

# STANDARDSERING AV GEOGRAFISK INFORMASJON

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# STANDARDISERINGSARENAER

## Norge

- Kartverket utviklet SOSI-formatet på 80-90 -tallet

## Internasjonalt

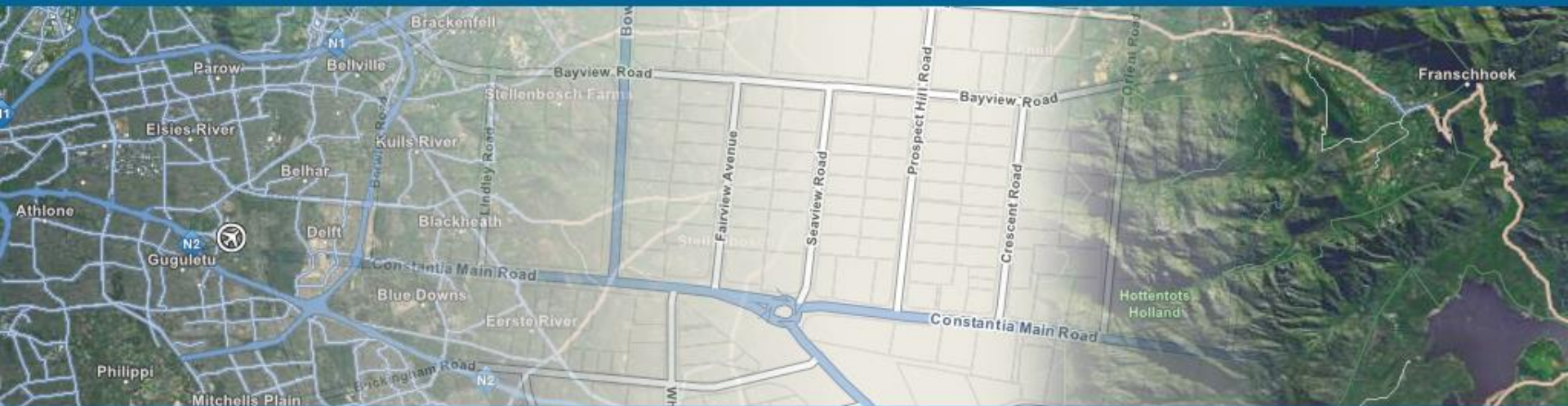
- ISO TC211
- OGC

# ISO/TC 211

## GEOGRAPHIC INFORMATION/GEOMATICS

### 2015-06

*...building the foundation of the geospatial infrastructure, brick by brick ...*



# THE GOAL OF ISO/TC 211...

... is to develop a family of international standards that will

- support the understanding and usage of geographic information
- increase the availability, access, integration, and sharing of geographic information, enable inter-operability of geospatially enabled computer systems
- contribute to a unified approach to addressing global ecological and humanitarian problems
- ease the establishment of geospatial infrastructures on local, regional and global level
- contribute to sustainable development

# SCOPE OF ISO/TC 211

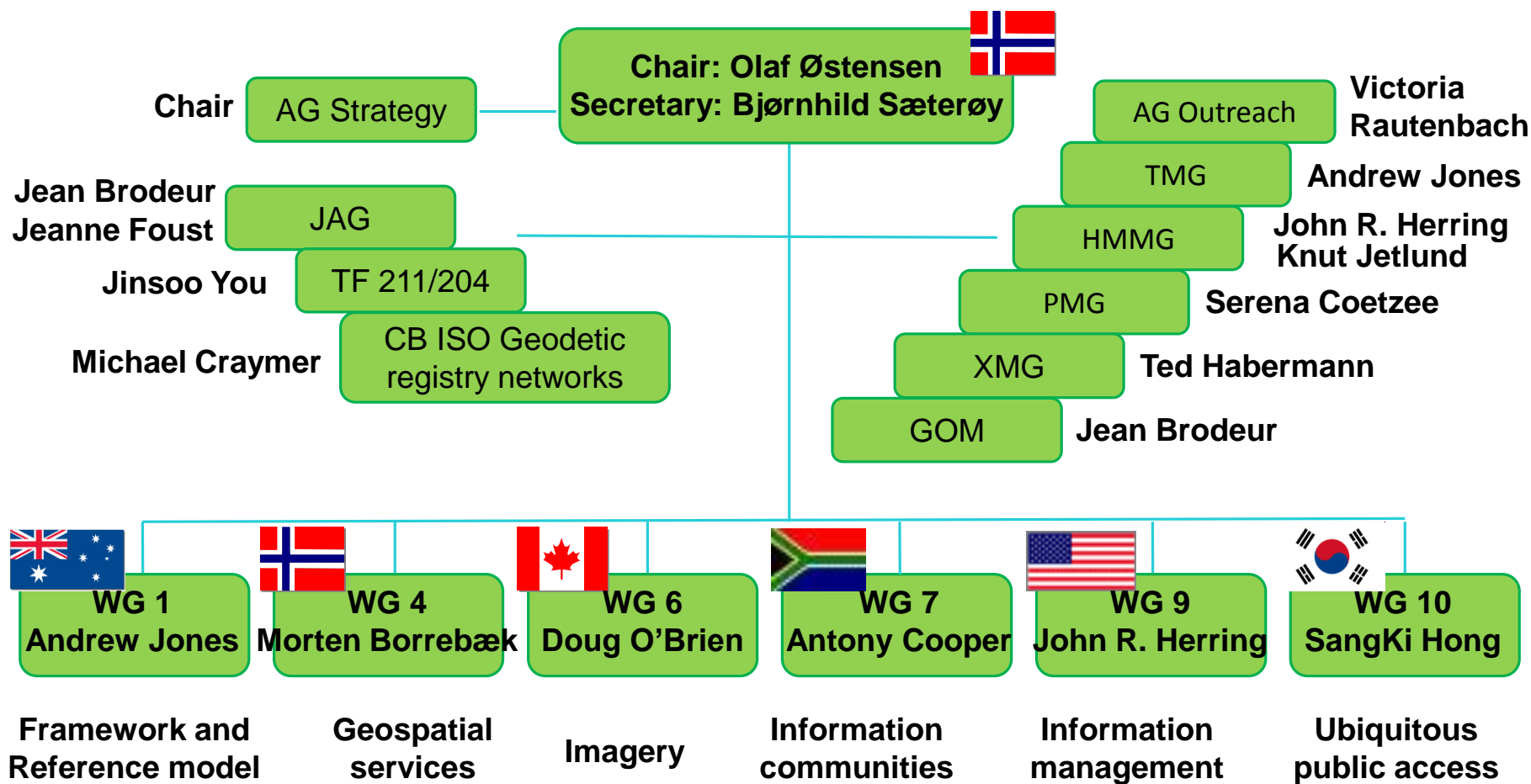
Standardization in the field of digital geographic information.

This work aims to establish a structured set of standards for information concerning objects or phenomena that are directly or indirectly associated with a location relative to the Earth.

These standards may specify, for geographic information, methods, tools and services for data management (including definition and description), acquiring, processing, analyzing, accessing, presenting and transferring such data in digital/electronic form between different users, systems and locations.

This work shall link to appropriate standards for information technology and data where possible, and provide a framework for the development of sector-specific applications using geographic data.

# ISO/TC 211 ORGANIZATION



# WHO ARE WE ? ...MEMBER LIST

ACTIVE MEMBERS (P-MEMBERS), 34 COUNTRIES

Australia

Austria

Belgium

Botswana

Canada

Chile

China

Czech Republic

Denmark

Finland

France

Germany

Hungary

India

Iran

Italy

Japan

Rep. of Korea

Lithuania

Malaysia

Netherlands

New Zealand

Norway

Peru

Russian Federation

Saudi Arabia

Serbia

South Africa

Spain

Sweden

Switzerland

Thailand

United Kingdom

United States of America



# WHO ARE WE ? ...MEMBER LIST

OBSERVING MEMBERS (P-MEMBERS), 30 COUNTRIES

Argentina

Azerbaijan

Bahrain

Brunei Darussalam

Colombia

Croatia

Cuba

Cyprus

Estonia

Greece

Hong Kong

Iceland

Indonesia

Ireland

Israel

Kenya

Mauritius

Morocco

Oman

Pakistan

Philippines

Poland

Romania

Slovakia

Slovenia

Swaziland

Tanzania

Turkey

Ukraine

Uruguay





# ISO/TC 211 Publications (1)

- **ISO 6709:2008 – Standard representation of geographic point location by coordinates**
- **ISO 19101-1:2014 – Reference model – Part 1: Fundamentals**
- **ISO 19101-2:2008 – Reference model – Part 2: Imagery**
- **ISO/TS 19103:2005 – Conceptual schema language** (under revision)
- **ISO/TS 19104:2008 – Terminology** (under revision)
- **ISO 19105:2000 – Conformance and testing**
- **ISO 19106:2004 – Profiles**
- **ISO 19107:2003 – Spatial schema** (under revision)
- **ISO 19108:2002 – Temporal schema**
- **ISO 19109:2005 – Rules for application schema** (under revision)
- **ISO 19110:2005 – Feature cataloguing methodology** (under revision)
- **ISO 19111:2007 – Spatial referencing by coordinates**
- **ISO 19111-2:2009 – Spatial referencing by coordinates – Part 2: Extension for parametric values**
- **ISO 19112:2003 – Spatial referencing by geographic identifiers**
- **ISO 19115-1:2014 – Metadata – Part 1: Fundamentals**
- **ISO 19115-2:2008 – Metadata – Part 2: Extensions for imagery and gridded data** (under revision)
- **ISO 19116:2004 – Positioning services**
- **ISO 19117:2012 – Portrayal**
- **ISO 19118:2011 – Encoding**
- **ISO 19119:2005 – Services** (under revision)

# ISO/TC 211 Publications (2)

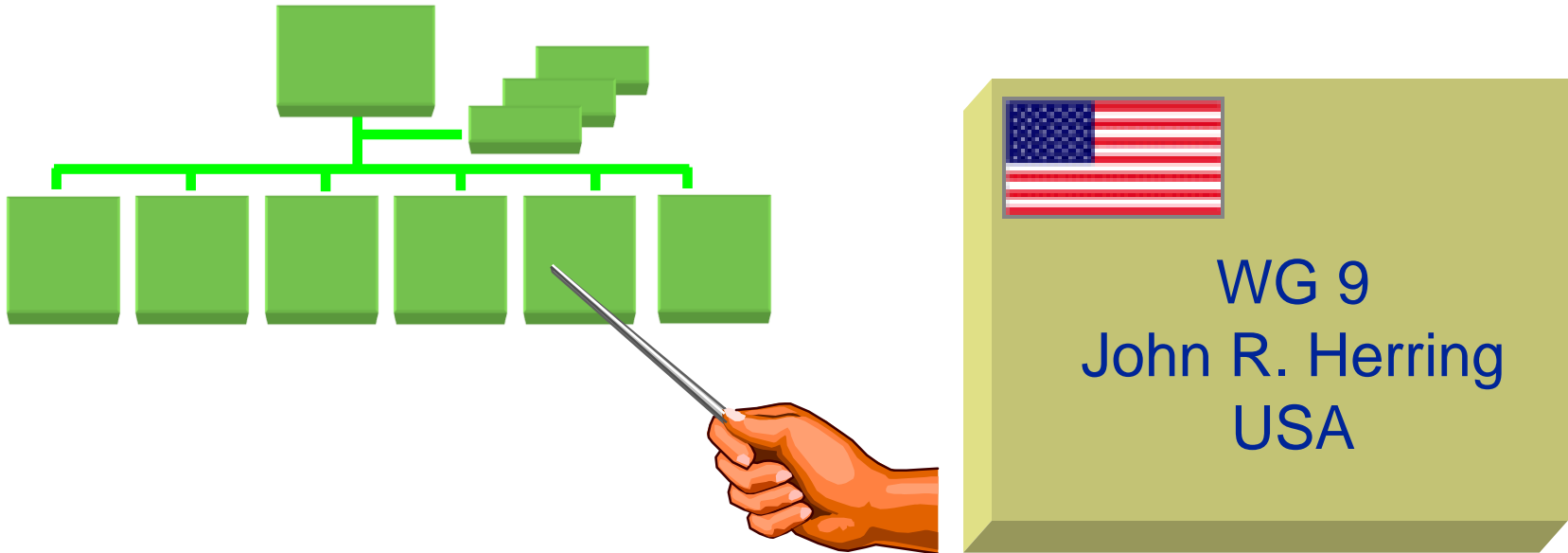
- **ISO/TR 19120:2001 – Functional standards**
- **ISO/TR 19121:2000 – Imagery and gridded data**
- **ISO/TR 19122:2004 – Qualification and certification of personnel**
- **ISO 19123:2005 – Schema for coverage geometry and functions**
- **ISO 19125-1:2004 – Simple feature access – Part 1: Common architecture**
- **ISO 19125-2:2004 – Simple feature access – Part 2: SQL Option**
- **ISO 19126:2009 – Feature concept dictionaries and registers**
- **ISO/TS 19127:2005 – Geodetic codes and parameters (under revision)**
- **ISO 19128:2005 – Web Map Server Interface**
- **ISO/TS 19129:2009 – Imagery, gridded and coverage data framework**
- **ISO/TS 19130:2010 – Imagery sensor models for geopositioning (under revision)**
- **ISO/TS 19130-2:2014 – Imagery sensor models for geopositioning – Part 2: SAR, InSAR, lidar and sonar**
- **ISO 19131:2007 – Data product specification**
- **ISO 19132:2007 – Location-based services – Reference model**
- **ISO 19133:2005 – Location-based services – Tracking and navigation**
- **ISO 19134:2007 – Location-based services – Multimodal routing and navigation**
- **ISO 19135:2005 – Procedures for item registration (under revision)**
- **ISO/TS 19135-2:2012 – Procedures for item registration -- Part 2: XML schema implementation**
- **ISO 19136:2007 – Geography Markup Language (GML)**
- **ISO 19137:2007 – Core profile of the spatial schema**
- **ISO/TS 19139:2007 – Metadata – XML schema implementation (under revision)**
- **ISO/TS 19139-2: 2012 – Metadata – XML schema implementation – Part 2: Extensions for imagery and gridded data**

# ISO/TC 211 Projects (1)

Colour legend: DIS, FDIS

- ISO 19103 – Conceptual schema language (rev of ISO/TS 19103:2005)
- ISO 19104 – Terminology (rev of ISO/TS 19104:2008)
- ISO 19107 – Spatial schema (rev of ISO 19107:2003)
- ISO 19109 – Rules for application schema (rev of ISO 19109:2005) (→IS)
- ISO 19110 – Methodology for feature cataloguing (rev of ISO 19110:2005) (→IS)
- ISO 19115-2 – Metadata - Part 2: Extensions for imagery and gridded data (rev of ISO 19115-2:2009)
- ISO 19115-3 – Metadata - Part 3: XML schema implementation of metadata fundamentals
- ISO 19119 – Services (rev of ISO 19119:2005)
- ISO 19127 – Geodetic codes and parameters (rev of ISO/TS 19127:2005)
- ISO/TS 19130-1 – Imagery sensor models for geopositioning (rev of ISO/TS 19130:2010)
- ISO 19135-1 – Procedures for item registration - Part 1: Fundamentals (rev of ISO 19135:2005) (→IS)
- ISO 19136-2 – Geography Markup Language (GML) - Part 2: Extended schemas and encoding rules (→IS)
- ISO/TS 19139-1 – Metadata – XML schema implementation (rev of ISO/TS 19139:2007)

# WG 9 – Information management



- ISO 19107 – Spatial schema (revision of ISO 19107:2003)
- ISO 19109 – Rules for application schema (revision of ISO 19109:2005)
- ISO 19135-1 – Procedures for item registration – Part 1: Fundamentals (revision of ISO 19135:2005)
- ISO/TS 19157-2 – Data Quality – Part 2: XML schema implementation of ISO 19157
- ISO 19162 – Well known text representation of coordinate reference systems



Foregående lysbilder er hentet fra:

ISO/TC 211 Presentations - June 2015, 25 slides ([www.isotc211.org](http://www.isotc211.org))

# STANDARDISERING

ISO-TC211

Referansemodell

Terminologi

Spatial  
Schema

Simple  
Features

...

# GRUNNLEGGENDE STANDARDER (UTVALGTE)

- ISO19101 Referansemodeller
- ISO19103 Beskrivelsesspråk (Conceptual schema language)
- ISO 19104 Terminologi
- ISO 19107 Spatial Schema
- ISO 19111 Spatial referencing by coordinates
- ISO 19112 Spatial referencing by geographic identifiers

# STANDARDE FOR ANVENDELSER (UTVALGTE)

- ISO 19115 Metadata
- ISO 19125 Simple Features Access
- ISO 19128 Web Map Service Interface (WMS)
- ISO 19136 Geography Markup Language (GML)





Myndighetsdrevet  
standardisering

Utviklerdrevet  
standardisering

# OGC (OPEN GEOSPATIAL CONSORTIUM)

“The OGC (Open Geospatial Consortium) is an international not for profit organization committed to making quality open standards for the global geospatial community. These standards are made through a consensus process and are freely available for anyone to use to improve sharing of the world's geospatial data.”

[www.opengeospatial.org](http://www.opengeospatial.org)

# MEDLEMMER

<u>Organization</u>	<u>Level</u>	<u>Region</u>
<a href="#">Airbus Defence &amp; Space</a>	Principal	Europe
<a href="#">BAE Systems - C3I Systems</a>	Principal	North America
<a href="#">Bentley Systems, Inc.</a>	Principal	North America
<a href="#">Department of Science &amp; Technology</a>	Principal	Asia Pacific
<a href="#">DigitalGlobe, Inc.</a>	Principal	North America
<a href="#">Esri</a>	Principal	North America
<a href="#">Feng Chia University</a>	Principal	Asia Pacific
<a href="#">GeoConnections - Natural Resources Canada</a>	Principal	North America
<a href="#">GIS Center for Security</a>	Principal	Middle East
<a href="#">Google</a>	Principal	North America
<a href="#">Intergraph Corporation</a>	Principal	North America
<a href="#">Lockheed Martin</a>	Principal	North America
<a href="#">Oracle USA</a>	Principal	North America
<a href="#">Pitney Bowes Software</a>	Principal	North America
<a href="#">Pixia Corporation</a>	Principal	North America
<a href="#">Trimble Navigation Ltd.</a>	Principal	North America
<a href="#">United Nations Geographic Information Working Group (UNGIWG)</a>	Principal	Europe
<a href="#">US National Oceanic and Atmospheric Administration (NOAA)</a>	Principal	North America

# MEDLEMSKATEGORIER

Strategic (5)  
Principal (18)  
Technical (73)

Technical  
Aggregate (1)  
Associate (126)  
Small Company (44)

GovFuture-  
Subnational (20)  
NGO / Not For  
Profit Institute (57)  
GovFuture-Local (33)

University (110)  
Individual (32)

# FRA OGC TIL ISO



# TO STANDARDS MED ULIKT FOKUS

ISO 19107 Spatial Schema:

Spatial schema is an abstract and non-platform dependent specification

ISO 19125 Simple Features Access:

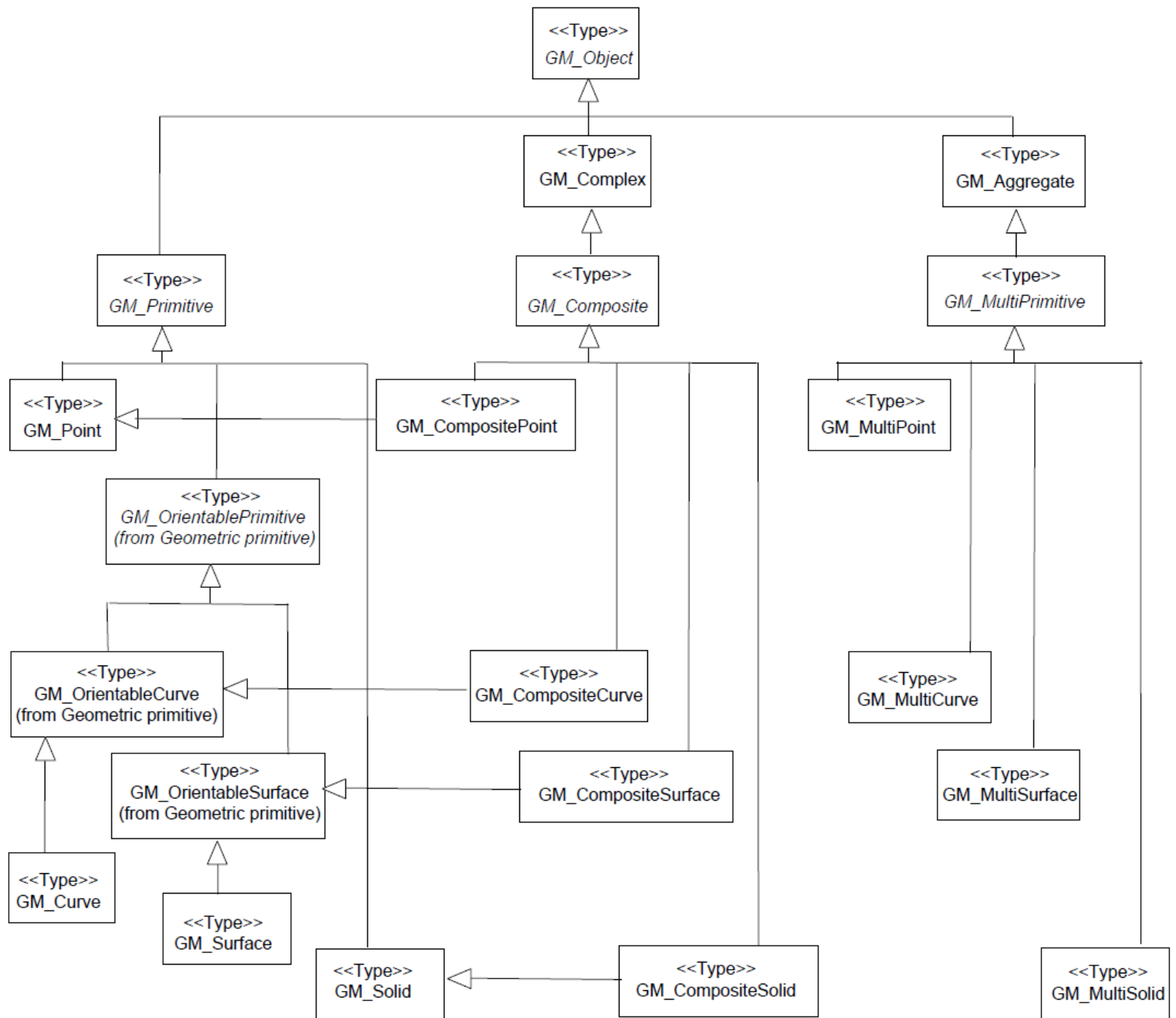
SFA-CA is an implementation and platform dependent specification

# ISO 19107 SPATIAL SCHEMA

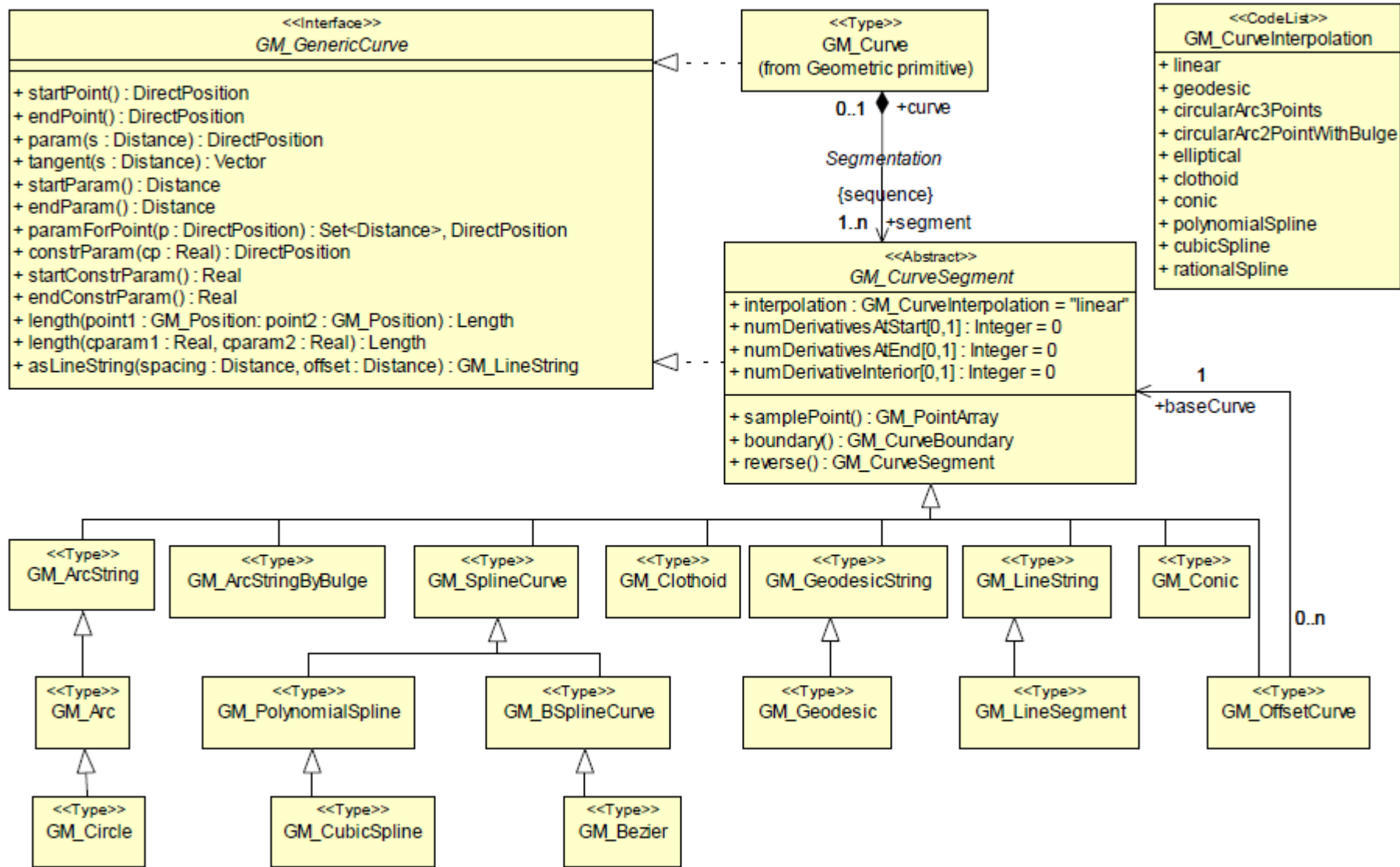
Hoveddeler:

- Geometry packages
- Topology packages

Disse pakke-settene beskrives uavhengig av hverandre.







Figuren på foregående side viser de forskjellige klassene som kan brukes for å definere linje-objekter. Noen av dem er:

GM\_LineSegment

GM\_ArcString

GM\_Arc

GM\_Circle

GM\_ArcByBulge

GM\_Clothoid

GM\_CubicSpline

GM\_Bezier

## Eksempel: GM\_ArcString

“A GM\_ArcString (Figure 17) is similar to a GM\_LineString except that the interpolation is by circular arcs.

Since it requires 3 points to determine a circular arc, the controlPoints are treated as a sequence of overlapping sets of 3 GM\_Positions, the start of each arc, some point between the start and end, and the end of each arc.

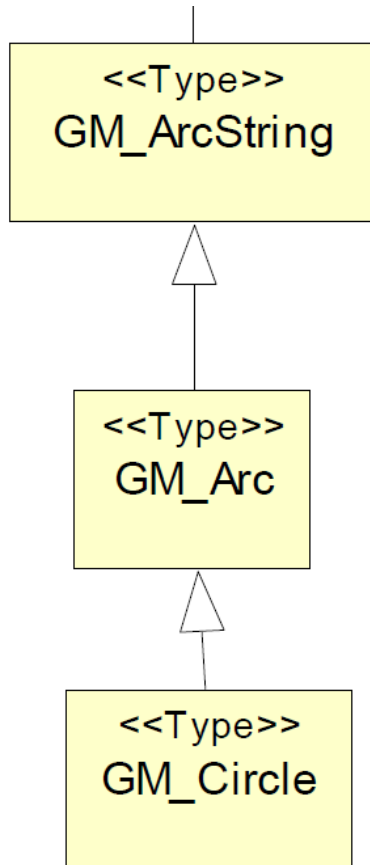
Since the end of each arc is the start of the next, this GM\_Position is not repeated in the controlPoint sequence.”

GM\_Arc er en underklasse av GM\_ArcString. GM\_Arc er ett enkelt buesegment, mens GM\_ArcString kan være flere sammenhengende buesegmenter, hvert med potensielt forskjellig radius, f.eks.

“A GM\_Arc is defined by 3 points, and consists of the arc of the circle determined by the 3 points, starting at the first, passing through the second and terminating at the third.

If the 3 points are co-linear, then the arc shall be a 3-point line string, and will not be able to return values for center, radius, start angle and end angle.”

<<Type>> GM_Arc	
<ul style="list-style-type: none"><li>+ GM_Arc(point[3] : GM_Position) : GM_Arc</li><li>+ GM_Arc(point[2] : GM_Position, bulge : Real, normal : Vector) : GM_Arc</li><li>+ center() : DirectPosition</li><li>+ radius() : Distance</li><li>+ startOfArc() : Bearing</li><li>+ endOfArc() : Bearing</li></ul>	



### **GM\_Circle**

Same as GM\_Arc, but closed to form a full circle. The "start" and "end" bearing are equal and shall be the bearing for the first controlPoint listed.

# OPPSUMMERT

Standarden definerer en rekke klasser som kan brukes for å definere ulike type geometrier. Geometriene kan være i 0D, 1D, 2D og 3D.

Standarden definerer på en presis måte hvilke parametre som beskriver geometriene, f.eks. at det trengs 3 sett med koordinater for å beskrive en `GM_Arc`.

# TOPOLOGY PACKAGES

På samme måte som det finnes klasser som beskriver geometri finnes det i standarden også klasser som beskriver topologi.

