

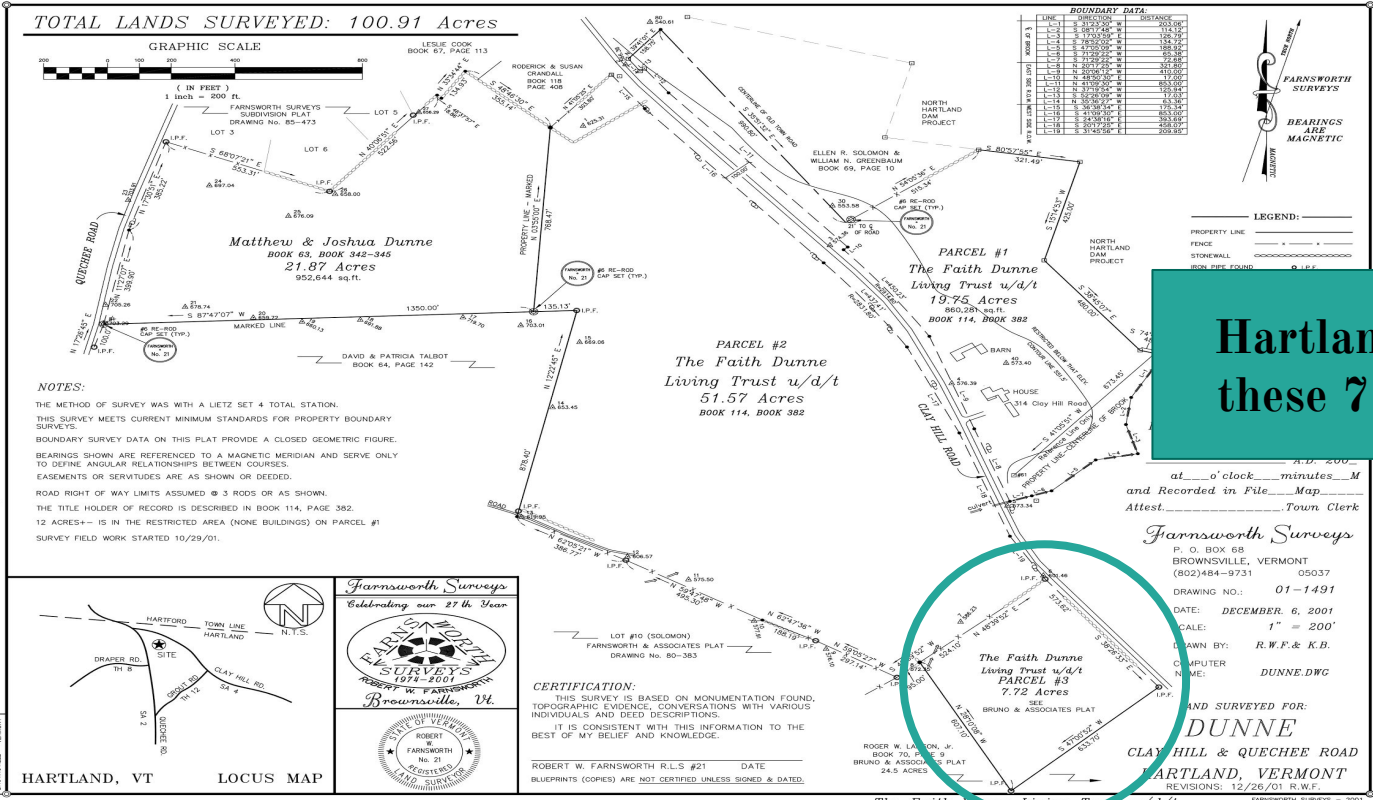
Opportunities for a coordinate-based land surveying system.

“When I observe that there are different ways of surveying, my employer commonly asks which will give him the most land, not which is most correct.”

- Henry David Thoreau
Life Without Principle

Surveying and land record-keeping systems are flawed.

The Faith Dunne Living Trust u/d/t



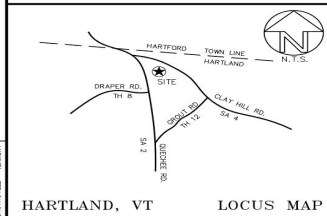
Hartland lost these 7 acres

at _____ o'clock _____ minutes _____ M
and Recorded in File _____ Map _____
Attest: _____ Town Clerk

Farnsworth Surveys
P. O. BOX 68
BROWNVILLE, VERMONT
(802)484-9731 05037
DRAWING NO.: 01-1491
DATE: DECEMBER 6, 2001
SCALE: 1" = 200'
DRAWN BY: R.W.F. & K.B.
COMPUTER NAME: DUNNE.DWG

AND SURVEYED FOR:
DUNNE
CLAY HILL & QUECHEE ROAD
HARTLAND, VERMONT
REVISIONS: 12/26/01 R.W.F.

E-MAIL: fsurveys@vermont.net
THIS PLAT MEETS THE REQUIREMENTS OF 27 V.S.A. § 1403 ORIGINAL INKED PLAT PRODUCED BY: FARNSWORTH SURVEYS - P.O. BOX 68, BROWNVILLE, VERMONT 05037



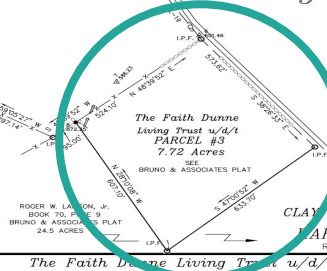
Farnsworth Surveys
Celebrating our 27th Year

FARNSWORTH SURVEYS
1974-2001
RESIDENTS OF FARNSWORTH
BROWNVILLE, VT.

ROBERT FARNSWORTH R.L.S. #21
LICENSED LAND SURVEYOR

CERTIFICATION:
THIS SURVEY IS BASED ON MONUMENTATION FOUND, TOPOGRAPHIC EVIDENCE, CONVERSATIONS WITH VARIOUS INDIVIDUALS AND DEED DESCRIPTIONS.
IT IS CONSISTENT WITH THIS INFORMATION TO THE BEST OF MY BELIEF AND KNOWLEDGE.

ROBERT W. FARNSWORTH R.L.S. #21 DATE _____
BLUEPRINTS (COPIES) ARE NOT CERTIFIED UNLESS SIGNED & DATED.



The Faith Dunne Living Trust u/d/t



**Which can lead to
the tragic...**

...and the absurd.



Surveys are not easy to retrace, even for professionals...

“Beginning at two sugar trees and a Buckeye, upper corner to Philip Slaughter’s survey, No. 588, running with his line N. 66 degs. W. 290 poles, to a lynn sugar tree and ash, in the line of said Slaughter’s survey. Thence W. 14 degs S. . . ”

...Which creates costs.

Stake from
correct survey

Stakes from incorrect
surveys

**Homeowners pay to have
surveys retraced again and
again to ensure accuracy.**



5th time's the charm...

The problem? We describe property today largely the same way we did in the late 1700s.

To show shape and area of land, we use:

- **Bearings** derived from a magnetic pole that drifts up to 40 miles/yr
- **Distances** measured in links, rods, or feet over uneven terrain
- **Physical lines** like rock walls, fences, or the middle of a stream
- **Physical monuments** like trees, rocks, iron stakes, peaks, etc

The solution? Coordinate-based surveying



Professional grade GPS is now accurate to 2 cm.

This precision meets standards for all surveying needs besides surveying for complex engineering projects.

Geographic Information Systems (GIS) technology can display dynamic and precise coordinate data on online maps.

A GPS based system would

- Eliminate redundant surveying
- Reduce boundary disputes
- Improve surveying precision
- Increase safety at dig sites
- Reduce cost of property transfers
- Improve public records access (see right)
- Simplify zoning calculations, tax assessments
- Expedite developments, subdivisions
- Streamline mortgage applications
- ... And much more.



Beneficiaries of a new system include:

- Homeowners
- Municipalities (taxpayers)
- Developers
- Planning commissions
- Banks/lenders
- Safety Organizations
- RETech (Real Estate Tech)
- UAV operators (e.g., drone delivery)
- Extraction companies
- Conservation organizations



Test Case: The Park Street School



- Former public high school
- Town of Springfield, VT is hoping to sell the property
- Parcel contains steep hills and trees on back side
- We hired a surveyor to retrace the parcel using lat/long coordinates

We took GPS readings at all corners



A “6 inch maple”
from 1946



Taking GPS readings

**And mapped the
coordinates using
a GIS platform**



Would a coordinate-based system be legal?

Surveying is regulated by state, but largely, yes.

- 2cm GPS margin of error meets industry precision and confidence standards
- In most states, coordinates can legally be included in property descriptions
- Whether deed submissions are accepted electronically or available to view online is often a county by county decision, but electronic adoption is increasing

In Missouri, for example, state statutes wouldn't automatically disqualify the use of coordinates in surveys, and many counties already accept electronic deed submissions.

However, the chief legal barrier to full adoption is the priority of evidence in boundary disputes.

- When judges settle boundary disputes, they decide what boundary evidence is most persuasive based on centuries of common law.
- Centuries of common law precedent dictates that coordinates are less persuasive than monuments, lines in the field, and distances and bearings.
- **As a result, surveyors don't use coordinates to describe parcels for fear their work won't hold up in court if challenged**

How could the hierarchy of evidence be changed?

1. State legislatures could codify new hierarchies of evidence.

- Coalition of advocates likely needed to push legislation through
- Could begin as pilot project in a specific municipality



How could the hierarchy of evidence be changed?

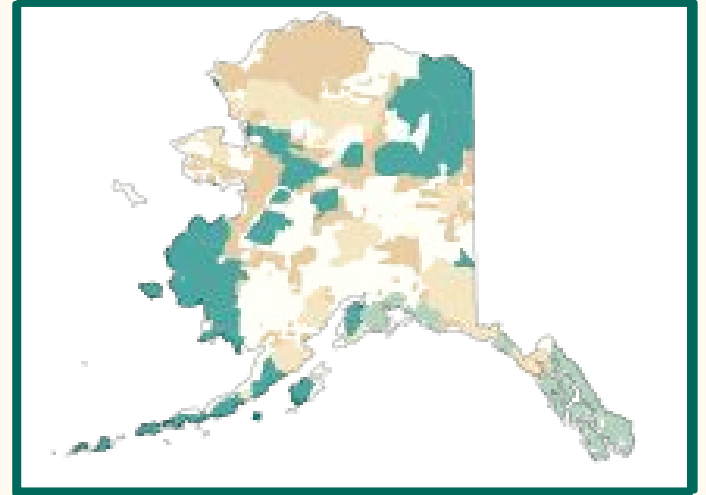


2. Influential courts could depart from common law precedent

- Test case could be introduced in favorable district
- Case then appealed to influential courts

Catalyst to a paradigm shift? The Bureau of Land Management

- The BLM still needs to convey vast tracts of land to state of Alaska (per the Alaska Statehood Act)
- But they need to survey the land first
- They have proposed surveying the land with GPS to save time (and ~\$60M)
- They asked the Alaska legislature to accept coordinates as equivalent to monuments
- **The AK legislature hasn't yet decided**

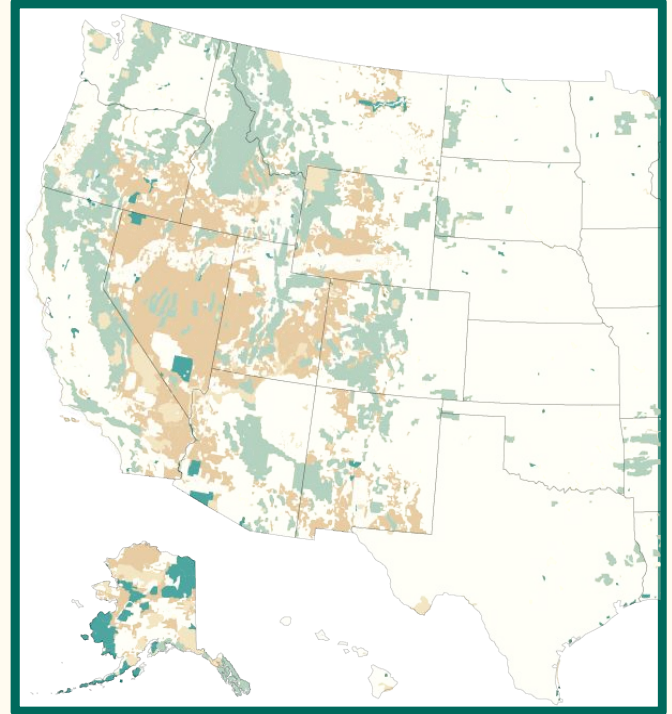


Beige = BLM lands

From NYTimes, "Why the Government Owns So Much Land in the West," Jan 5, 2016

If the BLM's proposal is approved?

- The BLM will use coordinates for surveying needs in other states
- Since land is conveyed to and from the BLM in many other states (see left), those state legislatures will be prompted to address coordinate surveying as well
- Legislative approval of coordinate-based surveying in any state could prompt broader common-law changes as well



From NYTimes, “Why the Government Owns So Much Land in the West,” Jan 5, 2016

Another possible catalyst? **Boundary line agreements**

When the boundary evidence between two neighbors is unclear, they can sign a boundary line agreement (BLA) clarifying where the boundary is and what evidence will be used.

Though it isn't common practice to use coordinates, it isn't expressly illegal.

Executing BLAs with coordinates would provide a use case for viability of a new surveying system

Adopting Alberta, CA's policies would make for a slow and steady transition

- Monuments and coordinates are considered equally valid, but the two may never be used to indicate the same point
- Ergo, coordinates can be used for new surveys, and to replace lost monuments
- The result? 100% adoption may never happen, surveying industry will persist even as surveying paradigm changes



**Without changing the hierarchy of evidence,
there is still ample opportunity for innovation.**

GIS Platform for Subdivision Developments

Developers draft “plat maps” of individual plots when making subdivisions.

Since subdivided plots have no existing monumentation, coordinates could be used and considered the most persuasive boundary evidence.

**Pre-recession there were a
million new single-home
subdivision plots created
each year.**

**Today, that number is
500,000/year,
but growing.**



Parcel Details:

Total Land: 2.220042 acres

Lot A:	.597302 acres
Lot B:	.598782 acres
Lot C:	.589287 acres
Lot D:	.488672 acres



Show Federal Floodplain

Show Buried Utilities

Show Municipal Right of Way

Submit Plat

Or a new twist on title insurance

Title insurance covers homeowners against defects in deeds or title.

Insurers extensively research deeds and chains of title to protect against flaws.

Incorporating coordinate-based surveys into their battery of verification would de-risk their portfolio

Insurer would provide additional value during subsequent deed transfers.



Advancing the cause: How Kansas City could initiate broader change

- Record all public property boundaries and road right of way using 7 digit GIS coordinates
- Require utilities to use GIS to map infrastructure
- Sponsor the use of coordinate-based surveys of abandoned properties in order to facilitate transfer in collaboration with the UMKC Land Bank mapping project
- Partner with county officials to use coordinate surveys whenever possible, and require coordinates for future survey submissions
- Work with the state legislature to pass a law that makes coordinate-based descriptions as valid as monumentation for boundary disputes, or all surveys



42 Temple Rd.
Kansas City, MO



Parcel Details

Size: 1.245151 acres

Zoning: Residential

Subdivision Eligible: Yes

Boundaries: Potentially disputed

Easements: None

Commercial Drone Flyover: Not approved

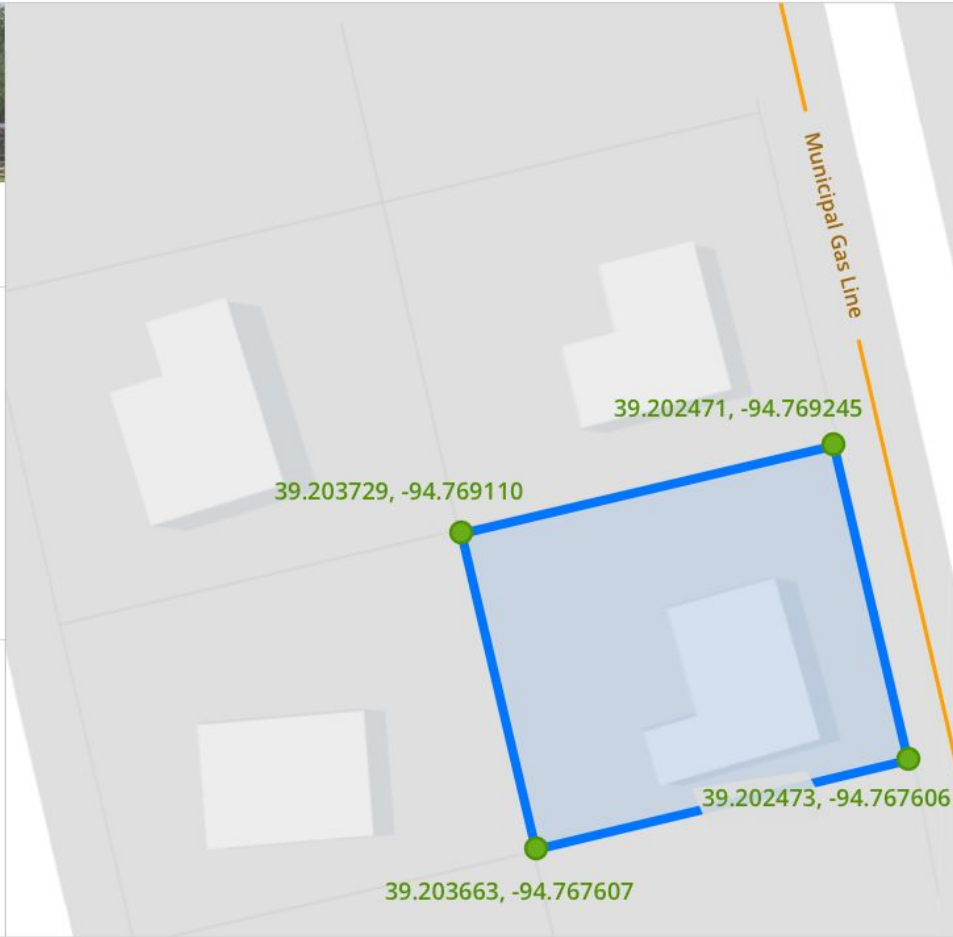
Survey History:

May 17th, 2000



Schull Surveying, Inc
723 N. Bell St.
Avondale, MO

[View All Associated Land Records](#)



Show Federal Floodplain

Show Buried Utilities



44 Temple Rd.
Kansas City, MO



Parcel Details

Size: 1.367501 acres

Zoning: Residential

Subdivision Eligible: Yes

Boundaries: Potentially disputed

Easements: None

Commercial Drone Flyover: Approved

Survey History:

April 4th, 2004

Donahue Surveying, Inc
244 Fairview Rd
Kansas City, MO



[View All Associated Land Records](#)



Show Federal Floodplain

Show Buried Utilities



44 Temple Rd.
Kansas City, MO



Parcel Details

Size: 1.367501 acres

Zoning: Residential

Subdivision Eligible: Yes

Boundaries: Potentially disputed

Easements: None

Commercial Drone Flyover: Approved

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April 4th, 2004

Donahue Surveying, Inc
244 Fairview Rd
Kansas City, MO



[View All Associated Land Records](#)



Warning

One of your boundaries doesn't align with your neighbor.

[Click here](#) to learn about the easy ways you can clarify this.



Show Federal Floodplain

Show Buried Utilities

Thank you!

Legal professionals and experts we consulted

Matt Chase, Executive Director National Association of Counties

Randy Mayhew, President, School of Real Estate Law

Byron Calkins, Professor of Surveying at Great Basin College

VT Law School faculty; Professor Oliver Goodenough

VT Law School student researchers

Dave Sherret, VT and MA based attorney

5 Town and County clerks, Recorders of Deeds

See our whitepaper for full list of citations.