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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 19116 was prepared by Technical Committee ISO/TC 211, *Geographic information/Geomatics*.

Introduction

0.1 General

Positioning services are among the processing services identified in ISO 19119. Processing services include services that are computationally oriented and operate upon the elements from the model domain, rather than being directly integrated in the model domain itself. This International Standard defines and describes the positioning service. Other services in this domain are coordinate transformation, metric translation, format conversion, semantic translation, etc.

Positioning services employ a wide variety of technologies that provide position and related information to a similarly wide variety of applications, as depicted in Figure 1. Although these technologies differ in many respects, there are important items of information that are common among them and serve common needs of these application areas, such as the position data, time of observation and its accuracy. Also, there are items of information that apply only to specific technologies and are sometimes required in order to make correct use of the positioning results, such as signal strength, geometry factors, and raw measurements. Therefore, this International Standard includes both general data elements that are applicable to a wide variety of positioning services and technology specific elements that are relevant to particular technologies.

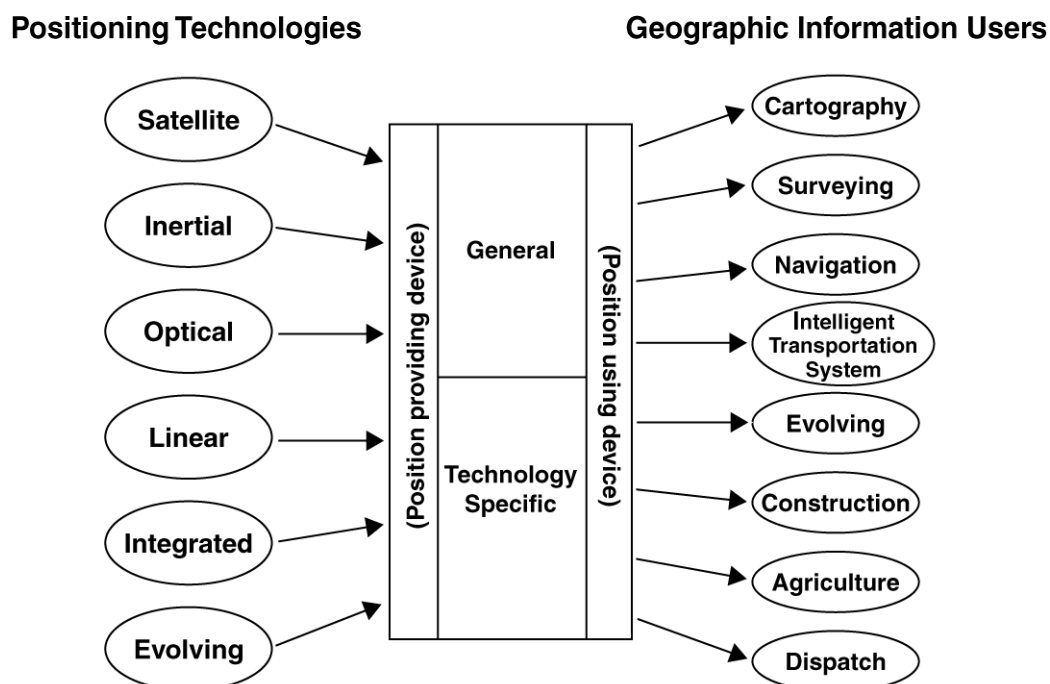


Figure 1 — Positioning services interface allows communication of position data for a wide variety of positioning technologies and users

Modern electronic positioning technology can measure the coordinates of a location on or near the Earth with great speed and accuracy, thereby allowing geographic information systems to be populated with any number of objects. However, the technologies for position determination have had neither a common structure for expression of position information, nor a common structure for expression of accuracy. The positioning-services interface specified in this International Standard provides data structures and operations that allow spatially oriented systems, such as GIS, to employ these technologies with greater efficiency by permitting interoperability among various implementations and various technologies.

This interface may be applied to communication among any of the components of systems that generate and use position information. Such systems may incorporate an instrument providing position updates to one or more position-using devices for data processing, storage, and display. For example, a navigation display system may include recording functions that store the history of a vehicle's movement, processing tools that compute guidance updates along a planned course relying on stored waypoints, and a display device that provides the navigator with current position, computed guidance information, and cartography from stored coordinate information. This International Standard specifies an interface that carries position and related information among any of these components, and should be sufficient for communication between the position providing device and any connected position using devices. Additional interfaces may also exist in such a system, for example providing for cartographic portrayal of stored coordinate information, which are outside the scope of this International Standard.

Standard positioning services provide client systems with operations that access positioning results and related information in a uniform manner, isolating the client from the multiplicity of protocols that may be employed to communicate with the positioning instruments. For example, a realized-positioning service could communicate with a GNSS receiver using the well-known NMEA 0183 protocol, translate the information, and provide the positioning results to a geographic information display client through the ISO 19116 standard interface specified in this document. Another realized-positioning service could communicate with a GNSS receiver using a manufacturer's proprietary binary protocol. Through the use of standardized positioning service interfaces, the hardware communication protocols become transparent to the client application.

Evolution of new communication protocols that closely follow the data structures described in this International Standard is also anticipated. Such communication standards will facilitate efficient fulfilment of the information requirements of the positioning services interface and facilitate modular interchangeability of the positioning technology components.

0.2 Potential use of the service

The application of this International Standard is illustrated in Figure 2 by a simplified case for a user obtaining coordinates from a GNSS receiver.

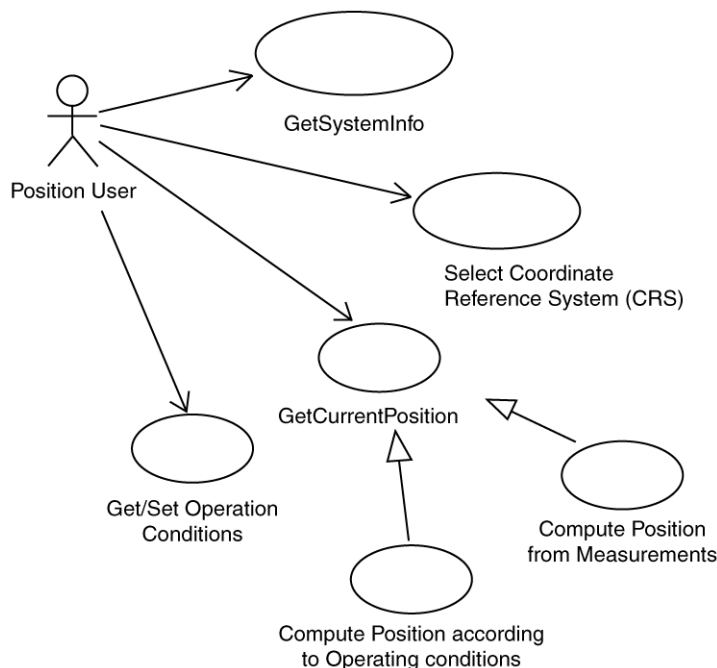


Figure 2 — Use case for getting coordinates from a positioning service