Integration of FAA Software Programs

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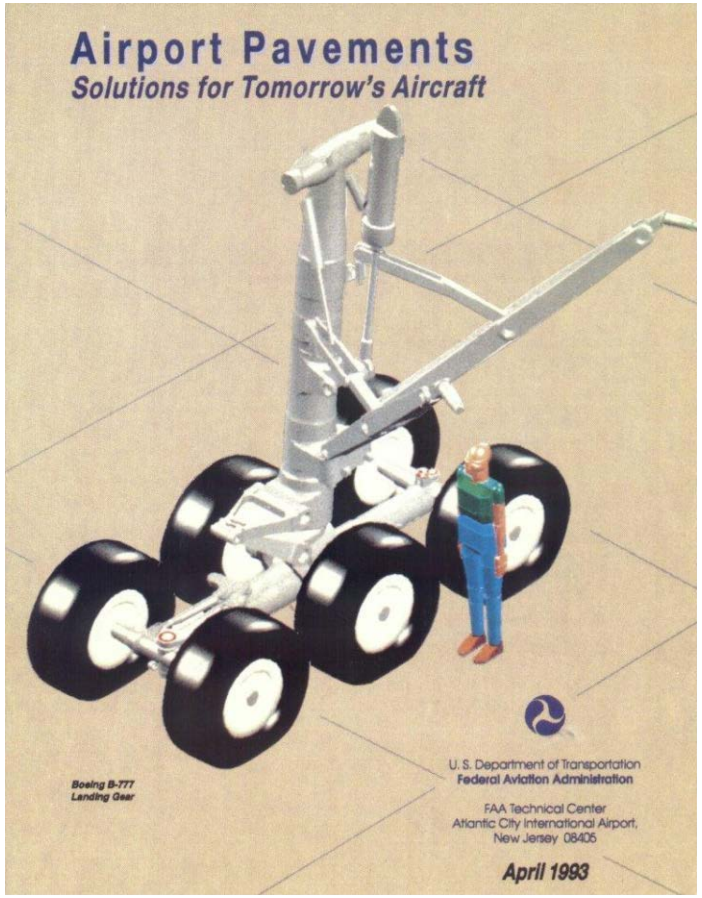
Current Status



- Since publication of the first airport pavement R&D plan in 1993, a comprehensive collection of airport pavement design and evaluation computer programs have been developed.
- Development of the computer programs was supported by analytical and full-scale test work.

Computer Programs Since 1993

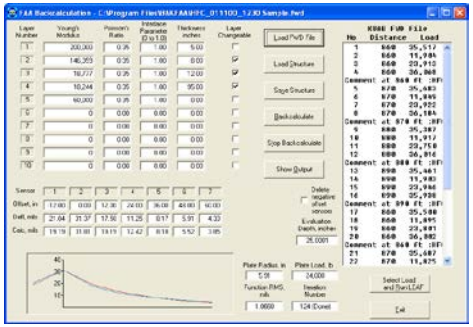
Name	Date of Adoption	Advisory Circular	Description
BAKFAA 2.0	2012	150/5370-11A	FAA Backcalculation of elastic layer properties using LEAF. Also computation of elastic layered system responses and used for LEAF development.
PAVEAIR	2011	NA	Web-based application for airport pavement management, including PCI evaluations.
COMFAA 3.0	2011	150/5335-5B	Automatic PCN computation.
FAARFIELD 1.3	2009	150/5320-6E	FAA Rigid and Flexible Interactive Layer Design. Fully tested thickness design. Uses NIKE3D for rigid and LEAF for flexible.
ProFAA	2009	150/5380-9	Longitudinal roughness profile analysis, roughness index computation, and aircraft ride simulation.
LEDFAA 1.3	2003	150/5320-6D Change 3	Rewrite of LEDFAA 1.2 as a 32-bit program. Uses LEAF instead of JULEA. Updated flexible failure model. Updated aircraft library, includes A380.
FEAFAA		NA	3D FEM program for rigid pavement response computation. Up to 9 slabs. Used to improve and extend FAA-NIKE3D.
FAA-NIKE3D		NA	3D finite element modeling system. Custom modification of the NIKE 3D FEM system developed by Lawrence Livermore Labs.
COMFAA 2.0	2006	150/5335-5A	ACN computation and thickness design by the FAA CBR and Westergaard methods.
BAKFAA	2003	150/5370-11A	FAA Backcalculation of elastic layer properties using LEAF. Also computation of elastic layered system responses and used for LEAF development.
LEAF	2003	NA	Layered Elastic Analysis FAA. Windows DLL layered elastic computational engine written in Visual Basic.
LEDFAA 1.2	1995	150/5320-16	FAA Layered Elastic Design. Windows-based 16-bit thickness design for flexible and rigid pavements. Used JULEA layered elastic computational engine. Development of DOS-Based LEDNEW by USACE.

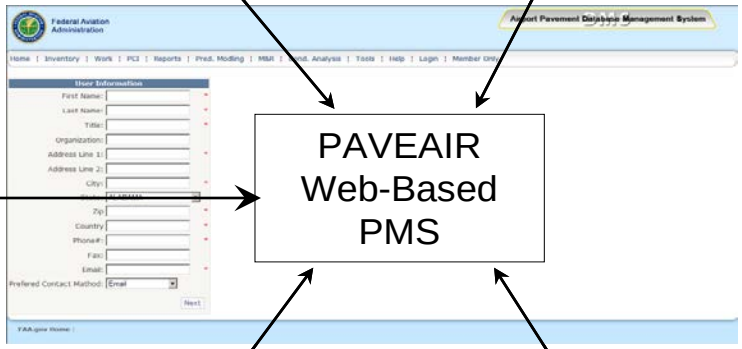
10-Year FAA R&D Plan

FAA Pavement Software Integration

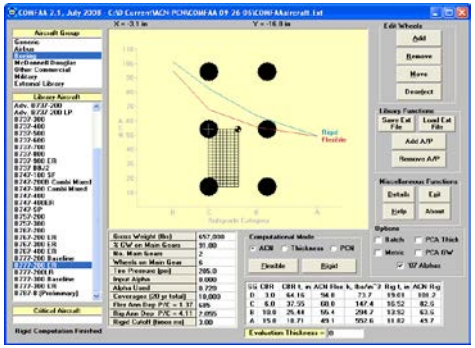
FAARFIELD Thickness Design

BAKFAA Strength Evaluation



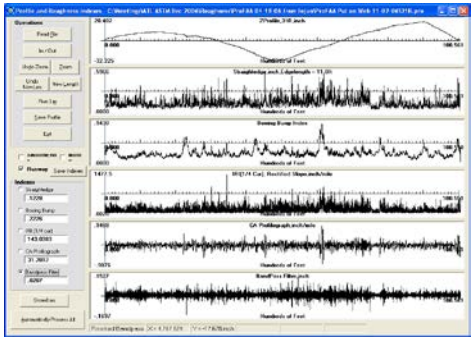


PAVEAIR Web-Based PMS



COMFAA PCN Load Rating

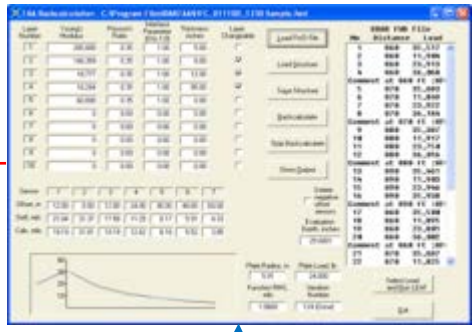
ProFAA Roughness Condition Evaluation



FAARFIELD

Pav't X-Section
Pav't Layer Properties
Aircraft Traffic

BAKFAA



Pav't Layer Properties

New Pav't Design

Pav't X-Section
F/HWD Data

New Pav't Design
Cost Information
Design Life

LCCA for New Pav't Design

Software Structures

- **FAA Pavement R&D Section is committed to further development and maintenance of computer program applications.**
- **FAA PAVEAIR is considered to be the “hub” application and should be the depository of almost all data required by the other programs.**
- **Current thinking is that the “satellite” programs should remain as individual applications linked to PAVEAIR by specialized services or other data pathways.**

Software Structures

- **All programs, including PAVEAIR, should be capable of being run stand-alone on individual personal computers.**
- **All programs should be capable of communicating with PAVEAIR over the internet.**

Software Structures (continued)

- **Different levels of integration.**
- **FAARFIELD, COMFAA, and BAKFAA should share pavement structures.**
- **FAARFIELD and COMFAA should share aircraft mixes.**
- **ProFAA should probably be almost completely independent, unless profiles are stored by PAVEAIR.**

Software Development Models

- **All programs except PAVEAIR were developed in VB 6.0.**
- **VB 6.0 is no longer supported by Microsoft and all programs must be translated into .NET applications, including all ancillary programs.**
- **Windows 7 should be the target operating system. The future of Windows 8 is not clear.**

Software Development Models

- **PAVEAIR is an ASPX web application and will remain so.**
- **FAARFIELD and BAKFAA have been translated from VB 6.0 into VB.NET Windows Forms applications.**
- **ProFAA is being translated from VB 6.0 into a VB.NET Windows Presentation Foundation application.**

Windows Forms

- **Windows Forms is the traditional Microsoft Windows software model.**
- **It might not be developed significantly beyond its current state.**
- **It is strictly a single computer software model.**
- **Communication over the internet is difficult (consider the 1-Click distribution model).**

Windows Presentation Foundation

- **Windows Presentation Foundation (WPF) is an alternative Windows software model with potential to displace Windows Forms for single computer use and allow a path to conversion to web-based applications.**
- **Features of WPF distinct from Forms are:**

Features of WPF distinct from Windows Forms

- **User interface and application code bases are almost completely separate (XAML versus VB).**
- **Automatic component resizing is built in.**
- **Can be compiled as a browser plug-in with reduced functionality.**
- **Can be translated to a Microsoft Silverlight application with reduced functionality with manageable effort.**

Microsoft Silverlight

- **Silverlight is Microsoft's version of Adobe Flash.**
- **Can be compiled as a true single computer application or a true web-based application (plug-in) by changing only a couple of lines of code.**
- **Need to decide which model to use very soon.**

Download the Brochure for More Information

http://www.airporttech.tc.faa.gov/10YearPlan/

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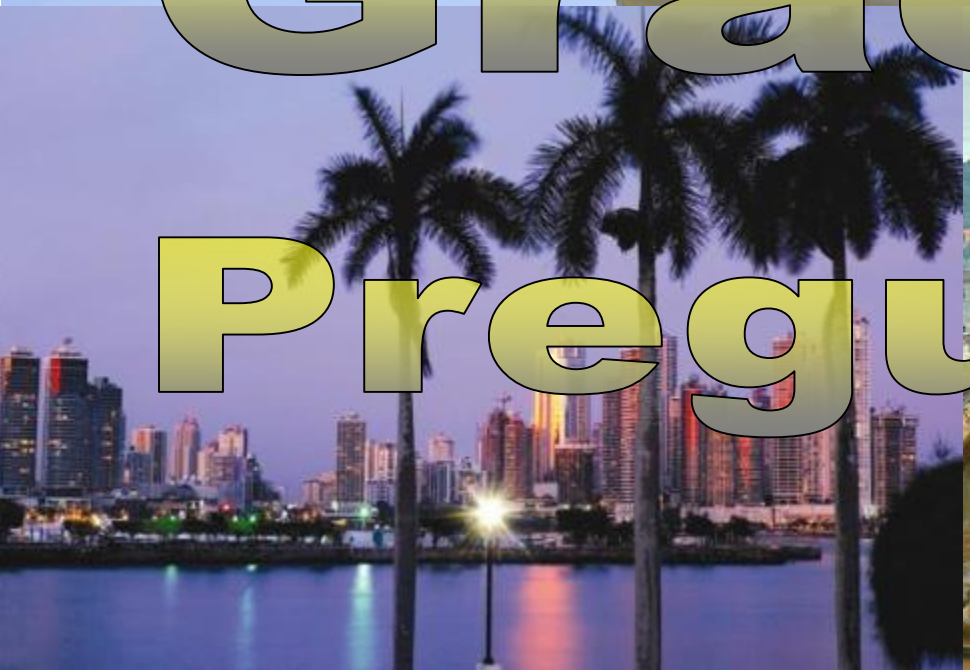
Gracias



Preguntas

Airport Technology R&D Branch
http://www.airporttech.tc.faa.gov