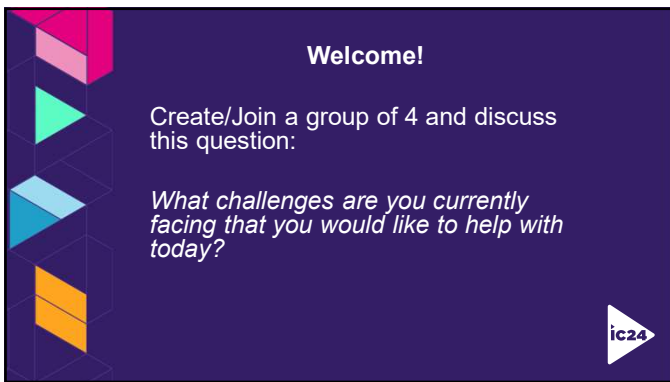
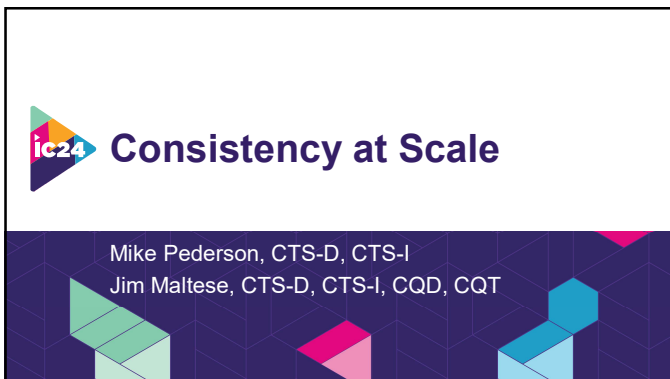





1



2





3



About the Presenters

James Maltese, CTS-D, CTS-I, CQD, CQT

- VP of Quality Standards; Level 3 AV
- Avixa Educator of the Year 2017
- Board Member, AQAV
- Quality Committee Chairman, PSNI
- Avid scouter

4



About the Presenters

Mike Pedersen, CTS-D, CTS-I
 Audiovisual Experience Manager
 Information Technology Services (ITS)
 Iowa State University

#InHouseIntegrator

6th Year at Iowa State University
 19 Years at Audiovisual Integrator called Mechdyne Corporation
 2018 AVIXA CTS Holder of the Year
 Team won Higher Ed AV Team of the Year in 2023




5



IOWA STATE UNIVERSITY
 OF SCIENCE AND TECHNOLOGY

- Public Land-grant University
- Founded 1858
- Fall 2023 Enrollment: 30,177
- 10 Schools and Colleges
- 100 Majors
- World's first electronic, digital computer invented here, 1942
- Ames, Iowa
 - #1 on 2019 US News Best College Towns
 - #1 Midwest on 2023 Research.com Best College Towns List




6




ic24 Shameless Plugs

7



HETMA
HIGHER EDUCATION TECHNOLOGY MANAGERS ALLIANCE

- Higher Education Technology Managers Alliance
- Advocacy for Higher Ed within the Professional AV market
- PRISM Scholarship
- HETMA Approved Program
- <https://hetma.org>



8



etc
EDUCATIONAL TECHNOLOGY COLLABORATIVE
Connecting AV & IT in Higher Education

- Educational Technology Collaborative (Formerly CCUMC)
- Professional and leadership development
- Outstanding collaboration
- <https://etc.memberclicks.net/>



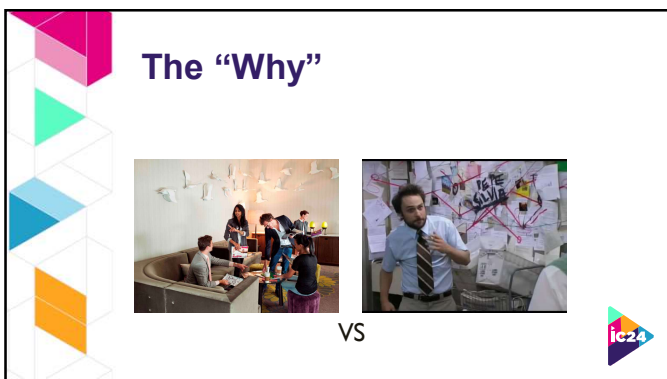
9



10



11




12

The “Why” (User Remix)


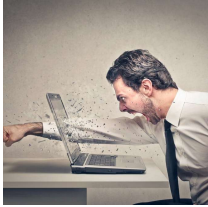


13

The “Why” (User Remix)




VS



14

What if I told you AV systems could be:


- Globally managed as one “AV Program”
- Designed accurately, quickly, and inexpensively
- Deployed completely and consistently
- Effectively managed and maintained



15

How?


1. Manage Global AV as one AV Program
2. Develop multiple types of standards
3. Detail a Project Delivery Process
 - Leverage a single quality management system
4. Implement a maintenance/management plan



16

One AV Program to Rule Them All!



- Accountability
- User-focused reporting
- Roadmap/ Resource Planning
- Vendor Relations
- Std Catalog/POC
- Risk Management
- Cost Management



17

Benefits of Program Management


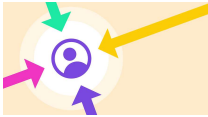
- Accountability
- Provide executive level reporting on entire program
 - Schedule accuracy
 - Project issues
- Spot trends when reviewing entire program
 - Not just by project



18

Benefits of Program Management



- User-focused reporting
- Typical project reporting doesn't translate to users
 - ✗ - "Oh, that was Proj #1234"
 - ✓ - "Oh, that's Room 456"
- Program Reporting stays with the systems instead of only the deployment



19

Benefits of Program Management



- Roadmap Planning
- Forecasting
- Resource Management
- Key Vendor Relationship
 - Project planning
 - Feature requirements
 - Negotiated pricing/ benefits



20

Benefits of Program Management



- Proof of Concept Testing
- Not just "for a project"
 - It impacts an entire program...many rooms!
- Better support from:
 - Manufacturers
 - Programmers
 - Integrators



21

Benefits of Program Management

- Risk Management
 - High level reporting
 - Spot trends
 - Share lessons learned
 - Prioritize tasks/projects
 - Cyber Security Concerns
- Cost Management
 - Benefits to work being completed in certain regions
 - Look globally across program



22


Polls

Let's get to know each other




23

What type of organization are you representing?



24

Are your rooms consistent from site to site?



25

Once turned over to the users, are managing your systems centralized and "easy"?



26

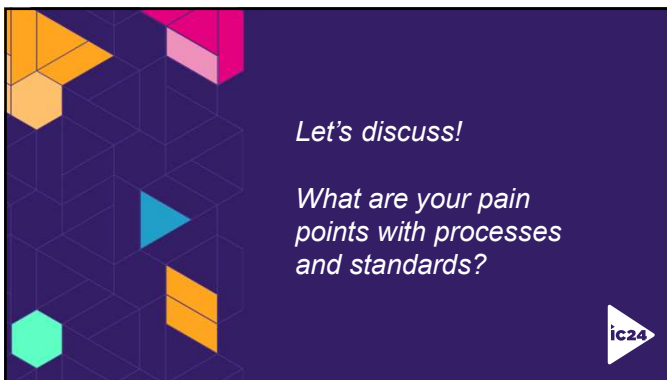
Do you have a process in place where an improvement or changes in system design/configuration/operation could be easily distributed to all AV stakeholders?



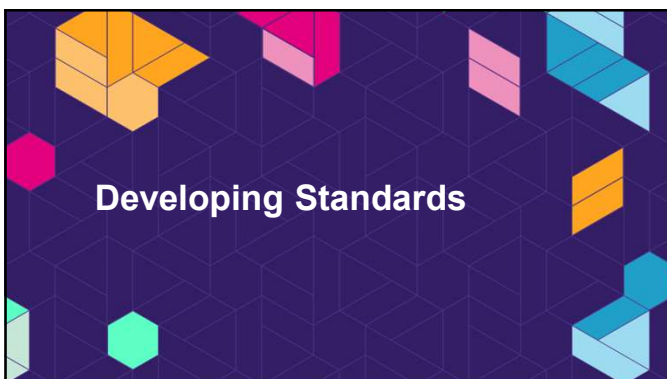
27




28



29



30




Industry Standards

The basis to start from

31

AVIXA

- Actively developing standards since 2006
- (At least) 13 Published Standards
 - Technical
 - Display Image Size for 2D Content in Audiovisual Systems
 - Audio Coverage Uniformity
 - Projected Image System Contrast Ratio
 - Cable Labeling for Audiovisual Systems
 - Rack Design for AV Systems
 - Rack Building for Audiovisual Systems
 - Audio, Video and Control Architectural Drawing Symbols




32

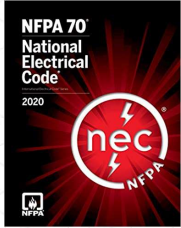
AVIXA

- (At least) 13 Published Standards
 - Process
 - Standard Guide for Audiovisual Systems Design and Coordination Processes
 - Audiovisual Systems Performance Verification
 - Best Practice
 - Energy Management for Audiovisual Systems
 - Recommended Practices for Security in Networked AV Systems
 - Recommended Practice for Lighting Performance for Small to Medium Sized Videoconferencing Rooms
 - Unified Automation for Buildings




33

NFPA 70 – National Electric Code



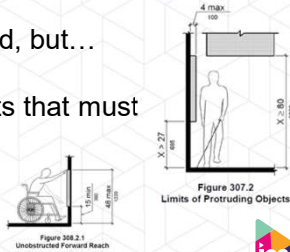
- Not just for electricians
- Need to know the impacts
 - Outlet locations and access
 - Cable fill
 - Cable pathway and dressing
- Ready to answer inspectors



34

Americans with Disabilities Act (ADA)

- Not exactly a standard, but...
- Provides requirements that must be adhered to
 - Reach
 - Protruding objects
 - Assistive listening



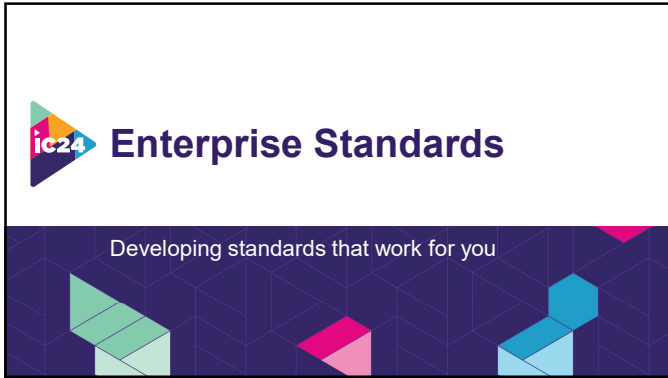
35

So many more...

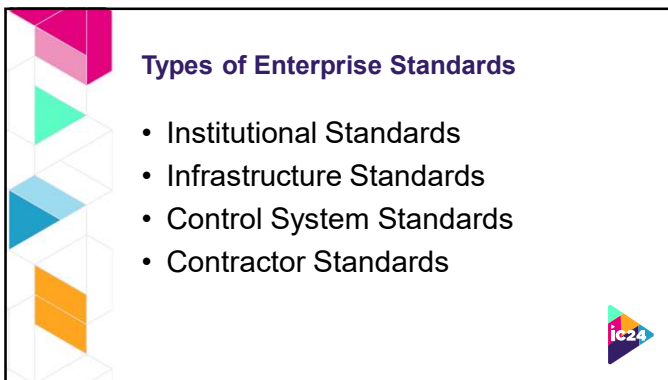
- TIA
 - TIA 468B
- BICSI
 - PoE install, IoT, WiFi, Grounding
- AES
 - AES 67
- SMPTE
 - SMPTE 292
- IEEE
 - 802.2, 802.11, 802.1X



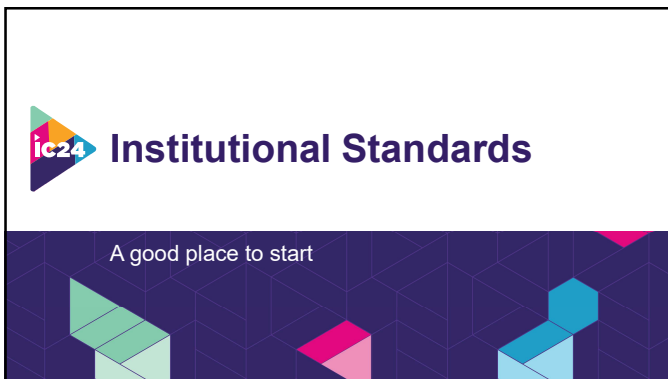
36




37




38



39



Institutional Audiovisual Standards




General Theme

- “General” AV standards
- Wide application AV standards

Target Audience


- Enterprise AV professionals
- Contractors

40



Institutional Audiovisual Standards

- Content
 - Can be whatever you want it to be!
 - Brand/component standards
 - Defines what is acceptable and not acceptable
- Breakdown
 - Sources
 - Displays
 - Video infrastructure
 - Audio
 - Control systems
 - Other (cameras, capture/streaming, mounts, racks, cables, etc.)



41



Infrastructure Standards




42

ic24 Infrastructure Matters

- Ease of Install
 - Can dramatically simplify and expedite
 - Hard cable pulls? → conduits!
 - Challenging mounting situation? → backer board!
 - Hard to mount items behind a display? → back boxes!
 - Makes future upgrades easier
- Coordination
- Safety
 - Can ensure proper mounting points
 - Can eliminate trip hazards
- Aesthetics




43




Let's discuss!


Tell us your infrastructure horror story.



44



Infrastructure Standards




General Theme

- Facility and construction infrastructure that supports audiovisual systems

Target Audience

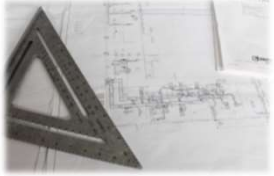
- AEC Design Consultants
- Facilities Management
- General Contractors



45

ic24 Infrastructure Standards


- Content
 - What does a GC need to provide for a successful AV install?
 - Drawings worth 1000 words
- Breakdown
 - Coordination (e.g. clean room prior to AV install)
 - Conduit/raceway/junction boxes
 - Electrical / lighting
 - HVAC
 - Projector / screen needs
 - Flat panel display needs



46

ic24 Standard Details

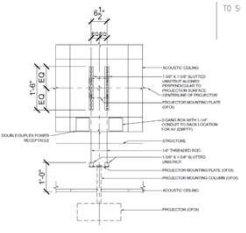
The devil is in the details



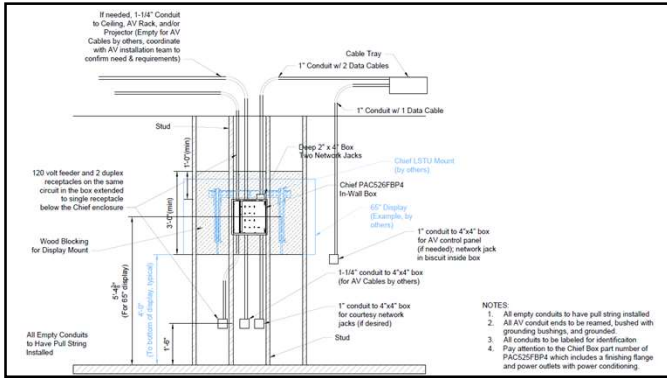
47

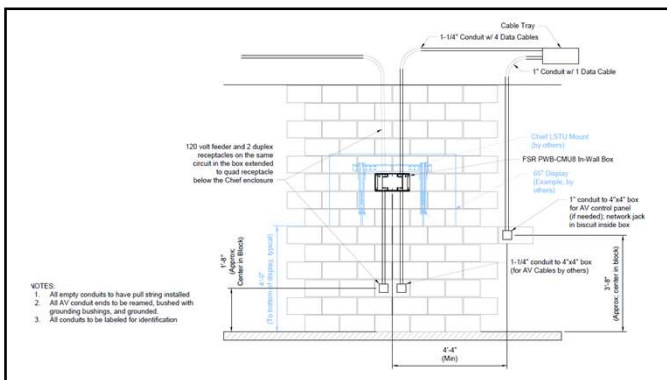
ic24 Standard Details

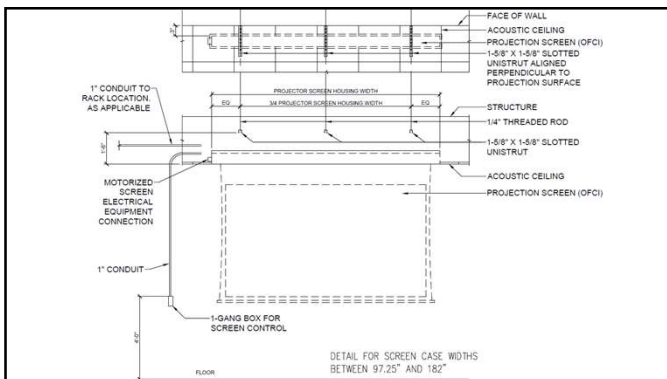
- Standard details will endear you to everyone
- Types of details
 - Flat panel display mounting
 - Projector mounting
 - Screen mounting
 - Rack locations
- Do them in AutoCAD (or get them transferred to AutoCAD)
 - Provide both .dwg (AutoCAD) and PDF copies




48







Infrastructure Relationships



Befriend those who can help

- Enterprise facility teams
 - Focus on project managers and construction managers - Offer to help
 - Provide them standards - drawings are worth a thousand words
- Outside consultants
 - Engage early (hint – befriending facilities PMs can help!)
 - Show them written standards and details
 - MasterFormat – 27 41 00
 - Reduce their workload
- General contractors
 - Ask to be involved in project meetings
 - You're on their side

52

Let's discuss!

What challenges or opportunities do you see with building relationships with infrastructure stakeholders?




53



Control System Standards



54




Control System Standards

General Theme

- Look, feel, and operation of control systems

Target Audience

- Audiovisual control system programmers
- In-house programmers
- External contractors or control system consultants



55



Control System Standards

- Content
 - Everything a growing programmer needs
- Breakdown
 - GUI layout
 - GUI behavior
 - Automations
 - Communication protocols
 - Warnings / alerts / e-mails
 - Central management (GVE, Fusion, RMS, etc.)



56



AV Contractor Standards



57



ic24 Contractor Standards



General Theme

- Expectations for performance of external audiovisual integrators

Target Audience

- External integrators
- Procurement services
- General contractors who may sub outside AV integrators

58

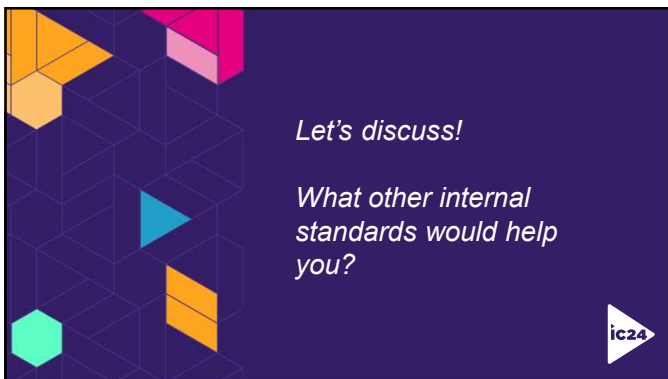


ic24 Contractor Standards

- Breakdown
 - General scope expectations
 - Responsibilities of owner
 - Performance requirements
 - Submittals
 - Quality assurance
 - Coordination
 - Equipment / OFE / substitutions
 - Fabrication / Installation
 - Programming and IT security
 - Warranty




59



Let's discuss!

What other internal standards would help you?




60






Benefits of Enterprise Standards




61



Improved Communication

 "Proactive" communication	Requirements presented in advance
 Works for you	Serves as proxy
 Provides authority	Not just your opinion



62




Minimizes Surprises

- Fewer mistakes
 - Standards provide guiderails
- Infrastructure is ready for you
 - Needs and expectations set early in construction process
 - How much does that missing outlet/conduit/network jack cost?



63

ic24 Improved Performance



- Easier training
- Easier troubleshooting
- Efficient installations
- Confident end users

64

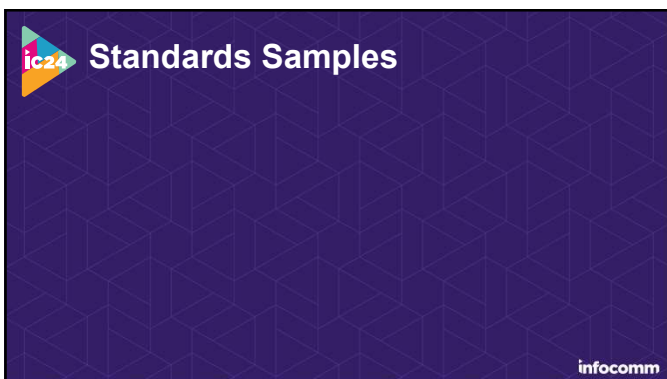
Reduced Costs

- Lower shelf stock
- Better bulk purchase opportunities
- Reduced labor hours



65

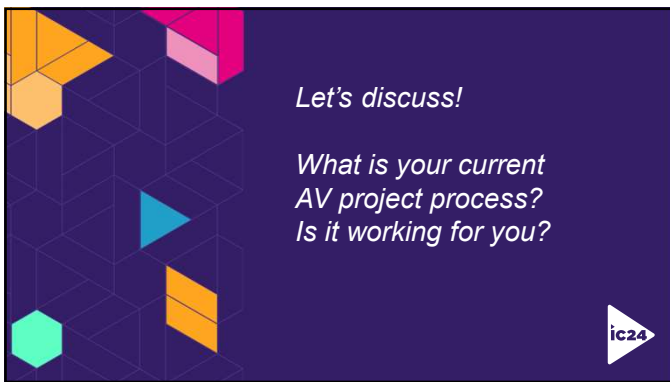
ic24 Standards Samples



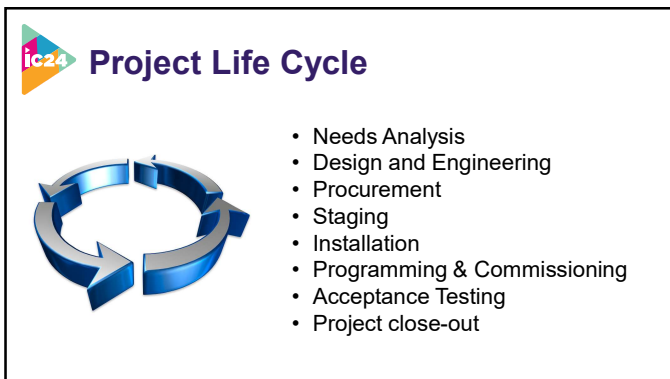
66




67




68



69

 **Project Delivery Process**

- A Project Delivery Process, or PDP, is a comprehensive and structured set of steps and checklists organized around the project life cycle that guide a successful project outcome
- The PDP can define:
 - Process steps
 - Sub-processes to refer to and utilize
 - Checklists to complete
 - Required meetings, including recommended meeting agenda
 - Required documentation




70






Benefits From a PDP

71

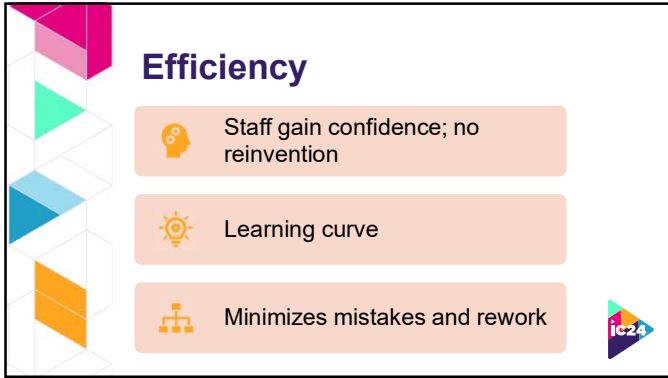


Consistency

-  Structured Process
-  Minimizes the possibility of end-result differences



72

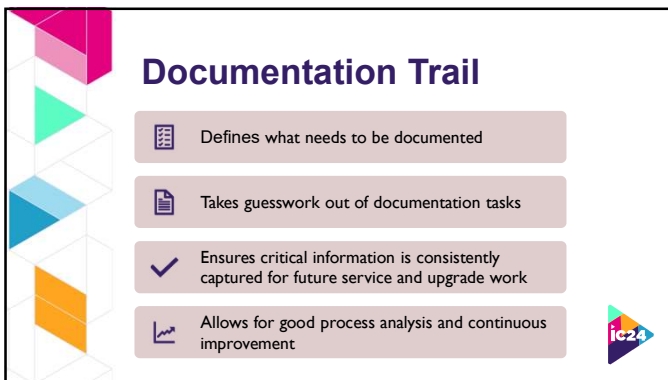


Efficiency

- Staff gain confidence; no reinvention
- Learning curve
- Minimizes mistakes and rework

ic24

73

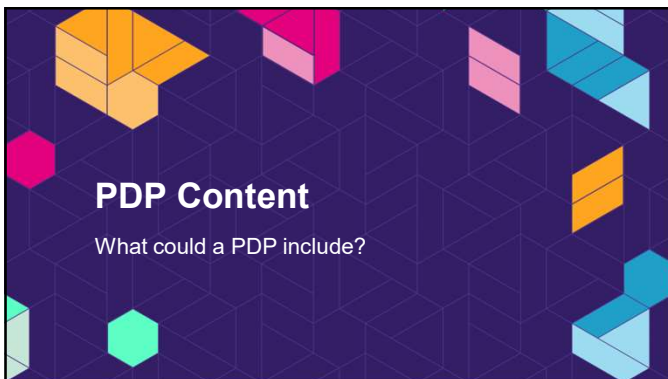


Documentation Trail

- Defines what needs to be documented
- Takes guesswork out of documentation tasks
- Ensures critical information is consistently captured for future service and upgrade work
- Allows for good process analysis and continuous improvement

ic24

74




PDP Content

What could a PDP include?

75




Needs Analysis



- Most important step
- Meet with the actual ultimate end-users of the space
- If the space exists, attempt to meet with them in their space
- Ask if you could spend some time watching them work or watching them run classes or meetings
- If allowed – just observe how they work

76




Needs Analysis

- A proper needs analysis involves a lot of questions!
 - Who are the users?
 - What are they doing?
 - What is their workflow – how do they achieve their goals?
 - What experience should they expect?
 - How would you measure success of the space?




77




Site Visit

- Visit to the actual space
- Create a site visit checklist



78

ic24 Site Visit Checklist



- Building: location, access, parking, door/hallway/elevator sizes, dumpster location
- General: formal space identification, overall dimensions, window/door locations
- Construction: obstructions (fire alarms, thermostats, lights), wall construction (drywall, brick, plaster), floor finishes
- Ceiling: ceiling type, lighting type and locations, HVAC locations, obstructions, what is above the ACT
- Infrastructure: power and data locations, rack locations, cable pathways
- Existing audiovisual
- Photos, photos, photos!

79


ic24 Estimating

After all the user and space information has been gathered, an estimate can be created.

- For in-house integrators, this is done by the in-house team
- For external integrators, they need to be involved in all the prior conversations and they would assemble the estimate

Estimate then goes to client for **formal** approval

- Get it in writing!
- Terms and conditions



80

ic24 Project initiation

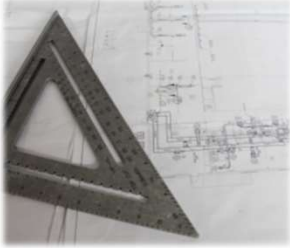


- Handoff from "sales" team to "delivery" team
- Have a handoff checklist or standard internal kick-off meeting (IKOM)
- Allow delivery team to note any red flags
- Ensure customer expectations have not changed
 - They still agree with the project scope
 - Have an external kick-off meeting if needed (EKOM)

81


ic24 Design & Engineering

- Timing depends on your process flow
- Create final design documents:
 - Connectivity diagrams
 - Room layout
 - Rack elevations
 - Bill of Materials



82


ic24 Procurement




- Once the bill of materials is finalized, the procurement stage can start
- Includes both purchasing and receiving
- Having a developed process is critical
 - Ensure tracking is occurring
 - Scan packing slips

83

Staging




- For this discussion, staging is completing pre-work in your facility
 - Gathering and kitting all hardware for the project
 - Capturing key information such as serial numbers and MAC addresses
 - Printing out wiring diagrams and rack elevations for install team
 - Pre-printing cable labels
 - Building out racks.
 - This is a great candidate for a checklist!
 - Print a copy and tape it to the rack for check-off as rack is completed
 - Initial rack power-up to test for DoA equipment
 - Reserving and applying IP addresses to equipment
 - Initial programming and configuration of equipment



84

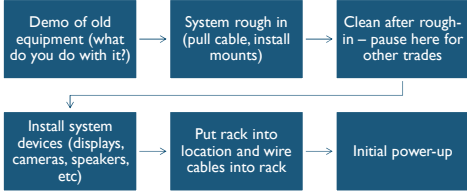
Installation

- Lead installer has primary responsibility
- Should create a written installation plan and/or checklist
- Should complete a final pre-install site visit




85

Installation Steps



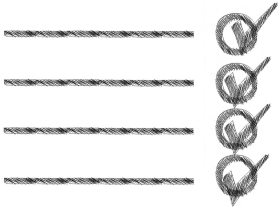
```

graph LR
    A["Demo of old equipment (what do you do with it?)"] --> B["System rough in (pull cable, install mounts)"]
    B --> C["Clean after rough-in - pause here for other trades"]
    C --> D["Install system devices (displays, cameras, speakers, etc)"]
    D --> E["Put rack into location and wire cables into rack"]
    E --> F["Initial power-up"]
  
```



86

Programming & Commissioning




- Once physical installation is complete
- Install and test control and DSP programming
- Comprehensive system test
- Have a checklist
- Document!

87

Testing Checklist

- AVIXA Audiovisual Systems Performance Verification (AVSPV) ANSI/INFOCOMM 10:2013
- Make it your own!
- Example



88

Project close-out



- Client sign-off (in writing)
- Finalize documentation
- Training
- Billing
- Promotion

89

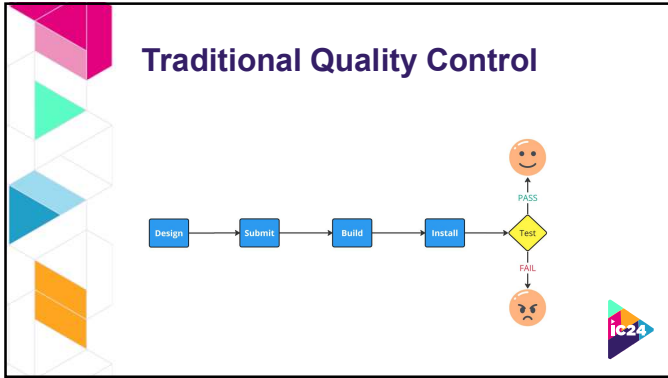
Quality Management



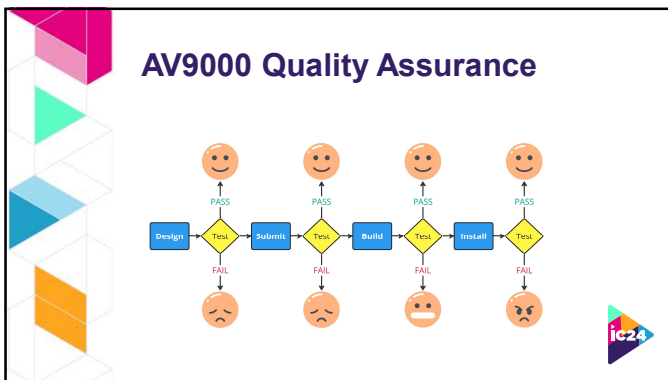
- AV9000
- Iterative Testing
- Used by all
- **Audited**
- Confirms Design, Install, Training, Docs
- Consistent User XP



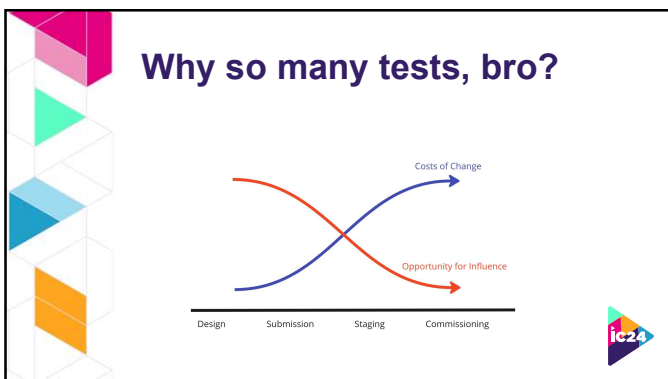
90



91



92




93




Top 5 Risks: No Design Review




94




1: Incomplete Design Package




- Incomplete design gets passed down the line
- Decisions are filled in by anyone...maybe
- Often way down the line, far removed from client
- Who do you want making design decisions?
 - Experienced designer
 - New tech on the job
 - Users




95



2: Missing/Wrong Equipment




- BOM never reviewed
- There may be critical or long-lead pieces missing
- May not be able to issue CO for change
- Massive project delays
- Scramble to fill the holes
 - Aka: AV Fire Drill




96

3: Poor Performance




- If the design isn't reviewed, it might not deliver what the client expects
- Feedback on audio system
- Too hard to read material on screen
- Poor audio coverage in space
- Terrible contrast on projector screen
- Etc.




97

4: Lack of Coordination



- Missing floor boxes
- Missing power/data when walls are up
- Need to re-do construction
- Equipment overheating
- Very expensive
- Users must choose between
 - Very expensive fix
 - Live with a poor installation



98

5: Small Changes = Big Problems



- Designs "evolve" with lots of small changes
- Each small changes needs a review
- Small changes can have HUGE impacts




99



Top 5 Risks: No Staging




100




1: Intersystem Communication

A FAILURE TO COMMUNICATE



- As integrators, we make sure different devices can communicate and function together. This takes time.
- Much better to do it in a controlled shop space
- 3:1 Rule
 - Every troubleshooting hour in a shop environment
 - Would have taken 3+ hours in the field




101



2: Firmware

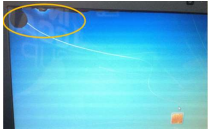


- Devices stay on shelves for months
- Many need a firmware update
- This takes valuable resources
- Doing in the field is a huge waste of resources
 - 3:1 Rule
 - Limited computer resources
 - Increase time on site




102

3: DOA Equipment




- Finding DOA equipment in the field adds tremendous time
- Each device should be staged
- Think about time it takes to:
 - Pack up equipment
 - Ship to site
 - Unpack
 - Install
 - Test and realize there's an issues
 - Get an RMA (time wasted in the field)
 - De-Comm
 - Re-pack
 - Re-Ship
 - Get a new device
 - ...Lots of time lost




103

4: Unexpected Performance


Advertising.



Reality.

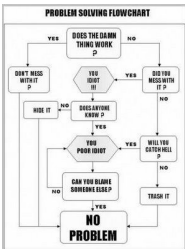


- Designs and design reviews rely on specifications
- They are not always accurate
- Staging is used to verify the system CAN perform as expected




104

5: Difficult Troubleshooting



- Staging can "certify" a rack
 - So everything inside the rack works
- When the rack goes to the field, and there's an issue, it should only be field cabling
 - Everything else was tested in the shop
- Installs go incredibly smoothly




105



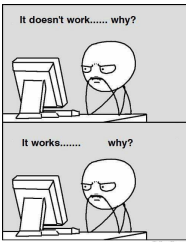
Top 5 Risks: No Commissioning



106




1: Systems not tested




It doesn't work..... why?

It works..... why?


- Not all aspects of the system are tested
- Job deemed "complete" but after a month the client notices something
 - A Warranty call is scheduled
 - A month later, something else is noticed
 - Another warranty call
 - A month after that, something else is noticed
 - Another warranty call
- Users never trust the system
- Installers never leave the site




107



2: Poor Audio Performance




- Feedback
- Echo on conferencing
- Poor full duplex/double talk on conferencing
- Can't hear microphones
- Uneven audio coverage
 - Aka: "cheap seats"
- Audio systems are supposed to support natural conversations
- "Good enough" is the enemy of "great"




108

3: Poor System Maintainability




- Systems must last 3-7 years
- Eventually something will go wrong
- Updates, maintenance must happen easily
- Systems need to have
 - Consistency
 - Documentation
 - Accessibility
 - Proper labelling




109

4: Lose trust in tech/integrator

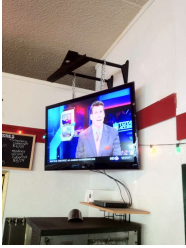


- Large project with no commissioning will lead to endless issues
- Clients will begin to expect systems to fail
 - No trust in technology
 - No trust in integrator
- Warranty calls will happen for things that have nothing to do with the system
 - Client builds habit of calling
 - Integrator submits because they did such a poor job
- Not good for client relationship




110


5: Unprofessional deliverables




- AV needs more respect among the Construction Trades
 - Competing with engineered systems and Amazon-culture
- Installation must meet codes, specs, and expectations
- Without commissioning, it looks like an amateur installed the system




111



QA Samples




112




QA Demo


- Think about a nightmare that happened to you on a past project?
- What could be done to prevent it?
- How can we share this information with the team?




113



Corrective Actions



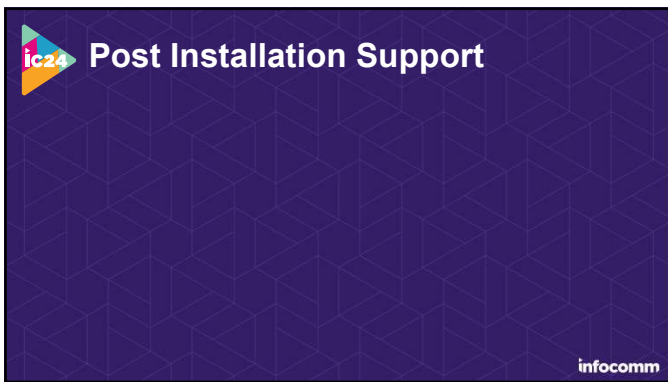
- Identify Issue
- Root Cause
- Immediate Action
- Corrective Action
- Preventive Action
- Compliance Date
- Follow up with team



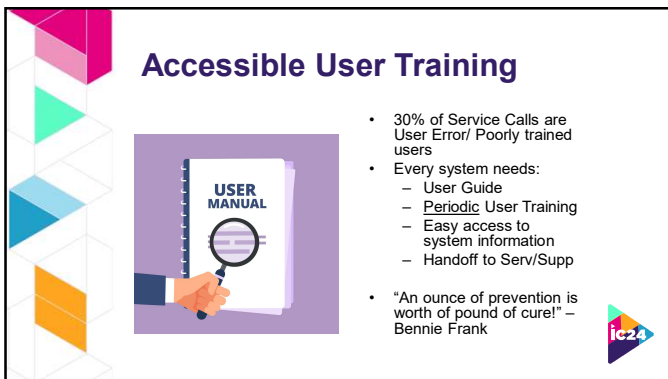
114




115



116





117




Preventive Maintenance (PM)


- Interview
- Function test
 - Yes, even that thing that no one ever uses
- Commissioning-Lite
- Document Visit/Exec Summary
 - Review database yearly to look for trends
- "Re-Commissioning" in the Cx World
- For critical systems, RMM may not be enough


118




Monitor, Manage, & Maintain




- RMM for all systems
- Effective remote support
- Preventive Maintenance for Critical Systems
- Usage Analytics with Manager Review



119



Room Usage Analytics




Guessing Conference Space requirements can be costly

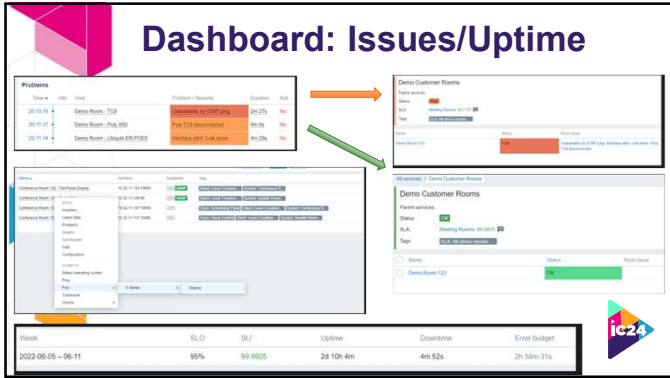
Fairly easy to introduce Analytics

- Start with Baby Steps
 - Room Usage (Use & Capacity)
 - Room Booking Efficiency
 - Source Usage
 - Service Issues
 - User Experience

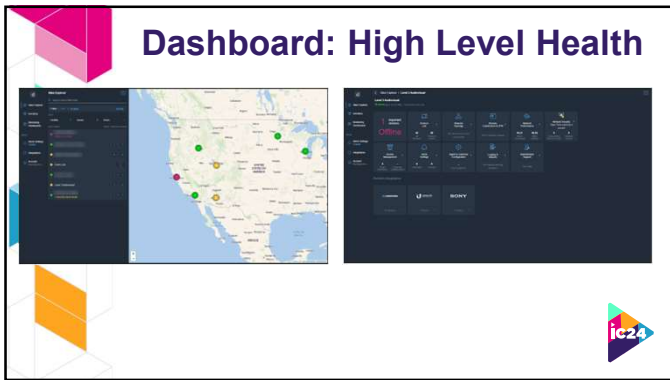
Base decisions on data metrics instead of guesses.



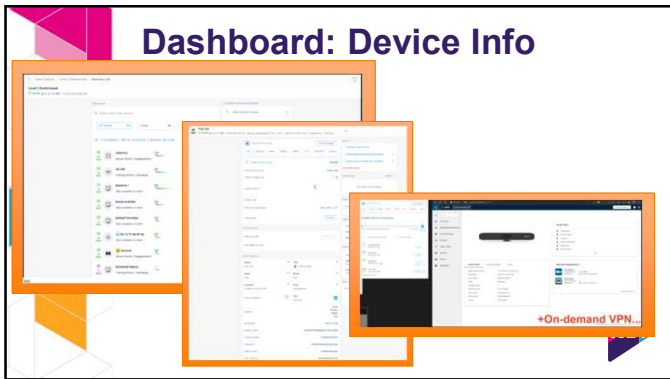
120



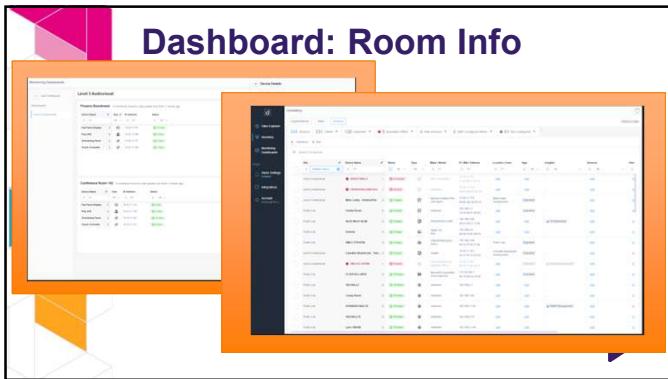
121



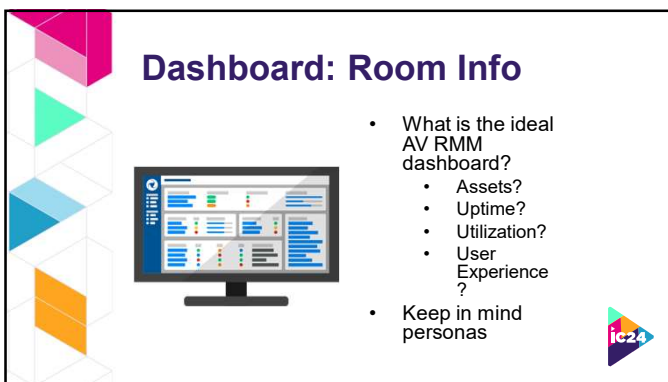
122



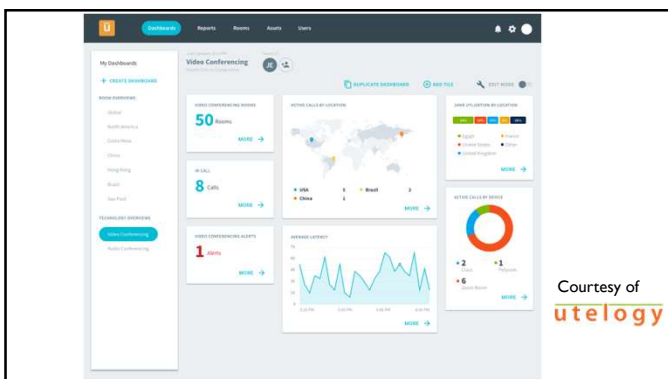
123



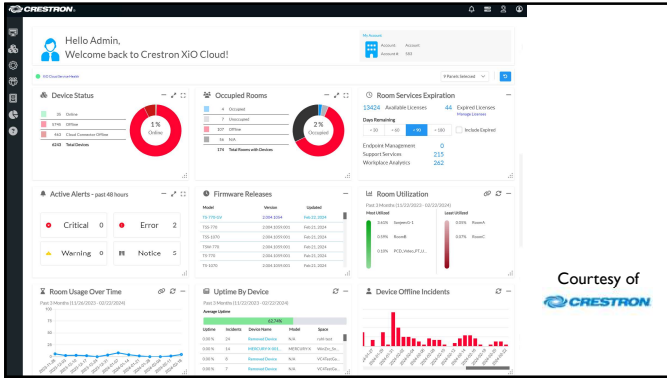
124



125

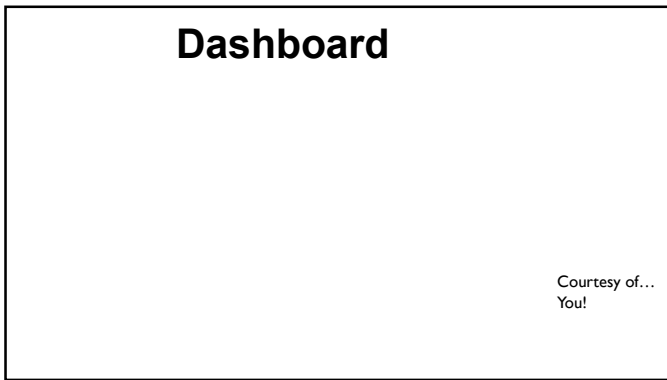


126



Courtesy of
CRESTRON

127



128

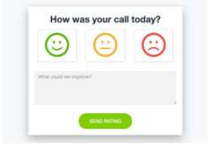
Are your KPIs supported?

- Designs must allow for data to be collected
- One pane of glass, or multiple services?
- Drives importance of standardization and vendor relationships
- Scalability!
- Most AV MFGs are terrible at IT


ic24

129

KPI Ex: CSAT




- User Survey:
 - Is it supported?
 - Not in pre-baked TPs
- How do I get the information?
 - Custom UI?
 - Network permissions?
- How do I compile the information?
 - Dashboard?
 - Control system?
 - SaaS?



130

KPI Ex: System Utilization


E70



People Counting:

- Is it supported?


- How do I get the information?
 - API?
 - Network security?
- How do I compile the information?
 - Dashboard?
 - Control system?
 - SaaS?



131

What is required?

Documentation	Strategy/Design	Training
<ul style="list-style-type: none"> • Complete documentation • Equipment Inventory • System Drawings • Network Schedule • Login information • File per room <p><small>* Not per project</small></p>	<ul style="list-style-type: none"> • Equipment that supports monitoring • Software • Services • Key relationships • Feature roadmaps 	<ul style="list-style-type: none"> • Trained Technicians <ul style="list-style-type: none"> - CTS, CTS-I, CTS-D - COT, COD • Trained Users



132

But it costs too much money!



It is already costing you money!

- Support Techs for "fire drills"
- Renting new spaces/equipment for events
- Expediting Service and Equipment
- Overtime Labor/ Supervision/ Security
- Other Hidden CoPQ



133

15% - 20%?! You're crazy!




- The "(USD\$206) Bolt"




134

15% - 20%?! You're crazy!




- The "(USD\$206) Bolt"
 - Never staged 98" display mount and missing a bolt
 - Team of 3 halted: (USD\$40)
 - Tech needs to find a hardware store, if it's open: (USD\$100)
 - Get car from lot: (USD\$25)
 - Reassemble team: (USD\$40)
 - Oh...and the bolt: (USD\$1)
- This is one instance
 - How often on a typical project?




135

What about the others?



- Firmware patches: (USD\$350/ 4hrs)
 - Download 4G file on cell...twice
 - Load new firmware
 - Load it again
- Warranty calls: (USD\$1,200/ 12hrs)
- Escalation calls: (USD\$2,500/ 24hrs)
 - Typically not tracked to project
 - Prep call, call, and wrap-up: \$\$\$
- ...it adds up quickly!



136


Cheaper, Better, Faster




- Avoiding CoPQ across the entire team can increase profits/protect reputations for the same effort
- Verifying client's needs are met every time will drive more business
- Gaining a reputation for consistently meeting needs may allow you to charge more...or less to be more competitive (and maintain profits)



137



Developing Standards & PDPs



138

Don't start from scratch!



PEER INSTITUTIONS




CUSTOMIZATION NEEDED




139


Get buy-in




SOLICIT IDEAS



SEND FOR REVIEW



SHARED OWNERSHIP




140


 **Prioritize & Start Small**



- Implementing standards and/or a PDP is a long road
- Which aspects have greater ROI?
- Choose one or two areas
- Remember:
 1. Crawl, walk, run.
 2. Progress over perfection


141

 **Communicate & Iterate**




- Communicate your standards and process with your team, partners, and clients
- Never final
- Slowly expand scope
- Implement lessons learned
- Regular follow-up
- At least an annual review

142




We just told you AV systems can be:

- Designed accurately, quickly, and inexpensively
- Deployed completely and consistently
- Effectively managed and maintained
- Globally managed as one "AV Program"




143



Your Mission



- Pick one aspect, and try it, or a piece of it:
- One AV Program
- Standard Systems
- Quality Assurance
- Maintenance Plan



144




Questions?

Mike Pedersen
mikeped@iastate.edu

Jim Maltese
jmaltese@L3AV.com




145



Think - Reflect - Share

- What strategies from this session will you consider implementing?



146
