

Emerson steps out of their process comfort zone, into solids level measurement: plus moves up in the Top 20

In a really interesting development, Emerson has stepped outside its normal comfort zone, in terms of market profile, and outside the normal corporate acquisition comfort zone, to buy Israel based APM Automation Solutions, a developer and producer of high-tech solids and powder volume and level measurement systems and instrumentation. It is also interesting for your editor to try to analyze the problems of making this move, as an ex-Mobrey (now absorbed into Emerson Rosemount) liquid level measurement marketing person in the 70s and 80s, and subsequently as an observer of the suppliers of ultrasonic and radar equipment, as they supply either the solids level or the liquid level customer base.



Tom Moser:
Moving Rosemount further into the solids measurement market

The APM technology

The APM technology, using acoustic imaging and 3D mapping to show level, volume and deduced mass of bulk solid storage areas, for example in bins or silos, is impressive. When first introduced as a new development, it was a difficult concept to grasp, using the echoes from low frequency acoustic pulses, and computing a 3D level profile from these, but that was a long time ago. The first report about APM recorded on www.iainsider.com was in March 2008, when Golconda in the UK, a Rockwell SI and solid materials handling specialist, demonstrated the APM units at the Easyfairs Solids and Bulk Handling Expo in the UK.

A typical installation is described on the APM website, for an Adani Group warehouse in southern India, where bulk fertilizer solids are stored in a 'small' warehouse, just 78metres long and 25m wide (that's 250+ feet by 82 feet). Eight

synchronized APM scanners provide precise inventory volume measurement, and send this data to the Honeywell India ERP and control system on site. The Adani Group also operates other import terminals, which for example include the world's largest coal terminal, at their own private port at Mundra, so has further potential for APM sales. Sudipta Bhattacharya, ex-CEO of Invensys Operations Management, joined the Adani Group last year, as chief strategy and technology officer. Other APM customers include Cargill, Bunge, Louis Dreyfus, Proctor and Gamble, International Paper, Cemex, Lafarge, Anheuser Busch, Fagen, Holcim, Henkel, Coca Cola, Alcan, ArcelorMittal, and De Beers.

Process level measurement

Level measurement and control companies and businesses originally developed based on an expertise in a particular technology. So there were Mobrey, Besta and Magnetrol who built float operated liquid level switch systems, and paddle or tilt switch companies like Monitor and Bindicator who built solids and powder storage level switches. Then the pressure measurement companies like Rosemount monitored tank levels using their pressure measurement systems for liquids. Other RF probes and similar seemed mainly to target the solids market, rather than liquids, as float systems were understood and entrenched in the liquids market.

Then came pulse echo ultrasonics and radar systems, where the technology could be applied equally to solids or liquids. Here it seemed that the company thinking and/or sales structure meant that some companies stayed with their established

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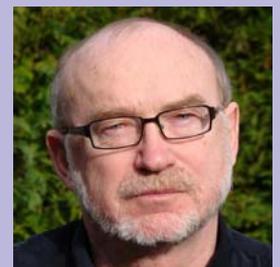
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A separate news website and blog is published as www.iainsider.com

Vega point level for process extremes

Holger Sack, head of product management at Vega in Germany, explains that their vibrating point liquid level switch, the VegaSwing 66, has been re-engineered to make it capable of operation at temperatures from -195°C to 450°C (minus 320°F to 842°F) and pressures of up to 160bar (2400psi). This patented development makes the VegaSwing one of the few technologies available for use at such extremes.

The new VegaSwing still uses the vibrating tuning fork principle, but the piezoelectric drive (as used in the previous construction) is replaced with a solenoid inductive drive system, able to withstand such extremes of temperature.

In addition, on the VegaSwing 66, the electronic system can detect build-up on the sensor, by monitoring the amplitude of the oscillation. It can also tell whether the sensor is corroded or broken, by monitoring any change in the natural resonant frequency. Holger Sack said that such 'anticipatory' diagnostic capabilities are being demanded by customers more and more.

Presumably the VegaSwing is a suitable offering for operation as a fail-safe high level alarm, since it is active (vibrating) when in a dry state: the more conventional float operated devices tend to be fail-safe as low level alarms.

(liquids) market, like Mobrey and Rosemount, whereas others, like Vega and Endress + Hauser, decided to approach both market segments. Others, like Milltronics in Canada (now part of Siemens), who had grown up with grain silo measurement, and Nivelco in Hungary, then successfully moved across into liquids level measurement, particularly for the water treatment industry.

Facing this scenario, who could APM choose to approach about spreading their technology across the major applications where silo and bin inventory control was needed? Obviously there was no keen interest evident from Milltronics, Endress or Vega, so a surprising answer, last April, was Magnetrol, the self-styled worldwide "Preferred partner for process level controls".

APM strategic partnership

In April 2013 Magnetrol became a global private label distributor of APM bulk solids measurement technology. APM felt that Magnetrol would give them a global business reach, difficult to achieve when building a network of smaller locally based installers and distributors. Magnetrol gained a system capability applicable to larger open storage installations: they call it "Contour Acoustic Volume Mapping", and expect it to secure large segments of the bulk solids measurement market.

Magnetrol have always been the prime head-on process competitor to Emerson's Rosemount/Mobrey product line, in liquids, and making such a strong move towards the high-tech end of solids level/contents measurement could have been a danger signal for Emerson. While the ultrasonic range of level controls by Mobrey was developed to include transducers and systems specifically designed for solids measurement, dating from the 1990s, to be strong in this market area Emerson possibly still needed a technology advantage - hence the interest in APM.

The Emerson viewpoint

"The APM acquisition is an exciting step as we move further into the solids measurement market," said Tom Moser, group vp of the Emerson Process

Management measurement and analytical businesses [Rosemount]. "Our customers want to be able to go to a single source for liquids, gases and solids measurement instrumentation - now we can better deliver on that request. The addition of APM's leading technology will enable Emerson to provide customers with a broad range of solids volume measurement options, from small bins up to very large bins and open piles."

So what happens next?

Having bought APM, it would be expected that Emerson would not wish to continue the APM relationship with Magnetrol, if there are any options available to them for backing out! But equally, looking at the existing Mobrey and Rosemount customer profile (and maybe the Magnetrol profile) the customers for APM systems are not the typical liquids processors that are on the current Emerson sales visit list for sensors or control systems: APM customers tend to be large companies handling discrete or bagged products such as dry foodstuffs, minerals or aggregates.

So possibly this move signals the start of a larger solids strategy within the Emerson Rosemount level business. Inevitably there will be another move by Emerson, maybe by acquisition of a sales marketing biased solids instrumentation company, probably US based. This comment reflects the lack of interest that exists in such commercial acquisitions with the German family owned businesses.

However, looking at the broader aspect of world manufacturing facilities within the Emerson level measurement and control business, buying privately owned Magnetrol itself (based in Chicago) would complement the Mobrey facilities in the UK, and is a merger that has made sense for many years.

- Magnetrol entered the annual *Control* magazine listing of the 2012 Top 50 North American automation and control vendors, published this month, at #50, with automation sales quoted by *Control* of \$67m. They also assessed the Magnetrol total world sales in the automation and control sector at \$157m in 2012.

● The last Israel based acquisition in automation and control that I can remember was in 2011, when Motorola M2M solutions of Tel Aviv was acquired by Telit Wireless Solutions, based in Italy. But local Israeli papers suggest there is a stampede to buy up their high-tech companies at present, and go as far as saying Emerson will expand the APM operation into a technology centre there, for solids level.

Those 2012 automation and control vendor rankings

The results are out! Every year we look forward to this annual analysis from *Control* magazine, produced by Walt Boyes and two ARC Advisory Group staff, David Clayton, director of research, automation and safety systems, and Inderpreet Shoker,

an ARC analyst on automation systems. Maybe this appearing late in December shows how long is spent preparing this analysis, and how long the lead times then are for paper magazines.

Another aspect of a paper magazine is that this article is effectively five pages, of which the adverts use one and a half, and the informed analysis alongside the tabulations is all too brief. I'm not that keen on large tabulations, because (with respect) I don't think they get read! You leave reading them to people like me, so I'm delighted our friends at *Control* provide the data – see www.controlglobal.com.

The tabulation provided here shows the “Rest of the World” (ROW) figures, to try to give that alternative view, covering the 77% of the world market that exists outside North America. Because that is the figure, albeit an estimate from the figures provided by *Control*, of how the

Festo flies in to the *Control*Top 50

Newly included in the *Control*Top 50 listings, Festo quote that they are the world's 'leading provider' of pneumatic and electrical automation technology. Split into factory and process automation businesses, factory automation tends to be the main first impression, established over 60 years, to “Join, rotate, grip, position, connect, hold, test and check discrete materials” – as used to control an automated conveyor system or package production line.

Process automation is another major part of the business, “providing centralized and decentralized automation concepts for the production, transport, handling and disposal of gases, fluids, paste-like materials or bulk solids”. Their description includes equipment for GMP, food or ATEX zones, with optional FDA and HACCP conformity, condition monitoring and comprehensive diagnostics concepts, for high and low temperatures, or for harsh, corrosive atmospheres.

Festo is an independent, family owned company: turnover was Euro 2.24Bn (\$3Bn) in 2012, with 16200 employees, of which nearly half are located in Germany – about 7% of income is reinvested in R&D activities. It has 300,000 customers world-wide, and operating companies established in 61 countries.

2012 Automation Vendor's Revenues

ROW Rank	Vendor	ROW Sales \$m	North America Sales \$m	Rank	% Growth in Sales
1	Siemens	12772	1541	4	-3.3
2	ABB	9782	1810	3	1.7
3	Emerson Process	4763	4404	1	16.0
4	Schneider Electric	4326	1427	5	2.7
5	Yokogawa	4014	345	19	11.8
6	Mitsubishi	3422	188	32	-5.0
7	Rockwell Auto	3097	2975	2	10.4
8	GE	2328	1227	7	1.6
9	Honeywell	2232	963	9	3.1
10	Omron	2195	299	22	-0.2
11	Phoenix Contact	1936	102	40	-3.0
12	Danaher	1895	1412	6	6.7
13	IMI Fluid Controls	1764	458	17	11.1
14	Fanuc	1736	219	28	22.2
15	Endress+Hauser	1710	460	16	3.3
16	Invensys	1368	796	11	20.2
17	Spectris	1330	618	12	21.8
18	Festo	1198	212	29	n/a
19	Cameron	1178	964	8	26.0
20	Flowserve	1034	523	15	11.2
21	Yaskawa	985	240	26	-31.9
22	Ametek	973	899	10	17.0

Schneider appoint marketing guru

Chris Hummel is joining Schneider Electric, the specialist in energy management, as chief marketing officer, executive vp, and as a member of the executive committee.



Reporting directly to Jean-Pascal Tricoire, chairman and chief executive officer, Hummel will have responsibility for the company's marketing.

Hummel joins Schneider from Unify (previously known as Siemens Enterprise Communications), where most recently he was chief commercial officer, working to reposition the company by launching its new brand and providing the commercial vision behind its communication and collaboration offerings.

Before that, he had held several executive sales, product and marketing rôles at SAP and Oracle. Hummel has a varied background, in marketing, sales and general management: he has lived and worked in the USA, Germany, Russia and Singapore.

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automation and control business is distributed – and is this what your business profile should maybe follow?

The automation business profile

The North American market for the top 50 vendors selected by *Control* was valued at around \$25Bn in 2012, the year reported on by *Control*. This was 23% of the total global market for automation and control products – the world total value was \$109Bn, up 6.5% on 2011.

The rankings – for both World, North America (NA), and Rest of the World – are fairly well unchanged from the previous year, despite a wide variation in the growth rates apparent for the different companies. So who can we pick out as worthy of note?

Rest of World Top 20

Starting at the top, **Siemens** and **ABB** had minimal change in their figures: Siemens fell a bit and ABB rose in NA, as might be expected from the Baldor acquisition. **Emerson** has shown strong growth worldwide of 16%, more than any other member of the World Top 15 companies, and moved up in our 'Rest of the World' (ROW) ranking to #3: this is steady progress from #5 in 2010 and #4 in 2011. Plus they do this while also tying with **Rockwell** and **Ametek** for having the highest proportion of sales within NA, at approx 50%.

Emerson pushed **Schneider** down to #4 in ROW, but when 2014 figures emerge and **Invensys** is included they will be back up to 20% above Emerson. **Yokogawa** at #5 showed strong growth in ROW figures 2011-2012, but little change in NA at only 8% of the total. Similarly **Mitsubishi** had only 5% of sales in NA, and with total sales declining 5% still retains ROW ranking #6, with significant sales in Japan and Asia Pacific, including China. Still at #7, **Rockwell** had declining sales in the USA, but total growth of 10%, so ROW figures grew significantly, however not quite enough yet to move up.

A new entrant to the *Control* listings, perhaps having been overlooked in the past, is **Festo**, entering the global ranking right up at #21: North American sales produce a ranking there of #29, but

because of the significant European presence in the Rest of the World tabulation they go straight into the Top 20 at #18.

Risers and Fallers in the middle rankings

Again **GE** and **Honeywell** were fairly static, but a 3% sales fall at **Phoenix Contact** mainly in the NA market has slipped them by 3 places in the World rankings to #16, but they retain #11 in ROW. At #13 in ROW we have **IMI Fluid Controls**, seemingly continuing their rise up the World and ROW charts, but falling in NA ranking. **Endress+Hauser** falls back to ROW #15, and World ranking to #13, because of a small 3.3% growth in this period.

Invensys rises to #16 in ROW, and is up to #11 in NA, with 37% of sales there. Then come the group of rising 'newcomers' – **Spectris**, **Festo**, **Cameron**, **Flowserve** and **Ametek**, with **Yaskawa** falling down the table to be in the middle of them at #20 after a 32% decline in world sales.

It is interesting that the companies that have their NA sales at between 20-25% of their total business, mirroring the actual world market distribution, do not fit one pattern – they are a random selection: **Schneider Electric**; **Endress + Hauser**; **IMI Fluid Controls**; and **Yaskawa**. One from each style of company, you could say – and so it seems that not much can be deduced from this profile!

The Top 20 names that might not be so familiar

Some of the names on the Top 20 list, whether for the "Rest of the World", or for the North American market, will be a little unfamiliar – we don't hear of them that often. Last January, in a similar review, **IMI Severe Service** was discussed, as a niche market valve supplier to industries like nuclear and conventional power, LNG production, iron and steel, oil and gas. As well as Severe Service **IMI** has another relevant division – Fluid Power.

IMI Fluid Power

The Fluid Power business is a similar size to the Severe Service business, at

GBP717m (\$1150m) turnover in 2012, but it makes around 50% more profit and employs maybe 50% more people, at 6000. Sales are split 25% in North America and 52% in Western Europe, possibly significantly in Germany, but with 8% coming from the UK.

The management identify five key market areas for the business. These are: Commercial Vehicles, focusing on emissions control and fuel economy; Life Sciences, focusing on the aging population; Energy, focusing on climate change and low carbon energy; Food and Beverage; and Rail and mass transit infrastructures. Throughout these markets IMI apply engineering expertise in fluid power - ie control and automation, to improve performance efficiencies - maybe not the normal markets we consider, but basically the same problems.

Fluid power brands

Brands within their operation are Herion and Buschjost, well respected German solenoid and specialist control valve manufacturers for fluid power and automation; Kloehn, supplying OEM equipment; FAS (Fluid Automation Systems) miniature solenoid valves and micro-fluidics equipment; and also Norgren Fluid Power, for fluids and general motion control.

Norgren made a further acquisition in this area last August, buying AFP - Analytical Flow Products, of Thetford Mines in Quebec, in a phased acquisition that might achieve GBP40m (\$65m) for the two founders and previous owners over the next five years. Established in 2007, AFP manufactures specialized valves critical to the performance of gas/liquid chromatography systems, as well as a broad range of other styles of analytical system - including those that test the purity of gases in refineries. AFP has also developed new products for Life Science and Energy applications, thereby meeting several of the market target objectives of the IMI Fluid Power business.

The Danaher Corporation?

We all know the name Danaher, ranked #6 in the USA and #12 in the Rest of the

World: but then I really did not know what their main brands or products were, from a UK perspective. This has to be because of something that I usually praise - the use of business and trade names rather than US corporate branding. Danaher is a diverse corporation, ranging from dental equipment through environmental to electronic test and measurement.

In the Danaher Environmental Division there are several names that are familiar: Hach, for water analytical equipment and systems; and McCrometer, for flow measurement systems - those used for the water in oil flow analysis on subsea wells, for steam flow, and for irrigation metering. McCrometer also have developed into irrigation and crop management systems. Then another customer driven business is Gilbarco Veeder-Root, who make petrol pump delivery systems, but expanded into whole forecourt dispensing systems - for food, drinks, whatever. I guess somewhere they still make counters too.

In the Danaher Industrial Division we find Gems Sensors, making solenoid valves and light industrial fluid handling sensors. Plus in the Test and Measurement Division, a name that should be well known to all is Fluke, with portable equipment for electrical maintenance and testing, thermal imaging and vibration monitoring!

Another Spectris acquisition

Spectris, now quoted at #17 in the Rest of the World, and #12 in North America, describe themselves as supplying productivity enhancing instrumentation and controls: again they tend not to use the corporate name on the individual business branding. The last time they were quoted for their business activity in the **INSIDER** was when they acquired Omega Engineering in the USA: this was in the September 2011 issue. The company history was described in detail in a September 2008 article on www.iainsider.com.

In the last year, in September, Spectris acquired a UK company known as NanoSight, who supply particle size measurement instrumentation to the pharmaceutical, chemical and academic

Further management changes at E+H

As Matthias Altendorf, aged 46, takes over on 1st January at Endress+Hauser, as their third ceo since 1953, Bernd-Josef Schäfer takes over as the new managing director at Endress+Hauser Flowtec, the flowmeter specialists within the group.



Schäfer joins the company from the automotive supply and electronics group Bosch, where he was svp of engineering and manufacturing within the electric drives and controls division of Bosch Rexroth in Germany.

E+H Flowtec is headquartered at Reinach in Switzerland, and has other sites at Cernay in France, Greenwood in the USA, Aurangabad in India and Suzhou in China, plus recently Itatiba in Brazil.

E+H has announced the opening of new sales centres in 2014: these are situated in the United Arab Emirates, and in Algeria. The Abu Dhabi and Dubai offices in the UAE will integrate the E+H business previously handled by Descon Automation Control Systems, the E+H agent in the territory for over 20 years.

Yokogawa LNG order for Siberia project

The Technip and JGC consortium working on the Yamal LNG project has awarded a major contract for integrated control and safety systems to Yokogawa Europe. Three process liquefaction trains, located above the Arctic circle on the Yamal peninsula, in northwestern Siberia, will each have an annual production output of 5.5m tonnes LNG: this makes Yamal one of the largest resource projects in Russia. The development of this resource is being undertaken by JSC Yamal LNG, a joint venture between Novatek of Russia and Total of France.

Yokogawa will supply their Centum VP integrated production control systems, ProSafe-RS SIS, Exaquantum plant information management systems, and PRM device management packages to monitor and diagnose plant equipment, plus the required analytical systems, analyzer shelters, and operator training systems to be used on the Yamal project.

Yokogawa has a strong track record in supplying automation and control systems for use in many LNG installations around the world, with systems in use in 47 gas liquefaction plants and 42 LNG receiving terminals. In addition Yokogawa systems are used by, or are on order for, a total of 54 LNG carriers.

markets - Spectris bought the business for around GBP15m (\$25m) to combine it with that of Malvern Instruments, to benefit from the pooling of expertise and technology. In a different type of news item in July, the head of corporate development at Spectris, Jeremy Morcom, announced his return to Invenys plc as head of corporate development, from September - effectively to a rôle he had held prior to joining Spectris in 2006. During the last five years at Spectris, Morcom managed the expansion by acquisition programme for that company, spending \$900m on a total of 20 new businesses.

Remote HMI and SCADA is getting easier - maybe!

InduSoft, acquired by Invenys in October, has released a white paper discussing the current difficulties of implementing remote HMI connectivity, when the user can expect so many different styles of device to be able to use this access. The requirement is growing, because of the ever more sophisticated automation and HMI/SCADA systems in use within plants, and because of the ever fewer workers expected to manage this information. These employees must be able to access important HMI information from anywhere within the facility, or outside it.

How is access needed?



Remote access is typically achieved using the internet, whether the employee uses a laptop or a smartphone: but there is no simple single solution for all users and devices. Browser-based data works well for users with PCs or laptops, their screens match the plant HMI screen.

Such browser data is often unsuitable for handheld devices, tablets or smartphones, because the download times are long and the screen sizes do not match:

so users try to find inexpensive apps. But such apps are generally only readily available for iPhones and iPads. The users of Androids and other tablets, with variable screen sizes and operating systems, means that apps are less readily available, and if available, can be expensive.

White paper from InduSoft

The InduSoft white paper discusses these problems, and suggests that new developments might simplify this problem in the future, and reduce overall costs, by using such technologies as HTML5 and cloud computing to achieve more efficient remote access to HMI data. The more advanced HMI/SCADA suppliers are now developing their remote access applications in HTML5, taking advantage of this open standard to develop a multitude of web applications for many types of device at the same time.

Hosting the HMI/SCADA system in a cloud-based environment potentially enables users to reduce costs and achieve greater reliability, while being able to remotely access data from a very wide variety of hardware platforms over several types of network, ranging from hard-wired to cellular. Quite apart from inclusion of Androids and tablets, this also enables SMS text messaging and email alerts/alarms. For a copy of the InduSoft white paper, please see <http://tinyurl.com/qe4rpkw>.

New team for the **INSIDER**, to analyze the news in 2014

Operating in the Measurement, Control and Automation business sector, the **INSIDER**, edited by Andrew Bond and then Nick Denbow (from 2010), and the *Sound Off!* blog from Walt Boyes, have provided analysis and comment for many years - effectively as competitors. The difference between the two has always been one of style, perhaps based on geography, because the **INSIDER** is solidly UK based physically and culturally. *Sound Off!*, certainly from this Editor's viewpoint, has the American approach and style you would expect from Walt.

Modern communications and the Internet have changed everything today, in that most developments and press releases are available world-wide, once they are written. Even User Group conferences held around the World in specific locations, are reported with video interviews and Tweets available to everyone. These factors have increased the overlap between the publications.

An opportunity for change

As reported last month, Walt Boyes has left *Control* magazine and Putman Media, but is continuing to write his *Sound Off!* blog on his own account: Walt is keen to expand his activities and is joining the Editorial team of the **INSIDER**. Over the past year, Nick Denbow has been seeking a future development route for the newsletter, that would take away some of the workload involved in typesetting and administration, and also create further expansion opportunities. Some of this requirement has arisen from developing eye problems caused by glaucoma and the consequent increase in typos that can remain undetected. Probably this is more likely a result of 14 years in front of a PC screen!

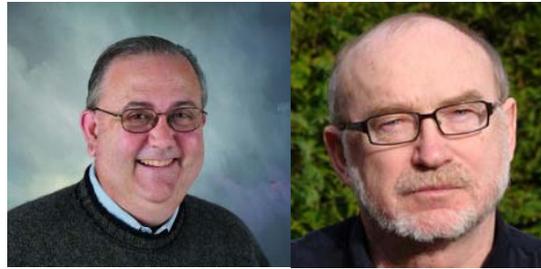
The result is that Walt and I have agreed that he and David Spitzer will become the co-publishers of the **INSIDER**, with Walt sending out the newsletter as from the February issue - next month!

Walt will be the Managing Editor, and your main editorial contact, based in Saint Louis, Missouri, and he will also deal with the subscription administration. This agreement also enables Nick Denbow to continue writing editorial reports for the **INSIDER**, as the European Editor (based in Winchester, UK) - maintaining the European contacts and approach established over the years by the **INSIDER**.

Walt has started his involvement with the **INSIDER** already, and provides some of the review articles featured later in this January issue.

The future **INSIDER** format

The monthly issue of the **INSIDER** subscription newsletter will continue as it has done for the last 17 years, and we will



*The new **INSIDER** editorial team looks a bit like a 'Good Cop' and 'Bad Cop' combination, but appearances can be deceptive!*

do our best to expand and improve the publication for the future. Walt and I believe that the format around the newsletter, with the associated websites and other services, needs to develop and change, to bring in new ideas and publishing techniques. But the **INSIDER** newsletter is set to continue, with both Walt Boyes and Nick Denbow as editors, writers, commentators and columnists throughout 2014. Hopefully the combination will bring both the European and the American view to the **INSIDER** news analysis!

Three A, M&C journalists faced a test - two failed!

Three journalists, an Englishman, an Irishman and a man from Galway, deep in the far west of Ireland, went on a press trip to Switzerland. Fairly competent at handling the complexities of automation and control systems, the air travel was straightforward. From there it was just a simple task to transfer downstairs to the railway station underneath the airport, to catch a train and travel the few stops to the destination. However, here was a challenge that was to test their capabilities in driving another automated system.

Undaunted by such trivia, all three stepped up, side by side, to face three of the robotic ticket dispensing machines, for there was a train due to depart in only 5 minutes.

The reckoning

Heading quickly for the platform with ticket(s) in hand, everything seemed OK:

Google to build robots

Google has acquired Boston Dynamics, the MIT spin-out company founded in 1992 that has been responsible for robots such as the Big Dog quadruped and Cheetah, the world's fastest legged robot.

Big Dog was developed as a robotic cargo carrier to negotiate all types of rough terrain, and in March this year it was revealed that the robot had been modified to handle and throw heavy objects. It uses the strength of the legs and torso to help power motions of the arm. Cheetah is a tethered robot, which has achieved a new land speed record for legged robots, at 28.3mph.

These and many others of the Boston Dynamics robots have been developed with funding from the DARPA (US Defense Advanced Research Projects Agency) 'Maximum Mobility and Manipulation' programme. Another robot under development, Atlas, is a six-foot humanoid that can perform tasks that might be needed in a disaster, such as clearing debris.

Another Google robot development company from Japan, Schaft, is aiming to develop robots for clean-up operations for environments such as that at Fukushima, after they realized robots had to do more than just go into places and look around.

Electrostatic hazards

A problem found on automated production lines for discrete components is the generation of a static electric charge, which can cause sparks, and other problems of dust adhesion and product handling. Keyence recently produced the SJ Series static eliminator, which uses a pulsed AC method to generate alternating positive and negative ions, which are spread or blown across the work area to neutralize any static charge on the surrounding surfaces.

Keyence quote that competing brands offer sensor-based control, to supply the ion polarity needed to neutralize the charge detected – which is quoted as more complex, and costly. This approach was the subject of a lot of research and experimentation on high flow rate deliveries of flammable liquids by Bestobell Mobrey and Prof Bright at Southampton University some 30+ years ago, to monitor the charge build-up in the liquid and then eliminate it. This looked at problems with low conductivity aviation fuel, and also investigated the hazard from the slopping of marine fuel in GRP tanks. With the growth of LNG transport, and the current investigations into North Dakota crude oil transport problems - and potential worries about such pipelines carrying Bakken crude - it introduces the need to consider that static generation, even from slopping in part filled tank cars, could be a factor.

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all three had spent the same amount of money. But sitting down in the train there seemed to be a difference between the three tickets, both in terms of colour, thickness, and number of pieces of paper – the man from Galway had two.

Now as perhaps the man from Galway was the only true European citizen, and more accustomed to foreign travel, the Englishman and the Irishman asked why he had two tickets? He explained that he did not really know how this had happened, but since the machines were tri-lingual, he had chosen to use German as the language on the screen to get some practice and brush up his German skill. So maybe this was a special system applying to German travellers, because the Englishman and the Irishman had used English as their screen language.

Judgement day

There was no need to worry, because all would soon be explained by the friendly ticket collector lady, who was coming down the train. First to show his ticket was the Englishman, and the lady did not seem very impressed, but also did not seem to speak much English.

There was some mention of an 80 Swiss Franc fine, which did not sound too bad, until a quick calculation showed this was around \$90. Apparently the Englishman had got the right ticket, but it was for use sometime in the future, and should have been stamped in the handy little time stamp machine on the edge of the platform, or somewhere, before boarding the train.

After much discussion to try to understand each other, ably assisted by the Irishman and the man from Galway, whose dialect the lady possibly found even more confusing, she decided the Englishman was just another tourist of limited intelligence and would be let off.

The last straw

In trepidation the Irishman offered his ticket, and the Inspector lady seemed pleased, in her own way – he had done everything right (possibly), and it seemed OK. Then of course there was the man from Galway, with his two tickets. They

were the same of course, because they were both half fare tickets for children.

There was not much conversation about this, the lady just wrote something unintelligible across the tickets, muttered something about that we should pay an 80 Swiss Franc fine really, and then maybe there was something about our competence in travelling on our own - and she went on down the train to seek help for her sanity.

New publishing venture for Gary Mintchell - on paper!

Last month the **INSIDER** reported that after ten years as the *Automation World* founder and editor in chief, Gary Mintchell, had left to start his new weblog, www.themanufacturingconnection.com. Well it seems Mintchell has slightly bigger plans than a weblog – you never can tell what these editors will dive into next!

In co-operation with another ex *Automation World*/ Summit Media colleague, Glen Gudino, they have taken up rôles as executive directors at Applied Technology Publications (ATP), based in Barrington, Chicago (Illinois), with the intention of renovating and re-branding the print (yes – paper) publication *Maintenance Technology*, currently edited by Jane Alexander and Rick Carter.



Gary Mintchell

Gary has a major interest and drive to focus on how manufacturing and production benefits can arise from the intelligent application of automation technologies, using the intelligent maintenance data now available, to improve asset performance, so the magazine will focus on 'Asset Performance' technologies rather than just maintenance: this is the new sub-head for the magazine.

The magazine also hosts the annual 'MARTS' conference (originally known as

the Maintenance and Reliability Technology Summit) – so this will be rebranded as MARTS – ‘Creating Operational Excellence Through Effective Asset Performance’, and is scheduled for March 19-20 in Rosemont, Illinois.

- It is quite a compliment to know that the regular Gary Mintchell page in *Maintenance Technology*, for some time, has been titled as the “Automation Insider”.

- Another blog that Gary is currently developing relates to the product physical asset lifecycle from engineering and design through to operations and maintenance, including management of change. This is currently being hosted on PhysicalAssetLifecycle.com.

PTC acquires IOT platform provider ThingWorx

The following article came from a news item on themanufacturingconnection.com.

At the very end of 2013, PTC of Needham, Massachusetts announced the acquisition of ThingWorx, creators of an award-winning platform for building and running applications for the Internet of Things (IoT), for approximately \$112m, plus up to \$18m earn-out. PTC say this positions them as a major player in the emerging Internet of Things era, enabling them to support manufacturers seeking competitive advantage as they create and service smart, connected products.

As part of PTC, ThingWorx will continue to help customers in a wide range of industries seeking to leverage the IoT, including telecommunications, utilities, medical devices, agriculture, and transportation, as well as an emerging partner network of IoT-enabled service providers. As increasingly sophisticated Internet of Things technologies become available, companies can not only track the flow of products or keep track of physical assets, but they can also manage the performance of individual machines and systems: hence Gary Mintchell’s particular interest.

Enabling better product performance

PTC will use the ThingWorx platform to speed the creation of high value IoT applications that support manufacturers’ service strategies, such as predictive maintenance and system monitoring, to complement PTC’s existing ‘service lifecycle management’ (SLM) and extended ‘product lifecycle management’ (PLM) solution portfolio.

“At ThingWorx, we share PTC’s vision for helping organizations fundamentally leverage the connected world,” said Russell Fadel, ceo and co-founder, ThingWorx. “We believe all industries, but especially manufacturing, will be transformed in the Internet of Things era. We are excited to pursue this broad set of opportunities with the resources and proven solution portfolio that PTC provides.”



Russ Fadel

- Mintchell also points out in his blog that ThingWorx co-founders Russell Fadel and Rick Bullotta are serial entrepreneurs, who earlier found success with Lighthammer, also a connectivity company, which they sold to SAP. That technology became key to SAP’s ability to move data from manufacturing systems to enterprise systems.

Metso introduces automated sewage dewatering systems

Sludge dewatering at wastewater plants possibly presents an opportunity market, taking advantage of the more efficient digestion of the higher percent solids sludge for energy generation – as well as reducing any required transport costs. Metso is now stepping into this area, presumably using technology developed on paper and pulp processing, although this offering is from Metso Automation, rather than the spin-off Valmet, which concentrates on paper and pulp. The Metso SDO is a Sludge

Stopping explosions by removing oxygen

A Scandinavian producer of biogas has selected the Michell Instruments XTP601 oxygen analyzers to monitor the oxygen levels in the biogas production processes at two sites in Sweden, to ensure both plant safety and gas quality.

Biogas produced from sewage and food/garden waste in these plants is intended for use as a transport fuel, and must be upgraded by processing to achieve a purity of above 95% methane. Typically, the operational level of oxygen should be no more than 0.5%, and a danger level for shut-down should be set at 4%. The XTP601 has alarms that can shut down the plant if oxygen levels approach this danger level, to ensure plant and personnel safety.

The instrument provides stable, accurate readings and is capable of measuring oxygen from 0-1% up to 0-50%, with the equipment approved suitable for installation in either hazardous or non-hazardous areas. The display has a touch screen interface to enable easy operation without needing to remove the lid. The menu allows easy access to standard information, plus also offers a graph showing oxygen trends over a user-defined time period; alarm history; and minimum and maximum concentration levels monitored.

INSIDER interviews at the ARC Forum

Walt Boyes and the new INSIDER team members will be on hand at the ARC Forum to answer your questions about our current changes, and explain the plans for further developments of the newsletter capability.

For the first time, the INSIDER will be conducting video interviews with the Forum participants, and these will be available on the INSIDER website and also on YouTube. A full report with both analysis and commentary will then follow in the March edition of this newsletter.

The topics where views will be sought will include the major area industrial cyber-security, including how to secure the 'Internet of Things'. We note that the thrust of the proposed sessions is primarily IT-focused, not plant floor and device focused, and that will give us the opportunity to ask some pointed questions about IT versus OT in security.

Inevitably ARC will plan to discuss Asset Lifecycle Management, Collaborative Automation Systems, and the rest of the usual suspects.

Dewatering Optimizer that can also reduce the normal quantity of chemicals consumed by 50%: it is applicable to industrial as well as municipal wastes.

The Metso TS total solids transmitter is a microwave system for measuring feed solids and dry cake percent solids. For lower solids content measurement Metso use the LS system, based on LED and laser technology. These sensors provide data to the advanced control application of the Metso SDO which controls and optimizes the non-linear processes involved in sludge dewatering. Metso says the SDO will improve dewatering efficiency by 50%.

- It is interesting that Alfa Laval, also from Scandinavia, are deeply involved in sludge dewatering systems, but through filter bed presses et al.
- The Metso spin off company, Valmet, has launched its own operation this month, with a new website at www.valmet.com. The company strategy is that 'Valmet develops and supplies competitive technology and services for the pulp, paper and energy industries'.

INSIDER to sponsor the ARC Forum, Feb 10-13 in Orlando

.....Walt Boyes reports:

It would appear that the ARC Advisory Group Forum held every February in Orlando, Florida has become the most prestigious meeting in the automation industry. This year, the **INSIDER** is a media sponsor of the event, and will have reporters there to bring readers in-depth coverage of the conference, and the hallway conversations that are, to some, even more important than the conference program.

The conference begins on Monday, February 10, with an entire afternoon of press conferences. **INSIDER** will be attending and reporting on those conferences. Beginning on the Tuesday, the conference opens with keynotes by Andy Chatha, president of ARC, Christine Healy from Statoil and Donovan Waller from Anglo American, followed by an executive panel consisting of Chatha, Mike

Caliel, the ceo of Invensys, and Sandy Taylor, the new senior group vice president for process automation at ABB, discussing the state of the industry.

Conference theme

The theme of the conference this year is "Industry in Transition: The Information Driven Enterprise in a Connected World," and as Andy Chatha's commentary says, "The business environment is increasingly dynamic and volatile. New business models such as the Information Driven Enterprise, Industry 4.0, Industrial Internet, and Connected Manufacturing are emerging. In addition to a host of potentially disruptive technologies, companies must also face rapid changes in government regulations, energy and raw material availability and fierce global competition."



Andy Chatha

ARC has put together a globally significant group of speakers from a wide set of industry verticals, ranging from Anglo American Mining, to Boeing, to Mallinckrodt Pharmaceuticals, and all the major automation vendors, of course.

New topics to be aired

ARC plans to introduce discussions on new areas like "additive manufacturing" a fascinating technique which is sometimes known as 3D printing. Companies are already using these techniques in low volume manufacturing builds.

New topics of interest include the Internet of Things and cloud computing, both having been adopted rapidly in the face of the reputation of the automation and process industries for being late adopters of technology.

Finally, and perhaps most importantly, the topic of workforce development comes up over and over again. How do we develop the workforce of the future to deal with the changing technologies they'll be asked to use, without really being sure what those technologies will be?

Siemens Analytical User Group Meeting in Houston

.....Another Walt Boyes report

Last month, the Siemens Process Analysis group in the US combined their customer advisory board meeting with their user group to produce what they called the “2013 Process Analytics Customer Event”. As might be imagined, it was held in Houston where many of the customers are located. And in order to point up the high technology aspects of process analytics, it was held at the Hilton Clear Lake — right across the highway from the Johnson Space Center, where a much reduced NASA continues to pump out technology advances as it seeks to *boldly go* out into the solar system.

Siemens has been pointing to their collaboration with NASA on the Mars Curiosity rover for a year now. The rover was designed with Siemens design engineering software. Their idea is to have some of that shine rub off on their other technologies, like process analytics.

At-line, online and NESSI

This writer and Bill Lydon of *Intech* were the only journalists invited to attend, but there were still some sessions where we were politely asked to withdraw! Plenty of of the rest were really interesting, and with some concurrent sessions, there was a hard choice between equally good topics.

The keynote was by Dr. Melvin V Koch, who is now principal scientist at CPAC, the Center for Process Analysis and Control (as well as affiliate professor of chemical engineering) at the University of Washington in Seattle. Koch was previously global director of analytical sciences for the Dow Chemical Company.

One of the drivers behind PAT (process analytical technology), Koch spoke about the rôle of at-line and online analysis in improving quality and productivity in chemical and pharmaceutical processing. He also gave an extended commercial about CPAC and a report on the state of NESSI, the new sampling system initiative. NESSI has been struggling to achieve critical mass for years, and it is still not clear why.

It would seem that having standardized analyzer sampling systems is a good thing, and since CPAC has always encouraged multiple vendors, nobody is trying to gain commercial advantage. That may be the rub. According to Koch, NESSI is alive, well, and growing in acceptance.

Remote maintenance

Two aspects of the breakout sessions were of particular interest. In the first, Siemens explained how they can do remote diagnostics and maintenance on analyzers anywhere in the world. Rick Brackett led the discussion on the remote performance inspection of analytical products and systems. According to Siemens, they're able to detect developing faults anywhere in the world, allowing maintenance to be performed when needed, rather than on a “run to failure” scheme.

The more telling comment was from Michael Hoffman of Siemens, who said: “We can do more with remote control of analyzer systems than our customers want us to.”

Novel applications for gas analyzers

Oil & gas and the HPI/CPI industry have traditionally been the Siemens Process Analyzer business' sweet spot. But two further breakout presentations showed other areas where their analyzers are improving very different processes.

Ed Rossino presented the sessions on gas monitoring in such new business areas - firstly discussing the use of the Ultramat 6 analyzer in air separation plants, to detect and control the removal of carbon dioxide from the separated fractions.

His second session described the SET BGA continuous monitoring system for biogas and landfill gas applications. BGA stands for BioGas Analyzer system, and is capable of simultaneously measuring up to four gas components: methane, carbon dioxide, oxygen, and hydrogen sulfide. These are the most important components of biogas and the percentage of methane is what is used to price biogas into the energy market.

The event was well attended by the Siemens' Houston customers, and, according to Bob Bartels, Siemens' media consultant, will likely be repeated in 2014.

Renishaw 3D metal printing on show

Core skills at Renishaw are in machine tool automation, motion control, co-ordinate measurement, calibration and position feedback. They also provide precision machining, but recently this has been extended to cover additive manufacturing to 'print' metal parts, in titanium and cobalt chrome – otherwise known as 3D printing.

Renishaw are sponsoring a major exhibition at the Science Museum in London which explores the future of 3D printing. This takes visitors on a journey through three key sectors in which the technology is driving innovation – industry, medicine and small-scale projects and businesses. It features 600 printed objects that illustrate the diverse applications for the technology, including replacement body parts, artworks, metal teeth, aeroplane parts, and the notorious 'Liberator' plastic gun.

Renishaw designs and manufactures its metal-based 3D printing machines in the UK, and also uses the technology to develop and manufacture its own products, including metal crowns and bridges for its dental business which are supplied across the UK and Europe.

The exhibition is supported by EADS, Renishaw, and the Additive Manufacturing & 3D Printing Research Group (3DPRG) based at The University of Nottingham.

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The Smart Manufacturing Leadership Coalition Meets

....An exclusive Walt Boyes report

Representing both Spitzer and Boyes and the **INSIDER**, I attended the SMLC board meeting in Chicago on December 13, 2013.

I have been involved with the SMLC for a number of years. In fact, Spitzer and Boyes LLC is one of the smallest active members of the coalition, as is Gary Mintchell's *The Manufacturing Connection*. Why does SBLLC belong? It is because, in my opinion, SMLC is one of the organizations that is way out on the cutting edge of what is variously called Industry 4.0, Smart Manufacturing, and other names that are all in danger of becoming the latest in buzz words.

Manufacturing needs a completely new metaphor. Right now, if you stand and look at a process or a discrete assembly line, what you see is control masquerading as worker replacements. That is, when it got too expensive to have a paid, experienced worker watching a gauge and turning a knob or valve, we put in a controller. Now we have groups of controllers, but essentially we are still automating the old human expertise and observation. Robots mimic human workers in discrete automation programs as well.

And as we did this, we "grew it like topsy". Nothing easily talks to anything else. Even flavors of the same protocol sometimes don't work together.

We have basically bumped up against the hard barrier of what the current manufacturing metaphor can do to optimize and make manufacturing more efficient and more cost effective... our only option has been to ship manufacturing offshore, which, itself, is bumping up against the ceiling that the former low cost of manufacturing countries aren't low cost anymore.

SMLC has defined an excellent roadmap, and established two test beds for what we are calling the Smart Manufacturing Platform. The idea is that the platform can be vendor neutral and company neutral, and can be used like a substrate onto which applications can be bolted. The metaphor is the app store and apps that Apple pioneered for the iPhone. "We are calling this the Smart Manufacturing Marketplace," said Peggy Hewitt, formerly of Honeywell and now doing marketing for SMLC. Another metaphor would be like NESSI, the new sample system initiative I discussed in the previous Siemens article in this issue.

"What SMLC doesn't have yet is a lot of end users who want to pioneer more test beds. We need them. What SMLC DOES have is grants from the US Federal Government to produce these test beds," said Jim Davis from UCLA, one of SMLC's founders.

"The Obama Administration is doing more than making "Mom, the Flag and Apple Pie" statements about the future of manufacturing. Take a look at www.smartmanufacturingcoalition.org and talk to SMLC about what you need, and what SMLC can do for you," said John Bernaden from Rockwell, SMLC's vice chair.

SMLC isn't an academic think tank. Although many professional organizations are on the board, such as ASQ, ASME, ACEE, SME, and universities such as UT Austin, Purdue, UCLA, NCSU and others, there are representatives from both automation vendor and automation end-user companies. Corning, Alcoa, Praxair, General Mills, General Motors, General Dynamics and other end-users attended along with representatives from Rockwell Automation, Emerson, Schneider Electric, Honeywell, and others. These companies are serious about creating a platform that would be vendor neutral, company neutral, and designed from the ground up as a secure platform for manufacturing.

● Also on display at the Siemens Analytical User Group meeting, beside the analyzer demos, was the Siemens Smart Electric Chopper. This custom motorcycle was built by Orange County Choppers and featured on the American Chopper syndicated television show. The chopper was manufactured using Siemens-controlled CNC machine tools. It was the first electric chopper, made entirely of recyclable materials, can reach speeds of up to 100 mph with 60 miles between charges. It can be plugged into a 110 VAC outlet, and has LED lighting provided by Siemens Osram. Siemens did a lively business in photographing attendees astride the chopper, but unfortunately, no actual driving was offered.



● Expect the next **INSIDER** on 11 Feb