



CENTER FOR ADVANCED AVIATION SYSTEM DEVELOPMENT (CAASD)

Enhancing the FAA's Airport Safety Analysis Capability

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MITRE/CAASD Overview

- **The MITRE Corporation**
 - Private, independent, not-for-profit organization
 - Chartered to work in the public interest
- **CAASD**
 - Federally Funded Research & Development Center (FFRDC) operated by MITRE
 - Provides system engineering, research and development, and information technology support to the Federal Aviation Administration (FAA) and international civil aviation authorities



FAA Airport Safety Analysis

- **The FAA may evaluate**
 - **Obstacles**
 - **Terminal Procedures (TERPS) surfaces**
 - **Terrain**
 - **Taxiing aircraft**

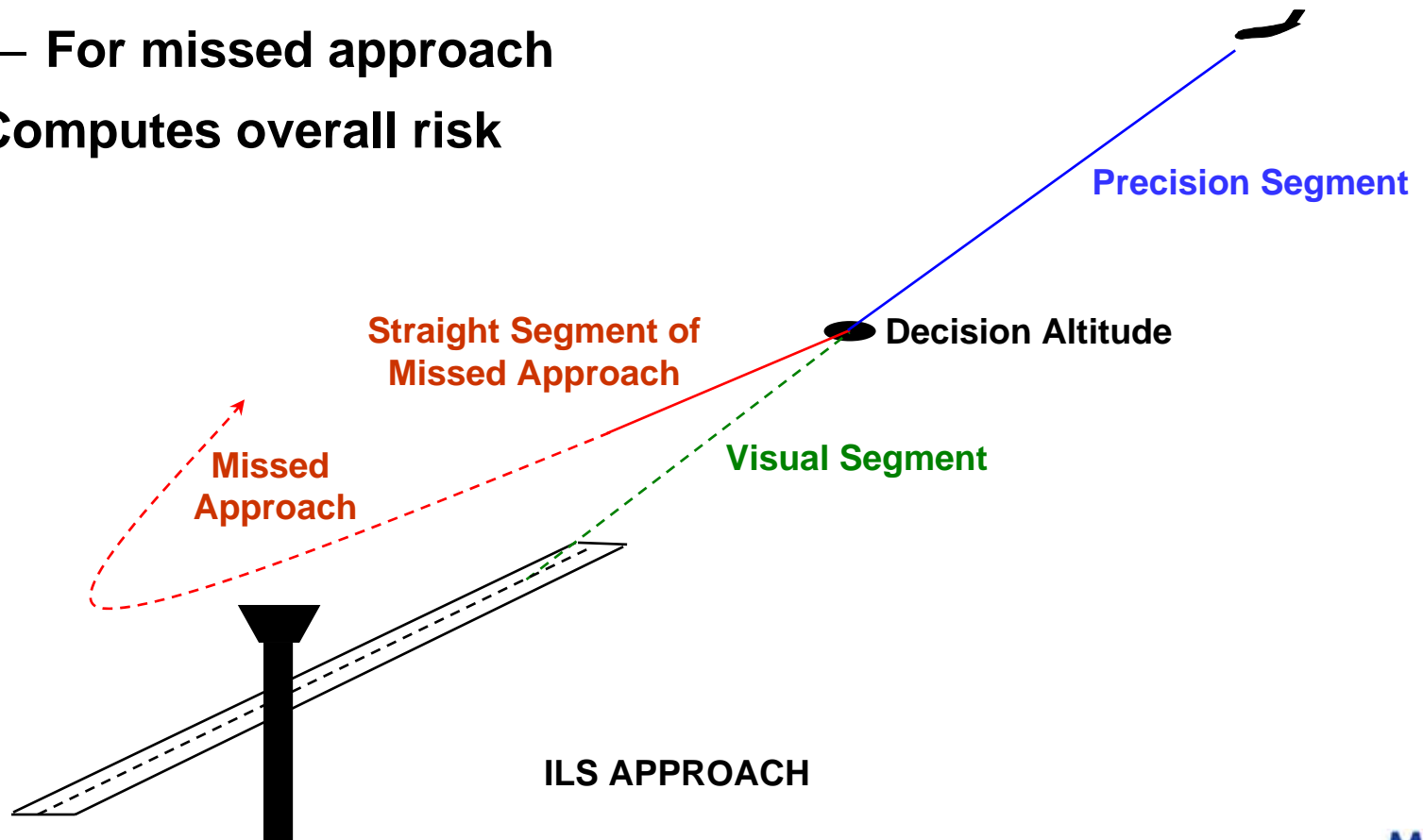


Construction of new runway at SEA



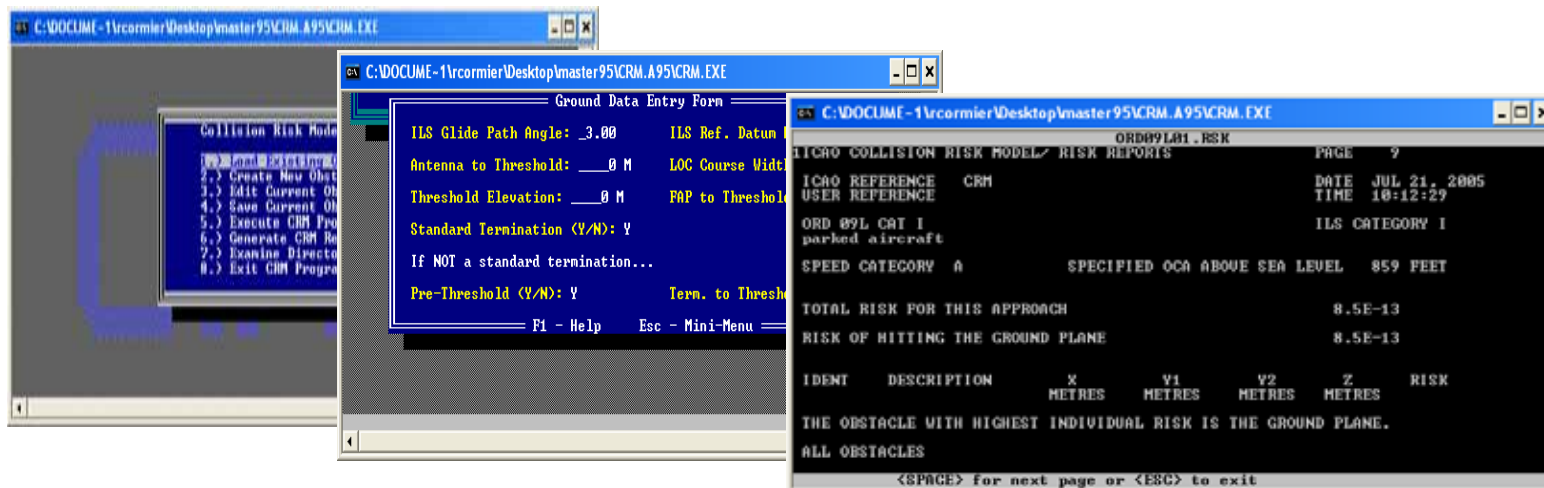
Collision Risk Model (CRM)

- Analyzes risk of collision with each obstacle
 - For precision segment
 - For missed approach
- Computes overall risk



CRM Limitations

- PC-DOS text based interface or no GUI
- Text file I/O
- No interfaces to data sources
- No GIS display capability
- One runway per input file
- Only point or wall obstacles (no complex shapes)

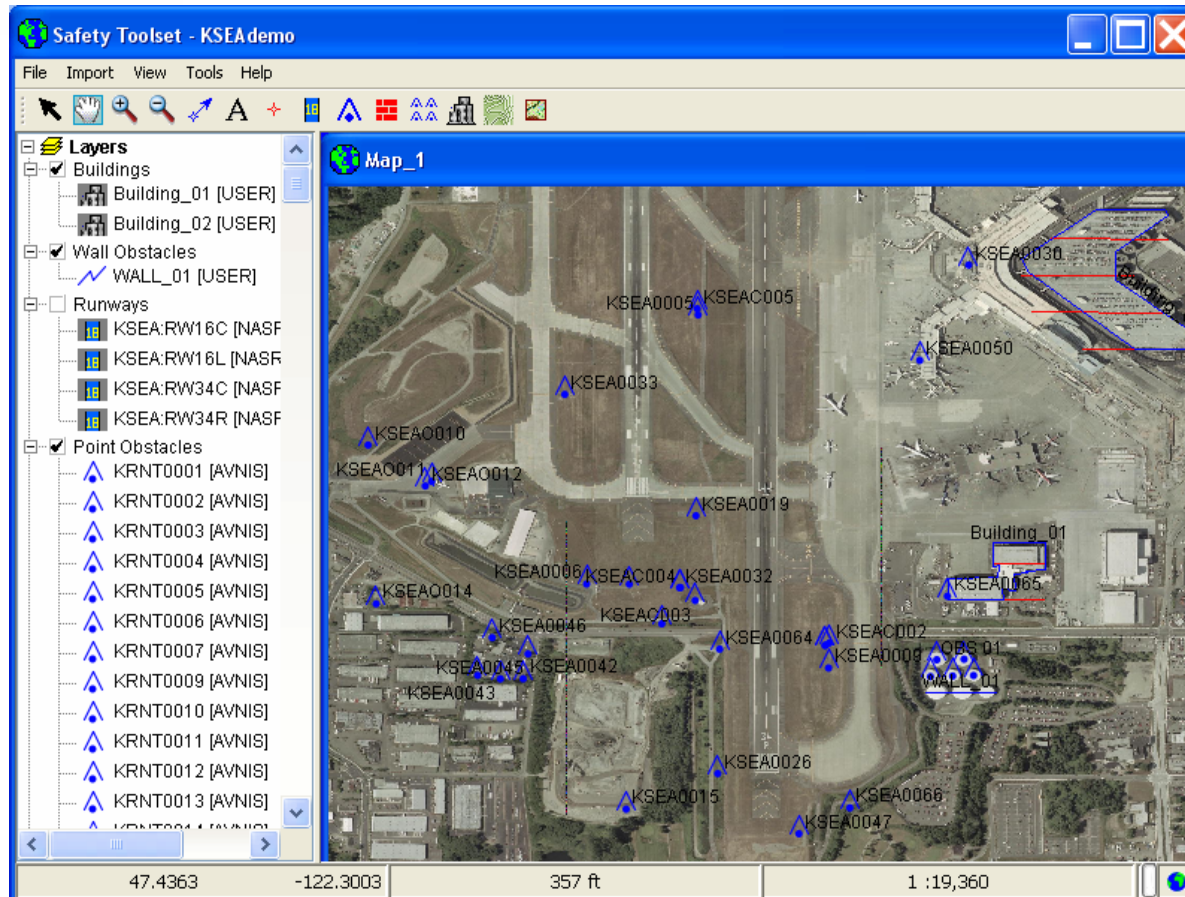


Legacy CRM GUI



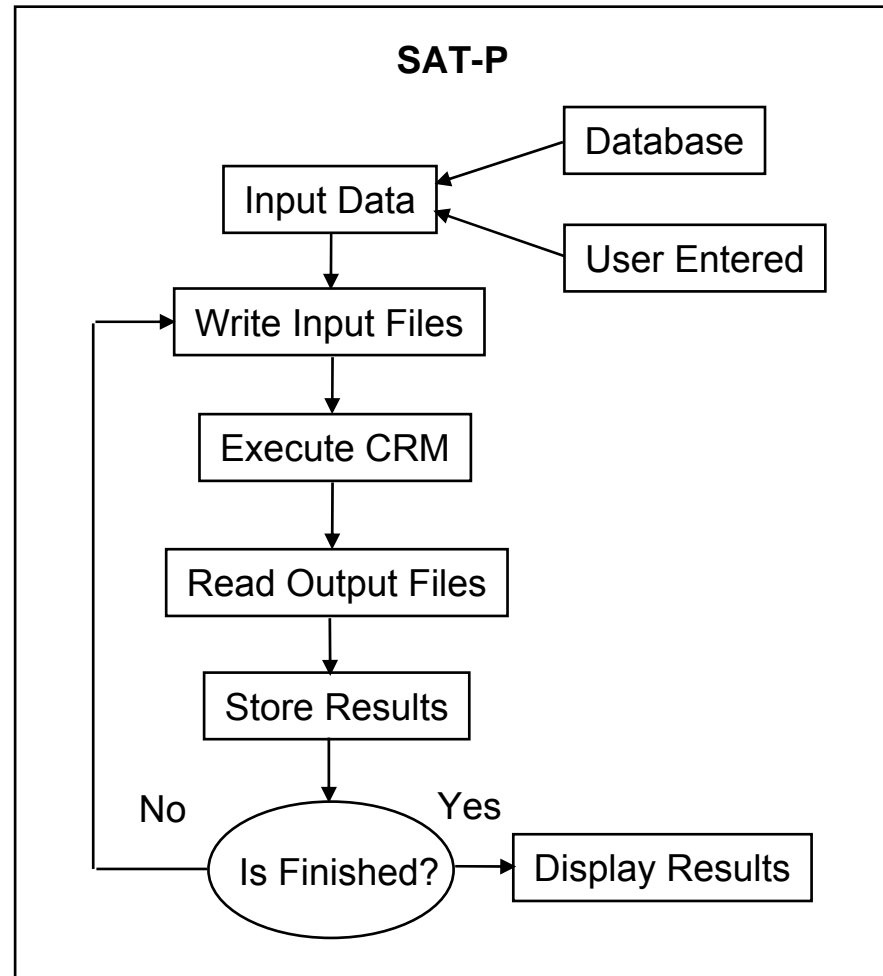
Safety Assessment Toolset Prototype (SAT-P)

- Provides GIS display using ESRI MapObjects –Java libraries



SAT-P/CRM Interface

- Provides access to :
 - Airports
 - Runways
 - Obstacles
 - ILSs
 - Nav aids
 - Imagery
 - Terrain data
- Allows batch CRM analysis





Advanced Features: Modeling Buildings

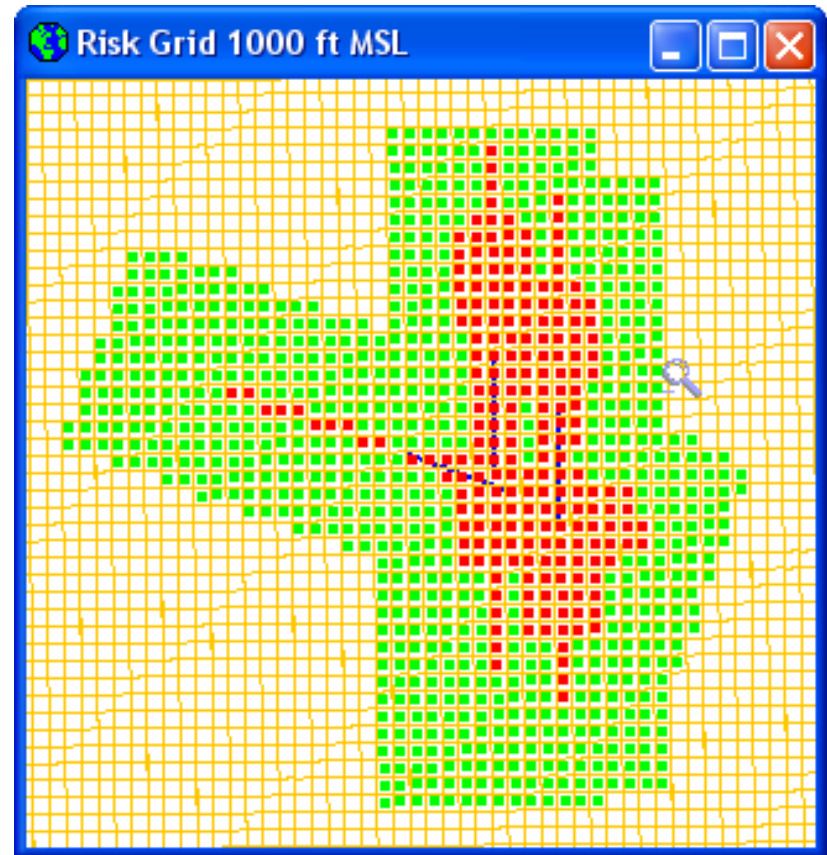
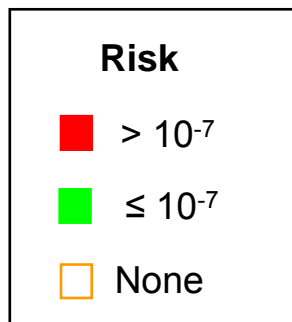
- **Import imagery, outline buildings**
- **Generates wall obstacles perpendicular to each runway, suitable for CRM analysis**





Advanced Features : Risk Grids

- **Assess risk over**
 - Large area
 - Small detailed area
 - Stacked grids
- **Runs CRM hundreds or thousands of times**
- **Shows areas of high, low or no risk**

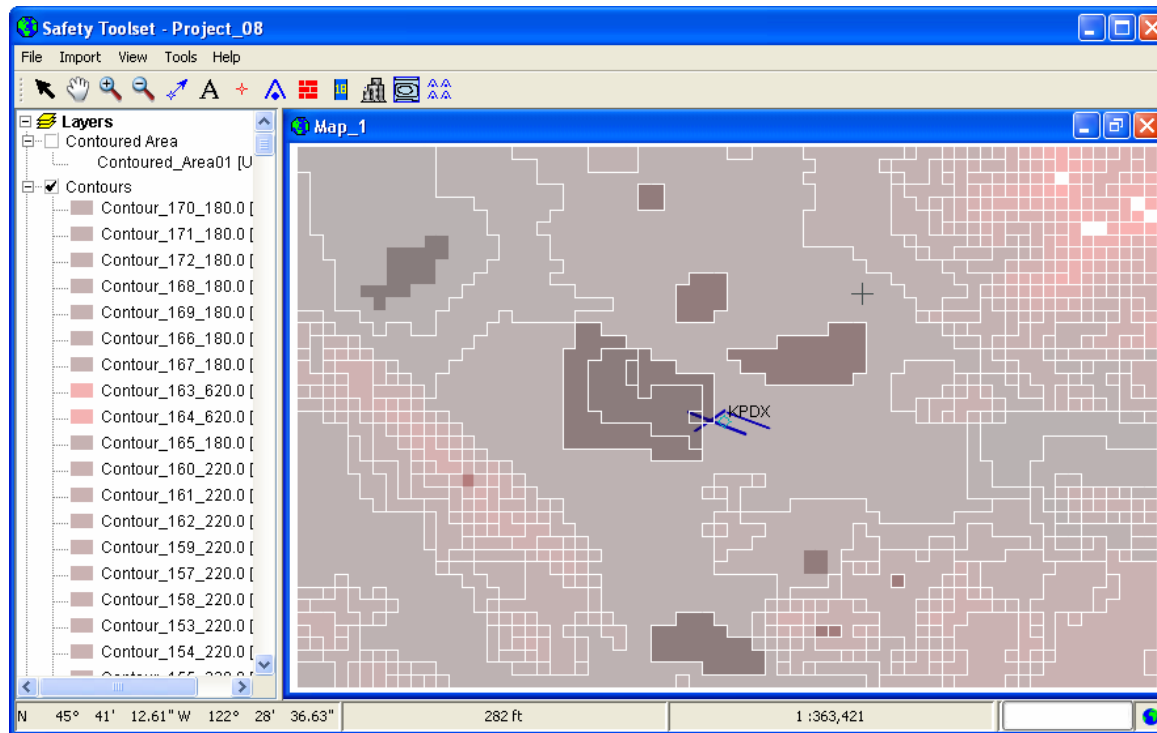


Risk Grid at IAD (1000 FT MSL)



Advanced Features : Terrain Evaluation

- Creates contours from terrain data
- Generates obstacles along contours for CRM



Terrain Contours



Beyond CRM

- **TERPS surfaces**
- **3D visualization – Google Earth**
- **Runway/taxiway separation standards**
- **Other data sources**
 - **Electronic Airport Layout Plans (eALP)**
 - **Fleet mix**



SEA TERPS Surfaces – RW16L

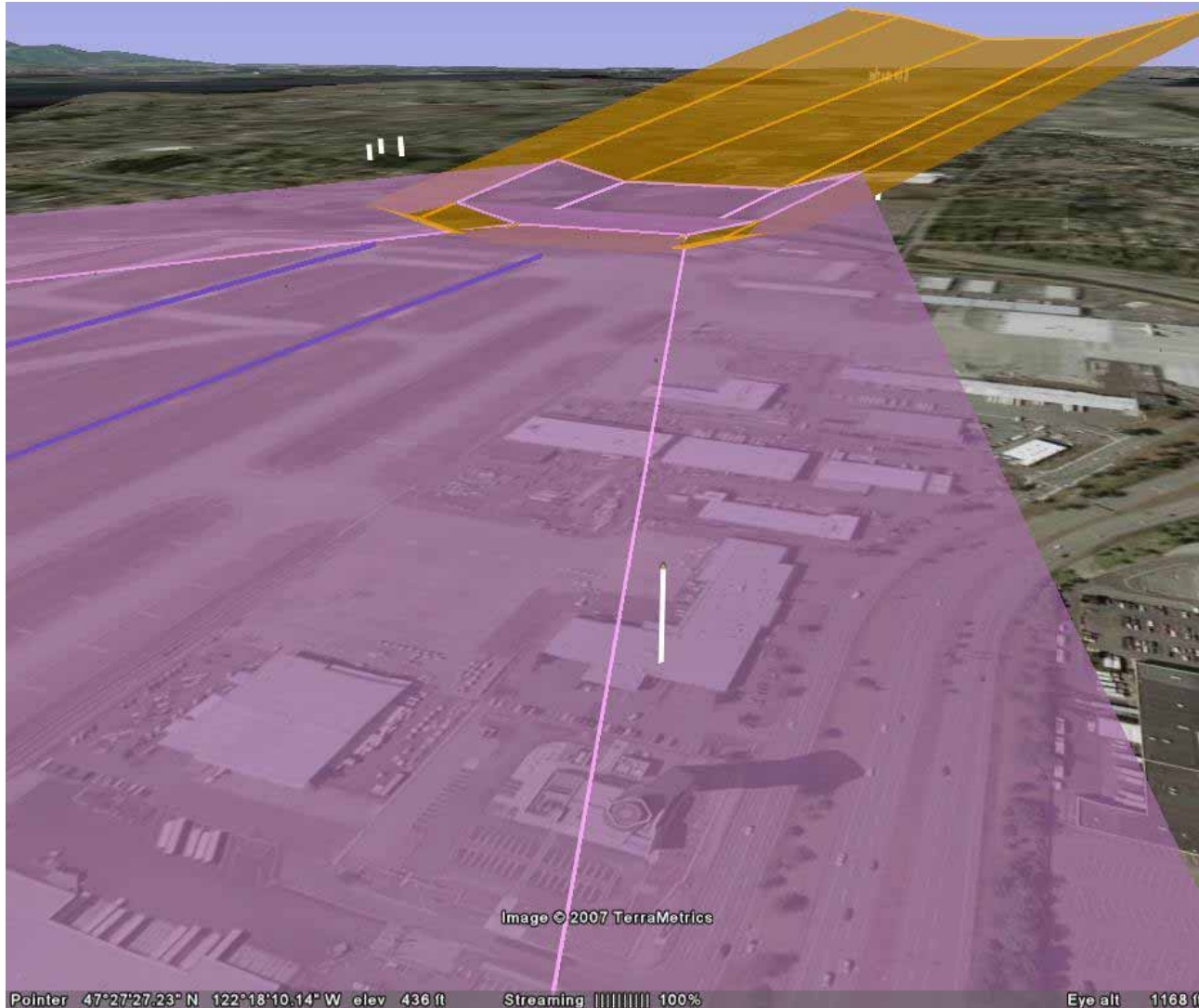


OCS

MAS

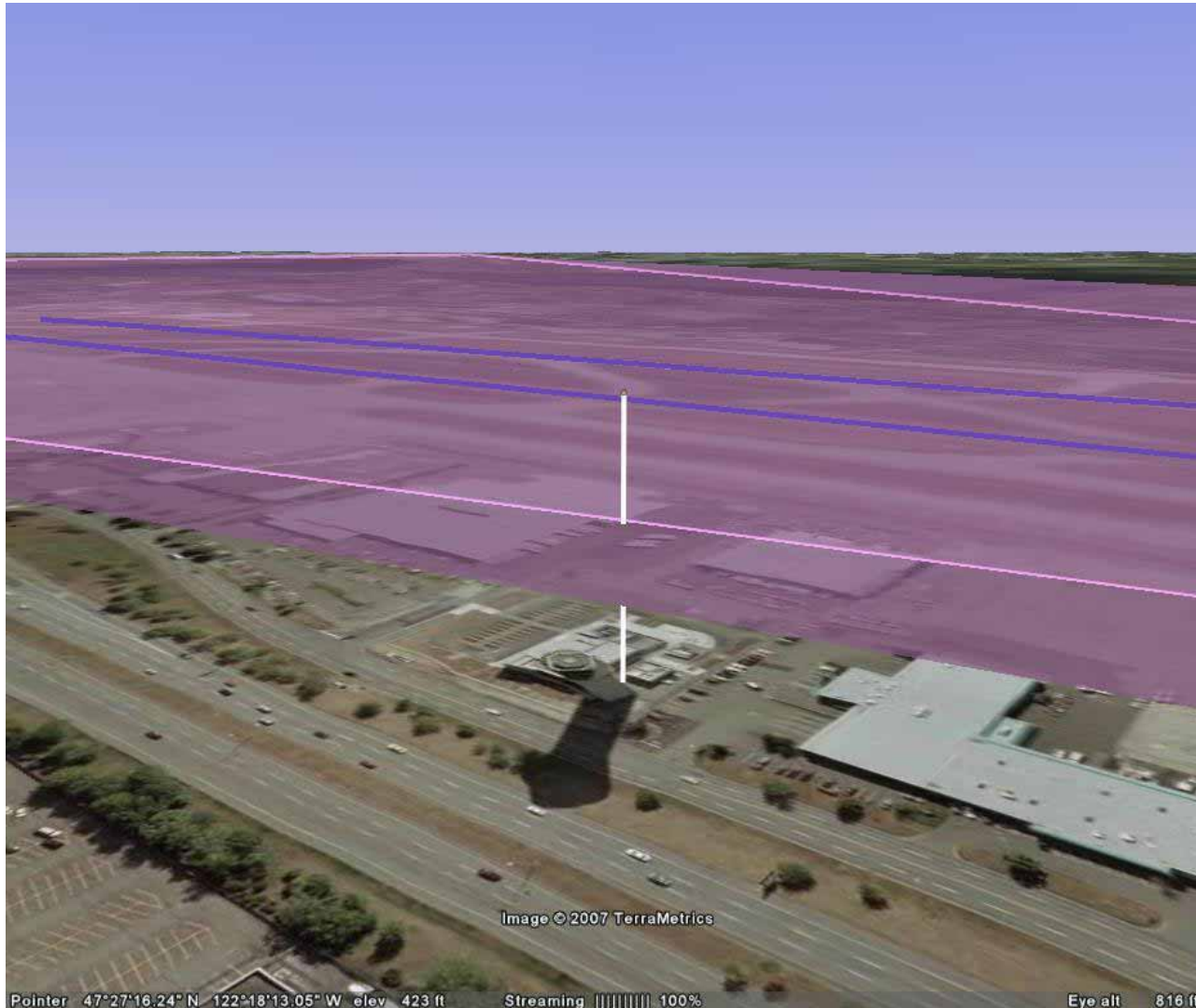


SEA Tower – View 1



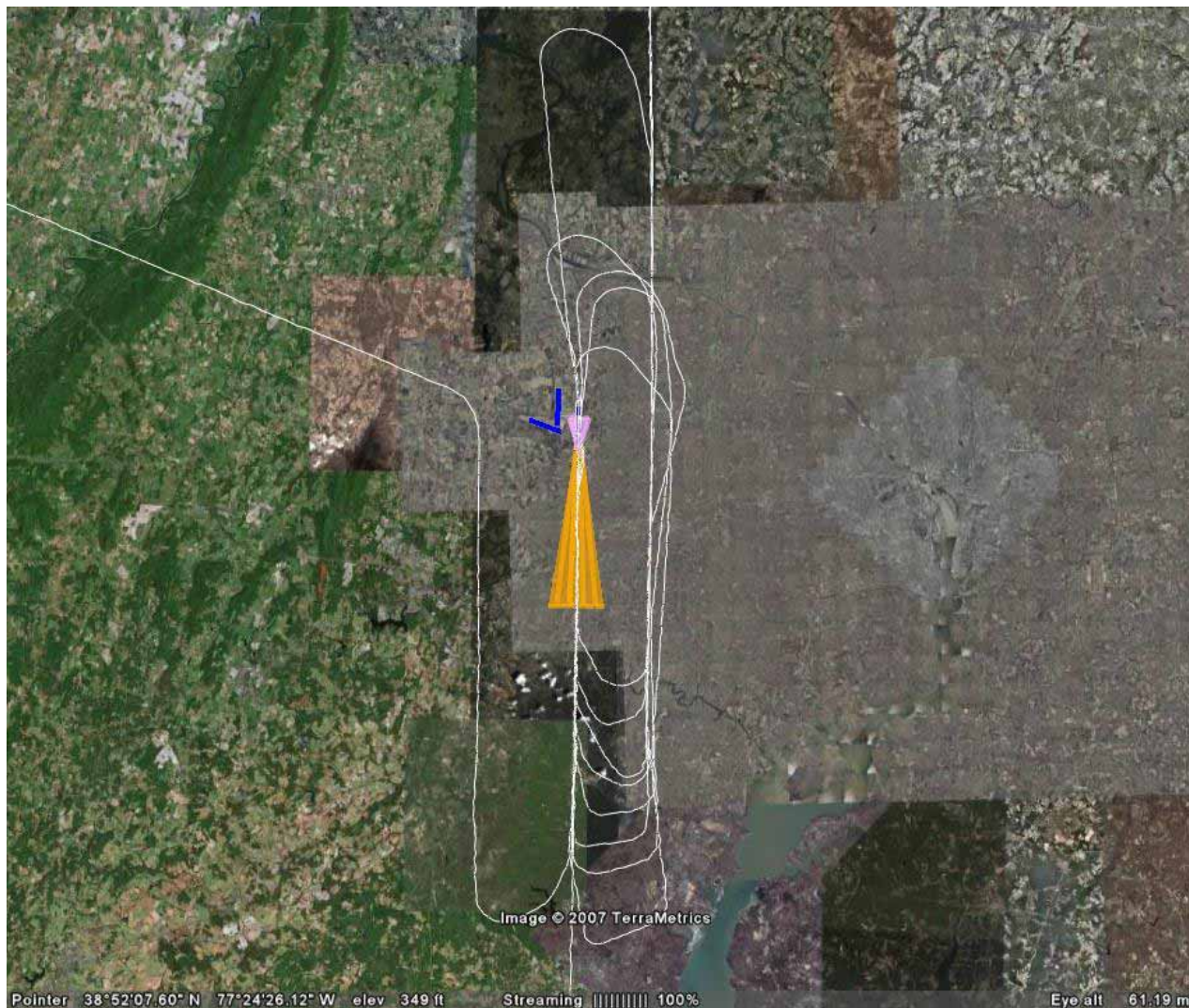


SEA Tower – View 2



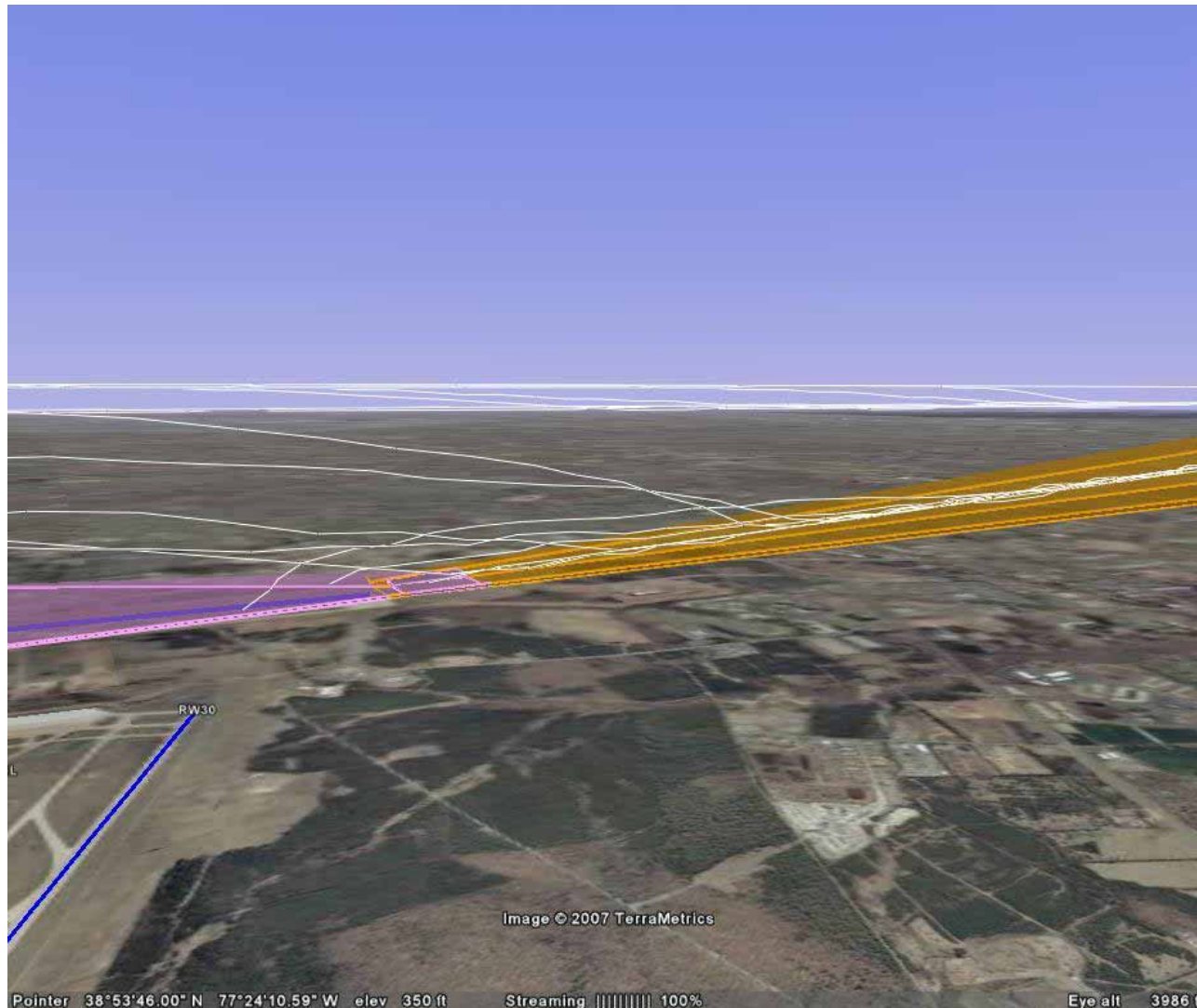


IAD RW01R Missed Approach Track Data – View 1



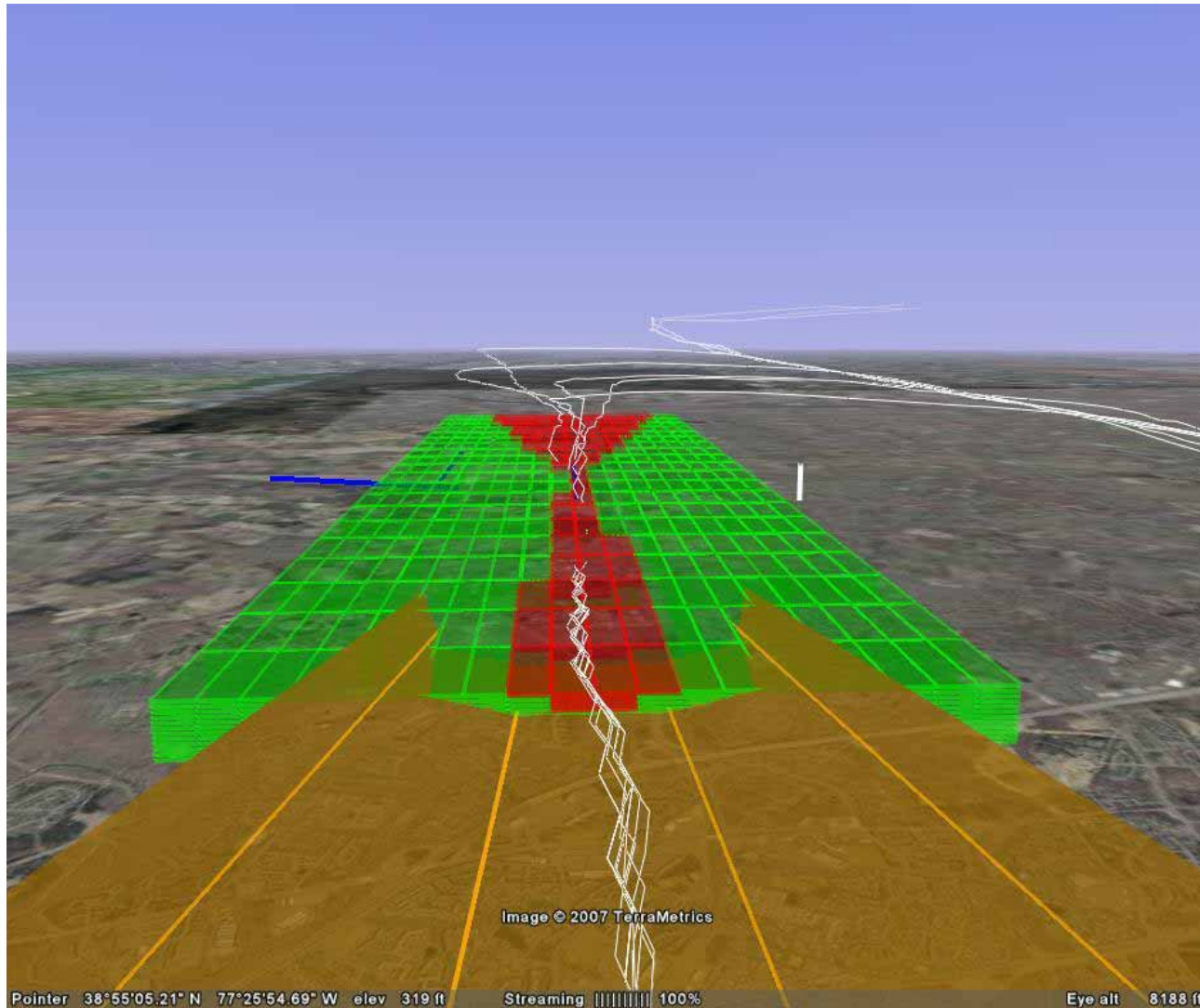


IAD RW01R Missed Approach Track Data – View 2



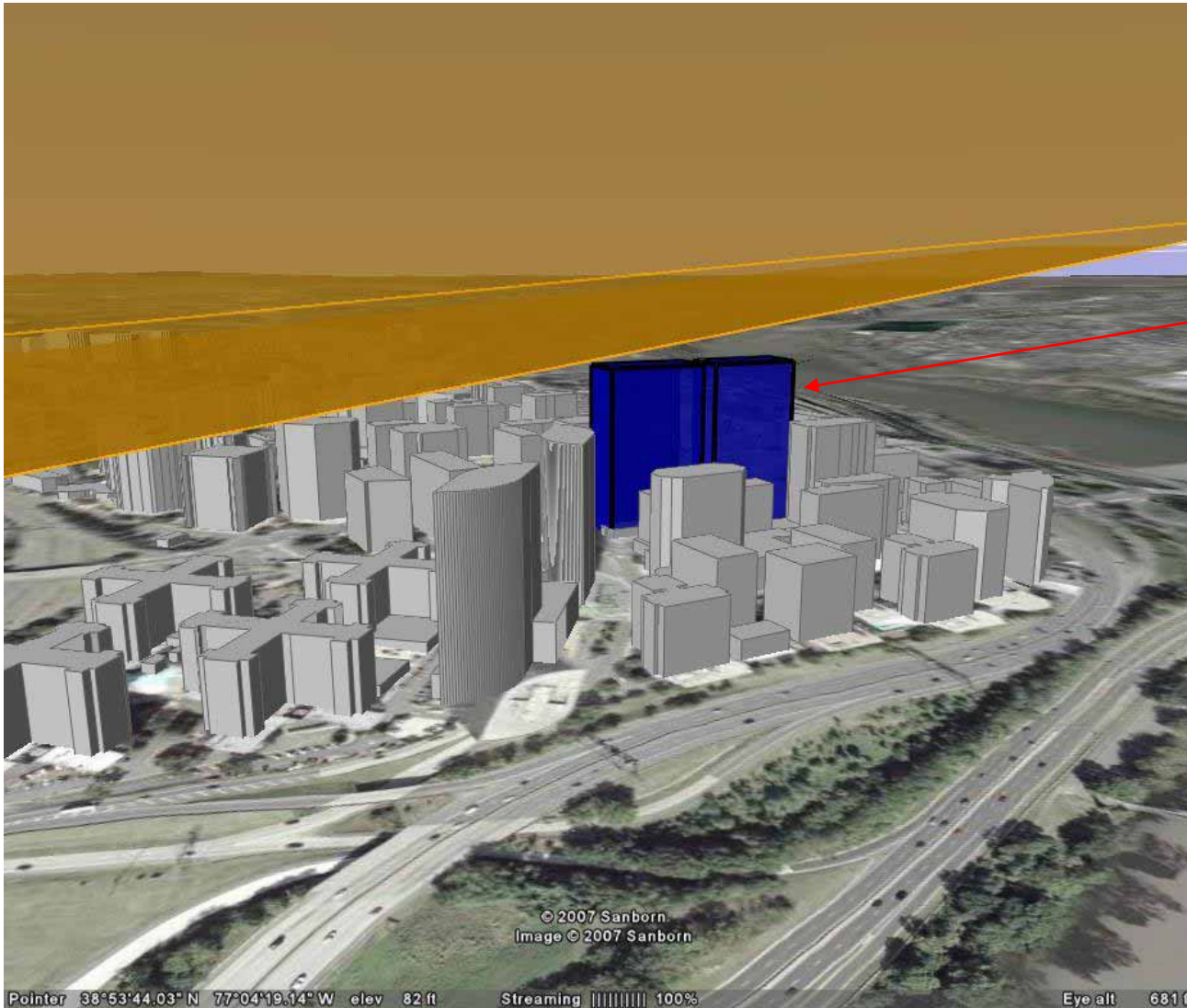


Stacked Risk Grids





DCA TERPS Surfaces / Rosslyn, VA



Generic
TERPS
Surfaces

Approximation of
Proposed
Buildings

© 2007 Sanborn
Image © 2007 Sanborn

Pointer 38°53'44.03" N 77°04'19.14" W elev 82 ft

Streaming ||||| 100%

Eye alt 681 ft



SAT-P Summary

- **Provides GIS display**
- **Allows easy access to data**
- **Saves time in completing CRM analyses**
- **Models complex obstacles**
- **Analyzes TERPS surfaces**
- **Exports data to Google Earth**



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