NORSAR

ROYAL NORWEGIAN COUNCIL FOR SCIENTIFIC AND INDUSTRIAL RESEARCH

Scientific Report No. 5-74/75

FINAL TECHNICAL REPORT
NORSAR PHASE 3

1 July 1974 – 30 June 1975

Prepared by
K. A. Berteussen

Kjeller, 8. August 1975

Sponsored by
Advanced Research Projects Agency
ARPA Order No. 2551

APPROVED FOR PUBLIC RELEASE, DISTRIBUTION UNLIMITED

T. DETECTION PROCESSOR OPERATION

The Detection Processor system has been run and operated with the goal of having minimal system down time within the reporting period. The up time percentage is thus 99.2% for this period, as compared to 97% for the last reporting period (January - June 1974). The causes of breaks in the recording have mainly been hardware problems. A floating threshold procedure has been introduced, computing periodically a noise stability estimate. The low priority message task has been split into overlays, to obtain space for future additions to DP.

T.1 Data Recording and DP Down Time

Fig. T.1 and the accompanying Table T.1 show the daily DP down time in hours for the days between 1 July 1974 and 30 June 1975. The monthly recording times and percentages up are given in Table T.2. The most significant break, as seen from Fig. T.1, occurred on June 26, when a power failure had introduced an error in the SPS hardware. The DP went down 3 times, giving a total down time of 3 hours on the 25th and a little more than 11 hours on the 26th. On March 10 a case of "SPS interrupts not received by the DP" caused the system to be down more than 6 hours. On August 9, 1974, the SPS went down, indicating high temperature (THERM - FR 1 on), giving a break of 5½ hours.

Additionally, we have a relatively even spread of down time throughout the period. However, if we look at the column giving "DAYS WITH BREAKS", we will see that this number has been low after January this year. Since repeated breaks within a day very often have the same cause, the decrease of this number indicates better conditions towards the end of the period. The 130 breaks listed in Table T.1 can be separated into the following groups, according to the cause of the break:

SPS problems	: 23
Software problems	: 22
TOD problems	: 21
Other hardware (CPU, 2701, etc.)	: 15
Power breaks & jumps	: 12
Tape drive problems	: 10
Disk drive problems	: 7
CE work	: 7
Program change	: 6
Tests	: 3
ARPANET TIP	: 2
Unknown	: 2

The "Software problems" category consists mainly of situations when, for some reason not yet understood, the system timing printed out on the 1052 console typewriter is completely wrong. To correct this, the system has to be taken down and up again. A malfunctioning Time-of-Day (TOD) unit was the cause of many recording irregularities and breaks, until the error was tracked down and fixed in the beginning of February this year. It has worked correctly since that time. Apart from these two categories, the predominant causes of DP going down have been hardware problems. The case of the SPS not sending an interrupt when it should is the major single cause of DP going down. The total down time for this period was 74 hours 15 minutes. The over-all mean time between failures, which is the sum of the uptime intervals, divided by the number of breaks plus one, was 2.8 days, as compared with 1.7 days for the last reporting period (January - June 1974).

T.2 DP Algorithms and Parameters

Two changes have been performed in the programs making up the Detection Processor. The Low Priority Message task has been implemented as a set of overlays, in order to make room

for the future implementation of the Network Control Program task. A floating threshold procedure has been coded into the detection task. An estimate of the noise stability is computed periodically, to be ultimately passed to the Event Processor in a signal arrival record.

D. Rieber-Mohn

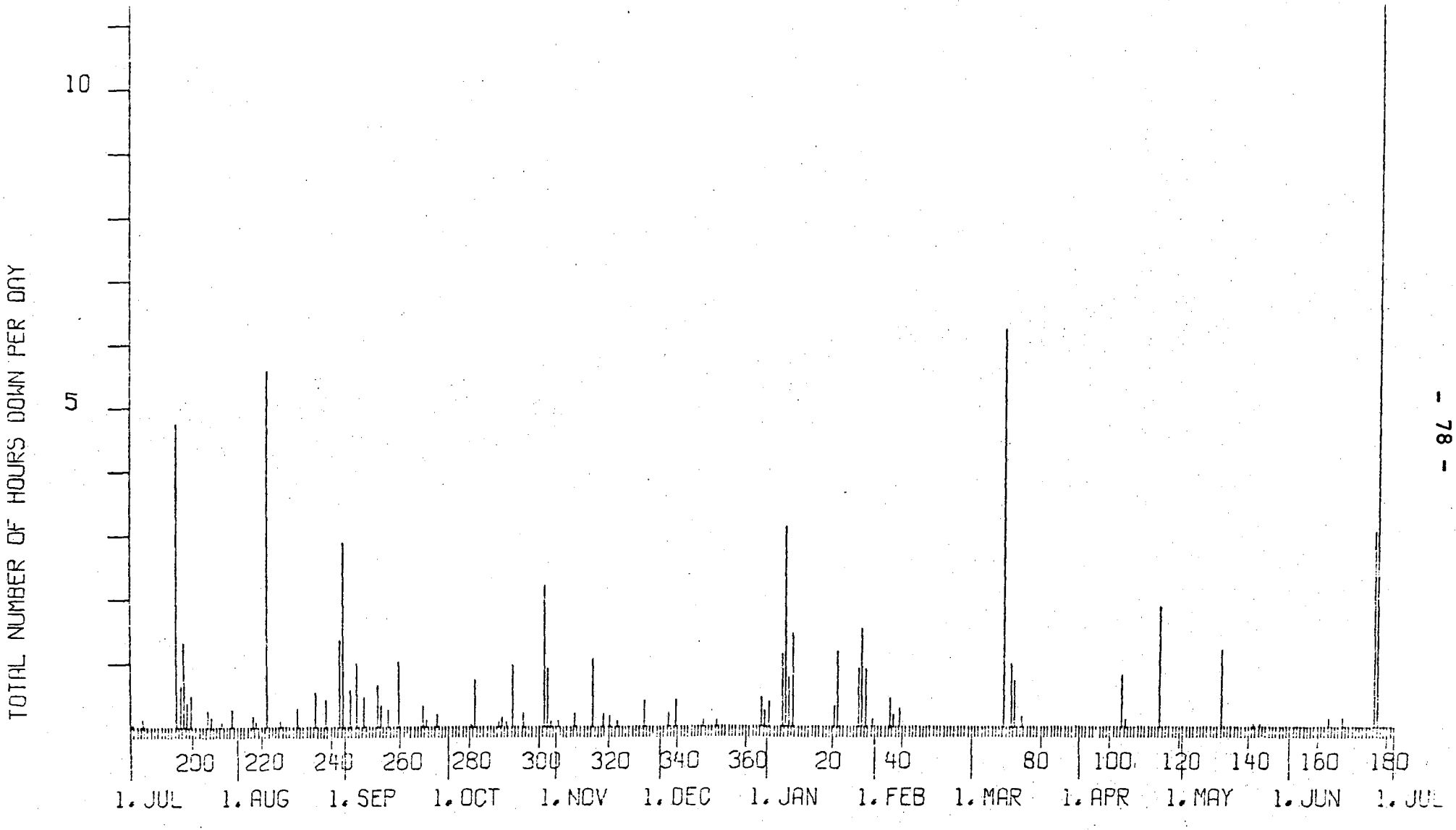

Fig. T.1 Detection Processor down time in the period 1 July 1974 - 30 June 1975.

TABLE T.1

List of breaks in DP processing in the period 1 July 1974 - 30 June 1975.

LIST OF BREAKS IN DP PROCESSING THE LAST YEAR

DAY	START		STOP		COMMENTS.....
182	9	55	9	57	CHANGE OF TAPE UNITS
185	12	3	12	11	CHANGED TOD UNIT
195	11	29	14	35	POWER BREAK
195	20	55	22	14	CPU FAILURE A TO B
196	9	24	9	38	POWER FAILURE ON B
196	15	12	15	37	SPS INTER NOT RECIVED
197	1	53	2	37	POWER ON A CAUSE B STOP
197	20	39	21	15	2701 FAILURE
198	22	25	22	48	2701 POWER TROUBLE
199	7	4	7	11	2701 FAILURE
199	13	33	13	47	270. FAILURE.SPS I.N.R.
199	17	16	17	27	TOD FAILURE
204	14	30	14	46	POWER JUMP
205	3	33	3	43	1052 TIMING WRONG
208	8	19	8	24	1052 TIMING WRONG
211	15	25	15	42	1052 TIMING WRONG
217	0	41	0	52	SPS INTER NOT RECEIVED
218	12	25	12	30	PROGRAM CHANGE
221	0	17	0	55	SPS HIGH TEMPERATURE
221	1	17	6	15	SPS HIGH TEMPERATURE
225	8	35	8	41	1052 TIMING WRONG
230	1	28	1	46	TOD ADJUSTMENT
235	3	25	3	33	2701B POWER FAILURE
235	11	53	12	13	PROGRAM TEST
238	9	56	10	12	TAPE INDICATE ON 183
238	10	27	10	37	POWER FAILURE
242	21	57	23	19	POWER OFF FOR 8
243	18	16	21	11	CHANNEL 1 HANGING
245	8	2	8	13	BAD TAPE UNIT 252
245	9	5	9	29	TEST ON TAPE UNIT 272
247	10	51	11	5	SPS INTER NOT RECEIVED
247	12	9	12	30	PROGRAM ERROR
247	12	47	12	58	PROGRAM ERROR
247	13	56	14	12	PROGRAM ERROR
249	13	4	13	32	PROGRAM ERROR
253	8	8	8	28	PROGRAM ERROR
253	14	16	14	35	PROGRAM ERROR
254	13	14	13	35	PROGRAM ERROR
256	10	26	10	43	PROGRAM ERROR
259	20	26	21	27	POWER BREAK
266	8	0	8	20	CHANGE OF TAPE DRIVES
267	9	9	9	15	PROGRAM CHANGE
270	11	44	11	56	PARAMETER CHANGE
280	9	15	9	18	CHANGE OF TAPE DRIVES
281	16	15	16	59	1052 TIMING WRONG
288	8	56	9	1	1052 TIMING WRONG
289	9	59	10	9	CHANGE OF TAPE DRIVES
290	7	26	7	31	1052 TIMING WRONG
292	12	58	13	56	T.U. 270 CAUSED HANGUP
295	17	54	18	8	PUNCH UNIT CHECK
301	8	56	9	10	T.U. 252 CAUSED HANGUP
301	18	50	20	25	DISK DRIVE IAO TROUBLE
301	22	56	23	19	DISK DRIVE IAO TROUBLE
302	6	51	7	6	DISK DRIVE IAO TROUBLE
302	8	31	9	11	DISK DRIVE IAO TROUBLE
303	9	25	9	30	CHANGE OF DISK PACK
305	12	0	12	6	CHANGE OF DISK DRIVES
310	7	52	8	5	CE WORK
315	3	48	4	52	POWER FAILURE
318	12	52	13	5	CE WORK

LIST OF BREAKS IN DP PROCESSING THE LAST YEAR

DAY	START		STOP		COMMENTS.....
320	0	1	0	12	DISK DRIVE TROUBLE
322	17	30	17	36	TOD ADJUSTMENT
330	14	22	14	47	CE CAUSING MACHINE CHK
337	8	54	9	2	PROGRAM CHANGE
337	10	43	10	49	PROGRAM CHANGE CORR.
339	10	11	10	15	CHANGE OF TAPE DRIVES
339	20	33	21	0	CHANNEL HANGUP
347	6	42	6	48	1052 TIMING WRONG
351	6	56	7	2	PROGRAM CHANGE
364	9	45	10	13	CE WORK
365	23	45	24	0	TOD ADJUSTMENT
1	0	0	0	10	TOD ADJUSTMENT
1	1	14	1	20	1052 TIMING WRONG
1	3	2	3	10	1052 TIMING WRONG
5	3	24	4	32	CPU ERROR A TO B
6	6	0	6	10	UNKNOWN
6	10	46	10	54	TOD FAILURE B TO A
6	11	29	11	45	TOD FAILURE
6	13	55	14	14	CPU ERROR A TO B
6	16	23	18	12	CE WORK
6	18	39	19	0	CE WORK
7	11	43	11	53	TOD ADJUSTMENT
7	17	35	18	8	TOD ADJUSTMENT
7	18	13	18	16	SPS INTER NOT RECEIVED
8	7	19	7	35	TOD ADJUSTMENT
8	10	36	11	3	TOD ADJUSTMENT
8	11	24	11	37	TOD UNIT CHANGED
8	14	9	14	40	TOD ADJUSTMENT,B TO A
20	9	28	9	33	TIP POWER OFF
20	12	32	12	47	ARPANET INTERFACE TEST
21	9	45	10	35	POWER FAILURE A TO B
21	13	40	13	52	INTERFACE TEST B TO A
21	14	39	14	49	TIP POWER OFF
27	12	32	12	49	TOD INCORRECT
27	14	47	14	58	TOD INCORRECT
27	15	21	15	48	TOD INCORRECT
28	21	35	23	7	POWER JUMP
29	8	20	8	56	TOD INCORRECT
29	13	6	13	24	TOD INCORRECT
31	13	2	13	10	TOD ADJUSTMENT
36	10	56	11	25	POWER JUMP
37	9	7	9	10	TOD ADJUSTMENT
37	12	56	13	5	SPS C3 FRAME 1 POWER
39	12	8	12	26	CE WORK
69	3	55	10	12	SPS INTER NOT RECEIVED
71	14	37	14	47	SPS INTER NOT RECEIVED
71	19	32	19	37	SPS INTER NOT RECEIVED
71	20	16	20	47	SPS INTER NOT RECEIVED
71	23	47	24	0	SPS INTER NOT RECEIVED
72	0	0	0	8	SPS INTER NOT RECEIVED
72	1	6	1	22	SPS INTER NOT RECEIVED
72	2	38	2	44	SPS INTER NOT RECEIVED
72	3	48	4	1	SPS INTER NOT RECEIVED
74	10	20	10	30	UNKNOWN

Table T.1
Sheet 2 of 3

LIST OF BREAKS IN DP PROCESSING THE LAST YEAR

DAY	START		STOP		COMMENTS.....
103	8	17	8	28	SPS INTER NOT RECEIVED
103	8	49	9	26	SPS INTER NOT RECEIVED
104	1	33	1	40	SPS ERROR,WRONG TODTIME
114	13	47	13	56	SPS INTER NOT RECEIVED
114	14	10	14	32	SPS INTER NOT RECEIVED
114	14	34	14	56	SPS INTER NOT RECEIVED
114	15	11	15	34	SPS INTER NOT RECEIVED
114	15	42	16	0	SPS INTER NOT RECEIVED
114	20	29	20	47	SPS INTER NOT RECEIVED
132	4	26	5	38	1052 ERROR A TO B
141	11	32	11	35	B TO A
143	10	17	10	29	POWER JUMP
163	8	0	8	8	LINEPRINTER BAD,A TO B
167	7	50	7	58	B TO A
176	20	58	24	0	SPS ERROR,POWER FAILURE
177	0	0	1	3	SPS ERROR,POWER FAILURE
177	1	30	2	50	SPS ERROR,POWER FAILURE
177	4	58	13	56	SPS ERROR,POWER FAILURE

Table T.1
Sheet 3 of 3

TABLE T.2

DP and EP Computer Usage 1 July 1974 - 30 June 1975.

Month	DP Uptime (hrs)	DP Uptime (%)	No. of DP Breaks	No. of Days with DP Breaks	DP MTBF	EP Uptime (hrs)	EP Uptime (%)
Jul 74	738	99.1	16	11	1.9	336	45.2
Aug 74	733	98.5	12	9	2.6	264	35.5
Sep 74	715	99.3	15	10	2.0	200	27.8
Oct 74	739	99.3	13	10	2.4	225	30.2
Nov 74	718	99.7	7	7	4.3	218	30.3
Dec 74	742	99.8	88	6	3.9	191	25.7
Jan 75	732	98.4	29	11	1.1	175	23.5
Feb 75	671	99.9	4	3	7.0	198	29.5
Mar 75	736	98.9	9	4	3.4	166	22.3
Apr 75	717	99.6	9	3	3.3	233	32.4
May 75	743	99.8	3	3	10.3	167	22.4
Jun 75	705	98.0	5	4	5.9	236	32.8
Total	8688	99.2	130	81	2.8	2609	29.8