

Engineering Report for [REDACTED] Managing Director of [REDACTED]

Following the successful completion of a BSc 'Engineering with Business Studies' in the mid-1980's, I started my career in the Building Services sector with Landis and Gyr as a Sales Engineer and progressed to a Senior Project Engineer within 2 years. This gave me a solid grounding of the operational aspects of the controls industry from the perspective of a large multi-national organisation. An opportunity then arose for me to run (as Managing Director) a small controls company in Hampshire which gave me a completely different perspective of the controls supply chain and enhanced my business acumen .

Over the subsequent decade (1991-1998) I developed my skills/experience of controls through a variety of different challenges ranging from telephone lighting controls to medical electronics as well as process controls and automation (via inhaler testing for Shearing Plough) and hydraulic valve flushing for Vickers, as I fulfilled the role of Controls Consultant and Business Development Director.

Finally after 12 years of controls experience and identifying a gap in the market for a customer-led (as opposed to product-led) controls company, InTandem Systems Ltd was formed , primarily on the back of the newly launched SeaChange system which at that time pioneered a more 'user friendly' approach to building controls. This system proved especially popular for smaller applications and this was where InTandem filled a niche in its local area.

Over the past 15 years products, applications and technologies have changed dramatically and InTandem Systems, with myself as Managing Director, has been well placed to deliver a sustainable business solution to a diverse range of customers (from schools/colleges/universities to leisure complexes/airports/transport terminals as well as specialising in historic buildings and specialist environmental controls in laboratories and hospitals) with varied and often bespoke solutions.

Economic downturns have ebbed and flowed but I have managed to lead and steer the business to become a leading BeMS specialist in the region , recognised nationally by the BCIA (Building Controls Industry Association) in achieving finalist status in four awards categories in 2014 (Independent Installer of the Year/Contribution to Training/Student of the Year/Energy Management Award) .

This 28 year career (to date but plenty more to come) has enabled me to experience and contribute to an extensive range of projects and initiatives in the controls sector and I have outlined some of these below:

A.Optimising Application of Existing/Emerging Technology

A1.Enabling the introduction and exploitation of emerging technologies

Whilst 'Business Development Director' of Morgan Automation, the innovative DIAL Telephone Controlled Lighting System was introduced to the marketplace and successfully installed in a range of key commercial premises (Barclays European Headquarters in Coventry/ Sainsbury's Head Office in London/Hammersmith & Fulham Borough Council).

This technology tapped into the growing market need in open-plan offices for individual control of work station lighting as well as the increasing emphasis on reducing energy costs. This system, which pioneered zones for lighting systems and (in conjunction with pre-programmed occupancy patterns),

meant that in buildings where DIAL was installed, lights being left on all night were a thing of the past.

Another example was that during the launch phase of InTandem Systems, it was identified that a new BMS provider had entered the market and was seeking supply partners. SeaChange had developed an advancing technology which had a fixed controls strategy and distributed intelligence which at that time was innovatory. InTandem Systems, as a small specialist supplier for small controls systems, saw this as a cost-effective, energy-efficient solution for many customers whose needs couldn't easily be met (within budget) by the larger proprietary options. It was through the selective recommendation and installation of such systems that InTandem established itself as a customer-driven BEMS solutions provider.

A2.Engaging in the Innovative Development of Engineering Technology and Continuous Improvement Systems

Recent examples of involvement in these areas, following client consultations in relation to energy reviews, have been:

- Domestic Frequency Inverter Application - We were asked to look at the energy saving potential on a private swimming pool and identified that the single-phase 4kW supply fan alone was costing over £4.5k a year to operate. Frequency Inverters can only operate on three-phase fans but we identified a single-phase input to three-phase output frequency inverter, changed the supply fan for a three-phase fan with the same duty and linked the operation to the end-switches on the automatic pool cover such that the fan could run at lower speeds when the pool was not in use. This was measured by the client to reduce energy costs to £1.8k per year
- Boiler Dry Cycling - A number of bolt on products have arrived in the market recently to reduce the potential for the Dry Cycling of Boilers (continuing to fire boilers when the load isn't high) – we were asked to fit Dry Cycling Controllers on a particular site and after consulting with Trend Controls, we included the Dry Cycling control function by adding 2No return temperature sensors and modifying the control strategy
- Commercial Frequency Inverter Application - The 18.5kw supply and extract fans at a Swimming Pool were running continuously. We proposed (with an air balancing specialist) to reduce the fan speed during occupied periods to 90% whilst running the fans at 60% during unoccupied periods with return air humidity control as an overriding safety net to increase fan speed should the return humidity increase. The impact of these changes on swimmers was none but energy savings for the operator was 58%. This initiative was nominated as a finalist for the 2014 BCIA Energy Management Award.

B. Applying Appropriate Theoretical and Practical Methods to Engineering Problems

B1. Identifying Potential Projects

As Managing Director, part of my role is business development and in recent years this has involved transforming InTandem Systems from being perceived as a 'systems based' provider to a 'solutions based' provider focusing on each client's specific working environment. This has been achieved successfully as the business targets have consistently been met (and many key performance

indicators, being surpassed) . For example the business has grown from a turnover of £540,679 in 2011 to £663,112 in 2012, followed by £861,019 in 2013 and with 2014 likely to top £1 million. More importantly this has been achieved with acceptable margins maintained and a sustainable business model.

Other business development opportunities have been to explore the application of BeMS technologies in historic buildings. This has led to a number of proposals and presentations being made to key decision makers who are custodians of significant heritage buildings to explore the most appropriate solutions for their specific environmental constraints. For example at [REDACTED] Stately Home wireless technology was used to keep the installation element sympathetic to the building's aesthetics.

B2. Conducting appropriate research and undertaking design and development of engineering solutions

Increasingly I am being consulted at the early stage of tender preparations to give advice and direction on the best BeMS solution for a given building environment because the earlier we are involved in system design/development the more effective our systems are. Specific examples are:

- [REDACTED] College - We were invited to present a snapshot of the BMS marketplace to [REDACTED] College as part of an on-going project to facilitate an informed choice on a long-term decision. They think in long timescales so I presented the last 20 years of BMS suppliers in the UK to include mergers, take-overs, backwards compatibility and technology changes. This helped the College and our customer strengthen their working relationship with the client.
- Remote Access - Remote broadband access to BMS is extremely beneficial. Although proprietary products are available, we have developed our own 3g remote access device which we install on sites following commissioning so fine tuning and performance monitoring can take place as the building goes live.
- High Level Interfacing - 'Open systems' have been on the building services agenda for many years and a healthy scepticism of true open systems has always lead me to identify robust interfaces that meet specified requirements. I have ensured that we have strong links with providers of 3rd party interfaces as well as drawing our engineers further into the IT world, system connectivity and integration as this is a growing part of our industry.

B3. Implementing Design Solutions and evaluating their effectiveness

As part of the business's management accounting process regular monitoring and evaluation is carried out by myself (supported by my team) into project performance in terms of profitability by job and against client targets/satisfaction levels. Our performance against these targets are then measured from a stand-alone basis but more importantly (for the long-term future of the business) , against the impact this has on customer retention and repeat business rates, which have remained high even with business growth.

In addition my role in this area has also been to lead improvements for building performance and optimise system benefits following post-occupancy reviews. For example we were involved in the [REDACTED] project 'Unlocking the Archives' which entailed working with the curator and facilities team, who needed verification that conditions would stay within the specification in order to protect and preserve ancient artefacts. This was achieved by logging data in

the Western and Eastern Archive for 3 months to 'prove' that conditions were maintained regardless of usage patterns.

As the industry continues to develop, InTandem have discovered that consultants particularly, are increasingly seeking to integrate a wide range of building control requirements into the BeMS . This in turn has increased the need for me to work with manufacturers to understand the technical implications and sometimes limitations of incorporating third party equipment into prescribed systems.

For example one project required the system to provide heating and cooling 'enable' and 'demand' signals as well as being able to display all sensors on the BMS. The solution recommended was to monitor all sensors (pressure/temperature) using BACNET over the IP network whilst controlling the borehole system using traditional BMS input/outputs. This solution provided a robust means of control and was easier for customers to support in the future.

C. Providing Technical and Commercial Leadership

C1. Planning for effective project implementation

As Managing Director I have ultimate responsibility for overall project management and whilst smaller projects (less than £50k) are overseen by the Operations Manager, all large projects (£50k plus) are directly supervised by myself. This starts with tender submissions, contract negotiations and leads on to resource planning, implementation and final completion, handover and final account negotiations.

In the recent economic environment this role has become increasingly complex and challenging as clients require on-going design reviews to curb spiralling costs in other areas. For example a project we embarked upon in 2013 for a premier league football club (as sub-contractor to M&E contractor) required careful management up the supply chain to ensure that the bid was fully compliant but still achievable within budget and defined timescales . This involved careful analysis of viable 'adds and omits' so that a fully defined scope of work could be agreed and be commercially viable for all stakeholders. eg CHP was included to reduce running costs (a client objective) and integrated into the pitch irrigation system.

C2. Planning, budgeting, organising , directing and controlling tasks

As Managing Director it is my responsibility to define and control the management system that ensures that InTandem delivers projects efficiently from design & engineering through to final commissioning and handover. This involves me :

- preparing clear costings (sometimes liaising with third party suppliers like Mitsubishi and its networked air-conditioning units) so that financial performance can be monitored and controlled on a per job basis and specifically by material category (eg field controls/control panels/installation materials) and building phase completion
- setting resource requirement targets and monitoring these against actual performance
- evaluating proposed contract additions/omissions

- preparing for and negotiating final account figures taking into account variation orders and contra claims

C3. Leading teams/developing staff to meet changing technical and managerial needs

InTandem has been nominated as a finalist for the past 2 years (2013 and 2014) in the BCIA Awards for its 'Contribution to Training' which is testimony to our business philosophy of investing in our people. This commitment to developing staff as individuals evolved in the late 1990's when I 'won' a one-to-one business development consultation with Sir John Harvey-Jones, during which we discussed how to achieve sustainable business growth.

We spoke about training and I said how important I felt it was and told him how much we spent on training. "Not enough" he said forcefully "you need to be spending 10% of your payroll on training". Consequently I adopted the advice for increasing our investment in training and since then we have nurtured many staff within the business whose talent has been unlocked through a combination of internal/external training. This was recognised earlier this year when we were given an Employer Ambassador Award by Eastleigh College for our commitment to the apprenticeship programme which we have actively supported for the past 10 years.

Other initiatives include:

- Leadership, management & team building enhancement through :
 - => company expeditions to climb mountains (Snowdon/Scafell/Ben Nevis)
 - => organisation of /participation in InTandem's Round the Island Charity Cycle
- Development of technical/fault-finding abilities in BeMS through:
 - => extensive mentoring whereby apprentices train rotationally with all team members
 - => in-house training days facilitating knowledge exchange through case studies/'live' projects/ best practice

This responsive training programme enables staff to take an active part in formulating their personal development route so they focus on strengths as well as what they enjoy – this powerful combination results in highly motivated staff and superior performance for our customers.

C4. Bringing about continuous improvement through quality management

Knowledge Exchange - InTandem's philosophy (which I have pioneered over the years) of exchanging knowledge and helping one another, has informed/improved our whole business model by focussing upon solutions-based approaches. This in turn has enabled InTandem to turn traditional B2B contracts into working partnerships as recommended by the government's 'Achieving Excellence in Construction' initiative. Developing long-term relationships with stakeholders (over 80% of our turnover is repeat business) has resulted in projects being delivered on-time and on-budget. By sharing our BeMS knowledge within supply chains (contractors/clients/suppliers), the building services industry gains a greater appreciation of the role of BeMS and ensures that 'controls

packages' are more appropriately specified/implemented to maximise efficiency whilst enabling client comfort within their built environment parameters. This in turn facilitates improved quality delivery both internally for InTandem and externally for our customers and the end user.

Quality Workmanship - Another initiative designed to foster the development of quality has been the 'InTandem's Got Talent' Award, an internal 'competition' loosely based on the formulaic 'Britain's Got Talent' programme, in order to channel the talents, enthusiasm and focus of its apprentices.

Employees nominate each other's installation work by photographing it and sending to the office, along with a description of the technical/environmental constraints being faced and the merits of the resulting solution. Entries are then judged monthly against three key criteria (neatness/ complexity/ regulation compliance).

This programme has developed a culture of best practice and excellence re-inforcing how BEMS installations should look and operate , alongside regulation compliance.

Design Workshops - As BeMS specialists, we are always under pressure towards the end of the contract and this is unlikely to change so our challenge is how is this managed. InTandem achieves this by encouraging design workshops with clients, contractors and consultants to design out surprises/unknowns so at system handover the solution matches their expectations. We also focus on what we can progress as opposed to what we can't – this sometimes involves manufacturing junction box sub-assemblies in the workshop so when we eventually get site access the work is more straightforward/repeatable. We also train our installation team to pre-commission field devices so they get cross-checked early on to ease pressure on commissioning engineers.

D. Demonstrating Effective Interpersonal Skills

D1. Communicating with others at all levels

InTandem Systems, under my stewardship, strives to understand who the 'customer' is by identifying key stakeholders in projects so that the broad range of needs (end users/building operators/facilitators/contractors) can be met. It is only by communicating with these stakeholders that consideration can be given to their range of requirements - eg end users want comfort, building operators focus on energy efficiency whilst facilities managers strive to maximise performance/service level. It is then our job to manage specific environmental constraints, operational needs and combine them all under the 'umbrella' of the defined specification, so that a project can be delivered on-time, on budget and meet the end-users needs.

I strive to ensure that InTandem identifies end-user's specific operational requirements within buildings in order to match BeMS solutions with environmental constraints and the client's budget. For example by talking to pool staff at [REDACTED] InTandem identified that they manually switched on pool features in the plantroom, which was both unsafe and inefficient. InTandem's solution of a graphics interface, enabled key pool features to be operated remotely from within the pool space. No specification had identified this need but stakeholder consultation had established a practical problem.

At the other end of the spectrum I have developed a demonstration checklist to ensure that at final handover all stakeholders are clear about/satisfied with system operations. eg consultants need to

assess technical performance against the specification whilst operationally Theatre Management are more interested in temperature settings for the casts changing rooms.

D2. Presenting and discussing proposals

As 'Managing Director' I am responsible for Business Development and Client/Customer Liaison which involves meetings with key stakeholders on main contracts (both pre/during and post contract) . This includes meetings (both on and off site) to analyse client's specifications and discuss how their operational requirements can be best achieved before the final bid is submitted. Our bid (for BeMS) is then subsumed into the overall Mechanical/Electrical bid so it's essential the contractor (our customer) is clear on our extent of supply so duplications and/or omissions don't occur and clients get the system they require/expect. To carry this out effectively it is vital to understand the tendering practices of your customer as well as the cultural differences of the varied client types.

For example we have installed several BeMS systems in mental health units and have found that Centre Managers appreciate an upfront site visit so they can reiterate their specific needs/explain the constraints of the working environment (eg in one secure unit it was safer/more practical to move from one block to another by going across the roof) .

Other presentations have been more formal. For example:

- 'Futures Day' presentations at local colleges on the challenges of energy usage in buildings in order to inspire debate and hopefully an interest in an engineering career
- Post-contract presentations to stakeholders on how to maximise BeMS post installation
- Pre-tender presentations on BeMS options for a specific environment

D3. Demonstrating personal and social skills

As Managing Director I have ultimate responsibility for ensuring that the workforce delivers our projects on-time, on-budget and to the standards expected by the client. To achieve this I have developed in myself and the team around me a wide range of interpersonal skills to help deal with all stakeholders in the supply chain (both internal and external). This has encompassed:

- ⇒ Understanding how people communicate and what motivates them to get the best out of different personality types and build a strong team
- ⇒ Leading by example eg by running a design skills workshop myself, staff realised that basic engineering skills needed to be in place before they could progress
- ⇒ Having empathy to inform our decisions eg a heritage building client didn't want sensors visible but the resulting cable run would have been problematic so wireless ones were installed instead
- ⇒ Resolving short-term conflicts whilst striving to preserve long-term relationships but still achieving an acceptable outcome eg project handovers are stressful occasions but using a range of speaking/listening skills to accommodate the views/concerns of all stakeholders leads to successful practical completions

E. Demonstrating Personal Commitment to Professional Standards and Recognising Obligations to Society, the Profession and the Environment

E1. Complying with relevant codes of conduct

I am particularly conscious of the personal responsibility I have for ensuring that professional standards are upheld by my company and even more aware that this process/approach needs to be instilled in new recruits. Therefore I ensure that design parameters adhere to appropriate CIBSE Guidelines (specifically in relation to BEMS commissioning) to facilitate benchmark referencing, alongside compliance with 17th Edition IEE Wiring Regulations and other relevant British Standards.

This is achieved through regular reference to web sites (BREEAM/Part L), journals (HVAC/BSEE) and attendance at industry conferences and trade exhibitions.

E2. Managing and applying safe systems of work

As Managing Director I have ultimate responsibility for the implementation of company-wide Health & Safety Policy and ensuring that employees understand their health and safety responsibilities but perhaps more importantly that they have the support/necessary skills and 'tools' to make sure these are complied with. eg regularly hosting internal training events for staff in which relevant health & safety issues are discussed and taught.

Recent initiatives have involved updating the procedure and format of Risk Assessments and Method Statements and reviewing the role of Permits to Work.

E3. Undertaking engineering activities to contribute to sustainable development

My underlying business philosophy has always been focussed upon sustainable solutions, whatever the brief/problem. This initially started in relation to the business I was running by ensuring that the business model itself was sustainable in terms of long-term business growth and profitability (we are now in our 18th trading year with no loss recorded).

This philosophy naturally then extended to our customers to help them deliver their sustainability targets through engineering activities and InTandem helps them achieve this as follows:

- Consideration of refurbishment versus replacement in relation to controllers/valves etc taking into account whole life cost and performance. Eg on recent office refurbishment projects we have decommissioned control panels/field equipment and re-used as many components as possible
- Promotion of the installation and integration of more sustainable engineering solutions into the BeMS like biomass boilers, natural ventilation systems, variable speed drives and rainwater harvesting to minimise energy consumption (especially carbon-based energy) and natural resources
 - ⇒ For example [REDACTED] we exceeded requirements by building in capacity for a full BMS in the future

