how the Postal Service will compare the service scores obtained under the current and proposed systems, including the proposed methodology for such comparisons.**

RESPONSE

The Postal Service intends to compare the service scores obtained under the current and proposed systems at the national, area, and district levels for each product. The analysis will use two-sided t-tests for individual score metrics and multiple comparison tests across score metrics to compare the results and identify whether the differences are statistically significant.

For differences determined to be statistically significant, additional root cause analyses will be conducted to identify the factors causing the differences. These analyses will compare the First Mile Profiles for Single-Piece First-Class Mail in the proposed system with analogous metrics using data from the External First Class measurement (EXFC) system. Similarly, Processing Duration Profiles and Last Mile Profiles for Single-Piece and Presort First-Class Mail letters/cards and flats, Periodicals, Standard Mail letters and flats, and Bound Printed Mail flats will be compared between the proposed system with the analogous metrics from the Intelligent Mail Accuracy and Performance System or EXFC. The differences between systems for these component metrics will be analyzed to determine the extent to which each component metric contributes to differences in overall

service measurement results.   The goal of the root cause analyses is to explain

significant differences and validate that the new measurement approach

provides accurate service performance results.

3. **On page 7 of the Statistical Design Plan, the Postal Service states: "[t]he actual and scheduled collection times for all managed collection points will be used to develop a Collection Profile."**

   a. **Please define "scheduled collection times."**

   b. **Please explain what collection points will serve as "managed collection points."**

RESPONSE

a. A scheduled collection time is the earliest time that a carrier is expected to retrieve mail from a collection point on a particular day of the week consistent with the schedule established for that collection point.

b. Managed collection points are locations (collection boxes, wall chutes, etc.) with a defined schedule for collections, having a USPS label (Decal 55B) with the collection schedule and a barcode inside the box/chute that postal personnel scan to generate a record of collection activity.

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4. **On page 7 of the Statistical Design Plan, the Postal Service states: "[t]he Collection Profile will be calculated based on the evaluation of daily Postal Service personnel scanning activities for managed collection boxes in the Collection Point Management System (CPMS) with eligible box types and location types." Please indicate what box types and location types are considered eligible.**

RESPONSE

The box types from CPMS that are eligible for inclusion in the Collection Profile and First Mile sampling include the following: Jumbo Snorkel, Jumbo Standard, Large, Large Snorkel, Mail Chute, Post Office Lobby Dropbox, Post Office Vestibule, Post (which is an older style mailbox mounted on a post), Snorkel, Standard, and Wall. Ineligible box types include the following: Express Snorkel, Express, Firm, Hub/Depot, Other, Priority, Priority Snorkel, and Rack. These latter types are ineligible because they are not designated for deposit of Single-Piece First-Class Mail.

The location types from CPMS considered eligible include the following: Customer Dock, Customer Lobby, Government Building, Mail Room, Airport, Approved Shipper, Contract Station, Other, Business, Post Office Lobby, Post Office Outside, and Residential. Currently, there are no excluded location types.

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5. **On page 8 of the Statistical Design Plan, there is a description of the methodology for estimating density in the collection boxes for a day of the week. Please discuss whether or not the Postal Service will initiate any testing to compare the (statistical) variation between the estimates obtained using the described methodology and the actual density of the particular collection boxes. If so, please describe the methodology for such testing and provide the results when available.**

RESPONSE

To develop the methodology for estimating the densities in collection boxes where density information is missing altogether or missing for certain days of the week, the Postal Service analyzed the density data collected during a one-year period (May 2014 – April 2015), which included density information for approximately 54 percent of the collection points. Analysis was first performed to identify and remove obvious outlier density records, followed by a General Linear Model analysis to determine the most influential factors in explaining variation in density among collection points. Once the factors were identified, analysis was performed to establish the method for imputing missing density values. This analysis consisted of running a simulation model 100 times to randomly remove 25 percent of the available density estimates to develop testing datasets. The simulation model then imputed the missing values using the planned methodology and compared the predicted values to the actual density to test the model fit. The methodology for estimation was refined through an iterative process of running the analysis with an imputation approach, examining the results, refining the approach, and re-running the analysis. The Postal Service plans to repeat the analysis during the Postal Quarter 1 FY16 using the data from the nationwide density testing conducted during August and September 2015.

The analysis will also assess the completeness of the density testing and,

conversely, the frequency, if necessary, to use the imputation method for missing

values. The results will be reported in USPS Library Reference PI2015-1/2.

6.   **On page 12 of the Statistical Design Plan, the Postal Service states that initial sampling targets are set at approximately 200 collection boxes per week per district. Is this calculation based on the formula presented on page 11 of the Statistical Design Plan? If not, please explain. Please show the sampling calculations resulting in 200 collection boxes per week per district.**

RESPONSE

The formula on page 11 of the Statistical Design Plan was the primary basis for the target. An additional factor was included to establish a minimum number of sampling requests per 3-digit ZIP Code area per week. That minimum number increases the number of sampling requests slightly in some postal districts comprised of a large number of 3-digit ZIP Code areas.

The following shows the calculations which result in a target of approximately 200 collection points per week per district.

$$N = \frac{(0.985) * (1 - 0.985)}{(0.017/1.96)^2} = 196.4$$

In the formula, 0.985 represents the proportion of mail expected to have 0 days in First Mile and 0.017 represents the weekly target precision level.

7.   **On page 12, footnote 7, of the Statistical Design Plan, the Postal Service
       refers to some small number of 3-digit ZIP Codes that "will be excluded
       from the Carrier Sampling process but will be included in other aspects of
       measurement."**
       a.   **Please identify the 3-digit ZIP Codes that will be excluded from the
              Carrier Sampling process.**
       b.   **Are these ZIP Codes identical to those currently excluded from the
              External First-Class measurement system (EXFC)? If not, how do
              they differ?**
       c.   **What is the Postal Service referring to when it states "other aspects
              of measurement"?**

RESPONSE

a.   The 3-digit ZIP Codes excluded from the Carrier Sampling process related to the

       First Mile Profile are as follows: 059, 101, 102, 311, 332, and 753. These ZIP

       Codes have been excluded from the sampling process because each has very

       few eligible collection points.

b.   The 3-digit ZIP Codes excluded from Carrier Sampling are not exactly the same

       as those excluded from EXFC for inductions, but are similar. ZIP Code 059 is

       excluded entirely from EXFC because of the very low number of collection and

       delivery points. Additionally, ZIP Codes 101, 102, 311, 332, 753, and 772 are

       excluded from EXFC test mail inductions, but do have destination test mail. ZIP

       Code 772 is excluded from inductions in EXFC because there are a limited

       number of collection points eligible for EXFC inductions. However, the ZIP Code

       will be included in the Carrier Sampling process because a larger number of

       collection points are eligible.

c.   While the ZIP Codes will be excluded from sampling for First Mile, they will be

included in the Collection Profile if there are eligible managed collection points, in

the Retail Profile if they have eligible retail locations, in Processing Duration

calculations, and in Last Mile sampling.

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8.   **On page 13 of the Statistical Design Plan, the Postal Service indicates that there is still a risk that sampling targets for flats will not be achieved. On the same page, the Postal Service provides some general ideas of what can be done to decrease or eliminate such risk.**

      a.   Please indicate a time frame when the Postal Service expects to solve, or at least minimize, this problem?

      b.   Please describe the Postal Service's ongoing efforts aimed to ensure that sampling targets for flats are achieved.

RESPONSE

a.   The Postal Service will evaluate the success in achieving all sampling targets during the parallel testing phase and during ongoing operations of the proposed system, with ongoing adjustment processes built into the system. Assessing the degree of success and adjusting the usability factor to make additional requests (or fewer requests if targets are overachieved) is already designed as part of the system. The success in meeting targets will be assessed after each fiscal quarter and enhancements to the sampling process will be undertaken, if the adjustment process in place is deemed insufficient.

b.   The Postal Service has designed the employee handheld scanners to be capable of signaling requests for sampling for letters only, flats only, or a certain number of letters and flats. This design allows for additional sampling requests to be made focused only on flats, should that be necessary. Other potential solutions will be considered, such as using the results from sampling to determine which collection boxes are more likely to have flats. Analyses would be conducted during the parallel testing phase and would rely on correlating data about factors

such as box density and box locations with the presence of available flats to

develop flats density estimates which could be used for sampling.

9.   **On page 19 of the Statistical Design Plan, the Postal Service states: "[t]he initial sample size targets were established leveraging the available data from the current service measurement systems." Please describe what data from the current measurement systems the Postal Service used in the process of estimating the initial sample size targets.**

RESPONSE

Data from the Intelligent Mail Accuracy and Performance System were used for this analysis, specifically the Last Mile data which indicate the processing scans each piece received, the Processing Duration, the date delivered to the external reporter, to which sampling group each piece belonged, and the destination district. The data from Quarter 2 FY15 were used for this analysis.

10. **On page 19 of the Statistical Design Plan, the Postal Service states: "[t]he selected sample size of 3,000 delivery points per week per district, or approximately 500 delivery points per day is expected to be sufficient to yield the precision levels in Table 6.1 below for 90 percent of districts for the required quarterly service performance estimates."**
    a. **Please confirm that the sample size of delivery points per week per district would not differ by district. If not confirmed, please provide the range for delivery points per week per district.**
    b. **Please describe the statistical methodology and provide the resulting calculations (including the worksheets) used to estimate the sample size of delivery points (per week per district).**

RESPONSE

a. The initial targets were set at 3,000 delivery points per district per week for all

districts except Caribbean, which was set at 2,500 delivery points per week,

Honolulu, which was set at 2,100 delivery points per week, and Alaska, which

was set at 1,500 delivery points per week. The lower targets for Caribbean,

Honolulu, and Alaska were established by analyzing the number of delivery

points and delivery routes in these districts, and were set to balance statistical

precision objectives and operational impact.

b. Last Mile data including processing scans and receipt date information from

Quarter 2 FY15 for all Intelligent Mail Accuracy and Performance System

reporters were compiled and software programs were developed to simulate the

sampling approaches under consideration. The simulations were run 500 times

each to gather statistics about the accuracy and precision of the service

performance estimates at both national and district levels. The results from the

simulations were analyzed to select the sampling model that best met statistical

and operational objectives. Statistical objectives included meeting targets for

margin of error and minimizing bias. Another operational objective was to limit the percentage of sampling requests in which there would be no mail available to scan at the delivery point for the sampling date. Once the sampling approach was determined, the initial sampling targets were selected by examining the simulation results for weekly and quarterly time periods. The Postal Service analyzed the margins of error at the district level using the minimum, 10th percentile, median, 90th percentile, and maximums among the 67 districts for each Last Mile sampling group. The worksheet showing the results from the simulation runs has been provided as an Attachment to this response. See <Attachment.ResponseChIR4Question10b.xlsx>.

11. **On page 31 of the Statistical Design Plan, the Postal Service discusses two types of non-sampling errors.**

   a. **Has the Postal Service initiated any testing to evaluate the impact of these errors? Please provide the results of such testing, if applicable.**

   b. **Is the Postal Service anticipating (under certain conditions in the near future) these errors will lose significance to the degree they could be dismissed without consideration? Please indicate any underlying conditions and the possible time frame.**

RESPONSE

a. Currently, no testing has been initiated to evaluate the impact of non-sampling errors.

b. The first example of non-sampling error, related to mail without scans, has diminished significance, as long as the volume of mail without scans is small. The Postal Service has several ongoing initiatives focused on increasing visibility and therefore continuously increasing the proportion of mail with scannable barcodes that can contribute data for measurement.

   The second example of potential non-sampling error is related to using the data from accountable Single-Piece First-Class Mail accepted at postal retail counters to represent First Mile duration for all single-piece mail accepted at retail units. Because standard operating procedure is for such accountable and non-accountable pieces to be simultaneously dispatched to plants for processing, the Postal Service considers accountable Single-Piece First-Class Mail accepted at retail to be representative of the First Mile experience for all single-piece mail

accepted at retail. Accordingly, there is currently no plan to sample non-

accountable pieces mailed at retail units to compare with the Retail Profile data.

12. **Please refer to Library Reference USPS-LR-PI2015-1/1, slide 7. The Postal Service provides a brief explanation of the density test process, which "[u]ses an actual count for letters or records a linear measurement of letters contained in the box," "[c]onverts linear measurement to pieces currently at 227 pieces per foot" and adds "actual piece counts for flats and small parcels." It also indicates that "[m]ail density is measured at least once annually."**

   a. **Please explain how the Postal Service defines "linear measurement of letters" and under what conditions the actual count for letters in a tested collection box is substituted.**

   b. **Please explain how the Postal Service estimated the 227 pieces per foot, and how often the corresponding number will be re-evaluated.**

   c. **Please clarify what the Postal Service means by adding "actual piece counts for flats and small parcels."**

   d. **Please explain if the Postal Service is undertaking density testing for each collection point separately for letters and flats. If not, please explain how the Postal Service is going to achieve the sampling targets for flats.**

   e. **Using an example, please illustrate the density testing process for a collection box.**

   f. **Please indicate if the Postal Service accounts for any seasonal differences in mail density in a particular collection point. If so, please provide the methodology. If seasonal differences are not accounted for, please explain why not.**

RESPONSE

a. Linear measurement of letters refers to the process in which the letters are measured with a ruler (or other linear measuring tool) to estimate the number of letters in the group. This substitutes for an actual piece count when such a count cannot be performed in an expedited manner.

b. The search for records that would precisely explain the derivation of the conversion factor has not yet proven fruitful. On the basis of collective institutional knowledge, it can be reported that the conversion factor was

developed before 2001 as an industrial engineering initiative to standardize the estimation of First-Class Mail letter/card mail volume observed in various mail processing operations, when actual piece counts could not otherwise be obtained efficiently. For the sake of internal consistency, the conversion factor was adopted for estimating volumes of single-piece First-Class Mail letters/cards retrieved from collection boxes. Since 2001, the Postal Service has not observed changes in the physical characteristics of single-piece First-Class Mail that would trigger concern that the conversion factor is any less reasonable than when it was developed, or that there is an imminent need to revisit the basis for the conversion factor for purposes of implementing the proposed Service Measurement Plan.

c. A manual count of flats and small parcels found in collection boxes during the density is added to the estimated piece count of letters to determine the total volume in the collection box.

d. While the density testing process does not record volume information separately for letters and flats, the Postal Service will use information about the relationship between total density and the presence of flats in randomly sampled collection points to refine the flats density estimation process if the initial approach fails to meet the sampling targets.

e. The following example illustrates the density testing process for a collection box:

-- The employee walks up to the collection box.

– The employee opens the collection box and scans the Collection Point

Management System barcode.

– The employee then removes the current flat tub and replaces with an empty

flat tub.

– The employee locks the collection box and takes the full tub back to mail

truck.

– The employee conducts a physical count of flats and small parcels.

– Linear measurement is used to estimate the number of letters.

– After adding together the flats and small parcels and letters volumes, the

employee enters the total into the handheld scanner in the Collection Box

Density screen.

f. Under current design, the density tests are conducted simultaneously for all

collection points over a few week time period each year. Using the same time

period for all boxes provides a standard basis for evaluating the fluctuation of

volumes across days of the week and across the collection points. For service

measurement purposes, the data from these tests are used to determine the

proportion of total collection volume which each collection point represents.

These proportions are then applied to processing volumes to estimate the

Collection Profile and the First Mile Profile. The general seasonal differences

expected for all collection points (e.g., more mail in December) will be accounted

for when Collection Profile results are applied to the processing volumes.

13. **Please refer to Library Reference USPS-LR-PI2015-1/1, slide 22. The Postal Service states: "[d]elivery points with higher expected volumes will have proportionally greater chances of selection." Please confirm that the methodology for estimating mail density of delivery points is the same as the methodology for estimating mail density of collection boxes. If not confirmed, please explain the difference and provide the methodology to estimate mail density of collection points.**

RESPONSE

Not confirmed. The methodologies for estimating the volume of mail at collection points and delivery points differ.

For delivery points, the Informed Visibility system will accumulate information from mail processing each day to estimate the number of pieces expected at each delivery point. The estimates will consider the last processing operation type, date, and time observed for each piece of mail for the delivery point for the current day and prior four days. The probability for each piece to be delivered on the current sampling day will be calculated based on historical performance. For example, suppose that an address has only 2 presort letters observed by scan data during the inventory period, one with a probability of 0.97 and one with probability of 0.02 of being delivered on that sampling date. The expected pieces would be 0.97+0.02=0.99 for the delivery point for presort letters. The methodology is described in the Statistical Design Plan, Section 6.1.2, with the primary steps detailed in Step 3.

The methodology for estimating mail density at collection points is described in the Statistical Design Plan, Section 4.1.1.

14. **Please refer to Library Reference USPS-LR-PI2015-1/1, slide 22. The Postal Service states: "[t]here is a configurable maximum number of pieces to scan at a delivery point." Please explain how the Postal Service estimates the maximum number of pieces to scan (at a delivery point).**

RESPONSE

The maximum number of pieces to scan was determined by combining information about delivery point volumes with assessments of operational feasibility. For initially setting the maximum, data from the Intelligent Mail Accuracy and Performance System (IMAPS) reporters were compiled for the most recently completed four quarters (Q4 FY14 and Q1-Q3 FY15) to summarize how many pieces each reporter scanned per day. IMAPS reporters are expected to scan all Intelligent Mail barcoded pieces delivered to their address. The data were summarized across days of the quarter to show the proportion of reporter/day combinations having n scanned pieces, where n = 1, 2, 3, etc.. While these data differed across quarters, at least 90 percent of reporter/day combinations had 10 or fewer pieces scanned and at least 97 percent of reporter/day combinations had 15 or fewer pieces scanned in the four quarters examined.