

Table of Contents

Introduction	1
1 Invention of Civilization	1
2 Reinventing – the Key Concept for the Study of TRIZ	3
Methods of Inventing	14
3 Invention	14
3.1 Discovery and Invention	14
3.2 Levels of Inventions	16
4 Inventive Creativity	18
4.1 Inventing Theories of Inventing	18
4.2 Traditional Methods of Inventing	28
5 Classical TRIZ	34
5.1 Ideas of TRIZ	34
5.2 Development of Classical TRIZ	36
5.3 Structure of Classical TRIZ	41
Exercises 3 – 5	44

XII Table of Contents

A-Studio: Algorithmic Navigation of Thinking	46
6 From Praxis to Theory	46
6.1 A-navigation of Thinking	46
6.2 A-navigators of Inventing	50
7 Discipline of Creativity	60
7.1 Discipline and Inspiration	60
7.2 Meta-Algorithm of Inventing	65
8 Operative Zone	78
8.1 Epicenter of the Problem	78
8.2 Resources	83
9 From What exists to What's coming	91
9.1 Contradictions	91
9.2 Functional-Ideal Modeling	99
9.3 Reduction and Transformation	106
9.4 Classification of the A-models of Transformations	126
Exercises 6 – 9	128
Classical Navigators of Inventing in the A-Studio	130
10 Navigators for Standard Solutions	130
10.1 Tables of Complex Transformations	130
10.2 Application Principles for Complex Transformations	131

11 Navigators for Solution to Technical Contradictions	139
11.1 Integration of Inverse Technical Contradictions	139
11.2 A-Table and A-Matrix of Specialized Transformations	141
11.3 Application Principles for Specialized A-Navigators	143
11.4 Integration of Alternative Contradictions – the CICO-method	155
12 Navigators for Solution to Physical Contradictions	160
12.1 Integration of Physical Contradictions	160
12.2 Tables of Fundamental Transformations	163
12.3 Application Principles for Fundamental Transformations	167
13 Navigators to Search for New Functional Principles	179
13.1 Tables of Technical Effects	179
13.2 Application Principles for Technical Effects	182
Exercises 10 – 13	190
Strategy of Inventing	192
14 Control of System Development	192
14.1 Development of Systems	192
14.2 “Ideal Machine”	197
14.3 Growth Curve of the Main Parameter of a System	199
15 Classical TRIZ Models for Innovative Development	205
15.1 TRIZ Laws of Systems Development	205
15.2 Lines of Technical Systems Development	207
15.3 Integration of Alternative Systems	221
Exercises 14 – 15	231

XIV **Table of Contents**

Tactics of Inventing	233
16 Diagnostics of the Problem	233
16.1 Types of Problem Situations	233
16.2 Algorithm for the Diagnostics of a Problem Situation	236
17 Verification of the Solution	241
17.1 Effectiveness of the Solution	241
17.2 Development of the Solution	243
17.3 Algorithm for the Solution Verification	245
Exercises 16 – 17	245
Art of Inventing	248
18 Pragmatism of Fantasy	248
18.1 Non-algorithmic TRIZ Methods	248
18.2 Models “Fantogram” and “What was – What became”	252
18.3 Method of “Modeling with Small Figures”	257
19 Integration of TRIZ into Professional Activity	261
19.1 Motivation and Development of the Personality	261
19.2 Adaptation of TRIZ Knowledge for Your Profession	263
19.3 Ten Typical Mistakes	266
19.4 Practical Examples Reinventing	267
Exercises 18 – 19	279

Development of TRIZ	280
20 Choice of a Strategy: Human or Computer?	280
20.1 TRIZ Knowledge: Strategies of Development and Application	280
20.2 <i>Homo Inventor</i> : the Inventive Human	283
20.3 CROST: Five Main Cores of Creativity	285
21 CAI: Computer Aided Innovation / Invention	289
21.1 From <i>Invention Machine</i> to <i>Co-Brain and Goldfire</i>	289
21.2 From <i>Problem Formulator</i> to <i>Innovation Workbench</i>	291
21.3 <i>Idea Navigator</i> : Integration of Intellects	291
Concluding remarks	307
Appendices: Tables of the Inventing Navigators in the A-Studio	311
1 Functional-Structural Models	311
2 A-Compact-Standards	312
3 A-Matrix for the Selection of Specialized A-Navigators	315
4 Specialized A-Navigators	322
5 Fundamental Transformations	331
6 Fundamental Transformations and A-Compact-Standards	332
7 Fundamental Transformations and Specialized A-Navigators	334
8 Physical Effects	336
9 Chemical Effects	340
10 Geometric Effects	343
Answers and Solutions	344
Index	349
Selected works by Genrikh S. Altshuller	352
Additional Sources of Information	352