# Google LLC,
# v.
# Geoscope Technologies Pte. LTD.

**Patent Owner Demonstratives**
IPR2023-01209 (Patent 7,561,104)
IPR2023-01210 (Patent 8,400,358)
IPR2023-01211 (Patent 8,786,494)
IPR2023-01212 (Patent 8,406,753)

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Geoscope Exhibit 2024
Google v. Geoscope
IPR2023-01212

# Overview

1. **Background**
2. Claim Construction
   A. Calibration Data
   B. [Non-Uniform] Grid Point
3. The Alleged Prior Art Does Not Teach Or Suggest [Non-Uniform] Grid Points
   A. Shkedi
   B. Spain
   C. Zhu

# Claims At Issue

| IPR | Patent | Claims At Issue[1] |
|---|---|---|
| IPR2023-01209[2] | 7,561,104 | 2 |
| IPR2023-01210 | 8,400,358 | 18 |
| IPR2023-01211 | 8,786,494 | 4 and 26 |
| IPR2023-01212 | 8,406,753 | 1, 7, 9, 32, 38, and 40 |

IPR 2023-01209, -10210, -01211, 01212 POR, 1

1 Patent Owner Patent Owner has statutorily disclaimed claims 1, 3, and 11 of the ’104 Patent, claims 1, 15, 41, and 52 of the ’352 Patent, and claims 1, 25 and 35 of the ‘494 Patent.
2 Unless otherwise indicated herein, citations in these Demonstratives are to the IPR2023-01209 record.

# IPR2023-01209 ('104 Patent)

## Method To Modify Calibration Data Used To Locate A Mobile Unit

| Ground | Reference(s) | Basis | Claims |
|---|---|---|---|
| 1 | U.S. Patent No. 7,706,811 ("Shkedi") (EX1006) | §102 | 1, 2, 3, 11 |
| 2 | Shkedi; U.S. Patent Publication No. 2003/0064735 ("Spain") (EX1009) | §103 | 2 |
| 3 | Jian Zhu and G. D. Durgin, "Indoor/outdoor location of cellular handsets based on received signal strength," *2005 IEEE 61st Vehicular Technology Conference,* Stockholm, Sweden, 2005, pp.92-96, Vol. 1, doi: 10.1109/VETECS.2005.1543256 ("Zhu") (EX1010) | §102 | 1, 2, 3, 11 |
| 4 | Zhu; Heikki Laitinen, Jaakko Lähteenmäki, Tero Nordström, "Database Correlation Method for GSM Location", VTT Information Technology, IEEE, 2001. ("Laitinen") | §103 | 1, 2, 3, 11 |
| 5 | Zhu; Spain | §103 | 2 |

IPR 2023-01209 Petition, 6

# IPR2023-01209 ('104 Patent)

## Claim 2

**2**. The method of claim **1** wherein said database comprises previously-gathered calibration data for one or more non-uniform grid points within said region.

EX1001 ['104 Patent], Cl 2

# IPR2023-01210 ('358 Patent)

**Method To Modify Calibration Data Used To Locate A Mobile Unit**

| Ground | Reference(s) | Basis | Claims |
|---|---|---|---|
| 1 | U.S. Patent No. 7,706,811 ("Shkedi") (EX1006) | §102 | 1, 15, 18 |
| 2 | Shkedi; U.S. Patent Publication No. 2003/0064735 ("Spain") (EX1009) | §103 | 18 |
| 3 | Jian Zhu and G. D. Durgin, "Indoor/outdoor location of cellular handsets based on received signal strength," *2005 IEEE 61st Vehicular Technology Conference,* Stockholm, Sweden, 2005, pp.92-96, Vol. 1, doi: 10.1109/VETECS.2005.1543256 ("Zhu") (EX1010) | §102 | 1, 15, 18, 41, 52 |
| 4 | Zhu; Spain | §103 | 18 |
| 5 | Zhu; Heikki Laitinen, Jaakko Lähteenmäki, Tero Nordström, "Database Correlation Method for GSM Location", VTT Information Technology, IEEE, 2001 (Laitinen) | §103 | 52 |
| 6 | Shkedi; Zhu | §103 | 41, 52 |

IPR 2023-01210 Petition, 6

# IPR2023-01210 ('358 Patent)

## Claim 18

**18**. The system of claim **15** wherein said database comprises previously-gathered calibration data for one or more non-uniform grid points within said region.

EX1001 ['358 Patent], Claim 18

# IPR2023-01211 ('494 Patent)

## Method To Modify Calibration Data Used To Locate A Mobile Unit

| Ground | Reference(s) | Basis | Claims |
|---|---|---|---|
| 1 | U.S. Patent No. 7,706,811 ("Shkedi") (EX1006) | §102 | 1, 4 |
| 2 | Shkedi; U.S. Patent Publication No. 2003/0064735 ("Spain") (EX1009) | §103 | 4 |
| 3 | Jian Zhu and G. D. Durgin, "Indoor/outdoor location of cellular handsets based on received signal strength," *2005 IEEE 61st Vehicular Technology Conference,* Stockholm, Sweden, 2005, pp.92-96, Vol. 1, doi: 10.1109/VETECS.2005.1543256 ("Zhu") (EX1010) | §102 | 1, 4, 25, 26, 35 |
| 4 | Zhu; Spain | §103 | 4, 26 |
| 5 | Zhu; Heikki Laitinen, Jaakko Lähteenmäki, Tero Nordström, "Database Correlation Method for GSM Location", VTT Information Technology, IEEE, 2001 (Laitinen) | §103 | 35 |
| 6 | Shkedi; Zhu; Spain | §103 | 25, 26, 35 |

IPR 2023-01211 Petition, 6

# IPR2023-01211 ('494 Patent)

## Claim 4

**4**. The method of claim **1** wherein said database comprises previously-gathered calibration data for one or more non-uniform grid points within said region.

EX1001 ['494 Patent], Claim 4

## Claim 26

**26**. The method of claim **25** wherein said database comprises previously-gathered calibration data for one or more non-uniform grid points within said region.

EX1001 ['494 Patent], Claim 26

# IPR2023-01212 ('753 Patent)

**System and Method For Generating A Location Estimate Using Uniform and Non-Uniform Grid Point**

| Ground | Reference(s) | Basis | Claims |
|---|---|---|---|
| 1 | U.S. Patent Publication No. 2003/0064735 ("Spain") (EX1006), as evidenced by:<br><br>Agiwal (EX1005) | §§102/103 | 1, 7, 9, 32, 38, 40 |

IPR 2023-01212 Petition, 6

# IPR2023-01212 ('753 Patent)

## Claim 1

1. A method of determining the location of a mobile device in a geographic region comprising the steps of:

(a) providing calibration data for each of one or more calibration points in a geographic region, said calibration data having one or more characterizing parameters;

(b) generating one or more sets of grid points for said calibration data;

(c) receiving at least one network measurement report from a mobile device at an unknown location in said geographic region;

(d) evaluating said at least one network measurement report with each of said sets of grid points as a function of select ones of said characterizing parameters;

(e) selecting a set of grid points as a function of a predetermined criteria; and

(f) determining the location of a mobile device in said geographic region as a function of said selected set of grid points.

EX1001 ['753 Patent], Claim 1

# IPR2023-01212 ('753 Patent)

## Claim 32

**32**. A system for determining the location of a mobile device in a geographic region comprising:

(a) a database; and

(b) a processor for receiving calibration data for each of one or more calibration points in a geographic region and receiving at least one network measurement report from a mobile device at an unknown location in said geographic region, said calibration data and network measurement report having at least one characterizing parameter and said processor is programmed to:

(i) generate one or more sets of grid points for said calibration data,

(ii) evaluate said at least one network measurement report with each of said sets of grid points as a function of select ones of said characterizing parameters,

(iii) select a set of grid points as a function of a predetermined criteria, and

(iv) determine the location of a mobile device in said geographic region as a function of said selected set.

EX1001 ['753 Patent], Claim 32

# Overview

1. Background
2. Claim Construction
   A. Calibration Data
   B. [Non-Uniform] Grid Point
3. The Alleged Prior Art Does Not Teach Or Suggest [Non-Uniform] Grid Points
   A. Shkedi
   B. Spain
   C. Zhu

# Calibration Data

**A. "calibration data"**

The phrase "calibration data" should be construed as:

**modified or unmodified network measurement data associated with a geographic location**

IPR 2023-01209, Pet, 14

# Overview

1. Background
2. Claim Construction
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   A. Shkedi
   B. Spain
   C. Zhu

# Claim Construction

| [Non-Uniform] Grid Point | |
|---|---|
| **Patent Owner Construction** | **Petitioner Construction** |
| "a point associated with representative calibration data for an area whose boundaries are determined from evaluation of the calibration data." | "a point associated with representative calibration data for an area" |

IPR 2023-01209, POR, 17, Pet, 15-16

# Claim Construction

| Patent Owner Construction |
| --- |
| "a point associated with representative calibration data for an area whose boundaries are determined from evaluation of the calibration data." |

"Defendants' use of 'representative calibration data' is intended to reflect that ***the defining characteristic of a NUG region***—as explained in the specifications of the '753 Patent, '104 Patent, and '748 Patent—is that the data points within an area are all 'statistically very similar' such that each of the grid points within the NUG region can represent the overall NUG. *See* Ex. B at 3:56–60; Ex. E at 10:29–11:7; Ex. F at 6:22–28."

IPR 2023-01209, POR, 18-19, EX1028 [Markman Order], 20 (emphasis added)

# Claim Construction

| Patent Owner Construction |
| --- |
| "a point associated with representative calibration data for an area whose boundaries are determined from evaluation of the calibration data." |

> The location of a wireless mobile device may be estimated using, at least in part, one or more pre-existing Network Measurement Reports ("NMRs") which include calibration data for a number of locations within a geographic region. *The calibration data for these locations is gathered and analyzed so that particular grid points within the geographic region can be determined and associated with a particular set or sets of calibration data from, for example, one or more NMRs.*

Ex. E at Abstract (emphasis added). But the italicized language from which Plaintiff's construction is drawn is directed more toward what *must be done* to arrive at a grid point or set of grid points rather than what a grid point *is*. The specification of the '104 Patent, sibling to the '753 Patent,

IPR 2023-01209, POR, 21, EX1008 ['753 Patent], Abstract

# Claim Construction

| Patent Owner Construction |
| --- |
| "a point associated with representative calibration data for an area whose boundaries are ***determined from evaluation of the calibration data***." |

"The claimed grid points represent an ***area*** for which calibration data is sufficiently similar that they can be represented by a single ***point*** for the entire area. Defendants' proposal captures that essence of a 'grid point'; Plaintiff's does not."

IPR 2023-01209, Sur-Reply, 3-4; EX2025 [Google Claim Construction Brief], 15-16

# Claim Construction

| Patent Owner Construction |
| --- |
| "a point associated with representative calibration data for an area whose boundaries are ***determined from evaluation of the calibration data.***" |

"the described system stores only one point for a given NUG, because ***the NUG represents an area for which all of the points within it would be similar if measured***, so each point is representative of the area"

IPR 2023-01209, Sur-Reply, 4; EX2025 [Google Claim Construction Brief], 16

# Claim Construction

| Patent Owner Construction |
| --- |
| "a point associated with representative calibration data for an area whose boundaries are ***determined from evaluation of the calibration data***." |

"Once the NUG is defined, the system can store a single point within the NUG ***because that point is, by definition, representative of (i.e., statistically similar to) the other points within the NUG***"

IPR 2023-01209, Sur-Reply, 5; EX2025 [Google Claim Construction Brief], 17

# Claim Construction

**Patent Owner Construction**

"a point associated with ***representative calibration data for an area whose boundaries*** are determined from evaluation of the calibration data."

"That natural obstacles can form a grid point boundary further confirms that the grid point represents an ***area*** with defined boundaries."

IPR 2023-01209, Sur-Reply, 5; EX2025 [Google Claim Construction Brief], 16

# Claim Construction

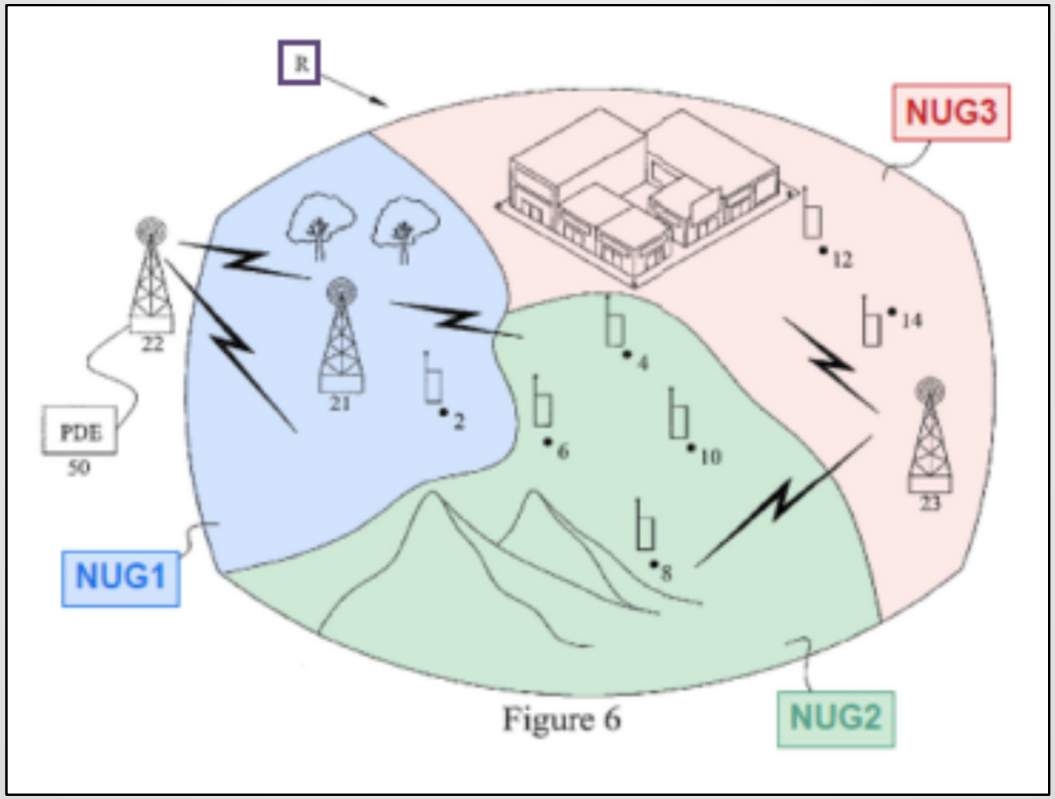
| Patent Owner Construction |
| --- |
| "a point associated with representative calibration data for an area whose boundaries are determined from evaluation of the calibration data." |

**2**. The method of claim **1** wherein said database comprises previously-gathered calibration data for one or more non-uniform grid points within said region.

IPR 2023-01209, POR, 24; EX1001 ['104 Patent], claim 1

# Claim Construction

| Patent Owner Construction |
| --- |
| "a point associated with representative calibration data for an area whose boundaries are determined from evaluation of the calibration data." |




IPR 2023-01209, POR, 26; EX2013 ['784 Patent], FIG. 6

# Claim Construction

| Patent Owner Construction |
| --- |
| "a point associated with representative calibration data for an area whose boundaries are determined from evaluation of the calibration data." |

The NUGs represent an area of collected calibration data, which may be stored in a database for easy retrieval during a calibration data comparison operation between the NUG and a received network measurement report (NMR).

IPR 2023-01209, POR, 27; EX1001 ['104 Patent], 3:56-60

# Claim Construction

| Patent Owner Construction |
| --- |
| "a point associated with representative calibration data for an area whose boundaries are determined from evaluation of the calibration data." |

The NUGs fully cover the region R and each NUG has statistically similar data accumulated into itself. The geometrical shape and the amount of data accumulated into such NUGs is seen to be variable since these are determined by the statistical similarity of the data allocated to a NUG.

IPR 2023-01209, POR, 24-25; EX1005 ['379 Provisional], 7

The NUGs may fully cover the region R and each NUG may have statistically similar data accumulated into itself. The geometrical shape (i.e., the shape defined by the union of locations of calibration points assigned to the NUG) and the amount of data accumulated into such NUGs is seen to be variable since these are determined by the statistical similarity of the data allocated to a NUG.

IPR 2023-01209, POR, 24-25; EX1008 ['753 Patent], 12:7-14

# Claim Construction

| Patent Owner Construction |
| --- |
| "a point associated with representative calibration data for an area whose boundaries are ***determined from evaluation of the calibration data.***" |

"In any of these cases, the NUG generator evaluates the data vectors at a particular calibration point, or at the fixed grid point it is assigned. This calibration point or grid point serves as the root of the first NUG. The root of the NUG is the calibration data vector that initiates the creation of that NUG. The evaluation of the data vectors is of great importance since it is fundamental to the method."

IPR 2023-01209, POR, 24-25, 27-29; Sur-Reply, 12-13; EX1005 ['379 Provisional], 6

# Claim Construction

| Patent Owner Construction |
| --- |
| "a point associated with representative calibration data for an area whose boundaries are ***determined from evaluation of the calibration data.***" |

The primary test made to determine the allocation is one of a variety of clustering tests, such as for example the K-means algorithm, whereas the statistical similarity is determined by for example, the pdf of the data parameters (for example, NC signal levels, timing information etc.), the mean and variance of the data parameters, the serving cell/sector or other functions of the calibration data.

IPR 2023-01209, POR, 28; EX1005 ['379 Provisional], 6

# Overview

1. Background
2. Claim Construction
   A. Calibration Data
   B. [Non-Uniform] Grid Point
3. The Alleged Prior Art Does Not Teach Or Suggest [Non-Uniform] Grid Points
   A. **Shkedi**
   B. Spain
   C. Zhu

# Shkedi

## Shkedi's Predetermined Proximity Is Not An Evaluation

Simply stated, if a mobile telephone (at a user selected location) measures a plurality of service antenna signals and stores these with their respective service antenna identifications, then that mobile telephone (or an equivalent unit) upon observing an identical list of service antennas with substantially identical respective signal strengths—can reasonably conclude that it is within a predetermined proximity of the original user selected location. We will call the coordinate of

IPR 2023-01209, POR, 32-34; Sur-Reply, 18-19; EX1006 [Shkedi], 8:41-48

# Shkedi

## Shkedi's Signal Strengths Are Not NUGs

According to a fourth implementation aspect of the Basic embodiment of the Signal-Comparison Based Location-Determining Method, the Registering step includes accessing a GPS location coordinate for the selected location and Recording step includes keeping the GPS location coordinate with the stored signal strength measurements. This aspect antici-

IPR 2023-01209, Sur-Reply, 19-20; EX1006 [Shkedi], 13:9-14

# Shkedi

## Shkedi's Extrapolated Locations Are Not NUGs

the stored signal strength measurements. This aspect anticipates that a transformational data bank could be created by collecting correspondences between GPS (latitude longitude) coordinates and antenna space reception "coordinates" for the same location. If sufficient correspondence data is collected, then a never registered location can be found by grabbing antenna space reception "coordinates" and extrapolating them within the correspondence set. This would be of great benefit for "911" emergency service location-determining compliance; since locations failing to be able to report GPS could be known from extrapolation using only the reception signature.

IPR 2023-01209, Sur-Reply, 20-21; EX1006 [Shkedi], 13:14-25

# Shkedi

## Shkedi Does Not Discuss Boundaries

mining methods do not impact the suggested method. Such obstacles include the non-availability of GPS signals within buildings or accuracy problems originating from the propagation of signals to cell towers and their measurement by systems located at the cell towers.

IPR 2023-01209, Sur-Reply, 21; EX1006 [Shkedi], 17:43-47

# Overview

1. Background
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   A. Shkedi
   B. **Spain**
   C. Zhu

# Spain

## Spain Does Not Teach Or Suggest NUGs

[0101] In another embodiment, the database is built by taking fingerprint measurements at predetermined locations and using intelligent algorithms that interpolate the fingerprints at all locations in between the sampled locations. This method has the advantage of not requiring a great many physical measurements to be made, however, it does suffer from some loss in accuracy. This is because, however clever, the interpolating algorithms will not be as accurate as making the actual measurements.

IPR 2023-01209, POR, 41; Sur-Reply, 24; EX1009 [Spain], [0101]

# Spain

## Spain's "Grid Points" are Calibration Points, Not NUGs

Fingerprint ambiguities exist, for example, when a measured fingerprint (i.e., calibration data, such as signal strength) from a mobile device matches "the fingerprint model for the incorrect location." *Id.*, ¶[0103]. Spain discloses that "(4)

IPR 2023-01209, Reply, 21; Sur-Reply, 24

¶[0055]. One technique Spain discloses for generating a new grid point (i.e., fingerprint) is by interpolation of existing fingerprints, as discussed *infra*. *Id.*, ¶[0101]. Spain's interpolated grid points increase database accuracy by resolving

IPR 2023-01209, Reply, 22; Sur-Reply, 24

# Spain

## Spain Does Not Teach Or Suggest NUGs

**Lat./Long. Indicates Position, Not Area**

501

Fingerprint Database

| No. | Lat. | Long. | Time | Fingerprint | Description |
|---|---|---|---|---|---|
| 1 | | | | | |
| 2 | | | | | |
| 3 | | | | | |
| 4 | | | | | |
| 5 | | | | | |
| 6 | | | | | |
| … | | | | | |
| L | | | | | |

IPR 2023-01209, Sur-Reply, 25; EX1009 [Spain], FIG. 10

# Spain

## The Petition's Obviousness Arguments Fail

"To satisfy its burden of proving obviousness, a petitioner cannot employ mere conclusory statements. The petitioner must instead articulate specific reasoning, based on evidence of record, to support the legal conclusion of obviousness." *In re Magnum Oil Tools Int'l, Ltd.*, 829 F.3d 1364, 1380 (Fed. Cir. 2016).

IPR 2023-01209, POR, 42-43

# Spain

## The Reply's New Obviousness Arguments Fail

"[I]n an inter partes review the petitioner is master of its complaint." *SAS Institute Inc. v. Iancu*, 138 S.Ct. 1348 (US 2008)

IPR 2023-01209, Reply, 22; Sur-Reply, 26

Petition must identify "with particularity ... the grounds on which the challenge to each claim is based." 35 U.S.C. §312

IPR 2023-01209, Sur-Reply, 26

# Spain

## The Reply's New Obviousness Arguments Fail

[0076] **FIG. 12** depicts a flowchart of the tasks associated with reducing the number of possible locations that must be searched in accordance with the illustrative embodiment. Tasks **1201** though **1203** are normally performed by the cellular network as a part of its operation. Task **1207** is the operation of the base location server described in this specification. Tasks **1204** through **1206** are elements of the present invention, and their purpose is to reduce the number of possible positions that must be considered by task **1207**.

IPR 2023-01209, Reply, 19-20; Sur-Reply, 27

# Overview

1. Background
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   A. Shkedi
   B. Spain
   C. Zhu

# Zhu

## Zhu Does Not Teach Or Suggest NUGs

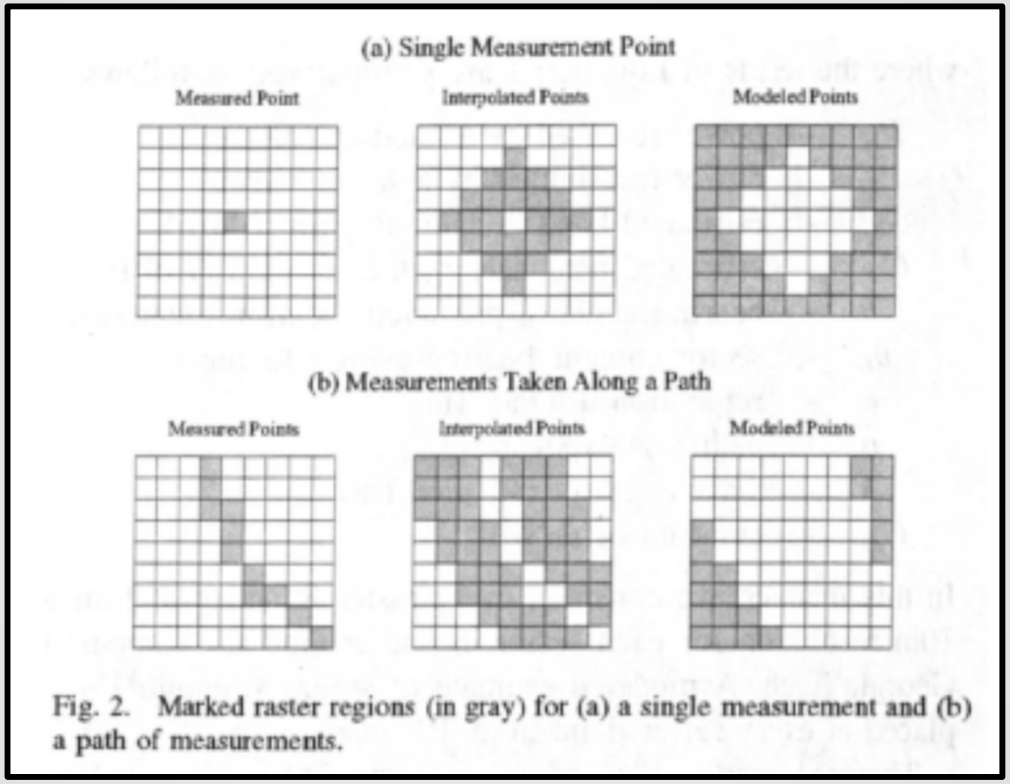


Fig. 2. Marked raster regions (in gray) for (a) a single measurement and (b) a path of measurements.

IPR 2023-01209, POR, 45-46; Sur-Reply, 28-32

# Zhu

## Zhu Does Not Teach Or Suggest NUGs

Each Square In The Grid Represents A 10 Meter Square

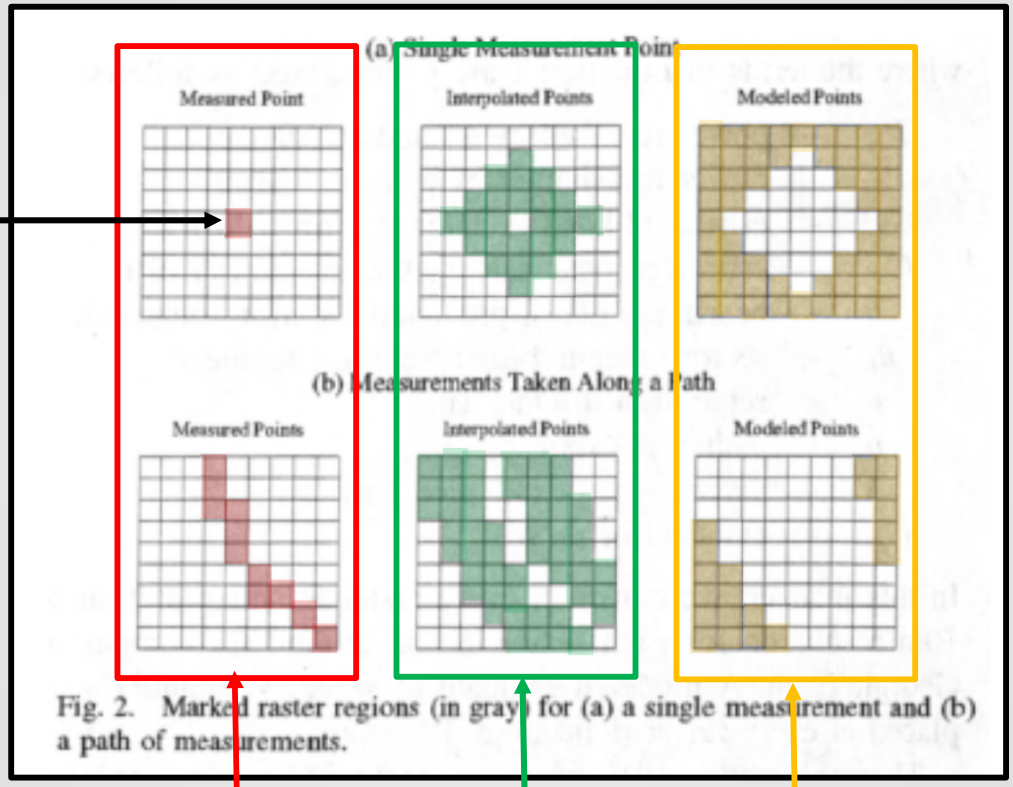


Fig. 2. Marked raster regions (in gray) for (a) a single measurement and (b) a path of measurements.

Measured Calibration Data

Interpolated Calibration Data

Modeled Calibration Data

IPR 2023-01209, POR, 45-46; Sur-Reply, 28-32