

TABLE OF CONTENTS

Introduction.....	1
1. Management Overview.....	8
1.1 Reasons for CIM-OSA.....	8
1.1.1 The Problems in Manufacturing Industry.....	8
1.1.2 The Problems in Information Technology.....	9
1.1.3 Future Needs in Manufacturing Industry.....	10
1.1.4 The Integration Problems and Their Solutions.....	11
1.2 CIM-OSA Overview.....	13
1.2.1 Scope and Goal of CIM-OSA.....	13
1.2.2 CIM-OSA Objectives and Requirements.....	14
1.3 Content of CIM-OSA.....	16
1.3.1 The CIM-OSA Framework.....	17
1.3.2 Main Components of CIM-OSA.....	21
1.4 Applying CIM-OSA.....	27
1.5 CIM-OSA Relation to State of the Art.....	28
1.6 Project Results and Status of CIM-OSA.....	29
1.6.1 Current Level of Validation and Applicability.....	29
1.6.2 Current Level of Involvement in Standardization.....	29
1.6.3 Future Contributions to CIM-OSA.....	30
1.7 Benefits of CIM-OSA.....	30
2. Project Perspective.....	31
2.1 Before AMICE.....	31
2.2 Starting AMICE.....	32
2.3 The AMICE Project.....	33
2.4 After AMICE.....	34
2.5 List of Participating Members.....	35
3. Introduction to CIM-OSA.....	39
3.1 Architectural Principles.....	39
3.2 Structuring Concepts.....	40
3.3 Relation of CIM-OSA to the Real World.....	40
4. CIM-OSA Architectural Model.....	42
4.1 Architectural Framework of CIM-OSA.....	44
4.1.1 Levels of Genericity and Stepwise Instantiation.....	46
4.1.2 Levels of Modelling and Stepwise Derivation.....	49
4.1.3 Levels of Views and Stepwise Generation.....	52
4.2 CIM-OSA Models.....	53
4.3 CIM-OSA Relation to State of the Art.....	54
4.4 Architecture Summary.....	56
5. The CIM-OSA Modelling Levels.....	58
5.1 CIM-OSA Requirements Definition Modelling Level.....	60
5.1.1 Function View.....	60
5.1.2 Information View.....	68
5.1.3 Resource View.....	71
5.1.4 Organisation View.....	71

5.2	CIM-OSA Design Specification Modelling Level.....	71
5.2.1	Function View.....	72
5.2.2	Information View.....	75
5.2.3	Resource View.....	75
5.2.4	Organisation View.....	76
5.3	CIM-OSA Implementation Description Modelling Level.....	78
5.3.1	System Description Manufacturing Technology Components.....	80
5.3.2	System Description Information Technology Components.....	80
5.3.3	Function View.....	81
5.3.4	Information View.....	87
5.3.5	Resource View.....	89
5.3.6	Organisation View.....	89
5.3.7	CIM-OSA Environments.....	92
6.	The Parts of the CIM-OSA Framework and Their Relations.....	95
6.1	CIM-OSA Architectural Levels.....	95
6.2	CIM-OSA Modelling and View Levels.....	95
6.3	CIM-OSA View Level Constructs and Their Relations.....	96
6.3.1	Function View.....	96
6.3.2	Information View.....	99
6.3.3	Resource View.....	101
6.3.4	Organisation View.....	101
7.	Detailed Description of CIM-OSA.....	103
7.1	CIM-OSA Requirements Definition Modelling Level Constructs.....	103
7.1.1	Business Process Event.....	103
7.1.2	Business Process.....	104
7.1.3	Business Process Result.....	104
7.1.4	Procedural Rule Set.....	105
7.1.5	Declarative Rule.....	106
7.1.6	Enterprise Activity.....	107
7.2	CIM-OSA Information Model.....	107
7.2.1	Information View - Instantiation Process.....	109
7.2.2	Information View - Derivation Process.....	109
7.2.3	Components of the Information View.....	110
7.3	CIM-OSA Implementation Description Modelling Level Constructs.....	112
7.3.1	Functional Entity Content.....	112
7.3.2	Functional Entity Communication.....	114
7.3.3	Functional Entities, Transactions, and Protocols.....	116
7.4	CIM-OSA Integrating Infrastructure (IIS).....	117
7.4.1	Concepts of the Architecture of the IDPE.....	117
7.4.2	Overview of the Resulting IDPE Architecture.....	122
7.4.3	Communications Management (CM) Service.....	129
7.4.4	The System Wide Exchange (SE) Service.....	133
7.4.5	The System Wide Data (SD) Service.....	137
7.4.6	The Data Management (DM) Service.....	140
7.4.7	The Machine Front End Service.....	142
7.4.8	The Human Front End (HF) Service.....	150
7.4.9	The Application Front End Service.....	163

7.4.10	The Business Process Control (BC) Service..	170
7.4.11	The Activity Control (AC) Service.....	176
7.4.12	The Resource Management (RM) Service.....	181
7.4.13	IIS Relation to State of the Art.....	188
7.4.14	Reference Architecture and Standardisation.	188
8.	CIM-OSA System Life Cycle.....	190
8.1	Product Life Cycles.....	190
8.2	System Life Cycle.....	191
8.3	Relationships Between the Product and System Life Cycles.....	192
8.4	Contents of System Life Cycles.....	193
8.4.1	Phase A - System Requirements Specification.	195
8.4.2	Phase B - System Design.....	197
8.4.3	Phase C - System Build and Release.....	199
8.4.4	Phase D - System Operation.....	200
8.5	Relation of System Life Cycle to the CIM-OSA Framework.....	200
9.	CIM-OSA Business Process Design and Execution.....	202
9.1	Business Process Design and Maintenance.....	202
9.2	CIM-OSA Run Time - Business Process Execution....	204
9.3	Example of Business Process Design.....	205
9.3.1	Step 1: Select Business Process Type.....	205
9.3.2	Step 2: Identify Business Process Content...206	
9.3.3	Step 3: Design Procedural Rule Set.....	206
9.4	Example of Business Process Execution.....	207
9.4.1	Step 1: Start Business Process Execution....	208
9.4.2	Step 2: Select Enterprise Activity Inputs...208	
10.	Results from Standardisation Efforts.....	210
	List of Figures.....	212