

# A Study of The Current and Future Status of Integrated Automation in the Commercial Printing Industry

## *Table of Contents*

- Table of Contents

Executive Summary -	i
I Introduction and Definitions -	1
Introductory Overview	1
Integrated Manufacturing Related Definitions	2
<i>CIP4</i>	3
JDF	5
<i>JMF</i>	5
Automation	5
Integrated Automation	5
Computer Integrated Automation	6
Islands of Automation	6
Workflow	6
Print Management Information System	7
An Awareness and Technology Impact Study	7
Basic Conclusions Provide Study Framework	8
II Study Objectives, Scope and Methodology	11
- Objectives	11
- Scope	12
- Methodology	13
III The Commercial Printing Market –	
Structure and Characteristics	19
- A Changing Industry	19
- Integrated Automation-Eligible Commercial Printing Plants	20
Print Volume	21
Type and Number of Plants	23
Management Information Systems	26
CtP Installations and Ink Fountain Key Setting	27
IV Integrated Automation In 2004	31
Continuous Progress Toward Production Integration	31
Premedia/Prepress Automation	31
Prepress --- Island or Link?	34

	Machine Automation	35
	The Legacy Equipment Inhibitor	37
	Islands of Automation	37
	Integrated Automation	40
	Physically Linked Machines Combining	
	Different Functional Elements of Production	40
	Information Integration Only	42
	Electronic Data Controlled Production Machines	43
	Information Integration and Machine Control Utilization	44
	Print Integrated Automation 2004 Status	45
	Computer Integrated Automation	45
	The Role of CIP4 in Integrated Automation	46
V	Workflow – Jobflow – Business Information Flow	49
	Identification of Print Production Flow	49
	Workflow/Jobflow	53
	Workflow Sequence	53
	Within buying organization	53
	Printers selection/quoting	53
	Job specification/content submission	56
	Job planning – Scheduling	57
	Prepress	60
	Platemaking	61
	Jobflow Sequence	62
	Presswork	62
	Postpress	64
	Shipping and Distribution	65
	Other Production Flows	66
	Missing Jobflow Steps	66
	Company Size and Equipment Type and	
	Configuration Impact on Jobflow	68
	Small Sheetfed Lithographic Plants	68
	Large Sheetfed Lithographic Plants	69
	Combination Lithographic Sheetfed	
	and Web Offset Plants	69
	Heatset Web Plants	70
	Non-heatset Web Plants	71
	Variable Data Imaging	73
	Business Information Flow	75
	Impact of Current Workflow/Jobflow	
	on Integrated Automation	76
VI	The Role of MIS in Integrated Automation	79
	MIS as an Integrated Automation Enabler	79
	The Road to Computer Integrated Manufacturing	80

	The Evolution of Print Management Systems	81
	Where Are We Now	85
	Print Management System Trends	86
	Internet and Interconnectivity	87
	So What Does It All Mean?	90
	Market Sizing and Product Provider Leader Profile	91
	Flexo and Label Printing	93
	Trade Binderies	94
	Packaging	94
	Prepress Providers	95
	Print Management System Market and System Characteristics	95
	Companies Under \$2,000,000 Sales	95
	Companies from \$2 million to \$10 million in Sales	97
	Companies Over \$10 million in Sales	98
	Pre-JDF: Successes with System Integrations	99
	Accounting	99
	Data Collection	99
	Typesetting/Prepress	100
	Scheduling	102
	Shipping Programs	102
	Barriers to Success	103
VII	Management Information Systems in 2004 - 2010	105
	Print Specific Management Information Systems	105
	Size of 2004 installed base	106
	Management Information System Utilization	108
	Non-print Specific MIS	108
	• ERP	109
	• SAP	110
	Factors Affecting Acceptance of CIM	111
	New Equipment	111
	JDF-Enable Equipment	111
	Print Specific Management Information Systems	112
	Printer Attitudes	112
	Forecast Utilization from 2005 to 2010	112
VIII	The Role of JDF/JMF in Integrated Automation	117
	Defining JDF and JMF	118
	The Need for Standards	118
	Process Control and Process Monitoring	119
	What is Required?	120
	Information Technology Requirements	120
	The Legacy Equipment Dilemma	121
	The Importance of New Equipment	122
	The Benefits of JDF and JMF	122

	Other Integrated Automation Enablers	122
	Networked Graphic Production	123
	Universal Printer, Pre- and Postpress Interface (UP <sup>3</sup> i)	123
	AFP	123
	Supplier Proprietary Systems	124
IX	Data and Opinion from the Field	125
	Data Shows Wide Range of Views	125
	Expert Panel Opinions	126
	Survey and Interview Data	135
X	The Real World	145
	Background	145
	Transcontinental	146
	Print Buyer and Printer	150
	Corporate Marketing Print Purchaser and Small Printer	150
	Major Corporate Print Purchaser and \$30 Million Sheetfed Printer	152
	Berlin	153
	Cenveo	162
	Rex Three	164
	LAglyphico	166
	Banta	169
	JohnsByrne	172
	Case Studies from the Digital Smart Factory Forum	174
	CP Printing	175
	NEBS	176
	VistaPrint	179
XI	The Economics of Integrated Automation	189
	Competitive Industry Looks at ROI	189
	Production Labor Reduction – Automation Focus	189
	Historical Reluctance to Calculate ROI	190
	Right Equipment Required	191
	Private vs. Public Cost/ROI Considerations	192
	Supplier Touted Benefits and ROI	195
	Meaningful ROI Calculation Impractical	195
	The ROI Barrier	196
XII	Characteristics of Printing Companies Likely to Implement CIM	197
	General Discussion of Characteristics	197
	Review of Characteristics	198
	Review by Integrated Automation Types	198
	Creative Organization	198
	Buyer-Developed Intent Specification	198
	Electronic Communication	199

	Machine Automation	199
	Machine Level Integrated Automation	199
	Islands of Automation	199
	Electronic Prepress to CtP to Ink Fountain Presets	200
	MIS Suitability	201
	Characterization Requirements	201
	Review by Business and General Characteristics	201
	Printer Size	201
	Customer Data Demand	203
	Printer Type	203
	Sheetfed Printers	203
	Web Printers	204
	Digital Printers	204
	Other Printers	204
	Trade Services Businesses	205
	Computer Usage	205
	Financial Strength	206
	Management Philosophy	206
	Publicly Held Corporations	206
	Privately Held Companies	207
	Mechanical Orientation	207
	Countervailing Philosophy	207
	Ranking of Business and Global Characteristics	207
	Application of the Metrics	209
XIII	The Conclusions and the Outlook for Integrated Automation	211
	Results of the Research	211
	Digital Imaging Printers' Perspective	214
	Digital Printing Integration Issues	215
	Hybrid-Litho/Digital Plants	215
	Lithographic Printers' Perspective	216
	Litho Integrated Automation Segmentation	217
	JDF Interoperability	218
	Legacy Equipment Barrier	218
	New Equipment JDF Compatible	220
	Outlook for Integrated Automation – 2005-2010	220
	The 2004 Starting Situation	220
	The 2005 to 2010 Outlook	223
	The Lithographic Outlook	223
	The Digital Outlook	227
	After 2010 – Speculative Perspectives	228
	Radical Full-fledged Integrated Automation	228
	Improved MIS plus Legacy Equipment	229
XIV	Implication of Findings and Recommendations	231
	Equipment and Software Suppliers	231

Printers	232
Commercial Printers and Some Digital Printers	232
Printers	232
Paper Manufacturers	233
All GAMIS Members	233
• Appendices	235
A -- Glossary	237
B – Definitions of JDF/JMF	245
C -- Basic JDF Tutorial	247
D – Overview of Print MIS	257
F – Interview and Survey Guides	263
G – List of expert panel participants	283
H – Supporting Material	285

# A Study of The Current and Future Status of Integrated Automation in the Commercial Printing Industry

## *Exhibits*

Exhibit II – 1 – Conferences and Exhibitions Attended	14
Exhibit II – 2 – Number of Interviews by Venue	16
Exhibit III – 1 – Integrated Automation-Eligible Commercial Printing Plant Locations	25
Exhibit III – 2 – N.A. Commercial Printing Metal Plate CtP Installed Base	28
Exhibit VII – 1 – Installed Base of Qualified Management Information Systems	106
Exhibit VII – 2 – Installed Base of Qualified Management Information Systems - Forecast	113
Exhibit X – 1 – Integrated Automation Likelihood Ranked by Size	202
Exhibit X – 2 – Ranking of Business and General Characteristics For Integrated Automation Adoption	208
Exhibit XIII – 1 – Status and Forecast of Commercial Printing Installed Equipment Base Not Suitable for Integrated Automation	225
Exhibit XIII – 2 – Forecast of Gating Factors for Lithographic Integrated Automation	226
Exhibit XIII – 3 – Installed Base and Forecast of Fully Integrated Digital Printing	228