

4. INFORMATION ON THE MGB GROUP (Cont'd)

4.3.13 Key Achievements and Awards

Summarised below are the key achievements and awards of the MGB Group for the past ten (10) years:

Year	Achievement and Awards
1994	Dealer of the Year by Westinghouse Security Electronics, Inc. USA
1995	International Independent Field Office ("IFO") Excellence Award 1994 - 1995 by SIEBE Environmental Controls Far East Pte Ltd
1996	International IFO Million Dollar Award, "MEGASTAR" Award 1995 - 1996 by SIEBE Environmental Controls Far East Pte Ltd
1996	The Excellent Performance Contractor of Air-Conditioned Control System Award by Chunghwa Picture Tubes (M) Sdn Bhd
1997	The Excellent Performance (Sales and Technical) by SIEBE Environmental Controls Far East Pte. Ltd.
1998	Dealer of the Year by Westinghouse Security Electronics Inc. USA
1999	Top IFO, Top Sales of Barber Colman, Robertshaw & Satchwell Controls & System Award 1999 - 2000 by Invensys Building Systems
2000	Partner of the Year for Outstanding Regional Sales Performance Award 2000 - 2001 by Invensys Building System, Asia Pacific Partner Awards
2001	Enterprise 50 Award by Accenture, The Small and Medium Industries Development Corporation, RHB Bank & Business Times
2001	Engineering Excellence Award 2001- 2002 by Invensys Building System, Asia Pacific Partner Awards
2001	Asia Pacific Dealer of the Year Award by NexWatch
2001	Achievement of 1,000,000 Manhours without Lost of Time due to Injury ("LTI") Award, Pandan Hospital Project by Metro Health Sdn Bhd
2002	ISO 9001:2000 by Lloyd's Registrars, UKAS, JAB
2002	Achievement Award for Dedication in Industrial Construction Safety and Unique Contribution Towards the Achievement of 1,000,000 Manhours without LTI Universiti Teknologi Petronas by Ibai Bina Sdn Bhd
2002	Achievement Award for Dedication to Excellence in Industrial Construction Safety and Unique Contribution Towards the Achievement of 2,000,000 Manhours without LTI, Universiti Teknologi Petronas by Ibai Bina Sdn Bhd
2002	Area Dealer of the Year for Asia Pacific Region Award by NexWatch
2003	Partner of the Year 2002/2003 for Invensys Building Systems, Asia Pacific for Outstanding Regional Sales Performance by Invensys
2003	Excellence Award 2003 by IJM Construction Berhad for Putrajaya Convention Centre
2003	International Dealer of the Year Award by NexWatch

4. INFORMATION ON THE MGB GROUP *(Cont'd)*

4.3.14 Location

The MGB Group is operating from its headquarters in Shah Alam which is a 3-storey semi-detached office cum factory with a land area of 23,838 square feet and a built-up area of 25,112 square feet. It is located at No 2, Jalan Astaka U8/83, Seksyen U8, Bukit Jelutong, 40150 Shah Alam, Selangor Darul Ehsan. The Group has branch offices located in Putrajaya, Kuching, Alor Setar and Sabah to service its clients.

4.3.15 Competitive advantages

The Directors believe that the MGB Group has distinct advantages over its competitors in terms of the following:

(a) Established track record

The Group recognises that an established track record is important in convincing potential clients of its ability to undertake projects and deliver the results expected of it. The Group is one of the pioneers in the system integration of IBMS and ISMS in Malaysia and has been in the IBMS and ISMS industry for more than seventeen (17) years. It has, over the years, successfully established itself as a reputable system integrator in Malaysia and has successfully commercialised numerous engineered solutions developed by the Group. In addition, it has also proven its expertise and reliability in the IBMS and ISMS fields, as evidenced in the list of notable projects completed by the Group as set out in Section 4.3.1 of this Prospectus.

(b) Experienced management team

The senior management team comprising Dr Ng Tek Che, the Group Managing Director and founding member and Mr Liew Chiap Hong, the Executive Director, has played a very important role in nurturing the growth of the Group over the years and are expected to continue to propel the Group towards a world-class status in system integration of IBMS and ISMS. Dr Ng and Mr Liew have more than twenty (20) years of experience each in the IBMS and ISMS industry and under their guidance and supervision, the Group has built up a team of technically competent professionals to provide system integration solutions to its clients. As an indication of the quality of services provided by its management team which translates into customer satisfaction, there has been a growing demand for the Group's services through referrals over the years.

(c) Value-added services

The Group is able to provide its clients with comprehensive and customised solutions to address complex system integration needs of the clients. Its system integration solutions not only incorporate quality products from the principals but, together with its qualified and experienced staff, the Group, through its experiences and proven methodology, is also able to tailor solutions to meet the demanding requirements of its clients. The total solution approach adopted by the Group not only eliminates the need for its clients to engage or deal with different vendors thereby removing from them the potential logistical and compatibility problems associated with co-ordinating systems from various vendors, but also provides a cost efficiency alternative for its clients.

4. INFORMATION ON THE MGB GROUP *(Cont'd)*

(d) Strong relationship with principals

Over the years, the Group has built and maintained long term business relationship with its principals who supply the Group with advanced ICT products that are compatible with the latest IBMS technology system, thereby enabling the Group to compete effectively in the rapidly evolving market. Such relationship with the Principals, which was established over the years through its prompt payment policy as well as the Group's proven capability to market the products as a result of its technological capabilities, provides the Group with an added advantage over its competitors in terms of its ability to obtain continuous supply of quality leading edge products at competitive prices and on a timely basis.

(e) Strong R&D capabilities

The Group believes that strong commitment towards R&D is essential to enhance its competitiveness and maintain sustainable growth in the IBMS and ISMS industry. The continuous R&D efforts exercised by the Group over the years have resulted in the successful completion and implementation of several in-house developed applications specifically for the IBMS and ISMS industry, such as the JBCM software.

(f) Skilled and dedicated staff

The MGB Group is backed by a team of dedicated and talented pool of staff, most of whom have extensive industry skills ranging from technical, engineering, R&D, information technology, marketing and sales. In addition, the R&D team of MGB is experienced in the field of IBMS, ISMS, electronics, telecommunications, application design and development using the Java technology. In order to motivate and retain key staff, the Group has implemented an incentive package that rewards the team members for successful implementation of projects. The Directors firmly believe that the key to the Group's success lies in its "human-capital" and as such, the reward systems are based on an environment that is goal and performance oriented.

4. INFORMATION ON THE MGB GROUP *(Cont'd)*

4.4 Subsidiaries

4.4.1 Information on MESB

(a) History and Business

MESB was incorporated in Malaysia on 20 August 1984 under the Companies Act, 1965 as a private limited company. The company commenced operation in 1986 and is principally engaged in system integration specialising in the field of IBMS and ISMS, e-project management of mechanical and electrical services, and supply of engineered systems.

(b) Share Capital

The present authorised and issued and paid-up share capital of MESB are as follows:

	RM
Authorised	
Ordinary shares of RM1.00 each	5,000,000
Issued and paid-up	
Ordinary shares of RM1.00 each	3,000,000

(c) Changes in Share Capital

The changes in the issued and paid-up share capital of MESB since its incorporation are as follows:

Date of allotment	No. of shares allotted	Consideration	Cumulative issued and paid-up share capital RM
20.08.1984	2	Subscribers' shares	2
31.03.1986	1	Cash	3
17.12.1986	49,997	Cash	50,000
24.10.1989	39,000	Cash	89,000
26.12.1989	11,000	Cash	100,000
15.06.1990	1	Cash	100,001
18.11.1992	49,999	Cash	150,000
23.11.1993	20,000	Cash	170,000
23.11.1993	320,000	Bonus issue	490,000
15.09.1999	1,010,000	Bonus issue	1,500,000
26.06.2002	1,500,000	Bonus issue	3,000,000

4. INFORMATION ON THE MGB GROUP (Cont'd)

(d) Profit and Dividend Record

The audited profit and dividend record of MESB for the past five (5) financial years ended 31 December 1999 to 31 December 2003 are summarised as follows:

	<-----Years ended 31 December----->				
	1999	2000	2001	[#] 2002	2003
	RM'000	RM'000	RM'000	RM'000	RM'000
Revenue	55,352	82,303	49,789	129,427	131,836
EBITDA	7,602	9,427	6,771	8,538	7,712
Finance cost	(51)	(20)	(194)	(141)	(188)
Finance income	75	180	146	236	200
Depreciation	(153)	(198)	(597)	(674)	(707)
Profit before exceptional items	7,473	9,389	6,126	7,959	7,017
Exceptional items	-	-	-	-	-
PBT	7,473	9,389	6,126	7,959	7,017
Taxation	(104)	(2,558)	(1,460)	(1,041)	(3,729)
PAT	7,369	6,831	4,666	6,918	3,288
Weighted average no. of ordinary shares in issue ('000)	785	1,500	1,500	2,250	3,000
Gross EPS (RM)	9.5	6.3	4.1	3.5	2.3
Net EPS (RM)	9.4	4.6	3.1	3.1	1.1
Net dividend rate (%)	-	466.7	-	-	164.2

Note:

Year 2002 figures have been restated in compliance with the adoption of MASB 25 – Income Taxes, which became effective from 1 January 2003

(e) Substantial Shareholder

MESB is a wholly-owned subsidiary of MGB.

(f) Subsidiary and Associated Company

MESB had on 20 October 2003 disposed of its wholly-owned subsidiary, Metronic Building Services Sdn Bhd as part of its internal restructuring. On 22 March 2004, MESB transferred to MGB its entire equity interest in MISSB as part of the restructuring scheme to facilitate the listing of MGB on the MESDAQ Market.

As at the date of this Prospectus, MESB does not have any subsidiary or associated company.

4. INFORMATION ON THE MGB GROUP (Cont'd)

4.4.2 Information on MISSB

(a) History and Business

MISSB was incorporated in Malaysia on 25 January 1995 under the Companies Act, 1965 as a private limited company. The company commenced operation in 1995 and is principally engaged in the procurement of contracts in relation to engineering work specialising in the field of IBMS and ISMS, and sale of engineering equipment.

(b) Share Capital

The present authorised and issued and paid-up share capital of MISSB are as follows:

	RM
Authorised	
Ordinary shares of RM1.00 each	100,000
Issued and paid-up	
Ordinary shares of RM1.00 each	1,000

(c) Changes in Share Capital

The changes in the issued and paid-up share capital of MISSB since its incorporation are as follows:

Date of allotment	No. of shares allotted	Consideration	Cumulative issued and paid-up share capital RM
25.01.1995	2	Subscribers' shares	2
16.07.1996	998	Cash	1,000

(d) Profit and Dividend Record

The audited profit and dividend record of MISSB for the past five (5) financial years ended 31 December 1999 to 31 December 2003 are summarised as follows:

	<-----Years ended 31 December----->				
	1999	2000	2001	*2002	2003
	RM'000	RM'000	RM'000	RM'000	RM'000
Revenue	1,014	2,272	3,519	4,396	4,762
EBITDA	53	155	417	545	263
Finance cost	-	-	-	-	-
Finance income	-	3	8	1	-
Depreciation	-	-	-	-	-
Profit before exceptional items	53	158	425	546	263

4. INFORMATION ON THE MGB GROUP *(Cont'd)*

	<-----Years ended 31 December----->				
	1999	2000	2001	2002	2003
	RM'000	RM'000	RM'000	RM'000	RM'000
Profit before exceptional items	53	158	425	546	263
Exceptional items	-	-	-	-	-
PBT	53	158	425	546	263
Taxation	-	(119)	(158)	(132)	(77)
PAT	53	39	267	414	186
Weighted average no. of ordinary shares in issue ('000)	1	1	1	1	1
Gross EPS (RM)	53	158	425	546	263
Net EPS (RM)	53	39	267	414	186
Net dividend rate (%)	-	-	-	-	-

Notes:

Year 2002 figures have been restated in compliance with the adoption of MASB 25 – Income Taxes, which became effective from 1 January 2003

(e) Substantial Shareholder

MISSB is a wholly-owned subsidiary of MGB.

(f) Subsidiary and Associated Company

As at the date of this Prospectus, MISSB does not have any subsidiary or associated company.

4. INFORMATION ON THE MGB GROUP *(Cont'd)*

4.5 Industry Overview

4.5.1 The Malaysian Economy

The Malaysian economy performed better than expected in 2003, with GDP expanding at 5.2% (2002: 4.1%) on the back of stronger export growth, higher consumer spending and a strong revival in investments. The Manufacturing sector led the way with a 8.2% year-on-year growth followed by the agriculture sector at 5.5%. Economic growth for the fourth quarter of 2003 was remarkable at 6.4%, the highest quarterly result in three years. The May stimulus package and the 2004 Federal Government Budget had played their parts in enhancing productivity and strengthening the economy.

Going forward, the outlook for the Malaysian economy in 2004 is significantly improved on stronger domestic demand, an up-trend in private sector activities and a more favourable external environment. For 2004, BNM has forecast an economic expansion of between 6% - 6.5%, private sector expenditure growth of 8.7% (2003: 4.3%), consumer spending growth of 8.1% (2003: 5.1%) and private investment growth of 11.5% (2003: 1.1%).

All the major sectors of the economy showed improvements as agriculture (2003: 5.5%), mining (2003: 4.8%), construction (2003: 2.1%), manufacturing (2003: 8.2%) and services (2003: 4.1%) sectors registered commendable growth rates. The external sector also reported encouraging growth rates with exports and imports growing 6.3% and 5.9% respectively. The firm export performance was driven by the manufacturing sector, in particular electrical and electronic products, and the primary commodities sector, primarily palm oil, crude petroleum and liquefied natural gas.

Malaysia's GDP is expected to accelerate from 4.5% in 2003 to about 6% in 2004, driven by improving export performance, domestic consumption and private investments. Furthermore, the RM7.3 billion economic stimulus package unveiled on 21 May 2003, swift conclusion of the Iraq war and the end of the SARS epidemic had regained consumer confidence. The country's economic fundamentals are expected to remain strong in 2004 with inflation rate projected to record a low 1.5% and improvement in the labour market.

(Source: Bank Negara Malaysia Report 2003)

4.5.2 The ICT Industry

The ICT industry in Malaysia has shown signs of recovery from the economic downturn that has been affecting its performance since the contagion effect spread to the country in 1998. Market billings have stabilised and are expected to grow higher in tandem with the economic revival in a number of service-centric sectors. The revenue growth for the Malaysian ICT industry from 1997 to 2002 is set out in the table below:

Malaysian ICT Industry Revenue, 1997 -2002

Year	ICT Industry Domestic Billings (RM' million)
1997	5,380
1998	4,840
1999	5,230
2000	5,910
2001	6,510
2002	7,151

4. INFORMATION ON THE MGB GROUP *(Cont'd)*

The use of the Internet in Malaysia has grown rapidly since the start of its commercialisation in the early 1990s. The rapid growth in the popularity of the Internet is due in large part to increasing penetration of computer, modem and other access devices, reduced Internet connection costs, the emergence of new Internet appliances (such as personal digital assistants, cellular phones and Wireless Application Protocol phones), development of the web, the introduction of easy-to-use navigational tools and utilities, and the growth in the number of information, entertainment and commercial applications available on the Internet. Growth in client/server computing, multimedia personal computers and online computing services and the proliferation of networking technologies have resulted in a large and growing group of people who are accustomed to using networked computers for a variety of purposes, including e-mail, electronic file transfers, online computing and electronic financial transactions. These trends have increasingly led businesses to explore opportunities of providing Internet-based applications and services within their organisations and to customers and business partners.

Taking cognisance of the role of a knowledge-based economy in promoting growth and productivity, the Government has implemented the Knowledge-based or K-based Economy Master Plan. The Master Plan, launched in September 2001, outlines seven (7) strategic thrusts comprising recommendations to accelerate the shift towards the knowledge-based economy. The strategic thrusts focus on areas that are salient to the transformation to the new economy, encompassing human resource development, institutional framework, info-structure and infrastructure, science and technology capacity, role of the private sector, a knowledge-based civil service as well as bridging the knowledge and digital divides. In providing the infrastructural support for the development of a K-based economy and ICT industries, the development of the MSC has covered further grounds. As at July 2002, 745 companies (2001: 621 companies) have been awarded MSC status. Investment in the MSC has reached RM9.7 billion, an increase of 42% compared with 2001, and has provided employment to 18,550 workers, out of whom 84% or 15,594 are knowledge workers.

Thus far, there are 53 world-class companies operating in the MSC. Skilled and knowledge workers are prerequisites for the country to propel itself into the K-based economy as well as enhance competitiveness. In this regard, education and training programmes continue to be given emphasis to address the issue of manpower shortage in ICT and related areas. In promoting computer literacy and improving students' accessibility to ICT, a sum of RM441.8 million was provided for the construction of 2,874 computer laboratories and facilities in both urban and rural areas. By mid-2002, a total of 1,977 projects or 68.8% were completed. In addition, as a brain-gain strategy, incentives were offered to attract highly skilled Malaysians working abroad to return. As of August 2002, 474 applications were received and 171 applications were approved covering expertise in the fields of accounting and finance, medicine, information technology, industry as well as science and technology.

(Source: Infocredit D&B (Malaysia) Sdn Bhd)

4. INFORMATION ON THE MGB GROUP *(Cont'd)*

4.5.3 Industry Assessment

The Internet age, advances in ICT and the globalisation of businesses have fundamentally changed the way that people live, work and interact today. Businesses today place a high priority on an intelligent working environment that is secure, safe and productive.

Over the last century, large buildings have had either pneumatic controls or electrical controls that manage the operations of the building but the last 30 years saw the processes migrate over to automated systems that require less manpower. The majority of commercial and institutional buildings of today incorporates an extensive number of microprocessors that intelligently control the mechanical and electrical equipment through a series of stand-alone systems.

IBMS, which is an enhanced version of BAS is a relatively new technology. It has been around for the past 30 years, originating as an elaborate time clock designed to limit runtime. Early days of BAS consisted separate system units for fire, environmental services, HVAC, security, elevators, and others. Conservation of resources was traditionally achieved through simple scheduling, direct monitoring and control of HVACs and respond to emergencies. Applications requirements and technology advancements grew as control needs became more varied and energy resources became more expensive. Due to the increasing complexity, multiplicity of functions and the ever changing environment, building facilities have to be controlled through a computer-based system. Today, BAS technology allows us to integrate all building equipment functions through a single unified system.

Integrated BAS comprises the control and management of the entire building's primary component systems which include HVAC, access control, CCTV, lighting, fire and security. The control and management are done via the placements of sensors and equipment around the building regulated through a central command centre. In addition to being an operations tool, integrated BAS allows end users to gather data, perform analysis, provide precise control for increased efficiency, fully automate components with minimal support and diagnose problems. The main purpose of building owners and managers investing in an integrated BAS is to realise savings from reduced resource consumption and operational costs, increase safety and security, reduce maintenance costs and increase the comfort of the inhabitants.

Some of the main users of BAS are as follows :

- Large commercial buildings;
- Universities and educational facilities;
- Hospitals and health care;
- Industrial estates; and
- Hospitality and retail.

Contemporary BAS comprises a distributed network of computing hardware and software consisting of personal computers and control modules. These control modules utilise direct control technology to interconnect with each other and form an extendible network of modules to control the separate systems (HVAC, security, lighting, fire safety, etc) within the building, managed by a single control system. Otherwise known as a distributed control system, current BAS technology is capable of extending the network of control modules almost without limit to as many separate systems and sub-systems as required.

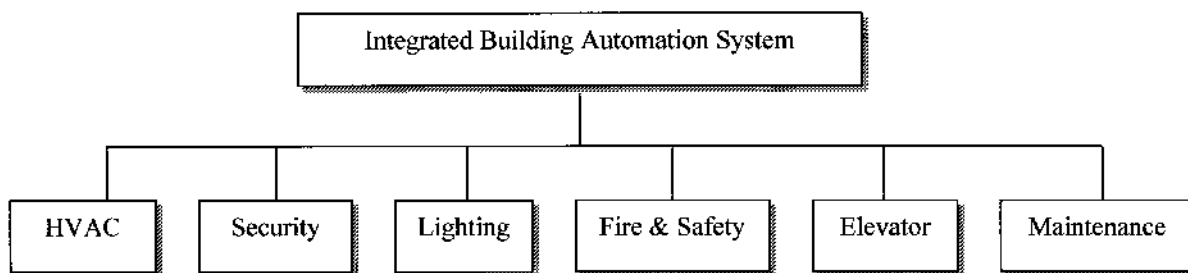
(Source: Infocredit D&B (Malaysia) Sdn Bhd)

4. INFORMATION ON THE MGB GROUP *(Cont'd)*

4.5.4 Industry Structure

An integrated BAS comprises the control, monitor and management of the entire building's component systems which includes HVAC, security, lighting, fire and safety, elevator and maintenance through the use of intelligent sensors, network controllers, actuators and software for integration, drivers and operating systems.

Integrated Building Automation System Industry Structure



(a) HVAC

The dramatic climate changes in many countries can prove to be quite a challenge for many operators of non-automated buildings as they try to maintain a comfortable temperature within the premises regardless of what the weather is like outside the building. That is why the type and design of the HVAC system are among the primary priorities of any building engineer when implementing an integrated system. In an ideal situation, HVAC must be taken into consideration way before the finalisation of many architectural designs or it would be detrimental to the occupants of the building should the design be done only as an afterthought.

The HVAC is divided into different components, one of the key components being the chillers system, which forms part to the air-conditioning unit. The chillers system main function is to remove heat from the building. The other component would be the boilers which burn fuels to produce heat. Gas boilers which burn energy at 70-85°C, is the most common type of boilers in the building. However, it should be noted that many tropical countries like Malaysia, the boiler may not be a major component in the HVAC system. The third component would be the controller of fresh air in the ducted air system. Its main function is to ensure there is a minimum amount of fresh air that is circulating around the building but at the same time, able to maximise the use of the cooling effect to reduce the cost of energy.

(b) Security

The security system once lean towards the patrolling of security guards has now evolved to a highly intelligent ISMS solution which comprises many sub-systems, each reporting to its own controller. This modern system may only require one operator to monitor the access control, intrusion detection and CCTV, each with its own reporting and recording system to record events as it happens. The access control system will be used to limit access to certain parts of the building while the CCTV monitors movement of each personnel. By using these security equipments, the task of securing the safety of a building have moved away from being labour-dependent to one that is more technologically reliable.

4. INFORMATION ON THE MGB GROUP *(Cont'd)*

The ISMS form an integral part of the BAS as the software programs will be communicating with camera systems, switchers, multiplexers and intercommunication systems. The challenge of building such a system is developing a standard that meets all the demands of each system. Despite its sophistication, the security system can be very flexible depending on the level of security required by the building managers. Some may find the integration of the CCTV cameras and digital video recorder sufficient in securing its premises. Other features like the access control system and intrusion devices can be integrated should the requirement arises.

(c) Lighting

One of the most noticeable features of the BAS would be the control of lighting using schedules, manual controls, occupancy sensors and photosensors, used individually or in combination. Many has predicted that the next generation of the lighting system will be achieved through new levels of savings when lighting plans are designed, planned and integrated to other buildings systems like the HVAC. One very important feature of this integration is the ability of the lighting system to share information with other building systems. For example, during office hours if an occupancy sensor node tells the network that a certain private office is occupied, the BAS can turn on the hallway lights on that floor. Manufacturers of occupancy sensors are confident that their devices will be able to generate a savings of almost 30% for private offices.

For the past decades, lighting system has become more efficient by decreasing the load on power distributions. Considering that lighting typically accounts for 30% of energy use in most buildings, it can translate to quite an amount of savings for any building management. It is therefore understandable that the advantage of having a lighting system that consumes less energy will be increasingly appreciated and adopted, with the integration of lighting and day-light linked lighting controls to the BAS.

(d) Fire and safety

Any BAS would not be complete without adding the security features whereby fire alarms and smoke detectors form the most basic parts of fire and life safety system. These two features of fire safety devices can be integrated to form part of the fire suppression system which will initiate the notification signal within the security network. In some buildings with a fire pump, the fire alarm system would be able to detect fire pump activation or loss of power thus alerting the building management to potential disasters.

Some intelligent building system would be able to integrate the fire alarm system to security devices like the activation of the CCTV and the automatic closure of fire doors to prevent the spread of fire. They can even alert outside authorities like the fire department or the ambulance for immediate assistance. In addition, the fire and life safety system can also be integrated with the HVAC to provide for an automatic smoke evacuation system during fire emergencies.

(e) Elevator

Any high rise building would not be complete without an efficient elevator system. The current trend of BAS is where designers have incorporated a built-in elevator management system whereby a front-end software will not only manage the basic elevator function but also analyse the elevator requirements in terms of number of passengers and speed they are travelling. For a building owner, their objective of modernising the elevator system is to improve the service provided to its passengers. For added security, these elevators can be fitted with an access control system whereby certain floors of the building could be sealed off for non-essential personnel.

4. INFORMATION ON THE MGB GROUP *(Cont'd)*

(f) Maintenance

Maintenance is a very crucial part of the building automation industry. Building automation maintenance contracts are usually offered together with the sale of building automation products by the designated manufacturer. With the advances made in open protocols, maintenance agreements today are more flexible and spread out among the various vendors and system integrators. Hardware maintenance for the building automation industry is very similar to the maintenance of any electronic equipment. Most intelligent electronic equipment in the market have self diagnostics capabilities where any malfunction is reported by an error message. Regular software maintenance for the building automation industry entails taking preventive steps by making back-up copies of all critical and relevant files, to be made available for retrieval in the event of corrupted files or new updates by the vendors in question.

(Source: Infocredit D&B (Malaysia) Sdn Bhd)

4.5.5 Industry Trends

(a) Outsourcing of IBMS

Despite the global economic recovery, companies are still faced with pressures to lower variable cost and optimise profits. IBMS is gradually changing the way controls and automation of a building are being handled. As BAS becomes integrated, companies could minimise operating cost by outsourcing the building management function to a third party. It also makes report easy for an outsourced building manager in controlling the various integrated building systems. The development of Internet-based BAS applications empowers building managers by integrating the facility's many systems and providing them the necessary information to make informed strategic decisions in real time. Comprehensive building management strategies using integrated BAS can quickly signal problems and opportunities, and help building managers evaluate possible actions accurately and quickly.

(b) Sensor and Actuator Smart Solutions

Most IBMS or BAS today possesses BACnet and LonWorks compatible sensors, actuators and controllers. Sensors and actuators are linked up to the building equipment to send messages to controllers of a subsystem or multiple subsystems. These days, vendors utilise state-of-the-art network compatible due to the demand for increased energy efficiency and comfortable environment, which has been a growing trend for intelligent buildings. Sensors and actuators are increasingly being designed as information distribution tools for integrated BAS, in which greater efficiency and more precise control are anticipated.

Multiple subsystems may also be connected to incorporate an intelligent building infrastructure. For example, if a safety subsystem reports a fire blackout, a lighting subsystem may facilitate a safe exit through lighting up a designated area for evacuation. However, each controller receiving such as message must be programmed to react accordingly. Companies like Johnson Controls and Honeywell could even connect their own manufactured sensors and actuators to the Internet as a user-friendly solution.

4. INFORMATION ON THE MGB GROUP *(Cont'd)*

(c) **Internet**

Major advances in Internet technology have had a profound impact on society's social, economic and political interaction. With the new breed of building occupants and owners demanding greater innovation and conveniences, building owners are also demanding for new commercial and residential building standards.

The advances of the Internet have contributed immensely to networking technologies, the heart of any BAS. Continued advances in networking technology will provide the impetus of growth within the building technologies industry. Building automation systems today have the ability to leverage on the capabilities and economies of scale that Internet technology offers. Information technology advances in Ethernet, TCP/IP, HTTP and XML have contributed immensely to building technology in design, install, implement, control and monitor capabilities.

Internet technologies have enabled manufacturers of building automation systems greater options, flexibility and functionality to offer to their clients. Internet technologies have also enabled manufacturers to migrate over an open infrastructure offering real-time control systems. The Internet acts as a communication backbone, connecting two or more remote networks on a single integrated system. Without the Internet, building automation systems rely on local area networks and wide area networks for interconnectivity through leased lines, dedicated lines or fiber optic lines. This system set up places an enormous cost on the end user and severely limits its capabilities. The Internet, on the other hand, offers building owners an inexpensive connection to the Internet Service Provider, greatly reducing the cost for the network interconnectivity, whether inter state or anywhere around the world.

With the continued advances in Internet and open systems technologies, building owners will have more flexibility and options in not only the current management and monitoring of BAS but also provide a platform to migrate or expand to newer systems at a lower cost.

(d) **Interoperability and Compatibility**

As open systems integrated with Internet technology become more common place, interoperability becomes more of a reality, combining several BAS to act as one. A good example would be the HVAC control manufacturers who are moving away from current proprietary protocols to protocols that operate on Internet languages. One common Internet protocol would be the TCP/IP, a protocol that is responsible for dividing data at the transmission end into manageable bits and bytes and reassembling the bits and bytes at the receiving end in the proper order. On a front end level, manufacturers of HVAC are moving towards Microsoft Windows based operating systems to create front-end user interfaces that are understandable and recognisable by end users.

The use of TCP/IP is expected to greatly increase the growth of open systems architecture whereby a reduction in the number of gateways and interfaces on a control system will lead to a decrease in the probability of problems arising, a very costly endeavour for the end user. Another factor driving the growth of open systems architecture would be the relatively inexpensive cost of setting up and the maintenance of such a system.

4. INFORMATION ON THE MGB GROUP (Cont'd)

(e) Wireless Communications

Wireless communications in the BAS industry meets the requirement for instant notification. Technological trends are moving towards the integration of wireless technology into building automation and management equipment for improved efficiency and a more effective information tool. A contractor utilising wireless technology would be able to request for detailed information about the condition any particular installed equipment in real time, ie. temperatures, humidity, pressures. Incorporating real time notification via wireless technology into building automation systems is helping vendors offer their clients high-tech solutions at an affordable price.

(f) Direct Digital Controls And Device Networking

DDC is a form of technology used in building automation systems and is incorporated into control modules to communicate with each other and act as a single 'intelligent' entity. BAS are actually distributed control systems whereby the hardware and software are spread out over a network or multiple networks. DDC systems offer the building automation industry a virtually limitless extensibility, linking up all separate systems to one unified control system to monitor and troubleshoot one building's or multiple buildings' automation equipment such as HVAC, lighting, security manufacturing processes, etc. The main advantage of DDC technology is that it offers a "closest connection" node connectivity as opposed to centralised control systems which require all nodes to be connected to a central hub. DDC's "closest connection" node connectivity is flexible, convenient and can be connected anywhere on the network as an administration node.

(Source: Infocredit D&B (Malaysia) Sdn Bhd)

4.5.6 Industry Players and Competition

Most players in the BAS market locally do not encompass the entire value chain of what is considered as an integrated BAS company. The value chain extends from the design and supply of building automation products and services to the R&D, integration as well as the maintenance of the said products and services.

Major Players' Profile by Products/Services, 2003

<i>Company</i>	<i>M&E*, lighting, lift, HVAC</i>	<i>Security systems</i>	<i>Fire alarm</i>	<i>Others</i>
Alton Controls Sdn Bhd	✓	✓		Utilises third party software from Alerton Inc (Operates using BACnet open standards)
Cabnet System (M) Sdn Bhd	✓	✓		Utilises third party software
CNN System (M) Sdn Bhd	✓	✓		Utilises third party software / hardware from Andover Controls (Utilises BACnet open standards)
Honeywell Engineering Sdn Bhd	✓	✓	✓	In-house developed software & hardware for Windows, web-enabled (HTML)

4. INFORMATION ON THE MGB GROUP (Cont'd)

<i>Company</i>	<i>M&E*, lighting, lift, HVAC</i>	<i>Security systems</i>	<i>Fire alarm</i>	<i>Others</i>
Johnson Controls Sdn Bhd	✓	✓	✓	In-house developed software & hardware for Windows/web-enabled
MESB	✓	✓	✓	Utilises in-house developed software as well as third party software. Hardware from Invensys Building Systems Pte Ltd, NexWatch
Siemens Building Technologies Sdn Bhd		✓	✓	In-house developed software & hardware

* *Mechanical and electrical*

Honeywell Engineering Sdn Bhd, Johnson Controls Sdn Bhd and Siemens Building Technologies Sdn Bhd are the top three (3) multinational players to develop their software and hardware in-house to produce an efficient building management system flow. The other few players source their software and hardware devices from their major principal to integrate BAS for the Malaysian buildings market.

All the players provide design works, installation, integration of systems and solutions to end-users as well as act as distributors to other smaller suppliers mainly for contractual projects. In addition, all players supply security products or control systems either in the form of stand-alone or customised solutions to the end-users. Common security products and solutions offered by all the major players include sensors and controls for CCTV surveillance system, access control equipment, monitoring and alarm systems.

The major players were found to cater to the higher-end market such as commercial buildings, airports, prominent landmarks (such as Putrajaya, KL Tower, Petronas Twin Towers, Sepang Circuit), hospitals, prison buildings, universities, and others. Common open standards used by the other players are usually the BACnet or LonWorks. Local players like Alton Controls Sdn Bhd and MESB have the capability to provide complete solutions by integrating various applications developed by different vendors who use BACnet, a non-proprietary data communications protocol standard for building automation and control networks. The integration is upgraded through the use of gateways.

The local players source from overseas principals such as Invensys Inc., Andover Controls Inc., Alerton Technologies Inc., and Westinghouse Security Electronics Inc.

(Source: Infocredit D&B (Malaysia) Sdn Bhd)

4.5.7 Government Legislation, Policies and Incentives

(a) BAS network standards

The lack of industry standards, in network communications as well as the systems management area, gave rise to both the development of proprietary communications protocols and system management solutions. This has slowed system integration development for BAS. Vendors with proprietary systems make it difficult for customers to hook up components from different vendors to a common existing system. Therefore, customers using a proprietary system often have to rely on a single vendor for maintenance, repair and system upgrades.

4. INFORMATION ON THE MGB GROUP (Cont'd)

Today, major worldwide BAS companies are publicly committed to a worldwide network standard known as BACnet formulated by the American Society of Heating, Refrigeration and Air-Conditioning Engineers (ASHRAE) for the building automation and control industry. The Ansi/ASHRAE Standard 135-2001 is a data communication protocol for Building Automation and Control Networks which has been approved as an ISO and European Committee for Standardisation standards. ASHRAE is established for the purpose of advancing the arts and sciences of heating, refrigeration, air-conditioning, ventilation and related sciences. The standardisation provides flexibility for vendors and customers to mix and match components and software on the same network. It takes the form of a written specification that spells out the requirements that conform to a successful protocol standard.

(b) Regulations in the construction industry

The establishment of the Construction Industry Development Board ("CIDB") and Contractors' Service Centre ("PKK") is to provide codes of conducts and practice for contractors in the construction and construction related industries. CIDB is a national construction body that regulates the local construction industry and the PKK, which is an agency of the Ministry of Entrepreneur Development, is the national registration centre for all contractors tendering for government projects.

PKK's registration process for new applicants as contractors are divided into:

- A) Headquarters
- Public Works and Buildings Class A, B and C
 - Electrical Works Class I, II, III

Registration for Class A, B and C contractors' public works requires companies to have engineers and technical employees with relevant technical qualifications. Companies applying for Class C and above have to own a minimum capital of RM100,000 and above.

- B) District / States
- Public Works and Buildings Class D, E and F
 - Electrical Works Class IV, V and VI

For Class D and E registration, requirements are more flexible and approval is granted by PKK's district office. Registration for Class F contractors requires a 100% Bumiputera status company. Companies registered with the PKK Class A contractor license allow them to undertake projects of any size or value. The projects can be categorised into construction of roads, bridges, buildings, industrial parks, water treatment plants, infrastructure works for commercial, housing and industrial development.

(c) CIDB

CIDB's perspective on the construction industry policies is one that reflects plans or courses of action that are intended to influence and determine decisions on construction-related matters. The general policies of construction covers:-

- Policy on labour
- Policy on construction markets
- Policy on technology
- Policy on R&D
- Policy on construction materials and sustainable resource management

4. INFORMATION ON THE MGB GROUP *(Cont'd)*

- Policy on quality
- Policy on environment
- Policy on health & safety in construction

In the Malaysian BAS industry, CIDB defines the standards for controls of mechanical and electrical building services. All the major players are registered with CIDB's Contractor Group for Mechanical and Electrical in BAS classified under the M04 category. The M04 registration covers building automation, industrial and process control systems, it includes installation and maintenance of micro-processors or computer based building control systems and industrial process control systems.

(d) Fire safety and protection regulations

Fire safety is the main concern of all building sector regulations. In Malaysia, the regulations governing fire protection requirements are very much inclined towards the British Standards under the existing building legislations. The main legislation covering this is the Uniformed Building By-laws 1984 in which fire prevention requirements are necessary prerequisites particularly for high-rise buildings. The Fire and Rescue Department of Malaysia, under the purview of the Ministry of Housing and Local Government, is the authority responsible for regulating the laws related to aspects of fire safety and providing fire services in the country.

(Source: Infocredit D&B (Malaysia) Sdn Bhd)

4.5.8 Prospects and Outlook of the Industry

The majority of today's buildings in Malaysia are still based on the old legacy system of hard-wired electric, pneumatic and electronic control systems for the mechanical services, lighting and security systems. Newer buildings constructed would contain certain levels of proprietary intelligent systems for their building services, but these systems are hardly if not at all integrated. If integration occurred, it is mainly at the software level, customised to a configuration through proprietary designed drivers that do not allow upgrading or integration of two intelligent building services. Integration on a hardware level began a few years back with the HVAC and lighting controls systems. Successful integration between HVAC and lighting controls systems have paved the way for additional integrations with security systems and fire safety control systems.

There has been further adoption of LonWorks devices for sub-level device integration while BACnet is used as a common gateway protocol. Although there is no single protocol that is adopted as a world standard in the integrated BAS market, BACnet is the most common protocol at the gateway level due to its open system architecture while LonWorks is most widely used on the device level because it is supported by the most number of automation manufacturers in the world.

The clear industry trend is towards open systems and Internet technology as they offer end users the flexibility, scalability, options and affordability advantages over current proprietary systems. The future growth of BAS will be driven by the continued advances in information technology, Internet technology and networking technology. Advancements in software development for the integrated BAS industry will see more and more manufacturers moving their platforms away from proprietary software to the Internet browser based interface. End user demands are becoming more sophisticated with the request for integration of multiple platforms, multiple building sites and/or access to the buildings from multiple locations. Manufacturers and system integrators will have an edge if they are able to provide the front-end (HVAC, fire & safety, security, lighting) and back-end (software, sensors, actuators, servers) platforms integrated seamlessly.

(Source: Infocredit D&B (Malaysia) Sdn Bhd)

4. INFORMATION ON THE MGB GROUP (Cont'd)

4.6 Major Customers

A list of the Group's top ten (10) customers for the financial year ended 31 December 2003 is as follows:

	Name of customer	Country	Revenue contribution RM'000	% contribution to total revenue*	Length of relationship
1.	MH Projects Sdn Bhd	Malaysia	41,332	31	5
2.	Ministry of Defence, Malaysia	Malaysia	20,217	15	3
3.	Putra Perdana Construction Sdn Bhd	Malaysia	9,049	7	10
4.	ZAQ – Nam Fatt JV	Malaysia	5,574	4	2
5.	Norwest – Orbttech – IJM JV	Malaysia	5,156	4	2
6.	IJM Construction Sdn Bhd	Malaysia	5,064	4	10
7.	Bina Goodyear Bhd	Malaysia	4,429	3	8
8.	Perbadanan Putrajaya	Malaysia	3,220	2	2
9.	Invescor – Dumez Jaya – Woh Hup JV	Malaysia	3,030	2	5
10.	Malayan Banking Berhad	Malaysia	2,778	2	2

* Contribution from customers is dependent on projects awarded for the period and will differ from year to year

4.7 Major Suppliers

A list of the Group's top ten (10) suppliers for the financial year ended 31 December 2003 is as follows:

	Name of supplier	Country	Total cost of sales RM'000	%	Length of relationship	Products / services supplied
1.	Invensys Building Systems Pte Ltd	Singapore	7,052	6	17	Building automation components
2.	Ademco Asia Pacific Ltd*	Hong Kong	9,785	8	15	Security system components
3.	GPS JV	Malaysia	11,976	10	3	Air-conditioning services
4.	Cobrain Holdings Sdn Bhd	Malaysia	7,603	7	3	Electrical services
5.	DD Techniche Sdn Bhd	Malaysia	5,669	5	3	Water supply, boiler, sanitary plumbing, LPG and fire protection systems
6.	P.J. Indah Sdn Bhd	Malaysia	6,214	5	10	Electrical services
7.	Alarm & Automation Supplies (M) Sdn Bhd	Malaysia	4,214	4	12	Security system components
8.	M-Kap Engineering Sdn Bhd	Malaysia	3,718	3	10	Air-conditioning services
9.	ITG Worldwide (M) Sdn Bhd	Malaysia	2,952	2	3	Building automation components
10.	Digital Star Sdn Bhd	Malaysia	2,501	2	10	Installation services

* Marketing and procurement arm of NexWatch for Asia Pacific region

4. INFORMATION ON THE MGB GROUP *(Cont'd)*

4.8 Future Plans and Outlook

The MGB Group's vision is to be internationally recognised as an integrated IBMS and ISMS player. The Group has embarked on various strategies that will enable the Group to grow from strength to strength. These strategies include understanding the market segment, product diversity, quality and competitive advantage. The Directors of MGB envisage that the development strategies will comprise the following key areas:

(a) Expansion of market coverage and strategic alliances

The immediate focus of the MGB Group is to establish and build a distribution network locally and overseas. The Group intends to appoint more distribution agents in order to cover a larger geographical area at a reasonable cost and to expand through acquisition of companies with existing technology in China, Thailand and other countries. The Group intends to strategically build-up the well-nurtured and close business and technology alliance with international partners to spearhead the conversion of tremendous overseas business opportunities in the high-growth area of IBMS and ISMS on the proven successful implementations (technology partnership with high MESB product contents, channels and geographical business partners).

(b) Embark on a value-enhancing productisation exercise

The growth strategy of the MGB Group in the future is aggressively embarking on a value-enhancing productisation exercise, leveraging on its trademarked and patented technologies and solutions to create world-class, IBMS and ISMS solutions. The Group intends to focus on market development and expansion plans in the IBMS, ISMS as well as homeland security. The Group has responded by recruiting new product agencies, new technology partners, to respond to this need and to be a first port of call for Military, Police, Customs, National Security Agencies and Commercial Bodies seeking to enhance the protection of both civilian population and Armed Forces. The system developed and marketed by the Group is unique as its principal competitive advantages include detection capability, versatility, reliability, ease of use, cost effectiveness and effective after market service policy.

(c) Continuous process improvements through the Metronic Digital Nervous System ("MDNS")

The Group also plans to dramatically improve its effectiveness and efficiencies to strengthen its leadership position by implementing people-focused, process-centric and technology-driven strategic initiatives to yield world-class modus operandi and support infrastructure through its unique business process management tool, namely MDNS to support local and international businesses, and adherence to industry-assessed, stringent technology development discipline.

(d) Value-added extension of its IBMS and ISMS core competencies

The Group's knowledge of the local business conditions, reputation and established relationship has given it an edge over its competitors. Furthermore the forging of strategic alliances with top manufacturers of control systems and an experienced design and implementation team completes the Group's competitive advantage over its competitors. As such, the Group intends to quickly capture emerging niche market of security and surveillance through the value-added extension of its IBMS and ISMS core competencies (from security and control of devices to security and tracking of devices and both living and non-living objects within the region of interest). This addresses the lucrative market of environmental, community and homeland security value proposition.