

May 1989

AVIATION SAFETY

Comparison of Specific Responses in FAA Controller Questionnaire





Resources, Community, and
Economic Development Division

B-222217

May 24, 1989

The Honorable Guy V. Molinari
Ranking Minority Member, Subcommittee
on Investigations and Oversight
Committee on Public Works and Transportation
House of Representatives

The Honorable Glenn M. Anderson
Chairman, Committee on Public Works
and Transportation
House of Representatives

This fact sheet supplements the work contained in our reports¹ concerning conditions within the air traffic control work force. The information in this fact sheet responds to your request that we show for certain questions in our survey how air traffic controllers who responded to one question answered a second question.

The comparisons are shown in two sections. Section 1 shows how controllers who responded to the question about how much traffic they handled during typical daily peak periods answered two other survey questions: (1) how often, if ever, they were taking certain traffic actions and (2) how long they were continuously working an air traffic position. Section 2 shows how controllers who answered a question that rated system safety responded to seven survey questions on (1) the amount of traffic they handled, (2) the frequency with which they took certain traffic actions, (3) the length of time they continuously worked an air traffic position, (4) the staff available for certain positions, (5) the impact certain factors had on the maintenance of system safety, (6) their morale, and (7) the number of years of experience they had controlling traffic with the Federal Aviation Administration (FAA).

The initial part of section 1 shows that controllers who responded that they handle "much more" or "somewhat more" traffic than they should be handling also generally indicated that they were more likely to "often" or "very often" provide lesser services to pilots than those

¹Aviation Safety: Serious Problems Continue to Trouble the Air Traffic Control Work Force (GAO/RCED-89-112, Apr. 12, 1989) and Aviation Safety: Conditions Within the Air Traffic Control Work Force (GAO/RCED-89-113FS, Apr. 24, 1989).

controllers who responded they were handling lesser amounts of traffic. Also, the controllers responding that they handle "much more" or "somewhat more" traffic than they should indicated that they were more likely to work more than 2 hours without a break during typical daily peak periods than those working an appropriate or lesser amount of traffic.

Section 2 shows that controllers who rated overall system safety as "excellent" or "good" were more likely than controllers who rated safety as "adequate," "poor," or "very poor" to

- (1) indicate they work an appropriate or lesser amount of traffic,
- (2) provide pilots with pilot-requested information or services,
- (3) believe full performance level controller staffing levels were appropriate, and
- (4) have fewer years of experience controlling traffic with the FAA.

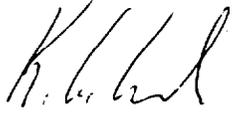
Data used to respond to this request came from our survey of the air traffic controllers at FAA's 84 largest facilities. Section 3 contains our overall survey objectives, scope, and methodology, including our questionnaire procedures and sampling methods. Appendix I lists the 84 major air traffic control facilities included in our 1988 survey.

- - - -

FAA provided comments on the development of our questionnaire. However, as you requested we did not obtain its official comments on a draft of this fact sheet. As arranged, unless you publicly announce its contents earlier, we plan no further distribution of this fact sheet until 30 days from the date of this letter. At that time we will send copies to the Secretary of Transportation; the Administrator, FAA; and other interested parties. If you have any question about this fact sheet, please call me on

B-222217

(202) 275-1000. Major contributors to this fact sheet are listed in appendix II.

A handwritten signature in black ink, appearing to read "K. Mead". The signature is stylized with a large initial "K" and a cursive "Mead".

Kenneth Mead
Director, Transportation Issues

C o n t e n t s

	<u>Page</u>
LETTER	1
SECTION	
1	5
2	13
3	28
APPENDIX	
I	33
II	35
Table	
3.1	31

ABBREVIATIONS

ATA	air traffic assistant
ATC	air traffic control
FAA	Federal Aviation Administration
FPL	full performance level (controller)
GAO	General Accounting Office

SECTION 1

HOW AIR TRAFFIC CONTROLLERS WHO RESPONDED TO THE QUESTION OF HOW MUCH TRAFFIC THEY HANDLED DURING TYPICAL DAILY PEAK PERIODS ANSWERED TWO OTHER SURVEY QUESTIONS

INTRODUCTION

The following sets of data show how controllers who responded to one question answered a second question. To illustrate, two questions--2 and 7.a--are shown on the following page. The left of the page shows the percentage of controllers who responded to each of the five possible answers to question 2 on the amount of traffic they typically handled. For example, 11.7 percent of the estimated 5,244 controllers who responded to both questions said they were handling much more traffic than they should be.

The right of the page shows what percentage of those responding to each of question 2's five answers responded to question 7.a about how frequently they provided another aircraft with instructions without waiting for a first aircraft to acknowledge receipt of its instructions. For example, of the 11.7 percent of the controllers who said they were handling much more traffic than they should be, 14.9 percent said they "very often" provided another aircraft with instructions without waiting for the first aircraft to acknowledge receipt of its instructions.

Because of rounding or omitting a negligible number of responses, the total of the four percentages to question 7.a may not equal 100 percent.

Three other items should be noted.

- (1) The "estimated respondents" are the sum of the actual number of terminal controllers who responded to both questions and our estimate of the number of center controllers who would have responded to both questions had they all received questionnaires. Center controllers were sampled and results calculated using appropriate estimating techniques.
- (2) Percentages may not add to 100 because of rounding.
- (3) Responses are not shown for "other" categories because of the wide range of written responses received.

Question 2

Consider the complexity of the sectors you work and your capabilities as a controller. While working radar during typical daily peak periods, do you believe you are typically required to handle more traffic than you should be handling, less traffic than you should be handling, or an appropriate amount of traffic?

Question 7.a

While working daily peak periods, how often, if ever, are you taking each of the following actions?

- a. Provide another aircraft with instructions without waiting for first aircraft to acknowledge receipt of its instructions.

<u>Question 2</u>	<u>Percent of response</u>	<u>Question 7.a-- percent of question 2 responses</u>			
		<u>Very often</u>	<u>Often</u>	<u>Occasionally</u>	<u>Seldom, if ever</u>
1. Much more than I should be handling	11.7	14.9	25.7	31.2	28.1
2. Somewhat more than I should be handling	53.0	5.6	16.8	42.0	35.6
3. Appropriate level of traffic	32.8	1.7	6.2	34.7	57.4
4. Somewhat less than I should be handling	2.4	3.8	1.6	28.5	66.1
5. Much less than I should be handling	<u>0.1</u>	a	a	a	a
Total Estimated respondents	<u>100.0</u> 5,244				

^aNot calculated because of negligible response.

Question 2

Amount of traffic handled.

Question 7.b

b. Drop track before target leaves area of jurisdiction.¹

<u>Question 2</u>	<u>Percent of response</u>	<u>Question 7.b-- percent of question 2 responses</u>			
		<u>Very often</u>	<u>Often</u>	<u>Occasionally</u>	<u>Seldom, if ever</u>
1. Much more than I should be handling	11.6	9.3	17.0	22.1	51.6
2. Somewhat more than I should be handling	52.9	4.5	12.6	24.5	58.4
3. Appropriate level of traffic	32.9	3.1	6.4	23.9	66.6
4. Somewhat less than I should be handling	2.4	7.1	6.2	28.8	57.9
5. Much less than I should be handling	<u>0.1</u>	a	a	a	a
Total Estimated respondents	<u>100.0</u> 5,221				

¹Removal of the aircraft image from one controller's radar scope that is subsequently picked up by another controller in a different area.

^aNot calculated because of negligible response.

Question 2

Amount of traffic handled.

Question 7.c

c. Use inefficient vector patterns.

<u>Question 2</u>	<u>Percent of response</u>	<u>Question 7.c-- percent of question 2 responses</u>			
		<u>Very often</u>	<u>Often</u>	<u>Occasionally</u>	<u>Seldom, if ever</u>
1. Much more than I should be handling	11.6	8.9	14.5	37.7	39.0
2. Somewhat more than I should be handling	53.1	3.3	8.8	35.6	52.3
3. Appropriate level of traffic	32.9	0.6	2.6	25.0	71.8
4. Somewhat less than I should be handling	2.4	1.7	4.1	17.6	76.6
5. Much less than I should be handling	<u>0.1</u>	a	a	a	a
Total Estimated respondents	<u>100.0</u> 5,115				

^aNot calculated because of negligible response.

Question 2

Amount of traffic handled.

Question 7.d

d. Decline to provide weather advisories.

<u>Question 2</u>	<u>Percent of response</u>	<u>Question 7.d-- percent of question 2 responses</u>			
		<u>Very often</u>	<u>Often</u>	<u>Occasionally</u>	<u>Seldom, if ever</u>
1. Much more than I should be handling	11.6	13.7	24.6	29.8	32.0
2. Somewhat more than I should be handling	52.9	6.3	15.5	38.4	39.8
3. Appropriate level of traffic	32.9	2.4	5.1	27.1	65.3
4. Somewhat less than I should be handling	2.4	2.5	6.1	25.3	66.1
5. Much less than I should be handling	<u>0.1</u>	a	a	a	a
Total Estimated respondents	<u>100.0</u> 5,218				

^aNot calculated because of negligible response.

Question 2

Amount of traffic handled.

Question 7.e

e. Decline to provide traffic advisories.

<u>Question 2</u>	<u>Percent of response</u>	<u>Question 7.e-- percent of question 2 responses</u>			
		<u>Very often</u>	<u>Often</u>	<u>Occasionally</u>	<u>Seldom, if ever</u>
1. Much more than I should be handling	11.6	20.6	31.6	33.0	14.7
2. Somewhat more than I should be handling	53.1	7.8	25.3	44.7	22.2
3. Appropriate level of traffic	32.8	2.6	8.7	44.0	44.7
4. Somewhat less than I should be handling	2.4	2.7	6.8	30.1	60.4
5. Much less than I should be handling	<u>0.1</u>	a	a	a	a
Total Estimated respondents	<u>100.0</u> 5,232				

^aNot calculated because of negligible response.

Question 2

Amount of traffic handled.

Question 7.f

f. Decline user requests for services (direct routes, altitude changes, etc.)

<u>Question 2</u>	<u>Percent of response</u>	<u>Question 7.f-- percent of question 2 responses</u>			
		<u>Very often</u>	<u>Often</u>	<u>Occasionally</u>	<u>Seldom, if ever</u>
1. Much more than I should be handling	11.8	41.5	34.5	17.6	6.4
2. Somewhat more than I should be handling	52.8	22.9	36.4	33.0	7.8
3. Appropriate level of traffic	32.9	6.6	21.4	47.9	24.2
4. Somewhat less than I should be handling	2.4	7.7	14.8	44.2	33.3
5. Much less than I should be handling	<u>0.1</u>	a	a	a	a
Total Estimated respondents	<u>100.0</u> 5,229				

^aNot calculated because of negligible response.

Question 2

Consider the complexity of the sectors you work and your capabilities as a controller. While working radar during typical daily peak periods, do you believe you are typically required to handle more traffic than you should be handling, less traffic than you should be handling, or an appropriate amount of traffic?

Question 8

During typical daily peak periods, how long are you required to work on position continuously without a break?

<u>Question 2</u>	<u>Percent of response</u>	<u>Question 8--</u>		
		<u>percent of question 2 responses</u>		
		<u>Hours continuously working</u>		
		<u>2 or less</u>	<u>More than 2 to 2.5</u>	<u>More than 2.5</u>
1. Much more than I should be handling	11.6	49.3	36.9	13.7
2. Somewhat more than I should be handling	53.0	63.6	30.3	6.0
3. Appropriate level of traffic	32.8	80.3	16.3	3.4
4. Somewhat less than I should be handling	2.4	86.7	7.6	5.8
5. Much less than I should be handling	<u>0.1</u>	a	a	a
Total	<u>100.0</u>			
Estimated respondents	5,258			

^aNot calculated because of negligible response.

SECTION 2

HOW AIR TRAFFIC CONTROLLERS WHO RATED
SYSTEM SAFETY RESPONDED TO
SEVEN OTHER SURVEY QUESTIONS

INTRODUCTION

The following comparisons of responses correspond with the pattern and stipulations established in section 1--showing how controllers who responded to one question, printed on the left, answered a second question, included on the right. For example, of controllers responding that system safety was "adequate," about 61 percent said that they handled somewhat more traffic than they should.

Question 26

How would you rate the overall safety of the ATC system today?

Question 2

Consider the complexity of the sectors you work and your capabilities as a controller. While working radar during typical daily peak periods, do you believe you are typically required to handle more traffic than you should be handling, less traffic than you should be handling, or an appropriate amount of traffic?

<u>Question 26</u>	<u>Percent of response</u>	<u>Question 2-- percent of question 26 responses</u>				
		<u>Much more than I should be handling</u>	<u>Somewhat more than I should be handling</u>	<u>Appropriate level of traffic</u>	<u>Much less than I should be handling</u>	<u>Much less than I should be handling</u>
1. Excellent	12.6	3.7	33.8	58.1	3.9	.5
2. Good	35.4	4.6	49.7	42.6	3.0	.1
3. Adequate	36.2	12.3	61.2	24.7	1.7	.1
4. Poor	14.0	29.2	60.4	9.1	1.2	^a
5. Very poor	<u>1.8</u>	64.0	31.9	4.0	^a	^a
Total	<u>100.0</u>					
Estimated respondents	5,279					

^aNo controller responded.

Question 26

Rating of system safety.

Question 7.a

While working daily peak traffic periods, how often, if ever, are you taking each of the following actions?

- a. Provide another aircraft with instructions without waiting for first aircraft to acknowledge receipt of its instructions.

<u>Question 26</u>	<u>Percent of response</u>	<u>Question 7.a-- percent of question 26 responses</u>			
		<u>Very often</u>	<u>Often</u>	<u>Occasionally</u>	<u>Seldom, if ever</u>
1. Excellent	12.6	2.4	8.0	31.9	57.7
2. Good	35.4	3.0	9.7	39.2	48.1
3. Adequate	36.2	6.4	15.4	40.1	38.1
4. Poor	14.0	9.7	24.1	36.6	29.6
5. Very poor	<u>1.8</u>	20.5	31.5	25.8	22.2
Total Estimated respondents	<u>100.0</u> 5,233				

Question 26

Rating of system safety.

Question 7.b

- b. Drop track before target leaves area of jurisdiction.

<u>Question 26</u>	<u>Percent of response</u>	<u>Question 7.b-- percent of question 26 responses</u>			
		<u>Very often</u>	<u>Often</u>	<u>Occasionally</u>	<u>Seldom, if ever</u>
1. Excellent	12.6	2.6	8.1	22.2	67.1
2. Good	35.5	2.8	9.0	26.6	61.7
3. Adequate	36.1	4.7	11.8	22.8	60.7
4. Poor	14.0	9.7	14.8	23.3	52.1
5. Very poor	<u>1.8</u>	12.3	20.8	22.9	44.1
Total Estimated respondents	<u>100.0</u> 5,208				

Question 26

Rating of system safety.

<u>Question 26</u>	<u>Percent of response</u>
1. Excellent	12.6
2. Good	35.6
3. Adequate	36.1
4. Poor	13.8
5. Very poor	<u>1.8</u>
Total	<u>100.0</u>
Estimated respondents	5,102

Question 7.c

c. Use inefficient vector patterns.

Question 7.c--
percent of question 26 responses
 Very often Often Occasionally Seldom, if ever

1.0	5.5	24.2	69.4
1.9	4.8	30.0	63.4
3.6	8.2	36.3	51.8
6.4	12.0	32.7	49.0
8.0	13.0	28.7	50.3

Question 26

Rating of system safety.

<u>Question 26</u>	<u>Percent of response</u>
1. Excellent	12.7
2. Good	35.4
3. Adequate	36.2
4. Poor	13.9
5. Very poor	<u>1.8</u>
Total	<u>100.0</u>
Estimated respondents	5,205

Question 7.d

d. Decline to provide weather advisories.

Question 7.d--
percent of question 26 responses
 Very often Often Occasionally Seldom, if ever

3.0	8.1	28.9	60.0
3.5	10.8	30.4	55.4
5.7	13.6	38.4	42.4
13.5	19.7	31.8	35.0
17.4	21.0	31.2	30.4

Question 26

Rating of system safety.

Question 7.e

e. Decline to provide traffic advisories.

<u>Question 26</u>	<u>Percent of response</u>	<u>Question 7.e-- percent of question 26 responses</u>			
		<u>Very often</u>	<u>Often</u>	<u>Occasionally</u>	<u>Seldom, if ever</u>
1. Excellent	12.6	2.8	12.0	40.2	45.0
2. Good	35.5	4.2	17.2	43.7	34.8
3. Adequate	36.3	7.6	22.5	44.8	25.1
4. Poor	13.8	17.9	27.1	36.8	18.2
5. Very poor	<u>1.8</u>	20.3	34.5	34.6	10.6
Total Estimated respondents	<u>100.0</u> 5,220				

Question 26

Rating of system safety.

Question 7.f

f. Decline user requests for services (direct routes, altitude change, etc.)

<u>Question 26</u>	<u>Percent of response</u>	<u>Question 7.f-- percent of question 26 responses</u>			
		<u>Very often</u>	<u>Often</u>	<u>Occasionally</u>	<u>Seldom, if ever</u>
1. Excellent	12.6	11.4	21.6	46.4	20.6
2. Good	35.4	13.2	27.2	41.7	18.0
3. Adequate	36.1	20.0	36.4	33.4	10.2
4. Poor	14.0	35.6	34.0	22.9	7.5
5. Very poor	<u>1.8</u>	55.0	20.2	15.7	9.1
Total Estimated respondents	<u>100.0</u> 5,217				

Question 26

How would you rate the overall safety of the ATC system today?

Question 8

During typical daily peak periods, how long are you required to work on position continuously without a break?

<u>Question 26</u>	<u>Percent of response</u>	<u>Question 8-- percent of question 26 responses</u>		
		<u>Hours continuously working</u>		
		<u>2 or less</u>	<u>More than 2 to 2.5</u>	<u>More than 2.5</u>
1. Excellent	12.6	78.8	17.9	3.4
2. Good	35.5	73.9	21.5	4.6
3. Adequate	36.2	65.5	28.2	6.4
4. Poor	14.0	53.0	36.1	10.9
5. Very poor	<u>1.8</u>	36.1	48.3	15.7
Total	<u>100.0</u>			
Estimated respondents	5,249			

Question 26

How would you rate the overall safety of the ATC system today?

Question 11.a

In your opinion, is the current number of staff available for each of the following types of positions higher than needed, lower than needed, or at the appropriate level? If you work at a center, answer for your area of specialization; if you work at a terminal, answer for your schedule.

a. First-line supervisors

<u>Question 26</u>	<u>Percent of response</u>	<u>Question 11.a-- percent of question 26 responses</u>				
		<u>Much higher than needed</u>	<u>Somewhat higher than needed</u>	<u>Appropriate number</u>	<u>Somewhat lower than needed</u>	<u>Much lower than needed</u>
1. Excellent	12.6	14.3	14.0	62.2	9.3	0.2
2. Good	35.4	9.3	17.9	59.1	12.6	1.1
3. Adequate	36.1	14.2	20.5	53.2	10.7	1.5
4. Poor	14.1	23.9	20.3	40.1	12.7	3.1
5. Very poor	<u>1.8</u>	34.7	15.2	30.2	16.8	3.1
Total Estimated respondents	<u>100.0</u> 5,256					

Question 26

Rating of system safety.

Question 11.b

b. FPLs

<u>Question 26</u>	<u>Percent of response</u>	<u>Question 11.b-- percent of question 26 responses</u>				
		<u>Much higher than needed</u>	<u>Somewhat higher than needed</u>	<u>Appropriate number</u>	<u>Somewhat lower than needed</u>	<u>Much lower than needed</u>
1. Excellent	12.6	a	4.3	31.4	50.1	14.2
2. Good	35.4	0.2	1.3	16.4	55.8	26.3
3. Adequate	36.1	0.1	0.8	8.9	46.8	43.4
4. Poor	14.1	0.1	0.1	5.7	35.9	58.1
5. Very poor	<u>1.8</u>	1.6	1.0	2.3	15.3	79.8
Total Estimated respondents	<u>100.0</u> 5,276					

Question 26

Rating of system safety.

Question 11.c

c. Air traffic assistants (ATAs)

<u>Question 26</u>	<u>Percent of response</u>	<u>Question 11.c-- percent of question 26 responses</u>				
		<u>Much higher than needed</u>	<u>Somewhat higher than needed</u>	<u>Appropriate number</u>	<u>Somewhat lower than needed</u>	<u>Much lower than needed</u>
1. Excellent	12.6	3.5	2.9	23.7	35.2	34.7
2. Good	35.5	1.6	2.9	26.6	35.4	33.5
3. Adequate	35.9	2.0	2.6	20.7	40.4	34.3
4. Poor	14.1	1.9	1.6	19.1	36.5	40.9
5. Very poor	<u>1.8</u>	a	4.4	16.1	39.2	40.3
Total Estimated respondents	<u>100.0</u> 5,228					

^aNo controller responded.

Question 26

How would you rate the overall safety of the ATC system today?

Question 27.a

Please consider your own observations and experience for each of the factors listed as to whether that factor is currently helping, is currently hindering, or currently has no impact on the maintenance of ATC system safety today.

- a. Current skill level of developmental controllers.

<u>Question 26</u>	Percent of response	Question 27.a-- percent of question 26 responses				
		<u>Strongly helps</u>	<u>Helps somewhat</u>	<u>No impact</u>	<u>Hinders somewhat</u>	<u>Strongly hinders</u>
1. Excellent	12.5	11.1	23.1	38.3	25.9	1.6
2. Good	35.3	4.5	28.0	30.8	34.4	2.4
3. Adequate	36.3	2.0	15.4	28.3	48.2	6.1
4. Poor	14.1	1.8	7.9	17.9	55.5	16.8
5. Very poor	<u>1.8</u>	2.1	4.5	10.0	42.3	41.1
Total	<u>100.0</u>					
Estimated respondents	5,269					

Question 26

Question 27.b

Rating of system safety.

b. Current number of developmental controllers available.

<u>Question 26</u>	Percent of response	Question 27.b-- percent of question 26 responses				
		<u>Strongly helps</u>	<u>Helps somewhat</u>	<u>No impact</u>	<u>Hinders somewhat</u>	<u>Strongly hinders</u>
1. Excellent	12.5	4.7	24.7	42.8	25.7	2.1
2. Good	35.4	1.6	22.9	40.4	31.0	4.1
3. Adequate	36.2	0.2	11.6	34.5	47.0	6.7
4. Poor	14.1	0.6	6.3	29.0	49.3	14.9
5. Very poor	<u>1.8</u>	^a	2.5	19.3	51.1	27.1
Total Estimated respondents	<u>100.0</u> 5,276					

Question 26

Question 27.c

Rating of system safety.

c. Current number of FPL controllers available.

<u>Question 26</u>	Percent of response	Question 27.c-- percent of question 26 responses				
		<u>Strongly helps</u>	<u>Helps somewhat</u>	<u>No impact</u>	<u>Hinders somewhat</u>	<u>Strongly hinders</u>
1. Excellent	12.6	17.4	26.5	16.0	32.7	7.4
2. Good	35.4	8.8	19.7	14.2	45.0	12.3
3. Adequate	36.2	3.0	10.5	10.4	47.8	28.3
4. Poor	14.0	2.0	5.0	7.0	39.1	46.9
5. Very poor	<u>1.8</u>	1.0	5.1	2.5	24.9	66.4
Total Estimated respondents	<u>100.0</u> 5,279					

^aNo controller responded.

Question 26

Rating of system safety.

Question 27.d

d. Current amount of traffic work load.

<u>Question 26</u>	Percent of response	Question 27.d-- percent of question 26 responses				
		<u>Strongly helps</u>	<u>Helps somewhat</u>	<u>No impact</u>	<u>Hinders somewhat</u>	<u>Strongly hinders</u>
1. Excellent	12.4	3.3	10.9	32.0	45.6	8.1
2. Good	35.3	1.1	5.6	24.0	57.2	12.0
3. Adequate	36.3	0.5	2.8	13.8	54.2	28.8
4. Poor	14.1	0.6	a	5.7	40.4	53.3
5. Very poor	<u>1.8</u>	1.0	a	1.0	14.5	83.4
Total	<u>100.0</u>					
Estimated respondents	5,257					

Question 26

Rating of system safety.

Question 27.e

e. Current amount of overtime being worked.

<u>Question 26</u>	Percent of response	Question 27.e-- percent of question 26 responses				
		<u>Strongly helps</u>	<u>Helps somewhat</u>	<u>No impact</u>	<u>Hinders somewhat</u>	<u>Strongly hinders</u>
1. Excellent	12.6	1.7	7.4	64.8	21.6	4.6
2. Good	35.3	0.9	6.5	55.3	30.9	6.4
3. Adequate	36.2	0.6	5.2	41.6	39.9	12.8
4. Poor	14.1	0.3	4.5	28.7	43.4	23.2
5. Very poor	<u>1.8</u>	4.6	1.1	16.0	38.4	40.0
Total	<u>100.0</u>					
Estimated respondents	5,241					

^aNo controller responded.

Question 26

Rating of system safety.

Question 27.f

f. Current hardware reliability.

<u>Question 26</u>	Percent of response	Question 27.f-- percent of question 26 responses				
		<u>Strongly helps</u>	<u>Helps somewhat</u>	<u>No impact</u>	<u>Hinders somewhat</u>	<u>Strongly hinders</u>
1. Excellent	12.6	14.6	23.1	14.6	34.2	13.5
2. Good	35.4	7.1	19.9	17.1	37.1	18.9
3. Adequate	36.2	4.7	13.0	16.8	39.4	26.1
4. Poor	14.0	3.8	6.8	12.9	33.2	43.2
5. Very poor	<u>1.8</u>	10.1	1.8	11.3	30.7	46.1
Total Estimated respondents	<u>100.0</u> 5,278					

Question 26

Rating of system safety.

Question 27.g

g. Current software reliability.

<u>Question 26</u>	Percent of response	Question 27.g-- percent of question 26 responses				
		<u>Strongly helps</u>	<u>Helps somewhat</u>	<u>No impact</u>	<u>Hinders somewhat</u>	<u>Strongly hinders</u>
1. Excellent	12.6	16.8	29.4	18.4	28.0	7.5
2. Good	35.4	7.0	24.9	19.7	35.7	12.7
3. Adequate	36.2	4.2	17.6	19.4	38.6	20.2
4. Poor	14.0	4.4	8.9	16.8	32.8	37.1
5. Very poor	<u>1.8</u>	7.4	6.0	11.7	33.8	41.2
Total Estimated respondents	<u>100.0</u> 5,274					

Question 26

Question 27.h

Rating of system safety.

h. Current controller morale.

<u>Question 26</u>	Percent of response	Question 27.h-- percent of question 26 responses				
		<u>Strongly helps</u>	<u>Helps somewhat</u>	<u>No impact</u>	<u>Hinders somewhat</u>	<u>Strongly hinders</u>
1. Excellent	12.6	7.5	25.3	19.3	35.4	12.5
2. Good	35.3	2.8	13.6	18.1	48.4	17.1
3. Adequate	36.2	1.2	5.3	11.5	50.1	31.8
4. Poor	14.1	0.8	2.9	7.1	35.8	53.4
5. Very poor	<u>1.8</u>	2.1	1.1	a	18.6	78.2
Total	<u>100.0</u>					
Estimated respondents	5,278					

^aNo controller responded.

Question 26

How would you rate the overall safety of the ATC system today?

Question 28

In general, how would you describe your morale as a controller at this facility?

Question 28--
percent of question 26 responses

<u>Question 26</u>	<u>Percent of response</u>	<u>Very High</u>	<u>High</u>	<u>Neither high nor low</u>	<u>Low</u>	<u>Very low</u>
1. Excellent	12.6	23.9	34.4	19.9	19.3	2.5
2. Good	35.1	9.7	30.6	30.0	23.0	6.7
3. Adequate	36.5	1.5	15.9	33.3	34.8	14.4
4. Poor	14.0	0.8	6.5	17.1	42.0	33.6
5. Very poor	<u>1.8</u>	1.1	1.1	5.3	18.7	73.9
Total	<u>100.0</u>					
Estimated respondents	5,194					

Question 26

How would you rate the overall safety of the ATC system today?

<u>Question 26</u>	<u>Percent of response</u>
1. Excellent	12.6
2. Good	35.4
3. Adequate	36.1
4. Poor	14.1
5. Very poor	<u>1.8</u>
Total Estimated respondents	<u>100.0</u> 5,259

Question 45.a

How many total years experience do you have for each of the following?

a. Total years with FAA

Question 45.a-- percent of question 26 responses

	<u>1 to 6</u>	<u>7 to 12</u>	<u>13 to 18</u>	<u>19 to 24</u>	<u>25 or more</u>
1. Excellent	62.6	19.4	8.6	5.4	4.1
2. Good	57.3	22.8	9.2	5.9	5.0
3. Adequate	45.4	21.6	16.3	11.7	4.9
4. Poor	33.5	20.8	25.0	13.5	7.2
5. Very poor	21.8	20.7	25.3	24.5	7.8

Question 26

Rating of system safety.

<u>Question 26</u>	<u>Percent of response</u>
1. Excellent	12.7
2. Good	35.6
3. Adequate	36.1
4. Poor	13.8
5. Very poor	<u>1.8</u>
Total Estimated respondents	<u>100.0</u> 5,168

Question 45.b

How many total years experience do you have for each of the following?

b. Years controlling traffic with FAA (Developmental and FPL)

Question 45.b-- percent of question 26 responses

	<u>1 to 6</u>	<u>7 to 12</u>	<u>13 to 18</u>	<u>19 to 24</u>	<u>25 or more</u>
1. Excellent	67.0	15.8	9.4	4.3	3.2
2. Good	61.1	19.8	9.8	5.5	4.0
3. Adequate	48.1	19.6	17.2	10.8	4.3
4. Poor	37.2	19.2	25.5	13.2	5.3
5. Very poor	23.4	20.8	28.8	20.6	6.5

Question 26

Rating of system safety.

Question 45.c

How many total years experience do you have for each of the following?

c. Years controlling traffic for the military¹

Question 45.c--
percent of question 26 responses

<u>Question 26</u>	<u>Percent of response</u>	<u>1 to 6</u>	<u>7 to 12</u>	<u>13 to 18</u>	<u>19 or more</u>
1. Excellent	9.5	82.3	15.2	2.0	.6
2. Good	34.2	85.5	12.5	1.1	.9
3. Adequate	38.6	82.4	15.3	1.4	.7
4. Poor	15.4	85.3	12.8	1.0	.7
5. Very poor	<u>2.3</u>	88.5	11.5	a	a
Total	<u>100.0</u>				
Estimated respondents	1,898				

¹Data relate only to those controllers with 1 or more years' military experience.

^aNo controller responded.

SECTION 3

OBJECTIVES, SCOPE, AND METHODOLOGY

The Ranking Minority Member, Subcommittee on Investigations and Oversight, House Committee on Public Works and Transportation, and the Chairman, House Committee on Public Works and Transportation, requested that we (1) update and replicate our previous evaluation of the air traffic control system¹ and (2) show how controllers who responded to one question answered a second question for certain pairs of questions. To accomplish this, we mailed separate questionnaires to air traffic controllers, first-line supervisors of controllers, and facility managers at the 84 largest air traffic control facilities. The pairs of questions shown in this report were specifically requested.

The following sections provide details on our scope and methodology in designing and administering the questionnaires and estimating the overall results.

SCOPE

Our 1988 survey included the 84 largest air traffic control facilities, consisting of all 20 air route traffic control centers in the continental United States and all 64 of the largest terminal facilities (level 4 and 5) in March 1988, the survey selection period. Appendix I shows the specific facilities included in the 1988 survey, in addition to those included in our 1985 survey. Ten more facilities were included in 1988 because (1) the volume of their air traffic had increased, resulting in FAA's including them in the group of largest facilities, or (2) FAA had reorganized some facilities by splitting them into two distinct components (see app. I for details).

We summarized the problems concerning the air traffic control work force in our report, Aviation Safety: Serious Problems Continue to Trouble the Air Traffic Control Work Force (GAO/RCED-89-112, Apr. 21, 1989). The complete responses to all survey questions are contained in our fact sheet, Aviation Safety: Conditions Within the Air Traffic Control Work Force (GAO/RCED-89-113FS, Apr. 24, 1989). We performed our review from November 1987 to December 1988, in accordance with generally accepted government auditing standards.

METHODOLOGY

Between May 2 and August 5, 1988, we surveyed the air traffic control work force. Specifically, we mailed similar, but not

¹Aviation Safety: Serious Problems Concerning the Air Traffic Control Work Force (GAO/RCED-86-121, Mar. 6, 1986).

identical, questionnaires to (1) full performance level controllers and developmental level controllers certified on at least one radar position, (2) first-line supervisors of controllers, and (3) facility managers. The topics of the survey included work load, staffing, overtime, training, system safety and air traffic control operations, operational error detection, and retirement.

To meet our objectives, we replicated questions from the 1985 survey. To gain further insight into a variety of issues--such as working conditions, safety, and morale--we added questions to the 1988 survey. In developing the questionnaires, suggested changes were provided by the Ranking Minority Member, FAA, the National Transportation Safety Board, and the controllers' union. Individual controller, supervisor, and manager comments were considered during our questionnaire pretesting at nine specific FAA facilities.

We designed three separate questionnaires for each of the three work force components for both the 1988 and 1985 surveys. Each questionnaire was designed to gain a unique perspective of the air traffic work force: controllers directly work and control air traffic primarily using radar; first-line supervisors represent a manager's view and also reflect personal observations from directly working and controlling traffic; facility managers represent the perspective of FAA field management.

Research Design

To establish the universe of controllers, we used an FAA computer file, containing names and home addresses, of all controllers (GS-2152 series) employed at the 84 largest facilities as of March 23, 1988. Since some of the controllers on this file were not radar qualified, we developed criteria in consultation with FAA to identify qualified controllers. This procedure identified 7,742 air traffic controllers; however, the criteria to screen FAA's file for radar-certified controllers were inexact. Therefore, we included a screening question in the questionnaire to more precisely identify full performance level controllers and developmental controllers who were certified on at least one radar position.

We used a similar selection and screening process for first-line supervisors and identified 1,196.

We sent all facility managers at the 84 largest facilities questionnaires. FAA provided a list of the facility managers' names and addresses. At four terminals (Chicago, Dallas-Fort Worth, Denver, and St. Louis), FAA has one manager overseeing two facilities, or organizational components--the control tower and the terminal radar approach control, or TRACON, facility. Thus, questionnaires were sent to 80 facility managers.

Sample, Universe, and
Return-Related Data

The largest FAA facilities in the air traffic control system consist of air route traffic control centers, which control flights between airports, and terminal facilities. Because a center has a considerably greater number of controllers and supervisors than does a terminal, we used a stratified sample at centers for selection; at terminals, all controllers and supervisors were sent questionnaires. The number of controllers and supervisors sampled at each center was large enough to yield a sampling error of no more than 5 percent at the 95-percent confidence level for each center.

Table 3.1 shows universe, sample, and return-related data for the 1988 survey.

Table 3.1: Universe, Sample, and Return-Related Data for the Three Questionnaires Used in the 1988 Survey

Return rate in percent

Questionnaire and location	Size		Responses		Not returned		Return rate ^b
	Universe	Sample	Eligible	Ineligible ^a	Incorrect address	No response	
<u>Controllers</u>							
Terminals	2,451	2,451	1,699	152	32	568	75.5
Centers	<u>5,291</u>	<u>2,824</u>	<u>1,859</u>	<u>333</u>	<u>25</u>	<u>607</u>	77.6
Total	<u>7,742</u>	<u>5,275</u>	<u>3,558</u>	<u>485</u>	<u>57</u>	<u>1,175</u>	76.6
<u>Supervisors</u>							
Terminals	478	478	393	16	3	66	85.6
Centers	<u>718</u>	<u>636</u>	<u>546</u>	<u>24</u>	<u>2</u>	<u>64</u>	89.6
Total	<u>1,196</u>	<u>1,114</u>	<u>939</u>	<u>40</u>	<u>5</u>	<u>130</u>	87.9
<u>Managers</u>							
Terminals	60	60	57	0	0	3	95.0
Centers	<u>20</u>	<u>20</u>	<u>19</u>	<u>0</u>	<u>0</u>	<u>1</u>	95.0
Total	<u>80</u>	<u>80</u>	<u>76</u>	<u>0</u>	<u>0</u>	<u>4</u>	95.0

^aIneligibles represent respondents who were (1) either not full performance level controllers or developmentals certified on at least one radar position or (2) were not first-line supervisors.

^bReturn rates were calculated by dividing the total of all responses by the applicable sample size.

Survey Results

We used stratified sampling at centers and assigned appropriate weights to sampled cases prior to analyzing the survey results. Thus, responses shown for centers and overall represent weighted estimates.

Questionnaire Procedures

The 1988 questionnaires were developed using the 1985 questionnaires as our starting point. We added and deleted questions based on suggestions provided by the Ranking Minority Member, FAA officials, the National Transportation Safety Board, union officials, and members of the air traffic control work force. We conducted pretests with a total of 36 individuals at 9

facilities: 4 centers (Cleveland, Jacksonville, Oakland, and Seattle) and 5 terminal facilities (Cleveland, Jacksonville, Oakland TRACON, Orlando, and Seattle TRACON).

During each session, an individual respondent filled out a questionnaire in the presence of two GAO observers. The GAO observers timed the respondent and observed reactions to questions and question flow. Afterwards, the observers debriefed the respondent to identify ambiguities, incorrect use of technical language, potential bias, or other problems in question wording or questionnaire format.

Questionnaires for controllers and supervisors were mailed to the respondents' home address. If a home address was not available, questionnaires were mailed to controllers at the facilities where they worked. Questionnaires for the facility managers were also mailed to each facility.

Because of the sensitive nature of some questions, respondents were promised confidentiality to encourage a reply. The only exception to this pledge was one section of staffing questions on the 1988 facility manager questionnaire. The facility managers were informed that information in this section could be specifically identified to their facilities.

In order to maintain confidentiality, a control number was written on each questionnaire to identify the respondents without using their names and to facilitate follow-up mailings. The nonconfidential section of the managers' questionnaire was detached and processed separately so that no identification remained on the confidential questions.

On June 6, 1988, we sent follow-up letters to all nonrespondents. The letters also included a second copy of the questionnaire in case the respondent could not locate the original. We subsequently phoned some facility managers to clarify facility staffing information.

THE 84 MAJOR AIR TRAFFIC CONTROL
FACILITIES INCLUDED IN GAO'S SURVEY

Air Route Traffic Control Centers

- | | | |
|----------------|------------------|----------------------|
| 1. Albuquerque | 8. Houston | 15. Minneapolis |
| 2. Atlanta | 9. Indianapolis | 16. New York |
| 3. Boston | 10. Jacksonville | 17. Oakland |
| 4. Chicago | 11. Kansas City | 18. Salt Lake City |
| 5. Cleveland | 12. Los Angeles | 19. Seattle |
| 6. Denver | 13. Memphis | 20. Washington, D.C. |
| 7. Fort Worth | 14. Miami | |

Terminal Facilities

- | | | |
|--|--------------------------------|-----------------------------------|
| 1. Atlanta | 22. Houston | 44. Ontario TRACON |
| 2. Austin Tower ^a | 23. Indianapolis | 45. Orlando |
| 3. Baltimore-Washington | 24. Jacksonville | 46. Pensacola |
| 4. Boston | 25. Kansas City | 47. Philadelphia |
| 5. Burbank | 26. Kennedy Tower | 48. Phoenix |
| 6. Charlotte | 27. LaGuardia Tower | 49. Phoenix TRACON |
| 7. Chicago O'Hare ^b | 28. Las Vegas | 50. Pittsburgh |
| 8. Chicago TRACON ^b | 29. Los Angeles | 51. Portland TRACON ^c |
| 9. Cleveland | 30. Los Angeles TRACON | 52. Sacramento |
| 10. Columbus | 31. Lubbock | 53. St. Louis ^b |
| 11. Dallas-Fort Worth ^b | 32. Memphis | 54. St. Louis TRACON ^b |
| 12. Dallas-Fort Worth
TRACON ^b | 33. Miami | 55. Salt Lake TRACON ^c |
| 13. Dallas-Love Tower ^a | 34. Milwaukee | 56. San Antonio |
| 14. Dayton | 35. Minneapolis | 57. San Diego |
| 15. Denver ^b | 36. Nashville ^a | 58. San Francisco |
| 16. Denver TRACON ^b | 37. Newark | 59. Santa Ana |
| 17. Detroit | 38. New Orleans | 60. Seattle TRACON ^c |
| 18. Dulles Tower ^a | 39. New York TRACON | 61. Tampa |
| 19. Edwards Air Force
Base | 40. Norfolk | 62. Washington National |
| 20. Fort Lauderdale | 41. Oakland Tower ^a | 63. West Palm Beach |
| 21. Hebron ^a | 42. Oakland TRACON | 64. Windsor Locks |
| | 43. Oklahoma City | |

Notes: TRACON = Terminal radar approach control facility.

^aFacility upgraded subsequent to 1985 survey and now included in FAA's list of largest facilities (level 4 and 5).

^bFacility reorganized subsequent to 1985 survey to include separate tower and TRACON activity; each organizational unit is sufficiently large to be separately included in FAA's list of largest facilities.

^CFacility reorganized subsequent to 1985 survey to include separate tower and TRACON. Towers (Portland, Salt Lake City, and Seattle) no longer included in our survey since FAA deleted them from its list of largest facilities.

MAJOR CONTRIBUTORS TO THIS FACT SHEETRESOURCES, COMMUNITY, AND ECONOMIC DEVELOPMENT DIVISION,
WASHINGTON, D.C.

Kenneth M. Mead, Director, Transportation Issues (202) 275-1000
Victor S. Rezendes, Associate Director
Thomas J. Barchi, Assistant Director
David A. Rogers, Assistant Director
M. Jane Hunt, Reports Analyst

PHILADELPHIA REGIONAL OFFICE

Joseph A. Kredatus, Evaluator-in-Charge
Eric L. Hallberg, Supervisory Evaluator
William F. Schmanke, Technical Assistance Manager
Thomas N. Bloom, Systems Analyst
Jeannie Bryant Davis, Evaluator
June A. Ragone, Evaluator

(341225)

Requests for copies of GAO reports should be sent to:

**U.S. General Accounting Office
Post Office Box 6015
Gaithersburg, Maryland 20877**

Telephone 202-275-6241

The first five copies of each report are free. Additional copies are \$2.00 each.

There is a 25% discount on orders for 100 or more copies mailed to a single address.

Orders must be prepaid by cash or by check or money order made out to the Superintendent of Documents.

**United States
General Accounting Office
Washington, D.C. 20548**

**Official Business
Penalty for Private Use \$300**

**First-Class Mail
Postage & Fees Paid
GAO
Permit No. G100**
