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MINI-NASPAC TEST PLAN

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1. INTRODUCTION.

1.1 PURPOSE.

The purpose of these tests is to verify that Mini-NASPAC is operational and free of execution errors.

1.2 BACKGROUND.

MITRE Corp. delivered a preliminary version of Mini-NASPAC to AOR 110, March 19, 1990. This version consists of the simulation model, input data and postprocessing files. The Transition Plan for NASPAC specifies that ACD-340 shall "Conduct Test and Evaluation of Preliminary Mini-NASPAC", by May 1990. This test plan will guide that effort.

1.3 TEST PHILOSOPHY.

Testing will focus on verifying the capability to simulate the provided scenarios and to use the filename files and SUBMIT script to drive the simulation. MITRE plans to deliver an interim simulation (mini-NASPAC) version with a menu-driven user interface. Therefore, any human engineering evaluation will be deferred until this version is delivered.

Performance of the simulation model is constrained by the hardware limitations of the SUN system on which the tests will be conducted. Performance statistics will be recorded for later comparative purposes.

2. TEST APPROACH.

2.1 DEFINITION OF TEST REQUIREMENTS.

No formal requirements or specifications exist for Mini-NASPAC. The preliminary version delivered to AOR-110 included instructions for running Mini-NASPAC. These operational instructions were used as guidelines in devising the tests.

2.2 TEST LOCATION.

Tests will be performed at the FAA Technical Center, Atlantic City International Airport, Pomona, N.J.

2.3 TEST CONFIGURATION.

Tests will be run on a SUN Sparcstation 1, with 12 megabytes of main memory. Due to disk space limitations on this system, input files may be stored on another machine's (a SUN 3/160) file system and accessed across Ethernet.

3. DEFINITION OF TEST SEQUENCES.

3.1 SUBMIT SCRIPT TEST.

3.1.1 TEST OBJECTIVE.

The objectives of this test are to demonstrate that a simulation can be started using the SUBMIT script and that the SUBMIT script will perform as intended. The test will also verify the use of the FILENAME file to specify simulation inputs and outputs.

3.1.2 Test Methodology.

a. Modify the filename.0214_noweather file to match FAATC directory structure.

b. Use the SUBMIT script to run the simulation.

c. Verify initiation of the job using the UNIX PS command.

d. Submit a second simulation and verify that the script file will not initiate a new simulation while the first one is still executing.

3.2 VMC 2/14/89 SCENARIO.

3.2.1 Test Objective.

The objective of this test is to demonstrate that the simulation may be run using 2/14/89 flights and VMC weather conditions.

3.2.2 Test Methodology.

a. Modify filename.0214_noweather as necessary and submit the job.

b. Upon job completion, verify that expected output files were produced and the simulation terminated normally.

3.3 IMC 2/14/89 SCENARIO.

3.3.1 Test Objective.

The objective of this test is to demonstrate that the simulation may be run using scheduled flights and (IMC) weather conditions for 2/14/89.

3.3.2 Test Methodology.

a. Modify filename.0214_weather as necessary and submit the job.

b. Upon job completion, verify that expected output files were produced and the simulation terminated normally. Verify that reported system delays are greater than 2/14/89 VMC simulation.

3.4 1991 VMC BASELINE.

3.4.1 Test Objective.

The objective of this test is to demonstrate that the simulation may be run using 1991 demand and VMC weather.

3.4.2 Test Methodology.

a. Modify filename.1991_noweather as necessary and submit the job.

b. Upon job completion, verify that expected output files were produced and the simulation terminated normally.

3.5 IMC 3/22/89 - 1995 DEMAND.

3.5.1 Test Objective.

The objective of this test is to demonstrate that the simulation may be run using estimated 1995 demand levels and (IMC) weather conditions for 3/22/89.

3.5.2 Test Methodology.

a. Modify filename.0322_weather as necessary and submit the job.

b. Upon job completion, verify that expected output files were produced and the simulation terminated normally.

3.6 SECTOR CAPACITY TEST.

3.6.1 Test Objective.

The objective of this test is to demonstrate that sector capacities may be turned on or off by selecting the appropriate sector capacity file. The effects of limiting sector capacity on delay will be examined.

3.6.2 Test Methodology.

a. Modify filename.0214_noweather so that sector_sim.p18 is specified as the sector capacity file. Run the simulation.

b. Upon job completion, verify that the expected output files were produced and the simulation terminated normally.

c. Review the Sector report file and verify that delays associated with sectors are all equal to zero.

d. Compare the delays generated at airports, other resources and the overall system with the delays generated in test 3.2.

3.7 PERFORMANCE TEST.

3.7.1 Test Objective.

The objective of this test is to measure the performance of the Mini-NASPAC program at the FAA Technical Center.

3.7.2 Test Methodology.

During the conduct of tests 3.2-3.6, the TIME command will be used to collect performance measures on the simulation.

3.8 RANDOM NUMBER GENERATION TEST.

3.8.1 Test Objective.

The objectives of this test are to verify that the random number seed used in the simulation can be defined by the user and to determine the effect of random number seed variation on delay.

3.8.2 Test Methodology.

a. In the filename.0214_noweather file, change the random number seed parameter and submit the job.

b. Upon job completion, verify that the expected output files were produced and that the job terminated normally.

c. Verify that the total delay statistics generated differed marginally from those obtained in test 3.2.

d. Perform Analysis of Variance (ANOVA) tests to determine if random number seed variation has a significant effect on arrival delays.

3.9 POSTPROCESSING TEST.

3.9.1 Test Objective.

The objective of this test is to demonstrate the capability of displaying NASPAC summary data using the DataViews graphics package.

3.9.2 Test Methodology.

a. Invoke the NASPAC demonstration.

b. Manually advance through the various displays, using the three mouse buttons for selection and sequencing.

c. Run through the demonstration in automatic mode.