ATIS-0500045

Interworking of 2D and 3D Shapes Across Industry Standards

TECHNICAL REPORT

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Interworking of 2D and 3D Shapes Across Industry Standards

Alliance for Telecommunications Industry Solutions

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Abstract

This Technical Report will be used as a vehicle for communicating elevation or height acquisition concepts in liaisons with other relevant Standards Development Organizations (SDOs). The Z-axis information associated with location estimates can be reported using either ellipsoidal or orthometric height, among other representations.

This report describes the terms used to represent height and then elaborates the ellipsoidal versus orthometric representations of height. It also provides an overview of the uncertainty shapes used in representing Z-axis information and adds clarifying visualizations. It offers recommendations for the end-to-end delivery of Z-axis information and includes suggested mappings for both 2D and 3D uncertainty shapes, exploring some limitations and risks associated with the mapping process. This report investigates each shape but does not presume that any single shape will be used universally. The various tables within the document specify uncertainty shape mapping recommendations and highlight impacts to downstream entities.

Foreword

The Alliance for Telecommunications Industry Solutions (ATIS) serves the public through improved understanding between carriers, customers, and manufacturers. The Emergency Services Interconnection Forum (ESIF) provides a forum to facilitate the identification and resolution of technical and/or operational issues related to the interconnection of wireline, wireless, cable, satellites, Internet, and emergency services networks.

The mandatory requirements are designated by the word *shall* and recommendations by the word *should*. Where both a mandatory requirement and a recommendation are specified for the same criterion, the recommendation represents a goal currently identifiable as having distinct compatibility or performance advantages. The word *may* denotes an optional capability that could augment the standard. The standard is fully functional without the incorporation of this optional capability.

Suggestions for improvement of this document are welcome. They should be sent to the Alliance for Telecommunications Industry Solutions, Emergency Services Interconnection Forum (ESIF), 1200 G Street NW, Suite 500, Washington, DC 20005.

At the time of consensus on this document, ESIF, which was responsible for its development, had the following leadership:

R. Muscat, ESIF Chair (Bexar Metro 911)
D. Morkunas, ESIF 1st Vice-Chair (Intrado)
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The Emergency Services & Methodologies (ESM) Subcommittee was responsible for the development of this document.

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1 Scope, Purpose, & Application

1.1 Scope

Current standards define several two-dimensional and three-dimensional shapes and numerous reporting formats with varying underlying assumptions and approaches for capturing the wireless location estimate with its uncertainty bounds and confidence. These varying approaches to reporting two-dimensional and three-dimensional shapes have the potential to cause confusion and introduce additional errors, particularly as the shapes propagate between components in a broader positioning system from wireless network to PSAP. Furthermore, these varying representation approaches can cause confusion when testing location solutions, potentially impairing test results. This Technical Report presents the results of a survey of the existing standards related to location reporting shapes along with recommendations.

1.2 Purpose

In addition to surveying the related standards where reporting formats are defined, identifying common features and potential gaps, this Technical Report makes recommendations for reporting two-dimensional and three-dimensional shapes and best practices for propagating the shapes to minimize the accumulation of errors. It also makes recommendations for performing the minimum number of position estimate shapes conversion between elements in the end-to-end location system, where different standards may be used.

Detailed discussion of the entities responsible for performing shapes conversion under various network interconnection architectures is outside the scope of this document.

1.3 Application

This Technical Report should be used by wireless carriers, infrastructure vendors, handset manufacturers, and public safety to: (1) implement best practices, and (2) understand where information conversion can occur and could introduce some additional error in the position estimates.

2 References

The following standards contain provisions which, through reference in this text, constitute provisions of this Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below.

2.1 Normative References

The following references are normative.

[Ref 1] ATIS J-STD-036-C-2, *Addendum to J-STD-036-C, Enhanced Wireless 9-1-1 Phase II*.[1]

[1] This document is available from: https://www.techstreet.com/atis/standards/atis-j-std-036-c-2?product_id=1984450.