



# Making Geodesy Engaging: Geo-Engineering Studies and Approaches to Public Outreach in Lithuania



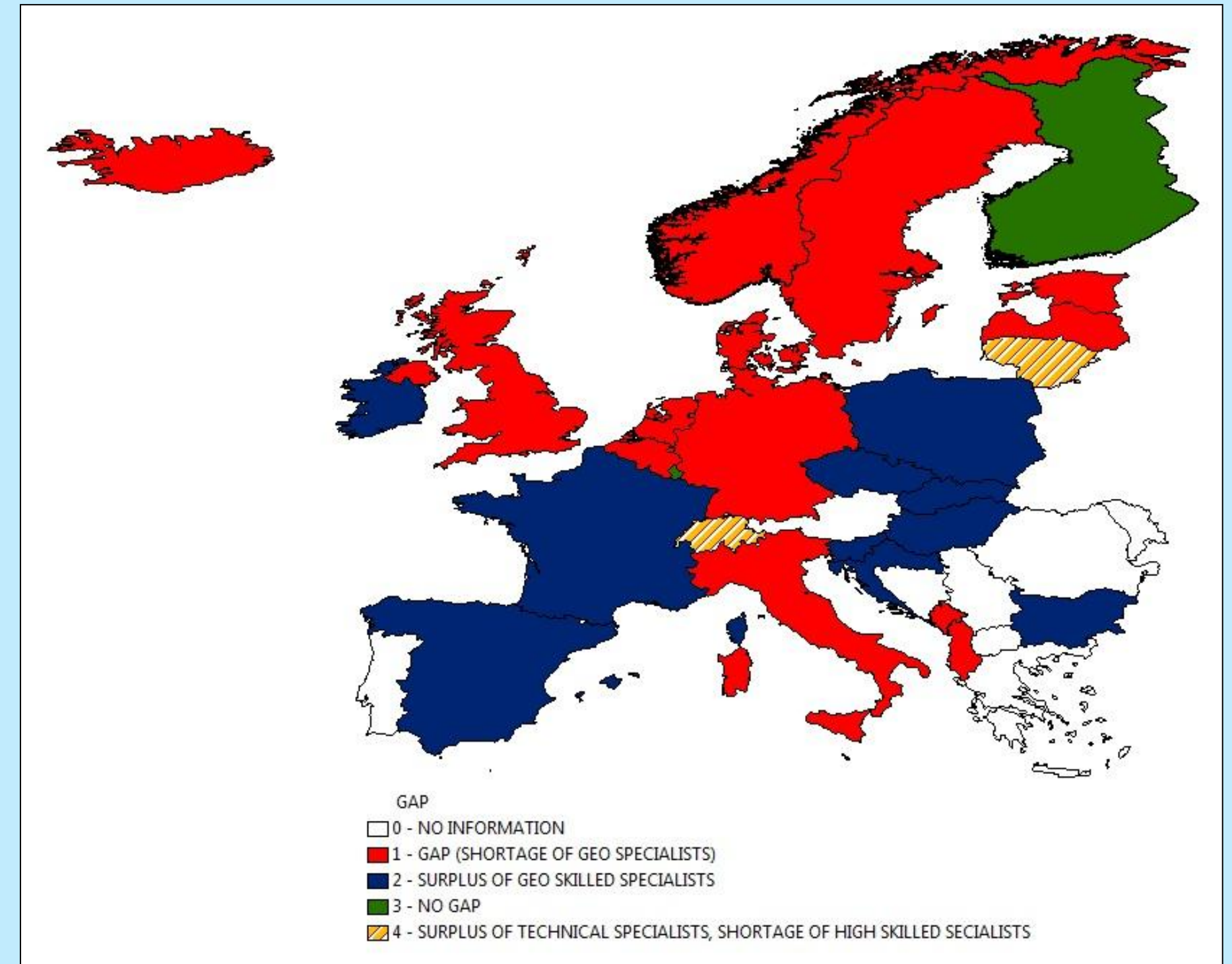
# GEO-ENGINEERING Education in Lithuania

Mismatch between demands of GEO labour market and quantity and quality of students and graduates

The factors of the gap arise

## Three main groups of factors:

1. factors dependent on GEO market,
2. external factors,
3. factors dependent on educational system.





# GEO-ENGINEERING

## Education in Lithuania

115 factors  
in total!

| Synthesis with respect to: Goal: GAP factors                      |      |  |
|-------------------------------------------------------------------|------|--|
| Overall Inconsistency = ,09                                       |      |  |
| Universities and high schools have their own interest due t...    | ,115 |  |
| Low salary                                                        | ,052 |  |
| Non-transparent salary system                                     | ,052 |  |
| GEO technologies are updated faster than curriculums              | ,048 |  |
| Govermental regulation is not effective                           | ,046 |  |
| GEO companies do not participate in development of curri...       | ,041 |  |
| Countries do not have the GEO governance bodies of high...        | ,038 |  |
| Education system oriented towards the number of student...        | ,038 |  |
| Preparation of GEO specialists is expensive                       | ,036 |  |
| GEO industry/fields/specialities are not among government...      | ,030 |  |
| Some GEO subjects related to space-born and air-born fiel...      | ,029 |  |
| Private/public(governmental) partnership is not effective         | ,022 |  |
| Theoretical knowledge is not so easily applicable in occup...     | ,022 |  |
| GEO companies do not support GEO students studies                 | ,020 |  |
| Methotological methods are too old                                | ,016 |  |
| GEO field work more acceptable for males                          | ,016 |  |
| Rapid technological development                                   | ,013 |  |
| Confrontation between high developed countries and weak           | ,013 |  |
| GEO production is expensive and there is no payback quar...       | ,013 |  |
| Possibilities to avoid taxation                                   | ,013 |  |
| No (sufficient) daily allowance                                   | ,012 |  |
| No unification of curriculums in different countries              | ,012 |  |
| GEO equipment more acceptable for males                           | ,012 |  |
| Number of GEO distance learning programmes is too small           | ,012 |  |
| Some GEO subjects impossible to teach by distance method          | ,012 |  |
| Global/Regional social growth is weak                             | ,011 |  |
| Students prefer to study social/humanitarian sciences inst...     | ,011 |  |
| Less children in total in economical developed countries          | ,011 |  |
| Universities intent to give more fundamental subjects             | ,010 |  |
| Subjects oriented to males work                                   | ,010 |  |
| Importance of local professional bodies is not significant        | ,009 |  |
| VET system is weak                                                | ,009 |  |
| No relation with the primary education schools                    | ,009 |  |
| No payments for working equipment and its amortization            | ,008 |  |
| Demand mismatching                                                | ,008 |  |
| No promotion system for quality of work                           | ,007 |  |
| No promotion for professionalism                                  | ,007 |  |
| No self regulation institutions (like RICS in UK)                 | ,007 |  |
| No means to improve the working safety                            | ,006 |  |
| No prestige of duty                                               | ,006 |  |
| Importance of internatinal professional bodies is not signific... | ,006 |  |
| Economical crises are often                                       | ,006 |  |
| GEO studies - comparatively expensive                             | ,006 |  |
| GEO production often serves as half-done product only             | ,005 |  |
| GDP growth is slow                                                | ,005 |  |
| GEO professions are not prestige                                  | ,005 |  |

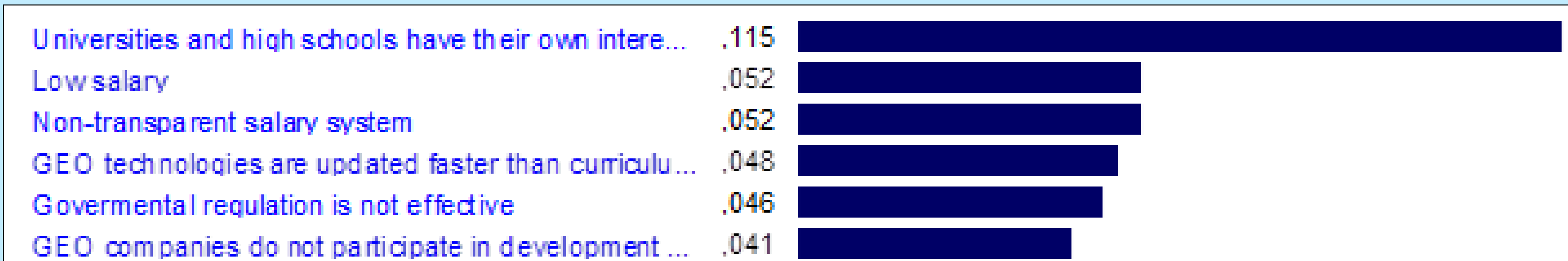
|                                                                 |      |  |
|-----------------------------------------------------------------|------|--|
| No payments for studies, training courses                       | ,004 |  |
| No possibility to have a loan from company budget               | ,004 |  |
| GEO specialists are concentrated in big cities                  | ,004 |  |
| GEO is very specific among other science/production/indu...     | ,004 |  |
| Youth unemployment                                              | ,004 |  |
| CVET system is not implemented                                  | ,004 |  |
| CVET does not quarantee the costs and benefits of trainin...    | ,004 |  |
| CVET does not reduce of skill mismatch                          | ,004 |  |
| No possibility to share the savings of company                  | ,003 |  |
| No guaranteers for employment                                   | ,003 |  |
| Militaries do GEO separately from civilians                     | ,003 |  |
| Countries needs only small number of top-level specialists      | ,003 |  |
| No inputs to pensions, insurance funds                          | ,002 |  |
| No trust in colleagues                                          | ,002 |  |
| No reputation/prestige of organisation                          | ,002 |  |
| Weak regulations to become a chartered surveyor                 | ,002 |  |
| GEO production is not so important as other fundamental ...     | ,002 |  |
| There are no Global/Regional scientific programmes on GE...     | ,002 |  |
| Global/Regional GEO needs international cooperation             | ,002 |  |
| Part of GEO is Top-secret                                       | ,002 |  |
| Big number of non-educated children                             | ,002 |  |
| Universities officials do not show enough attention to leis...  | ,002 |  |
| IVET does not help to further career development opportun...    | ,002 |  |
| No promotion for working years                                  | ,001 |  |
| No additional payments for harmful working conditions           | ,001 |  |
| No additional payments for child or in the case of death of ... | ,001 |  |
| No payments for vacations, clubs, sports etc                    | ,001 |  |
| No special conditions to buy the company shares                 | ,001 |  |
| No possibility to buy the services or products of company ...   | ,001 |  |
| Leader is not respecting workers                                | ,001 |  |
| Working climate with different tensions                         | ,001 |  |
| No respect and recognition from colleagues                      | ,001 |  |
| No clear goals, strategy, vision                                | ,001 |  |
| Non-adecvate working flow                                       | ,001 |  |
| Work is non-creative                                            | ,001 |  |
| No autonomy in work, no self-dependency                         | ,001 |  |
| No work variety                                                 | ,001 |  |
| No stress/accent on work importance, significance               | ,001 |  |
| Tasks unclear, non-understandable                               | ,001 |  |
| No special uniform for GEO employees                            | ,001 |  |
| No possibilities for growth/career                              | ,001 |  |
| GEO production is necessary for narrow/small part of socie...   | ,001 |  |
| GEO sciences are not conidered as modern                        | ,001 |  |
| High rates of unemployment                                      | ,001 |  |
| Confrontation on racial basis                                   | ,001 |  |
| Confrontation on religion basis                                 | ,001 |  |
| Weak or not-existing tradeunions                                | ,001 |  |
| GEO officials, industry did not warn in time about the lack ... | ,001 |  |
| IVET system is not implemented                                  | ,001 |  |
| IVET does not reduce the unemployment and inequality            | ,001 |  |
| IVET does not increase the profitability and economic grow...   | ,001 |  |
| Life long learning system is not popular                        | ,001 |  |
| CVET does not improve the quality of life for individuals       | ,001 |  |
| CVET does not increase the employee productivity                | ,001 |  |
| No additional payments during illness                           | ,000 |  |
| Leader doesn't have authority                                   | ,000 |  |
| No leader's attention to complains, interests of employees      | ,000 |  |
| No leader's trust and no transfer of responsibility to workers  | ,000 |  |

|                                                              |      |
|--------------------------------------------------------------|------|
| No team work                                                 | ,000 |
| No open communication                                        | ,000 |
| No flexible working shedule                                  | ,000 |
| No comfortable working/leisure regime                        | ,000 |
| No creative vacations                                        | ,000 |
| No support of family institution                             | ,000 |
| No possibilities for self-expression                         | ,000 |
| No possibilities to reach the planned goals                  | ,000 |
| No possibilities to make an influence on governance, mana... | ,000 |
| IVET does not increase the motivation to study GEO scienc... | ,000 |
| IVET system is not popular                                   | ,000 |



# GEO-ENGINEERING Education in Lithuania

## The digital values of the most important factors (Lithuania)



The AHP computations were made and expected digital values of gap factors importance was determined for some European countries (Belgium, Bulgaria, Lithuania, the Netherlands). It was detected that the following factors are on the highest priority

- *Universities and high schools have their own interest due to financial reasons,*
- *Low salary*
- *GEO companies do not support GEO students studies*



# GEO-ENGINEERING Education in Lithuania

*Admission figures for study programmes*

| Study programme                | Enrolment<br>Year,<br>Number of<br>the<br>enrolled<br>(SF+NF) |      |      |      |      |      |      |      |
|--------------------------------|---------------------------------------------------------------|------|------|------|------|------|------|------|
|                                | 2018                                                          | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 |
| Geodesy and geoinformatics (B) | 9+2                                                           | 3+5  | 4+0  | 8+1  | 18+0 | 11+0 | 18+0 | 16+0 |
| Geodesy and Cartography (M)    | 13+1                                                          | 13+3 | 8+0  | 6+0  | 6+0  | 8+0  | 6+0  | 6+0  |
| Total enrolment                | 25                                                            | 24   | 12   | 15   | 24   | 19   | 24   | 22   |

\* SF- state funded; NF- non-funded



# GEO-ENGINEERING Education in Lithuania

- VILNIUS TECH is a member of the [ATHENA European University alliance](#). Advanced Technology Higher Education Network Alliance (ATHENA) seeks to transform alliance's universities into connecting spaces, where the arts, social sciences, and humanities interplay with the natural and engineering sciences across all partner institutions.
- ATHENA continues to thrive as a beacon of collaboration and innovation, uniting over 160,000 students and more than 17,500 staff members across nine EU countries





# GEO-ENGINEERING Education in Lithuania

*Geodesy and Cartography study programme content (Geographic Information Systems specialization)*

| Subject                                                           | Credits | Subject                                                   | Credits |
|-------------------------------------------------------------------|---------|-----------------------------------------------------------|---------|
| <b>1 semester 30 credits</b>                                      |         | <b>2 semester 30 credits</b>                              |         |
| Geodetic Algorithms and Data Structures                           | 6       | Spatial Information Infrastructures                       | 6       |
| Digital Photogrammetry                                            | 3       | Remote Sensing Methods                                    | 6       |
| Scientific Researches and Innovations                             | 6       | Geoinformation Systems Design (with course project)       | 9       |
| Theory of the Figure of the Earth                                 | 6       | Geoinformation Data Bases (with course project)           | 6       |
| Electronic Systems of Geodetic Measurements (with course project) | 9       | Research Work 1 (Geographic Information Systems)          | 3       |
| <b>3 semester 30 credits</b>                                      |         | <b>4 semester 30 credits</b>                              |         |
| Digital Surface Models (with course project)                      | 9       | Master Graduation Thesis (Geographic Information Systems) | 30      |
| Research Work 2 (Geographic Information Systems)                  | 3       |                                                           |         |
| Geodetic Laser Scanning Technologies (with course project)        | 9       |                                                           |         |
| Geoinformation Systems Technology                                 | 6       |                                                           |         |
| Free choice obligatory course                                     | 3       |                                                           |         |



# GEO-ENGINEERING Education in Lithuania

Currently, the department coordinates two master's degree programmes:

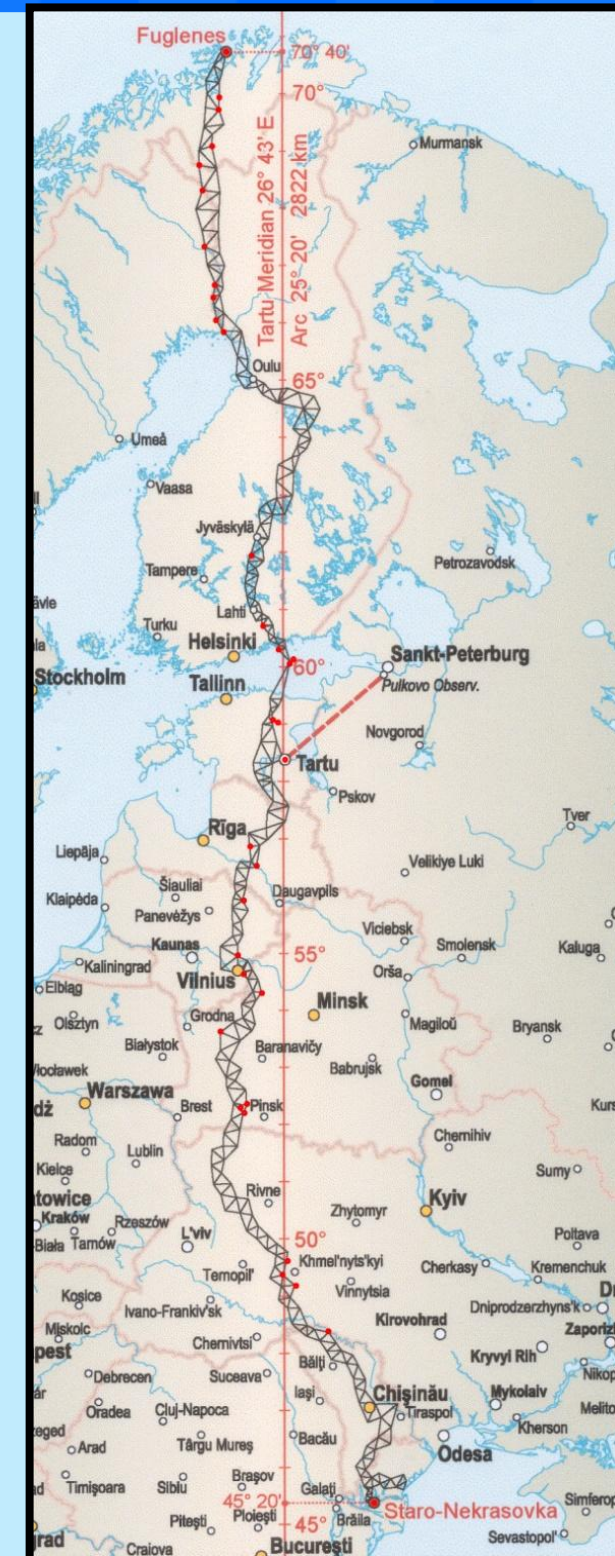
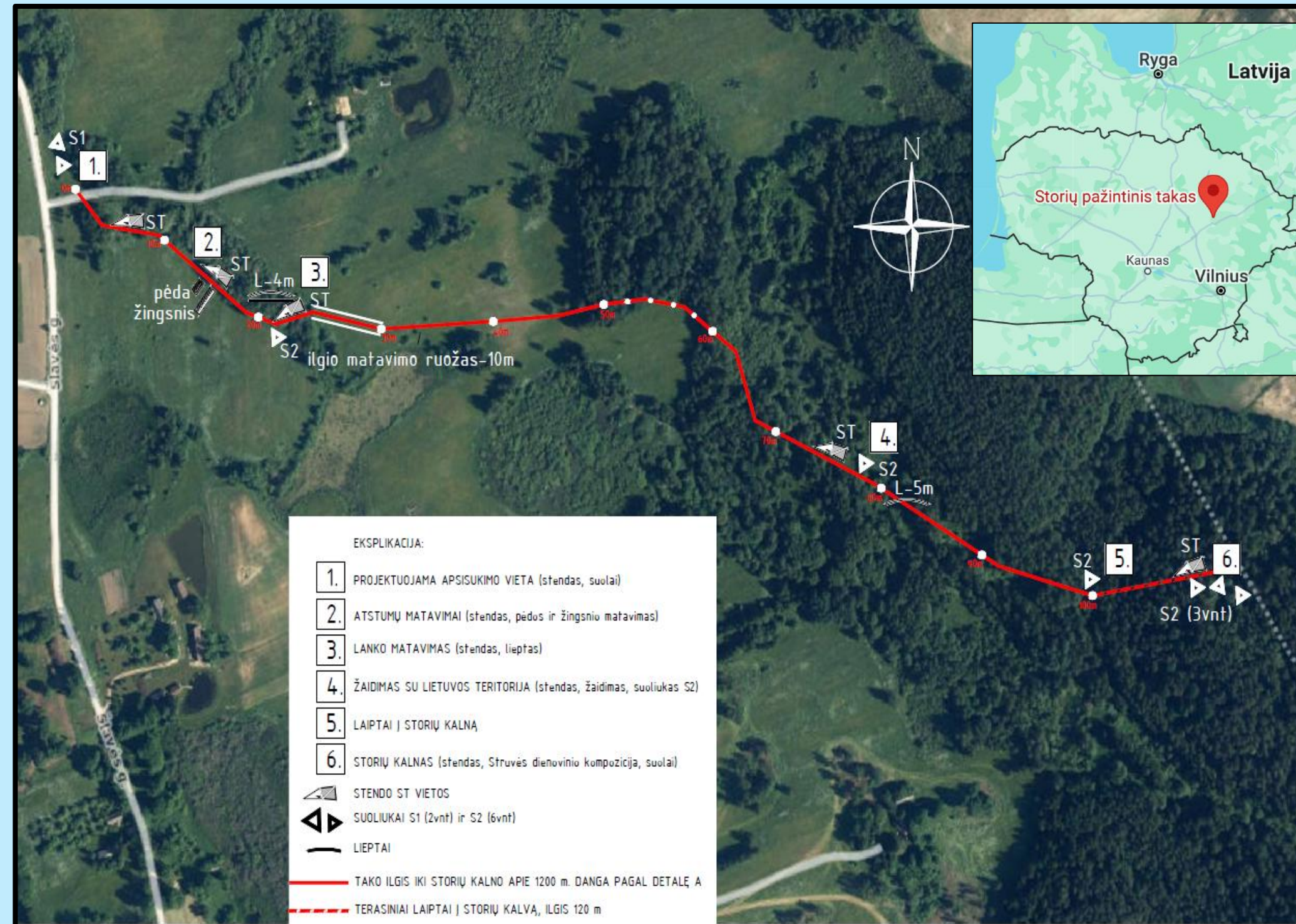
- ❑ **Geographic Information Systems (GIS)** – taught in Lithuanian, focusing on advanced geoinformation technologies, spatial analysis, and the engineering applications of GIS. Programme overview is in the VILNIUS TECH website (**Geographic Information Systems, 2026** : <https://vilniustech.lt/en/international-students/study-programme/geographic-information-systems-119187-u/> ).
- ❑ **Innovative Solutions in Geomatics (ISG)** – an English-taught international programme aimed at providing competencies in modern geomatics, satellite data processing, automation, and innovative geospatial engineering technologies. Programme overview website (**Innovative Solutions in Geomatics, 2026**: <https://vilniustech.lt/en/international-students/study-programme/innovation-solution-in-geomatic-1696681-u/> ).

# Storiai Educational Path

Interreg project No. LLI-477 "Creation of the International Tourist Route  
"Struve Geodetic Arc"



- Length – 1.2 km
- 6 information stands
- 3 practical exercises
- Audio guides
- Quizes



# Distance measurements in sajens, tuazes and meters, curved elevation



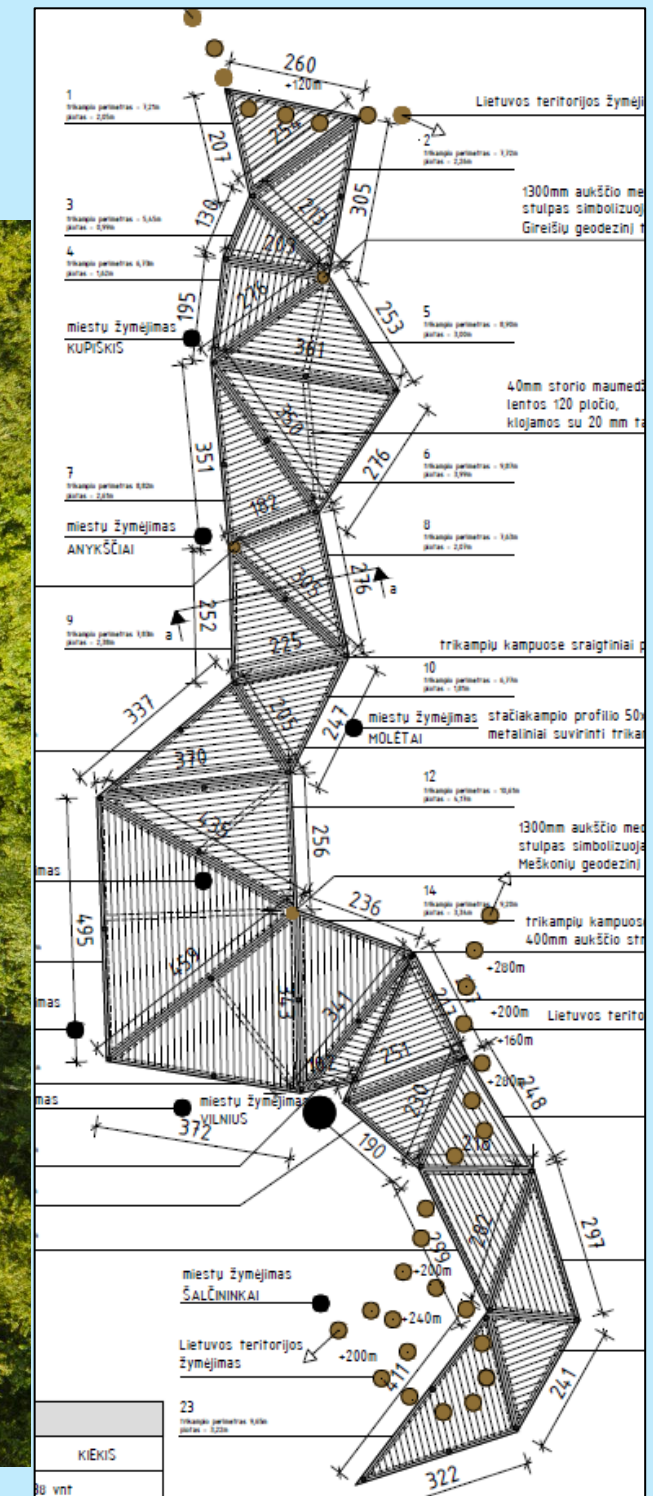
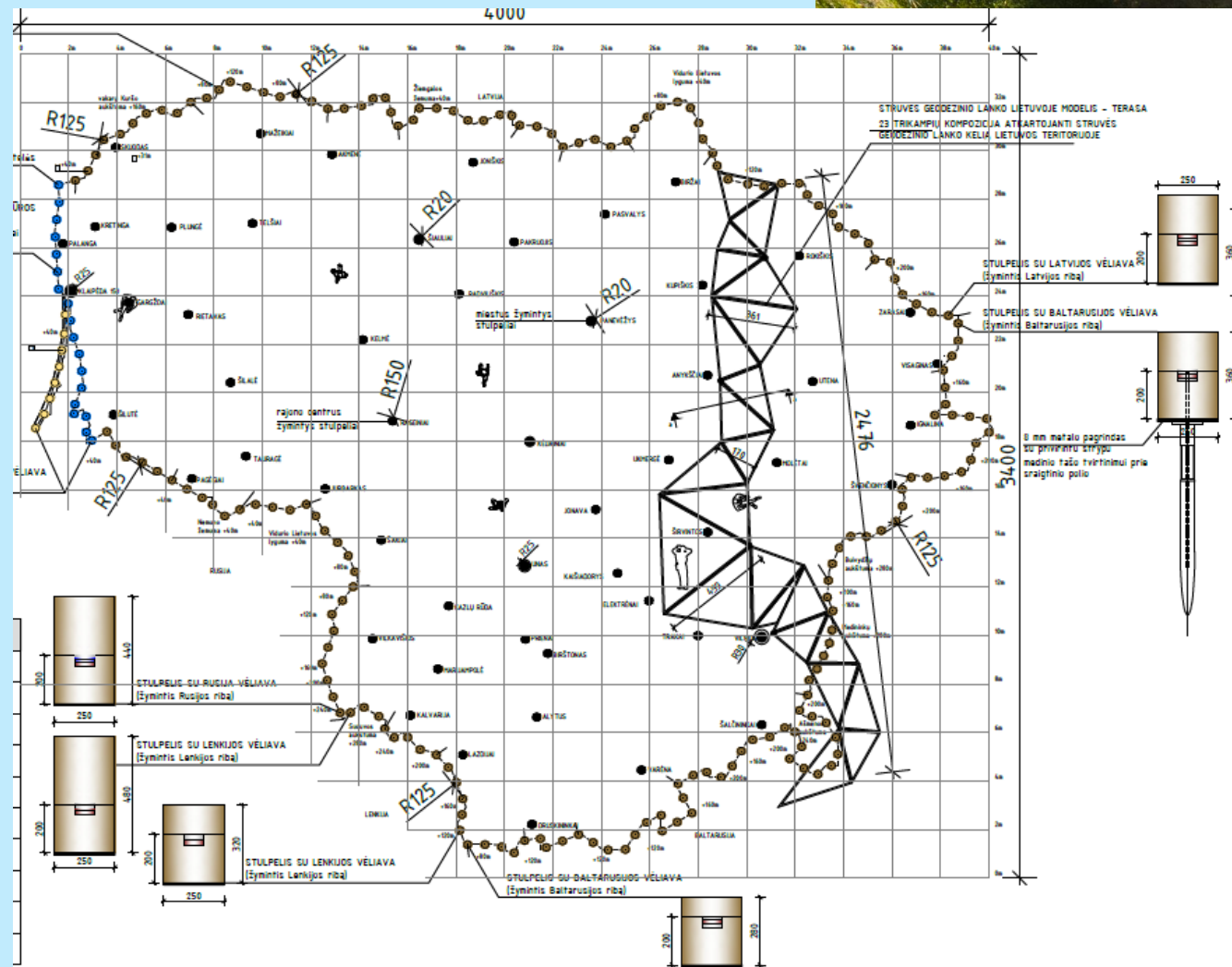
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# Lithuania in the scale 1:10 000



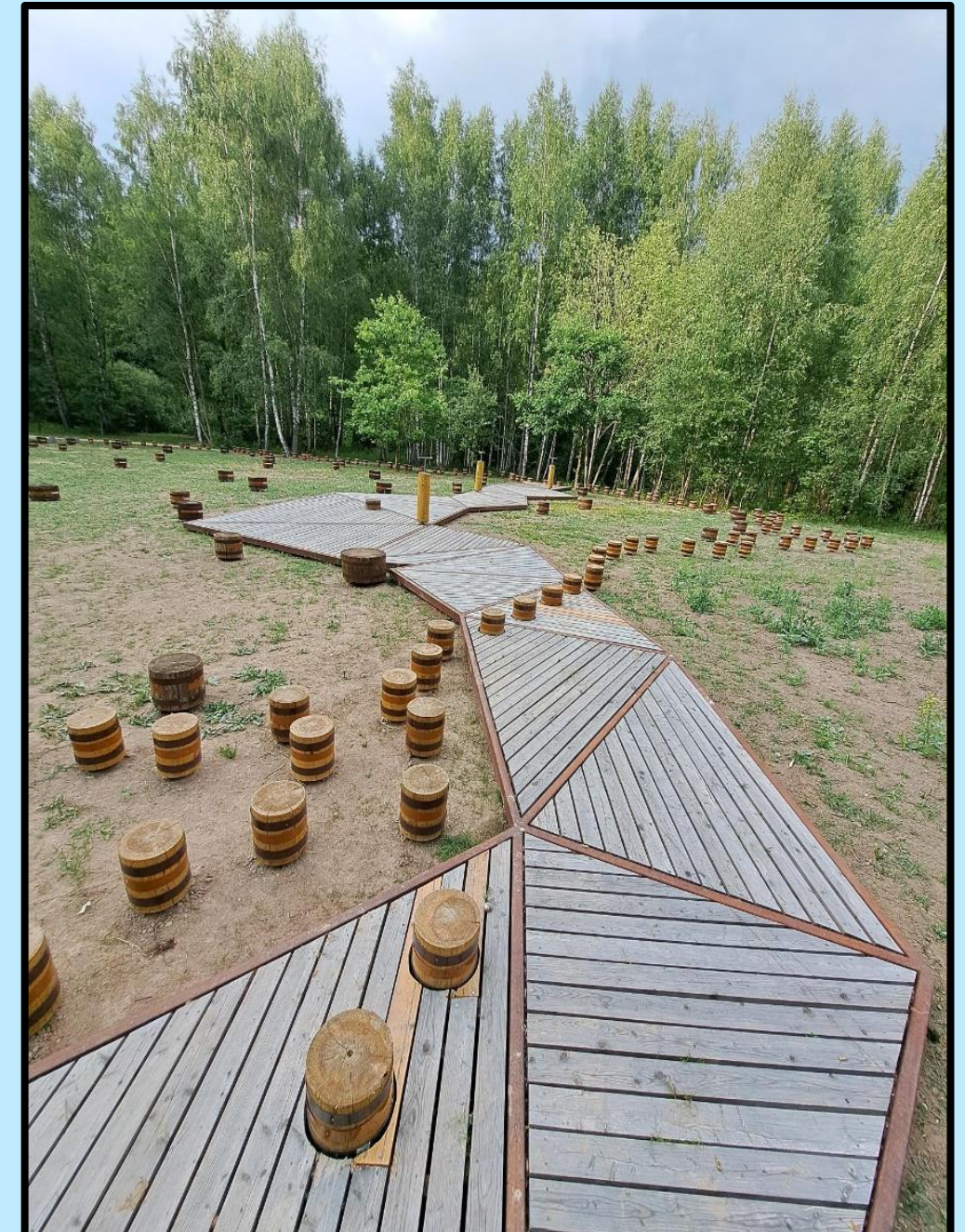
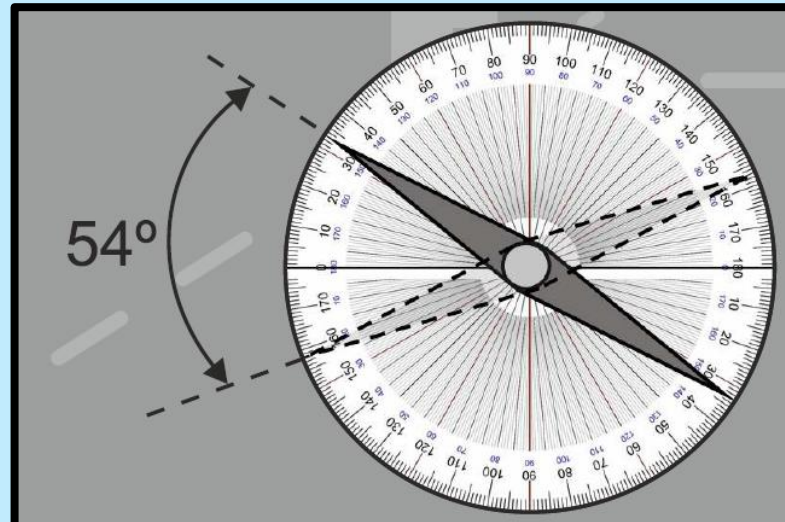
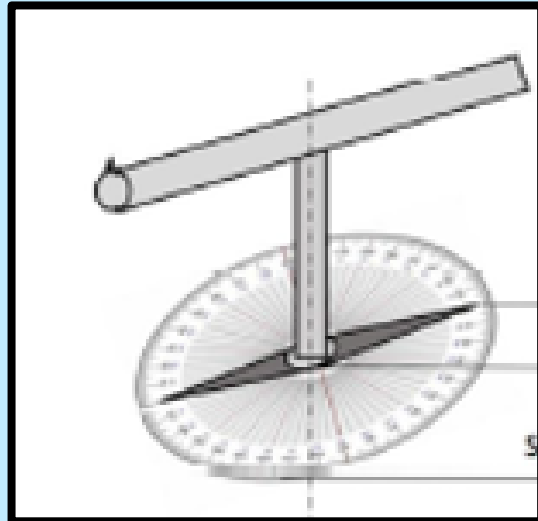
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# Angular measurements along Struve Geodetic Arc in Lithuania



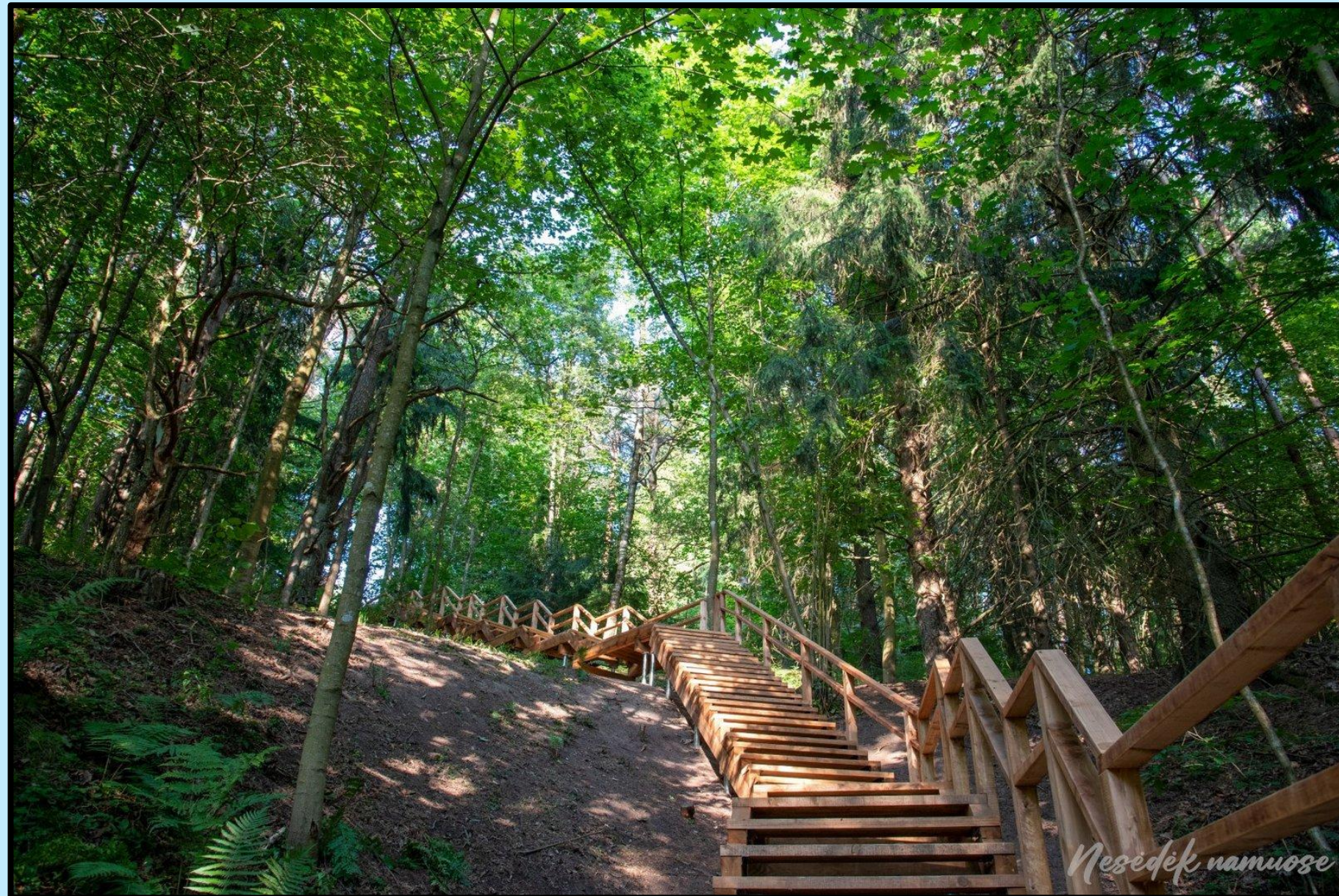
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# Climbing to Storiai geodetic point



<https://anyksciuparkas.lt/struves-geodezinis-lankas>



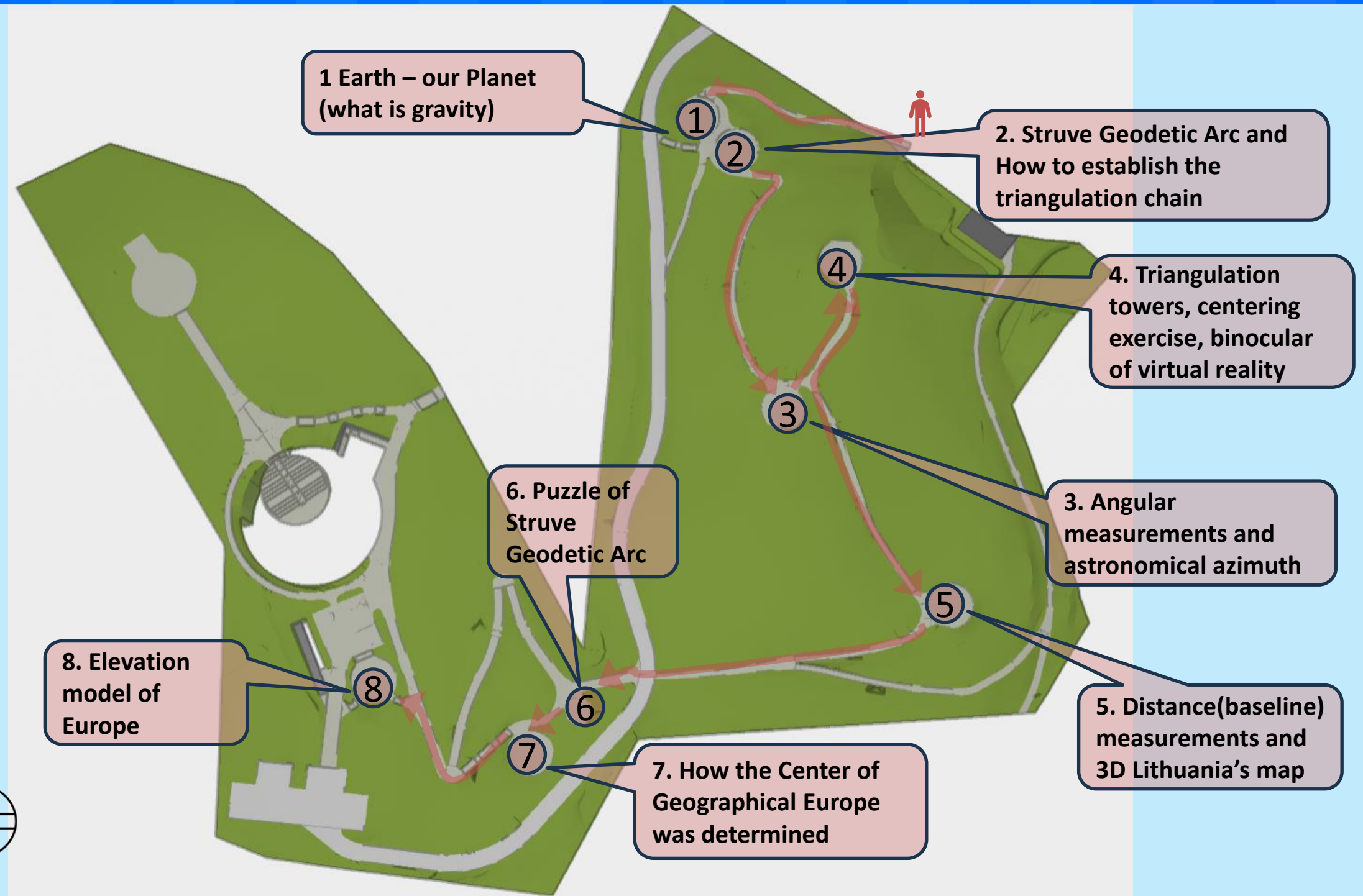
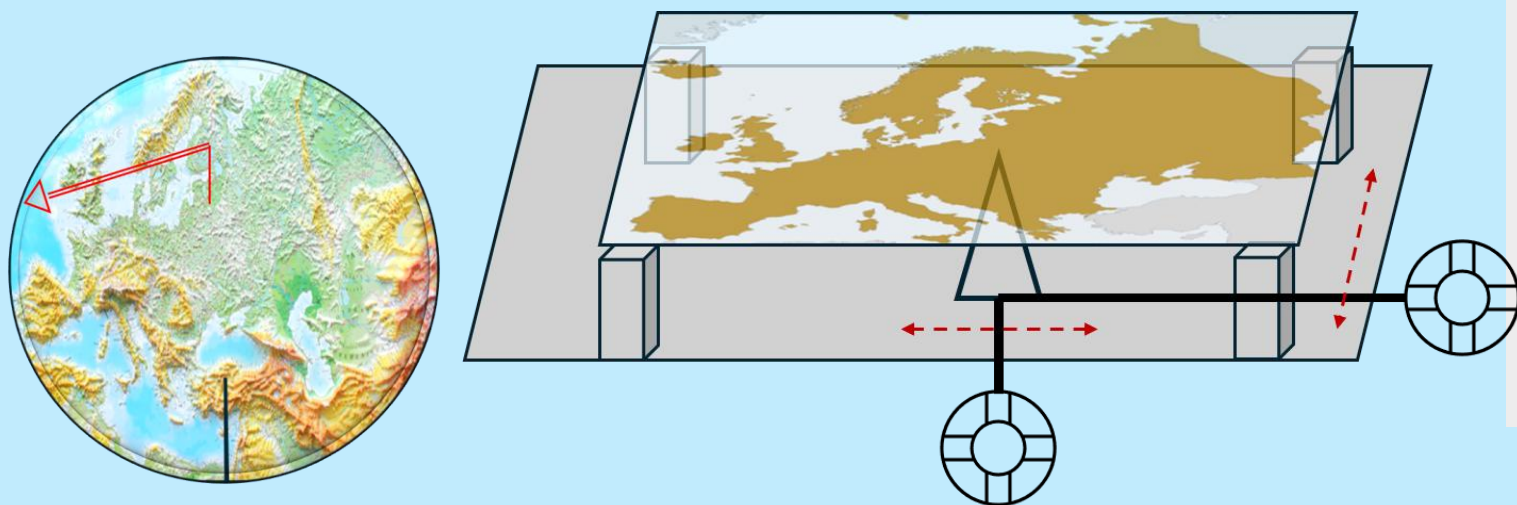
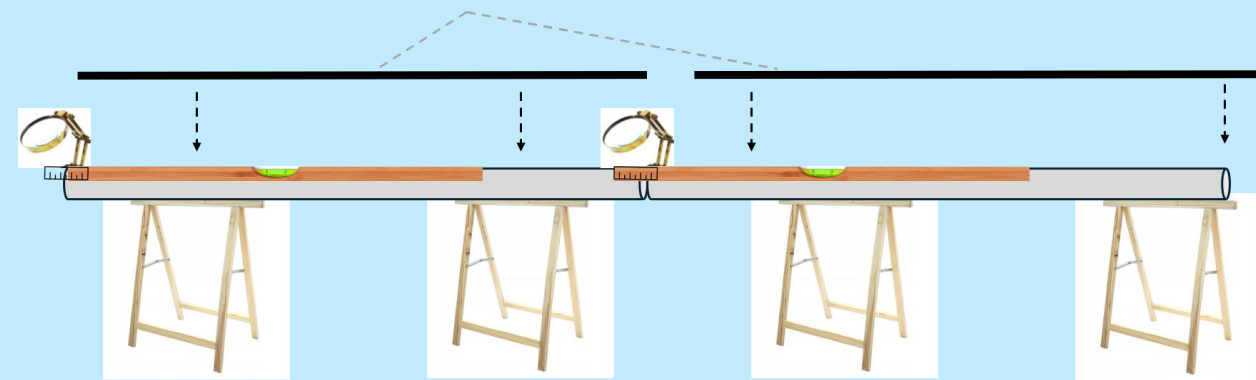
# Relaxation area and a model of Struve Geodetic Arc



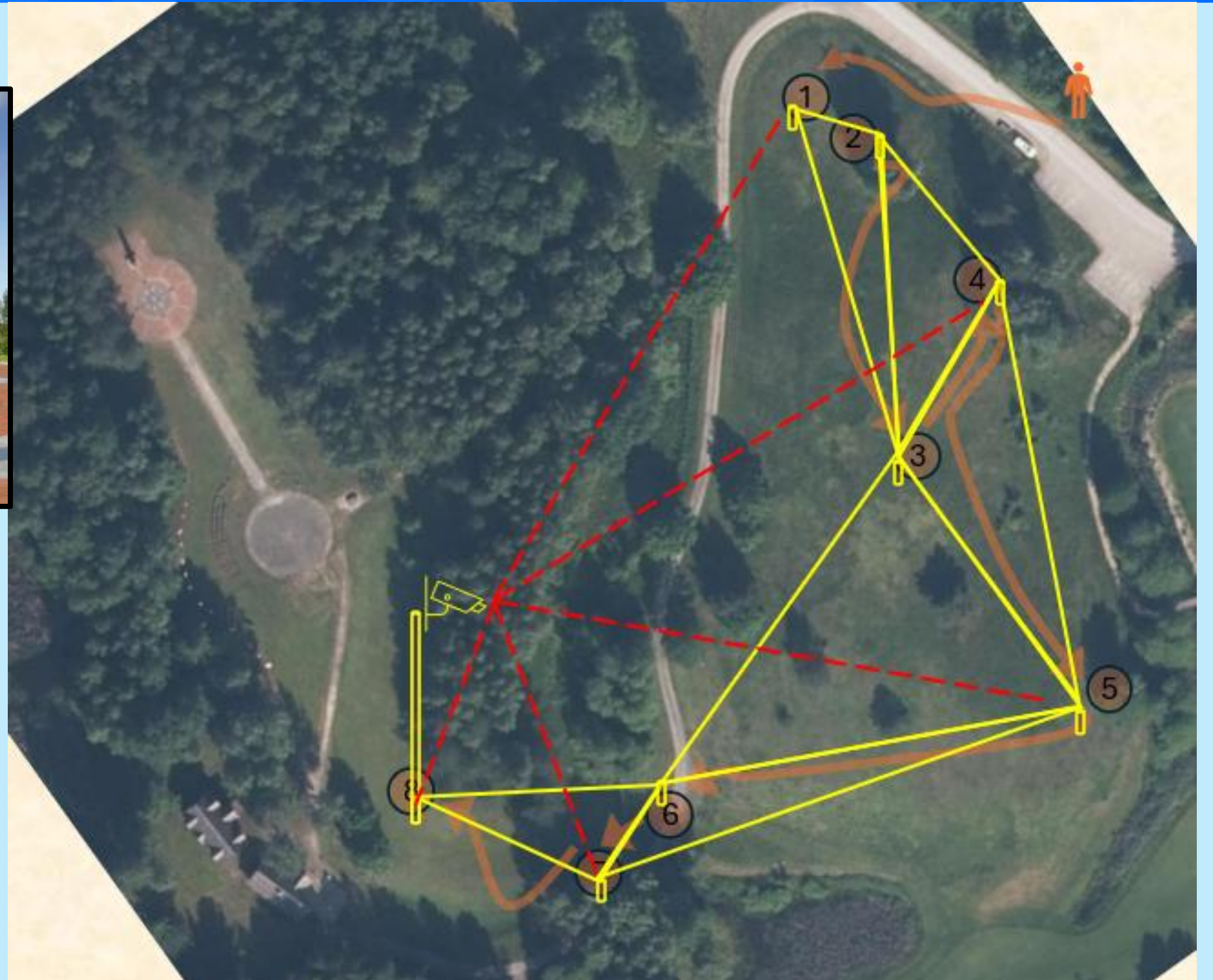
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# New Educational Space in The Center of Geographical Europe



# New Educational Space in The Center of Geographical Europe



# Thank you for the attention

Eimuntas Paršeliūnas and Saulius Urbanas