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COMPUTER PROGRAM DOCUMENTATION  
RAW-TO-PROCESSED SINDA PROGRAM (RTOPHS)  
USER'S GUIDE

Job Order 52-309

CPD-923

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

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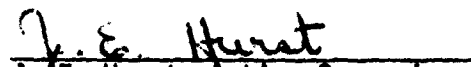
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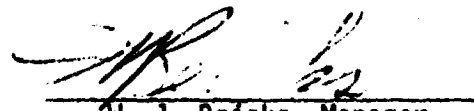
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## 1. INTRODUCTION

The Raw-To-Processed SINDA (System Improved Numerical Differencing Analyzer) Program, RTOPHS, provides a means of making the temperature prediction data on binary HSTFLO and HISTRY (referred to later as HISTRY) units generated by SINDA available to engineers in an easy to use format. The program accomplishes this by reading the HISTRY unit and, according to user input instructions, extracting the desired times and temperature prediction data and writing it to a word addressable drum file.

## 2. DESCRIPTION

RTOPHS processes a binary "raw" HISTRY unit to its word addressable "processed" form and returns the input unit number of the new drum file for subsequent use. The user can process some or all of the times of the raw file by indicating the desired start and stop times. The processed file will be in the same time units as the raw file and the temperature prediction data for all the node numbers on the input unit will be processed. The forms of processed HSTFLO and HISTRY units are shown in figures 1 and 2.

## 3. INPUT

The RTOPHS program requires HISTRY data assigned to a logical unit and the \$CNVTHS namelist data as input. The namelist data is used to determine the input HISTRY logical unit, file number, and the time span desired for the processed file. The variables of \$CNVTHS are described in Table I. A HISTRY unit may contain several files so the user must specify which file he desires to be processed. One explanation is important to aid in determining the unit number of the processed file before executing RTOPHS. The program has logical unit numbers 10 through 28 set aside to be used as the processed file. When the program attempts to assign the unit number to be used as the final file, it checks the status of these 19 unit numbers, starting with number 10, and assigns the first one which is not already assigned in the user's overall run-stream. However, unit numbers can be assigned by the user in this range, but he should be careful. For example, if units 4 and 7 were assigned to the run, the program would assign unit 10 for the processed file. However, if units 7 and 10 were assigned to the run, the program would assign unit 11 for the

IB(1)	WORD POSITION DATA 5 WORDS (ARRAY IB)
IB(2)	HEADER 27 WORDS
IB(3)	DICTIONARY NLTOTAL WORDS TUBE NUMBERS           1-NW PRESSURE NUMBERS       1-NPR VALVE NUMBERS           1-NV NODE NUMBERS            1-NN
IB(4)	TIME ARRAY NPTS WORDS
	NODE 1 NPTS WORDS
	NODE 2 NPTS WORDS
	· · ·
IB(5)	NODE LTOTAL NPTS WORDS

HEADER WORDS

1-12	DESCRIPTION
13	START TIME
14	STOP TIME
15	TIME DELTA
16	NPTS - NUMBER OF TIME POINTS
17	UNUSED
18	NW
19	NPR
20	NV
21	0
22	0
23	0
24	0
25	0
26	0
27	NN

$LTOTAL = 2*NW+NPR+NV+NN$

$NLTOTAL = NW+NPR+NV+NN$

LTOTAL NODES

1-NW	PRESSURE DROPS
1-NPR	PRESSURES
1-NV	VALVE POSITIONS
1-NW	FLOW RATES
1-NN	TEMPERATURES

Figure 1. - Processed HSTFLO file format.

IB (1)	WORD POSITION DATA 5 WORDS (ARRAY IB)
IB (2)	HEADER 27 WORDS
IB (3)	DICTIONARY NLTOTAL WORDS  TUBE NUMBERS           1-NWW PRESSURE NUMBERS       1-NPRR VALVUE NUMBERS         1-NVP NODE NUMBERS            1-NNT CONDUCTOR NUMBERS      1-NGT CONSTANT NUMBERS        1-NCT
IB (4)	TIME ARRAY NPTS WORDS
	NODE 1 NPTS WORDS
	NODE 2 NPTS WORDS
	.
	.
	.
IB(5)	NODE LTOTAL NPTS WORDS

HEADER WORDS

- 1-12 DESCRIPTION
- 13 START TIME
- 14 STOP TIME
- 15 TIME DELTA
- 16 NPTS - NUMBER OF TIME POINTS
- 17 UNUSED
- 18 NWW
- 19 NPRR
- 20 NVP
- 21 NND
- 22 NGT
- 23 NCT
- 24 NQI
- 25 NNC
- 26 UNUSED
- 27 NSL

$$LTOTAL = 2*NWW+NPRR+NVP+NSL+NND+NNC+NQI+NGT+NCT$$

$$NLTOTAL = NWW+NPRR+NVP+NNT+NGT+NCT$$

LTOTAL NODES

- 1-NWW PRESSURE DROPS
- 1-NPRR PRESSURES
- 1-NVP VALVE POSITIONS
- 1-NWW FLOW RATES
- 1-NSL TEMPERATURES
- 1-NQI INCIDENT HEATS
- 1-NND HEAT CAPACITY
- 1-NNC NET HEAT
- 1-NGT CONDUCTIVITIES
- 1-NCT CONSTANTS

Figure 2. - Processed HISTRY file format.

TABLE I. - \$CNVHS NAMELIST VARIABLE DESCRIPTION

<u>Variable</u>	<u>Description</u>	<u>Default</u>
IN	Input HISTRY unit number	1
NFILE	Number of file on input unit to be processed	1
NHSAY	Flag for processing all times (0-no, 1-yes)	0
TFINAL	User stop time for processed file	200.0
TZERO	User start time for processed file	0.0

```

VRUN,R/R 170SDX,E3206,ES3-L7777,30,500
VASG,T 1., 8c,X12345 . ASSIGN INPUT HISTRY
VMAP ES3*SINDA.RTOPH/MAP,ABS . MAP FROM ES3*SINDA.
VXQT ABS
$CNVTHS . ADD NAMELIST DATA
  IN=1,
  NFILE=1,
  TZERO=0.0,
  TFINAL=200.0,
  NHSAY=0,
$END
VUSE 2,ES3*L77777*FILE. . ASSIGN PERSONAL FILE
VUSE S,ES3*SURTEM
VS.DRM2DRM 10.,2. . WRITE PROCESSED FILE TO
VFIN . PERSONAL FILE

```

Figure 3. - Sample runstream for RTOPHS with namelist variables.



APPENDIX A  
LIST OF ROUTINES

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1. EXRPHS

EXRPHS is the main routine. It reads the namelist data, calls RNEWFL to assign the temporary unit the processed data will be written to, RHSTFN to obtain the header information from the input HISTRY unit, and RHSTCN to process the raw temperature prediction data on the input HISTRY unit.

2. RHSTCN

RHSTCN has the unit number of the raw HISTRY unit, the options for processing it, and the dictionary of the raw unit as input. It reads the raw unit, extracts the time and temperature prediction data for the desired time span, and writes the dictionary and the extracted time and temperature prediction data to the temporary unit in its processed form.

3. RHSTFN

RHSTFN has the raw unit and file number as input. It positions the raw unit to the desired file and reads the header and dictionary information for that file. It returns the header, dictionary, and the length of the dictionary to EXRPHS.

4. RNEWFL

RNEWFL searches an array of unit numbers, ranging from 10 to 28, to obtain the first file in the array that is not already assigned to the run and assign it so it can be used for the word-addressable processed file. RNEWFL returns the unit number of the unit it assigns.