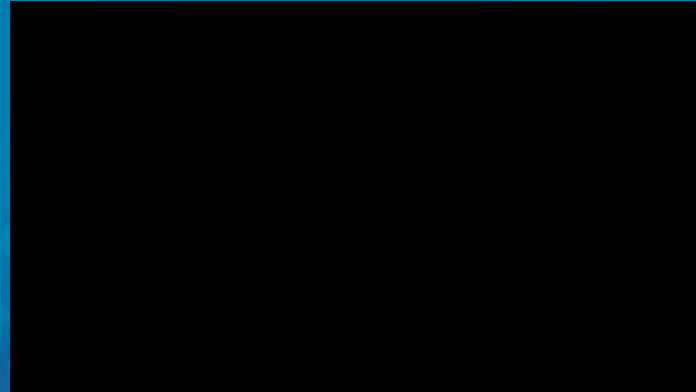




Achieving Digital Transformation and Providing Actionable Information for Sound Business Decisions



Russell Manson



Who am I?

- Wrote my 1st line of code in 1981
- Work experience
 - Home construction (Laborer/Carpenter/Mason)
 - United States Air Force Veteran (Military)
 - Caterpillar/Solar Turbines (Manufacturing)
 - CollegeClub.com (Social Media)
 - i2 Technologies (B2B)
 - 24 Hour Fitness (Health & Fitness)
 - Sony Online Entertainment (Entertainment)
 - LPL Financial (Investment & Brokerage)
 - Nexus Biosystems (Biotech)
 - General Atomics (DOD Contractor)
 - General Atomics Aeronautical (DOD Contractor)



What is General Atomics?

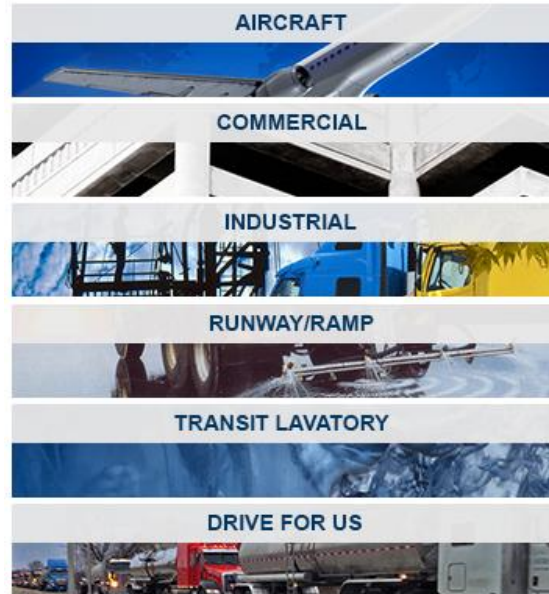
- Defense and diversified technologies company founded in 1955 as a division of General Dynamics
- Operates on five continents
- Occupies more than 5 million square feet of Engineering, Laboratory and Manufacturing facilities and comprises over 15,000 employees
- Headquarters in San Diego, California



What is General Atomics?



- World leader in deicing technology



What is General Atomics?



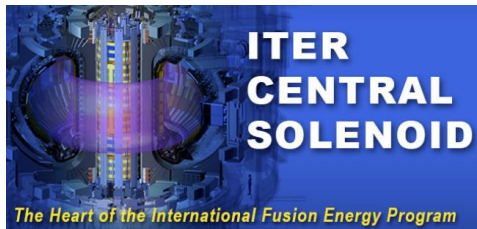
- Enzyme technologies to develop diagnostic reagents which can be used on most automated chemistry analyzers in user-friendly formats
- Products include test kits for diagnosis of cardiovascular disease, liver disease, cancer markers, renal disease, diabetes, and electrolytes



What is General Atomics?

Energy Systems and
Products

- Nuclear Engineering
 - Fission Reactor Design
 - Radiochemical Engineering
 - Nuclear Mechanical Engineering
 - Magnet Technologies



- Nuclear Fuels
 - Converdyn
 - Heathgate Resources
 - Nuclear Fuels Corporation
 - Rio Grande Resources
 - Quasar Resources
 - Cotter Corporation

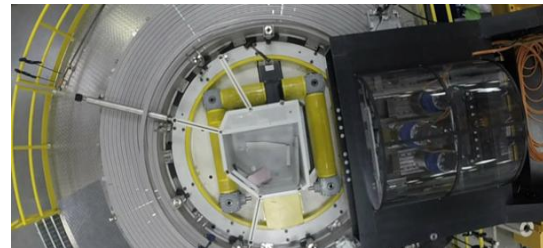
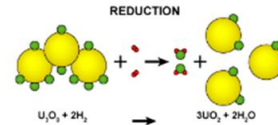


What is General Atomics?

Energy Systems and
Products

- Fusion Technologies
 - Tokamak Operations and Engineering
 - Plasma Control
 - Microwave Technologies

- Advanced Materials
 - SiGA™ SiC Composite
 - High Neutron Reflector Materials



What is General Atomics?



• Dresden Germany



performs commercially characterized and marketing oriented consulting and support services for the companies of the group. The Aviation Business Unit coordinates all activities for GA-ASI in Germany.



Innovative manufacturer of and service provider for special rail vehicles – ranging from production via modernization and maintenance up to 24/7/52 in-situ service.



Leading development and application centre in the fields of environmental monitoring, exploration and process technologies for water and mineral resources.



performs environmentally friendly and special innovative services in the construction and environmental sector and operates an independent chemical-analytical laboratory.



Develops, produces and assembles voluminous prefabricated reinforced concrete elements for supply and disposal, environmental protection, traffic and communication.



environmentally friendly and innovative disposal of conventional munitions and explosives at 97% reuse of the components in the civil market.



is active in the field of demilitarization of conventional munitions and explosives and uses the process heat energetically.



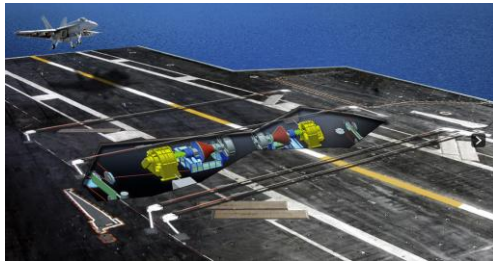
develops and manages properties of the Spezialtechnik-Gruppe Dresden.



What is General Atomics?

Electromagnetic Systems Group

- Advanced Arresting Gear (AAG) System Capacitors
- Electromagnetic Aircraft Launch System (EMALS)
- Gulftronic® electrostatic oil separator systems
- Space Systems and Technologies
- Power Management and Energy Storage Technologies
- Missile Defense Systems – Railgun platforms and technology
- Radiation Monitoring Systems
- TRIGA® research reactor control systems



What is General Atomics?



- Remotely Piloted Aircraft (RPA)
- State-of-the-art digital Ground Control Stations (GCS)
- Lynx® Multi-mode Radar and the highly sophisticated Claw® sensor payload control and image analysis software
- Headquartered in Poway, California
- Spans multiple facilities in the San Diego area and in the Mojave Desert, as well as adjacent to various customer locations around the U.S.



Business Challenge

- DFARS – Defense Acquisition Regulations System
- ITAR - International Traffic in Arms Regulations
- IT
- Manufacturing VLAN
- Vertically oriented organization with independent directions
- Many areas of data opportunity
- Data being sent offsite to 3rd party systems
- Tags, Tags, Tags (CNC PLC Siemens 840D)

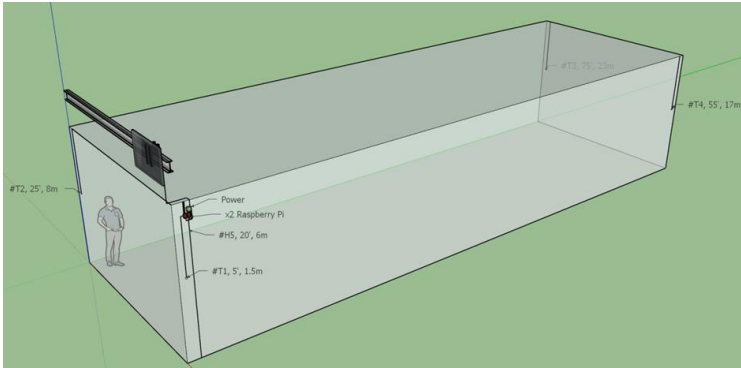


Business Challenge

- MCCI – Manufacturing Center for Continuous Improvement
 - Operational Technology Group
 - Seven people
- Proof of Concept (POC)
- Paint booth temperature and humidity conditions need to be within specification before aircraft coating operations can begin.
- Time is wasted having to manually check/inform of environmental conditions
- Data is being sent offsite to 3rd party system reducing time to react to abnormal temperatures

What we started with

- Four paint booths
- Eight Raspberry Pi 3's, 14 PT100's, Four AM2315, Four 55" monitors, Four power receptacles, Eight Ethernet drops
- FogLAMP 1.3



What we implemented

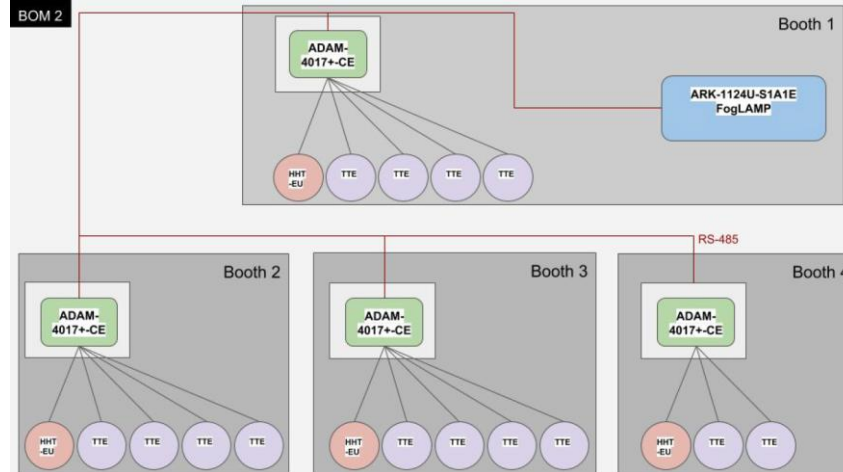
- Four paint booths
- One ARK-1124U Gateway, Four Hoffman NEMA enclosures, 14 Dwyer RTD temperature sensors, Four Dwyer humidity sensors, Four ADAM 4017+ modules, Four 55" monitors, Four power receptacles, One Ethernet drop
- FogLAMP 1.5

DIANOMIC

FOGLAMP

ADVANTECH

Enabling an Intelligent Planet



PI System allows display of real-time temperature & humidity on large monitors



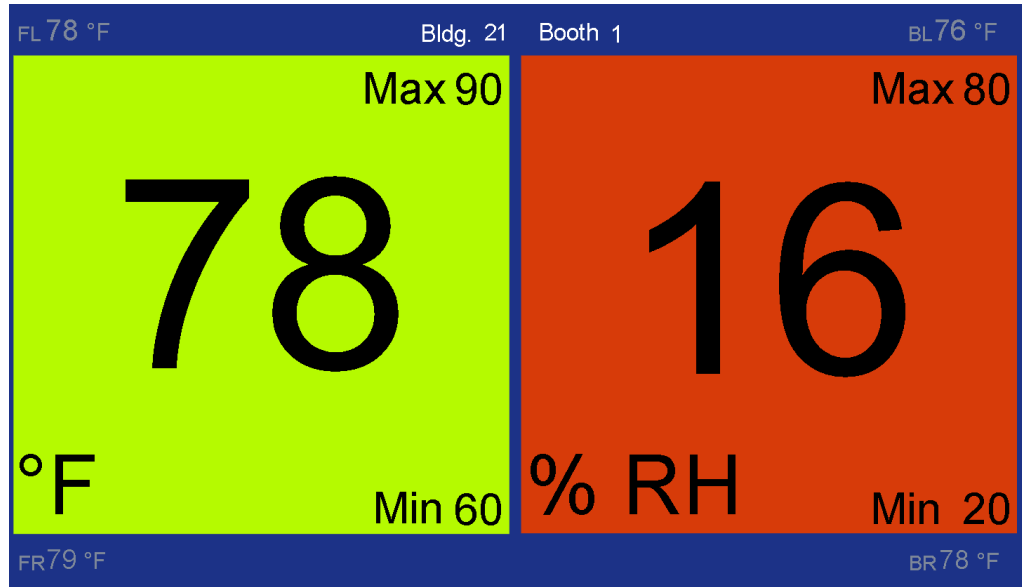
PI Vision enables visual cues based on multi-state configurations

States

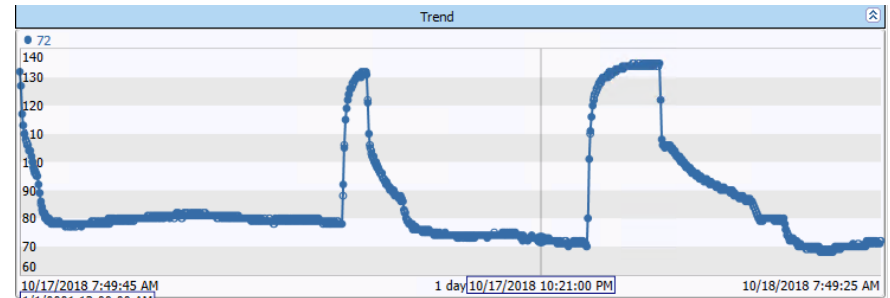
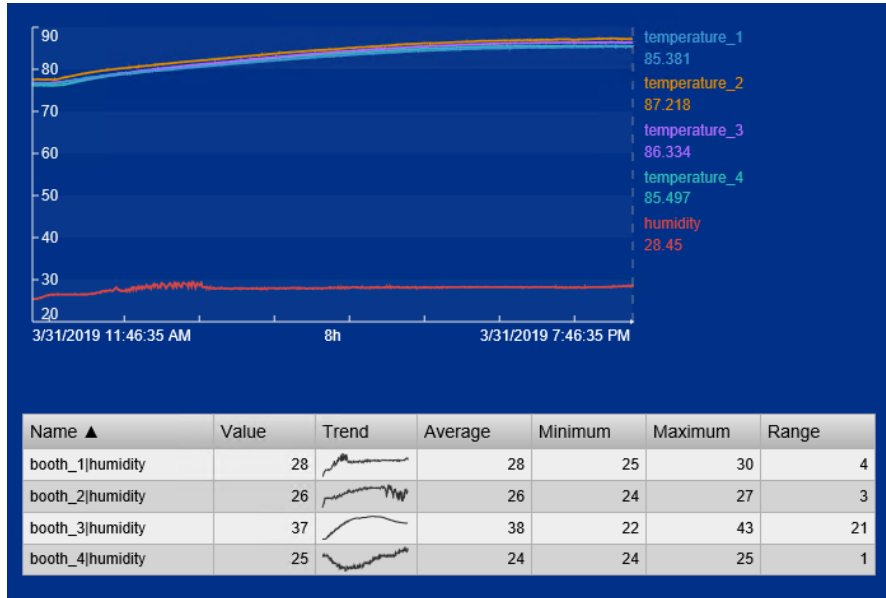
Bad data

Add

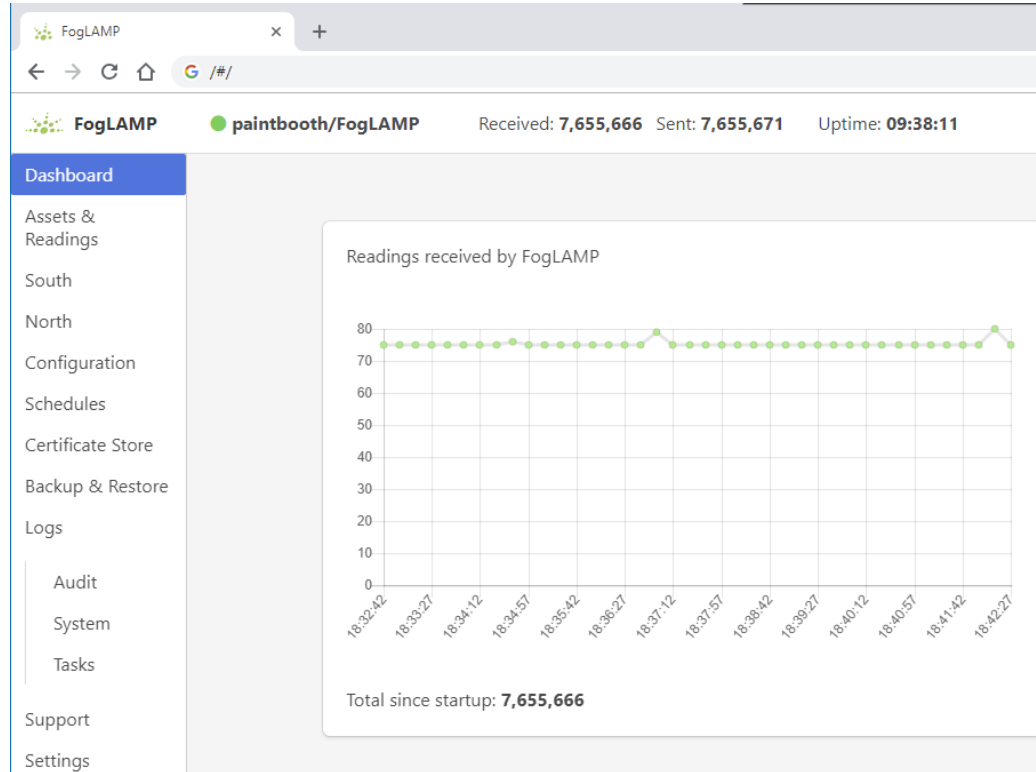
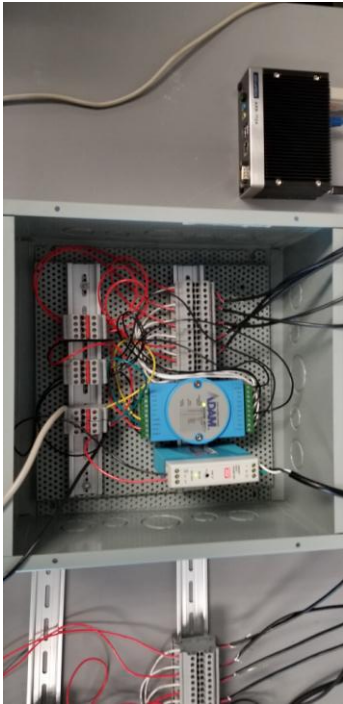
160	x
95	x
90	x
85	x
65	x
60	x
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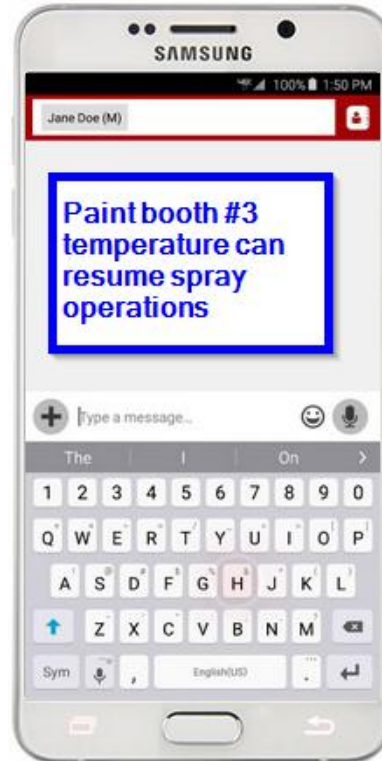
PI System allows analysis of data that was not previously available



FogLAMP 1.5 GUI makes it very easy to configure our edge devices



Currently working with Event Frames and Notifications to send alerts autonomously



Results Obtained and Business Impact

- Technicians receive immediate visual feedback via PI Vision monitors when environmental conditions are met so spray operations can resume.
- Manufacturing engineer can view trends via PI Vision to determine how long paint booths are heating up or cooling down to better plan cycle times.
- Analysis can be provided from the Data Archive to compare temperature readings across time to determine cost justifications such as insulation or cooling devices.
- (Future) Event Frames monitor critical parameters and Notifications can be quickly sent communicating that conditions are moving beyond specifications.

Other Opportunities (Ah-ha moments)

- Machine connectivity/data collection via various technologies (Modbus, OPC UA, OPC DA, MQTT, MTCConnect, FOCAS, WAGO, Proprietary)
- Building environment reporting/notifications
- Thermal Chamber monitoring/analysis
- Autoclave monitoring/analysis
- Machine Learning, Predictive Analytics
- IT Monitoring

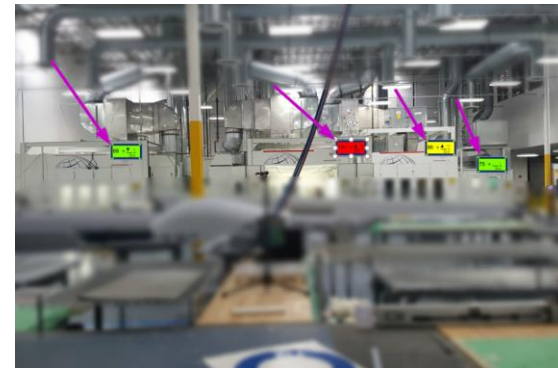


Some lessons learned

- Management, allow your people to immerse in this technology
- Budget for training
- Involve Cybersecurity early in the process
- Foster an open dialog with your system integrators
- Expect organizational process delays
- Communicate often
- Hidden requirements
- Drive or you will be Driven

General Atomics Aeronautical

Achieving digital transformation and providing actionable information for sound business decisions



CHALLENGE

Provide immediate feedback of environmental conditions within paint booths to improve process and safety

- Delay in process determining when the environmental conditions correct
- Unable to determine past conditions or when they occurred
- Interfacing with offsite data collection agencies time consuming

SOLUTION

Using the PI System we are now ingesting paint booth data into the Data Archive to track temperature/humidity across time and compare to coating quality standards

DIANOMIC

FOGLAMP

- PI Vision shows when temperature and humidity are correct
- AF provides configuration for multi-state events
- FogLAMP provides flexibility and extensibility

RESULTS

Technicians can determine correct temperature conditions from anywhere in the area decreasing wait times. Manufacturing engineers can monitor results remotely

- Able to detect over temperature conditions
- Provide data to determine if insulation retrofit is needed
- Immediate notification of out of tolerance conditions

Thank you



- Russell Manson
- Integration Automation Architect
- General Atomics Aeronautical
- russell.manson@ga.com

Questions?

Please wait for
the **microphone**

State your
name & company



Please remember

TO DOWNLOAD
APP, SEARCH
OSISOFT



謝謝 KEA LEBOHA
 TAPADH LEIBH 고맙습니다
 БАЯРЛАЛАА MISAOTRA ANAO
 DZIĘKUJĘ CI NGIYABONGA TEŞEKKÜR EDERIM GRACIES OBRIGADO شكرا SALAMAT
 KÖSZÖNÖM DANKIE TERIMA KASIH DANKON TANK TAPADH LEAT
 СПАСИБО МУЛТUMESC
 PAKMET CIZGE GO RAIBH MAITH AGAT OSIssoft. HVALA FAAFETAI
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 ТИ БЛАГОДАРАМ TI БЛАГОДАРАМ HVALA ХВАЛА ВАМ
 TAK DANKE MAHANSANID TEŞEKKÜR EDERIM
 RAHMAT MERCİ DANK JE EΥΧΑΡΙΣΤΩ GRATIAS TIBI GRAZIE
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 GRAZZI ПAKKA PĒR ありがとうございます ǃAKUJEM
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 FALEMINDERIT

