

DOE/NASA CONTRACTOR  
REPORT

DOE/NASA CR-161104

SYSTEM INTEGRATION OF MARKETABLE SUBSYSTEMS  
(Third Collection of Progress Reports)

Prepared by

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Under Contract NAS8-32036 with

National Aeronautics and Space Administration  
George C. Marshall Space Flight Center, Alabama 35812

For the U. S. Department of Energy

(NASA-CR-161104) SYSTEM INTEGRATION OF	N79-18448
MARKETABLE SUBSYSTEMS Progress Reports (IBM	
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**U.S. Department of Energy**



**Solar Energy**

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Section A  
MONTHLY PROGRESS REPORT

JULY 1978

CONTRACT NAS8-32036

PREPARED FOR:

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INTERNATIONAL BUSINESS MACHINES CORPORATION  
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I. MANAGEMENT

- o A total of 11 technical documents were submitted to MSFC.
- o A total of five Program Office Directives were generated within IBM to accomplish SIMS program objectives.

II. INTEGRATION PROGRAM

- o System 1A - Replaced the deteriorated backpressure damper at the heat pump return duct with a neoprene blade unit. Instead of adding an additional backpressure damper, as originally planned, to prevent heat pump to rock storage air leaks, a better way was derived which consisted of adding a relay to the air handler controller to close the load damper whenever the heat pump operates.
- o System 1B - Controller was repaired by vendor and was re-installed with subsequent proper system operation. The three replacement backdraft dampers with neoprene blades have been received and will be installed during a site visit in late August. Support to software debug was completed.
- o System 2 - Replaced freeze protection switch with one set for a lower temperature to accommodate the actual site cold water temperature. System is operating normally.
- o System 3 - Supported Installation Design Review (IDR) at Cheyenne, Wyoming on July 13, 1978. Site agreement was signed on August 4, 1978. Disassembled system for shipment at MSFC's convenience. Completed actions on additional System 3 documentation comments with submittal of second revision of test report and IBM's reply to the comments. Updated Data Collection Installation Kit and Instrumentation Plan.
- o System 4 - Revised documentation will be forwarded to MSFC early in August and will include actions resulting from the FAR and from design changes to  $\Delta T$  controller and higher horsepower blower motors. The documentation will include:
  - o Design Data Brochure
  - o System Description Drawing
  - o System Assembly Drawing (with B/M).

o System 4 (Continued)

Transportability requirements have been reviewed and approved by the consultant. SDAS environmental control installation was completed. All system testing has been completed and the test report update is in process. Preparations are underway to finalize the data collection sensor installation and checkout, to remove the pebbles (to be shipped separately), and to prepare the assembly for shipment. Updated the Installation Kit and Instrumentation Plan.

III. SITE DATA COLLECTION SUBSYSTEM

- o SDAS/OSM Spares - Approximately 85 percent of the spares subassembly work has been completed at the vendor. The remainder is either in work or awaiting parts delivery. All effort will be completed by the end of August.

IV. CENTRAL DATA PROCESSING SYSTEM

- o Production Processing - Detailed measurement data and plots continue to be supplied for OTS sites during July. Solar data from all sites, including intrastate and those outside the 48 contiguous states, is collected via an automatic data collection program and is processed by the host computer. This automatic system has been upgraded to accept data from four sites simultaneously. Currently, data is being collected from 17 OTS systems.
- o Data Evaluation - During the month of July CDPS printouts continued to be delivered to MSFC. Data for approximately eighteen sites are being distributed.

During the month of July IBM delivered Automatic Data Listings for the following July sites:

- GE - Normal
- IBM-1A Huntsville
- Wormser
- Fern-Tunkhannock
- Fern-Lansing

During the month of July IBM delivered Monthly System Performance Reports for the following three sites:

- Elcam-Tempe
- IBM-Togus
- Semco-Macon

V. SYSTEM ANALYSIS

- o Analysis - The two Technical Directives (TD-23 and TD-24) have been closed based on customer direction. The remaining manhours will be used to supplement the revised Data Evaluation program.
- o Change Integration - In addition to the normal routine mission tasks, the following special activities were performed:
  - Prepared a technical contract modification for IBM effort.
  - Finalized all DRL items on Northrup in preparation for contract closure.
  - Updated performance specifications on Life Sciences, Elcam, and Northrup.

VI. TEST FACILITY OPERATIONS

Solar Simulator

- o Thermal performance and stagnation tests were conducted on the General Electric evacuated tube solar collector. The stagnation tests with two separate cover materials were also performed.

Modification of the Solar House was started with removal of the collectors and previous system.

Breadboard Test Facility

- o System 3 - Disassembled and awaiting shipping instructions.
- o System 4 - A test report addendum, discussing results of differential control scheme, has been released. The SDAS thermal control has been installed. A new collector loop blower motor has been installed.
- o Solargenics Collector - All tests were completed. Test report in process.

Breadboard Test facility (Continued)

- o Weathering tests on 18 collector units continue on Test Bed No. 4 with data being monitored and recorded on a monthly basis.
- o Normal Facilities Maintenance, repair activities, and normal instrumentation functions continued during July.

VII. DATA PROGRAM

- o Site Personalization - The Operational Test Sites (OTS) currently number 45. Site personalization effort has progressed to hardware status as outlined in Table 1. Dates are completed (planned) with an "X" noted for completions prior to status month.

VIII. TECHNICAL DIRECTIVES

Word charts for the following Technical Directives active during June are attached:

<u>ID</u>	<u>Title</u>
23 (CLOSED)	Solar Cooling - Baseline System Performance
24 (CLOSED)	Collector Selection for Absorption Cycle
31 (CLOSED)	Site Selection Analysis for IBM Systems
46	Site Instrumentation and Personalization
58	Extension on Change Integration Mission from April 1, 1978 through September 30, 1978

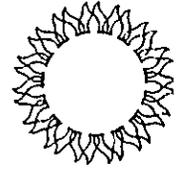
IX. FINANCIAL STATUS

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TABLE I

OTS HARDWARE STATUSAPPROVED INSTRUMENTATION PLAN

<u>SITE</u>	<u>Sensors Ordered</u>	<u>Sensors Shipped</u>	<u>J-Box Shipped</u>	<u>SDAS Shipped</u>	<u>SDAS On-Line</u>
DECADE 80	X	X	X	X	X
SEMCO-GA	X	X	X	X	X
SEMCO-FLA	X	X	X	X	X
ELCAM-TEMPE	X	X	X	X	X
WORMSER-SC	X	X	X	X	X
SEECO - EL RENO	X	X	X	X	X
FERN-LANSING	X	X	X	X	X
COLT-YOSIMITE	X	X	X	X	(8-78)
IBM-1A	X	X	X	X	X
IBM-2A	X	X	X	X	X
IBM-1B	X	X	X	X	X
COMPTEMP-MANCHESTER	X	X	X	X	July
HONEYWELL-STILLWATER	X	X	X	X	X
HONEYWELL-NEW CASTLE	X	X	X	X	(8-78)
GE-NORMAL	X	X	X	X	X
CONTEMP-YORK	X	X	X	X	tbd
FERN-TUNKHANNOCK	X	X	X	X	X
SEECO-LINCOLN	X	X	X	X	X
ELCAM-SAN DIEGO	X	X	X	X	X
COLT-PUEBLO	X	X	X	X	X
GE-SPOKANE	X	X	X	X	X
GE-MILWAUKE	X	X	X	X	tbd
AIRESEARCH-HOUSTON	X	X	X	X	(10-78)
AIRESEARCH-LAWRENCEBURG	X	July	July	July	(10-78)
AIRESEARCH-ALLAIRE	X	July	(8-78)	(8-78)	(12-78)
IBM-3A-GLENDON	X	X	(8-78)	(8-78)	( 9-78)
IBM-4A-JACKSON	X	X	X	X	( 9-78)
SOLARON-AKRON	X	July	July	July	( 8-78)
HONEYWELL-LAWRENCE	X	July	July	July	( 9-78)
HONEYWELL-CARROLLTON	X	X	July	July	tbd
GE - FT. MEADE	X	(8-78)	(8-78)	(8-78)	(10-78)



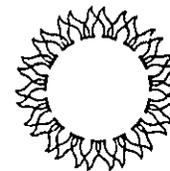
## SOLAR COOLING - BASELINE SYSTEM PERFORMANCE - TD NO. 23

### CONTRACT SCOPE

PROVIDE BASELINE SOLAR COOLING PERFORMANCE DATA FOR SINGLE FAMILY RESIDENCES

### PRESENT STATUS

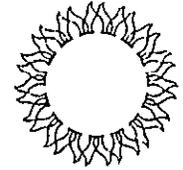
- ① CLIMATIC REGIONS FOR COOLING HAVE BEEN DETERMINED
- ① COMFORT CRITERIA HAVE BEEN ESTABLISHED
- ① GENERIC SYSTEM DESCRIPTIONS HAVE BEEN BASELINED
- ① RESTRUCTURING OF MINI-SHAC TO ACCEPT COOLING MODIFICATIONS HAS BEEN INITIATED
- ① EXPANDED SITE DEPENDENT CLIMATIC DATA HAS BEEN ASSEMBLED AND PRE-PROCESSED



## SOLAR COOLING - BASELINE SYSTEM PERFORMANCE - TD NO. 23 (CONTINUED)

### FUTURE ACTIONS

- DOCUMENTATION OF REGIONALIZATION AND GENERIC SYSTEMS
- COMPLETION OF MODIFICATION OF MINI-SHAC
- ADDITION OF EXPANDED CLIMATIC DATA TO MINI-SHAC DATA BASE
- INITIATE DEVELOPMENT OF PARAMETRIC DATA FOR PERFORMANCE CORRELATION
- TD HAS BEEN CLOSED PER CUSTOMER DIRECTION



## COLLECTOR SELECTION FOR ABSORPTION CYCLE COOLING - TD NO. 24

### CONTRACT SCOPE

DETERMINE COLLECTOR TYPE FOR ABSORPTION CYCLE APPLICATIONS

### PRESENT STATUS

- ④ INPUT GENERATOR CHARACTERISTICS FOR CONCENTRATING,  
2 PANE SELECTIVE, 2 PANE NON-SELECTIVE
- ④ UPDATED ECONOMIC ANALYSIS TOOLS TO INCLUDE IMPACT OF OPERATING  
COST AND CONVENTIONAL EQUIPMENT PERFORMANCE

### FUTURE ACTIONS

- ④ VALIDATE TRANSIENT PERFORMANCE ( SIMULATION)
- ④ DETERMINE SYSTEM ECONOMICS
- ④ TD HAS BEEN CLOSED PER CUSTOMER DIRECTION

## SITE SELECTION ANALYSIS FOR IBM SYSTEMS - TD NO. 31

### CONTRACT SCOPE

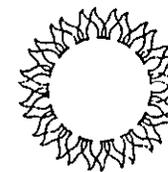
- PROVIDE SITE SELECTION ANALYSIS FOR INITIAL SITE ASSESSMENT
- PROVIDE RECOMMENDATIONS FOR FINAL SITE SELECTION FOR 13 IBM DESIGNATED SITE LOCATIONS
- PROVIDE ONE TRIP FOR ONE IBM PERSON TO EACH OF THE 13 SITES

### PRESENT STATUS

- FOUR SITES ADDRESSED:
  - CARLSBAD, N.M. (VISITED) - CLOSED PER SITE SELECTION
  - LARAMIE, WYOMING (VISITED) - CLOSED PER SITE SELECTION
  - TOGUS, MAINE (VISITED) - CLOSED PER SITE SELECTION
  - JACKSON, MISSISSIPPI (VISITED) - CLOSED PER SITE SELECTION

### FUTURE ACTIONS

- ALL SITES FOR IBM SYSTEMS HAVE BEEN SELECTED; THEREFORE, THIS TD IS CLOSED.

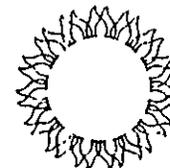


## SITE INSTRUMENTATION AND PERSONALIZATION - TD NO. 46

(THIS TD SUPERSEDES TD NO. 35)

### CONTRACT SCOPE

- PERFORM SITE PERSONALIZATION ACTIVITIES FOR THE MSFC DIRECTED OPERATIONAL TEST SITE (OTS) INSTALLATIONS
  - INSTRUMENTATION DEFINITION
  - SDAS PERSONALIZATION
  - PERFORMANCE EQUATION MODIFICATIONS
  - J-BOX PERSONALIZATION
  - CDPS PERSONALIZATION
  - INSTALL AND CHECKOUT

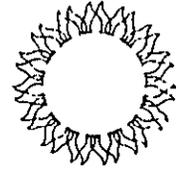


## SITE INSTRUMENTATION AND PERSONALIZATION (CONTINUED)

### PRESENT STATUS

- FORTY-FIVE OTS SITES ARE IDENTIFIED
- PERSONALIZATION ACTIVITY INITIATED FOR 31 SITES
- SENSOR SHIPMENTS
  - FOUR SITES COMPLETED DURING JULY
  - ONE SITE PROJECTED FOR AUGUST
- J-BOX SHIPMENTS
  - FOUR SHIPMENTS DURING JULY
  - THREE SHIPMENTS PROJECTED FOR AUGUST
- SDAS SHIPMENTS
  - FOUR SHIPMENTS DURING JULY
  - THREE SITES PROJECTED FOR AUGUST
- SDAS INSTALLATION AND CHECKOUT
  - ONE INSTALLED IN JULY
  - THREE PROJECTED FOR AUGUST

## CHANGE INTEGRATION MISSION - TD NO. 58



### CONTRACT SCOPE

- ⑥ OPERATE BASELINE AND CHANGE MANAGEMENT SYSTEM ON BOTH PROGRAMMATIC AND TECHNICAL CHANGES FOR THE SOLAR HEATING AND COOLING PROJECT

### PRESENT STATUS

- ⑥ VARIOUS CHANGE INTEGRATION TASKS SUPPORTING THE SOLAR HEATING AND COOLING PROJECT OFFICE WILL BE PERFORMED NOT TO EXCEED 4725 MANHOURS IN THE TIME PERIOD APRIL 1, 1978 THROUGH SEPTEMBER 30, 1978.

Section B  
MONTHLY PROGRESS REPORT

AUGUST 1978

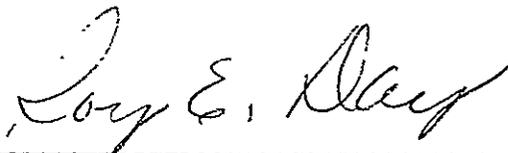
CONTRACT NAS8-32036

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PREPARED FOR:

GEORGE C. MARSHALL SPACE FLIGHT CENTER  
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION  
MARSHALL SPACE FLIGHT CENTER, ALABAMA 35812

PROGRAM OFFICE APPROVAL:

  
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INTERNATIONAL BUSINESS MACHINES CORPORATION  
FEDERAL SYSTEMS DIVISION  
150 SPARKMAN DRIVE  
HUNTSVILLE, ALABAMA 35805

## I. MANAGEMENT

- o Eight technical documents were submitted to MSFC.
- o A total of eight Program Office Directives were generated within IBM to accomplish SIMS program objectives.

## II. INTEGRATION PROGRAM

- o System 1A - All manual dampers were labeled as to function and with "open" and "closed" position indications.
- o System 1B - Site visit to install replacement backdraft dampers and to investigate data collection noise problems was accomplished on August 29, 1978. During the scheduled visit, the replacement dampers were installed with the result that the proper operation of all modes was demonstrated and the previous noise eliminated. In addition, correction of a house grounding problem corrected sensor instrumentation.
- o System 2 - System continues to operate properly.
- o System 3 - Reviewed latest installation drawings and furnished recommendations to Wyoming Recreation Commission. Data collection sensors were shipped to the site with MSFC shipping the solar system on August 17, 1978.
- o System 4 - In preparation for shipment, all pebbles were removed from the storage bin and placed in a shipping container. Remaining site data collection sensors were sent to Wyle for inclusion in the system shipment. Reviewed data collection system installation in the RSA and identified items requiring correction. Preparation of test report continues. Shipment of System 4 by MSFC is scheduled for the first week of September. Cost estimates are being generated to include installation of the data collection sensors and wiring by IBM as requested by MSFC.

## III. SITE DATA COLLECTION SUBASSEMBLY

- o SDAS/OSM Spares - All but four subassembly build items were completed at the vendor in August. These four remaining subassemblies are either awaiting piece parts or in final stages of build. All build effort is projected to be completed by mid-September, assuming that ordered piece parts arrive as scheduled.

#### IV. CENTRAL DATA PROCESSING SYSTEM

- o Production Processing - Detailed measurement data and plots continued to be supplied for OTS sites during August. Data from all sites, including intrastate and those outside the 48 contiguous states, is collected via an automatic data collection program and is processed by the host computer. Currently, data is being collected from 19 OTS systems.
- o Data Evaluation - During the month of August CDPS printouts continued to be delivered to MSFC. Data for approximately nineteen sites are being distributed.

During the month of August IBM delivered Automatic Data Listings for the following July sites:

- Colt-Pueblo
- IBM-Carlsbad
- IBM-1A Huntsville
- Honeywell-Stillwater
- Wormser
- Fern-Runkhannock
- Fern-Lansing

During the month of August IBM delivered Monthly System Performance Reports for the following two sites:

- IBM-Togus
- Elcam-Tempe

#### V. SYSTEM ANALYSIS

- o Analysis- The two Technical Directives (TD-23 and TD-24) have been closed based on customer direction. The remaining manhours will be used to supplement the revised Data Evaluation program.

V. SYSTEM ANALYSIS (Continued)

- o Change Integration - In addition to the normal routine mission tasks, the following special activities were performed:
  - Prepared and distributed five Project Status Reports.
  - Assisted in closing preparations for the Owens Illinois contract.
  - Assisted in the SEECO contract closure.
  - Prepared an update on Colt data submitted.

VI. TEST FACILITY OPERATIONS

- o Solar Simulator - Retest performed for the LOF and Sunworks liquid collectors following weathering tests. Reports forthcoming in September.
- o Solar House - Modification in process to install several systems in place of the previous single system.
  - Removal of old system complete.
  - Installation of Solargenics Collectors complete for new heating system.
  - Survey for Northrup Concentrating Collector site complete for absorption heating/cooling system.

VI. TEST FACILITY OPERATIONS (Continued)

o Breadboard Test Facility

- System 3 shipped.
- System 4 preparation for shipment completed and unit ready to ship on August 31, 1978.
- Solargenics Collector - Test report in process.

VII. DATA PROGRAM

- o Site Personalization - The Operational Test Sites (OTS) currently number 45. Site personalization effort has progressed to hardware status as outlines in Table 1. Dates are completed, (planned) with an "X" noted for completions prior to status month.

VIII. TECHNICAL DIRECTIVES

Word charts for the following Technical Directives active during August are attached:

<u>TD</u>	<u>Title</u>
46	Site Instrumentation and Personalization
58	Extension on Change Integration Mission from April 1, 1978 through September 30, 1978.

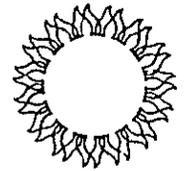
IX. FINANCIAL STATUS

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TABLE 1 - OTS HARDWARE STATUS

APPROVED INSTRUMENTATION PLAN

<u>SITE</u>	<u>Sensors Ordered</u>	<u>Sensors Shipped</u>	<u>J-Box Shipped</u>	<u>SDAS Shipped</u>	<u>SDAS On-Line</u>
DECADE 80	X	X	X	X	X
SEMCO-GA	X	X	X	X	X
SEMCO-FLA	X	X	X	X	X
ELCAM-TEMPE	X	X	X	X	X
WORMSER-SC	X	X	X	X	X
SEECO - EL RENO	X	X	X	X	X
FERN-LANSING	X	X	X	X	X
COLT-YOSIMITE	X	X	X	X	(9-78)
IBM-1A	X	X	X	X	X
IBM-2A	X	X	X	X	X
IBM-1B	X	X	X	X	X
COMPTMP-MANCHESTER	X	X	X	X	X
HONEYWELL-STILLWATER	X	X	X	X	X
HONEYWELL-NEW CASTLE	X	X	X	X	(9-78)
GE-NORMAL	X	X	X	X	X
CONTEMP-YORK	X	X	X	X	tbd
FERN-TUNKHANNOCK	X	X	X	X	X
SEECO-LINCOLN	X	X	X	X	X
ELCAM-SAN DIEGO	X	X	X	X	X
COLT-PUEBLO	X	X	X	X	X
GE-SPOKANE	X	X	X	X	X
GE-MILWAUKE	X	X	X	X	tbd
AIRESEARCH-HOUSTON	X	X	X	X	(10-78)
AIRESEARCH-LAWRENCEBURG	X	X	X	X	(10-78)
AIRESEARCH-ALLAIRE	X	X	AUG	AUG	(12-78)
IBM-3A-GLENDON	X	X	AUG	AUG	( 9-78)
IBM-4A-JACKSON	X	X	X	X	( 9-78)
SOLARON-AKRON	X	X	X	X	AUG
HONEYWELL-LAWRENCE	X	X	X	X	( 9-78)
HONEYWELL-CARROLLTON	X	X	X	X	tbd
GE - FT. MEADE	X	AUG	AUG	AUG	(10-78)
HONEYWELL-OCMULGEE	X	(9-78)	(9-78)	(9-78)	tbd
AIRESEARCH-HARRISONBURG	X	(9-78)	(9-78)	(9-78)	tbd
AIRESEARCH-LOS VEGAS	X	(9-78)	(9-78)	(9-78)	tbd

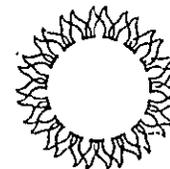


## SITE INSTRUMENTATION AND PERSONALIZATION - TD NO. 46

(THIS TD SUPERSEDES TD NO. 35)

### CONTRACT SCOPE

- PERFORM SITE PERSONALIZATION ACTIVITIES FOR THE MSFC DIRECTED OPERATIONAL TEST SITE (OTS) INSTALLATIONS
  - INSTRUMENTATION DEFINITION
  - SDAS PERSONALIZATION
  - PERFORMANCE EQUATION MODIFICATIONS
  - J-BOX PERSONALIZATION
  - CDPS PERSONALIZATION
  - INSTALL AND CHECKOUT

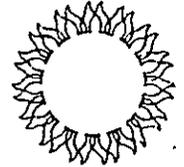


## SITE INSTRUMENTATION AND PERSONALIZATION (CONTINUED)

### PRESENT STATUS

- FORTY-FIVE OTS SITES ARE IDENTIFIED
- PERSONALIZATION ACTIVITY INITIATED FOR 34 SITES
- SENSOR SHIPMENTS
  - ONE SITE COMPLETED DURING AUGUST
  - THREE SITES PROJECTED FOR SEPTEMBER
- J-BOX SHIPMENTS
  - THREE SHIPMENTS DURING AUGUST
  - THREE SHIPMENTS PROJECTED FOR SEPTEMBER
- SDAS SHIPMENTS
  - THREE SHIPMENTS DURING AUGUST
  - THREE SITES PROJECTED FOR SEPTEMBER
- SDAS INSTALLATION AND CHECKOUT
  - ONE INSTALLED IN AUGUST
  - FIVE PROJECTED FOR SEPTEMBER

CHANGE INTEGRATION MISSION - TD NO. 58



CONTRACT SCOPE

- ① OPERATE BASELINE AND CHANGE MANAGEMENT SYSTEM ON BOTH PROGRAMMATIC AND TECHNICAL CHANGES FOR THE SOLAR HEATING AND COOLING PROJECT

PRESENT STATUS

- ① VARIOUS CHANGE INTEGRATION TASKS SUPPORTING THE SOLAR HEATING AND COOLING PROJECT OFFICE WILL BE PERFORMED NOT TO EXCEED 4725 MANHOURS IN THE TIME PERIOD APRIL 1, 1978 THROUGH SEPTEMBER 30, 1978.

Section C  
MONTHLY PROGRESS REPORT

SEPTEMBER 1978

CONTRACT NAS8-32036

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PREPARED FOR:

GEORGE C. MARSHALL SPACE FLIGHT CENTER  
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION  
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PROGRAM OFFICE APPROVAL:

Roy E. Day

INTERNATIONAL BUSINESS MACHINES CORPORATION  
FEDERAL SYSTEMS DIVISION  
150 SPARKMAN DRIVE  
HUNTSVILLE, ALABAMA 35805

## I. MANAGEMENT

- One technical document was submitted to MSFC during September.
- A total of five Program Office Directives were generated within IBM to accomplish SIMS program objectives.

## II. INTEGRATION PROGRAM

- System 1A - Air flowmeter W100 was manipulated to eliminate apparent debris and is now reading properly. Water flowmeter W300 was fixed by restoring 5V power. Tape recorder and COMM card were replaced to correct occasional data loss problem. Overall, the system continues to operate properly.
- System 1B - A collector air flow problem was noted on September 2, 1978 and further investigation revealed that the air handler damper motor assembly gears did not mesh properly. By propping open the affected damper pair, a temporary summer mode fix was provided. It is recommended that MSFC procure a replacement damper motor assembly prior to winter mode operation.
- System 2 - The system continues to operate properly.
- System 3 - An IBM engineer spent nine days at the Glendo site to support the initial stage of the solar system installation. Some shipping damage on equipment was noted and on-site repairs were made on eleven collectors and several components. The storage tank and furnace were installed; plumbing and ductwork installation progressed on schedule and pipe and tank insulation will be completed by October 4. A new roof has been installed and collector installation started. The system will be operational by October 4 and the data collection system will be checked out and operational on October 5. The Installation Acceptance Review is tentatively scheduled for October 24, 1978.
- System 4 - MSFC shipped the RSA on September 8, 1978, and placed it on the pad at Clinton on September 9, 1978, with close IBM support. Solar system installation was completed during September and the initial solar system was operational on September 28, 1978. The data collection system will be completed and activated the first week in October.

### III. SITE DATA COLLECTION SUBASSEMBLY

- SDAS/OSM Spares - Three subassembly build items are still at the vendor. The items are awaiting piece parts in the final build cycle. Vendor build will be completed when the missing piece parts are received.

### IV. CENTRAL DATA PROCESSING SYSTEM

- Production Processing - Detailed measurement data and plots continued to be supplied for OTS sites during September. Data from all sites, including intrastate and those outside the 48 contiguous states, is collected via an automatic data collection program and is processed by the host computer. Currently, data is being collected from 22 OTS systems
- Data Evaluation - During the month of September CDPS printouts continued to be delivered to MSFC. Data for approximately twenty-two sites are being distributed.

During the month of September IBM delivered Automated Data Listings for the following sites:

- Colt-Pueblo
- Wormser
- IBM-Carlsbad
- Fern-Lansing
- Fern-Tunkhannock
- Honeywell Stillwater

During the month of September IBM delivered Monthly System Performance Reports for the following sites:

- IBM-Togus
- Elcam-San Diego

V. SYSTEM ANALYSIS

- Analysis - The two Technical Directives (TD-23 and TD-24) have been closed based on customer direction. The remaining manhours will be used to supplement the revised Data Evaluation program.
- Change Integration - In addition to the normal routine mission tasks, the following special activities were performed.
  - Prepared and distributed eight Project Status Reports.
  - Finalized Request for Proposal for Holiday Inn, Frenchman's Reef Motel installations.
  - Assisted in the preparation of two solar energy related documents.
  - Prepared and submitted Technical Directive No. 75 covering change integration tasks.

VI. TEST FACILITY OPERATIONS

- Solar Simulator - Retest performed for the Solaron (air) and Lennox/Honeywell and solar energy systems (liquid) collectors following weathering tests.

Tests completed on seven ELCAM absorber plates.
- Solar House - Modification in process to install several systems in place of the previous single system.
  - Mounting pad poured for Northrup Concentrating Collector site.
  - Piping system complete for Solargenics Collectors and Domestic Hot Water System.
  - MSFC directed change from Yazaki to ARKLA Heat Absorption unit has necessitated a redesign of the ducting and storage system. Yazaki ducting, installed this month, will have to be modified.

VI. TEST FACILITY OPERATIONS (Continued):

• Breadboard Test Facility

- System 4 shipped to Glendo, Wyoming.
- Solargenics Collector - Test report received.

VII. DATA PROGRAM

- Site Personalization - The Operational Test Sites (OTS) currently number 46. Site personalization effort has progressed to hardware status as outlined in Table 1. Dates are completed, (planned) with an "X" noted for completions prior to status month.

VIII. TECHNICAL DIRECTIVES

Word charts for the following Technical Directives active during September are attached:

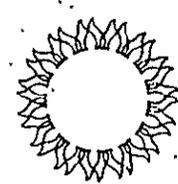
<u>TD</u>	<u>Title</u>
46	Site Instrumentation and Personalization
75	Extension on Change Integration Mission from October 2, 1978 through September 30, 1979.

IX. FINANCIAL STATUS

• This information removed.

TABLE 1 - OTS HARDWARE STATUS  
APPROVED INSTRUMENTATION PLAN

<u>SITE</u>	<u>Sensors Ordered</u>	<u>Sensors Shipped</u>	<u>J-Box Shipped</u>	<u>SDAS Shipped</u>	<u>SDAS On-Line</u>
DECADE 80	X	X	X	X	X
SEMCO-GA	X	X	X	X	X
SEMCO-FLA	X	X	X	X	X
ELCAM-TEMPE	X	X	X	X	X
WORMSER-SC	X	X	X	X	X
SEECO - EL RENO	X	X	X	X	X
FERN-LANSING	X	X	X	X	X
COLT-YOSIMITE	X	X	X	X	SEPT
IBM-1A	X	X	X	X	X
IBM-2A	X	X	X	X	X
IBM-1B	X	X	X	X	X
COMPTMP-MANCHESTER	X	X	X	X	X
HONEYWELL-STILLWATER	X	X	X	X	X
HONEYWELL-NEW CASTLE	X	X	X	X	SEPT
GE-NORMAL	X	X	X	X	X
CONTEMP-YORK	X	X	X	X	(7-79)
FERN-TUNKHANNOCK	X	X	X	X	X
SEECO-LINCOLN	X	X	X	X	X
ELCAM-SAN DIEGO	X	X	X	X	X
COLT-PUEBLO	X	X	X	X	X
GE-SPOKANE	X	X	X	X	X
GE-MILWAUKE	X	X	X	X	(1-79)
AIRESEARCH-HOUSTON	X	X	X	X	tbd
AIRESEARCH-LAWRENCEBURG	X	X	X	X	tbd
AIRESEARCH-ALLAIRE	X	X	X	X	tbd
IBM-3A-GLENDON	X	X	X	X	(10-78)
IBM-4A-JACKSON	X	X	X	X	(10-78)
SOLARON-AKRON	X	X	X	X	X
HONEYWELL-LAWRENCE	X	X	X	X	(10-78)
HONEYWELL-CARROLLTON	X	X	X	X	(12-78)
GE - FT. MEADE	X	X	X	X	(12-78)
HONEYWELL-OCMULGEE	X	SEPT	SEPT	SEPT	( 2-79)
AIRESEARCH-HARRISONBURG	X	SEPT	SEPT	SEPT	tbd
AIRESEARCH-LOS VEGAS	X	SEPT	SEPT	SEPT	tbd

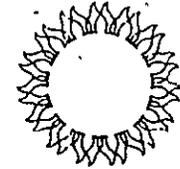


## SITE INSTRUMENTATION AND PERSONALIZATION - TD NO. 46

(THIS TD SUPERSEDES TD NO. 35)

### CONTRACT SCOPE

- PERFORM SITE PERSONALIZATION ACTIVITIES FOR THE MSFC DIRECTED OPERATIONAL TEST SITE (OTS) INSTALLATIONS
  - INSTRUMENTATION DEFINITION
  - SDAS PERSONALIZATION
  - PERFORMANCE EQUATION MODIFICATIONS
  - J-BOX PERSONALIZATION
  - CDPS PERSONALIZATION
  - INSTALL AND CHECKOUT

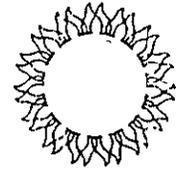


## SITE INSTRUMENTATION AND PERSONALIZATION (CONTINUED)

### PRESENT STATUS

- FORTY-SIX OTS SITES ARE IDENTIFIED
- PERSONALIZATION ACTIVITY INITIATED OR COMPLETED FOR 34 SITES
- SENSOR SHIPMENTS
  - THREE SITES COMPLETED DURING SEPTEMBER
  - NONE PROJECTED FOR OCTOBER
- J-BOX SHIPMENTS
  - THREE SHIPMENTS DURING SEPTEMBER
  - NONE PROJECTED FOR OCTOBER
- SDAS SHIPMENTS
  - THREE SHIPMENTS DURING SEPTEMBER
  - NONE PROJECTED FOR OCTOBER
- SDAS INSTALLATION AND CHECKOUT
  - TWO INSTALLED IN SEPTEMBER
  - THREE PROJECTED FOR OCTOBER

## CHANGE INTEGRATION MISSION - TD NO. 75



### CONTRACT SCOPE

- OPERATE THE CHANGE MANAGEMENT SYSTEM ON BOTH PROGRAMMATIC AND TECHNICAL CHANGES AND THE DATA DISSEMINATION EFFORT FOR THE SOLAR HEATING AND COOLING PROJECT.

### PRESENT STATUS

- VARIOUS CHANGE INTEGRATION TASKS SUPPORTING THE SOLAR HEATING AND COOLING PROJECT OFFICE WILL BE PERFORMED NOT TO EXCEED 7700 MANHOURS IN THE TIME PERIOD OCTOBER 2, 1978 THROUGH SEPTEMBER 30, 1979.

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Section D  
MONTHLY PROGRESS REPORT

OCTOBER 1978

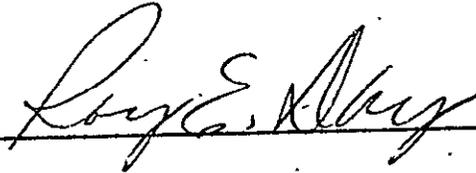
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PREPARED FOR:

GEORGE C. MARSHALL SPACE FLIGHT CENTER  
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION  
MARSHALL SPACE FLIGHT CENTER, ALABAMA 35812

PROGRAM OFFICE APPROVAL:



A handwritten signature in cursive script, appearing to read "Roy E. Alvey", is written over a horizontal line.

INTERNATIONAL BUSINESS MACHINES CORPORATION  
FEDERAL SYSTEMS DIVISION  
150 SPARKMAN DRIVE  
HUNTSVILLE, ALABAMA 35805

## I. MANAGEMENT

- Eight technical documents were submitted to MSFC during October.
- A total of three Program Office Directives were generated within IBM to accomplish SIMS program objectives.

## II. INTEGRATION PROGRAM

- System 1A - Winter mode of operation was selected on October 18, 1978; however, the unusual warm weather required extensive use of cooling only. The system continues to operate properly.
- System 1B - System continues to operate properly and changeover to winter mode occurred on October 27, 1978. A replacement damper motor assembly must be installed for proper winter operation. This replacement is scheduled for early November.
- System 2 - The system continued to operate properly up to October 15, 1978, when communication with the SDAS was lost. This SDAS communication problem is being investigated.
- System 3 - IBM continued to provide extensive on-site installation support culminating with the Installation Acceptance Review (IAR) at Glendo, Wyoming, October 25 - 31, 1978. The system is operating properly.
- System 4 - A site visit was made to adjust damper linkage, check for possible damper leaks, perform other miscellaneous solar system tasks, and make data system repairs. Although some air flow questions remain, solar system performance is satisfactory with solar heating and hot water supplying nearly 100 percent of the load. Remaining solar and data systems tasks will be accomplished at the IAR scheduled for November 2, 1978.

A revised system test report has been submitted to MSFC. This revision includes the delta-T control test results, FAR comments, and completes the documentation update cycle.

## III. SITE DATA COLLECTION SUBASSEMBLY

- SDAS/OSM Spares - Two subassembly build items are still at the vendor. The items are awaiting piece parts in the final build cycle. Vendor build will be completed when the missing piece parts are received

- Sensor Procurements - A total of 34 sets of sensors have been procured and shipped for the OTS Data Program. With 11 sets of open-commitments the budget appears adequate. During October, 10 replacement sensors were identified and shipped. In addition, the rework of instrumentation for Decade 80 was completed.
- Data System Maintenance - A total of 5 maintenance trips were made to OTS sites during the month of October. Repairs included sensor and SDAS anomalies. Depot spares provisioning continued to supply the required hardware replacements.

#### IV. CENTRAL DATA PROCESSING SYSTEM

- Production Processing - Detailed measurement data and plots continued to be supplied for OTS sites during October. Data from all sites, including intrastate and those outside the 48 contiguous states, is collected via an automatic data collection program and is processed by the host computer. Currently, data is being collected from 24 OTS systems.
- ~~●~~ Data Evaluation - During the month of October CDPS printouts continued to be delivered to MSFC. Data for approximately 24 sites are being distributed.

During the month of October, IBM delivered Automated Data Listings for the following sites:

- Colt-Pueblo
- Wormser
- Fern-Tunkhannock

#### V. SYSTEM ANALYSIS

- Analysis - The two Technical Directives (TD-23 and TD-24) have been closed based on customer direction. The remaining manhours will be used to supplement the revised Data Evaluation Program.
- Change Integration - In addition to the normal routine mission tasks, the following special activities were performed.
  - Prepared and distributed seven Project Status Reports

- Forwarded 11 reports to DOE for dissemination, thus a total of 133 reports have been processed. In addition, 44 Solar Heating and Cooling documents are being prepared.
- Assisted in the preparation of an Operating Plan for solar work.
- Finalized two additional Solar Development RFP's.

## VI. TEST FACILITY OPERATIONS

- Solar Simulator - Test performed for the Suncatcher solar collector. Tests started on NBS fluids on Lennox/Honeywell collector using water.
- Solar House - Modification in process to install four systems in place of the previous single system.
  - Tracking System for Northrup Concentrating Collectors installed and calibrated.

Piping system complete for Domestic Hot Water System and Lennox/Honeywell collectors installed.

MSFC directed change from Yazaki to ARKLA Heat Absorption Unit has necessitated a redesign of the ducting and storage system. Yazaki ducting has been modified and ARKLA installation initiated.

### Breadboard Test Facility

- Liquid loops and outside piping winterized, antifreeze added.
- Weathering tests continue on collectors under outdoor conditions.

## VII. DATA PROGRAM

- Site Personalization - The Operational Test Sites (OTS) currently number 46. Site personalization effort has progressed to hardware status as outlined in Table 1. Dates are completed, (planned) with an "X" noted for completions prior to status month.

## VIII. TECHNICAL DIRECTIVES

Word charts for the following Technical Directives active during October are attached:

<u>TD</u>	<u>Title</u>
46	Site Instrumentation and Personalization
75	Personalization Extension on Change Integration Mission from October 2, 1978 through September 30, 1979.

IX. FINANCIAL STATUS

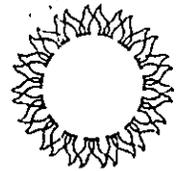
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TABLE 1 - OTS HARDWARE STATUS  
APPROVED INSTRUMENTATION PLAN

<u>SITE</u>	<u>Sensors Ordered</u>	<u>Sensors Shipped</u>	<u>J-Box Shipped</u>	<u>SDAS Shipped</u>	<u>SDAS ON-Line</u>
DECADE 80	X	X	X	X	X
SEMCO-GA	X	X	X	X	X
SEMCO-FLA	X	X	X	X	X
ELCAM-TEMPE	X	X	X	X	X
WORMSER-SC	X	X	X	X	X
SEECO - EL RENO	X	X	X	X	X
FERN-LANSING	X	X	X	X	X
COLT-YOSIMITE	X	X	X	X	X
IBM-1A	X	X	X	X	X
IBM-2A	X	X	X	X	X
IBM-1B	X	X	X	X	X
CONTEMP-MANCHESTER	X	X	X	X	X
HONEYWELL-STILLWATER	X	X	X	X	X
HONEYWELL-NEW CASTLE	X	X	X	X	X
GE-NORMAL	X	X	X	X	X
CONTEMP-YORK	X	X	X	X	(7-79)
FERN-TUNKHANNOCK	X	X	X	X	X
SEECO-LINCOLN	X	X	X	X	X
ELCAM-SAN DIEGO	X	X	X	X	X
COLT-PUEBLO	X	X	X	X	X
GE-SPOKANE	X	X	X	X	X
GE-MILWAUKE	X	X	X	X	(1-79)
AIRESEARCH-HOUSTON	X	X	X	X	tbd
AIRESEARCH-LAWRENCEBURG	X	X	X	X	tbd
AIRESEARCH-ALLAIRE	X	X	X	X	tbd
IBM-3A-GLENDO	X	X	X	X	(Oct)
IBM-4A-JACKSON	X	X	X	X	(Oct)
SOLARON-AKRON	X	X	X	X	X
HONEYWELL-LAWRENCE	X	X	X	X	(Oct)
HONEYWELL-CARROLLTON	X	X	X	X	(12-78)
GE - FT. MEADE	X	X	X	X	(12-78)
HONEYWELL-OCMULGEE	X	X	X	X	( 2-79)
AIRESEARCH-HARRISONBURG	X	X	X	X	tbd
AIRESEARCH-LOS VEGAS	X	X	X	X	tbd

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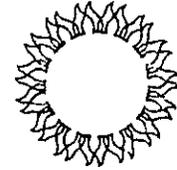
## CHANGE INTEGRATION MISSION - TD NO. 75

### CONTRACT SCOPE

- ① OPERATE THE CHANGE MANAGEMENT SYSTEM ON BOTH PROGRAMMATIC AND TECHNICAL CHANGES AND THE DATA DISSEMINATION EFFORT FOR THE SOLAR HEATING AND COOLING PROJECT.

### PRESENT STATUS

- ① VARIOUS CHANGE INTEGRATION TASKS SUPPORTING THE SOLAR HEATING AND COOLING PROJECT OFFICE WILL BE PERFORMED NOT TO EXCEED 7700 MANHOURS IN THE TIME PERIOD OCTOBER 2, 1978 THROUGH SEPTEMBER 30, 1979.

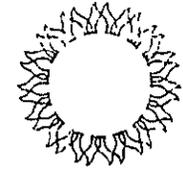


## SITE INSTRUMENTATION AND PERSONALIZATION - TD NO. 46

(THIS TD SUPERSEDES TD NO. 35)

### CONTRACT SCOPE

- PERFORM SITE PERSONALIZATION ACTIVITIES FOR THE MSFC DIRECTED OPERATIONAL TEST SITE (OTS) INSTALLATIONS
  - INSTRUMENTATION DEFINITION
  - SDAS PERSONALIZATION
  - PERFORMANCE EQUATION MODIFICATIONS
  - J-BOX PERSONALIZATION
  - CDPS PERSONALIZATION
  - INSTALL AND CHECKOUT



## SITE INSTRUMENTATION AND PERSONALIZATION (CONTINUED)

### PRESENT STATUS

- FORTY-SIX OTS SITES ARE IDENTIFIED
- PERSONALIZATION ACTIVITY INITIATED OR COMPLETED FOR 34 SITES
- SENSOR SHIPMENTS
  - NONE COMPLETED DURING OCTOBER
  - NONE PROJECTED FOR NOVEMBER
- J-BOX SHIPMENTS
  - NO SHIPMENTS DURING OCTOBER
  - NONE PROJECTED FOR NOVEMBER
- SDAS SHIPMENTS
  - NO SHIPMENTS DURING OCTOBER
  - NONE PROJECTED FOR NOVEMBER
- SDAS INSTALLATION AND CHECKOUT
  - THREE INSTALLED IN OCTOBER
  - NONE PROJECTED FOR NOVEMBER

Section E  
MONTHLY PROGRESS REPORT

NOVEMBER 1978

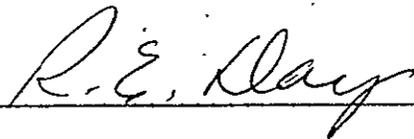
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PREPARED FOR:

GEORGE C. MARSHALL SPACE FLIGHT CENTER  
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION  
MARSHALL SPACE FLIGHT CENTER, ALABAMA 35812

PROGRAM OFFICE APPROVAL:

  
\_\_\_\_\_

INTERNATIONAL BUSINESS MACHINES CORPORATION  
FEDERAL SYSTEMS DIVISION  
150 SPARKMAN DRIVE  
HUNTSVILLE, ALABAMA 35805

## I. MANAGEMENT

- Ten technical documents were submitted to MSFC during November.
- A total of seven Program Office Directives were generated within IBM to accomplish SIMS program objectives.

## II. INTEGRATION PROGRAM

- System 1A - To prevent the system from adding unnecessary solar heat to the building due to improper switchover (control interface switch set to solar heat and the thermostat set to cool), a relay was added to the control system on 11-29-78. Solar and data systems continued to operate properly.

The IBM response to a MSFC memo criticizing various aspects of the IBM technique for evaluating solar system performance, using the IBM-1A February 1978 report as a basis, was presented to MSFC at 11-29-78 meeting. MSFC was apparently satisfied on most matters, although additional study will be performed before total closeout can be effected.

- System 1B - Failed damper motor assembly was repaired on 11-19-78 and the solar system is working properly, although two data collection sensors are defective. Loss of these sensors is making auxiliary energy calculations very difficult.
- System 2 - The telephone coupler at Togus was replaced such that receipt of good data started 11-29-78. Review of new data indicates that the solar system continues to operate properly.
- System 3 - Due to problem-free solar and data system installation, combined with early completion of software analysis, the normal 30-day checkout and debug will not be necessary, allowing issuance of the monthly performance report one month early (October data).
- System 4 - Solar and data systems continue to operate properly. Early resolution of solar and data system problems, combined with early completion of software analysis, will allow the issuance of an October monthly report (one month earlier than scheduled).

### III. SITE DATA COLLECTION SUBASSEMBLY

- SDAS/OSM Spares - An Engineering Change Proposal has been prepared and is scheduled for delivery to MSFC early in December. At present, no effort is being expended on this activity.
- Sensor Procurements - A total of 34 sets of sensors have been procured and shipped for the OTS Data Program. During November, partial shipments were made to five sites, including replacement sensors to four sites.
- Data System Maintenance - A total of six maintenance trips were made to OTS sites during the month of November. Repairs included sensor and measurement improvements. Depot spares provisioning continued to supply the required hardware replacements.

### IV. CENTRAL DATA PROCESSING SYSTEM

- Production Processing - Detailed measurement data continued to be supplied for OTS sites during November. Data from all sites including intrastate and those outside the 48 contiguous states is collected via an automatic data collection program and is processed by the host computer. Currently, data is being collected from 24 OTS systems.
- Data Evaluation - During the month of November CDPS printouts continued to be delivered to MSFC. Data for approximately 24 sites are being distributed.

During the month of November, IBM delivered Automated Data Listings for the following sites:

- Elcam-Tempe (August)
- Elcam-Tempe (September)
- Elcam-San Diego (September)

## V. SYSTEM ANALYSIS

- Change Integration - In addition to the normal routine mission tasks, the following special activities were performed.
  - Finalized a Solar Energy Management Plan.
  - Finalized a Solar Energy request for a proposed statement of work.
  - Prepared a contract deliverable status update on Wormser and a contract statement of work update on Honeywell.
  - Updated Performance Specification on Elcam.
  - Prepared and distributed 6 change Control Board Directives.
  - Forwarded 10 reports to DOE for dissemination, making a total of 143 reports processed. In addition, 55 Solar Heating and Cooling documents are being prepared.
  - Prepared and distributed seven Project Status Reports.

## VI. TEST FACILITY OPERATIONS

- Solar Simulator - Test evaluation performed for the Sun-catcher solar collector. Tests continue on the NBS fluids task on Revere collector using water.
- Solar House - Modification is in process to install four systems in place of the previous single system.
  - Solargenics Collectors installed and checked out.
  - Domestic Hot Water System installed, checked out and in operation.
  - ARKLA Absorption Subsystem - Excavation complete for storage tanks.
  - Heat pump has been received and is available for installation.

VI. TEST FACILITY OPERATIONS (Continued)

• Breadboard Test Facility

- Weathering tests continue on collectors under outdoor conditions.

VII. DATA PROGRAM

- Site Personalization - The Operational Test Sites (OTS) currently number 46. Site personalization effort has progressed to hardware status as outlined in Table 1. Dates are completed, (planned) with an "X" noted for completions prior to status month.

VIII. TECHNICAL DIRECTIVES

Word charts for the following Technical Directives active during November are attached.

<u>TD</u>	<u>Title</u>
46	Site Instrumentation and Personalization
75	Personalization Extension on Change Integration Mission from October 2, 1978 through September 30, 1979.

IX. FINANCIAL STATUS

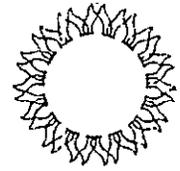
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TABLE 1 - OTS HARDWARE STATUS

APPROVED INSTRUMENTATION PLAN

<u>SITE</u>	<u>Sensors Ordered</u>	<u>Sensors Shipped</u>	<u>J-Box Shipped</u>	<u>SDAS Shipped</u>	<u>SDAS ON-Line</u>
DECADE 80	X	X	X	X	X
SEMCO-GA	X	X	X	X	X
SEMCO-FLA	X	X	X	X	X
ELCAM-TEMPE	X	X	X	X	X
WORMSER-SC	X	X	X	X	X
SEECO - EL RENO	X	X	X	X	X
FERN-LANSING	X	X	X	X	X
COLT-YOSIMITE	X	X	X	X	X
IBM-1A	X	X	X	X	X
IBM-2A	X	X	X	X	X
IBM-1B	X	X	X	X	X
COMTEMP-MANCHESTER	X	X	X	X	X
HONEYWELL-STILLWATER	X	X	X	X	X
HONEYWELL-NEW CASTLE	X	X	X	X	X
GE-NORMAL	X	X	X	X	X
CONTEMP-YORK	X	X	X	X	(7-79)
FERN-TUNKHANNOCK	X	X	X	X	X
SEECO-LINCOLN	X	X	X	X	X
ELCAM-SAN DIEGO	X	X	X	X	X
COLT-PUEBLO	X	X	X	X	X
GE-SPOKANE	X	X	X	X	X
GE-MILWAUKE	X	X	X	X	(1-79)
AIRESEARCH-HOUSTON	X	X	X	X	tbd
AIRESEARCH-LAWRENCEBURG	X	X	X	X	tbd
AIRESEARCH-ALLAIRE	X	X	X	X	tbd
IBM-3A-GLENDO	X	X	X	X	X
IBM-4A-JACKSON	X	X	X	X	X
SOLARON-AKRON	X	X	X	X	X
HONEYWELL-LAWRENCE	X	X	X	X	X
HONEYWELL-CARROLLTON	X	X	X	X	( 1-79)
GE - FT. MEADE	X	X	X	X	(12-78)
HONEYWELL-OCMULGEE	X	X	X	X	( 2-79)
AIRESEARCH-HARRISONBURG	X	X	X	X	tbd
AIRESEARCH-LOS VEGAS	X	X	X	X	tbd
DELTAGE-MILWAUKEE	(12-78)	(12-78)	(12-78)	(12-78)	( 1-79)

## CHANGE INTEGRATION MISSION - TD NO. 75

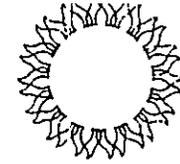


### CONTRACT SCOPE

- OPERATE THE CHANGE MANAGEMENT SYSTEM ON BOTH PROGRAMMATIC AND TECHNICAL CHANGES AND THE DATA DISSEMINATION EFFORT FOR THE SOLAR HEATING AND COOLING PROJECT.

### PRESENT STATUS

- VARIOUS CHANGE INTEGRATION TASKS SUPPORTING THE SOLAR HEATING AND COOLING PROJECT OFFICE WILL BE PERFORMED NOT TO EXCEED 7700 MANHOURS IN THE TIME PERIOD OCTOBER 2, 1978 THROUGH SEPTEMBER 30, 1979.

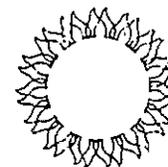


## SITE INSTRUMENTATION AND PERSONALIZATION - TD NO. 46

(THIS TD SUPERSEDES TD NO. 35)

### CONTRACT SCOPE

- PERFORM SITE PERSONALIZATION ACTIVITIES FOR THE MSFC DIRECTED OPERATIONAL TEST SITE (OTS) INSTALLATIONS
  - INSTRUMENTATION DEFINITION
  - SDAS PERSONALIZATION
  - PERFORMANCE EQUATION MODIFICATIONS
  - J-BOX PERSONALIZATION
  - CDPS PERSONALIZATION
  - INSTALL AND CHECKOUT



## SITE INSTRUMENTATION AND PERSONALIZATION (CONTINUED)

### PRESENT STATUS

- FORTY-SIX OTS SITES ARE IDENTIFIED
- PERSONALIZATION ACTIVITY INITIATED OR COMPLETED FOR 34 SITES
- SENSOR SHIPMENTS
  - NO SITES COMPLETED DURING NOVEMBER
  - ONE PROJECTED FOR DECEMBER
- J-BOX SHIPMENTS
  - NO SHIPMENTS DURING NOVEMBER
  - ONE PROJECTED FOR DECEMBER
- SDAS SHIPMENTS
  - NO SHIPMENTS DURING NOVEMBER
  - ONE PROJECTED FOR DECEMBER
- SDAS INSTALLATION AND CHECKOUT
  - NONE INSTALLED IN NOVEMBER
  - ONE PROJECTED FOR DECEMBER

Section F  
MONTHLY PROGRESS REPORT

DECEMBER 1978

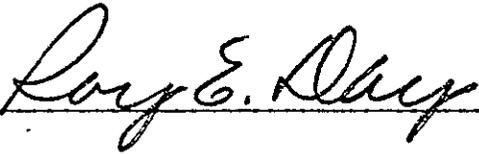
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PREPARED FOR:

GEORGE C. MARSHALL SPACE FLIGHT CENTER  
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION  
MARSHALL SPACE FLIGHT CENTER, ALABAMA 35812

PROGRAM OFFICE APPROVAL:

  
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INTERNATIONAL BUSINESS MACHINES CORPORATION  
FEDERAL SYSTEMS DIVISION  
150 SPARKMAN DRIVE  
HUNTSVILLE, ALABAMA 35805

## I. MANAGEMENT

- Six technical documents were submitted to MSFC during December.
- A total of four Program Office Directives were generated within IBM to accomplish SIMS program objectives.

## II. INTEGRATION PROGRAM

- System 1A - The solar and data systems operated properly except for tripping of the house-side circuit breaker, causing shut-down of the heating system, and for occasional sticking of the air handler and load damper. To alleviate these problems, a 100 amp circuit breaker was replaced with a proper 125 amp unit by the building contractor and the damper motor assembly was replaced by IBM.
- System 1B - The solar system operated properly during the month. Data System sensor problems are being addressed. A replacement meter for auxiliary energy air flow was shipped and installed by NPS personnel. Replacement fuel meters were shipped from the vendor on December 15, 1978 and will be installed in January.
- System 2 - Reoccurrence of SDAS Communication problems was eliminated. Further communication problems subsequent to the telephone coupler replacement were solved by replacement of SDAS cards during the site visit on December 13, 1978.
- System 3 - System 3 solar system operated properly, although unusually high heating loads combined with unusually low insolation have caused low solar contributions. Insolation measurements are occasionally affected by ice accumulations on the pyronometer. Such low insolation readings would affect certain portions of each monthly performance report. At present, no resolution is known for this condition.
- System 4 - Solar system operation continues to be satisfactory, although data problems starting on December 16, 1978 which were resolved during a site visit on December 20, 1978. Site equations have been modified to more accurately calculate solar energy into the DHW preheat tank. A minor water leak in the remote assembly unit was repaired by tightening a pipe union.

### III. SITE DATA COLLECTION SUBASSEMBLY

- SDAS/OSM Spares - An Engineering Change Proposal was prepared and was delivered to MSFC to support the additional 50 Mod II SDAS units. At present, no effort is being expended on this activity.
- Sensor Procurements - A total of 35 sets of sensors have been procured and shipped for the OTS Data Program. During December shipments were made to two sites, including replacement sensors to five sites.
- Data System Maintenance - A total of three maintenance trips were made to OTS sites during the month of December. Repairs included sensor and measurement improvements at one site and replacing recorders on two others. Depot spares provisioning continued to supply the required hardware replacements.

### IV. CENTRAL DATA PROCESSING SYSTEM

- Production Processing - Detailed measurement data continued to be supplied for OTS sites during December. Data from all sites including intrastate and those outside the 48 contiguous states is collected via an automatic data collection program and is processed by the host computer. Currently, data is being collected from 24 OTS systems.
- Data Evaluation - During the month of December CDPS print-outs continued to be delivered to MSFC. Data for approximately 24 sites are being distributed.

Also, during the month of December, IBM delivered six Automated Data Listings and sixteen monthly Performance Reports for sites in the reporting phase.

## V. SYSTEM ANALYSIS

- Change Integration - In addition to the normal routine mission tasks, the following special activities were performed.
  - Continued efforts on a Solar Energy Management Plan.
  - Updated IBM Contract Statement of Work.
  - Prepared and distributed 16 Change Control Board Directives.
  - Forwarded three reports to DOE for dissemination, making a total of 146 reports processed. In addition, 53 Solar Heating and Cooling documents are being prepared.
  - Prepared and distributed six Project Status Reports.

## VI. TEST FACILITY OPERATIONS

- Solar Simulator - Test evaluation is in process for the Sunmaster solar collector. Tests continue on the NBS fluids task as the simulator becomes available.
- Solar House - Modification is in process to install four systems in place of the previous single system.
  - Solargenics Collectors installed and checked out.
  - Domestic Hot Water System installed, checked out and in operation.
  - ARKLA Absorption Subsystem - Installation and checkout complete.
  - Heat pump has been installed and checked out.
  - Data collection system installation is complete.
  - All systems operational with exception of Hot Air Heating System. Solar House should be open for tours during the coming reporting period.

VI. TEST FACILITY OPERATIONS (Continued)

• Breadboard Test Facility

- Weathering tests continue on collectors under outdoor conditions.

VII. DATA PROGRAM

- Site Personalization - The Operational Test Sites (OTS) currently number 46. Site personalization effort has progressed to hardware status as outlined in Table 1. Dates are completed, (planned) with an "X" noted for completions prior to status month.

VIII. TECHNICAL DIRECTIVES

Word charts for the following Technical Directives active during November are attached.

<u>TD</u>	<u>Title</u>
46	Site Instrumentation and Personalization
75	Extension of Change Integration Mission from October 2, 1978 through September 30, 1979.

IX. FINANCIAL STATUS

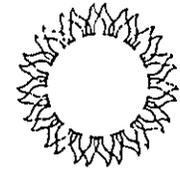
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TABLE 1 - OTS HARDWARE STATUS

APPROVED INSTRUMENTATION PLAN

<u>SITE</u>	<u>Sensors Ordered</u>	<u>Sensors Shipped</u>	<u>J-Box Shipped</u>	<u>SDAS Shipped</u>	<u>SDAS ON-Line</u>
DECADE 80	X	X	X	X	X
SEMCO-GA	X	X	X	X	X
SEMCO-FLA	X	X	X	X	X
ELCAM-TEMPE	X	X	X	X	X
WORMSER-SC	X	X	X	X	X
SEECO - EL RENO	X	X	X	X	X
FERN-LANSING	X	X	X	X	X
COLT-YOSIMITE	X	X	X	X	X
IBM-1A	X	X	X	X	X
IBM-2A	X	X	X	X	X
IBM-1B	X	X	X	X	X
COMTEMP-MANCHESTER	X	X	X	X	X
HONEYWELL-STILLWATER	X	X	X	X	X
HONEYWELL-NEW CASTLE	X	X	X	X	X
GE-NORMAL	X	X	X	X	X
CONTEMP-YORK	X	X	X	X	(7-79)
FERN-TUNKHANNOCK	X	X	X	X	X
SEECO-LINCOLN	X	X	X	X	X
ELCAM-SAN DIEGO	X	X	X	X	X
COLT-PUEBLO	X	X	X	X	X
GE-SPOKANE	X	X	X	X	X
GE-MILWAUKEE	X	X	X	X	Note 1
AIRESEARCH-HOUSTON	X	X	X	X	tbd
AIRESEARCH-LAWRENCEBURG	X	X	X	X	tbd
AIRESEARCH-ALLAIRE	X	X	X	X	tbd
IBM-3A-GLENDO	X	X	X	X	X
IBM-4A-JACKSON	X	X	X	X	X
SOLARON-AKRON	X	X	X	X	X
HONEYWELL-LAWRENCE	X	X	X	X	X
HONEYWELL-CARROLLTON	X	X	X	X	(2-79)
GE - FT. MEADE	X	X	X	X	(2-79)
HONEYWELL-OCMULGEE	X	X	X	X	Note 2
AIRESEARCH-HARRISONBURG	X	X	X	X	tbd
AIRESEARCH-LOS VEGAS	X	X	X	X	tbd
DELTA GE-MILWAUKEE	Dec	Dec	Dec	Dec	(3-79)
DELTA HONEYWELL-CCMULGEE	Dec	Dec	Dec	Dec	(3-79)

NOTES: 1. Replaced by DELTA GE-MILWAUKEE  
 2. Replaced by DELTA HONEYWELL-OCMULGEE



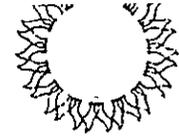
## SITE INSTRUMENTATION AND PERSONALIZATION - TD NO. 46

(THIS TD SUPERSEDES TD NO. 35)

### CONTRACT SCOPE

- PERFORM SITE PERSONALIZATION ACTIVITIES FOR THE MSFC DIRECTED OPERATIONAL TEST SITE (OTS) INSTALLATIONS
  - INSTRUMENTATION DEFINITION
  - SDAS PERSONALIZATION
  - PERFORMANCE EQUATION MODIFICATIONS
  - J-BOX PERSONALIZATION
  - CDPS PERSONALIZATION
  - INSTALL AND CHECKOUT

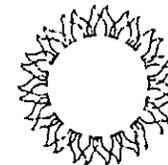
SITE INSTRUMENTATION AND PERSONALIZATION (CONTINUED)



PRESENT STATUS

- FORTY-SIX OTS SITES ARE IDENTIFIED
- PERSONALIZATION ACTIVITY INITIATED OR COMPLETED FOR 34 SITES
- SENSOR SHIPMENTS
  - TWO SITES COMPLETED DURING DECEMBER
  - NONE PROJECTED FOR JANUARY
- J-BOX SHIPMENTS
  - TWO SHIPMENTS DURING DECEMBER
  - NONE PROJECTED FOR JANUARY
- SDAS SHIPMENTS
  - TWO SHIPMENTS DURING DECEMBER
  - NONE PROJECTED FOR JANUARY
- SDAS INSTALLATION AND CHECKOUT
  - NONE INSTALLED IN DECEMBER
  - NONE PROJECTED FOR JANUARY

## CHANGE INTEGRATION MISSION - TD NO. 75



### CONTRACT SCOPE

- OPERATE THE CHANGE MANAGEMENT SYSTEM ON BOTH PROGRAMMATIC AND TECHNICAL CHANGES AND THE DATA DISSEMINATION EFFORT FOR THE SOLAR HEATING AND COOLING PROJECT.

### PRESENT STATUS

- VARIOUS CHANGE INTEGRATION TASKS SUPPORTING THE SOLAR HEATING AND COOLING PROJECT OFFICE WILL BE PERFORMED NOT TO EXCEED 7700 MANHOURS IN THE TIME PERIOD OCTOBER 2, 1978 THROUGH SEPTEMBER 30, 1979.