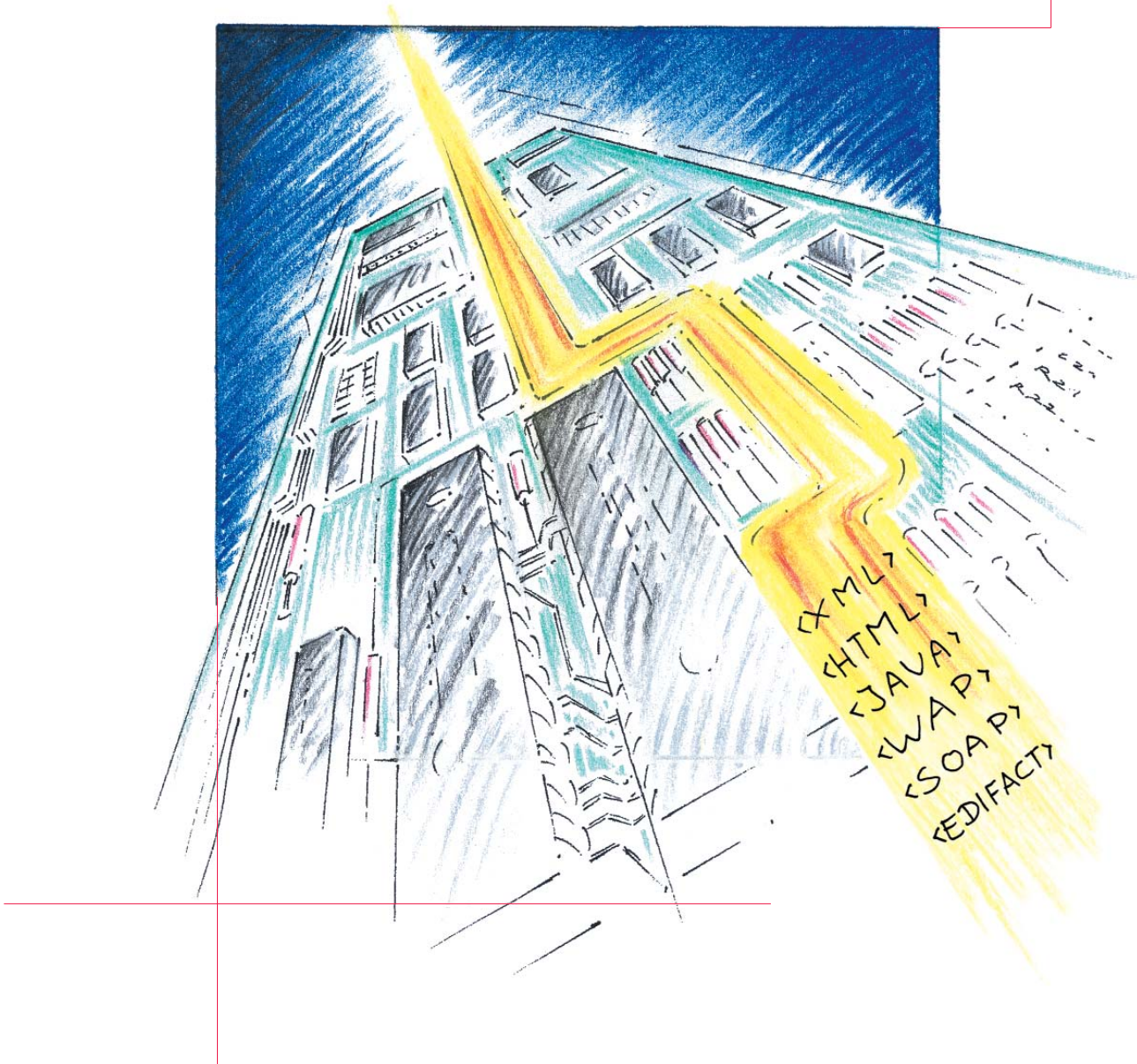


SPEC 2000M

Whitepaper



SEEBURGER
BUSINESS INTEGRATION

Table of Content

1	Introduction	2
2	AECMA SPEC 2000M	3
2.1	What is SPEC 2000M?	3
2.2	What is the goal SPEC 2000M?	4
2.3	Who is involved in the specification process of SPEC 2000M?	4
2.4	Who is using SPEC 2000M?	5
2.5	How is SPEC 2000M structured?	5
3	Implementing SPEC 2000M	7
3.1	Points to consider when implementing SPEC 2000M	7
3.1.1	Communication	7
3.1.2	Conversion	8
3.1.3	Integration of internal applications	9
4	SEEBURGER and SPEC 2000M	11

Introduction

1.1 Cost reduction through standardisation in the aerospace industry

Reducing cost through automated and standardised business processes is one of the most important issues in the aerospace industry. In the field of civilian aircraft, specifications for standardised processes exist already for a long time. Examples are the ATA 100 (specification for manufacturers technical data) and ATA 200 (integrated data processing – supply) released by Air Transport Association of America (ATA). ATA 200 was later revised by the world's airlines and the aerospace industry changing the name into SPEC 2000.

In the field of military, each air force operated to a different national specification, as there was no standardisation in former times. Furthermore procedures were particularly designed or tailored for each new aircraft project resulting in many different procedures used at the same time. The growing number of existing military procedures caused more and more problems e. g. in coordination and in the use of complex IT systems resulting in increasing processing cost for the aerospace industry and its military customers.

As consequence members of AECMA (Association Européenne des Constructeurs de Matériel Aérospatial) augmented by representatives of AIA (Aerospace Industry Association of America) created an equivalent standard to the civilian SPEC 2000 supporting the military requirements.

The standard was named **AECMA SPEC 2000M**.

This whitepaper will answer all questions around SPEC 2000M. It will explain the meaning and structure of SPEC 2000M and its tight relationship to Business-to-Business integration. This document will show you the benefits companies have, using SPEC 2000M and furthermore will be of assistance in selecting a software supporting SPEC 2000M by giving you major points to consider during the decision making process.

AECMA SPEC 2000M

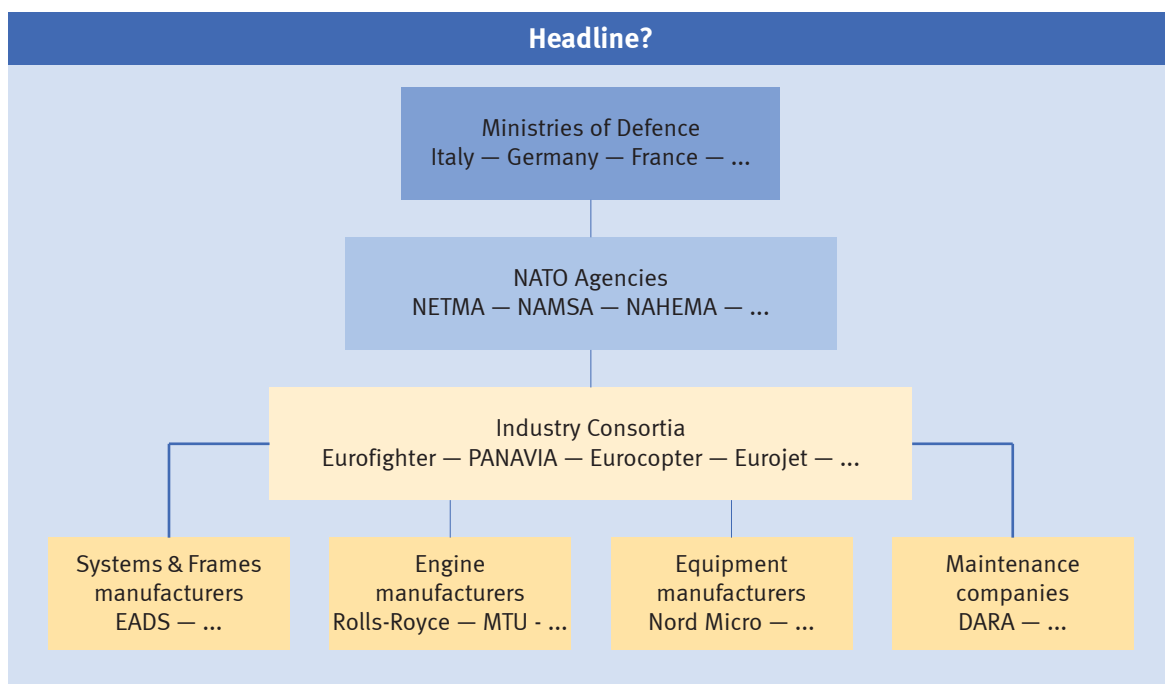
2.1 What is SPEC 2000M?

SPEC 2000M (**specification 2000 for military**) is an international specification for harmonised business processes and standardised electronic communication within the aerospace industry and for its customers in the field of defence. SPEC 2000M supports the logistical supply chain of complex systems (e. g. parts of the aircraft) from the initial procurement of systems and through their entire lifecycle.

The standardisation comprises whole business processes regarding the data interchange process between two or more companies. It defines how electronic documents have to be exchanged regarding message formats, security of communication, acknowledgement of receipt data, etc. SPEC 2000M has a lot to do with Business-to-Business integration as data has to be exchanged between different companies in a standardised manner

and these exchanged electronic documents have to be integrated in the IT applications of the receiving company. Business-to-Business integration software with workflow technology can control the whole process comprising communication, the conversion of data, the execution of message control procedures up to the integration of documents in the companies' systems.

In the graphics below you can see the involved parties doing business and therefore have to exchange, process and integrate a huge amount of data.



■ Security aspects within

SPEC 2000M

Establishing a specification for the aerospace industry and its customers in the field of defence means to pay attention to the industry- and customer-specific requirements. In this context the security aspect is of major importance. Companies have to transfer documents related to military equipment. Therefore the protection of confidential data is a very important point to consider. To pay attention to security aspects is traditionally very high in the aerospace industry. Therefore a much closer control on electronic data exchange is demanded resulting in e. g. elaborated control message procedures. SPEC 2000M also took note of establishing a basis for an extended tracking and tracing of parts due to security relevant reasons required by the community.

2.2 What is the goal of SPEC 2000M?

SPEC 2000M was designed to cut processing cost tremendously by simplifying the handling of business data within the supply chain between the manufacturing/maintenance companies, industry consortia and customers from the public sector.

■ This means in detail:

- Standardised processes eliminate long-lasting discussions with business partners about the handling of individual processes
- Automated business processes based on SPEC 2000M reduce manual work and therefore lead to a faster and cost-saving processing of documents
- Electronic procurement and faster order processing means shorter delivery times and the-rewith reduced inventory cost
- Higher security in data exchange and the processing of documents due to electronically controlled procedures and the use of sophisticated security methods like encryption
- SPEC 2000M combines the various existing systems through the agreement on a common exchange data format
- Investment security is given by the use of standards developed by experts of the aerospace industry and public sector
- SPEC 2000M aims to bring companies closer together on an international basis by offering an internationally accepted standard

AECMA SPEC 2000M

2.3 Who is involved in the specification process of SPEC 2000M?

The concept was originated in the Association Européenne des Constructeur de Matériel Aérospatial (AECMA) in 1976. In the following years the working group was extended by representatives of the Aerospace Industry Association of America (AIA) and supported by major organisations listed below:

Aeronautica Militare	Italy
Ejército del Aire	Spain
Forces Aériennes Françaises	France
Luftwaffe (German Air Force)	Germany
Royal Air Force	United Kingdom
US Air Force	United States of America
Aerospace Industry of America AIA	United States of America
Association of European Airlines AEA	Europe
Association Européenne des Constructeurs de Matériel Aérospatial AECMA	Europe
Associazione Industrie Aerospaziali AIA	Italy
Agrupacion Técnica Espanola de Constructores de Material Aeroespacial ATECMA	Spain
Bundesverband der Deutschen Luftfahrt-, Raumfahrtund Ausrüstungsindustrie e.V. BDLI ...	Germany
Groupement des Industries Françaises Aéronautiques et Spatiales GIFAS	France
Netherlands Aerospace Industries NAI	Netherlands
Society of British Aerospace Companies Limited SBAC	United Kingdom
Swedish Aerospace Industries SAI	Sweden

AECMA SPEC 2000M

2.4 Who is using SPEC 2000M?

SPEC 2000M is used throughout Europe, USA, Canada, Australia and South Africa by well-known industry consortia, aerospace manufacturers/maintenance companies and customers from the public sector.

Some of the organisations using SPEC 2000M are listed below:

Industry consortia:

Eurofighter, Panavia, Eurocopter, ...

Manufacturers:

Dassault, BAe, Rolls-Royce, Westland, Lockheed, CASA, Agusta, SNECMA, ...

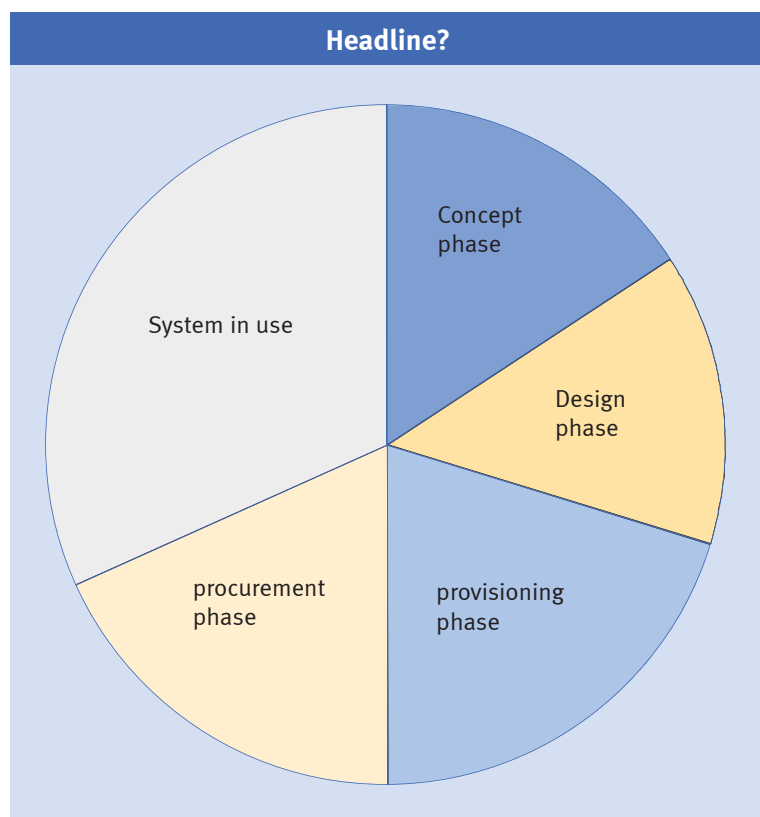
Customers from the public sector:

Ministries of Defence in France, Germany, Italy, Spain, UK, ...

In addition SPEC 2000M was selected by NATO as a source specification for the Acquisition Logistics Model process

2.5 How is SPEC 2000M structured?

SPEC 2000M covers all material management activities in support of purchasing and maintaining military aircraft. The specification describes the processes and interfaces between industry and customers. SPEC 2000M is organised in chapters. Each of those chapters stands for a certain phase in the life cycle of a project or system.



It is very typical for e. g. a military aircraft to stay in service for more than 30 years so that during its lifetime the circle shown above is run through more than once.

For a better understanding and an easier step-by-step implementation the chapters and its included processes are designed to stand alone and therefore allow an easy establishing of business scenarios one after the other.

■ Chapter 1A + 1B — Provisioning and Codification

Chapter 1A — Provisioning defines the process and specifies the data, formats and transmission procedures for customers to negotiate the range and scale of products to buy with suppliers.

■ **Chapter 1B — Codification** provides the interfacing messages to define a standard reference for identifying products between industry, the National Codification Bureau and the customer. The rules for structure and layout of an illustrated parts catalogue (IPC) are defined in the standard AECMA Spec 1000D — international specification for technical publications utilising a common source database.

■ Chapter 2 Procurement Planning

Once the business partners have agreed on a special product to be delivered based on indicative prices, it is necessary to negotiate firm prices, based on quotation and response. **Chapter 2 — Procurement Planning** will accomplish this and establish and update customer price lists.

■ Chapter 3 Order Administration

Placing the order, accepting it, rejecting it, amending it, querying it, hastening it, cancelling it, etc. is specified in **Chapter 3 — Order Administration**. You will also find shipment advice, acknowledgment of receipt and mutual supply support arrangements between customers and contractors.

■ Chapter 4 Invoicing

By integrating the payment functions, **Chapter 4 — Invoicing** provides the fastest and most efficient means to guarantee rapid and accurate payment for goods and services delivered.

■ Chapter 5 Repair and Overhaul

An effective control of repair and overhaul procedures and accurate performance data are required so that products perform efficiently. **Chapter 5 — Repair and Overhaul** provides the means to effectively plan and manage assets that are temporarily out of action, including all relevant commercial (i. e. ordering, invoicing) and logistic (i. e. asset control, inspection, consumption monitoring) activities.

Implementing SPEC 2000M

3.1 Points to consider when implementing SPEC 2000M

Before implementing processes based on SPEC 2000M, companies have to select suitable Business-to-Business integration software covering all requirements of SPEC 2000M and the specific demands of the aerospace industry and its customers in the public sector.

Below are important points necessary to consider during the decision making process to make the best out of an investment in integration software and to be prepared for the future.

For the realisation of automated processes based on SPEC 2000M companies need an integration software supporting different methods of communication, conversion and system integration. In the following chapters you will find valuable information about these three main fields of business integration.

3.1.1 Communication

Regarding SPEC 2000M there is no single communication protocol for the exchange of messages specified. Therefore it is far more important that Business-to-Business integration software supports various communication standards, as business partners will use different communication methods. In the aerospace industry FTP is a widely used communication protocol. But there exists further communication methods that gain in importance and companies in the aerospace industry will need additional protocols for the data exchange with other industries:

- https
- OFTP (TCP/IP, ISDN)
- SMTP, VIM and MAPI
- X.400
- EDIINT (EDI over the Internet) AS1 und AS2
- Connectivity to all leading VAN's like GEIS, AT & T IBM, ...

The following criteria will support you in finding the suitable integration solution for your communication requirements:

■ Internationality

Communication standards have often been developed regionally. To do business on an international basis it is inevitable to support the standards common in different countries. Companies in the aerospace industry are often purchasing raw materials, parts or systems abroad, driven by cost reasons and the international linkage within the aerospace industry. Orders, acknowledgements, invoices, etc. have to be exchanged with domestic and foreign companies using their specific communication standards. Regarding customerservice it is often necessary to support the customers' preferred communication method used in its country.

Implementing SPEC 2000M

■ Cross-industry support

Communication standards are often industry-specific. One of the best examples is certainly OFTP in the European automotive industry. Being a company in the aerospace industry it is much easier to establish a relationship with an automotive supplier if you are in the position to support the traditional way of communication used in the automotive industry. Supporting cross-industry communication leads also to advantages in e. g. the handling with financial institutes as they also have specific communication protocols.

■ Secured transport of information

It has to be ensured by the communication protocol, that the information is only delivered to the intended recipients and that no unauthorised third party can have access to the messages transferred. In respect to security this is especially important for the aerospace industry doing business for military and defence purposes. The use of electronic signature and various encryption tools should easily be possible with your integration software.

■ Assured delivery

The communication component has not only to ensure delivery to the intended recipient, but also has to provide information about the status of delivery to the central operations management. In cases of errors it should be capable of automatically inform the system administration, ideally in different escalation levels, according to the severity of the event.

■ Handling of control message procedures

SPEC 2000M requires a differentiated system of control messages

as reaction to events on different stages of the communication process. The procedures for acknowledging the receipt of a message and for notifying certain error conditions encountered during the various validation levels will operate at three levels: The interchange level where service data is checked, the message level where the message format and format of user data is checked and the application level where the content of the user data is checked. This SPEC 2000M based procedure has to be supported by the communication system with workflow functionality to execute the control procedure step-by-step.

■ Flexibility in the choice of communication channels in accordance with the business partners involved

When integrating smaller business partners, there can be the requirement to offer browser-based communication facilities as this kind of communication doesn't require specific installations at the business partner smaller in size or with less data volume. In many cases companies are also forced by their business partners to use a very specific communication if the partner's market influence is important enough. In consideration of these facts it is necessary that your integration software supports different communication channels like Internet or VAN (Value Added Network).

Implementing SPEC 2000M

3.1.2 Conversion

■ Future/emerging communication standards

In the past we have seen communication standards that were often based on VAN providers or traditional point-to-point dial-up connections. All these channels are burdened with relatively high cost, especially if large data volumes have to be exchanged. High data volumes are very typical for the aerospace industry as necessary descriptions for products are very comprehensive and therefore lead to large data files. For companies this means high cost if they only have the possibility to exchange data via classical communication channels. Leading companies across several industries are pushing this move to make use of the cheap Internet for dataexchange processes. The most popular amongst new messaging standards is EDIINT AS2, which has the potential to become a world wide accepted standard.

To be prepared for existing and future communication standards and to have always the chance to choose the most cost-efficient and most suitable communication method for your specific purpose, integration software should support all relevant communication channels and communication protocols.

Data exchange between different companies requires the conversion of incoming and outgoing documents from and to various message standards demanded by the specific industry or by different business partners.

- AECMA SPEC 2000M (specification for the aerospace industry doing business with customers of the public sector representing business processes for military purposes)
- ATA SPEC 2000 (specification for the aerospace industry doing business with customers of the civil sector representing business processes for civil purposes)
- SWIFT (specification for the financial sector)
- RosettaNet (specification for the high-tech industry)
- ...

The specifications mentioned above use different message formats for the exchange of data:

- EDIFACT (all syntax versions and releases)
- XML (DTD and schemata/all standardises syntax versions)

To choose a suitable Business-to-Business integration software regarding conversion requirements, companies should pay attention to the following points, to be best prepared for present and future requirements:

■ Industry specifications are based on different message formats

Processes based on AECMA SPEC 2000M use EDIFACT as message exchange format. With ATA SPEC 2000 we already have a specification based on XML syntax. The support of XML will certainly become more important in the very near future. Therefore integration software should enable companies to deal with all message formats incorporated in the different industry specifications.

■ Company spanning processes require the handling of various message standards

Changes in the production process lead to the requirement of supporting different message standards. The aerospace industry is following the general trend to reduce the share of in-house production in other industries, one is often faced with the situation, that these suppliers have already heavily invested in B-to-B systems that are suited for their core industry.

Implementing SPEC 2000M

3.1.3 Integration of internal applications

The ability to support their common message standards, as for example VDA of the German automotive industry, definitely helps to speed up the integration process. Due to this fact integration software should support all relevant industry-specific message standards.

■ Additional functionality during the conversion process is required

Specifications like SPEC 2000M not only want to make sure that a uniform message format is used but also demand for syntactical and semantical correctness of the messages transferred. Syntactical correctness means that the message structure is checked before starting the conversion process. Within a semantical check the conversion tool investigates if mandatory fields of the message are filled and execute various field value checks. Fulfilling the described tasks, the conversion system is like a filter to identify all invalid or incomplete messages, ideally indicating what is incorrect within a message. Regarding conversion software it should be possible to to the benefit of supply chain oriented processes. When integrating suppliers that have their rootseasily configure the mentioned control processes and in case of incorrectness to inform responsible persons very quickly e. g. via e-mail, SMS, etc.

To ensure automated processes as described in SPEC 2000M companies need to transfer documents directly from system-to-system. This requires the ability to deliver the messages received from external parties to the internal application systems and vice versa.

In the aerospace industry lots of applications exist. Some of them are:

- ERP systems like SAP, JDE, Baan, etc.
- CRM and SCM systems
- Legacy systems still in use
- different databases
- ...

To directly process inbound and outbound documents within the existing application infrastructure, a Business-to-Business integration software should offer several methods of application integration:

■ Direct integration through the usage of connectors

Many companies are using commercial packages like SAP, JDE, Baan, etc. All of these systems provide standardised interfaces e. g. SAP BAPI for all common business transactions. There are several reasons to use these standard interfaces to the farthest possible extend:

- save cost in programming for something that already exists
- save cost in modifying the interfaces after each release cycle of the commercial application

Implementing SPEC 2000M

Through ready-to-use connectors for standardised interfaces companies can realise the integration of documents very quickly and therefore bring implementation cost to its minimum. Therefore business integration software should support these standardised interfaces by offering connectors for all known systems. A close cooperation between the integration software provider and the providers of commercial packages like SAP is very valuable for information exchange and the realisation of current and cost saving application integration.

■ File based integration

Some applications might not offer standardised interfaces and therefore no ready-to-use connectors exist on the market. To easily realise integration it is best to create a file suitable for the external interface of the application. In comparison to direct system integration the file-based integration will avoid:

- complex agreement processes due to deep system integration
- high programming cost by using the external interface of the application

To integrate legacy systems, smaller ERP systems and less known systems companies need to have file-based integration offered by their integration software:

■ Database integration

Database integration enables direct access to database tables. This is essential e. g. to execute control procedures required by SPEC 2000M. In this case databases are used as a cross reference to validate or augment data in the process of conversion. Database integration reduces programming work and avoids additional processing steps like the multiple loading of data as the data is written and extracted directly in/from the database. Deploying SPEC 2000M in the aerospace industry requires integration software that is capable of directly accessing databases to execute the necessary control procedures and to achieve cost savings through fast processing of large data volumes.

SEEBURGER and SPEC2000M

4. SEEBURGER and SPEC 2000M

SEEBURGER is Europe's leading provider of industry-specific business integration solutions. Experienced experts develop, sell, implement and maintain software and solutions that integrate cross-company and cross-application business processes. Automating processes along the supply chain results in massive cost savings potential for customers, particularly in the area of inventory and handling costs. 5,800 companies in all sectors trust in integration solutions from SEEBURGER.

SEEBURGER offers the most comprehensive solution for companies at all levels of the aerospace and defence supply chain to implement and fulfil the SPEC 2000M and other relevant Business-to-Business requirements. The uniqueness of the SEEBURGER solution is based on the following characteristics:

■ Comprehensive support of international requirements

The aerospace industry and its customers show a high international linkage. This requires the attention to country specific business standards comprising e. g. communication or message standards. SEEBURGER has customers in more than 35 countries and therefore has the necessary experience and solutions supporting country specific standards.

■ Wide range of industry-specific standards

SEEBURGER has customers in all known industries and therefore can offer cross industry support. This might be useful if manufacturers come e. g. from the automotive industry or regarding the invoicing process, experience in data exchange with the financial sector is required.

■ Covering all aspects of security

The traditionally high demand for security in the industry also reflects in high security requirements for data exchange. SEEBURGER offers secured transport of documents through the use of state-of-the-art encryption tools and safe delivery of data only to authorised recipients using electronic signature.

■ Flexible solution to solve specific processing requirements

Regarding the control message procedures SEEBURGER simply fulfils the requirements of SPEC 2000M. Different control mechanisms during conversion, direct database access for e. g. data cross check and the possibility to execute a communication process step-by-step using workflow technology makes it possible to easily generate control messages or notify errors to responsible persons.

SEEBURGER and SPEC2000M

■ **Open for future requirements**

SEEBURGER supports all relevant present and future message standards. This includes e. g. the AECMA SPEC 2000M message standard based on EDIFACT or AECMA SPEC 2000 based on XML syntax. Pre-configured mappings for the conversion of messages lead to a minimum of implementation cost and to fastest connection of business partners.

■ **Easy integration into the existing IT-landscape**

In the aerospace industry there are a lot of legacy systems still in use due to e. g. a long life cycle of the aircraft. There also exist various ERP systems, CRM systems, etc... SEEBURGER works closely together with application providers like SAP, Baan, etc. and the refore can offer latest and the most suitable integration.

■ **Fast availability of new solutions covering new requirements**

SEEBURGER has always been known for its technological expertise. Upcoming new integration standards are incorporated in the software very quickly. The latest example is EDIINT AS2 as new messaging standard already installed at several customers.

■ **Suitable solutions for every company**

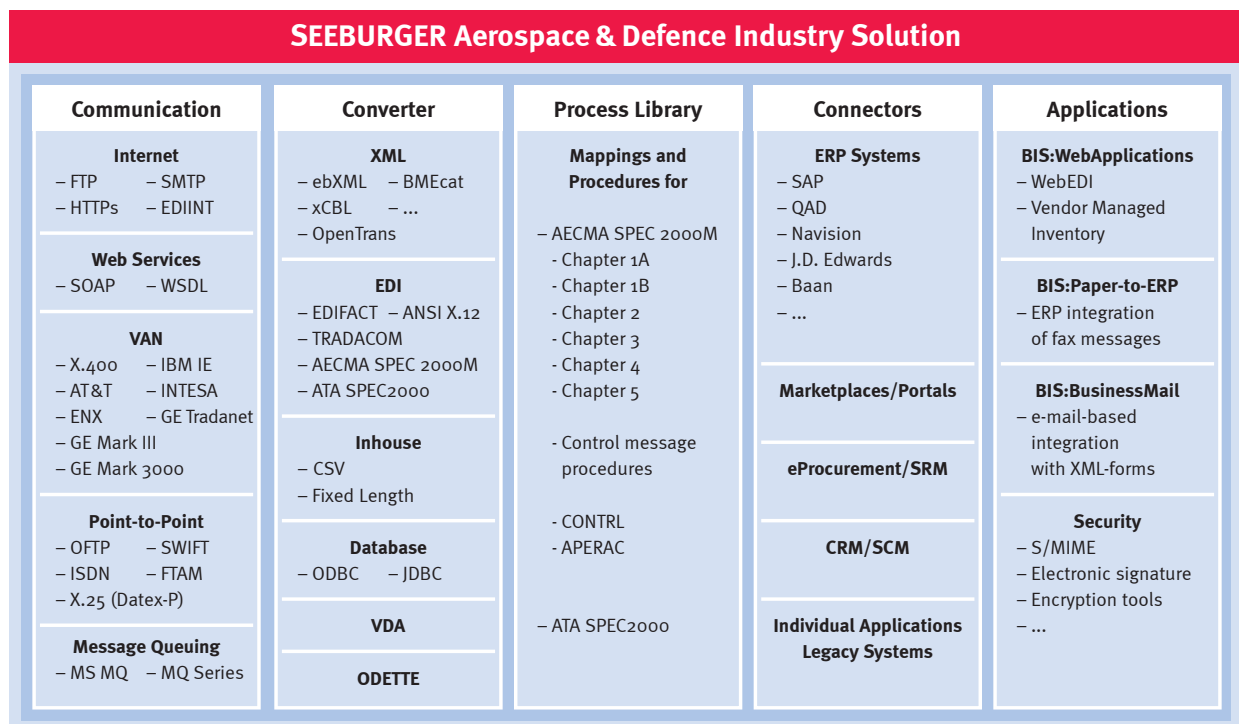
SEEBURGER offers suitable solutions for every company independent of the scope of integration requirements or the available technical infrastructure

■ **Protection of investment with COTS-solution**

Furthermore SEEBURGER offers high investment protection as the integration soft ware is based on standard technology (known in the public sector as COTS which means Commercial off the shelf) and offers scalability to fulfil increasing requirements.

SEEBURGER and SPEC2000M

The SEEBURGER Aerospace & Defence solution map will give you an overview of the offered components supporting SPEC 2000M and the specific requirements of the involved business partners in the aerospace industry and its customers from the public sector.



Depending on the integration requirements and the technical infrastructure of a company, customers can choose between three different solution packages: Entry solution, compact solution and enterprise solution. The different solutions vary in the number of connected partners, the offered communication protocols, the used methods of application integration and in the ability to maintain installed processes by the customer itself or by external integration experts.

About SEEBURGER

- **SEEBURGER** is a leading Business-to-Business Integration (B-to-Bi) provider in the European market. Founded in 1986, it is a software company that develops products and solutions to integrate processes with external business partners in the context of collaborative commerce. The focus is on integrating B-to-B solutions such as virtual marketplaces, portals, e-procurement systems, Web solutions, EDI and XML into the cross-company IT architecture. Software solutions from SEEBURGER are a promise of automated integration and processing of B-to-B data that eliminates media breaks.
- **Our customers** are from the industry, trade and service branches. In a complex network of internal and external business processes, they have managed structures for optimised logistics.
- **Our partners** are providers of standard software who in their respective sectors belong to the worldwide leading providers.

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