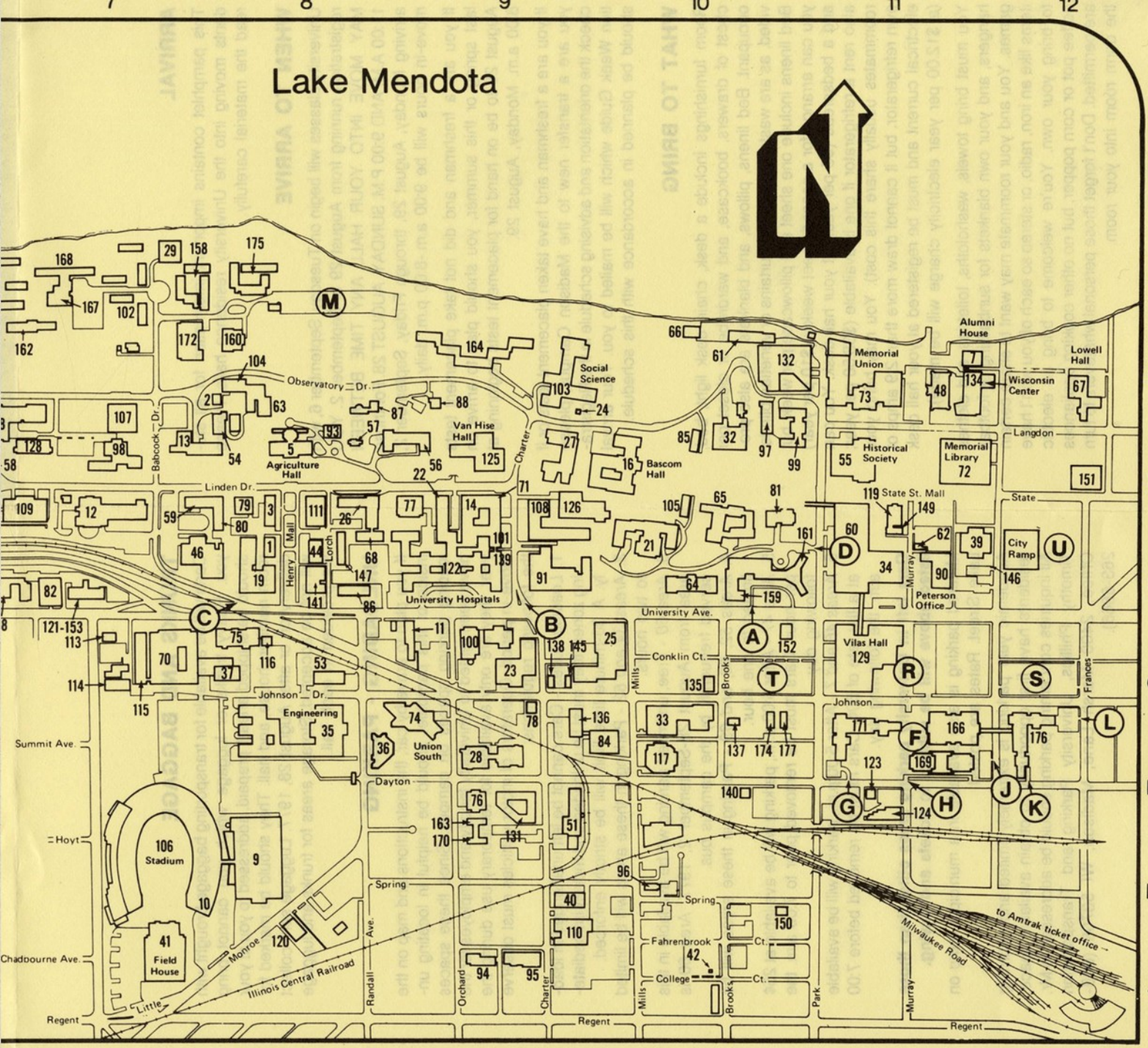


. 2105 Herrick Dr.	E4	169. Ogg	H11
. 2115 Herrick Dr. (Marine Studies Lab)	F4	170. Rust	I-9
		171. Sellery	G11
. 2135 Herrick Dr.	F4	172. Slichter	D7
. 1120 W. Johnson St.	G9	173. Sullivan	C7
. 420 N. Lake St.	F12	174. Susan Davis	G10
. 427 Lorch St.	F8	175. Tripp	C8
. 2575 Marsh Lane	C2	176. Witte	G12
. 432 N. Murray St.	E11	177. Zoe Bayliss	G10
. 913 Spring St.	I-10		
. 602 State St.	E12		
. 917 University Ave.	G10		
. 1552 University Ave.	F7		
. 1815 University Ave.	G6		
. 504 Walnut St.	F4		
. 1925 Willow Dr.	C6		
. 1975 Willow Dr.	B6		

SIDENCE HALLS

. Adams	C7
. Barnard	F10
. Bradley	C6
. Carson Gulley Commons	D8
. Chadbourne	F11
. Cole	D7
. David Schreiner	H9
. Elizabeth Waters	D9
. Gordon Commons	G11
. Holt Commons	C7
. Kronshage	C7

PARKING AREAS

Area 7 - T

Area 34 - M

Area 46 - S

Area 47 - R

Area 52 - J

Area 60 - P

Area 62 - N

Area 68 - G

Area 69 - L

Lake Street Parking Ramp - U

ENTRY POINTS - UNLOADING

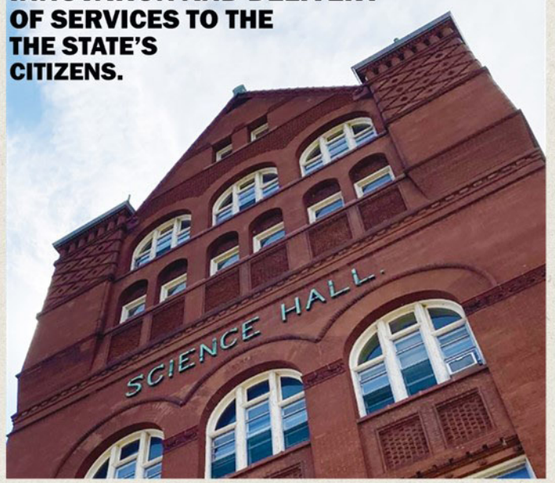
Directional signs for all halls will be posted; entry points to hall unloading areas are:

Adams - C or E
Barnard - A
Bradley - C or E to Elm Drive
Chadbourne - D
Cole - C or E to Elm Drive
Elizabeth Waters - B
Kronshage Houses - Chamberlin, Conover, Jones, Swenson - C or E to Elm Drive
Kronshage Houses - Gilman, Mack, Showerman, Turner - C or E to Babcock Drive
Ogg East (Rooms __51 through __72) - J
Ogg West (Rooms __01 through __22) - H
Sellery A (Rooms __51 through __83) - G
Sellery B (Rooms __01 through __33) - F
Slichter - C or E
Sullivan - C or E to Elm Drive
Tripp - C or E
Witte A (Rooms __01 through __37) - L
Witte B (Rooms __51 through __79) - K

Wisconsin State Cartographer's Office Annual Report 2023-24

About the State Cartographer's Office

OUR MISSION IS TO FOSTER THE DEVELOPMENT OF WISCONSIN'S GEOSPATIAL COMMUNITY BY FACILITATING THE CREATION AND EXCHANGE OF GEOSPATIAL DATA, SERVICES AND INFORMATION, AND PROMOTING THEIR USE IN SUPPORT OF EDUCATION, INNOVATION AND DELIVERY OF SERVICES TO THE THE STATE'S CITIZENS.



WISCONSIN STATE CARTOGRAPHER'S OFFICE
384 SCIENCE HALL
550 N. PARK ST.
MADISON, WI
53706-1491

The SCO is a special program at the University of Wisconsin–Madison housed within the Department of Geography. Staff and students of the SCO engage in outreach, research and education to support Wisconsin's geospatial community and the state's citizens. We support the Wisconsin Idea through our efforts to apply the expertise of the university to enhance the quality of life for all citizens of the state.

In recognition of the 50th anniversary of the SCO's creation, the theme of this year's Annual Report is mapping technology of the '70s, '80s and '90s.

State Cartographer's Office Turns Fifty!

The driving force behind the establishment of the Office was Arthur H. Robinson, a faculty member in the Department of Geography at the University of Wisconsin. Robinson began advocating for such an office in the early 1960s. He helped craft the legislation that formally created the State Cartographer position in 1973 as a special program within the University of Wisconsin. Robinson's vision was that the State Cartographer would serve the citizens of the state through dissemination of cartographic information, preparation of special-purpose maps and coordination of mapping activities to improve efficiency.

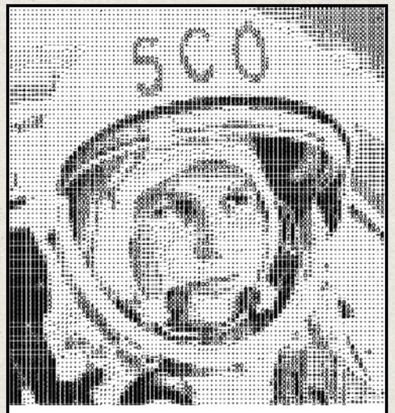
In 1974, the Department of Geography allocated space for the SCO in Science Hall and the first State Cartographer, Art Ziegler, was appointed. Other staff consisted of an office assistant and part-time student clerical help. After Art Ziegler retired in 1990, Ted Koch was appointed State Cartographer. Koch retired in 2009, and Howard Veregin was then appointed to the position.

During its fifty-year history, the SCO has been home to dozens of staff and hundreds of student assistants. The size of the office has grown over the years and now includes staff members Ann Buschhaus, Hayden Elza, Mike Hasinoff, Thomas Kazmierczak, Jim Lacy, Howard Veregin, David Vogel and Ana Wells. The SCO also employs student assistants working on a variety of real-world projects.

Internal funding remains a cornerstone of the university's commitment to the SCO. In addition, over the last decade, the SCO has increasingly turned to external funding to help advance its vision of a mature and collaborative geospatial community and well-informed citizenry. Today about one-half of the SCO's funding is obtained externally.

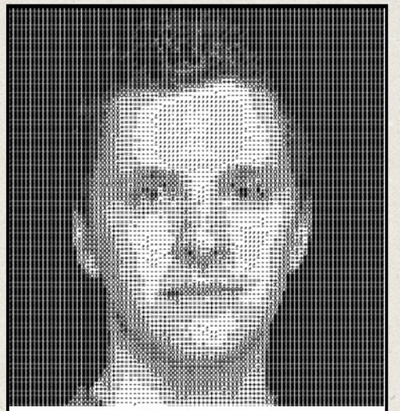
The SCO is a unique institution, the only office of its kind in the nation tied so closely to an academic geography department. This arrangement has fostered the values and principles of the "Wisconsin Idea" to bridge the gap between the university and citizens of the state. Through these efforts, and thanks to the vision and determination of Arthur Robinson, the SCO continues to support Wisconsin's citizens and the state's mapping and geospatial communities.

OUR STAFF



Ann Buschhaus

Christina Dennis



Hayden Elza

Mike Hasinoff

Thomas Kazmierczak

Jim Lacy

Howard Veregin

SYMAP

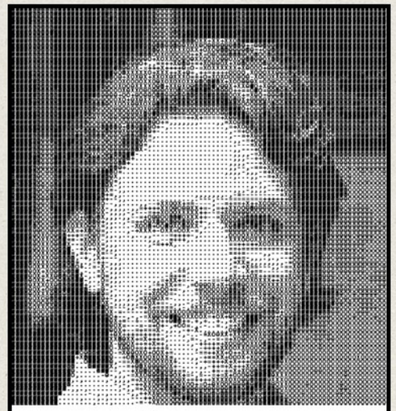
One of the earliest computer mapping programs, SYMAP (Synagraphic Mapping System) created maps on line printers by overstriking characters to create symbols with different visual weights.

SYMAP was developed at Harvard University's Laboratory for Computer Graphics. It ran on mainframe computers using input from punch cards or "green screen" terminals. The program was still in use in the 1980s, when the first GIS packages became available.

To pay homage to SYMAP and the early history of computer mapping, the staff photos on this page have been rendered using SYMAP symbols.

Standard SYMAP Symbols	
Class 1	.
Class 2	,
Class 3	-
Class 4	=
Class 5	+
Class 6	X
Class 7	O
Class 8	O + - => Θ
Class 9	O + X => ⊠
Class 10	O + X + A + V => ■

Source: J. C. Robertson (1967) The Symap Programme for Computer Mapping, The Cartographic Journal, 4:2, 108-113



David Vogel

Ana Wells

Who We Are

Ann Buschhaus joined the SCO in July 2020. She has a bachelor's degree in physics and a master's in engineering. After years as a water resources engineer, Ann now works with GIS.

Christina Dennis worked as a GIS Researcher for the SCO until September 2023, when she became a graduate student in the Geography Department at UW-Madison.

Hayden Elza has a BS in Forest Science and a GIS Capstone Certificate from UW-Madison. He conducts research, development, and support of new geospatial technologies, as well as project coordination and technical support for SCO students.

Mike Hasinoff graduated with an MS degree in Cartography/GIS from UW-Madison in December 2022. Mike's former life includes teaching English in Japan, high school science and working as a technician in genetics and biochemistry labs.

Thomas Kazmierczak joined the SCO in August 2020, after almost a decade at Northern Illinois University's Center for Governmental Studies. His has a bachelor's in Geographic Information Science from Michigan State University and a master's in Geography from Northern Illinois University.

Jim Lacy joined the SCO in 2004 as the Associate State Cartographer. He has a BS in Geography and Information/Computing Science from the University of Wisconsin-Green Bay and an MS in Cartography and GIS from UW-Madison.

Howard Veregin was appointed State Cartographer in September 2009. His previous positions include Director of Geographic Information Services at Rand McNally, Associate Professor of Geography at the University of Minnesota-Twin Cities, and Assistant Professor of Geography at Kent State University. He received his PhD from the University of California-Santa Barbara in 1991.

David Vogel joined the SCO in December 2012 to work on cartographic projects and web applications. He received his BS in Forest Management and Conservation Biology from UW-Stevens Point in May 2008 and completed the UW-Madison GIS Certificate Program in 2014.

Ana Wells joined the SCO in April 2018. She has worked on campus as a research and teaching assistant for Urban and Regional Planning, the Nelson Institute and the Soils Department. She has a PhD in Soil Science and a Graduate Certificate in GIS from UW-Madison.

Our Students

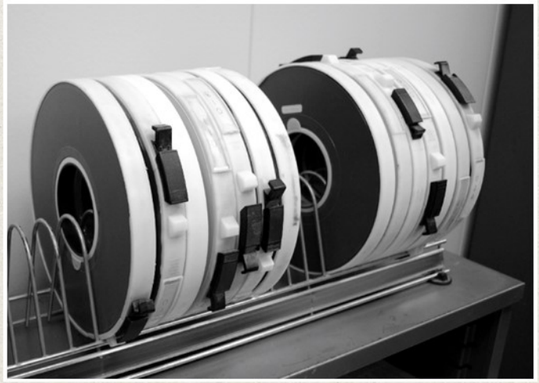


Image Processing on the Apple II

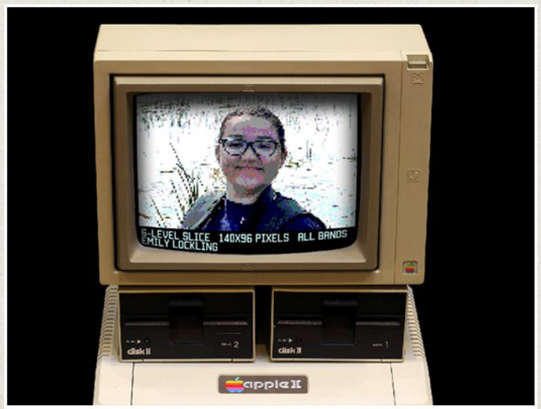
By the early 1980s, a number of digital image processing systems were available for the Apple II microcomputer. These included A/DIPS, AIPE, Oklahoma Landsat Training Program System, Mini-LARSYS and APPLEPIPS. By today's standards, these systems were quite limited. For example, APPLEPIPS operated on a set of 280x192 pixels and could display an image with a resolution of 140x96 pixels.

Source: R. W. Kiefer & F. J. Gunther (1983) Digital Image Processing Using the Apple II Microcomputer, Photogrammetric Engineering & Remote Sensing, 49:8, 1167-1174.

The student photos on this page have been rendered using the limited resolution and color palette of early 1980s Apple II image processing software.

Param Bhandare

Jack Dipaolo



Emily Lockling

Chris Susnik

Jean Traudt

Ray Wiegand

Cole Wilson

Valerie Zhaawendaagozikwe

Param Bhandare has a BS in Computer Sciences from UW-Madison and is now studying at Madison College.

Jack Dipaolo is a graduate student in GIS/Cartography at UW-Madison.

Emily Lockling recently completed her bachelor's degree in GIS from the University of Minnesota-Duluth.

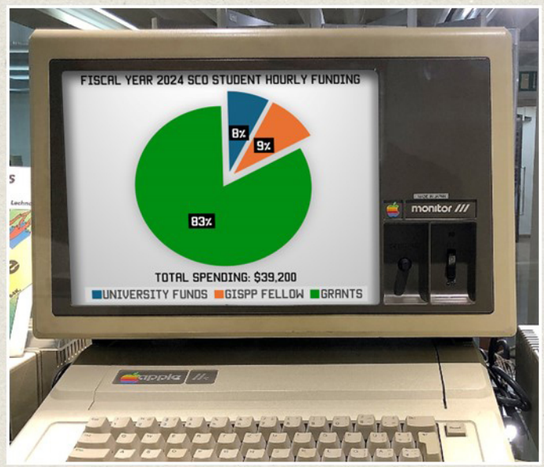
Chris Susnik is a student at UW-Superior pursuing a bachelor's degree in Environmental Science with a minor in GIS.

Jean Traudt is an undergrad at UW-Madison studying Cartography/GIS and Conservation Biology.

Ray Wiegand is an undergrad at Augustana College in Illinois, where he is majoring in Geography and Finance with a GIS minor.

Cole Wilson recently completed a master's in Environmental Observation & Informatics at UW-Madison.

Valerie Zhaawendaagozikwe is a student at UW-Superior pursuing a bachelor's degree in Biology/Environmental Science with a minor in GIS.



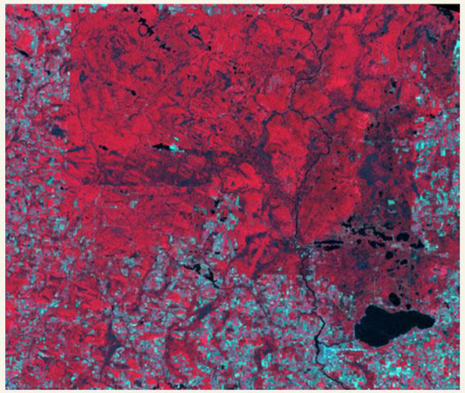
Funded Projects

LANDSAT

NASA's Earth Resources Technology Satellite (ERTS), later renamed Landsat 1, became the first earth-observing satellite when it was launched in 1972. It orbited the earth every 103 minutes, acquiring imagery from its Multispectral Scanner (MSS) sensor at a ground resolution of 80 meters. Landsat 1 was joined by Landsat 2 in 1975 and Landsat 3 in 1978. With Landsat 9, launched in 2021, the program's record of land imaging extends to over half a century.

The images of Wisconsin on these pages are false-color composites made by merging the green, red and infrared channels of Landsat MSS data.

Forested Menominee county stands out against the agricultural parcels in neighboring counties in this false-color Landsat 3 image from July 5, 1979.



Statewide Parcel and Public Land Survey System Project

Goal: Update the statewide parcel database and online application, as well as the statewide PLSS (Public Land Survey System) database, using county data sources.

Version 9 of the Statewide Parcel Database & Edition 5 of the Statewide PLSS Database
Dates: Jan-Dec 2023
Amount: Approx: $139,000

Version 10 of the Statewide Parcel Database & Edition 6 of the Statewide PLSS Database
Dates: Jan-Dec 2024
Amount: Approx: $150,000

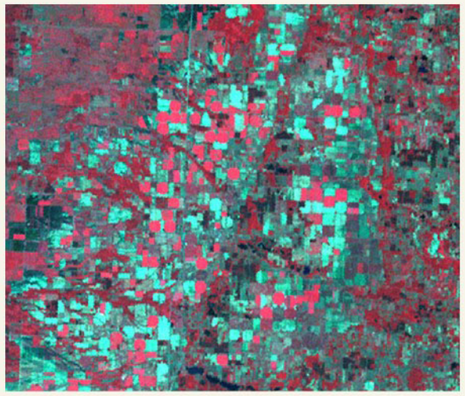
The project was established by Act 20 of 2013 and is a partnership with the Wisconsin Land Information Program (WLIP) at the Wisconsin Department of Administration and the state's 72 county Land Information **Offices**. Funding comes from the WLIP. The Robinson Map Library is also a project partner, providing discovery and access to parcel, PLSS and other county datasets.

SCO Staff: Vogel, Wells, Kazmierczak, Buschhaus, Veregin (Principal Investigator)

SCO Students: Bhandare, Traudt, Wiegand, Wilson

Robinson Map Library Partner: Jaime Martindale

WLIP Partners: Peter Herreid & Davita Veselenak



Central-pivot irrigation fields on agricultural parcels are visible on this false-color Landsat 3 image of the Central Sands Region taken July 5, 1979.

Mapping Urban Trees in Milwaukee County with High-Res LiDAR Imagery

Goal: Use high-resolution LiDAR data to develop an urban tree model for a study site in Milwaukee County

Dates: July 2023 to June 2024

Amount: Approx: $60,000

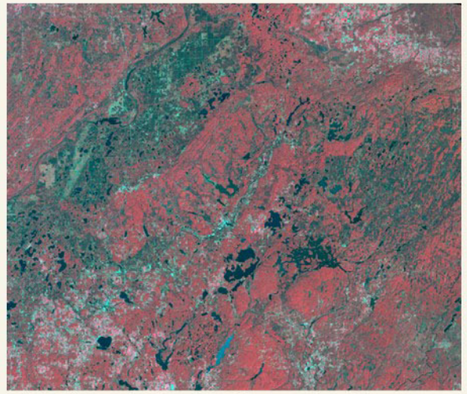
The project was funded by the Wisconsin Department of Natural Resources to explore the capabilities of high-resolution Lidar data for urban forest mapping and analysis.

SCO Staff: Wells, Hasinoff, Kazmierczak, Buschhaus (Principal Investigator)

SCO Students: Wilson

DNR Partners: Bob Smail & Dan Buckler

Parks and nature preserves appear in shades of red on this false-color Landsat 1 image of southern Milwaukee county acquired on July 18, 1976.



This false-color Landsat 3 image of northwest Wisconsin from Sept. 17, 1979, shows some of the diversity of landscapes present in the state.

WisconsinView Data Archive for Aerial Imagery and LiDAR Access

Goal: Develop and test long-term preservation and access strategies for Wisconsin LiDAR and aerial imagery

Dates: April 2023 to March 2026

Amount: Approx: $51,000

This project will transfer management responsibility of the WisconsinView Data Archive to the SCO and Robinson Map Library, working with the UW Division of Information Technology to make significant improvements to technology.

SCO Staff: Lacy (Principal Investigator)

Co-Investigator: Jaime Martindale, Robinson Map Library

State Highway Map

Goal: Help the Wisconsin Department of Transportation (WisDOT) convert the official state highway map to GIS, by preparing specific data layers.

Dates: Jan 2023 to June 2024

Amount: Approx: $20,000

This project was funded by WisDOT. SCO students produced GIS layers for the highway map by applying data selection rules and performing cartographic generalization. The 2025 edition of the Wisconsin State Highway Map will be the first produced using GIS.

SCO Staff: Vogel, Veregin (Principal Investigator)

SCO Students: Dipaolo, Traudt, Wiegand

DOT Partners: Katie Ginther, Christine Koeller, David Layton

The transportation network shows up clearly on this false-color Landsat 1 image centered on Milwaukee, acquired on July 18, 1976.

St. Louis River Estuary Habitat Mapping

False-color Landsat 2 image from Sept. 6, 1976, including the future site of the Lake Superior National Estuarine Research Reserve near Superior, WI.

Portion of the St. Louis River running along the Wisconsin-Minnesota state boundary, shown here on a false-color Landsat 3 image from Sept. 17, 1979.

Goal: Complete habitat map of Lake Superior National Estuarine Research Reserve (NERR) and extend the map to both sides of the St. Louis River estuary.

Lake Superior NERR Habitat Map. A collaborative project between the SCO and the Lake Superior NERR.

Dates: Feb 2023-June 2024
Amount: Approx: $50,000
Funding: UW-Madison Office of the Vice Chancellor for Research and Graduate Education, UW-Madison Division of Extension & Wisconsin Alumni Research Foundation

Transferring Lake Superior NERR habitat mapping tools and methods to the Wisconsin-Minnesota St. Louis River Estuary. A collaborative project between the SCO, the Lake Superior NERR, U-Spatial at the University of Minnesota, and Natural Resources Research Institute at the University of Minnesota-Duluth.

Dates: Oct 2023-March 2025
Amount: Approx: $139,000
Funding: Sponsored by the National Estuarine Research Reserve System Science Collaborative, which supports collaborative research that addresses coastal management problems important to the reserves. The Science Collaborative is funded by the National Oceanic and Atmospheric Administration and managed by the University of Michigan Water Center (NA19NOS4190058).

SCO Staff: Dennis, Buschhaus, Veregin (Principal Investigator)

NERR Staff: Kirsten Rhude, Co-Principal Investigator

SCO Students: Lockling, Susnik, Wilson, Zhaawendaagozikwe

U-Spatial Staff: Jeff Thompson, Olena Boiko

NRRI Staff: Kristi Nixon

Consultants: Carol Reschke, Kelly Beaster

Flood Exposure/Vulnerability, Northern Ashland County

Portion of northern Ashland County, the city of Ashland, and the Bad River Reservation on a false-color Landsat 1 image acquired on July 3, 1976.

Goal: Build a GIS database for flood exposure & vulnerability in northern Ashland County, including small-area population estimates from dasymetric mapping

Dates: July 2022-Dec 2023 **Amount:** Approx: $49,000

Funded by the Wisconsin Coastal Management Program and the National Oceanic and Atmospheric Administration, Office for Coastal Management under Coastal Zone Management Act, Grant #NA22NOS4190085

SCO Staff: Dennis, Wells, Hasinoff, Buschhaus, Veregin (Principal Investigator)

Heritage Oaks Mapping

Goal: Re-inventory the heritage oaks of Dane county, originally identified by local conservationist Walter Scott in 1976, and resurveyed in 2001 by arborist Bruce Allison. These trees are now at least 250 years old. Only one-half of the trees identified in 1976 are still surviving.

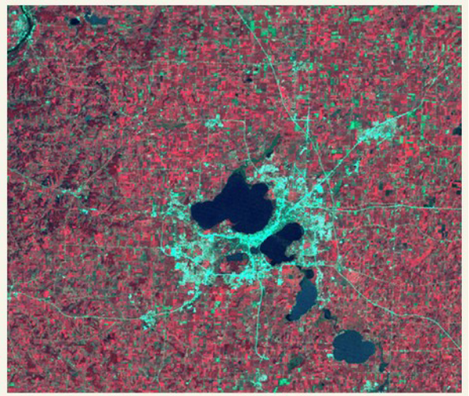
Funded by the Dane County Tree Board

SCO Staff: Hasinoff, Veregin

Project Partner: Matt Noone, Capital Area Regional Planning Commission & Dane County Tree Board

There are still specimens of once dominant oaks scattered throughout the city streets, backyards, parks, farmland and forests of Dane County. We are trying to add as many as we can to the inventory. You can help! Find out how:

www.sco.wisc.edu/oaks



A portion of Dane County, with Madison and Lakes Mendota and Monona at the center, shown here on a false-color Landsat 1 image from August 28, 1972.

Municipal Urban-Rural Classification

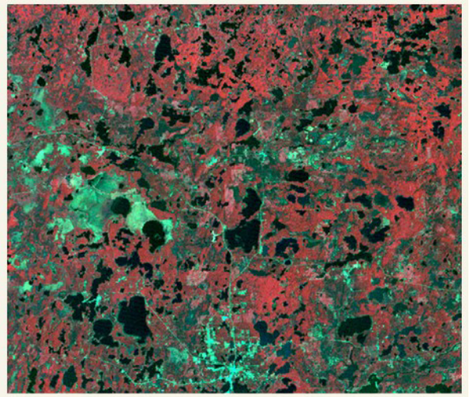
Goal: Update the Wisconsin Office of Rural Heath's Municipal Urban-Rural Classification (MURC) using updated Census data and improved driving distance analysis.

MURC was developed by the Office of Rural Health to identify the level of rurality of each of Wisconsin's 1,850 cities, towns, and villages. MURC is based on population size, population density and distance to the nearest population center.

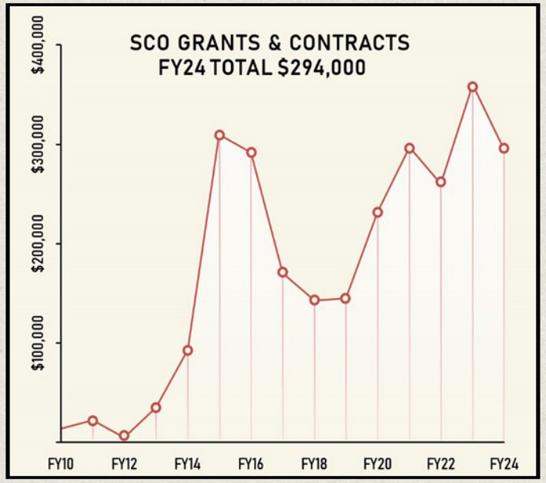
Funded by the Wisconsin Office of Rural Heath

SCO Staff: Buschhaus, Veregin

Project Partner: Penny Black, Wisconsin Office of Rural Heath at UW-Madison



The area north of Minocqua, shown here on a false-color Landsat 1 image from July 3, 1976, is the most rural part of the state according to the Wisconsin Office of Rural Health.



New in FY25

Digitizing the 1930s Bordner Maps (Wisconsin DNR)

Starkweather Creek Chloride Monitoring and Operation Fresh Start GIS Training (Water@UW-Madison and UW-Madison's Office of the Provost)

Coastal Habitat Evaluation Tool (CHET) in Brown County (Wisconsin Coastal Management Program)

Magnificent Tree App (Dane County Tree Board)

Indian Lands Map (UW-Madison Law School)

Understanding Antimicrobial Resistance in Wisconsin (UW-Madison School of Pharmacy)

V11/E7 Statewide Parcel/PLSS Project (WLIP)

Featured projects

Voyager 1 & 2

Voyager 1 and 2 were launched by NASA in 1977. After exploring the outer planets of our solar system, they became the first human objects to reach interstellar space — the region beyond the heliosphere, the protective bubble of particles and magnetic fields generated by the Sun.

Both spacecraft are still operating after nearly a half century in space. They are currently traveling at a velocity of about 35,000 miles per hour, and are over 12 billion miles from the earth. Their current mission is to explore the outermost edge of the Sun's domain.

The images on these pages were taken by the Voyager spacecraft as they explored Jupiter, Saturn, Uranus and Neptune.

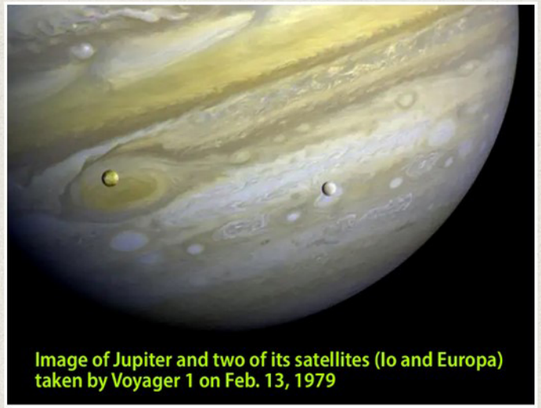
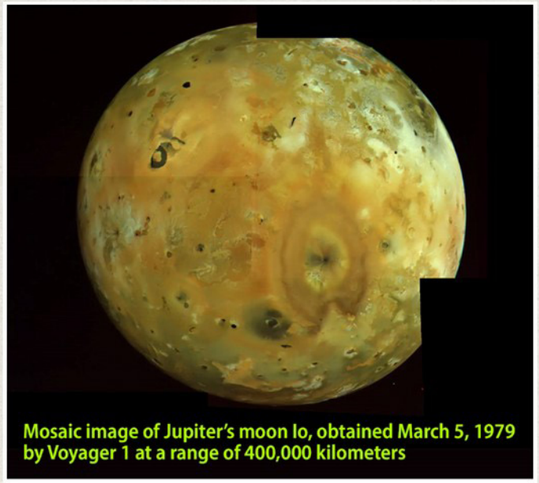


Image of Jupiter and two of its satellites (Io and Europa) taken by Voyager 1 on Feb. 13, 1979

UW-Madison Computer Science Capstone Course Mentor

SCO staff participated as mentors for the UW-Madison Computer Science capstone course. Two semesters of Computer Science student teams worked on creating an Original Land Survey Explorer application. This app is still in development.

(Elza, Vogel, Wells, Veregin)



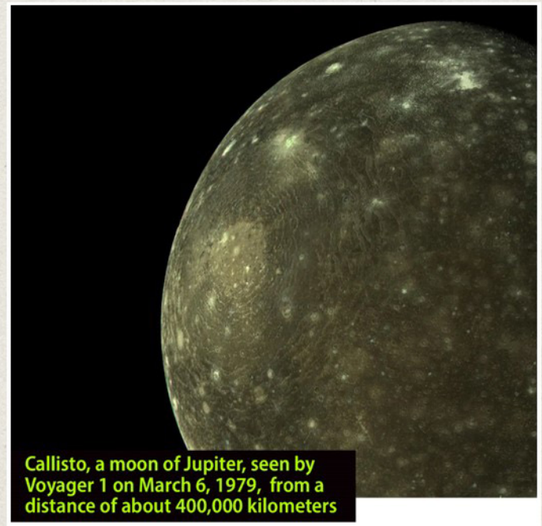
Mosaic image of Jupiter's moon Io, obtained March 5, 1979 by Voyager 1 at a range of 400,000 kilometers

Survey Control Finder

The Survey Control Finder app was updated to integrate feedback from the Wisconsin County Surveyors Association regarding the display of coordinate precision.

(Vogel, Elza)

maps.sco.wisc.edu/surveycontrolfinder



Callisto, a moon of Jupiter, seen by Voyager 1 on March 6, 1979, from a distance of about 400,000 kilometers

Culvert Vulnerability

Work continues on the development of a model to assess the flood vulnerability of culverts, based on estimates of flood volume for various annual exceedance probability events.

(Bhandare, Buschhaus, Veregin, Wells)

Jupiter's Great Red Spot as seen by Voyager 1 in 1979

SCO App Infrastructure

We continue to improve the infrastructure supporting our web app development and update efforts, allowing us to efficiently develop new apps while also maintaining existing ones. Many of our apps are in the ArcGIS Online ecosystem and more continue to be migrated to this environment.

(Elza)

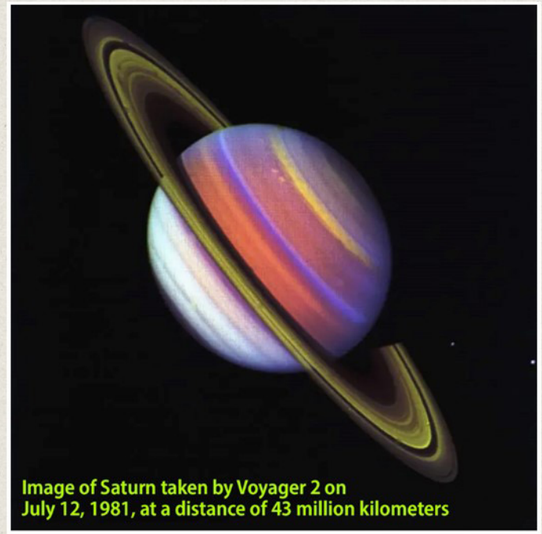
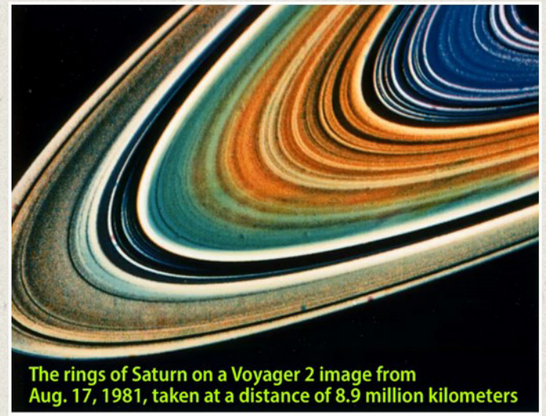


Image of Saturn taken by Voyager 2 on July 12, 1981, at a distance of 43 million kilometers

Parcel App

The parcel app was updated to integrate the latest version (V10) of the Statewide Parcel Dataset and include new application libraries.

(Vogel, Elza) maps.sco.wisc.edu/Parcels



The rings of Saturn on a Voyager 2 image from Aug. 17, 1981, taken at a distance of 8.9 million kilometers

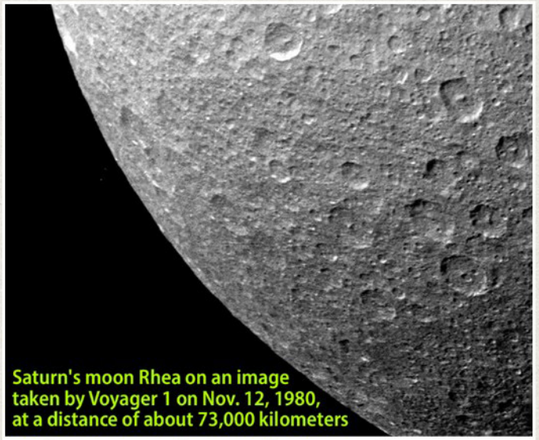
GeoData @ Wisconsin

In addition to adding new collections of data to GeoData@Wisconsin, we made improvements to the tools used for record management and made additions to our LiDAR data holdings.

A collaboration with the Robinson Map Library.

(SCO: Elza, Lacy; RML: Jaime Martindale, Sophat Seng, Luc Messmer)

geodata.wisc.edu



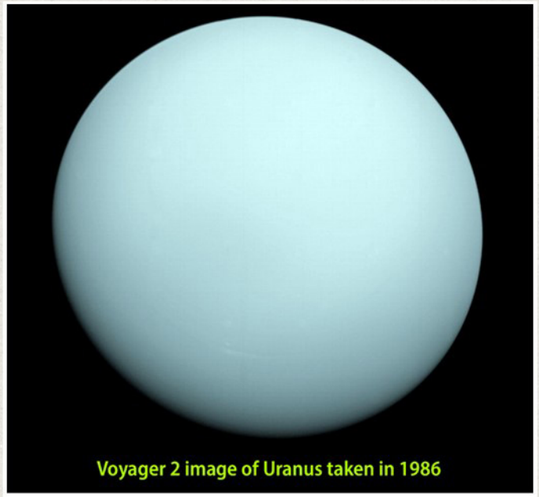
Saturn's moon Rhea on an image taken by Voyager 1 on Nov. 12, 1980, at a distance of about 73,000 kilometers

Wisconsin Historical Aerial Image Finder

We are rebuilding our WHAIFinder app using the Esri Javascript framework and ArcGIS Online. When completed in fall 2024, users will have access to 130,000 historic air photos from the Robinson Map Library archive.

A collaboration with the Robinson Map Library

(SCO: Elza, Lacy; RML: Jaime Martindale)



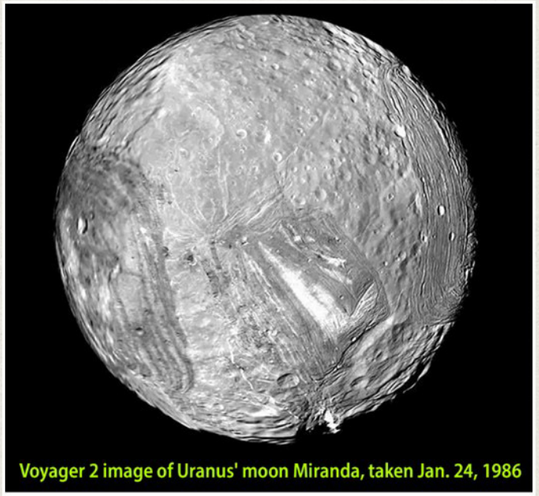
Voyager 2 image of Uranus taken in 1986

County Surveyor Directory

An updated version of the County Surveyor Directory was released, making use of ArcGIS dashboards for presenting relevant information.

(Vogel, Elza)

www.sco.wisc.edu/county-surveyors

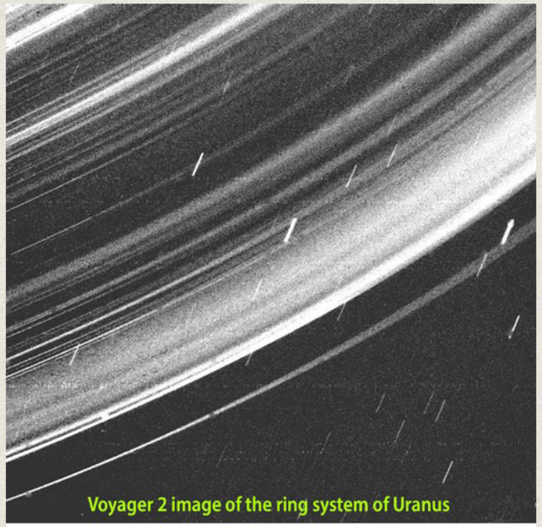


Voyager 2 image of Uranus' moon Miranda, taken Jan. 24, 1986

Cartographic Phantoms

We continue to document and map the locations of cartographic phantoms (places that appear on maps but do not exist on the ground) and unincorporated communities (small, usually rural communities without legal status).

(Hasinoff, Veregin)



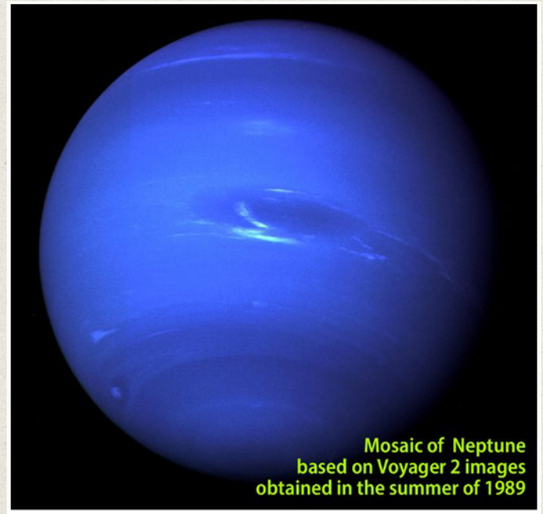
Voyager 2 image of the ring system of Uranus

Strategic Framework

We developed a new strategic framework to help align activities to our strategic priorities.

(All SCO Staff)

www.sco.wisc.edu/pubs/sco-strategic-framework-2024



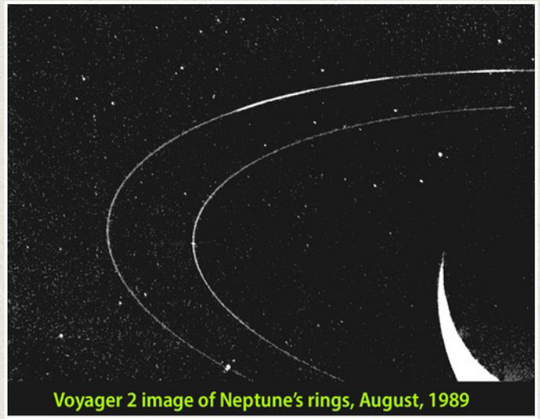
Mosaic of Neptune based on Voyager 2 images obtained in the summer of 1989

Menominee Place Names

We helped develop a new version of Mike Hoffman's interactive Menominee Place Names Map for the College of the Menominee Nation.

(Veregin)

www.menominee.edu/tmcs



Voyager 2 image of Neptune's rings, August, 1989

Judicial Privacy

Work is in progressing on the development of a workflow to facilitate shielding of judicial officers' private information from public exposure, as a result of Act 235 ("Judicial Privacy Law"). This new law primarily affects the statewide parcel database.

A collaboration with the Robinson Map Library

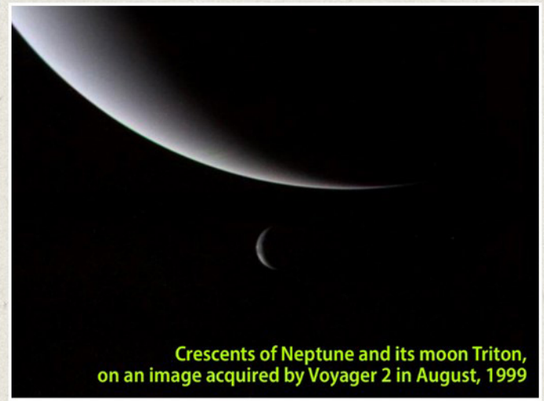
(SCO: Elza, Lacy, Kamierczak, Veregin, Vogel, Wells; RML: Jaime Martindale)

Voyager 2 image of Neptune's clouds taken in 1996

Parcel Validation Tool

Additional enhancements were made to the parcel validation tool, with the goal of streamlining its use by county data contributors. This is part of the Statewide Parcel Project.

(Bhandare, Kazmierczak, Vogel, Wells)



Crescents of Neptune and its moon Triton, on an image acquired by Voyager 2 in August, 1999

Historic Aerial Imagery

We are expanding the availability of downloadable historic aerial imagery, focusing on: acquiring & processing imagery from the 1950s on; publishing a new online feature service; utilizing more reliable infrastructure for data storage; developing a process for georeferencing; and making plans for additional data acquisitions.

A collaboration with the Robinson Map Library.

(SCO: Lacy; RML: Jaime Martindale, Luc Messmer, Zac Pinard)

OUR APPS

Floppy Disks

Floppy disks were used for data storage and software distribution from the 1970s until the 1990s. The first floppies were 8 inches in diameter and held 80 kilobytes (KB).

5¼-inch floppy disks, used with the early IBM PC, held 160 KB. A later dual-sided version could hold 1.2 megabytes (MB).

The hard-shell 3½-inch floppies, used with the Apple Macintosh, initially held 720 KB. A later high-density version was able to hold 1.44 MB.

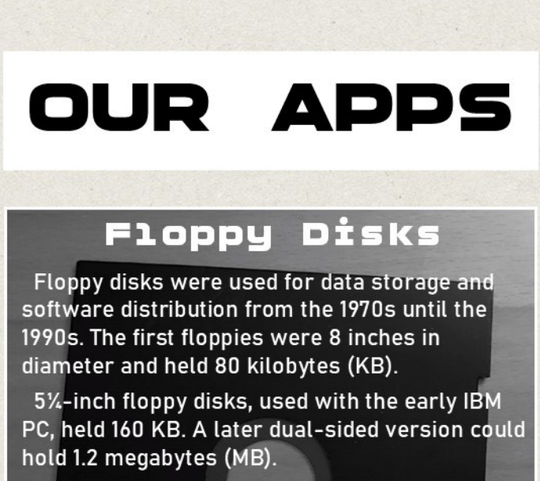
For comparison purposes, a modern LiDAR point cloud dataset for a single Wisconsin county might consume over one-half terabyte (TB) of data — equivalent to between 350,000 and 6,250,000 floppy disks, depending on the type of floppy used.

Statewide Parcel Map

The Statewide Parcel Map lets you view available Wisconsin digital parcel data — over 3.5 million parcels — all in one place.

Part of the WLIP Statewide Parcel Project

maps.sco.wisc.edu/Parcels



WHAIFinder

Download high-resolution scans of thousands of 1930s-era aerial photographs of Wisconsin, all from your desktop. Soon to include additional photographs from other time periods.

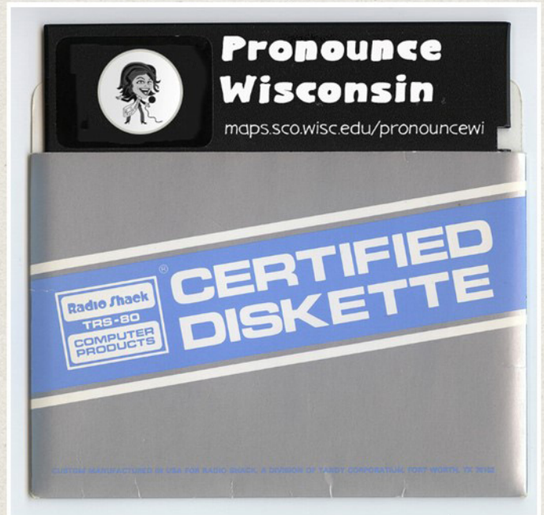
A collaboration with the Robinson Map Library

maps.sco.wisc.edu/WHAIFinder

Find Lidar Data

Lidar data comes in a lot of flavors — LAS files, DEMs, point clouds — but whatever flavor you're looking for, this app is the place to start.

www.sco.wisc.edu/data/elevationlidar



Pronounce Wisconsin

Sound like you're from Wisconsin, even if you aren't, with our unique talking place names map. No understanding of pronunciation marls or phonetic alphabets required.

maps.sco.wisc.edu/PronounceWI

GeoData@Wisconsin

With almost 23,000 datasets available online, GeoData@Wisconsin makes your data-hungry GIS projects easier than ever.

A collaboration with the Robinson Map Library

geodata.wisc.edu

Survey Control Finder

Channel your inner surveyor. Where else can you access 28,000 geodetic control points, over 200,000 Public Land Survey System records, and the CORS network, all from a simple and intuitive map interface?

maps.sco.wisc.edu/SurveyControlFinder

Aerial Photography Catalog

Find the aerial photography you need with this Wisconsin catalog going back to the 1920s.

maps.sco.wisc.edu/apcat

Coastal Bordner Explorer

Step back in time with this collection of data from the 1930s Wisconsin Bordner Survey maps.

Funded in part by the Wisconsin Coastal Management Program & National Oceanic and Atmospheric Administration, Office for Coastal Management, under the Coastal Zone Management Act, Grant #NA16NOS4190108

maps.sco.wisc.edu/BordnerCoastal

Wisconsin Culvert Inventory

The foundation for a statewide culvert database.

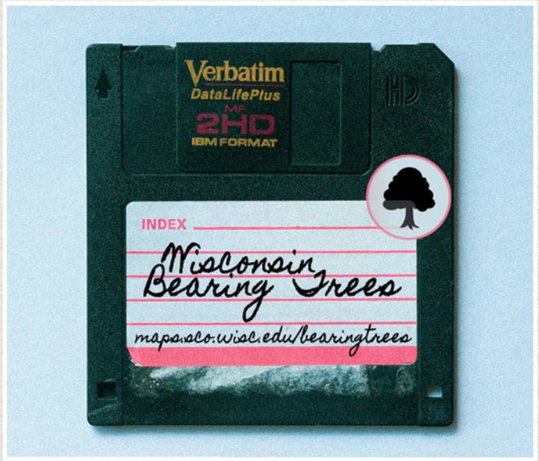
Funded by the Wisconsin Coastal Management Program & National Oceanic and Atmospheric Administration, Office for Coastal Management, under the Coastal Zone Management Act, Grant # NA18NOS4190087, Grant # NA20NOS4190105 and Grant #NA21NOS4190032

sco.wisc.edu

PLSS Locator

Discover your location in the Public Land Survey System network, at the Township, Section, Quarter Section and Quarter-Quarter Section level. Search by latitude-longitude, address, county or municipality.

maps.sco.wisc.edu/PLSS-Locator



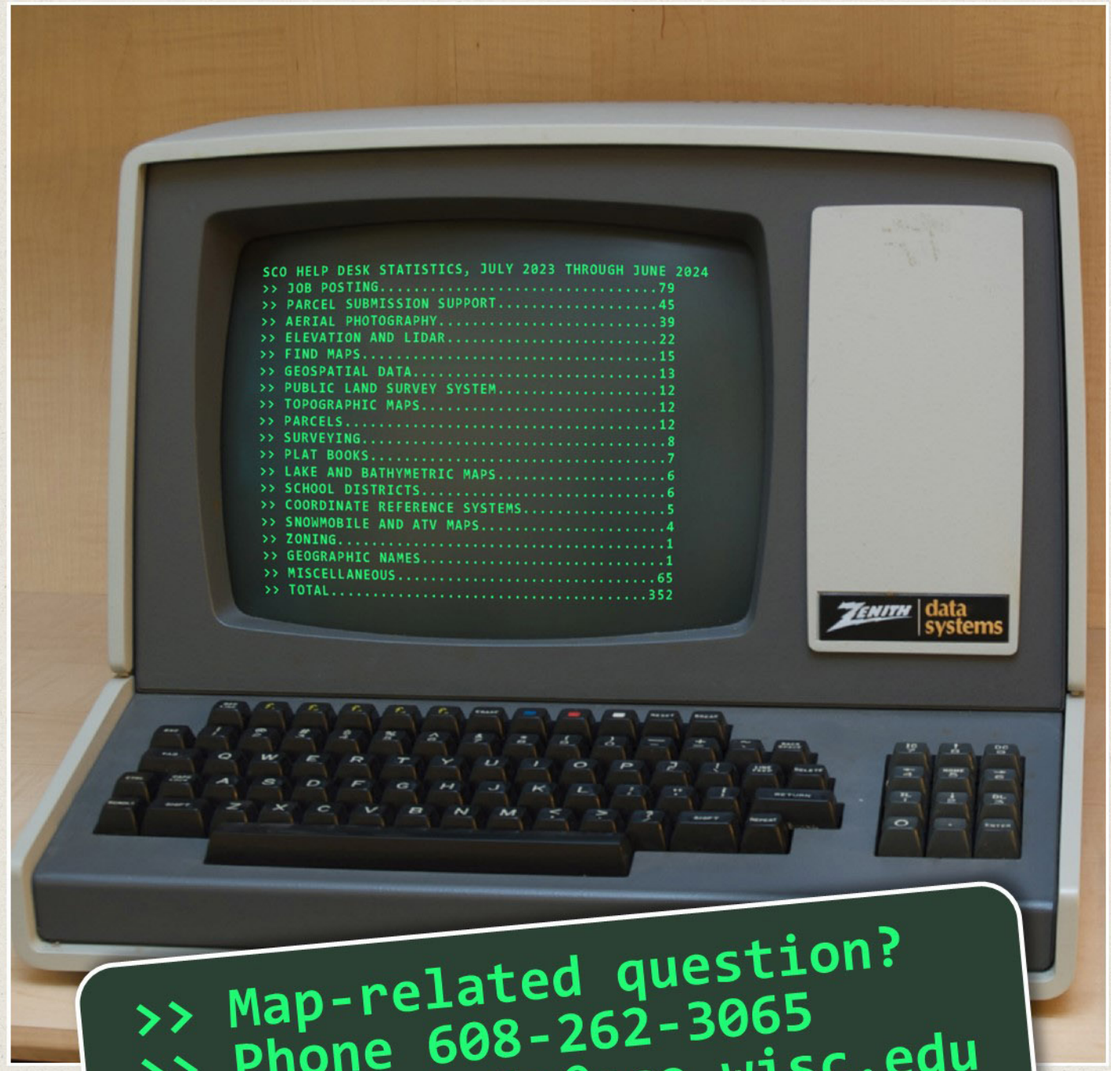
Wisconsin Bearing Trees

Surveyors began to use bearing trees starting in the 1930s. Without these trees, Wisconsin never would have been fully mapped. Use this app to discover which of these historic trees have survived and help us document more of them.

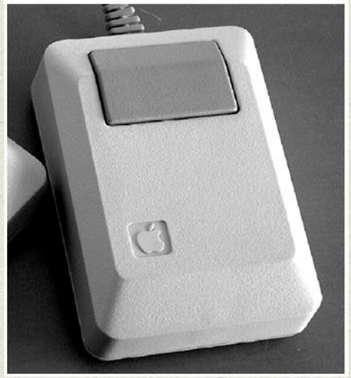
maps.sco.wisc.edu/BearingTrees

SCO Help Desk

Requests for information or assistance submitted to our Help Desk system, July 2023 thru June 2024



Presentations & workshops

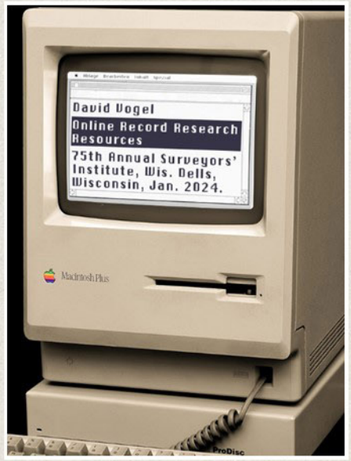


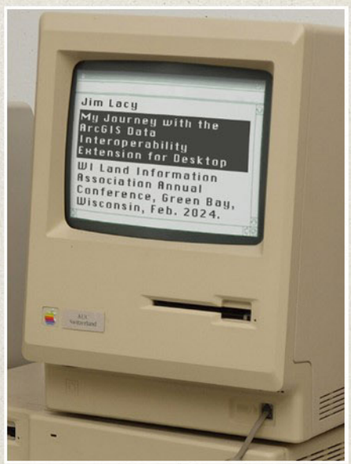
MacDraw and the Macintosh

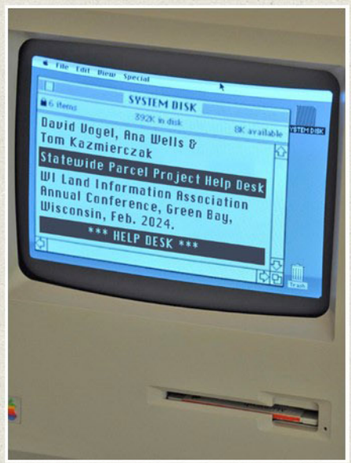
MacDraw was a vector drawing package released with the Macintosh computer in the mid-1980s. MacDraw allowed the user to draw shapes using a hand-help mouse, a revolutionary feature at the time.

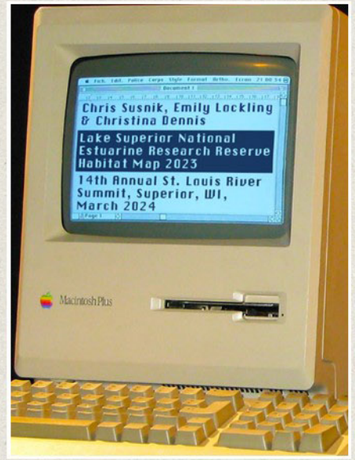
MacDraw was widely used for illustrations and technical drawings, including maps. Users could draw shapes, apply different shading patterns, and incorporate text labels.

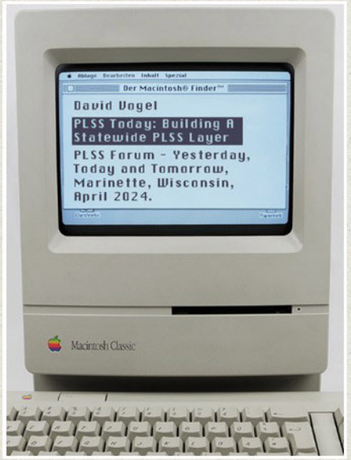
The early Macintosh had a 12-inch monochrome screen with a resolution of 512 by 342 pixels.

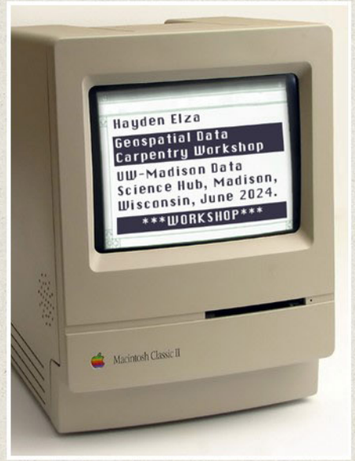


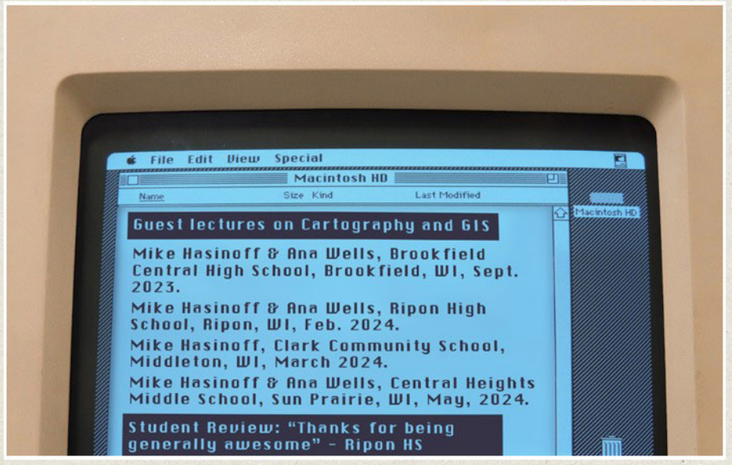


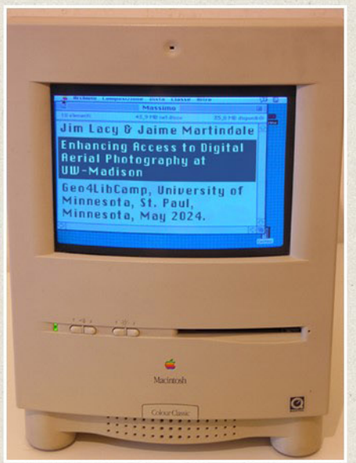


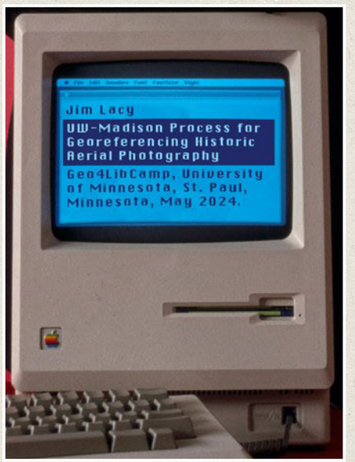




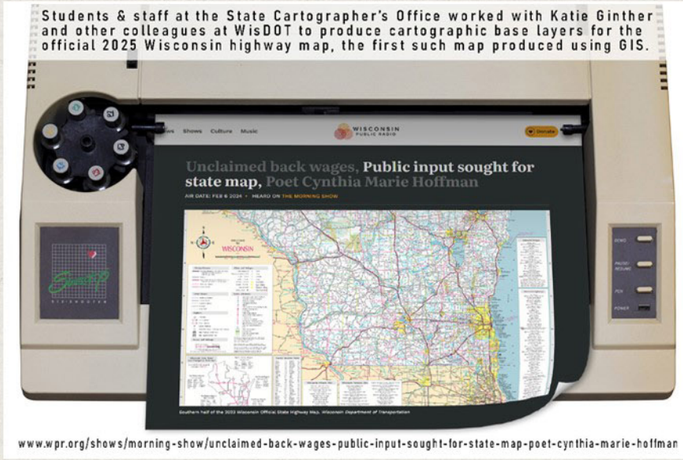








Media Mentions



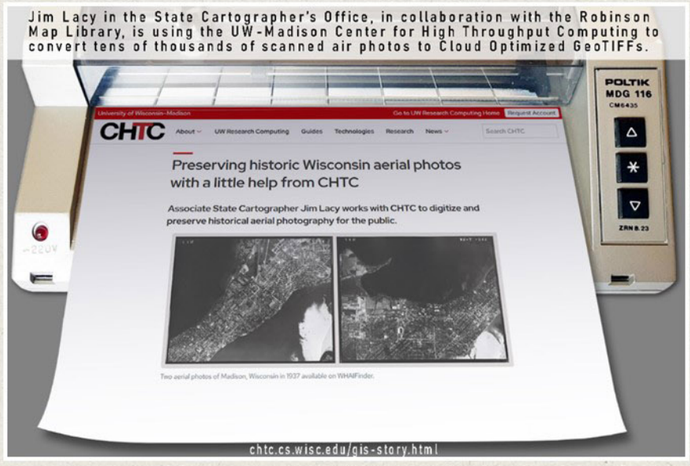
The Pen Plotter

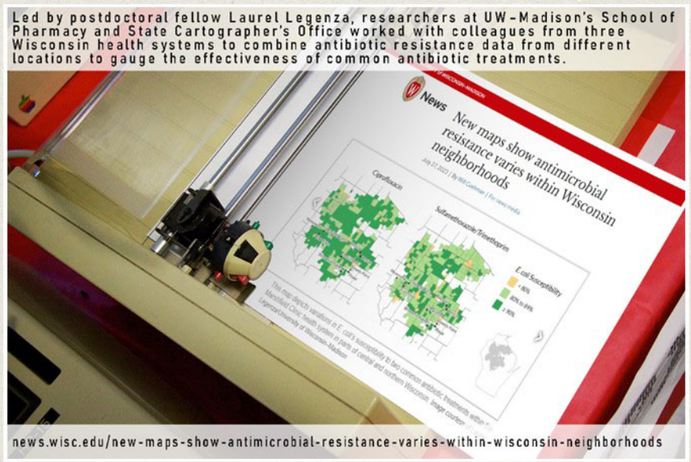
A pen plotter is a mechanical device to draw illustrations.

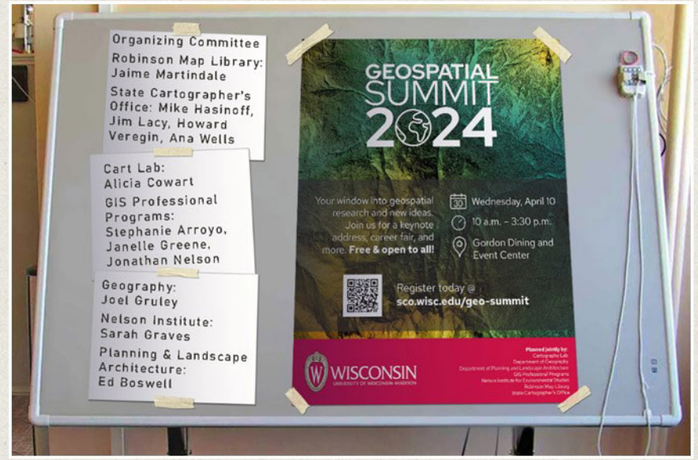
Pen plotters hold one or more pens, which move across the drawing surface based on commands sent from a computer.

Pen plotters draw vector graphics, unlike modern inkjet and laser printers, which are raster-based.

Pen plotters were first developed in the 1950s. By the 1980s, small and inexpensive versions existed that could be used with computer mapping software programs.







Organized by the Wisconsin County Surveyors Association (led by Dan Frick & Ryan Duckart) and the State Cartographer's Office (David Vogel & Howard Veregin)

State Cartographer's Office staff members Mike Hasinoff, Jim Lacy, Howard Veregin & Ana Wells participated in the Science Hall Open House on April 5, 2024

Events Organized

The Digitizer

In the early days of computer mapping, ready-to-use digital geospatial datasets were not as common as they are today.

It was often necessary to create digital data from scratch. This meant producing a digital version of an existing paper map using a digitizer.

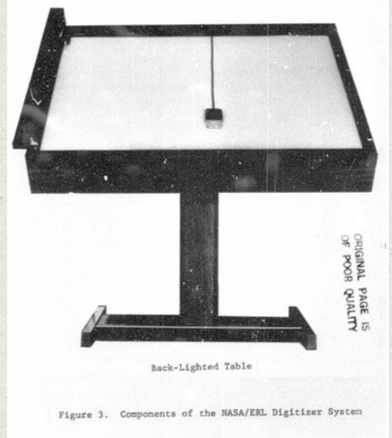


Figure 3. Components of the NASA/ERL Digitizer System

The paper map was first taped to the surface of the digitizer. The operator then traced the features on the map using a hand-help cursor. Every point that was digitized became a vertex with x-y coordinates in a database. These coordinates could then be manipulated with software to perform analysis and make maps.

Associations, Committees and Councils

A Topological Data Model

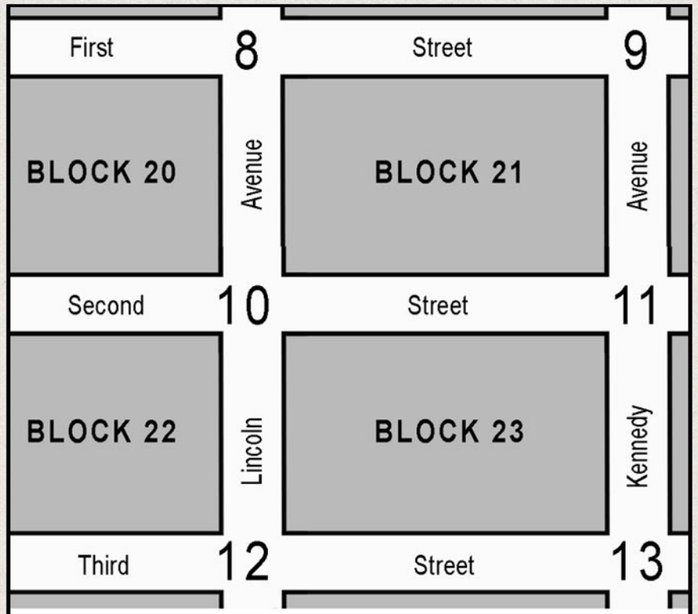
In the late 1960s, cartographers developed a method of encoding geospatial data using topology. The idea was to encode each cartographic line as a segment bounded by two nodes and bounding two polygons. By designating one of the nodes the start node, and the other the end node, the polygons to the left and right sides of the line could be characterized. (See example to the right.)

The advantage of this data model was that it prevented gaps and slivers from forming between polygons encoded as complete geometric rings. Explicit encoding of topological relationships also allowed for automated error detection.

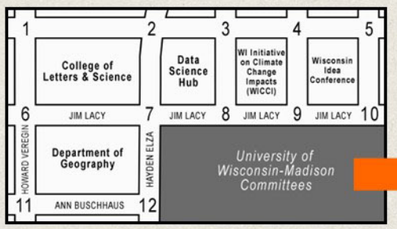
This data model was used by the US Census Bureau for its DIME (Dual Independent Map Encoding) files starting with the 1970 census. It was also used in Harvard Lab's POLYVRT software and, perhaps most famously, as the basis for the coverage model in Arc/INFO.

* * *

In the figures below, SCO staff participation on associations, committees and councils is encoded using this topological data model.

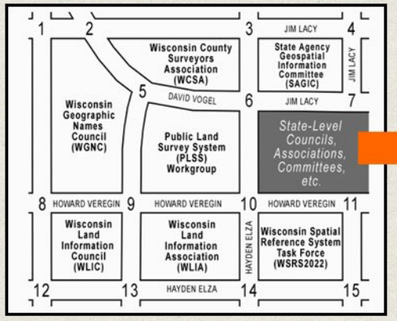


Street Name	Start Node	End Node	Left Block	Right Block
Lincoln Ave.	10	8	20	21
Lincoln Ave.	12	10	22	23
Second St.	10	11	21	23
...				



STREET SEGMENT RECORDS

NAME	START NODE	END NODE	LEFT ASSN	LEFT DESCR	RIGHT ASSN	RIGHT DESCR
Buschhaus	11	12	Geog	Diversity, Equity, Inclusion & Climate Cmte	-	-
Elza	12	7	Geog	IT Oversight Cmte	-	-
Lacy	6	7	L&S	Chair, Cmte on Academic Staff Issues (CASI)	Geog	Finance Cmte
Lacy	7	8	DS Hub	Search Cmte, Data Science Facilitator	-	-
Lacy	8	9	WICCI	Geospatial Working Grp	-	-
Lacy	9	10	WI Idea	Outreach Cmte	-	-
Veregin	11	6	Geog	Staff/Faculty Devt Cmte	-	-



STREET SEGMENT RECORDS

NAME	START NODE	END NODE	LEFT ASSN	LEFT DESCR	RIGHT ASSN	RIGHT DESCR
Elza	14	10	WLIA	Education Cmte	WSRS2022	Member
Elza	13	14	WLIA	Logistics Co-Chair, Annual Conference Cmte	-	-
Lacy	6	7	SAGIC	SCO Rep and Chair	-	-
Lacy	3	4	-	-	SAGIC	Communications Cmte
Lacy	7	4	SAGIC	2024 GIS Symposium Planning Cmte	-	-
Veregin	8	9	WGNC	Ex Officio Member	WLIC	Ex Officio Member
Veregin	9	10	PLSS	SCO Rep	WLIA	Judicial Privacy Cmte
Veregin	10	11	-	-	WSRS2022	Co-Chair
Vogel	5	6	WCSA	SCO Rep	PLSS	SCO Rep

Arc/INFO and X Windows

The X Window System provides a windows-based graphical user environment, often on top of a Unix operating system.

Developed in the 1980s by MIT, X Windows was designed to operate over a network using a client-server model.

Users of Arc/INFO in the 1980s and 1990s would probably have used X Windows as their graphical user interface.

ESRI (Environmental Systems Research Institute, now known simply as Esri) launched Arc/INFO in 1982. It ran on minicomputers, which were smaller than a mainframe but larger than a PC.

The name Arc/INFO reflected the pairing of a spatial data handling system ("Arc") with a database management system ("INFO"). The term "arc" referred to the line segments in the topological data model, as discussed on the previous page.

* * *

The example below shows a listing of the SCO's blog postings (on sco.wisc.edu/news) for July 2023 through June 2024, as they would appear in INFO in an X Windows environment.

Publications

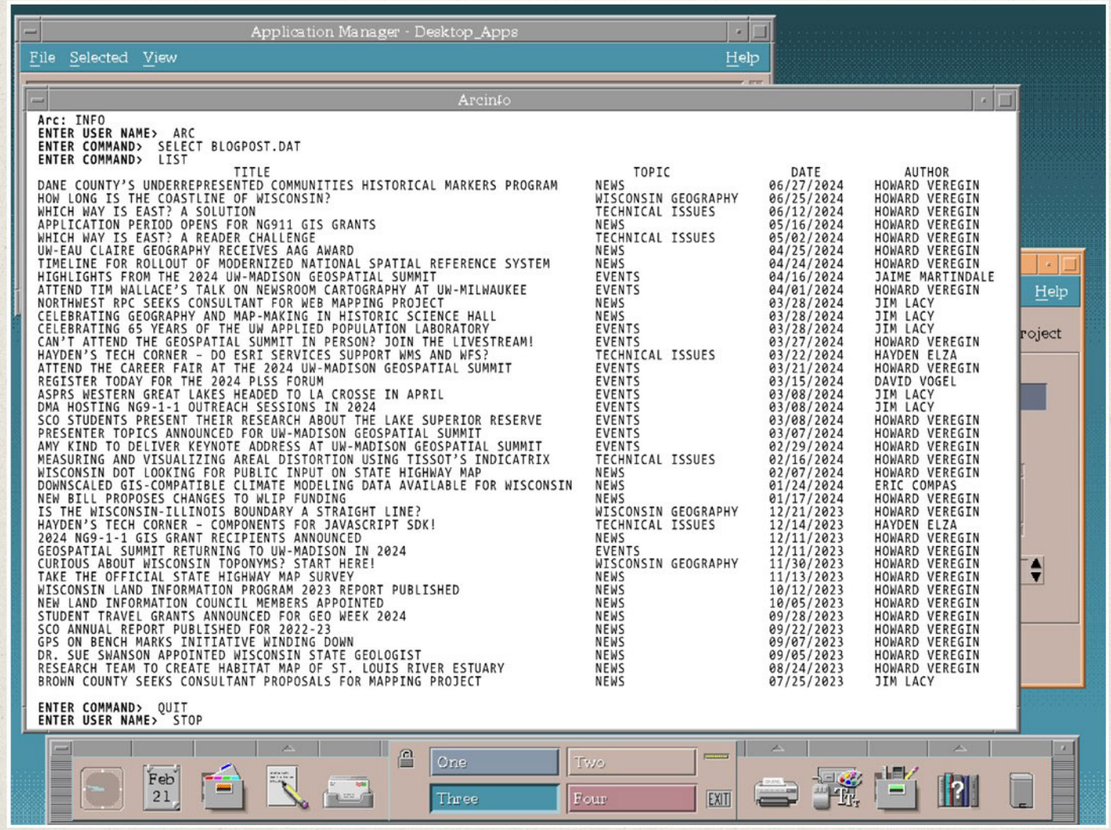


Photo & Image Credits

All photos have been cropped, resized, adjusted for tone or color, geometrically distorted, or otherwise modified from their originals.

Paper texture by kiwihug on Unsplash.

Cover

UW Campus Map, ca. 1971-72
https://digital.library.wisc.edu/1711.dl/6HTXLMJGXO3RW8L

Staff

https://commons.wikimedia.org/wiki/File:DEC_PDP-10_(from_ca._1970_named_decsystem-10)_mainframe_computer_system,_1970s_(edited,_white_background).jpg
Author Gah4, with modifications by Pittigrilli. This file is licensed under the Creative Commons Attribution-Share Alike 4.0 International license. https://creativecommons.org/licenses/by-sa/4.0/deed.en

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https://commons.wikimedia.org/wiki/File:Tereshkova_Space_Suit.jpg Public Domain

Students

https://commons.wikimedia.org/wiki/File:Scientist_working_with_personal_computer,_2013_(Dell_Precision_T3500_Workstation).jpeg
Flickr user ipasadelaide (artist: Jennie Groom). This file is licensed under the Creative Commons Attribution 2.0 Generic license.
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https://commons.wikimedia.org/wiki/File:Apple_III,_personal_computer,_1980.jpg
Author: Sailko. This file is licensed under the Creative Commons Attribution 3.0 Unported license.
https://creativecommons.org/licenses/by/3.0/deed.en

https://commons.wikimedia.org/wiki/File:Living_Computers_-_Apple_--_(31826773817).jpg
Author: Michael Dunn. This file is licensed under the Creative Commons Attribution 2.0 Generic license.
https://creativecommons.org/licenses/by/2.0/deed.en

https://commons.wikimedia.org/wiki/File:Apple_IL_Computer.jpg
Author: Maksym Kozlenko. This file is licensed under the Creative Commons Attribution-Share Alike 4.0 International license.
https://creativecommons.org/licenses/by-sa/4.0/deed.en

https://commons.wikimedia.org/wiki/File:Smithsonian_National_Museum_of_American_History_-_Apple_II_computer_at_the_Smithsonian_(8306564827).jpg
Author: Kevin Burkett from Philadelphia, Pa., USA. This file is licensed under the Creative Commons Attribution-Share Alike 2.0 Generic license.
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https://commons.wikimedia.org/wiki/File:Apple_IIe_-_Deutsches_Museum_(40219954572).jpg
FaceMePLS from The Hague, The Netherlands. This file is licensed under the Creative Commons Attribution 2.0 Generic license.
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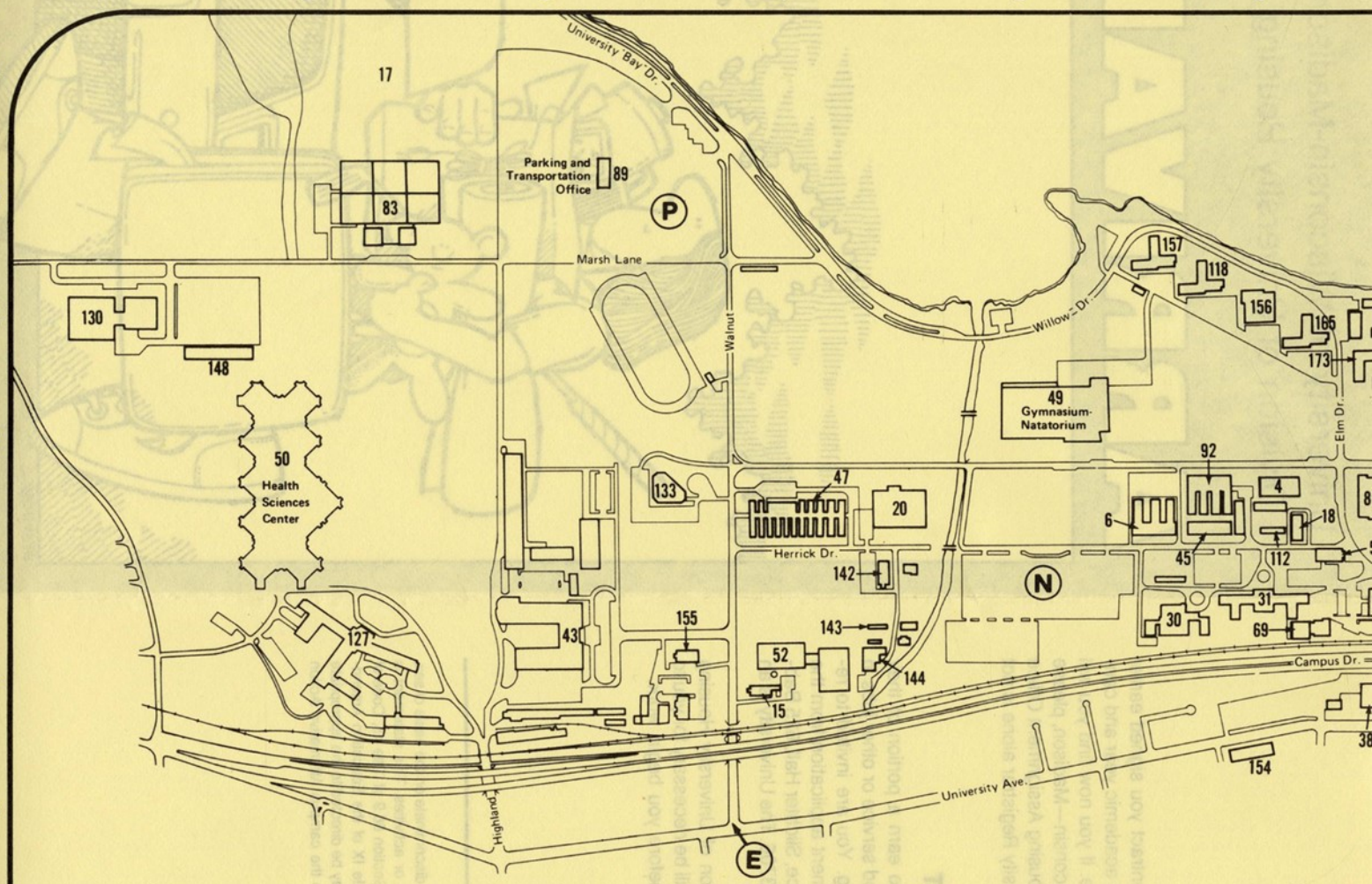

University of Wisconsin-Madison

1. Agricultural Journalism F8
2. Agricultural Bulletin D8
3. Agricultural Engineering E8
4. Agriculture Engineering Lab D6
5. Agriculture Hall E8
6. Agronomy Seed E6
7. Alumni House D11
8. Animal Sciences D6
9. Athletic Practice I-8
10. Athletic Ticket Office I-8
11. Audio-Visual Instruction, Bureau of F9
12. Babcock Hall E7
13. Bacteriology E7
14. Bardeen Medical Lab E9
15. Barley & Malt Lab F4
16. Bascom Hall E10
17. Baseball Field A2
18. Beef Barn E6
19. Biochemistry F8
20. Biotron E5
21. Birge Hall F10
22. Bradley Hospital E9
23. Brogden Hall (Psychology) G9
24. Carillon Tower D9
25. Chemistry G10
26. Children's Hospital E8
27. Commerce E9
28. Computer Sciences-Statistics H9
29. Crew House C7
30. Dairy Barn E6
31. Dairy Cattle Instruction & Research Center E6
32. Education E10
33. Educational Sciences G10
34. Elvehjem Art Center F11
35. Engineering: Chemical, Civil, Electrical & Engineering Mechanics G8
36. Engineering & Physical Sciences Library H8
37. Engineering Research G8
38. Enzyme Institutes F6
39. Extension F11
40. Extension Services; Duplicating & Photography I-9
41. Field House J7
42. Fleet Car Office J10
43. Forest Products Lab F3
44. Genetics F8
45. Genetics Research Lab E6
46. Greenhouses: Babcock Dr. F7
47. Greenhouses: Walnut St. D4
48. Gymnasium-Langdon St. (Old Red Gym; Armory) D11
49. Gymnasium-Natatorium D5
50. Health Sciences, Center for D2
51. Heating Station: Charter St. H9
52. Heating Station: West F4
53. Highway Lab, State G8
54. Hiram Smith E8
55. Historical Society, State E11
56. Home Economics E9
57. Home Management House E8
58. Horse Barn E6
59. Horticulture (Moore Hall) E7
60. Humanities E11
61. Hydraulics Lab D10
62. Inter-College Programs F11
63. King Hall (Soil Science) D8
64. Lathrop Hall F10
65. Law E10
66. Limnology Lab D10
67. Lowell Hall (Extension) D12
68. McArdle Lab for Cancer Research F8
69. Meats Lab–Animal Research Lab F6
70. Mechanical Engineering G7
71. Medical Sciences E9
72. Memorial Library E11
73. Memorial Union D11
74. Memorial Union South G9
75. Metallurgical & Mineral Engineering G8
76. Meteorology & Space Science H9
77. Middleton Medical Library E9
78. Miekiejohn House (ILS) G9
79. Molecular Biology-Biophysics E9
80. Moore Hall (Horticulture) E8
81. Music Hall E10
82. Naval ROTC Armory F7
83. Nielsen Tennis Stadium B2
84. Noland Zoology Building H10
85. North Hall E10
86. Nursing, 1402 Univ. Ave. F8
87. Observatory D8
88. Observatory Hill Office D9
89. Parking and Transportation Office, Lot 60. See their parking map for spaces available. B3
90. Peterson Office Building F11
91. Pharmacy-Physics (Thomas C. Chamberlin Hall) F9
92. Poultry Research Lab D6
93. Preschool Lab E8
94. Primate Center J9
95. Primate Lab J9
96. Protection & Security I-10
97. Radio Hall D10
98. Russell Labs E7
99. Science Hall E11
100. Service G9
101. Service Memorial Institutes F9
102. Short Course Dorms C7
103. Social Science D9
104. Soil Science (King Hall) D8
105. South Hall E10
106. Stadium I-7
107. Steenbock Memorial Library D7
108. Sterling Hall E9
109. Stock Pavilion E7
110. Stores I-9
111. Stovall Hygiene Lab, State E8
112. Swine Barn E6
113. T-22 Food Services G7
114. T-23 Nuclear Engineering G7
115. T-24 General Engineering G7
116. T-27 Motor Vehicle Lab G8
117. Teacher Education H10
118. University Bay Center for Continuing Education C6
119. University Club E11
120. University Credit Union I-8
121. University Health Service F7
122. University Hospitals F9
123. University Press H11
124. University Press Warehouse H11
125. Van Hise Hall E9
126. Van Vleck Hall E9
127. Veterans Administration Hospital F2
128. Veterinary Science E7
129. Vilas Communication Hall G11
130. Waisman Center C1
131. Weeks Hall (Geology-Geophysics) H9
132. White Hall: College Library D10
133. Wis. Alumni Research Foundation (WARF) D4
134. Wisconsin Center D11
135. YMCA: Univ. Branch G10
136. Zoology Research G9

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137. 215 N. Brooks St. G10
138. 307 N. Charter G9
139. 420 N. Charter St. F9
140. 931 W. Dayton St. H10
141. 425 Henry Mall F8
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