Implementing a new software solution is one of the most difficult projects an engineering division or MRO facility will undertake. Making the software work properly is known to be difficult. There are lessons that anyone planning an implementation should study to avoid wasting millions.

Successful MRO system implementation

The process of installing, configuring, testing and providing training for a complex computerised maintenance and repair operations (MRO) system is demanding. It needs careful planning and project management to ensure it does not overrun on time or budget. Experience shows that in the commercial airline world, MRO systems have a bad habit of doing just that. Whether it is a large-scale, fully integrated and wide-ranging enterprise resource planning (ERP) implementation, or a small-scale system to address a specialist area, the amount of wasted resources during project implementation can be considerable.

The first stage of the project is seen as the beginning of a new chapter in the department or airline concerned. The software looks wonderful, and seems to have many more functions than an older system. Once the project starts, however, the challenges begin to creep out of the woodwork. Commitment to the project may start to falter in the face of the pressure caused by these challenges. The functional details of the system begin to emerge and may not meet the expectations set during the sales demonstration. Data conversion becomes messy. Timescales slip. Software modifications are required. Senior management demands results and the pressure increases further. Go-live is not achieved.

Now the project is staring at failure, but it does not need to be like this. There are measures that can be taken to avoid disaster scenarios.

Planning before selection

An organisation faces a number of decisions and choices before implementing MRO software. How much money should be invested in the project to ensure a success? How many people are needed to implement the solution? Should consultants assist in the selection and implementation process? What activities can an organisation undertake itself during the project? But trouble can start even before this point.

Many organisations fail to start a project correctly. Some may only have a vague definition of the project's needs which leads to uncertainty about scope, timescales, resource impact and business case returns. Others focus too heavily on producing a huge requirements specification and fail to consider or start vital work on data cleansing and preparation. There needs to be a balance at the project definition stage. Experience shows that an organisation needs to start planning the implementation as soon as it begins considering the project. It needs to start assessing their existing data almost in parallel to the evaluation and selection process.

Real life experience

A good example of the benefits of this approach is Scandinavian Airlines (SAS). In 2005, airline management at SAS identified the need to reduce information technology (IT) costs as a percentage of revenue from 5.2% to near the industry average of 2.8%. This required a radical technology transformation to replace the variety of legacy in-house systems with a single, modern IT system. Management also saw the need to adopt industry 'best practices' throughout the maintenance organisation, and needed an IT tool that would enable and integrate these business processes.

SAS also wanted to adopt standard original equipment manufacturer (OEM) maintenance programmes to reduce costs, which meant moving away from customised, SAS-designed maintenance programmes. Several technical interfaces to external systems were also required to communicate maintenance requirements to service vendors and to obtain component information from suppliers. It was a wide-ranging and complex project. Interestingly, one of the first tasks that SAS undertook was to map all the existing data and identify areas of master data overlap. In particular, SAS mapped the data relationships and the current source and likely accuracy of the master data in the various legacy systems. This process started about 12 months before system selection.

SAS conducted an in-depth vendor analysis, which included visits to a number of operators to observe the leading aviation maintenance IT systems in use. ERP systems, which typically require extensive customisation to function in the operator's world, were rejected early in the process.

Ultimately, SAS selected AuRA from MIRO Technologies. A formal proof-of-concept (POC) was conducted in Stockholm in the autumn of 2004 to demonstrate that the system could support all critical SAS, EASA Part M functions and critical SAS business functions. The POC also identified software gaps that required modifications and necessary technical interfaces.

Thirty SAS staff members were involved in the 18-day POC, which was supported on site by three subject matter experts from the vendor. After the results of the POC were compiled and analysed, an enterprise deal was executed between MIRO and SAS Group. The enterprise deal was structured to ensure that SAS and all other SAS Group subsidiary airlines, plus certain third-party affiliates, have the opportunity to benefit from AuRA implementations in subsequent phases.

Scandinavian Airlines successfully managed a complex and wide-ranging implementation of MRO software in a little over 12 months. An initial proof-of-concept workshop was a key part of achieving this success.

After the contract was signed, plans were made to launch the implementation phase in April 2005, starting with the Airbus A321 fleet, with other aircraft models to follow. This plan gave SAS several months to conduct some additional data clean-up and put together its internal support team.

SAS relied on Computer Sciences Corporation (CSC) to provide technical support for data conversion activities, testing, programme management and development of technical interfaces to link AuRA to several legacy systems that were retained at the maintenance provider, SAS Technical Services. The CSC programme manager worked closely with both MIRO and SAS on planning and managing the project from start to finish, a process that took just over 12 months.

There are several key lessons to be learnt from this example. First, the data identification and mapping work carried out by SAS right at the start of the project proved to be crucial in enabling the project to hit the ground running.

Second, the POC was a very important part of the risk-reduction exercise for both the supplier and customer. The teams got to know each other, the vendor acquired a lot of insight into the state of the data and the training needs of the client, and built a strong senior management relationship that sustained the project through its more challenging phases.

Third, the vendor provided a dedicated on-site project manager, who provided a real day-to-day link to the SAS project team to facilitate communications.

Finally, the project was professionally managed by SAS, which benefited from the expertise of CSC. Project management skills are often undervalued in projects like these, and when projects are managed well, the results can be significant.

"The AuRA implementation gives us the powerful system we need to strengthen our maintenance and engineering operations, and substantially improve efficiency and lower costs," says Ulf Nystrom, head of technical operations, Scandinavian Airlines. "This important IT initiative saves us thousands of dollars annually in systems operations and maintenance."

Implementation challenges

It is worth taking a step back and looking at the wider view of MRO system implementations, to identify the broad challenges that should be taken into account when planning a project. One of the best ways of doing this is to talk to an independent consulting company with years of experience in aviation MRO implementations.

SAKS Consulting (SAKS) is a well known international management consulting organisation in the aviation market. It offers a broad range of services including strategy, business process optimisation and software package selection and implementation. SAKS was formed in 2000 by five partners drawn from leading systems integrators and 'the big four' management consultancies. SAKS claims to have deep industry and business process expertise and aims to mobilise the right people, skills and technologies to improve business performance. It works across industries focusing on the areas of corporate strategy, supply chain, change management, ERP strategy and internet/wireless technologies.

"We are often asked by the senior management of airlines or maintenance organisations what experience we have of the overall issues and problems that we have encountered in implementation approaches," comments Sharhabeel Lone, partner, global business strategy at SAKS Consulting. "The top three issues are a recurring factor in almost any audit that we do. The first is a lack of sustainable long-term executive management commitment. We often find that the project team is left to fend for itself when problems arise. This eventuality is hard to predict and plan for, but awareness of the issue is the first step in addressing the problem.

"The second issue is actually the primary reason for the first, and that is a lack of sufficient skill sets in programme and project management from the airline or MRO division. This affects the project team's ability to deal effectively with the board as well as vendors and consultants," continues Lone. "This is an area often misunderstood, or not given sufficient emphasis by the senior management team, which ultimately take responsibility for the project's return on investment (ROI). The third issue sounds like a very 'soft' issue, but in spite of this, or perhaps because of this, proves to be one of the most difficult obstacles to overcome. The issue is poor change management and mostly stems from a lack of experience in implementing major change in an organisation. The change management issue breaks down into three sub-components. First, there is generally no effective change management programme. This needs to be a structured and planned series of actions built into the overall project plan. Second, there is typically poor recognition, particularly by senior management, of the need for a comprehensive and monitored process over the long term. This stems primarily from the lack of a change-management-driven implementation methodology and team focus. It is mainly a result of people not understanding that these are business-led and not technology-led projects. Third, there is usually a lack of skilled implementation consultants who understand both technology and process in equal measure."

Looking across the MRO organisation, the drivers for an enterprise-wide implementation need to be comprehensively evaluated and highlighted.
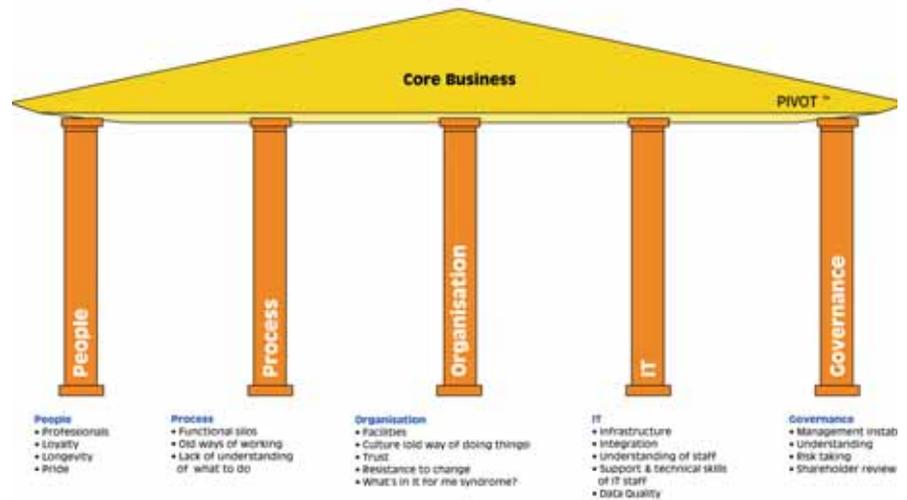

While the last comment from SAKS contains some degree of vested interest, it is generally true that most airline and MRO organisations will lack internal individuals with the skill sets in both IT and in the detailed specialist business processes. These types of people are a very rare breed. While not advocating hiring large teams of very expensive consultants, it is true that medium- to large-scale projects will benefit enormously from outside help, provided that the consultants match up to their claimed credentials. Companies will also have to go through another separate selection process for this part of the project.

The consultants bring another benefit, and that is independence. When hard questions must be asked of either the project team, or indeed of senior management's leadership or decision-making, they stand on more solid ground. They have no internal politics to navigate, no long-term career objectives to consider, and so on.

When it comes to the implementation itself, SAKS has some interesting observations based on its own experience in the aviation MRO systems marketspace. The question of whether a company should go it alone with the software vendor, or take the SAS approach and rely on outside help depends upon circumstances.

"There are pros and cons to a software company implementing its own systems instead of getting a consulting company to help," continues Lone. "Either can work well. Some of the bigger software companies have set up strategic partnerships with well known consulting companies and use their consultants frequently for implementation. Other software companies tend to prefer to implement their own systems. Larger enterprises prefer to have a systems integrator to minimise both real and perceived risk. Whatever the balance, it is essential that a sizeable number of the implementation consulting team come from the software providers."

It is true to say that in some instances, middle management takes comfort from the fact that external consultants act as a convenient scapegoat to point to if the project runs into difficulty. One of the big downsides, however is the blurring of responsibilities. Many times it is difficult to say whether the project has run aground because of poor data conversion and set-up, poor training or inadequate software. Fingers can easily be pointed in three directions to deflect criticism. It also requires a much stronger project management team and methodology to make sure the composite team functions correctly and boundaries and responsibilities are clear.

Project timescales

Timescales and resources vary widely, depending upon the scope and size of the organisation. Implementing one module of an MRO suite in one department for one aircraft will be easier than implementing the entire system for SAS, for example. However, what would it take to implement a typical full-spectrum system for a fleet of 10 aircraft with a staff of 50 people over five departments, on top of an existing legacy system? "There is no right answer to such a question," replies Lone. "I can tell you that most MRO software vendors will say six to nine months. However, from experience I can also tell you that it could take them up to three years or more to get it right. Organisations need to be aware of this. There are three key variables that determine timescale. We start with the quality of data and associated data cleansing. Most organisations grossly overestimate how good their current data is because they assume that it is fine since they currently operate. Wrong! Most organisations have pretty poor legacy data in a variety of systems, but just do not realise the situation."

The second key variable in the timescale for go-live is the quality of the change-management-driven implementation methodology. This is mainly in the hands of the organisation buying the system, but it needs to choose a vendor or a consultant to help it navigate through this.

Third, and most notably, of course is the element of scope creep regarding the functionality and business process coverage that everyone, including the software vendor, thought was decided at the beginning of the implementation. How can this be avoided? First, you need a reasonably good requirements definition at the request for proposal stage. Second, you need to run a detailed POC, and document in detail the outcome of these workshops in terms of gaps and defining the specification of the modifications required to fill them. Third, you must have extremely strong senior and project leadership to stick to the agreed business processes and functions and to turn down all requests for the 'nice-to-have'. This is the classic area of project overrun or failure.

"This last point ties in with the whole question of whether a company should change the business to fit the software, or insist that the software is changed to fit the business," continues Lone. "I am often asked if there are risks in changing business processes if the product has flaws or gaps in functionality. My experience says that undoubtedly businesses have to change. Current aviation MRO systems are business-led and efficiencies can only be driven and realised when businesses recognise the need to change. This is where executive sponsorship is crucial and change-management-driven methodologies play a pivotal role. Most modern systems should bring with them best practice business processes. Benefit to the business can be gained only by leveraging these best

Enterprise Wide MRO Technology implementation Cost of Ownership lifecycle curve.
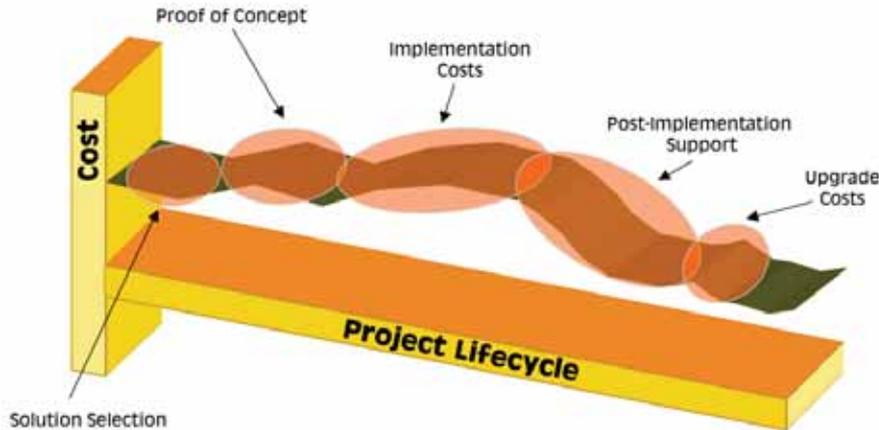
practices and incorporating them back into the business. Only as a last resort should organisations contemplate changing the solution to fit current requirements. One of the few acceptable reasons for changing certain aspects of the solution is if there are current processes that give the organisation a competitive advantage in the market place and that are critical enough to be maintained. The only other situation that may lead to changing the software is inexperience on the part of the vendor. If it is new to the market, or only has a few specific customers that helped develop the software, the vendor may have processes that do not benefit an organisation and cause inefficiencies instead. However, this eventuality is rare these days."

However, software modifications are needed on occasion and if they are, then they can be tricky to handle for the organisation buying the software. Should they wait until go-live, and then gather up all the modification requirements and go back to the vendor? By this time the customer has invested so much time and money in the project, that it is in a weak position to negotiate, and it will have to pay top rate to have the vendor modify the programme. Or should the customer try and negotiate all the modifications as part of the initial contract and get a good price for the changes?

"We live in the real world," comments Lone from SAKS. "So we have to recognise that there will always be a need for some software modifications. Our role as best practice consultants is to guide our clients so that these modifications are kept to a minimum, for example by avoiding a very expensive duplication of the existing legacy system. The software suppliers' responses to the RFP will indicate the number of modifications to be expected, depending

on the coverage of their product. The majority of expected modifications are realised during the POC phase. Hence, our own methods for selection and implementation rely heavily on process and data analysis during this stage. We advise clients that most of the modifications must be defined and costed up front to avoid lengthy and acrimonious negotiations later."

Another important aspect of a software implementation project is the composition of the project team, and its size. For example, should a company insist on a full-time on-site project manager from the vendor? "Absolutely and emphatically yes," says Lone. "We recommend that the vendor demonstrates visible 'skin in the game'. This includes key people and signed-up milestone delivery with penalties for non-deliverance and reassignment of key people onto other vendor projects. Also, some vendors are involved in implementations on the other side of the world from their offices. This does not matter provided that the vendors can guarantee the right resources at the appropriate stages of implementation. This is a significant risk, however, and many clients use systems integrators with local offices for this very reason. During the selection process the support and cultural alignment issues must be evaluated."

Another task that the joint project team must undertake is training. Invariably, people underestimate, and hence underfund, the training task. Whether to train the trainer or hold training classes led by the vendor is part of this decision. A mixture of the two is essential. The question here is not what type, but the detail of the training programme and its effectiveness. There must be a recognition that the same

training sometimes has to be provided several times, and that this must be budgeted for so that it is not the first item to be cut when financial problems hit the organisation. There is no point implementing a multi-million dollar system and using only 10% of its capability due to lack of forethought and budgeting on training. Ineffective and insufficient training is a major cause of low ROI."

The company buying the system also has responsibility for the project, not just the software vendor. If internal key staff are not available to make decisions, data cleansing and mapping are not resourced properly and take longer, or training is not fully supported, then the project will fail. "A full-time dedicated team is essential to any such implementation," comments Lone, "supplemented by part-time key users (part-time may mean up to three-month stints) and associated expertise from the business. Project managers must be full-time and dedicated entirely to the project. This requires firm and enforced executive commitment and empowerment of the project team. There is no point running a project of the complexity of an MRO system on a part-time, ad hoc basis. This will only ensure unmanageable delays and associated cost escalation."

An important part of the life cycle of the implementation project is how you resolve disputes between you and the vendor without risking the project This is why the up-front contracting stage is so critical. Significant amounts of time need to be spent on developing service level agreements (SLAs) and "what if" scenarios before implementation. These define performance criteria between each party and escalation paths if disputes arise. Often much of this preparation is overlooked as initial relationships are good. However if they begin to sour at any stage we have seen real acrimony that results in severe project delays leading in some cases to complete failure. Dispute resolution takes significant amounts of time and requires all parties to refocus on getting to the end game. Ultimately there may be a need to bring in independent mediators with no vested interests who are able to refocus the partners towards getting the job done.

Constituents of Managing an Enterprise Wide MRO Technology Implementation Programme.

Staying on budget

So how does a company ensure that the MRO software go-live is on time and on budget? "That's the million dollar question!" says Lone. "The key to this is actually the business case. This may come as a surprise, since often the business case is seen as a one-off document that is approved once by the board, and is usually never seen again. The only parts that are sometimes available are the revised pages, where cost estimates are on an unending curve spiralling upwards. It is in the client's best interests to have a programme management team that understands the needs of the business and how to create and deliver on a realistic project plan. ROI monitoring in line with a realistic business case must not be forgotten during the implementation and must not be left until the end. Risk management is a key thread that should weave through the entire project lifecycle. Carrying out a comprehensive selection process with due diligence will greatly reduce the project risk. The market place has probably half a dozen software vendors that may look suitable to any one client. Any software selection process, with cost as the only driver, increases the risk of a negative return on process and investment, leading to an increase in the risk of a failed implementation. Not all solutions are the same in terms of MRO business process coverage, user-friendliness, initial cost and the long-term cost of ownership. All of these elements need to be assessed thoroughly.

"We recommend, as a rule, that the client conducts a POC based upon critical business processes identified in the selection phase during the business process mapping when the project team was putting together the RFP document. POC allows the project team and other key users to work the system using its own data, gaining experience of not only the system, but just as importantly getting to know the implementation consultants and their potential suitability to be partners. The outcome of this POC must be satisfactory to both parties before any long-term implementation contracts are signed with the implementation partners.

"When we eventually get to the day of go-live, the client has another decision to make. Should it run a parallel live system with the old legacy system before final cut over? The answer to this question is yes and no. Much depends on the type of software being implemented and the type of roll out proposed: phased or a 'big bang', for example. Implementation partners should be in a position to advise on this, since each MRO provider has differing needs, business models and governance demands. Furthermore the final choice is typically dependent on the amount of disruption that an organisation can absorb and the associated costs of interfaces.

The key points

MRO software projects are expensive. The software itself can run into millions of dollars, but this money can be wasted by a poor, ill-resourced implementation project. "Senior management play a crucial role in the project," states Lone. "Executive commitment is crucial to ensuring that the project team is able to drive through change within an organisation. A strong and respected project sponsor with an empowered steering committee made up of committed senior executives is essential to a successful implementation. So, what are the golden rules for successful implementation?

- Unwavering executive commitment
- Good project management
- Not just any team, but the right team
- Understanding the need for change
- Focused data cleansing and migration
- Training and more training
- Realistic project planning
- Organisation and shop-floor buy-in
- Running a POC
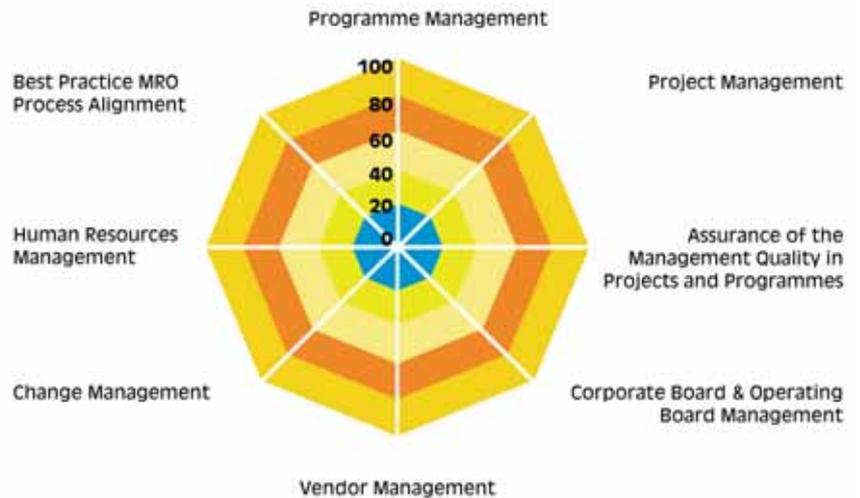
- Picking the right vendor

If an airline gets it right, like SAS, it can start feeling the payback within a year and a half. If it gets it wrong, it can actually damage its business performance enormously for years to come, as well as wasting millions of dollars on a failed project. Caution and planning are the keywords. What are SAKS's key recommendations?

- Never compromise your vision
- Value loyalty among your project team (including additional financial remuneration)
- Success does not require genius. Roll your sleeves up and get stuck in
- Stick to agreed decisions, execute them and move on in a timely manner, repeat the process at every turn ensuring discipline within the MRO organisation
- Empower the programme management team for it to be effective and able to take ownership of the final responsibility for the implementation

"There are success stories, but anyone who tells you that it is painless is, quite frankly, not telling the truth," says Lone. "Strong project management, good understanding of the business drivers and requirements coupled with realistic expectations and timescales will significantly reduce the risk associated with this type of project." **AC**

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