

# Digital Offset Printing for Newspaper Production

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## Abstract

At DRUPA 2000, MAN Roland introduced the DICOweb - a completely film- and plateless CTPress web offset system. It features a revolutionary flexible and open platform concept with an easy way to adapt its printing format. It integrates the complete production process from prepress to postpress and offers a unique modularity in the press system configuration, today and in the future. At DRUPA, MAN Roland sold several DICOweb systems to beta site customers with different production programmes. According to its modularity and flexibility the DICOweb can easily be adapted for a wide range of possible applications in publishing, commercial or packaging sectors - in this example for a newspaper application in practice on a DICOweb which recently was delivered to Nussbaum Medien, MAN Roland's first customer to whom a DICOweb is delivered.

## Introduction of Nussbaum Medien

Nussbaum Medien prints mainly community newspapers for the local governments of the rural districts in the south of Germany.

Amongst the official news he prints news about the societies, sports and cultural events and other actual occurrences and a big volume of advertisements for the Cities and communities with up to 20,000 inhabitants.

Nussbaum Medien was founded in 1959 and in the meantime has four production facilities, two field offices and 8 publishing offices. The production is distributed over many sites to allow the closest and fastest contact with their customers. At his main production site in Weil der Stadt he prints ca 150 different issues per week in black & white or with spot colour. The scope of run lengths varies from a few hundred up to ca 25.000 copies. The page count of these community newspapers is between ca 20 and 150 pages depending on run length and seasonal influences. The final format is A4.

The major part of the whole described print production must be carried out very fast - within two and a half days. This is the time span between closing of the ad taking and the delivery of the new issues to the cities and communities.

Oswald Nussbaum, the owner of Nussbaum Medien came in contact with the research and development department of MAN Roland several years ago as he felt an increasing demand for four colour products. He since longer time was looking for an appropriate printing system which fulfilled his requirements concerning cost

effectiveness for short print runs and very fast job throughput which he found with the DICOweb. He agreed to be the very first beta-site customer for this printing system. His production site in Weil der Stadt is comparably close to Augsburg, where MAN Roland develops the DICOweb which helps facilitating the common development efforts to safeguard the process of further improvements for the first DICOweb to a fully reliable production system.

## Introduction of the DICOweb

One of the major advantages of the machine is not that it can do on-press imaging, but rather that it can do on-press de-imaging (or erasing). That not only reduces costs, but also simplifies and shortens the changeover between jobs. The DICOweb is actually, as the name says, more of a `Digital Change-Over` machine than a press, since the printers actually earn their money increasingly with efficient changeovers.

## The DICO Process

Job change-over is a three-step process: imaging, fixing and de-imaging (or erasing). The elements include a forme cylinder (or imaging cylinder), a transfer ribbon, an IR-laser, a heating element, cleaning liquid and cloth.

## Imaging

**Elements:** the laser imaging head, the MAN Roland patented DICOtape transfer ribbon and the forme cylinder.

The imaging head receives digital data in the form of a file containing the image from the DICOweb database. Then the MAN Roland patented polymer coated ribbon is brought into close contact with the forme cylinder sleeve. A 200+ channel CreoScitex laser heats imagewise the ribbon. The laser and ribbon move across the cylinder to create the image on the cylinder at a resolution of 3200 dpi. The imaging takes place on all cylinders simultaneously and takes less than two minutes for an A2 image. The DICOtape thermal transfer ribbon is supplied by MAN Roland and is contained in an easily removable cartridge similar to the one of a video cassette.

## Fixing

**Elements:** heating element, forme cylinder and conditioning system

Next, the image must be fixed or solidified on the forme cylinder to provide durability and consistency of the image. A heating element fixes the image,

subsequently a conditioning process prepares each forme cylinder for ink reception and rejection sensitivity. These two environmentally friendly processes take about 3 minutes for an A2 image. This image is ready to be printed and can remain on the cylinder without being re-imaged up to 30,000 impressions.

### **De-imaging**

**Elements:** cleaning liquid, cleaning cloth, forme cylinder, wash-up system.

Once the job is complete, the image is de-imaged (or erased) from the forme cylinder. The image and ink is removed from the forme cylinder with special cleaning liquids and cleaning cloth. The de-imaging liquid is environmentally friendly. Simultaneously, the blanket cylinder is washed via another wash-up system. De-imaging and wash-up takes less than three minutes for an A2 image.

For our above-mentioned A2 example, the entire process of imaging, fixing and de-imaging takes approximately 8 minutes. (without cylinder movement, substrate or format change, colour-water balance)

### **Workflow**

DICOWeb can be part of an integrated workflow using the RIP at the press or a non-integrated workflow, which uses a separate RIP and a TIFF-downloader. Whichever workflow is used, the direction and processing can be initiated from the DICOWeb Central Press Console. All necessary data to preset the press is to be submitted by the prepress workflow.

The Central Press Console is a new generation operating system. The console and monitor uses a touch screen control graphic user interface (GUI), which controls all print production elements. It has an integrated, closed loop register and color control system. It offers on-line help for diagnostics and maintenance to assist the press operator throughout the process. An intuitive system guidance feature helps to avoid errors on the press. The open architecture ensures easy software upgrades, the ability to add new press modules (such as a UV curing unit or even additional print units) and to integrate these modules into the system easily. At the customer's discretion, complete data for management information systems can be accessed directly from press interface.

### **Direct Drive**

DICOWeb is loaded with new technology. One substantial feature is the MAN Roland's direct drive technology. Each blanket and each forme cylinder has its own direct drive. This technology is the key to DICOWeb's format variability and platform flexibility. Its direct drive design is what makes the variable format feature of DICOWeb possible. Additionally, each auxiliary element, such as the reel paster or unwind unit, has its own direct drive. The direct drive design allows for fine adjustment of every cylinder by means of extremely accurate encoders. This means that there is unprecedented control over cylinder position. Web tension can be controlled at each nip point and over the entire length of the web. Because there is no drive shaft, the direct drive technology also minimizes vibration and backlash, which

occurs during acceleration or deceleration. No drive shaft also means mechanical expansion of DICOWeb, such as adding print units or finishing modules, is a relatively simple task. Finally, each direct drive is monitored by an on-line diagnostic system for service and maintenance.

### **Modularity From Start To Finish**

DICOWeb is built on the concept of expandability. As business grows, as markets change, as competition changes, why restrict productivity? DICOWeb allows printers to expand or exchange modules. The choice is the printers – they can choose standard modules such as a reel stand, printing units, conventional hot air dryer sheeter/cutter and folder. Or they can choose to expand to other modules: rewind unit, stacker, varnishing unit, and so on.

DICOWeb includes a new generation MAN designed and developed flying Autopaster. The Autopaster is 100% integrated into the DICOWeb system and features an automatic web up device that goes all the way through to the rotary cutter. It provides for easy web roll loading and because of the low running speed of the press, web handling is much easier. The standard design comes with a two-reel supply and a web aligner. The Autopaster can handle a wide range of substrates from light weight uncoated stock to 250gsm carton.

### **Format Variability**

The printing unit design is built utilising a unique linear movement instead of eccentric bearings. It is this linear movement of the cylinders and imaging technology that allows for variable format and in-press imaging. The linear movement allows the cylinders and the imaging system to reposition themselves so that imaging can take place, formats can be changed and the cylinders can be adjusted very easily to print on a very wide range of print substrates with different weights and thicknesses.

There are three elements within DICOWeb which combined provide the means for flexibility of format and substrates.

The forme and blanket cylinders "ride" on a linear guide, which allows for access and flexibility within the press. Because of the direct drive technology, each cylinder can move and rotate independently of all other cylinders or elements in the press. Finally, MAN Roland has developed a sleeve technology for both the blanket and forme cylinder to allow the adjustment for a variable format.

To change the format, a press operator has two options:

The press can accommodate forme and blanket sleeves having a specific wall thickness, resulting in varying circumferences. Exchanging the sleeves of blanket and forme cylinder can expand the format from the base cylinder up to 200mm (8"). The sleeves slide over the base cylinder cores and can easily be changed by the operator.

If a larger format change is desired, then the blanket and forme cylinder cores have to be changed before the sleeves are loaded into place. Additionally, repositioning of the inking, dampening and imaging elements is required.

Each MAN Roland constructed DICOweb print unit is made up of double (blanket to blanket) printing units. Single printing units are also available.

### Post Press Components

Depending on a printer's needs, DICOweb is designed for cold-set or heat-set production. For heat-set applications, a compact 2-zone dryer is 100% integrated into the DICOweb operating system. Integrated into the drying module is an oxidizer (after burner) for pollution control, chill roll stand. The entire system is controlled and managed by the DICOweb Central Press Console. Options for UV / EB drying units are in development.

With DICOweb, printers have a choice of finishing options. A rewind unit is optional for off-line processing and again, is 100% integrated into the DICOweb operating system. For more advanced finishing options the DICOweb can be configured with a 100% integrated in-line rotary sheeter/cutter. It has an adjustment for varying sheet length and can handle stock range up to 250 gsm. The sheeter/cutter is controlled from the DICOweb Central Press Console.

### Fact sheet DICOweb.

<b>Web width</b>	300 - 520 mm
<b>Cut-off length</b>	variable
<b>Printing speed</b>	3.5 m/s
<b>Production output</b>	80,000 sheets A4, printed on both sides, 4C, i.e. ca 20,000 rev./h for an 8 page - format or 10,000 rev./h for a 16 page - format
<b>Printing process</b>	wet offset (more processes to be available in future)
<b>Number of printing units</b>	any (at present: 6 maximum)
<b>Drive</b>	Individual cylinder motors
<b>Ink supply</b>	automatic
<b>Register control</b>	automatic
<b>Change of printing forme</b>	8 min. (target time, depends on format)
<b>Imaging resolution</b>	3,200 dpi
<b>Imaging stability</b>	ca 30,000 copies
<b>Laser</b>	830 nm (laser diode)
<b>Dimensions, width, height</b>	4.6 m x 2.3 m (length depending on configuration)
<b>Printing materials</b>	any (depending upon finishing and dryer)
<b>Delivery</b>	fold, sheet, rewind
<b>Data management</b>	PECOM for drive, operating controls, regulation, presetting

As delivery the DICOweb can be configured with a folder or stacker unit. Either can be in-line with conventional drying or UV / EB units. Both are fully format variable, have a high degree of automation and can be exchanged with each other within 30 minutes .

MAN Roland's DICOweb is innovative technology, which requires innovative partners. Some of our partners include: AGFA, CreoScitex, Hunkeler, MBO, Megtec.

## General Information About the Current Print Production of Nussbaum Medien

### Prepress

For the production of the community newspapers, Nussbaum needs two different typesetting systems - one for the composition and pagination of the news articles and the other one for the composition of advertising matter.

Most of the text manuscripts and images for the news information are sent by mail or are picked up at the communities offices by messengers. Data are received in all variations of paper, films, slides, floppy discs, CD's etc. Some customers also sent their data directly over an ISDN channel to Nussbaum. All texts are then keyed in manually for later automated pagination according to the planned layout. Images with two colours are scanned and integrated.

For the composition of advertising matter, Nussbaum applies a composition system especially tailor-made for his needs. The external offices which take all the ads send the text information as classified ad to Weil der Stadt where the layout, typography etc. is done according to the customers requirements. The positioning of the respective ad is done automatically according to the applying category. For image information of the ads the situation is quite similar as for the news information - a huge bulk of inhomogeneous data of all kinds which is to be integrated somehow. Nussbaum offers here a wide range of additional services for the customer's ads like image preparation, layout, design etc.

Both the news and the advertising pages are converted to postscript files (A4 format). For black and white print production the files are printed on paper by a laser printer and are imaged on A2 paper plates in for ups by projection platemaking. For Spot color production the flight check and imposition was done by a comparably low performance workflow. The data then were sent to a CTPlate device for imaging in polyester plates. As resulting from the platemaking process and the applied plate material the process is very cost effective and leads to a good-enough newspaper quality. They have a top plate output of 140 plates per hour.

### Print and Finishing

For the print production in Weil der Stadt, Nussbaum uses three 8-page coldset presses, cross grain, for black and white print on both sides which all are in two-web operation (i.e. 16 pages per print run).

For the print production of spot colour products Nussbaum uses a 16-page coldset press with three double print units which can produce in one-web operation with three colours or in a two-web operation with black and white and two colours.

All presses have rotary folders in line. The printed and folded products are delivered to a print roll intermediate storage which will be transported to the different sections of some collators where the community newspapers are also stitched and trimmed.

## Application of the DICOweb for Nussbaum

The DICOweb intervenes in a printers overall production workflow as no other commercial offset printing system before. It is a fully automated production line that conveys all steps beginning with the generating of the print forme over printing on both sides, cutting and folding. There are no more manual steps between these steps needed, no more intermediate storage and no more drying time. For Nussbaum, the DICOweb offers a huge potential of starting a very streamlined four colour newspaper print production with big advantages concerning financial issues, throughput time and productivity in comparison to other possible four colour production alternatives.

To address the DICOweb optimally, Nussbaum newly implemented an Apogee workflow from Agfa. For a conventional four colour print production Nussbaum would have been forced to invest into an additional high capacity platemaking stage which he can skip with the DICOweb.

Changeover of the DICOweb is done in up to now unequalled speed. The print is done on both sides in a speed that is higher than in any other four colour print system which is designed for shorter print runs.

As Nussbaum has a very big production volume which can not be covered with a single DICOweb he decided to print in first step mainly the most important parts of the community newspapers in four colours - the covers. More exactly: the first and the last four pages of the community newspapers. The covers then will be collated together with other one-, two- and three coloured newspaper parts. As the DICOweb print quality is significantly better than achievable with the current production equipment it is also planned to produce beyond the newspaper covers also advertising inserts which can be added extra to the newspapers.

The folded products easily can be integrated in the current finishing processes. Delivery from DICOweb to a Print Roll storage is no Problem.

## The First DICOweb Beta Site Project

The machine platforms of the DICOweb shown at DRUPA 2000 were produced twice. But the two machines being assembled basing on the same platform differ significantly concerning their intended field of application. The DRUPA-DICOweb was made to demonstrate commercial applications. The Nussbaum machine was made for newspaper applications. The main differences between these two concepts:

- The Nussbaum machine has an Anilox inker which absolutely sufficient for a very respectable newspaper quality. This allows extremely less waste. From job to job there are only about 50 revolutions paperwaste needed. For some jobs even lower waste rates have been achieved already. Thanks to the aforementioned modular concept of the DICOweb it was not difficult to provide the DRUPA machine with a long train inker for a commercial application and the Nussbaum machine with the Anilox inker. Both inking systems are built in interchangeable ink cassettes with the same interfaces to the machine platform.

- There is no heatset drying unit included as it is not needed for Nussbaum's newspaper production.
- For the standard DICOweb a combination folder with a buckle folder and a knife and may be additional buckle plates is planned. For Nussbaum, who uses a paper type with a comparably low grammage and stiffness, it was decided to use a simple rotary folder which leaves enough flexibility for his production purposes and safeguards that despite the complicated paper the maximum speed and folding quality of the DICOweb can be reached without risk.

The Nussbaum DICOweb is in operation at the web press production site of MAN Roland in Augsburg since more than half a year and in the meantime is running reliable and stable under test conditions. MAN Roland made several test productions for Nussbaum which have been sent to his production site and have been integrated there in his finishing process.

As this is the very first DICOweb which will be delivered to a customer, the development time and all actions needed for making this press were difficult to predict. So both parties were in close, flexible and very open contact to commonly pursue the development progress. Both parties are confident with the actual state and think they can take the risk to install the press at the customer's site. It is a big advantage that Weil der Stadt is not far from Augsburg - a two hours car ride - and so each support needed from Augsburg is available very quick. The parties agreed to deliver the DICOweb April 17, this year. In the meantime the assembly work at the DICOweb at the customer's site is nearly finished and the installation team is starting to set the press in operation.

By operating a beta-site machine at Nussbaum's plant, MAN Roland sees the opportunity to test it under real conditions and thus gain knowledge for subsequent series production of the DICOWEB.

The idea of forming a development partnership is to link the customer's and MAN Roland's specific know how and potential.

The parties realize that beta-site development can entail technical and deadline risks. These risks were and will be checked at milestone dates which take place at regular intervals during the course of the project. These milestones are for example:

- Communication about development and test results
- Clarification of subprojects of the whole project such as requirements concerning prepress and postpress connection
- Delivery of the DICOweb to Nussbaum
- Quality acceptance of the press after a commonly agreed test phase
- Reliability Check after a further test and optimization phase

If there should be deviations from the originally agreed objective, then the further procedure is to be determined anew by agreement.

Development partnership means that the individual units / functional groups of the DICOweb such as inking unit, damping unit, imaging unit, etc. are tested under test and production conditions. Both partners will run

systematic test series and analyses, draw up corresponding documentation and evaluations and plan actions based on them. Both partners will be actively involved in the development process and will integrate their respective experiences and potentials.

### **References**

1. Ralf Schloezer, The Impact of In-Press imaging and Erasable forms on press design, TAGA proceedings Colorado Springs May 2000
2. Dr. Josef Schneider, New Products and Technologies at drupa 2000, IS&T's NIP16, Vancouver October 2000

### **Biography**

Thomas Buck started his career at Nussbaum Medien around ten years ago as assistant in Weil der Stadt. In the

first time he was focussed on prepress issues but received increasingly more complex and responsible assignments especially in the print area. In the meantime he is responsible for all technical processes around the print production. He has experience with two web offset installations.

Max Schaeble received his Master of Science degree in Berlin. He worked as scientific assistant and as quality manager at a big German printer. Since 1995 he works for MAN Roland where he accompanied the development of the DICO-CTPress process and of the DICOweb. In the meantime he is focused on the planning and realization of the first DICOweb beta-site projects in close coordination with the customers.