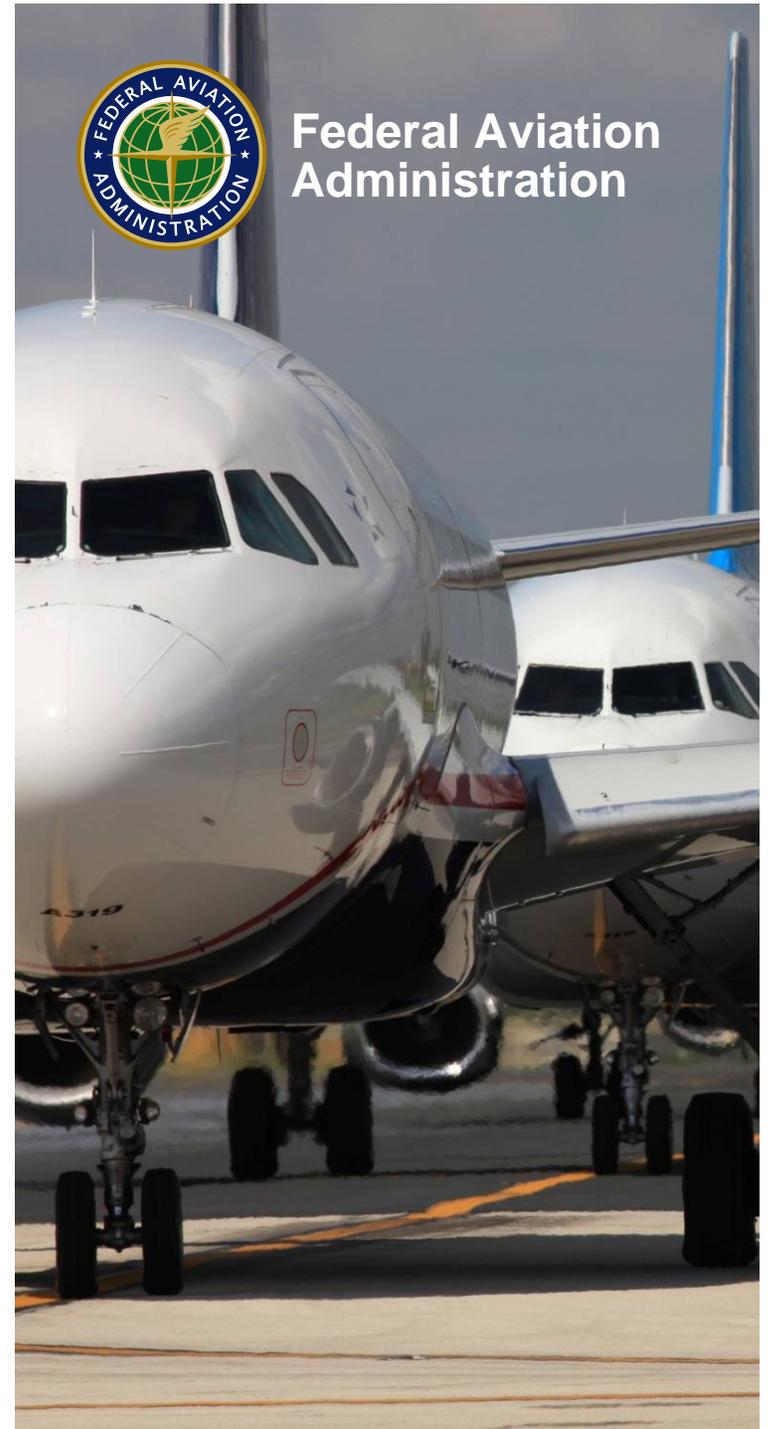


FAA PAVEAIR Updates

Presented to: FAA Working Group

By: Al Larkin & Qingge Jia, FAA Technology R & D
Branch and Jason Tarby, SRA International

Date: April 17, 2013



Presentation Outline

- **FAA PAVEAIR Functionalities**
- **FAA PAVEAIR Updates**
- **FAA PAVEAIR Planned Improvements**



FAA PAVEAIR Status

- **February 2011, beta release**
- **June 2012, version 2.0 release**
 - Source code and installation files are available at <http://www.airporttech.tc.faa.gov>
 - FAA PAVEAIR official site: <http://faapaveair.faa.gov>
- **Since version 2.0 release**
 - Over 1 million visits
 - 358 databases were created
 - 814 registered users



Primary Functions

- Inventory
- Work
- PCI/SCI/FOD
- Prediction Modeling
- Condition Analysis
- Maintenance and Rehabilitation (M&R)
- Reports
- Maps

The screenshot shows the FAA PAVEAIR website. At the top left is the 'FAA PAVEAIR' logo. To the right is the Federal Aviation Administration logo. Below the logo is a navigation menu with links: Home, Inventory, Work, PCI, Pred. Modeling, Cond. Analysis, M&R, Reports, Maps, Tools, Login, Member Area, About, Help. Below the menu is the text 'FAA PAVEAIR' and 'Please choose a database'. The main content area is divided into two columns. The left column has a heading 'Welcome to PAVEAIR' followed by two paragraphs of text describing the application. The right column has a 'Login' form with fields for 'User Name:' and 'Password:', a 'Remember me next time.' checkbox, and a 'Login' button. Below the form are links for 'Register' and 'Forget password?'. Underneath the login form is a section titled 'Public Databases' with text stating 'These databases are available for public (read only) access.' and a link for 'Ohio State University Airport ALDATA'. At the bottom of the page is a footer with links: 'FAA.gov Home | Privacy Policy | Web Policies | Contact Us'.



FAA PAVEAIR Updates

- **Updates**
 - Comply with ASTM standard
 - Database import/export
 - Prediction Modeling
 - M&R improvements
- **New functions**
 - Pavement Distress guide
 - Pavement Distress Deduct Curve Library
 - FAA PAVEAIR User Forum
 - Life Cycle Cost Analysis (LCCA)



ASTM Compliance

- **FAA PAVEAIR distresses and Inspection guide are based on the latest ASTM standards**
 - **Airport – D5340-10**
 - **Road – D6344-09**
- **Any change in ASTM standards will be reflected in FAA PAVEAIR**



Database Import/Export

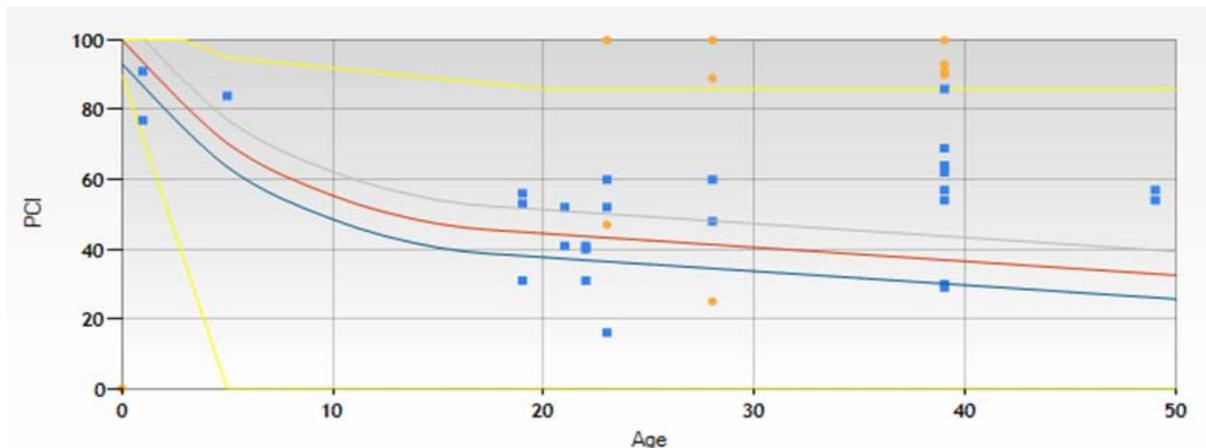
- Import database from MicroPaver databases
 - e50, e60, e65
- Import database from shape file (.shp)
- Export database to XML file

```
- <JFKRDM>
- <xs:schema id="JFKRDM" xmlns="" xmlns:xs="http://www.w3.org/2001/XMLSchema"
- <xs:element name="JFKRDM" msdata:IsDataSet="true" msdata:UseCurrentLocale="true"
- <xs:complexType>
- <xs:choice minOccurs="0" maxOccurs="unbounded">
- <xs:element name="NetworkHistory">
- <xs:complexType>
- <xs:sequence>
  <xs:element name="NetworkID" type="xs:int" minOccurs="0" />
  <xs:element name="NetworkHistoryID" type="xs:int" minOccurs="0" />
  <xs:element name="Name" type="xs:string" minOccurs="0" />
  <xs:element name="DateTime" type="xs:dateTime" minOccurs="0" />
  <xs:element name="Comment" type="xs:string" minOccurs="0" />
</xs:sequence>
</xs:complexType>
```



Prediction Modeling

- Support multiple databases
- Improved curve fitting algorithm
- Calculate Critical PCI
- Export to Excel



Maintenance & Repair Updates

- **ASTM Standards support**
- **Unit support**
- **Data selection categories**
- **Form validation**
- **Excel export**
- **Improved performance**
- **Improved accuracy**

The screenshot displays the FAA PAVEAIR web application interface. At the top, there is a header with the FAA PAVEAIR logo on the left and the Federal Aviation Administration logo on the right. Below the header is a navigation menu with links for Home, MR Management, Consequence of Local Repair, Minimum Condition, Critical PCI, and Help. The main content area is titled "MR:2:mr2:ALDATA" and contains a section for "Open Existing M&R". This section includes a table with columns for MR Name, Database, and MR Type. The MR Name is "mr2", the Database is "ALDATA", and the MR Type is "ConsequenceOfLocalRepair". Below the table is an "Open" button. Below the "Open Existing M&R" section is a "Save All Changes" section with a "Save" button. At the bottom of the page, there is a footer with links for FAA.gov Home, Privacy Policy, Web Policies, and Contact Us.

MR Name	Database	MR Type
mr2	ALDATA	ConsequenceOfLocalRepair

Scope | Timing | Option | Result

Save All Changes

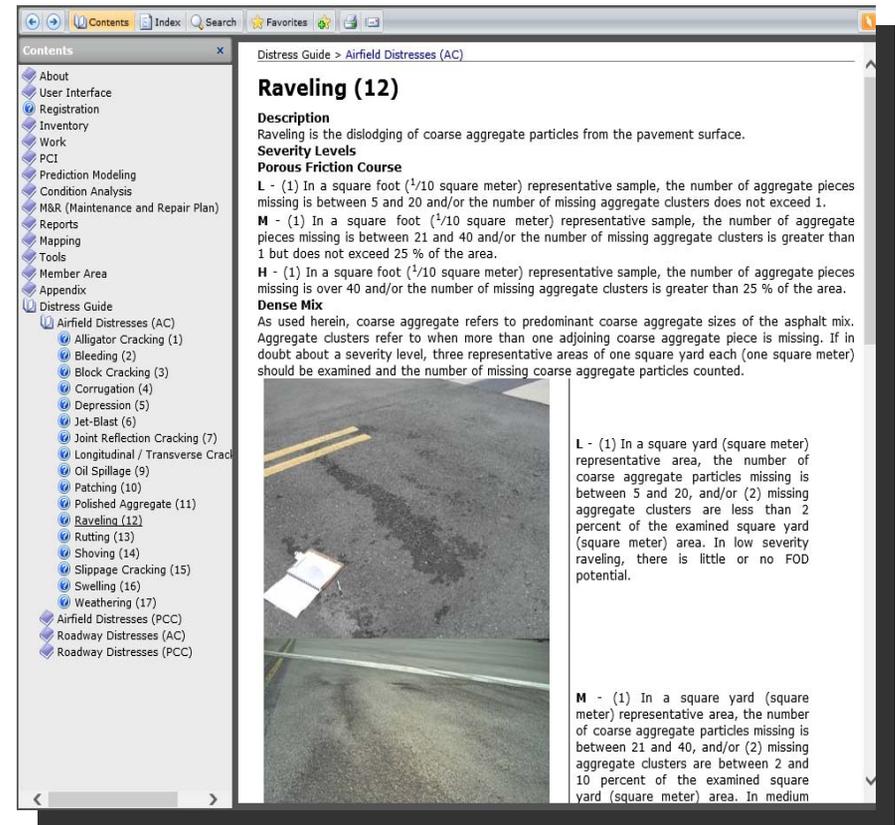
Scope has changed
Timing has changed
Option has changed
Please click Save before proceed

Select



FAA PAVEAIR Distress Guide

- High-resolution color pictures for:
 - Each distress
 - Each severity level
- Inspection guide
- Accessible from FAA PAVEAIR Help file



Rigid Pavement Distress Pictures



FIG. X2.16 High-Severity Longitudinal Cracks

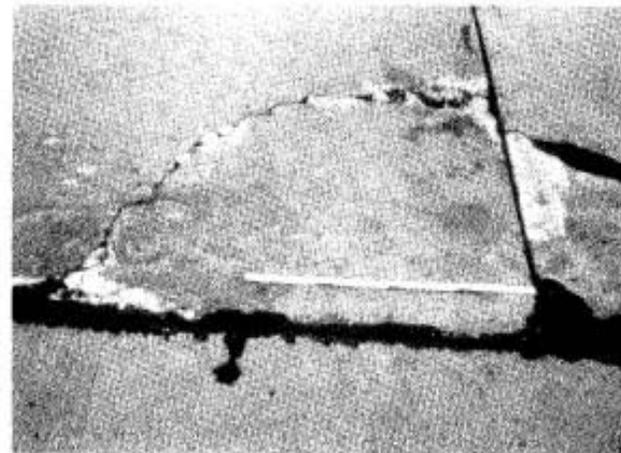
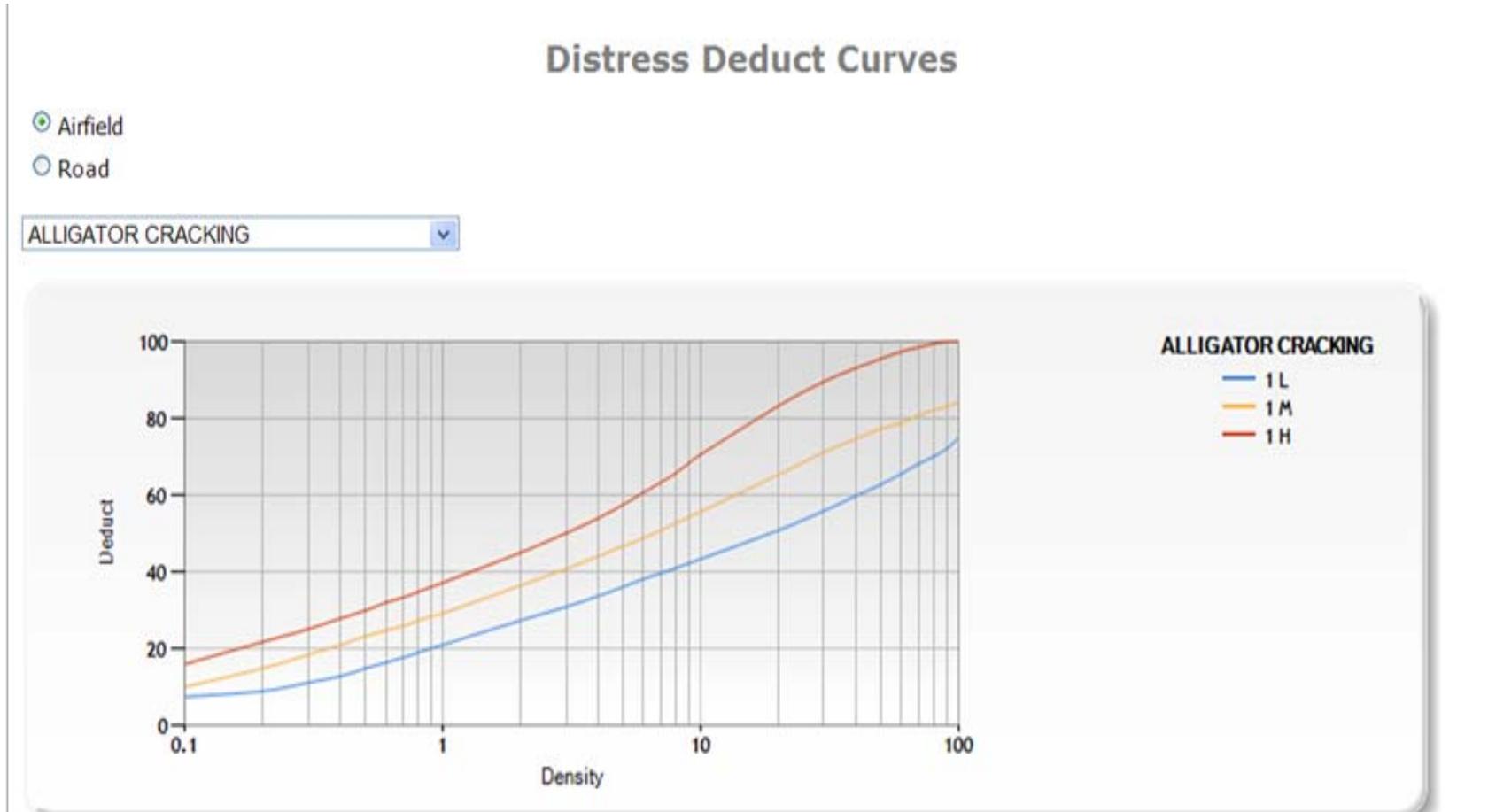


FIG. X2.8 High-Severity Corner Break



Pavement Distress Deduct Curves



Pavement Distress Deduct Curves

- Deduct Values

Density	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1	2	3	4	5	6	7	8	9
L	7.45	8.94	11.17	12.85	14.90	16.39	17.69	18.99	20.11	21.04	27.37	30.91	33.71	36.13	38.18	39.66	40.97	42.11
M	10.06	14.90	18.44	21.04	23.28	24.77	25.88	27.37	28.49	29.24	36.50	40.78	44.13	46.74	48.79	50.84	52.70	54.41
H	16.01	21.79	25.14	27.93	29.98	32.03	33.33	34.82	36.13	37.24	45.07	50.09	54.00	57.54	60.71	63.31	65.74	68.00

- Spline Interpolation

Input:

x

$x_i, y_i, i=1, \dots, N$

Calculation:

$y''_j, j=1, \dots, N-1$

Computed from the first derivative continuity across the interval points.

Output:

$$y = Ay_j + By_{j+1} + Cy''_j + Dy''_{j+1}$$

Where

$$A = (x_{j+1} - x) / (x_{j+1} - x_j)$$

$$B = (x - x_j) / (x_{j+1} - x_j)$$

$$C = 1/6(A^3 - A)(x_{j+1} - x_j)^2$$

$$D = 1/6(B^3 - B)(x_{j+1} - x_j)^2$$



Federal Aviation
Administration

Life Cycle Cost Analysis

- Integrate AAPTTP AirCost LCCA application into FAA PAVEAIR

FAA PAVEAIR

Exit Member Area Logout: faa

FAA PAVEAIR : Member Area : LCCA Current database: Sample

Select Airport/ Project Springfield Regional Airport Add New Delete

[Airport Information](#) | [Project Detail](#) | [LCCA Parameters](#) | [Pay Item & Unit Cost](#) | [Create Alternatives](#) | [Execute LCCA](#)

Airport Name	Springfield Regional Airport
Location(City, State)	Springfield
Airport Authority Name	Springfield Airport Authority
Airport Consultant Name	Airport Consultants, Inc.
Project AIP Number	
Project Description	Rehab of South End (3800 ft) of Existing Asphalt Runway
LCCA Date	1/1/2011

[Edit](#)

FAA.gov Home | Privacy Policy | Web Policies | Contact Us

AirCost

Life-Cycle Cost Analysis for Airport Pavements

Developed under the Federal Aviation Administration (FAA) Airfield Asphalt Pavement Technology Program (AAPTTP) Project 06-06

Airfield Asphalt Pavement Technology Program

AirCost Main Menu

LCCA Parameters

[General Airport/ Project Information](#) | [Project Details](#) | [Edit LCCA Parameters](#) | [Help](#)

[Add Spec/ Pay Items & Unit Costs](#) | [View Spec/ Pay Items & Unit Costs Library](#)

Create/Modify Alternatives

[Alternative 1](#) | [Alternative 2](#) | [Alternative 3](#) | [Alternative 4](#)

Run LCCA Simulation

[Execute Simulation](#)

View Simulation Results

[View Deterministic NPV Table](#) | [View Deterministic EAC Table](#) | [View Probabilistic NPV Table](#) | [View Probabilistic EAC Table](#)

Save/Exit

[Save Workbook](#) | [Exit AirCost](#)

Version 1.0.0
1 January 2011



Planned Improvements

- **Traffic and Climate Modules**
- **Life Cycle Cost Analysis Improvements**
- **Prediction Modeling**
 - Prediction Curve Library
- **Materials and Cost Database**
- **Integration with other FAA programs**
- **Acquire Data from U.S. Airports**
- **Inspection Module**
 - Integration with inspection devices (Trimble GeoExplorer)



Acquired Databases

State	Airports
Iowa	87
Kansas	37
Nebraska	48
So. Carolina	52
NY/NJ (PA)	4
Washington	100
Oregon	66
Idaho	48
Wyoming	35
Colorado	63
TOTALS:	545

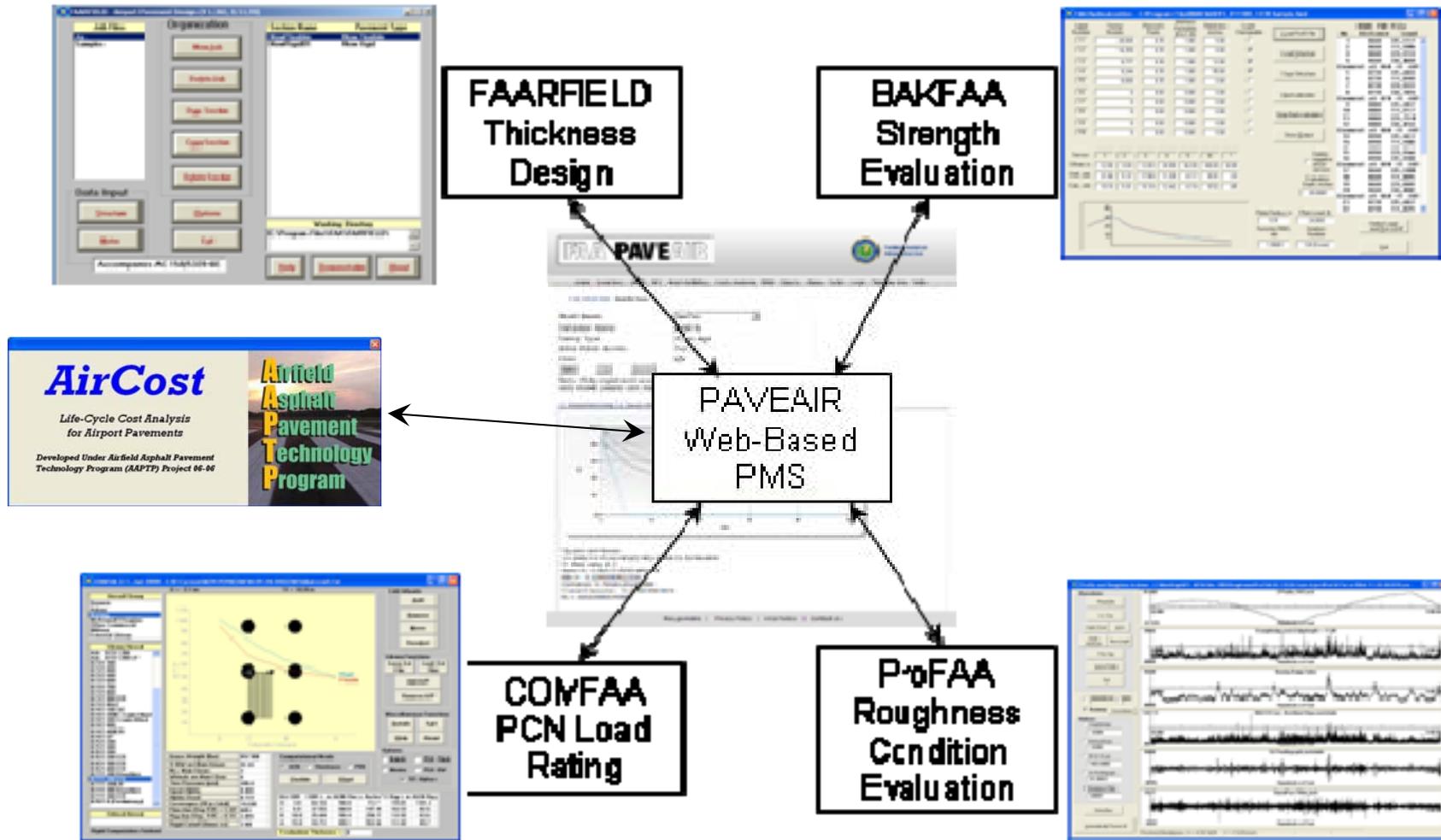


Airport Database Locations



Federal Aviation
Administration

FAA PAVEAIR Integration



PCI/Inspections

- **Integration with handheld Inspection devices**
 - **Trimble GeoExplorer 6000**
- **Bulk import of inspection data**
 - **XML**



Workshop and User's Group Meetings

- **Chicago, IL – March 2011**
- **University of Massachusetts at Dartmouth, MA – March 2011**
- **Houston, TX – July 2011**
- **Nashville, TN – September 2011**
- **Salt Lake City, UT – September 2012**
- **Panama City, Panama – October 2012**
- **Sioux Falls, SD – September 2013**
- **Sao Paulo, Brazil – December 2013**



Federal Aviation
Administration

Questions

- **Download:**
<http://airporttech.tc.faa.gov>
- **FAA PAVEAIR official site:**
<http://faapaveair.faa.gov>

