

CRYPTO-SPATIAL : AN OPEN STANDARDS SMART CONTRACTS LIBRARY FOR BUILDING GEOSPATIALLY ENABLED DECENTRALIZED APPLICATIONS ON THE ETHEREUM BLOCKCHAIN

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KEY WORDS: Blockchain, Decentralized Applications, Smart Contracts, Ethereum, IPFS, OrbitDB, Geospatial Data Structures, OGC Open Standards.

ABSTRACT:

Blockchain is an emerging immature technology that disrupt many well established industries. In this contribution we present a smart contracts library, named Crypto-Spatial, written with Solidity for the Ethereum Blockchain and designed to serve as a framework for geospatial data decentralized permanent storage and retrieval.

1. INTRODUCTION

1.1 General Instructions

The maximum paper length is restricted to 8 pages. Invited papers can be increased to 12 pages. The paper should have the following structure:

1. Development platform
2. Blockchain as a service (BaaS)
3. Blockchain based Software products
4. Token economy (Tokenomics)
5. Professional services

Also sentences such as “As we have shown in previous work (Author_x, 20xx)” are to be avoided. Instead use a formulation such as “Author_x (20xx) has shown ...”. Note that submissions which have not been appropriately anonymised may be subject to immediate rejection.

1.2 Page Layout, Spacing and Margins

The paper must be compiled in one column for the Title and Abstract and in two columns for all subsequent text. All text should be single-spaced, unless otherwise stated. Left and right justified typing is preferred.

1.3 Preparation in electronic form

To assist authors in preparing their papers, styleguides for preparing digital versions of papers are provided in Word and/or LaTeX on the ISPRS web Page, see: <http://www.isprs.org/documents/orangebook/app5.aspx>.

1.4 Length and Font

All manuscripts, except Invited Papers are limited to approximately eight (8) single-spaced pages (A4 size), including abstracts, figures, tables and references. ISPRS Invited Papers are limited to approximately 12 pages. The font type Times New Roman with a size of nine (9) points is to be used.

Setting	A4 size paper	
	mm	inches
Top	25	1.0
Bottom	25	1.0
Left	20	0.8
Right	20	0.8
Column Width	82	3.2
Column Spacing	6	0.25

Table 1. Margin settings for A4 size paper

2. DEVELOPEMENT PLATFORM

2.1 Title

The title should appear centered in bold capital letters, at the top of the first page of the paper with a size of twelve (12) points and single-spacing. After one blank line, type the author(s) name(s), affiliation and mailing address (including e-mail) in upper and lower case letters, centred under the title. In the case of multi-authorship, group them by firm or organization as shown in the title of these Guidelines.

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2.2 ISPRS Affiliation (optional)

For those authors affiliated with a specific Commission and/or Working Group of ISPRS, a separate title may be entered. The title should be centered in bold type after one blank line below the author's affiliation, i.e. Commission #, Working Group #. The Commission number shall be Roman and the Working Group number should be the Commission Roman number, slash, WG Arabic number (see example above).

2.3 Key Words

Leave two lines blank, then type **“KEY WORDS:”** in bold capital letters, followed by 5–8 key words. Note that ISPRS does not provide a set list of key words any longer. Therefore, include those key words which you would use to find a paper with content you are preparing.

2.4 Abstract

Leave two blank lines under the key words. Type **“ABSTRACT:”** flush left in bold Capitals followed by one blank line. Start now with a concise Abstract (100–250 words) which presents briefly the content and very importantly, the news and results of the paper in words understandable also to non-specialists.

3. MAIN BODY OF TEXT

Type text single-spaced, **with** one blank line between paragraphs and following headings. Start paragraphs flush with left margin.

3.1 Headings

Major headings are to be centered, in bold capitals without underlining, after two blank lines and followed by a one blank line.

Type subheadings flush with the left margin in bold upper case and lower case letters. Subheadings are on a separate line between two single blank lines.

Subsubheadings are to be typed in bold upper case and lower case letters after one blank line flush with the left margin of the page, with text following on the same line. Subsubheadings may be followed by a period or colon, they may also be the first word of the paragraph's sentence.

Use decimal numbering for headings and subheadings.

3.2 Footnotes

Mark footnotes in the text with a number (1); use the same number for a second footnote of the paper and so on. Place footnotes at the bottom of the page, separated from the text above it by a horizontal line.

3.3 Illustrations and Tables

3.3.1 Placement: Figures must be placed in the appropriate location in the document, as close as practicable to the reference of the figure in the text. While figures and tables are usually aligned horizontally on the page, large figures and tables sometimes need to be turned on their sides. If you must turn a figure or table sideways, please be sure that the top is always on the left-hand side of the page.

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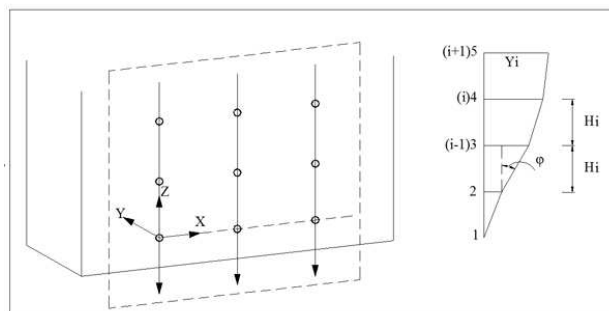


Figure 1. Figure placement and numbering

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3.4 Equations, Symbols and Units

3.4.1 Equations: Equations should be numbered consecutively throughout the paper. The equation number is enclosed in parentheses and placed flush right. Leave one blank lines before and after equations:

$$x = x_0 - c \frac{X - X_0}{Z - Z_0}; y = y_0 - c \frac{Y - Y_0}{Z - Z_0} \quad (1)$$

where c = focal length
 x, y = image coordinates
 X_0, Y_0, Z_0 = coordinates of projection center
 X, Y, Z = object coordinates

3.4.2 Symbols and Units: Use the SI (Système Internationale) Units and Symbols. Unusual characters or symbols should be explained in a list of nomenclature.

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References should be cited in the text, thus (?), and listed in alphabetical order in the reference section. The following arrangements should be used:

3.5.1 References from Journals: Journals should be cited like (?) or (?). Names of journals can be abbreviated according to the “International List of Periodical Title Word Abbreviations”. In case of doubt, write names in full.

3.5.2 References from Books: Books should be cited like (?).

3.5.3 References from other Literature: Other literature should be cited like (?) and (?).

3.5.4 References from Websites: References from the internet should be cited like (?) and (?). Use of persistent identifiers such as the Digital Object Identifier (DOI) rather than URLs is strongly advised. In this case last date of visiting the website can be omitted, as the identifier will not change.

3.5.5 References from Research Data: References from research data should be cited like (?).

3.5.6 References from Software Projects: References to a software project as a high level container including multiple versions of the software should be cited like (?).

3.5.7 References from Software Versions: References to a specific software version should be cited like (?).

3.5.8 References from Software Project Add-ons: References to a specific software add-on to a software project should be cited like (?).

3.5.9 References from Software Repository: References from software repositories should be cited like (?).

ACKNOWLEDGEMENTS (OPTIONAL)

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APPENDIX (OPTIONAL)

Any additional supporting data may be appended, provided the paper does not exceed the limits given above.

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