

Siemens Transit Team "Progress of the Turnkey Project"



UPR/MIT ENCuentro

Third Conference on Tren Urbano

January 13, 1997

San Juan, Puerto Rico

Siemens Transit Team Panelists



- | | |
|------------------|-------------------------------------|
| •George Miles | <i>Systems</i> |
| •Joe Marie | <i>Vehicles</i> |
| •Segundo Cardona | <i>Station Design</i> |
| •Joe Ferretti | <i>Operations & Maintenance</i> |

Agenda



- Introduction / Overview
- Systems
- Vehicles
- Station Design
- Operations and Maintenance
- Break
- Discussion

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The STT Consortium



- *Siemens Transportation Systems, Inc.*
- *Juan R. Requena Associates*
- *Alternate Concepts, Inc.*

Exclusive subcontractors are:

- *Redondo-Perini*
Joint Venture
- *Lord-Mass*
Joint Venture
- *Parsons Brinckerhoff*



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The Siemens Transit Team



- **Additional Subcontractors :**

Guillermety, Ortiz & Associates

St. James Security Services

URS

SESCO

Safetran

Carrillo/DiGeronimo

Marquina Publicidad

Soza & Co., Ltd

Wallace, Floyd Associates

Railquip

Siemens Empros

SIQ HKC Signaling

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Project Overview

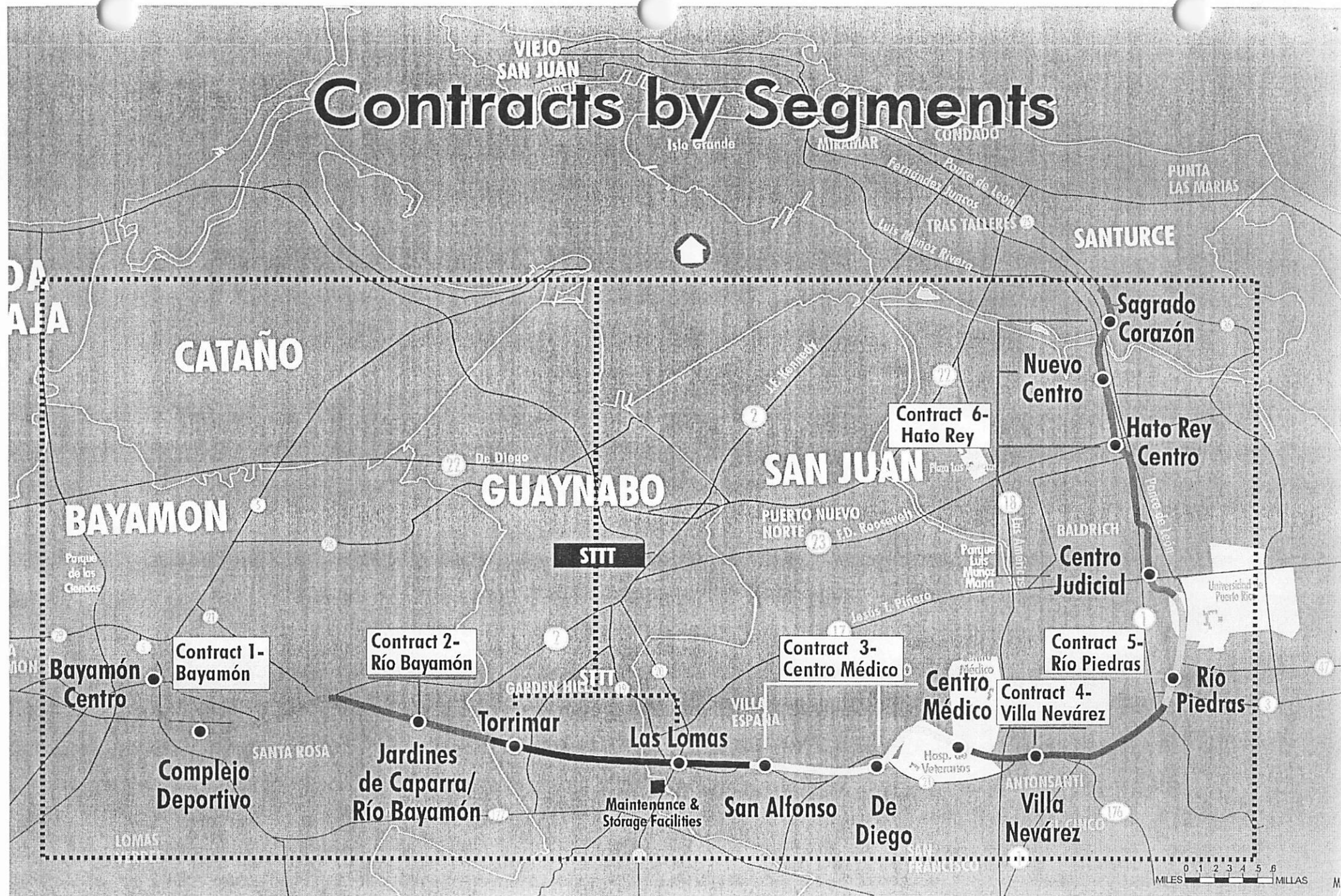


- **General Description:**

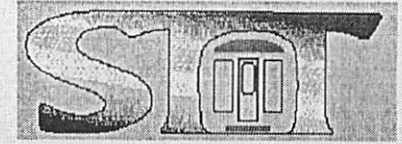
- Approximately 17 KM project length, mixed guideway, retained cut and tunnel section;
- Project is divided into nine (9) civil/facility construction segments, being packaged in seven (7) construction contracts;

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VIEJO SAN JUAN



Project Overview



- **General Description:**

- The Systems and Test Track Turnkey (STTT) contract consists of the civil/facility construction of Segment 3 (including yards and shops), and all system wide design, procurement, installation, start-up and operation of:

- » Vehicles
 - » Train Control Systems
 - » Communications Systems
 - » Operations Control Center System
 - » Power Distribution and Traction Power Systems
 - » Trackwork Systems
 - » Maintenance & Storage Facility Equipment
 - » Escalator and Elevator Systems
 - » Fare Collection System
 - » Other Support Systems (Signage/Graphics, etc.)

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Section	1	2	3	4	5	6	7	8	9	Vehicle				
2001	Start Revenue Operation 11-11-2001									32 Pairs Tested 7-17-01 32 Pairs in P/R 6-18-01				
	Pre-Revenue Operation 10-11-2001													
	Systemwide Integrated Testing 9-11-2001													
	SIT = 4 Months 4/11/01				SIT = 5 Months 4/11/01			SIT = 1 1/2 Months						
2000		JUN 4/23 3 months	SIT Veh. Test 18 Months 3/11/00				MAF 3/6 F 1-5-01 12 months	APR 4/19 F 3-25-01	APR 4/19 F 3-25-01	20 Pairs in P/R 10-28-00 10 Pairs in P/R 5-16-00 2nd Pair to Site 1-21-00				
1999	OCT F 5-11-99 10 months	F 2-17-00 P 9-7-99 10 months	F 5-14-99 APR 6/23 11 months	NOV F 2-8-00 5 months	JUL 7/23 F 12-14-99 7 months	SEP 9/21 F 12-14-99 7 months				1st Pair to Site 6-25-99				
1998	P 12-8-98		MAINLINE P 6-12-98											
1997														
1996			NTP 8-12-96											
Contract	Contract # 1	Contract # 2	Contract # STTT	Contract # 3		Contract # 4	Contract # 5	Contract # 6						
Section	1	2	3	4	5	6	7	8	9					
Station	Bayamon Centro	Complejo Deportivo	Rio Bayamon	Torrimar	M Las Lomas	San Alfonso	De Diego	Centro Medico	Villa Nevarez	Rio Piedras	Centro Judicial	Hato Rey	Nuevo Centro	Sagrado Corazon
Grade	X No. 10	X No. 8	X No. 10				X No. 8			X No. 8	X No. 8			X No. 10
BPSS		1 BPSS			BPSS		BPSS 3				4 BPSS			
TPSS	1 TPSS	2 TPSS	3 TPSS	TPSS	Y 4 TPSS		5 TPSS	6 TPSS		7 TPSS	8 TPSS	9 TPSS	10 TPSS	
SS				1 SS	Y SS	2 SS			3 SS			4 SS		
Bungalow Train Ctrl		# 1	# 2	# 8 # 3			# 4			# 5	# 6		# 7	
Bungalow Comms	# 1	# 2	# 3	# 4	# 5	# 6	# 7	# 8	# 9	# 10	# 11	# 12	# 13	

PRELIMINARY

LEGEND

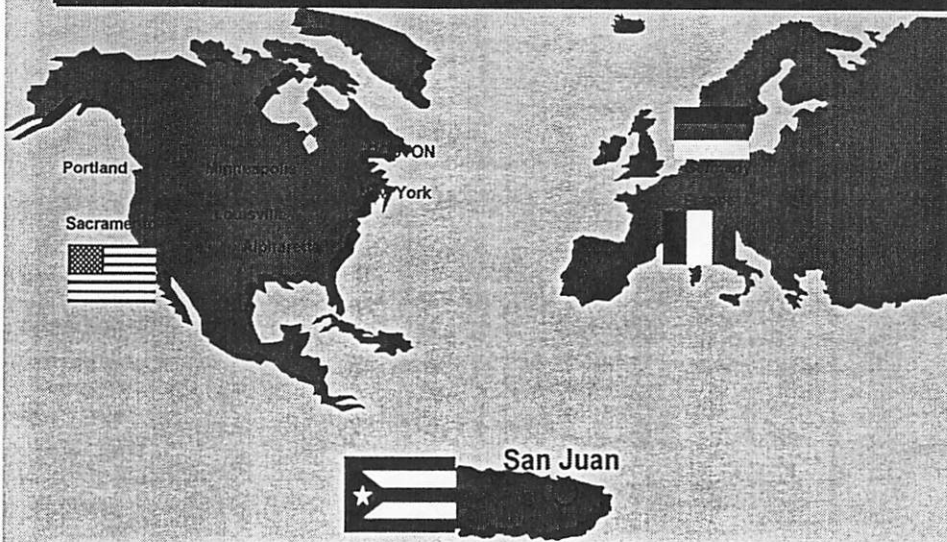
P = Partial Completion (Civil) 30 days, no later than
F = Final Completion (Civil)
P/R = Puerto Rico
— = Track Work

X Double Crossover
Aerial/Direct Fixation
At Grade & Rtn. Cut/ Ballastd Track
Tunnel

M Maintenance/Storage Facility
Sectional Integrated Testing (SIT)
Systemwide Installation
Civil Work (ASC)

TREN URBANO - SIEMENS TRANSIT TEAM
Manta De Caballo (Marching Chart)
Revision 5, Dec. 15, 96 AOT

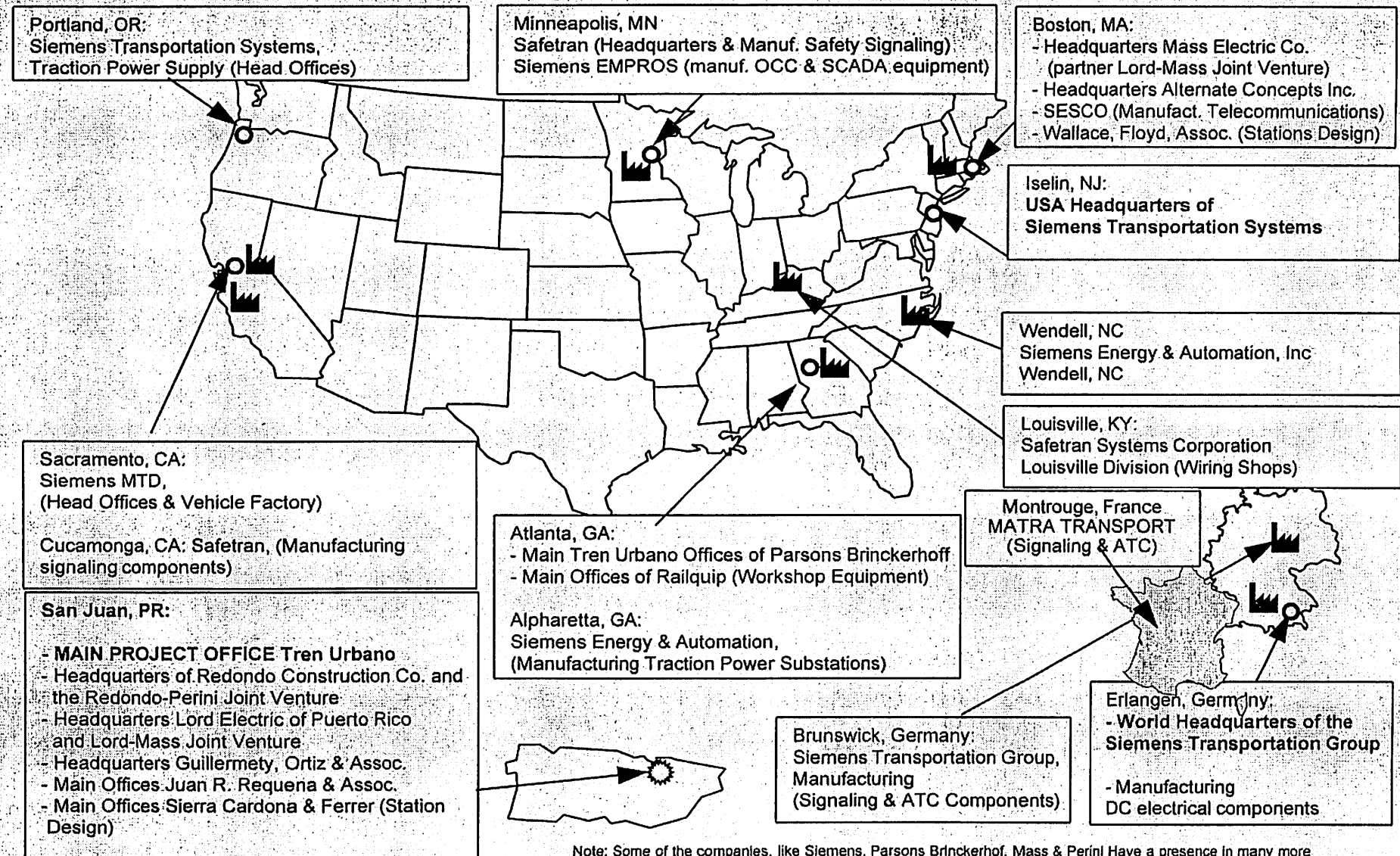
World Wide Participation



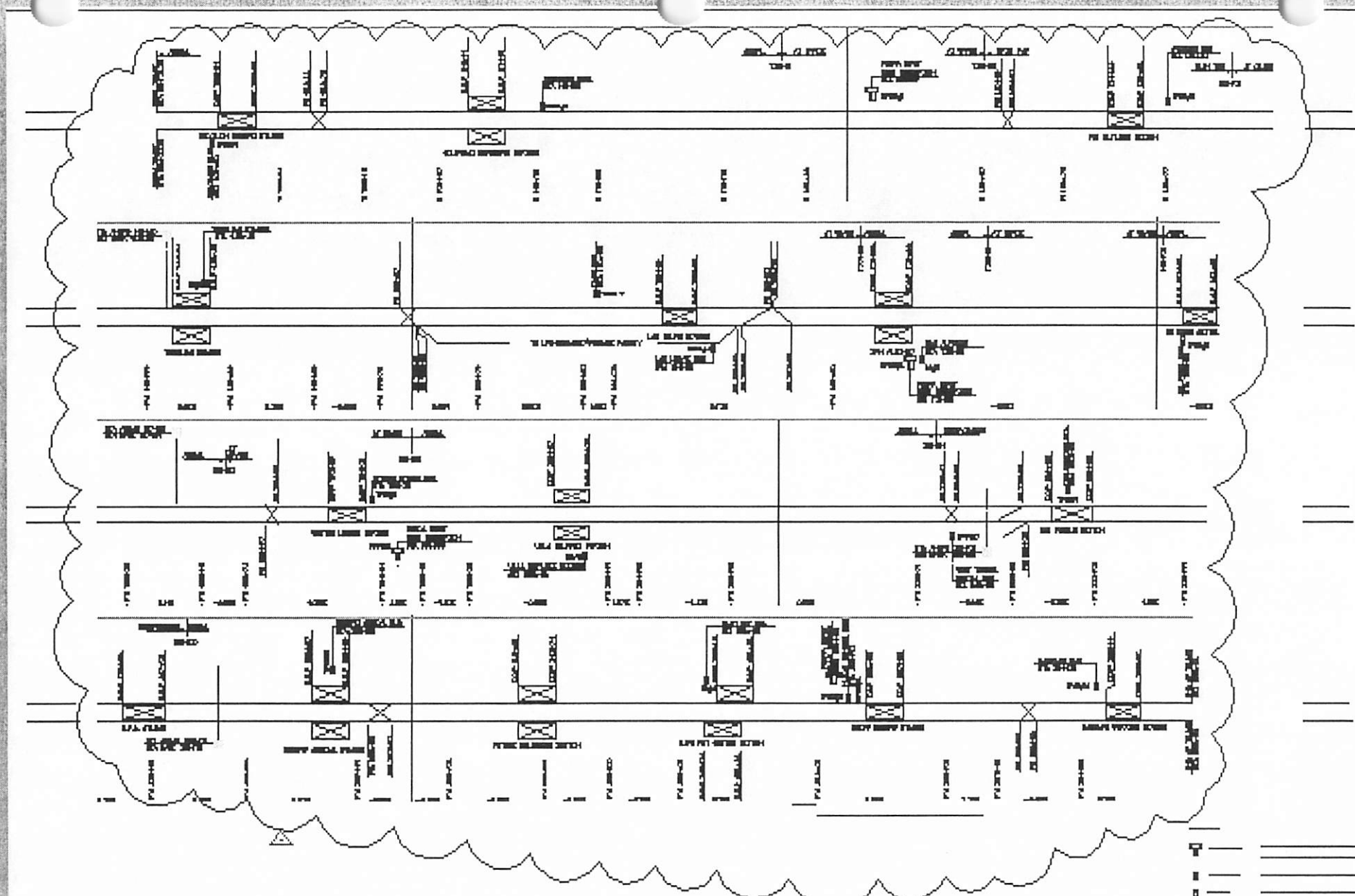
Siemens Transit Team

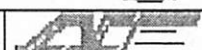
Tren Urbano - Headquarters & Factories of the Siemens Transit Team

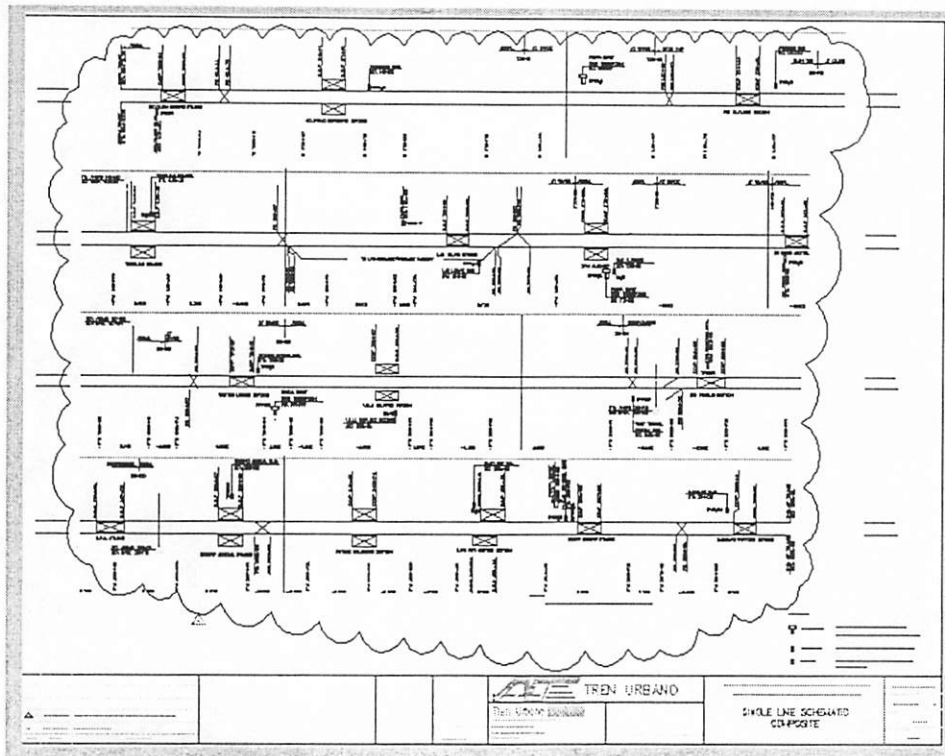
Not on scale



Note: Some of the companies, like Siemens, Parsons Brinckerhoff, Mass & Perini have a presence in many more locations throughout the USA and worldwide. However, we have decided to show here only the main locations involved directly in the Tren Urbano Project.



			 TREN URBANO Tren Urbano	SINGLE LINE SCHEMATIC COMPOSITE
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Project Overview



- **Power Distribution and Traction Power:**
 - 4 Bulk Substations 38kV/13.2kV;
 - 10 Traction Power Substations 13.2 kV/480 VAC & 750 VDC;
 - 4 Passenger Station Substations 13.2 kV/480 VAC
 - 1 Yard Substation 13.2 kV/480 VAC;
 - High and Low Voltage Distribution System which converts utility inputs to a nominal 750 VDC power source to feed a conductor rail (or third rail) system.

Project Overview



- **Train Control:**

- The ATC, divided into three functional groups, consists of:
 - » Automatic Train Operation (ATO);
 - » Automatic Train Protection (ATP); utilizing jointless track circuits
 - » Automatic Train Supervision (ATS).

Project Overview



- **Train Control:**

- The Signal/Train Control System (including on board and wayside systems) will be supplied by MATRA Transport;
- The ATC will control, direct and coordinate all functional operations of the automated Tren Urbano trains. Operations include train berthing, vehicle door movements, train identification, automatic turn back terminal operations, automatic entering/departing service areas, and automatic route selection/execution.

Project Overview



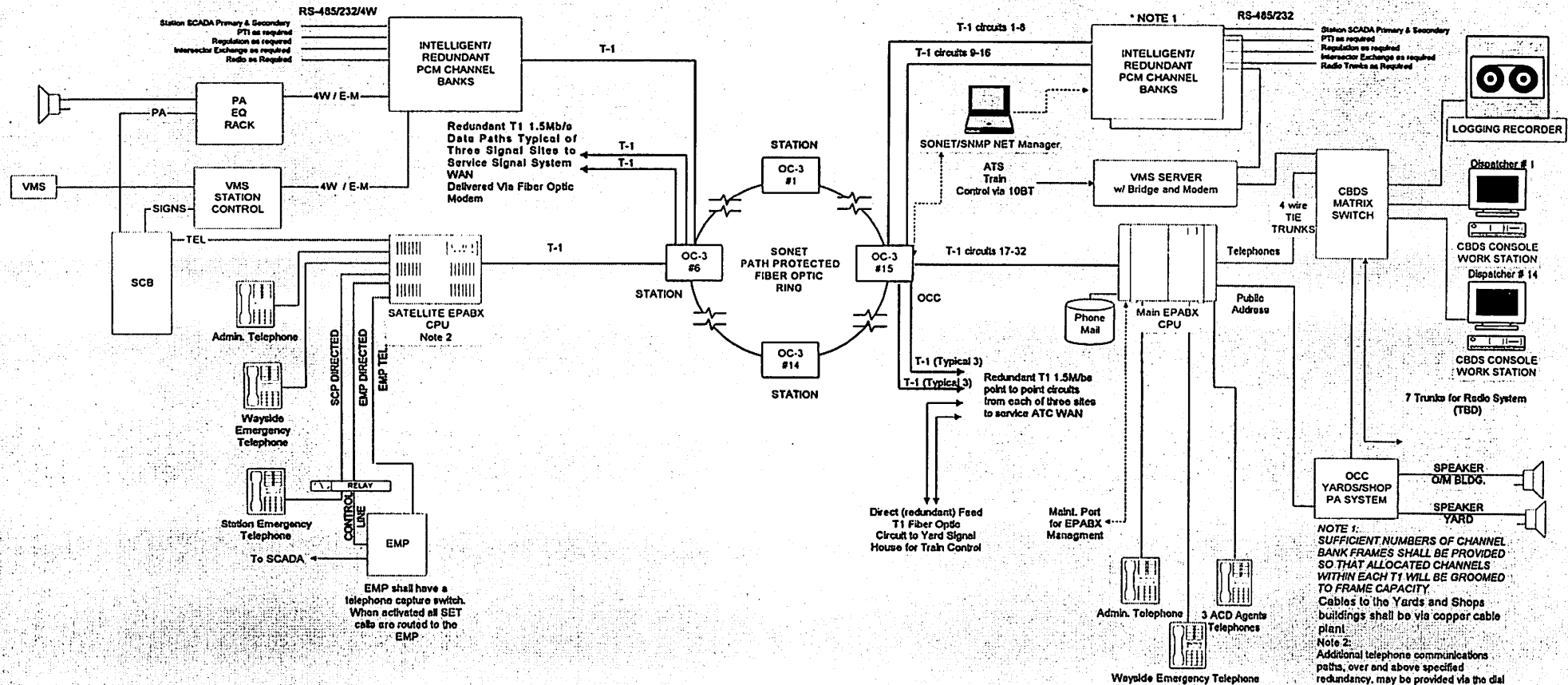
- **Communications:**

- Fiber Optic Cable Backbone System;
- Cable Distribution System;
- SCADA, Telephone, Intercom, Public Address, CCTV, Fire Detection and Suppression Monitoring System, Seismic, Intrusion/Detection and Controlled Access System, Master Clock, and Other Related Communications Systems

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TREN URBANO COMMUNICATIONS SYSTEM

Voice and Data Network



Project Overview



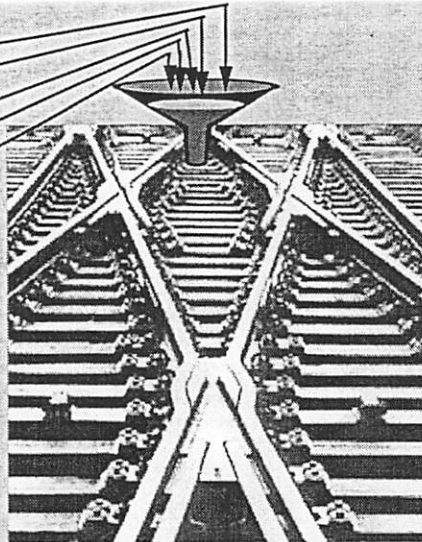
- Operations Control Center
 - Mainline Control System
 - Yard Control System
 - Computer Based dispatch System
 - Communications Alarm System
 - Master Clock System
 - Interface & Control of VMS, & CCTV

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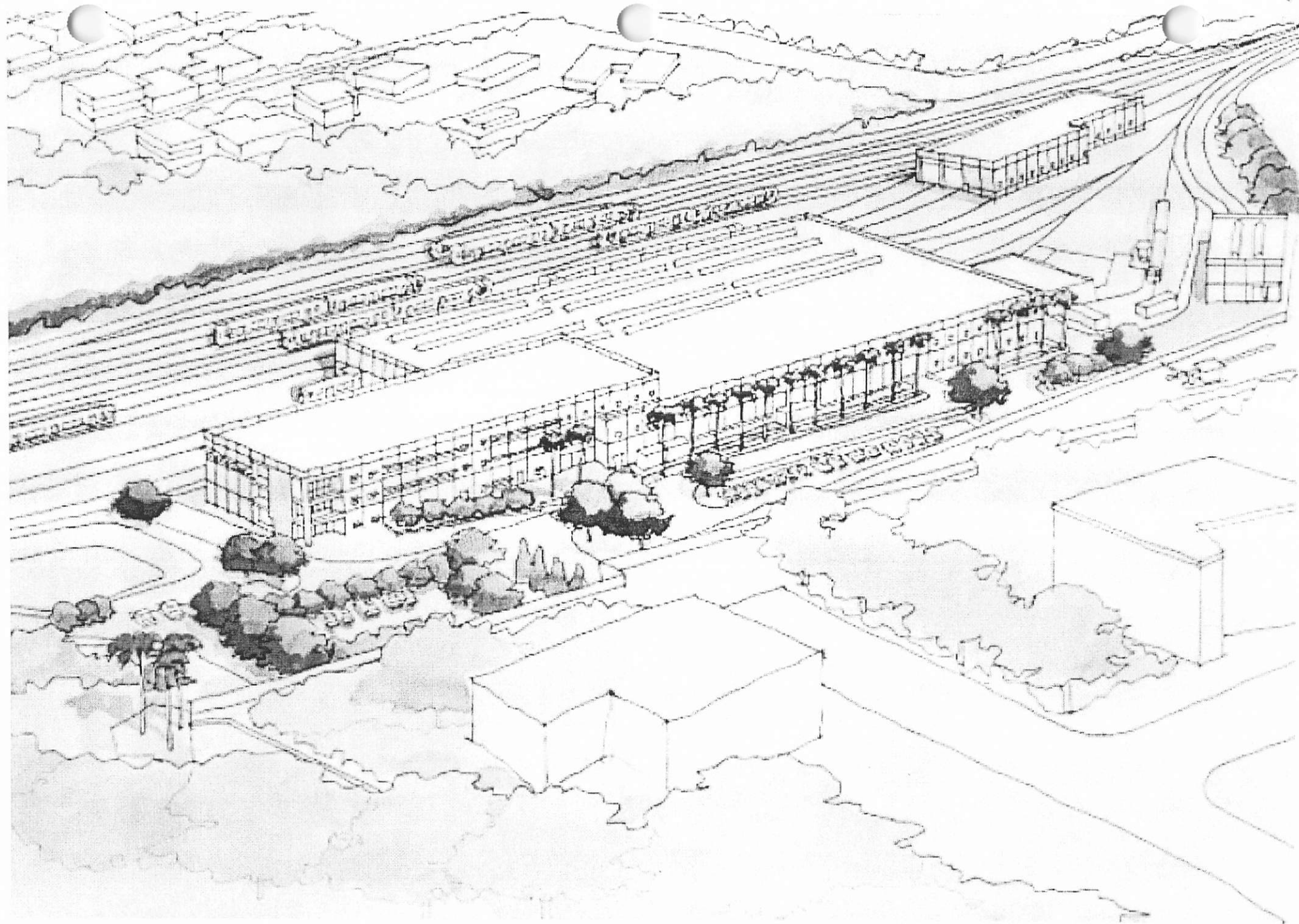
Trackwork

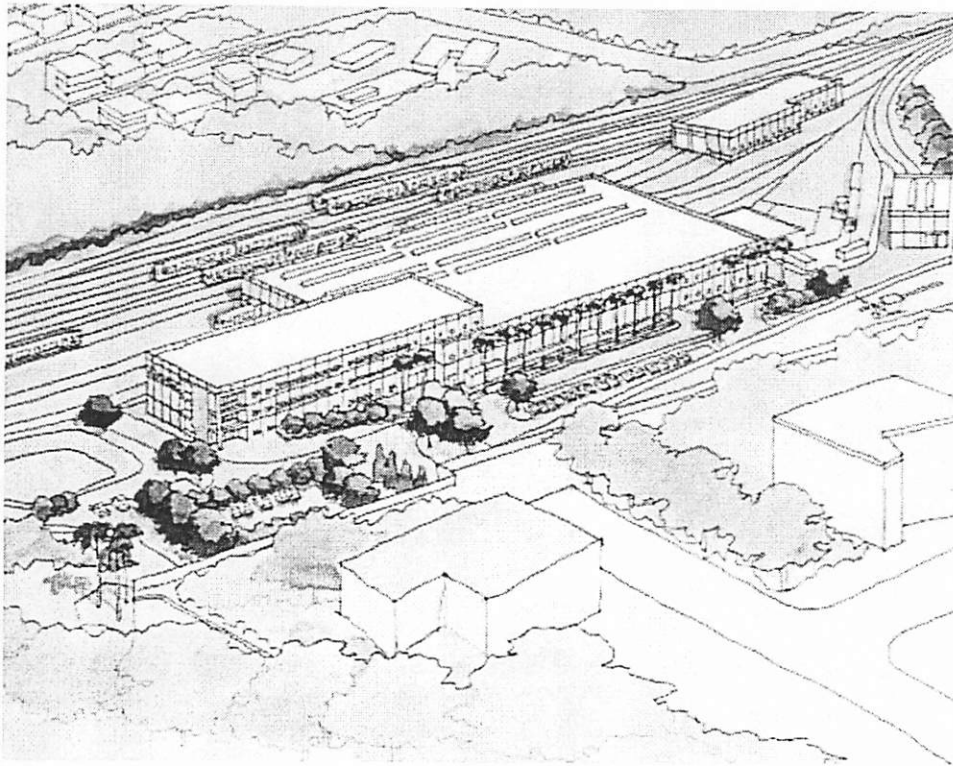


- Ballast
- Plinth
- Concrete Ties
- Wood Ties
- Special Work
 - Switches
 - Stock Rails
 - Frogs



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Project Overview



- **Escalators and Elevators:**
 - 40 Escalators in 14 Passenger Stations;
 - 28 Elevators in 14 Passenger Stations;
 - 2 Elevators in Administration Building

Project Overview



- **Fare Collection:**

- Barrier Equipment;
- Revenue Collection Equipment;
- Fare Media Dispensing Equipment;
- SCADA Interfaces;
- Monitoring and Surveillance Equipment;
- Revenue Record keeping Equipment

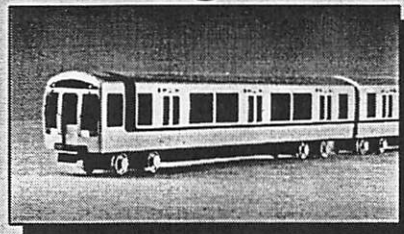
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Vehicle Subsystems



- Train Control and Monitoring
- Carbody
- Propulsion
- Trucks
- Auxiliary Power
- Air Conditioning

Systems
Integration



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Comprehensive Test Program



Goals

- Assure all Systems Elements Conform to Specifications,
- Assure all systems Function Effectively Together to Provide Safe & Dependable Service,
- Verify System Readiness and Regulatory Compliance for Revenue Service.

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Comprehensive Test Program



Implementation

- Identification of Test Program Organization, Roles, and Responsibilities,
- Establishing the Process for Managing Test Program Activities,
- Defining Administrative Requirements for the Test Program,
- Describing Types of Tests to be Performed:
 - Verification of Contract Compliance
 - Validation & Demonstration of System Performance
 - Demonstration of Safety & Service Requirements
 - Training of O&M Personnel and Integration of Personnel, Equipment, & Procedures.

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Comprehensive Test Program



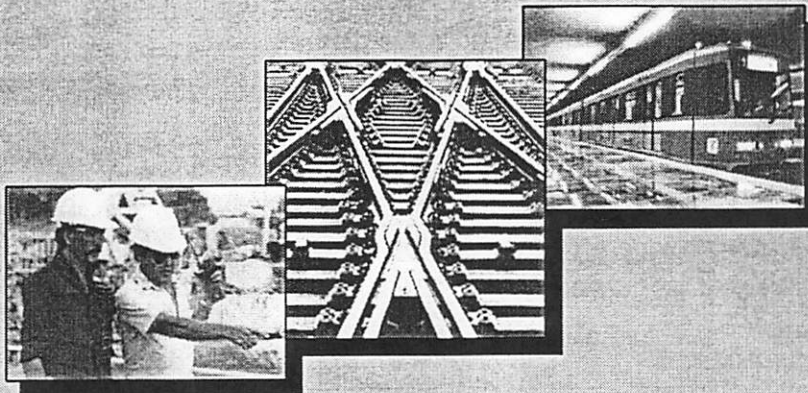
Test Categories

- Design Qualification Tests
- Production Verification Tests
- Construction Inspection Tests
- Installation Verification Tests
- Acceptance Tests
- Systems Integration Tests
- System Readiness Drills
- Pre-Revenue Operation Tests
- Demonstration Tests

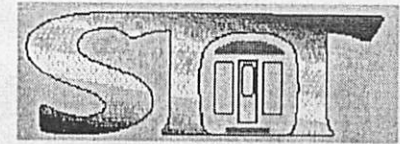
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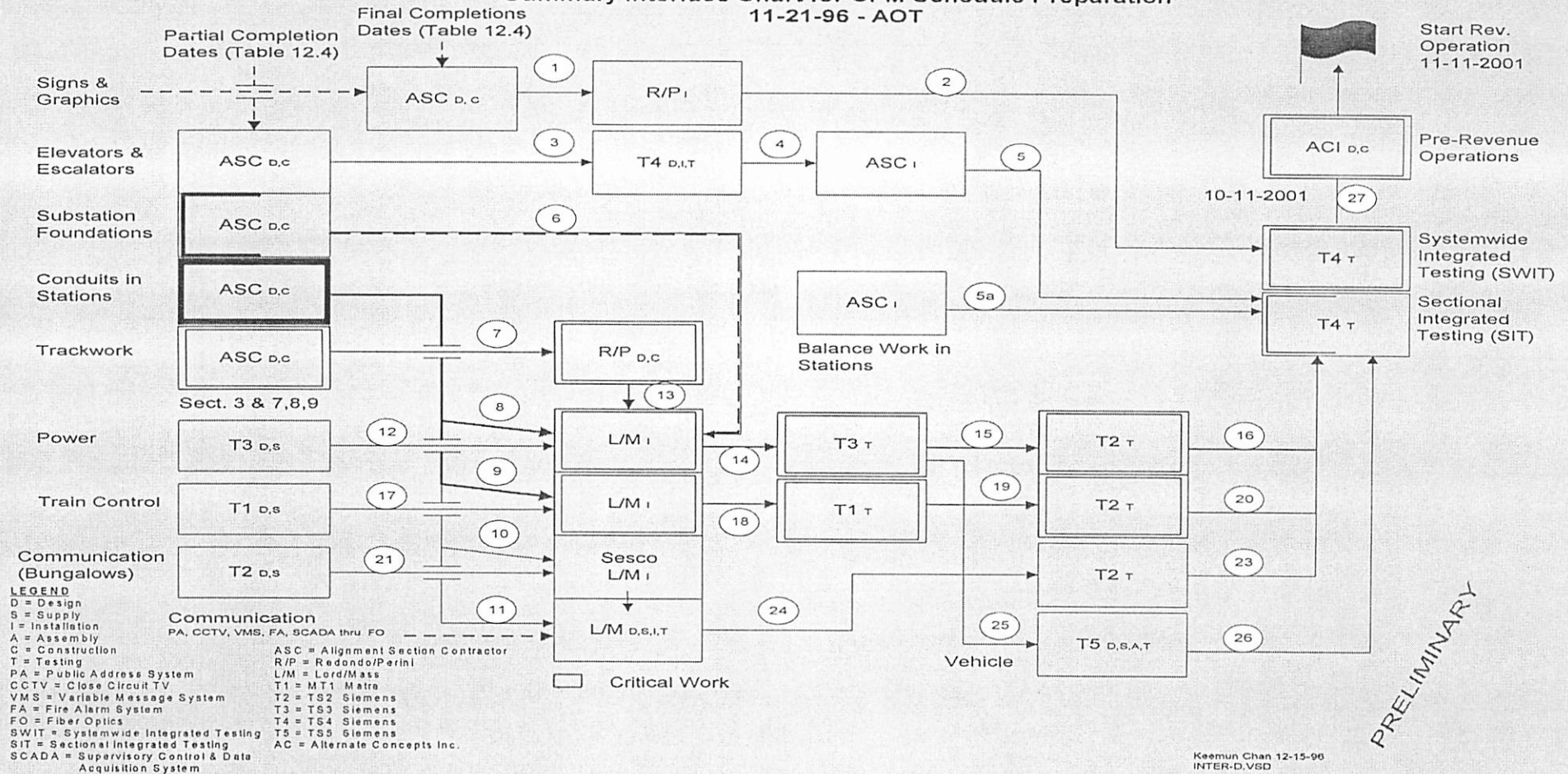
Implementation



Systems Interfaces

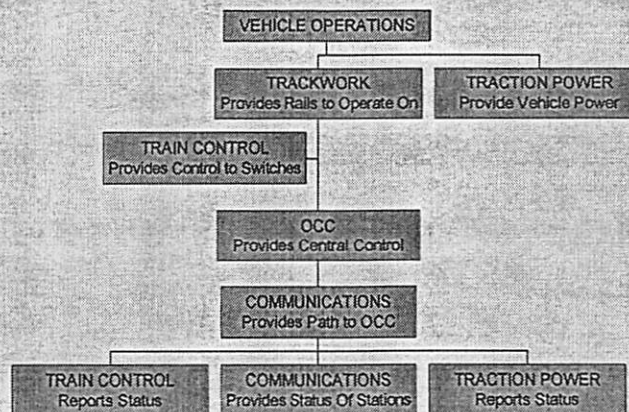


SIEMENS TRANSIT TEAM
Summary Interface Chart for CPM Schedule Preparation
11-21-96 - AOT



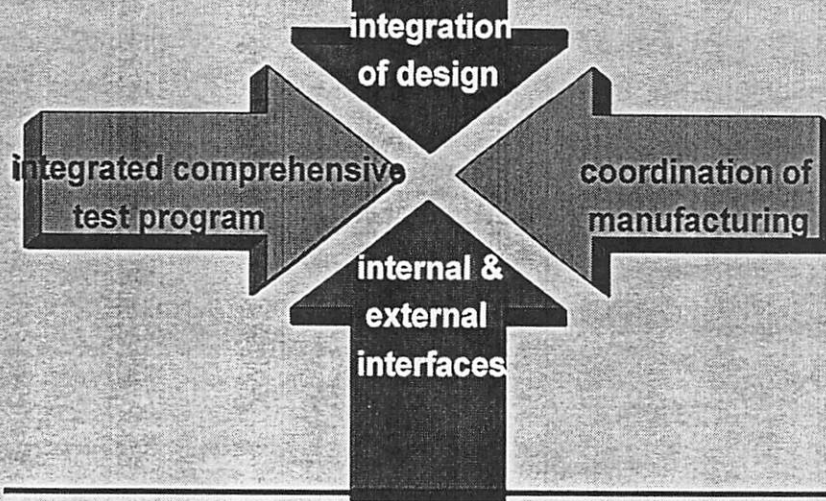
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Keemun Chan 12-15-96
INTER-D,VSD



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Summary



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