REPORT NO. DOT-TSC-1238

LORAN
AUTOMATIC VEHICLE MONITORING SYSTEM

TELEDYNE SYSTEMS COMPANY
19601 Nordhoff St.
Northridge, Calif. 91324

PHASE I
FINAL REPORT

VOLUME II
APPENDICES

MARCH 1977

Prepared for

U. S. DEPARTMENT OF TRANSPORTATION
TRANSPORTATION SYSTEMS CENTER
CAMBRIDGE, MASS. 02142

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16 Abstract

Results of the evaluation phase of a two phase program to develop an Automatic Vehicle Monitoring (AVM) System for the Southern California Rapid Transit District in Los Angeles, California. Tests were conducted in Philadelphia, Pa. on a LORAN based location subsystem to evaluate system and subsystem performance on fixed route and random route vehicles. Performance characteristics measured include location accuracy, time of passage accuracy, and coverage.

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APPENDIX A

LORAN CALIBRATION DATA

AVM LOCATION SUBSYSTEM TEST PLAN

APPENDIX A

CALIBRATION DATA

LORAN calibration of the Fixed and random route test areas was accomplished in sectors. Four sectors were defined and are shown in Figure A-1. Separate lists of calibration points by sector are provided. The list contains all points where an attempt was made to obtain calibration data. No data is included in the listing for points where a valid LORAN measurement was not possible or where the point was thrown out by the screening process.

Calibration points 600 and up are used in the special case tests only.

The calibration point lists were generated by using the software program which is shown at the end of this appendix. Also, at the end of that program, a sample execution of the program is included. The sample happens to be the calibration data reduction for the LORAN Bridge Special Case Run.

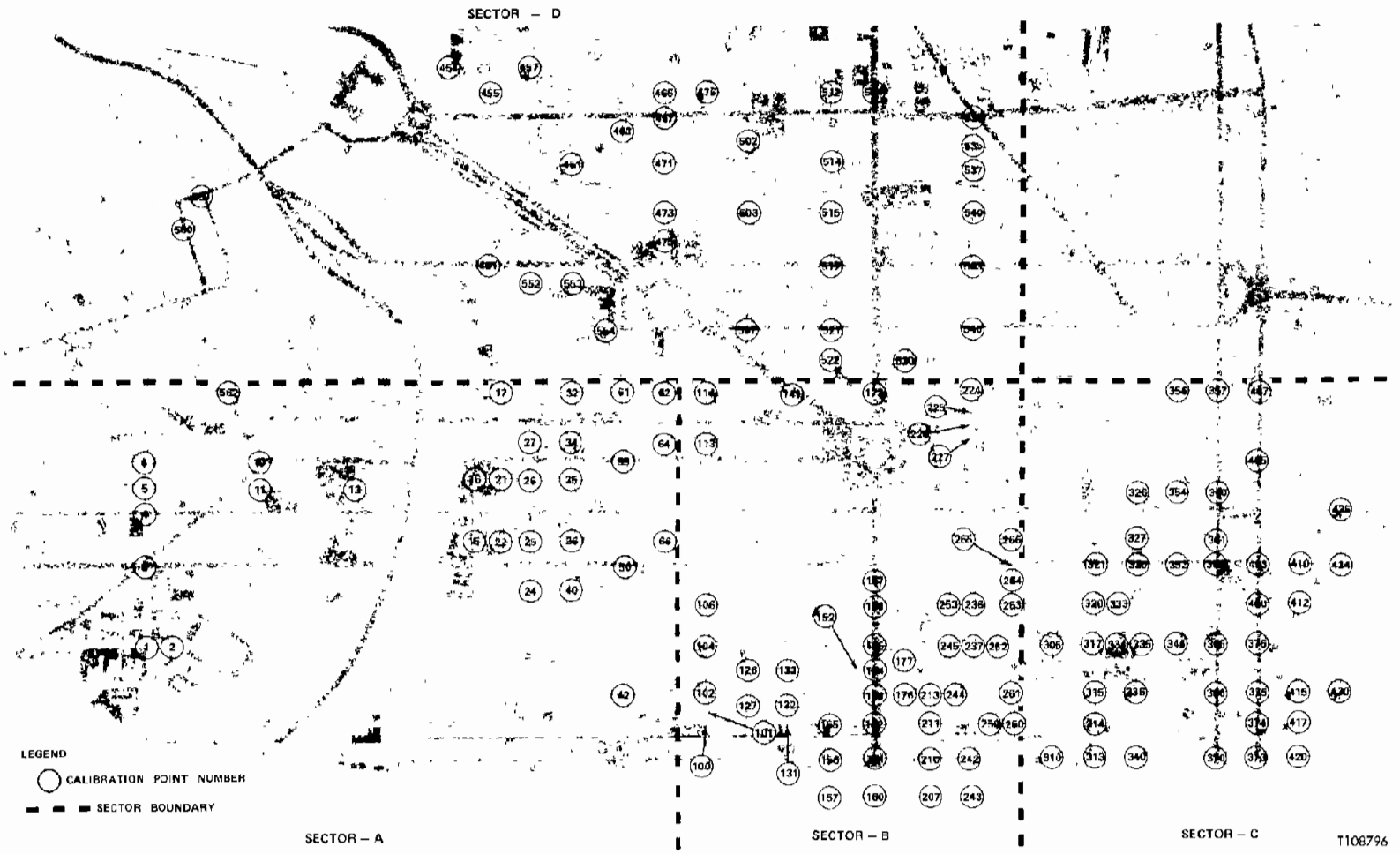


Figure A-1. Calibration Area

LORAN Calibration Data

Sector A

CAL Pt. No.	Intersection	X	Y	TDA Mean TD	TDA Std. Dev.	TDB Mean TD	TDB Std. Dev.
1	34th St. & Spruce	1115	1190	51,763.576	34ns	82,232.300	93ns
2	33rd St. & Spruce	1340	1190	51,763.316	46ns	82,232.326	56ns
3	34th St. & Walnut	1100	2000	51,762.996	29ns	82,230.781	32ns
4	34th St. & Chestnut	1100	2610	51,761.582	21ns	82,229.855	41ns
5	34th St. & Ludlow	1100	2850	51,761.185	39ns	82,229.296	62ns
6	34th St. & Market	1100	3175	51,760.738	32ns	82,228.966	63ns
10	32nd & Market	2000	3188	51,759.700	23ns	82,229.453	62ns
11	32nd & Ludlow	2000	2922	51,759.757	47ns	82,229.978	48ns
13	30th & Ludlow	3375	2875	51,758.910	41ns	82,230.998	78ns
15	24th & Sansom	4650	2300	51,758.285	23ns	82,232.573	44ns
16	24th & Ludlow	4650	3000	51,757.717	77ns	82,231.791	140ns
17	23rd & Arch	4940	3860	51,755.613	32ns	82,230.328	53ns
21	23rd & Ludlow	4930	2975	51,757.046	88ns	82,231.203	114ns
22	23rd & Sansom	4940	2310	51,757.984	33ns	82,232.789	74ns
24	22nd & St. James	5260	1800	51,758.129	39ns	82,233.820	48ns
25	22nd & Sansom	5260	2360	51,757.457	22ns	82,232.797	67ns
26	22nd & Ludlow	5260	2970	51,756.376	17ns	82,231.762	86ns
27	22nd & Commerce	5260	3422	51,755.906	16ns	82,231.097	47ns
32	21st & Arch	5725	3905	51,754.587	40ns	82,230.694	72ns
34	21st & Commerce	5720	3422	51,755.434	23ns	82,231.432	75ns
35	21st & Ludlow	5720	2945	51,756.246	29ns	82,232.226	80ns
36	21st & Sansom	5720	2355	51,757.508	51ns	82,233.233	91ns
40	21st & Chancellor	5720	1800	51,758.259	103ns	82,234.210	89ns
42	20th & Pine	6260	690	51,759.015	67ns	82,236.128	45ns
50	20th & Walnut	6260	2025	51,756.840	41ns	82,234.014	95ns
55	20th & Market	6260	3240	51,755.117	65ns	82,231.406	110ns
61	20th & Arch	6260	3880	51,753.975	17ns	82,230.655	51ns
62	19th & Arch	6720	3940	51,753.605	84ns	82,231.462	59ns
64	19th & Commerce	6720	3422	51,754.475	59ns	82,231.844	80ns
66	19th & Sansom	6720	2320	51,756.228	46ns	82,233.676	165ns

Total Number of Calibration Points - 30 Mean Radial Error 131.66 feet

LORAN Calibration Data

Sector B

CAL Pt. No.	Intersection	X	Y	TDA Mean TD	TDA Std. Dev.	TDB Mean TD	TDB Std. Dev.
100	18th St. & Lombard	7150	300	51,758.333	35ns	82,237.306	80ns
101	18th St. & Addison	7150	475	51,758.008	68ns	82,237.105	119ns
102	18th St. & Pine	7150	640	51,757.351	80ns	82,236.504	189ns
104	18th St. & Spruce	7150	1220	51,757.057	42ns	82,236.228	269ns
106	18th St. & Locust	7150	1670	51,756.107	70ns	82,235.195	163ns
113	18th St. & Commerce	7150	3300	51,753.416	52ns	82,232.222	90ns
114	18th St. & Arch	7150	3945	51,752.513	60ns	82,231.365	122ns
126	17th St. & Delancy	7605	545	51,757.209	56ns	82,236.949	127ns
127	17th St. & Waverly	7605	545	51,757.617	34ns	82,237.543	154ns
131	16th St. & Lombard	8020	395	51,757.059	29ns	82,237.623	64ns
132	16th St. & Waverly	8020	540	51,757.249	42ns	82,237.726	87ns
133	16th St. & Delancy	8020	935	51,756.408	40ns	82,236.737	111ns
141	16th St. & Arch	8500	3900	51,751.488	72ns	82,232.364	198ns
152	Delancy & Rosewood	8785	955	51,755.868	26ns	82,231.652	50ns
155	15th St. & Lombard	8500	340	51,757.057	34ns	82,238.030	101ns
156	15th St. & South	8500	70	51,757.840	66ns	82,238.921	206ns
157	15th St. & Bainbridge	8500	- 293	51,758.307	52ns	82,239.492	90ns
160	Broad & Bainbridge	9000	- 293	51,757.331	27ns	82,239.310	87ns
161	Broad & South	9000	45	51,756.969	20ns	82,238.859	31ns
162	Broad & Lombard	9000	310	51,756.441	22ns	82,238.351	44ns
163	Broad & Pine	9000	690	51,756.019	34ns	82,237.836	59ns
164	Broad & Delancy	9000	855	51,755.672	25ns	82,237.472	84ns
165	Broad & Spruce	9000	1215	51,754.902	33ns	82,236.918	79ns
166	Broad & Locust	9000	1650	51,754.285	52ns	82,236.355	96ns
167	Broad & Chancellor	9010	1835	51,753.819	77ns	82,235.690	162ns
173	Broad & Arch	9000	3950	51,750.620	41ns	82,232.083	85ns
176	Juniper & Pine	9300	675	51,755.837	83ns	82,238.194	120ns
177	Juniper & Cypress	9300	1000	51,754.818	58ns	82,237.782	147ns
207	13th St. & Bainbridge	9580	- 293	51,757.556	44ns	82,240.690	67ns
210	13th St. & South	9580	45	51,756.152	20ns	82,239.433	33ns

LORAN Calibration Data

Sector B (Continued)

CAL Pt. No.	Intersection	X	Y	TDA Mean TD	TDA Std. Dev.	TDB Mean TD	TDB Std. Dev.
211	13th St. & Lombard	9580	380	51,754.867	72ns	82,238.679	84ns
213	13th St. & Pine	9580	710	51,755.004	31ns	82,238.220	62ns
224	12th St. & Arch	10,000	3950	51,749.748	50ns	82,233.324	131ns
225	12th St. & Cuthbert	10,000	3752	51,750.156	58ns	82,233.422	59ns
226	12th St. & Filbert	10,000	3575	51,749.375	52ns	82,233.324	111ns
227	12th St. & Commerce	10,000	3435	51,749.948	52ns	82,233.897	93ns
236	12th St. & Locust	10,000	1640	51,753.099	34ns	82,236.840	84ns
237	12th St. & Spruce	10,000	1225	51,753.949	59ns	82,237.433	82ns
242	12th St. & South	10,000	25	51,755.755	27ns	82,239.566	60ns
243	12th St. & Bainbridge	10,000	- 375	51,758.185	78ns	82,241.541	59ns
244	Camac & Pine	9825	690	51,754.894	49ns	82,238.738	90ns
245	Camac & Spruce	9810	1200	51,753.969	73ns	82,237.523	243ns
250	Quince & Lombard	10,250	365	51,754.902	33ns	82,239.515	56ns
252	Quince & Spruce	10,250	1200	51,753.494	122ns	82,237.873	142ns
253	Quince & Locust	10,250	1640	51,752.947	48ns	82,237.157	87ns
260	11th St. & Lombard	10,500	320	51,754.476	85ns	82,239.652	109ns
261	11th St. & Pine	10,500	690	51,753,910	43ns	82,238.664	116ns
263	11th St. & Locust	10,500	1680	51,751.422	42ns	82,236.273	83ns
264	11th St. & Chancellor	10,500	1875	51,750.616	72ns	82,235.937	120ns
265	11th St. & Walnut	10,500	2085	51,751.306	163ns	82,236.080	139ns
266	11th St. & Sansom	10,500	2350	51,749.719	54ns	82,235.519	216ns

Total Number of Calibration Points - 51
Mean Radial Error - 191 feet

LORAN Calibration Data

Sector C

CAL Pt. No.	Intersection	X	Y	TDA Mean TD	TDA Std. Dev.	TDB Mean TD	TDB Std. Dev.
305	10th St. & Spruce	10,910	1275	51,753.238	100ns	82,238.567	142ns
310	10th St. & South	10,910	0	51,754.805	74ns	82,240.156	70ns
313	9th St. & South	11,355	50	51,753.883	33ns	82,240.504	147ns
314	9th St. & Lombard	11,355	320	51,753.726	42ns	82,239.495	80ns
315	9th St. & Pine	11,370	660	51,752.871	79ns	82,239.281	64ns
317	9th St. & Spruce	11,360	1245	51,752.430	77ns	82,238.621	104ns
320	9th St. & Locust	11,360	1675	51,751.523	26ns	82,237.816	57ns
321	9th St. & Walnut	11,371	2030	51,750.981	22ns	82,237.289	53ns
326	8th St. & Ranstead	11,825	2875	51,749.449	84ns	82,236.606	149ns
327	8th St. & Sansom	11,825	2405	51,750.106	67ns	82,237.090	123ns
330	8th St. & Walnut	11,835	2100	51,750.590	29ns	82,237.551	69ns
333	Darien & Locust	11,585	1640	51,751.297	17ns	82,237.945	38ns
334	Darien & Spruce	11,585	1220	51,752.191	34ns	82,238.783	76ns
335	8th & Spruce	11,795	1220	51,751.719	74ns	82,238.519	89ns
336	8th & Pine	11,815	660	51,752.746	19ns	82,239.742	100ns
340	8th & South	11,815	40	51,753.746	12ns	82,240.816	29ns
346	7th & Spruce	12,240	1255	51,751.121	61ns	82,239.101	122ns
352	7th & Walnut	12,260	2115	51,750.008	55ns	82,237.875	106ns
354	7th & Ranstead	12,260	2865	51,748.854	28ns	82,236.606	57ns
356	7th & Arch	12,260	3865	51,747.168	46ns	82,234.878	60ns
357	6th & Arch	12,700	3995	51,746.458	20ns	82,235.147	55ns
360	6th & Ranstead	12,695	2825	51,748.305	33ns	82,236.967	62ns
361	6th & Sansom	12,690	2335	51,749.102	49ns	82,237.875	186ns
362	6th & Walnut	12,690	2070	51,749.609	150ns	82,238.664	156ns
365	6th & Spruce	12,680	1215	51,751.047	31ns	82,239.582	78ns
366	6th & Pine	12,675	695	51,751.734	27ns	82,240.304	55ns
370	6th & South	12,655	0	51,752.879	26ns	82,241.344	76ns
373	5th & South	13,120	25	51,752.023	31ns	82,241.523	82ns
374	5th & Lombard	13,125	390	51,751.559	34ns	82,241.012	60ns
375	5th & Pine	13,120	700	51,750.855	34ns	82,240.346	67ns

LORAN Calibration Data

Sector C (Continued)

CAL Pt. No.	Intersection	X	Y	TDA Mean TD	TDA Std. Dev.	TDB Mean TD	TDB Std. Dev.
376	5th & Spruce	13,120	1210	51,750.012	37ns	82,239.336	103ns
400	5th & Locust	13,120	1660	51,748.980	57ns	82,238.490	120ns
403	5th & Chestnut	13,145	2660	51,747.990	28ns	82,237.469	33ns
405	5th & Market	13,120	3035	51,747.223	50ns	82,236.477	71ns
407	5th & Arch	13,130	4030	51,745.559	26ns	82,235.047	73ns
410	4th & Chestnut	13,590	2705	51,747.746	37ns	82,237.773	84ns
412	4th & Locust	13,580	1685	51,749.281	20ns	82,239.406	58ns
415	4th & Pine	13,575	695	51,750.746	34ns	82,240.855	62ns
417	4th & Lombard	13,570	370	51,751.473	37ns	82,241.578	64ns
420	4th & South	13,570	25	51,752.215	64ns	82,242.390	116ns
430	3rd & Pine	14,000	1245	51,750.262	37ns	82,241.484	44ns
434	3rd St. & Walnut	14,000	2045	51,748.098	26ns	82,239.000	49ns
435	3rd St. & Chestnut	14,000	2605	51,747.305	12ns	82,238.179	33ns

Total Calibration Points - 43
Mean Radial Error - 148 feet

LORAN Calibration Data
Sector D

CAL Pt. No.	Intersection	X	Y	TDA Mean TD	TDA Std. Dev.	TDB Mean TD	TDB Std. Dev.
451	Vine & 24th St.	4320	5790	51,754.062	32ns	82,227.512	49ns
454	24th St. & Green	4370	7385	51,750.833	34ns	82,224.644	24ns
455	23rd St. & Brandywine	4830	7130	51,750.750	38ns	82,225.299	78ns
457	22nd St. & Green	5270	7410	51,749.783	28ns	82,224.839	50ns
461	21st St. & Hamilton	5720	6370	51,750.937	26ns	82,226.726	17ns
463	20th St. & Nectarine	6280	6725	51,749.648	18ns	82,226.359	61ns
466	19th St. & Brandywine	6725	7120	51,748.576	71ns	82,226.063	117ns
467	19th St. & Spg. Garden	6725	6910	51,748.930	20ns	82,226.707	69ns
471	19th St. & Hamilton	6725	6390	51,749.402	41ns	82,227.137	85ns
473	19th St. & Callowhill	6725	5820	51,750.890	79ns	82,228.445	86ns
475	19th St. & Wood	6725	5535	51,751.227	38ns	82,228.957	64ns
476	18th St. & Brandywine	7225	7130	51,748.203	39ns	82,226.367	234ns
502	17th St. & Buttonwood	7640	6630	51,747.984	27ns	82,227.644	49ns
503	17th St. & Callowhill	7640	5840	51,749.469	42ns	82,228.781	68ns
507	17th St. & Race	7620	4520	51,751.270	33ns	82,230.707	70ns
512	15th St. & Brandywine	8500	7140	51,746.648	58ns	82,227.395	71ns
514	15th St. & Hamilton	8500	6400	51,747.773	48ns	82,228.433	46ns
515	15th St. & Callowhill	8500	5890	51,748.543	41ns	82,229.171	55ns
517	15th St. & Vine	8500	5360	51,749.441	26ns	82,230.018	41ns
521	15th St. & Race	8500	4630	51,760.628	85ns	82,231.141	111ns
522	15th St. & Cherry	8500	4295	51,750.707	36ns	82,231.536	76ns
524	Broad & Brandywine	9000	7170	51,746.008	31ns	82,227.520	42ns
530	Juniper & Cherry	9265	4270	51,750.326	52ns	82,232.078	126ns
533	12th St. & Spg. Garden	10,040	6815	51,745.504	34ns	82,228.832	57ns
535	12th St. & Buttonwood	10,040	6715	51,745.523	27ns	82,228.890	62ns
537	12th St. & Noble	10,040	6380	51,746.379	37ns	82,229.938	134ns
540	12th St. & Callowhill	10,040	5900	51,746.699	42ns	82,230.145	76ns
543	12th St. & Vine	10,040	5270	51,747.679	31ns	82,231.185	59ns
546	12th St. & Race	10,040	4655	51,748.594	73ns	82,232.387	252ns
552	22nd St. & Winter	5280	5090	51,753.332	19ns	82,238.434	89ns
553	21st St. & Winter	5720	5090	51,752.906	38ns	82,238.672	69ns

LORAN Calibration Data

Sector D (Continued)

CAL Pt. No.	Intersection	X	Y	TDA Mean TD	TDA Std. Dev.	TDB Mean TD	TDB Std. Dev.
554	Race & Woodstock	6075	4560	51,753.145	50ns	82,239.492	90ns
557	31st St. & Spg. Garden	1734	6031	51,755.772	26ns	82,234.875	64ns
560	32nd St. & Howelton	1750	5000	51,757.000	25ns	82,236.334	89ns
562	32nd St. & Arch	1950	3848	51,758.277	34ns	82,237.582	63ns

LORAN Calibration Data

Sector Special Case - LORAN Only Area

CAL Pt. No.	Intersection	X	Y	TDA Mean TD	TDA Std. Dev.	TDB Mean TD	TDB Std. Dev.
600	4th St. & Ducannon	1633	609	51,705.629	41ns	82,193.546	58ns
601	4th St. & Lindley	1633	1156	51,706.520	50ns	82,193.395	60ns
602	4th St. & Ruscomb	1633	1719	51,707.305	37ns	82,194.094	66ns
603	4th St. & Rockland	1633	2312	51,708.183	81ns	82,195.063	96ns
604	4th St. & Loudon	1633	2835	51,709.019	29ns	82,195.488	67ns
605	4th St. & Wyoming	1633	3398	51,709.879	54ns	82,196.719	74ns
606	10th St. & Wyoming	1172	3398	51,711.410	50ns	82,196.188	38ns
607	10th St. & Loudon	1172	2835	51,710.156	32ns	82,195.027	58ns
610	10th St. & Rockland	1172	2312	51,710.176	70ns	82,195.766	128ns
611	10th St. & Ruscomb	1172	1719	51,708.297	64ns	82,192.961	95ns
612	10th St. & Lindley	1172	1156	51,707.633	42ns	82,193.430	105ns
613	10th St. & Ducannon	1172	609	51,706.984	55ns	82,193.402	117ns
614	Hutchinson & Ducannon	1375	609	51,706.109	38ns	82,192.832	53ns
615	Hutchinson & Lindley	1375	1156	51,706.887	76ns	82,193.234	105ns
616	Hutchinson & Ruscomb	1375	1719	51,707.472	26ns	82,193.992	51ns
617	Hutchinson & Rockland	1375	2312	51,708.766	59ns	82,195.020	74ns
620	Hutchinson & Loudon	1375	2835	51,709.230	49ns	82,195.254	101ns
621	Hutchinson & Wyoming	1375	3398	51,710.320	25ns	82,196.367	45ns
622	Warnock & Wyoming	945	3398	51,710.555	25ns	82,196.125	51ns
623	Warnock & Loudon	945	2835	51,709.676	61ns	82,195.309	87ns
624	Warnock & Rockland	945	2312	51,710.347	57ns	82,195.451	90ns
625	Warnock & Ruscomb	945	1719	51,707.965	47ns	82,193.301	105ns
626	Warnock & Lindley	945	1156	51,707.765	38ns	82,193.654	98ns
627	Warnock & Ducannon	945	609	51,706.805	61ns	82,192.813	98ns
630	11th St. & Ducannon	723	609	51,707.241	75ns	82,192.500	162ns
631	11th St. & Lindley	723	1156	51,707.339	50ns	82,192.891	101ns
632	11th St. & Ruscomb	723	1719	51,708.778	63ns	82,192.868	98ns
633	11th St. & Rockland	723	2312	51,709.201	40ns	82,194.492	39ns
634	11th St. & Loudon	723	2835	51,710.184	26ns	82,195.313	55ns
635	11th St. & Wyoming	723	3398	51,711.027	41ns	82,195.824	65ns

LORAN Calibration Data

Sector Special Case (Continued)

CAL Pt. No.	Intersection	X	Y	TDA Mean TD	TDA Std. Dev.	TDB Mean TD	TDB Std. Dev.
636	Marvine & Wyoming	500	3398	51,711.152	64ns	82,195.824	54ns
637	Marvine & Loudon	500	2835	51,710.031	31ns	82,194.988	37ns
640	Marvine & Rockland	500	2312	51,709.160	46ns	82,194.164	42ns
641	Marvine & Ruscomb	500	1719	51,708.406	16ns	82,193.148	46ns
642	Marvine & Lindley	500	1156	51,707.348	39ns	82,192.699	65ns
643	Marvine & Ducannon	500	609	51,706.938	62ns	82,192.004	109ns
644	12th St. & Ducannon	313	609	51,706.816	46ns	82,191.625	106ns
645	12th St. & Lindley	313	1164	51,707.750	20ns	82,192.500	32ns
646	12th St. & Ruscomb	313	1719	51,708.582	45ns	82,193.133	75ns
647	12th St. & Rockland	313	2312	51,709.535	43ns	82,194.051	99ns
650	12th St. & Loudon	313	2835	51,710.168	64ns	82,194.824	87ns
651	12th St. & Wyoming	313	3398	51,711.352	69ns	82,195.637	61ns
652	Windbrim & Marvine	500	340	51,704.324	45ns	82,192.816	81ns
653	Windbrim & 11th St.	723	156	51,707.023	16ns	82,191.230	56ns
654	Windbrim & Warnock	945	55	51,705.941	29ns	82,191.277	64ns
655	Fisher & 10th St.	1172	23	51,705.383	25ns	82,191.398	44ns
656	Fisher & Hutchinson	1375	18	51,704.586	27ns	82,191.113	94ns
657	Fisher & 4th St.	1633	10	51,704.492	32ns	82,191.328	49ns

LORAN Calibration Data

Sector Special Case - Unusual Coverage Bridge Area

CAL Pt. No.	Intersection	X	Y	TDA Mean TD	TDA Std. Dev.	TDB Mean TD	TDB Std. Dev.
700	North & Point	19,452	6,188	51,731.940	115 ns	82,232.207	109 ns
701	Delaware & Penn	19,149	3,751	51,740.070	31 ns	82,239.690	25 ns
702	State & 2nd	20,216	5,566	51,736.186	38 ns	82,237.800	76 ns
703	5th & Penn	21,164	2,642	51,737.898	40 ns	82,241.163	36 ns
704	Willow & 2nd	14,607	6,237	51,741.132	26 ns	82,232.917	41 ns
705	4th & Arch	13,528	4,024	51,745.183	37 ns	82,235.105	107 ns
706	Race & Delaware	15,412	4,596	51,742.890	32 ns	82,236.089	75 ns
707	Front & Chestnut	15,069	2,661	51,746.093	32 ns	82,238.875	36 ns
710	4th & Walnut	13,591	2,077	51,748.425	32 ns	82,238.550	91 ns

CALIBRATION DATA REDUCTION PROGRAM &

SAMPLE PROGRAM EXECUTION

(BRIDGE RUN)

```
REMOTE       START JOB 261   CALIB261 CUST=0668955100S     I.D.=ESM$0035 TERM.=9013 DATE=FRI. 11 MAR 1977          TIME=17.06.53
REMOTE       START JOB 261   CALIB261 CUST=0668955100S     I.D.=ESM$0035 TERM.=9013 DATE=FRI. 11 MAR 1977          TIME=17.06.53
REMOTE       START JOB 261   CALIB261 CUST=0668955100S     I.D.=ESM$0035 TERM.=9013 DATE=FRI. 11 MAR 1977          TIME=17.06.53
```

H A S P S Y S T E M L O G

```
$ 16.50.22 JOB 261 -- CALIB261 -- BEGINNING EXEC - INIT 8 - CLASS A
$ 16.54.36 JOB 261 END EXECUTION.
```

SYSTEM/JOB STATISTICS ---------- TELEDYNE RYAN AERONAUTICAL ---------- SYSTEM/JOB STATISTICS

```
O/S MVT RELEASE 21.8B WITH HASP-II VERSION 3.1, CICS VERSION 2.3 WITH DL/I VERSION 2.0.1 AND ISO RELEASE 21.8B WITH TCAM LEVEL 5F,
370/155 2.0 MEG., 1=3215, 1=2540, 2=1403, 1=101A, 1=3705, 2=3272, 22=3670, 2=3420 7/9 TRACK DUAL-DEN, 6=3420 9 TRACK 1600BPI.

   0.21 MIN CPU TIME -- MUS      .29 --    344 CARDS READ --     811 LINES PRINTED --      0 CARDS PUNCHED -- TIME ON READER 16.30
```

```
//CALIB261 JOB (ESMS0035,9999,2,1),'06689551003',                    , JOB 261
// TIME=0002,MSGLEVEL=1,REGION=100K
// EXEC FORTGCLG
XXFORT     EXEC PGM=IFYFORT,REGION=100K                              00000100
XXSYSPRINT DD  SYSOUT=A                                              00000200
XXSYSPUNCH DD  SYSOUT=B                                              00000300
XXSYSLIN   DD  UNIT=SYSDA,DISP=(MOD,PASS),SPACE=(80,(200,100),RLSE),  00000400
XX             DSN=&&LOADSET,DCB=BLKSIZE=80                          00000500
//SYSIN  DD *
IEF236I ALLOC. FOR CALIB261 FORT
IEF237I 0E7   ALLOCATED TO SYSPRINT
IEF237I 0D1   ALLOCATED TO SYSPUNCH
IEF237I 253   ALLOCATED TO SYSLIN
IEF237I 089   ALLOCATED TO SYSIN
IEF142I - STEP WAS EXECUTED - COND CODE 0000
IEF285I   SYS77069.T044750.RV000.CALIB261.LOADSET       PASSED
IEF285I   VOL SER NOS= WORK03.
IEF373I STEP /FORT     / START 77070,1650
IEF374I STEP /FORT     / STOP  77070,1652 CPU    0MIN 10.13SEC MAIN  90K LCS   0K
XXLKED EXEC PGM=IEWL,REGION=110K,PARM=(XREF,LET,LIST),COND=(4,LT,FORT)  00000600
XXSYSLIB   DD  DSNAME=SYS1.FORTLIB,DISP=SHR                          00000700
XXSYSPRINT DD  SYSOUT=A                                              00000800
XXSYSLMOD  DD  UNIT=SYSDA,DISP=(NEW,PASS),SPACE=(1024,(20,10,1),RLSE),  00000900
XX             DSN=&&GOSET(MAIN),DCB=BLKSIZE=1024                    00001000
XXSYSUT1   DD  UNIT=SYSDA,SPACE=(1024,(100,10)),DCB=BLKSIZE=1024     00001100
XXSYSLIN   DD  DSN=&&LOADSET,DISP=(OLD,DELETE)                       00001200
XX             DD  DDNAME=SYSIN                                      00001300
IEF236I ALLOC. FOR CALIB261 LKED
IEF237I 130   ALLOCATED TO SYSLIB
IEF237I 0E0   ALLOCATED TO SYSPRINT
IEF237I 253   ALLOCATED TO SYSLMOD
IEF237I 252   ALLOCATED TO SYSUT1
IEF237I 253   ALLOCATED TO SYSLIN
IEF142I - STEP WAS EXECUTED - COND CODE 0000
IEF285I   SYS1.FORTLIB                                  KEPT
IEF285I   VOL SER NOS= SYS218.
IEF285I   SYS77069.T044750.RV000.CALIB261.GOSET         PASSED
IEF285I   VOL SER NOS= WORK03.
IEF285I   SYS77069.T044750.RV000.CALIB261.A0012248      DELETED
IEF285I   VOL SER NOS= WORK02.
IEF285I   SYS77069.T044750.RV000.CALIB261.LOADSET       DELETED
IEF285I   VOL SER NOS= WORK03.
IEF373I STEP /LKED     / START 77070,1652
IEF374I STEP /LKED     / STOP  77070,1654 CPU    0MIN 02.19SEC MAIN 100K LCS   0K
XXGO EXEC PGM=*.LKED.SYSLMOD,COND=((4,LT,FORT),(4,LT,LKED))          00001400
XXFT05F001 DD  DDNAME=SYSIN                                          00001500
XXFT06F001 DD  SYSOUT=A                                              00001600
XXFT07F001 DD  SYSOUT=B                                              00001700
//GO.SYSIN DD *
//
IEF236I ALLOC. FOR CALIB261 GO
IEF237I 253   ALLOCATED TO PGM=*.DD
IEF237I 0BF   ALLOCATED TO FT05F001
IEF237I 0E0   ALLOCATED TO FT06F001
IEF237I 0D1   ALLOCATED TO FT07F001
IEF142I - STEP WAS EXECUTED - COND CODE 0000
IEF285I   SYS77069.T044750.RV000.CALIB261.GOSET         PASSED
IEF285I   VOL SER NOS= WORK03.
IEF373I STEP /GO       / START 77070,1654
IEF374I STEP /GO       / STOP  77070,1654 CPU    0MIN 00.82SEC MAIN  68K LCS   0K
```

```
IEF285I   SYS77069.T044750.RV000.CALIB261.GOSET          DELETED
IEF285I   VOL SER NOS= WORK03.
IEF373I JOB /CALIB261/ START 77070.1650
IEF376I JOB /CALIB261/ STOP  77070.1654 CPU    0MIN 13.14SEC
```

```
      C     THIS DECK IS A STAND ALONE DECK FOR CALIBRATION
0001        COMMON/INDIRT/ITA,ITB,IX,IY
0002        ITA=1
0003        ITB=2
0004        IX=3
0005        IY=4
      C     READ TOTAL NUMBER OF SECTORS
0006        READ(5,10) NSECTS
0007     10 FORMAT(I5)
0008        WRITE(6,20) NSECTS
0009     20 FORMAT('0','NSECTS=',I5)
0010        DO 30 I=1,NSECTS
0011        CALL CALIB
0012     30 CONTINUE
0013        END
```

COMMON BLOCK /INDIPT / MAP SIZE = 10

SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION
ITA	0	ITB	4	IX	8	IY	C		

SUBPROGRAMS CALLED

SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION
IBCOM#	98	CALIB	9C						

SCALAR MAP

SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION
NSECTS	A0	I	A4						

FORMAT STATEMENT MAP

SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION
10	A8	20	AC						

```
*OPTIONS IN EFFECT*   ID,EBCDIC,SOURCE,NOLIST,NODECK,LOAD,MAP
*OPTIONS IN EFFECT*   NAME = MAIN      , LINECNT =      59
*STATISTICS*     SOURCE STATEMENTS =        13,PROGRAM SIZE =      444
*STATISTICS*   NO DIAGNOSTICS GENERATED
```

```
0001            SUBROUTINE CALTR
0002            COMMON/CALWRK/WORK(100,5),U(20),V(20)
0003            COMMON/CALIBR/ICALID(100)
0004            DIMENSION TDS(10,2,20),REF(10,6),SECTRS(10,4)
0005            COMMON/INDIPT/ITA,ITB,IX,IY
0006          2000 FORMAT(I10,(6F10.0))
0007          2001 FORMAT(16I5)
0008          2002 FORMAT(' ',I5,6F11.4)
0009          2003 FORMAT(8F10.3)
0010          2005 FORMAT('0','INPUT DATA FROM CODING FORMS')
0011          2006 FORMAT('0','X COEFFS FOR SECTOR',I5,5F12.4)
0012          2007 FORMAT('0','Y COEFFS FOR SECTOR',I5,5F12.4)
0013          2008 FORMAT('0','SECTOR NUMBER=',I5,' REF POINT NUMBER=',I5,' NUMBER OF
                  1 CALIBRATION POINTS=',I5)
0014          2009 FORMAT('0','COORDINATES OF SECTOR BOUNDARY POINTS')
0015               READ(5,2001) IN,IR,ISECT,N
0016               WRITE(6,2008) ISECT,IR,N
0017               READ(5,2003) (SECTRS(ISECT,J),J=1,4)
0018               WRITE(6,2009)
0019               WRITE(6,2003)  (SECTRS(ISECT,J),J=1,4)
                C      READ CARDS
0020               WRITE(6,2005)
0021            1  DO 10 J=1,N
0022               READ(5,2000) ICALID(J),(WORK(J,K),K=1,4),A,B
                C.....KLUGE FOR STAND ALONE LOREN=REMOVE NEXT TWO CARDS AFTER THIS RUN
                C      WORK(J,2)=WORK(J,2)+60.
                C      WORK(J,1)=WORK(J,1)+520.
                C      END OF KLUGE
0023               WRITE(6,2002) ICALID(J),(WORK(J,K),K=1,4),A,B
0024               WORK(J,5)=A**2+B**2
0025            10 CONTINUE
0026               DO 1000 I=1,N
0027               IF(ICALID(I).EQ.IR) IR=I
0028          1000 CONTINUE
0029          100  CALL COEF(WORK,U,V,N,IR,IN)
0030               IDIM=(IN+1)*(IN+2)/2+1
0031               DO 13 J=1,IDIM
0032               TDS(ISECT,1,J)=U(J)
0033          13   TDS(ISECT,2,J)=V(J)
0034               WRITE(6,2006) ISECT,(U(J),J=1,5)
0035               WRITE(6,2007) ISECT,(V(J),J=1,5)
0036               DO 14 J=1,4
0037          14   REF(ISECT,J)=WORK(IR,J)
0038               REF(ISECT,6)=IN
0039               REF(ISECT,5)=1.0
0040               RETURN
0041               END
```

COMMON BLOCK /CALWRK / MAP SIZE 870

SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION
WORK	0	U	700	V	820				

COMMON BLOCK /CALIBR / MAP SIZE 190

SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION
ICALIB	0								

COMMON BLOCK /INDIRT / MAP SIZE 10

SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION
ITA	0	ITB	4	IX	8	IY	C		

SUBPROGRAMS CALLED

SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION
IBCOM#	C8	COEF	CC						

SCALAR MAP

SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION
IN	E8	IR	EC	ISECT	F0	N	F4	J	F8
K	FC	A	100	B	104	I	108	IDIM	10C

ARRAY MAP

SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION
IDS	110	REF	750	SECTAS	840				

FORMAT STATEMENT MAP

SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION
2000	AE0	2001	AEC	2002	AF2	2003	AFE	2005	905
2006	92A	2007	949	2008	964	2009	989		

OPTIONS IN EFFECT ID,EBCDIC,SOURCE,NOLIST,NODECK,LOAD,MAP
OPTIONS IN EFFECT NAME = CALIB , LINECNT = 59
STATISTICS SOURCE STATEMENTS = 41,PROGRAM SIZE = 3724
STATISTICS NO DIAGNOSTICS GENERATED

```
0001            SUBROUTINE COEF(WORK,S,T,INUM,IREF,N)
0002            COMMON/INDIPT/ITA,ITB,IX,IY
0003            COMMON/CALIBR/ICALID(100)
0004            DIMENSION S(1),T(1)
0005            DIMENSION WORK(100,1),U(100),V(100)
0006            DIMENSION D(100),E(100),H(100,20),U1(20),V1(20),A(20),B(20),G(100)
0007            DOUBLE PRECISION U1,V1,E,D,H
0008         1000 FORMAT(5X,(10E12.4))
0009         1001 FORMAT(I5,(10E12.4))
0010         1002 FORMAT(1H1)
0011         1003 FORMAT(9X,'XC',8X,'X',8X,'ERRX',7X,'YC',8X,'Y',8X,'ERRY',//)
0012         1004 FORMAT('0','MEAN RADIAL ERROR=',E14.5,' RADIAL ERROR STANDARD DEVI
                 1ATION=',E14.5)
0013         1005 FORMAT('0','RANK ORDER STATISTICS OF CALIBRATION POINT RADIAL ERRO
                 1RS')
0014         1006 FORMAT('0','CALIBRATION POINT ERROR MAP')
0015               IF( N .NE. 0) GO TO 13
0016            13 CONTINUE
0017               J1=1
0018               J2=INUM
0019               IDIM=(N+1)*(N+2)/2+1
0020               IF(IREF .EQ. 0) GO TO 14
0021               J1=IREF
0022               J2=IREF
0023               G1=1.0 E 20
0024               GO TO 15
0025            14 IREF=1
0026            15 DO 10 I=J1,J2
0027               G(I)=0.0
0028               DO 1 K=1,INUM
0029               D(K)=(WORK(K,IX)-WORK(I,IX))/WORK(K,5)
0030             1 E(K)=(WORK(K,IY)-WORK(I,IY))/WORK(K,5)
0031               CALL HMAT(WORK,INUM,I,H,N)
0032               CALL LINEAR(V1,E ,H,INUM,IDIM)
0033               CALL LINEAR(U1,D ,H,INUM,IDIM)
0034               WRITE(6,1006)
0035               WRITE(6,1003)
0036               DO 3 J=1,INUM
0037               DELX=0.0
0038               DELY=0.0
0039               DO 2 K=1,IDIM
0040                DELX=DELX+U1(K)*H(J,K)*WORK(J,5)
0041             2  DELY=DELY+V1(K)*H(J,K)*WORK(J,5)
0042               DX=DELX-D(J)*WORK(J,5)
0043               DY=DELY-E(J)*WORK(J,5)
0044               U(J)=WORK(IREF,IX)+DELX
0045               V(J)=WORK(IREF,IY)+DELY
0046               AX=DX**2+DY**2
0047               AX=SQRT(AX)
0048               WRITE(6,1001) ICALID(J),U(J),WORK(J,IX),DX,V(J),WORK(J,IY),DY,AX
0049               U(J)=AX
0050             3 G(I)=G(I)+DX**2+DY**2
0051               CALL RANK(U,INUM)
0052               CALL MEAN(U,INUM,RMEAN,VAR,SIGR)
0053               WRITE(6,1005)
0054               DO 20 J=1,INUM
0055            20 WRITE(6,1001) J,U(J)
```

```
0056              IF (I .NE. I) GO TO 5
0057              G1=G(I)
0058              GO TO 4
0059         5    IF(G1.LT. G(I)) GO TO 10
0060              G1=G(I)
0061              IRFF=I
0062         4    DO 6 K=1,IOIM
0063              S(K)=U1(K)
0064         6    T(K)=V1(K)
0065         10   CONTINUE
0066              WRITE(6,1004) PMEAN,SIGR
0067              RETURN
0068              END
```

COMMON BLOCK /INDIPT / MAP SIZE 10

SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION
ITA	0	ITR	4	IX	8	IY	C		

COMMON BLOCK /CALIBR / MAP SIZE 190

SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION
ICALID	0								

SUBPROGRAMS CALLED

SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION
HMAT	F4	LINEAR	F8	IBCOM#	FC	RANK	100	MEAN	104
SQRT	108								

SCALAR MAP

SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION
N	168	J1	16C	I2	170	INUM	174	IDIM	178
IREF	17C	GI	180	I	184	K	188	J	18C
DELX	190	DELY	194	DX	198	DY	19C	AX	1A0
RMEAN	1A4	VAR	1A8	SIGR	1AC				

ARRAY MAP

SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION
S	1B0	T	1B4	WORK	1B8	U	1BC	V	34C
D	4E0	F	B00	H	B20	U1	49A0	V1	4A40
A	4AE0	R	4B30	G	4B80				

FORMAT STATEMENT MAP

SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION
1000	4D10	1001	4D1C	1002	4D28	1003	4D2D	1004	4D57
1005	4D99	1006	4DD8						

OPTIONS IN EFFECT ID,EBCDIC,SOURCE,NOLIST,NODECK,LOAD,MAP
OPTIONS IN EFFECT NAME = COEF , LINECNT = 59
STATISTICS SOURCE STATEMENTS = 66,PROGRAM SIZE = 21716
STATISTICS NO DIAGNOSTICS GENERATED

```
FORTRAN IV G LEVEL 21          MEAN          DATE = 77070      16/50/31          PAGE 0001

0001            SUBROUTINE MEAN(ERR,ICOUNT,RMEAN,VAR,SIGMA)
0002            DIMENSION ERR(1)
0003            DOUBLE PRECISION SUM,SUMSQ
0004            SUM=0.0
0005            SUMSQ=0.0
0006            RMEAN=0.0
0007            VAR=0.0
0008            SIGMA=0.0
0009            IF(ICOUNT .EQ. 0) RETURN
0010            DO 2 J=1,ICOUNT
0011          2 SUM=SUM+ERR(J)
0012            RMEAN=SUM/ICOUNT
0013            IF(ICOUNT .EQ. 1) RETURN
0014            DO 3 J=1,ICOUNT
0015          3 SUMSQ=SUMSQ+(ERR(J)-RMEAN)**2
0016            VAR=SUMSQ/ICOUNT
0017            SIGMA=SQRT(VAR)
0018            RETURN
0019            END
```

SUBPROGRAMS CALLED

SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION
SQRT	A0								

SCALAR MAP

SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION
SUM	A8	SUMSQ	B0	RMEAN	B8	VAR	BC	SIGMA	C0
ICOUNT	C4	J	C8						

ARRAY MAP

SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION
ERR	CC								

```
*OPTIONS IN EFFECT*   ID,EBCDIC,SOURCE,NOLIST,NODECK,LOAD,MAP
*OPTIONS IN EFFECT*   NAME = MEAN      , LINECNT =      59
*STATISTICS*     SOURCE STATEMENTS =        19,PROGRAM SIZE =      704
*STATISTICS*  NO DIAGNOSTICS GENERATED
```

```
0001          SUBROUTINE HMAT(WORK,INUM,IREF,D,N)
0002          COMMON/INDIPT/ITA,ITB,IK,IY
0003          DIMENSION WORK(100,1),D(100,1)
0004          DIMENSION C(20)
0005          DOUBLE PRECISION D
0006          IDIM=(N+1)*(N+2)/2-1
0007          DO 1 J=1,INUM
0008          A=WORK(J,ITA)-WORK(IREF,ITA)
0009          B=WORK(J,ITB)-WORK(IREF,ITB)
0010          CALL EXPAND(A,B,C,N)
0011          DO 1 K=1,IDIM
0012        1 D(J,K)=C(K)/WORK(J,5)
0013          RETURN
0014          END
```

COMMON BLOCK /INDIPT / MAP SIZE 10

SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION
ITA	0	ITB	4	IX	8	IY	C		

SUBPROGRAMS CALLED

SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION
EXPAND	9C								

SCALAR MAP

SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION
IDIM	80	N	84	J	88	INUM	8C	A	C0
IREF	C4	B	C8	K	CC				

ARRAY MAP

SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION
WORK	00	D	04	C	08				

OPTIONS IN EFFECT ID,EBCDIC,SOURCE,NOLIST,NODECK,LOAD,MAP
OPTIONS IN EFFECT NAME = HMAT , LINECNT = 59
STATISTICS SOURCE STATEMENTS = 14,PROGRAM SIZE = 842
STATISTICS NO DIAGNOSTICS GENERATED

```
FORTRAN IV G LEVEL  21                  LINEAR          DATE = 77070        16/50/31            PAGE 0001

0001                SUBROUTINE LINEAR(X,Z,H,M,N)
0002                DIMENSION H(100,1),X(1),Z(1)
0003                DIMENSION A(20,20),B(20,20)
0004                DIMENSION C(20)
0005                DOUBLE PRECISION X,Z,H,A,B,C,D
0006                DO 1 I=1,N
0007                DO 1 J=1,N
0008                A(I,J)=0.0
0009                DO 1 K=1,M
0010              1 A(I,J)=A(I,J)+H(K,I)*H(K,J)
0011                DO 2 I=1,N
0012                C(I)=0.
0013                DO 2 J=1,M
0014              2 C(I)=C(I)+H(J,1)*Z(J)
0015                CALL DECOMP(N,A,B)
0016                CALL SOLVE(N,B,C,X)
                  C CALL IMPRUV(N,A,B,C,X,D)
                  C CALL LINERR(A,C,X,N)
0017                RETURN
0018                END
```

SUBPROGRAMS CALLED

SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION
DECOMP	A8	SOLVE	AC						

SCALAR MAP

SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION
I	CC	N	D0	J	D4	K	D8	M	DC

ARRAY MAP

SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION
H	E0	X	E4	Z	E8	A	F0	B	070
C	19F0								

```
*OPTIONS IN EFFECT*   ID,EBCDIC,SOURCE,NOLIST,NODECK,LOAD,MAP
*OPTIONS IN EFFECT*   NAME = LINEAR  , LINECNT =     59
*STATISTICS*     SOURCE STATEMENTS =       18,PROGRAM SIZE =     7402
*STATISTICS*  NO DIAGNOSTICS GENERATED.
```

```
0001                SUBROUTINE DECOMP (NN, A, UL)
0002                IMPLICIT REAL*8 (A-H,O-Z)
0003                DIMENSION A(20,20), UL(20,20), SCALES(20), IPS(20)
0004                COMMON IPS
0005                N = NN
                C
                C     INITIALIZE IPS, UL AND SCALES
0006                DO 5 I = 1,N
0007                IPS(I) = I
0008                ROWNRM = 0.0
0009                DO 2 J = 1,N
0010                UL(I,J) = A(I,J)
0011                IF(ROWNRM-DABS(UL(I,J))) 1,2,2
0012              1 ROWNRM =DABS(UL(I,J))
0013              2 CONTINUE
0014                IF (ROWNRM) 3,4,3
0015              3 SCALES(I) = 1.0/ROWNRM
0016                GO TO 5
0017              4 CALL SING(1)
0018                SCALES(I) = 0.0
0019              5 CONTINUE
                C
                C     GAUSSIAN ELIMINATION WITH PARTIAL PIVOTING
0020                NM1 = N-1
0021                DO 17 K = 1,NM1
0022                BIG = 0.0
0023                DO 11 I = K,N
0024                IP = IPS(I)
0025                SIZE =DABS(UL(IP,K))*SCALES(IP)
0026                IF (SIZE-BIG) 11,11,10
0027             10 BIG = SIZE
0028                IDXPIV = I
0029             11 CONTINUE
0030                IF (BIG) 13,12,13
0031             12 CALL SING(2)
0032                GO TO 17
0033             13 IF (IDXPIV-K) 14,15,14
0034             14 J = IPS(K)
0035                IPS(K) = IPS(IDXPIV)
0036                IPS(IDXPIV) = J
0037             15 KP = IPS(K)
0038                PIVOT = UL(KP,K)
0039                KP1 = K+1
0040                DO 16 I = KP1,N
0041                IP = IPS(I)
0042                EM = -UL(IP,K)/PIVOT
0043                UL(IP,K) = -EM
0044                DO 16 J = KP1,N
0045                UL(IP,J) = UL(IP,J) + EM*UL(KP,J)
                C     INNER LOOP, USE MACHINE LANGUAGE CODING IF COMPILER
                C     DOES NOT PRODUCE EFFICIENT CODE.
0046             16 CONTINUE
0047             17 CONTINUE
0048                KP = IPS(N)
0049                IF (UL(KP,N)) 19,18,19
0050             18 CALL SING(2)
0051             19 RETURN
```

```
0052          END
```

COMMON BLOCK / / MAP SIZE 50

SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION
IPS	0								

SUBPROGRAMS CALLED

SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION
SING	11C								

SCALAR MAP

SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION
ROWNRM	138	BIG	140	SIZE	148	PIVOT	150	EM	158
N	160	NN	164	I	168	J	16C	NM1	170
K	174	IP	17A	IDXPIV	17C	KP	180	KP1	184

ARRAY MAP

SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION
A	1A8	UL	1AC	SCALES	190				

OPTIONS IN EFFECT ID,EBCDIC,SOURCE,NOLIST,NODECK,LOAD,MAP
OPTIONS IN EFFECT NAME = DECOMP , LINECNT = 59
STATISTICS SOURCE STATEMENTS = 52,PROGRAM SIZE = 1630
STATISTICS NO DIAGNOSTICS GENERATED

```
0001            SUBROUTINE EXPAND(X,Y,D,N)
0002            DIMENSION D(1)
0003            IADD=0
0004            DO 10 I=1,N
0005            I1=I +1
0006            DO 9 J=1,I1
0007            IF(J .NE. 1 .AND.J .NE. I1 ) GO TO 8
0008            IF(J .EQ. 1) D(IADD+J)=X**(I1-J)
0009            IF(J .EQ. I1) D(IADD+J)=Y**(J-1)
0010            GO TO 9
0011         8  D(IADD+J)=X**(I1-J)*Y**(J-1)
0012         9  CONTINUE
0013        10  IADD=IADD+I1
0014            RETURN
0015            END
```

SUBPROGRAMS CALLED

SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION
FRXPI*	84								

SCALAR MAP

SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION
IADD	D8	T	DC	A	E0	I1	E4	J	E8
X	EC	Y	F0						

ARRAY MAP

SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION
D	F4								

OPTIONS IN EFFECT ID,EBCDIC,SOURCE,NOLIST,NODECK,LOAD,MAP
OPTIONS IN EFFECT NAME = EXPAND , LINECNT = 59
STATISTICS SOURCE STATEMENTS = 15,PROGRAM SIZE = 776
STATISTICS NO DIAGNOSTICS GENERATED

```
FORTRAN IV G LEVEL 21          SING          DATE = 77070          16/30/31          PAGE 0001

0001            SUBROUTINE SING (IWHY)
0002         11 FORMAT(54HOMATRIX WITH ZERO ROW IN DECOMPOSE,                    )
0003         12 FORMAT(54HOSINGULAR MATRIX IN DECOMPOSE,  ZERO DIVIDE IN SOLVE,  )
0004         13 FORMAT(54HONO CONVERGENCE IN IMPROV, MATRIX IS NEARLY SINGULAR,  )
0005            NOUT=6
             C  NOUT = STANDARD OUTPUT UNIT
0006            GO TO (1,2,3),IWHY
0007          1 WRITE (NOUT,11)
0008            GO TO 10
0009          2 WRITE (NOUT,12)
0010            GO TO 10
0011          3 WRITE (NOUT,13)
0012         10 RETURN
0013            END
```

SUBPROGRAMS CALLED

SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION
IBCOM#	80								

SCALAR MAP

SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION
NOUT	B4	IWHY	B8						

FORMAT STATEMENT MAP

SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION
11	BC	12	FA	13	130				

OPTIONS IN EFFECT ID,EBCDIC,SOURCE,NOLIST,NODECK,LOAD,MAP
OPTIONS IN EFFECT NAME = SING , LINECNT = 59
STATISTICS SOURCE STATEMENTS = 13,PROGRAM SIZE = 628
STATISTICS NO DIAGNOSTICS GENERATED

```
0001            SUBROUTINE SOLVE (NN, UL, B, X)
0002            IMPLICIT REAL*8 (A-H,O-Z)
0003            DIMENSION UL(20,20), B(20), X(20), IPS(20)
0004            COMMON IPS
0005            N = NN
0006            NP1 = N+1
                C
0007            IP = IPS(1)
0008            X(1) = B(IP)
0009            DO 2 I = 2,N
0010            IP = IPS(I)
0011            IM1 = I-1
0012            SUM = 0.0
0013            DO 1 J = 1,IM1
0014          1 SUM = SUM + UL(IP,J)*X(J)
0015          2 X(I) = B(IP) - SUM
                C
0016            IP = IPS(N)
0017            X(N) = X(N)/UL(IP,N)
0018            DO 4 IBACK = 2,N
0019            I = NP1-IBACK
                C     I GOES (N-1),....,1
0020            IP = IPS(I)
0021            IP1 = I+1
0022            SUM = 0.0
0023            DO 3 J = IP1,N
0024          3 SUM = SUM + UL(IP,J)*X(J)
0025          4 X(I) = (X(I)-SUM)/UL(IP,I)
0026            RETURN
0027            END
```

COMMON BLOCK / / MAP SIZE 50

SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION
IPS	0								

SCALAR MAP

SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION
SUM	A8	N	B0	AN	B4	NP1	B8	IP	BC
I	C0	IM1	C4	J	C8	IBACK	CC	IP1	D0

ARRAY MAP

SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION
UL	D4	B	D8	X	DC				

```
*OPTIONS IN EFFECT*   ID,EBCDIC,SOURCE,NOLIST,NODECK,LOAD,MAP
*OPTIONS IN EFFECT*   NAME = SOLVE    , LINECNT =      59
*STATISTICS*     SOURCE STATEMENTS =       27,PROGRAM SIZE =     1012
*STATISTICS*  NO DIAGNOSTICS GENERATED
```

```
0001            SUBROUTINE RANK(R,IC)
0002            DIMENSION R(1)
0003          2 IFLAG=0
0004            I1=IC-1
0005            DO 19 I=1,I1
0006            IF(R(I).LE.R(I+1))GO TO 19
0007            TEMP=R(I)
0008            R(I)=R(I+1)
0009            R(I+1)=TEMP
0010            IFLAG= 1
0011         19 CONTINUE
0012            IF(IFLAG.NE.0) GO TO 2
0013            RETURN
0014            END
```

```
F40-LEVEL LINKAGE EDITOR OPTIONS SPECIFIED XREF,LET,LIST
        DEFAULT OPTION(S) USED - SIZE=(102400,49152)
```

CROSS REFERENCE TABLE

CONTROL SECTION NAME	ORIGIN	LENGTH
MAIN	00	1BC
CALIB	1C0	E8C
COEF	1050	5404
MEAN	6528	2C0
HMAT	67E8	348
LINEAR	6B3H	1CFA
DECOMP	8828	65E
EXPAND	8E88	30A
SING	9190	274
SOLVE	9408	3F4
RANK	9800	1D0
IHCERXPI*	99D0	141
IHCECOMH*	9B1B	F61
IHCCOMH2*	AA80	650
IHCSSORT*	B0E0	145
IHCFCVTH*	B228	1185
IHCFFNTH*	C3E0	542
IHCFFIOS*	C928	F28
IHCFIOS2*	C850	52F
IHCERRM *	D0A0	5DC
IHCUOPT *	E360	300
IHCFTRCH*	E660	28E
IHCUATBL*	E8F0	638
INDIPT	FF28	10
CALWRK	FF38	B70
CALIBW	F7A8	190
$BLANKCOM	F938	50

ENTRY NAME	LOCATION	NAME	LOCATION	NAME	LOCATION	NAME	LOCATION
ERXPI*	99D0						
IHCOM*	9B1A	FDIOCS*	9BD4	INTSWTCH	AA5E		
SEQDASD	A0F8						
SORT	B0E0						
ADCON*	B228	FCVADUTP	B2D2	FCVLOUTP	B362	FCVZOUTP	B4BA
FCVIOUTP	B86F	FCVEOUTP	B970	FCVCOUTP	BF8A	INT65WCH	C273
ARITH*	C3E0	ADJSWTCH	C77C				
FIOCS*	C928	FIOCSREP	C92E				
ERRMOD	D080	IHCERRE	D098				
IHCTRCH	E660	ERRTRA	F668				

LOCATION	REFERS TO SYMBOL	IN CONTROL SECTION	LOCATION	REFERS TO SYMBOL	IN CONTROL SECTION
78	INDIPT	INDIPT	98	IHCOM*	IHCECOMH
9C	CALIB	CALIB	B0C	CALWRK	CALWRK

SCALAR MAP

SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION
IFLAG	AC	I1	B0	IC	B4	I	B8	TEMP	BC

ARRAY MAP

SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION
R	C0								

```
*OPTIONS IN EFFECT*   ID,EBCDIC,SOURCE,NOLIST,NODECK,LOAD,MAP
*OPTIONS IN EFFECT*   NAME = RANK     , LINECNT =      59
*STATISTICS*     SOURCE STATEMENTS =       14,PROGRAM SIZE =     464
*STATISTICS*   NO DIAGNOSTICS GENERATED

*STATISTICS*   NO DIAGNOSTICS THIS STEP
```

LOCATION	REFERS TO SYMBOL	IN CONTROL SECTION
8D4	CALWRK	CALWRK
238	CALWRK	CALWRK
240	INDIPT	INDIPT
298	CALWRK	CALWRK
29A	IBCOM#	IHCECOMH
AE0	CALWRK	CALWRK
10CC	CALIBR	CALIBR
114A	LINEAR	LINEAR
1150	RANK	RANK
1158	SQRT	IHCSSQRT
65CA	SQRT	IHCSSQRT
6A9A	EXPAND	EXPAND
6BF4	SOLVE	SOLVE
8840		
8A90		
9240	IBCOM#	IHCECOMH
9510		
9AA4	IHCERRM	IHCERRM
A964	ADCON#	IHCFCVTH
A968	ARITH#	IHCEFMTH
A984	IHCUOPT	IHCUOPT
A970	FCVLOUTP	IHCFCVTH
A978	FCVCOUTP	IHCFCVTH
A980	FCVZOUTP	IHCFCVTH
A93C	IHCCOMH2	IHCCOMH2
A914	IHCCOMH2	IHCCOMH2
A91C	IHCCOMH2	IHCCOMH2
AD1D	IHCECOMH	IHCECOMH
AAC8	IHCERRM	IHCERRM
AF3D	IHCECOMH	IHCECOMH
AF5D	IHCECOMH	IHCECOMH
B1D8	IHCERRM	IHCERRM
C230	IHCERRM	IHCERRM
C7D0	INTSWTCH	IHCECOMH
C774	IHCUOPT	IHCUOPT
C7D4	FIOCS#	IHCEFIOS
CA90	IHCERRM	IHCERRM
D6A0	IHCUATBL	IHCUATBL
D6C1	IHCFIOS2	IHCFIOS2
D849	IHCFIOS2	IHCFIOS2
E350	IBCOM#	IHCECOMH
E358	FIOCSHEP	IHCEFIOS
E7DA	ADCON#	IHCFCVTH

LOCATION	REFERS TO SYMBOL	IN CONTROL SECTION
8D0	CALIBR	CALIBR
23C	CALIBR	CALIBR
290	CALWRK	CALWRK
29A	CALWRK	CALWRK
2BC	COEF	COEF
10C8	INDIPT	INDIPT
1144	HMAT	HMAT
114C	IBCOM#	IHCECOMH
1154	MEAN	MEAN
5E94	CALIBR	CALIBR
6860	INDIPT	INDIPT
6BE0	DECOMP	DECOMP
8AAA		
8944	SING	SING
AF3C	FRXPI#	IHCFRXPI
9AA0		
9AA0	IBCOM#	IHCECOMH
9804	SEQDASD	IHCCOMH2
A95C	FIOCS#	IHCEFIOS
A988	ADJSWTCH	IHCEFMTH
A96C	FCVEOUTP	IHCFCVTH
A974	FCVIOUTP	IHCFCVTH
A97C	FCVAOUTP	IHCFCVTH
A910	IHCERRE	IHCERRM
A940	IHCERRM	IHCERRM
A91A	IHCCOMH2	IHCCOMH2
A920	IHCCOMH2	IHCCOMH2
AD20	IHCECOMH	IHCECOMH
AAC4	IBCOM#	IHCECOMH
AF4D	IHCECOMH	IHCECOMH
B1A0	IBCOM#	IHCECOMH
C234	IBCOM#	IHCECOMH
C7CC	IBCOM#	IHCECOMH
C77A	INTGSWCH	IHCFCVTH
C7DA	ADCON#	IHCFCVTH
CA44	IHCERRM	IHCERRM
CA94	IHCFIOS2	IHCFIOS2
D6AC	IBCOM#	IHCECOMH
D6DA	IHCFIOS2	IHCFIOS2
E34C	IHCUOPT	IHCUOPT
E354	IHCTRCH	IHCETRCH
E7D4	IBCOM#	IHCECOMH
E7DC	FIOCSHEP	IHCEFIOS

ENTRY ADDRESS 00
TOTAL LENGTH F9AA

****MATH DOES NOT EXIST BUT HAS BEEN ADDED TO DATA SET

NSECTS= 1

SECTOR NUMBER= 1 REF POINT NUMBER= 704 NUMBER OF CALIBRATION POINTS= 19

COORDINATES OF SECTOR BOUNDARY POINTS

0.0 0.0 99999.000 99999.000

INPUT DATA FROM CODING FORMS

700	211.9400	312.2068	19542.0000	6188.0000	1.0000	1.0000
701	220.0700	319.6899	19149.0000	3751.0000	1.0000	1.0000
703	217.8980	321.1628	21164.0000	2642.0000	1.0000	1.0000
704	221.1320	312.9170	14607.0000	6237.0000	1.0000	1.0000
705	225.1830	315.1050	13528.0000	4024.0000	1.0000	1.0000
706	227.8900	316.0889	15412.0000	4596.0000	1.0000	1.0000
707	226.0930	318.8750	15069.0000	2661.0000	1.0000	1.0000
710	228.4250	318.3499	13591.0000	2077.0000	1.0000	1.0000
376	230.0120	319.3359	13120.0000	1210.0000	1.0000	1.0000
400	228.9800	318.4900	13120.0000	1660.0000	1.0000	1.0000
403	227.9900	317.4690	13145.0000	2660.0000	1.0000	1.0000
405	227.2230	316.4768	13120.0000	3035.0000	1.0000	1.0000
407	225.5590	315.0469	13130.0000	4030.0000	1.0000	1.0000
410	227.7460	317.7729	13590.0000	2705.0000	1.0000	1.0000
412	229.2810	319.4058	13580.0000	1685.0000	1.0000	1.0000
415	230.7460	320.8550	13575.0000	695.0000	1.0000	1.0000
417	231.4730	321.5779	13570.0000	370.0000	1.0000	1.0000
420	232.2150	322.3899	13570.0000	25.0000	1.0000	1.0000
434	228.0980	319.0000	14000.0000	2045.0000	1.0000	1.0000

CALIBRATION POINT ERROR MAP

	XC	X	ERRX	YC	Y	ERRY	
700	0.1955E 05	0.1954E 05	0.7953E 01	0.6219E 04	0.6188E 04	0.3098E 02	0.3198E 02
701	0.1911E 05	0.1915E 05	-0.3873E 02	0.3540E 04	0.3751E 04	-0.2109E 03	0.2144E 03
703	0.2118E 05	0.2116E 05	0.1237E 02	0.2726E 04	0.2642E 04	0.8367E 02	0.8458E 02
704	0.1461E 05	0.1461E 05	0.0	0.6237E 04	0.6237E 04	0.0	0.0
705	0.1348E 05	0.1353E 05	-0.4341E 02	0.4203E 04	0.4024E 04	0.1787E 03	0.1839E 03
706	0.1541E 05	0.1541E 05	-0.3979E 00	0.4557E 04	0.4596E 04	-0.3942E 02	0.3942E 02
707	0.1515E 05	0.1507E 05	0.7737E 02	0.2939E 04	0.2661E 04	0.2783E 03	0.2888E 03
710	0.1346E 05	0.1359E 05	-0.1282E 03	0.2104E 04	0.2077E 04	0.2737E 02	0.1311E 03
376	0.1310E 05	0.1312E 05	-0.2010E 02	0.1204E 04	0.1210E 04	-0.5598E 01	0.2087E 02
400	0.1322E 05	0.1312E 05	0.9558E 02	0.1818E 04	0.1660E 04	0.1575E 03	0.1843E 03
403	0.1320E 05	0.1315E 05	0.5483E 02	0.2046E 04	0.2660E 04	-0.2136E 03	0.2215E 03
405	0.1308E 05	0.1312E 05	-0.4312E 02	0.2995E 04	0.3035E 04	-0.4017E 02	0.5893E 02
407	0.1323E 05	0.1313E 05	0.9706E 02	0.4075E 04	0.4030E 04	0.4475E 02	0.1069E 03
410	0.1353E 05	0.1359E 05	-0.6283E 02	0.2506E 04	0.2705E 04	-0.1992E 03	0.2088E 03
412	0.1357E 05	0.1358E 05	-0.5123E 01	0.1573E 04	0.1685E 04	-0.1125E 03	0.1126E 03
415	0.1356E 05	0.1358E 05	-0.1748E 02	0.7487E 03	0.6950E 03	0.5368E 02	0.5645E 02
417	0.1355E 05	0.1357E 05	-0.1851E 02	0.3574E 03	0.3700E 03	-0.1259E 02	0.2238E 02
420	0.1359E 05	0.1357E 05	0.1924E 02	-0.2499E 02	0.2500E 02	-0.4999E 02	0.5356E 02
434	0.1404E 05	0.1400E 05	0.3750E 02	0.2163E 04	0.2045E 04	0.1183E 03	0.1241E 03

RANK ORDER STATISTICS OF CALIBRATION POINT RADIAL ERRORS

1	0.0
2	0.2087E 02
3	0.2238E 02
4	0.3198E 02
5	0.3942E 02

```
 6  0.5356E 02
 7  0.5645E 02
 8  0.5893E 02
 9  0.8458E 02
10  0.1069E 03
11  0.1126E 03
12  0.1241E 03
13  0.1311E 03
14  0.1839E 03
15  0.1843E 03
16  0.2088E 03
17  0.2140E 03
18  0.2215E 03
19  0.2888E 03

MEAN RADIAL ERROR=   0.11287E 03 RADIAL ERROR STANDARD DEVIATION=   0.81001E 02

X COEFFS FOR SECTOR   1   -590.4443    580.9658    -1.0128     2.1800    -0.9111

Y COEFFS FOR SECTOR   1   -204.8187   -475.8906   -28.7610    28.4008    11.8919
```

```
REMOTE    END JOB 261   CALIB261 CUST=06689551003   I.D.=ESMS0035 TERM.=9013 DATE=FRI, 11 MAR 1977   TIME=17,08,16
REMOTE    END JOB 261   CALIB261 CUST=06689551003   I.D.=ESMS0035 TERM.=9013 DATE=FRI, 11 MAR 1977   TIME=17,08,16
REMOTE    END JOB 261   CALIB261 CUST=06689551003   I.D.=ESMS0035 TERM.=9013 DATE=FRI, 11 MAR 1977   TIME=17,08,16
REMOTE    END JOB 261   CALIB261 CUST=06689551003   I.D.=ESMS0035 TERM.=9013 DATE=FRI, 11 MAR 1977   TIME=17,08,16
REMOTE    END JOB 261   CALIB261 CUST=06689551003   I.D.=ESMS0035 TERM.=9013 DATE=FRI, 11 MAR 1977   TIME=17,08,16
REMOTE    END JOB 261   CALIB261 CUST=06689551003   I.D.=ESMS0035 TERM.=9013 DATE=FRI, 11 MAR 1977   TIME=17,08,16
REMOTE    END JOB 261   CALIB261 CUST=06689551003   I.D.=ESMS0035 TERM.=9013 DATE=FRI, 11 MAR 1977   TIME=17,08,16
REMOTE    END JOB 261   CALIB261 CUST=06689551003   I.D.=ESMS0035 TERM.=9013 DATE=FRI, 11 MAR 1977   TIME=17,08,16
REMOTE    END JOB 261   CALIB261 CUST=06689551003   I.D.=ESMS0035 TERM.=9013 DATE=FRI, 11 MAR 1977   TIME=17,08,16
REMOTE    END JOB 261   CALIB261 CUST=06689551003   I.D.=ESMS0035 TERM.=9013 DATE=FRI, 11 MAR 1977   TIME=17,08,16
REMOTE    END JOB 261   CALIB261 CUST=06689551003   I.D.=ESMS0035 TERM.=9013 DATE=FRI, 11 MAR 1977   TIME=17,08,16
REMOTE    END JOB 261   CALIB261 CUST=06689551003   I.D.=ESMS0035 TERM.=9013 DATE=FRI, 11 MAR 1977   TIME=17,08,16
REMOTE    END JOB 261   CALIB261 CUST=06689551003   I.D.=ESMS0035 TERM.=9013 DATE=FRI, 11 MAR 1977   TIME=17,08,16
REMOTE    END JOB 261   CALIB261 CUST=06689551003   I.D.=ESMS0035 TERM.=9013 DATE=FRI, 11 MAR 1977   TIME=17,08,16
REMOTE    END JOB 261   CALIB261 CUST=06689551003   I.D.=ESMS0035 TERM.=9013 DATE=FRI, 11 MAR 1977   TIME=17,08,16
REMOTE    END JOB 261   CALIB261 CUST=06689551003   I.D.=ESMS0035 TERM.=9013 DATE=FRI, 11 MAR 1977   TIME=17,08,16
REMOTE    END JOB 261   CALIB261 CUST=06689551003   I.D.=ESMS0035 TERM.=9013 DATE=FRI, 11 MAR 1977   TIME=17,08,16
REMOTE    END JOB 261   CALIB261 CUST=06689551003   I.D.=ESMS0035 TERM.=9013 DATE=FRI, 11 MAR 1977   TIME=17,08,16
REMOTE    END JOB 261   CALIB261 CUST=06689551003   I.D.=ESMS0035 TERM.=9013 DATE=FRI, 11 MAR 1977   TIME=17,08,16
REMOTE    END JOB 261   CALIB261 CUST=06689551003   I.D.=ESMS0035 TERM.=9013 DATE=FRI, 11 MAR 1977   TIME=17,08,16
REMOTE    END JOB 261   CALIB261 CUST=06689551003   I.D.=ESMS0035 TERM.=9013 DATE=FRI, 11 MAR 1977   TIME=17,08,16
REMOTE    END JOB 261   CALIB261 CUST=06689551003   I.D.=ESMS0035 TERM.=9013 DATE=FRI, 11 MAR 1977   TIME=17,08,16
```

APPENDIX B

SPECIAL CASE TEST DATA SHEETS

The special case data sheets are divided into five sections:

AUGMENTOR COVERAGE - GENERAL

Teledyne Systems Company
Positioning Systems

SPECIAL CASE TEST

DATA SHEET

(1) Date 2-6-71 (2) Time 1335

(2) Test Name: Augmentor Coverage

(3) Distance from Vehicle Start to Augmentor 5001

(4) Distance from Augmentor detection Pt. to Aug. 37' (R.T. ≈10)

(5) Distance from loss of Aug. Detection Pt. to Aug. 85' (R.T. ≈10)

(6) Augmentor ID No. 61 Detected correctly Yes ✓ No ____

(7) Run Number 30101 (8) Vehicle Speed ~~X~~ 10 MPH

(9) Augmentor Elevation 15 (Ft)

(10) Remarks: ____

(11) Test Conductor [signature] Teledyne Systems

(12) Assistant [signature] Teledyne Systems

(13) Witnesses [signature] [signature] USC

Teledyne Systems Company
Positioning Systems

SPECIAL CASE TEST

DATA SHEET

(1) Date 2-6-72 (2) Time 1340

(2) Test Name: Augmentor Coverage

(3) Distance from Vehicle Start to Augmentor 500'

(4) Distance from Augmentor detection Pt. to Aug. 35' (R.T. ≈10)

(5) Distance from loss of Aug. Detection Pt. to Aug. 90' (R.T. ≈10)

(6) Augmentor ID No. 61 Detected correctly Yes ✓ No ____

(7) Run Number 30102 (8) Vehicle Speed ~~X~~ 10 MPH

(9) Augmentor Elevation 15 (Ft)

(10) Remarks: _____

(11) Test Conductor [signature] Teledyne Systems

(12) Assistant ~~[illegible]~~ Teledyne Systems

(13) Witnesses [signature] SC

Teledyne Systems Company
Positioning Systems

SPECIAL CASE TEST

DATA SHEET

(1) Date 2-6-77 (2) Time 1340

(2) Test Name: Augmentor Coverage 5001

(3) Distance from Vehicle Start to Augmentor 23' (+R.T. x 20')

(4) Distance from Augmentor detection Pt. to Aug. 108' (-R.T. x 20')

(5) Distance from loss of Aug. Detection Pt. to Aug.

(6) Augmentor ID No. 61 Detected correctly Yes ✓ No

(7) Run Number 30103 (8) Vehicle Speed 15 MPH

(9) Augmentor Elevation 15 (Ft)

(10) Remarks:

(11) Test Conductor Barry E. Bl Teledyne Systems

(12) Assistant [illegible] Teledyne Systems

(13) Witnessed [illegible]

Teledyne Systems Company
Positioning Systems

SPECIAL CASE TEST

DATA SHEET

(1) Date 2-6-77 (2) Time 1345

(2) Test Name: Augmentor Coverage

(3) Distance from Vehicle Start to Augmentor 500'

(4) Distance from Augmentor detection Pt. to Aug. 21' (+R.T. ≈ 24')

(5) Distance from loss of Aug. Detection Pt. to Aug. 110' (-R.T. ≈ 20')

(6) Augmentor ID No. 61 Detected correctly Yes ✓ No ____

(7) Run Number 30104 (8) Vehicle Speed 15 MPH

(9) Augmentor Elevation 15 (Ft)

(10) Remarks: ____

(11) Test Conductor Barry E. Brown Teledyne Systems

(12) Assistant ____ Teledyne Systems

(13) Witnesses ____

Teledyne Systems Company
Positioning Systems

SPECIAL CASE TEST

DATA SHEET

(1) Date 2-6-77 (2) Time 1352

(2) Test Name: Augmentor Coverage

(3) Distance from Vehicle Start to Augmentor 1000'

(4) Distance from Augmentor detection Pt. to Aug. -60+(R.T. 88')

(5) Distance from loss of Aug. Detection Pt. to Aug. 160-(R.T. 88)

(6) Augmentor ID No. 61 Detected correctly Yes ✓ No _____

(7) Run Number 30110 (8) Vehicle Speed 55 MPH

(9) Augmentor Elevation 15 (Ft)

(10) Remarks: _____

(11) Test Conductor Barry E. Brown Teledyne Systems

(12) Assistant _____ Teledyne Systems

(13) Witnesses Joseph Horlick Jr

Teledyne Systems Company
Positioning Systems

SPECIAL CASE TEST

DATA SHEET

(1) Date 2-6-77 (2) Time 1352

(2) Test Name: Augmentor Coverage

(3) Distance from Vehicle Start to Augmentor 1000'

(4) Distance from Augmentor detection Pt. to Aug. -50' + (R.T. 88')

(5) Distance from loss of Aug. Detection Pt. to Aug. 150' - (R.T. 88')

(6) Augmentor ID No. 61 Detected correctly Yes ✓ No _____

(7) Run Number 30107 (8) Vehicle Speed 55 MPH

(9) Augmentor Elevation 15 (Ft)

(10) Remarks: _____

(11) Test Conductor Barry T. Br Teledyne Systems

(12) Assistant [illegible] Teledyne Systems

(13) Witnesses Joseph [illegible] TSC

Teledyne Systems Company
Positioning Systems

SPECIAL CASE TEST

DATA SHEET

(1) Date 2-6-77 (2) Time 1348

(2) Test Name: Augmentor Coverage

(3) Distance from Vehicle Start to Augmentor 1000'

(4) Distance from Augmentor detection Pt. to Aug. 54 (R.T. 44)

(5) Distance from loss of Aug. Detection Pt. to Aug. 95 - (R.T. 44')

(6) Augmentor ID No. 61 Detected correctly Yes ✓ No ____

(7) Run Number 30106 (8) Vehicle Speed 35 MPH

(9) Augmentor Elevation 15 (Ft)

(10) Remarks: ____

(11) Test Conductor Barry E. B[illegible] Teledyne Systems

(12) Assistant ~~[illegible]~~ Teledyne Systems

(13) Witnesses [signature] TSC

Teledyne Systems Company
Positioning Systems

SPECIAL CASE TEST

DATA SHEET

(1) Date 2-6-77 (2) Time 1343

(2) Test Name: Augmentor Coverage

(3) Distance from Vehicle Start to Augmentor 1000'

(4) Distance from Augmentor detection Pt. to Aug. 10' + (R.T. 44')

(5) Distance from loss of Aug. Detection Pt. to Aug. 91' - (R.T. 44')

(6) Augmentor ID No. 61 Detected correctly Yes ✓ No _____

(7) Run Number 30105 (8) Vehicle Speed 35 MPH

(9) Augmentor Elevation 15 (Ft)

(10) Remarks: _____

(11) Test Conductor Barry E. Br Teledyne Systems

(12) Assistant _____ Teledyne Systems

(13) Witnesses _____

Teledyne Systems Company
Positioning Systems

SPECIAL CASE TEST

DATA SHEET

(1) Date_____ (2) Time_____

(2) Test Name: Augmentor Coverage

(3) Distance from Vehicle Start to Augmentor

(4) Distance from Augmentor detection Pt. to Aug.

(5) Distance from loss of Aug. Detection Pt. to Aug.

(6) Augmentor ID No._____ Detected correctly Yes_____ No_____

(7) Run Number 30111 (8) Vehicle Speed ~~85~~ 75 MPH

(9) Augmentor Elevation 15 (Ft)

(10) Remarks: ELEVATION & RANGE TOO LOW FOR MEASUREMENT RESULTING AT THIS SPEED. (DETECTION & LOSS OCCURED SIMULTANEOUSLY JUST AFTER PASSING)

(11) Test Conductor Barry E. Be Teledyne Systems

(12) Assistant _____ Teledyne Systems

(13) Witnesses JSC

_____

_____

_____

Teledyne Systems Company
Positioning Systems

SPECIAL CASE TEST

DATA SHEET

(1) Date_____ (2) Time_____

(2) Test Name: Augmentor Coverage

(3) Distance from Vehicle Start to Augmentor

(4) Distance from Augmentor detection Pt. to Aug.

(5) Distance from loss of Aug. Detection Pt. to Aug.

(6) Augmentor ID No._____ Detected correctly Yes_____ No_____

(7) Run Number 30112 (8) Vehicle Speed ~~85~~ 75 MPH

(9) Augmentor Elevation 15 (Ft)

(10) Remarks:_____

Same as # 30111

(11) Test Conductor [illegible] Teledyne Systems

(12) Assistant ~~[illegible]~~ Teledyne Systems

(13) Witnesses /_____

Teledyne Systems Company
Positioning Systems

SPECIAL CASE TEST

DATA SHEET

(1) Date 2-6-77 (2) Time 1325

(2) Test Name: Augmentor Coverage

(3) Distance from Vehicle Start to Augmentor 1000'

(4) Distance from Augmentor detection Pt. to Aug. 32' (+R.T. 10')

(5) Distance from loss of Aug. Detection Pt. to Aug. 95' (-R.T. 10')

(6) Augmentor ID No. 61 Detected correctly Yes ✓ No _____

(7) Run Number 30201 (8) Vehicle Speed ~~8~~ 10 MPH

(9) Augmentor Elevation 10 (Ft)

(10) Remarks: _____

(11) Test Conductor Barry E. B Teledyne Systems

(12) Assistant _____ Teledyne Systems

(13) Witnesses _____

Teledyne Systems Company
Positioning Systems

SPECIAL CASE TEST

DATA SHEET

(1) Date 2-6-77 (2) Time 1520

(2) Test Name: Augmentor Coverage 1000'

(3) Distance from Vehicle Start to Augmentor

(4) Distance from Augmentor detection Pt. to Aug. 24' (+R.T. 10')

(5) Distance from loss of Aug. Detection Pt. to Aug. 101' (-R.T. 10')

(6) Augmentor ID No. 61 Detected correctly Yes ✓ No ____

(7) Run Number 30202 (8) Vehicle Speed ~~X~~ 10 MPH

(9) Augmentor Elevation 10 (Ft)

(10) Remarks: ____

(11) Test Conductor Barry E. Brown Teledyne Systems

(12) Assistant [illegible] Teledyne Systems

(13) Witnesses [illegible] DSC

Teledyne Systems Company
Positioning Systems

SPECIAL CASE TEST

DATA SHEET

(1) Date 2-6-77 (2) Time 1240

(2) Test Name: Augmentor Coverage

(3) Distance from Vehicle Start to Augmentor 1000'

(4) Distance from Augmentor detection Pt. to Aug. 297' (+R.T. 10')

(5) Distance from loss of Aug. Detection Pt. to Aug. 378' (-R.T. 10')

(6) Augmentor ID No. 61 Detected correctly Yes ✓ No ____

(7) Run Number 30203 (8) Vehicle Speed ~~8~~ 10 MPH

(9) Augmentor Elevation 20 (Ft)

(10) Remarks: ____

(11) Test Conductor [signature] Teledyne Systems

(12) Assistant [signature] Teledyne Systems

(13) Witnesses [signature]

Teledyne Systems Company
Positioning Systems

SPECIAL CASE TEST

DATA SHEET

(1) Date 2-6-77 (2) Time 1235

(2) Test Name: Augmentor Coverage

(3) Distance from Vehicle Start to Augmentor 1000'

(4) Distance from Augmentor detection Pt. to Aug. 254' (+R.T. 10')

(5) Distance from loss of Aug. Detection Pt. to Aug. 389' (-R.T. 10')

(6) Augmentor ID No. 61 Detected correctly Yes ✓ No ____

(7) Run Number 30204 (8) Vehicle Speed ~~8~~ 10 MPH

(9) Augmentor Elevation 20 (Ft)

(10) Remarks: ____

(11) Test Conductor [signature] Teledyne Systems

(12) Assistant [signature] Teledyne Systems

(13) Witnesses [signature] TSC

Teledyne Systems Company
Positioning Systems

SPECIAL CASE TEST

DATA SHEET

(1) Date 2-6-77 (2) Time 1310

(2) Test Name: Augmentor Coverage

(3) Distance from Vehicle Start to Augmentor 1000'

(4) Distance from Augmentor detection Pt. to Aug. 8' (+R.T. 44')

(5) Distance from loss of Aug. Detection Pt. to Aug. 100' (-R.T. 44')

(6) Augmentor ID No. 61 Detected correctly Yes ✓ No ____

(7) Run Number 30207 [redacted] (8) Vehicle Speed 35 MPH

(9) Augmentor Elevation 10 (Ft)

(10) Remarks: ____

(11) Test Conductor [signature] Teledyne Systems

(12) Assistant [signature] Teledyne Systems

(13) Witnesses [signature] JC

Teledyne Systems Company
Positioning Systems

SPECIAL CASE TEST

DATA SHEET

(1) Date 2-6-77 (2) Time 1315

(2) Test Name: Augmentor Coverage

(3) Distance from Vehicle Start to Augmentor 1000'

(4) Distance from Augmentor detection Pt. to Aug. 22' (+R.T. 44')

(5) Distance from loss of Aug. Detection Pt. to Aug. 121' (-R.T. 44')

(6) Augmentor ID No. 61 Detected correctly Yes ✓ No _____

(7) Run Number 30210/[redacted] (8) Vehicle Speed 35 MPH

(9) Augmentor Elevation 10 (Ft)

(10) Remarks: _____

(11) Test Conductor Barry T. Br[illegible] Teledyne Systems

(12) Assistant [illegible] Teledyne Systems

(13) Witnesses [illegible] TSC

Teledyne Systems Company
Positioning Systems

SPECIAL CASE TEST

DATA SHEET

(1) Date 2-6-77 (2) Time 1230

(2) Test Name: Augmentor Coverage

(3) Distance from Vehicle Start to Augmentor 1430'

(4) Distance from Augmentor detection Pt. to Aug. 214' (+R.T. 44')

(5) Distance from loss of Aug. Detection Pt. to Aug. 444 (-R.T. 44')

(6) Augmentor ID No. 61 Detected correctly Yes ✓ No ____

(7) Run Number 30211 (8) Vehicle Speed 35 MPH

(9) Augmentor Elevation 20 (Ft)

(10) Remarks: ____________________

(11) Test Conductor [signature] Teledyne Systems

(12) Assistant [signature] Teledyne Systems

(13) Witnesses [signature] DSC

Teledyne Systems Company
Positioning Systems

SPECIAL CASE TEST

DATA SHEET

(1) Date 2-6-77 (2) Time 1225

(2) Test Name: Augmentor Coverage

(3) Distance from Vehicle Start to Augmentor 1430'

(4) Distance from Augmentor detection Pt. to Aug. 195' (+R.T. 44')

(5) Distance from loss of Aug. Detection Pt. to Aug. 525' (-R.T. 44')

(6) Augmentor ID No. 61 Detected correctly Yes ✓ No ____

(7) Run Number 30212 (8) Vehicle Speed 35 MPH

(9) Augmentor Elevation 20 (Ft)

(10) Remarks: ____

(11) Test Conductor [signature] Teledyne Systems

(12) Assistant [signature] Teledyne Systems

(13) Witnesses [signature] TSC

Teledyne Systems Company
Positioning Systems

SPECIAL CASE TEST

DATA SHEET

(1) Date 2-6-76 (2) Time 1325

(2) Test Name: Augmentor Coverage

(3) Distance from Vehicle Start to Augmentor 1000'

(4) Distance from Augmentor detection Pt. to Aug. -37 (+ R.T. 80')

(5) Distance from loss of Aug. Detection Pt. to Aug. 181 (- R.T. 80')

(6) Augmentor ID No. 61 Detected correctly Yes ✓ No ____

(7) Run Number 30216 [redacted] (8) Vehicle Speed 55 MPH

(9) Augmentor Elevation 10 (Ft)

(10) Remarks: ____

(11) Test Conductor [signature] Teledyne Systems

(12) Assistant [signature] Teledyne Systems

(13) Witnesses [signature] TSC

Teledyne Systems Company
Positioning Systems

SPECIAL CASE TEST

DATA SHEET

(1) Date 2-6-77 (2) Time 1330

(2) Test Name: Augmentor Coverage

(3) Distance from Vehicle Start to Augmentor

(4) Distance from Augmentor detection Pt. to Aug. -72 (+R.T. 88')

(5) Distance from loss of Aug. Detection Pt. to Aug. 165 (-R.T. 88')

(6) Augmentor ID No. 61 Detected correctly Yes ✓ No ____

(7) Run Number 30215 [redacted] (8) Vehicle Speed 55 MPH

(9) Augmentor Elevation 10 (Ft)

(10) Remarks: ____

(11) Test Conductor [signature] Teledyne Systems

(12) Assistant [signature] Teledyne Systems

(13) Witnesses [signature] TSC

Teledyne Systems Company
Positioning Systems

SPECIAL CASE TEST

DATA SHEET

(1) Date 2-6-77 (2) Time 1220

(2) Test Name: Augmentor Coverage

(3) Distance from Vehicle Start to Augmentor 1430'

(4) Distance from Augmentor detection Pt. to Aug. 161' (+R.T. 88')

(5) Distance from loss of Aug. Detection Pt. to Aug. 624' (-R.T. 88')

(6) Augmentor ID No. 61 Detected correctly Yes ✓ No ____

(7) Run Number 30217 (8) Vehicle Speed 55 MPH

(9) Augmentor Elevation 20 (Ft)

(10) Remarks: ____

(11) Test Conductor Barry T. Bu Teledyne Systems

(12) Assistant Joseph W. Young Teledyne Systems

(13) Witnesses Joseph W. Young

Teledyne Systems Company
Positioning Systems

SPECIAL CASE TEST

DATA SHEET

(1) Date 2-6-77 (2) Time 1215

(2) Test Name: Augmentor Coverage

(3) Distance from Vehicle Start to Augmentor 1430'

(4) Distance from Augmentor detection Pt. to Aug. 142' (+R.T. 88')

(5) Distance from loss of Aug. Detection Pt. to Aug. 557' (-R.T. 88')

(6) Augmentor ID No. 61 Detected correctly Yes ✓ No ____

(7) Run Number 30220 (8) Vehicle Speed 55 MPH

(9) Augmentor Elevation 20 (Ft)

(10) Remarks: ____

(11) Test Conductor Barry F. Burns Teledyne Systems

(12) Assistant [illegible] Teledyne Systems

(13) Witnesses Joseph M. Reilly TSC

Teledyne Systems Company
Positioning Systems

SPECIAL CASE TEST

DATA SHEET

(1) Date 2-6-77 (2) Time 1310

(2) Test Name: Augmentor Coverage

(3) Distance from Vehicle Start to Augmentor 1000'

(4) Distance from Augmentor detection Pt. to Aug.

(5) Distance from loss of Aug. Detection Pt. to Aug.

(6) Augmentor ID No. 61 Detected correctly Yes ____ No ____

(7) Run Number 30223/[redacted] (8) Vehicle Speed ~~65~~ 75 MPH

(9) Augmentor Elevation 10 (Ft)

(10) Remarks: ELEVATION & RANGE RESULTING TOO SHORT FOR MEASUREMENT (DETECTION & LOSS SIMULTANEOUS) JUST AFTER Augmentor

(11) Test Conductor [signature] Teledyne Systems

(12) Assistant [signature] Teledyne Systems

(13) Witnesses [signature]

Teledyne Systems Company
Positioning Systems

SPECIAL CASE TEST

DATA SHEET

(1) Date 2-6-77 (2) Time 1250

(2) Test Name: Augmentor Coverage

(3) Distance from Vehicle Start to Augmentor 1430'

(4) Distance from Augmentor detection Pt. to Aug. -5' (+R.T. 100')

(5) Distance from loss of Aug. Detection Pt. to Aug. 20' (-R.T. 100')

(6) Augmentor ID No. 61 Detected correctly Yes ✓ No ____

(7) Run Number 30224/[redacted] (8) Vehicle Speed ~~85~~ 75 MPH

(9) Augmentor Elevation 10 (Ft)

(10) Remarks: ELEVATION & RANGE TOO LOW FOR MEASUREMENT (DETECTION & LOSS SIMULTANEOUS JUST AFTER AUGMENTOR

(11) Test Conductor Barry E. Bu Teledyne Systems

(12) Assistant [illegible] Teledyne Systems

(13) Witnesses [illegible]

Teledyne Systems Company
Positioning Systems

SPECIAL CASE TEST

DATA SHEET

(1) Date 2-6-77 (2) Time 1210

(2) Test Name: Augmentor Coverage

(3) Distance from Vehicle Start to Augmentor 1430'

(4) Distance from Augmentor detection Pt. to Aug. 169' (+ R.T. 100')

(5) Distance from loss of Aug. Detection Pt. to Aug. 619' (- R.T. 100')

(6) Augmentor ID No. 61 Detected correctly Yes ✓ No ____

(7) Run Number 30225 (8) Vehicle Speed ~~85~~ 75 MPH

(9) Augmentor Elevation 20 (Ft)

(10) Remarks: ____

(11) Test Conductor [signature] Teledyne Systems

(12) Assistant [signature] Teledyne Systems

(13) Witnesses [signature] TSC

Teledyne Systems Company
Positioning Systems

SPECIAL CASE TEST

DATA SHEET

(1) Date 2-6-76 (2) Time 1208

(2) Test Name: Augmentor Coverage

(3) Distance from Vehicle Start to Augmentor 1430'

(4) Distance from Augmentor detection Pt. to Aug. 32' (+R.T. 100')

(5) Distance from loss of Aug. Detection Pt. to Aug. 588' (-R.T. 100')

(6) Augmentor ID No. 61 Detected correctly Yes ✓ No ______

(7) Run Number 30226 (8) Vehicle Speed ~~85~~ 75 MPH

(9) Augmentor Elevation 20 (Ft)

(10) Remarks: ______

(11) Test Conductor [signature] Teledyne Systems

(12) Assistant [signature] Teledyne Systems

(13) Witnesses [signature] TSC

Teledyne Systems Company
Positioning Systems

SPECIAL CASE TEST

DATA SHEET

(1) Date 2-6-77 (2) Time 1150

(2) Test Name: Augmentor Coverage

(3) Distance from Vehicle Start to Augmentor 1000'

(4) Distance from Augmentor detection Pt. to Aug. 368' (+R.T. 10')

(5) Distance from loss of Aug. Detection Pt. to Aug. 391 (-R.T. 10')

(6) Augmentor ID No. 61 Detected correctly Yes ✓ No _____

(7) Run Number 30206 (8) Vehicle Speed ~~30~~ 10 MPH

(9) Augmentor Elevation ~~30~~ 30 (Ft)

(10) Remarks: _____

(11) Test Conductor Barry F. Bu Teledyne Systems

(12) Assistant _____ Teledyne Systems

(13) Witnesses _____

Teledyne Systems Company
Positioning Systems

SPECIAL CASE TEST

DATA SHEET

(1) Date 2-6-77 (2) Time 1145

(2) Test Name: Augmentor Coverage

(3) Distance from Vehicle Start to Augmentor 1000'

(4) Distance from Augmentor detection Pt. to Aug. 361' (+R.T. 10')

(5) Distance from loss of Aug. Detection Pt. to Aug. 403' (-R.T. 10')

(6) Augmentor ID No. 61 Detected correctly Yes ✓ No ____

(7) Run Number 30205 (8) Vehicle Speed ~~30~~ 10 MPH

(9) Augmentor Elevation ~~30~~ 30 (Ft)

(10) Remarks: _____

(11) Test Conductor Barry E. Brown Teledyne Systems

(12) Assistant _____ Teledyne Systems

(13) Witnesses _____ TSC

Teledyne Systems Company
Positioning Systems

SPECIAL CASE TEST

DATA SHEET

(1) Date 2-6-77 (2) Time 1140

(2) Test Name: Augmentor Coverage

(3) Distance from Vehicle Start to Augmentor 1430'

(4) Distance from Augmentor detection Pt. to Aug. 342' (+R.T. 44')

(5) Distance from loss of Aug. Detection Pt. to Aug. 452' (-R.T. 44')

(6) Augmentor ID No. 61 Detected correctly Yes ✓ No _____

(7) Run Number 30214 (8) Vehicle Speed 35 MPH

(9) Augmentor Elevation ~~40~~ 30 (Ft)

(10) Remarks: _____

(11) Test Conductor Barry F. Bu Teledyne Systems

(12) Assistant _____ Teledyne Systems

(13) Witnesses _____

Teledyne Systems Company
Positioning Systems

SPECIAL CASE TEST

DATA SHEET

(1) Date 2-6-77 (2) Time 1135

(2) Test Name: Augmentor Coverage

(3) Distance from Vehicle Start to Augmentor 1430'

(4) Distance from Augmentor detection Pt. to Aug. 326' +R.T. (44')

(5) Distance from loss of Aug. Detection Pt. to Aug. 462' -R.T. (44')

(6) Augmentor ID No. 61 Detected correctly Yes ✓ No ____

(7) Run Number 30213 (8) Vehicle Speed 35 MPH

(9) Augmentor Elevation ~~40~~ 30 (Ft)

(10) Remarks: _____

(11) Test Conductor Barry T. Brown Teledyne Systems

(12) Assistant [illegible] Teledyne Systems

(13) Witnesses [illegible] TSC

Teledyne Systems Company
Positioning Systems

SPECIAL CASE TEST

DATA SHEET

(1) Date 2-6-77 (2) Time 1130

(2) Test Name: Augmentor Coverage

(3) Distance from Vehicle Start to Augmentor 1430'

(4) Distance from Augmentor detection Pt. to Aug. 217' +R.T. (88')

(5) Distance from loss of Aug. Detection Pt. to Aug. 497' -R.T. (88')

(6) Augmentor ID No. 61 Detected correctly Yes ✓ No _____

(7) Run Number 30221 (8) Vehicle Speed 55 MPH

(9) Augmentor Elevation ~~30~~ 30 (Ft)

(10) Remarks: _____

(11) Test Conductor Barry E. Brown Teledyne Systems

(12) Assistant _____ Teledyne Systems

(13) Witnesses _____

Teledyne Systems Company
Positioning Systems

SPECIAL CASE TEST

DATA SHEET

(1) Date 2-6-77 (2) Time 1125

(2) Test Name: Augmentor Coverage

(3) Distance from Vehicle Start to Augmentor 1430'

(4) Distance from Augmentor detection Pt. to Aug. 256' + R.T. (80')

(5) Distance from loss of Aug. Detection Pt. to Aug. 506' - R.T. (80')

(6) Augmentor ID No. 61 Detected correctly Yes ✓ No _____

(7) Run Number 30222 (8) Vehicle Speed 55 MPH

(9) Augmentor Elevation ~~30~~ 30 (Ft)

(10) Remarks: _____

(11) Test Conductor Barry T. Brown Teledyne Systems

(12) Assistant _____ Teledyne Systems

(13) Witnesses _____

Teledyne Systems Company
Positioning Systems

SPECIAL CASE TEST

DATA SHEET

(1) Date 2-6-77 (2) Time 1120

(2) Test Name: Augmentor Coverage

(3) Distance from Vehicle Start to Augmentor 1430'

(4) Distance from Augmentor detection Pt. to Aug. 202' [redacted]'(+ Reaction Time 88')

(5) Distance from loss of Aug. Detection Pt. to Aug. 518'(- " 88')

(6) Augmentor ID No. 61 Detected correctly Yes ✓ No ____

(7) Run Number 30227 (8) Vehicle Speed ~~80~~ 75 MPH

(9) Augmentor Elevation ~~30~~ 30 (Ft)

(10) Remarks: _____

(11) Test Conductor [signature] Teledyne Systems

(12) Assistant [signature] Teledyne Systems

(13) Witnesses [signature] TSC

Teledyne Systems Company
Positioning Systems

SPECIAL CASE TEST

DATA SHEET

(1) Date 2-6-77 (2) Time 1115

(2) Test Name: Augmentor Coverage

(3) Distance from Vehicle Start to Augmentor 1430'

(4) Distance from Augmentor detection Pt. to Aug. 190' + 1 SEC. REACTION (100')

(5) Distance from loss of Aug. Detection Pt. to Aug. 491'

(6) Augmentor ID No. 61 Detected correctly Yes ✓ No ____

(7) Run Number 30230 (8) Vehicle Speed ~~35~~ 75 MPH

(9) Augmentor Elevation ~~40~~ 30 (Ft)

(10) Remarks: ____

(11) Test Conductor Barry T. Bu Teledyne Systems

(12) Assistant [illegible] Teledyne Systems

(13) Witnesses [illegible]

AUGMENTOR COVERAGE IN TRAFFIC

Teledyne Systems Company
Positioning Systems

SPECIAL CASE TEST

DATA SHEET

(1) Date FEB. 9, 1977 (2) Time 1035 EST

(2) Test Name: Augmentor Coverage vs Traffic Conditions

(3) Augmentor ID 61 FULL-LONG WHIP CONFIG. (4) 2nd Augmentor ID 63

(5) Augmentor Elevation * (SEE BELOW) feet

(6)

*ELEVATION	Run No.	TEST #	Distance d_1	Distance d_2	Calculated Range, R $R = \sqrt{d_1^2 + d_2^2}$		LOSS + D_2
10	1A	30401	84	225	240	OBSTACLES	350
10	1B		72	195	208	—	350
15	2A	30402	84	374	392	TRUCK	660
15	2B		72	265	275	MAIL TRUCK	650
20	3A	30403	84	325	336	TRUCK	500
	3B		72	300	309	—	650
28	4A *	30404	84	645 **	**650	—	900
	4B *		72	685 **	**689	—	1000
10	5A	30405	84	200	217	—	400
10	5B		72	175	189	—	375
15	6A	30406	84	285	297	—	575
15	6B		72	300	309	4 BUSSES	550
20	7A	30407	84	320	331	—	600
	7B		72	355	362	—	605
28	8A **	30410	84	650 **	**655	BUS	875
	8B **		72	690 **	**694	—	1000

(7) Remarks ** BLOCK NOT LONG ENOUGH - AQUIRED I.D. PRIOR TO TURNING CORNER ON JFK DUE TO REFLECTIO

(8) Test Conductor _____ Teledyne Systems

(9) Witnesses _____ TSC

_____ TSC

AUGMENTOR INTERFERENCE

Teledyne Systems Company
Positioning Systems

SPECIAL CASE TEST

DATA SHEET

(1) Date 2-6-77 (2) Time 1355

(2) Test Name: Augmentor Interference

(3) Augmentor A ID 52 (4) Augmentor B ID 61

(5) Distance

TEST #	A-B (Feet)	A Detection Correct	A Detection Incorrect	B Detection Correct	B Detection Incorrect
30301	200	✓		✓	[redacted]
30302	200	✓		✓	
30303	150	✓		✓	
30304	150	✓		✓	
30305	100		✓	✓	
30306	100	✓ (LATE)		✓	
30307	50		✓		✓
30310	50		✓	✓	

(6) Remarks APPROACHED AUGMENTORS FROM "B" TO "A" DUE TO IMBALANCE IN AUGMENTORS; "A" WAS STRONGER & WAS OVERLAPPING WHEN APPROACHED FROM "A" DIRECTION - THIS PREVENTED AQUISITION OF "B" (UNLESS APPROACHED FROM "B" DIRECTION).

(7) Test Conductor [signature] Teledyne Systems

(8) Witnesses [signature] SC

[signature]

[signature]

AUGMENTOR RADIO INTERFERENCE

Teledyne Systems Company
Positioning Systems

SPECIAL CASE TEST

TEST #31001

DATA SHEET

(1) Date FEB. 9, 1977 (2) Time 1600

(2) Test Name: Radio Frequency Interference

(3) Augmentor ID 35

(4) Separation Distance ALL Ft.

(5) Augmentor ON (OFF)

Ambient noise -70 db

(6)

Frequency	Amplitude
67.5	-32 db
82.1	-45 db
66.6	-55

(7) Remarks _____

(8) Test Conductor Barry E. Burr

(9) Witnesses Joseph C. Hale SSC

Teledyne Systems Company
Positioning Systems

TEST #31002

SPECIAL CASE TEST

DATA SHEET

(1) Date FEB 9, 1977 (2) Time 1600

(2) Test Name: Radio Frequency Interference

(3) Augmentor ID 35

(4) Separation Distance 10 Ft.

(5) Augmentor (ON) OFF

(6)

Frequency	Amplitude
72.4	-36 db
76.3	-65 db

(7) Remarks 3 db bandwidth = 350 Hz
NO NOTICEABLE, MEASURABLE SIDE BANDS

(8) Test Conductor [signature]

(9) Witnesses [signature] SFTSC
[signature]
[signature]

Teledyne Systems Company
Positioning Systems

TEST # 31003

SPECIAL CASE TEST

DATA SHEET

(1) Date FEB. 9, 1977 (2) Time 1600

(2) Test Name: Radio Frequency Interference

(3) Augmentor ID 35

(4) Separation Distance 20 Ft.

(5) Augmentor (ON) OFF

(6)

Frequency	Amplitude
72.4	-40 db

(7) Remarks _____

(8) Test Conductor Barry T. B

(9) Witnesses [illegible] TSC

[illegible]

[illegible]

Test # 31004

Teledyne Systems Company
Positioning Systems

SPECIAL CASE TEST

DATA SHEET

(1) Date FEB. 9, 1977 (2) Time 1600

(2) Test Name: Radio Frequency Interference

(3) Augmentor ID 35

(4) Separation Distance 30 Ft.

(5) Augmentor (ON) OFF

(6)

Frequency	Amplitude
72.4	~~-46 db~~ -54 db

(7) Remarks _____

(8) Test Conductor _____

(9) Witnesses _____

Test # 31005

Teledyne Systems Company
Positioning Systems

SPECIAL CASE TEST

DATA SHEET

(1) Date FEB. 9, 1977 (2) Time 1600

(2) Test Name: Radio Frequency Interference

(3) Augmentor ID 35

(4) Separation Distance 40 Ft.

(5) Augmentor (ON) OFF

(6) Frequency	Amplitude
72.4	-50 db

(7) Remarks _____

(8) Test Conductor Barry E. Bu

(9) Witnesses Joseph C. Bell TSC

Test # 31006

Teledyne Systems Company
Positioning Systems

SPECIAL CASE TEST

DATA SHEET

(1) Date FEB. 9, 1977 (2) Time 1600

(2) Test Name: Radio Frequency Interference

(3) Augmentor ID 35

(4) Separation Distance 50 Ft.

(5) Augmentor (ON) OFF

(6)

Frequency	Amplitude
72.4	-57 db

(7) Remarks

(8) Test Conductor [signature]

(9) Witnesses [signature] DSC
[signature]

Test # 31007

Teledyne Systems Company
Positioning Systems

SPECIAL CASE TEST

DATA SHEET

(1) Date FEB. 9, 1977 (2) Time 1600

(2) Test Name: Radio Frequency Interference

(3) Augmentor ID 35

(4) Separation Distance 60 Ft.

(5) Augmentor (ON) OFF

(6)

Frequency	Amplitude
72.4	-58 db

(7) Remarks _____

(8) Test Conductor _____

(9) Witnesses _____

Test # 3/010

Teledyne Systems Company
Positioning Systems

SPECIAL CASE TEST

DATA SHEET

(1) Date FEB. 9, 1977 (2) Time 1600

(2) Test Name: Radio Frequency Interference

(3) Augmentor ID 35

(4) Separation Distance 70 Ft.

(5) Augmentor (ON) OFF

(6)

Frequency	Amplitude
72.4	-58 db

(7) Remarks

(8) Test Conductor [illegible]

(9) Witnesses [illegible]

[illegible]

Test # 31011

Teledyne Systems Company
Positioning Systems

SPECIAL CASE TEST

DATA SHEET

(1) Date FEB. 9, 1977 (2) Time 1600

(2) Test Name: Radio Frequency Interference

(3) Augmentor ID 35

(4) Separation Distance 80 Ft.

(5) Augmentor (ON) OFF

(6)

Frequency	Amplitude
72.4	-62 db

(7) Remarks _____

(8) Test Conductor _____

(9) Witnesses _____

Test # 31012

Teledyne Systems Company
Positioning Systems

SPECIAL CASE TEST

DATA SHEET

(1) Date FEB. 9, 1977 (2) Time 1600

(2) Test Name: Radio Frequency Interference

(3) Augmentor ID 35

(4) Separation Distance 90 Ft.

(5) Augmentor (ON) OFF

(6)

Frequency	Amplitude
72.4	-60 db

(7) Remarks _____

(8) Test Conductor _____

(9) Witnesses _____

Test # 31013

Teledyne Systems Company
Positioning Systems

SPECIAL CASE TEST

DATA SHEET

(1) Date FEB. 9, 1977 (2) Time 1600

(2) Test Name: Radio Frequency Interference

(3) Augmentor ID 35

(4) Separation Distance 100 Ft.

(5) Augmentor (ON) OFF

(6) Frequency Amplitude

LOST ON SPECTRUM ANALYZER

-70 db

(7) Remarks

(8) Test Conductor

(9) Witnesses

AUGMENTOR ANTENNA PATTERN

Test # 32001

Teledyne Systems Company
Positioning Systems

SPECIAL CASE TEST

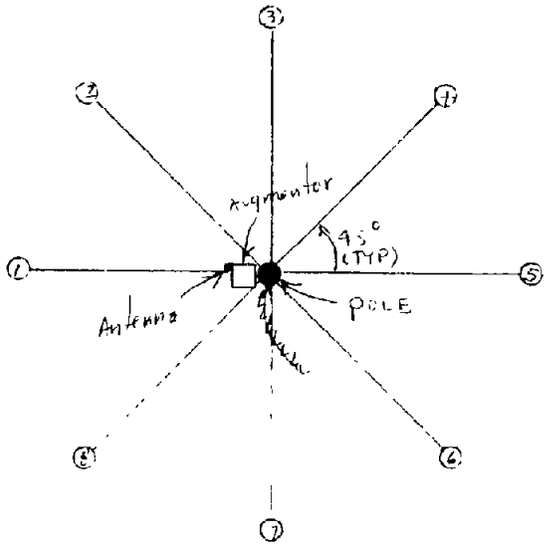
DATA SHEET

(1) Date MARCH 5 1977 (2) Time 1PM

(3) Test Name: Augmentor Antenna Pattern

(4) Augmentor ID 67

(5) Plan View



(6) 'Acquire' Light On

Line	Distance	Line	Distance
1	130	5	81
2	123	6	81
3	111	7	71
4	107	8	63

(7) Remarks 1) AUGMENTOR ELEVATION 10 FT.
2) Augmentor Antenna towards "1"

(8) Test Conductor [signature] 3/5/77 (9) Assistant [signature]

(10) Witnesses _____

_____

_____

Test #. 32002

Teledyne Systems Company
Positioning Systems

SPECIAL CASE TEST

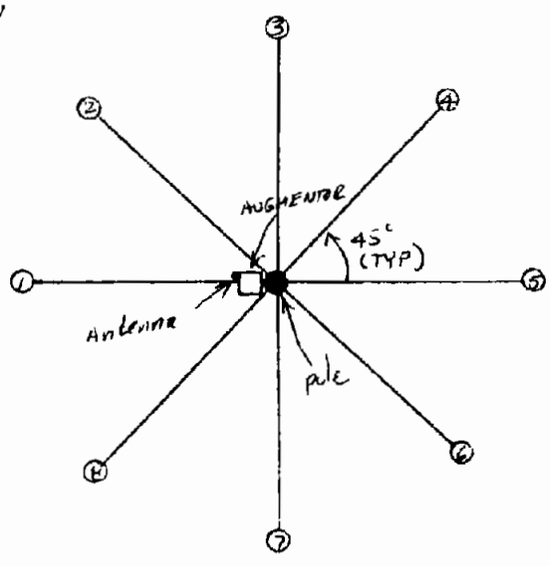
DATA SHEET

(1) Date MARCH 5, 1977 (2) Time 1:20 PM

(3) Test Name: Augmentor Antenna Pattern

(4) Augmentor ID 67

(5) Plan View



(6) 'Acquire' Light On

Line	Distance	Line	Distance
1	135	5	120
2	132	6	122
3	114	7	119
4	130	8	129

(7) Remarks 1) AUGMENTOR ELEVATION 15 FT.
2) AUGMENTOR ANTENNA TOWARDS "0"

(8) Test Conductor Barry F Bu 3/5/77 (9) Assistant Stapleton

(10) Witnesses _____

_____

_____

Test # 32003

Teledyne Systems Company
Positioning Systems

SPECIAL CASE TEST

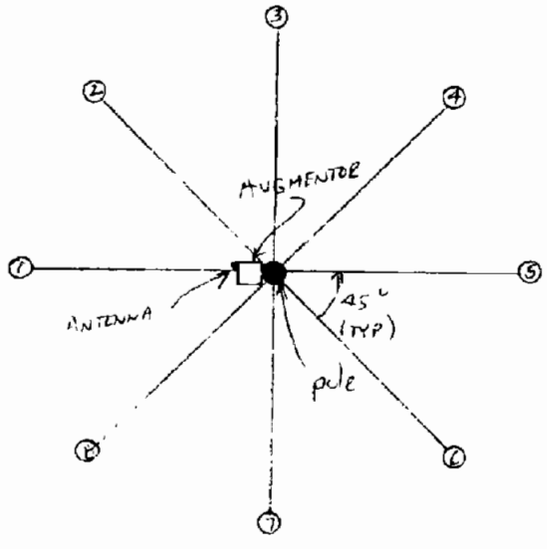
DATA SHEET

(1) Date MARCH 5, 1977 (2) Time 1:45 PM

(3) Test Name: Augmentor Antenna Pattern

(4) Augmentor ID 67

(5) Plan View



(6) 'Acquire' Light On

Line	Distance	Line	Distance
1	168	5	127
2	152	6	129
3	140	7	155
4	125	8	180

(7) Remarks 1) AUGMENTOR ELEVATION 20 FT
2) AUGMENTOR ANTENNA TOWARDS "D"

(8) Test Conductor Barry T. Bu... 3/5/77 (9) Assistant Stapleton

(10) Witnesses _____

APPENDIX C

AUGMENTOR LOCATION SUMMARY

AUGMENTOR LOCATION SUMMARY

This Appendix lists all augmentor ID's used in the Philadelphia Phase I tests. A listing according to street location for the fixed and random routes follows this page. In addition a numerical listing by I. D. code follows showing the detailed location coordinates for each augmentor. At the end of the Appendix Figures C-1 and C-2 show the map locations of each for the fixed and random routes respectively.

AUGMENTOR LOCATION SUMMARY
1/7/77

Fixed Route

Aug ID	Location
35	Spring Garden & Broad
24	Broad & Arch
30	JFK & Expressway
57	20th & Market
31	11th & Market
33	10th & Walnut
37	18th & Walnut
72	33rd & Walnut
100	22nd & Chestnut
15	18th & Vine
51	BF Parkway & 22nd
53	19th & Pine
67	10th & Pine
54	8th & Spruce
32	13th & Chestnut
110	13th & Spring Garden

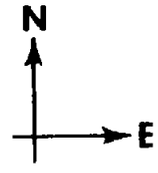
Random Route

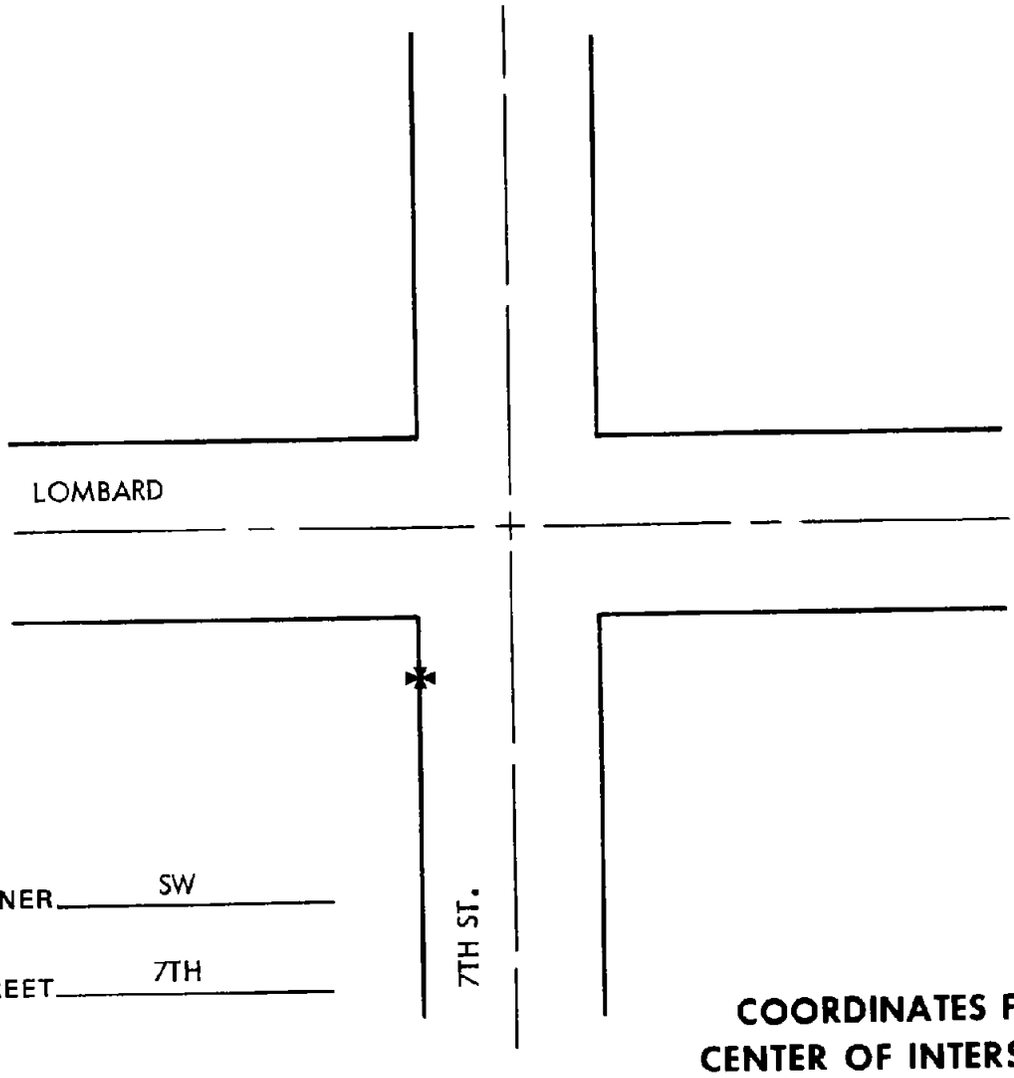
50	Broad & Walnut
16	Broad & Locust
44	Broad & Spruce
70	Broad & Pine
42	Broad & Lombard
45	13th & Walnut
43	13th & Locust
17	13th & Spruce
22	13th & Lombard
26	12th & Walnut
27	12th & Locust
40	12th & Spruce
14	11th & Walnut
75	8th & Lombard
63	W. Wash. Sq. & Locust
6	7th & Lombard
66	6th & Lombard
46	5th & South
62	4th & Pine
07	11th & Locust
111	11th & Spruce
112	11th & Pine
137	11th & Lombard
77	10th & Locust
113	10th & Spruce
67	10th & Pine
10	9th & Walnut
11	9th & Locust
12	9th & Spruce
21	9th & Lombard
76	8th & Walnut
74	8th & Pine
107	8th & South
20	S. Wash Sq. & 7th
73	6th & Walnut
55	5th & Walnut
13	4th & Spruce
60	4th & Lombard

TELEDYNE SYSTEMS COMPANY
POSITIONING SYSTEMS

AUGMENTOR LOCATION DESCRIPTION

AUGMENTOR NO. 6





CORNER SW

STREET 7TH

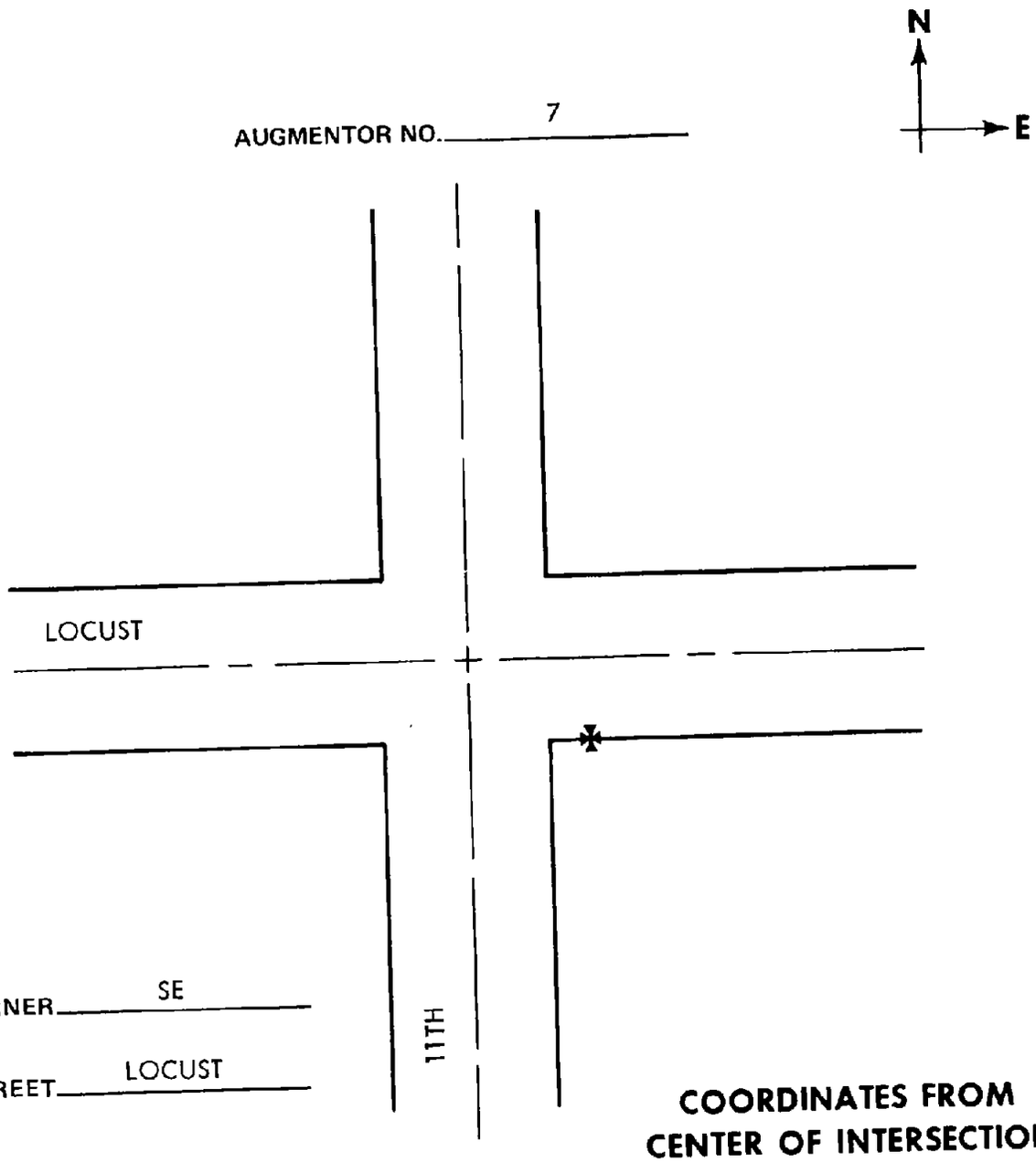
COORDINATES FROM CENTER OF INTERSECTION

27 FT SOUTH
14 FT WEST

TELEDYNE SYSTEMS COMPANY
POSITIONING SYSTEMS

AUGMENTOR LOCATION DESCRIPTION

AUGMENTOR NO. 7



CORNER SE

STREET LOCUST

COORDINATES FROM CENTER OF INTERSECTION

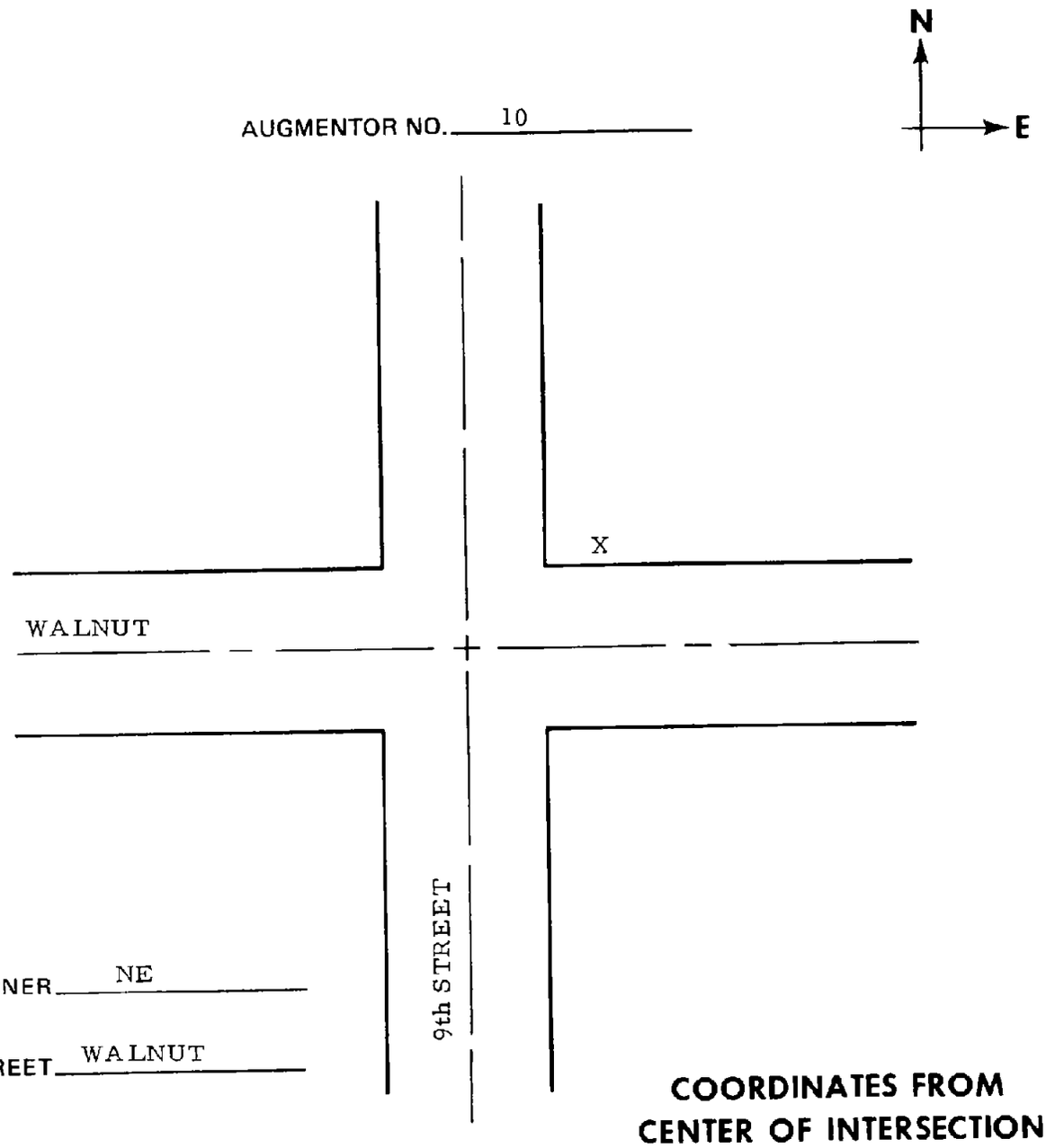
14 FT SOUTH
23 FT EAST

TELEDYNE SYSTEMS COMPANY
POSITIONING SYSTEMS

Revised 1/7/77

AUGMENTOR LOCATION DESCRIPTION

AUGMENTOR NO. 10



CORNER NE

STREET WALNUT

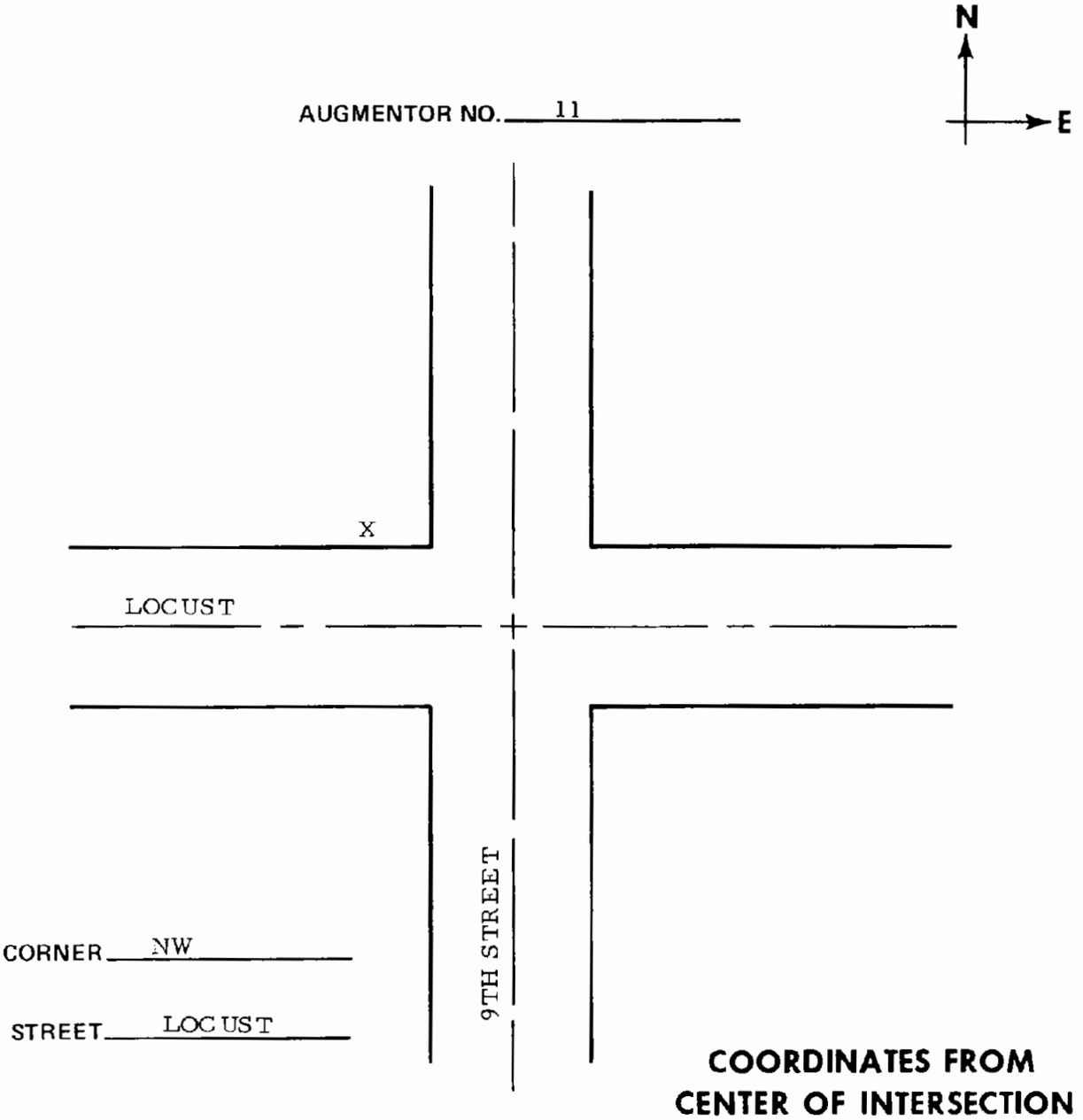
COORDINATES FROM CENTER OF INTERSECTION

15 FT NORTH
26 FT EAST

TELEDYNE SYSTEMS COMPANY
POSITIONING SYSTEMS

Revised 1/7/77

AUGMENTOR LOCATION DESCRIPTION



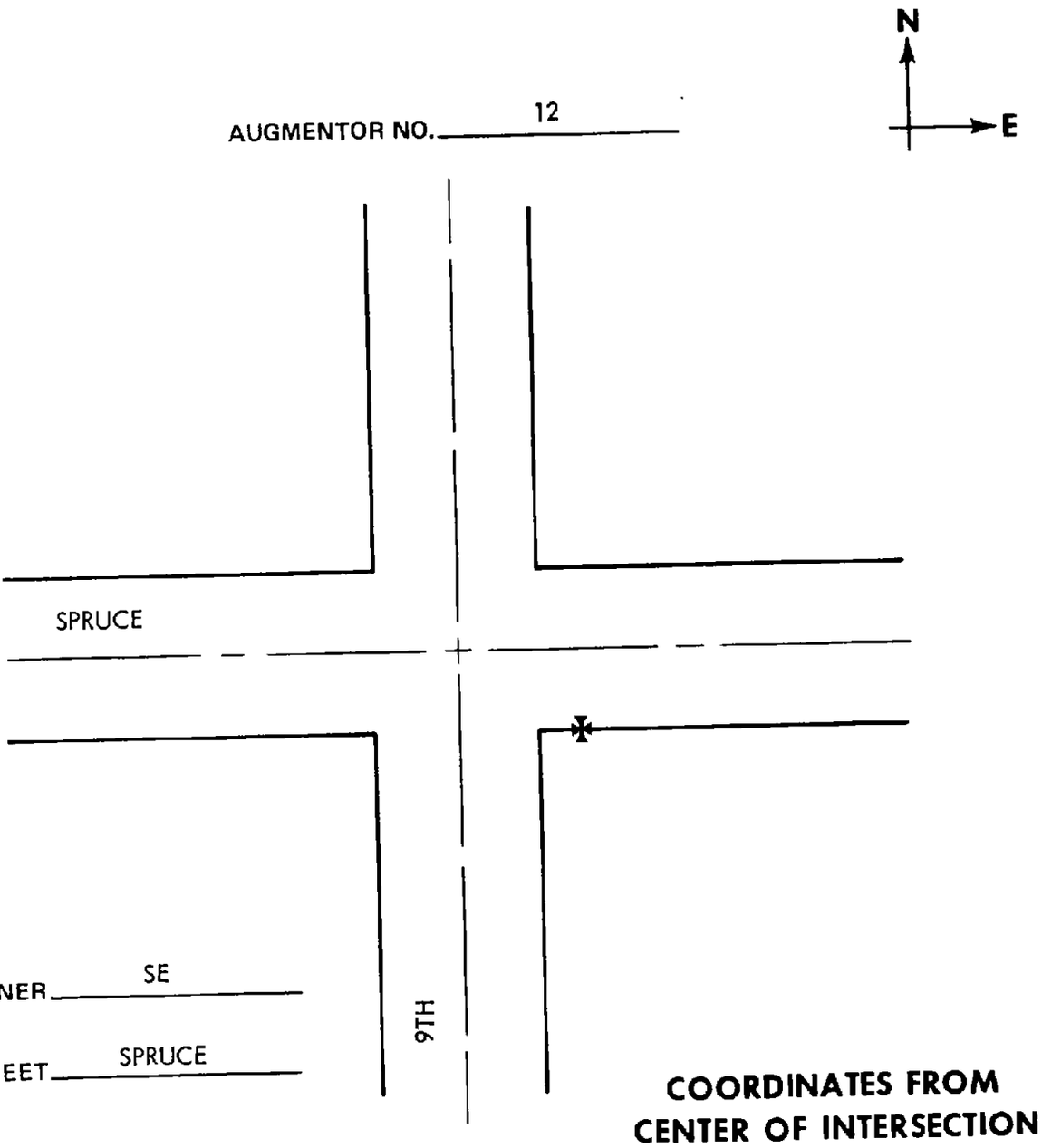
COORDINATES FROM CENTER OF INTERSECTION

14 FT NORTH
22 FT WEST

TELEDYNE SYSTEMS COMPANY
POSITIONING SYSTEMS

AUGMENTOR LOCATION DESCRIPTION

AUGMENTOR NO. 12



CORNER SE

STREET SPRUCE

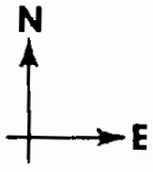
COORDINATES FROM CENTER OF INTERSECTION

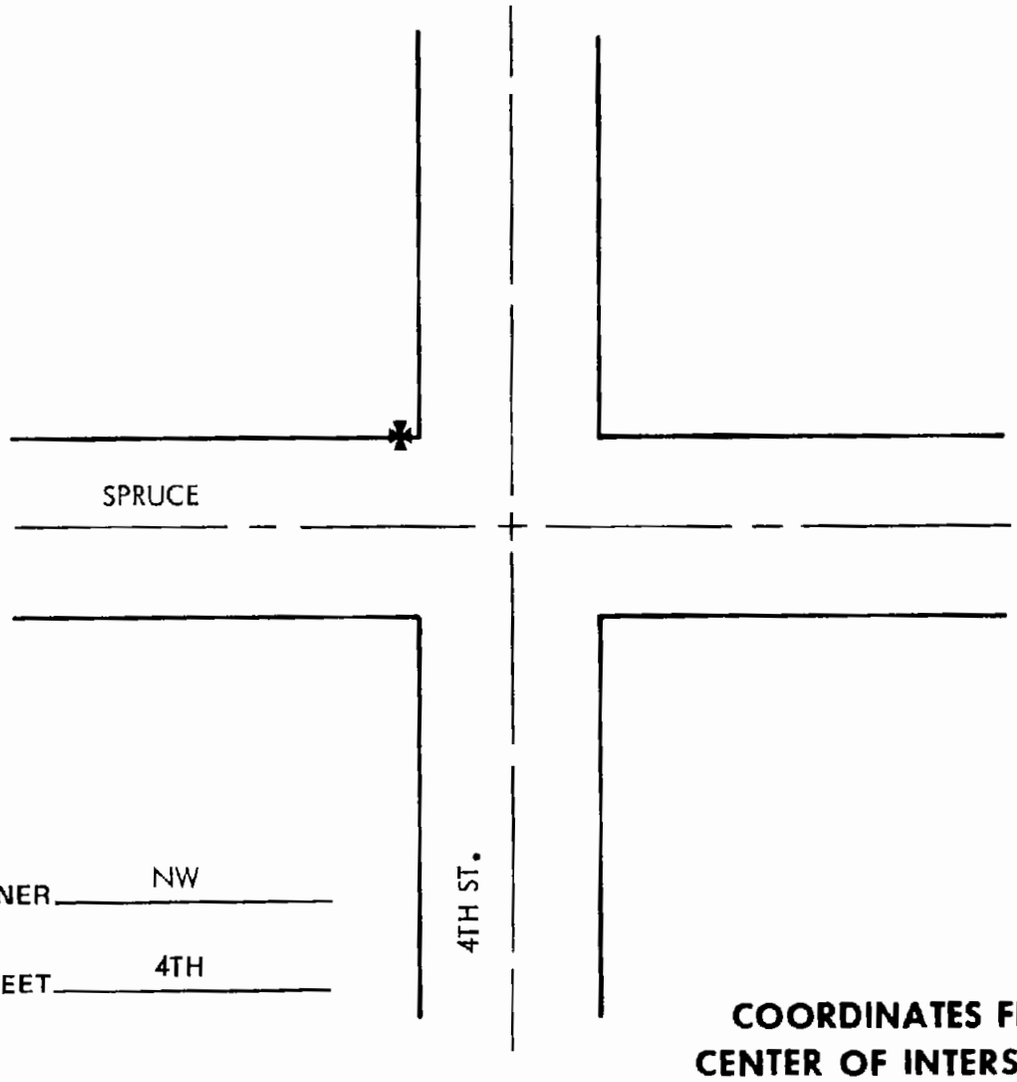
16 FT SOUTH
25 FT EAST

TELEDYNE SYSTEMS COMPANY
POSITIONING SYSTEMS

AUGMENTOR LOCATION DESCRIPTION

AUGMENTOR NO. 13





CORNER NW

STREET 4TH

COORDINATES FROM CENTER OF INTERSECTION

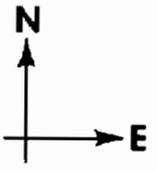
24 FT NORTH
14 FT WEST

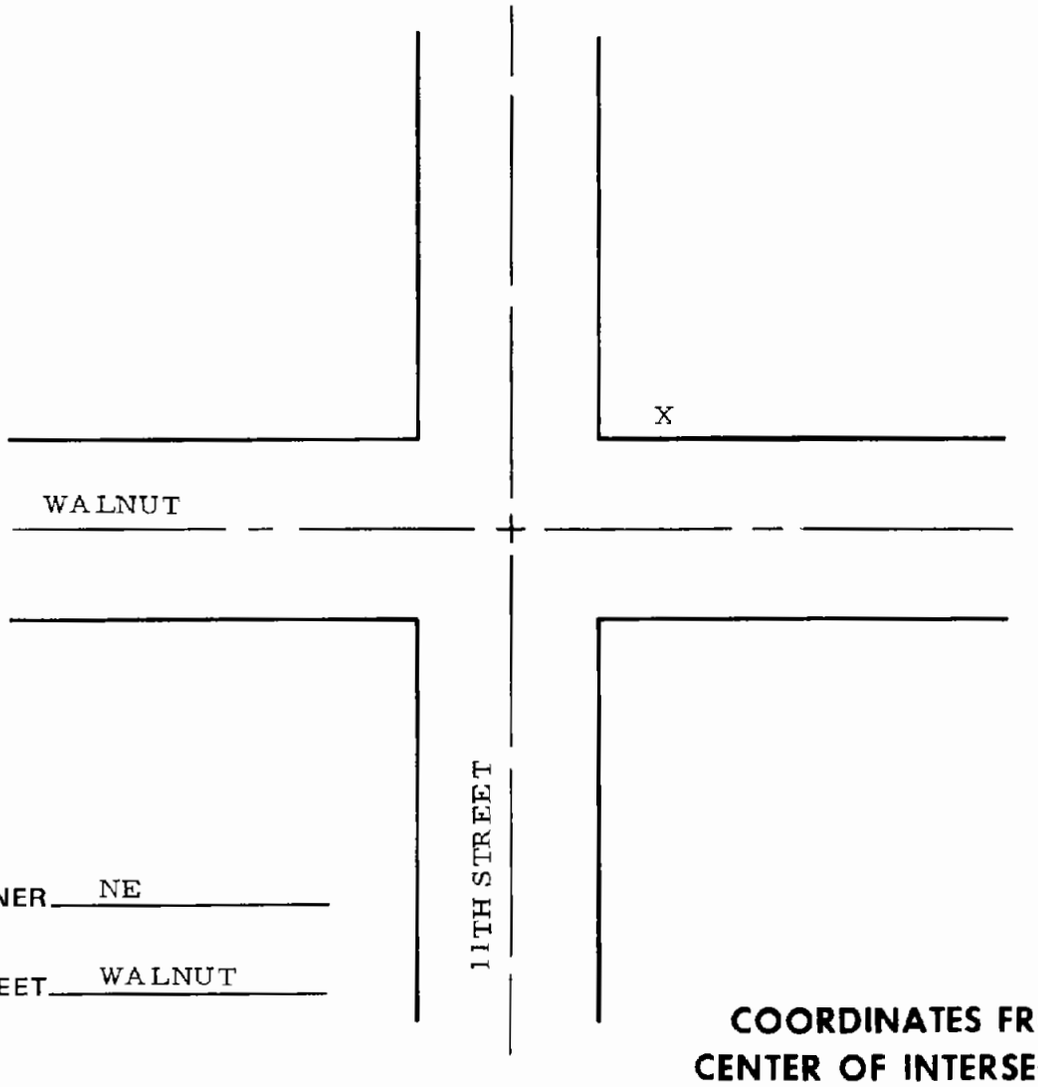
TELEDYNE SYSTEMS COMPANY
POSITIONING SYSTEMS

Revised 1/7/77

AUGMENTOR LOCATION DESCRIPTION

AUGMENTOR NO. 14





CORNER NE

STREET WALNUT

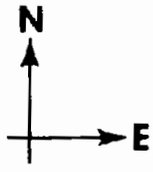
COORDINATES FROM CENTER OF INTERSECTION

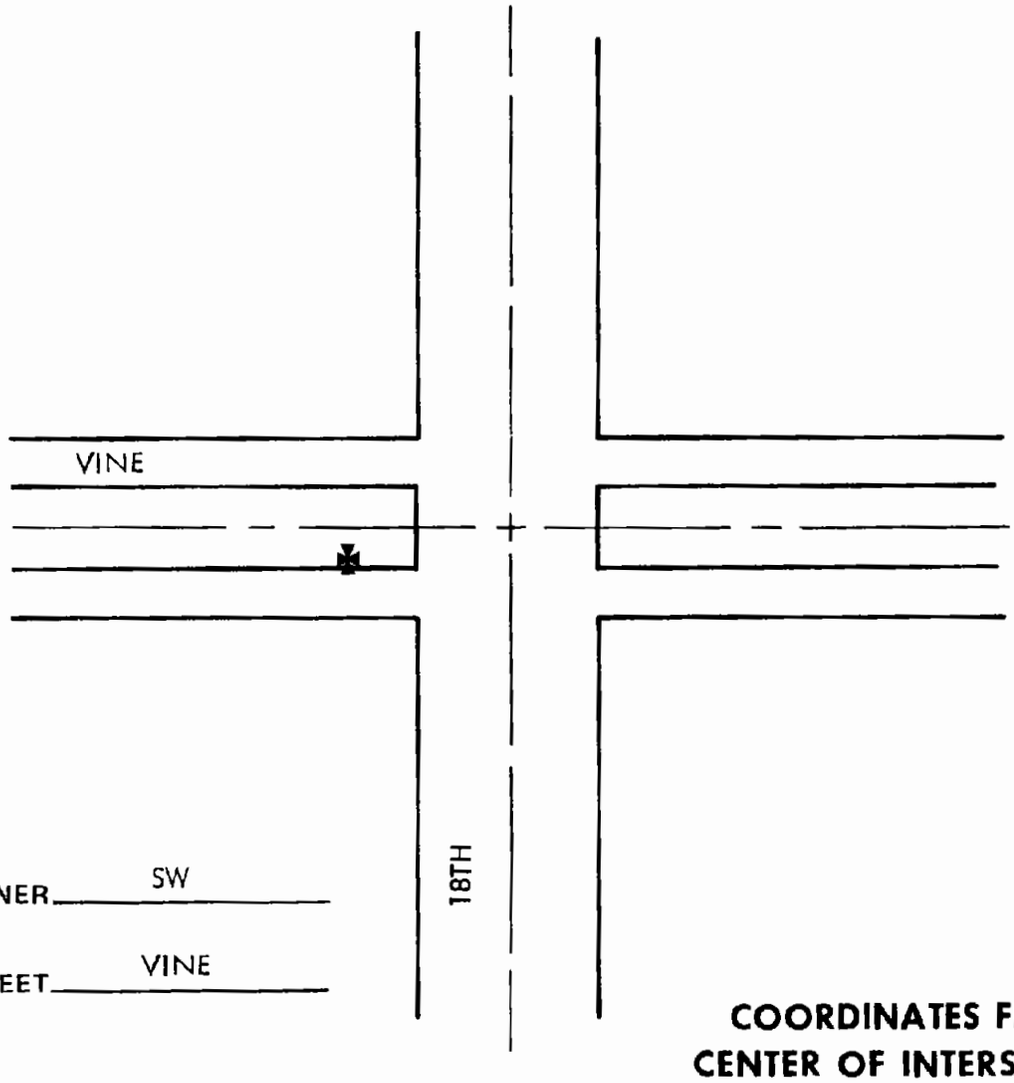
15 FT NORTH
25 FT EAST

TELEDYNE SYSTEMS COMPANY
POSITIONING SYSTEMS

AUGMENTOR LOCATION DESCRIPTION

AUGMENTOR NO. 15





CORNER SW

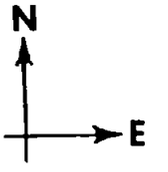
STREET VINE

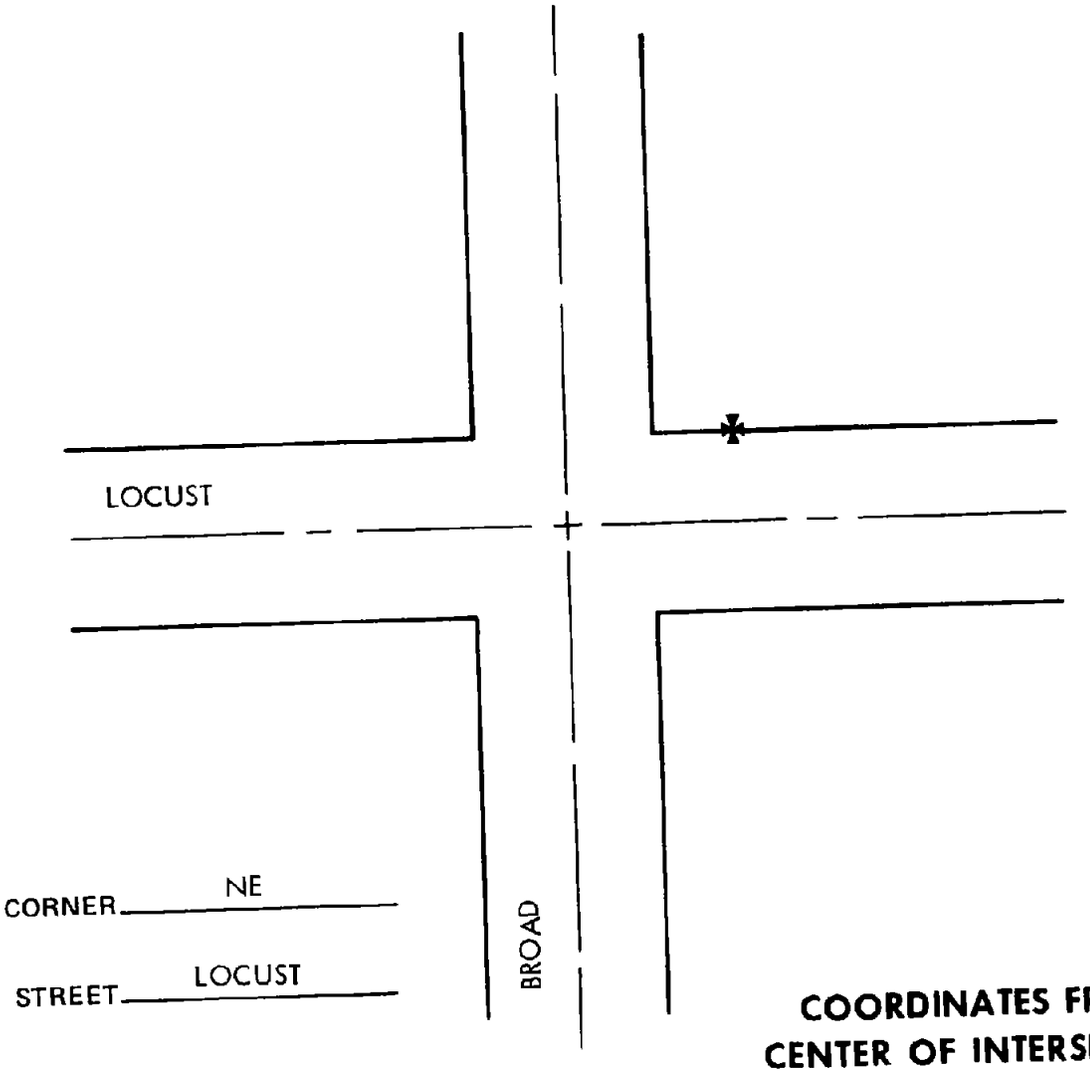
COORDINATES FROM CENTER OF INTERSECTION

64 FT SOUTH
23 FT WEST

AUGMENTOR LOCATION DESCRIPTION

AUGMENTOR NO. 16





CORNER NE

STREET LOCUST

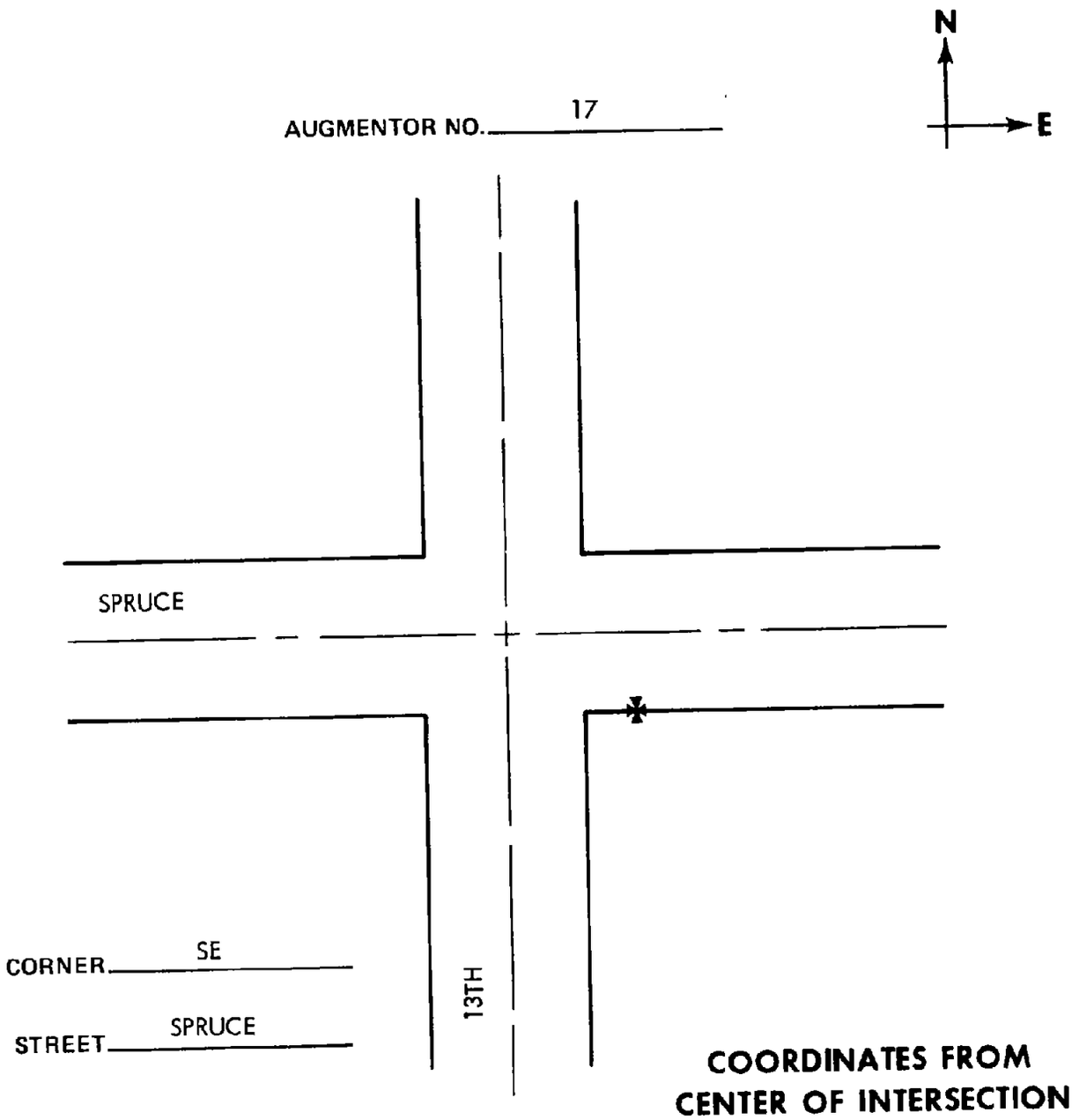
COORDINATES FROM CENTER OF INTERSECTION

22 FT NORTH
54 FT EAST

TELEDYNE SYSTEMS COMPANY
POSITIONING SYSTEMS

AUGMENTOR LOCATION DESCRIPTION

AUGMENTOR NO. 17



CORNER SE

STREET SPRUCE

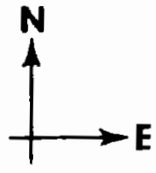
COORDINATES FROM CENTER OF INTERSECTION

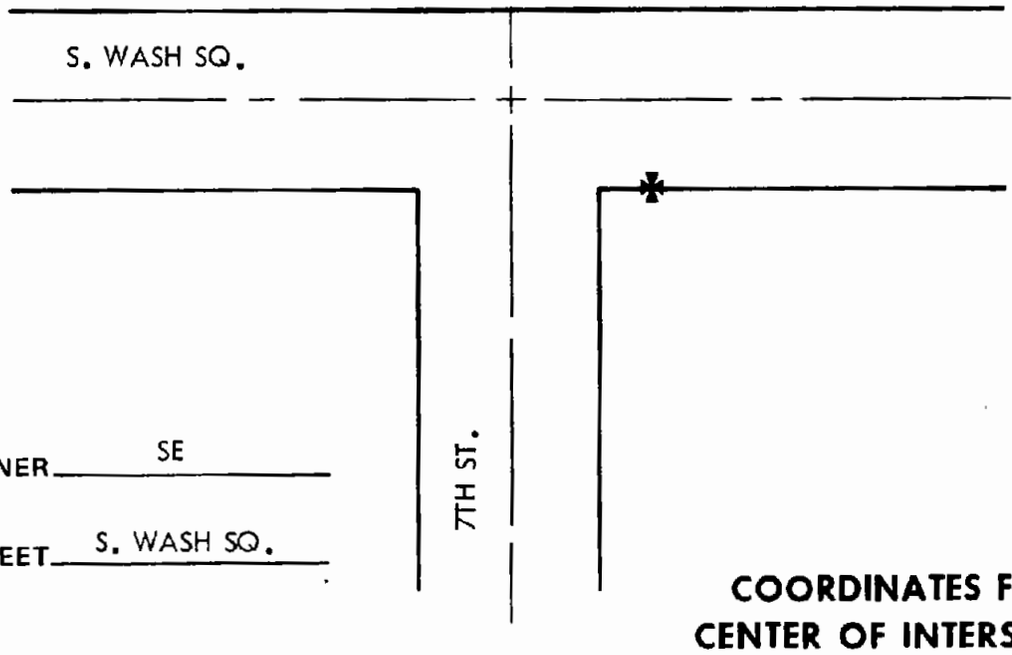
15 FT SOUTH
26 FT EAST

TELEDYNE SYSTEMS COMPANY
POSITIONING SYSTEMS

AUGMENTOR LOCATION DESCRIPTION

AUGMENTOR NO. 20





CORNER SE

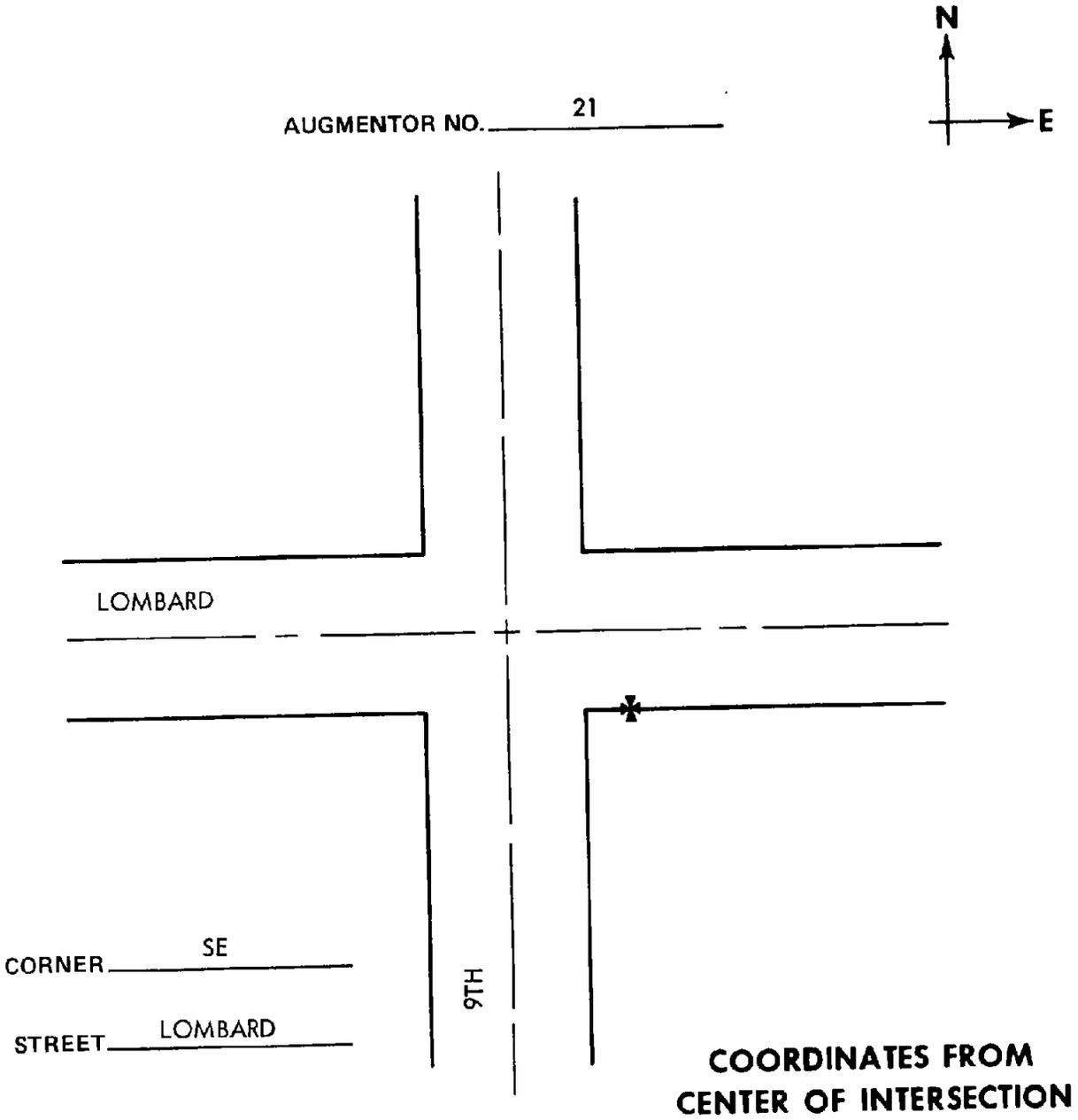
STREET S. WASH SQ.

COORDINATES FROM CENTER OF INTERSECTION

15 FT SOUTH
26 FT EAST

AUGMENTOR LOCATION DESCRIPTION

AUGMENTOR NO. 21



CORNER SE

STREET LOMBARD

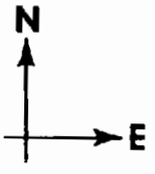
COORDINATES FROM CENTER OF INTERSECTION

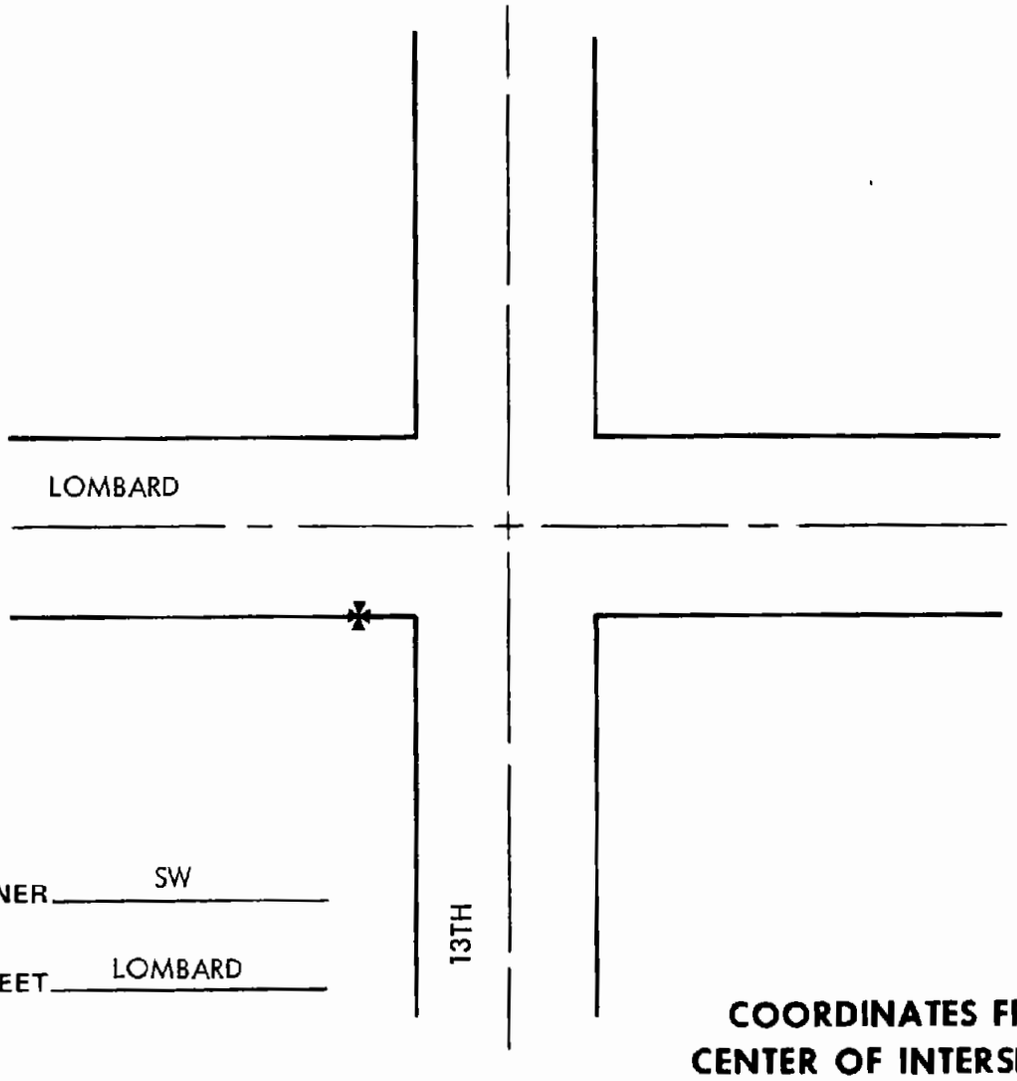
16 FT SOUTH
26 FT EAST

TELEDYNE SYSTEMS COMPANY
POSITIONING SYSTEMS

AUGMENTOR LOCATION DESCRIPTION

AUGMENTOR NO. 22





CORNER SW

STREET LOMBARD

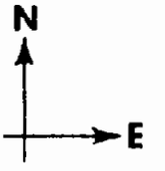
COORDINATES FROM CENTER OF INTERSECTION

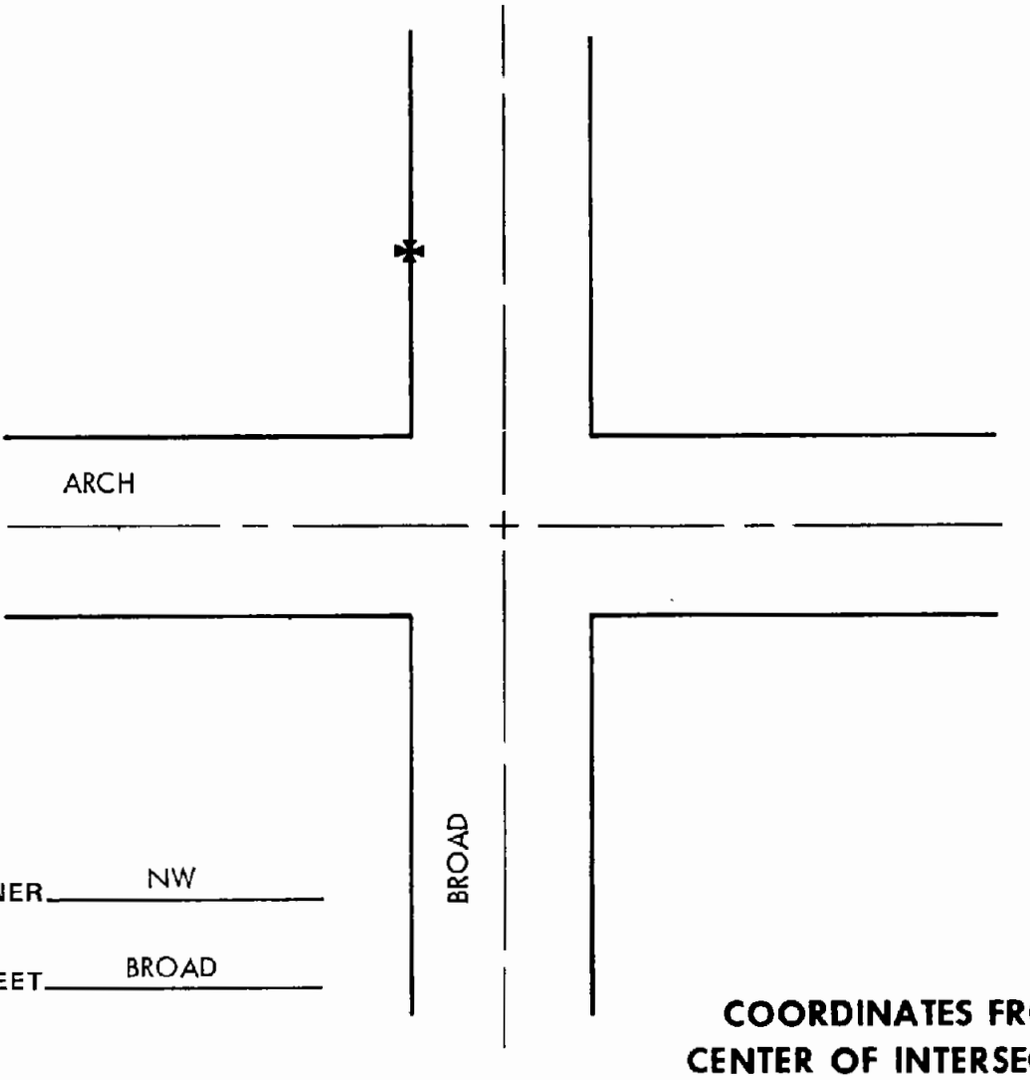
16 FT SOUTH
23 FT WEST

TELEDYNE SYSTEMS COMPANY
POSITIONING SYSTEMS

AUGMENTOR LOCATION DESCRIPTION

AUGMENTOR NO. 24





CORNER NW

STREET BROAD

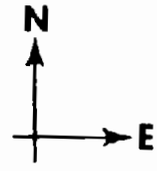
COORDINATES FROM CENTER OF INTERSECTION

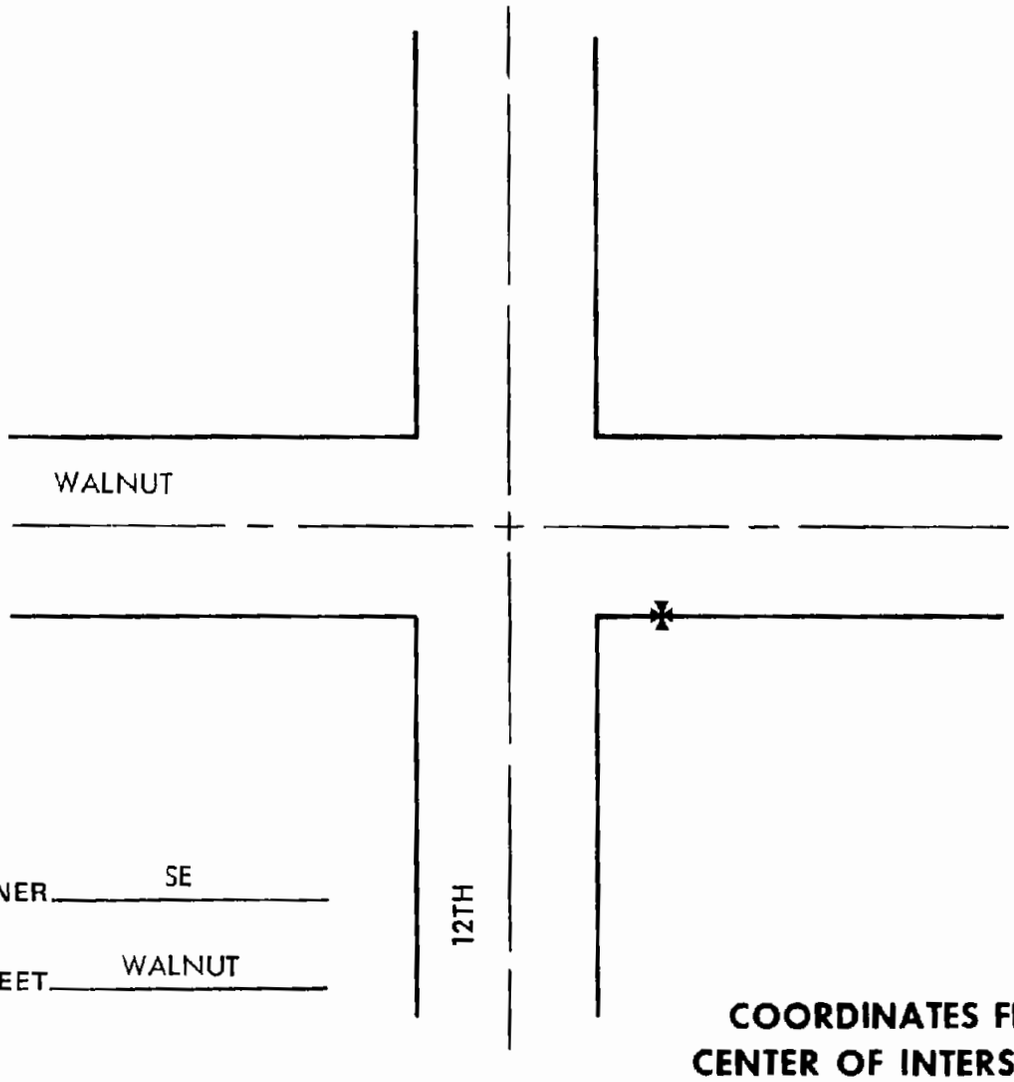
89 FT NORTH
36.5 FT WEST

TELEDYNE SYSTEMS COMPANY
POSITIONING SYSTEMS

AUGMENTOR LOCATION DESCRIPTION

AUGMENTOR NO. 26





CORNER SE

STREET WALNUT

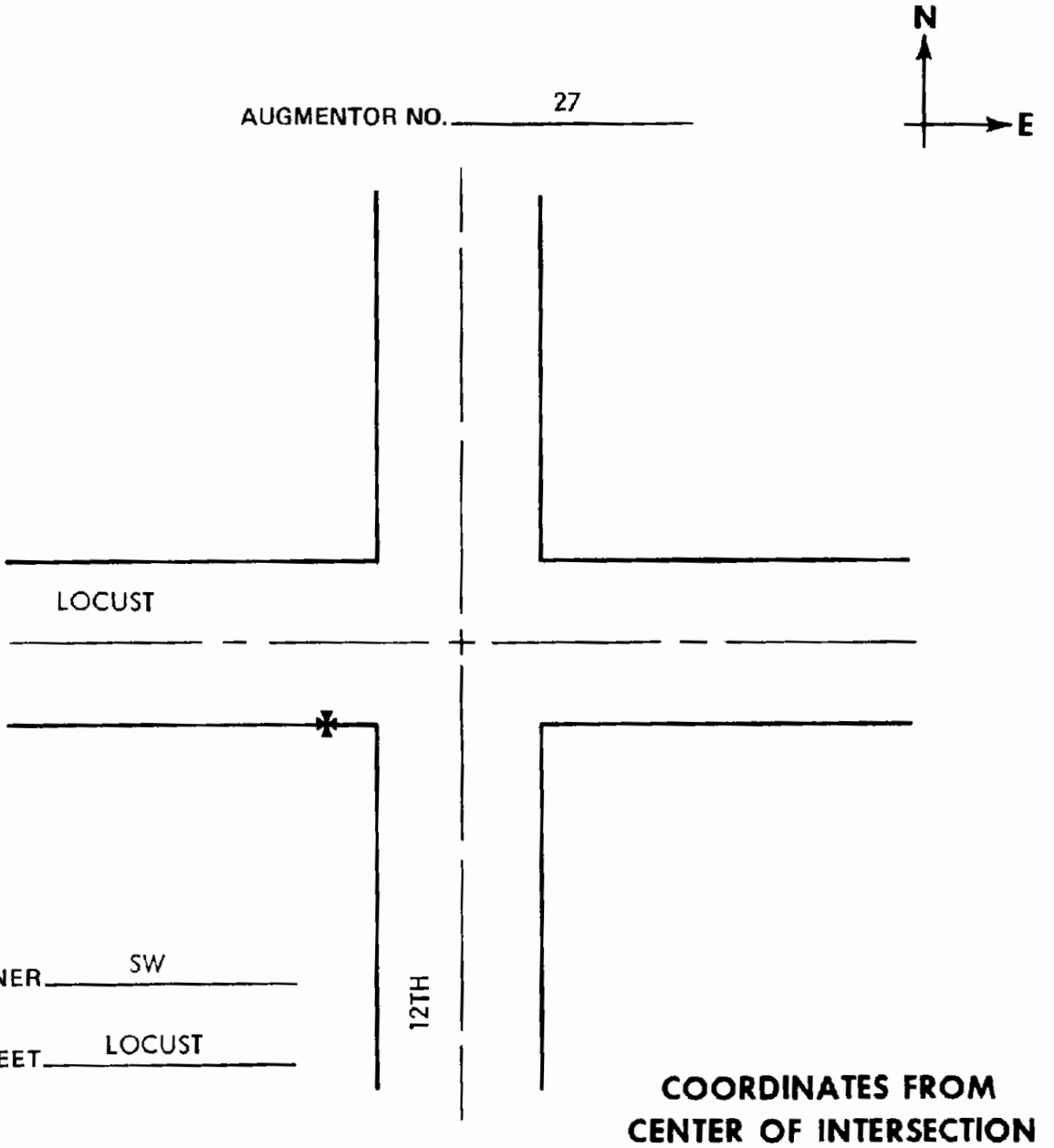
COORDINATES FROM CENTER OF INTERSECTION

15 FT SOUTH
25 FT EAST

TELEDYNE SYSTEMS COMPANY
POSITIONING SYSTEMS

AUGMENTOR LOCATION DESCRIPTION

AUGMENTOR NO. 27



CORNER SW

STREET LOCUST

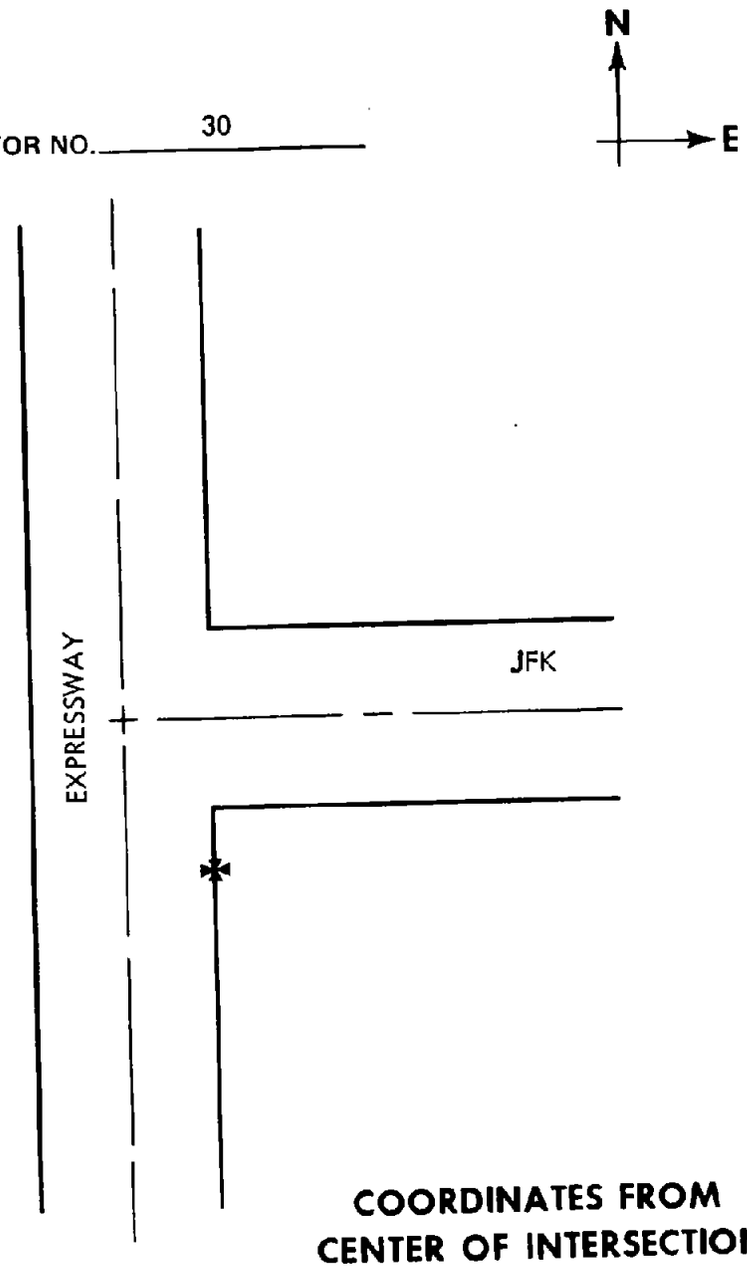
COORDINATES FROM CENTER OF INTERSECTION

15 FT SOUTH
23 FT WEST

TELEDYNE SYSTEMS COMPANY
POSITIONING SYSTEMS

AUGMENTOR LOCATION DESCRIPTION

AUGMENTOR NO. 30



CORNER SE

STREET JFK

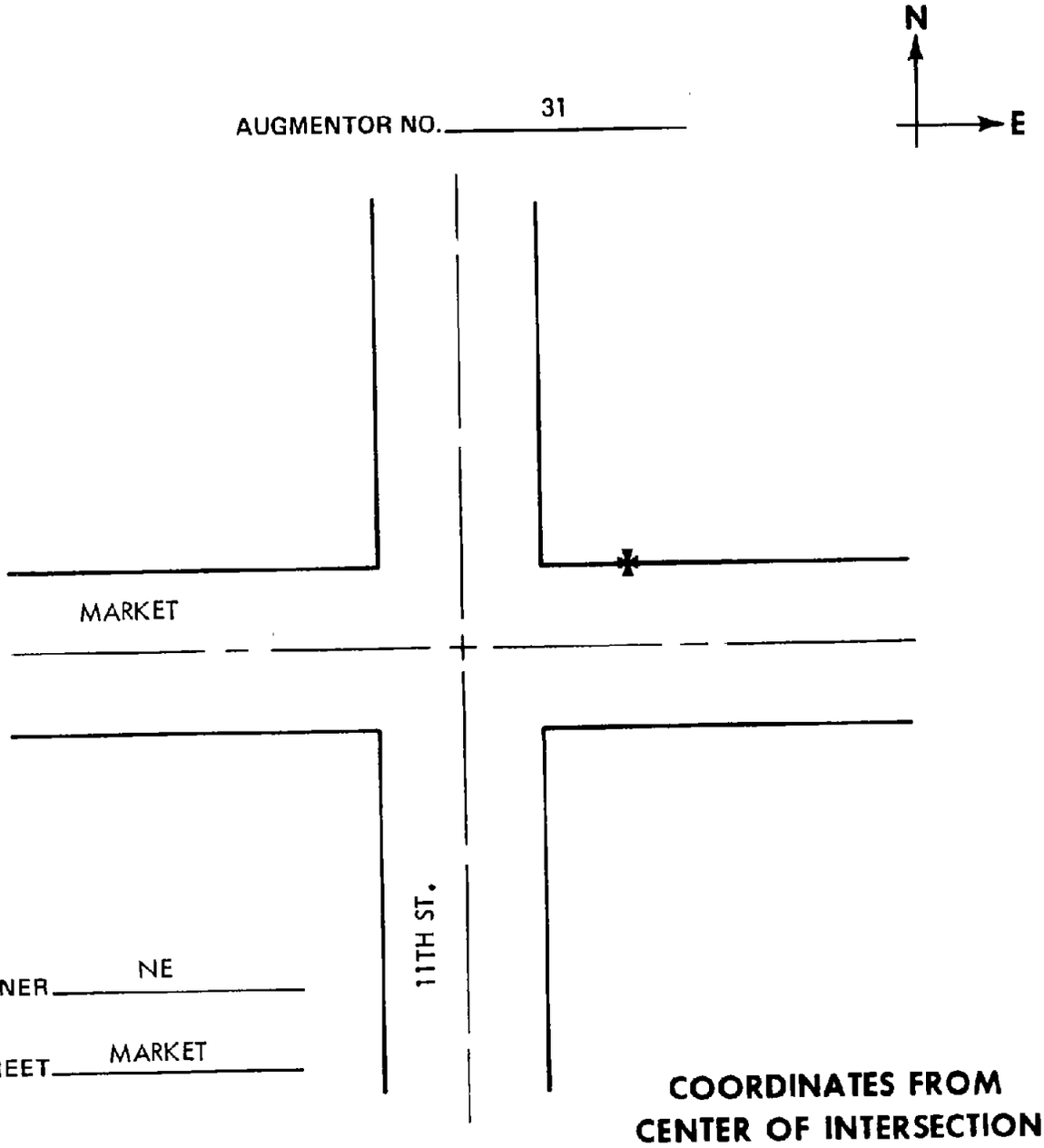
COORDINATES FROM CENTER OF INTERSECTION

56 FT SOUTH
38 FT EAST

TELEDYNE SYSTEMS COMPANY
POSITIONING SYSTEMS

AUGMENTOR LOCATION DESCRIPTION

AUGMENTOR NO. 31



CORNER NE

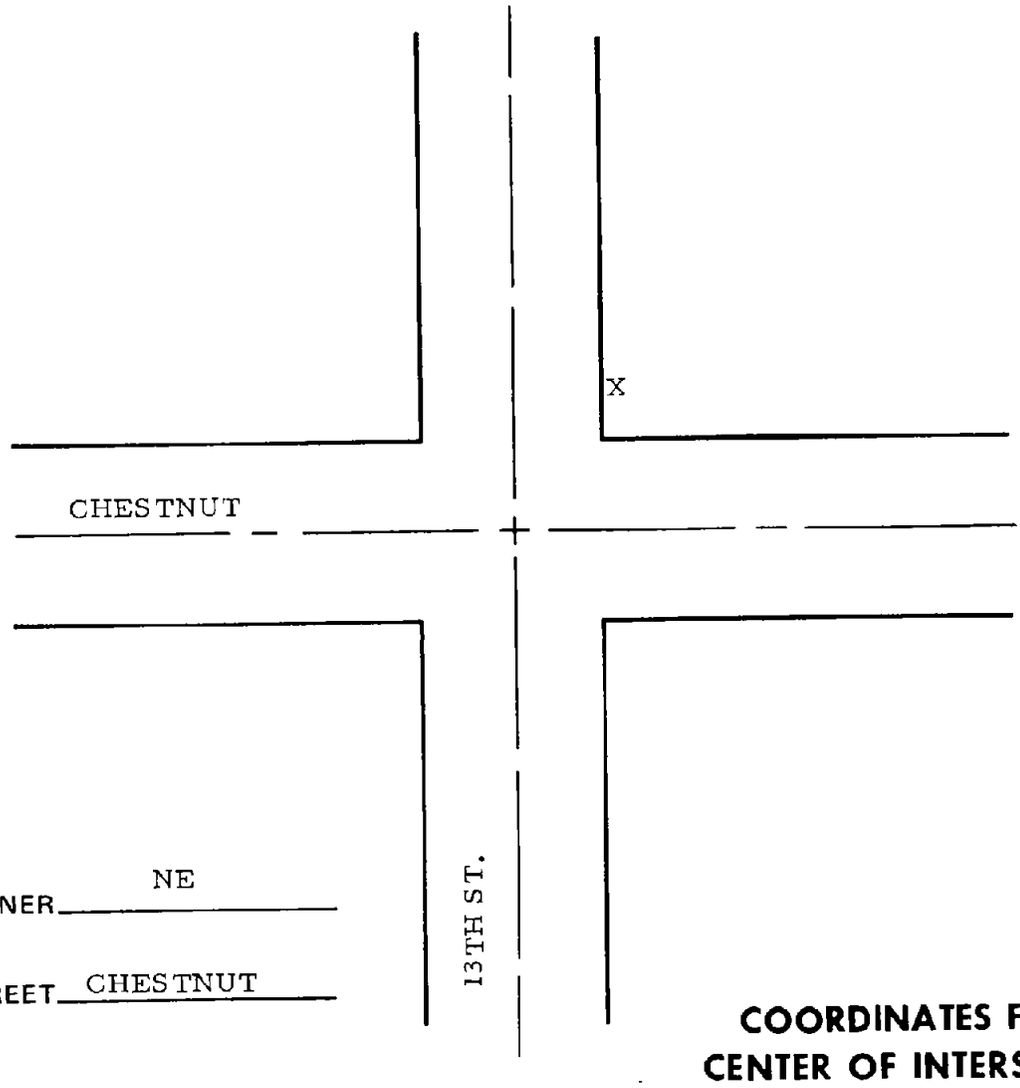
STREET MARKET

COORDINATES FROM CENTER OF INTERSECTION

33.5 FT NORTH
28.5 FT EAST

AUGMENTOR LOCATION DESCRIPTION

AUGMENTOR NO. 32



CORNER NE

STREET CHESTNUT

COORDINATES FROM CENTER OF INTERSECTION

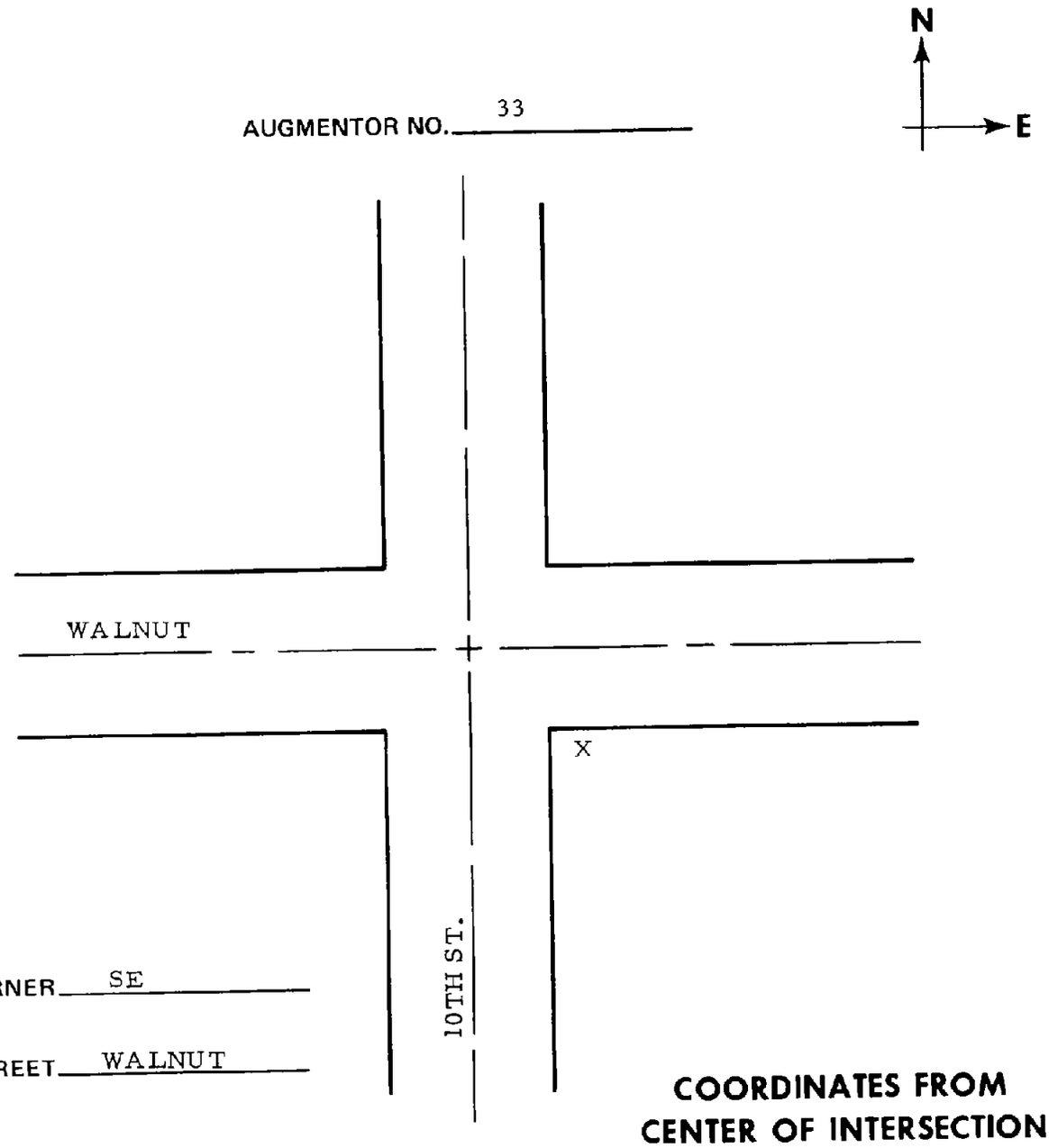
32 FT NORTH
15 FT EAST

TELEDYNE SYSTEMS COMPANY
POSITIONING SYSTEMS

Revised 1/7/77

AUGMENTOR LOCATION DESCRIPTION

AUGMENTOR NO. 33



CORNER SE

STREET WALNUT

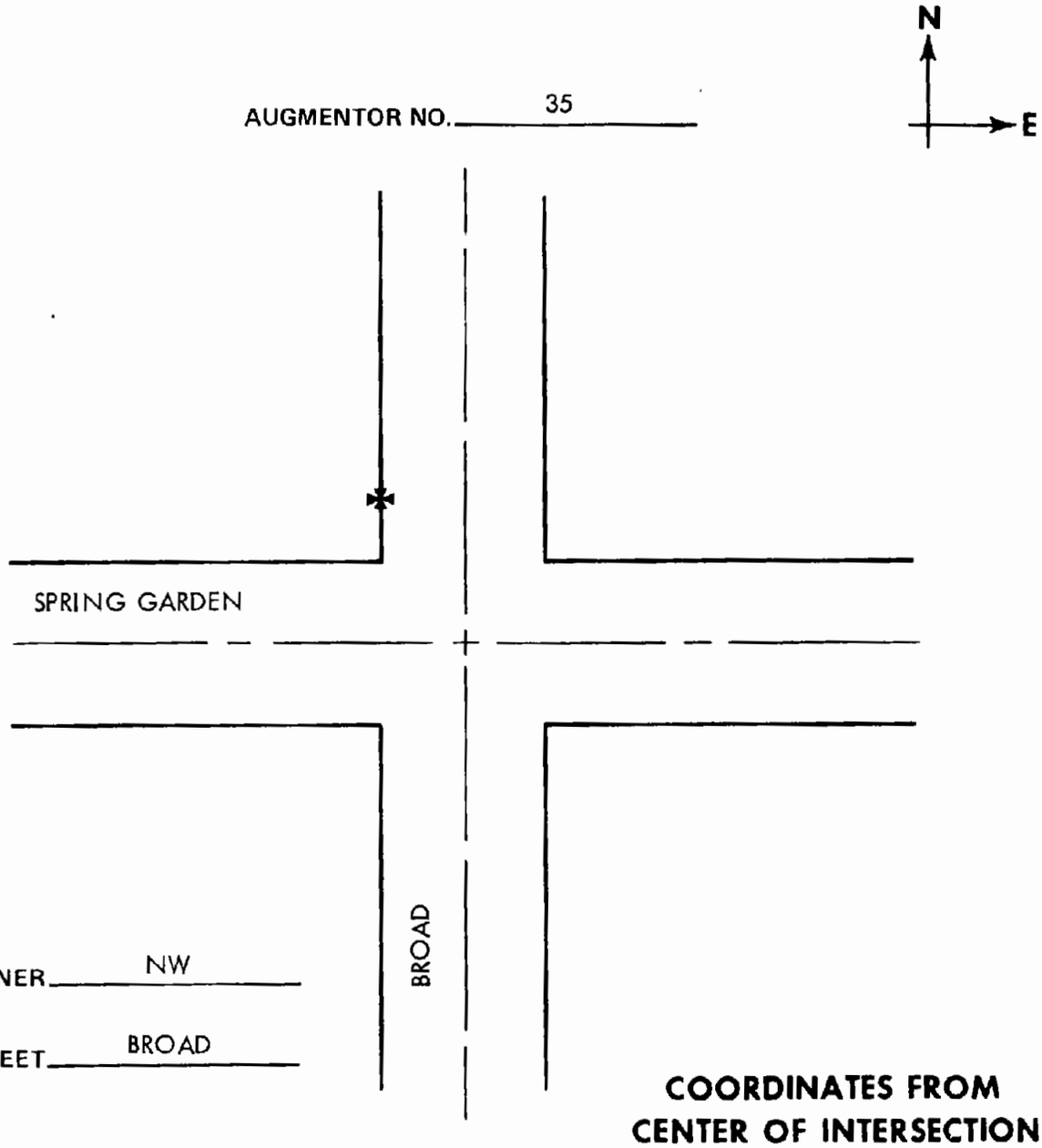
COORDINATES FROM CENTER OF INTERSECTION

16 FT SOUTH
35 FT EAST

TELEDYNE SYSTEMS COMPANY
POSITIONING SYSTEMS

AUGMENTOR LOCATION DESCRIPTION

AUGMENTOR NO. 35



CORNER NW

STREET BROAD

COORDINATES FROM CENTER OF INTERSECTION

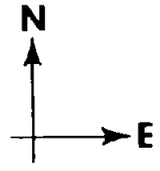
45 FT NORTH
36 FT WEST

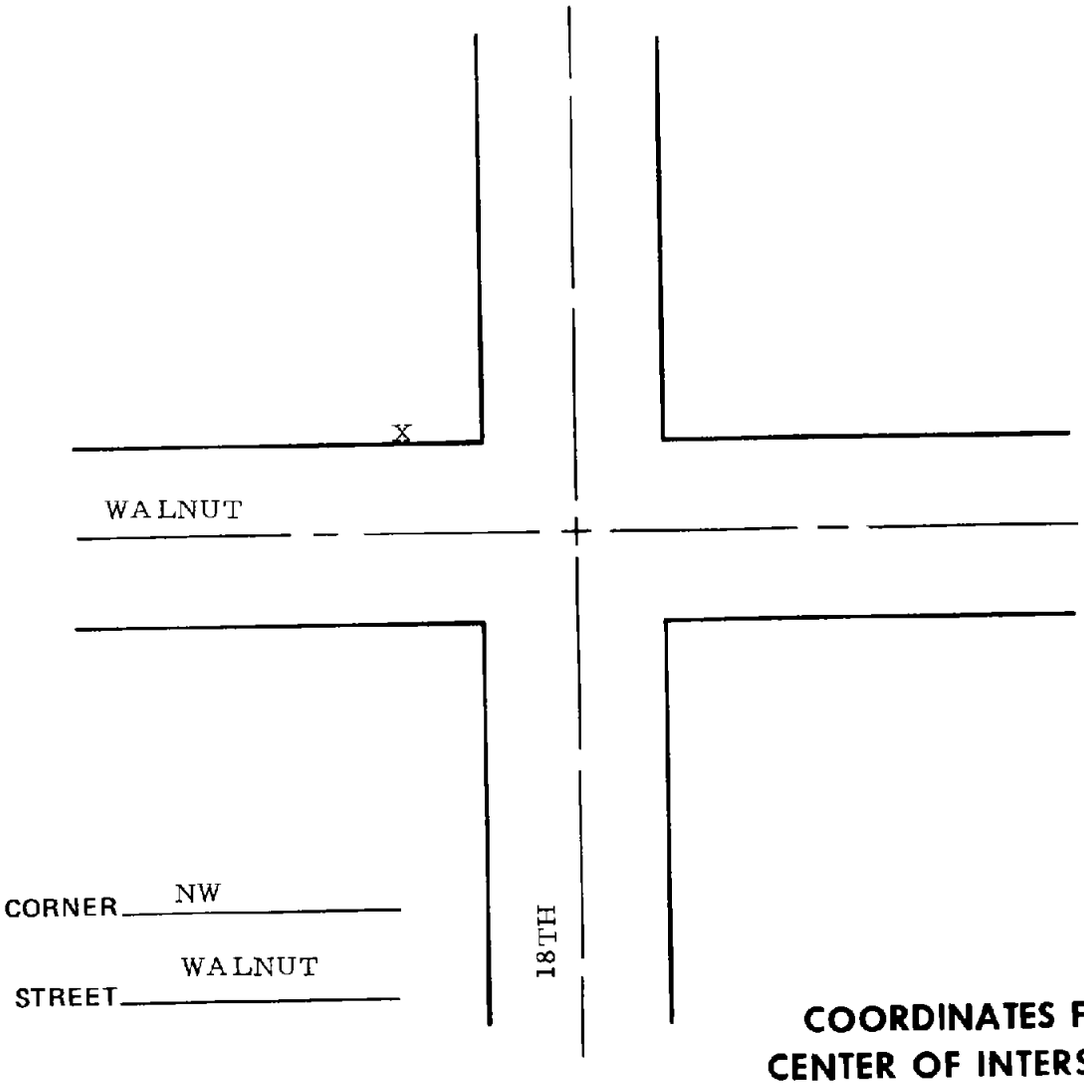
TELEDYNE SYSTEMS COMPANY
POSITIONING SYSTEMS

Revised 1/7/77

AUGMENTOR LOCATION DESCRIPTION

AUGMENTOR NO. 37





CORNER NW

STREET WALNUT

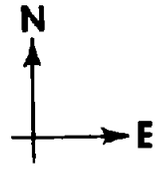
COORDINATES FROM CENTER OF INTERSECTION

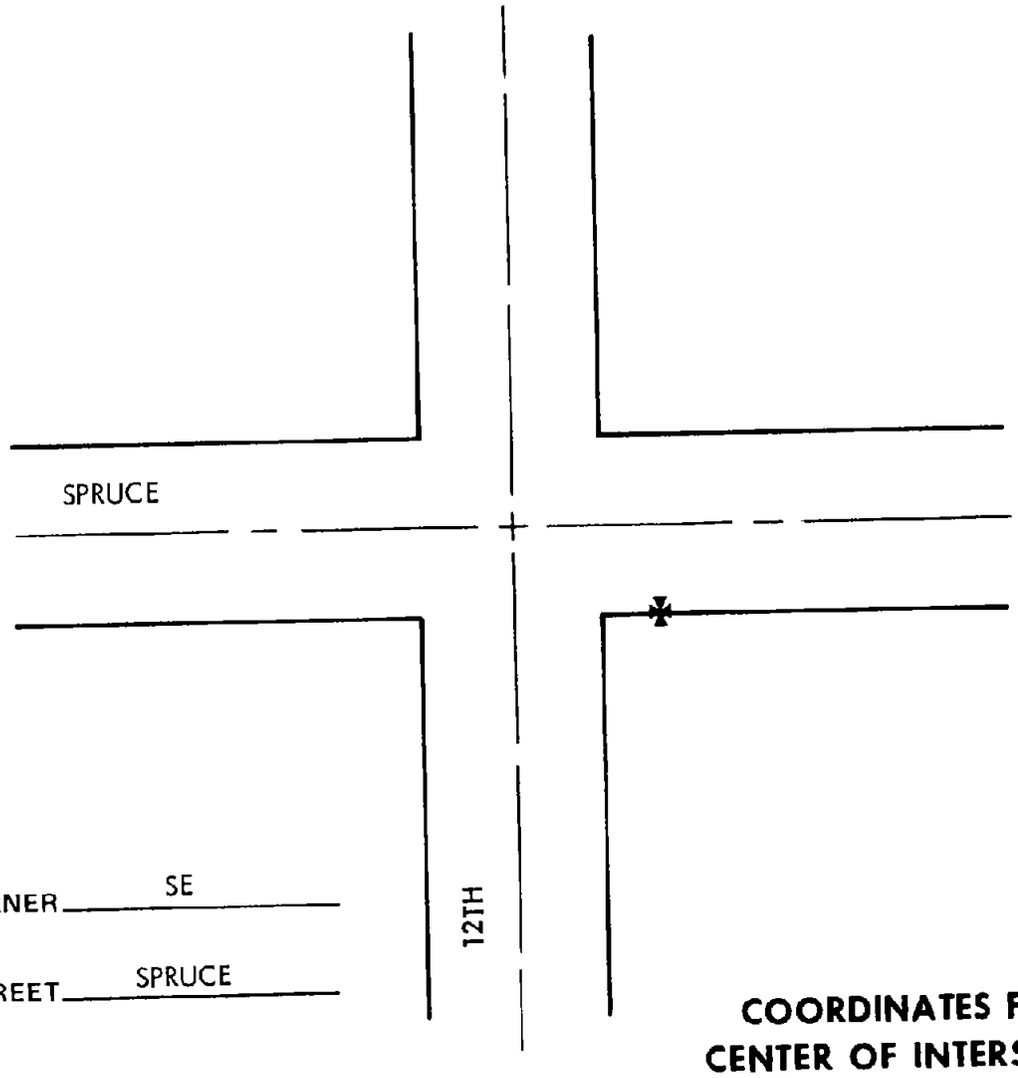
15 FT NORTH
29 FT WEST

TELEDYNE SYSTEMS COMPANY
POSITIONING SYSTEMS

AUGMENTOR LOCATION DESCRIPTION

AUGMENTOR NO. 40





CORNER SE

STREET SPRUCE

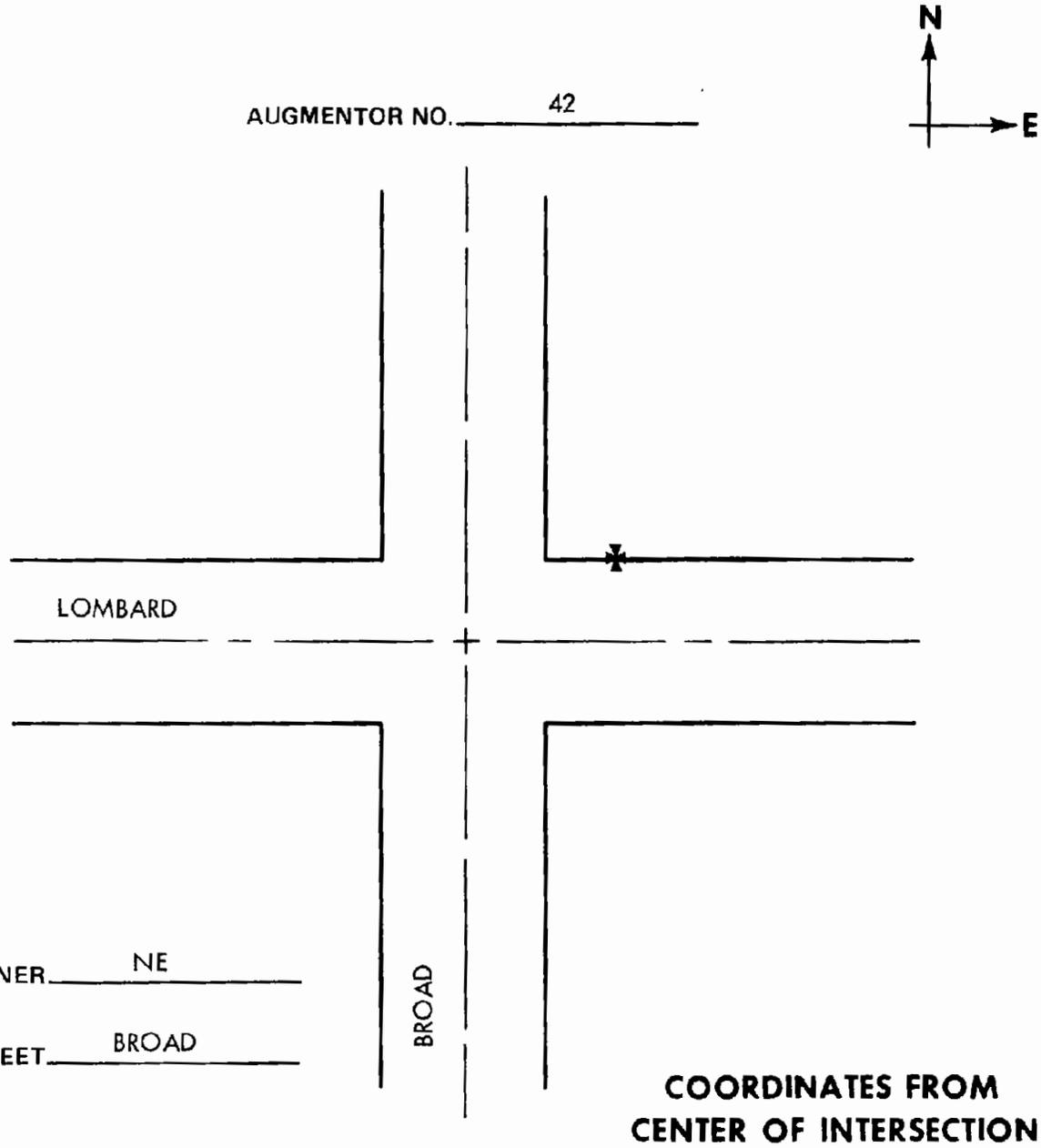
COORDINATES FROM CENTER OF INTERSECTION

15 FT SOUTH
24 FT EAST

TELEDYNE SYSTEMS COMPANY
POSITIONING SYSTEMS

AUGMENTOR LOCATION DESCRIPTION

AUGMENTOR NO. 42



CORNER NE

STREET BROAD

COORDINATES FROM CENTER OF INTERSECTION

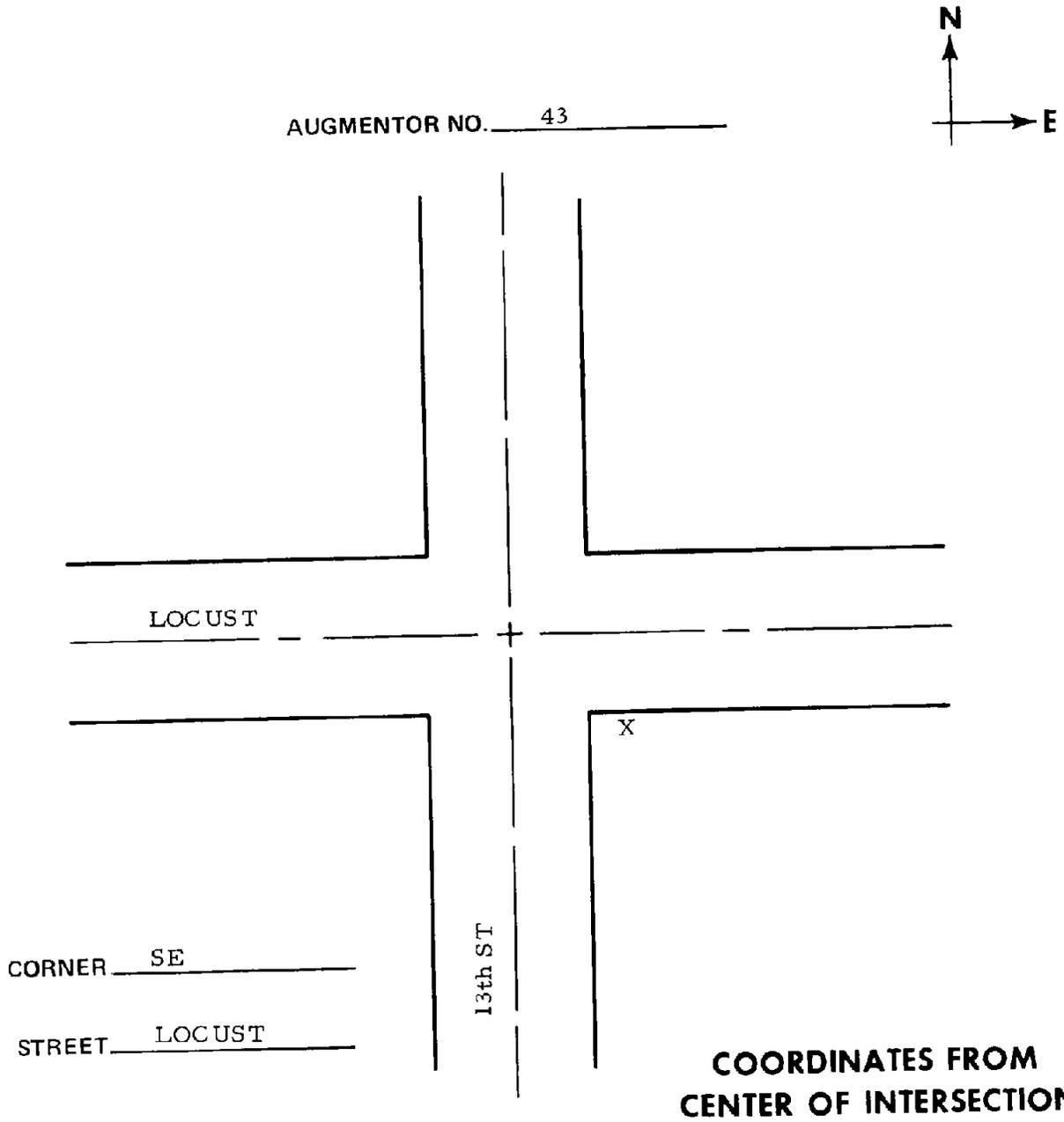
24 FT NORTH
37 FT EAST

TELEDYNE SYSTEMS COMPANY
POSITIONING SYSTEMS

Revised 1/7/77

AUGMENTOR LOCATION DESCRIPTION

AUGMENTOR NO. 43



CORNER SE

STREET LOCUST

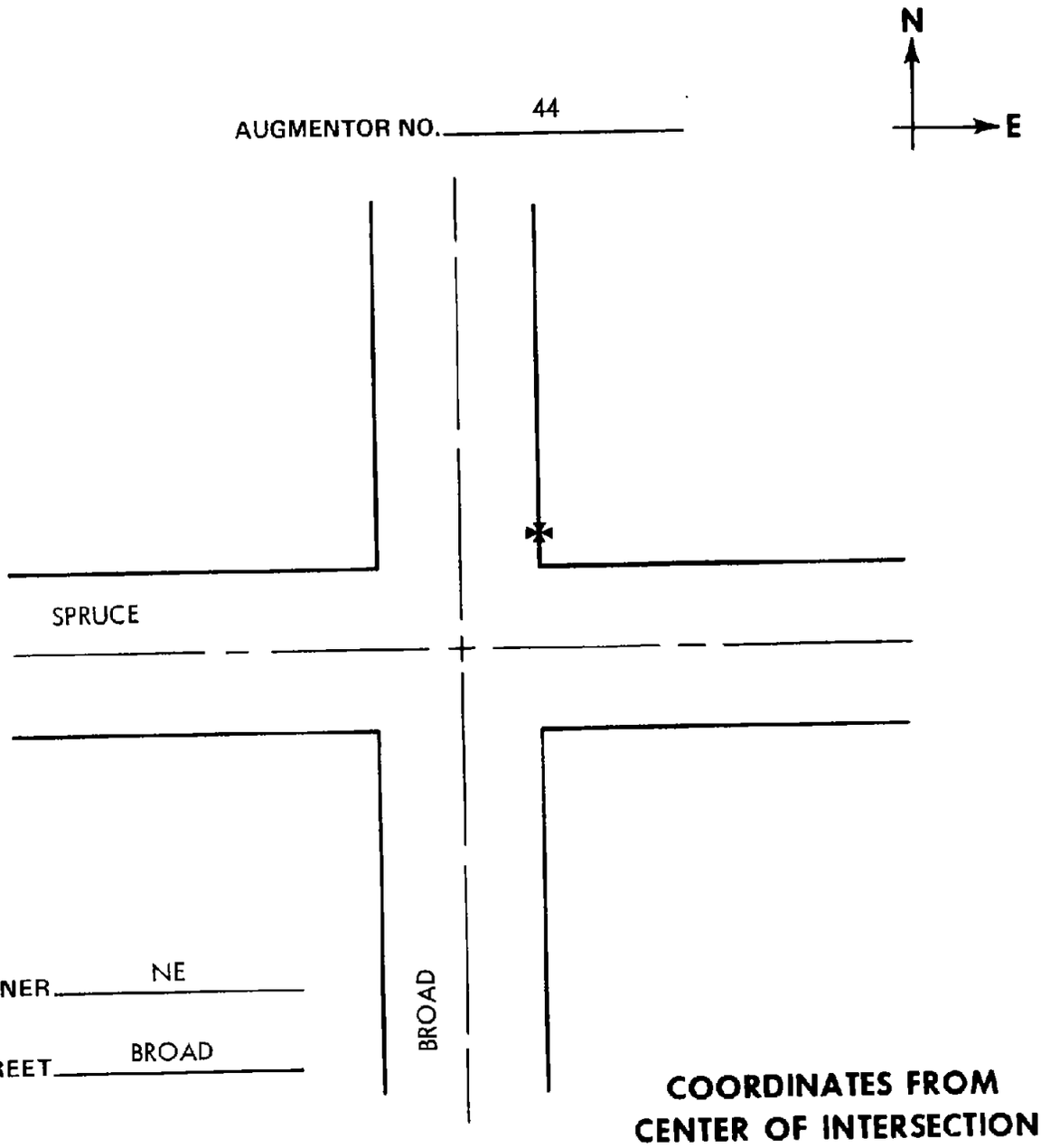
COORDINATES FROM CENTER OF INTERSECTION

16 FT SOUTH
26 FT EAST

TELEDYNE SYSTEMS COMPANY
POSITIONING SYSTEMS

AUGMENTOR LOCATION DESCRIPTION

AUGMENTOR NO. 44



CORNER NE

STREET BROAD

COORDINATES FROM CENTER OF INTERSECTION

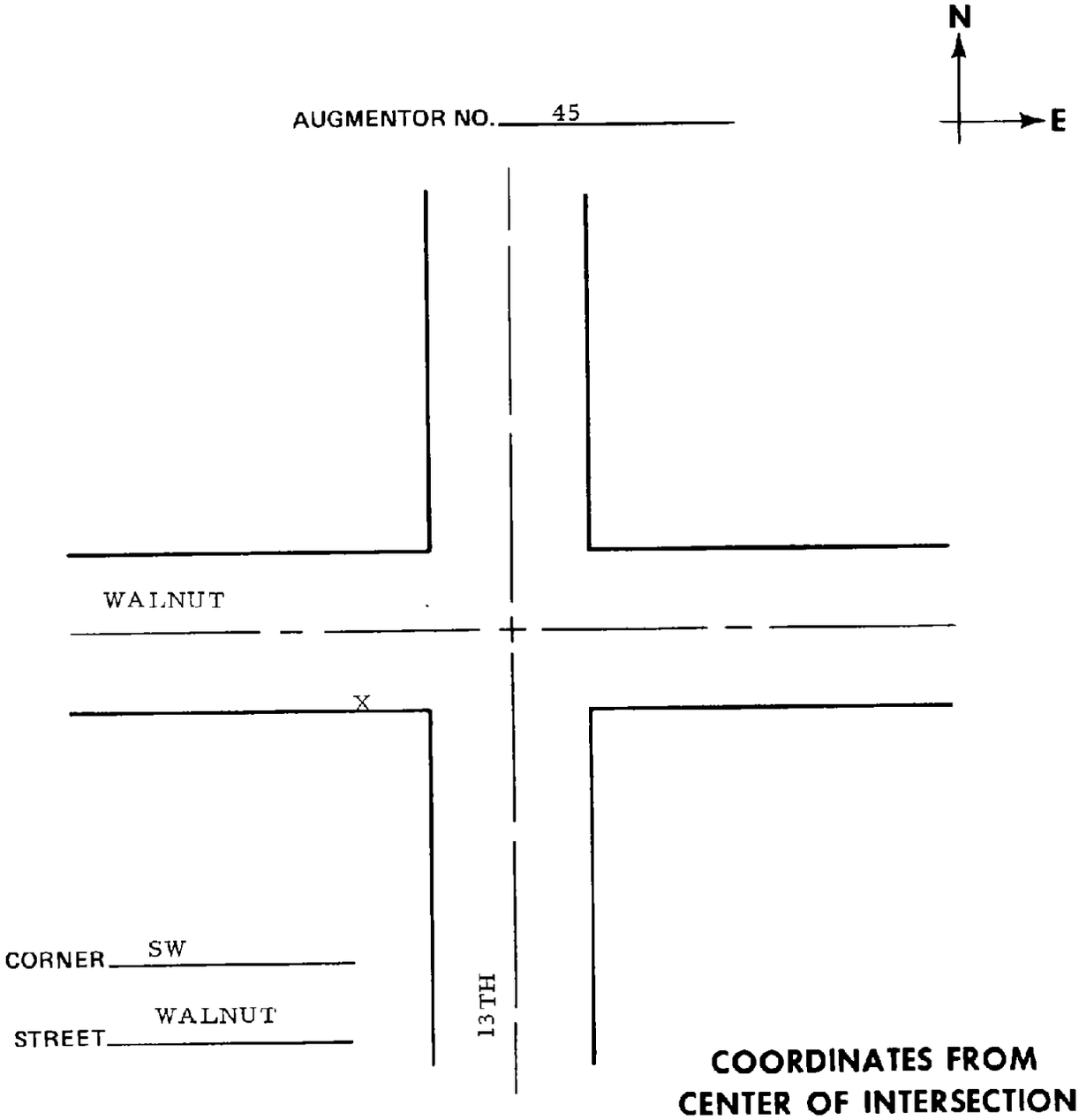
34 FT NORTH
39 FT EAST

TELEDYNE SYSTEMS COMPANY
POSITIONING SYSTEMS

Revised 1/7/77

AUGMENTOR LOCATION DESCRIPTION

AUGMENTOR NO. 45



CORNER SW

STREET WALNUT

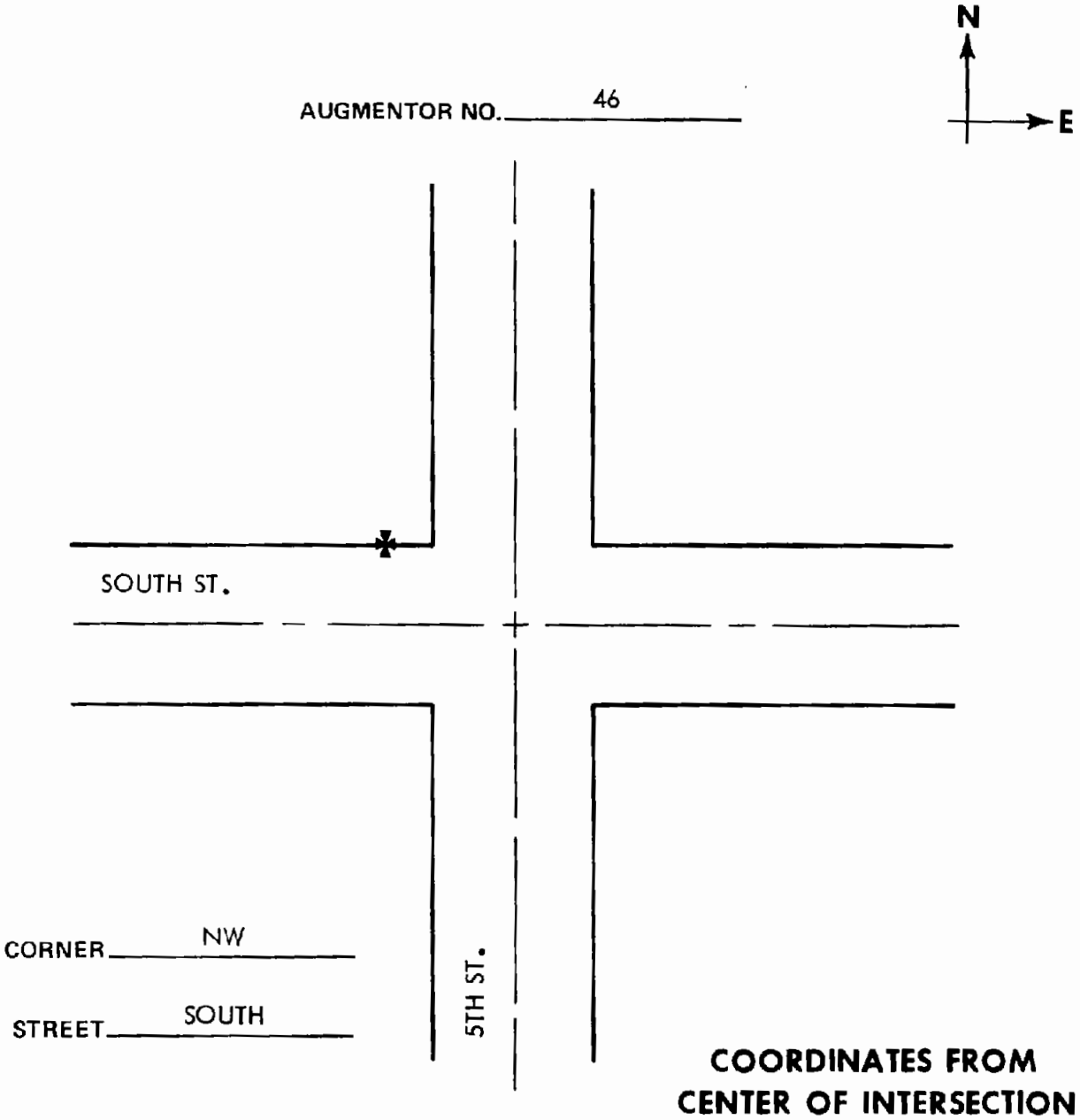
COORDINATES FROM CENTER OF INTERSECTION

15 FT SOUTH
25 FT WEST

TELEDYNE SYSTEMS COMPANY
POSITIONING SYSTEMS

AUGMENTOR LOCATION DESCRIPTION

AUGMENTOR NO. 46



CORNER NW

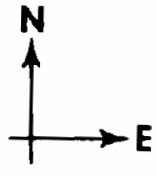
STREET SOUTH

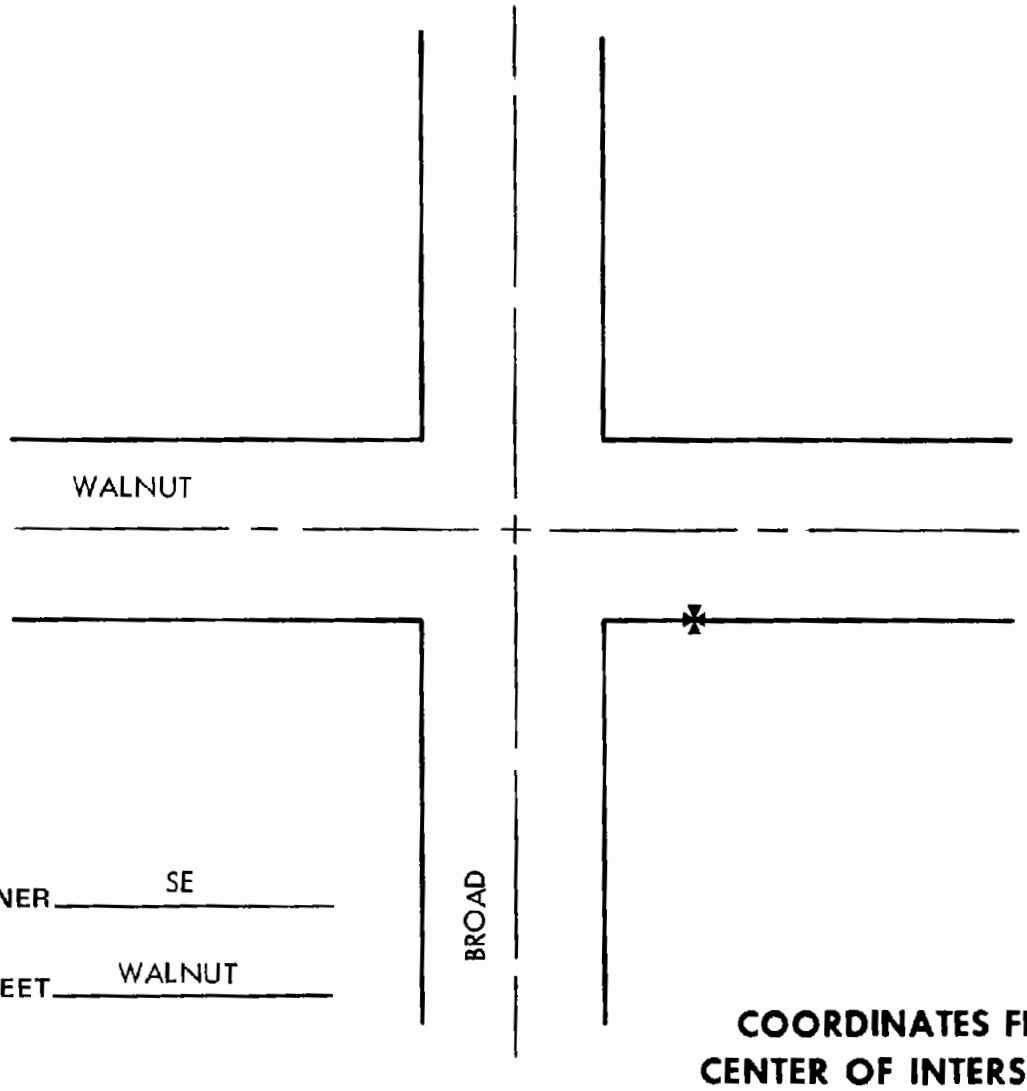
COORDINATES FROM CENTER OF INTERSECTION

16 FT NORTH
23 FT WEST

AUGMENTOR LOCATION DESCRIPTION

AUGMENTOR NO. 50





CORNER SE

STREET WALNUT

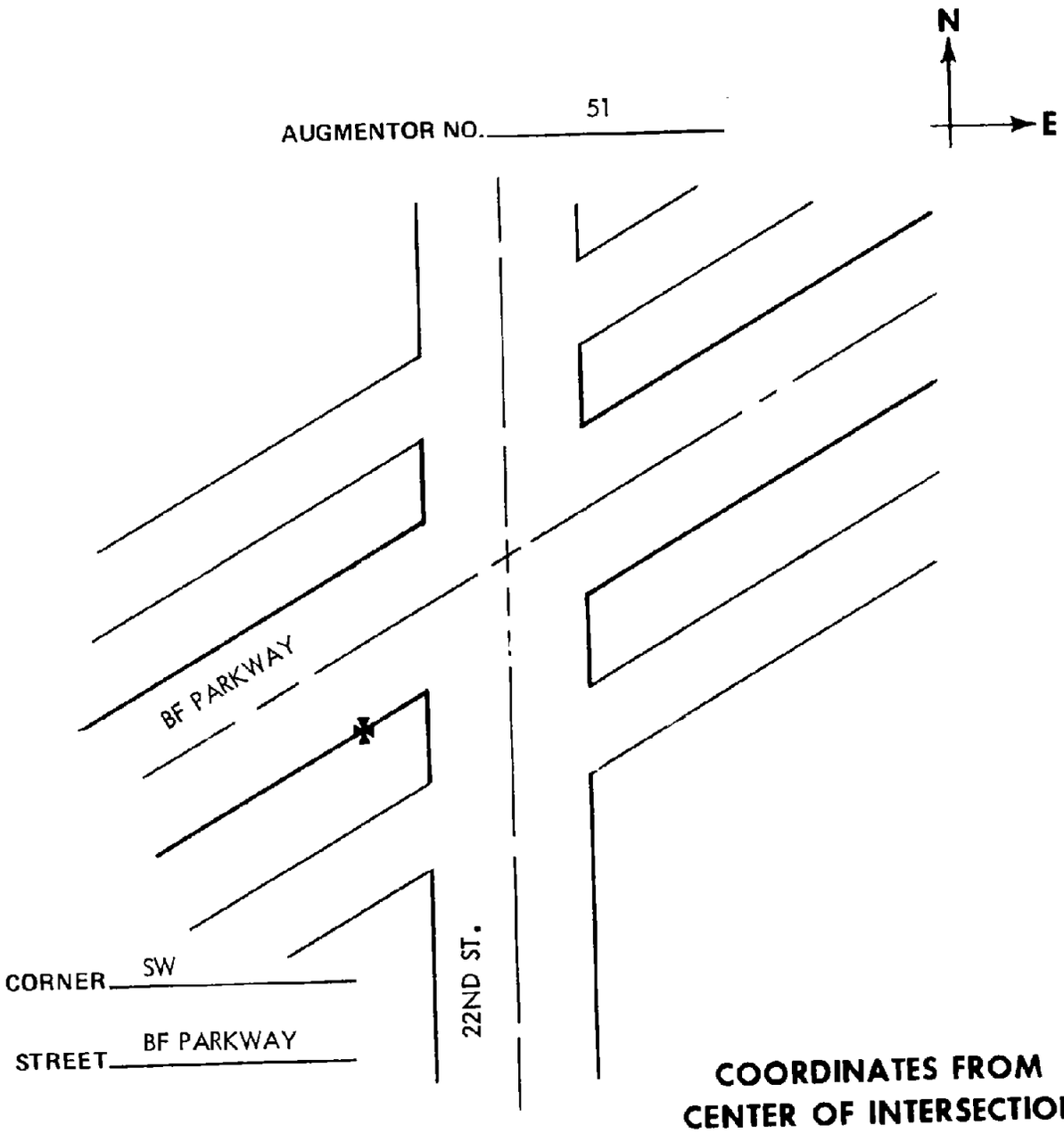
COORDINATES FROM CENTER OF INTERSECTION

15 FT SOUTH
59 FT WEST

TELEDYNE SYSTEMS COMPANY
POSITIONING SYSTEMS

AUGMENTOR LOCATION DESCRIPTION

AUGMENTOR NO. 51



CORNER SW

STREET BF PARKWAY

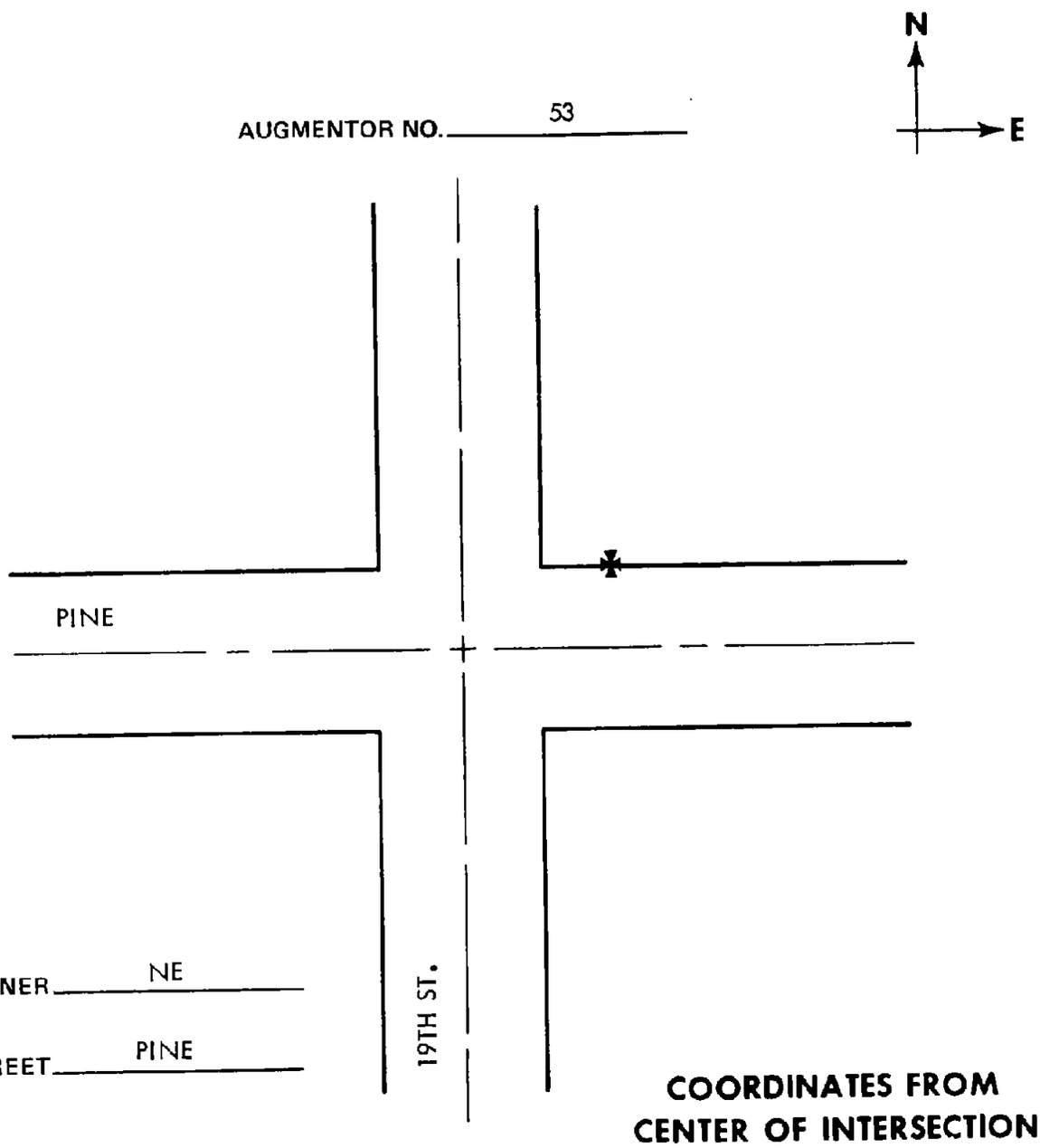
COORDINATES FROM CENTER OF INTERSECTION

45 FT SOUTH
43.5 FT WEST

TELEDYNE SYSTEMS COMPANY
POSITIONING SYSTEMS

AUGMENTOR LOCATION DESCRIPTION

AUGMENTOR NO. 53



CORNER NE

STREET PINE

COORDINATES FROM CENTER OF INTERSECTION

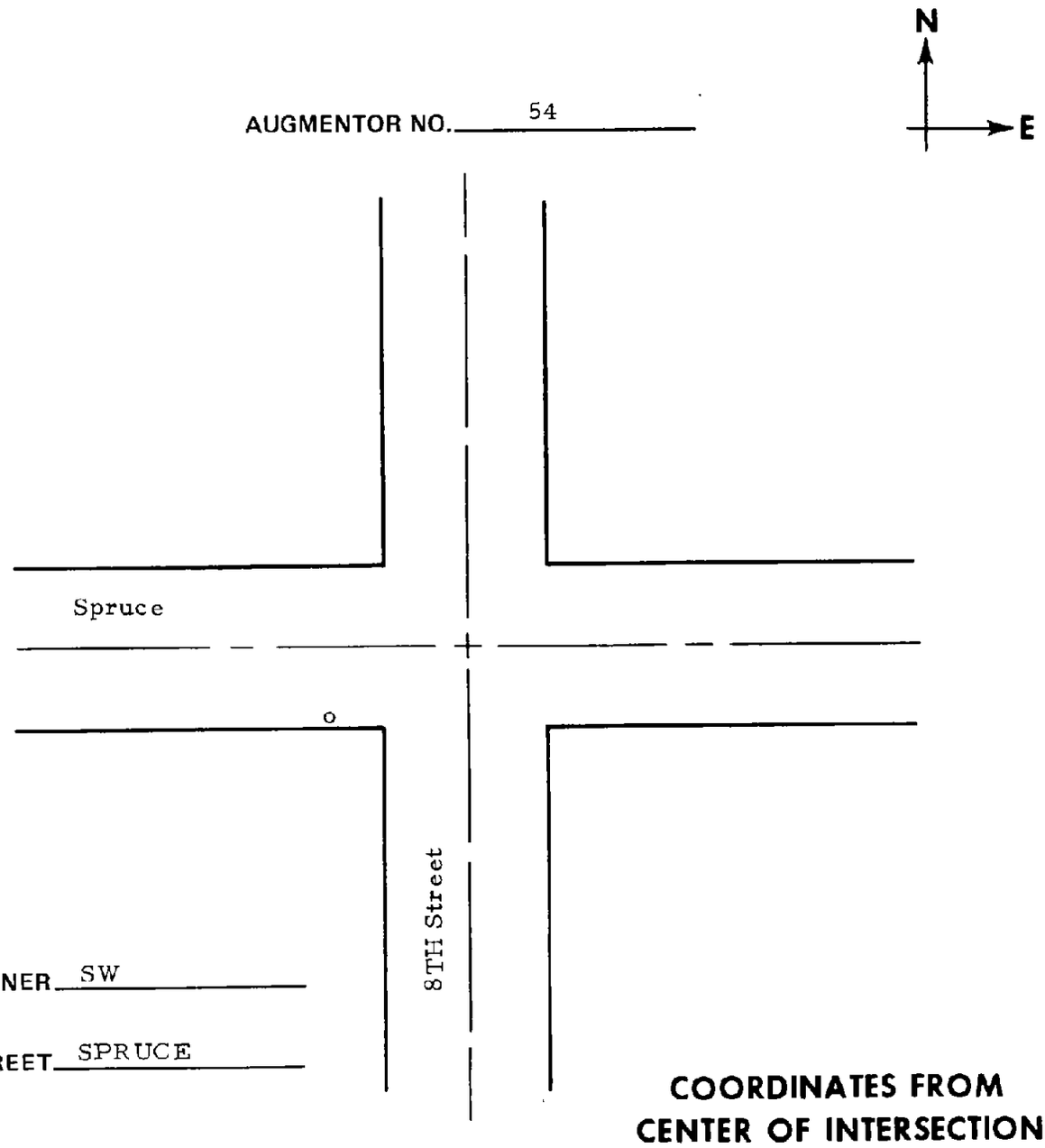
16 FT NORTH
33 FT EAST

TELEDYNE SYSTEMS COMPANY
POSITIONING SYSTEMS

Revised 1/7/77

AUGMENTOR LOCATION DESCRIPTION

AUGMENTOR NO. 54



CORNER SW

STREET SPRUCE

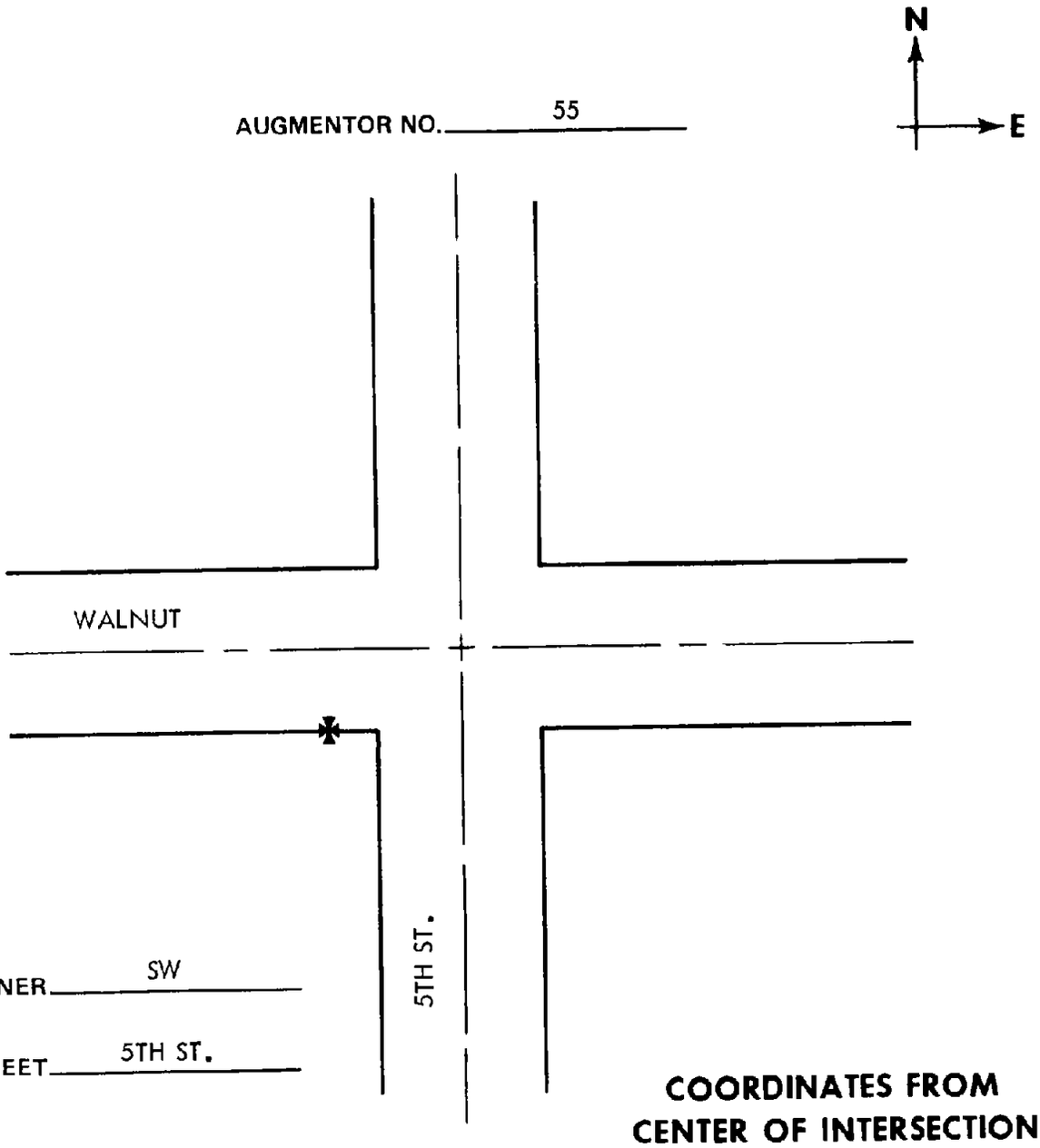
COORDINATES FROM CENTER OF INTERSECTION

16 FT SOUTH
25 FT WEST

TELEDYNE SYSTEMS COMPANY
POSITIONING SYSTEMS

AUGMENTOR LOCATION DESCRIPTION

AUGMENTOR NO. 55



CORNER SW

STREET 5TH ST.

COORDINATES FROM CENTER OF INTERSECTION

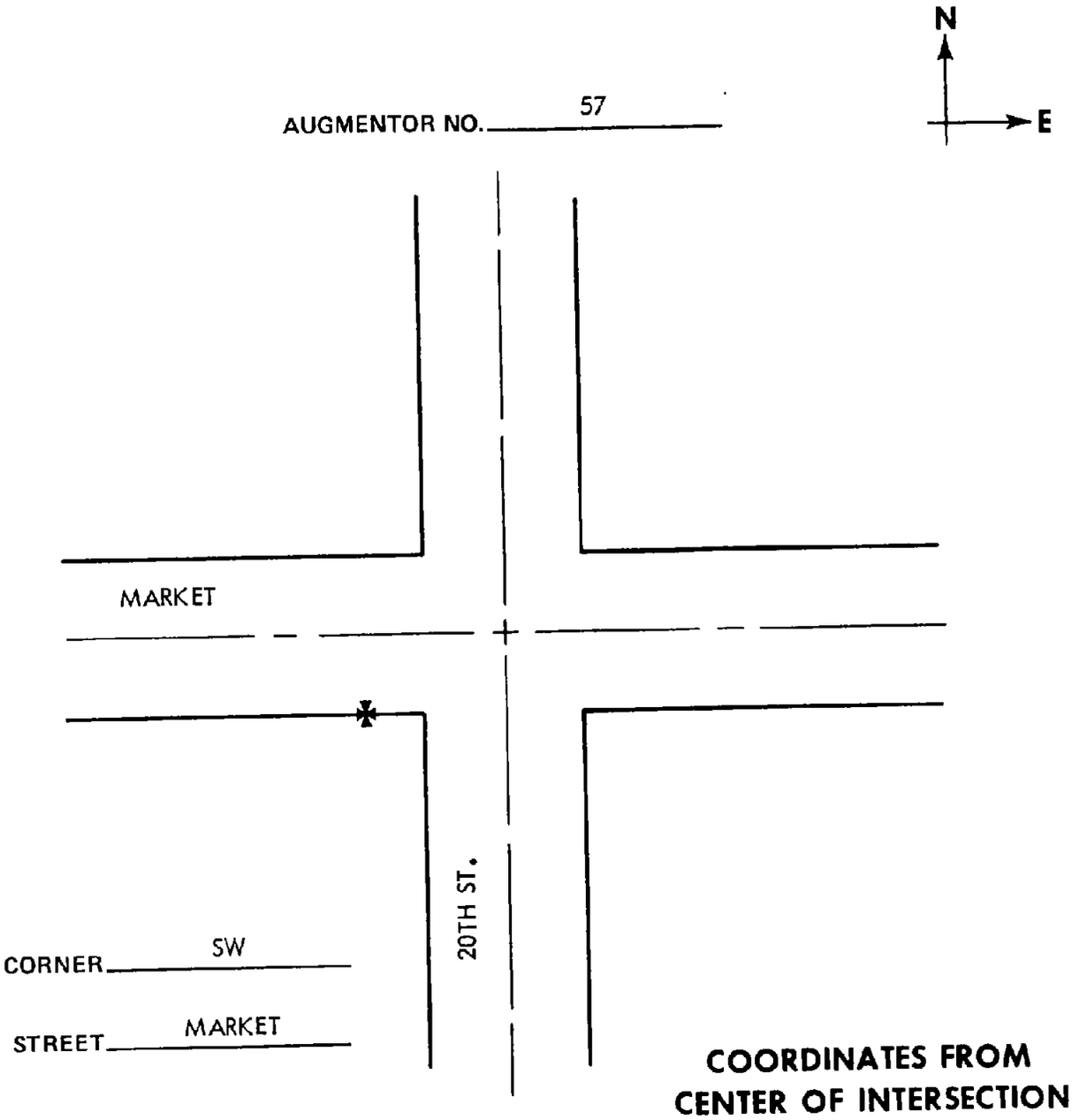
27 FT SOUTH

16 FT WEST

TELEDYNE SYSTEMS COMPANY
POSITIONING SYSTEMS

AUGMENTOR LOCATION DESCRIPTION

AUGMENTOR NO. 57



CORNER SW

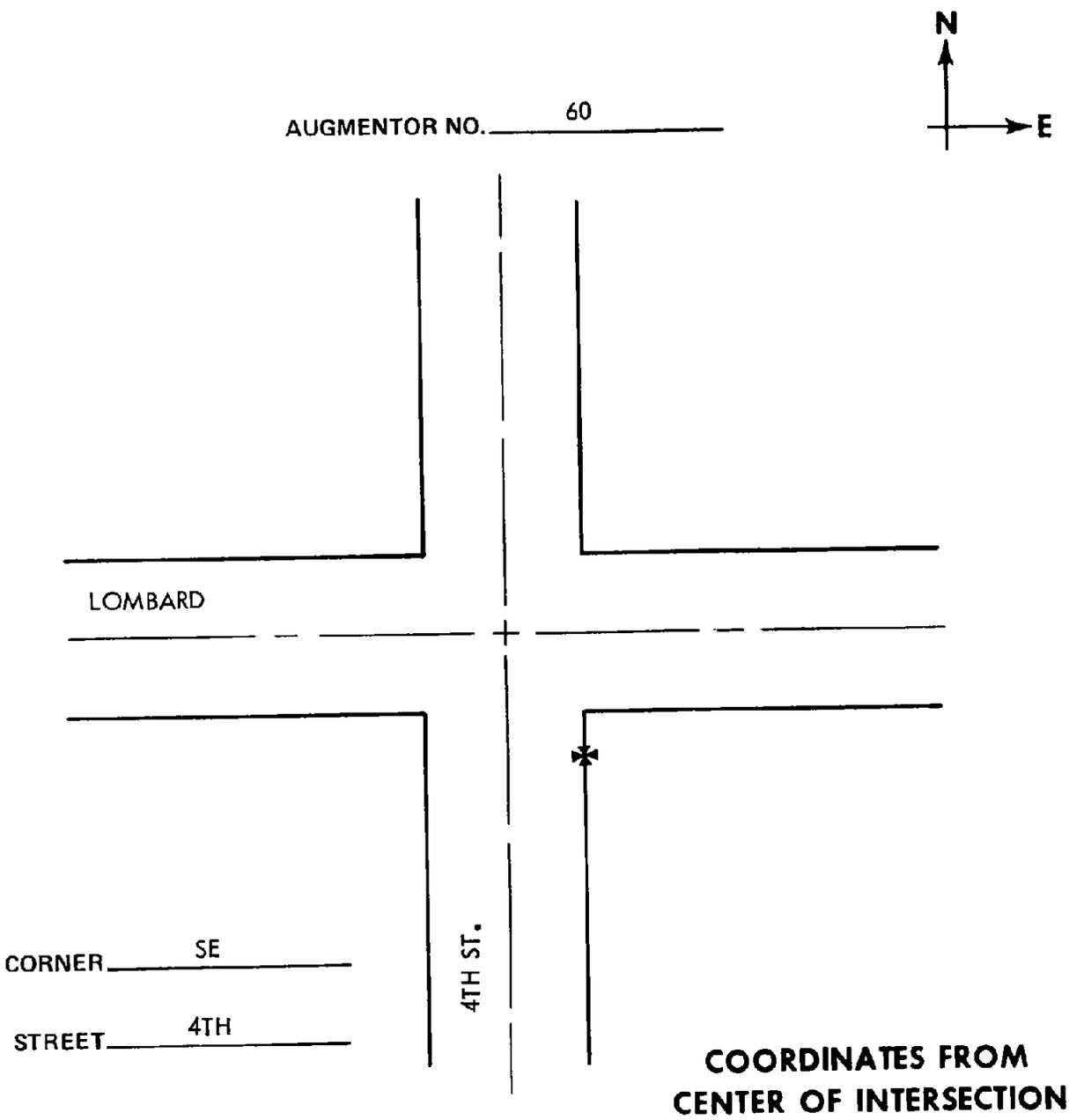
STREET MARKET

COORDINATES FROM CENTER OF INTERSECTION

33 FT SOUTH
27 FT WEST

TELEDYNE SYSTEMS COMPANY
POSITIONING SYSTEMS

AUGMENTOR LOCATION DESCRIPTION

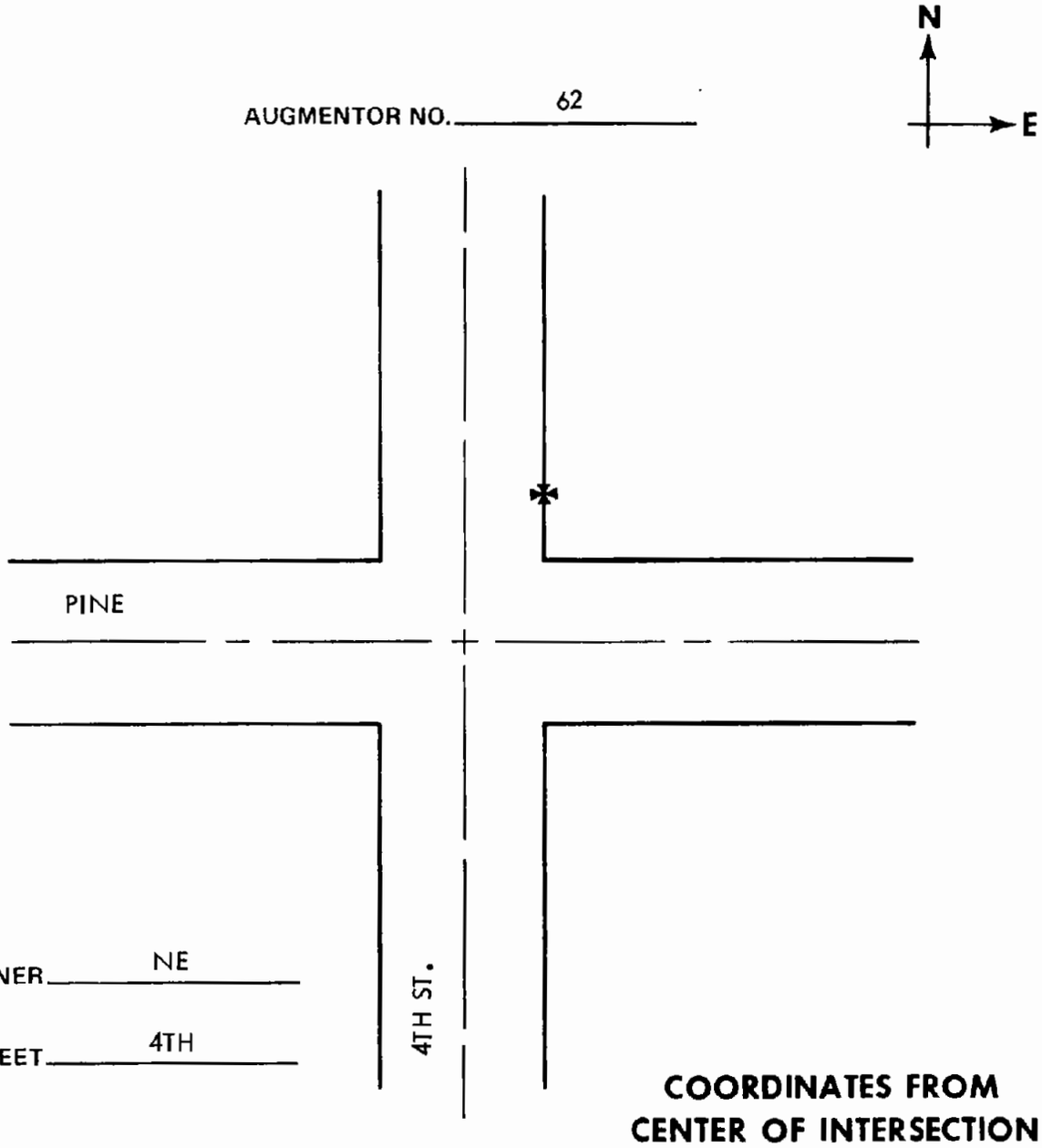


COORDINATES FROM CENTER OF INTERSECTION
25 FT SOUTH
14 FT EAST

TELEDYNE SYSTEMS COMPANY
POSITIONING SYSTEMS

AUGMENTOR LOCATION DESCRIPTION

AUGMENTOR NO. 62



CORNER NE

STREET 4TH

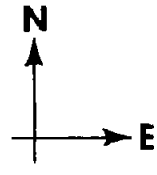
COORDINATES FROM CENTER OF INTERSECTION

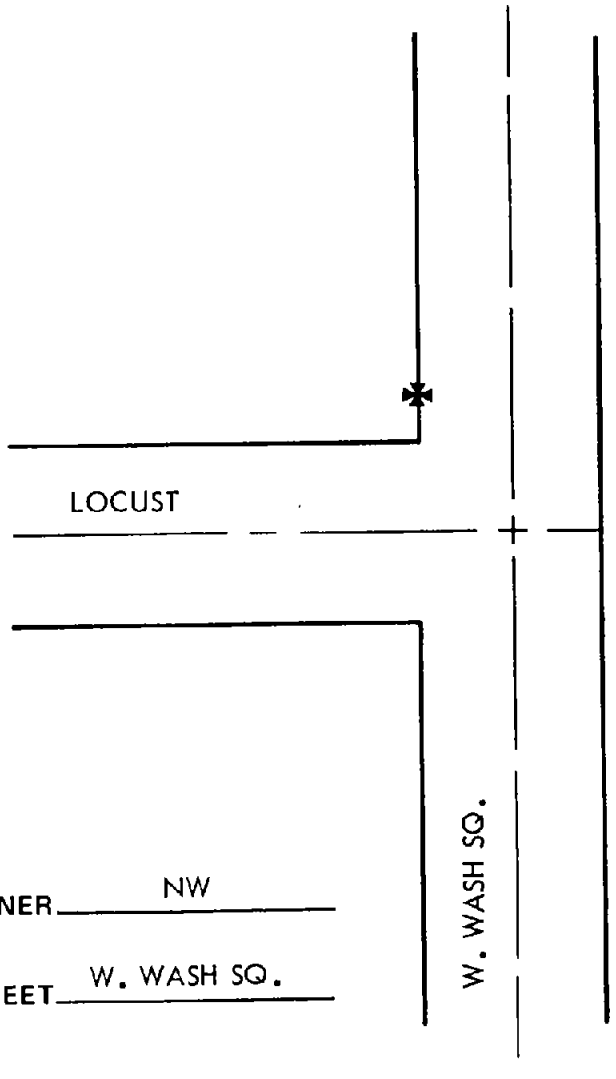
30 FT NORTH
15 FT EAST

TELEDYNE SYSTEMS COMPANY
POSITIONING SYSTEMS

AUGMENTOR LOCATION DESCRIPTION

AUGMENTOR NO. 63





CORNER NW

STREET W. WASH SQ.

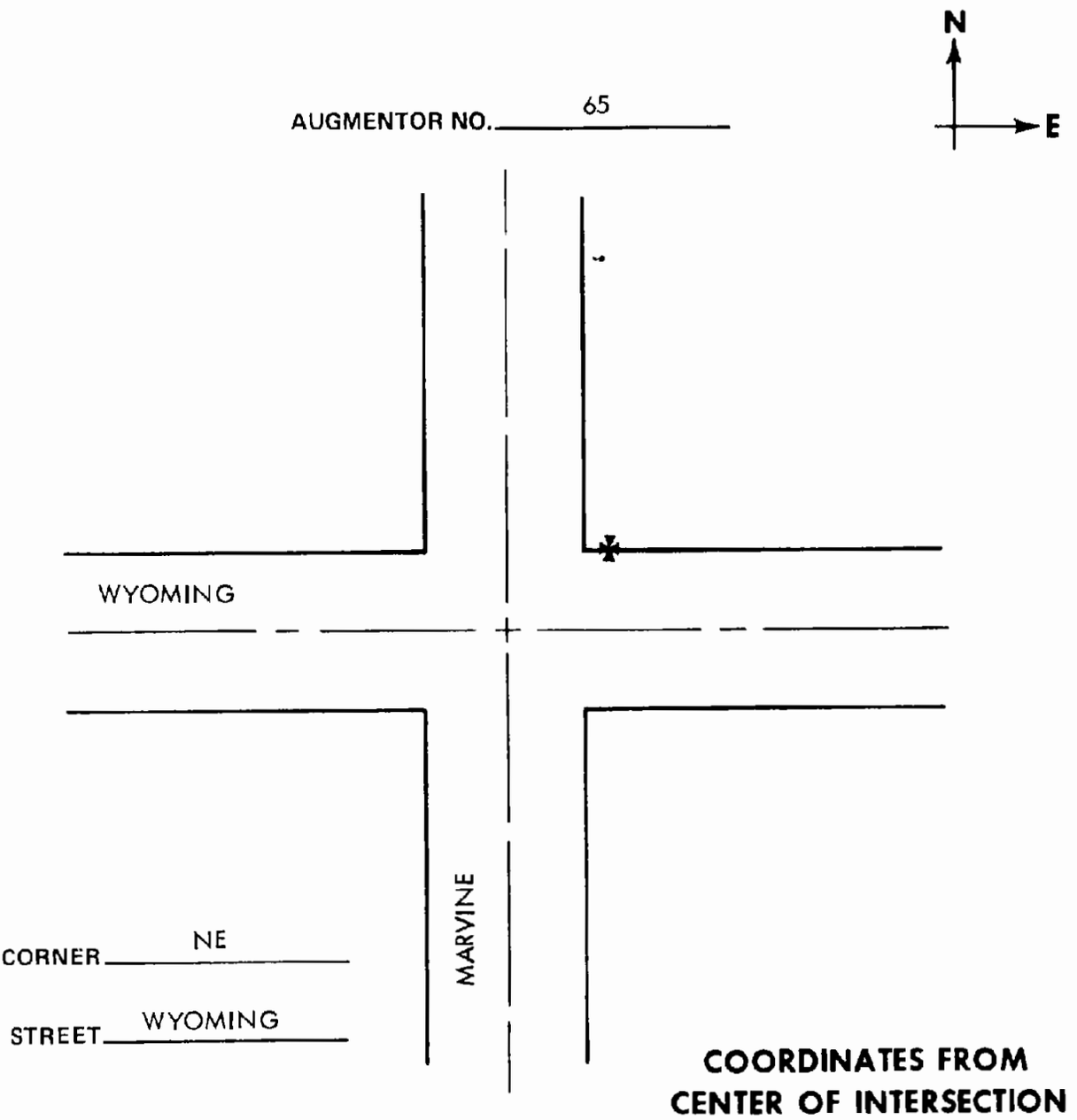
COORDINATES FROM CENTER OF INTERSECTION

26 FT NORTH
16 FT WEST

TELEDYNE SYSTEMS COMPANY
POSITIONING SYSTEMS

AUGMENTOR LOCATION DESCRIPTION

AUGMENTOR NO. 65



CORNER NE

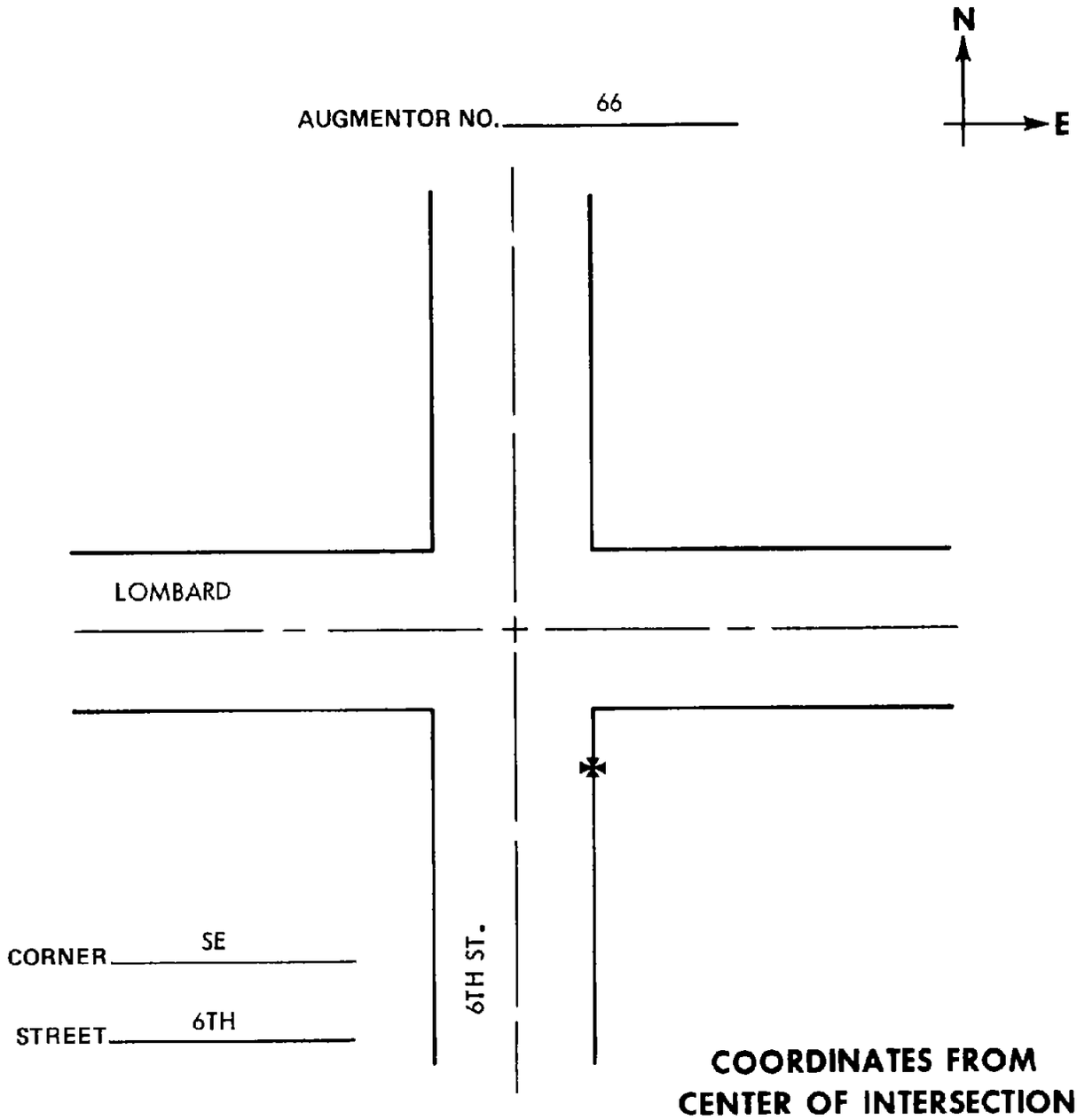
STREET WYOMING

COORDINATES FROM CENTER OF INTERSECTION

30 FT NORTH
24 FT EAST

TELEDYNE SYSTEMS COMPANY
POSITIONING SYSTEMS

AUGMENTOR LOCATION DESCRIPTION



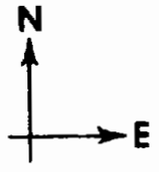
COORDINATES FROM CENTER OF INTERSECTION

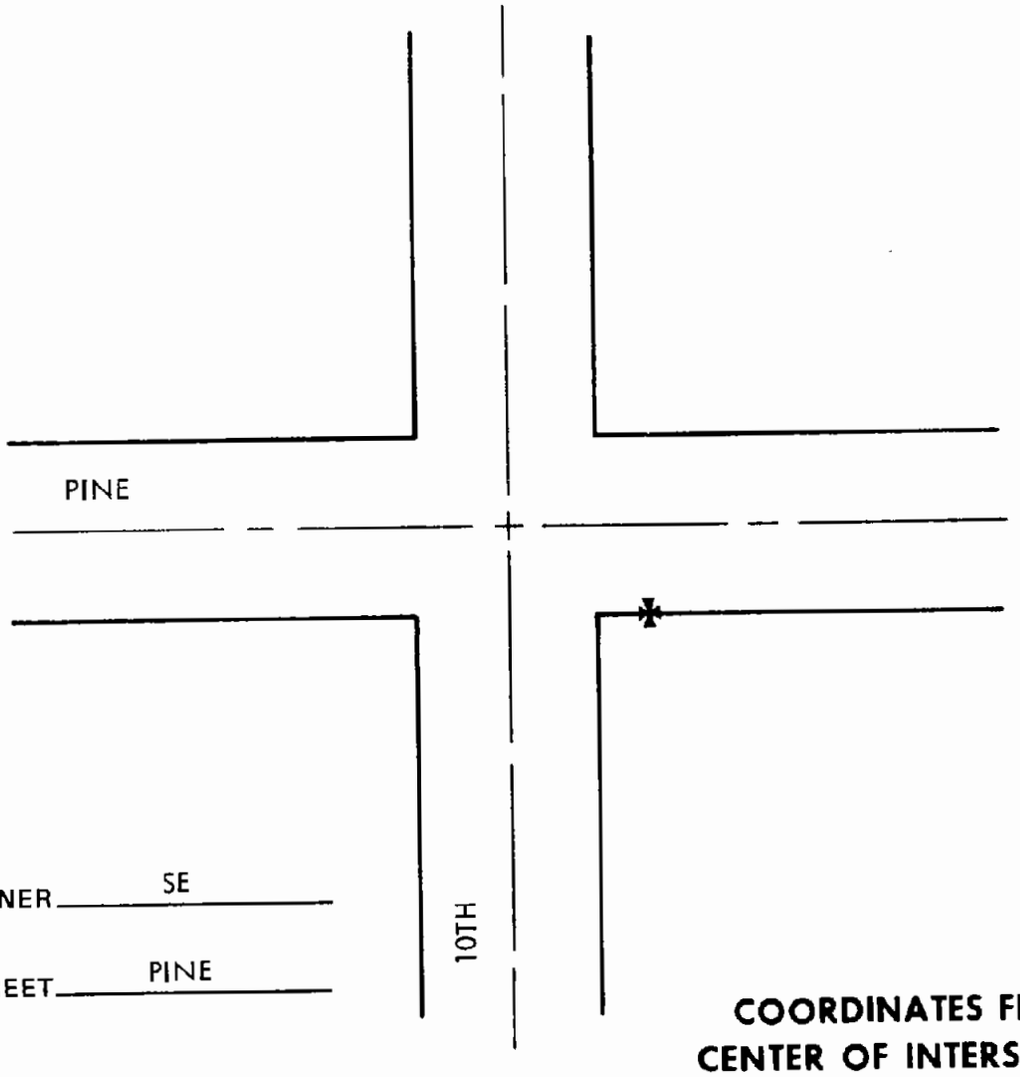
27 FT SOUTH
15 FT EAST

TELEDYNE SYSTEMS COMPANY
POSITIONING SYSTEMS

AUGMENTOR LOCATION DESCRIPTION

AUGMENTOR NO. 67





CORNER SE

STREET PINE

COORDINATES FROM CENTER OF INTERSECTION

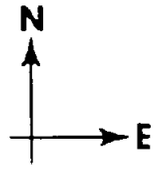
14 FT SOUTH
23 FT EAST

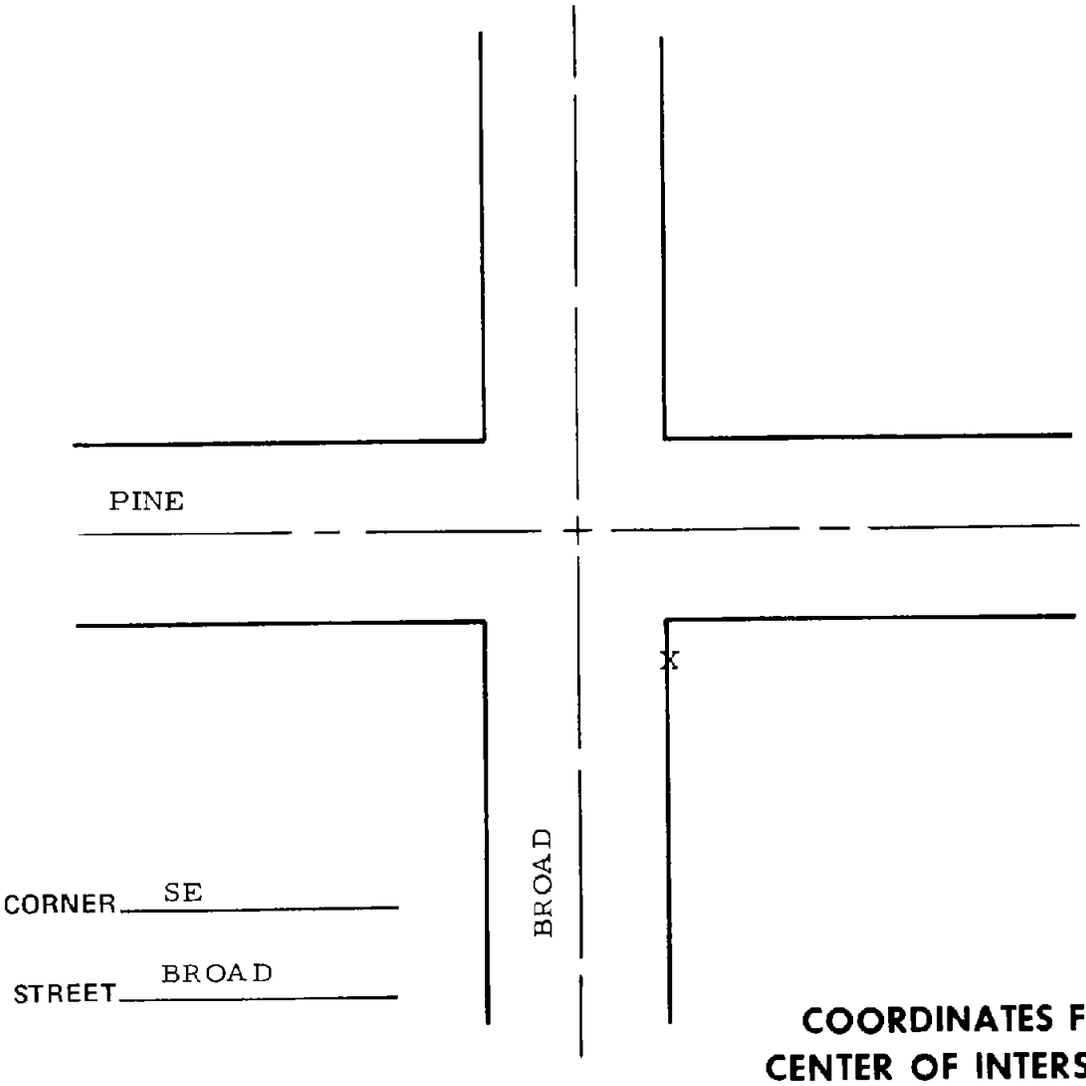
TELEDYNE SYSTEMS COMPANY
POSITIONING SYSTEMS

Revised 1/7/77

AUGMENTOR LOCATION DESCRIPTION

AUGMENTOR NO. 70





CORNER SE

STREET BROAD

COORDINATES FROM CENTER OF INTERSECTION

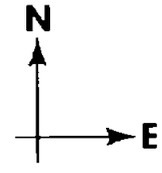
37 FT SOUTH
37 FT EAST

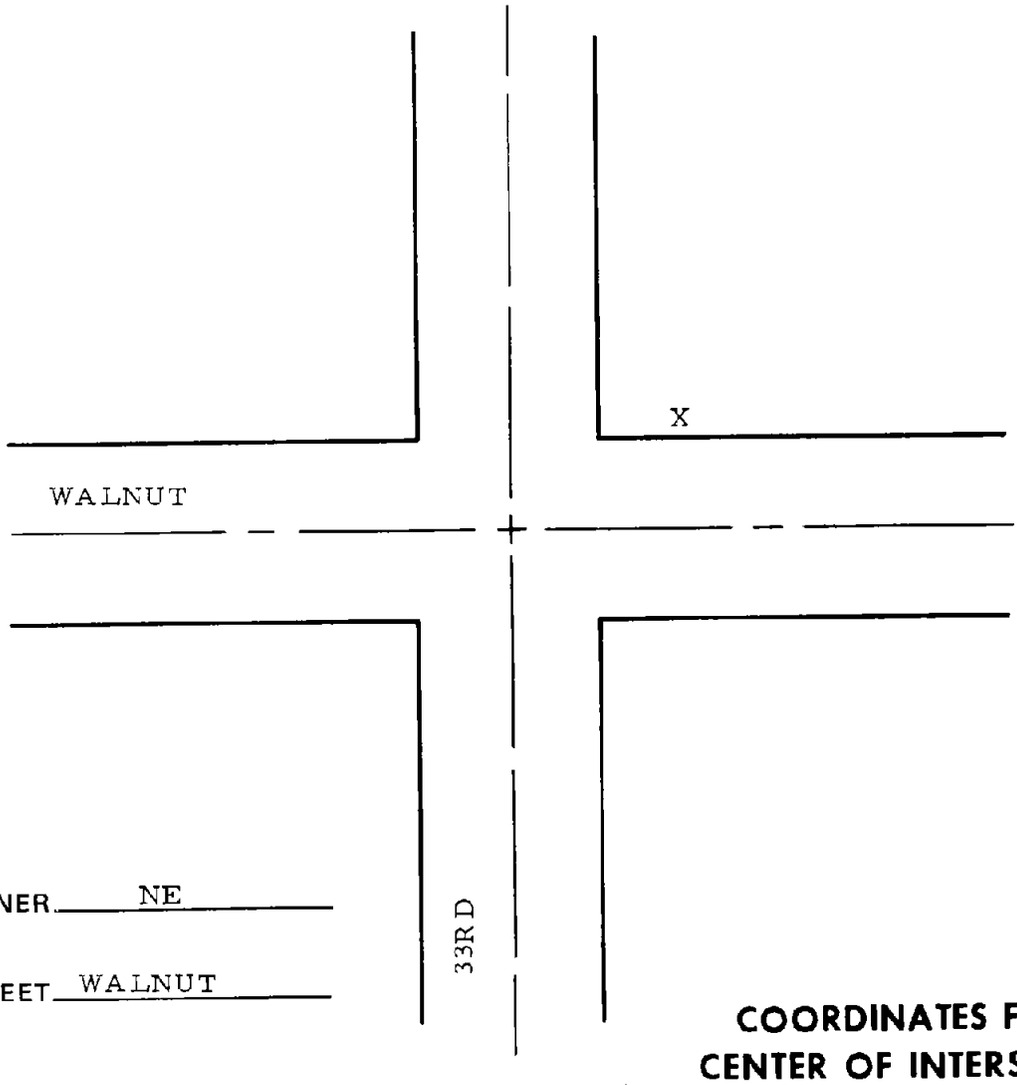
TELEDYNE SYSTEMS COMPANY
POSITIONING SYSTEMS

Revised 2-16

AUGMENTOR LOCATION DESCRIPTION

AUGMENTOR NO. 72





CORNER NE

STREET WALNUT

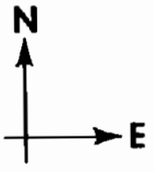
COORDINATES FROM CENTER OF INTERSECTION

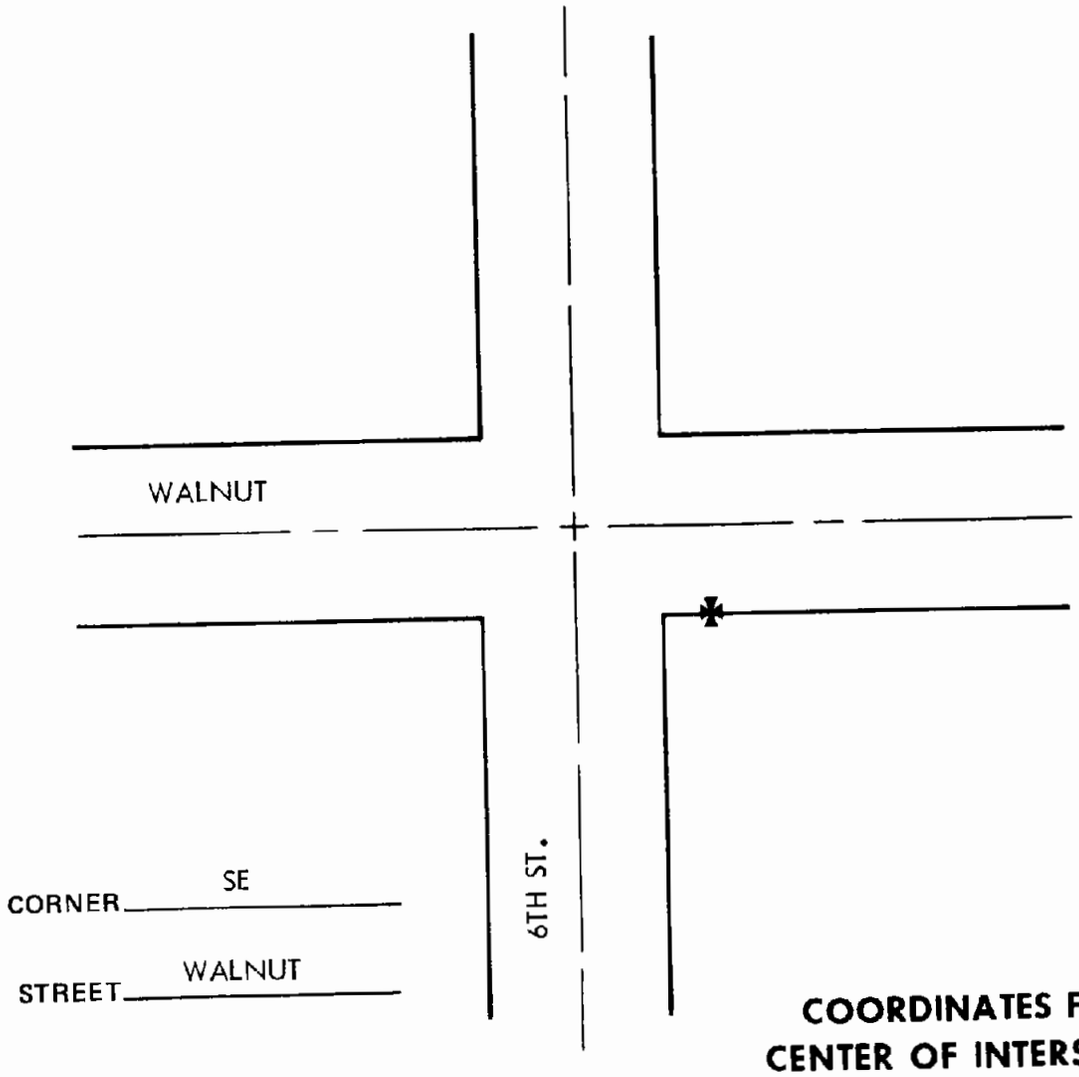
25 FT NORTH
39 FT EAST

TELEDYNE SYSTEMS COMPANY
POSITIONING SYSTEMS

AUGMENTOR LOCATION DESCRIPTION

AUGMENTOR NO. 73





CORNER SE

STREET WALNUT

COORDINATES FROM CENTER OF INTERSECTION

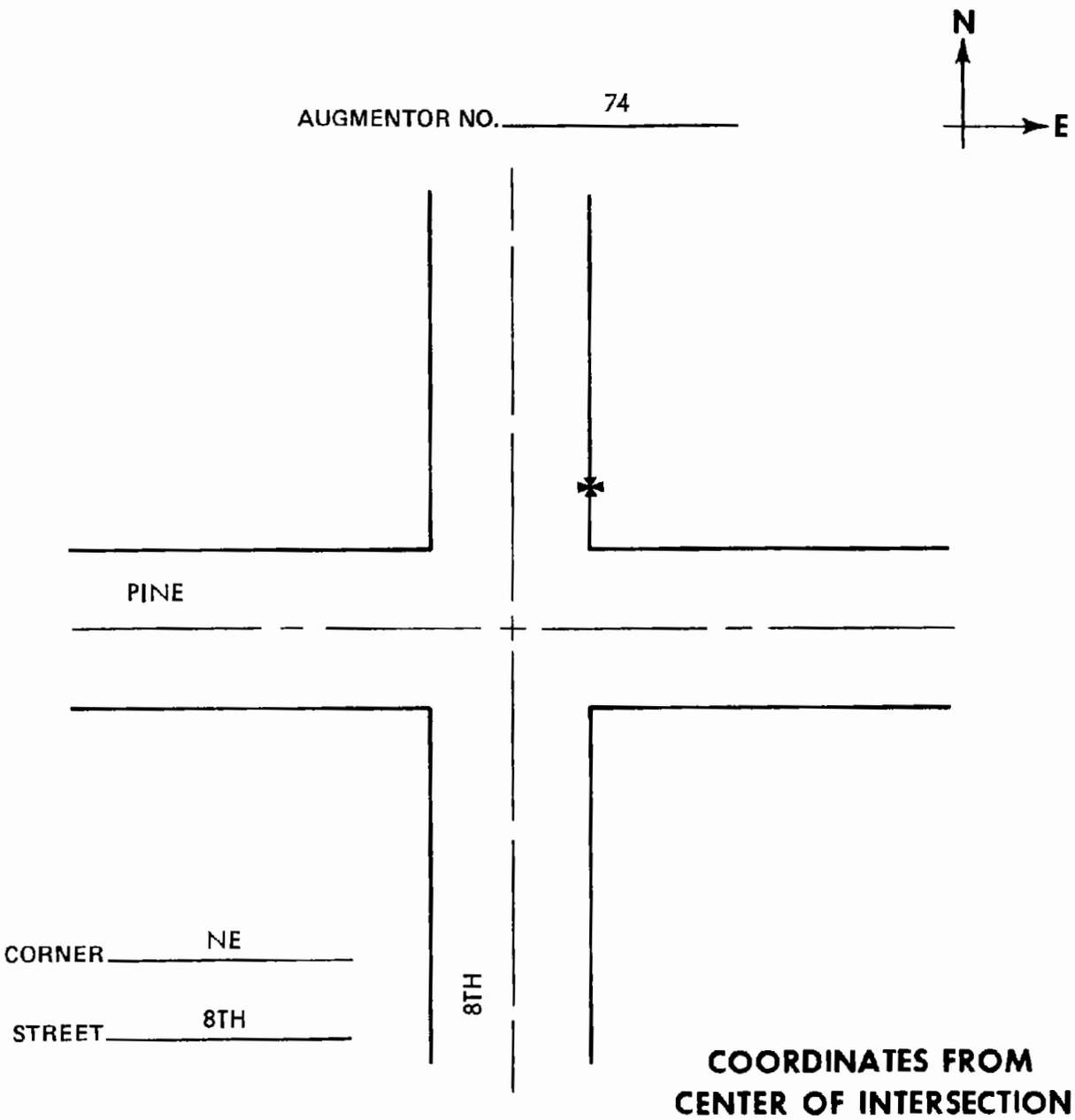
16 FT SOUTH

28 FT EAST

TELEDYNE SYSTEMS COMPANY
POSITIONING SYSTEMS

AUGMENTOR LOCATION DESCRIPTION

AUGMENTOR NO. 74



CORNER NE

STREET 8TH

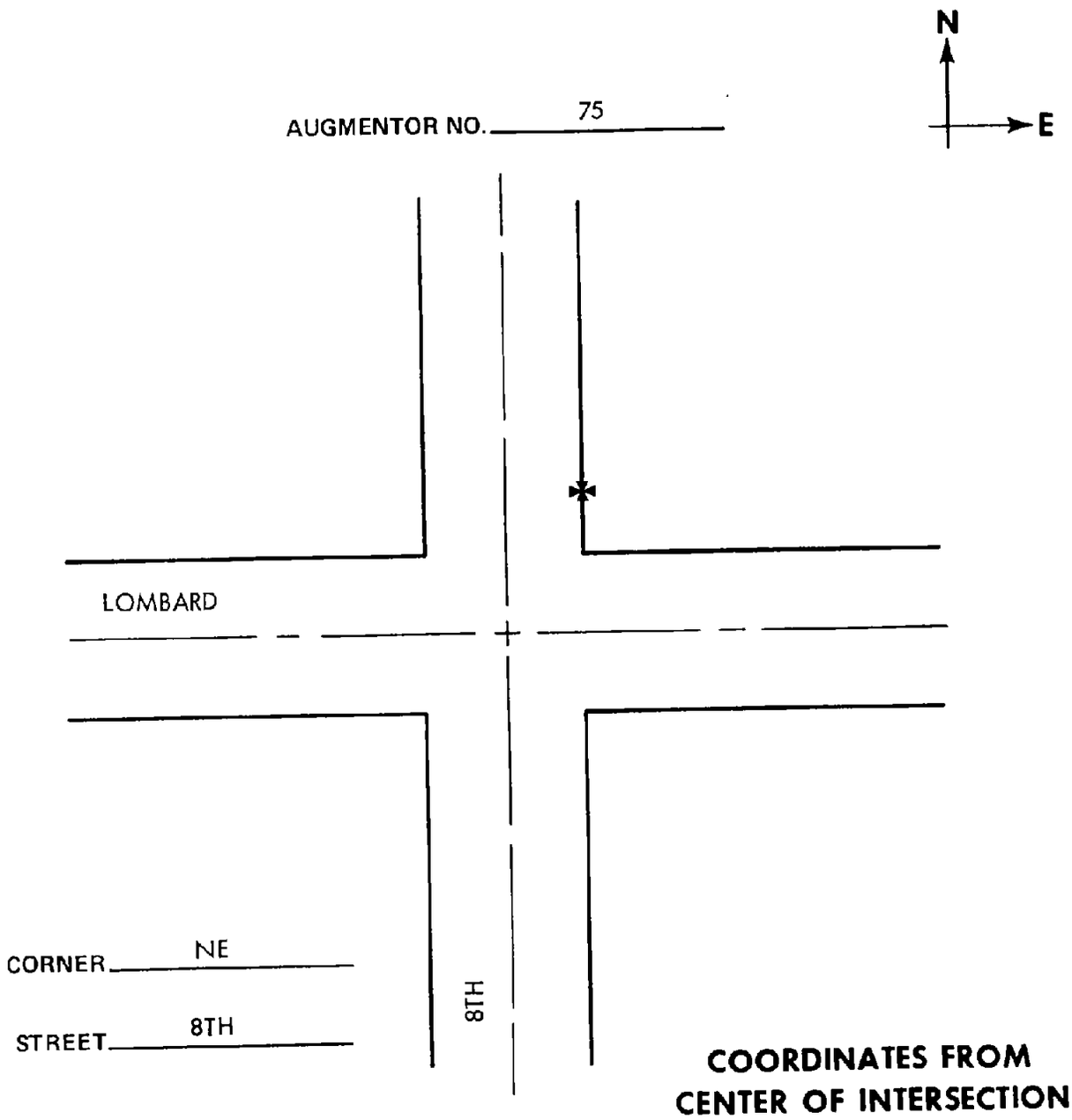
COORDINATES FROM CENTER OF INTERSECTION

30 FT NORTH
14 FT EAST

TELEDYNE SYSTEMS COMPANY
POSITIONING SYSTEMS

AUGMENTOR LOCATION DESCRIPTION

AUGMENTOR NO. 75



CORNER NE

STREET 8TH

COORDINATES FROM CENTER OF INTERSECTION

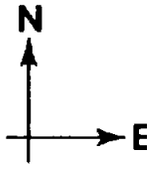
29 FT NORTH
15 FT EAST

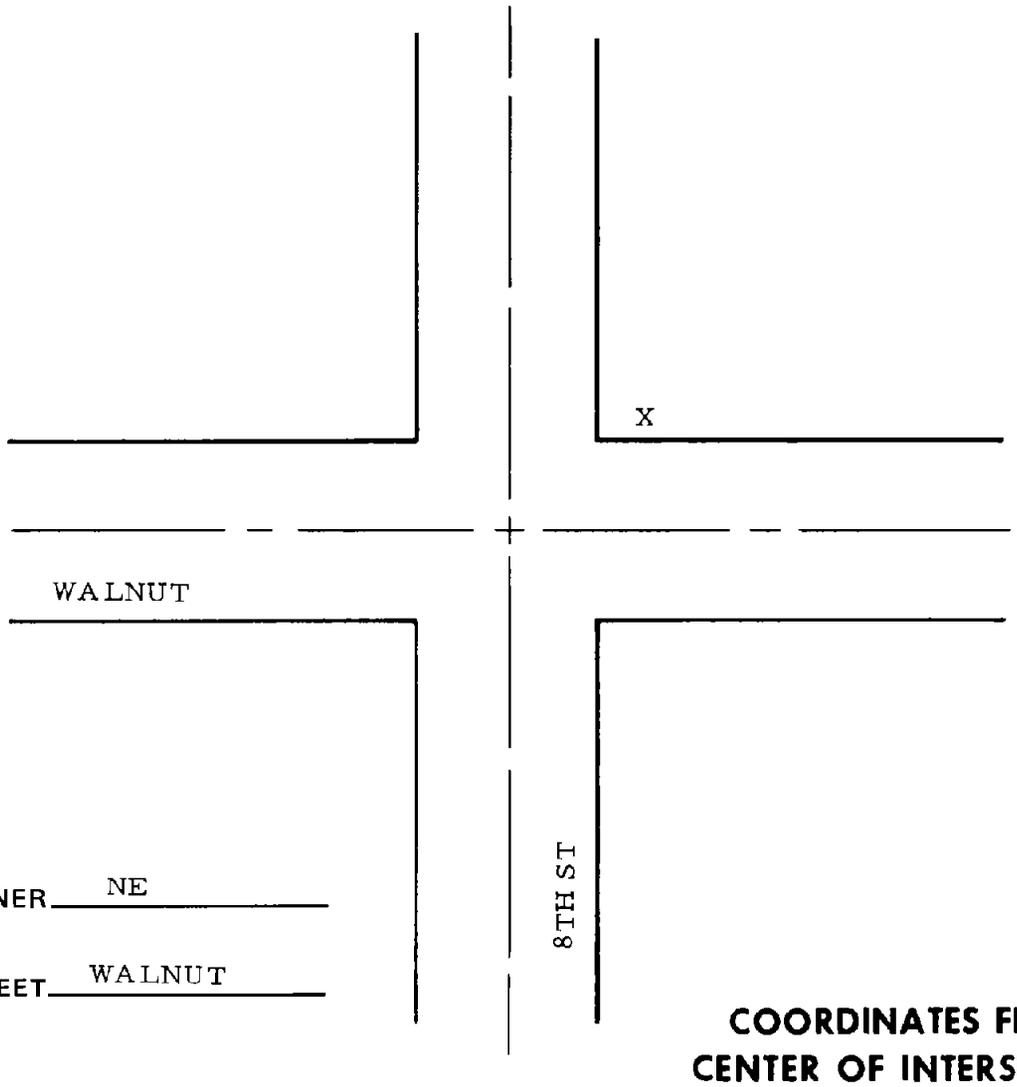
TELEDYNE SYSTEMS COMPANY
POSITIONING SYSTEMS

Revised 1/7/77

AUGMENTOR LOCATION DESCRIPTION

AUGMENTOR NO. 76





CORNER NE

STREET WALNUT

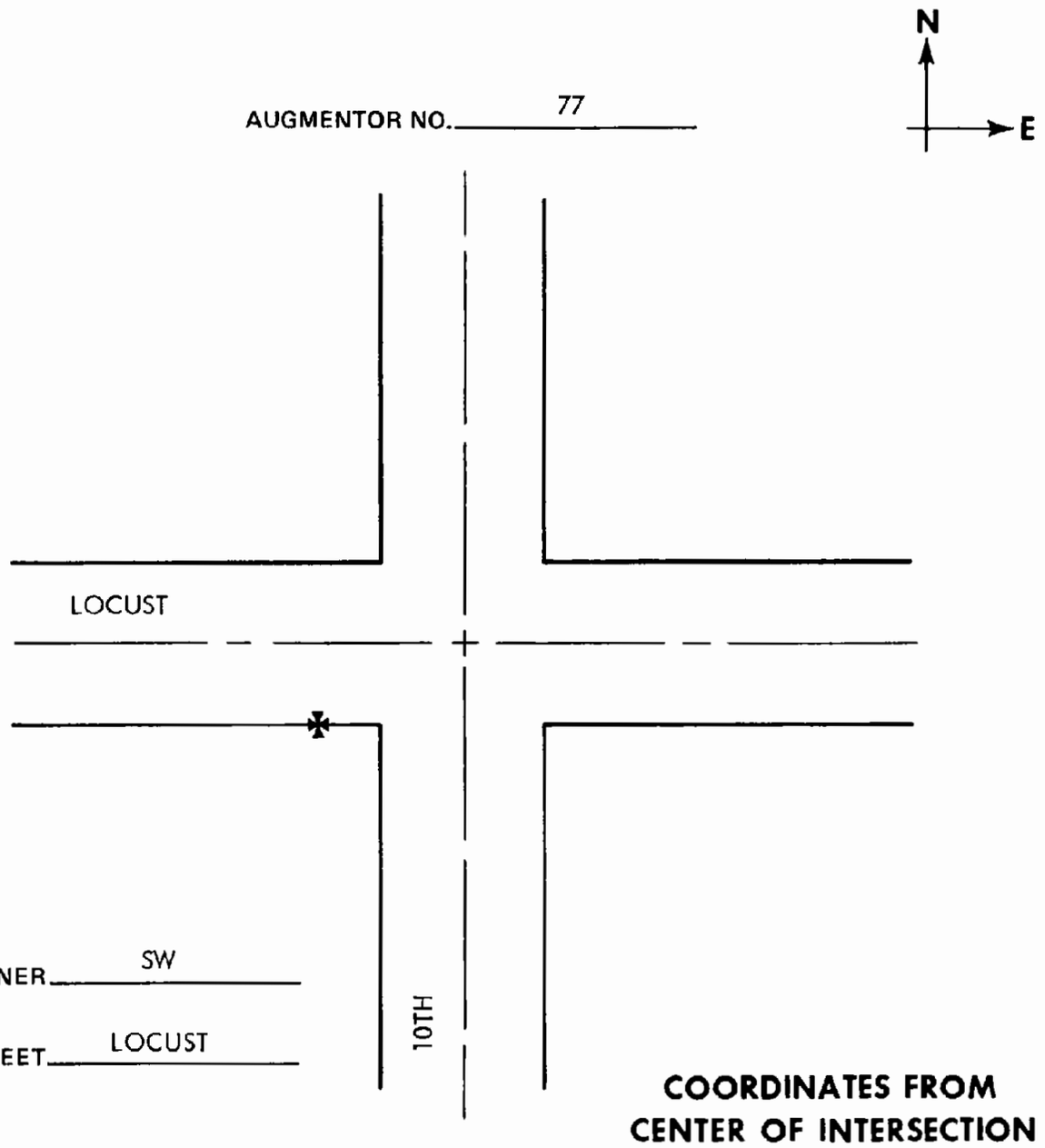
COORDINATES FROM CENTER OF INTERSECTION

15 FT NORTH
24 FT EAST

TELEDYNE SYSTEMS COMPANY
POSITIONING SYSTEMS

AUGMENTOR LOCATION DESCRIPTION

AUGMENTOR NO. 77



CORNER SW

STREET LOCUST

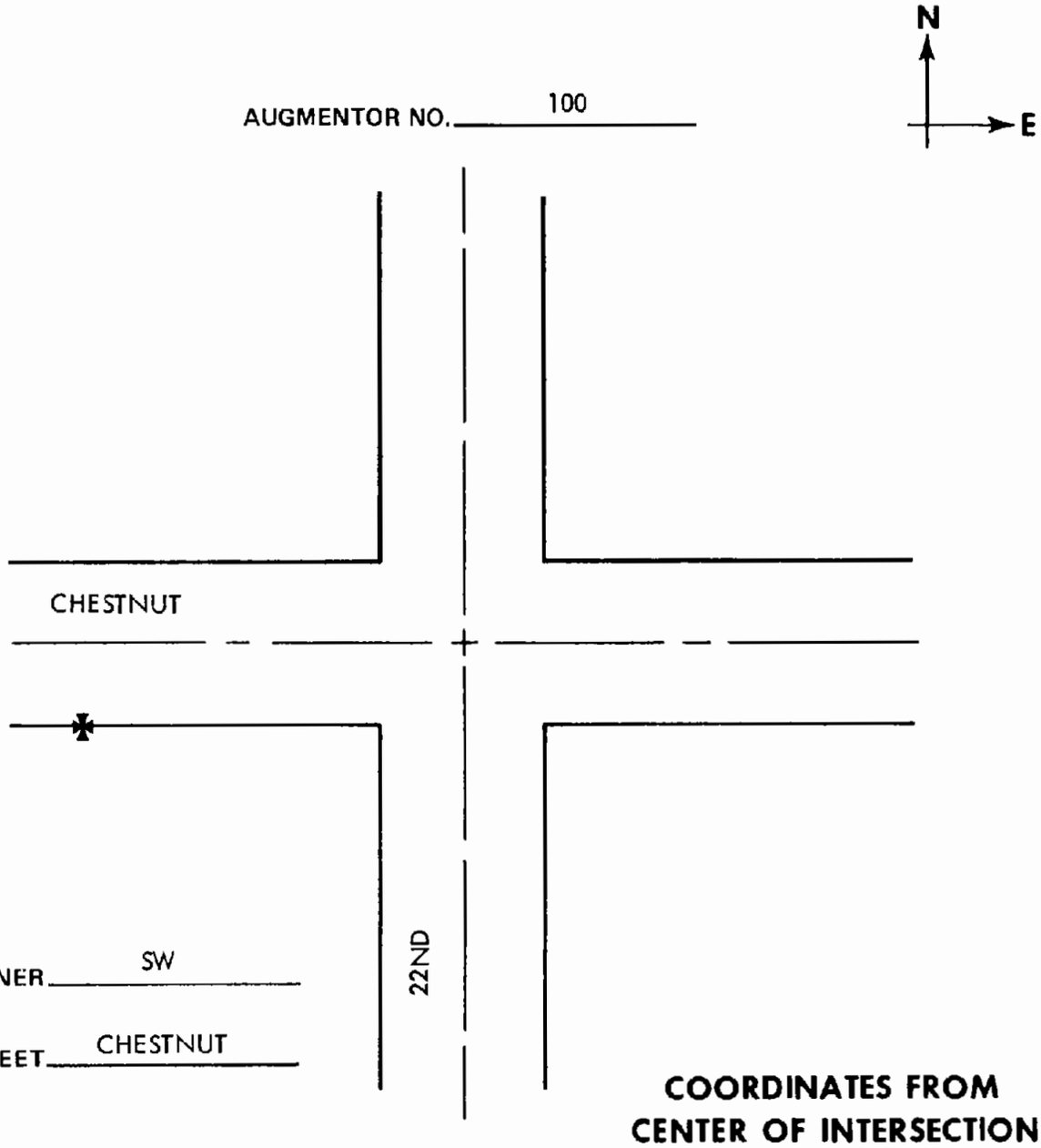
COORDINATES FROM CENTER OF INTERSECTION

15 FT SOUTH
26 FT WEST

TELEDYNE SYSTEMS COMPANY
POSITIONING SYSTEMS

AUGMENTOR LOCATION DESCRIPTION

AUGMENTOR NO. 100



CORNER SW

STREET CHESTNUT

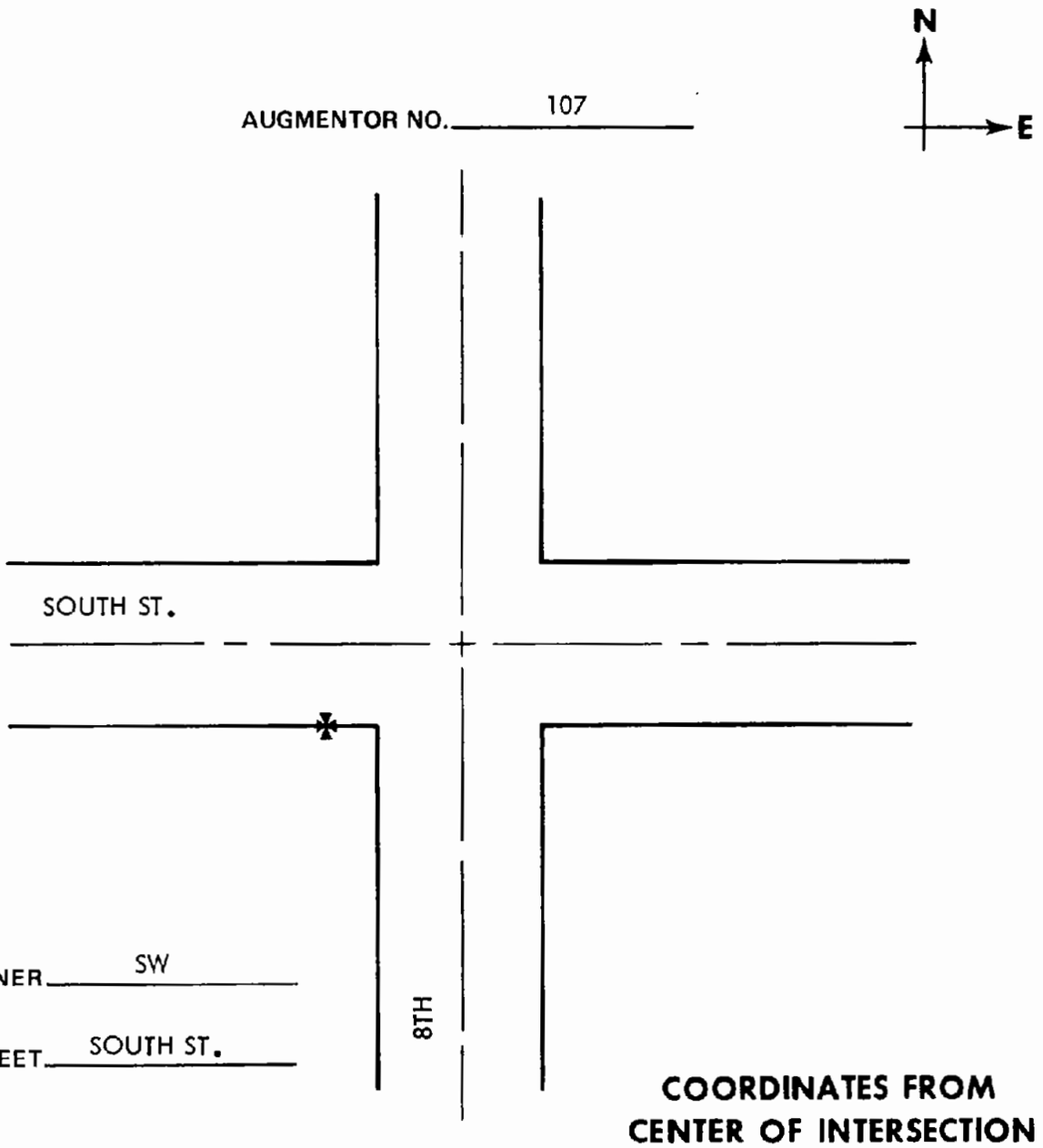
COORDINATES FROM CENTER OF INTERSECTION

21 FT SOUTH
223 FT WEST

TELEDYNE SYSTEMS COMPANY
POSITIONING SYSTEMS

AUGMENTOR LOCATION DESCRIPTION

AUGMENTOR NO. 107



CORNER SW

STREET SOUTH ST.

COORDINATES FROM CENTER OF INTERSECTION

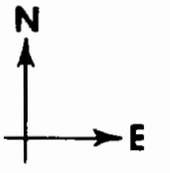
16 FT SOUTH
24 FT WEST

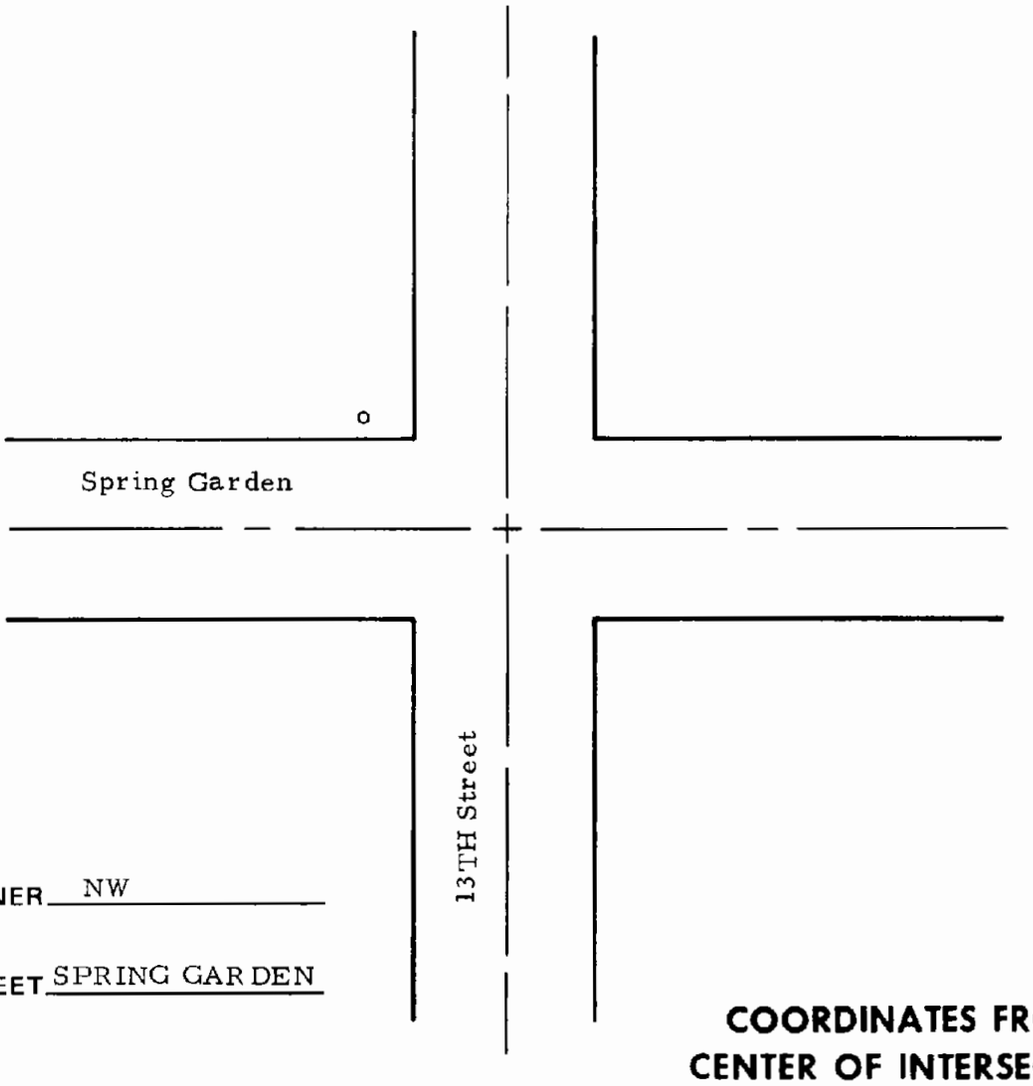
Revised 1/7/77

TELEDYNE SYSTEMS COMPANY
POSITIONING SYSTEMS

AUGMENTOR LOCATION DESCRIPTION

AUGMENTOR NO. 110





CORNER NW

STREET SPRING GARDEN

COORDINATES FROM CENTER OF INTERSECTION

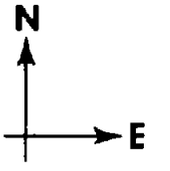
39 FT NORTH

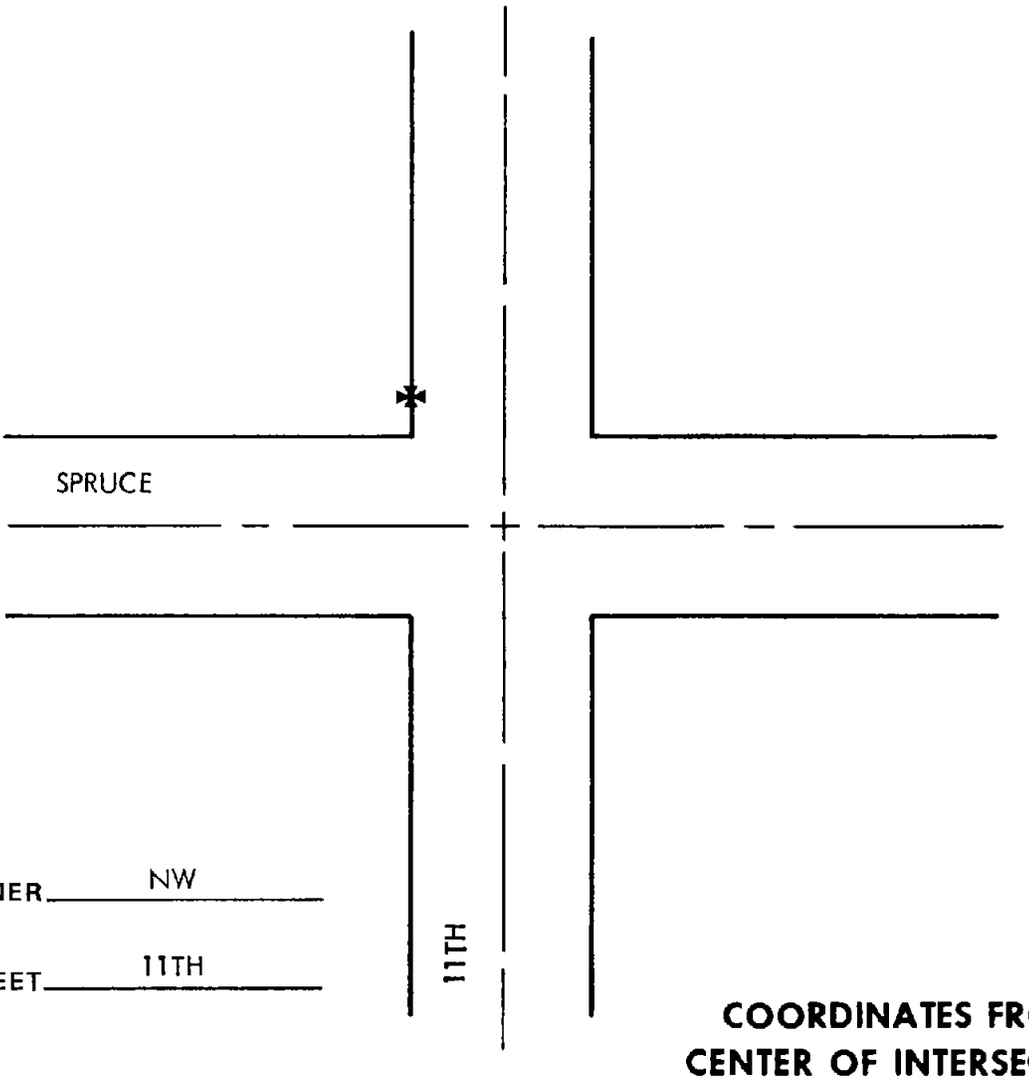
24 FT WEST

TELEDYNE SYSTEMS COMPANY
POSITIONING SYSTEMS

AUGMENTOR LOCATION DESCRIPTION

AUGMENTOR NO. 111





CORNER NW

STREET 11TH

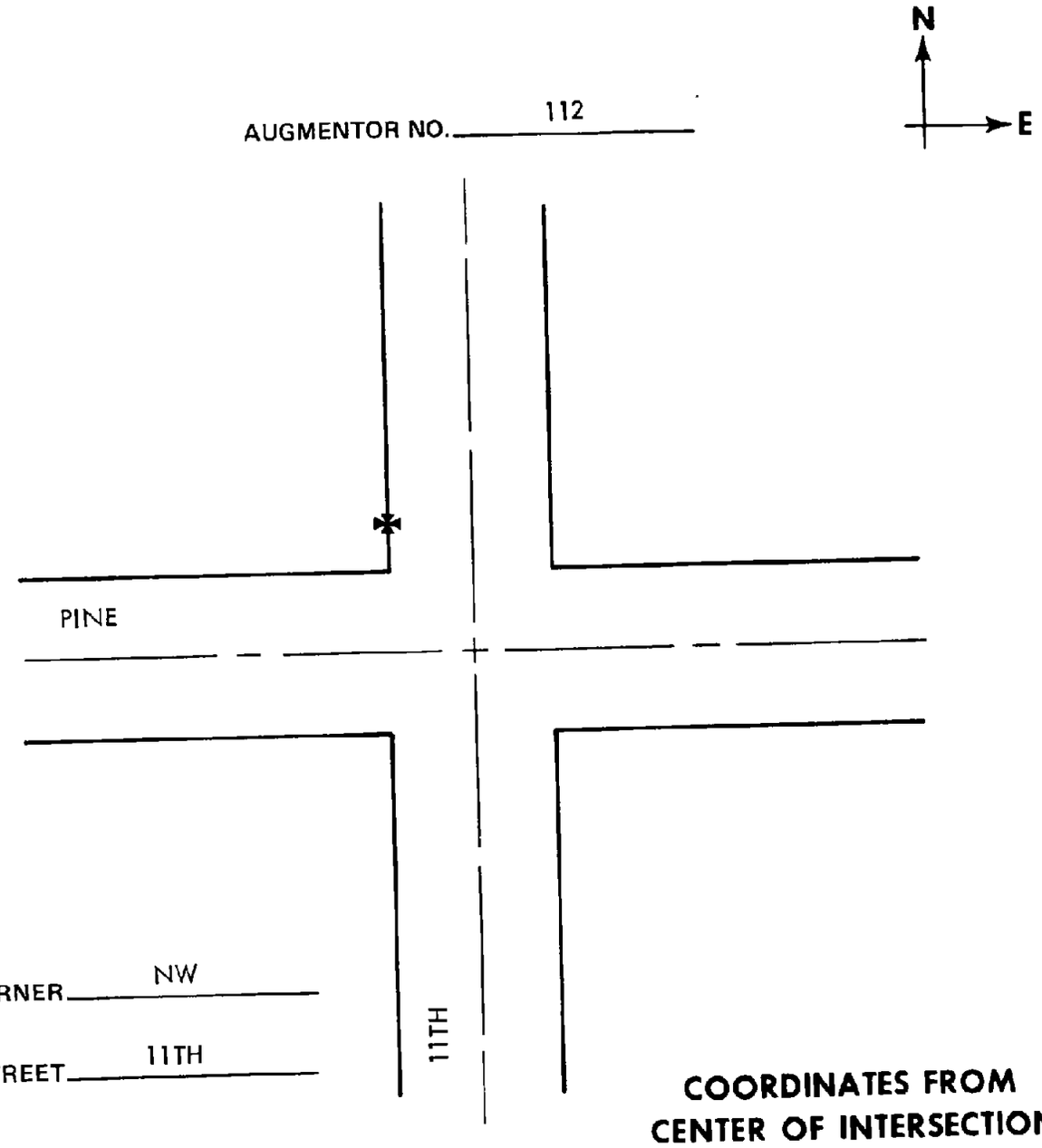
COORDINATES FROM CENTER OF INTERSECTION

28 FT NORTH
15 FT WEST

TELEDYNE SYSTEMS COMPANY
POSITIONING SYSTEMS

AUGMENTOR LOCATION DESCRIPTION

AUGMENTOR NO. 112



CORNER NW

STREET 11TH

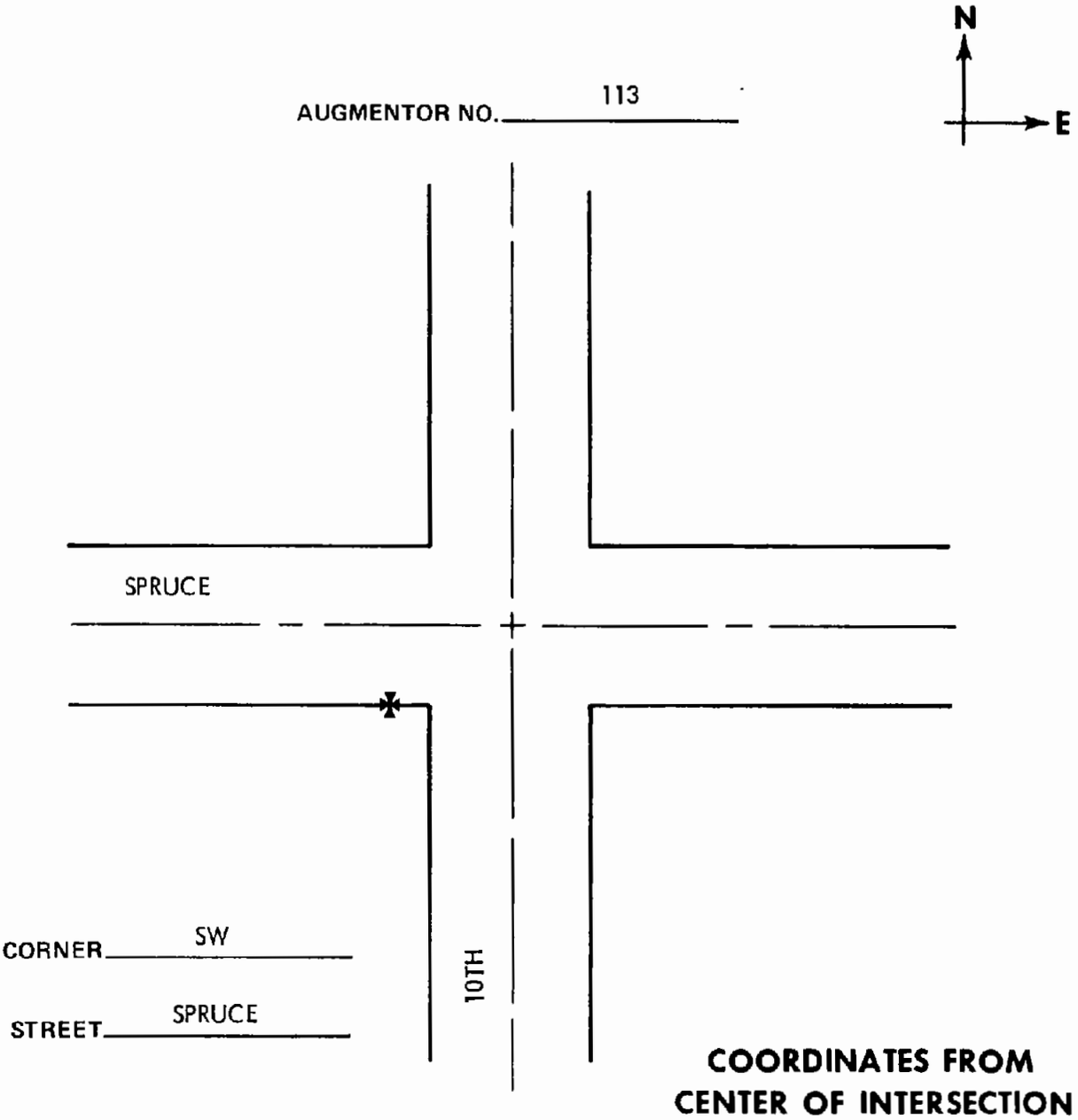
COORDINATES FROM CENTER OF INTERSECTION

26 FT NORTH
15 FT WEST

TELEDYNE SYSTEMS COMPANY
POSITIONING SYSTEMS

AUGMENTOR LOCATION DESCRIPTION

AUGMENTOR NO. 113



CORNER SW

STREET SPRUCE

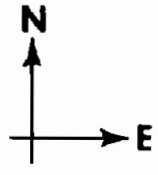
COORDINATES FROM CENTER OF INTERSECTION

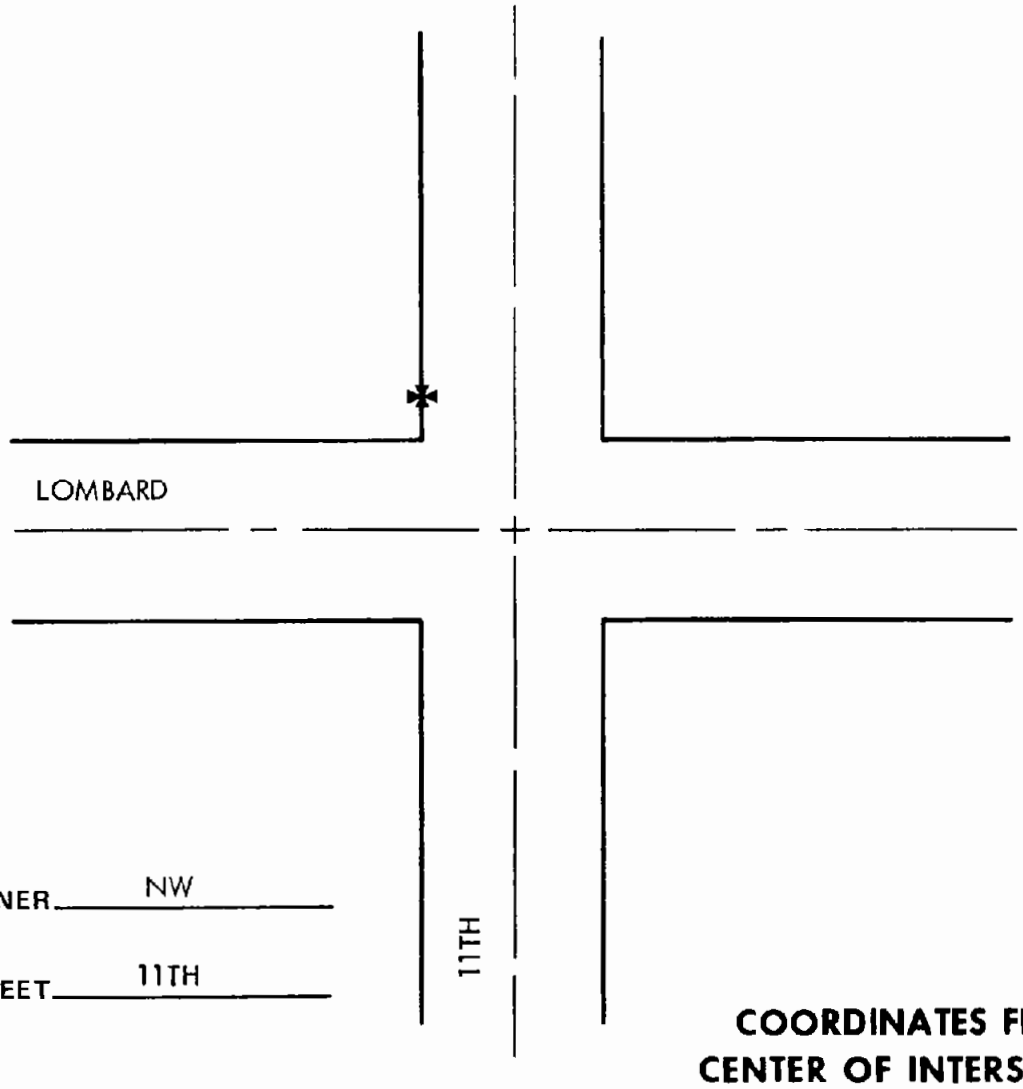
16 FT SOUTH
23 FT WEST

TELEDYNE SYSTEMS COMPANY
POSITIONING SYSTEMS

AUGMENTOR LOCATION DESCRIPTION

AUGMENTOR NO. 137





CORNER NW

STREET 11TH

COORDINATES FROM CENTER OF INTERSECTION

25 FT NORTH
15 FT WEST

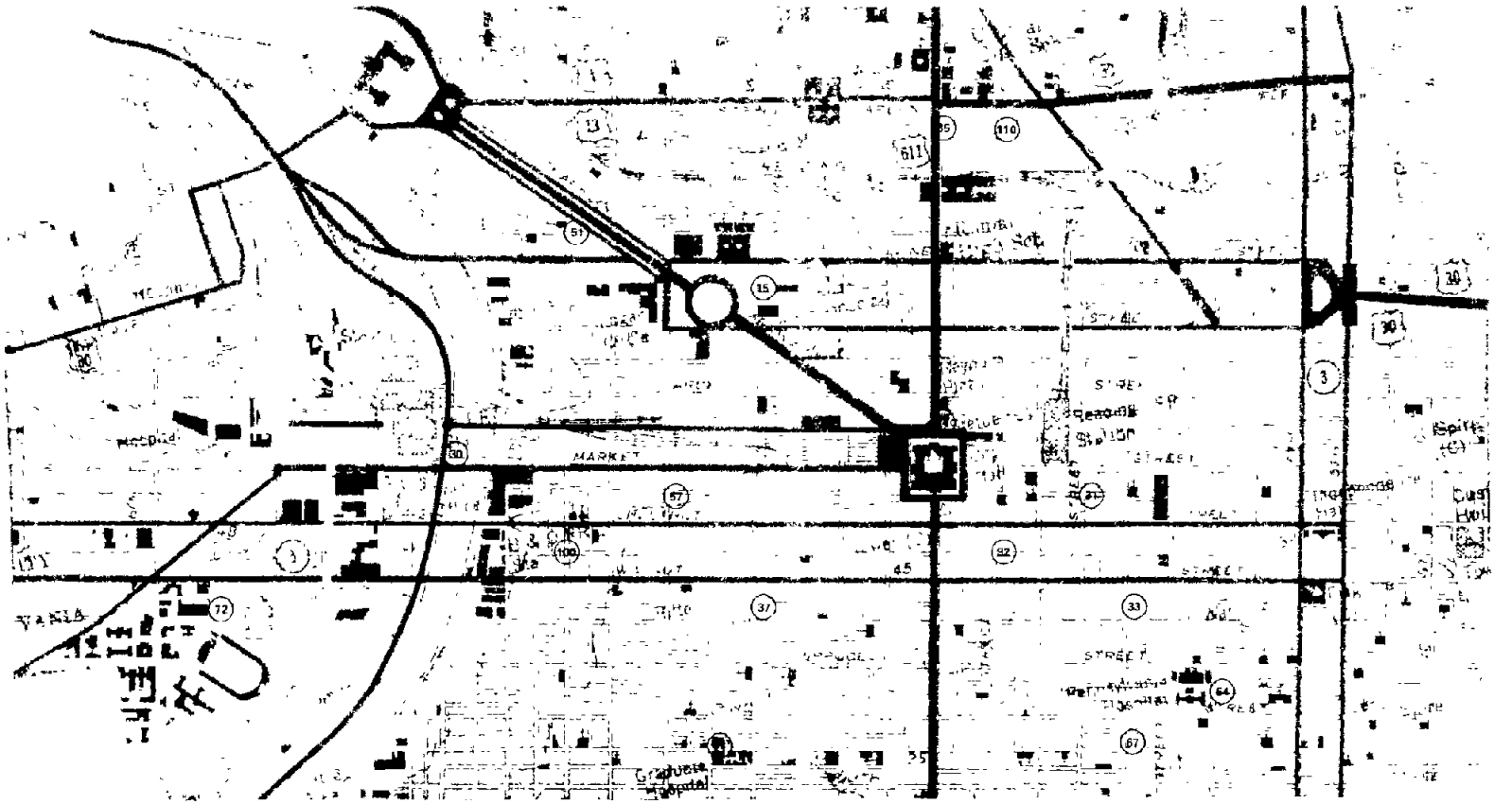


Figure C-1. Fixed Route Augmentor Deployment

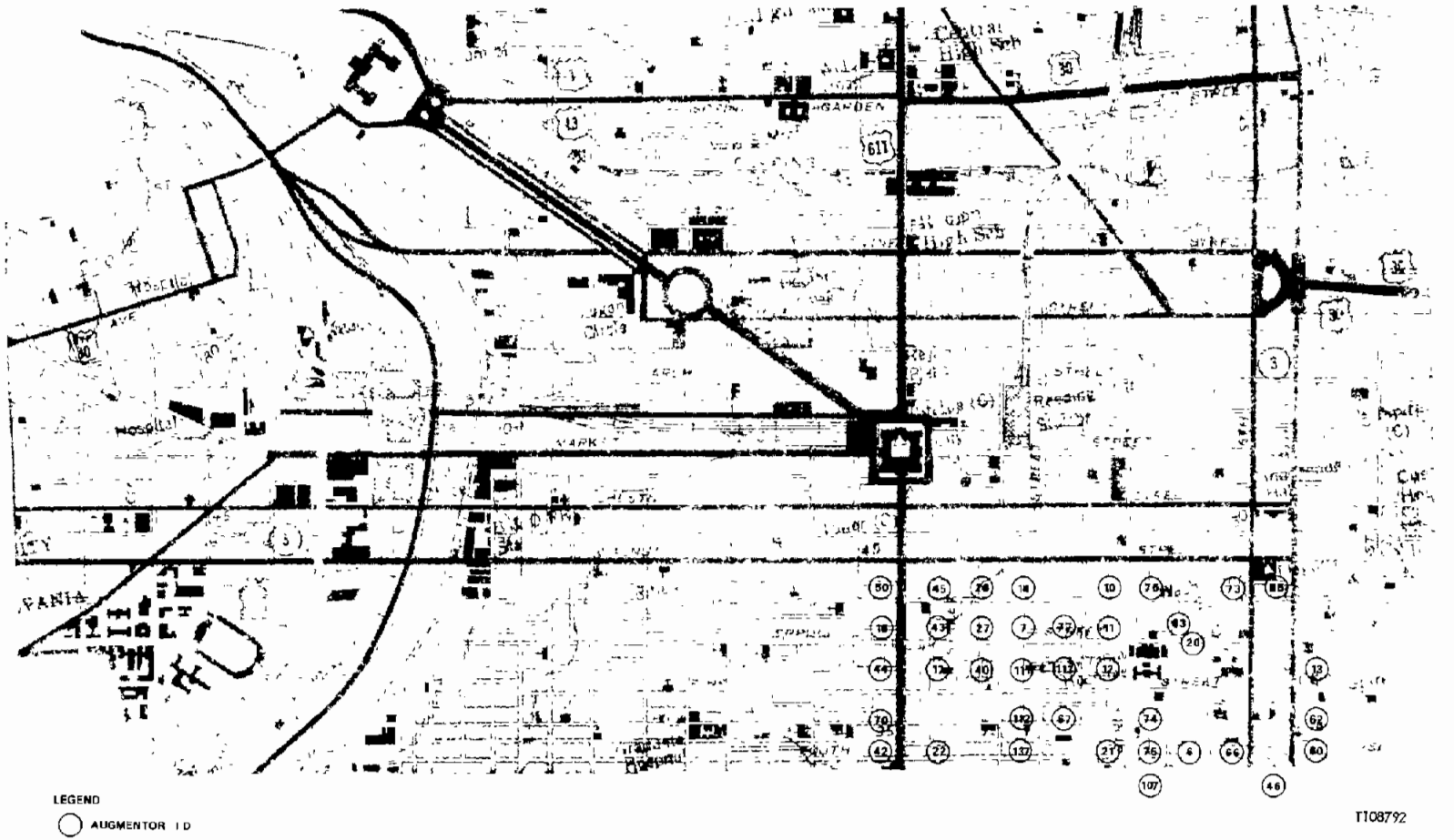


Figure C-2. Random Route Augmentor Deployment

APPENDIX D

TYPICAL MONITOR STATION
STRIPCHART RECORDING

APPENDIX D

The following stripchart recording is for February 1, 1977 and is a typical sample of the type of monitor station data recorded during a days test.

The legend and calibrated values are given on the chart for its interpretation.