

AD-A005 002

FEDERAL AVIATION ADMINISTRATION WASHINGTON DC SYSTEM--ETC F/G 17/7
MASTER PLAN: FLIGHT SERVICE STATION AUTOMATION PROGRAM. ADDENDU--ETC(U)
MAR 80
FAA/RD-80-52

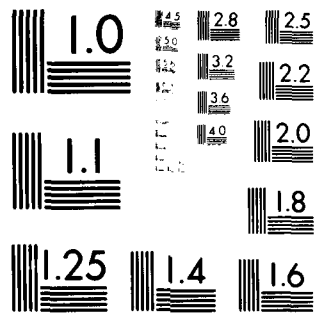
UNCLASSIFIED

NL

| OF |
00A - 1
000002



END
DATE
FILMED
7-80
DTIC



MICROCOPY RESOLUTION TEST CHART

Report No. FAA-RD-80-52

12

FSS-01A1



MASTER PLAN ADDENDUM

LEVEL III

ADA 085002

FLIGHT SERVICE STATION AUTOMATION PROGRAM

MARCH 1980

DTIC
ELECTE
JUN 3 1980
C

Document is available to the U.S. public through
the National Technical Information Service,
Springfield, Virginia 22161.

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
Systems Research and Development Service
Washington, D.C. 20590

DDC FILE COPY

80 6 2 083

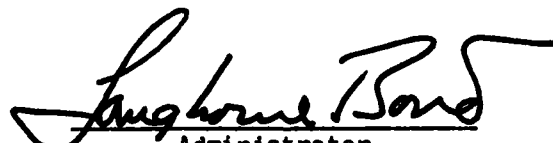
NOTICE

This document is disseminated under the sponsorship of the Department of Transportation in the interest of information exchange. The United States Government assumes no liability for its contents or use thereof.

This Addendum to the Flight Service Station Automation Program Master Plan, dated January 1978, describes the plan for the automated and modernized Flight Service Station System. It:

- Reaffirms the automation program
- Extends automation to Alaska, Hawaii, and Puerto Rico
- Establishes automated Flight Service Stations at 61 major centers of general aviation activity in 45 states and Puerto Rico. New buildings will be required for 59 of the 61 facilities
- Eliminates the collocation of Flight Service Stations at Air Route Traffic Control Centers
- Provides for the consolidation of existing Flight Service Stations into the 61 new facilities

As a result of these measures, the total cost of automating and consolidating the Flight Service Station System would be increased from the \$453 million necessary to automate 20 Hub facilities, as described in the Master Plan, to \$495 million to automate 61 Flight Service Stations. A difference of \$42 million.


Administrator

March 28, 1980

Date	
Accession For	
NTIS GRA&I	☒
DOC TAB	☐
Unannounced	☐
Justification	
By	
Distribution/	
Availability Codes	
Dist	Attn and/or special
A	

Technical Report Documentation Page

1. Report No. FAA/ARD-80-52 FSS-01A1		2. Government Accession No. AD-A085 002		3. Recipient's Catalog No. 12111	
4. Title and Subtitle Master Plan, Addendum Flight Service Station Automation Program, Addendum.				5. Report Date Mar 1980	
6. Performing Organization Code				7. Performing Organization Report No.	
9. Performing Organization Name and Address Department of Transportation Federal Aviation Administration Systems Research and Development Service Washington, DC 20590				10. Work Unit No. (TRIS)	
12. Sponsoring Agency Name and Address Department of Transportation Federal Aviation Administration Systems Research and Development Service Washington, DC 20590				11. Contract or Grant No.	
13. Type of Report and Period Covered Master Plan Addendum				14. Sponsoring Agency Code ARD-403	
15. Supplementary Notes (14) FAA/ED-80-52, FAA/ED-FSS-01A2					
16. Abstract The Flight Service Station Master Plan provides for automation of the highest activity stations and introduction of pilot self-service features. The Master Plan, however, deferred decisions on several key issues. The proposed resolution of these issues is as follows: — — The distribution and location of Flight Service Stations (domestic and nonconterminous) and possible collocation with Air Route Traffic Control Centers. We have identified 61 sites for automated Flight Service Stations. We have decided against collocation because it isolates the Flight Service Station System from the primary user, General Aviation. — — Construction of suitable quarters to house the automated facilities. New buildings will be required at 59 of the 61 sites to accommodate consolidation and automation. — — The consolidation of existing Flight Service Stations into the new facilities. Consolidation of adjacent Flight Service Stations into the automated facility will not be initiated until we have shown the level of service at the new facility to be at least equal to the service available at the nonautomated locations. As a result of these measures, the total cost of automating and consolidating the Flight Service Station network would be increased from \$453 million to \$495 million, a difference of \$42 million.					
17. Key Words Flight Service Stations Automation			18. Distribution Statement Document is available to the U.S. public through the National Technical Information Service, Springfield, VA 22161		
19. Security Classif. (of this report) UNCLASSIFIED		20. Security Classif. (of this page) UNCLASSIFIED		21. No. of Pages 14	
22. Price					

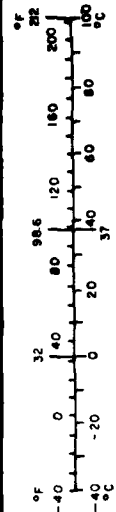
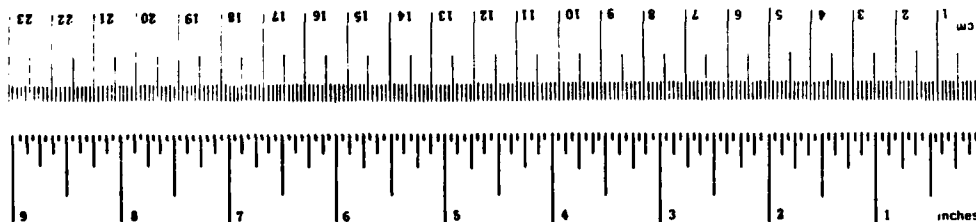
METRIC CONVERSION FACTORS

Approximate Conversions to Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
LENGTH				
in	inches	2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km
AREA				
sq in	square inches	6.5	square centimeters	cm ²
sq ft	square feet	0.09	square meters	m ²
sq yd	square yards	0.8	square meters	m ²
sq mi	square miles	2.6	square kilometers	km ²
acres	acres	0.4	hectares	ha
MASS (weight)				
oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons (2000 lb)	0.9	tonnes	t
VOLUME				
teaspoon	teaspoons	5	milliliters	ml
tablespoon	tablespoons	15	milliliters	ml
fl oz	fluid ounces	30	milliliters	ml
c	cups	0.24	liters	l
pt	pints	0.47	liters	l
qt	quarts	0.95	liters	l
gal	gallons	3.8	liters	l
cu ft	cubic feet	0.03	cubic meters	m ³
yd ³	cubic yards	0.76	cubic meters	m ³
TEMPERATURE (exact)				
°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C

Approximate Conversions from Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
LENGTH				
mm	millimeters	0.04	inches	in
cm	centimeters	0.4	inches	in
m	meters	3.3	feet	ft
km	kilometers	1.1	miles	mi
		0.6	miles	mi
AREA				
cm ²	square centimeters	0.16	square inches	in ²
m ²	square meters	1.2	square yards	yd ²
km ²	square kilometers	0.4	square miles	mi ²
ha	hectares (10,000 m ²)	2.5	acres	ac
MASS (weight)				
g	grams	0.035	ounces	oz
kg	kilograms	2.2	pounds	lb
t	tonnes (1000 kg)	1.1	short tons	ton
VOLUME				
ml	milliliters	0.03	fluid ounces	fl oz
l	liters	2.1	pints	pt
l	liters	1.06	quarts	qt
m ³	liters	0.26	gallons	gal
m ³	cubic meters	35	cubic feet	ft ³
m ³	cubic meters	1.3	cubic yards	yd ³
TEMPERATURE (exact)				
°C	Celsius temperature	9/5 (then add 32)	Fahrenheit temperature	°F



U.S. & Metric Conversion Tables, 1974, NIST Monograph 43-1, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000.

1.0 INTRODUCTION

The Master Plan for the Flight Service Station Automation Program dated January 1978 is a planning document for the implementation of the Flight Service Station Automation System and serves as the acquisition authorizing document. Acquisition is limited to Phases A and B of the plan with complete implementation of Flight Service Station Automation for Level III (highest activity) Flight Service Stations and implementation of pilot self service.

Phases C and D of the Master Plan provide a plan for collocation and consolidation of the present domestic 290 Flight Service Stations into 20 new Hub facilities at the Air Route Traffic Control Center locations. Also included was an alternate plan to meet system service demands without collocation, but with automation extended up to a maximum of 150 Flight Service Stations with or without consolidation of the remaining manual stations. The implementation approach and cost for both alternatives were considered to be almost identical for Phases A and B, therefore, the issue of which alternative would be followed was to remain under consideration without affecting program costs.

2.0 PURPOSE AND SCOPE

This document presents the policy, guidelines and plan for implementation of the alternate approach for Phase C and D of Flight Service Station Automation Program. It is intended that the January 1978 Master Plan will be modified as soon as possible. The scope of the modifications are presented in Appendix 5 in overview form by major headings.

3.0 GENERAL

The Master Plan of January 1978 deferred decisions on several key issues. These issues have been studied jointly by FAA Air Traffic Service, Airway Facilities Service, and Systems Research and Development Service to present the preferred alternative plan for consolidation, distribution and location of automated Flight Service Stations. The recommended approach considers each of the following issues, and the approach taken to resolve them.

4.0 ISSUES

4.1 Background

Flight Service Stations were established in the 1920's for communication with mail planes flying between Washington, D.C., and Oakland, California. In the 1930's and 1940's, the flight service role expanded to include relaying traffic control clearances and accepting position reports for the newly established Air Route Traffic Control Centers. In the 1950's, the advent of remote air-ground communications facilities led to the elimination of the Flight Service Station role as an en route communications relay. Since 1960, Flight Service Stations have provided weather and

aeronautical services primarily to the General Aviation pilot. These services include: flight plan processing, preflight and inflight weather briefings, en route communication and emergency services (direction finding).

While the role of Flight Service Stations has changed dramatically during this period, there has been little physical change to the facilities or to their geographic distribution.

Considering the role which the Flight Service Station now plays in General Aviation safety and in an effort to provide improved service to the General Aviation public, we have reviewed the distribution and location of existing Flight Service Stations. The purpose of this review was to determine if the existing distribution is consistent with the goal of improved safety and service.

4.1.1 Consolidation and Collocation at Air Route Traffic Control Centers

A significant factor in the review was the outcome of the operational tests at the Washington Flight Service Station, Leesburg, Virginia. The Leesburg project involved the collocation and consolidation of three Flight Service Stations to the Air Route Traffic Control Center. The Leesburg tests did demonstrate that specific benefits are attainable through consolidation. These benefits include: increased capacity to provide service; more efficient staff utilization; equitable workload distribution; net decrease in overhead administrative costs. The tests also indicate there are no significant operational or cost advantages to be realized through collocation. Additionally, collocation has the negative consequence of total isolation of the system from the principal users--General Aviation. Consequently, we are no longer considering collocation of Flight Service Stations at Air Route Traffic Control Centers.

4.2 Distribution and Location of Flight Service Facilities

The problem in the distribution of the Flight Service Stations is one of balancing service against operating cost. The operating costs of the existing Flight Service Stations and the projected growth of General Aviation make continuation or expansion of the present system impractical.

A number of factors, some quantifiable and others judgmental, were considered in arriving at the number and tentative locations of the Flight Service Stations to receive automation. These include: General Aviation activity; i.e., airport operations and based aircraft; compatibility with the recently announced Satellite Airport Program; geographical distribution of facilities in terms of concentration of activity and homogeneity of terrain and weather; equalizing workload distribution between facilities; and utilizing existing equipment and locations to the extent practical.

The result of applying these preferential criteria was the selection of 61 facilities to receive automation. The locations of these facilities have been coordinated with the Regions, but have not been included in this document because they have not been discussed with the airport sponsors.

The initial application of the criteria indicates the 61 facilities will be located in 45 states and Puerto Rico. Twenty-nine locations are satellite airports. Forty-two of these tentative locations already have a Flight Service Station. All 61 facilities would be located at airports which are major centers of General Aviation activity within their respective flight plan areas.

4.3 Flight Service Station Quarters

Nineteen of the tentatively selected General Aviation airports do not have Flight Service Stations. New buildings will be required at those locations. One of the remaining 42 locations has existing quarters that could be adequately adapted to accommodate both automation and consolidation. New buildings would be required at 41 of the existing locations. One of these buildings is already under construction; therefore, this program has been developed and priced on the basis of FAA constructed buildings at 59 locations.

4.4 Intervening Period

It is recognized that during the intervening period--before the new system is operational--the workload to handle increased operations and the proposed dual operation during the transition period will require reduced hours of operation at some low activity stations, or a temporary increase in staff or both.

4.5 Consolidation of Flight Service Stations

Consolidation of the existing Flight Service Stations will be accomplished in several stages. After each automated Flight Service Station is in operation, we will ascertain that the quality of service provided is equal or superior to the service available from the existing stations in the area. Only then will we begin to consolidate the surrounding Flight Service Stations into the automated facility. The heart of our approach to consolidation is the development of a consolidation plan tailored to the needs of each individual flight plan area. This plan will be developed within national guidelines by the chief of the automated facility. The plan will also reflect the input obtained from the chiefs of the facilities to be consolidated, the FAA maintenance sector manager and the local aviation community.

New buildings will permit the development of standard floor plans to facilitate national planning for equipment, systems and operations. We envision a highly energy efficient building with specially designed high reliability power and environmental support systems. Appendix 1 is an artist's rendering of the building design we have chosen.

4.6 Issue Resolution Summary

We believe that the foregoing solutions to the issues which were deferred in the Master Plan represent the most operationally advantageous and cost effective approach to improving safety and service to the General Aviation community.

5.0 PROGRAM SCHEDULE AND FUNDING

The plan for a 61-Flight Service Station Configuration does not disturb the previously announced automation program schedule or funding plan. Deliveries of the limited automation systems are planned to begin in 1982 and will be installed in selected existing Flight Service Stations. The computer systems will be installed at Air Route Traffic Control Centers as planned.

Construction of the new Flight Service Station buildings will begin in 1982. Deliveries of expanded automation systems will begin in 1983 with final deliveries scheduled for 1987. Equipment required for the additional 18 facilities, beyond the 43 currently programmed, has been added at the end of the program schedule. Appendix 2 shows the planned schedule of system deliveries.

The funding plan is consistent with earlier plans. The cost of automation has been increased \$19M to cover the cost of 18 additional display systems. The cost for new buildings and consolidation approximate those shown in the Master Plan of 1978, however, at first glance the numbers may appear significantly different. This is because the 1978 plan is costed in constant 1977 dollars and the currently approved automation program is costed in dollars inflated per guidelines provided by OMB. In order to be consistent for comparison purposes the new plan and the 20 Hub plan dollars have been inflated at the same OMB rate. If actual inflation rates differ from projections, adjustments will be made in each years annual budget submission. A summary of the funding required by year is shown in Appendix 3. Appendix 4 delineates the differences in funding between this plan for 61 facilities and the Master Plan.

APPENDICES

FSS BUILDING	1.
SCHEDULE	2.
FUNDING	3.
COST COMPARISON	4.
MASTER PLAN REVISIONS OVERVIEW	5.

THIS PAGE IS BEST QUALITY PRACTICABLE
FROM OUR ESTABLISHED TO DDG



CHARLES F. MCAFEE AIA
ARCHITECTS ENGINEERS AND PLANNERS

FLIGHT SERVICE STATION
ADMINISTRATION

APPENDIX 2

SCHEDULE (CY)
SYSTEM DELIVERIES

	1977-80	81	82	83	84	85	86	87	88	TOTAL
<u>AUTOMATION</u>										
Limited Automation		19	22							41
Full Automation			6		13	12	12	12	6	61
<u>BUILDINGS</u>				6	12	12	12	12	5	59

APPENDIX 3

FUNDING (FY)

	1977-80	81	82	83	84	85	86	87	TOTAL
<u>AUTOMATION</u>									
Original Level III (43)	30	85	32	33	25	19	-	-	\$ 224
Additional Locations(18)	-	-	-	2	8	9	-	-	<u>19M</u> \$ 243M
<u>BUILDINGS (59)</u>	-	-	23	25	25	27	26	-	\$ 126M
<u>CONSOLIDATION</u>	-	-	-	16	24	27	59 ⁽¹⁾	-	<u>\$ 126M</u> \$ 495M

(1) 1986 and following years

APPENDIX 4

	<u>MASTER PLAN</u>	<u>PROPOSED PLAN</u>	<u>DIFFERENCE</u>
<u>AUTOMATION</u>			
Original Level III (43)	\$224M	\$224M	
Additional Facilities (18)		\$ 19M	\$ 19M
<u>BUILDINGS</u>			
59 New Buildings		\$126M	
20 Hubs	\$ 104M		\$ 22M
<u>CONSOLIDATION</u>			
	\$125M	\$126M	\$ 1M
	(1)	(1)	(1)
	\$453M	\$495M	\$ 42M

The cost/benefit analysis, prepared to support the January 1978 Flight Service Station Automation Program Master Plan, indicated a \$1.5 billion cumulative cost savings to 1995 by proceeding to the 20 Hub configuration. An update to this analysis, prepared to support the proposed plan, indicates a similar \$1.5 billion cumulative cost savings by proceeding to the 61 Flight Service Station configuration.

(1) These figures represent inflated dollars to the year of expenditure in accordance with OMB inflation guidelines.

APPENDIX 5

Anticipated Master Plan Revisions

1.0 Introduction including Foreword and Introduction

Modification of Program Phases C and D

2.0 Program Objectives and Requirements

No changes

3.0 Program Planning

No change except Phases C and D earlier implementation of Building Program as required.

4.0 Systems and Systems Interface Descriptions

Minor changes - Remove collocation at ARTCCs.

5.0 Program Implementation

Modify building program and site numbers for 61 Automated Flight Service Stations. No change to AWP requirements. Increase FSDPS implementation requirement for 23 sites. Basic overall implementation schedule modification will be minor.

6.0 Major Program Relationships

No changes.

7.0 Program Management

Changes required.

8.0 Logistics Support

No changes

9.0 Staffing

Minor changes.

Planned levels for AF and AT personnel staffing are estimated to increase slightly in the preferred alternate plan as a result of increased numbers of facilities in the final system.

10.0 Training

Minor changes resulting from configuration change.

11.0 Security

No changes.

12.0 Financial

Changes required to reflect Program Schedule and Funding revisions of Section 5.0 of this document.