

July 10.4

AGENDA

PHILCO IMCC CONTRACT REVIEW

JULY 26, 1963

MSC Introduction	P. Vavra	15 min.
IMCC program discussion and allocation of responsibilities		
Management control mechanisms		
Program Scope and Status Overall	W. LaBerge	10 min.
Review of tasks to be performed and plan for accomplishment		
Status Review in general - schedule position, people, facilities, etc.		
Technical Discussion of the IMCC		
Hardware subsystems for IMCC	Cartwright	60 min.
Physical layout and building standardization	Cronhardt	15 min.
GOSS tasks (GLDS, Merritt Island, DCS, PCM)	<u>Wye</u>	10 min.
Financial Performance & Objectives	Nichols	20 min.
Costs negotiated and expended to date		
Changes expected and total projection		
Discussion	OPEN	

ORGANIZATIONS & TASKS

NASA

GROUND SYSTEMS PROJECT OFFICE

FOD
REQUIREMENTS

PHILCO/GSPO
INTEGRATION

IBM
RTCC
LTDS
M/O

PHILCO
IMCC
Display/Control
COMM
SCATS
Integration
M/O
LDS
Recovery

GFE
Remote Site
(GSFC)
Sim Consoles
(GSFC)
PCM TM Eqpt.
Comm. Processors
IMCC Building
Network Liaison
GSFC-JPL-DOD
MSFC-LOC
Digital Command

TELCO
Leased
Services
Toll Bldg.

IMCC & MISSION CONTROL SYSTEMS

MAJOR TECHNICAL AREAS

Display & Control System

Simulation, Checkout, and Training System

Communications System

Communications Processor Subsystem

Computing Equipment (RTCC)

Computer Programming

Command System

Telemetry System

Facilities/M & O

Launch Data System

Launch Trajectory Data Subsystem

RTCC-Display/Control - Comm. Interfaces

IMCC - LDS - Remote Site Integration

Network/IMCC Checkout

EFFORTS IN ESTABLISHING
REQUIREMENTS & PROCEEDING
WITH DESIGN

1. Philco Task Group working directly with F.O.D. in preparation of IMCC Operational Requirements Control Document.
2. Participation in technical groups by F.O.D., IBM, Philco, GSPO.

Meet bi-weekly to establish requirements, review and refine system designs.

Technical Group Outputs:

Meeting summaries

Data Books on each area compile:

Requirement - quantities

System design

Subsystem specifications

Interface specifications

GSPO/FOD EFFORTS TO KEEP
SYSTEM REQUIREMENTS & DESIGN
PLANS IN COST PERSPECTIVE

Pneumatic Tubes

Slide Files

Display Request Keyboards

Display Channels/Character Choices

SCATS

PCM Equipment

Dummy Remote Sites

RTCC Interface

Bissett-Berman Supplemental Studies (Philco)

Full Scale MOCR Mockups

Recovery Room - Staff Support Room Bldg. Changes

Digital Command

Network Status Boards

TV Hard Copy Printer

FIRST FLOOR - POWER & HEAT LOAD REQUIREMENTS

RM NO.	TECH PWR KVA		UTILITY PWR KVA		TOTAL	TECH LOAD BTU/HR ()	UTILITY LOAD BTU/HR ()	TOTAL
	BUSS-A	BUSS-B	BUSS-A	BUSS-B				
110			0.20	2.43	2.63		6,480	6,480
111			0.09	1.08	1.17		2,840	2,840
112	566.0		4.30	53.0	623.30	1,640,000	140,000	1,780,000
113**			0.55	6.75	7.30		20,900	20,900
114		12.0	0.40	4.95	17.35	34,300	13,000	47,300
115		12.0	0.45	5.52	17.97	34,300	14,400	48,700
116	139.2		1.54	19.00	159.74	398,000	50,100	448,100
116A		13.2			13.2	37,800		37,800
117		12.0	0.33	4.00	16.33	34,300	10,500	44,800
117A		9.6	0.08	0.97	10.65	27,500	2,550	30,050
118		44.4	0.47	5.89	50.76	127,000	15,500	142,500
118A		7.2	0.20	2.52	9.92	20,600	6,650	27,250
118B		7.5	0.20	2.52	10.22	21,450	6,650	28,100
122			0.05	0.58	0.63		1,540	1,540
122A		10.0	0.06	0.72	10.78	28,600	1,900	30,500
123			0.02	0.38	0.40		1,000	1,000
126**			0.82	10.20	11.02		31,700	31,700
127		18.0	0.36	4.50	22.86	51,500	11,850	63,350
127A		30.0	0.91	11.20	42.11	85,800	29,550	115,350
129	14.4	48.8	0.60	7.35	71.15	182,000	19,400	201,400
130	8.4	66.0	0.31	3.82	78.53	212,500	10,000	222,500
SERVICE AREA			0.44	5.42	5.86		14,350	14,350
CORRIDORS			1.18	14.76	15.94		38,860	38,860
SUB-TOTAL	728.0	290.70	13.56	167.56	1199.82	2,935,650	449,720	3,385,370
*RM113				42.00	42.00		* 101,800	* 101,800
*RM126				111.00	111.00		* 640,000	* 640,000
GRAND TOTAL	728.0	290.70	13.56	326.56	1352.82	2,935,650	1,191,520	4,127,170
* MECH. EQUIP. R.M'S UTILITY HEAT LOAD INDICATED REFLECTS								
INTERNAL LATENT, FAN MOTORS, FRESH AIR LOADS, ETC.								
** THESE FIGURES REFLECT RM LIGHTING & RMLIGHTING								
BTU LOAD ONLY								

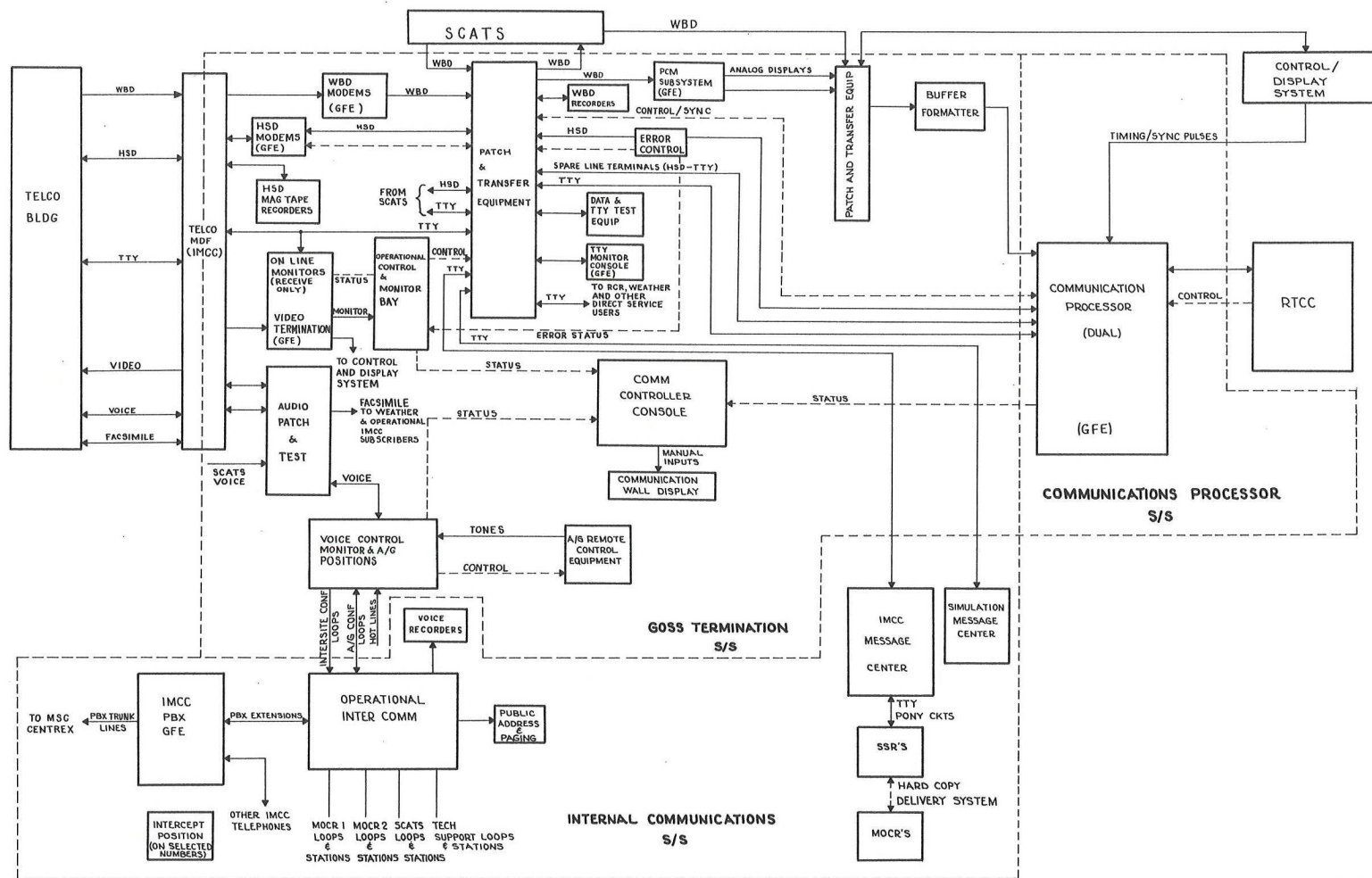
SECOND FLOOR - POWER & HEAT LOAD REQUIREMENTS

RM NO.	TECH PWR KVA		UTILITY PWR KVA		TOTAL	TECH LOAD BTU/HR ()	UTILITY LOAD BTU/HR ()	TOTAL
	BUSS-A	BUSS-B	BUSS-A	BUSS-B				
210		13.9	.25	5.0	19.15	39,500	12,710	52,210
211		11.5	.28	6.0	17.78	32,500	15,400	47,900
212		6.2	.11	2.3	8.61	17,700	7,150	24,850
212A		6.2	.11	2.3	8.61	17,700	7,150	24,850
213		6.2	.19	3.8	10.19	17,700	10,400	28,100
214		6.2	.23	5.0	11.43	17,700	12,710	30,410
216	13.2	139.0	.55	11.3	164.05	438,000	30,300	468,300
219		53.6	.47	9.7	63.77	152,000	26,000	178,000
219A		6.0	.13	2.6	8.73	17,000	7,100	24,100
219B		6.0	.13	2.6	8.73	17,000	7,100	24,100
DUMMY REMOTE 1		1.0	.04	0.8	1.84	2,700	2,100	4,800
NO.2								
NO.3								
NO.4								
NO.5								
NO.6								
NO.7								
NO.8		1.0	.04	0.8	1.84	2,700	2,100	4,800
225		12.0	.36	7.5	19.86	34,000	20,000	54,000
226		6.0	.19	3.9	10.09	17,000	10,500	27,500
227		12.0	.11	2.3	14.41	34,000	6,200	40,200
227A	10.0	6.0	.12	2.5	18.62	17,000	6,600	23,600
227B	10.0	6.0	.12	2.5	18.62	17,000	6,600	23,600
228		12.0	.13	2.8	14.93	17,000	7,400	24,400
229		6.0	.16	3.3	9.46	17,000	8,900	25,900
229A		3.8	.08	1.6	5.48	10,900	4,400	15,300
230		78.4	.42	8.7	87.52	222,000	23,300	245,300
231		24.0	.58	11.9	36.48	68,000	32,100	100,100
232A				.2				
232B				.2				
233		3.0	.26	5.3	8.54	8,500	14,100	22,600
SERVICE AREA			.32	6.5	6.82		5,900	5,900
CORRIDORS	1.3		1.30	26.7	28.00		71,600	71,600
SUB-TOTAL	34.5	425.8	9.62	140.54	164.60	1,250,800	498,220	1,621,220
*224			.42	115.0	115.42		*721,000	*721,000
GRAND TOTAL	34.5	425.8	10.04	255.54	270.02	1,250,800	1,219,220	2,342,220

* MECH. EQUIP. RM UTILITY HEAT LOAD INDICATED REFLECTS INTERNAL LATENT, FAN MOTORS, FRESH AIR LOADS ETC.

PHILCO IMCC
IMPLEMENTATION CONTRACT
QUARTERLY REVIEW

COMM SYSTEM



INTERNAL S/S

FUNCTIONS:

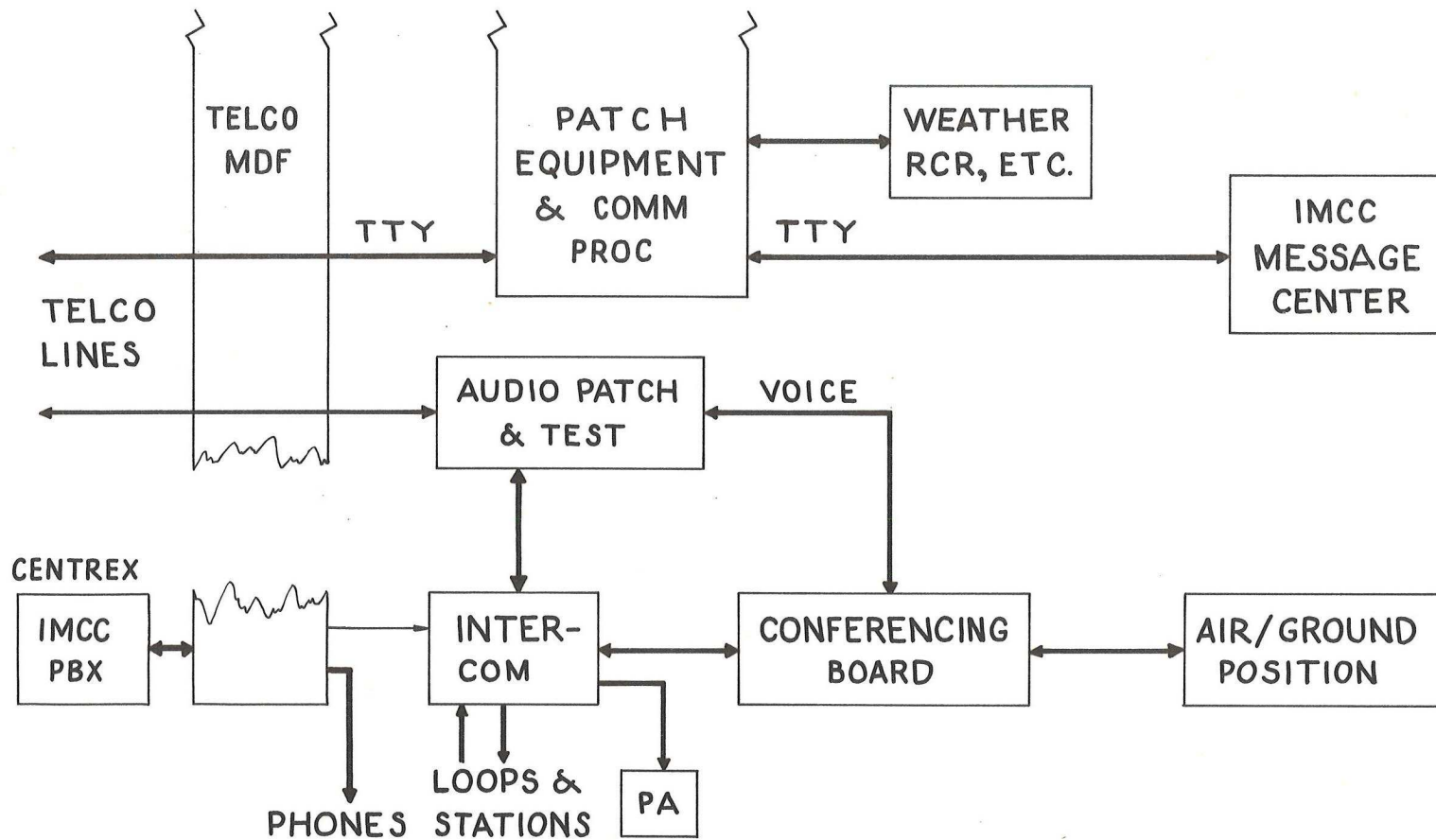
1. DISTRIBUTE HARD-WIRE VOICE COMMUNICATION FROM THE OUTSIDE WORLD THROUGHOUT THE IMCC.
2. PROVIDE INTERCOM THROUGHOUT THE IMCC AND VIA DIAL FACILITIES, PROVIDE TELEPHONE ACCESS TO THE OUTSIDE WORLD.
3. RECEIVE, PROCESS, DISTRIBUTE, TRANSMIT ALL TTY MESSAGE TRAFFIC.
4. PROVIDE PA FACILITIES.
5. DISTRIBUTE MESSAGE HARD COPY WITHIN THE IMCC.

TERMINATION S/S

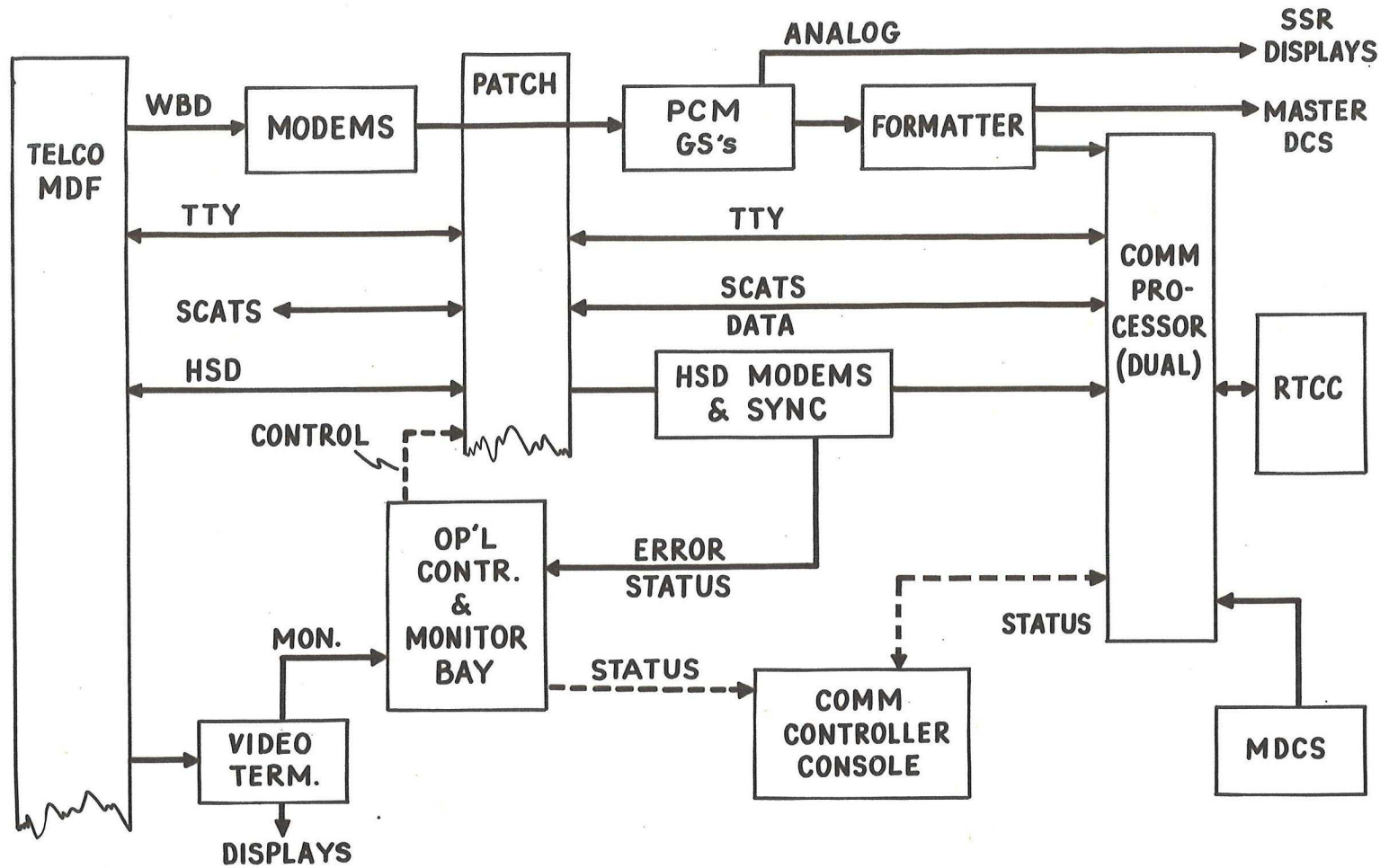
FUNCTIONS:

1. TERMINATE PROCESS AS NECESSARY AND DISTRIBUTE ALL GOSS NETWORK VOICE AND DATA CHANNELS AT THE IMCC.
2. PROVIDE CONTINUOUS QUALITY MONITORING OF THESE CHANNELS.

COMM SYSTEM: VOICE & MESSAGE



COMM SYSTEM: DATA



INTERNAL COMM. S/S

EQUIPMENT
INTERCOM

NOW
163 LOOPS
225 STATIONS
110 EXTRA JACK
STATIONS
P-TUBE

HARD COPY
DISTRIBUTION

TTY MACHINES
(MESSAGE CENTER)

21 M-28 ASR s
7 M-28 RO s
3 M-28 ROTR s
2 M-28 MXD

TERMINATION S/S

EQUIPMENT

NOW

VOICE CONFERENCING
& SWITCHING

1 EQUIP. GRP.

MODEMS

GFE

21-DATA MODEMS
6-WIDE BAND MODEMS

ERROR CENTRAL

0

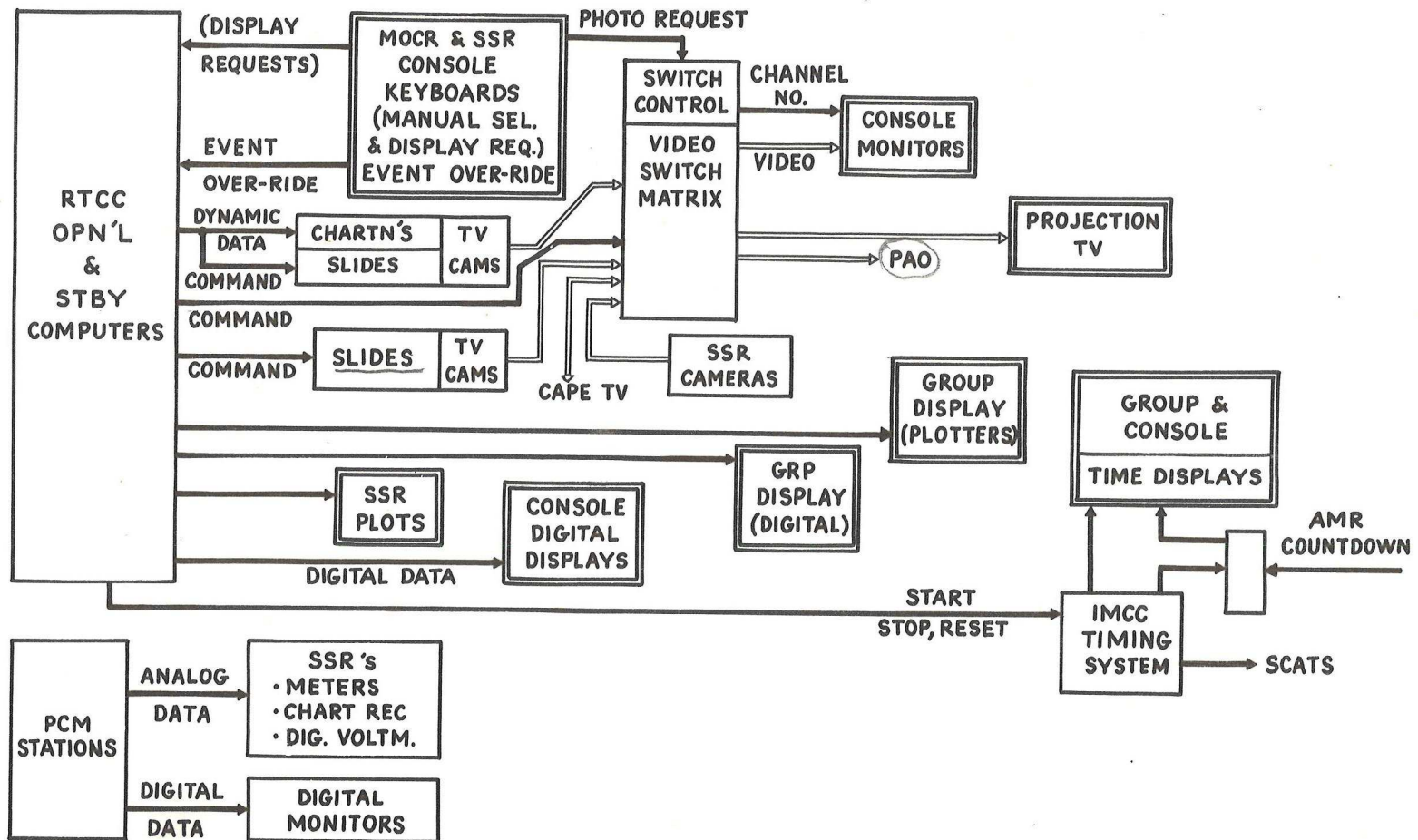
BUFFER FORMATTER

2

VIDEO TERM. UNITS

0 (GFE)

DISPLAY / CONTROL



D/C HARDWARE

SUBSYSTEM COMPONENTS

A. COMPUTER-DISPLAY/CONTROL INTERFACE SUBSYSTEM

A2 COMPUTER OUTPUT DEMULTIPLEXERS

A2/1 DIGITAL DISPLAY DRIVERS SDD

2

A2/2 PLOTTING DISPLAYS SDD

2

A2/3 D/A CONVERTERS SDD

—

A2/4 DIGITAL TO TV CONVERTER DD

2

A2/5 CONVERTER SLIDE FILES DD

2

A2A AUXILIARY CONVERTERS SLIDE FILES DD

2

A3 DIGITAL-TO-TELEVISION CONVERTERS

56

A3A AUXILIARY DIGITAL-TO-TELEVISION CONVERTERS

8

A3B AUXILIARY DIGITAL-TO-TELEVISION DD

2

7/15
QUANTITY

D/C HARDWARE (CONT'D)

	7/15 QUANTITY
A4 CONVERTER SLIDE FILES	56
A4A AUXILIARY CONVERTER SLIDE FILES	8
A5 REFERENCE SLIDE FILES	32(5000CAP)
A6 MANUAL SELECTION KEYBOARD WITH:	—
A. TV CHANNEL SELECTION CAPABILITY	117
B. REFERENCE FILE SELECTION CAPABILITY	103
C. DISPLAY REQUEST FROM RTCC CAPABILITY	103
D. HARD COPY REQUEST CAPABILITY	136
E. PHOTO RECORD REQUEST CAPABILITY	136
F. CONSOLE MONITOR SELECTION CAPABILITY	152
G. GROUP TV SELECTION CAPABILITY	4
A7 FILE SLIDE MAKING EQUIPMENT	2
A8 DIGITAL DISPLAY DRIVERS	52,956
A9 X-Y PLOTBOARDS	10

D/C HARDWARE (CONT'D)

	7/15 QUANTITY
A10 ANALOG DISPLAY DRIVERS	300
A11 METER DISPLAYS	300
A12 D/A CONVERTERS	—
A13 CHART RECORDERS	12
A14 DIGITAL VOLTMETERS	12
A15 COMPUTER INPUT MULTIPLEXERS	2
A15A AUXILIARY COMPUTER INPUT MULTIPLEXERS	2
A16 DISPLAY REQUEST KEYBOARDS WITH:	41
A. CONSOLE MONITOR SELECTION CAPABILITY	31
B. GROUP TV SELECTION CAPABILITY	6
C. PLOTTING PROJECTOR SELECTION CAPABILITY	4
A16A AUXILIARY DISPLAY REQUEST KEYBOARDS	10
A17 COMPUTER ENTRY KEYBOARDS	8
A18 PCM DIGITAL MONITORS	10

D/C HARDWARE (CONT'D)

B. TIMING SUBSYSTEM

B1-B2 MASTER INSTRUMENTATION TIMING EQUIPMENT

B3 RELATIVE TIME ACCUMULATORS

B4 WALL CLOCK EQUIPMENT

7/15
QUANTITY

1 (DUAL)

22

1

C. TELEVISION SUBSYSTEM

C1 HIGH RESOLUTION TV CAMERA CHAINS FOR :

A. GROUP DISPLAY PICKUP

B. OPAQUE TELEVISOR

C. REFERENCE SLIDE FILES

D. CONVERTER SLIDE FILES

C2 TV DISPLAY MONITORS

11

26

32

—

387

D/C HARDWARE (CONT'D)

	7/15 QUANTITY
C3 TV STANDARDS CONVERTERS :	
A. 945 TO 525 LINE	5
B. 525 TO 945 LINE	5
C. SLOW-SCAN TO 945 LINE	1
C4 LAND LINE INTERFACE	5
C5 SYNCHRONIZATION GENERATION AND DISTRIBUTION	4
C6 VIDEO SWITCHING MATRIX	2-80X120 2-2 X 20 2-10X10
C6A AUXILIARY VIDEO SWITCHING MATRIX	
C7 VIDEO SWITCHING MATRIX CONTROLS	2
C7A AUXILIARY VIDEO SWITCHING MATRIX CONTROLS	2
C8 MANUAL TV SELECT KEYBOARD	—
C9 PUBLIC AFFAIRS AND SPECIAL EFFECTS	4
C10 TV HARD COPIERS	4
C11 TV PHOTO COPIERS	—
C12 AUTOMATIC TV PHOTORECORDERS	4

D/C HARDWARE (CONT'D)

D. CONSOLE SUBSYSTEM

	^{7/15} QUANTITY
D1 CONSOLE SHELLS AND COMPONENT SUPPORTS	95
D2 WIRING DISTRIBUTION MODULES	160
D3 ELAPSED TIME INDICATOR MODULES	—
D4A EVENT SEQUENCE INDICATOR MODULES	—
D4B EVENT SEQUENCE OVERRIDE MODULES	—
D5 STATUS MONITOR MODULES	—
D6 LAMP TEST MODULES	95
D7 AC DISTRIBUTION MODULES	95
D8 DIGITAL DISPLAY MODULES	2500
D9 SWITCH MODULES	1000

D/C HARDWARE (CONT'D)

E. GROUP DISPLAY SUBSYSTEM

- E1 NETWORK STATUS DISPLAY
- E2 PROJECTION PLOTTING DISPLAYS
- E3 PROJECTION TELEVISION DISPLAYS
- E4 SCREENS AND MIRRORS
- E5 GROUP TIME DISPLAYS
- E6 GUIDANCE STATUS DISPLAYS

^{7/15}
QUANTITY

—

4

7

10, 10

2

2

MISCELLANEOUS

MICROWAVE LINKS

LINE PRINTERS

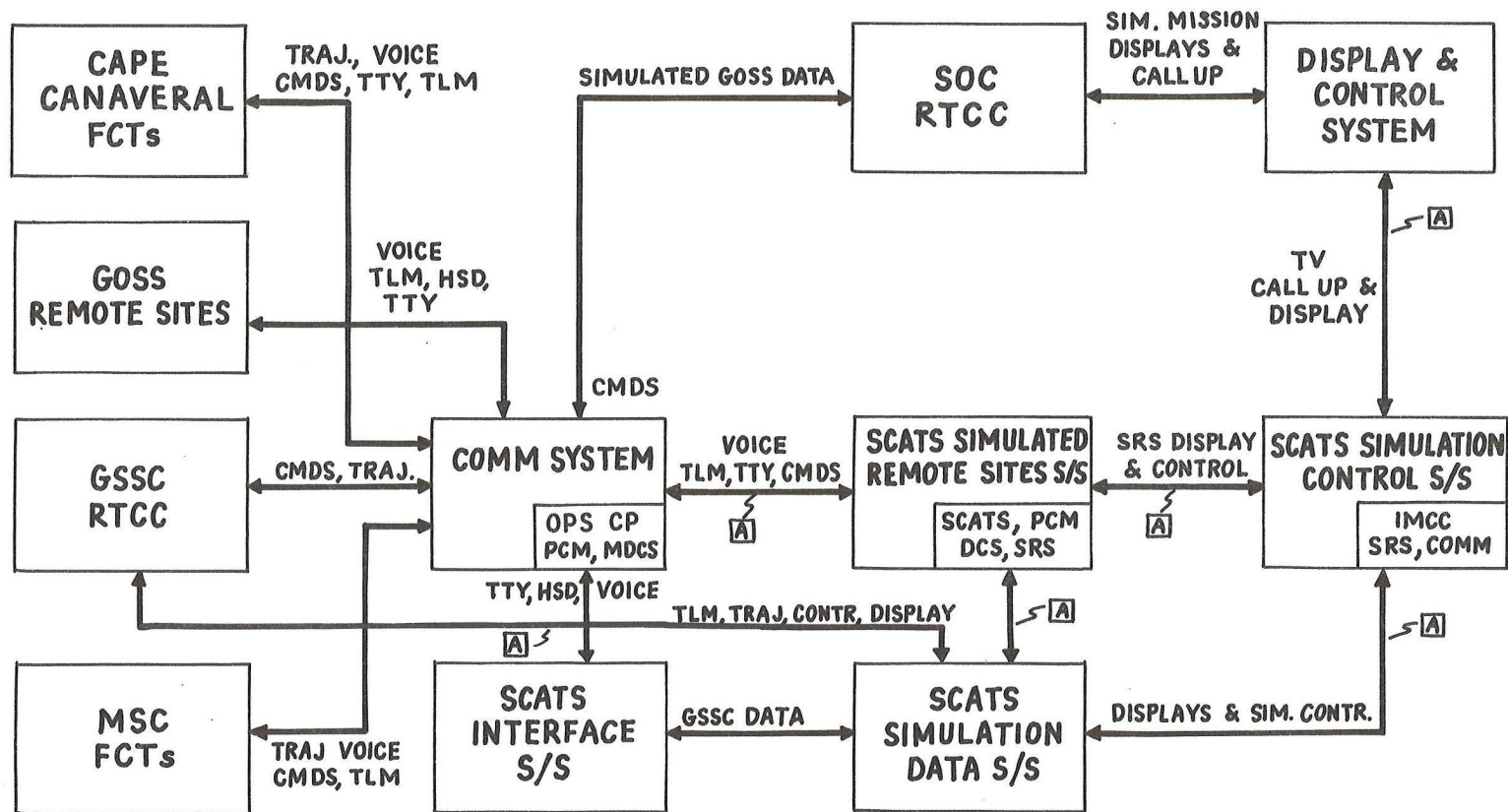
—

—

SCATS

- 1 TRAIN REM. SITE OPERATORS
- 2 TRAIN IMCC CONTROLLERS
- 3 EXERCISE GOSS
- 4 SIMULATE ENTIRE MISSION
WITHIN MSC

SCATS BLOCK DIAGRAM



[A] SCATS INTERNAL & EXTERNAL SIGNAL PATHS ARE SET UP BY INTERFACE SUBSYSTEM PATCH-BOARDS

MAJOR EQUIPMENTS

2 PCM STATIONS

2 DCS

2 REM. SITE CONS. SETS

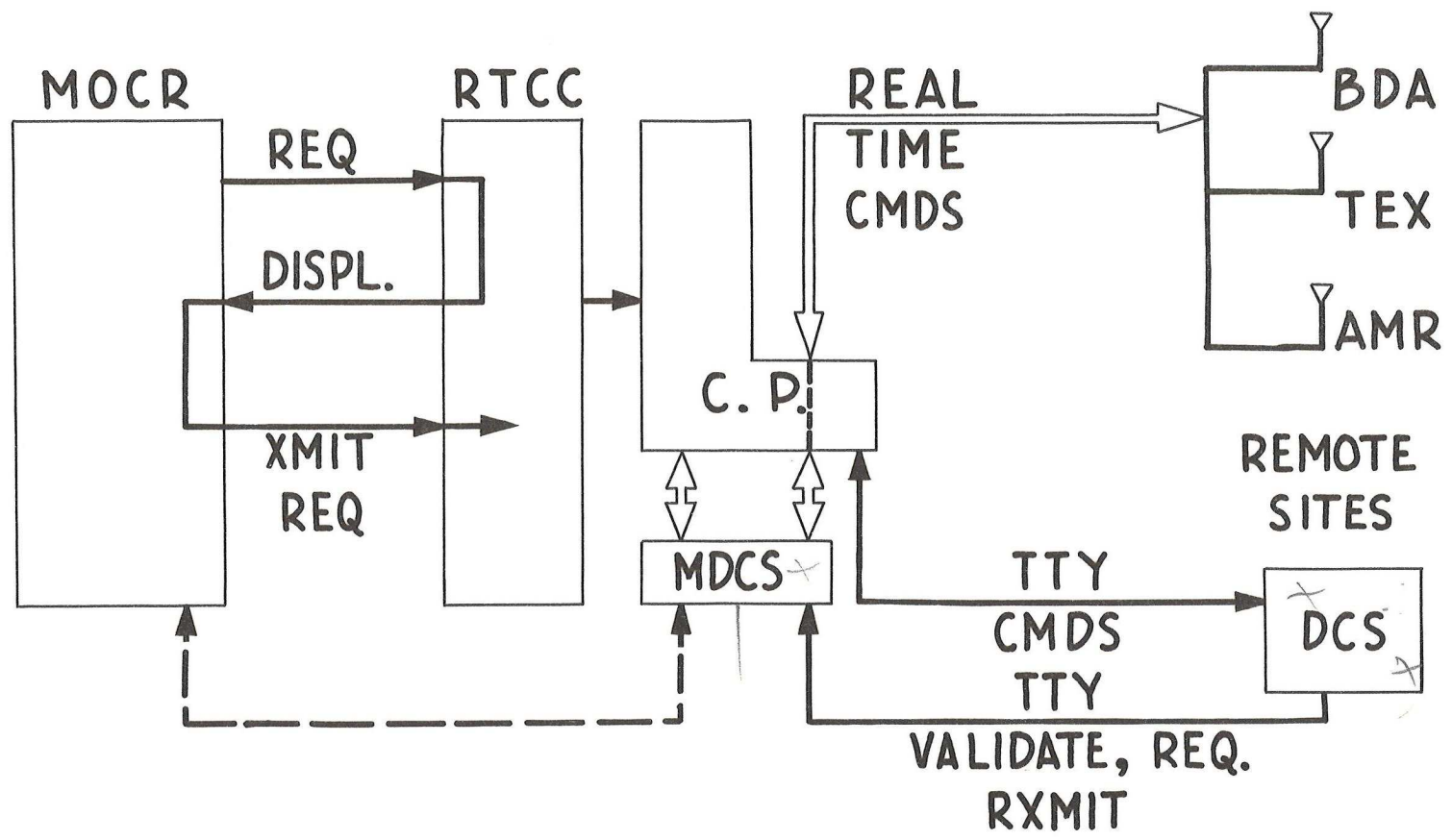
2 IMCC SIM. CONT. CONS. SETS

1 REM. SITE SIM. CONT. SETS

SCATS DATA DISTRIBUTION EQUIP.

SIMULATION VOICE & MESSAGE EQUIP.

DCS



CURRENT STATUS OF TASKS

INTERFACE RESOLUTION

SCHEDULE INTERRELATION

- BUILDING VS. OPERATIONAL EQUIPMENT
- TEST PLANNING

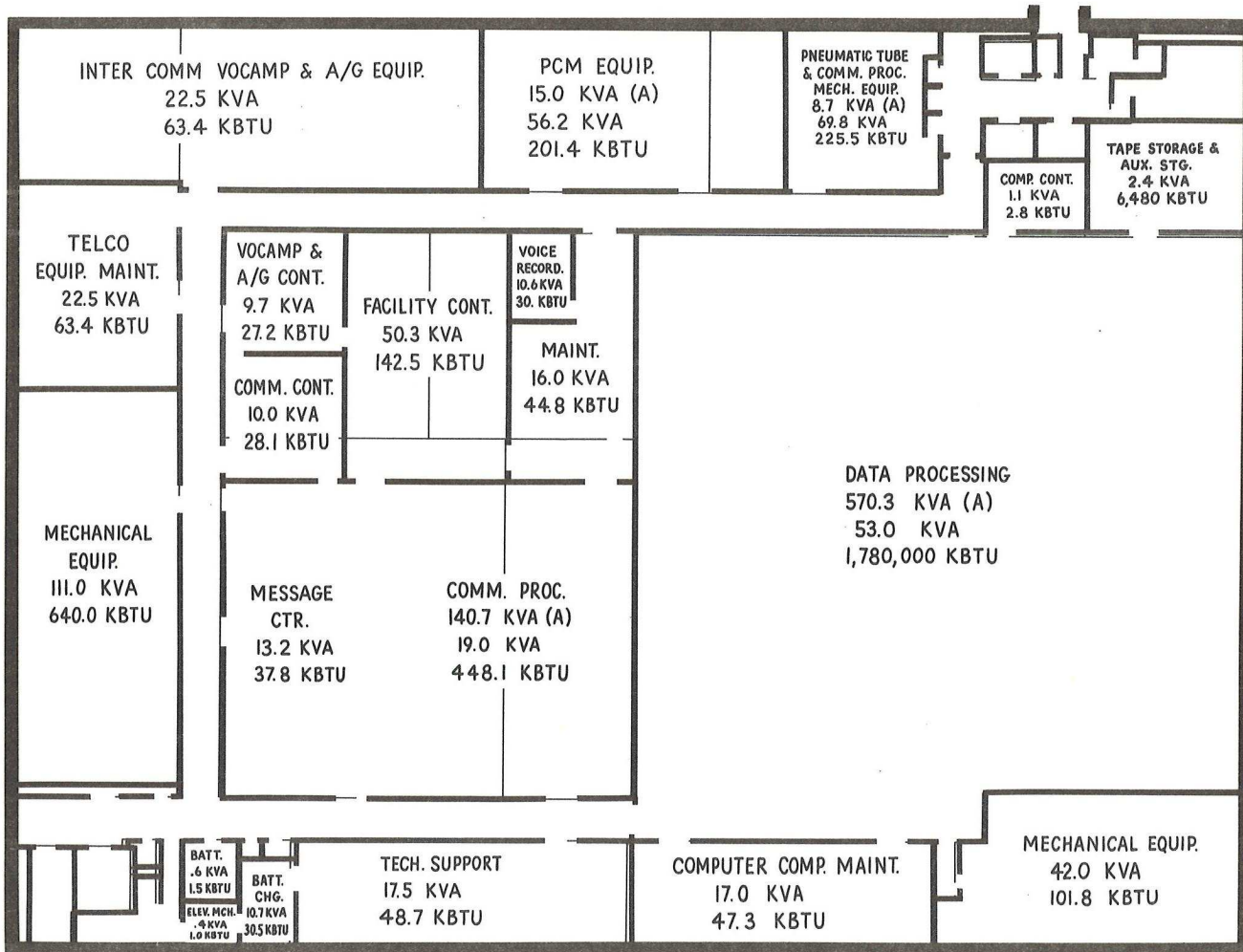
SITE ACTIVATION

- EQUIPMENT ARRANGEMENTS
- POWER AND A/C REQUIREMENTS
- POWER AND A/C DISTRIBUTION

PROGRAM STANDARDS

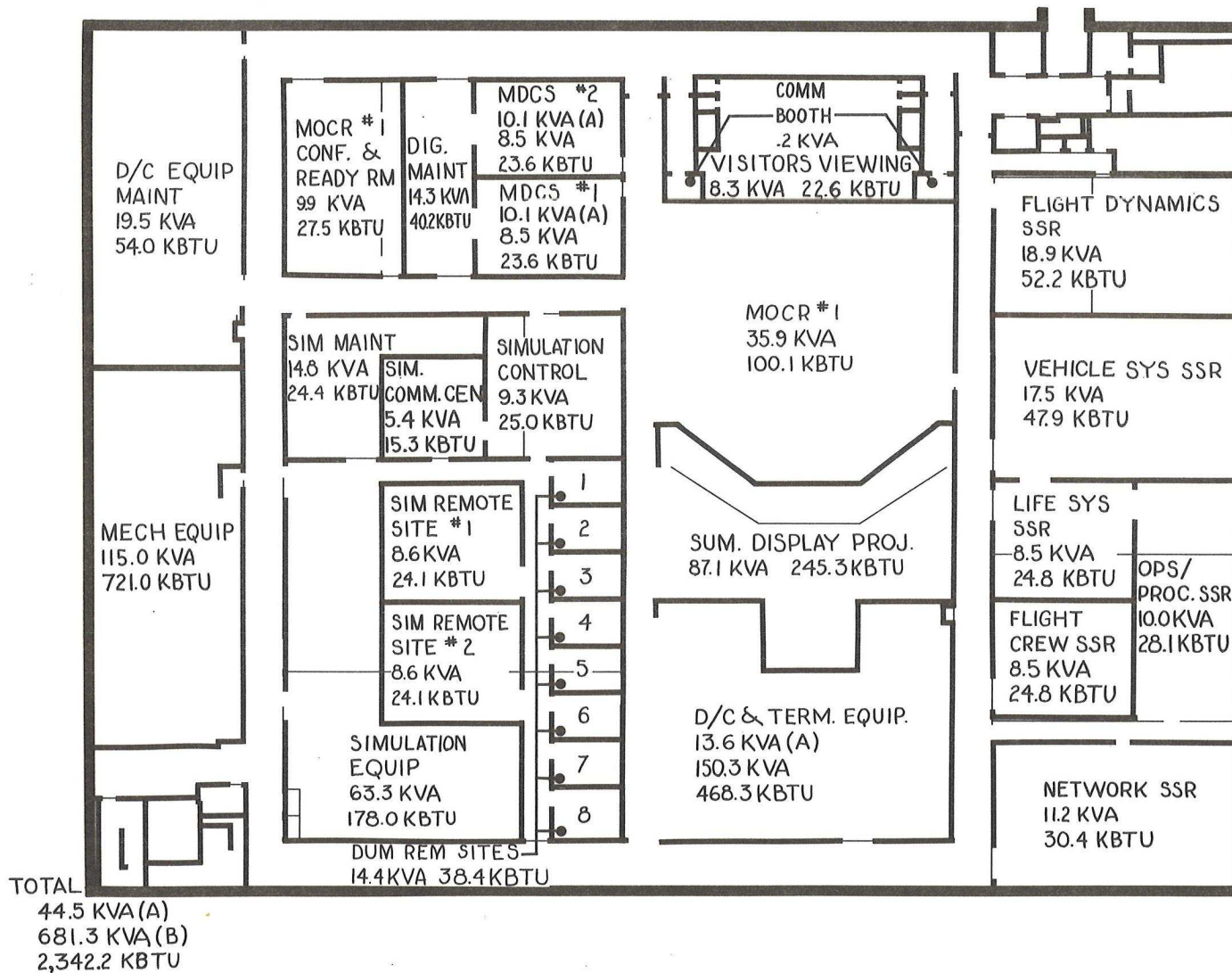
- EQUIP. CABINETS
- M&O MANUALS
- CONSOLES
- MISCELLANEOUS
- LOGIC CARDS

MOW 1 ST FLOOR ROOM PLAN

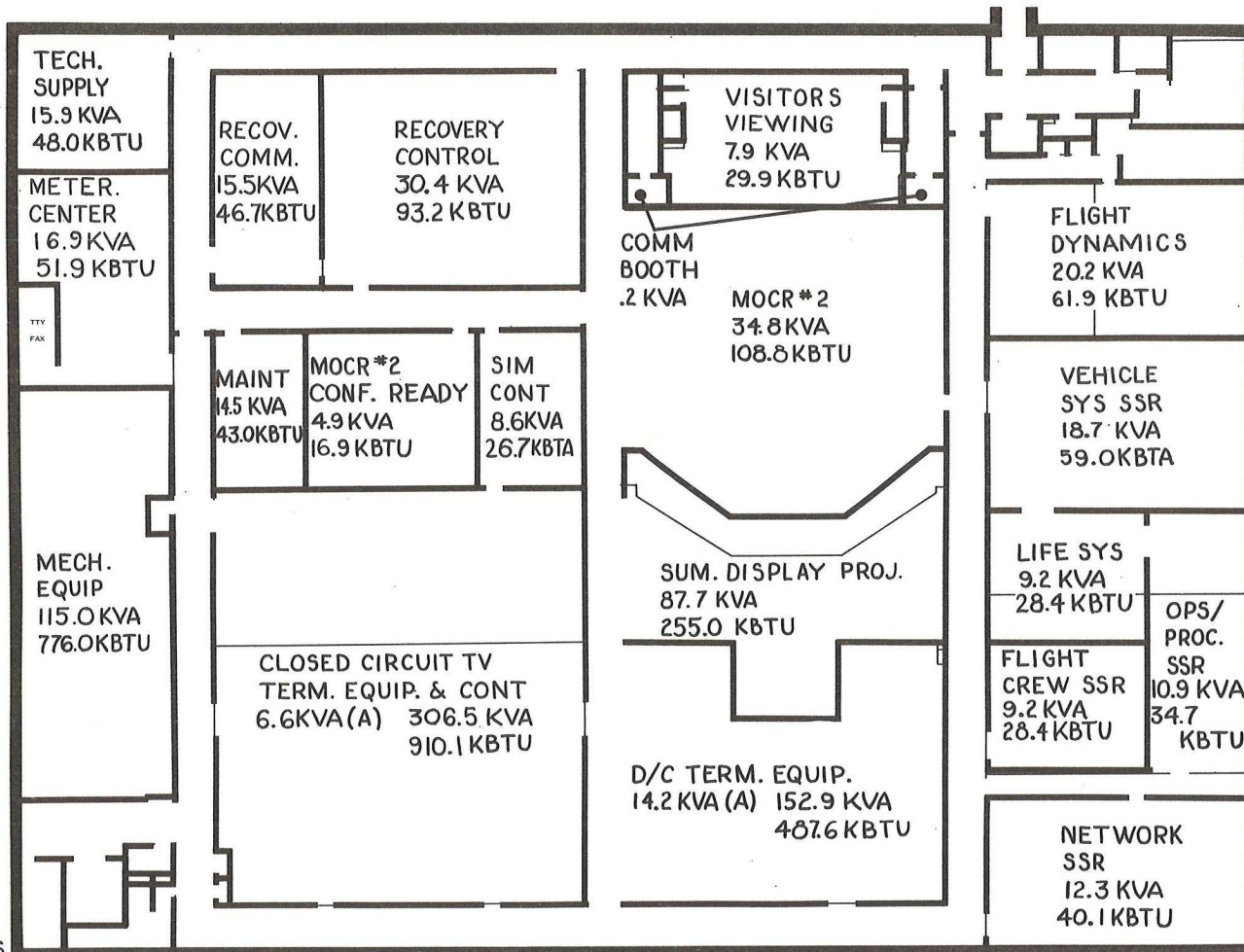


TOTAL 741.6 KVA (A)
 611.2 KVA (B)
 4,127.2 KBTU

MOW 2ND FLOOR ROOM PLAN

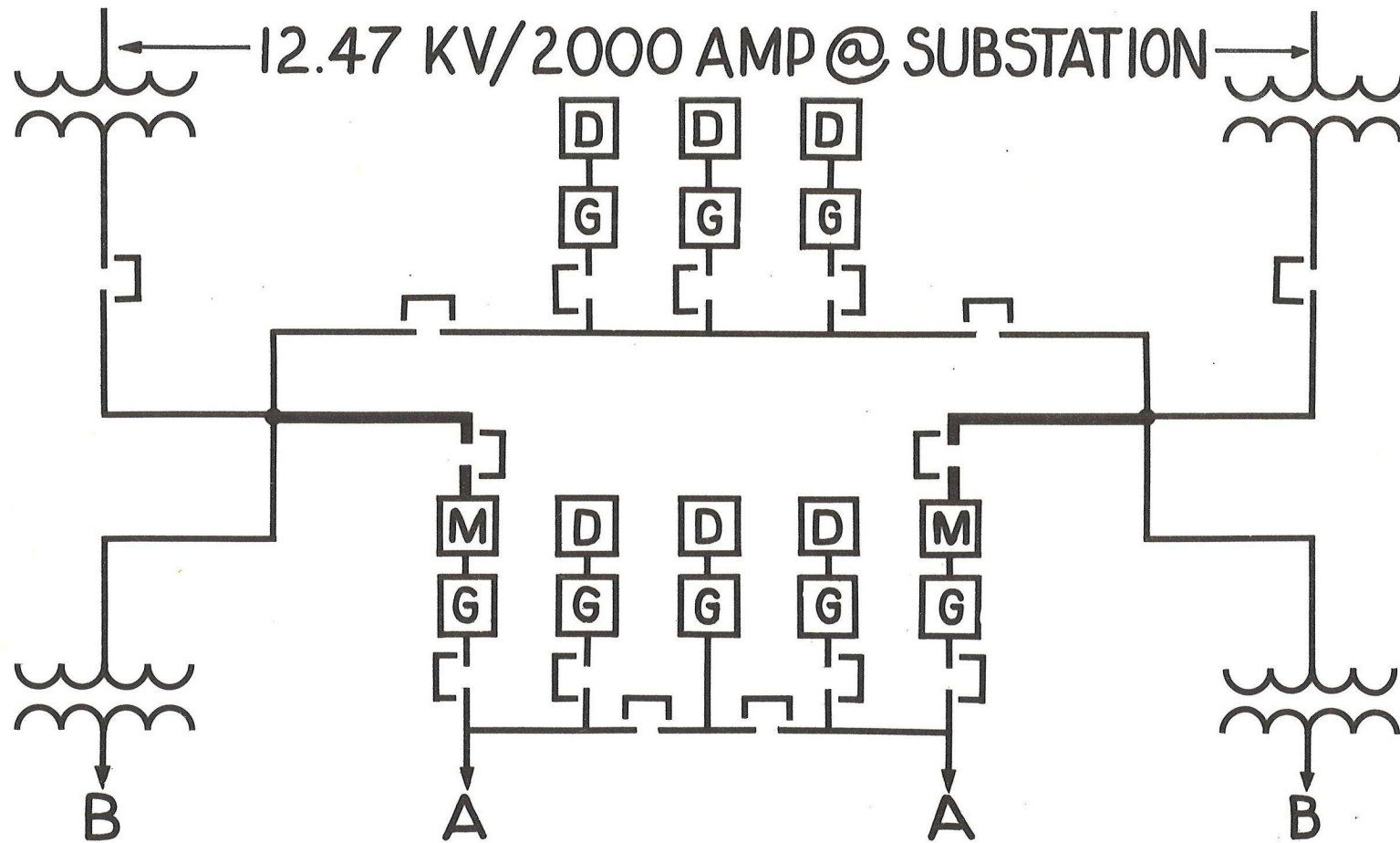


MOW 3RD FLOOR ROOM PLAN



TOTALS
 29.6 KVA(A)
 915.6 KVA(B)
 3,301 KBTU

POWER DIAGRAM



POWER SYSTEM SUMMARY

AVAILABLE TO SYSTEM

	<u>PRIMARY</u>	<u>BACKUP</u>
FROM COMMERCIAL POWER	<u>4000 KVA</u>	
FROM DIESELS		<u>3400 KVA</u>
FOR "A" MOTORS	730 KVA	730 KVA
FOR "B" BUSES	3270 KVA	2670 KVA

USAGE STATUS

AVAILABLE FROM "A" BUSES REQUIRED (100% DEMAND)		875 KVA
		<u>815 KVA</u>
		60 KVA
	<u>PRIMARY</u>	<u>BACKUP</u>
AVAILABLE FROM "B" BUSES	3270 KVA	2670 KVA
REQUIRED (100% DEMAND)	<u>3490 KVA</u>	<u>3490 KVA</u>
	- 220 KVA	- 820 KVA

A/C SYSTEM SUMMARY

AVAILABLE TO SYSTEM

FROM BLDG 24 (PRIMARY) 2000 TONS
FROM BLDG 48 (BACKUP) 700 TONS

USAGE STATUS

	AVAIL. TO MOW		REQ'D FROM SYS.	
	UNDERFLOOR	OVERHEAD	UNDERFLOOR	OVERHEAD
1 ST FLOOR	164	151	164	240
2 ND FLOOR		127		128
3 RD FLOOR		179		190
MECH. EQUIP.		80		80
	164	537	164	638

* ALL UNITS IN TONS