



Defense Research, Surveys, and Statistics Center (RSSC)

# 2014 Status of Forces Survey of Active Duty Members

## Statistical Methodology Report



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**2014 STATUS OF FORCES SURVEY OF ACTIVE  
DUTY MEMBERS:  
STATISTICAL METHODOLOGY REPORT**

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RSSC's Statistical Methods Branch, under the guidance of David McGrath, Branch Chief, is responsible for the all statistical aspects of this survey, including, sampling, weighting, imputation, and the implementation of statistical hypothesis testing used in the survey program. Eric Falk, RSSC, supervised the sampling and weighting process and provided consultation. The lead statistician was Jeff Schneider, RSSC, who used the DMDC Sampling Tool to design the sample. He also developed the weights for this survey. Sue Reinhold, RSSC, provided the data processing support. Eric Falk and Jeff Schneider wrote this methodology report.

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# **2014 STATUS OF FORCES SURVEY OF ACTIVE DUTY MEMBERS: STATISTICAL METHODOLOGY REPORT**

## **Introduction**

This report describes the statistical methodologies for the *2014 Status of Forces Survey of Active Duty Members (2014 SOFS-A)*. The first section describes the sample design and selection of the sample. The second section describes weighting and variance estimation. The third section describes the multiple comparison statistical tests used for the *2014 SOFS-A*. The final section describes the calculation of location, completion, and response rates for the full sample and population subgroups. Information about administration of the survey and detailed documentation of the survey dataset are found in the *2014 Status of Forces Survey of Active Duty Members: Administration, datasets, and codebook* (DMDC, 2015).

## ***Sample Design and Selection***

### ***Target Population***

The *2014 SOFS-A* was designed to represent individuals meeting the following criteria:

- Active duty members of the Army, Navy, Marine Corps, and Air Force
- Up to and including paygrade O-6
- Had a known personnel status (based on the Strength Accounting Code variable)
- Not a prisoner or a deserter

National Guard and Reserve members in active duty programs were excluded. Fielding of the survey was administered from September 24 to November 12, 2014.

### ***Sampling Frame***

The sampling frame consisted of 1,348,423 active duty members determined from using the May 2014 Active Duty Master Edit File (ADMF). Auxiliary frame data were obtained from the following files:

- May 2014 Active Duty Family Database File (contains the member's family information, such as marital status and children).
- May 2014 Basic Allowance for Housing (BAH) Population File (contains information on the member's housing).
- May 2014 Contingency Tracking System (CTS) File (contains deployment information).

- May 2014 Defense Enrollment Eligibility Reporting System (DEERS) Medical Point-in-Time Extract (PITE) and June 2014 DEERS Medical PITE (contains information of dependents and benefits). In addition, RSSC used the August 2014 DEERS Medical PITE to attempt to update contact information.
- April 2014 Unit Identification Code (UIC) file (contains information on the member's UIC). In addition, RSSC used the August UIC to attempt to update contact information.
- May 2014 Reserve Components Common Personnel Data System (this file was used to identify dual Service spouses).
- RSSC used an updated e-mail file as of 9/26/14 provided by DMDC-West.

In addition, after selecting the sample, RSSC performed additional checks to verify that the member was still eligible when the survey fielded. Any ineligible member in the sample was excluded from any mailings and notifications; this saves additional costs associated with the survey process. Using the June 2014 DEERS Medical PITE, 1,027 were determined to be record ineligible and were dropped (see Table 3).

### **Sample Design**

The sample for the *2014 SOFS-A* survey used a single-stage stratified design. Five population characteristics defined the stratification dimensions for the *2014 SOFS-A* sample:

- Service (Army, Navy, Marine Corps, Air Force),
- Paygrade grouping (E1-E4, E5-E9, W1-W5, O1-O3, O4-O6),
- Race/ethnicity (Non-minority and Minority),
- Duty location (U.S. and territories, Europe, Asia and Pacific), and
- Family status (Single with Children, Dual Spouses, Other).

These five variables are also shown in Table 1.

The population frame of 1,348,423 members was partitioned into 178 strata and initially determined by the cross-classification of the five stratification variables. Levels were collapsed when there were less than 200 members in the stratum, usually for family status and location. Dimensions within Service, paygrade grouping, and race/ethnicity were always preserved.

Individuals were selected with equal probability and without replacement within each stratum. However, because allocation was not proportional to the size of the strata, selection probabilities varied among strata, and individuals were not selected with equal probability overall. Nonproportional allocation was used to achieve adequate sample sizes for all important domains (reporting categories). The domain variables along with their population sizes,

expected sample sizes, expected number of respondents, and percent sampled are shown in the Appendix.

### **Sample Allocation**

The total sample size was based on precision requirements for all the reporting domains. Given estimated variable survey costs and anticipated eligibility and response rates, an optimization algorithm was used to determine the minimum-cost allocation that simultaneously satisfied the domain precision requirements. Estimated eligibility and response rates for Army, Navy, Marine Corps, and Air Force were based on rates from the *December 2009 SOFS-A*, the *June 2012 SOFS-A*, and the *2013 SOFS-A*.

The sample allocation was accomplished by means of the DMDC Sample Planning Tool (SPT), Version 2.1 (Dever & Mason, 2003). This application is based on the method originally developed by J. R. Chromy (1987) and described in Mason, Wheelless, George, Dever, Riemer, and Elig (1995). The SPT defines domain variance equations in terms of unknown stratum sample sizes and user-specified precision constraints. A cost function is defined in terms of the unknown stratum sample sizes and the per-unit cost of data collection, editing, and processing. The variance equations are solved simultaneously, subject to the constraints imposed, for the sample size that minimizes the cost function. Eligibility rates modify the estimated prevalence rates used in the variance equations, thus affecting the allocation; response rates inflate the allocation, thus affecting the final sample size. Prevalence rates refer to a percentage that is used in determining the estimated variance used for the calculation of the sample size. For example, RSSC used 50 percent since it is most conservative and yields the largest estimated sample size.

There were 67 reporting domains defined for the *2014 SOFS-A* and the goal was to achieve under 5 percent precision on estimates. The survey was divided into three modules (A-C) to ease the burden for each respondent. Module A items were administered to the entire sample, whereas Modules B and C items were each administered to half of the sample. The sample size for the survey enables results for Modules B and C items to be reported at a desired level of accuracy for smaller reporting groups. Generally, the precision requirement for each domain was based on an estimated prevalence rate of 0.5 with a 95 percent confidence interval half-width no greater than 0.035. RSSC used precisions of 0.035 in the sampling tool and this should allow for Module questions to have a 95 percent confidence interval half-width no greater than 0.05. Given the minimum sample size constraints of 65,000, RSSC was not able to design a sample to achieve an estimated precision of 5 percent for all domains, so precisions were relaxed on: 1) warrant officers, 2) Marine Corps enlisted, and 3) Marine Corps officer domains.

The *2014 SOFS-A* total sample size was 65,097; Table 2 provides the sample sizes by stratification variables.

**Table 1.**  
*Stratifying Variables*

Variable	Variable Name	Categories
Service	CSERVICE	1. Army
		2. Navy
		3. Marine Corps
		4. Air Force
Paygrade Grouping	CPAYGRP5	1. E1-E4
		2. E5-E9
		3. W1-W5
		4. O1-O3
		5. O4-O6
Race/Ethnicity	CRACECAT	1. Non-Minority
		2. Minority
Region	CREGION1	1. U.S. (Incl. Territories)
		2. Europe
		3. Asia and Pacific
Family Status	FAMSTAT4	1. Single w/ Children
		2. Dual Service Spouse
		3. All Others

**Table 2.**  
*Sample Sizes by Stratification Variables*

Stratification Variable	Total	Army	Navy	Marine Corps	Air Force
<b>Sample</b>	65,097	25,130	15,738	10,920	13,309
<b>Paygrade Group</b>					
E1-E4	30,278	12,216	7,721	5,951	4,390
E5-E9	16,733	6,000	4,221	2,125	4,387
W1-W5	1,306	1,077	99	130	-
O1-O3	10,551	3,952	2,277	1,515	2,807
O4-O6	6,229	1,885	1,420	1,199	1,725
<b>Race</b>					
Non-Minority	38,373	13,602	7,939	7,408	9,424
Minority	26,724	11,528	7,799	3,512	3,885
<b>Region</b>					
US and Territories	57,832	22,383	14,451	9,724	11,274
Europe	3,325	1,562	355	110	1,298
Asia	3,940	1,185	932	1,086	737
<b>Family Status</b>					
Single with Children	3,970	1,998	833	353	786
Dual Service Spouse	5,892	2,153	1,093	559	2,087
All Others	55,235	20,979	13,812	10,008	10,436

## ***Weighting***

Analytical weights for the *2014 SOFS-A* were created to account for unequal probabilities of selection and varying response rates among population subgroups. Sampling weights were computed as the inverse of the selection probabilities and then adjusted for nonresponse (eligibility and completion). The adjusted weights were then poststratified to match population totals and to reduce bias unaccounted for by the previous weighting steps.

### ***Case Dispositions***

Case dispositions were assigned to each sampled member for weighting based on eligibility for the survey and completion of the return. Execution of the weighting process as well as computation of response rates both depend on this classification. Case dispositions for weighting are determined using information from personnel records, field operations (the Survey Control System, or SCS), and returned surveys. No single source of information is both complete and correct. Inconsistencies among these sources are resolved according to the order of the precedence given in Table 3.

The order of execution is critical to resolving case dispositions. For example, suppose a sample person refused the survey, with the reason that it was too long; in the absence of any other information, the disposition would be “eligible nonrespondent” (SAMP\_DC=8). If a proxy reported that the sample person had been hospitalized and was unable to complete the survey, the disposition would be “ineligible” (SAMP\_DC=2). The case dispositions for *2014 SOFS-A* are shown in Table 3. Members of the sample became ineligible if they indicated in the survey or by other contact (e.g., telephone calls to the data collection contractor) they were not in active duty on as of the first day of the survey on September 25, 2014<sup>1</sup> (190 identified as self- or proxy report ineligible).

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<sup>1</sup> There was one eligibility question on the survey. Members needed to be in active duty on the first day of the survey (Q1. Were you on active duty on September 25, 2014?).

**Table 3.**  
**Case Dispositions for Weighting**

Case Disposition (SAMP_DC)	Information Source	Conditions	Sample Size
1. Record ineligible	Personnel record	RSSC determined whether sampled members had a record in the DEERS point-in-time extract (PITE) prior to fielding the survey. No record in DEERS indicated the member either separated from the military, passed away, etc.	1,027
2. Ineligible by self- or proxy-report	Survey Control System (SCS)	The sampled member or a proxy reported that member was ineligible due to such reasons as "Retired," "ill," "incarcerated," "No longer employed by DoD," or "Deceased."	28
3. Ineligible by survey self-report	Survey eligibility questions	The sampled member was determined to be ineligible based on their response to Question 1 of the survey: 1. Were you on active duty on September 25, 2014? Members who answered "No" were considered survey self-report ineligible.	162
4. Eligible, complete response	Item response rate	Item response to base questions (questions asked to everyone) is at least 50%.	13,447
5. Eligible, incomplete response	Item response rate	Survey isn't blank but item response to base questions is less than 50%.	1,146
8. Active refusal	SCS	Survey is returned blank due to such reasons as "refused-too long," "refused-inappropriate/intrusive," "refused-other," "ineligible-other," "unreachable at this address," "refused by current resident," or "concerned about security/confidentiality."	204
9. Blank return	SCS	Blank questionnaire returned with no reason given.	133
10. PND	SCS	Postal non-deliverable or original address is non-locatable.	12,762
11. Non-respondent	Remainder	Remaining sampled member did not respond to survey.	36,188
<b>Total</b>			<b>65,097</b>

Table 4 shows the 13,447 complete eligible respondents by the following stratification variables for Total and by Service: 1) Paygrade, 2) Race, 3) Region, and 4) Family Status.

**Table 4.**  
**Complete Eligible Respondents by Stratification Variables**

Stratification Variable	Total	Army	Navy	Marine Corps	Air Force
<b>Total Eligible Respondents</b>	13,447	4,464	3,180	1,896	3,907
<b>Paygrade Group</b>					
E1-E4	2,442	729	599	342	772
E5-E9	4,328	1,406	1,060	507	1,355
W1-W5	465	363	46	56	0
O1-O3	3,338	1,121	755	480	982
O4-O6	2,874	845	720	511	798
<b>Race</b>					
Non-Minority	8,790	2,597	1,914	1,354	2,925
Minority	4,657	1,867	1,266	542	982
<b>Region</b>					
US and Territories	11,776	3,908	2,928	1,623	3,317
Europe	885	354	102	34	395
Asia	786	202	150	239	195
<b>Family Status</b>					
Single with Children	872	368	210	82	212
Dual Service Spouse	1,468	471	260	102	635
All Others	11,107	3,625	2,710	1,712	3,060

### **Nonresponse Adjustments and Final Weights**

After case dispositions were resolved, the sampling weights were adjusted for nonresponse. First, the sampling weights for cases of known eligibility (SAMP\_DC = 2, 3, 4, 5) were adjusted to account for cases of unknown eligibility (SAMP\_DC = 8, 9, 10, 11). Second, the eligibility adjusted weights for eligible respondents (SAMP\_DC = 4) were adjusted to account for eligible sample members who had not returned a completed survey (SAMP\_DC = 5).

Weighting adjustment factors for eligibility and completion were computed as the inverse of model-predicted probabilities. First, a logistic regression model was used to predict the probability of eligibility for the survey (known eligibility vs. unknown eligibility). A second logistic regression model was used to predict the probability of response among eligible sample members (complete response vs. nonresponse). CHAID (Chi-squared Automatic Interaction Detection), a decision tree technique based on Bonferroni testing, was used to determine the best predictors for each logistic model. The models were weighted by the sampling weight for both eligibility and completion. Predictors included the following population characteristics: paygrade groups (formed based on historic response rates), Service, age category, occupational groups (formed based on historic response rates), education, race, on/off base, religion, gender, family status, and deployment.

Table 5 shows the variables and the levels used for eligibility and completion adjustment to the weights.

**Table 5.**  
***Variables Used for the Eligibility and Completion Adjustments***

Variable	Variable Name	Categories
Response Paygroups	RESPPAY (Collapsing of PAYGRADE)	1. E1-E2
		2. E3-E4
		3. E5
		4. E6, O1-O2, W1-W2
		5. E7,O3,W3
		6. E8, O4, W4
		7. E9, O5-O6, W5
Service	CSERVICE	1. Army
		2. Navy
		3. Air Force
		4. Marine Corps
Age Grouping	CAGE	1. 18-24
		2. 25-30
		3. 31-35
		4. 36-40
		5. 41+
Occupation Group	OCCGRP2 (Collapsing of DUTYOCC)	1. Bad Response
		2. Average Response
		3. Good Response
Education	CEDUC	1. No College
		2. Some College
		3. College Degree
		4. Post College
Race Grouping	CRACE5 (Collapsing of CRACE4)	1. White/Asian
		2. All others
On/Off Base	OFFBASE2	1. On Base
		2. Off Base
Gender	CSEX	1. Male
		2. Female
Family Status	FAMSTAT	1. Single w/ Children
		2. Single w/o Children
		3. Married w/ Children
		4. Married w/o Children
Deployment	DEPLOY24	1. Not deployed past 24 months
		2. Deployed in the past 24 months
Region	CREGION2	1. U.S. & U.S. Territories
		2. Other

Finally, the weights were post-stratified to match population totals and to reduce bias unaccounted for by the previous weighting adjustments. Post-stratification cells were defined by the cross-classification of paygrade grouping, Service, and race. Within each post-stratification cell, the non-response-adjusted weights for eligible respondents and self-reported ineligible (SAMP\_DC = 2, 3, 4) were adjusted to match population counts. Table 6 shows the three variables used for post-stratification.

**Table 6.**  
*Variables Used for Post-stratification*

Variable	Variable Name	Categories
Paygroup	CPAYGRP5	1. E1-E4
		2. E5-E9
		3. W1-W5
		4. O1-O3
		5. O4-O6
Service	CSERVICE	1. Army
		2. Navy
		3. Marine Corps
		4. Air Force
Race	CRACECAT	1. Non-minority
		2. Minority

Table 7 provides summaries of the distributions of the sampling weights, intermediate weights, final weights, and adjustment factors by eligibility status. Eligible respondents were those individuals who were 1) eligible to participate in the survey and 2) also completed 50% of the survey items asked of all respondents (SAMP\_DC=4). Self/Proxy ineligible were those determined to be ineligible (SAMP\_DC = 2 or 3) during the survey, while the nonrespondents include the incomplete eligibles, refusals, returned blank surveys, unreachables, and other nonrespondents (SAMP\_DC = 5 through 11). Record ineligible individuals (SAMP\_DC=1) were those who were not eligible to participate in the survey according to administrative records; no final weights were computed for these cases.

**Table 7.**  
***Distribution of Weights and Adjustment Factors by Eligibility Status***

<b>Eligibility Status</b>	<b>Statistic</b>	<b>Sampling Weight</b>	<b>Eligibility Status Adjusted Weight</b>	<b>Complete Eligible Response Adjusted Weight</b>	<b>Final Weight With Non-response and Post-stratification Factors</b>	<b>Eligibility Status Factor</b>	<b>Complete Eligible Response Factor</b>	<b>Post-stratification Factor</b>
Eligible Respondents	N	13,447	13,447	13,447	13,447	13,447	13,447	13,447
	MIN	4.4	8.2	8.5	9.3	1.9	1.0	0.8
	MAX	46.7	1,060.7	1,209.7	1,283.6	53.9	1.2	1.2
	MEAN	20.8	87.5	96.9	98.9	4.2	1.1	1.0
	STD	10.6	94.9	108.3	111.3	4.6	0.0	0.1
Self/Proxy Ineligibles	N	190	190	190	190	190	0	190
	MIN	4.4	9.6	9.6	10.4	1.9		0.8
	MAX	45.9	461.6	461.6	533.6	21.7		1.2
	MEAN	21.6	90.9	90.9	95.1	4.3		1.0
	STD	11.2	89.2	89.2	97.5	4.3		0.1
Non-Respondents	N	50,433	50,433	50,433	50,433	50,433	1,146	0
	MIN	4.4	0.0	0.0	0.0	0.0	0.0	
	MAX	46.7	1,335.6	0.0	0.0	53.9	0.0	
	MEAN	20.7	2.6	0.0	0.0	0.1	0.0	
	STD	8.8	24.5	0.0	0.0	1.2	0.0	
Record Ineligibles	N	1,027	1,027	1,027	1,027	0	0	0
	MIN	4.4	4.4	4.4	0.0			
	MAX	46.7	46.7	46.7	0.0			
	MEAN	21.3	21.3	21.3	0.0			
	STD	8.7	8.7	8.7	0.0			

Table 8 displays the sums of sampling weights, intermediate weights (eligibility and completion), and final weights by eligibility status.

**Table 8.**  
***Sum of Weights by Eligibility Status***

Eligibility Category	Sum of Sampling Weights	Sum of Eligibility Status Adjusted Weights	Sum of Complete Eligible Response Adjusted Weights	Sum of Final Weights With Non-response and Post-stratification Adjustments
1. Eligible Respondents	279,049	1,176,440	1,302,860	1,330,351
2. Self/Proxy Ineligibles	4,112	17,273	17,273	18,072
3. Non-Respondents	1,043,357	132,800	0	0
4. Record Ineligibles	21,905	21,905	21,905	0
<b>Total</b>	<b>1,348,423</b>	<b>1,348,418</b>	<b>1,342,038</b>	<b>1,348,423</b>

### ***Variance Estimation***

Sampling error is the uncertainty associated with an estimate that is based on data gathered from a sample of the population rather than the full population. Note that sample-based estimates will vary depending on the particular sample selected from the population. Measures of the magnitude of sampling error, such as the variance and the standard error (the square root of the variance), reflect the variation in the estimates over all possible samples that could have been selected from the population using the same sampling methodology. Analysis of the 2014 SOFS-A data required a variance estimation procedure that accounted for the weighting procedures. The final step of the weighting process was to define strata for variance estimation by Taylor series linearization. The 2014 SOFS-A variance estimation strata corresponded closely to the five variables used for stratification (Service, paygrade, race, region, and family status); however, it was necessary to collapse some sampling strata containing fewer than 25 complete eligible responses with non-zero final weights with similar strata. Ninety-four variance estimation strata were defined for the 2014 SOFS-A.

### ***Multiple Comparisons***

When statistically comparing groups (e.g., Army vs. Navy estimates of overall satisfaction with the military way of life), a statistical hypothesis whether there are no differences (null hypothesis) versus there are differences (alternative hypothesis) is tested. RSSC uses two-independent samples t-tests for its statistical tests. The conclusions are usually based on the p-value associated with the test-statistic. If the p-value is less than the critical value, then the null hypothesis is rejected. Any time a null hypothesis is rejected (conclude that estimates are significantly different), it is possible this conclusion is incorrect. In reality, the null hypothesis may have been true, and the significant result may have been due to chance. A p-

value of 0.05 means there is a five percent chance of finding a difference as large as the observed result if the null hypothesis were true.

In survey research there is interest in conducting multiple comparisons. For example, 1) testing whether retention for Army enlisted men is the same as retention for all enlisted men for all other Services and 2) satisfaction with the military life is the same for the Navy versus the Marine Corps. When performing multiple independent comparisons on the same data, the question becomes: “Does the interpretation of the p-value for a single statistical test hold for multiple comparisons?” If 200 independent statistical (significance) tests were conducted at the 0.05 significance level, and the null hypothesis is supported for all, 10 of the tests would be expected to be significant at the p-value < 0.05 level simply due to chance. These 10 tests would have incorrectly been concluded as statistically significant—known as false positives or false discoveries. When a single significance test is conducted, the error rate—the probability of false discoveries—is the p-value itself. When more than one significance test is conducted, the probability of false discoveries increases (i.e., the more tests that are conducted, the greater the number of false discoveries).

This problem is known in the statistical literature as the “multiple comparisons problem.” Therefore, it is important to control the false discoveries when performing multiple independent tests to reach more accurate conclusions. Numerous techniques have been developed to control the false positive error rate associated with conducting multiple statistical testing (multiple comparisons). It should be noted that there is no universally accepted approach for dealing with the problem of multiple comparisons.

RSSC typically uses a method to control for false discoveries known as the False Discovery Rate correction (FDR) developed by Benjamini and Hochberg (1995). FDR is defined as the expected percentage of erroneous rejections among all rejections. The idea is to control the false discovery rate which is the proportion of "discoveries" (significant results) that are actually false positives. The approach can be summarized as follows:

- determine the number of comparisons (tests) of interest, call it  $m$ ;
- determine the tolerable False Discovery Rate (FDR Rate), call it  $\alpha$ ;
- calculate the p-value for each statistical test;
- sort the individual p-values from smallest to largest and rank them, call the rank  $k$ .

For each ranked p-value, calculate the FDR-adjusted *alpha* (threshold) which is defined as  $\frac{k * \alpha}{m}$

Determine the cutoff delineating statistically significant results from non-significant results in the sorted file as follows: Look for the maximum rank ( $k$ ) such that the ordered p-value is less than the FDR-adjusted *alpha* (i.e., look for the maximum  $k$  after which the p-value becomes greater than the threshold), call this maximum  $k$  the cutoff. Any comparison (p-value) with rank less than the cutoff is considered statistically significant.

RSSC had not yet implemented the FDR method by the time this report was written.

### **Location, Completion, and Response Rates**

Location, completion, and response rates were calculated in accordance with the recommendations of the American Association for Public Opinion Research (AAPOR, 2015 Standard Definitions), which estimates the proportion of eligible respondents among cases of unknown eligibility.

The *location rate* (LR) uses AAPOR standard formula for the contact rate (CON2) and is defined as

$$LR = \frac{(I + P) + R + e(UO)}{(I + P) + R + NC + e(UO)} = \frac{\text{adjusted located sample}}{\text{adjusted eligible sample}} = \frac{N_L}{N_E}.$$

The *completion rate* (CR) uses AAPOR standard formula COMR and is defined as

$$CR = \frac{(I + P)}{(I + P) + (R + NC + e(UO))} = \frac{\text{usable responses}}{\text{adjusted located sample}} = \frac{N_R}{N_L}.$$

The *response rate* (RR) uses AAPOR standard formula RR4 and is defined as

$$RR = \frac{(I + P)}{(I + P) + (R + NC) + e(UO)} = \frac{\text{usable responses}}{\text{adjusted eligible sample}} = \frac{N_R}{N_E}.$$

Where

$I$  = Fully complete responses according to RR4 (> 80% complete)

$P$  = Partially complete responses according to RR4 (50 – 80% complete)

$R$  = Refusal and break-off according to RR4 (< 50% complete)

$NC$  = Non-contact

$e(UO)$  = Estimated eligibility of cases unknown

$N_L$  = Adjusted located sample

$N_E$  = Adjusted eligible sample

$N_R$  = Usable responses

Table 9 shows the corresponding sample disposition codes associated with the response categories.

**Table 9.**  
***Disposition Codes for Response Rates***

<b>Response Category</b>	<b>SAMP_DC Values</b>
Eligible Sample	4, 5, 8, 9, 10, 11
Located Sample	4, 5, 8, 9, 11
Usable Response	4
Not Returned	11
Eligibility Determined Cases	2, 3, 4, 5, 8, 9
Self Report Ineligible Cases	2, 3

***Ineligibility Rate***

The ineligibility rate (IR) is defined as the following and needs to be calculated for both weighted and unweighted to be applied to Table 9.

$$IR = \text{Self Report Ineligible} / \text{Eligibility Determined}.$$

***Estimated Ineligible Postal Non-Deliverable/Not Located Rate***

The estimated ineligible postal non-deliverable or not located (IPNDR) is defined as:

$$IPNDR = (\text{Eligible Sample} - \text{Located Sample}) * IR.$$

***Estimated Ineligible Nonresponse***

The estimated ineligible nonresponse (EINR) is defined as:

$$EINR = (\text{Not Returned}) * IR.$$

***Adjusted Location Rate***

The adjusted location rate (ALR) is defined as:

$$ALR = (\text{Located Sample} - \text{EINR}) / (\text{Eligible Sample} - \text{IPNDR} - \text{EINR}).$$

***Adjusted Completion Rate***

The adjusted completion rate (ACR) is defined as:

$$ACR = (\text{Eligible Responses}) / (\text{Located Sample} - \text{EINR}).$$

## Adjusted Response Rate

The adjusted response rate (ARR) is defined as:

$$\text{ARR} = (\text{Eligible Responses})/(\text{Eligible Sample} - \text{IPNDR} - \text{EINR}).$$

Weighted sampled counts used to compute the overall response rates are shown in Table 10.

The final response rate is the product of the location rate and the completion rate. Both weighted and unweighted location, completion, and response rates for the 2014 SOFS-A survey are shown in Table 11.

Weighted location, completion, and response rates for the full sample by the stratification variables are shown in Table 12.

**Table 10.**  
*Comparison of the Final Weighted Respondents Relative to the Drawn Sample*

Case Disposition Categories	Sample Counts		Weighted Estimates	
	Sample Size	%	Sample Size	%
Drawn sample and Population	65,097		1,348,423	
Ineligible on master files	-1,027	1.6%	-21,905	1.6%
Self-reported ineligible	-190	0.3%	-4,112	0.3%
Total: Ineligible	-1,217	1.9%	-26,017	1.9%
Eligible sample	63,880	98.1%	1,322,406	98.1%
Not located (estimated ineligible)	-160	0.2%	-3,271	0.2%
Not located (estimated eligible)	-12,602	19.4%	-247,239	18.3%
Total not located	-12,762	19.6%	-250,511	18.6%
Located sample	51,118	78.5%	1,071,895	79.5%
Requested removal from survey mailings	-204	0.3%	-4,474	0.3%
Returned blank	-133	0.2%	-2,913	0.2%
Skipped key questions	-1,146	1.8%	-24,327	1.8%
Did not return a survey (estimated ineligible)	-455	0.7%	-9,940	0.7%
Did not return a survey (estimated eligible)	-35,733	54.9%	-751,192	55.7%
Total: Nonresponse	-37,671	57.9%	-792,846	58.8%
Usable responses	13,447	20.7%	279,049	20.7%

**Table 11.**  
*Location, Completion, and Response Rates*

Type of Rate	Computation	Unweighted	Weighted
Location	Adjusted located sample/Adjusted eligible sample	80.1%	81.1%
Completion	Usable responses/Adjusted located sample	26.5%	26.3%
Response	Usable responses/Adjusted eligible sample	21.3%	21.3%

**Table 12.**  
*Rates for Full Sample and Stratification Level*

Variable	Domain	Sample	Eligible Response	Sum of Weights	Located %	Completed %	Response %
<b>Sample</b>	Sample	65,097	13,447	1,348,423	81%	26%	21%
<b>Service</b>	Army	25,130	4,464	512,705	77%	24%	19%
	Navy	15,738	3,180	319,393	81%	26%	21%
	Marine Corps	10,920	1,896	190,625	76%	20%	15%
	Air Force	13,309	3,907	325,700	90%	32%	29%
<b>Paygrade</b>	E1-E4	30,278	2,442	579,984	68%	13%	9%
	E5-E9	16,733	4,328	529,886	90%	30%	27%
	W1-W5	1,306	465	19,535	94%	39%	37%
	O1-O3	10,551	3,338	131,939	90%	36%	32%
	O4-O6	6,229	2,874	87,079	97%	50%	48%
<b>Race</b>	Non-minority	38,373	8,790	849,764	83%	28%	23%
	Minority	26,724	4,657	498,659	78%	24%	19%
<b>Region</b>	US & US Territories	57,832	11,776	1,193,666	80%	26%	21%
	Europe	3,325	885	68,749	92%	29%	27%
	Asia	3,940	786	86,008	82%	24%	20%
<b>Family Status</b>	Single with Children	3,970	872	65,095	84%	27%	22%
	Dual Service Spouse	5,892	1,468	82,726	90%	27%	24%
	All Others	55,235	11,107	1,200,603	80%	26%	21%

## Appendix: Domain Based Sampling Size and Expected Response

Domain	Population	Expected Sample Size	Expected Responses	Percent Sampled
All Domains	1,348,423	64,869	17,455	4.83
Army	512,705	25,038	5,705	4.90
Navy	319,393	15,676	4,192	4.93
Marine Corps	190,625	10,884	2,453	5.73
Air Force	325,700	13,270	5,105	4.09
Enlisted	1,109,870	46,856	9,236	4.24
Enlisted 3 to 5 YOS	250,701	11,096	2,019	4.44
Enlisted 6 to 9 YOS	166,176	5,620	1,558	3.40
E1-E4	579,984	30,215	4,088	5.22
E5-E9	529,886	16,656	5,148	3.16
Officer	238,553	18,005	8,219	7.58
W1-W5	19,535	1,302	607	6.69
O1-O3	131,939	10,524	4,453	8.00
O4-O6	87,079	6,181	3,159	7.15
US & US territories	1,176,889	56,738	15,092	4.84
Europe	68,700	3,313	1,028	4.84
Asia & Pacific Islands	85,768	3,889	1,090	4.55
Overseas	154,468	7,202	2,121	4.68
On Base/No. BAH	200,008	10,778	1,295	5.40
Off Base/Rec BAH	973,249	46,237	13,762	4.77
Deployed in last 24 months	1,076,170	52,383	13,939	4.88
Not deployed in last 24 months	272,253	12,486	3,515	4.60
No College	907,068	40,321	7,985	4.46
Some College	166,520	6,448	1,879	3.89
4-Year Degree	167,620	10,945	4,179	6.55
Grad/Prof Degree	107,215	7,151	3,392	6.71
Not Married	597,107	30,267	6,553	5.08
Single with child(ren)	65,130	3,951	1,102	6.09
Single without child(ren)	532,785	26,337	5,453	4.96
Married	750,508	34,581	10,895	4.63
Married with child(ren)	510,973	22,186	7,514	4.36
Married without child(ren)	239,535	12,396	3,377	5.19
Dual Service Spouse	82,875	5,888	1,784	7.13
Non-minority	849,764	38,238	11,134	4.52
Minority	498,659	26,632	6,321	5.36
Black	222,710	11,831	2,835	5.33
Hispanic	158,895	8,503	1,884	5.37
Male	1,145,540	53,601	14,353	4.70
Male*Enlisted	946,567	38,862	7,569	4.12
Male*Officer	198,973	14,731	6,784	7.44
Female	202,883	11,269	3,102	5.57

Domain	Population	Expected Sample Size	Expected Responses	Percent Sampled
Female*Enlisted	163,303	7,995	1,667	4.91
Female*Officer	39,580	3,273	1,435	8.30
Army*Enlisted	414,398	18,153	2,755	4.40
Army*E1-E4	220,090	12,189	1,247	5.55
Army*E5-E9	194,308	5,970	1,508	3.09
Army*Officer	98,307	6,883	2,950	7.03
Army*O1-O3	50,843	3,942	1,526	7.77
Army*O4-O6	31,834	1,870	937	5.92
Navy*Enlisted	264,982	11,898	2,274	4.51
Navy*E1-E4	129,067	7,703	1,004	5.98
Navy*E5-E9	135,915	4,200	1,270	3.11
Navy*Officer	54,411	3,776	1,918	6.98
Navy*O1-O3	32,209	2,270	1,083	7.07
Navy*O4-O6	20,506	1,407	782	6.92
Marine Corps*Enlisted	169,280	8,051	1,249	4.77
Marine Corps*E1-E4	112,033	5,938	634	5.31
Marine Corps*E5-E9	57,247	2,114	615	3.71
Marine Corps*Officer	21,345	2,831	1,204	13.32
Marine Corps*O1-O3	12,581	1,511	577	12.04
Marine Corps*O4-O6	6,555	1,189	560	18.29
Air Force*Enlisted	261,210	8,753	2,958	3.36
Air Force*E1-E4	118,794	4,383	1,203	3.70
Air Force*E5-E9	142,416	4,371	1,755	3.08
Air Force*Officer	64,490	4,515	2,147	7.03
Air Force*O1-O3	36,306	2,802	1,267	7.73
Air Force*O4-O6	28,184	1,714	880	6.12

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