

Accuracy assessment of RTK-GNSS equipped UAV conducted as-built surveys for construction site modelling

Varbla, Sander; Puust, Raido; Ellmann, Artu Survey review 2021 / p. 477-492 <https://doi.org/10.1080/00396265.2020.1830544>
[Journal metrics at Scopus](#) [Article at Scopus](#) [Journal metrics at WOS](#) [Article at WOS](#)

Advancements in underground mine surveys by using SLAM-enabled handheld laser scanners

Ellmann, Artu; Kütimets, Kaia; Varbla, Sander; Väli, Erik; Kanter, Sander Survey review 2022 / p. 363-374
<https://doi.org/10.1080/00396265.2021.1944545> [Journal metrics at Scopus](#) [Article at Scopus](#) [Journal metrics at WOS](#) [Article at WOS](#)

Advantages of low-cost LiDAR sensors in surveying underground utility networks

Jerjomina, Angelina; Varbla, Sander Tunnelling and underground space technology 2024 / art. 106325
<https://doi.org/10.1016/j.tust.2024.106325>

Airborne laser scanning derived sea surface height datasets in the Gulf of Finland (10.05.2018)

Varbla, Sander; Ellmann, Artu; Delpeche-Ellmann, Nicole Camille SEANOE 2020 <https://doi.org/10.17882/76491>

Applications of airborne laser scanning for determining marine geoid and surface waves properties

Varbla, Sander; Ellmann, Artu; Delpeche-Ellmann, Nicole Camille European journal of remote sensing 2021 / p. 558-568
<https://doi.org/10.1080/22797254.2021.1981156> [Journal metrics at Scopus](#) [Article at Scopus](#) [Journal metrics at WOS](#) [Article at WOS](#)

Assessment of marine geoid models by shipborne GNSS and airborne laser scanning profiles

Varbla, Sander; Ellmann, Artu [EUREF2019 abstracts] 2019 / p. [59] <https://www.maaamet.ee/euref2019/EUREF2019-Abstracts.pdf>

Assessment of marine geoid models by ship-borne GNSS profiles

Varbla, Sander; Ellmann, Artu; Märdla, Silja; Gruno, Anti Geodesy and cartography 2017 / p. 41-49 : ill
<https://doi.org/10.3846/20296991.2017.1330771> [Journal metrics at Scopus](#) [Article at Scopus](#)

Assessment of marine geoid models by ship-borne GNSS profiles in the Gulf of Finland ; S3-P21

Varbla, Sander; Ellmann, Artu; Gruno, Anti International Symposium Gravity, Geoid and Height Systems 2 : GGHS2018 : "Gravity Field Of The Earth" : The 2nd joint meeting of the International Gravity Field Service and Commission 2 of the International Association of Geodesy, Copenhagen, Denmark, Sept. 17-21, 2018 : abstract book 2018 / p. 81

Centimetre-range deformations of built environment revealed by drone-based photogrammetry

Varbla, Sander; Ellmann, Artu; Puust, Raido Automation in Construction 2021 / art. 103787
<https://doi.org/10.1016/j.autcon.2021.103787> [Journal metrics at Scopus](#) [Article at Scopus](#) [Journal metrics at WOS](#) [Article at WOS](#)

Deeper insights into the validation of hydrodynamic models using a synergy of remote sensing data

Delpeche-Ellmann, Nicole Camille; Varbla, Sander; Jahanmard, Vahidreza; Ellmann, Artu Baltic Earth Workshop Climate projections and uncertainties in the northern Baltic Sea region, Helsinki, Finland, 19-20 November, 2019 : Programme, Abstracts, Participants 2019 / p. 14-15

Development of continuous dynamic vertical reference for maritime and offshore engineering by applying geodetic and machine learning strategies

Ellmann, Artu; Delpeche-Ellmann, Nicole Camille; Varbla, Sander; Rajabi Kiasari, Saeed; Jahanmard, Vahidreza; Kupavõh, Aleksei EGU General Assembly 2025 2025 / art. EGU25-20596 <https://doi.org/10.5194/egusphere-egu25-20596>

Documentation of the BSCD2000 height reference grid

Schwabe, J.; Ågren, J.; Liebsch, G.; **Varbla, Sander**; Teitsson, H.; Strykowski, G.; **Ellmann, Artu**; Forsberg, R.; Bilker-Koivula, M.; Liepiņš, I. 2023

Eesti geodeedid rahvusvahelises teaduses

Varbla, Sander; Ellmann, Artu Geodeet 2019 / lk. 56-58 : fot http://www.ester.ee/record=b1072198*est
https://artiklid.elnet.ee/record=b2883052*est

Ehitusgeodeesia

Kala, Vello; **Varbla, Sander**; Kakko, Mairolt; **Ellmann, Artu** 2025 https://www.ester.ee/record=b5756579*est
<https://digikogu.taltech.ee/et/Item/069877a2-ba55-4dec-8cf4-65d08f60bd4b> <https://doi.org/10.23658/dy4b-gq54>

Esimesed kogemused sateliit-tehisavaradari (SAR) aktiivtransponderitega Eestis

Varbla, Sander; Ellmann, Artu Geodeet 2020 / lk. 30-35 : ill http://www.ester.ee/record=b1072198*est

The forthcoming Baltic Sea Chart Datum 2000 – how harmonized height reference benefits sustainability

Schwabe, Joachim; Ågren, Jonas; Liebsch, Gunter; **Varbla, Sander; Ellmann, Artu**; Teitsson, Hergair; Forsberg, Rene; Strykowski, Gabriel; Bilker-Koivula, Mirjam; Westfeld, Patrick XXVIII General Assembly of the International Union of Geodesy and Geophysics (IUGG) 2023 <https://doi.org/10.57757/IUGG23-2441>

Geodeesiakonverentsid Põhjamaades 2018. aastal

Varbla, Sander; Ellmann, Artu Geodeet 2018 / lk. 62-64 : fot http://www.ester.ee/record=b1072198*est

Geodetic SAR for Baltic height system unification and Baltic Sea level research : final report

Gruber, Thomas; Angermann, Detlef; Schlaak, Marius; Oikonomidou, Xanthi; Gisinger, Christoph; Brcic, Ramon; Poutanen, Markku; Marila, Simo; **Ellmann, Artu; Varbla, Sander** 2021 https://www.asg.ed.tum.de/fileadmin/w00cip/iapg/Baltic/SAR-HSU-FR-0022_Final_Report.pdf

Geodetic SAR for height system unification and sea level research - observation concept and preliminary results in the Baltic Sea

Gruber, Thomas; Agren, Jonas; Angermann, Detlef; **Ellmann, Artu**; Engfeldt, Andreas; Gisinger, Christoph; Jaworski, Leszek; **Varbla, Sander** Remote sensing 2020 / art. 3747, 30 p. : ill <https://doi.org/10.3390/rs12223747> [Journal metrics at Scopus](#) [Article at Scopus](#) [Journal metrics at WOS](#) [Article at WOS](#)

Geodetic SAR for height system unification and sea level research - observation concept and results in the Baltic Sea

Gruber, Thomas; Argen, Jonas; Angermann, Detlef; **Ellmann, Artu**; Gisinger, Christoph; Nastula, Jolanta; Poutanen, Markku; Schlaak, Marius; Nilfouroushan, Faramarz; **Varbla, Sander** Geodesy for a Sustainable Earth, Scientific Assembly of the International Association of Geodesy : abstract book 2021 / p. 78 S1-067 https://files.sciconf.cn/upload/file/20210626/20210626085039_69146.pdf

Geodetic SAR for height system unification and sea level research - observation concept and results in the Baltic Sea : [poster]

Gruber, Thomas; Lantmäteriet, Jonas Ågren; Angermann, Detlef; **Ellmann, Artu**; Gisinger, Christoph; Nastula, Jolanta; Poutanen, Markku; Schlaak, Marius; Lantmäteriet, Faramarz Nilfouroushan; **Varbla, Sander** Living Planet Symposium (LPS22) 2022 / 1 p <https://www.lps22.eu/>

Geodetic SAR for height system unification and sea level research-results in the Baltic Sea test network

Gruber, Thomas; Agren, Jonas; Angermann, Detlef; **Ellmann, Artu**; Engfeldt, Andreas; Gisinger, Christoph; Jaworski, Leszek; Kur, Tomasz; Marila, Simo; Varbla, Sander Remote sensing 2022 / art. 3250 <https://doi.org/10.3390/rs14143250> [Journal metrics at Scopus](#) [Article at Scopus](#) [Journal metrics at WOS](#) [Article at WOS](#)

Geodetic validation of sea Level variability in offshore

Ellmann, Artu; Kollo, Karin; **Varbla, Sander** IUGG 2019 : abstract book 2019 / [1] p., abstract: JG06 p-109 <http://iugg2019montreal.com/abstract-book.html>

Geotechnical analysis of road embankment test sections over soft peat layer in Estonia

Sillamäe, Sven; Ellmann, Artu; Varbla, Sander 30th International Baltic Road Conference August 23–24, 2021 : Abstracts 2021 / p. 29 https://balticroads.org/wp-content/uploads/2021/08/BRC_Abstacts_2021_V2.pdf

The influence of bathymetry on regional marine geoid modeling in Northern Europe

Varbla, Sander Journal of Marine Science and Engineering 2022 / art. 793, 25 p. : ill <https://doi.org/10.3390/jmse10060793> [Journal metrics at Scopus](#) [Article at Scopus](#) [Journal metrics at WOS](#) [Article at WOS](#)

An initiative for a European Height Reference Surface

Schwabe, Joachim; Sacher, Martina; Liebsch, Gunter; Lidberg, Martin; Denker, Heiner; Ågren, Jonas; Alfredsson, Anders; Barzaghi, Riccardo; **Ellmann, Artu; Varbla, Sander** XXVIII General Assembly of the International Union of Geodesy and Geophysics (IUGG) 2023 <https://doi.org/10.57757/IUGG23-2451>

Iterative data assimilation approach for the refinement of marine geoid models using sea surface height and dynamic topography datasets

Varbla, Sander; Ellmann, Artu Journal of geodesy 2023 / art. 24, 22 p. : ill <https://doi.org/10.1007/s00190-023-01711-7> [Journal metrics at Scopus](#) [Article at Scopus](#) [Journal metrics at WOS](#) [Article at WOS](#)

Iterative data assimilation approach for the refinement of marine geoid models using sea surface height and dynamic topography datasets : [conference paper]

Varbla, Sander; Ellmann, Artu XXVIII General Assembly of the International Union of Geodesy and Geophysics (IUGG) 2023 <https://doi.org/10.57757/IUGG23-0253>

Iterative refinement and accuracy validation of marine geoid models = Meregeoidi mudelite iteratiivne täpsustamine ja täpsuse valideerimine

Varbla, Sander 2023 <https://doi.org/10.23658/taltech.35/2023> <https://digikogu.taltech.ee/et/Item/4087a2ae-321e-4a1b-b11f-dd8fd5ab1b99> https://www.ester.ee/record=b5568726*est

Iterative refinement of regional marine geoid models by using sea surface height and dynamic topography datasets

Varbla, Sander; Ellmann, Artu Geodesy for a Sustainable Earth, Scientific Assembly of the International Association of Geodesy : abstract book 2021 / p. 111 S2a-026 https://files.sciconf.cn/upload/file/20210626/20210626085039_69146.pdf

Iterative refinement of regional marine geoid models using sea surface height and dynamic topography datasets

Varbla, Sander; Ellmann, Artu Nordic Geodetic Commission General Assembly 2022 in Copenhagen : Poster Session 2022 / 38 I.
<https://medialib.cmcn.dk/medialibrary/010C1367-E991-4A33-AB10-1953247E9C23/530AEABD-3A25-ED11-84B6-00155D0B0940.pdf>

Kaugseire andmete kasutuselevõtt avalike teenuste väljatöötamisel ja arendamisel. Lisa 4, Ehitustegevuse planeerimine ja järelevalve : lõpparuanne

Puust, Raido; Varbla, Sander 2020 <https://doi.org/10.23673/re-254>

Kaugseire sügiskoolist Võrus

Varbla, Sander Geodeet 2019 / lk. 59-60 : fot http://www.ester.ee/record=b1072198*est

Meregeoidi mudelite iteratiivne täpsustamine ja täpsuse valideerimine

Varbla, Sander Geodeet 2024 / lk. 22-27 https://www.ester.ee/record=b1072198*est

Meregeoidi mudelite valideerimine GNSS- ja aerolaserskaneerimise profiilidega

Varbla, Sander Geodeet 2019 / lk. 19-26 : ill http://www.ester.ee/record=b1072198*est

Meregravimeetrilised mõõdistused Soome lahel projekti FAMOS raames

Varbla, Sander; Ellmann, Artu; Metsar, Jaanus; Oja, Tõnis Geodeet 2017 / lk. 39-43 : ill http://www.ester.ee/record=b1072198*est
https://artiklid.elnet.ee/record=b2831828*est

Merevee taseme mõõtmine madala hinnaklassi GNSS-sensoriga

Koobak, Johanna; Varbla, Sander; Ellmann, Artu Geodeet 2022 / lk. 19-25 : ill http://www.ester.ee/record=b1072198*est

Modernization of construction as-built surveying documentation

Jerjomina, A.; Varbla, Sander; Hion, T.; Ellmann, Artu Current problems in engineering surveying abstracts of XVI International Science and Technology Conference 2023 / p. 15

The potential of SWOT altimetry data for validating the accuracy of marine geoidmodels in the Baltic Sea

Kupavõh, Aleksei; Ellmann, Artu; Delpeche-Ellmann, Nicole Camille; Varbla, Sander GGHS2024 : Gravity, Geoid and Height Systems : Book of Abstracts 2024 / p. 18-19 <https://www.gghs2024.com/appsfiles/go/boa/Book-of-Abstracts.pdf?v=1725460868>

Põhjamaade Geodeesiamisjoni teadusnädal Islandil

Rüdja, Andres; Varbla, Sander; Kollo, Karin; Metsar, Jaanus Geodeet 2020 / lk. 22-25 : fot http://www.ester.ee/record=b1072198*est

Quality evaluation of sizeable surveying-industry-produced terrestrial laser scanning point clouds that facilitate building information modeling - a case study of seven point clouds

Varbla, Sander; Puust, Raido; Ellmann, Artu Buildings 2024 / art. 3371 <https://doi.org/10.3390/buildings14113371> [Journal metrics at Scopus](#) [Article at Scopus](#) [Journal metrics at WOS](#) [Article at WOS](#)

Realistic coastal dynamic topography by a synergy of satellite altimetry data and marine geoid

Ellmann, Artu; Jahanmard, Vahidreza; Varbla, Sander; Mostafavi, Majid; Delpeche-Ellmann, Nicole Camille Living Planet Symposium (LPS22) 2022 / 1 p <https://www.lps22.eu/>

Release note for the BSCD2000 height transformation grid

Liebsch, Gunter; Schwabe, Joachim; Varbla, Sander; Agren, Jonas; Teitsson, Hergeir; Ellmann, Artu; Forsberg, Rene; Strykowski, Gabriel; Bilker-Koivula, Mirjam; Liepinš, Ivars The international hydrographic review 2023 / p. 194-199 <https://doi.org/10.58440/ihr-29-2-n11>

Report on availability and re-processing procedure of the historical marine gravity data of the southern and eastern Baltic Sea

Wilde-Piorko, M.; Bauer, T.; Bilker-Koivula, M.; Ellmann, Artu; Kaminskis, J.; Krynski, J.; Olsson, P.-A.; Olszak, T.; Paršeliunas, E. K.; Rosowiecka, O.; Schwabe, J.; Strykowski, G.; Szelachowska, M.; Szulwic, J.; Tomczak, A.; Varbla, Sander; Zuševics, V. 2023 https://interreg-baltic.eu/wp-content/uploads/2023/10/report_historical_final.pdf

Report on the homogenized historical marine gravity data of the southern and eastern Baltic Sea

Wilde-Piorko, M.; Schwabe, J.; Strykowski, G.; Varbla, Sander; Bauer, Tobias; Bilker-Koivula, Mirjam; Dykowski, P.; Ellmann, Artu; Josefsson, Ö.; Kaminskis, J. 2024 https://interreg-baltic.eu/wp-content/uploads/2024/11/report_homogenized_final.pdf

Retrieval of directional power spectral density and wave parameters from airborne LiDAR point cloud

Jahanmard, Vahidreza; Varbla, Sander; Delpeche-Ellmann, Nicole Camille; Ellmann, Artu Ocean engineering 2022 / art. 112694 <https://doi.org/10.1016/j.oceaneng.2022.112694> [Journal metrics at Scopus](#) [Article at Scopus](#) [Journal metrics at WOS](#) [Article at WOS](#)

Road deformation monitoring using unmanned aerial vehicles

Varbla, Sander; Ellmann, Artu; Puust, Raido 30th International Baltic Road Conference August 23–24, 2021 : Abstracts 2021 / p. 58 https://balticroads.org/wp-content/uploads/2021/08/BRC_Abstracts_2021_V2.pdf

Sea level measurements by a low-cost GNSS sensor-equipped marine buoy

Koobak, Johanna; Varbla, Sander; Ellmann, Artu Nordic Geodetic Commission General Assembly 2022 in Copenhagen : Poster Session 2022 / 37 p <https://medialib.cmcn.dk/medialibrary/010C1367-E991-4A33-AB10-1953247E9C23/530AEABD-3A25-ED11-84B6-00155D0B0940.pdf>

Shipborne GNSS acquisition of sea surface heights in the Baltic Sea

Liibusk, Aive; Varbla, Sander; Ellmann, Artu; Vahter, Kaimo; Uiboupin, Rivo; Delpeche-Ellmann, Nicole Camille Journal of geodetic science 2022 / 21 p. : ill., map <https://doi.org/10.1515/jogs-2022-0131> [Journal metrics at Scopus](#) [Article at Scopus](#) [Journal metrics at WOS](#) [Article at WOS](#)

Shipborne GNSS-determined sea surface heights using geoid model and realistic dynamic topography

Varbla, Sander; Liibusk, Aive; Ellmann, Artu Remote sensing 2022 / art. 2368, 30 p. : ill <https://doi.org/10.3390/rs14102368> [Journal metrics at Scopus](#) [Article at Scopus](#) [Journal metrics at WOS](#) [Article at WOS](#)

Sildkraanatee laserskanneriga mõõdistamise täpsuse aprobeerimine

Haljend, Emil; Kala, Vello; Varbla, Sander Geodeet 2020 / lk. 26-28 : ill http://www.estee.ee/record=b1072198*est

Status report for the EUREF Working Group “European Unified Height Reference”

Schwabe, Joachim; Sacher, Martina; Liebsch, Gunter; Lidberg, Martin; Denker, Heiner; Ågren, Jonas; Alfredson, Anders; Barzaghi, Riccardo; **Ellmann, Artu; Varbla, Sander** Abstracts EUREF 2023 2023 / p. 9-10 https://www.chalmers.se/api/media/?url=https://cms.www.chalmers.se/Media/vifgxhe/abstract_booklet_euref_2023_may22.pdf?

Status report for the EUREF Working Group "European Unified Height Reference"

Schwabe, Joachim; Sacher, Martina; Liebsch, Gunter; Lidberg, Martin; Denker, Heiner; Ågren, Jonas; Alfredson, Anders; Barzaghi, Riccardo; Bilker-Koivula, Mirjam; **Ellmann, Artu; Varbla, Sander** EUREF Symposium 2024 : abstract booklet 2024 / p. 39-40 https://euref-symposium.atlantidaviatges.com/wp-content/uploads/2024/05/EUREF_abstract_booklet.pdf

Status report for the EUREF Working Group “European Unified Height Reference”

Schwabe, Joachim; Sacher, Martina; Liebsch, Gunter; Lidberg, Martin; Denker, Heiner; Ågren, Jonas; Alfredsson, Anders; Barzaghi, Riccardo; Bilker-Koivula, Mirjam; **Ellmann, Artu; Varbla, Sander** EUREF Symposium 2025 : Abstracts Book 2025 / p. 14 [Abstracts Book \(PDF\)](#)

SWOT-derived geometric marine geoid surface complements gravimetric geoid modelling approaches

Kupavõh, Aleksei; Ellmann, Artu; Delpeche-Ellmann, Nicole Camille; Varbla, Sander EGU General Assembly 2025 2025 / art. EGU25-10957 <https://doi.org/10.5194/egusphere-egu25-10957>

Tallinna teede ja tänavate katendite deformatsioonide ja katete kulumise määramine, lähtudes liiklussagedusest ja teekatendi konstruktsioonist 2. etapp : aruanne

Aavik, Andrus; Ellmann, Artu; Varbla, Sander; Rõuk, Harri 2018 https://uuringud.tallinnlv.ee/file_download/830

Treatment of tide gauge time series and marine GNSS measurements for vertical land motion with relevance to the implementation of the Baltic Sea chart datum 2000

Varbla, Sander; Ågren, Jonas; Ellmann, Artu; Poutanen, Markku Remote sensing 2022 / art. 920, 24 p. : ill <https://doi.org/10.3390/rs14040920> [Journal metrics at Scopus](#) [Article at Scopus](#) [Journal metrics at WOS](#) [Article at WOS](#)

Ujednolicone morskie mapy grawimetryczne południowego i wschodniego Bałtyku dla współczesnych zastosowań 3D w geodezji morskiej, geologii i nawigacji (BalMarGrav)

Wilde-Piorko, Monika; Bauer, Tobias; Bilker-Koivula, Mirjam; Dykowski, Przemysław; **Ellmann, Artu; Varbla, Sander** I kongres geoinformacyjny : X ogólnopolskie sympozjum geoinformacyjne : „Współczesne technologie geoinformacyjne w modelowaniu przestrzeni” Kraków, 25 – 27 X 2023 : streszczenia referatów 2023 / p. 41-42 https://kongres-geo.pl/application/files/3316/9822/3649/ksiega_abstraktow_v03.pdf

Utilising airborne laser scanning and geoid model for examining marine processes

Varbla, Sander; Ellmann, Artu; Delpeche-Ellmann, Nicole Camille Abstracts : [BSSC 2019] 2019 / p. 166 https://www.su.se/polopoly_fs/1.446756.1566224624!/menu/standard/file/abstracts_A5_ny.pdf

Utilizing airborne laser scanning and geoid model for near-coast improvements in sea surface height and marine dynamics

Varbla, Sander; Ellmann, Artu; Delpeche-Ellmann, Nicole Camille Journal of coastal research 2020 / p. 1339-1343 <https://doi.org/10.2112/SI95-257.1> [Journal metrics at Scopus](#) [Article at Scopus](#) [Journal metrics at WOS](#) [Article at WOS](#)

UWB and GNSS Sensor Fusion Using ML-Based Positioning Uncertainty Estimation

Tommingas, Mihkel; Laadung, Taavi; Varbla, Sander; Müürsepp, Ivo; Alam, Muhammad Mahtab IEEE Open Journal of the Communications Society 2025 / p. 2177-2189 : ill <https://doi.org/10.1109/OJCOMS.2025.3554352>

Validation of marine geoid models by utilizing hydrodynamic model and shipborne GNSS profiles

Varbla, Sander; Ellmann, Artu; Delpeche-Ellmann, Nicole Camille Marine geodesy 2020 / p. 134-162

<https://doi.org/10.1080/01490419.2019.1701153> [Journal metrics at Scopus](#) [Article at Scopus](#) [Journal metrics at WOS](#) [Article at WOS](#)

Ühe geodeesiatudengi kirev konverentsiaasta

Varbla, Sander Geodeet 2017 / lk. 96-99 : fot http://www.ester.ee/record=b1072198*est https://artiklid.elnet.ee/record=b2831853*est