development in the computer and software industry gives us new opportunities for efficient scheduling, tracking, control and decision support from a global point of view. Tools like IFRAtack have been possible to develop and use due to the presence of open systems. Prepress, press, mailroom and distribution systems can communicate and exchange information in a standard format.

The global information exchange can be used to create more dynamic and more reliable production and distribution plans. This will be useful in the future when there are more customised products and thereby more flexible production runs.

Managing finer zoning is on one hand a technical issue and on the other hand a matter of synchronising all the operations involved – from the sale system to the carrier operation. This includes certain integration of administrative routines and systems like sale support systems, advertising systems, subscriber systems, and distribution systems. In this context, Geographical Information Systems based on relational databases can be very useful.

**Geographical Information Systems (GIS)**

In Sweden, there is a large project in the area of GIS systems for newspaper operations. This project is carried out by Göteborgs-Posten in Gothenburg. The objective is to create a GIS system based on ESRI’s GIS technology and an Oracle database. This GIS system will include the RouteSmart application, a software supporting distribution planning and optimisation. The GIS system is also prepared to support activities in the area of marketing and editorial work. The system will be closely linked to several other systems at the newspaper.

I am convinced that finer zoning will be extremely powerful if sale systems can be linked to the distribution system and have access to information regarding all carrier districts. In this context, the use of GIS’s based on database technology can become a key technology.

The use of IFRAtack-based systems gives us the tools to track, analyse and control the workflow from a global point of view. IFRAtack still needs to be extended in the area of distribution as the recommendation lacks support to track the carrier operation. IFRAtack support regarding the carrier operation means possibilities to integrate IFRAtack technology and GIS systems. This will help newspapers to refine their operations, support a more flexible and controlled production and distribution planning, and stay profitable despite more complex production and distribution operations.

The use of new technology in the mailroom combined with technical and organisational links between sales, administration, production and distribution will help newspapers manage finer zoning and thereby become even more competitive on the media market.

**Fine zoning – the needs, benefits and technical realisation**

Thomas Rasmussen of Schur Packaging Systems, based in Horsens, Denmark, gave a presentation about this company’s solution for zone control using the Thorsted Mailroom System (TMS).

For more than 10 years, Schur Packaging Systems (previously Thorsted Maskiner) has, under the name of Thorsted, developed and supplied PC-based solutions for mailroom automation. To begin with, these PCs controlled our stackers and bundle addressing units thus making, primarily, programmed bundles and small bundles.

Within the last three to five years, there has been an increasing need to integrate all mailroom machines. These needs have been very different and have ranged from general production control systems with statistics and reporting, right down to the need to obtain specific details from parts of the mailroom. Some customers have also needed to monitor their newspapers, from when they left the printing press until they lay packed and addressed in the required order and in the correct transport truck at the loading ramp.

One of the most frequent options required by our customers was the control of inserts in newspapers, so that newspapers could be distributed either in accordance with geographic zones or demographic requirements. Some customers wanted to automate and improve an existing manual process, while others have seen the marketing and earning potential in distributing advertisements together with the daily newspaper.

These fragmented requirements have again made great demands on the functionality and flexibility of our control systems. At the end of 1995, Thorsted decided to develop the concept of the Thorsted Mailroom System (TMS).

**Thorsted Mailroom System**

Emphasising zone control, this system spans the many solutions needed in the mailroom. The PC-based unit described below can, in addition to its primary task, also be combined to provide a complete system for the control of automatic zone operation (See Figure 2, Page 22).

- Together with our stackers, the Thorsted Stacker Controller (TSC) can produce programmed bundles down to one copy. A bundle addressing unit can also be connected to the TSC. Here, an address label can be printed, containing all relevant and updated information as regards to distribution, while the bundle is actually being produced.
- When newspapers with inserts are to be produced, it is easy to connect the Thorsted Inserter Controller (TIC).
This colour touch-PC is a very easy-to-operate graphic user interface. All functions on the inserter are controlled from here, both with standard operation and when, for example, operating zone production.

- The server, Thorssted Master Controller (TMC) is connected when several production lines (up to 20) are to share one, or several newspaper productions at the same time. This controls the distribution of orders to the PCs involved, using a flexible and reliable system: either so the system produces bundles in a sequential order for the entire system, or so that a priority is made per production line.

The Thorssted Work Station’s (TWS’s) and the connection to the host computer can easily be connected to the Ethernet. Thus, packing lists can be transferred directly from the subscription system. The TWS’s allow for central set-up and last-minute additions to individual productions. It is also from here that the user can zoom in on an individual machine and make changes if necessary, or can also follow production in general.

**Extending the system**

The TMS concept is built up in modules. Therefore, it is easy to extend the system with new functions, such as the Loading Bay Control System. This system links the loading bay with newspaper production in the mailroom. Another example is the ink-jet system which allows the newspapers to be individually addressed. The TMS concept also allows for the integration of specific customer requirements.

Another major advantage is that the same software is installed in each of the PCs. This ensures that the user interface and basic functions are the same on all the different units.

The basic software also forms the basis for a simple and fail-safe back-up concept. A reserve PC or, for example, an extra TWS can be used to replace a faulty PC. When this reserve PC is started up, it is thus possible to select which function (TSC, TMC, TWS) the PC now has to emulate.

The TMS concept allows for the production of the personal newspaper, in that there are no limitations as to how quickly zones can be changed in relation to each other. It is known that this selective operation can cause some practical production problems in that it is often in these cases that distribution requires the newspapers be packed in a fixed address order. Our customers have not yet expressed the need for this, but with TMS as a basis, we feel well equipped to solve this task should it prove necessary.

**Zone production sequence with TMS**

The key for zone control via TMS is a packing list which, as a rule, comes from the subscription department.

However, it is also possible to produce a list directly on a TSC or TWS, for example, for freely distributed weekly newspapers. In addition to the number of newspapers involved, and the order of distribution, the packing list also contains data as to which inserts are to be put in which bundle.

It is this packing list which determines what is to be produced: however, how production runs in the mailroom is determined directly on the TMS. For example, it is determined on the inserter touch screen as to which supplement feeder the inserts are to be placed (can also be dealt with centrally on a TWS).

**Customisable system**

On all the PCs mentioned in the TMS, it is possible:
- To set up the associated machines to the production mode required.
- To see the relevant statistics of work in progress and also the statistics of the latest 30 days production. This is shown either as specific figures or as graphs. All information can be printed out on a system printer.
- To see diagnoses, i.e. messages as to irregularities or direct reasons for production stops. The times for all these messages are recorded. It is thus easy to see which factors are important for the system as a whole, to work optimally.
- To limit those functions the individual user is to master. This is done through several user levels, thus improving ease of operation.
- To supply remote support from Schur Packaging Systems in Horsens.
When the packing list has been read into the TMS database, the zone operating mode most suitable for the production in question is selected. The operator presses the start button on the touch screen and an order is sent to all the machine’s PLCs (programmable logic controllers). These PLCs then immediately start their individual jobs.

In order to ensure 100 percent reliable production, each individual machine reports back to the PCs after each individual bundle has been produced. In this way we can guarantee that the bundles are correct, when an address label has been affixed. If there are any irregularities, this extensive reporting ensures that faulty bundles are re-produced. This logging also helps to trace and correct errors.

Zoning, mode of operation

We used the widespread needs of our customers, regarding zone control, to structure our solution, which can be adapted to the needs of the newspaper.

We also based our system on the IFRA Special Report 4.10: The Efficiency of the Inserting Process with Regard to Finer Zoning (published in 1995). This provided us with an excellent theoretical and practical basis which ensured that the product we developed would meet the requirements of the future.

The following explains how the zone system, in general, functions on the TMS (See Figure 1, left):

1. The newspapers are fed to the jacket section feeder of the inserter (1) from, for example, a gripper conveyor. The inserts can either be manually put in the supplement feeder or a bundle feeder can be used.
2. The inserts specified in the packing list for each individual newspaper are collected from the correct supplement feeder (2). A supplement check is performed and the inserter can be set up to deal with any repairs via a following feeder.
3. The main jacket and all the inserts are put together in the star (3). The size is checked, and after being compared with the supplement check, the newspaper can now either be approved or ejected.
4. The last newspaper in a zone is tracked to the stacker (4) intercept which divides the newspapers and sends the bundles to the bundle address unit.
5. The bundle addressing unit (5) affixes the address labels on the bundles, which are then transported towards the loading bay.

The three modes of zone operation

As mentioned previously, the different modes of zone operation which we have implemented take into consideration the different needs of our customer groups. In the following, we will look at the three zone solutions and see how the system reacts when changing between zones.

1. Stop between each zone: If there is a need to ensure that each individual subscriber receives exactly those inserts which he is expecting, the system is set so that it stops between each zone. This mode of operation can, with advantage, be used with the insertion of important supplements, for example, local news. The inserter will perform a number of idle cycles until it is sure that the last newspaper in a zone has been correctly produced. With this mode of operation, it is therefore also possible to produce zoned bundles down to one newspaper. The disadvantage with this mode of operation is the few seconds of time wasted between each zone change.

2. Marking of zone faults: For those newspaper plants requiring a final product with many small zones, the marking mode of operation will be the correct choice. Marking means that an alarm is given if there is a fault in a newspaper bundle. A message informing what has gone wrong is written on the address label and using this information, the bundle can be repaired manually.

Some newspaper plants manually treat their bundles after they have been produced, and after an address label
has been affixed. If personnel here are able to repair any faulty bundles it can be an advantage to choose the marking of zone fault mode of operation.

The advantage with this mode is that the machine operates continuously through the zone changes, only those newspapers and supplements necessary are used, and the order between the newspaper is kept, which means that the newspapers can be personally addressed.

3. Grey Zone: The third operating mode is designed to meet requirements from those newspaper plants which deal with large numbers of inserts. This ensures that supplements are distributed in a given area. Here, the grey zone mode is used. This means that with each zone change, inserts of both zones appear in a number of newspapers.

This overlapping number is adjustable and can be as low as five newspapers. If the number is set to zero, the system changes sharply on one newspaper (sharp zoning).

How to manage distribution by sole use of standard bundles

Peter D. Beets, from De Telegraaf in Amsterdam, explained his newspaper’s approach to distributing newspapers by using standard bundles. The following is Beets’ report.

Why use standard bundles?
Standard bundles will ensure speed, and with the right layout of the mailroom, greater flexibility.

A great advantage for De Telegraaf, and for the Dutch newspapers in general, is that the majority of readers are subscribers. This means that we can make a fairly approximate estimate of the number of newspaper copies we have to produce.

De Telegraaf has about 800,000 subscribers in all parts of Holland, who want to find their newspaper on the doormat before 7 a.m. Additionally, we print about 200,000 newspapers destined for single sales. This means that approximately one million newspapers have to be printed and delivered between midnight and 7 a.m.

The main thing is speed and efficiency.

Preparing for distribution

At 5 p.m. the last alterations are made in the subscription file, and at that time the prognosis for single sales is known as well. This is fed into two data files, the Telegraaf subscription file and the Telegraaf single-sales file.

After five hours this data is forwarded to the central data file called VST, De Telegraaf Transportation System.

This data file will be translated into instructions, such as: the number of newspapers per truck leaving the pressroom and the distribution route from pressroom to