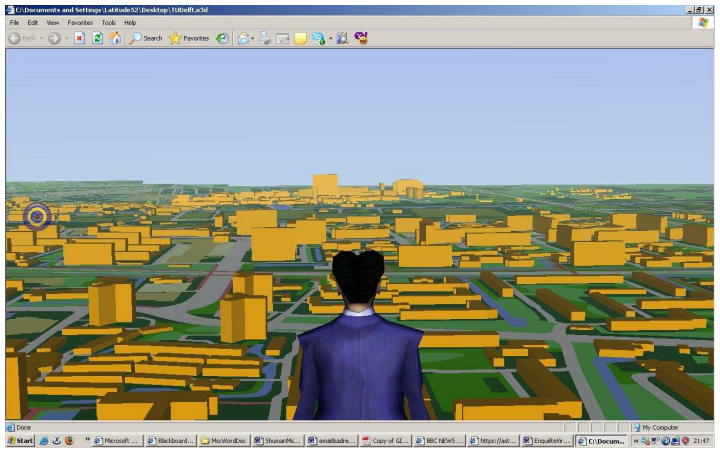
3D city modelling

Method for 3D polygonal modelling in ArcGIS Environment



Shuman M.S. Kibria
Msc. Student GIMA (Geographical Information Application and Management)
Supervisor:
Dr. Sisi Zlatanova

Basic Concept

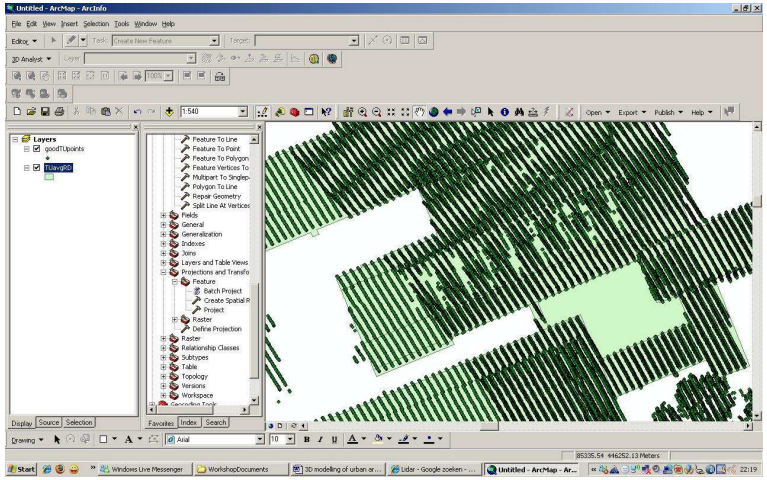
ArcGIS Environment:

ArcMap

ArcScene

3D Analyst Tool

Export Tool for Sketchup



Basic Concept:

Spatial Join of H (height) information to a building footprint

Extrude the building footprint using the H (height) information

Basic Concept

Data Used

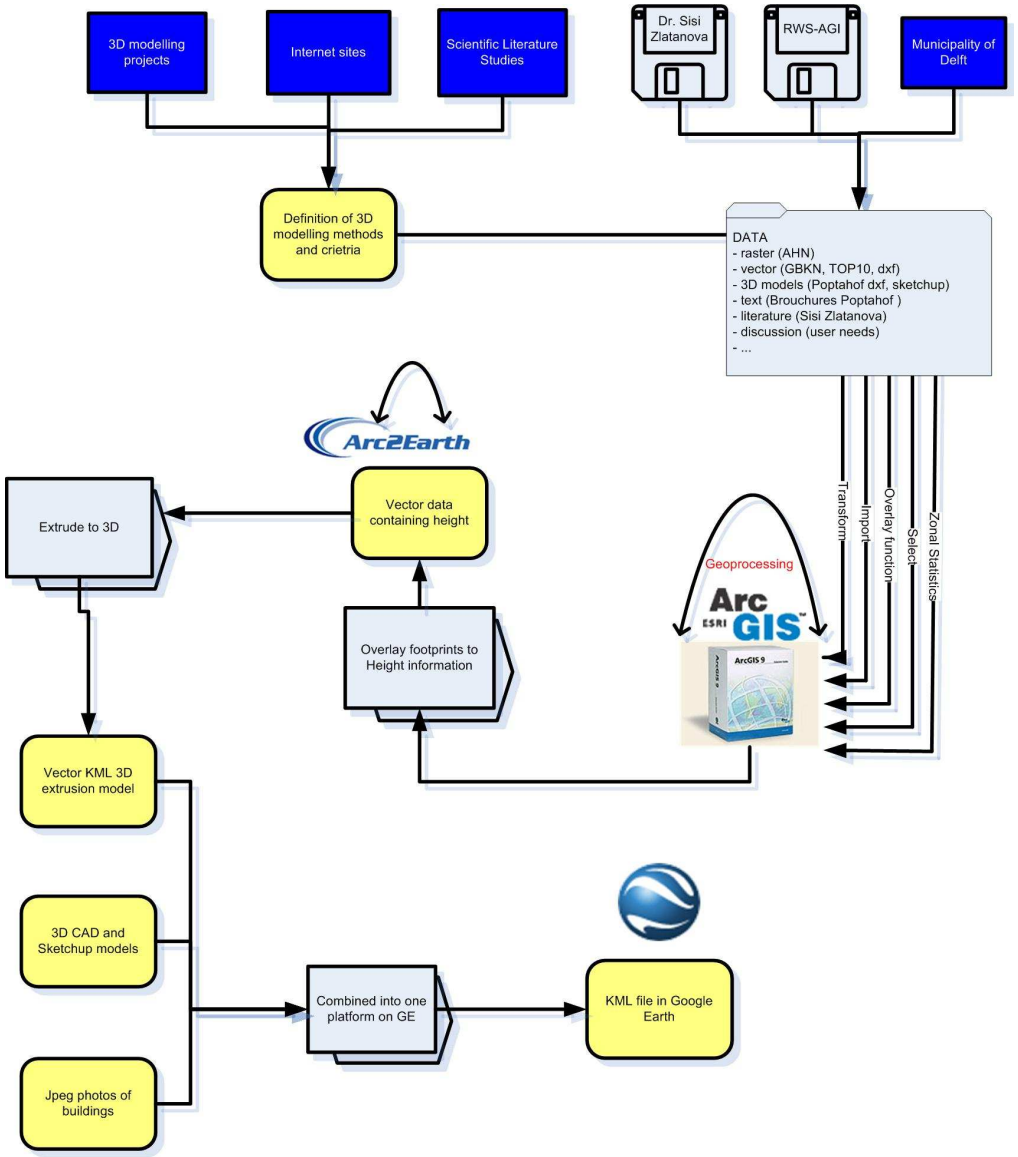
Shape polygon geometry GBKN (Grootschalige Basiskaart Nederland),

Shape polygon geometry TOP10NL (Topographical Map of the Netherlands, Scale 1:10,000)

XYZ Point Height model

Raster Actual Height Model or AHN

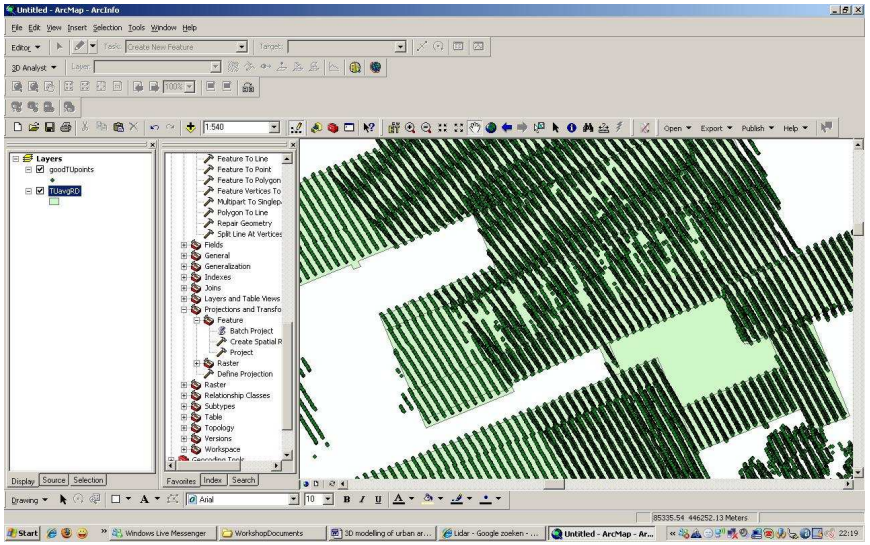
For overlay functions all data needs to be converted to vector shape geometry.

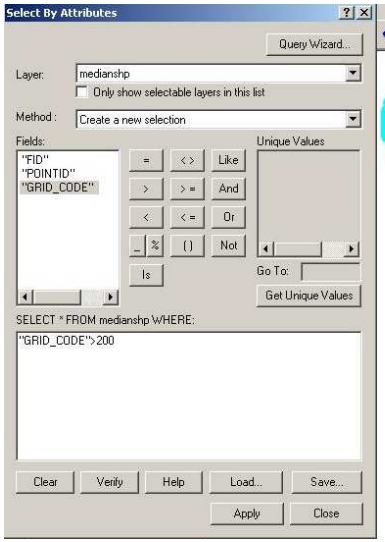


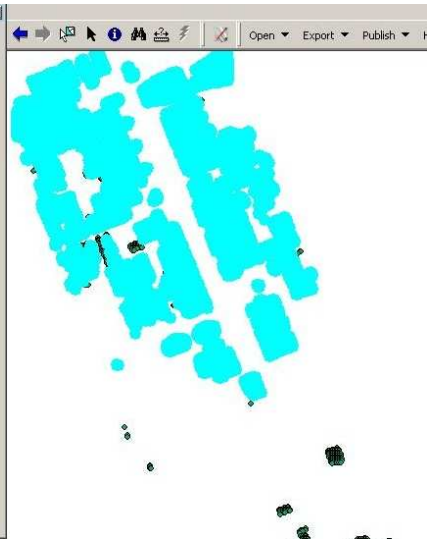
Step 1

Vector Overlay

Show me which points fall inside the building footprint polygons







Clip

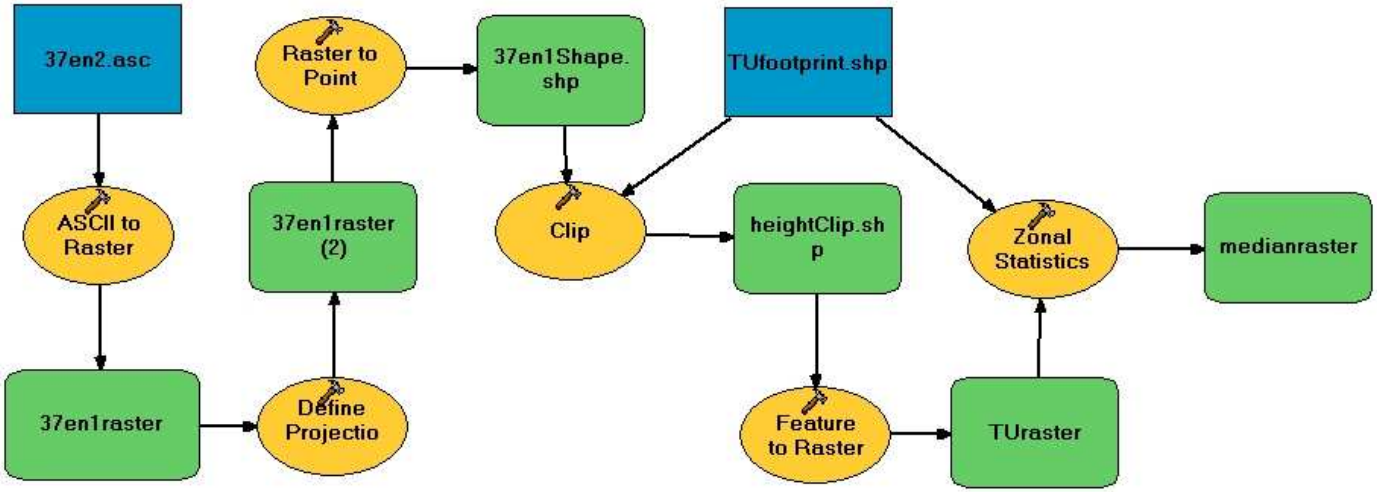
Make a clip of the vector points that fall inside building footprint polygon.

Zonal Statistics

Calculate the median value of these points that fall inside Polygon ID 001 using zonal statistics.

Give all the points that fall inside the polygon footprint the same value (median value)

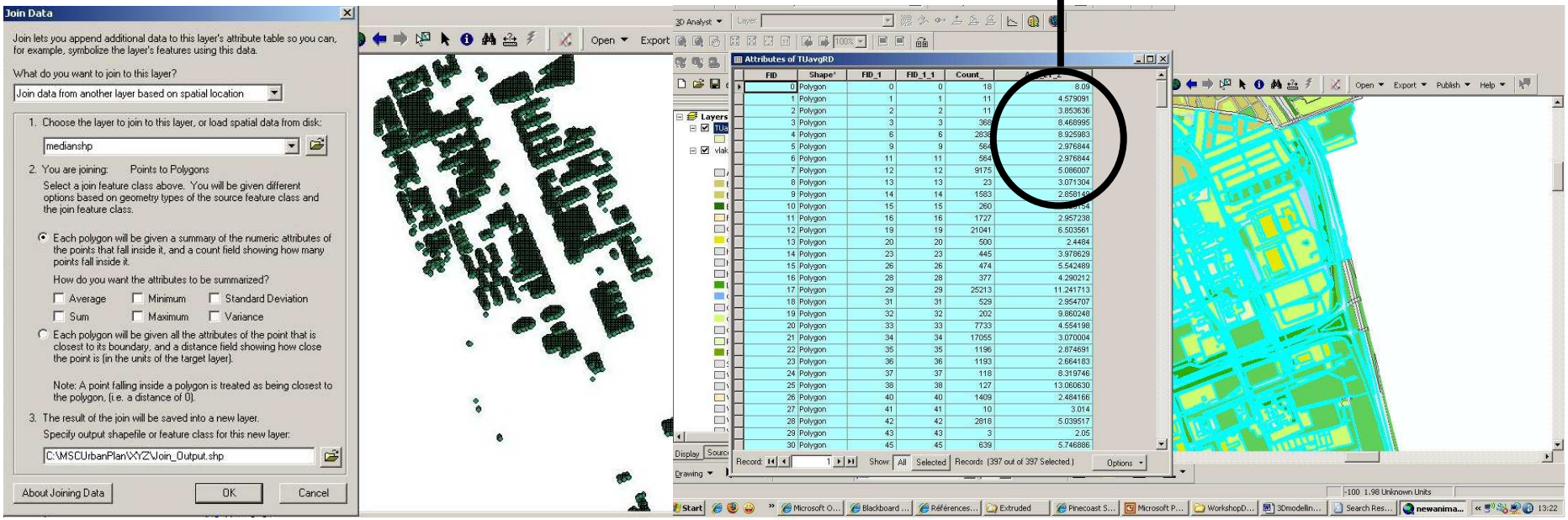
All the points inside a certian polygon receives the median value therefore the average of this values will represent the median height of the polygon which contains these points.



Spatial Join

Add this height information to the polygon as an attribute.

Height Information as Attribute of the Polygon Footprint



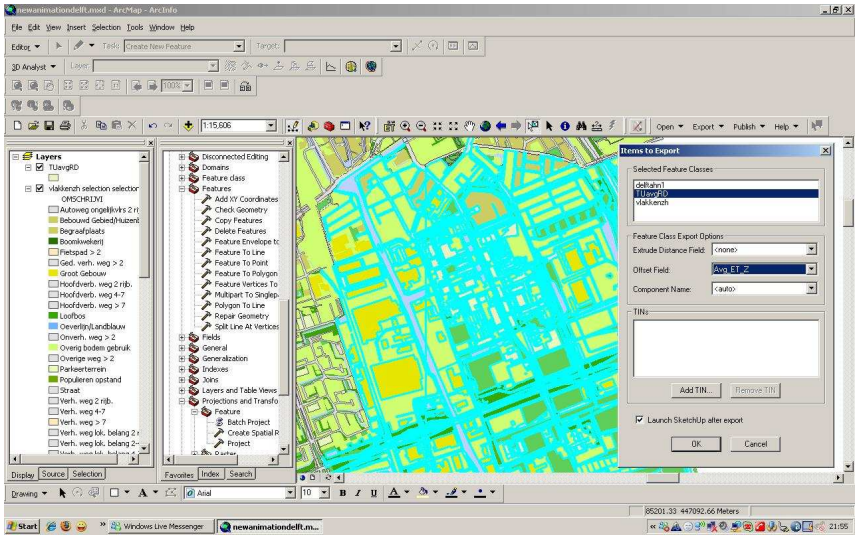
Step 4

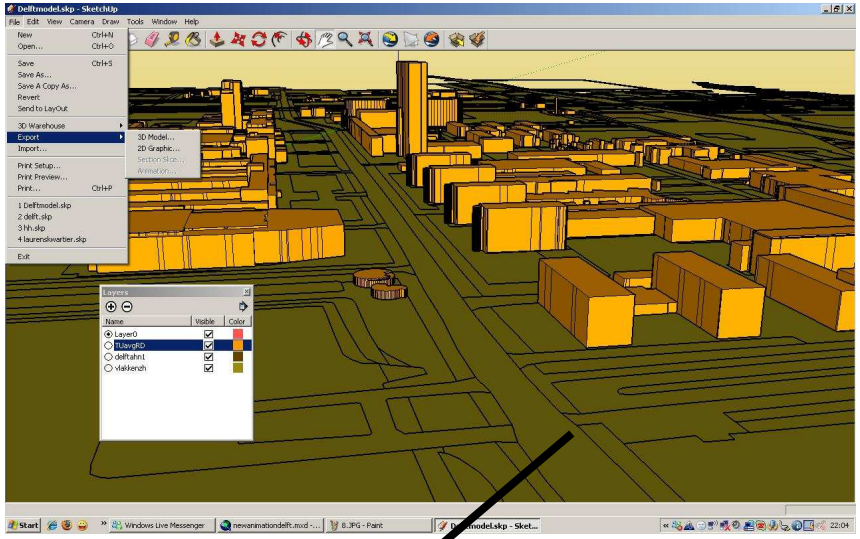
Extrusion

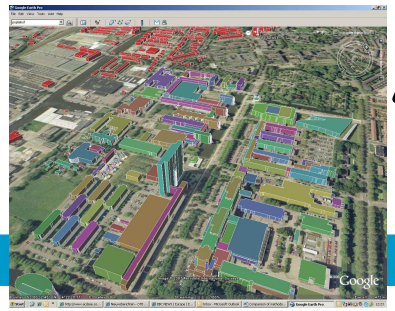
Free toolbox on Internet for Export to sketchup

Geo-referencing of original data from shape and TIN can be exported

3D data format (multipatch) can be exported and imported in ArcGIS Environment







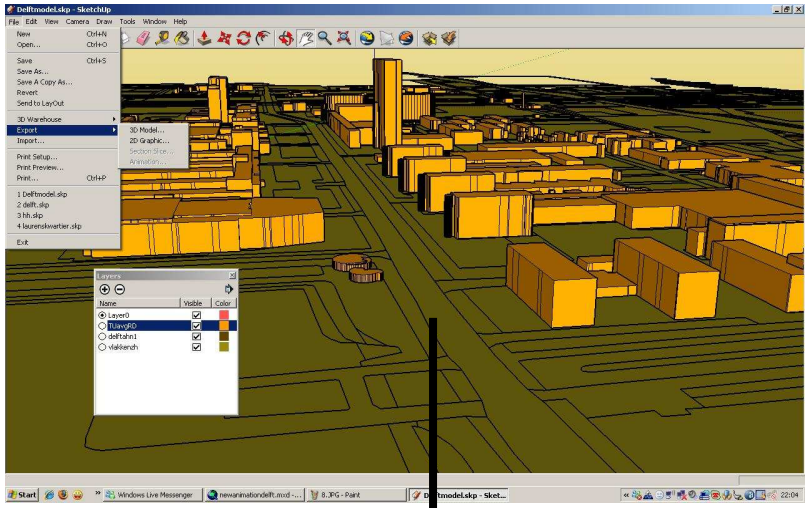
Georeferenced
Export to Google Earth

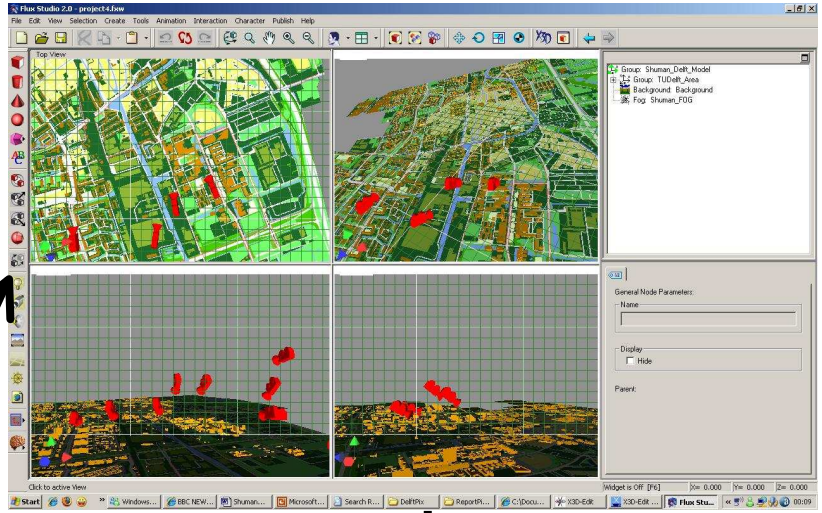
Creating a 3D Scene of Delft City

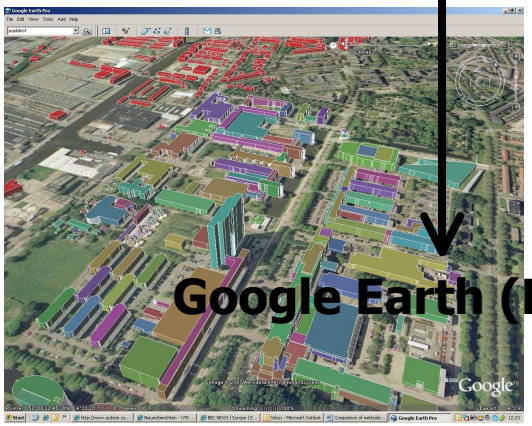
Export to KML/X3D LoD1

Tools Sketchup & FluxStudio

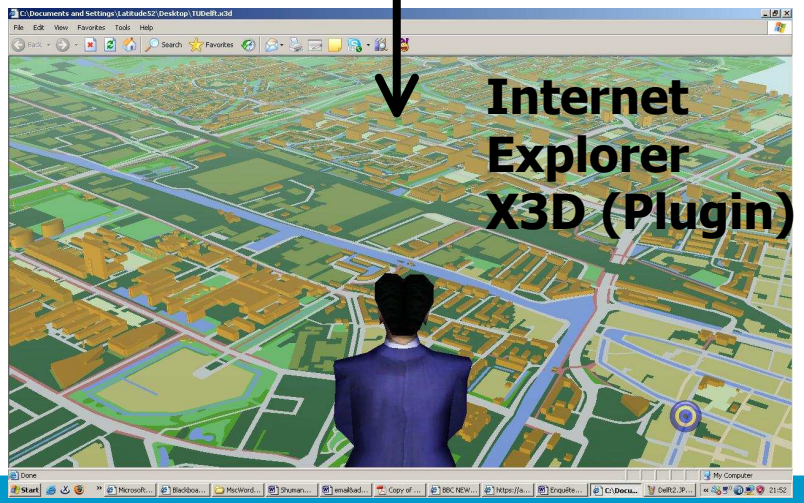
Freeware Data Fusion Environment: Flux Studio







Google Earth (KML Format)



Internet Explorer X3D (Plugin)