

Digital Computer Laboratory  
 Massachusetts Institute of Technology  
 Cambridge 39, Massachusetts

SUBJECT: BIWEEKLY REPORT, JUNE 27, 1954  
 To: Jay W. Forrester  
 From: Scientific and Engineering Computation Group

1. MATHEMATICS, CODING AND APPLICATIONS

1.1 Introduction

During the past two weeks 379 coded programs were run on the time allocated to the Scientific and Engineering Computation (S&EC) Group. These programs represent part of the work that has been carried on in 34 of the problems that have been accepted by the S&EC Group.

Problem #176 (Connector Provision In Automatic Telephone Exchanges) has been completed. Two new problems (#186, Tracking Response Characteristics of the Human Operator by J. Elkind of Lincoln Laboratory; and #190, Zeeman and Stark Effect in Positronium by H. Kendall of the MIT Physics Department) were initiated during this period.

The Comprehensive System of Service Routines (developed under problem #100) was described by D. Combelic of the S&EC Group on June 24 at the Ann Arbor meeting of the Association for Computing Machinery.

1.2 Programs and Computer Operation

<u>Problem No.</u>	<u>Title</u>	<u>WTI Time</u>
100	Comprehensive System of Service Routines	704 minutes
101 C.	Optical Properties of Thin Metal Films	12 minutes
106 C.	MIT Seismic Project	350 minutes
107 C.	(a) Autocorrelation and (b) Fourier Transform, Evaluate Integrals	45 minutes
120 D.	The Aerothermopressor	213 minutes
126 C.	Data Reduction	87 minutes
131	Special Problems (Staff training, demonstrations, etc.)	206 minutes

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<u>Problem No.</u>	<u>Title</u>	<u>WWI Time</u>
132 C.	Subroutines for the Numerically Controlled Milling Machine	36 minutes
136	Matrix Equation	4 minutes
141	S&EC Subroutine Study	121 minutes
142 D.	A Study of Shock Waves	354 minutes
144 C.	Self-consistent Molecular Orbitals	11 minutes
147 C.	Energy Bands in Crystals	728 minutes
149 C.	Digital Methods of Detecting Signal From Noise	7 minutes
155 D.	Synoptic Climatology	134 minutes
159 D.	Water Use in a Hydroelectric System	262 minutes
162 C.	Determination of Phase Shifts from Experimental Cross-Sections	25 minutes
163 C.	Ferrite Phase Shifters in Rectangular Wave Guides	27 minutes
166 C.	Construction and Testing of a Delta-Wing Flutter Model	23 minutes
169 B.	Utilizing a General Purpose Digital Computer in Switching-Circuit Design	27 minutes
171 C.	Improved Power Spectrum Estimates	11 minutes
172 B.	Overlap Integrals of Molecular and Crystal Physics	265 minutes
173	Course 6.537 Digital Computer Application Practice	22 minutes
175 C.	Impurity Levels in Crystals	122 minutes
176 B.	Connector Provision in Automatic Telephone Exchanges	317 minutes
179 G.	Transient Temperature of a Box-Type Beam	22 minutes
180 B.	Crosscorrelation of Blast Furnace Input-Output Data	9 minutes
183 D.	Blast Response of Aircraft	143 minutes
184 D.	Scattering Electrons from Hydrogen	31 minutes
186 C.	Tracking Response Characteristics of the Human Operator	11 minutes
187 C.	Response of a Fuel-Flow Controller	57 minutes
188 C.	Effect of Gravity on Relative Water Production in Oil Reservoirs	18 minutes

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<u>Problem No.</u>	<u>Title</u>	<u>WWI Time</u>
190 D.	Zeeman and Stark Effect in Positronium	22 minutes
192 D.	Frequency and Phase Spectrum Analysis of Seismograms	299 minutes

1.3 Computer Time Statistics

The following indicates the distribution of WWI time allocated to the S&EC Group.

Programs	75 hours, 19 minutes
Conversions	9 hours, 01 minute
Magnetic Drum Test	49 minutes
Magnetic Tape Test	1 hour, 02 minutes
Scope Calibration	46 minutes
PETR Test	2 minutes
Demonstrations (#131)	<u>3 hours, 26 minutes</u>
Total Time Used	90 hours, 25 minutes
Total Time Assigned	96 hours, 38 minutes
Usable Time, Percentage	93.7%
Number of Programs Run	379

2. COMPUTER ENGINEERING

2.1 WWI System Operation (A. J. Roberts, L. L. Holmes)

Several intermittent troubles caused a considerable loss of computer time during the last two weeks. The majority of down time was caused by the following troubles:

1. Installation faults - A cathode-follower resistor and a terminating choke were damaged during modification of the in-out registers. A wiring error resulted in lack of plate voltage to the buffer-drum writing circuits.
2. Photoelectric reader - The trouble with the Ferranti reader experienced during the last biweekly period continued. The fault was finally traced to poorly soldered connections in the amplifier.
3. Magnetic-drum matrix - Some time was lost because of an open filament in a cathode follower in this matrix. This is the third tube in the matrix to develop this fault. A new set of tubes has been put into service.
4. Magnetic-tape Unit 0 - Several errors have been detected in the recording on Unit 0. In an effort to reduce the time lost as a result of these errors two tapes will be recorded and checked as often as necessary.

Core memory continues to operate with excellent reliability. Operation from 2 May to 10 June was error-free.

(D. A. Morrison)

Work continues on the WWI reliability study. I have prepared a memo describing the WWI voltage-interlock panel.

2.2 Terminal Equipment

2.21 Magnetic Drums (K. E. McVicar)

Several additions and modifications are in process or have recently been made to both the auxiliary and the buffer-drum systems.

Two additional groups of auxiliary storage, to be designated Groups 2 and 3, are being added to the buffer-drum system. This work will be done without interfering with the normal operation of the buffer drum except that there will be no parity check on any of the buffer-drum transfers for a period of about a week. Programmers wishing to assure themselves of the operation of the buffer drum during that period should run a drum-check program prior to their computer run.

(H. L. Ziegler)

Ten digits of the auxiliary drum are now converted to electronic write-switching of heads, and the remaining six digits should be changed over by the 1 July "target" date for this job. Programmers should note that the present 32-msec change-group delay will be eliminated at the completion of the changeover.

It has been decided to proceed with the standardization of voltage connections for the magnetic-drum chassis. The necessary modification notices are being prepared now.

(L. D. Healy)

The auxiliary-drum checking procedure is being modified to take care of the electronic switching which is replacing relay switching in the system.

2.22 Ferranti PETR (F. E. Irish)

The Ferranti PETR amplifier that has been in service during the past month appears to have been the direct source of the intermittent trouble that has been experienced during reader operations. A replacement amplifier has been installed, and the intermittent troubles have not recurred. An inspection of the amplifier circuitry revealed several "cold" soldered joints that most likely were the cause of our past operational troubles.

### 3. ADMINISTRATION AND PERSONNEL

#### New Staff (J. C. Proctor)

William J. Eccles is a new DIC Staff Member working for Charlie Adams for the summer. He received his SB from MIT in June of this year.

Nicholas J. Saber is a new DIC Staff Member working for Charlie Adams for the summer. He received his SB from MIT in June of this year.

Richard E. Watson is a new DIC Staff Member working for Charlie Adams. He received his BS in Physics from Amherst College in June 1953.

#### Staff Transfers

John Frankovich has transferred from MIT Staff to DIC Staff.

Frederick Sarles has transferred from MIT Staff to DDL Staff.

#### Staff Terminations

Robert Hopkins  
Robert von Buelow  
William Wolf

New Non-Staff (R. A. Osborne)

Jane Aldenberg is Dave Israel's new secretary in Group 61.

Donald Bloom has joined Group 64 as a Laboratory Assistant.

Eleanor Derby is a Radcliffe student who will work for the summer as a clerk in Group 6345.

Barbara Hanlon is a high-school student who will work for the summer as a clerk in the Print Room.

Warren Hollis and Sidney Wood have been transferred from the Director's Office to the Group 60 Standards Section, where they have actually already been for some time.

Vincent Kelly has joined the Construction Shop as a Laboratory Assistant.

Elizabeth Osenton is a new clerk-typist who will operate the teletype in Group 62.

Edward Reardon is a new member of Group 62 temporarily assigned to the General Engineering Section of Group 60.

Rex Sinclair is a new Laboratory Assistant in the Memory Section of Group 62.

Robert Thornton is a Tufts student who will work in the Drafting Room for the summer.

Terminated Non-Staff

Joseph Dankese  
Leila Buckner  
Alfred Perry  
Margaret O'Brien

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