

3D Annotated Archive

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The catalogue below serves as an archive of 3D materials created by the author, and colleagues as noted in linked files, over the past seven years. In it, links are provided to servers that maintain persistent storage (in so far as possible). Brief descriptions accompany many of the links, making the archive and annotated one. Collections of links are grouped primarily according to style of software used to create the file and secondarily by topic. Recently, Google presented software to aid in the making of models of buildings; the addition is a welcome one and reduces the need for independent modelers to spend hours in tedious, but interesting, virtual construction. Models awarded "Blue Ribbon" status by Google appear in the default onboard layer of Google Earth called "3D Buildings."

Books:

- . 3D Atlas of Ann Arbor:
 - o [2006: 1st Edition](#) [Link](#) in Deep Blue.
 - o [2006: 2nd Edition](#) [Link](#) in Deep Blue.
 - o [2007: 3rd Edition](#) [Link](#) in Deep Blue.
- . Spatial Synthesis.
 - o Volume I
 - [2005: Book 1](#) [Link](#) in Deep Blue.
 - o Volume II
 - [2008: Book 1](#) [Link](#) in Deep Blue.
 - [2008: Book 2](#) [Link](#) in Deep Blue.
 - [2008: Book 2a](#) [Link](#) in Deep Blue.
 - [2008: Book 3](#) [Link](#) in Deep Blue.
 - [2009: Book 4](#) [Link](#) in Deep Blue.

In the [Google 3D Warehouse](#):

- . Featured Google Earth modeler, Arlinghaus, known as "Archimedes" 2007-present. [Link](#)
- . Archimedes's models (created by the author; the Collection in the Warehouse contains a few extras submitted by others)
 - o Adjusted Collections:
 - [University of Michigan, Adjusted](#). Contains 41 models. In June of 2007, higher resolution aeriels were introduced. In these, there appeared to be a datum shift from the previous lower resolution images. Thus, models built on building footprints for the lower resolution files need to be realigned to fit with the building footprints for the higher resolution images. This collection represents such a set for the campus of The University of Michigan. It also includes a few older models that would not respond appropriately to re-alignment and subsequent upload to the server (work continues on those). Download this entire set of models to have "best possible" coverage of the entire campus.
 - [Ann Arbor, Adjusted](#). Contains 3 models. In June of 2007, higher resolution aeriels were introduced. In these,

there appeared to be a datum shift from the previous lower resolution images. Thus, models built on building footprints for the lower resolution files need to be realigned to fit with the building footprints for the higher resolution images. This collection represents such a set for the city of Ann Arbor beyond The University of Michigan campus.

- **Adjusted Models, Ann Arbor.** Contains 2 collections of models from above. In June of 2007, higher resolution aerials were introduced. In these, there appeared to be a datum shift from the previous lower resolution images. Thus, models built on building footprints for the lower resolution files need to be realigned to fit with the building footprints for the higher resolution images. This collection represents a set of adjusted collections.
- **Original Collections, made prior to June 2007, using earlier aerials.**
 - **University of Michigan: Textured and Partially Textured Building Groups.** Contains 14 models. Sets of buildings: all have textured rooftops and at least one building in each group is fully textured (as a naming anchor for the set).
 - **University of Michigan: Textured.** Contains 34 models. Contains buildings of The University of Michigan, Ann Arbor, that are fully textured.
 - **University of Michigan.** Contains 41 models. All buildings of the University of Michigan on campus maps appear here (about 300 buildings). Unless otherwise noted, all models were created by Sandra Lach Arlinghaus. Special thanks (full citations appears in 3D Atlas of Ann Arbor, <http://www.imagenet.org/>): 3D Laboratory in the Duderstadt Center of The University of Michigan for their advice. Dr. Klaus-Peter Beier, Director; Lars Schumann, Manager; Steffen Heise, 3D Lab. Thanks for base GIS files: Donald T. Uchman, Drafting Intermediate Supervisor, Space Information, The University of Michigan; Matthew Naud, Environmental Coordinator, City of Ann Arbor; Wendy Rampson, City of Ann Arbor; and Karen Hart. Citations for materials obtained from public sites that were incorporated into files in this collection--as one might include pertinent quotations (and cite sources) in a conventional document, so too, pertinent model bits and sources are cited here: 1. <http://sketchup.google.com/3dwarehouse/details?mid=d9df666120fee38c7fb60589c24fde63&prevstart=12> 2. <http://sketchup.google.com/3dwarehouse/cldetails?mid=a7b9f69d31356fbef96dfde99ac0e896>, primarily by "Surreal 3D" and "Google Guy." 3. <http://sketchup.google.com/3dwarehouse/details?mid=c29682940165845a7c81e315a70337ac&prevstart=0> 4. <http://www-vrl.umich.edu/VRML/Field2.JPG> and <http://www-vrl.umich.edu/VRML/crowd.JPG> 5. <http://bentley.umich.edu/bhl/exhibits/umosu/umsongs.htm>
 - **Ann Arbor.** Contains 403 models. 3D models of buildings in Ann Arbor. This collection includes textured buildings for 24 blocks of the DDA, textured buildings for 27 single University of Michigan buildings, textured buildings in partially textured groups for another 11 partially textured groups of the University of Michigan, files for the remaining buildings of the DDA and the rest of Ann Arbor (not textured but set against the terrain), and environmental files involving the Allen Creek. Thus, the reader may use the collection as a source of completed models and also as a source of models to complete. To complete University of Michigan models, try obtaining photos for individual buildings from: <http://uuis.umich.edu/cic/buildingproject/>. To complete others, try the Assessor's website on the City of Ann Arbor site, <http://www.a2gov.org/>. BE A VOLUNTEER PHOTOGRAPHER AND SEND IN YOUR PHOTOS OF ANN ARBOR! For a more carefully partitioned file, see "Ann Arbor, MI: Collections" There, textured files are separated from non-textured ones. The models marked as "nonmapped" are untextured buildings extruded from footprints contained in The University of Michigan GIS database but not contained on the map on the university's website, <http://www.umich.edu/> Unless otherwise noted, models were created by Sandra Lach Arlinghaus (<http://www-personal.umich.edu/~sarhaus/>). For complete references, see the 3D Atlas of Ann Arbor, first edition, second edition, and third edition, at <http://www.imagenet.org/>
 - **Ann Arbor, MI. Untextured Buildings Outside the DDA and UM.** Contains 2 models. A single .kmz file set correctly against the terrain. Building height arbitrarily set at 2 stories. The buildings in this basic file are useful only as very general backdrop when looking at the massing of buildings throughout the urban area--especially in relation to terrain.
 - **Ann Arbor, MI. DDA, Textured.** Contains 13 models. Textured blocks of the Downtown Development Authority, Ann Arbor, Michigan.
 - **Ann Arbor, MI: DDA.** Contains 52 models. Extruded building footprints are set to the correct height. These simple structures create a backdrop for viewing skylines and general urban form. They offer a challenge to others to acquire photographic textures and make the buildings more recognizable. They are a beginning. The single model containing all buildings is to be used in Google Earth; it is correctly set against the terrain. Smaller groupings of buildings are for use in SketchUp and will need to be adjusted against terrain. The files contain a reference to a coordinate system in their name. A file with 2N3E is a block of the DDA two blocks north of the intersection centroid of Main and Huron Streets and 3 blocks to the east of the location.
 - **Allen Creek Floodplain.** Contains 17 models. Blue region depicts flooding of the Allen Creek floodplain to different topographic elevations. The region lies on the west side of downtown Ann Arbor, running from the Huron River, south to the University of Michigan golf course and west to the edge of town. These models make sense only when viewed in Google Earth with the terrain switch "on". They look best when also loaded in Google Earth with

buildings from the Ann Arbor collection; two general files are enclosed here; there are others, with textured buildings to fill in the gaps in the DDA and The University of Michigan, in the "Ann Arbor, MI: Collections" file.

- [Help Model Ann Arbor, MI](#). Contains 2 collections of models from various locations above. Help finish building the 3D Ann Arbor. Take a look in the "untextured" collection: the basic geometry is supplied there. Then, apply textures, submit your model to sarhaus@umich.edu, and once complete, then it will be moved to the "textured" collection! Watch Ann Arbor grow through YOUR efforts! There are already many completed buildings...add to this collection which already has served local municipal authorities in Planning, Emergency Management, Environmental Applications, and Citizens Groups. The modeling of the city is merely the beginning...applications of the model are important!
- [Archive Archimedes: Blue Ribbons](#). Contains 45 models. Newer versions of these models are present in other collections; these persist only here and are therefore archived. The icon for this particular collection is the Clements Library of the University of Michigan which archives prized books and artifacts.
- [Untextured Models or Partially Textured Models, Ann Arbor, MI](#). Contains 3 collections of selected models. Use the geometry of these models as a base for applying photographic textures (to come in Picasa, or find your own on the web). Complete a partially completed block or building! Then, submit the completed models and watch as this collection shrinks in size and the virtual, 3D city of Ann Arbor grows...all thanks to YOUR efforts!
- [Textured Models, Ann Arbor, MI](#). Contains 2 collections of selected models. Models of Ann Arbor that are "complete." No model, though, is really "complete." Land uses change; buildings are torn down or rebuilt; businesses change hands--consider updating an existing complete model and submit it. Or, think you can make a better model? Go for it! The completed models are partitioned into various child collections for convenience: the partition is based on University of Michigan buildings, Downtown Development Authority (DDA) buildings, and other buildings. <http://www.imagenet.org/>
- [Google Earth: Benchmarking a Map of Walter Christaller](#). Contains 18 models. Vertical benchmarks, with height in proportion to rank of city in a hierarchy created by Christaller, are used to align a map from 1941 (of unknown projection) with the Google Earth sphere. Thus, environmental texture is introduced into the original map. Based on an original article by Arlinghaus that appeared in Solstice: An Electronic Journal of Geography and Mathematics, Vol. XVII, No. 2, December, 2006, <http://www.imagenet.org/>. A direct link to that article is provided here: <http://www-personal.umich.edu/%7Ecopyrgh/image/solstice/win06/Germany/index.html> Download the full .kmz of all benchmarks from the following link Link: <http://www-personal.umich.edu/%7Ecopyrgh/image/solstice/win06/Germany/Benchmarks.kmz> or upload those associated with blue (highest) and red (secondary) levels of the hierarchy from the .skp files below. In addition, you will need also to have a copy of the map that is being benchmarked: Link: <http://www-personal.umich.edu/%7Ecopyrgh/image/solstice/win06/Germany/Poland,%201941%20Base%20Maps.kmz> Also, consider the second article in this set which uses the benchmarked map in Google Earth only, to examine the problems associated with interpolating lower level (smaller) central places on the Google earth.
- [1901 United Kingdom](#). Contains 47 models. This historical study offers visualization of the total population distribution of England, Scotland, and Wales in 1901. In it, bar charts are situated on the Google Earth sphere in locations corresponding to urban areas and towns. Thus, one gets a picture of size in relation to location and the opportunity to consider distance and environmental effects in population growth. Visualization of this sort brings history to life in an environmental, whole-earth, context. There are 199 .skp files created individually, each representing a single bar perpendicular to the earth. Each was uploaded to Google Earth where they were merged to form a more convenient single .kmz containing all the information. To see that .kmz that portrays the distribution across the entire island, one must download the .kmz from the link below (rather than merely uploading from the .skp file offered here as a sample of the entire package). Link: <http://www-personal.umich.edu/%7Ecopyrgh/image/solstice/win06/arlbat2/1901UnitedKingdom.kmz> Or, upload each of the sample files (below) directly to GE from the .skp files in this collection. The text in the Alnwick file serves for all (rather than repeating it). This work appeared originally in Arlinghaus and Batty, Solstice: An Electronic Journal of Geography and Mathematics, Vol. XVII, No. 2, December 21 2006. It is archived in the Directory of Open Access Journals of the University of Lund, among other places.
- [Population-Environment Dynamics](#). Contains 4 collections of selected models. Collections in this set go beyond building creation and attempt to make imaginative use of both Google SketchUp and Google Earth.
- [1901-2001 Greater London](#). Contains 11 models. Visualize changing population patterns in relation both to the earth's surface and time: the process can add substantially to traditionally graphed information. The materials in this collection appeared originally in an article by Arlinghaus and Batty, published in Solstice: An Electronic Journal of Geography and Mathematics, Vol. XVII, No. 2, December 2006, <http://www.imagenet.org/>. This article and a related one draw on simply viewing clusters of bar charts as being similar to clusters of buildings: vertical pattern offers insight of various sorts. Direct link to that article: <http://www-personal.umich.edu/%7Ecopyrgh/image/solstice/win06/>

arlb2/indexPartII.html The .kmz files associated with the many .skp files have been accumulated into one .kmz. Download that .kmz from the link below or use the sample .skp files below to create individual .kmz files for Bromley. Switch successive decades off and on in GE to animate the pattern. The .kmz file below contains data for Bromley and for 31 other London boroughs and for London, from 1901 to 2001. Link: <http://www-personal.umich.edu/%7Ecopyrgh/image/solstice/win06/arlb2/GreaterLondon.kmz>

- [Ann Arbor, MI: Collections](#). Contains 10 collections of selected models. Set of collections of geo-referenced models of Ann Arbor, both urban and environmental: 1. Textured buildings of the Downtown Development Authority (DDA) 2. Untextured buildings of the DDA extruded to correct height. 3. Textured buildings of The University of Michigan 4. Sets of partially textured buildings of The University of Michigan 5. kmz file of all buildings outside the DDA and outside The University of Michigan, untextured and extruded to an arbitrary height of 2 stories. 6. Allen Creek Floodplain.
- [Archimedes' Selected Collection](#). Contains 52 models. This collection includes a selection of models by Archimedes of buildings and scenes in Ann Arbor, Michigan. For a full set, see "Cities in Development." Also, for numerous other 3D models of Ann Arbor, see <http://www.imagenet.org/> and navigate to various versions of the "3D Atlas of Ann Arbor."

Google Earth models appearing in *Solstice: An Electronic Journal of Geography and Mathematics* that do not appear above. A link is given to the live article and also to the zipped (or other format) file in [Deep Blue](#).

- 2009. Volume XX, Number 1. With William E. Arlinghaus. [The Perimeter Project: Fragile Lands Protection Using Cemetery Zoning](#). [Link](#) to Deep Blue file.
- 2009. Volume XX, Number 1. With Diana Sammataro. [Bee Ranges and Almond Orchard Locations: Contemporary Visualization](#). [Link](#) to Deep Blue file.
- 2009. Volume XX, Number 1. Kerry Ard. [Air Pollution Changes in the Detroit Metro Area from 1988 - 2004](#). [Link](#) to Deep Blue file.
- 2009. Volume XX, Number 1. [The Platonic Solids: Earth-sculpture Anchored at Easter Island \(Barr's Condition\)](#). [Link](#) to Deep Blue file.
- 2009. Volume XX, Number 1. [Down the Mail Tubes: Yesterday, Today, and...Tomorrow?](#) [Link](#) to Deep Blue file.
- 2008. Volume XIX, Number 2. With Michael Batty. [Charting the Past: Population-Environment Dynamics](#). [Link](#) to Deep Blue file.
- 2008. Volume XIX, Number 2. [Project Archimedes: Google Earth Experiments in Innovative Scientific Communication](#). [Link](#) to Deep Blue file.
- 2008. Volume XIX, Number 1. Roger Rayle. [Google Earth Applications in a Community Information System: Scio Residents for Safe Water](#). [Link](#) to Deep Blue file.
- 2008. Volume XIX, Number 1. Matthew Naud. [Huron River Tour, Ann Arbor](#). [Link](#) to Deep Blue file.
- 2008. Volume XIX, Number 1. [Detroit North American Bridge Championship: the Google Earth Display](#). [Link](#) to Deep Blue file.
- 2008. Volume XIX, Number 1. Bert Onstott. [Unit 174. American Contract Bridge League Bridge Clubs: Greater Houston](#). [Link](#) to Deep Blue file.
- 2008. Volume XIX, Number 1. [Another Tale of Two Cities. Neighborhood Watch from Ann Arbor to Baghdad](#). [Link](#) to Deep Blue file.
- 2008. Volume XIX, Number 1. Lars Schumann. [Real-time Animation Scripts for Google Earth](#). [Link](#) to Deep Blue file.
- 2007. Volume XVIII, Number 2. [Geography/Geometry -- Visual Unity](#). [Link](#) to Deep Blue file.
- 2007. Volume XVIII, Number 2. [The Animated Pascal](#). [Link](#) to Deep Blue file.
- 2007. Volume XVIII, Number 2. [Desargues's Two-Triangle Theorem](#). [Link](#) to Deep Blue file.
- 2007. Volume XVIII, Number 1. [3D Atlas of Ann Arbor, 3rd Edition](#).

- 2007. Volume XVIII, Number 1. Diana Sammataro [Update on the Varroa Mite Map](#), [with Editorial Commentary].
- 2006. Volume XVII, Number 2. With Michael Batty. [Visualizing Rank and Size of Cities and Towns: Part I: England, Scotland, and Wales, 1901 - 2001](#). [Link](#) to Deep Blue file.
- 2006. Volume XVII, Number 2. With Michael Batty. [Visualizing Rank and Size of Cities and Towns: Part II: Greater London, 1901 - 2001](#). [Link](#) to Deep Blue file.
- 2006. Volume XVII, Number 2. [Visualizing a Map of Walter Christaller, Poland 1941. Part I: Benchmarking the Map](#). [Link](#) to Deep Blue file.
- 2006. Volume XVII, Number 2. [Visualizing a Map of Walter Christaller, Poland 1941. Part II: Interpolation of the Benchmarked Map](#). [Link](#) to Deep Blue file.
- 2006. Volume XVII, Number 2. [Announcement: 3D Atlas of Ann Arbor, 2nd Edition](#);
- **2006. Volume XVII, Number 2. [Banda Aceh: A View on the Globe](#) . [Link](#) to Deep Blue file.**
- 2006. Volume XVII, Number 1. [3D Atlas of Ann Arbor: The Google Earth® Approach. Part I](#). [Link](#) to Deep Blue file.
- 2006. Volume XVII, Number 1. [3D Atlas of Ann Arbor: The Google Earth® Approach. Part II](#). [Link](#) to Deep Blue file.

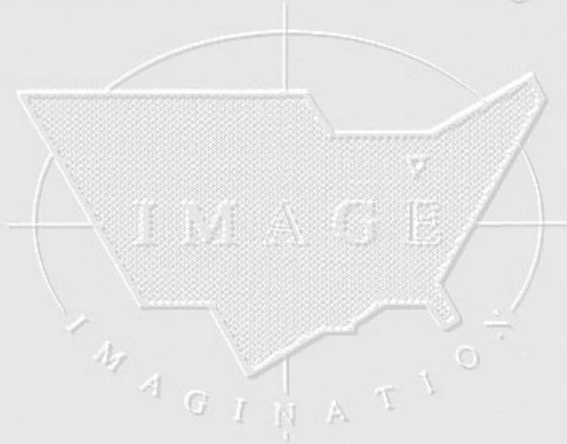
Solstice articles. Virtual Reality Modeling Language (VRML) models made using direct vrmf code or 3D Studio Max software. Early ones use GIS software from ESRI (ArcView with Spatial Analyst and 3D Analyst extensions).

- 2005. Volume XVI, Number 2. [News: Update on the 3D Atlas of Ann Arbor](#). -- Archimedes in Ann Arbor? and, with Alyssa J. Domzal, Ui Sang Hwang, and Kris J. Walters, Jr. Virtual Flood in the Allen Creek Floodplain and Floodway. [Link](#) to Deep Blue file. (Related partially to a student project in K.-P. Beier's Virtual Reality course.) <>
- <>2005. Volume XVI, Number 1. [Spatial Synthesis: The Evidence of Cartographic Example: Hierarchy and Centrality](#) . [Link](#) to Deep Blue file.
- 2005. Volume XVI, Number 1. [Kioskland: A Strategy for Linking Hierarchical Levels of Virtual Reality Maps](#) . [Link](#) to Deep Blue file.
- 2005. Volume XVI, Number 1. With Ann Evans Larimore and Robert Haug. [A Methodology for Historical Geography: Internet Implementation](#) . [Link](#) to Deep Blue file.
- 2004. Volume XV, Number 2. [Spatial Synthesis: 3D Atlas of Ann Arbor](#). [Link](#) to Deep Blue file.
- 2004. Volume XV, Number 2. With Braxton Blake. [Two Rivers Ridge: Capturing Art](#). [Link](#) to Deep Blue file.
- 2004. Volume XV, Number 1. With William Charles Arlinghaus. [Spatial Synthesis Sampler. Geometric Visualization of Hexagonal Hierarchies: Animation and Virtual Reality](#) . [Link](#) to Deep Blue file. Pirelli INTERNETional Award, Semi-Finalist.
- 2004. Volume XV, Number 1. Klaus-Peter Beier. [One Optimization of an Earlier Model of Virtual Downtown Ann Arbor](#). [Link](#) to Deep Blue file.
- 2004. Volume XV, Number 1. With Fred J. Beal and Douglas S. Kelbaugh. [The View from the Top: Visualizing Downtown Ann Arbor in Three Dimensions](#). [Link](#) to Deep Blue file.
- 2004. Volume XIV, Number 1. Andrew Walton. [A Golfer's Resource: Huron Hills Golf Course, Ann Arbor, Michigan](#). [Link](#) to Deep Blue file.
- 2004. Volume XIV, Number 1. Thana Chirapiwat. [Visualization of Geographic Information with VRML](#). [Link](#) to Deep Blue file.
- 2003. Volume XIV, Number 2. With Ann Evans Larimore and Robert Haug. [Lewis and Clark, 200 Years: A Visual Tribute to an Exploration](#).

The Gates of the Rocky Mountains. [Link](#) to Deep Blue file.

- 2003. Volume XIV, Number 2. [Ann Arbor, Michigan: Virtual Downtown Experiments, Part II.](#) [Link](#) to Deep Blue file.
- 2003. Volume XIV, Number 2. Taejung Kwon, Adrien A. Lazzaro, Paul J. Oppenheim, Aaron Rosenblum. [Ann Arbor, Michigan: Virtual Downtown Experiments, Part III.](#) [Link](#) to Deep Blue file. (Related partially to a student project in K.-P. Beier's Virtual Reality course.)
- 2003. Volume XIV, Number 1. [Ann Arbor, Michigan: Virtual Downtown Experiments.](#) [Link](#) to Deep Blue file.
- 2002. Volume XIII, Number 2. Marc Schlossberg. [Visual Accessibility with GIS.](#) [Link](#) to Deep Blue file.
- 2001. Volume XII, Number 1. [Maps and Decisions: Allen's Creek Floodplain, Opportunity or Disaster?.](#) [Link](#) to Deep Blue file.
- 2000. Volume XI, Number 2. Nakia D. Baird. [Animap Sequences.](#) [Link](#) to Deep Blue file.
- 2000. Volume XI, Number 1. [Animaps, IV: Of Time and Place.](#) [Link](#) to Deep Blue file.
- 1998. Volume IX, Number 1. With Ruben de la Sierra. [Revitalizing Maps or Images?.](#) [Link](#) to Deep Blue file.

Institute of Mathematical Geography



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Solstice was a Pirelli INTERNETional Award Semi-Finalist, 2001 (top 80 out of over 1000 entries worldwide)

One article in Solstice was a Pirelli INTERNETional Award Semi-Finalist, 2003 (Spatial Synthesis Sampler).

Solstice is listed in the Directory of Open Access Journals maintained by the University of Lund where it is maintained as a "searchable" journal.

Solstice is listed on the journals section of the website of the American Mathematical Society, <http://www.ams.org/>

Solstice is listed in Geoscience e-Journals

IMaGe is listed on the website of the Numerical Cartography Lab of The Ohio State University: http://ncl.sbs.ohio-state.edu/4_homes.html

Congratulations to all *Solstice* contributors.

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