June 2011 Interactive Wireless Webinar Series

Questions and Answers from live sessions

repeated questions/answers have been consolidated, and some initial responses were further clarified

Question	Answer
Does Wi-Fi interfere with WirelessHART?	Not at all. While both use the 2.4GHz band, WirelessHart is designed to coexist with other wireless signals, through channel hopping, retries, the mesh architecture. All of this coexistence occurs without any user configuration or engineering).
Regarding the $180,000 savings … was that achieved over the project or in the first year?	Over the course of the project.
Are there installations using wireless for control (vs monitoring)?	Sure, if the nature of the process can live with a scan rate of a few seconds, there is no reason not to use wireless measurements into open or even closed control loops. WirelessHART is simple, very reliable, robust and secure. Sometimes even more than the classically wired instruments.
Can you use wireless instruments in EEX zones? Including zone 0?	Yes, Smart Wireless instruments are intrinsically safe. You can even change the battery in the field. Just unscrew the cap, replace the battery, and close again. All in perfect safety.
Are you stuck with one manufacturer for instrumentation or can you mix and match from other suppliers?	IEC 62591 (WirelessHART) is an open standard. Emerson is one of many vendors with WirelessHART devices. All instruments are interoperable, because it is an IEC worldwide standard. Just in analogy to the HART protocol.
How is the wireless instrument powered? How are routine	Wireless instruments are battery powered. You work with the instrument exactly as if it were a wired instrument.

calibrations completed?	
What about power requirement for this wireless transmitter?	It is being supported by intelligent batteries that can last up to 10 YEARS depending on the application. The Emerson power modules are intrinsically safe, so they can be removed safely in hazardous areas without special work instructions.
What is the limit of gateway to collect only 100 points?	With shorter refresh rates the network can get 'overloaded'. You will have to balance refresh rate versus number of transmitters on 1 gateway.
Is there a battery diagnostics tool or alert when batteries are running low?	Sure, it is a standard alarm available.
How about update rate of the wireless signal?	Can be down to 1 sec, but bear in mind that this also eats battery life.... again, those two should balance.
What is the distance that you can effectively transmit over without degradation in the wireless network?	Standard 200 m/656 ft, with extended range antenna we've seen about 1000 m/3280 ft.
What is the scan time? Are the devices SIL rated?	Shortest scan rate is 1 s. There are no SIL ratings right now. The Smart Wireless THUM Adapter does not impact the 4-20mA loop of the wired device and can be used in SIL applications with minimal impact on the SFF.
Are solar powered / energy harvesting instruments available or being developed?	Battery technology is right now BY FAR the best solution, it is simple and cheap and competent (up to 10 YEARS). We continue to monitor alternative power sources, but most still require a backup battery and are often very costly.
How can you use this in very remote operations if it can only do 200m / 656 ft effectively?	Via Smart Wireless Solutions for Plant Network, a 5.7 GHz WiFi second wireless layer in a plant. This will be covered more later in the presentation.
Do you have any mobile configuration tool for gateway?	You could do it with a so called mobile worker, somewhat later in the presentation. If the Gateway is connected through a Wi-Fi Plant Network, the gateway configuration is available via any web-browsers with the appropriate security access.

Is the 5.7 GHZ WiFi built in gateway?	No, the Gateway operates on 2.4 GHz band. The output of the Gateway may be connected to a 5.7 GHz radio.
You referred to a distance of 1000m/3280ft. What was your power limit because the EIRP in Europe is limited to 10mWatt?	It is 10mW. We achieve 800-1000 m with it. While remaining within the law limits.
How is the receiving unit connected to the PLC? Multiple analogue IO or is it possible to use a single comms link? fiber/field bus?	Ethernet (Modbus, OPC), serial.
What is battery lifetime provided shortest scan time is enabled?	You will have to live with the fact that it can become around 1 year or even less. As said, it is balancing the needs with the lifetime of the battery.
For a project with many packages, what is the best practice to integrate all? Telling the vendor to install wireless instrument is possible.	All will depend on the scope of supply in total and per package and how wide the packages will be installed on site. If you have a concrete case, please ask our advice and we will help you.
Is WirelessHART secure? How robust is it with regards to other local wireless equipment, hand-held radios etc.?	It is very secure. To read more about Emerson Wireless Security, including a white paper, please visit the following webpage: http://www2.emersonprocess.com/EN-US/PLANTWEB/WIRELESS/TOPICSTOCONSIDER/Pages/Security.aspx
How much % do the wireless versions cost over a wired instrument?	While wireless instruments do cost more, the overall project cost including installation can be expected to be between 40-60% less than a wired alternative.
So, how much % is cost saving of the complete project?	This varies from project to project. To see an example, go to: http://www.emersonprocess.com/rosemount/solution/meassolcat/default.aspx

Have you been evaluated an example?	
The instruments available at present, do they cover level, pressure, temperature, proximity etc?	Yes. Please visit the following webpage to learn more: http://www2.emersonprocess.com/en-US/plantweb/wireless/products/Pages/Wireless-Products.aspx
If we are using the wireless device in the heat exchanger, what is the battery range for heat?	I would have to look it up in the manual, where it is described, but the main battery 'eaters' are refresh rate and type of measurement. Pressure and Temperature measurements consume nearly no power, pH on the contrary needs more power. The batteries have the same ambient temperature ratings as most devices: -40 to 85C.
What will the power pack capacity do if the ambient temperature at the installed location drops below 0, or below minus 20 or below minus 40 degrees Celsius (below 32, or below minus 68 or below minus 104 degrees Fahrenheit)?	It's obvious that life time of the power module is influenced (shortened) by extreme (hot or cold) temperatures. We are working on a lifetime calculator; temperature isn't the only influencing parameter. We have data and if you have a specific application, we will be happy to predict Power Module lifetime per type of instrument used in the specific environmental circumstances. A general rule doesn't exist. In general, continuous operation in extreme ambient temperatures (hot or cold) will impact the life of the power module 10-20%. However, most countries do not maintain extreme temperatures year-round, so the impact is less.
Can a wireless THUM be added to an existing wired device and used in combination with the 4-20mA output as a level of redundancy?	Yes it can, it is a perfect application for wireless.
Does Emerson have devices for Plant Network wireless solutions?	Yes, we do have Wireless Plant Network solutions. Our wireless platform = Wireless Field Networks (WFN) & Wireless Plant Networks(WPN). For more information, please visit the “Network Overview” on the following webpage: http://www2.emersonprocess.com/en-US/plantweb/wireless/topicstoconsider/Pages/NetworkOverview.aspx

Can a new battery module (as well as a THUM) be added to existing instruments? I'm thinking to prove that the 'hybrid' wireless network functions before removing redundant cabling.	The THUM scavenges power from the 4-20mA signal, so it is not battery powered. So no, you can't add a battery to an existing wired transmitter to make it wireless (there's nowhere to plug the battery in).
Does the THUM include a battery or does the instrument still require hard wired power?	The THUM sources power out of the analog wired loop so there are no special power requirements. To learn more visit the Smart Wireless THUM Adapter webpage: http://www2.emersonprocess.com/siteadmincenter/PM%20Rosemount%20Documents/00803-0100-6139.pdf or, to access the product brochure directly, go here: http://www2.emersonprocess.com/siteadmincenter/PM%20Rosemount%20Documents/00803-0100-6139.pdf
Is there any product for controlling the control value... like DVC6000 in wireless?	The DVC can be equipped with a THUM, and a fully wireless DVC7000 is in the pipeline. Exciting times for us, valve people.
What is a THUM Adapter?	The Smart Wireless THUM Adapter is a screw-in device that fits on any HART v5 or higher wired device, and makes any/all of the HART variables available wirelessly. This is particularly useful for accessing stranded diagnostics, but can also be used for the primary measurement variables.
Does a THUM and wired work at the same time?	It does. The operation of the analog loop isn't impacted by the wireless retransmission of data by a mounted THUM Adapter.
What is the max distance between the Instruments and the control system?	It depends on what kind of antenna you have. See future slide in this presentation. It also is depending on your application. A dense structure could shorten communication distance. With Extended Range antennas, devices can be approximately 800m from their nearest neighbor. However, since devices communicate on a mesh network and communications "hop" through other devices, a well formed network can go several km!
Is the wireless gateway wired straight into the Delta V controllers or how are the signals taken into Delta V?	From Delta V 10.3 you can install the gateway straight to the control network. Starting from S-series you will have a zone 0 gateway possibility, fully redundant.

Wireless for monitoring is one thing, what about using wireless for control? If you're really going to eliminate all the wiring structure, it must be capable of doing both monitoring & control.	Sure control with WirelessHART is possible, if the nature of the process can live with a scan rate of a few seconds, there is no reason not to use wireless measurements into open or even closed control loops. WirelessHART is simple, very reliable, robust and secure. Sometimes even more the classically wired instruments.
New technologies are difficult to introduce in our market, clients are not very likely to start proving something new in their plant; so what projects, plants, platforms, clients you have successfully implemented the wireless technology and where we can find information about it?	WirelessHart can be used in every industry, every plant, and you can with it start anywhere. In existing installations where you want to add measuring devices but you're short in junction boxes, cable trays, spare cables, I/O on the DCS needs expansion,..., Wireless will be a very attractive and cost effective solution. Also in new plants, wireless must be considered since you can realize important savings in engineering, equipment, installation, start-up, and other costs. We have over 2100 installed sites in every industry. To view customer references, visit Emerson's Smart Wireless website http://www2.emersonprocess.com/en-US/plantweb/wireless/applications/Pages/Wireless-Applications.aspx
Are there any concerns with using wireless on safety shower apps? I.e. safety applications? Are these considered critical apps?	No, safety showers are a great application for wireless. Most of the time we don't know in the control room that a safety shower has been turned on. We have many customers that are using wireless on safety showers. To see just one example, click on the following link to read a customer reference: http://www2.emersonprocess.com/siteadmincenter/PM%20Central%20Web%20Documents/SmartWirelessApps_Boise.pdf
With this technology, does it have delay in the data transition over the wired network? Is this a problem?	The wireless data is communicated back to the controller via OPC or Modbus. This transmission speed is similar to that of remote I/O.

How easy will it be to interface the gateway device with non Delta V control systems?	Very easy! The Smart Wireless Gateway can be integrated via Modbus or OPC to any host system.
What Mfr's other than Emerson support Wireless Hart?	Most of the Instrumentation companies producing Hart devices also support and are member of the WirelessHart Foundation. Visit the HART Communication Foundation's website to see a list of members and to learn more: http://www.hartcomm.org/
Typically how is the gateway connected to non Emerson control systems?	We have a number of possibilities for integration. OPC or Modbus via TCP/IP and the modbus via serial as well. I have integrated to a lot of systems already. It has never been a problem with these well know possibilities.
Does this equipment require line-of-site installation or can it be used in large buildings?	Line of sight is not a requirement, but the denser the installation is, the distances between the nodes in the mesh network will become shorter. And yes, this technology is usable in large buildings.
How about the update rate of the wireless signal?	The WirelessHart protocol allows update rates of 1, 2, 4, 8, 16,... seconds. Depending on the manufacturer of Wireless devices, a low limit might be in place. Emerson Process Manangement goes down till 4 seconds today and we will launch the 1 sec update rate during this summer.
What are the security implications of using wireless? Have there been any incidents where wireless technology was compromised and control systems were affected?	Two questions. First Security. To assure you all communications wireless at the devices side and wired at the control system side are fully secured you can make this as secure as you want. Emerson's wireless systems have an Achilles certification as well as FIPS 197 certification for security. There are no IP addresses in the devices and all data is fully encrypted. There have been no reported incidents. For more information on security, including a white paper, please visit the following webpage: http://www2.emersonprocess.com/en-US/plantweb/wireless/topicstoconsider/Pages/Security.aspx
What about the ISA100.11a standard?	ISA100 is a group trying to collect/design standards on wireless. *Wireless*HART has earned international standard status (*IEC 62591Ed. 1.0, EN 62591*) and has proven its ability to fulfill users' requirements for simple, reliable and secure wireless communication in thousands of applications working in concert with millions of installed HART devices and systems worldwide. For more information, see: http://www.hartcomm.org/hcf/news/pr2011/WirelessHART_achieves.html

How easy is it to integrate the WirelessHART into Honeywell system? Do you have any documents showing how to do it?	The Gateway has several output options like Modbus RTU over RS485, OPC, and some others. Depending on the type of DCS, the data can easily be transported to that DCS. And yes, we have documented solutions for Honeywell DCS's.
If we already have devices wired and we want to convert them in wireless without changing the device, how can we do that?	If your devices are Hart/smart wired ones of a Hart rev 5.0 or higher, adding a THUM Adapter to the device will make all info contained in your device, available to you.
Power - do you have actual field experience of customers using power scavenging? What kind?	There is extensive research being done. But at this moment in time, with the enormous and rapid technology of battery technology it is BY FAR the best solution for wireless instruments. Lifetime is expressed in YEARS for a simple battery.
Do the Positioner Switches and Position Transmitters use Battery Power?	We have 2 types of Wireless position monitors; the 4310 handles on/off valves and the 4320 handles control valves. Both are powered by a Smart Power module.
Will the extended range transmitter have a different power life span as compared to the normal ranged transmitter?	No, the same lifespan. The antenna sends out the same power but the propagation is different.
What does it mean by 100 points? Does it mean 100 devices?	Correct. A gateway can connect a maximum of 100 wireless devices.
What is the distance that you can effectively transmit over without degradation of the wireless network?	Standard antennas go up to 200-250 m. With an extended range antenna we can reach up to 800 m. I have even seen a project with just over 1000 meter (across a lake).

Are the devices SIL rated?	According to 61511 SIL loops must be wired. There are no SIL ratings right now. The Smart Wireless THUM Adapter does not impact the 4-20mA loop of the wired device and can be used in SIL applications with minimal impact on the SFF.
What is HFAT?	This would be the Hardware Factory Acceptance Test. So your projects hardware will be tested in house with your supplier. Next would be shipping this to site and really install everything and then test it again on Site. The Site Acceptance Test. SAT.
How safe is it to use Wireless in Hazardous gas plant, where mobile and other wireless items are banned due to probability of Fire Hazard?	Emerson Smart Wireless devices are intrinsically safe, so can be used in ATEX Zone 0. Even the batteries are i.e.: you can change them in the field. Open the housing, take the old battery out and put a new in.
Instrument and battery are intrinsically safe but what about the high frequency signals that may cause fire?	This has been researched. The power output of our devices is 10 mWatts. This is far below the amount of power you need to ignite a explosive mixture.
What is the difference between Wireless Gateway and Wireless I/O Card (WIOC)? Which is better?	The WIOC is effectively a gateway exclusively for DeltaV v11 and beyond. It has a number of advantages over a conventional gateway, most obviously being redundant in the field and separately in the system. It's also native to DeltaV and communicates directly to the system LAN without any need for other protocols. If you don't have DeltaV v11, then you need to use a 'normal' gateway and use some sort of intermediate protocol to communicate between the wireless infrastructure and the DCS - but interesting to note that Emerson offers a redundant gateway option.
In terms of costs, which is the different among wired devices and wireless devices?	Depending on the type of measurement and comparing "apples to apples" performance wise, a wireless device will cost more than a wired device. However, the savings that can be reached with wireless surpasses the price adder so you achieve cost savings in comparison.
What's the comparison between Wireless and Fieldbus?	Fieldbus is still a wired solution with the advantage of having multiple instruments on 1 segment connected with each other and the DCS by a 2-wire system and digital communications. Wireless does the same but WITHOUT wires until the Gateway. The output of the gateway is RS485 modbus RTU, OPC,..

Does Emerson have a redundant 1420 gateway?	The Gateways we deliver today are fitted for redundancy, the redundant feature will be launched during this summer; it's a question of very little time. We are already accepting orders for it.
With wired sensing and control, it is not likely for the cable to go bad, and disrupt connection. So, on a similar note how reliable is the wireless connection. And also, if connection is disrupted how much potential downtime (general) should be expected?	With redundant gateways, the system availability will also be >99% and will allow a "hot" failover from one gateway to another in less than 1 minute. Information reliability in an IEC 62491 (WirelessHART) mesh network - which does not require line-of-sight - is greater than 99%, so the same values as wired devices. Just like it is not likely for the cable to go bad, it is also not likely for the WirelessHART signal to go bad. And in the unlikely event there is a problem, repairing a cable breach can take days, whereas restoring wireless communication can be done within minutes.
It appears we can have 100 devices per gateway. Any limit on the number of gateways?	No limits on the number of gateways.
Question on quoted savings for tank farm example. I understand wireless radar requires external power.	Right now, the radar device needs to be powered locally and a Smart Wireless THUM adapter is added to communicate wirelessly. You could call it hybrid wireless. Just wire it up to a local power source (which can be done inexpensively) and do all communications over WirelessHART.
What protocols use gateways?	You can use Serial RS485 RTU modbus on a two wired connection. Also available is the Ethernet connection using OPC over TCP/IP or Modbus Protocol over TCP/IP. I also used converters a few times to go to Profibus DP.
In big projects, the wireless deployment will represent maximum 40 %, are there any benefits in addition of the total cost for the	There may be other benefits from the wired portion of the project that come from selecting wireless, mainly around things like UPSs, reduced footprints, reduced HVAC etc. But probably the most significant impact is that the wireless infrastructure is a great contingency and alternative for any surprises or problems that you could encounter during the construction and commissioning phases of the project.

wireless over the wired portion of the project?	
When working greenfield, and determining wireless location from drawings or 3 D model, how often are location errors experienced, upon entering construction/commissioning stage? (In your experience)	We do have a design tool within our AMS Device Manager called "Wireless Snap-on" which allows you to take in your drawings with the scale, locate the devices on the process applications, introduce allowed distances between nodes,.., helping you to create a 'best practice' network. Once installed, you can turn this into 'Live" and see the necessary communication channels & alternate ones with their signal strength and more. This way you limit errors to almost nil.
It's clear from the examples that not all loops in a project can be wireless, so are the criteria to define if a specific loop can be wireless or not? I'm not thinking in terms of cost, savings in time, commissioning, I'm thinking in terms of the purposes of the instrument loop like supervision, control, safety, etc.	These criteria are really dependent on your local philosophy and preference. There are relatively few things that you shouldn't or can't use wireless for - the most obvious one is that you need to be able to get the scan rate fast enough if you want to use a measurement in closed loop control. But even in this case it's a trade between speed and battery life, which is a balance that needs to be struck based on local context and circumstances.
What about the risk of gateway failures? What types of gateway failures have been experienced?	Gateway failures, once they are up and running, are very rare- no bad experiences. Emerson Process Management will soon launch the redundant feature. The Gateways delivered today are already fitted for that purpose from a hardware side.

What are the security implications of having 2 different plants within the same vicinity and using the same wireless protocol?	None, each network stands on its own with a "Network ID" and "Join Key". The latter can be common for all the devices of the network or specific per device within that same network.
Can a gateway be connected to a standard PC, then used to monitor the inputs?	Yes, the gateway has a web browser, so plug in the Ethernet cable and open the internet explorer. After addressing the gateway with IP addresses, and of course you need admin rights-configurable-, you get full access to the Gateway's content.
Does adding a THUM affect the entity parameter characteristics/IS rating of the loop? (i.e with regard to the barrier/device characteristics)	No, your loop will remain IS. The only thing you have to watch is that the THUM Adapter will create a small Voltage drop, specified in the literature, and your power supply must be covering this.
Is there any instrument that can be used to test the signal strength of the wireless network at various points on the plant?	In general, we don't recommend RF testing of the network because the RF environment is continually changing. Any testing is likely to be completely different a few hours later with different EMI sources present, different physical obstacles present, different weather conditions. The AMS Wireless Snap-On contains our best practices which can be used to ensure that the network will work reliably. Once the network is running, diagnostics are available in AMS Wireless Snap-On and the gateway to show signal strength and path stability of the network.
Is there any plan to apply for safety certification for wireless, for us in safety critical loops? (TUV)	No. SIL procedures prescribe the measurements need to be wired.
Any mining applications?	I don't know all application active today. Please have a look at our customer references, several of which are from metals and mining industries -- Leaching pads, vibration monitoring of conveyor belts, waste water monitoring, temperature monitoring of furnaces: http://www2.emersonprocess.com/en-US/plantweb/wireless/applications/Pages/Wireless-Applications.aspx
Is the wireless device self powered?	Yes, they come with a power module.

Do you have already the statistics of what the most frequent problem happened with wireless instrument?	Yes, we have some of them, but since problems are extremely seldom, it will take quite some time to build a database. We find that the most frequent issues occur from not following the simple network best practices. To see the best practices guide, click on the following link: http://www2.emersonprocess.com/siteadmincenter/PM%20Central%20Web%20Documents/00840-0400-4180.pdf
What is the reliability estimate for the wireless network?	Greater than 99% data reliability To learn more about reliability, please visit: http://www2.emersonprocess.com/en-US/plantweb/wireless/topicstoconsider/Pages/Reliability.aspx
Problems with WirelessHART?	No problems with WirelessHART. I'd like to add here that in most cases where we are called in to solve issues, there is no problem, but maybe a configuration issues or issues with the control system…
Is smart wireless THUM adapter works with any instrument brand?	Yes, it will work on any HART device.
Where can I see the list of analyzer instrumentation which can work with THUM adapter?	Whether it is analyzer equipment or other instrumentation, the use of the THUM Adapter is possible if the wired Hart/Smart device uses wired Hart communication of level Rev 5.0 or higher. This level was implemented early the nineties last age.
Does the field gateway come with redundancy?	Version 4.3 will have redundancy. Any Version 4.x will be able to be field upgraded for redundancy
Is there an option on having a THUM for non-HART instruments?	No, that option isn't available, but you can use one of our temperature transmitter's 248/648/848TX for analog inputs and these will convert your 4-20 mA into a Wireless PV transferrable to the Gateway.
After installation and start up, can the battery life be determined/estimated ?	You have access to the remaining voltage of the battery and can set alerts. The transmitter has a "HEALTHY" status that we recommend monitoring in your system. This will alert you in advance when the battery is becoming depleted. The battery voltage is also reported.
Next to monitoring, we are looking at WirelessHART for open loop control for slow non-critical processes. When will a redundant gateway be	Redundant Gateways will be available end of July 2011.

available?	
What do we mean by redundant gateways? Are 2 single gateways connected wirelessly to the mesh, and then wired to the DCS, considered redundant?	2 separate gateways are connected via Ethernet and can see the same mesh of field devices - if one stops working the second automatically takes over.
Typically, do wireless devices inside a building, require a remote antenna, to overcome any building attenuation?	No. Wireless devices usually work fine inside a building.
Does this include the path needed to get outside the building, to communicate with the mesh?	Depends on what the walls are made of but often the devices are mounted outside and the gateway is mounted inside a building and they still communicate fine - it is application dependant.
How about the update rate when we add more instruments in the network?	The devices will continue refreshing the data with the configured update rate.
How can a wireless sensor communicate over much longer distances, say 2-5 km (1 – 3 miles) to a remote site from the mill?	We can do data-backhaul from a remote site using radio-links operating on Wi-Fi - typically the max distance between antennas is 1.5km (~1m) - longer than this and we would need repeaters.
Can the wireless signal be affected by the weather or the material that is around the	No. when you are talking about short distances (100's of meters) and the frequency we are working at, the weather doesn't affect the signal.

device?	
The redundancy with wireless is at same level as the wire signal or wireless is better?	This will depend on how you set-up both wired and wireless systems - redundant power supplies, redundant IO etc...
What is the minimum cost for installing a wireless system?	Ask yourself how much you will be making by better quality, less rework, higher availability more efficient maintenance. But I can't tell you what the cost is. Depends on amongst other exchange rates. So please contact your local Emerson representative he can get into details with you for your specific case.
Is IEC 62591 now the same as ISA 100.11a?	No, they are different To learn more about standards, please visit: http://www2.emersonprocess.com/en-US/plantweb/wireless/topicstoconsider/Pages/Standards.aspx
Can you install a remote antenna to a transmitter to put the antenna outside of a building?	Yes that is possible.
Can you run also extensive control valve diagnostics (step response, signature, etc...) over WirelessHART?	Yes, of course. WirelessHART is nothing less than HART, but without the wires. If your control system is not HART capable for example, WirelessHART is the obvious enabler for finally using those hidden and thus unused, valve diagnostics.
So I only have to equip my digital valve controller with an adapter?	Yes, just as simple as that. Within a few minutes, it communicates to the gateway.
How fast the display update rate by using Emerson wireless?	The display updates as often as the update rate of the device - up to every 1 second.
After installing THUM, is it no problem to disconnect the wire of the instruments?	The THUM Adapter is connected to a wired device to get the HART info out wirelessly but the device continues to be loop powered and has a 4 to 20mA signal.