

# INCITS Proposal for a New Standard

## 1. Source of the proposed project

### 1.1 Title

Minimum Geographic Feature Identifying Attributes

### 1.2 Date submitted

13 July 2006

### 1.3 Proposed by

United States Department of the Interior, U.S. Geological Survey  
and

United States Department of Commerce, Bureau of the Census

## 2. Process description for the proposed project

### 2.1 Project type

Development

This standard shall supersede the following standards and contains additional elements not in any previous standard.

ANSI X3.47:1988 [R2004], *Structure for the Identification of Named Populated Places, Primary county Divisions and other Entities of the U.S. and Its Outlying Areas for Information Interchange.*

FIPS PUB 55-DC3:1994, *Codes for Named Populated Places, Primary County Divisions, and Other Locational Entities of the United States, Puerto Rico, and the Outlying Areas.*

### 2.2 Type of document

Standard

### 2.3 Definitions of concepts and special terms

The concept and terms relating to geographic feature names are defined within the Principles, Policies, and Procedures for Domestic Geographic Feature Names of the U.S. Board on Geographic Names (<http://geonames.usgs.gov>).

### 2.4 Expected relationship with approved reference models, frameworks, architectures, etc.

This standard is applicable to most entities defined in the following publications or their successors. It is related to and potentially augments the purpose and scope of these publications, but does not replace or conflict with them. (??)

ANS X3.47-1977, Information SystemsCodesStructure and Data Requirements for the Identification of Named Populated Places, Primary County Divisions, and Other Locational Entities of the United States and Its Outlying and Associated Areas for Information Interchange, American National Standards Institute.

ANS X3.38-1972, Information SystemsCodesIdentification of the States, the District of Columbia, and the Outlying and Associated Areas of the United States for Information Interchange, American National Standards Institute.

ANS X3.31-1973, Information SystemsCodesStructure for the Identification of the Counties and County Equivalents of the United States and Its Outlying and Associated Areas for Information Interchange, American National Standards Institute.

FIPS PUB 5-2, Codes for the Identification of the States, the District of Columbia and the Outlying Areas of the United States, and Associated Areas, 1987, National Institute of Standards and Technology.

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FIPS PUB 6-4, Counties and Equivalent Entities of the United States, Its Possessions, and Associated Areas, 1990, National Institute of Standards and Technology.

FIPS PUB 8-6, Metropolitan Statistical Areas (MSAs) (Including CMSAs, PMSAs, and NECMAs), 1984, National Institute of Standards and Technology.

Worldwide Geographic Location Codes, Office of Finance, U.S. General Services Administration.

National Five-Digit ZIP Code and Post Office Directory, U.S. Postal Service, 1994.

Congressional District Atlas, 103rd Congress of the United States, U.S. Government Printing Office, Washington, DC, 1993.

FIPS PUB 9-1, Congressional Districts of the United States, 1990, National Institute of Standards and Technology.

FIPS PUB 104-1, ANS Codes for the Representation of Names of Countries, Dependencies, and Areas of Special Sovereignty for Information Interchange, 1983, National Institute of Standards and Technology.

International Standard ISO 3166-1:1997, *Codes for the Representation of Names of Countries and their Subdivisions*.

### 2.5 Recommended INCITS Development Technical Committee (existing or new)

Existing. INCITS L1, Geographic Information Systems.

### 2.6 Anticipated frequency and duration of meetings

This standard is being developed as part of the translation of an existing federally developed standard into a national, public, consensus based standard. Therefore, the frequency and duration of review and editing meetings will be based on INCITS procedures and the need to progress this standard through the necessary steps. The experience of INCITS L1 in moving other federally developed standards through to public, consensus based standards will be utilized in determining the requirements for meetings.

Standards development team and editing committees will include volunteer subject matter experts and other interested parties drawn from federal, state, local and tribal government agencies, academia, and private industry.

### 2.7 Target date of initial public review

February 2007

### 2.8 Estimated useful life of standard or technical report

10 years or more. The federal version of the superseded standard has been in use for over 35 years and is mandatory when exchanging federal data. The U.S. Board on Geographic Names is chartered by Federal statute and has been in existence since the late nineteenth century. The Principles, Policies, and Procedures of the Board are mandatory for the use of geographic feature names in federal products.

## 3. Business case for developing the proposed standard or technical report

### 3.1 Description

This standard defines minimum identifying attributes applicable to physical and cultural geographic features, geographic areas, and locational entities of all types, but not including roads and highways, under the jurisdiction of the United States. The minimum attributes required to uniquely identify each feature are: 1) a single, unique, permanent database record identifier (Feature ID), 2) the official feature name, and 3) the official feature location point.

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## 3.1.1 Scope

This standard covers the 50 States, the District of Columbia, Puerto Rico, and the outlying areas (American Samoa, Guam, the Commonwealth of the Northern Mariana Islands, the Virgin Islands of the United States, and United States Minor Outlying Islands) and freely associated areas (the Federated States of Micronesia, the Marshall Islands and the Republic of Palau) of the United States. The concepts in this standard also are applied to Antarctica data maintained by the USGS.

The standard applies to natural and cultural features of all kinds, named populated places, primary county divisions (such as townships and census county divisions), American Indian and Alaska Native areas, counties and equivalent legal and statistical entities, and many kinds of facilities. The populated places or other locational entities to be identified in accordance with this standard include all those specified by the U.S. Board of Geographic Names and U.S. Bureau of the Census in coordination with Federal, State, county, and local agencies responsible for land and real property management.

This standard supports the primary mechanisms for storage, management, and display of geographic features, particularly geographic information system (GIS), relational databases, and Internet-based applications and services.

## 3.1.2 Definitions

- Geographic Feature

A geographic feature is essentially any entity on the landscape or seascape, except roads and highways, that requires identification, location, and attribution for the information purposes of government and the public. A geographic feature can be historical, defined to mean solely that it no longer exists and/or is no longer apparent on the landscape regardless of age, use, level of human habitation or any other factor. Geographic features fundamentally are characterized and differentiated by function. Other attributes, such as name, structure, size, and location can be attached to the feature but do not uniquely characterize it. A school and the church building in which it operates, for example, constitute two features.

- Feature ID

The Feature ID is an attribute assigned to a geographic feature for the sole purpose of uniquely identifying that feature as a record in any information system database, dataset, file, or document and for distinguishing it from all other feature records. The ID is a number assigned sequentially to new records as they are created. The number carries no information or association to the content of the feature record and therefore is not subject to change even as other attribute values change. Once assigned to a valid feature, the number is never withdrawn and never reassigned.

- Feature Name

The feature name is defined within the Principles, Policies, and Procedures for Domestic Geographic Feature Names of the U.S. Board on Geographic Names. An official name is one in which the written form of that name and its application to the appropriate place, feature, or area are approved by the Board or by the appropriate administrative agency. A geographic feature may have only one official name. It is the policy of the Federal Government that only official domestic geographic names are to be used on Federal maps and in other publications or products.

- Feature Location Point

The feature location is defined as a single point at a map scale of 1:24000 or 1:25000 to which the official feature name is attached. The location is determined by the agency responsible for the data and is approved or recognized as official either by policy or by decision of the Board on Geographic Names for use throughout the Federal Government.

A point feature is geographically defined by this single set of coordinates. With respect to areal and linear features, the placing of the location point is governed by policies of the Board on Geographic Names, normally at or near the geographic center but there are exceptions for certain classes of features. A geographic feature may have only one primary or official location point regardless of size or extent. The location point is in addition to and not an element in any other geospatial representation or boundary definition of the feature.

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## 3.2 Existing practice and the need for a standard

### 3.2.1 Background

The explosive growth of geographic information systems and Internet-based applications and services have generated multitudes of related, overlapping, and potentially contradictory datasets containing geographic feature data, served by multiple, interlocking, and interdependent applications at all levels of government and the private sector.

It is virtually impossible to correlate the many different sets of feature data containing thousands, tens of thousands, or more records based solely on attribute comparisons with any assurance that they mutually address the same features, record for record. Unregulated text fields such as feature names contain wide variations of spelling, content, and errors. There is no standard or official feature classification schema. Locational data are subject to variations and differing interpretations.

As valuable as geospatial data are, they cannot be relied upon to ensure identity, uniqueness, or consistency of any particular feature record. Vector boundary files, for example, frequently exist in multiple versions at varying scales and levels of accuracy. Many geographic features have no definable, official, recognized, or agreed upon boundaries.

Therefore, there is no known mechanism for ensuring at the national level that related datasets contain and are serving mutually consistent feature data. For over a hundred years, the USGS National Base Map series served as the standard feature representation for the Federal Government, but that process of printed maps has been rendered obsolete by technology.

The implications of incorrect, inaccurate, or contradictory feature data appearing simultaneously in multiple Internet applications are serious and potentially catastrophic with regard to national security, emergency preparedness and response, regional and local planning, site selection and analysis, cartographic applications, environmental problem-solving, tourism, and all levels of communication. This standard is intended to help correct this deficiency.

### 3.2.2 Solutions

The minimum identifying attributes, once validated and applied to a feature by the appropriate authority, are promulgated throughout multiple user communities.

- Feature ID

The Feature ID provides the only single attribute that can be shared across multiple datasets with the assurance that all attributes and attribute values associated with that Feature ID apply to the specified feature and to no other feature. Concerned constituencies are able to define additional attributes and attribute values as needed and attach them to the feature through reference to the Feature ID.

- Feature Name

Geographic feature names have been governed under Federal statute by the Principles, Policies, and Procedures of the U.S. Board on Geographic Names for well over a century. Feature names are submitted by Federal, State, and local sources, authorized by the Board, and validated by data specialists of the USGS Geographic Names Project, providing a single form of the name as a standard identifying, but not unique, feature attribute.

- Feature Location

The feature location point was established as the critical locational attribute for feature data from the beginning of the Board in the late nineteenth century. In the era of geographic information systems and the Internet, the value of this attribute is even more apparent. It overcomes the inherent ambiguities and inefficiencies of other geospatial representations for the purposes of certain feature identification.

The combination of Feature ID, official name, and official location point provides the means to assure common identification of geographic features across multitudes of related and overlapping datasets among multiple horizontal and vertical jurisdictions and agencies. It allows the association and display of any number of other attributes and attribute values, including geographic representations of all types, without confusion, contradiction, or error. In each case, data owners, data maintainers, and data users throughout the Nation have assurance that they all are referring to the same feature and only that feature.

### 3.2.3 Mechanism

The success of this standard relies on central management of the three critical attributes without restricting or restraining the use of feature data and other attributes attached to them. For over thirty years, the Board

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on Geographic Names has been served by the Geographic Names Information System (GNIS) containing almost two million feature records.

The GNIS is a fully capable geographic information system with established data storage, maintenance, and dissemination processes using the latest technology. Current data is available dynamically through web-based data query, geographic and tabular display, dynamic download, web map/feature and XML services, as well as by static file download and customized files upon request.

The Geographic Names Project data partnership program enables data owners from authorized Federal, State, and local agencies to enter and maintain their data directly in the database using web applications and services as well as batch submissions.

In addition to the critical feature attributes described above, the GNIS database defines the feature location by state, county, and USGS topographic map. Other secondary attributes include names or spellings other than the official name, feature designations, feature classification, and historical and descriptive information.

The GNIS already is achieving the purposes of this standard in the most efficient and cost effective manner. It requires no significant technical development or enhancements to continue doing so. All that is required is continuing expansion of the partnership program to maintain the existing data current and to include additional data.

### 3.3 Implementation impacts of the proposed standard

#### 3.3.1 Development costs

The full costs of developing this standard shall be born by the United States Government and participating organizations. Thus, there should be no significant costs to INCITS associated with the development of this standard.

#### 3.3.2 Impact on existing or potential markets

This standard will have a positive impact on the overall information community, as its predecessor FIPS standards have had, by providing a single, public set of feature identifying attributes.

#### 3.3.3 Costs and methods for conformity assessment

Conformance guidance will be provided to evaluate whether implementations are in conformance with this Standard and any implementation annexes.

#### 3.3.4 Return on investment (ROI)

No specific ROI can be calculated at this time. However, a significant ROI can be expected, given the anticipated continued efficiencies resulting from this standard's use.

### 3.4 Legal considerations

#### 3.4.1 Patent assertions

None. This is based on public information developed with public funds.

#### 3.4.2 Dissemination of the standard or technical report

Drafts of this document will be disseminated electronically. The Standard will be disseminated in accordance with ANSI and INCITS procedures.

## 4. Related standards activities

### 4.1 Existing standards:

The standards listed in sections 2.1 and 2.4 of this proposal exist and will be impacted by this work.

The most recent version of FIPS PUB 55-3 was issued 1994 December 28. This version and its predecessors have served the federal, State, local, Tribal, and other government agencies and civilian communities continuously for over 30 years providing a consistent and current set of codes for representing named populated places and other locational entities. The objective of this standard continues to be to

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improve the utilization of data resources for the users and avoid unnecessary duplications and incompatibilities in the collections, processing, and dissemination of data.

The Department of Commerce, National Institute for Standards and Technology (NIST) has announced that, in accordance with the Office of Management and Budget Circular A-119, which mandates that national or international consensus based standards be use whenever possible, they are withdrawing specific Federal standards. Federal Information Processing Standards Publication 5-2 (FIPS PUB 5-2), *Codes for the Identification of the States, the District of Columbia, and the Outlying Areas of the United States, and Associated Areas* is one of the standards to be withdrawn.

### 4.1.1 Supporting references

- <http://www.itl.nist.gov/fipspubs/fip5-2.htm>
- [http://standards.gov/standards\\_gov/v/Standards/index.cfm](http://standards.gov/standards_gov/v/Standards/index.cfm)
- <http://www.itl.nist.gov/fipspubs/withdraw.htm>

FIPS are developed by the National Institute of Standards and Technology (NIST) for Federal computer systems, Federal Information Processing Standards (FIPS) are intended for use government-wide. NIST develops FIPS when there are compelling Federal government requirements such as for security and inter-operability and there are no acceptable industry standards or solutions.

The former Federal Information Processing Standards (FIPS) listed below have been withdrawn. Many of these FIPS had adopted voluntary industry standards for Federal government use, but had not been updated to adopt current or revised industry standards. In some cases, commercial products implementing the standards are widely available.

It is no longer necessary for the government to mandate standards that duplicate industry standards. Federal government departments and agencies are directed by the National Technology Transfer and Advancement Act of 1995 (P.L. 104-113), to use technical industry standards that are developed in voluntary consensus standards bodies.

### 4.2 Related standards activity

International Organization for Standardization (ISO)

TC 211, Geographic information / Geomatics. Specifically work related to,

- ISO 19112, *Spatial referencing by geographic identifiers*
- ISO 19110, *Feature cataloguing methodology*
- ISO 19135, *Procedures for registration of geographic information items*

TC 46, Information and documentation. Specifically work related to,

- ISO 3166-1:1997, *Codes for the Representation of Names of Countries and their Subdivisions.*

### 4.3 Recommendations for coordinating liaison

Open GIS Consortium (OGC), Herndon, VA, USA.

United States Board of Geographic Names, U.S. Department of the Interior, U.S. Geological Survey.

### 4.4 Recommendations for close liaison

International Organization for Standardization (ISO), Technical Committee (TC) 211, Geographic Information / Geomatics.

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U.S. Federal Geographic Data Committee, U.S. Department of the Interior, Washington, D.C. (The FGDC is authorized by OMB Circular A-16 and permanently chaired by the Department of the Interior.) and the FGDC Address Standard Working Group.

### **5. Units of measure used in this standard**

Not applicable.