

Appendix 1: Information and consent documents for participants (Study 1)



Information and consent form (Study 1)

Exploring the effectiveness of spatiotemporal 3D visualization in VR

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| Place and time: | <i>Stefano-Franscini-Platz 5, HIL G36.1, XY.06.2025</i> |
| Contact person if you have any questions: | <i>Mischa Bauckhage</i> <i>Institute of Cartography and Geoinformation</i> <i>mbauckhage@student.ethz.ch,</i> <i>+41 77 429 18 89</i> |
| Data Protection Officer ETH Zurich: | Tomislav Mitar (1omislav.mitar@sl.ethz.ch) |

We would like to ask you if you are willing to participate in our research project. Your participation is voluntary. Please read the text below carefully and ask the conducting person about anything you do not understand or would like to know.

What is investigated and how?

The aim of this study is to investigate the effectiveness and gain of 3D visualized landscapes as well as animated temporal changes of landscapes in a VR environment. In particular, we want to know whether spatial awareness, recallability, and spatiotemporal understanding of novice users can be improved by using these representations in comparison to traditional 2D maps. The following three conditions will be analyzed: static-discrete 2D visualizations (baseline condition), static-discrete 3D visualizations and spatiotemporal 3D visualizations.

Who can participate?

To participate in this study, you should not have any special experience (studies, job, leisure time) in the field of cartography and GIS. Furthermore, you need to be at least 18 years old, have normal eye sights (contact lenses and glasses are allowed), and should not have any type of colour blindness or any acute/chronic physical/mental disorders.

What am I supposed to do as a participant?

As a participant, you will explore three different representations of time-changing landscapes in a VR environment while solving various small tasks. The tasks do not require any special prior knowledge or physical requirements. After each of the three rounds, you will complete post-condition questionnaires about your experience. After finishing all conditions, you will complete a post-study questionnaire.

What are my rights during participation?

Your participation in this study is voluntary. You can withdraw your participation at any time without giving reasons and without any disadvantage.

What risks and benefits can I expect?

We do not expect any high risks in participating in this study. You might experience some discomforts or eye fatigue when wearing the VR headset.

Will I be compensated for my participation?

You will not receive any monetary compensation, but you will be provided with drinks and some small snacks during and after the study and of course you will be able to experience the technology of VR headsets, which may still be new to you.

What data is collected from me and how is it used?

In this study, we do not collect any personal data (e.g., names, place of residence, or email address) from you. The main data we collect will be your written answers to the questionnaires, resulting sketches for sketching tasks of landscapes as well as your verbal answers to the questions we ask. They will be recorded using an audio recorder. Audio recordings, which may contain identifiable voice data, will be transcribed and then permanently deleted. Transcriptions are anonymized and stored separately without any personal references.

This data is collected to evaluate the effectiveness of 3D animated visualizations for educational purposes, particularly in enhancing spatial perception and memory in non-expert users.

In line with ETH Law Art. 36d, all data will be anonymized as soon as the purpose of the data processing allows. No identifying features will be retained in the stored data. Only the involved researchers of the study and the members of the ETH Zurich Ethics Commission may access the original data where strict confidentiality will be observed at any time. The obtained data will be stored safely on the internal server of ETH Zurich.

Any data or findings from this study will be published in a report and presentation of this Master Thesis.

This study complies with the applicable data protection laws, including the Swiss Federal Act on Data Protection (FADP) and, where applicable, the European General Data Protection Regulation (GDPR).

The members of the ETH Zurich Ethics Committee may inspect the original data for audit and control purposes, subject to strict confidentiality.

Who is funding the study?

Funding of small gifts for participants by the Chair of Cartography, ETH Zürich.

Is any damage to health insured?

Damage to health directly related to the study is covered by ETH Zurich's public liability insurance. Beyond that, accident or health insurance is your own responsibility (e.g. travel to and from study site).

Who reviewed the study?

This study was reviewed and approved by the ETH Zurich Ethics Committee under application number 25 ETHICS-154.

Complaints office

The secretariat of the ETH Zurich Ethics Committee is available to help you with complaints in connection with your participation in the study. Contact: ethics@sl.ethz.ch or 0041 44 632 85 72.

Consent Form

I, the participant, confirm by my signature that:

- I have read and understood the study information. My questions were answered completely and to my satisfaction.
- I had enough time to decide about my participation and am taking part in the study voluntarily.
- I fulfil the stated conditions for participation and am aware that the stated requirements must be met.
- I consent that the data described above may be collected from me and used as described.
- I know that I can cancel my participation any time.

I would like to be informed about the results of this study

- ☐ Yes, name, phone number or e-mail:
- ☐ No

Name of participant

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Place, date

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Signature participant

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Place, date

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Signature conducting person

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