Contents

rrelace		
Introduction	1	
About This Book	1	
A Historical Perspective	3	
The Government's Role	10	
Human Factors	11	
Human Involvement with Machines and Systems	16	
Some Human-Factors Postulates	18	
Summary	19	
References	20	
Systems and Systems Engineering	21	
Systems	21	
Systems Engineering	26	
System Life Cycle	28	
The Systems-Engineering Process	38	
Concurrent Engineering	52	
Speaking Practically	54	
Summary	55	
References	55	
	Introduction About This Book A Historical Perspective The Government's Role Human Factors Human Involvement with Machines and Systems Some Human-Factors Postulates Summary References Systems and Systems Engineering Systems Systems Engineering System Life Cycle The Systems-Engineering Process Concurrent Engineering Speaking Practically Summary	

vi Contents

3	Standards, Codes, Specifications, and Other Work Products	58		
	Standards and Codes	58		
	Guidelines	63		
	Human Engineering Program Plan (HEPP)	64		
	Systems-Engineering Work Products	69		
	Summary	76		
	References	77		
4	Human-Factors Methods			
	Basic versus Applied Research	80		
	Some Additional Preliminary Remarks	81		
	The Methods	84		
	Summary	138		
	References	139		
5	Human Physical Characteristics	142		
	The Starting Point	142		
	Anthropometry: The Science of Human Dimensions	158		
	The Skeletal System	170		
	Skeletal Muscles	172		
	Other Machinery of the Body	179		
	Interactions with the Environment	180		
	Work, Rest, and Work-Rest Cycles	198		
	Summary	202		
	References	202		
6	Human Mental Characteristics	206		
	The Human Subsystem	206		
	Attending	209		
	Sensing	211		
	Remembering	235		
	Decision-Making	238		
	Learning	240		
	Responding	247		
	Summary	255		
	References	25€		

		Content	rs vii
7	Personne	l Selection and Training	260
	Relationsl	nips Between System Design, Selection, and Training	260
	Mandator	y Personnel Requirements	262
	Reducing	System Complexity	263
	Human-Fa	actors Contributions to Training Programs	264
	Training I	Equipment	265
	Summary		268
	Reference	s	268
8	System R	equirements	270
	Specifying	g Human-System Requirements	271
	Tradeoffs	•	281
	Summary		286
	Reference	s	286
9	Postscrip	t	288
	Document	ation	288
	What Mal	xes a Successful Human-Factors Program?	291
	The Final	Word	294
	Reference	s	295
Аp	pendix A	Acronyms and Abbreviations	297
Аp	pendix B	Some ANSI and International Standards	307
		ANSI Standards	307
		International Standards	309
Inc	lex		311