ProFAA – Airport Pavement Roughness Update

Federal Aviation Administration

Presented to: FAA Airport Pavement Working Group Meeting

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Presentation Outline

- **ProFAA Program Improvements.**
- **Airport Pavement Profile Database.**
- **Pilot Subjective Ratings Pavement Roughness Simulator Project.**
- **ProFAA – Roughness Future Work.**

  - Bridging Filter, Dr. Qiang Wang, SRA

ProFAA Program Improvements

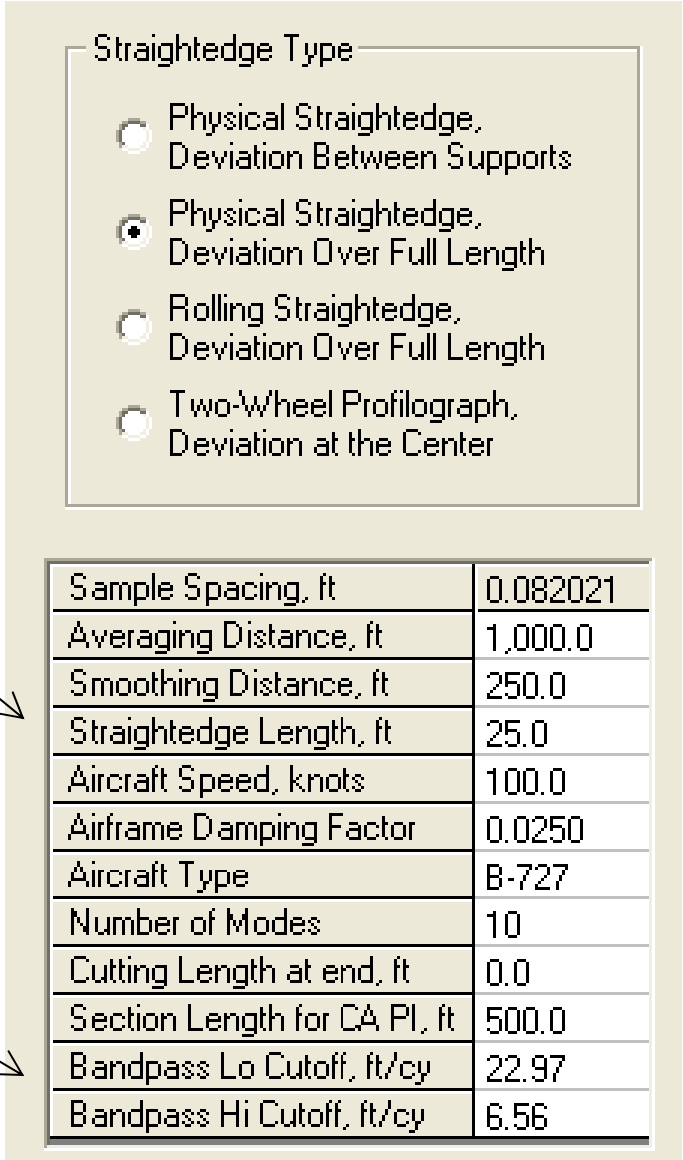
- New straightedge modes.
- Band-pass filter change.
- New zoom mode.
- Translation to VB.NET 2010.
- User interface about 80% complete.
- Now transferring the calculation code from the VB 6.0 implementation.

ProFAA Program Improvements

- Straightedge Modes

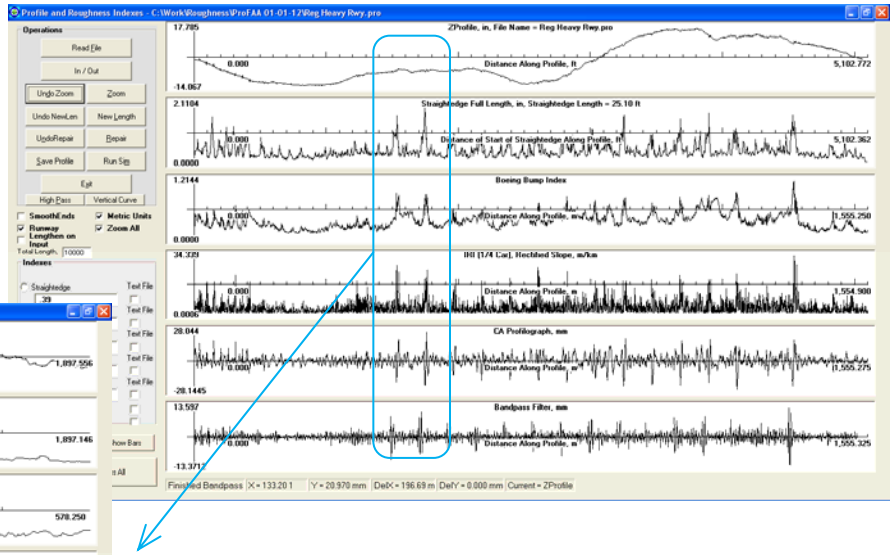
The length of all straightedges can be varied up to 1,500 ft. (457 m) by the user

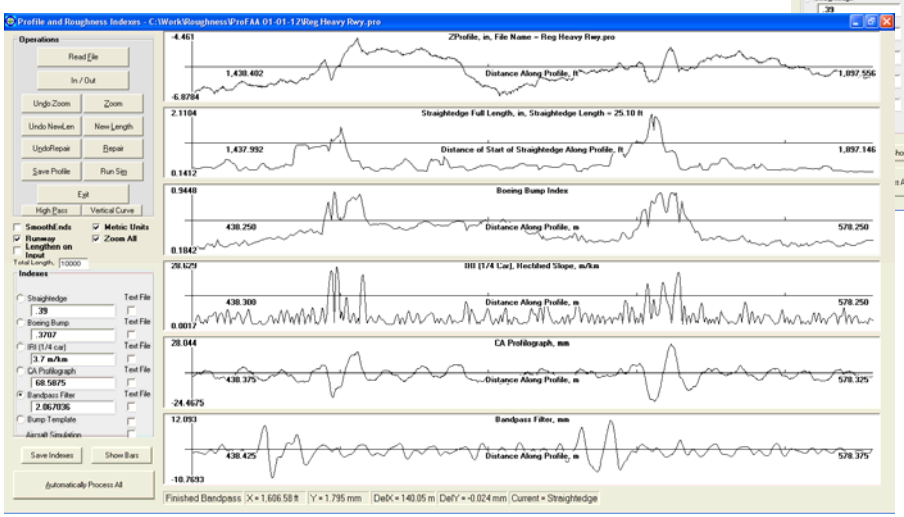
The cutoff wavelengths of the band-pass filter can be changed to any values by the user



ProFAA Program Improvements

- **Simultaneous Zoom on All Screens & Indexes**





Airport Pavement Profile Database

- Spreadsheet containing 69 CL runway longitudinal profiles.
- Database includes roughness indexes and raw data.
- Database to be made available on NAPTF website.

AIRFIELD ROUGHNESS INDEX CALCULATION

File Name	Straightedge Index (inch)	Boeing Bump	IRI (inch/mile)	BandPass (inch)	Profile Index (inch/mile)
18Rc1	0.2546	0.3243	214.8005	0.0425	43.894
36Lc1	0.217	0.1871	169.9431	0.0268	27.9676
Ac113c2	0.1128	0.1382	97.6946	0.0186	6.7243
Ac2tanc1	0.123	0.3373	102.8956	0.0167	16.9046
Ch122lc	0.1038	0.1227	88.9298	0.0147	5.9813
Ch132lc	0.1168	0.1537	101.0497	0.0143	11.7241
Ch132rc	0.1563	0.2025	126.423	0.018	30.3303
CHO103C1	0.0723	0.1345	63.1267	0.01	4.4573
CHO121C1	0.0734	0.1348	63.6595	0.0099	4.4709
CHO203C1	0.0945	0.159	82.8922	0.0124	9.4156
Co214lc2	0.1199	0.1458	95.2086	0.0199	9.4254
Co222lc1	0.1019	0.1143	88.4238	0.0151	5.3878
Co232rc1	0.1313	0.1636	101.875	0.0175	15.3191
Co2tssc1	0.1137	0.2001	88.9933	0.0169	9.393
Df113rc1	0.2229	0.2811	185.1442	0.0252	50.367
Df113rc2	0.2327	0.2892	195.2511	0.0257	53.6339
Df113rc3	0.2392	0.2935	199.8713	0.0267	55.1923
Df117rc	0.0985	0.1216	80.595	0.0124	7.3874
Df1cn1	0.1584	0.2705	130.7874	0.0164	32.7271
Df1cs1	0.1827	0.291	145.5159	0.0157	47.1283
Df1csc	0.1993	0.2868	161.1853	0.0219	49.5682
Df1gnc	0.1894	0.2395	168.054	0.0279	28.5021

Pavement Roughness Simulator Project

Cockpit Ride Quality

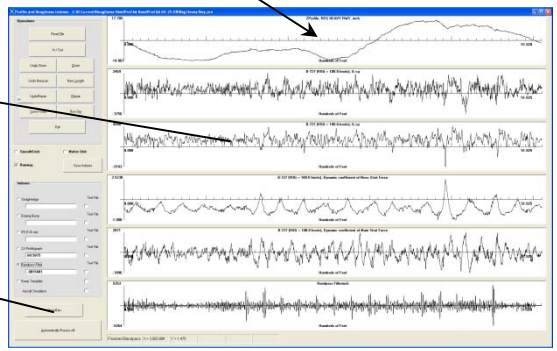
Measure profile and import into ProFAA

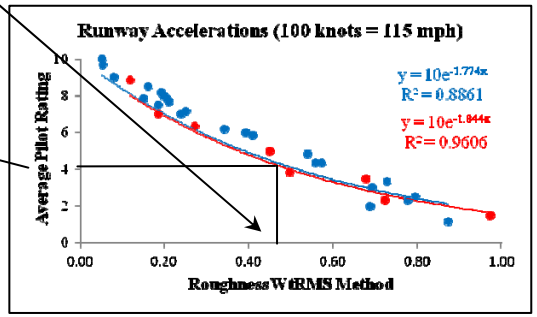
Compute vertical cockpit acceleration for a selected aircraft simulation in ProFAA

Filter the cockpit acceleration signal in ProFAA and compute an objective roughness index from the filtered acceleration

Compute a pilot ride quality rating from an established correlation between subjective pilot rating and objective roughness index

Input the ride quality rating into a pavement management database





ProFAA 2.0 Future Work

- **Proposed ProFAA Improvements:**
- **Create Output to Word and Text Files**
- **Refine Aircraft Simulation Output**
- **Add Functions for Save Index Results and Vertical Curve**
- **Bridging Filter Simulation**