
Distribution Fault Location

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Problem Formulation

- Node maps show multiple fault locations or inaccurate position
 - SCADA information is not being utilized to its maximum potential
 - Fault distances are difficult to interpret
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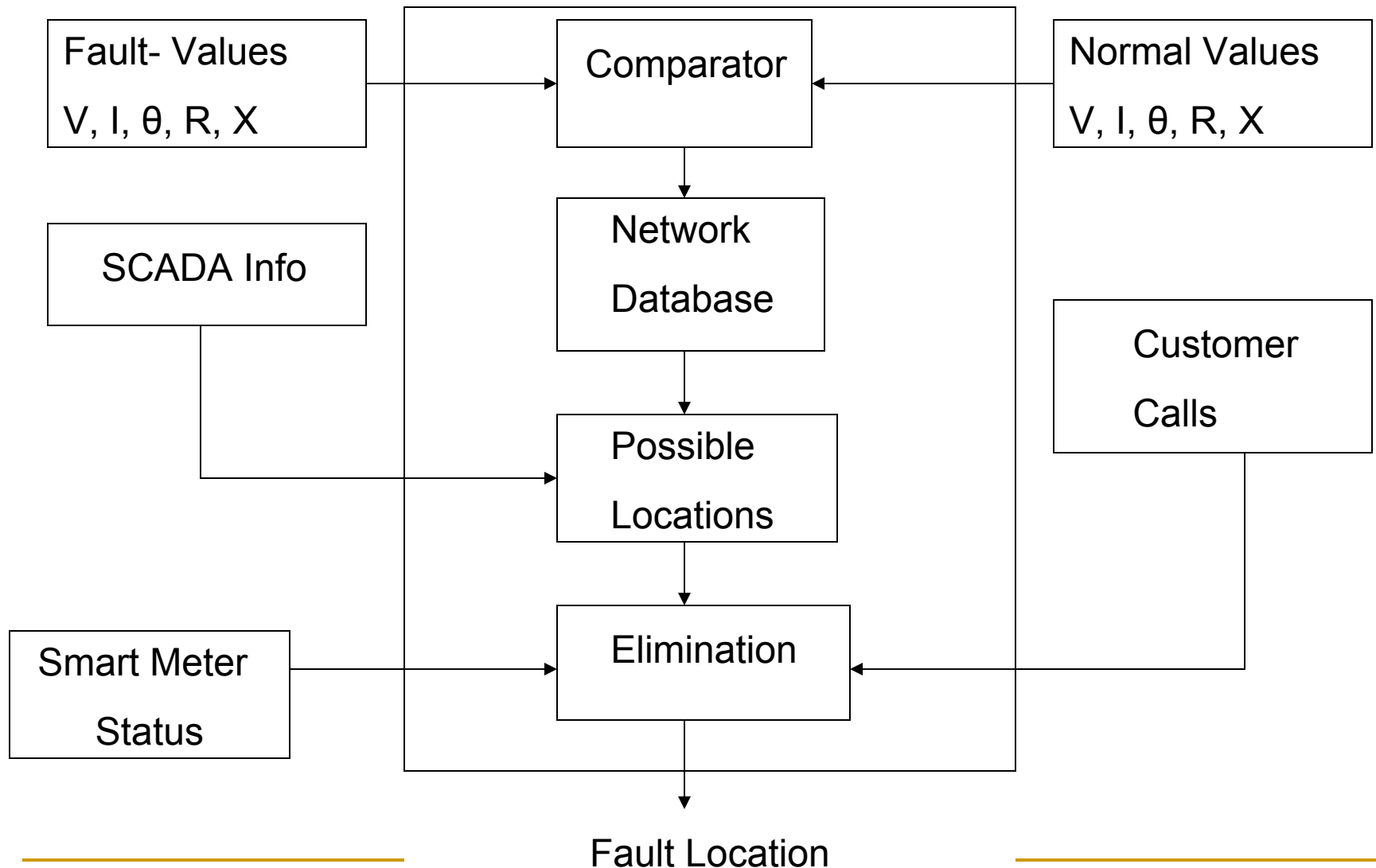
Solution Generation Criteria

- Data analysis
 - Computer program
 - Simulated environment
 - Integrate multiple databases
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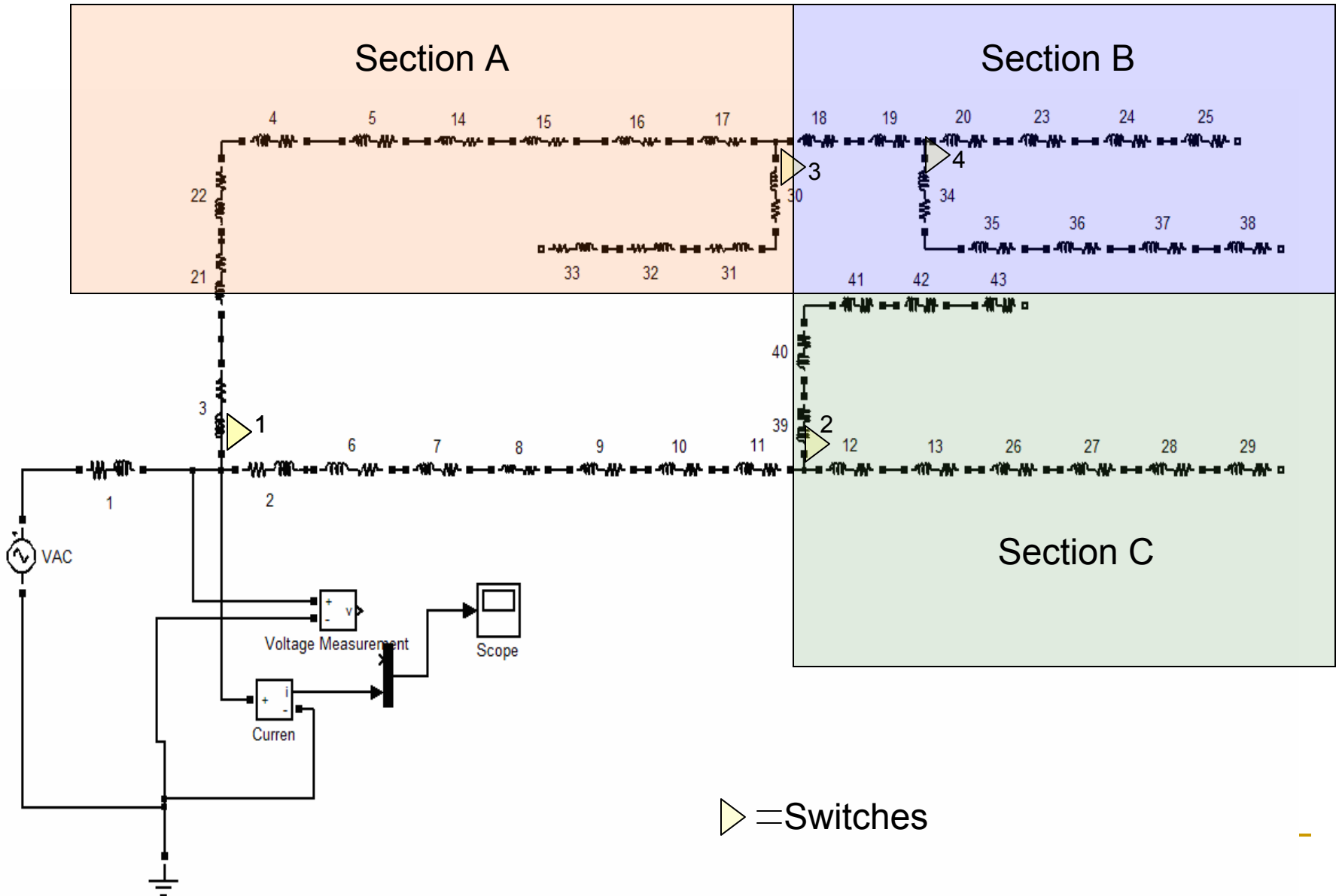
Code Name: Desperado

- Takes V/I data from Excel spreadsheets and compares the fault values to normal values
 - The nodes where a fault may have occurred are then isolated
 - SCADA, Smart Meters, and Customer Calls are then used during the elimination process
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Final Solution Product



Distribution Network



Impedance Values

SUMMARY_FAULTS[1] [Compatibility Mode]										
	A	B	C	D	E	F	G	H	I	J
53										
54	Node 1 (X1, Y1)	X1	Y2	Node 2 (X2, Y2)	X2	Y2	Reactance			
55	550	1778250	229495	PR M22964778 60 (PRMY)	1778663	229531	0.02			
56	PR M2296477860 (PRMY)	1778663	229531	PR M22937778 35 (PRMY)	1778396	229318	0.03	Actual location of the fault.		
57	PR M2293777835 (PRMY)	1778396	229318	SW 550-24 (DEVC)	1777958	229380	0.05			
58				SW 550-24 (DOWN)	1777950	229380	0.05			
59	SW 550-24 (DOWN)	1777950	229379.9344	PR P100476 (PRMY)	1777836	229379	0.06			
60	PR P100476 (PRMY)	1777836	229379	FU P171547 (DEVC)	1777623	229376	0.09			
61				FU P171547 (DOWN)	1777623.114	229381	0.09			
62	FU P171547 (DEVC)	1777623	229376	FU P239875 (DEVC)	1777561	229381	0.1			
63				FU P239875 (DOWN)	1777565.12	229385	0.1			
64	FU P171547 (DOWN)	1777623.114	229380.9987	PR P677349 (WIRE)	1777625	229464	0.1			
65	FU P239875 (DOWN)	1777565.12	229385.3621	PR D120398 (PRMY)	1777612	229435	0.11			
66	PR P677349 (WIRE)	1777625	229464	PR P676879 (PRMY)	1777626	229573	0.12			
67	FU P239875 (DEVC)	1777561	229381	PR P272447 (PRMY)	1777334	229384	0.12			
68	PR P676879 (PRMY)	1777626	229573	PR P276568 (PRMY)	1777629	229722	0.14			
69	PR P272447 (PRMY)	1777334	229384	PR P171548 (PRMY)	1777200	229384	0.14			
				FU P676880						
Summary Fault #1 Fault #2 Fault #3 Fault #4 Fault #5 Fault #7 Fault #6 Fault #8 Fault #9 Fault #10 Fault #11 Fault #12 Fa										

Smart Meter Status & SCADA Info

Microsoft Excel - smartmeter [Read-Only]

	A	B	C	D
1	Section	Smart Meter Location	(on/off)	
2	A	001	0	
3	A	002	0	
4	A	003	0	
5	A	004	0	
6	A	005	0	
7	A	006	0	
8	A	007	0	
9	A	008	0	
10	A	009	0	
11	A	010	0	
12	A	011	0	
13	A	012	0	
14	A	013	0	
15	A	014	0	
16	A	015	0	
17	A	016	0	
18	A	017	0	
19	A	018	0	
20	A	019	0	
21	A	020	0	
22	A	021	0	
23	A	022	0	
24	A	023	0	
25	A	024	1	
26	A	025	1	
27	A	026	1	
28	A	027	1	
29	A	028	1	
30	A	029	1	
31	A	030	1	
32	A	031	1	
33	A	032	1	
34	A	033	1	
35	A	034	1	
36	A	035	1	
37	A	036	1	
38	A	037	1	

Microsoft Excel - Book1

	A	B	C	D	E
1	Switch #	OPEN/CLOSED			
2	1	Closed			
3	2	Closed			
4	3	Closed			
5	4	Open			
6					
7					
8					
9					
10					
11					
12					
13					

Risk Management

Risks

- Not enough time to finish project
- Components of the program fail to integrate properly
- Scope of the project is too big

Solution

- Adhere to a strict schedule
 - Debug the system / Test components individually first
 - Scale down project to ideal scenarios before expanding
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Milestones vs. Outcomes

	Milestones	Outcomes
1.	Create Distribution Network	Done
2.	Generate Smart Meter Status	Done
3.	Generate SCADA Info	Done
4.	Generate Customer Calls	In Progress
5.	Program "Desperado" Phase 1	In Progress

Implementation Plan

Task	Date
Run network simulations to obtain fault values	March 12-14
Program comparator and network database	March 16-20
Integrate SCADA info with possible locations	March 21-27
Develop elimination block	March 28-31
Integrate customer calls and smart meters with elimination block	April 1-4
Combine the entire system	April 5-11
Output a fault location	April 12-19

Conclusion

- “Desperado” is still a work in progress
 - We are moving quickly to assemble all components of the program
 - By ECE day we hope to present a fully working fault location system
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Questions
