CABLING THE FRIENDLY SKIES: Planning a Smart Infrastructure for Airports

David Coleman, Vice President of Business Development, Paige DataCom Solutions

Carol Oliver, RCDD, DCDC, ESS, ICT Consultant, CEO Communications; BICSI President Elect
Who is Paige...

...Innovative solution provider

Each of our divisions are focused specifically on the fields they serve, with staff that dedicate their careers to their industries with care, friendliness and respect.

Paige is employee-owned, has over 200 employees and is globally headquartered in Union, NJ.
Global Reach

Big enough to handle anything, yet small enough to care

United States
- Fresno, CA
- Paramount, CA
- Columbus, NE
- McConnellsburg, PA
- Orlando, FL
- Jacksonville, FL
- Union, NJ

Europe & Middle East
- Veenendaal, Netherlands
- Dubai, UAE

Asia Pacific
- Shanghai, China
- Taipei, Taiwan
Today’s Presenters

David Coleman

• Sr. VP, Business Development, Paige Datacom Solutions
• Experience:
  • 4th Generation Wire Geek
  • Technical Sales
  • Marketing
  • Product Development

Carol Everett Oliver,
RCDD, DCDC, ESS

• Principal of CEO Communications (ICT Consultant)
• Experience:
  • Technical Sales & Marketing
  • Installer Trainer
  • Industry Author
• BICSI Association:
  • Board of Directors –
    • President-Elect (2020-2022)
    • President (2022-2024)
  • Chair, Intelligent Building Standards
Agenda

• Airport IP Challenges
  • Space, Time, Money, Technology

• Low Voltage Infrastructure Solutions
  • Lengthonomics and GameChanger Cable™
Making the most of what you have

Making it last as long as possible
Airport IP Applications

- Data Communications
- Security & Surveillance
- Access Control
- Baggage Handling
- A/V (Displays, Public Address)
- Point-of-Sale Transactions
Network Cabling Challenges

- Bandwidth
- Power (PoE)
- Space (Distance/Location)
- Cost
IDFs/Telecom Rooms
Understanding Standards & Codes

- Codes are mandatory, enforceable by law
- Standards Are VOLUNTARY
  - Written by vendors
  - Least common denominator
  - Based on best practices by committee
  - Can always be exceeded
  - Can be compliant
  - Not always in sync
Additional Standards Applicable for Intelligent Buildings


- **ISO/IEC 11801** part 6 “Distributed Building Services” – International Standards that align with TIA.

## Copper vs. Fiber Cables

<table>
<thead>
<tr>
<th></th>
<th>Copper</th>
<th>Fiber</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bandwidth</strong></td>
<td>Category 6 – 250 MHz</td>
<td>OM3 – up to 1500 MHz/km²</td>
</tr>
<tr>
<td></td>
<td>Category 6A – 500 MHz</td>
<td>OM4 – up to 3500 MHz/km²</td>
</tr>
<tr>
<td></td>
<td>Category 7A¹ – 1000 MHz</td>
<td>Singlemode - unlimited</td>
</tr>
<tr>
<td><strong>Distance</strong></td>
<td>Typical – 100m *(exception: hybrid cable or</td>
<td>Multimode – Up to 2km³</td>
</tr>
<tr>
<td></td>
<td>GameChanger)*</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Singlemode - Up to 40km³</td>
</tr>
<tr>
<td><strong>Applications</strong></td>
<td>Data and PoE (Power over Ethernet)</td>
<td>Data only</td>
</tr>
<tr>
<td></td>
<td>*(Power can be achieved through a hybrid cable</td>
<td></td>
</tr>
<tr>
<td></td>
<td>with media converters)*</td>
<td></td>
</tr>
<tr>
<td><strong>Termination</strong></td>
<td>RJ45 field termination</td>
<td>Factory terminated (trunks) or Requires trained/skilled labor for field termination</td>
</tr>
<tr>
<td><strong>Cost</strong></td>
<td>$ - Most cost effective cable and connectivity</td>
<td>Multimode cable - $$$</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Singlemode cable - $</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Electronics/Transceivers - $$$$$</td>
</tr>
</tbody>
</table>

¹ ISO 11801 Class Fₐ
² Minimum Overfilled Modal Bandwidth at 850nm wavelength
³ Application and fiber type dependent
ANSI/BICSI-007-2017: ICT Design for Intelligent Buildings

Integrating Applications on ICT Network

- Communications Infrastructure & Network Integration
- Design Considerations (Power, Data, Zone Cabling)
- Building Systems (Lighting, Digital Signage, Vertical Transportation, Sound Systems, ESS, etc.)
- Building Monitoring Systems
- Commissioning
Designing a Telecom Room that Supports Multiple Systems

Wireless Device Systems

Wall-Mounted Systems

Future Racks and Systems

Core Network

Specialty Systems
Dual TRs Provide Restricted Access to the Core

Critical/Sensitive Information Systems

Restricted Access
Direct Termination Solution (TIA & BICSI): Modular Plug Terminated Link (MPTL)

- Custom length, quick connections in the field for direct connection to devices
- Improves performance and allows for more efficient power delivery by eliminating patch cords and outlets
- Improves security for devices like surveillance cameras by eliminating exposed patch cords

*Photo taken at McCarran Airport in Las Vegas – Anyone could jump up and pull out the patch cord to the surveillance camera and wireless access point.*
Unique Cabling: “Lengthonomics”

• Standards for copper cable is limited by IEEE and TIA to 100m
• Many applications are requiring Power and Data exceed the 100 meter limit:
  • Analog to IP Video upgrades
  • Video in parking lots/structures
  • Access Control
  • Video in Baggage Handling Systems
  • Outdoor Security Cameras
  • WiFi
  • Digital Signage
The Challenge

The Standard(s) Challenge
Installing IP devices more than 328 feet away from the network requires additional (and unnecessary)

- Time
  - Hardware
  - Terminations
  - Touch Points

- Money
  - Trades
  - Extenders
  - IDFs

- Hassle
  - Points of Failure
  - Risk
  - Labor

GameChanger can be run over 2.5x the distance of a standard category cable
1 Gb/s and PoE+ over 656 feet? That’s a GameChanger

- Supports Ethernet and PoE+
  - 1 Gb/s up to 656 feet (200m)
  - 10 Mb/s up to 850 feet (259m)
- Lab Verified by UL
- Field Testing Supported by:
  - AEM
  - Fluke
  - Ideal
  - Netscout
  - Softing
  - Viavi

The GameChanger terminates like a standard Cat6. We recommend the ezEX44 or ezEX48 RJ 45 Connectors from Platinum Tools.
Riser

Plenum

Outside Plant

Outside Plant Shielded
Be A Hero

The Winning Solution for Your Team

- Recover from a blown budget
- Find Money for the bells and whistles you wanted
- Create RFP’s with faster, less expensive solutions

The GameChanger has won several awards including
## OPTION A: GAMECHANGER

<table>
<thead>
<tr>
<th>Required Hardware</th>
<th>MSRP Unit Price</th>
<th>Quantity</th>
<th>Extended Cost (No Labor)</th>
</tr>
</thead>
<tbody>
<tr>
<td>GameChanger CMR</td>
<td>$0.40</td>
<td>38,000</td>
<td>$15,010.00</td>
</tr>
<tr>
<td>24-Port Surge Suppressor</td>
<td>$1,121.60</td>
<td>5</td>
<td>$6,080.00</td>
</tr>
<tr>
<td>24-Port Patch Panel</td>
<td>$243.00</td>
<td>5</td>
<td>$1,215.00</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td><strong>$22,305</strong></td>
</tr>
</tbody>
</table>

## OPTION B: CAT 6 + PoE EXTENDERS

<table>
<thead>
<tr>
<th>Required Hardware</th>
<th>MSRP Unit Price</th>
<th>Quantity</th>
<th>Extended Cost (No Labor)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cat 6 CMR</td>
<td>$0.14</td>
<td>38,000</td>
<td>$5,320.00</td>
</tr>
<tr>
<td>24-Port Surge Suppressor</td>
<td>$1,121.60</td>
<td>5</td>
<td>$6,080.00</td>
</tr>
<tr>
<td>24-Port Patch Panel</td>
<td>$243.00</td>
<td>5</td>
<td>$1,215.00</td>
</tr>
<tr>
<td>PoE Extender at Camera</td>
<td>$385.00</td>
<td>106</td>
<td>$40,810.00</td>
</tr>
<tr>
<td>16-Port PoE Extender at IDF</td>
<td>$7,3000</td>
<td>7</td>
<td>$51,100.00</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td><strong>$104,525.00</strong></td>
</tr>
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</table>

## OPTION C: HYBRID FIBER+POWER

<table>
<thead>
<tr>
<th>Required Hardware</th>
<th>MSRP Unit Price</th>
<th>Quantity</th>
<th>Extended Cost (No Labor)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Powered Fiber &amp; Accessories</td>
<td></td>
<td></td>
<td><strong>$31,311.60</strong></td>
</tr>
<tr>
<td>PoE Extender Modules</td>
<td>$1,195.31</td>
<td>53</td>
<td><strong>63,351.56</strong></td>
</tr>
<tr>
<td>Fiber Connectivity in IDF</td>
<td></td>
<td></td>
<td><strong>7,319.25</strong></td>
</tr>
<tr>
<td>Power Supply in IDF</td>
<td></td>
<td></td>
<td><strong>$5,015.00</strong></td>
</tr>
<tr>
<td>Fiber/Copper SFPs</td>
<td>$93.75</td>
<td>106</td>
<td><strong>$9,937.50</strong></td>
</tr>
<tr>
<td>Chassis in IDF</td>
<td>$656.00</td>
<td>6</td>
<td><strong>$3,936.00</strong></td>
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<tr>
<td>Media Converter in IDF</td>
<td>$50.00</td>
<td>106</td>
<td><strong>$5,300.00</strong></td>
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<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td><strong>$126,570.91</strong></td>
</tr>
</tbody>
</table>

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**Pricing Analysis** provided by:
Mark S. Bennett, CPP, CSC

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**THIRD PARTY ANALYSIS OF GAMECHANGER SAVINGS**

- April 2018
- 860,000 ft.² parking garage
- 106 cameras
- Longest cable run 850 ft.
- Highest camera stream: 20Mb/s
WHAT’S THE MAXIMUM DISTANCE THE GAMECHANGER CABLE CAN BE RUN?

...and other frequently asked questions

1 Gb/s up to 656 feet (200m)

10 Mb/s up to 850 feet (259m)

Delivers 1Gbps performance and PoE+ over 200 meters
WHAT’S THE DIFFERENCE BETWEEN GAMECHANGER AND A STANDARD CAT 6?

...and other frequently asked questions

We’ve increased the gauge size to **22 AWG** (20% more than Cat 6)

We **twist it differently** than our standard Cat 6 to optimize for long distance transmission.

We’ve employed the use of **specialty materials** to allow for high performance
WHO’S HAVING SUCCESS WITH THE GAMECHANGER TODAY?

...and other frequently asked questions
For More Information
www.paigedatacom.com/gamechanger

Live Chat with any questions at
www.paigedatacom.com

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- Case Studies
- White Papers
- Blog Posts
- Videos
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- More FAQ