

# **Analysis of International and National Boundary Settlement and Demarcation Issues**

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**Key words:** Boundaries, treaty, ETRS89, agreed.

## **SUMMARY**

The notion of “Boundary” is not a new concept. Since the mists of time, human beings are desirous for boundaries. These points of reference guarantee our freedom: freedom for ourself but also for others.

The General Administration of Patrimonial Documentation (GAPD) is particularly attentive to a good management of the boundaries.

In this context, the GAPD decided to gather all the available relevant information about the Belgian boundaries and is compiling this information both legal and technical in an alphanumeric database.

The information sources are various: original Treaty, original PV and modifying PV, sketches attached to the original Treaty, cadastral map, photos, coordinates, etc.

The existence of a permanent boundary commission allows a good knowledge of the territorial boundary, a joint maintenance and maintains the visibility of the line of the boundary.

The EuroGeographics project State Boundaries of Europe (SBE) goal is to compile a multipurpose State Boundaries of Europe Dataset, meant to be the “definitive” description of all European state boundaries.

The State Boundaries of Europe project aims at providing and maintaining:

- The administrative and legal definition of State Boundaries, based on boundary Treaties,
- Their precise geometric description expressed in ETRS89 coordinates of boundary points, marks and lines.

In conclusion, the SBE project will allow improving pan-European cartographic products.

## **SUMMARY (French)**

La notion de « frontière » n'est pas un nouveau concept. Depuis la nuit des temps, l'être humain aspire à l'existence de frontières. Ces points de référence garantissent notre liberté: la nôtre mais aussi celle des autres.

L'Administration générale de la Documentation patrimoniale (AGDP) est particulièrement attentive à une bonne gestion des frontières.

Dans ce contexte, l'AGDP a décidé de rassembler toutes les informations pertinentes disponibles relatives aux frontières belges et de compiler ces informations tant légales que techniques dans une base de données alphanumériques.

Les sources d'information sont diverses: traités d'origine, procès-verbaux d'origine et modificatifs, croquis annexés au traité, plans cadastraux, photos, coordonnées, etc.

L'existence d'une commission de frontière permanente permet une bonne connaissance de la limite territoriale, un entretien conjoint et maintient la visibilité de la ligne frontière.

L'objectif du projet State Boundaries of Europe (SBE) est de créer un set de données, à usages multiples, des frontières d'Etats européens, destiné à être la description "définitive" de toutes les frontières d'Etats européens.

Le projet State Boundaries of Europe a pour but de fournir et de maintenir à jour:

- Les définitions légales et administratives des frontières d'Etats, basées sur les traités de frontières.
- Leurs descriptions géométriques précises exprimées en coordonnées ETRS89 des points, bornes et lignes frontières.

En conclusion, le projet SBE permettra d'améliorer les produits cartographiques paneuropéens.

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## 1. The “Boundary” notion

*“Borders define geographic boundaries of political entities or legal jurisdictions, such as governments, sovereign states, federated states and other subnational entities. Some borders—such as a state’s internal administrative borders, or inter-state borders within the Schengen Area—are open and completely unguarded. Other borders are partially or fully controlled, and may be crossed legally only at designated border checkpoints.”* (Wikipedia, 2012).

According to the International Law, the definition of a state is generally based on the “theory of the three elements”, meaning an independent state must have at least these three attributes or elements:

- Territory of a state, containing the definition of this territory and its boundaries;
- People of this state, and
- Their own Authority, i.e. their own legislation and execution.

It is commonly admitted that a state is thus notably in charge of the following tasks relating to its boundaries:

- To specify the border in legal documents;
- To determine the border geometry;
- To mark physically the border line;
- To ensure the visibility of the border.

*“Boundaries” is not a new concept. Since the mists of time « Human beings long for developed boundaries. This longing is neither reactionary nor paradoxical as it does not refer to concrete barriers or walls but to – in a sociological sense - points of reference. These points of reference guarantee our freedom: freedom for oneself and for others. [...]*

*We know that already Greeks and Romans grappled intensively with the term “boundary”. The Greek worldview focussed much more on finiteness than on infinity because only the notion of finiteness implies measurement and shape, and shapelessness was considered as an expression of imperfection. “But Nature flies from the infinite, for the infinite is unending or imperfect and Nature ever seeks an end. And the end is a limit.” (Aristotle).*

*In terms of the origin of terms, the Greeks are speaking of óras, péras and térma, the Latin equivalents are the terms finis, limes and terminus. The French language comprises a wide range of terms for the item boundary using terms like limite, frontière, borne and extrémité.*

*The English language uses four different terms for boundary: firstly frontier naming a development frontier which is constantly moving and behind it there is “no man’s land”; secondly limits which is derived from the Latin word limes, originally it named Barbarian limits between the (own) civilisation and foreign barbarism; thirdly border defining modern states national borders and fourthly boundary, a very versatile term for a system boundary which is also used for property boundary.*

*Each definition involves both inclusion and exclusion as Spinoza stated: “Omnis determinatio est negatio”(each limitation is also negative). Boundaries are far from being only means of delimitation, limits, threatening or annoying obstacles. Limitations may also serve as means of enclosure. Enclosing brings about familiar safety. Therefore boundaries are also means of beneficial separation. [...]*

*A property boundary is an enclosure of identity and property. Although the boundary is the end of one thing, it is also the beginning of a new thing. A property boundary does not belong to one person. It is the basis of peaceful neighbourhood. Finally, accepted boundaries create respect and harmony» (Kummer, 2009).*

The “boundary” notion was also included in Roman religion, «*Terminus was the god who protected boundary markers; his name was the Latin word for such a marker. Sacrifices were performed to sanctify each boundary stone, and landowners celebrated a festival called the "Terminalia" in Terminus' honor each year on February 23.*

*Terminus is often pictured as a bust on a boundary stone, here the concedo nulli or concedo nulli means yield no ground» (Wikipedia, 2012).*



**Figure 1: Christian Müller; Stephan Kemperdick; Maryan Ainsworth; et al, Hans Holbein the Younger: The Basel Years, 1515–1532, Munich: Prestel, 2006.**

## 2. The Boundary Management

### 2.1 Belgian boundaries management by the General Administration of Patrimonial Documentation

Historically, the General Administration of Patrimonial Documentation (GAPD) is called to set up the boundary stones and the auxiliary boundary stones which it considers necessary so that the layout of the border is identifiable, and this according to the geometrical descriptions included in the treaties and original documents.

The General Administration of Patrimonial Documentation is particularly attentive to a good management of the boundaries.

In this context, the General Administration of Patrimonial Documentation decided to gather all the available information about the Belgian boundaries and is compiling this information in an alphanumeric database.

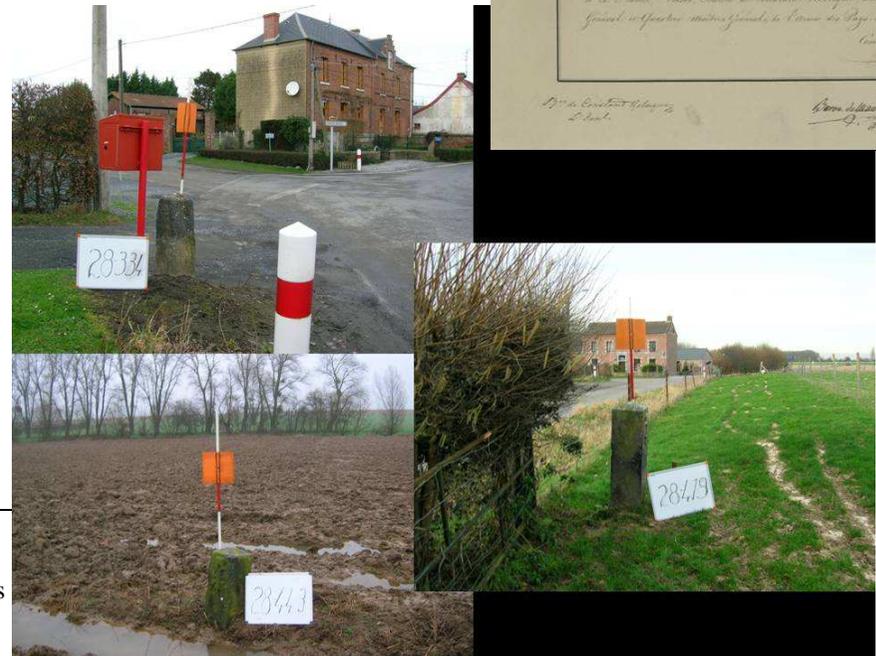
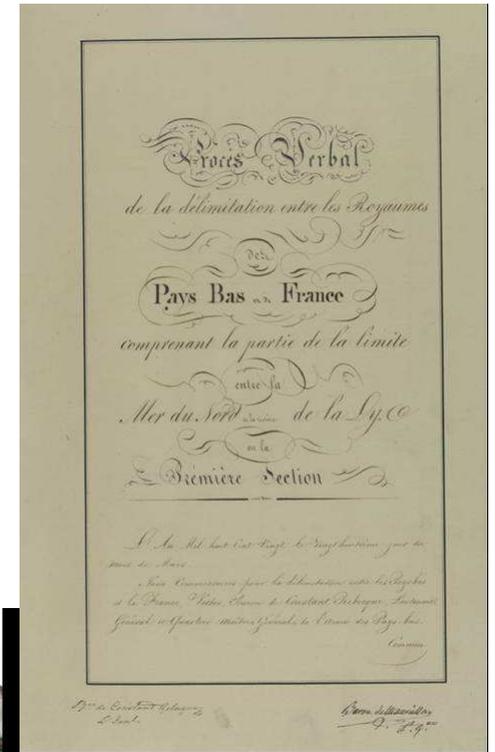
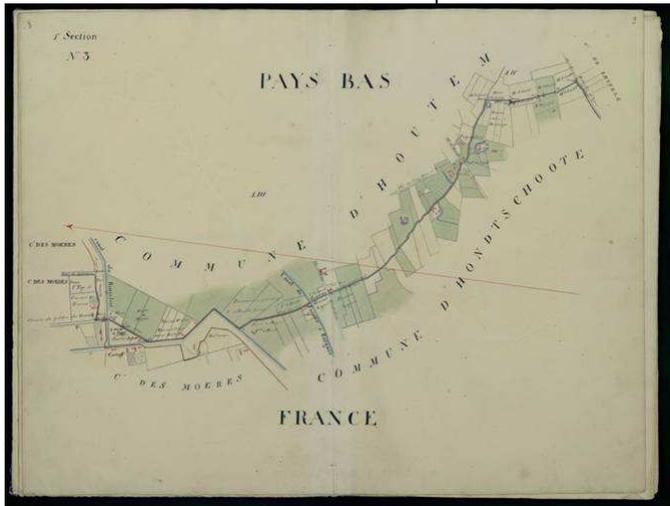
This project is composed of several successive steps:

- First of all, in order to complete our documentation, we have done a reference documents research at the Ministry of Foreign Affairs and at the National Archives of Belgium;
- Secondly, we have scanned more than 3000 documents from the Ministry of Foreign Affairs and from the National Archives and stored them in DVD format and on a specific server;
- In parallel, several teams carried out a field inspection and a statement of the description of the boundary marks;
- Now, we are studying the documents and we are trying to determinate with our neighbours the exact position of the boundary by comparing the boundary position between reference documents and information collected on the field;
- In parallel, we are filling in the alphanumeric database (web application).

The information sources are spread over several reference documents. For example, the main documents are:

- Original Treaty;
- Original PV and modifying PV;
- Sketches attached to the original Treaty;
- Cadastral Map;
- Photos;
- Coordinates;
- ...

**Figure 2 : Some examples of reference documents**



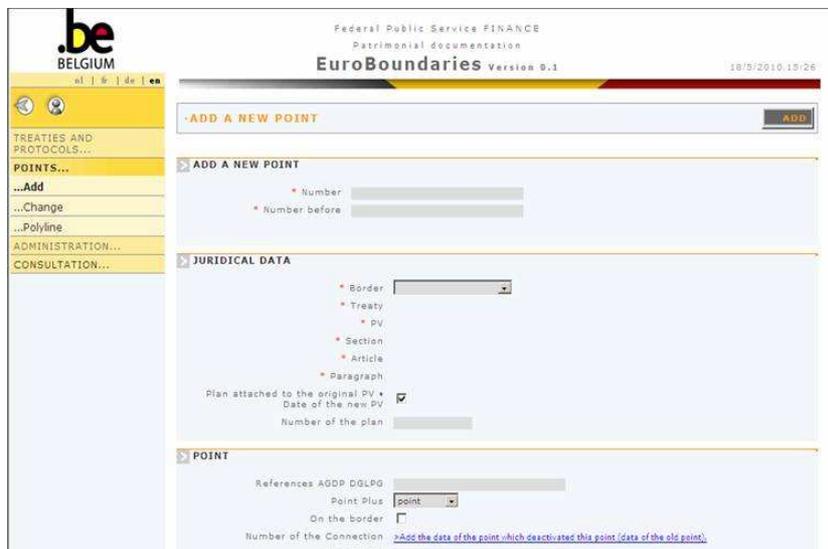
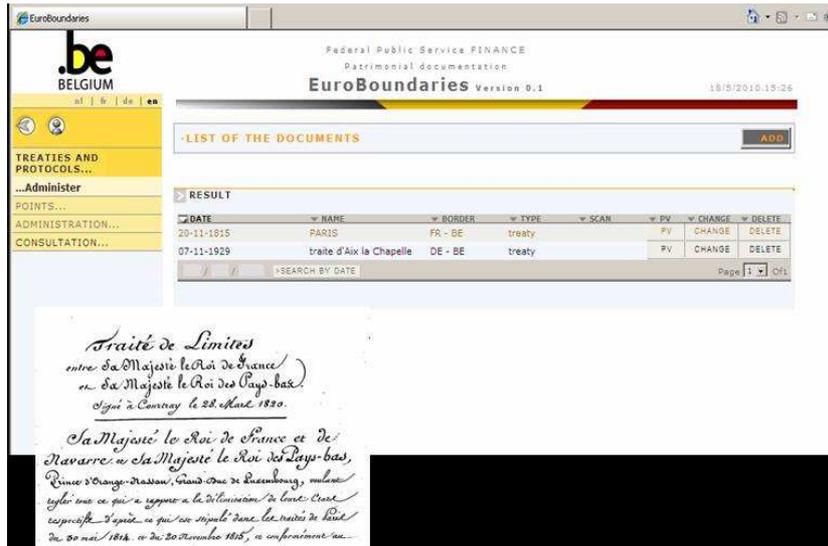
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To manage all this information, we have developed a **web application** (currently only for internal use) giving access to relevant information both legal and technical.

This web application is available in the 3 Belgian national languages and in English. It is composed of 4 parts:

- Treaties and Protocols;
- Points;
- Administration;
- Consultation.





**Figure 3: Some print screens of the web application**

In the first part, “Treaties and protocols”, we can find information about treaties and PV’s and the scans of these documents.

The second part is relating to the point, we can add a new point or modify an existing point. To facilitate the encoding, there are precompleted menus. Information is gathered by category:

- The first category relates to the legal data with the indication of the border concerned, the treaty,....
- Then, we add the information relating to the situation and materialisation of the point: geographical location and materialisation according to the PV, material, situation and current state (+date of last visit),...
- The third category is reserved for the geographical and cadastral data: municipality, cadastral division, section, sheet of plan, cadastral parcel, ...
- The following category relates to the polyline, i.e. the border line between the point which is described and the following point. For example, it is indicated that the border follows the axis of the road,...
- The fifth category allows to store various information such as the IGN map number or other references to documents.
- The last category relates to the coordinates. We find there in particular the coordinates of the point in Lambert 50, Lambert 72, geographical and geocentric ETRS 89, the precision as well as the measurement date.

The third part of the application that we call “administration” relates to the technical aspects: access management,...

Finally, the fourth part is intended for the consultation of the data.

## 2.2 Boundary Commissions

Belgium benefits of permanent Boundary Commissions only for two of its four bordering countries:

- One between Belgium and The Netherlands
- One between Belgium and Germany



Figure 4: Boundary commissions in Belgium

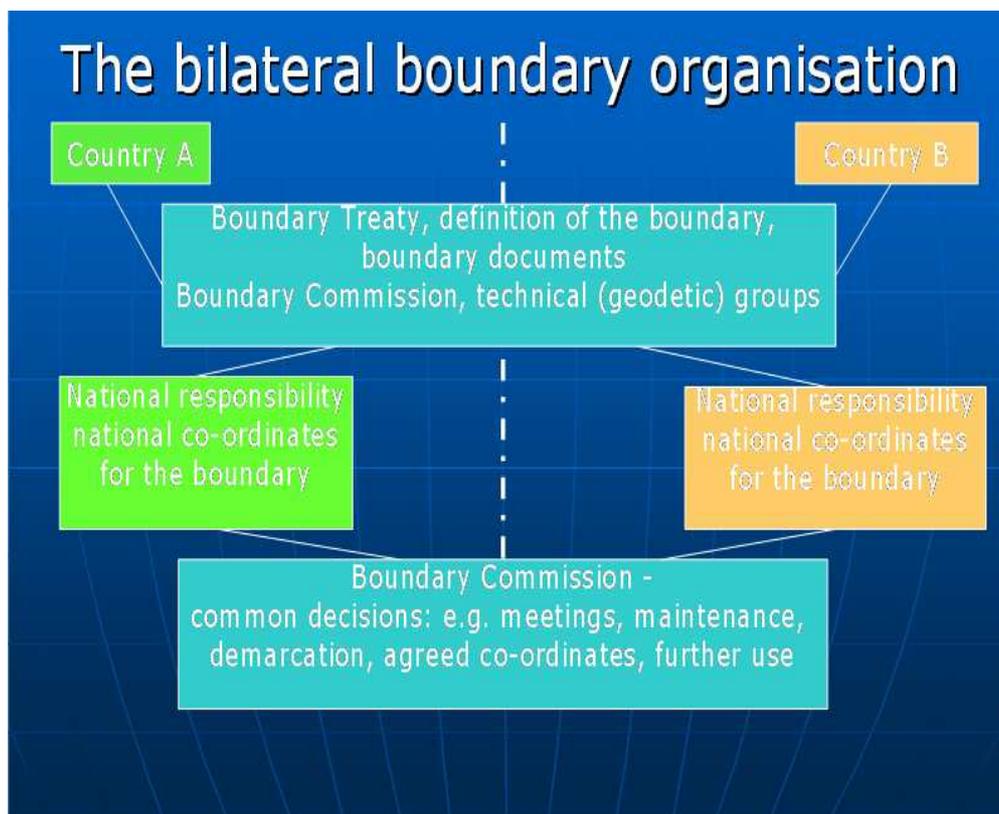
Agents from the GAPD are members of these commissions.

These Boundary commissions meet at regular intervals (usually annually) and their main tasks are:

- To ensure the conformity of the position of existing boundary stones with treaty and PV's previously signed by the parties;
- To draw up geographic position of all boundary marks;
- To ensure at regular interval the good state of boundary stones;
- To place new boundary stones in conformity with reference documents when old

- ones have disappeared or have been displaced;
- To replace or to repaint damaged boundary stones;
- To set up technical groups responsible for the field works;
- To control and approve the planning and results of the field work;
- To communicate about changes and tasks at the boundary line;
- To prepare new treaties when necessary.

The boundary commission is not entitled to change the boundary line.



**Figure 5: The bilateral boundary organisation (König H., 2005)**

The existence of a permanent boundary commission allows a good knowledge of the territorial boundary, a joint maintenance and maintains the visibility of the line of the boundary. From our point of view, it would be highly desirable that commissions between France and Belgium and between Luxembourg and Belgium are founded.

For this purpose, since years, we approached our French and Luxembourgian colleagues, the Foreign affairs Ministry, the CABL, the Internal Affairs Ministry, etc. in order to set in place missing boundary commissions.

### 3. EuroGeographics Project : State Boundaries of Europe (SBE)

Since 2004, the General Administration of Patrimonial Documentation is member of EuroGeographics.

EuroGeographics is a not-for-profit organisation formed in 2001 as the membership association and representation body of the European national mapping, land registry and cadastral agencies. EuroGeographics brings together 56 members from 45 countries across Europe and looks forward to further membership growth reflecting the ongoing changes taking place within Europe.

The boundary, an apparently simple feature of a map, actually conceals a complex set of legal, administrative and technical issues. The determination and definition of a common boundary between two states normally is agreed between the two neighbours. These boundary Treaties and documents may span a long historical and technical development. Thus, they have a great variety in size, appearance and evidence. In the context of unifying Europe's geographic data, it's also necessary to look for the international boundaries of the European states.

A growing number of geographical data users, as well as data integrators or service providers are requiring an agreed standard set of national boundaries. This requirement is expressed both by the institutional and by the private sector, at the European as well as at the global level.

This justifies the set up of a structured project to address this issue. It is why EuroGeographics started the State Boundaries of Europe (SBE) project with the participation of several of their members.

The General Administration of Patrimonial Documentation contributes to the State Boundaries of Europe project and moreover is in charge of the project management of SBE since 2007 (Mrs Pierrette Fraisse between beginning 2007 & 31/05/2011 and then myself, Delphine Maréchal since 1<sup>st</sup> of June 2011).

The EuroGeographics project State Boundaries of Europe (SBE) goal is to compile a multipurpose State Boundaries of Europe Dataset, meant to be the "definitive" description of all European state boundaries. The first step of this project is set for boundaries on land; a second step would include boundaries on the sea.

The State Boundaries of Europe project aims at providing and maintaining:

- The administrative and legal definition of State Boundaries, based on boundary Treaties,
- Their precise geometric description expressed in ETRS89 coordinates of boundary points, marks and lines.

The conceptual model of SBE has been developed by swisstopo (The Federal Office of Topography, swisstopo, is the centre of competence for the Swiss Confederation responsible

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for geographical reference data, for instance the description, representation and archiving of geographic spatial data such as national maps, elevation and landscape models, satellite images, orthophotos).

This data model consists of two different themes (TOPIC): the first one (TOPIC “Boundaries”) describes the information about the boundaries and the second one (TOPIC “EdgeMatching”) stores the connecting points and lines between two datasets. The last one is in test.

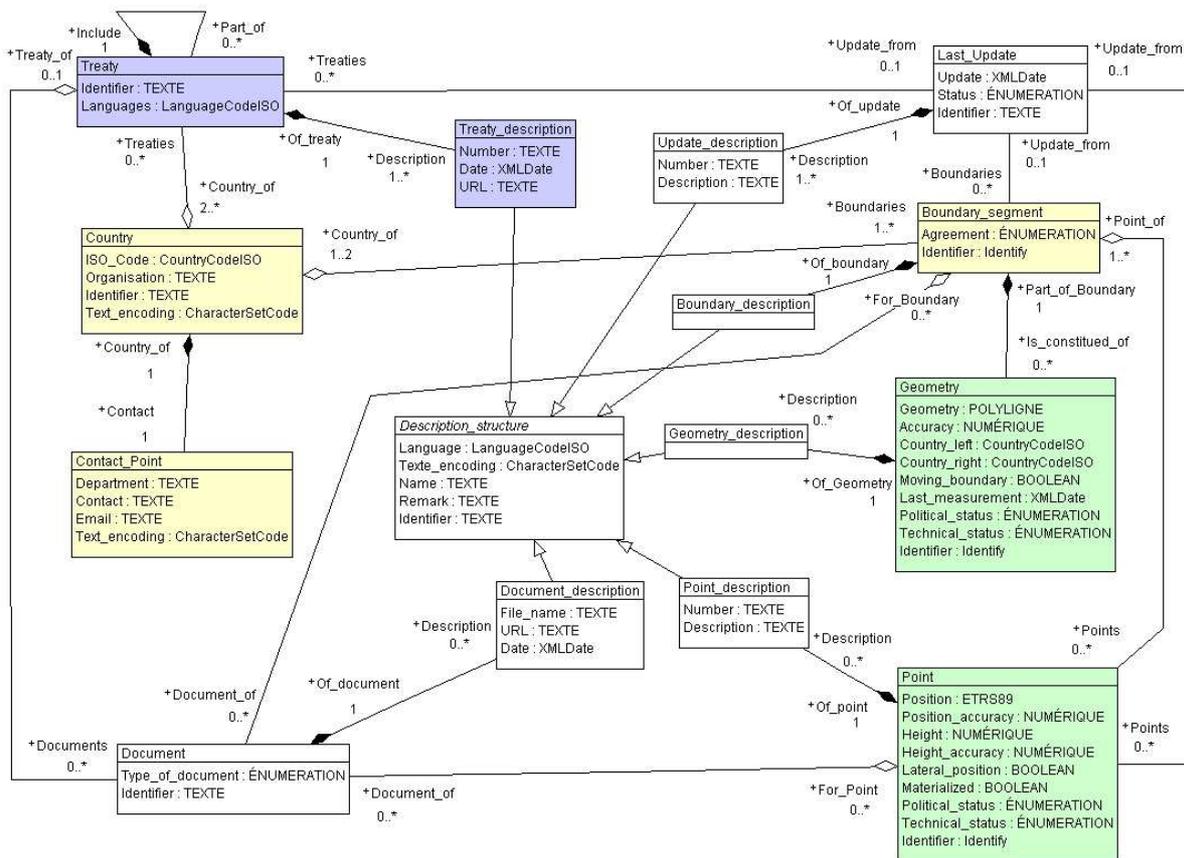


Figure 6 – Data Model of TOPIC Boundaries (BALANCHE, 2009).

The yellow classes define the minimum meta-information to manage, to have geographic information, the green classes has to be filled it up. The SBE project group recommends also giving information to the purple classes. The white classes should be to have!

The collection of high precision data relating to state boundaries on treaty level will need time, because it requires the availability of precise coordinates of boundary points in ETRS89 on the base of the agreed boundary treaties and boundary documents.

As an intermediate solution, if data related to boundary Treaties are not available, we will also collect the most accurate boundary representation based on large-scale national dataset

(topographic or cadastre).

In fact, the boundaries will be stored in 3 different levels of detail and compiled in a common INSPIRE compliant database.

**First level** (original SBE database): the legal definition of state boundaries with precise geometric description expressed in ETRS89 coordinates as described in official boundary treaties.

**Second level** (database in development): state boundaries as included in national topographic master databases in large scale.

**Third level** (common database of edge-matched state boundaries in medium scale): generalised boundaries in medium scale for use on regional level based on EuroGeographics existing products, like the EuroBoundaryMap and the EuroRegionalMap, which include a set of state boundaries which are agreed between the National Mapping and Cadastral Agencies (NMCA) for use at the regional level.

The State Boundaries of Europe project offers a solution to the **issues related to cross border** geometric and topologic integration by aiming at providing a net of agreed lines and points, to which individual dataset can be plugged in, in order to create a seamless whole.

Furthermore, the SBE dataset can provide a relevant contribution at INSPIRE. Indeed, in the Directive, Article 10§2 says: “In order to ensure that spatial data relating to a geographical feature, the location of which spans the frontier between two or more Member States, are coherent, Member States shall, where appropriate, decide by mutual consent on the depiction and position of such common features.”(INSPIRE, 2007)

In conclusion, the SBE project will allow to improve the knowledge on the boundaries and the pan-European cartographic products. In this way, it will be used, by relevant actors, as a Decision Support System for juridical, strategic and environmental matters.

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## BIOGRAPHICAL NOTES

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