

---

# Contents: Part I

<b>1</b>	<b>Introduction .....</b>	<b>3</b>
1.1	What is the purpose? .....	3
1.2	Where are we going? .....	7
1.3	Why plan? .....	1 0
1.4	When plan? .....	11
1.5	One man's axioms of system engineering .....	11
<b>2</b>	<b>The importance of enterprise identity .....</b>	<b>13</b>
2.1	It works for people .....	13
2.2	What constitutes an identity for an enterprise?.....	14
2.3	Customer standards, tailoring, and enterprise identity .....	15
<b>3</b>	<b>Sources of inspiration .....</b>	<b>17</b>
3.1	Help! .....	17
3.2	AFSCM 375 series .....	17
3.3	SAMSO and BMO standards .....	18
3.4	U.S. Army field manual .....	18
3.5	MIL-STD-499.....	18
3.6	NASA system engineering manual.....	19
3.7	Commercial and societal standards .....	20
3.8	International Organization For Standardization .....	20
3.9	DSMC Systems Engineering Management Guide.....	20
3.10	Books in print and otherwise .....	21
3.11	Selection .....	21
<b>4</b>	<b>Organizational structures.....</b>	<b>23</b>
4.1	Updating matrix management .....	23
4.2	A model program organization structure .....	26
4.3	Physical collocation options .....	28
4.3.1	The virtual organization .....	28
4.3.2	Virtual functional organization .....	29
4.3.3	Flexible optimum collocation policy .....	29
4.4	Resistance to PDT .....	29
4.4.1	Human resistance .....	30
4.4.2	C/SCS criteria conflict.....	31

4.4.2.1	What is the criteria? .....	31
4.4.2.2	Alternative approaches .....	32
4.4.2.2.1	Status quo .....	32
4.4.2.2.2	Change the criteria .....	32
4.4.2.2.3	Functional organization suppression .....	32
4.4.2.2.4	Three axis matrix .....	33
4.4.2.2.5	Projectized organization .....	33
4.4.2.2.6	Power to the WBS manager .....	33
4.4.3	PDT-stimulated personnel staffing problems .....	34
4.4.4	Personnel evaluation problems .....	35
4.5	Model matrix for this book .....	36
4.6	Enterprise integration team (EIT).....	37
<b>5</b>	<b>Integrated program planning .....</b>	<b>39</b>
5.1	The ultimate requirement and program beginnings .....	39
5.2	Program plan tree .....	41
5.3	Know thyself through generic program planning data .....	46
5.4	Integrated management system overview .....	49
5.5	Generating the six primary documents.....	50
5.5.1	The system specification .....	50
5.5.2	The WBS dictionary .....	51
5.5.3	The statement of work .....	53
5.5.4	Integrated master plan and schedule .....	58
5.5.4.1	Program events definition .....	61
5.5.4.2	Final work definition steps .....	61
5.5.4.3	Final IMS development .....	65
5.5.4.4	Planning process summary .....	65
5.5.5	Contract data requirements list .....	65
5.6	Work responsibility .....	68
5.7	Who plans the program? .....	70
5.8	A generic SEM/SEMP for you .....	72
5.9.	Rapid identity documentation .....	73
<b>6</b>	<b>Continuous process improvement and process audit <b>provisions</b> .....</b>	<b>79</b>
6.1	Is a static identity adequate?.....	79
6.2	Procedures media .....	79
6.3	Continuous improvement process .....	80
6.4	Process audit .....	80
<b>7</b>	<b>SEM/SEMP implementation .....</b>	<b>87</b>
7.1	First things first .....	87
7.2	Process definition and improvement .....	87
7.3	SEM/SEMP development .....	89

7.4	Organizational structure changes.....	90
7.5	Re-education of your work force .....	90
7.5.1	On-the-job training (OJT).....	91
7.5.2	In-house training program .....	91
7.5.3	Local university system engineering certificate program .....	93
7.5.4	Seminars and short courses .....	94
7.6	The database approach .....	95
7.7	Good luck .....	95

*Following is a condensed Contents listing for Part II of this book, the SEMISEMP section. A complete Contents listing immediately precedes the SEMISEMP section.*

---

# *Contents: Part II — SEM/SEMP*

<b>1</b>	<b>Introduction</b>	109
1.1	Document purpose?	109
1.2	Functional management responsibility	110
1.3	Continuous process improvement	110
1.4	Application on programs	110
1.5	Technical objectives	111
1.6	Technical plan summary	112
<b>2</b>	<b>Applicable documents</b>	117
2.1	Government documents	117
2.2	Non-government documents	117
<b>3</b>	<b>Development environment</b>	119
3.1	Program development environments	119
3.2	Phasing correlation	120
3.3	Product composition	125
3.4	Sequence model alternatives	126
3.5	Encouraged environments	129
3.6	Program information environment	130
3.7	Management style and the working environment	130
<b>4</b>	<b>Technical program planning and control</b>	133
4.1	Precedence of controlling documentation	133
4.2	Company organizational structure	133
4.3	Generic company process documentation	143
4.4	Input-process-output	143
4.5	Program planning transform	146
4.6	Program planning documentation	147
4.7	Program work definition and authorization	151
4.8	Performance tracking and reporting	153
4.9	Development controls	153
4.10	Risk management	168
4.11	Configuration management	177
4.12	Data management	187
4.13	Parts, materials, and processes standardization	188
4.14	Supplier technical control	189

4.15 Associate contractor relationships .....	190
4.16 Customer furnished property .....	190
<b>5 System engineering process .....</b>	<b>191</b>
5.1 Process overview .....	191
5.2 System definition .....	191
5.3 Functional decomposition .....	199
5.4 Requirements analysis .....	208
5.5 Design and integration .....	229
5.6 Test and evaluation development .....	239
5.7 System analysis development .....	242
5.8 Requirements verification .....	243
5.9 System test and evaluation .....	245
5.10 Quality assurance support .....	245
5.11 Production support .....	245
5.12 Computer software coding .....	246
5.13 Customer readiness for product delivery .....	246
5.14 Post-delivery support .....	247
5.15 System modifications.....	248
5.16 Design for disposal .....	249
5.17 Material control .....	249
5.18 Production process definition and control .....	250
5.19 Inspection and acceptance testingprocess control.....	250
5.20 Logistics and operational support.....	250
<b>6 Specialty engineering integration.....</b>	<b>251</b>
6.1 Specialty engineering basis .....	251
6.2 System and specialty engineering discipline summaries.....	251
6.3 Generic specialty engineering process description .....	259
6.4 Specialty engineering tools .....	260
6.5 PIT integration work .....	260
6.6 Concurrent development team activity .....	262
6.7 Concurrent development aids .....	266
<b>7 Notes .....</b>	<b>269</b>
7.1 Acronyms .....	269
7.2 Special terms .....	271
<b>Appendix A. Traceability to external standards.....</b>	<b>273</b>
<b>Appendix B. Program systems engineering assessment criteria .....</b>	<b>287</b>
<b>Appendix C, Generic process diagram .....</b>	<b>303</b>
<b>Appendix D, Task descriptions .....</b>	<b>331</b>
<b>Main body index .....</b>	<b>373</b>
<b>SEM/SEMP index .....</b>	<b>375</b>