The Mikron Group develops manufacturing and automation solutions for high-precision production processes for the most varied industries. Founded in Biel in 1908, Mikron has been rooted in Swiss innovation and quality culture for more than 100 years. The central activities of the company are still based in Switzerland: at the Mikron headquarters as well as the main sites of the two divisions Mikron Automation and Mikron Machining (including Mikron Tool). Other production sites are located in Germany, China, Singapore, and the USA. Mikron is both a series and a custom producer. The production of customer-specific machine tools is based on Engineering to Order (ETO) using standard components. In 2013, Mikron introduced a fully integrated system and a new process model that seamlessly links engineering and logistics: to make procedures more efficient, more secure, and specifically controllable as well as to increase productivity. Luigi Bertolli, IT Engineering Manager at Mikron, reports on the original situation and implementation successes.

At our sites in Agno (Switzerland) and Rottweil (Germany), product development had been running since 2005 with NX 4 plus Teamcenter Express 9.1 (TCE) as the IT and PLM system – with separate databases on each site. To transfer design data to SAP, we had programmed a special interface, but due to the system inconsistency, our change service still wasn’t working optimally. One problem was that CAD documents were not linked directly to the SAP master material system but only to the TCE master material system. This system inconsistency between SAP and TCE meant that neither the two master material systems nor the bills of materials could be kept consistent. And the logistics had great problems mapping material properties to the CAD document.

The next problem was unreliable and extremely weak release processes. Moreover, users showed little acceptance for the heterogeneous system, and the unproductive system usage time was very high. Quite clearly, something had to be done. In 2011, we decided to switch over to NX 8.5. This automatically
resulted in the question about a new PLM solution, for TCE was not compatible with this NX version. Furthermore, our version of the TCE software (9.1) was now becoming obsolete.

Future-proof decision
Particularly with a view to our Engineering to Order, an integrated PLM solution with a central data source seemed to be the best way to go. We wanted to link engineering and logistics by means of a common change process that also included material creation and Engineering Change Management (ECM). Design releases should automatically be able to trigger downstream logistics processes. Moreover, logistics staff should be better able to judge the extent to which changes made have immediate effects on current orders. We therefore decided against a changeover to new Teamcenter software. As a third-party system with a separate database, TC clashed with our integration strategy. Furthermore, a TC changeover would have incurred considerable costs. We therefore thought it would be more profitable to invest in a fully integrated system that would enable other divisions to be integrated in the global ETO process in the future.

Target-oriented system solution
We decided on SAP PLM and DSC’s Engineering Control Center solution – ECTR: to manage product data in SAP as the only reliable source and to ensure current, consistent data throughout the entire company; but also to be able to link objects with each other and standardize and control processes precisely in every phase. SAP PLM makes it possible to align data and process management to the product lifecycle and optimize it accordingly. ECTR integrates authoring tools of all kinds in SAP PLM: from MCAD/ECAD systems to MS Office and e-mail programs. The integration platform does not just deliver all product-relevant data reliably to SAP: it also supports data provision as well as requirement- and context-related processing – both in engineering and in the downstream divisions.

As far as user acceptance, efficiency, and productivity are concerned, the intuitive SAP cockpit of ECTR was also an important decision criterion. At the press of a button, it supplies all necessary SAP functions and SAP objects such as CAD data. Moreover, product-related documents can be structurally managed, classified, and linked logically to each other, very easily and without any special knowledge of SAP. Yet another great advantage: thanks to flexible window structures, freely configurable window contents, and individual folders, all users can customize their own cockpit according to individual taste. That alone results in clear time-saving in day-to-day operations. Enhanced functions and automatisms do the rest:
- Simple navigation in the class tree and targeted searching using classification features to find technical documents quickly
- Efficient cloning of complete assembly and product structures including all related documents and references
- Easy mass and set operations for attribute changing and versioning
- System-based change and release processes with automatic version and status tracing
- Automatic generation of bills of materials and updating of attribute values in product-related documents

New process design
We have completely redesigned the whole engineering process so that it equally meets the requirements of both Mikron Machining and Mikron Tool. Furthermore, we created an ECM process as a basis for the change service. Altogether, the process design is based on the following requirements:
- Implementation of material revisions into the ERP system (SAP)
- Linking of document version and material revision
- Introduction of a document classification
- Forcing document classification as a prerequisite for material creation
- Use of works-independent “x-plant material status” for engineering purposes and of works-specific “plant specific material status” for logistics purposes
- Implementation of control mechanisms to control the CAD process securely
- Implementation of a cross-plant data-ownership concept

We did the necessary SAP programming ourselves. DSC Software implemented the required plausibility checks, consistency checks, control mechanisms, and division automatisms in order to systematically
control and secure the defined processes. This task was particularly challenging: on the one hand because of our very complex change service, on the other because we had decided on document-based instead of material-based processes, so all workflows and functions that are usually implemented according to the material had to be aligned to the document; the material had to go along automatically. The know-how provided by DSC was very valuable to us, both in the relevant process consultation as well in its implementation. In the end, the new process design met all our expectations.

Efficient data migration

We had already decided to migrate all TCE data to SAP PLM in a single operation. And we knew that a routine and comprehensive approach was indispensable if we wanted to achieve high data quality. That’s why we chose DSC as our migration partner and drew up a king of roadmap consisting of the following preparatory steps:

- Analyzing the TCE database and identifying the datasets, attributes and statuses to be mapped
- Identifying the necessary document and data types (D-types)
- Mapping the document and data types on the basis of the TCE datasets
- Conducting simulation runs with successive optimization of migration rules

We thus managed to migrate approximately 1,500,000 items on time and in a single operation – and that despite the many out-of-standard exceptions we discovered in TCE that we had to deal with.

Supporting people-change management

The many new features made great demands not only on project participants but also on users. Besides the SAP-based PLM solution and the redesigned processes, they also had to get used to a completely different NX system. It is not easy to cope with such momentous changes straight off, so we involved users in the project right from the start and supported them throughout the entire change process. Above all, we explained the reasons for the changes and invited them to offer suggestions for improvement. Thanks to weekly key-user meetings, users were constantly kept up to date on the project status, so they also knew what restrictions to operations might be expected at the beginning. With all these measures plus continuous coaching and training, we were able to keep users interested right up to the end.

Convincing results

Only eleven months after the start of the project, the successful go-live took place at the Agno site in January 2013, where we had earlier defined the new processes. After the changes had proved them selves in productive operation, the rollout took place in Rottweil in May 2014.

At both sites, engineering and logistics now use a continuous, uniform change process that also includes material creation and Engineering Change Management – on the basis of SAP as the central IT system. This not only makes cooperation between design and logistics teams smoother – it also saves time, for example that taken up by the manual synchronization of bills of materials and attribute values. Bills of materials are now generated and attributes updated automatically. This gives staff more time for other tasks. They also profit from much more secure processes, since test mechanisms and system-controlled procedures have reduced potential errors to a minimum.

Even those NX users who had complained about the initial extra work finally recognized the benefits. They profit not only from consistent data but also and especially from document classification. This makes it easier for designers to find and reuse existing parts. That avoids the necessity for new designs and helps to reduce and clarify the amount of CAD data, partly by preventing duplicates. These improvements, as well as the enhanced user-friendliness – much of which is thanks to the SAP cockpit of ECTR – were confirmed by masses of staff feedback.

Apart from engineering and logistics, system administrators also profit from the new solution. The uniform platform has considerably reduced administration work, and also offers more flexibility in the cross-site distribution and management of technical resources. And thanks to the already existing SAP know-how, our IT Support can secure system operation without outside help. Plus: the new process model is CAD-independent and can be rolled out without problems in other company locations, just as in companies that we may buy up in the future.
Measurable success

Following the go-live, our management has now started to sound out possible optimization potentials with regard to CAD methods and integrated processes. In the case of management observations, a naturally subjective and emotional user feedback may be important, but this is no basis for business decisions. So what was needed for further discussions and decisions was a reliable fact basis. Accordingly, we had already defined key figures to enable a meaningful before/after comparison. This took place eight months following the changeover and was a great surprise, since the figures demonstrated much better results than we had expected from the positive user feedback: results that would have been unthinkable earlier. A few examples:

- The unproductive system usage time was reduced by more than 90% from the go live to the break even.
- The time needed for the NX actions Open UGM/UGD (Masterpart/Non-Masterpart) and Add View, Section View and 3D-View fell by over 50%.
- Productivity, measured against the number of material master data, new document versions, and new changes, rose considerably.

Motivated continuation – with DSC

We are extremely satisfied with the course and the results of the PLM project. That of course motivates us to go on. The following steps are planned:

- PLM link to ECAD systems to fully integrate our electro-design in SAP and in the global business process
- Linking of engineering and project implementation in order to optimize material procurement, e.g. through automatic triggering of orders
- Linking of engineering and service to make main tenance easier for customers: by means of Web-Tool, which delivers spare parts lists, maintenance manuals, etc. precisely tailored for their machines.

We are greatly looking forward to mastering these challenges together with DSC – in our tried and tested partnership. For it is the engagement and know-how of DSC specialists that have made such an enormous contribution to our present success.

Luigi Bertolli, IT Engineering Manager, Mikron Holding AG

„Fascination with Integration“

This is precisely the driving force behind DSC, and you too can get a taste of it: with solutions that make using SAP software in the technical environment as simple and profitable as possible – particularly with an eye to Industry 4.0. For example, SAP Engineering Control Center, the intuitive collaboration platform for development teams and systems engineering. Or the SAP Engineering Control Center interface to NX for a direct CAD link. Or how about Factory Control Center – FCTR – for integrated production planning and seamless CAD-CAM-DNC processes.

For more than 30 years, product manufacturers have been relying on the know-how of the Karlsruhe integration experts. Not without reason are DSC solutions at home worldwide – right across all branches of industry: from machinery and plant engineering to the automotive industry to aerospace to electrical and process engineering.