## ACRP Report 175 Improving Intelligibility of Airport Terminal Public Address Systems

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### ACRP 07-14 Research Team

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#### **Chips Davis Designs**

Chips Davis





# Participating Airports

- Anchorage International Airport
- Broward County Aviation Department
- Burlington International Airport
- City of Chicago/Department of Aviation
- City of Boise/Boise Airport
- City of Phoenix Aviation Department
- City of San Antonio/SAAS
- Corpus Christi International Airport
- Dallas/Fort Worth International Airport
- Denver International Airport
- Fairbanks International Airport
- Fort Wayne International Airport
- Los Angeles World Airports
- Maryland Aviation Administration
- Maryland Aviation Administration (BWI)
- McCarran International Airport

- Metropolitan Airports Commission
- Monterey Regional Airport
- Nantucket Memorial Airport
- Oakland International Airport
- Philadelphia International Airport
- Pittsburgh International Airport
- Portland International Airport
- Prince George Airport Authority
- Salt Lake City/Department of Airports
- San Diego County Regional Airport
- San Francisco International Airport
- Savannah Airport Commission
- Seattle-Tacoma International Airport
- Stockton Metropolitan Airport
- Wichita Airport Authority





# ACRP Report Highlights



- Industry and Passenger Perspectives
- Architectural Design
- Public Address System Design
- Commissioning Public Address Systems
- Public Address System Announcements
- Operation and Maintenance
- Decision Tools and Examples





#### What matters?

# Speech Intelligibility of PA Systems







## Reverberation Time (RT<sub>60</sub>)









# Speech Transmission Index (STI)

#### STI Range

0.66 to 0.75 High speech intelligibility

0.62 to 0.65 Good speech intelligibility

0.58 to 0.61 High-quality PA systems

0.46 to 0.53 Acceptable for voice address (target 0.5)

0.00 to 0.41 Not suitable for PA systems





### **Speech Transmission Path**









#### Speech Intelligibility and Reverberation Time







#### Occupied vs. Unoccupied











Ceiling height 42 feet

RT 3.5s

**STI 0.39** 









## Guidance Highlights – Design

- Speech Transmission Index (STI) target: 0.60+
- PA system must be 10 to 15 dB louder than background noise
- Introduce sound absorptive surfaces
- Where ceiling heights are higher than 24 feet...
  ....get professional help!



## Guidance Highlights – Operations

 Require commissioning to verify and optimize the PA system prior to sign-off or acceptance

 Prepare announcements so they take advantage of human response to broadcast information





### Announcement Example



Source: CCD

Figure 10-1. Announcement information example.





### For Additional Information



#### ACRP Report 175

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http://www.trb.org/main/blurbs/176329.aspx



