Druckhaus Cramer GmbH & Co.KG
Hansaring 118
48268 Greven
Background:

We are an owner-run family company with a history that spans a century. During this period, and due to our commitment to always remaining at least one step ahead of the competition, we have developed a great deal of expertise in dealing with customers and their requirements, and established a consistently open and enthusiastic approach to new technologies and opportunities.

Today, DRUCKHAUS CRAMER employs approximately 100 staff and is one of the best sheetfed offset printshops in Europe in terms of service, expertise, consulting and technology. Numerous international awards are proof of this.

- Family company established in 1904
- First offset press in the Münsterland region of Germany (1958)
- First 4-color offset press in Münsterland (1973)
- First Kienzle computer system (1982)
- First eight-color Heidelberg press (1995)
- Introduction of the first generation of CtP platesetters and FM screens (1999)
- Foundation of c:media gmbh as a subsidiary for interactive media (2000)
- Development of the CRAMERCOLOR color management system (2000)
- Development of expansion of the color space in 4-color offset printing, CRAMERCOLORplus (2001)
- Second generation of CtP platesetters, photoscreening without visible screen dots (2003)
- CRAMERCARD as a true color alternative to color swatches in real color printing (2004)
- CRAMERCOLORplus6 for an ultimate color space with 6 high pigment inks (2005)
- First HEIDELBERG XL 105 sheetfed offset press in Münsterland (up to 18,000 sheets per hour) (2006)
- Current workforce of just under 100
Objectives

Druckhaus Cramer manufactures products predominantly for publishing houses and industrial customers who expect quality of the very highest standard. It takes a great deal of dedication and work on our part to ensure we meet these complex requirements. As a result, we took the decision to automate a large proportion of our standard tasks. We had already taken the first steps towards automation with our project to phase out individual components and introduce an automated workflow in the prepress stage.

The following list gives a brief overview of individual projects undertaken at Cramer in the period up to 2005:
1999 – color presetting using CIP3
2000 – color measurement and control (CPC21)
2001 – in-image measurement / complete sheet measurement and control (CPC24)
2002 – introduction of color management tools from a wide range of manufacturers

However, in addition to automation, we also set out to achieve a number of further goals. We needed to find a solution that would enable us to guarantee top quality in a controllable process while still making full use of all the benefits offered by the most up-to-date automation.

JDF gives us the opportunity to realize this program of standardization and automation. It also creates more freedom within our production. As standard processes are now automated thanks to JDF, our employees have become quality managers. However, quality is rooted not in process steps but in complete integration – a JDF-based workflow can only be implemented successfully if quality targets are also met.

For us, JDF is a decisive factor in achieving our corporate goals. Our customers come to us precisely because we offer high levels of quality. This is what really sets us apart from the competition and we are determined to hold fast to this principle. Our primary goal is therefore to ensure top quality for our customers.

Putting standardization to one side, there is, in our view, little sense in addressing quality and JDF integration separately – we would not consider using a JDF workflow that only provides a solution for one particular area.

However, it takes considerable time and effort in prepress and press to achieve this goal. At Cramer, it was normal practice to print test forms on all presses and carry out profiling and calibration every 8 weeks. However, this method of process control is somewhat imprecise as it only provides information about the situation at the specific moment the measurements are taken. All the key parameters change constantly and the interplay between them cannot be reliably controlled using single measurements.

Troubleshooting remained an issue, including during adjustments to the machine. If there were deviations in the desired print result, plates were often remade as it was presumed that there was an error in the prepress stage.
For internal purposes, multiple complete page proofs were created to check colors. In our view, it was no longer possible to deal with these areas separately as we did not want responsibility for any deviations from the process standard to be constantly bounced back and forth between the prepress and press departments. Given these issues, it was decided that urgent progress had to be made in terms of automation, standardization and reducing makeready times.

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**Figure 1 – workflow up till 2006**

**Methodology**

In 2005, we began the process of assessing new press technology, focusing on minimizing makeready times and increasing process reliability. Our in-house staff has extensive color know-how that enables us to consistently meet our customers’ high standards. The aim of our selection process was to cut press makeready times, minimize errors in prepress and the pressroom, and reduce outlay for calibration. However, for technical reasons, these aims could not be realized with the existing Kodak Prinergy prepress system. This workflow had no color management system, meaning that production data could not be used to calibrate or profile the process. This system was also unable to integrate our processes both to and from the press.

We initially favored a purely mechanical solution to cut press makeready times, but this would have meant investing in a stand-alone solution.

Having taking the decision to replace the presses, we quickly decided against the idea of a mechanical solution for reducing makeready times. Instead, we opted for a proposal from Heidelberger Druckmaschinen that involved the trial of a JDF-based PDF workflow.
and installing two presses. We felt this option gave us the best possible chance of achieving our goals.

The key factor in our decision to choose the concept from Heidelberg at the end of 2005 was the prospect of being able to achieve both targets using one integrated JDF-based system. This concept was based on the introduction of a JDF-based PDF workflow on a trial basis and the installation of two presses (SM 102 – 8, XL 105 – 5+L). The aim was to create a closed loop that would ensure we could achieve not just one, but both of our goals.

**Implementation Story**

1. **Project steps from May 2006**

   Implementation of Prinect Printready -> in changing the workflow, the focus was not on immediate effects in prepress, but rather on the impact on the press presetting. We were also prepared to accept more outlay in the prepress stage if this meant significant improvement in press makeready times. The first phase of the project resulted in only small savings in prepress as the benefits of the new workflow were offset to some extent by the need for training and the extra effort involved in migrating jobs.

2. **Project steps from fall 2006**

   - Implementation of two new presses
   - Update of workflow software
   - Introduction of Print Color Management with the Mini Spot workflow
   - Kodak Magnus 800 Quantum replaced by Creo Lotem Quantum 800.

These have resulted in the following developments in prepress:

- Plate checking is no longer required after imaging
- Dramatic reduction in the need for post-imaging due to errors
- Process reliability (fewer searches, queries, communication requirements)
- Plate set costs for calibration have been halved
- Process calibration costs are decreasing dramatically
- Costs resulting from complaints have been cut by around 70 %
- Time and effort spent on communication has been reduced considerably
- Increased throughput in prepress
- Reduction in working hours required
- 50 – 60 % reduction in content proofs

They have also resulted in the following developments at the press stage:
- JDF data has shortened the makeready process by 15-20 % compared to CIP3 data
- 35% reduction in makeready waste
- Costs for process calibration reduced to under 5 %
- Greater capacity in the press

**Resulting Workflow/Processes**

Today, the workflow at Cramer is based entirely on JDF. The workflow is used to calculate platesetter data and a JDF that contains a digital preview of the print job as well as printing parameters such as ink, paper and the position of the Mini Spots for process control. Job information including paper type, format and ink series is transported via a JDF job ticket. The pressroom server uses this data to calculate for each ink zone both the amount of ink to be applied and the area of the paper it is to be applied to, then transfers these values to the press control console. Here, the values are automatically adjusted to the paper and ink and are converted into presets for the inking unit, feeder, etc.

*Figure 2 – workflow with Prinect Printready*

The CIP4 data (ink zone data, preview, paper formats, paper grades, Mini Spots…) are transferred to the pressroom server.

The data is evaluated by the integrated Quality Monitor in the Prinect Image Control measuring system.
and then transferred back to Meta 1 (RIP). Calibration Manager installed there imports the data into platesetter and merges it with the platesetter calibration. A new plate set can then be imaged.

For this purpose, the press control system holds a database in which various characteristic curves can be stored. These ensure that exactly the right amount of ink is always applied to the paper. As a result, even the first pull yields results that come close to the desired coloring. At the same time, a software module in Prinect compares the digital input data with settings from the OK sheet. Once optimum coloring has been achieved, these settings can then be stored as a new characteristic curve for subsequent print jobs and can be accessed quickly and easily at any time.

The introduction of the Prinect Printready workflow has also brought further benefits. Previously, we carried out a complete process calibration every 2 months due to the very high standards expected by our customers. We created test forms that were then printed using different paper types for each particular press. Unfortunately, due to the influencing factors in the offset process, this could only produce a snapshot of the production situation at that particular moment and did not measure the overall effect of the various factors (ink series, condition of the blanket, condition of the inking rollers) on the process. Now, using a continuous process of evaluation, we are able to trace the precise impact of any alterations in the parameters. The necessary adjustments are only carried out if it can be established that the deviation is not spontaneous.

As well as the clear advantages in makeready times derived from presetting the format, printing pressure adjustment, etc., these changes have also delivered a range of further benefits.
## Best cost/benefit realization

**Calculation of Druckhaus Cramer - CIPPI Awards 2008**

<table>
<thead>
<tr>
<th>Discount rate</th>
<th>6%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discount factor</td>
<td>0.9434 0.8900 0.8396 0.7921 0.7473</td>
</tr>
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</table>

### Benefits (in savings)

<table>
<thead>
<tr>
<th>Periods</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Annual savings Milestone 1</strong>&lt;br&gt;(starting Q2/2006)&lt;br&gt;JDF integration and automation in prepress</td>
<td>Prepress</td>
<td>14,940.00</td>
<td>14,940.00</td>
<td>14,940.00</td>
<td>14,940.00</td>
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<tr>
<td><strong>Annual savings Milestone 2</strong>&lt;br&gt;(starting Q4/2006)&lt;br&gt;JDF-based integration of job management and automation in pressroom</td>
<td>Prepress</td>
<td>0.00</td>
<td>72,800.00</td>
<td>72,800.00</td>
<td>72,800.00</td>
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<tr>
<td><strong>Annual savings</strong>&lt;br&gt;<strong>Labor costs</strong>&lt;br&gt;incorrect plates&lt;br&gt;no further calibration runs&lt;br&gt;less proofs&lt;br&gt;machine setup waste-paper failure costs</td>
<td>0.00</td>
<td>117,560.00</td>
<td>117,560.00</td>
<td>117,560.00</td>
<td>117,560.00</td>
</tr>
<tr>
<td><strong>Total annual savings</strong></td>
<td>14,940.00</td>
<td>549,826.00</td>
<td>549,826.00</td>
<td>549,826.00</td>
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### Cumulative savings

<table>
<thead>
<tr>
<th>Periods</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
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</thead>
<tbody>
<tr>
<td><strong>Cumulative savings</strong></td>
<td>14,940.00</td>
<td>564,766.00</td>
<td>1,114,592.00</td>
<td>1,664,418.00</td>
<td>2,214,244.00</td>
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<td><strong>Discounted annual savings</strong></td>
<td>14,094.34</td>
<td>280.00</td>
<td>461,644.51</td>
<td>435,513.69</td>
<td>410,861.97</td>
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### Total investment

<table>
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<tr>
<th>External investment (products)</th>
<th>Printridge Migration</th>
<th>68,370.00</th>
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<tr>
<td>Enhancement</td>
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<td>Image Control</td>
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<td>(Preset Link)</td>
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<tr>
<td>Quality Monitor</td>
<td>1,265.00</td>
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<tr>
<td>Internal investment (internal training)</td>
<td>Internal Project</td>
<td>3,200.00</td>
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<tr>
<td>Management</td>
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<tr>
<td>Maintenance costs (recurring)</td>
<td>Internal IT admin.</td>
<td>6,000.00</td>
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<td>Service costs</td>
<td>3,657.00</td>
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<td>Training</td>
<td>10,800.00</td>
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<table>
<thead>
<tr>
<th>Periods</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
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<tbody>
<tr>
<td><strong>Total annual costs</strong></td>
<td>154,035.00</td>
<td>3,200.00</td>
<td>12,257.00</td>
<td>7,314.00</td>
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<tr>
<td><strong>Cumulative costs</strong></td>
<td>154,035.00</td>
<td>157,235.00</td>
<td>169,492.00</td>
<td>176,806.00</td>
<td>184,120.00</td>
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<td><strong>Discounted costs</strong></td>
<td>154,035.00</td>
<td>3,018.87</td>
<td>10,908.69</td>
<td>6,140.98</td>
<td>5,793.37</td>
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### Net benefit (annually) (=2-5)

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<thead>
<tr>
<th>Periods</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Net benefit (annually)</strong></td>
<td>-154,035.00</td>
<td>11,740.00</td>
<td>537,569.00</td>
<td>542,512.00</td>
<td>542,512.00</td>
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</table>
The primary advantage of the solution from Heidelberger Druckmaschinen AG was the fully integrated approach – the machines are part of a coordinated overall concept. This was, and still is, the only solution that enables the presses to be networked seamlessly with prepress via JDF integration. For us, this solution offered the best prospects for avoiding errors, minimizing makeready times and achieving standards more efficiently. This integration has significantly reduced the amount of valuable time and effort spent on communication between departments.

Specific savings:

- There is no longer any need for plate checking after imaging due to the increase in the quality of data from prepress. This in turn freed up 2 members of staff for other tasks. One employee retired and the other now works in the bookbinding department. In 2006, only 50% of these savings could be implemented.

- Previously, the process standard had to be checked every two months, a procedure that occupied each machine for half a day and required the Head of Prepress and Press to devote time to evaluations and adjustments.

- Troubleshooting during the adjustment process caused waiting times that equated to approximately 10 hours of machine time per week.

- Costs resulting from complaints have been cut by around 70%.

- We have been able to free up 20% capacity in prepress. Despite the increase in throughput, fewer employee-hours are now required in the prepress department.

- The double-sided content proofs have resulted in savings of 50-60%.

- There has been a dramatic reduction in the post-imaging of plates caused by deviations. This has saved around 10% of the total volume of 18,000 – 20,000 m² p.a., equivalent to approx. 2,200 plates (around 2,000 m²).
• Additional savings were generated by the increased reliability in PDF processing and improved calibration (now consistently transparent as a key is included on the plate).
• There have also been benefits in the pressroom resulting from both the implementation of new machine technology and presetting with the JDF data.
• The makeready process with JDF is around 15-20% faster than presetting with CIP3 data. For example, the makeready time for the 8-color press used to be 60 minutes – this has now been reduced to approx. 35 minutes.
• At the same time, makeready waste has been reduced from 600 to 450 sheets. Across all jobs and across the company as a whole, we have been able to save 20% waste, based on the volumes produced.

Impact on overall productivity
Although we still have the same number of employees, we now have a 20-30% increase in capacity. Of that, 50% is due to faster machine speed and 50% to workflow integration. Currently, we are realizing 10% of this boost in productivity – we can therefore utilize a further 20% without having to increase the number of employees. This will also be covered by the growth in sales.

Conclusion:
Unscheduled interruptions can occur in even the most stable production processes, as changes in the parameters can go unnoticed. With the closed loop of the JDF workflow for automation and standardization of processes with integrated quality monitoring, any deviations and their causes can now be identified quickly and unambiguously. We have achieved our goal of using JDF to comprehensively control the automation and integration of various processes. In the role of quality manager, we monitor and control our customers’ jobs. This has generated considerable savings throughout the process, without which we would have been unable to maintain our position on the market. We now have more time to spend developing new business ideas with our customers and thus expanding our portfolio of services. The workflow integration has increased our return on sales by around 3-5%!

The modular character of the Prinect range of products gives us great opportunities to improve our processes further still. As far as production is concerned, we now plan to focus on postpress, as we have identified significant potential for improving control of deadlines and quality in this area.

We are also keen to establish a web portal to expand our offerings and services for our customers.