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| **TITLE:** | **Spatial Data Infrastructure (SDI) for Urban Planning  Standards Working Group Charter** |
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# **1. SDI for Urban Planning, Smart City**

A **spatial data infrastructure (SDI)** is a data infrastructure implementing a framework of geographic data, metadata, users and tools that are interactively connected in order to use spatial data in an efficient and flexible way ([Wikipedia - Spatial data infrastructure](http://en.wikipedia.org/wiki/Spatial_data_infrastructure)).

**Urban planning** (also known as regional, city, or town planning) is a technical and political process concerned with the use of land and design of the urban environment, including air, water, and the infrastructure passing into and out of urban areas such as transportation and distribution networks ([Wikipedia - Theories and process of urban planning](http://en.wikipedia.org/wiki/Theories_and_process_of_urban_planning)).

A **smart city** (also smarter city) uses digital technologies to enhance performance and well-being, to reduce costs and resource consumption, and to engage more effectively and actively with its citizens. ([Wikipedia - Smart City](http://en.wikipedia.org/wiki/Smart_city)).

The **commons** is the cultural and natural resources accessible to all members of a society, including natural materials such as air, water, and a habitable earth. These resources are held in common, not owned privately ([Wikipedia-Commons](https://commons.wikimedia.org/)).

Although “Urban Planning” implies planning and not implementation, maintenance, management or usage, the Urban Planning DWG has expanded the topic to consider the urban infrastructure in its entire life cycle to model a “system of systems” built on the “digital” infrastructure of the Smart City. This sort of systems evolves all the pieces spoken of above to become parts of a “**digital commons**” that extends all these aspects of urban living and management to all stakeholders in an urban environment; e.g. to its residence and to its governing bodies, agencies and those who have been entrusted to manage the “polis” ([Greek, meanings both the ‘city’ and its people](http://en.wikipedia.org/wiki/Polis))..

# The use of an SDI in such an urban planning system or a smart city is a given, but the special requirements of such systems have not yet been investigated in depth.

# **2. Purpose of this Standards Working Group**

Given this need, the purpose of this SWG is to investigate the existing standards for SDI and geospatial data, to determine what extensions or profiles are needed to support the applications that would be required to support urban planning, smart city and all associated applications within a common spatial data infrastructure.

Existing SDI standards from ISO, CEN and INSPIRE would be used to establish a baseline SDI capability model, and extensions and profiles, as needed will be created from that current body of standards.

# **3. Business Value Proposition**

Our current understanding of the future of urban planning and smart city implementations is as a system of systems, and SDI-like data infrastructures are likely to be close to the model required for this. This is not surprising since many aggregated urban areas (e.g. [New York Metropolitan Area](http://en.wikipedia.org/wiki/New_York_metropolitan_area) has a population of 20.1 million, 6,720 sq mi) are larger in population than countries that already use SDI to support their geospatial needs (e.g. [Belgium](http://en.wikipedia.org/wiki/Belgium) has a population of 11.3 million in 11,787 sq mi). The benefits of an SDI in Belgium should be comparable to what the benefits would be to the New York Metropolitan Area.

Smart city applications should benefit from urban SDI frameworks, but the personal orientation of many of them may not be a fundamental consideration of country-based SDI standards.

These arguments seem to imply while many applications supported by SDI frameworks would be useful to urban planning and smart city applications. So the scalability of such systems is important to both the smaller and larger cities and countries. So some work in SDI frameworks may need to attack scalability for a wider range than currently envisioned country-based SDI systems. On the other hand the differences between an urban environment and a national one may need to be extended for applications that work on a more personally level. For example, we already know that indoor navigation will be critical to smart city applications, but is seldom used to derive requirements for national SDI frameworks. In conclusion, the SWG may need to look at both restrictions (profiles) of SDI and extension of SDI to handle personal-targeted applications.

# **4. Scope of Work (Statement of Work, SoW)**

The description of the business values leads to an interesting conclusion, beginning with a top-down analysis of the relationship between SDI standards and Urban Planning and Smart City. There is sufficient reason to believe that current SDI capabilities has functionalities to offer to Urban Planning/Smart City applications, as long as it scales both up for New York and down for the Podunks (small places) of the world.

The inescapable conclusion is that the SDI for UP SWG will be a top-down design effort to understand the relationship between SDI standards and the needs of urban planning and smart city applications. The first result of this study should be a reference model as well as an abstract (high level) architecture for SDI use in Urban Planning, Smart City environments. Such a reference model would be very likely to identify several profiles and extensions of SDI standards.

Therefore, once this SWG creates at least a draft Reference Model, other SWG with very specific tasks would be created. The logical conclusion would be that the SDI for Urban Planning SWG would have a second life as an umbrella SWG for these new task-oriented SWG derived from the new Reference Model.

Questions that

## 4.1 Statement of relationship of planned work to the current OGC standards baseline

OGC has many standards that are used in SDI implementations and this work would be using these same standards.

For example, much of the SDI will be feature oriented data and so the Simple Features set of standards which defined both the architecture in general and the implementation specific for SQL databases is important in SDI work. The encoding standards of GML, CityGML and IndoorGML will also be widely used in implementations. Navigation requirements may be addressed through standards such as OpenLS. Since the Internet of Things is also important, the SWE standards may be heavily referenced, including more recent offsprings such as SensorThings. Augmented Reality should also play an important role in Smart City applications.

OGC web services standards like WMS (Mapping), WFS (Feature), WPS (Process), can achieve on the fly processing and visualization of urban data, supporting end-users of SDI for smart cities/urban planning who are novice (e.g. public) or advanced (e.g. planner / GIS professional / engineer / developer). Within an SDI, consideration should be given the extending standards-based services e.g. gazetteer, and new services for example for semantic mediation, geospatial data and webs service discovery / retrieval / publication. Proposed OGC standards may also become relevant as these mature, including: InfraGML (proposed), 3D web process and webview services (proposed), CityGML Utility ADE (extension). Interoperability with non-OGC standards will also be required for smart city and urban planning, such as with BIM, bSi IFCs, and ISO 61850 (for substation automation), especially where smart cities may ‘plug-&-play’/manage new distributed energy resources.

## 4.2 What is Out of Scope?

The purpose of the SWG is to create a framework or reference model for the use of spatial data infrastructures, the discussion of specific applications should be restricted to the gathering of requirements. The standardization of such applications may be the topic of other standards working groups. This SWG should avoid too much detail on applications, and should avoid applications that do not fall into urban planning, smart cities or city management.

## 4.3 Specific Contribution of Existing Work as a Starting Point

There is a large body of work on spatial data infrasture embodied in standard and in running systems of various sizes (small towns to large metropolitan area and to entire countries). All of this work will contribute to the work of this SWG, whose major purpose is to ensure that the processes used and scale through the entire range of size and complexity of urban areas - anywhere that people live.

## 4.4 Determination of SWG Completion

Since this SWG creates a reference model for SDI to be used in urban planning, smart city and city management, it will be the core of a number of standards to follow. This SWG can then serve the purpose of an “umbrella” SWG to coordinate efforts in the various following standards work on urban planning.

## 4.5 Persistent SWG?

Yes, as describe in the scope above, the SDI for UP SWG should produce a Reference Model that defines other SWG projects and then continue as an Umbrella group for those projects. The follow-on work in standards would, at a minimum, address the requirements of urban planning, smart cities and city planning in the following application aspects:

* long and short term planning and management of urban areas
* continuous navigation for all modes of transportation, both indoor and outdoor
* citizen-support services
  + transparency in government
  + civic planning and maintenance
  + education
  + health care and services e.g. elder care, medical services
  + accessibility
  + communication
  + security, public safety
  + traffic and transportation, goods and people
  + facilities management
  + environmental applications
  + participatory planning
  + Energy planning, delivery, management (note: while traditionally a utility domain, is increasingly a municipal planning need where local energy resources are integrated / managed, and often involve 3rd parties)
  + Resiliency assessment and planning (note: aligns with disaster risk reduction, response and recovery; involves citizen participation)
  + Heat alert and response systems (note: aligns within health care services; involves citizen participation)

## 4.6 When can SWG be dissolved?

As a persistent, umbrella SWG, the UP SWG should only be dissolved when all standards created under it auspices are no longer in the OGC baseline or no longer being worked.

# **5. Description of Deliverables**

There are two purposes behind this SWG.

First, it must create from existing technology an approximation of the spatial data infrastructure needed in the “**digital commons**” described above. This will take the form of a “reference model” (RM) describing which existing technology can be leveraged to build such a digital commons and identifying the work that is still to be done in this effort. As such the RM would thus identify future work needed in building the Urban SDI, and thus layout a technology and standards roadmap to the future data infrastructure to support urban planning and maintenance in light of the communications capabilities that will be supplied by such current projects as smart cities. The types of standards that will be investigated include but are not limited to:

* Smart City
* SDI, such as in ISO, CEN and INSPIRE
* Wireless communications technology, existing and planned within the next decade (as approximate complete capability target time)
* Information Management
* Big Data, to manage and analyze the enormous amounts of data associated to both large and small urban areas, from Podunk to Megalopolis.
* Moving “features” technologies to monitor traffic (both physical and digital) while still maintaining individual privacy.
* Security issues in the data management of large and dynamic systems.

# **6. IPR Policy for this SWG**

 RAND-Royalty Free.  RAND for fee

## 7. Anticipated Participants

Because of the very nature of the view of the Urban Planning system of systems that form the basis of the Urban Planning DWG, experts from all aspects of geographic information management and web services will be useful to the successful completion of this project.

This is not meant as a limiting statement but instead is intended to provide guidance to interested potential participants as to whether they wish to participate in this SWG.

# **8. Other Informative Remarks about this SWG**

## a. Similar or Applicable Standards Work (OGC and Elsewhere).

The following standards and projects may be relevant to the SWG's planned work, although none currently provide the functionality anticipated by this committee's deliverables:

* INSPIRE SDI Standards and implementations (Infrastructure for Spatial Information in the European Community)
* ISO and CEN SDI and Metadata Standards
* Geographic Information Standards
* United Nations Spatial Data Infrastructure (UNSDI)
* Various National and Regional SDI projects
* GSDI - Global Spatial Data Infrastructure Association
* Global Earth Observation System of Systems (GEOSS)

The SWG intends to seek and if possible maintain liaison with each of the organizations maintaining the above works.

## b. Details of the First Meeting

The first meeting of the SWG will be, most likely be held during the September 2015 meetings in Nottingham UK.

## c. Projected On-going Meeting Schedule

Because the work of the SWG will mostly be documenting existing standards that may be of value to the final RM, most of the work will be done in independent online document creation using the auspices of the Urban Planning DWG. The final aggregation into an OGC standard will be done in SWG meetings at OGC meetings, and regularly scheduled online meetings scheduled to accommodate the geographic diversity of the SWG, rotating between multiple time zones to acquire a global view or urban requirements for an Urban SDI common architecture adaptable to local requirements. .

## d. Supporters of the Proposal (Charter Members)

The following people support this proposal and are committed to the Charter and projected meeting schedule. These members are the Charter members. The charter members agree to the SoW (Clauses 4 and 5) and IPR terms (Clause 6) as defined in this charter. The charter members have voting rights beginning the day the SWG is officially formed. Charter Members are shown on the public SWG page.

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| **Name** | **Organization** |
| Giacomo Martirano | Epsilon Italia srl |
| Giuseppe Conti | Trilogis |
| Eddie Oldfield | Individual member |
| John R. Herring | Oracle USA |

## e. Convener(s)

The conveners who started this SWG process are Giacomo Martirano, Giuseppe Conti, Eddie Oldfield and John R. Herring.