



# Documentation of **W**ooden **A**rchitectural **H**eritage



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**R**esearch and **T**heory of **A**rchitecture

Linnanmaa, 2<sup>nd</sup> October 2017

Sara Porzilli  
PostDoctoral Fellow  
[sara.porzilli@oulu.fi](mailto:sara.porzilli@oulu.fi)



2006

■ First research expedition at the **Kinerma village** (University of Oulu)

2007

■ First **International conference about Wooden Architecture in Carelia (Russia)**



2007-'08

■ Research expeditions in **Bol'shaya Selga village** and **Panozero village**.

2009

■ **Second International conference about Wooden Architecture in Carelia (Russia)**



2009

■ Research expedition for the documentation of the landscape and architecture of the northern part of **Kizhi Island**, Carelia, Russia

2010- '11

■ Digital survey of the **Pogost Complex** on Kizhi Island, UNESCO Heritage.



2012

■ **EUROPEAN PROJECT** Participation as ESR Early Stage Research in the European project (duration 36 months) **“Wooden Architecture. Traditional Karelian Timber Architecture and Landscape”**

Coordinators: Prof. S. Bertocci, Prof. S. Parrinello

2013

■ **Summer Schools in Carelia**

2014

■ Documentation of the historical villages in the **geographical area of Vedlozero**  
Surveying and documentation of traditional historical villages which **area of Syamozero**.

2015

2016

■ *Digital survey for the documentation of **Lamminaho** wooden farm house in Vaala region, **Finland***

As Postdoctoral Fellow at the University of Oulu, Department of «History of architecture and restoration studies»



2017

2018

2019

■ **EUROPEAN PROJECT Marie S. Curie Individual Fellowship**  
Title: **“Preserving Wooden Heritage. Methods for monitoring wooden structures: 3D laser scanner survey and application of BIM systems on point cloud models”**.



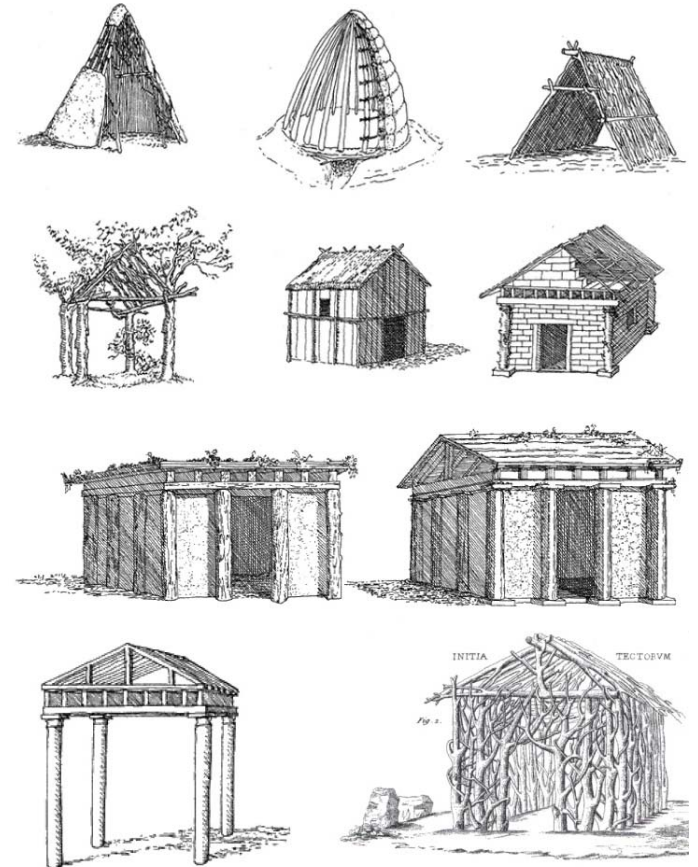
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*A Liri di giunchi (seguita per Vitruvio) ricoprono i loro tuguri.*



Wooden architecture has been recognized as an object of growing interest of scientific research even on international scale, not only from the architectural point of view but also from theoretical approaches. Vitruvius' old theory of the «primitive hut» caused the notion that all architecture and classical compositional models would come from the first «wooden hut» designed by our ancestors.

## Research and Theory of Architecture

Linnanmaa, 2<sup>nd</sup> October 2017

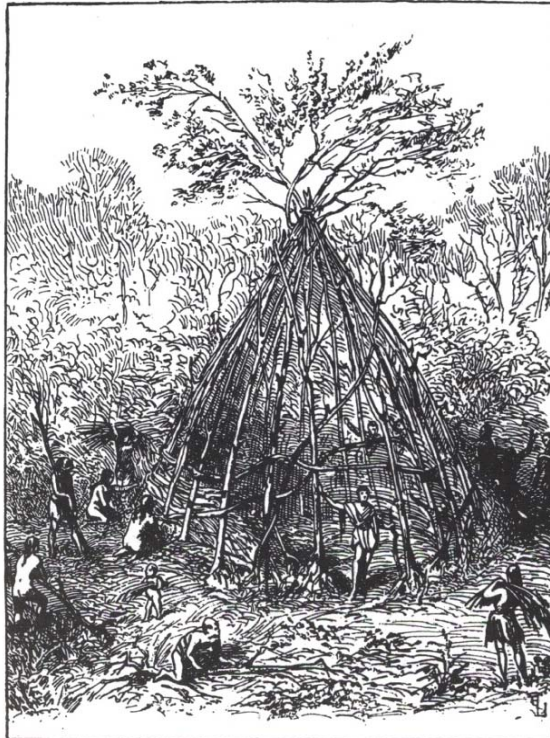
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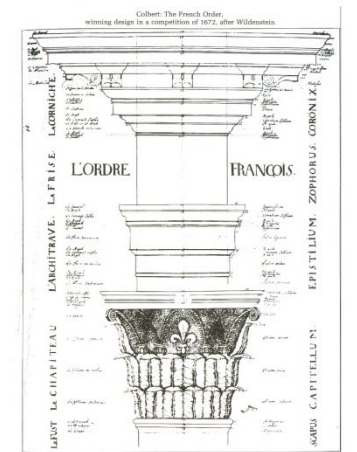
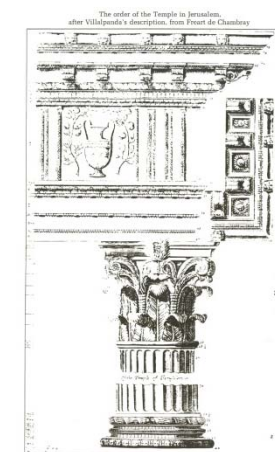
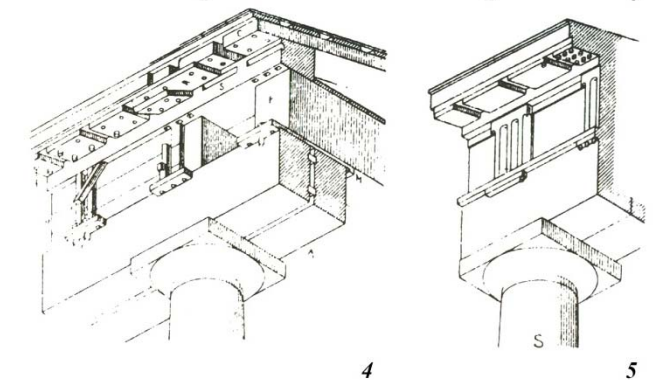
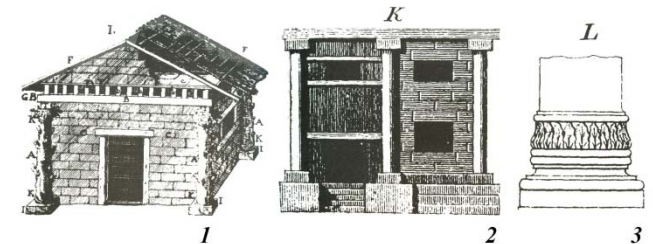
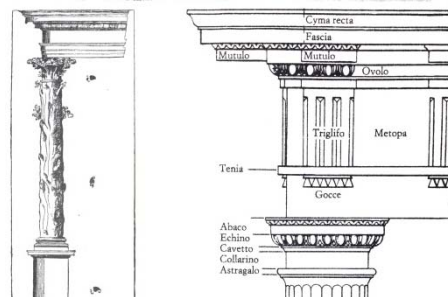


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The primitive hut, *Histoire de l'Habitation Humaine*, 1875. Eugène Viollet-le-Duc. La scoperta del fuoco, da C. Cesariano, *De Lucio Vitruvio Pollione De Architectura libri decem*, Como, 1521.

The tree-coloumn shape by de l'Orme and the origin of the doric order. Da J. Summerson, "Il linguaggio classico dell'architettura" / "The classical language of Architecture".



## Research and Theory of Architecture

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The theme of the «primitive hut» has always existed and the topic of the ancient wooden shelter has included in the wider theme of the relationship between Architecture and Nature, or rather Human Being and Nature.



**Eyes can see just what our mind already knows.** Johann Wolfgang Goethe

**The eyes see only what the mind is prepared to comprehend.** Robertson Davies

Culture and Experience are fundamental for the interpretation and evaluation of determined values.

Several times we see but we do not observe.



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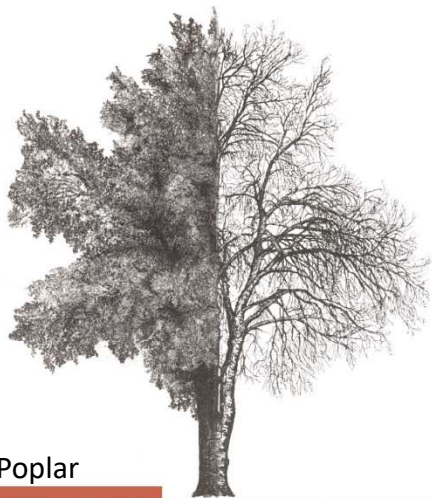
Elements and general characteristics of timber structures



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## Poplar

**PIOPPO TREMULO** (*Populus tremula* L.)

Famiglia: Salicaceae  
Genere: Populus

**Descrizione:** sono alberi caratterizzati da radici che si allungano in profondità, per questo motivo sono estremamente resistenti a condizioni climatiche estreme. Hanno una crescita molto veloce, in 20 anni riescono già a raggiungere la loro altezza massima. Il pioppo tremulo è uno dei pioppi più piccoli che arrivano ai 10,50 m di altezza e ai 6 m di larghezza. Ha foglie rotonde molto dentellate. Spuntano a primavera e rimangono sull'albero fino quasi all'inverno successivo, volgendo verso un colore giallo chiaro nel tardo autunno.

**Legno:** con albume bianco ben distinto dal durame più scuro, è tenero ed omogeneo, ma di valore mediocre.

**Impiego:** scandole e decorazioni.



## Spruce

**ABETE ROSSO** (*Picea abies* L.)

Famiglia: Pinaceae  
Genere: Abies

**Descrizione:** è un albero molto longevo, il suo areale di vegetazione naturale è estesissimo e va dalle Alpi, attraversando la Germania, Scandinavia, Polonia, varie zone dei Balcani raggiungendo la Russia di cui copre la metà settentrionale debordando in parte sulla Siberia, sino al limite Nord della vegetazione arborea. Si caratterizza per un tronco diritto e cilindrico, molto resinoso, corona lungamente piramidale e acuta, corteccia rossastra, sfaldata in piccole squame. Questa specie ha rami così fitti da presentare una struttura quasi perfettamente conica arrivano ad un'altezza di oltre 60 m. Gli aghi di abete hanno di solito la punta smussata e il profilo piatto, sono morbidi al tatto. Lunghi da 2,5 a 5 cm, variano di colore dal verde scuro al verde-azzurro sulla pagina superiore, mentre hanno una tinta argentea su quella inferiore.

**Legno:** di colore bianco-opaco, senza durame apparente e con anelli annuali ben distinti e regolari ed evidenti vasi resiniferi.

**Impiego:** strutture portanti.



## Pine

**PINO** (*Pinus Sylvestris*)

Famiglia: Pinaceae  
Genere: Pinus

**Descrizione:** sono conifere predominanti nelle regioni vicine alla Siberia, ma si incontrano anche nell'Europa Centro Settentrionale. Sopportano sia il terreno umido che quello secco. Ha aghi rigidi verde-azzurri e, sui rami superiori, una corteccia bruno-arancio, che si stacca in falde. Il pino ha un rapido sviluppo quando è giovane raggiungendo in poco tempo l'altezza massima che arriva, a seconda dei casi, a 30- 48 m. E' una pianta molto longeva e resinosa. La forma dei fusti è fortemente influenzata dalle condizioni ambientali. Offrono un gran quantitativo di legname. Hanno forme coniche allargate finché sono giovani, ma con l'età si arrotondano e appiattiscono.

**Legno:** albume bianco e durame roccioso, con anelli distinti, è resinoso, tenero e di facile lavorazione.

**Impiego:** strutture portanti.



## Birch

**BETULLA** (*Betula alba* L.)

Famiglia: Betulaceae  
Genere: Betula

**Descrizione:** raggiunge in età adulta i 20-25 metri di altezza, poco longevo, non supera infatti gli 80 anni. E' un albero a crescita rapida, per raggiungere la sua altezza massima, infatti, impiega circa vent'anni. I rami sono sottili, le foglie piccole, verde chiaro, diventano gialle in autunno; la corteccia, liscia e sottile, con l'età diventa bianca, e sviluppa caratteristiche striature nere nei punti in cui si desquama. I fiori sono dei lunghi amenti marroni-giallastri; i semi compaiono in autunno, sono gialli, contornati da una membrana marrone.

**Legno:** di colore bianco-giallognolo, sprovvisto di durame, omogeneo, elastico e tenero, poco durevole.

**Impiego:** finiture e parti decorative. Con la lana di betulla venivano eseguite le "guarnizioni" e imbottiture di tutte quelle parti soggette a ponte termico, ovvero lungo i bordi dei telai delle aperture e fra tronco e tronco nelle pareti esterne, affinché la non perfetta aderenza fra le superfici dei tronchi posti uno sopra l'altro non generasse comunque degli intercapedini causa di dispersioni.

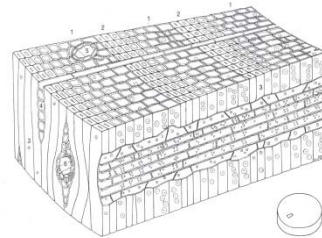
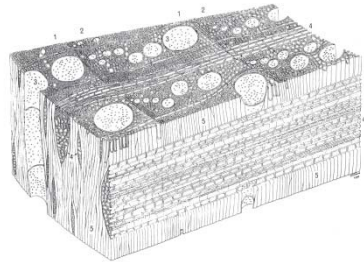




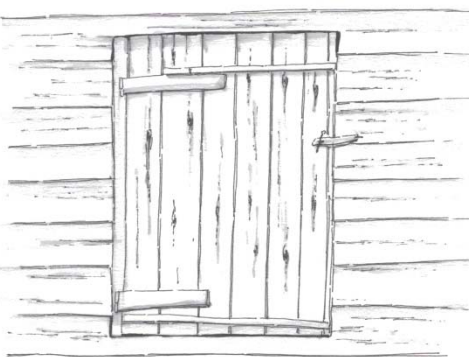
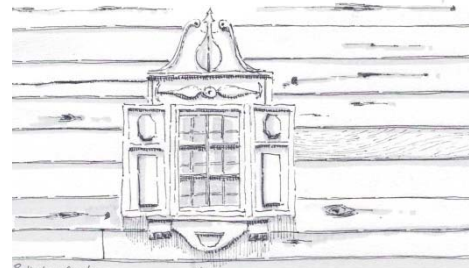
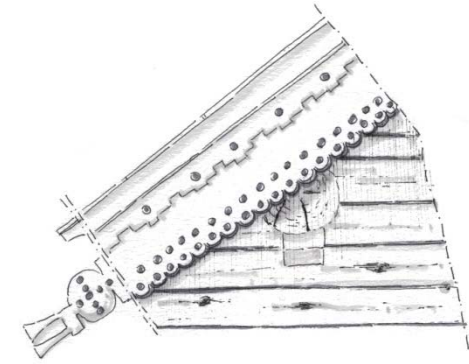
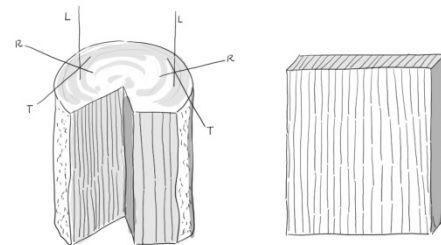
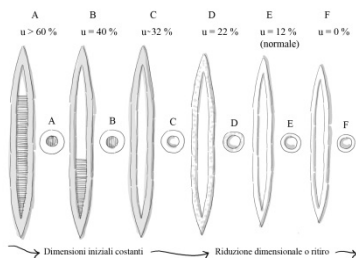
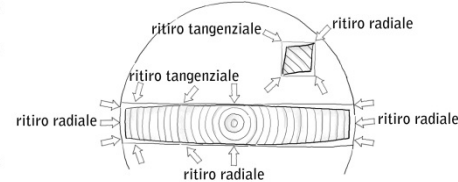
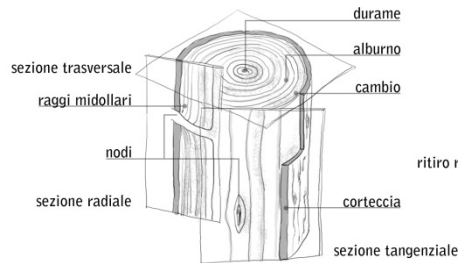
# Documentation of Wooden Architectural Heritage



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The different microstructure of a hardwood and a softwood.



In the analysis of the intrinsic characteristics of a wooden structural element are performed generally with **three zoom levels**:

- **ultrastructural**, which analyzes the cell walls,
- **microscopic level**, for the understanding of the organization of the cells forming the woody tissues
- **macroscopic level**, analysis of veins, anomalous, defects, presence of nodes and what type, presence of deviations of the grain.

## Research and Theory of Architecture

Linnanmaa, 2<sup>nd</sup> October 2017

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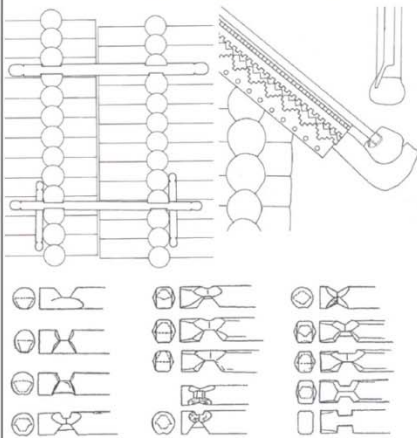
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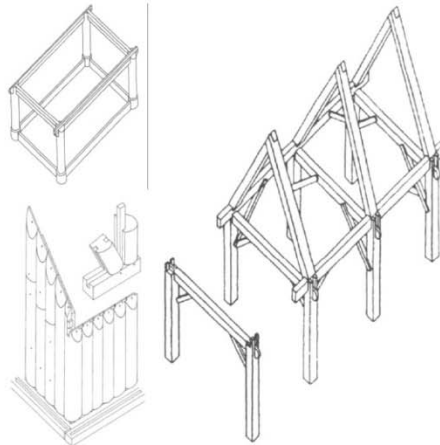
## STRUTTURE ORIZZONTALI

Sistema a *block-bau*  
Metodo a *laft*



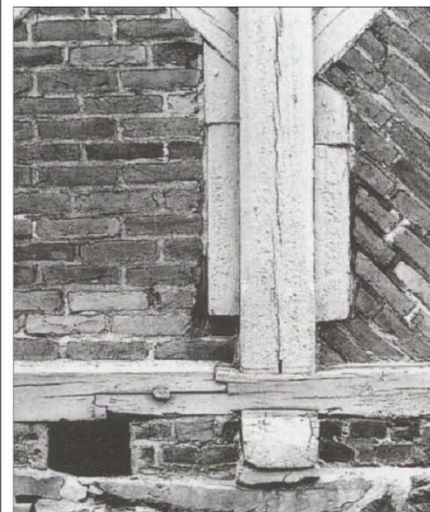
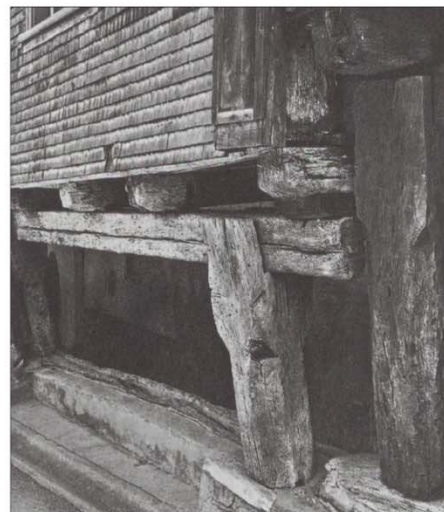
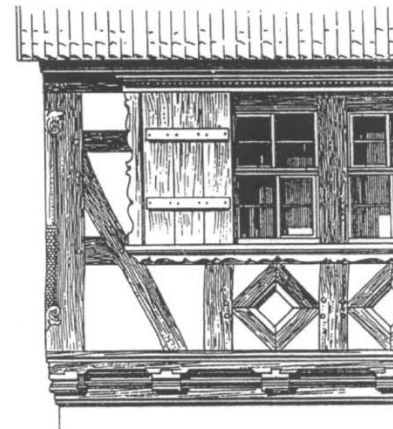
## STRUTTURE VERTICALI

Strutture a telaio  
Metodo *stav* a pali portanti



## TECNICHE MISTE

Strutture portanti verticali in legno e  
tamponamenti in muratura



It is known that wooden architecture is one of the oldest building systems adopted by the majority of people belonging to different geographic areas. Over time they have developed **building techniques dictated by local characteristics**, the availability of the raw material on site and the geomorphological and climatic characteristics of the area. . In spite of these facts, it is often possible to discover **strong similarities in different contexts**, especially in planning compositions of villages and in the choices of manufacturing solutions. Research-theory-practice triangle has offered new insights into the world of wooden architecture, different sectors of investigation have found mutual interaction in 2D and 3D new digital representations.

Research and Theory of Architecture

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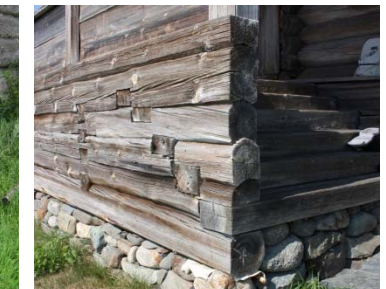
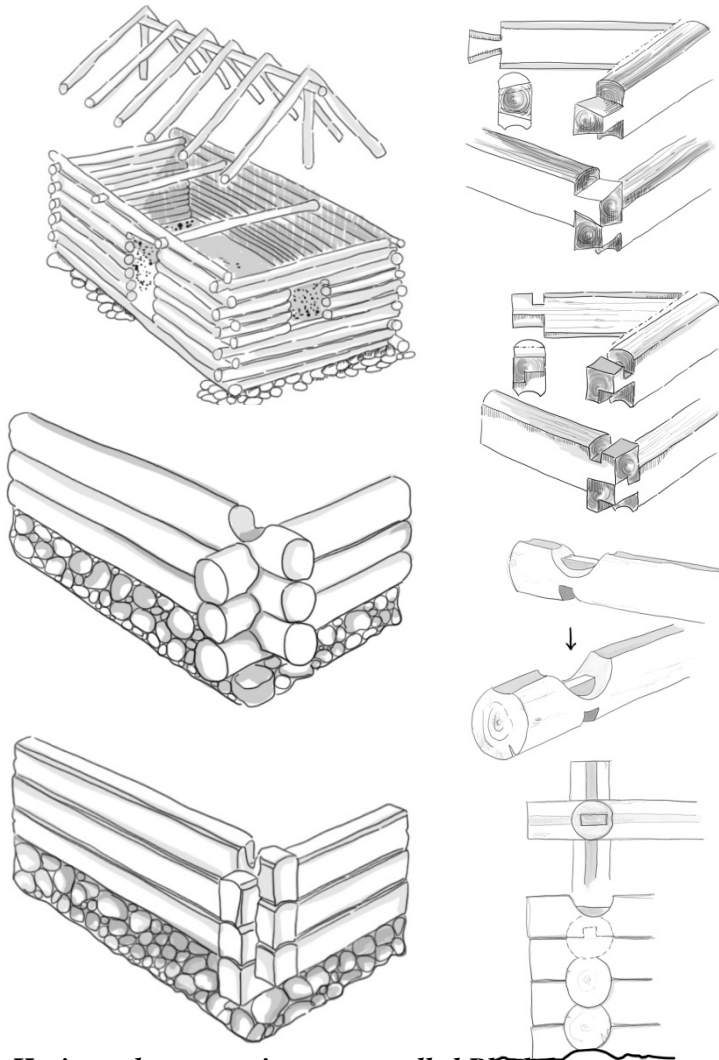
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*Horizontal constructive system called Block-bau*

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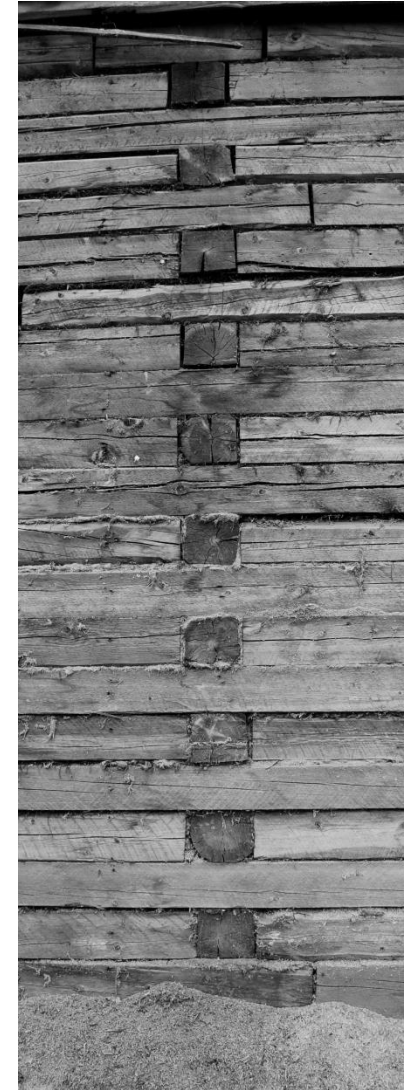
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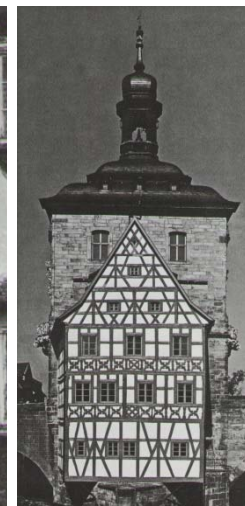
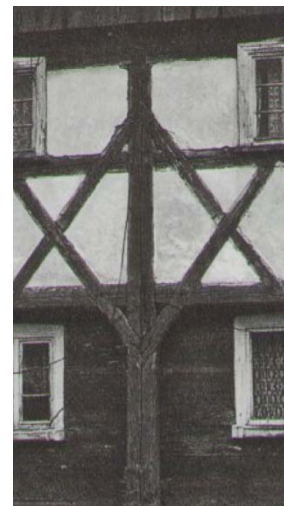
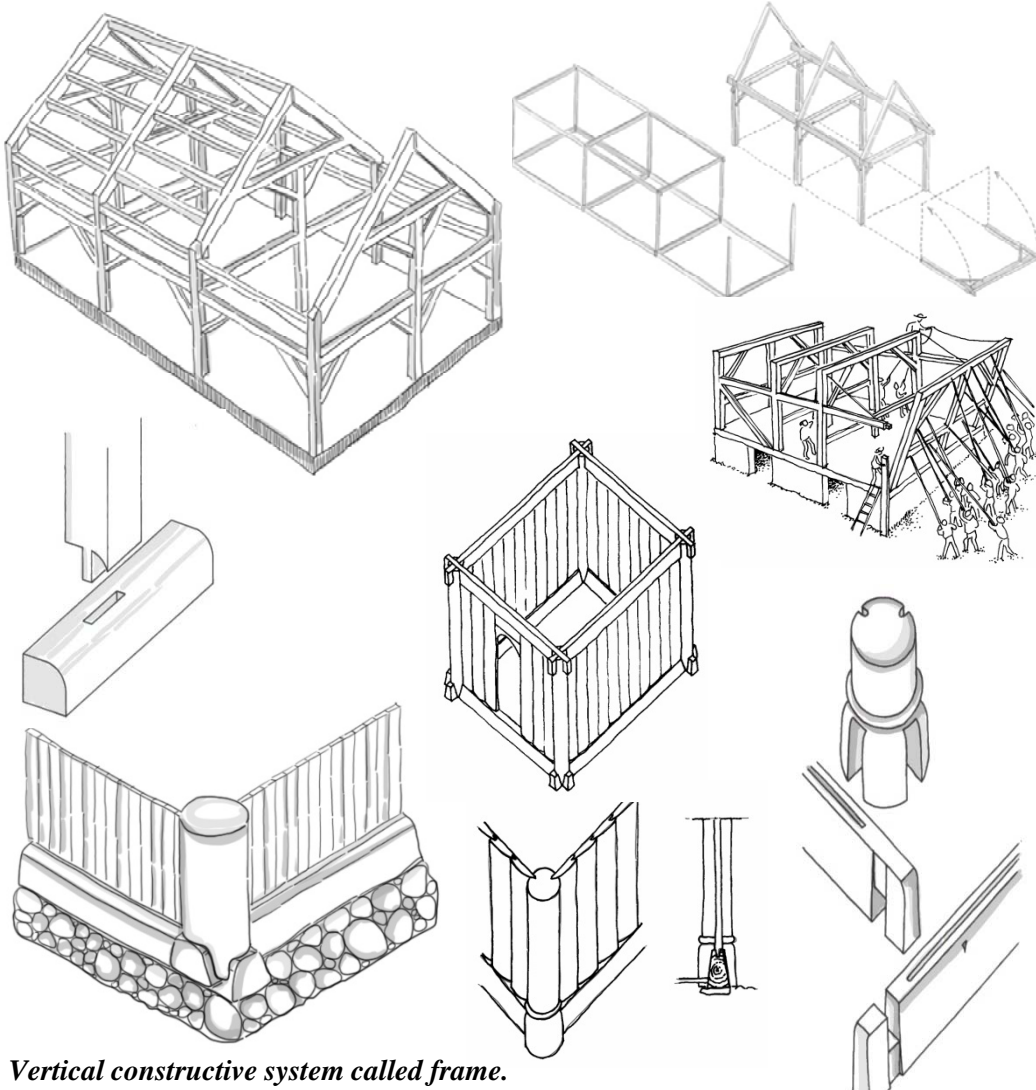
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*Vertical constructive system called frame.*

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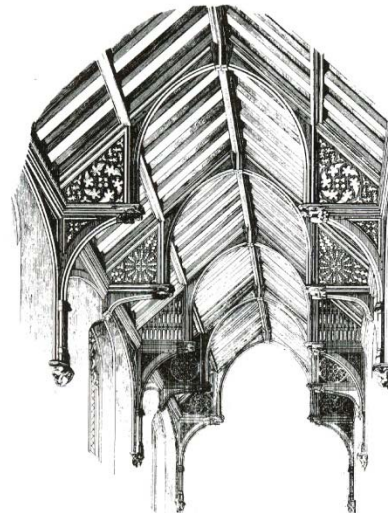
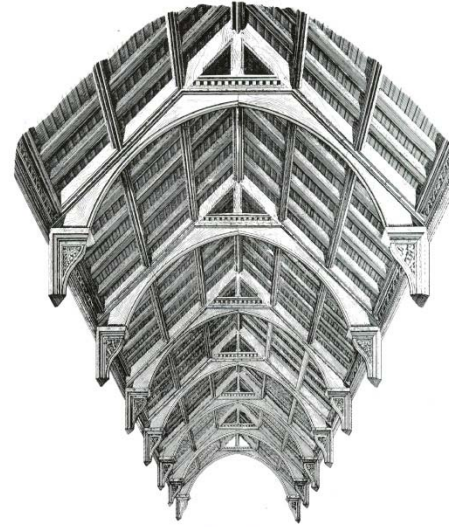
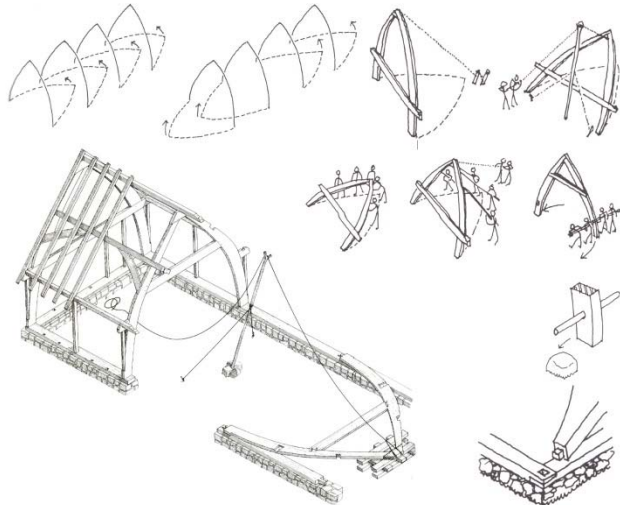
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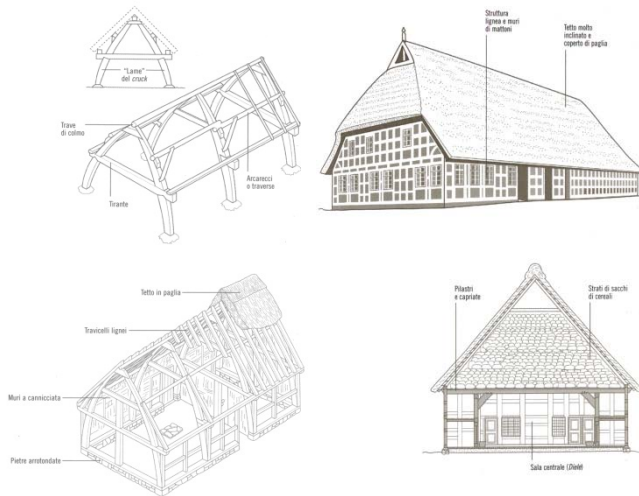
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*Anglo-Saxon region*



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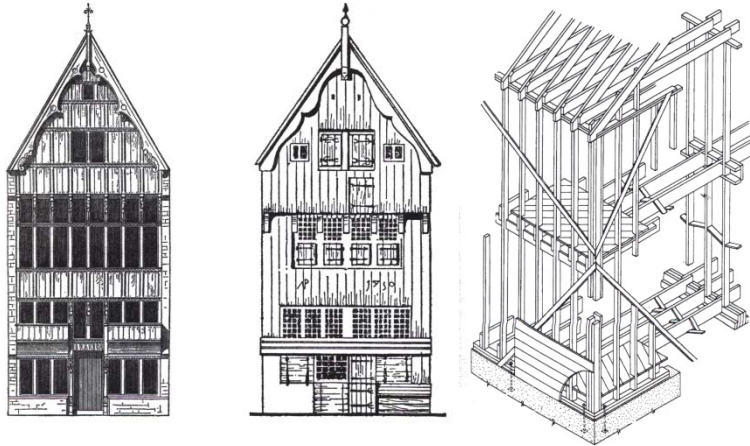
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*Holland. The construction systems of Balloon Frame and Platform Frame*

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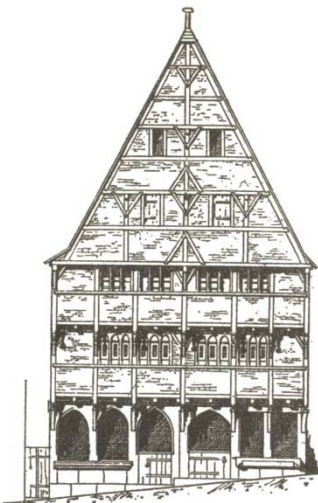
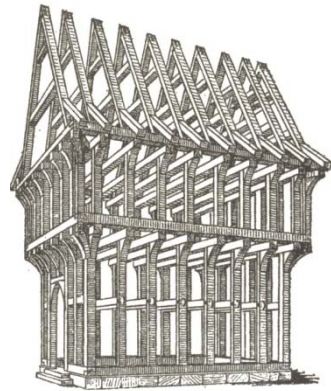
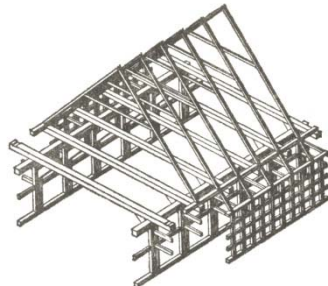
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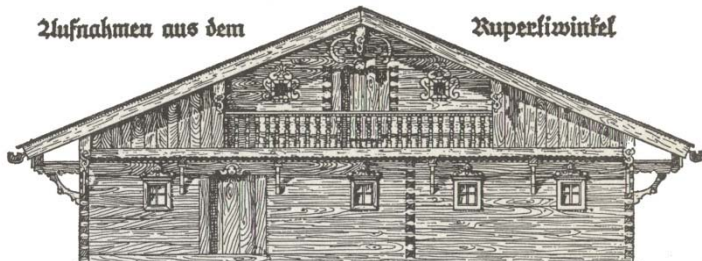


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Aufnahmen aus dem

Rूपेक्षविंकेल



*Germany. The houses of Bavaria and the rural houses dell'Hellenhaus*

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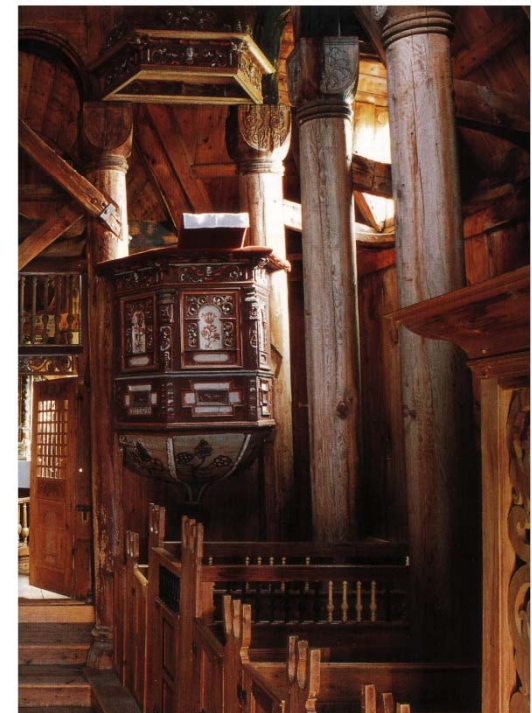
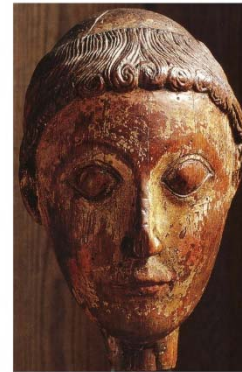
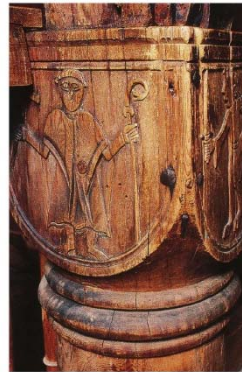
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*Norway and Sweden. The church of Urnes*

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*Finland. The church of Petäjävesi*

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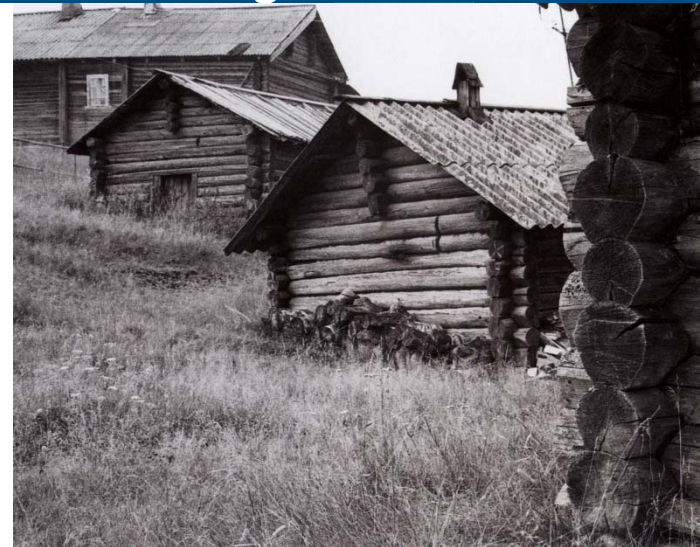
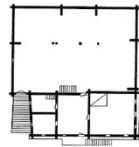


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*Russia. The traditional architectonic syre of the country side*

## Research and Theory of Architecture

Linnanmaa, 2<sup>nd</sup> October 2017

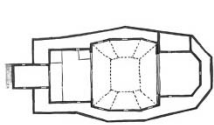
Sara Porzilli  
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sara.porzilli@oulu.fi



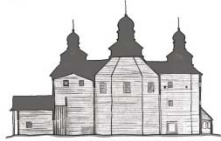
# Documentation of **W**ooden **A**rchitectural **H**eritage



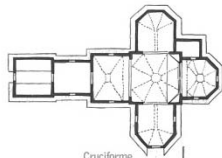
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Forma allungata



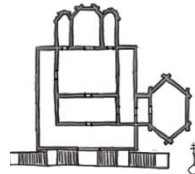
Chiesa di San Pietro e Paolo, Chudnova



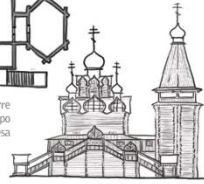
Cruciforme



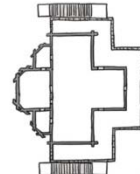
Chiesa della Trinità, Polonno



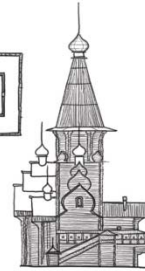
Forma allungata con torre  
mpartaria collegata al corpo  
principale della chiesa



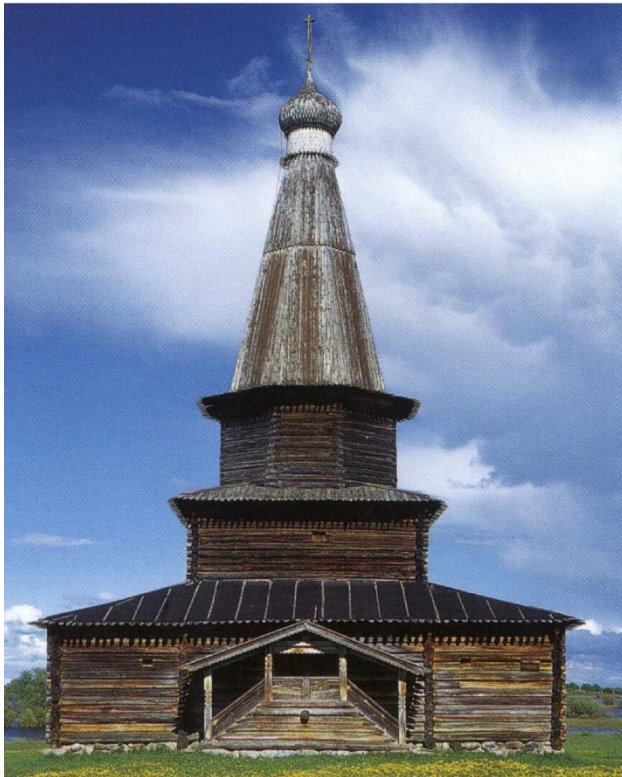
Cattedrale di Santa Sofia, Tobolsk



Triangolo altare con  
scale coperte



Chiesa della Trinità, Siberia



Chiesa della Dormizione di Kuritsko (1595)



Chiesa dell'Assunzione di Kondopoga (1774)



Chiesa della Trasfigurazione di Kirki (1714)

Russia. The colossal religious architectures

## Research and Theory of Architecture

Linnanmaa, 2<sup>nd</sup> October 2017

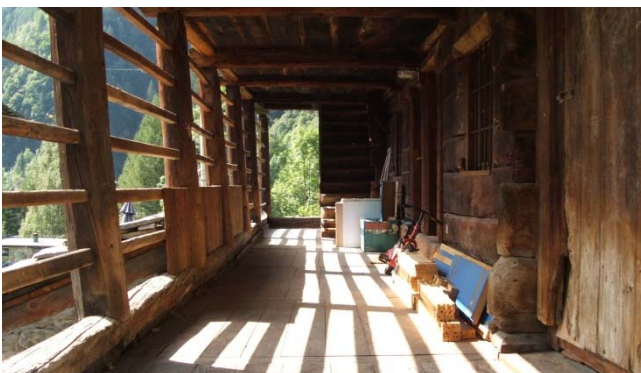
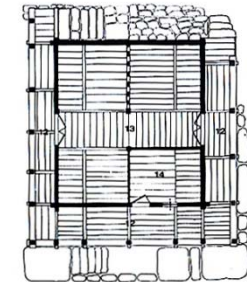
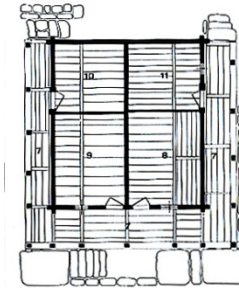
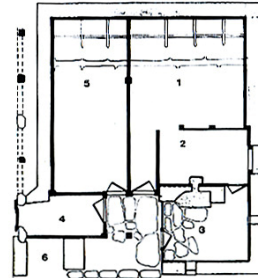
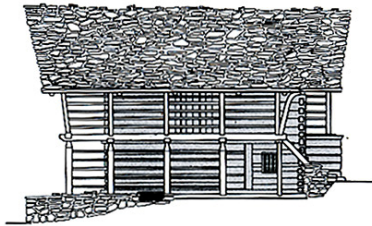
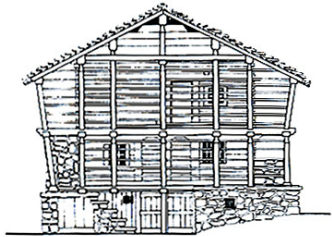
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# Documentation of **W**ooden **A**rchitectural **H**eritage



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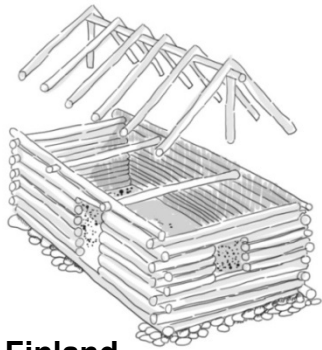
*Italy. The architecture on Alps developed by Walsler population*

## Research and Theory of Architecture

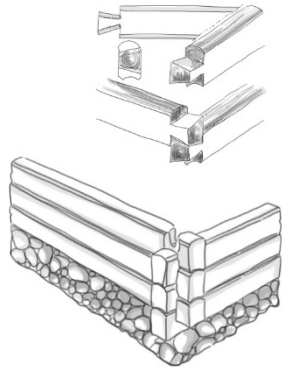
Linnanmaa, 2<sup>nd</sup> October 2017

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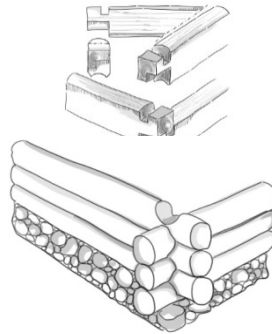
Wooden Architecture represents one of the oldest building systems adopted by the majority of people that developed construction techniques in respect of the local tradition.



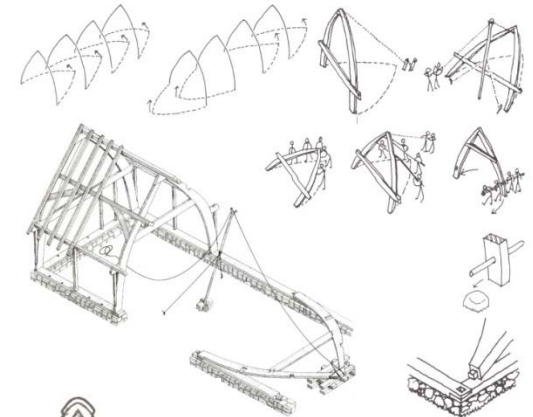
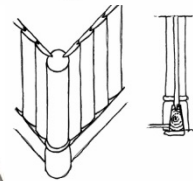
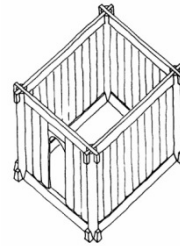
**Finland**



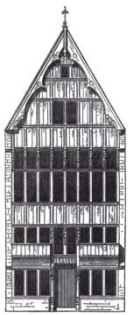
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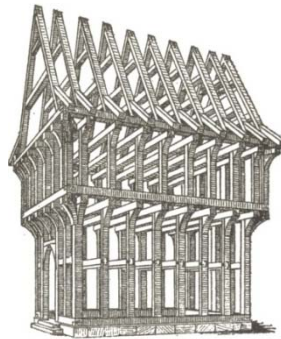
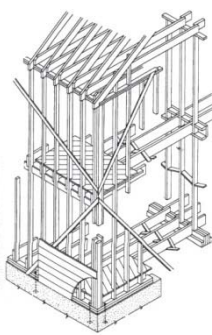
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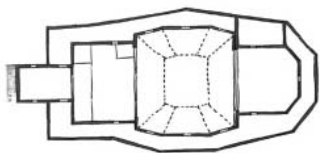
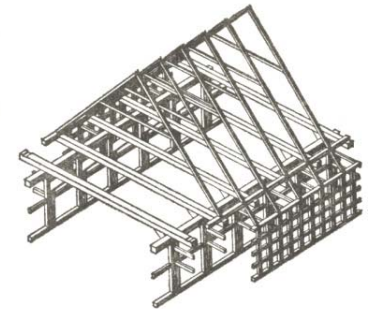
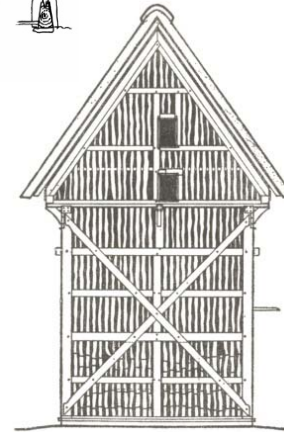
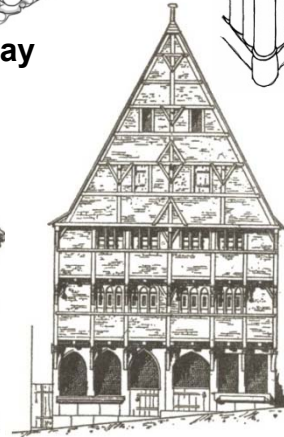
**Anglosaxon region**



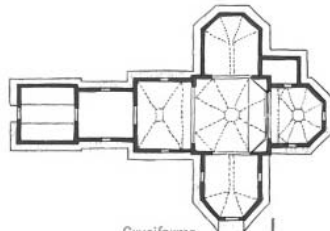
**Holand**



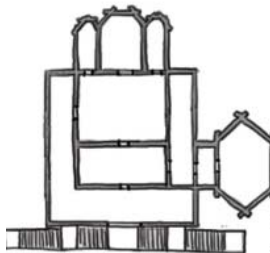
**Germany**



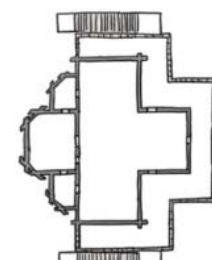
Forma allungata



Cruciforme

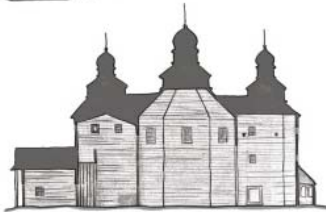


Forma allungata con torre campanaria collegata al corpo principale della chiesa

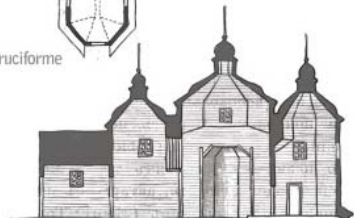


Triplo altare con scale coperte

**Russia**



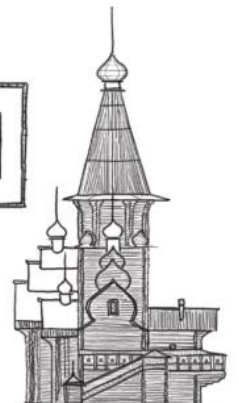
Chiesa di San Pietro e Paolo, Chudnova



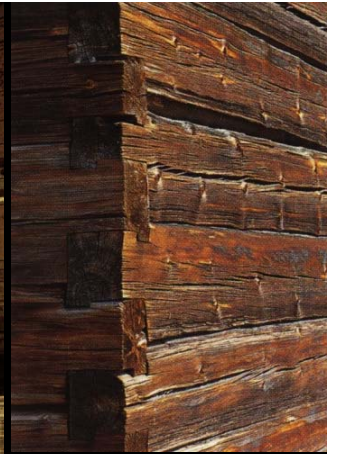
Chiesa della Trinità, Polonno



Cattedrale di Santa Sofia, Tobolsk



Chiesa della Trinità, Siberia



Today this vast and unique wooden world heritage is strongly needing to be surveyed and cataloged. Fires and abandonment for negligence are the main factors which are jeopardizing the preservation of this architecture; every year too many wooden buildings still disappear because of these main reasons.



Preserving **W**ooden **H**eritage project is born from the urgent necessity to **keep** and **preserve** wooden architecture by developing systematic specific technical procedures of interventions based on scientific survey, 2D/3D representations for diagnostic analysis and cataloging of the elements with census activities.

Accurate survey operations constitute the fundamental basis for critical analysis on the development of a context, a village, an architecture as well as for planning specific interventions:

➔ CONSERVATION

➔ RESTORATION

➔ RE-USE AND NEW PLANNING



This important challenge has the purpose to obtain new technical methods, **procedures** and **protocols**, fundamental for technicians and operators.





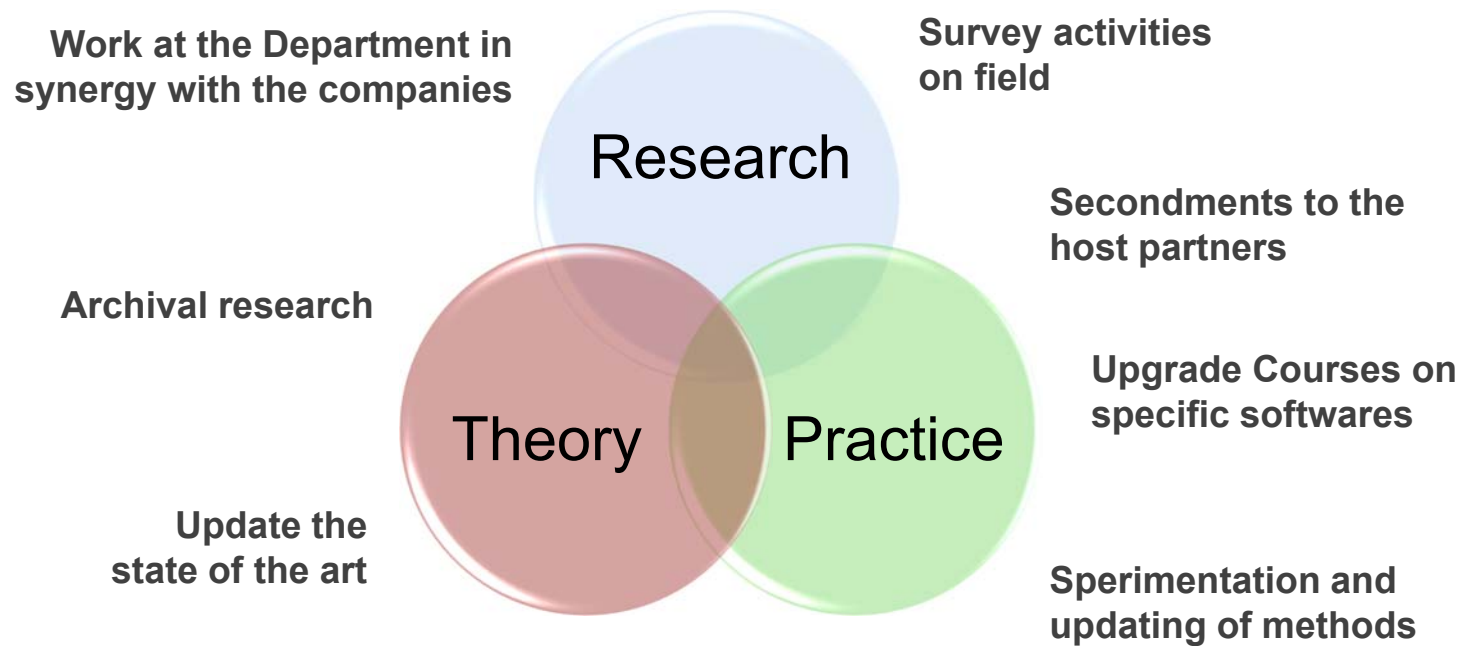
Develop **systematic specific technical procedures** of interventions based on:



Obtain a **complete description** of a wooden architecture as a sort of **echography** by including analysis of practical matters with different techniques.

Define the main **tangible and intangible values**, fundamental for preserving not only the historical memory of the place but mainly the **authenticity of the architecture** with its intrinsic characteristics.

This project wants to address a new scientific approach of **how-to-do research** on **wooden buildings** for practical interventions with respect to scientific foundations.



In this sense **Research-Theory-Practice triangle** will offer new insights into the world of timber architecture and wooden heritage preservation.

The research approach of this study is based on **cultural ecology** where **historic preservation and restoration, both in theory and methods, are seen as part of a wider process, sustainable development.**



Evolution of technology

Evolution of programmes  
And software

Development of the laser scanner  
survey **technology** and  
**methodologies**

**Traditional survey:** need to select the information already in the survey phase

**Digital survey:** acquisition of a large number of information that the surveyor will have to select in the second phase

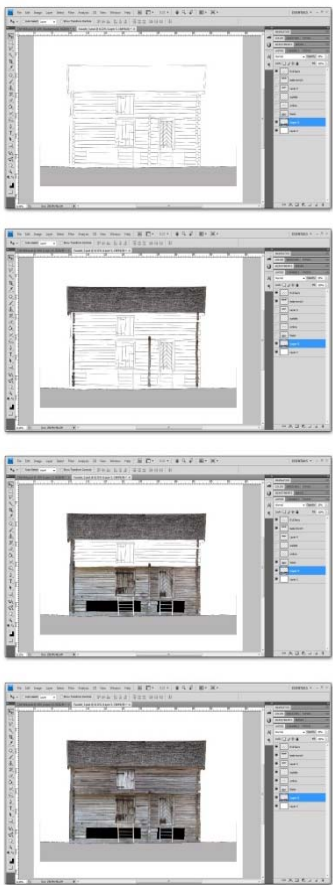
Accurate surveying operations constitute the fundamental basis for designing any kind of architectural project and critical analysis. Innovative methods for survey and geo-reference data on architecture allow technicians to acquire exact knowledge of the current status of the object studied. **True metrical information and data are fundamental for understanding the formation and development of an architectural entity, village, or city, as well as for planning interventions for conservation and restoration activities.**



# Documentation of **W**ooden **A**rchitectural **H**eritage



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Newest technologies still must be based on technical knowledge in architecture and its environment. Cool equipment is not sufficient for producing technical documentation. We **constantly** need to push and improve our knowledge (curiosity?) increasing both our skills and critical point of view. Observe, analyse, sketch for the understanding of reality. If we assume these aspects technology can give us all the best support in our research activities.

## Research and Theory of Architecture

Linnanmaa, 2<sup>nd</sup> October 2017

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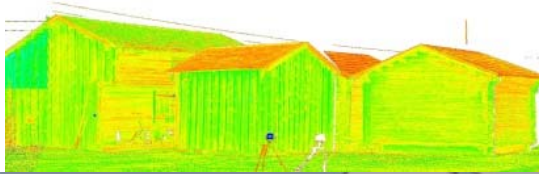


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Lamminaho farm house  
VAALA - FINLAND



Pogost Complex on Kizhi  
Island and its rural settlements  
REP. OF CARELIA - RUSSIA



**R**esearch and **T**heory of **A**rchitecture

Linnanmaa, 2<sup>nd</sup> October 2017

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Lamminaho farm house VAALA - FINLAND



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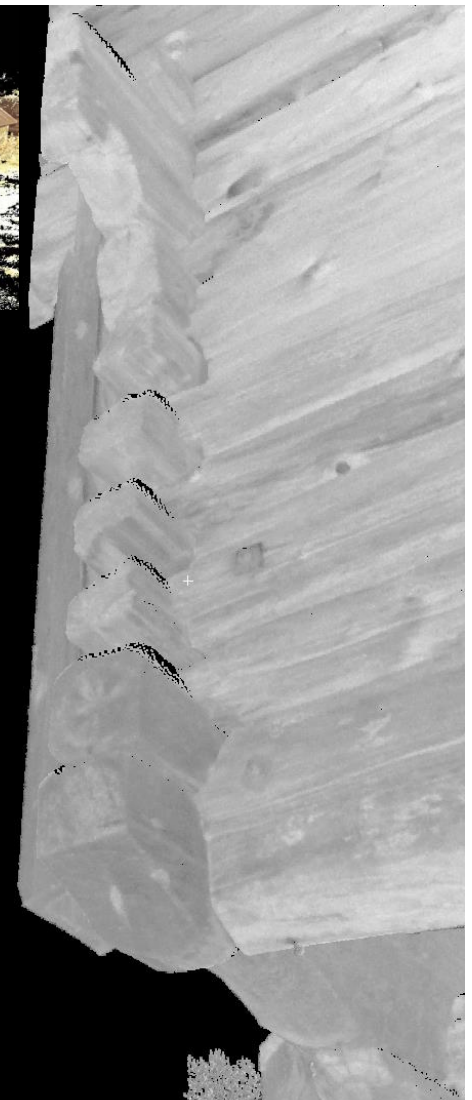
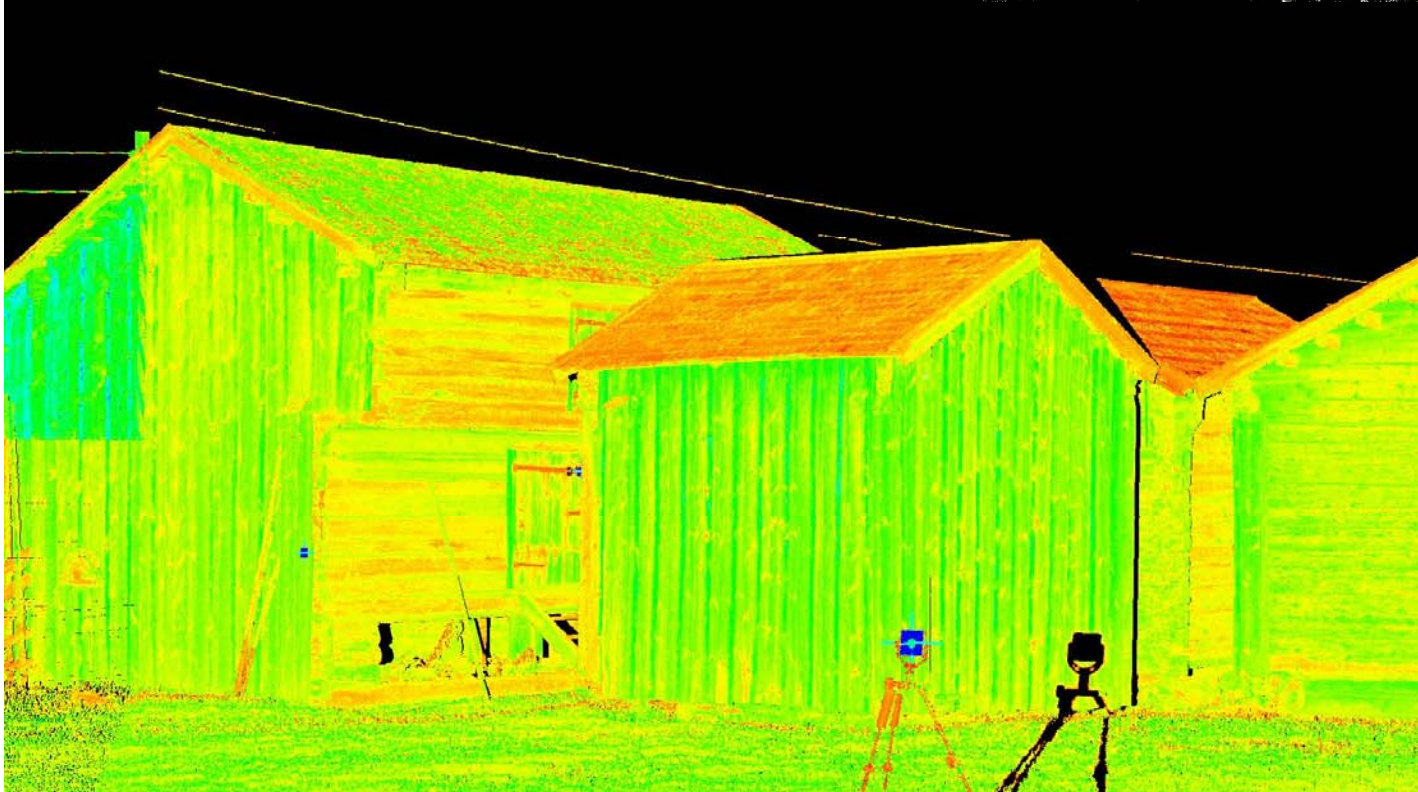
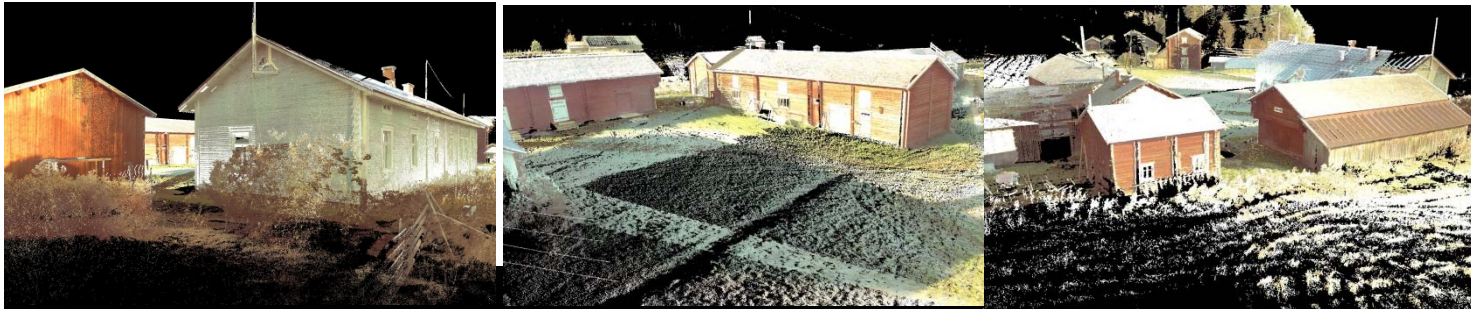
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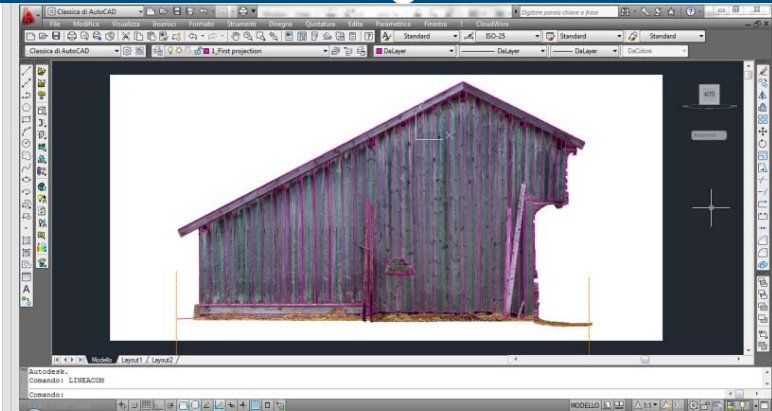
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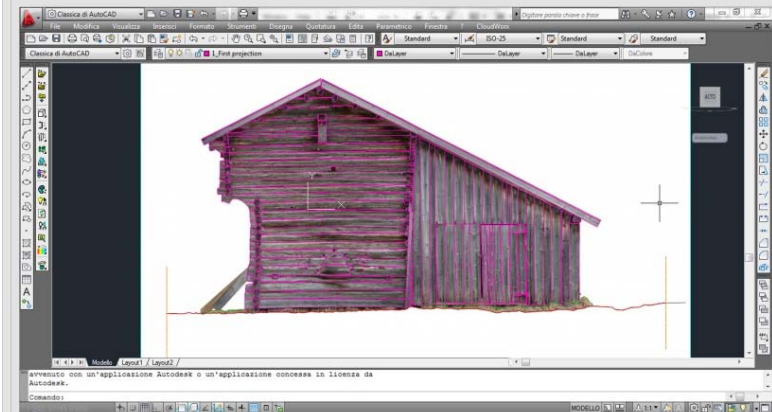


◀.....From the point cloud to the photo maps / ortho photos. ....▶



Exmple of the main process used for the elaboration of the data acquired.

1. Laser scanner survey
2. Orthoimages of the facades from the point cloud obtained;
3. Wireframe drawings on the othoimages imported in CAD softwares
4. Elaboration of the photo maps or ortho photos;
5. Conclusion and re-elaboration of the CAD drawings adding all the missing information of the point cloud visible on the picture.



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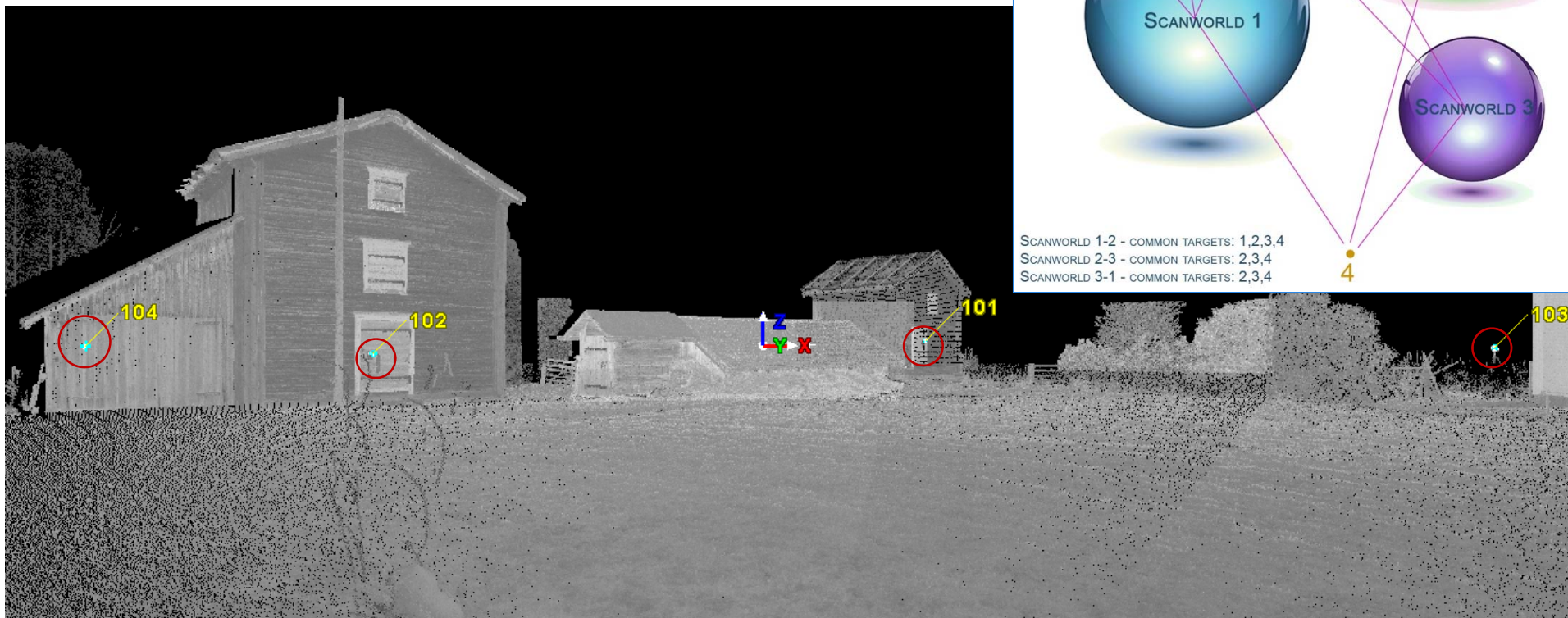


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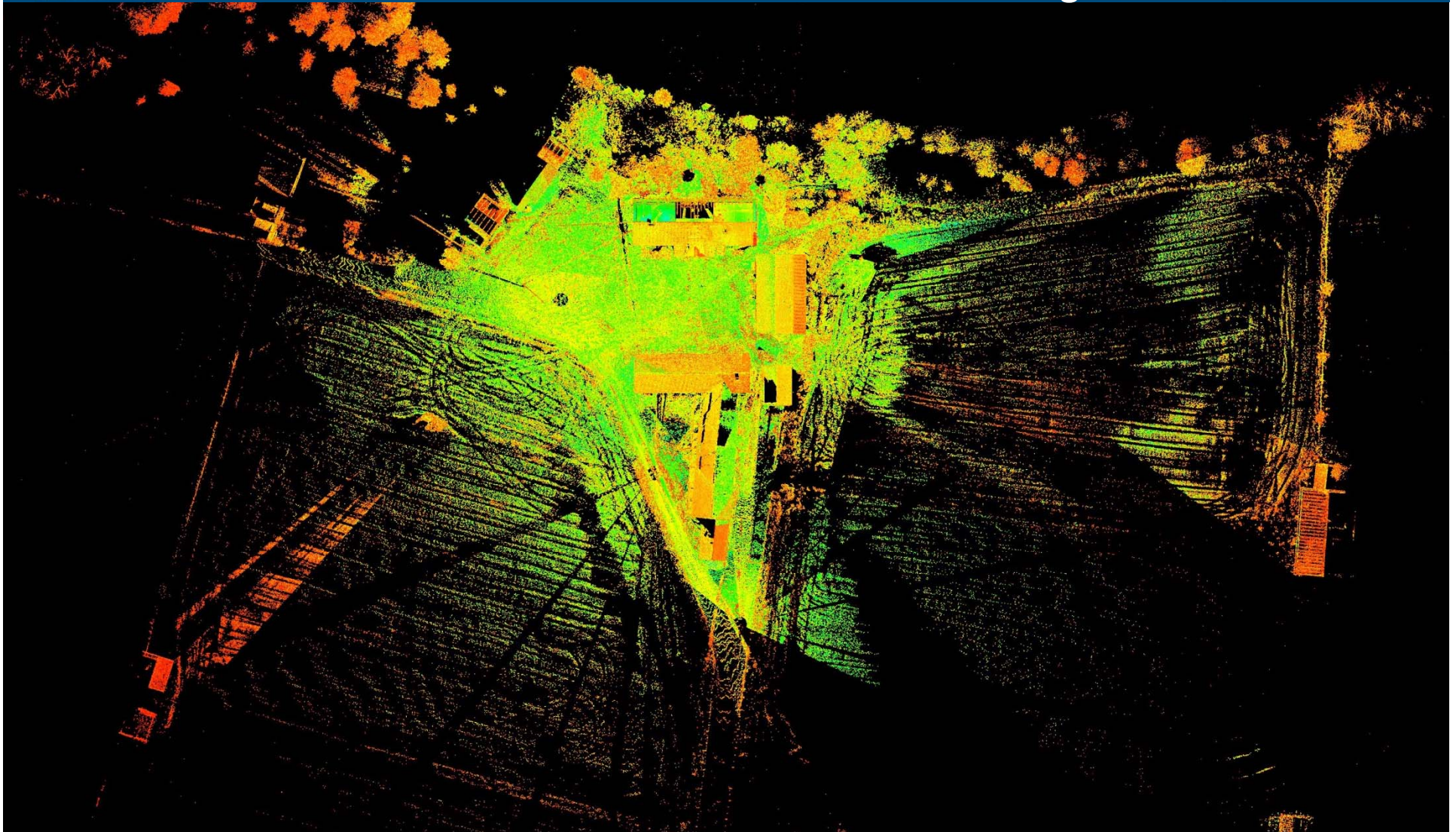


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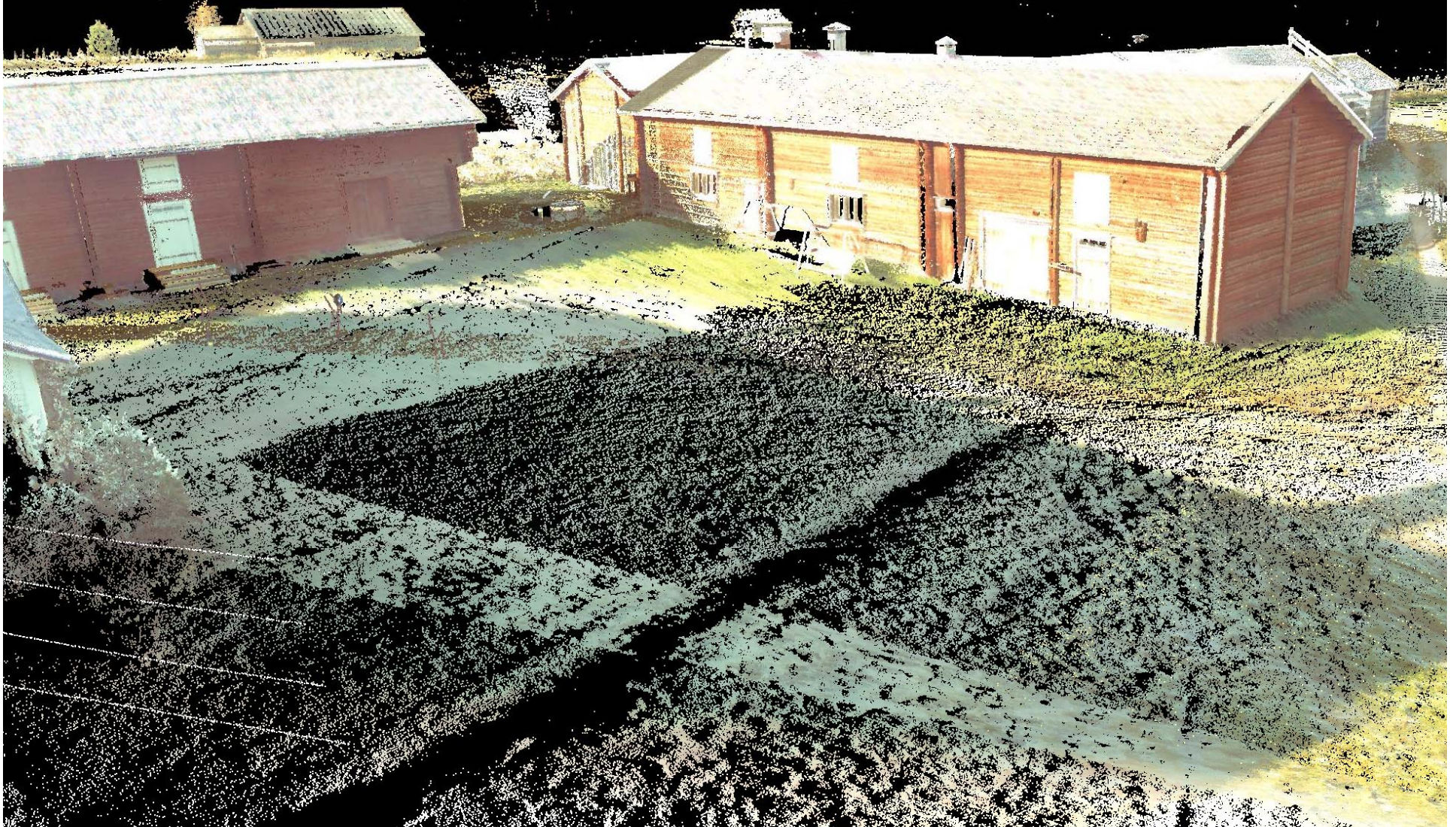
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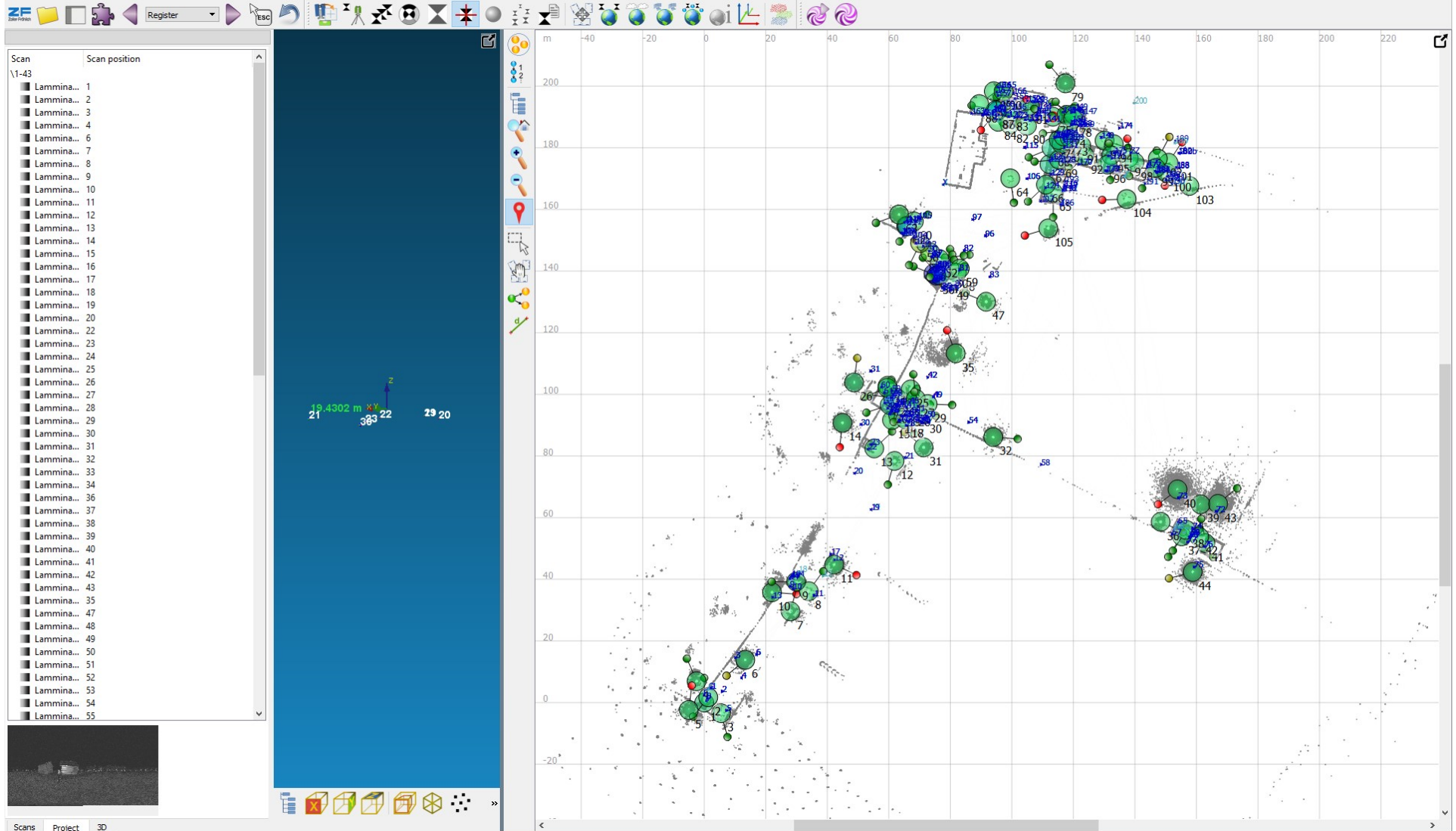
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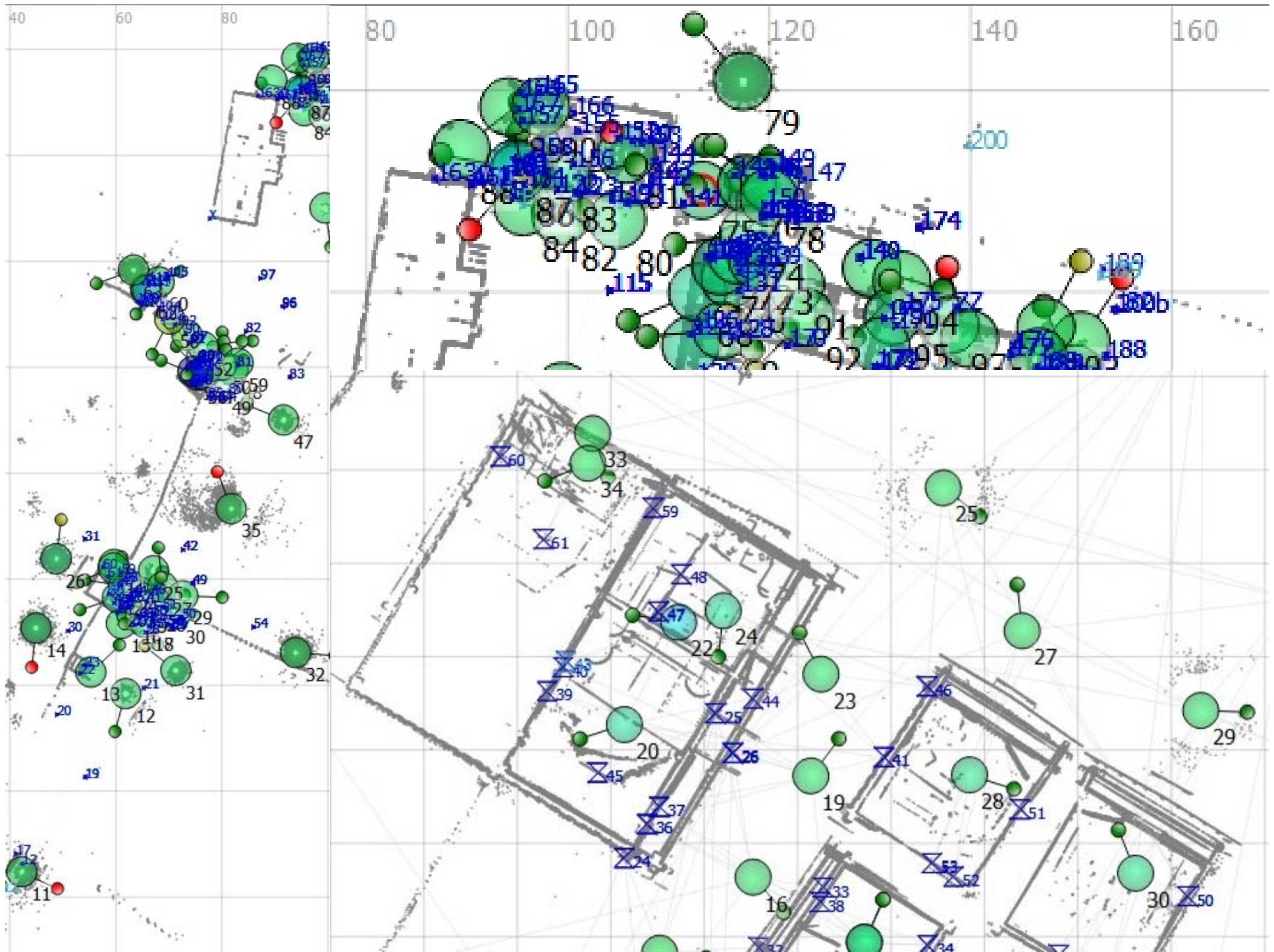
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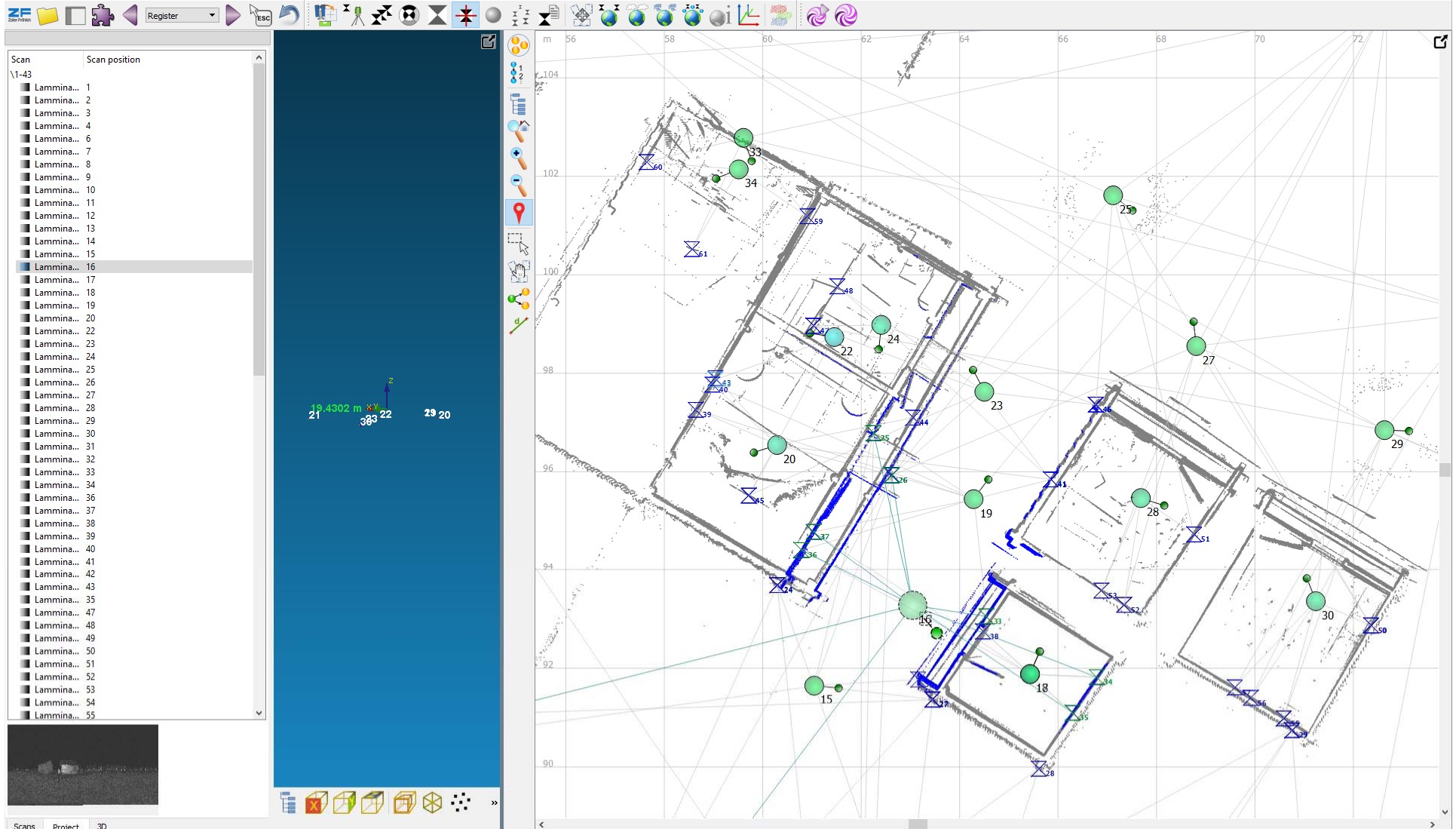




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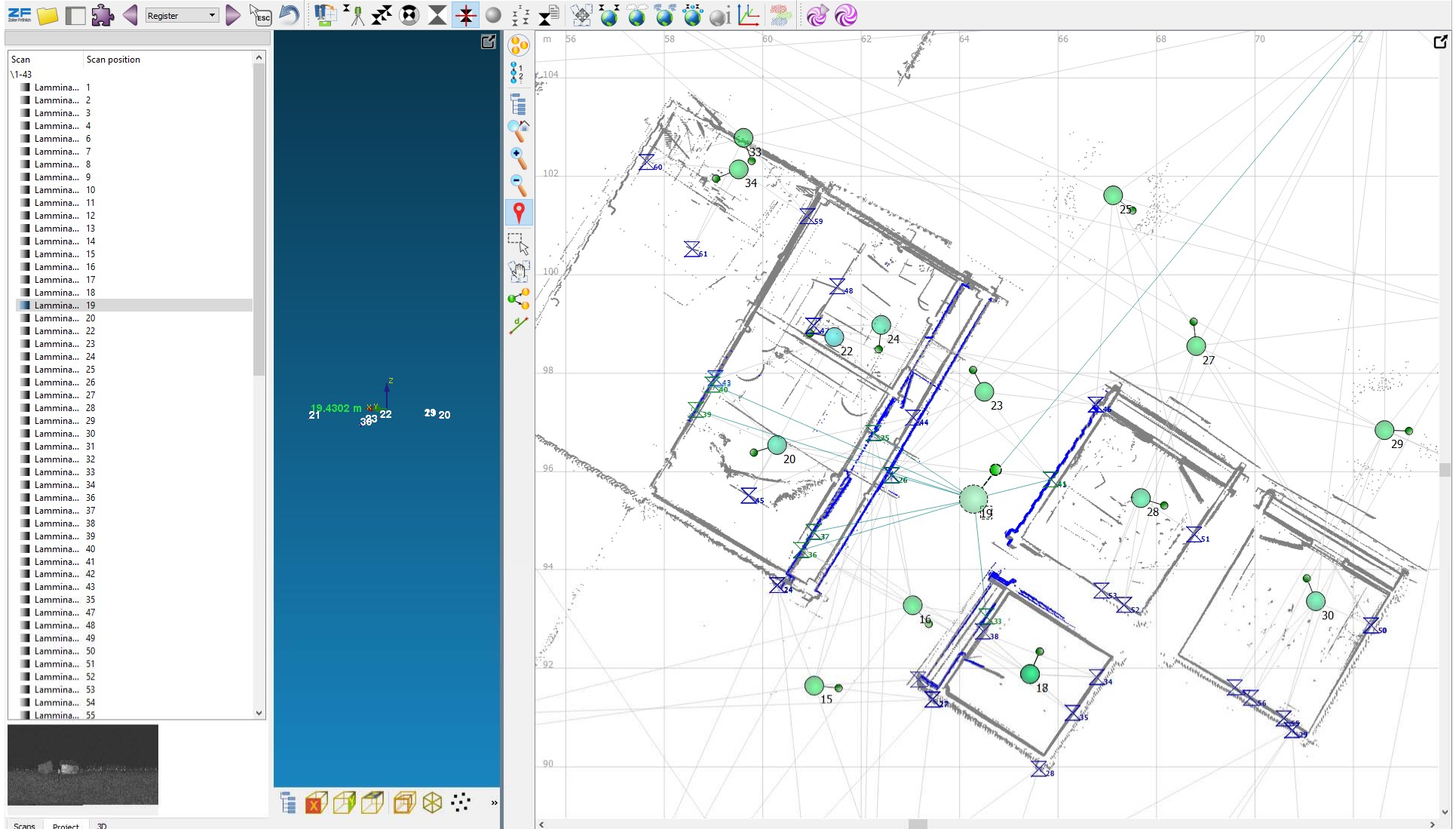
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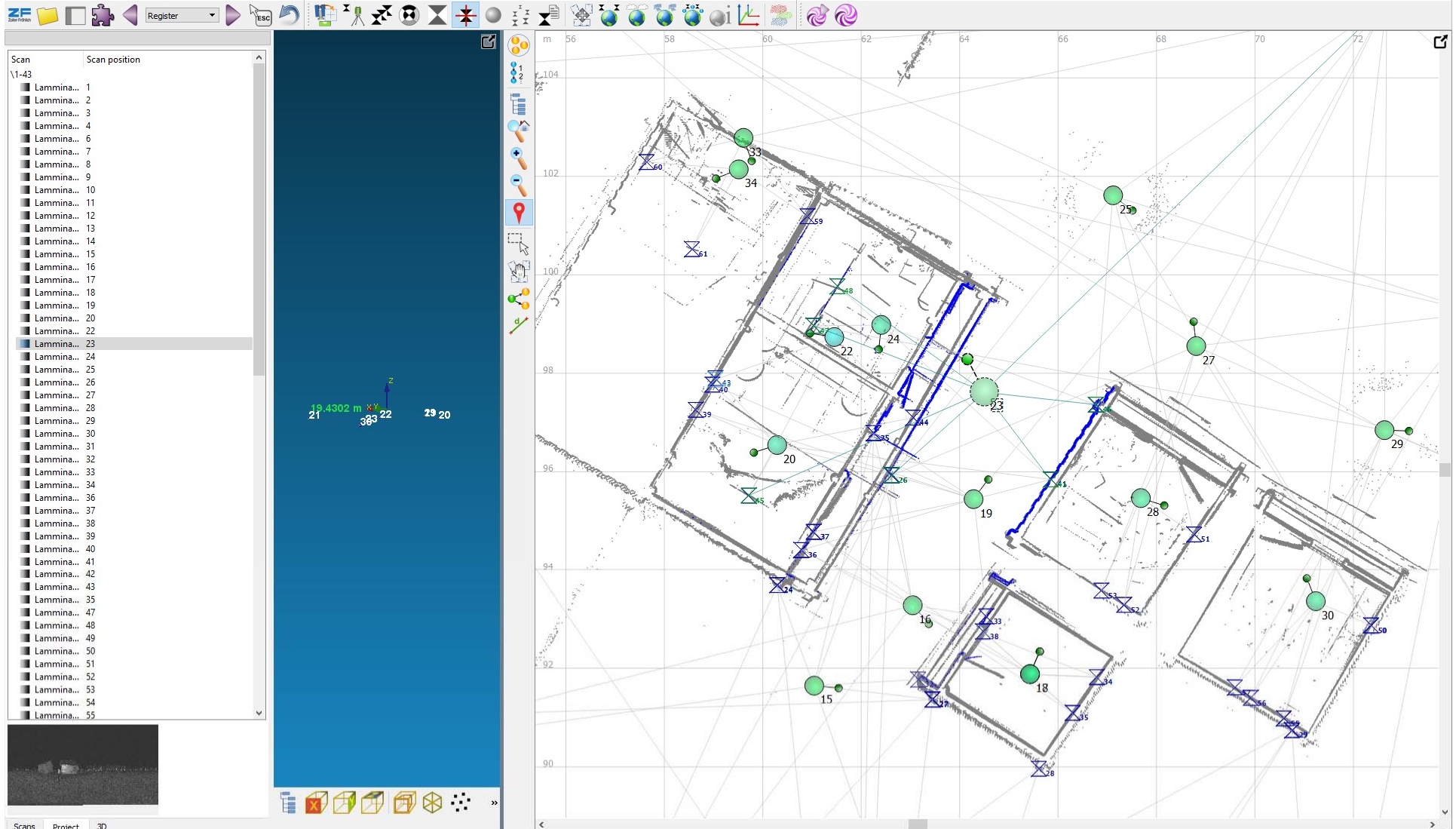
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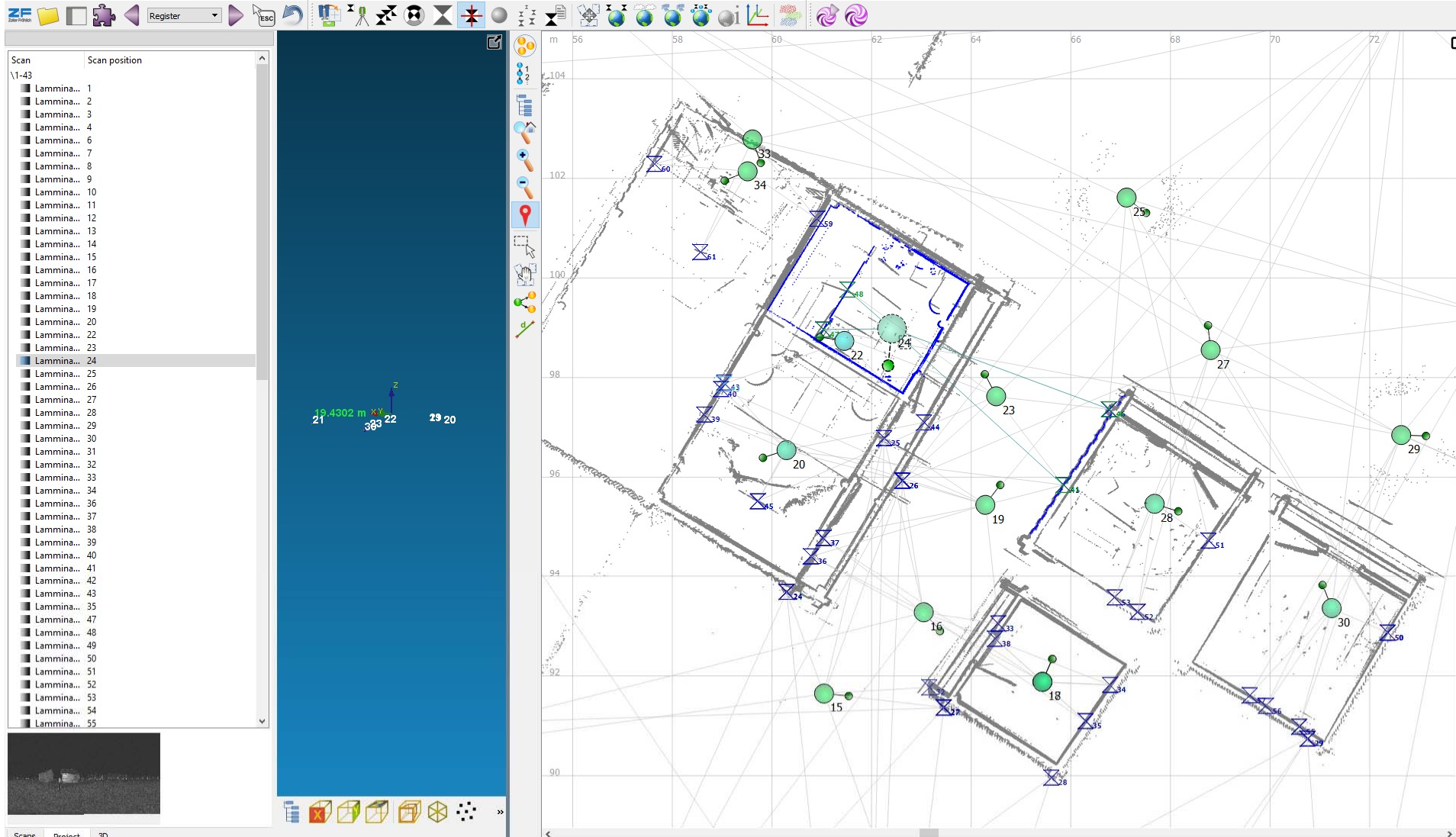


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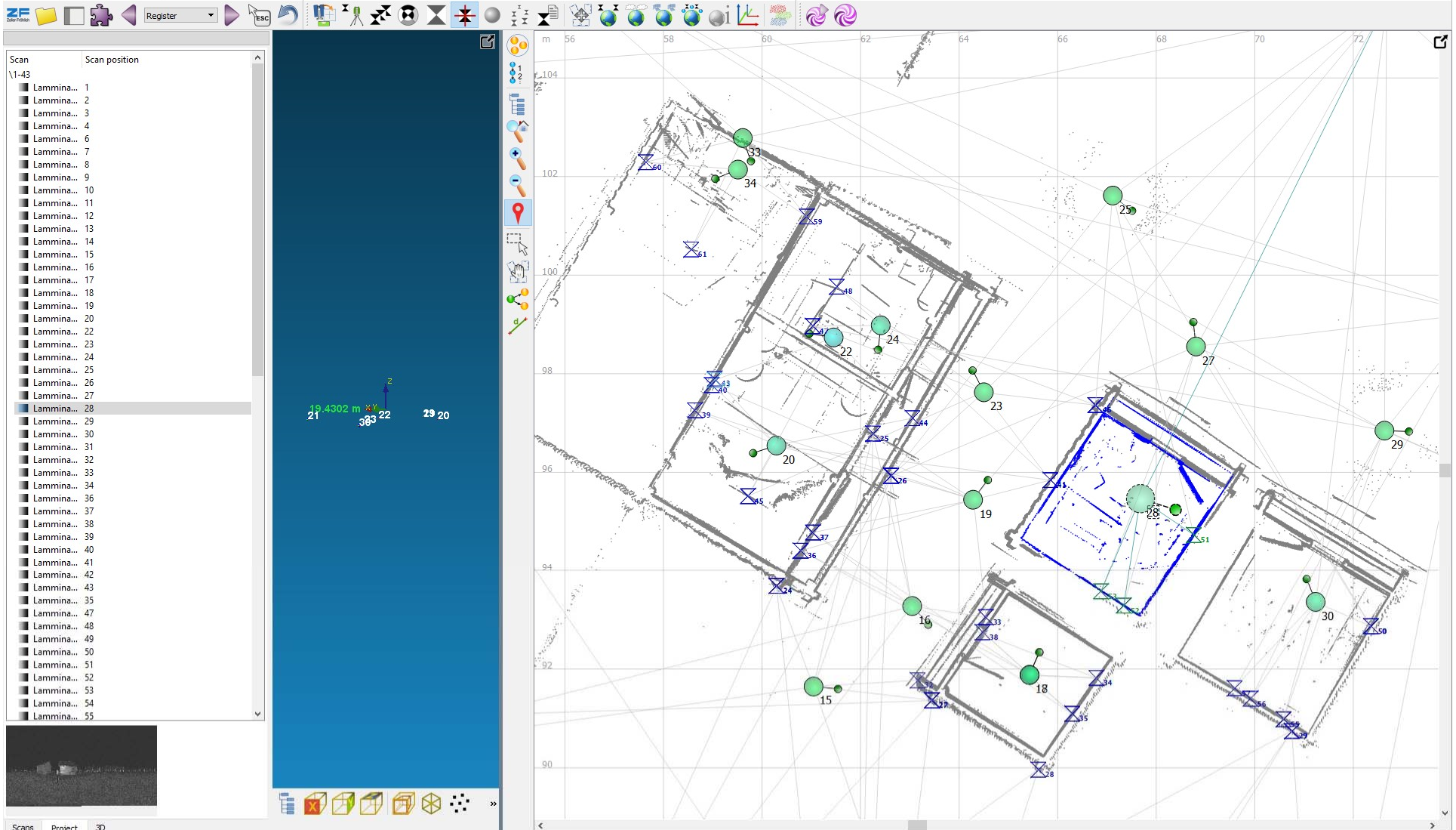
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Linnanmaa, 2<sup>nd</sup> October 2017

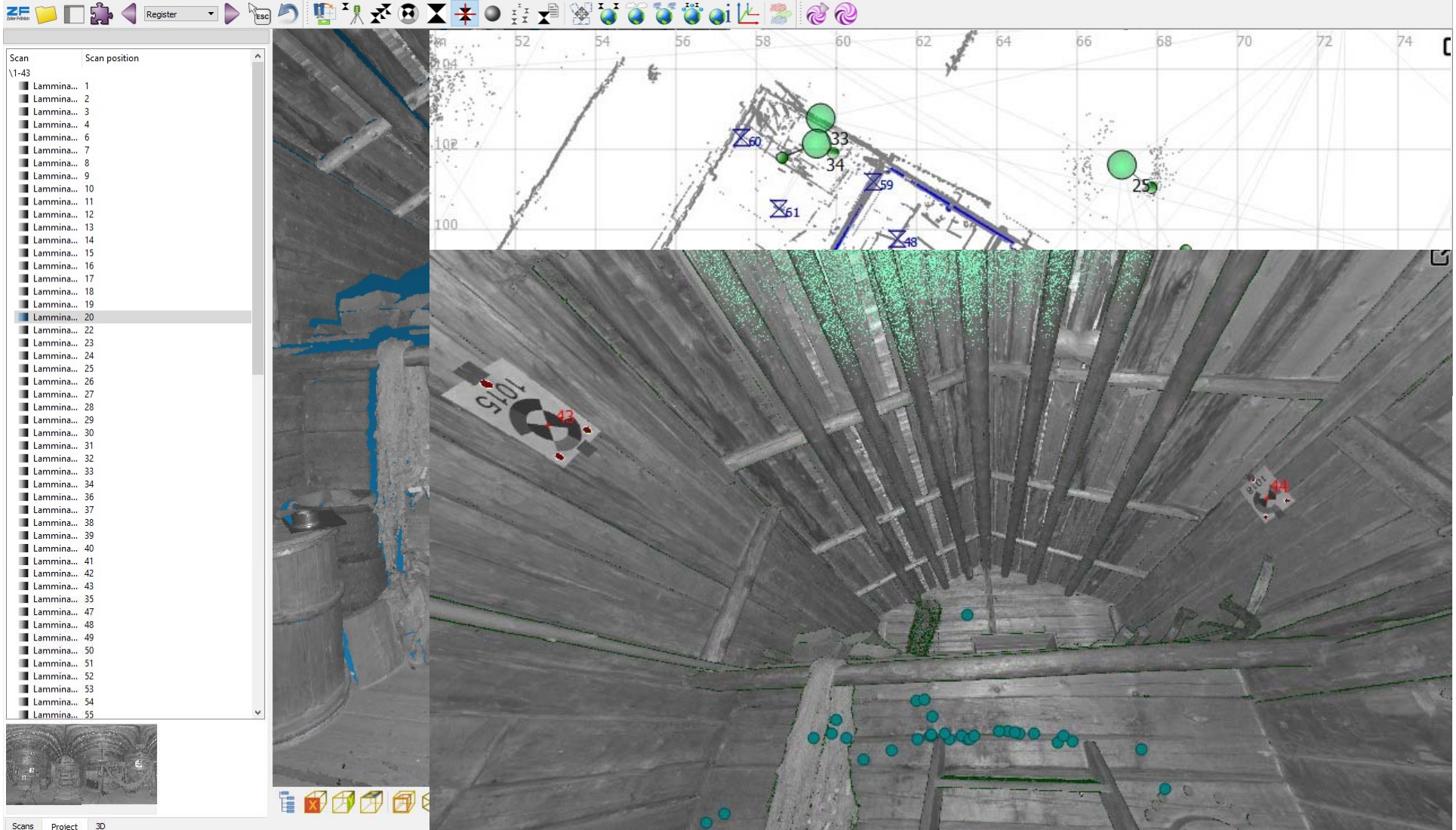
Sara Porzilli  
PostDoctoral Fellow  
sara.porzilli@oulu.fi



# Documentation of Wooden Architectural Heritage



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Research and Theory of Architecture

Linnanmaa, 2<sup>nd</sup> October 2017

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PostDoctoral Fellow  
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# Documentation of **W**ooden **A**rchitectural **H**eritage



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**R**esearch and **T**heory of **A**rchitecture

Linnanmaa, 2<sup>nd</sup> October 2017

Sara Porzilli  
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Linnanmaa, 2<sup>nd</sup> October 2017

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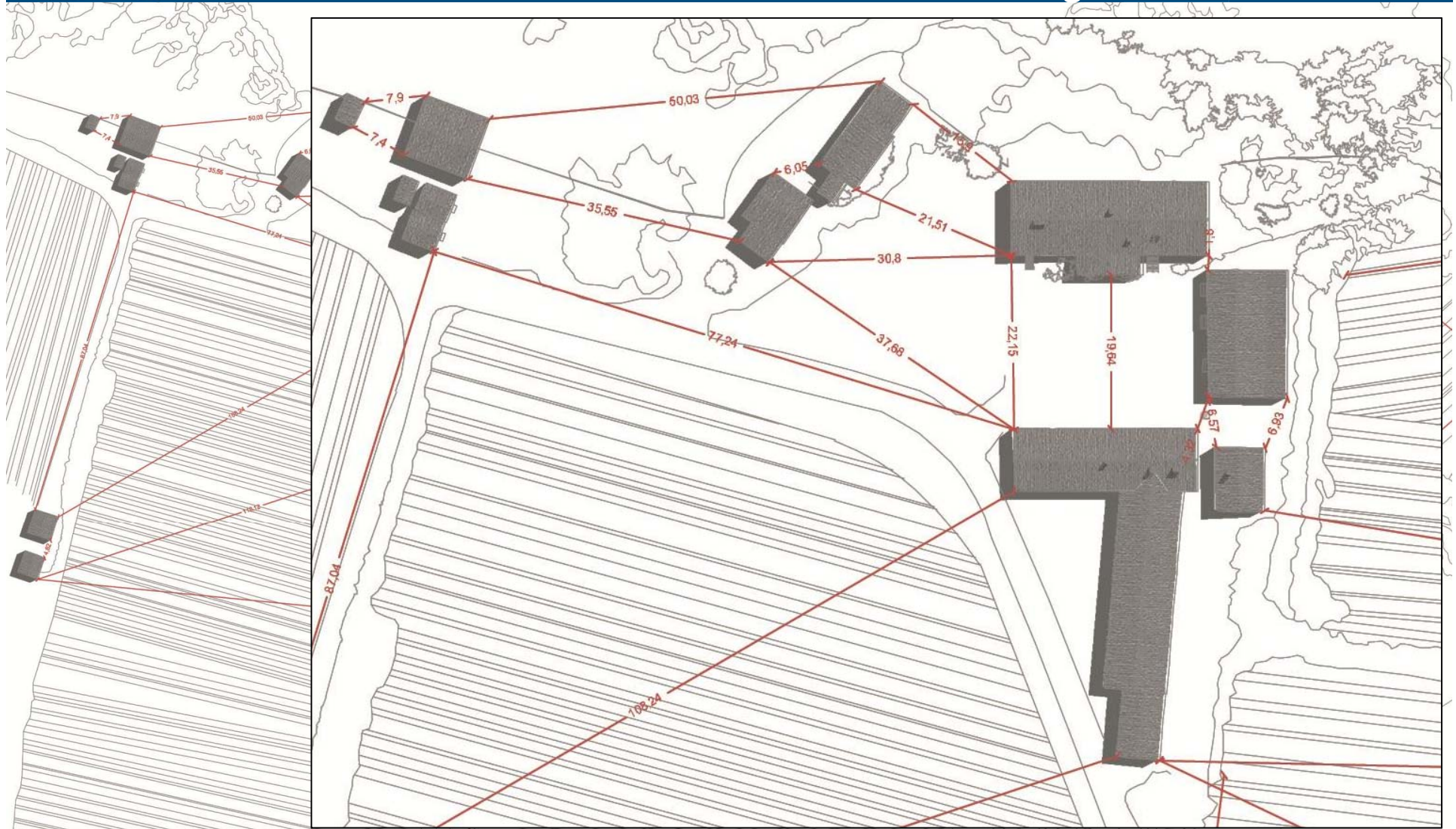




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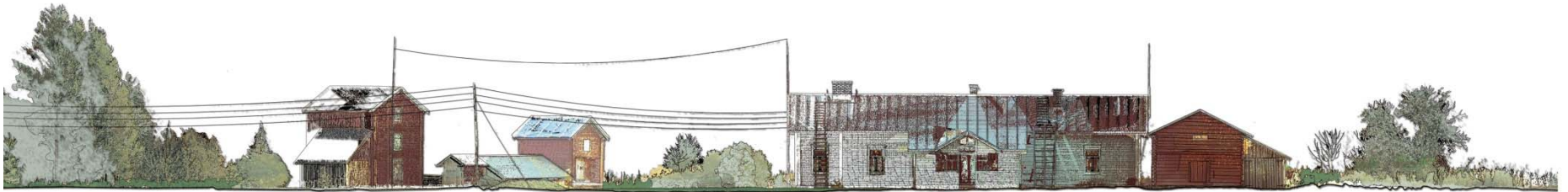
**R**esearch and **T**heory of **A**rchitecture

Linnanmaa, 2<sup>nd</sup> October 2017

Sara Porzilli  
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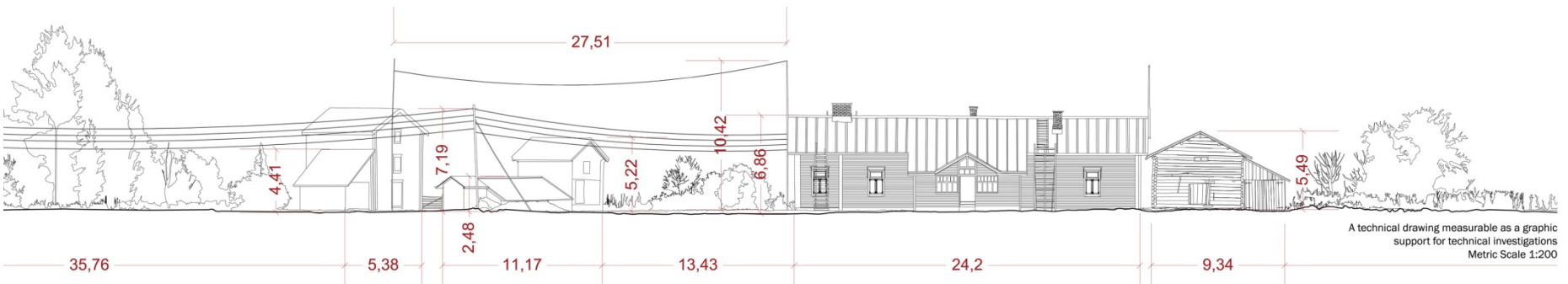
Point cloud and vector redrawing



Point cloud and vector redrawing  
Metric Scale 1:200



Vector redrawing with application of colours  
Metric Scale 1:200



A technical drawing measurable as a graphic  
support for technical investigations  
Metric Scale 1:200

**Research and Theory of Architecture**  
Linnanmaa, 2<sup>nd</sup> October 2017

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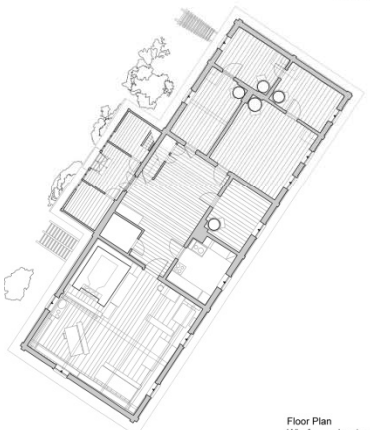
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Facade NORTH-WEST  
Photomapping  
Metric Scale 1:50



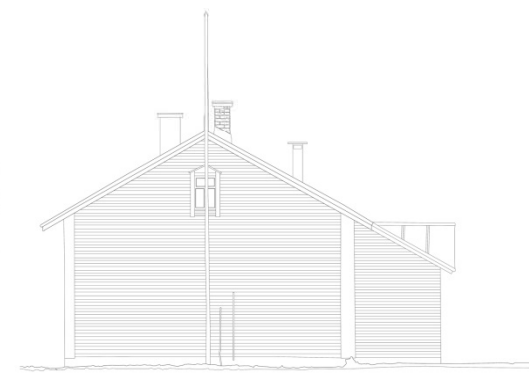
Facade SOUTH-WEST  
Photomapping  
Metric Scale 1:50



Floor Plan  
Wireframe drawing



Facade NORTH-WEST  
Wireframe drawing  
Metric Scale 1:50



Facade SOUTH-WEST  
Wireframe drawing  
Metric Scale 1:50



## Research and Theory of Architecture

Linnanmaa, 2<sup>nd</sup> October 2017

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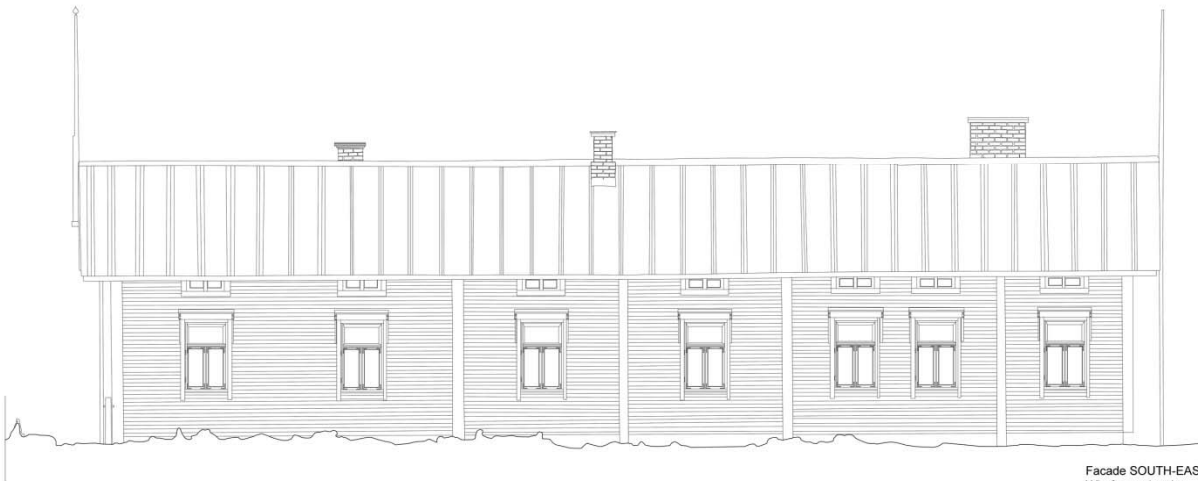
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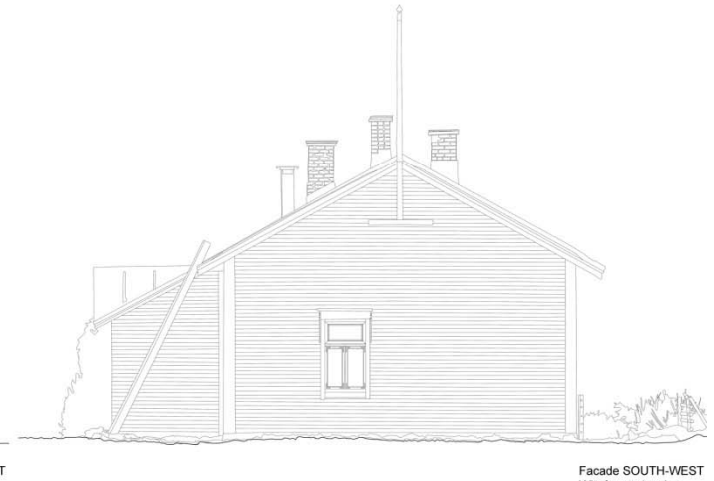
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Photomap  
Metric Scale 1:50



Facade SOUTH-WEST  
Photomap  
Metric Scale 1:50



Facade SOUTH-EAST  
Wireframe drawing  
Metric Scale 1:50



Facade SOUTH-WEST  
Wireframe drawing  
Metric Scale 1:50

## Research and Theory of Architecture

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North

General Plan  
Metric Scale 1:1000



General views from the point cloud



Facade NORTH  
Photomapping  
Metric Scale 1:25



Facade WEST  
Photomapping  
Metric Scale 1:25



Facade EAST  
Photomapping  
Metric Scale 1:25

Research and Theory of Architecture  
Linnanmaa, 2<sup>nd</sup> October 2017

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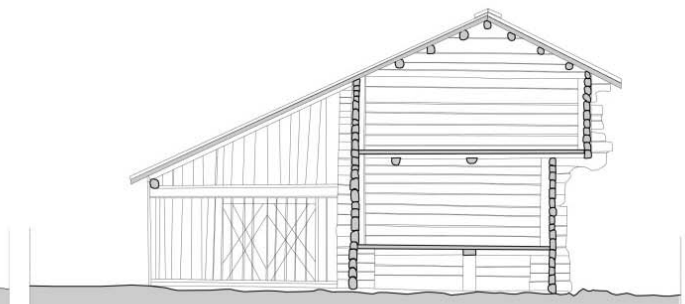
Facade 1



Facade 2



Facade 4



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**Pogost Complex on Kizhi Island and its rural settlements** REP. OF CARELIA - RUSSIA



**R**esearch and **T**heory of **A**rchitecture

Linnanmaa, 2<sup>nd</sup> October 2017

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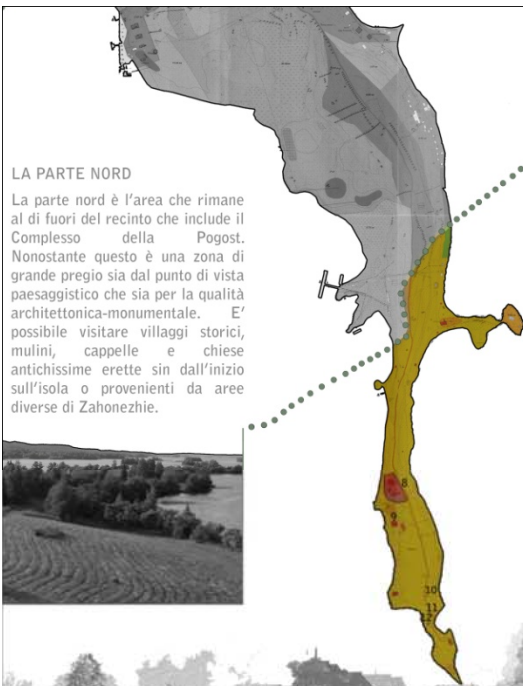
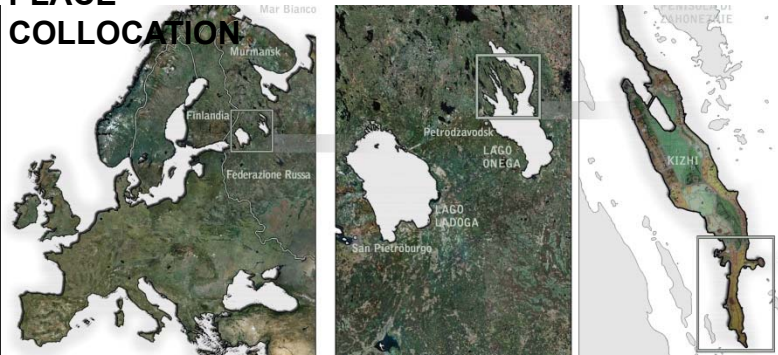


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## PLACE COLLOCATION



### LA PARTE NORD

La parte nord è l'area che rimane al di fuori del recinto che include il Complesso della Pogost. Nonostante questo è una zona di grande pregio sia dal punto di vista paesaggistico che sia per la qualità architettonica-monumentale. E' possibile visitare villaggi storici, mulini, cappelle e chiese antichissime erette sin dall'inizio sull'isola o provenienti da aree diverse di Zahonezhie.



### LA PARTE SUD

La parte sud è la zona maggiormente investita dal flusso turistico. In prossimità dell'ingresso del museo, è situato uno scalo portuale con delle attività commerciali. Da qui i visitatori hanno la possibilità di dirigersi direttamente verso l'area principale, ossia verso il Complesso della Pogost. Proprio per questo motivo, il paesaggio di questa zona appare più antropizzato e studiato, provocando in parte una perdita di autenticità del luogo naturale.



## Research and Theory of Architecture

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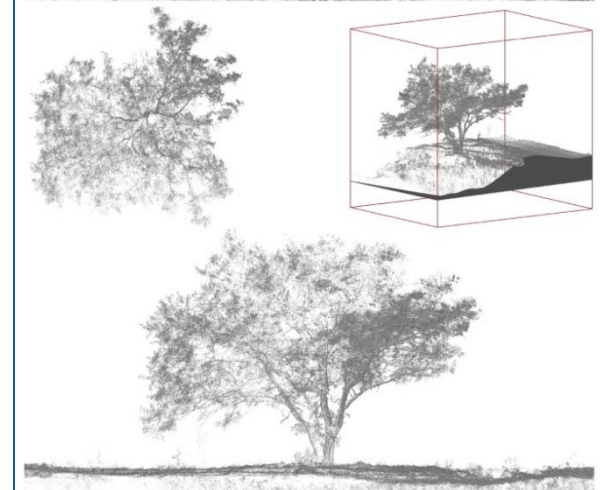
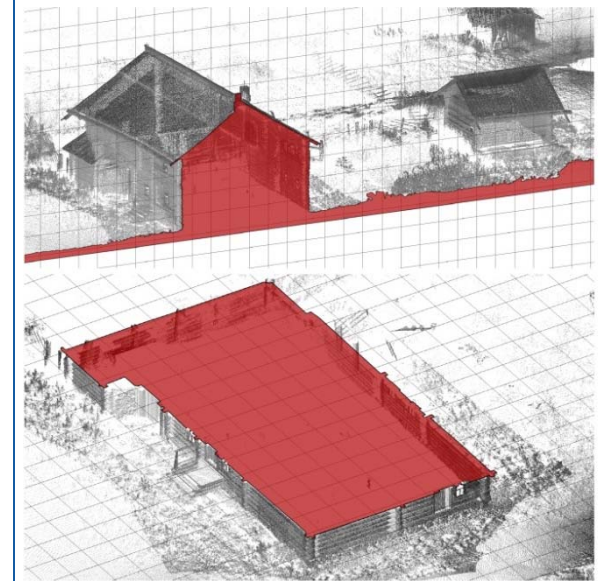
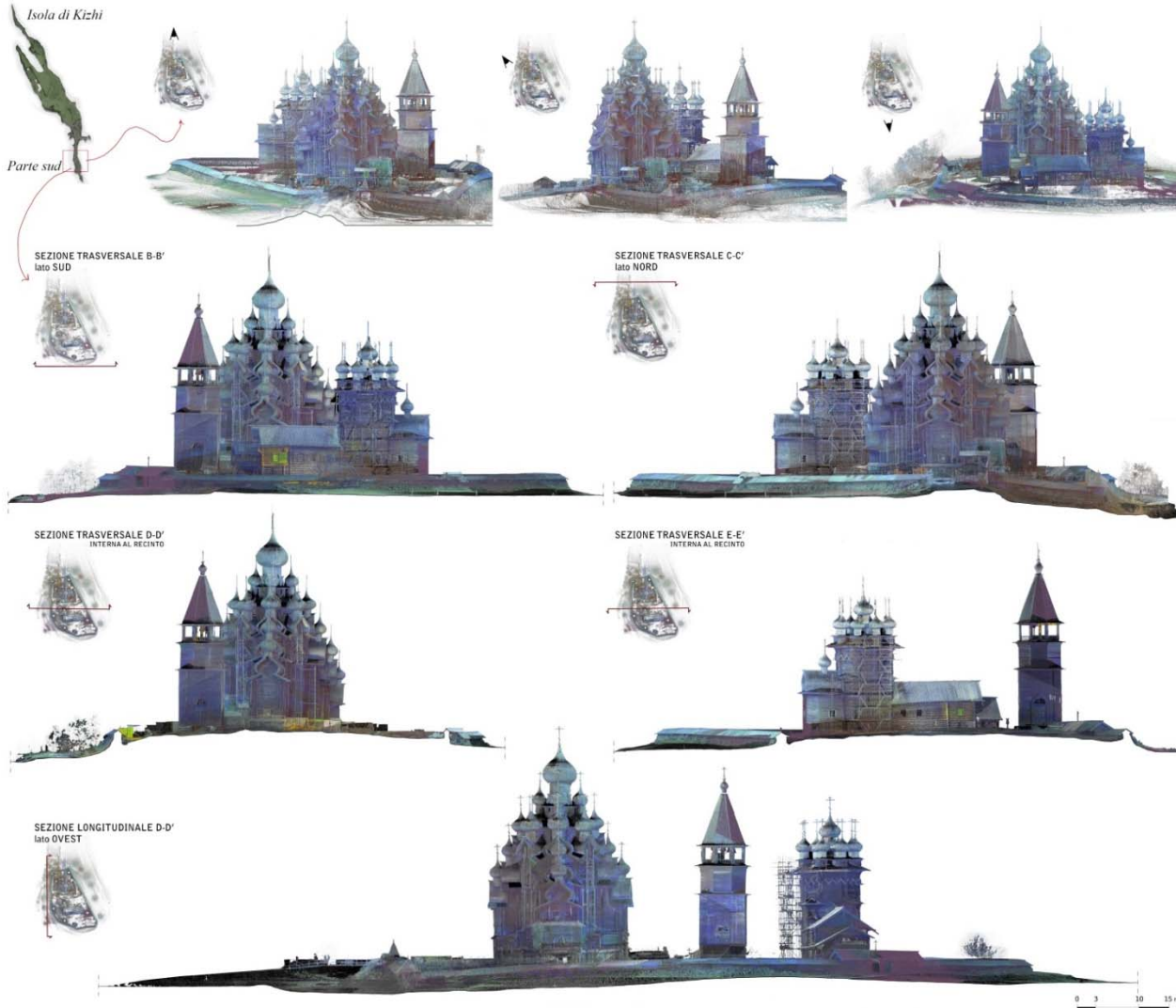




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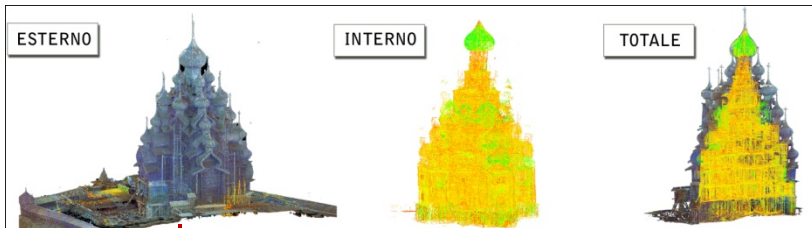


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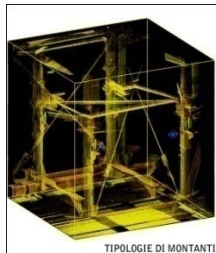
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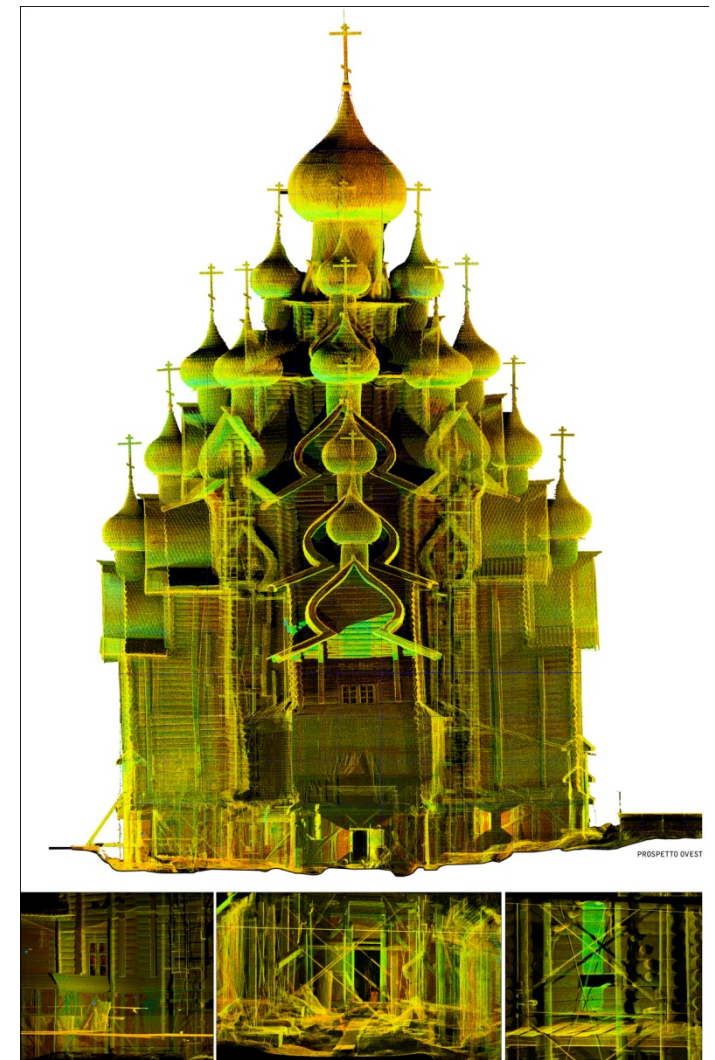
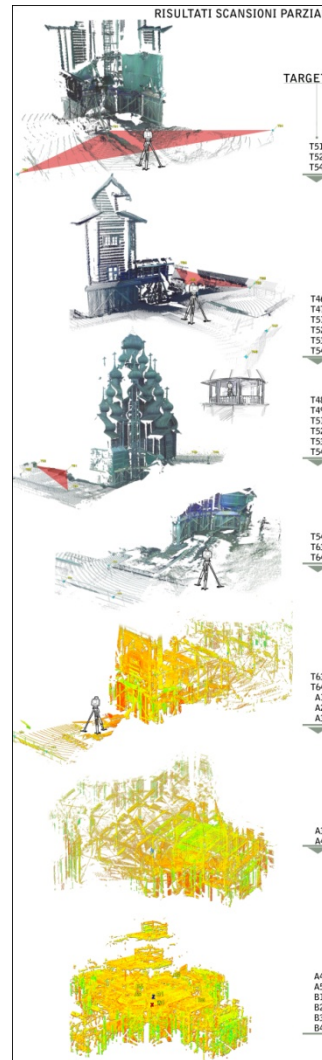
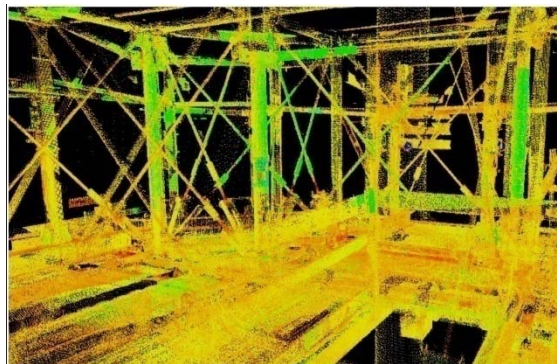
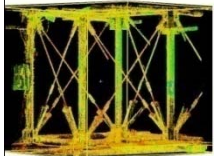
ANALYSIS OF THE  
WOODEN STRUCTURE

ANALYSIS OF THE  
METALLIC  
STRUCTURE

ANALYSIS OF ALL  
MOVEMENTS IN  
RELATIONSHIP  
EACH OTHER



TIPOLOGIE DI MONTANTI



## Research and Theory of Architecture

Linnanmaa, 2<sup>nd</sup> October 2017

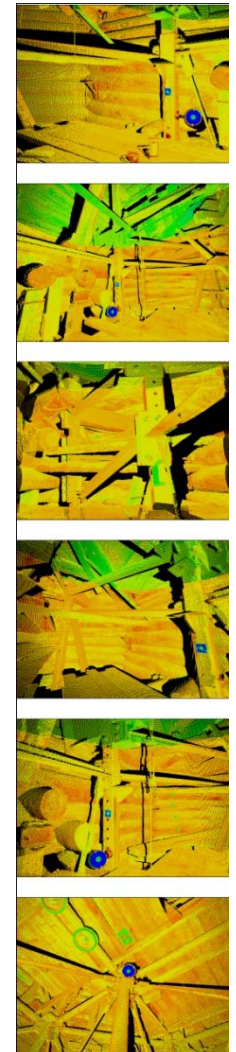
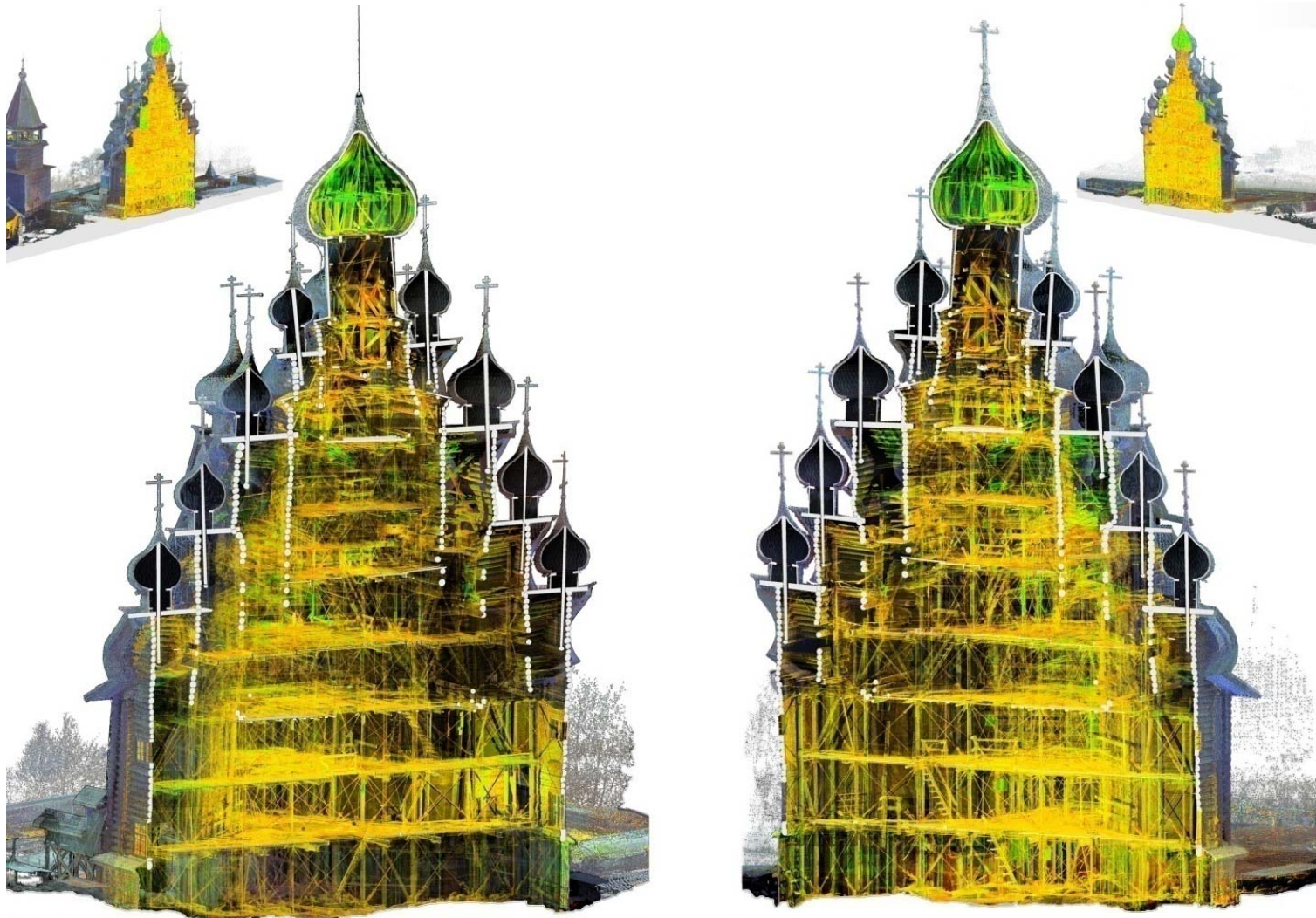
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Linnanmaa, 2<sup>nd</sup> October 2017

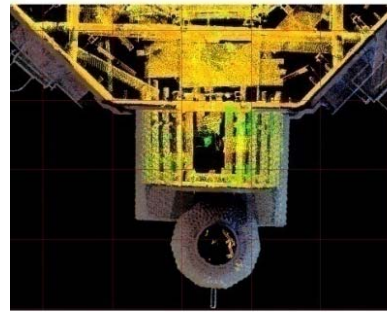
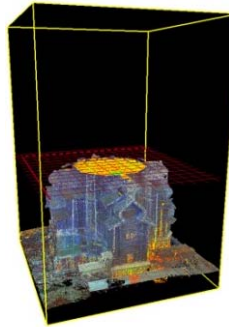
Sara Porzilli  
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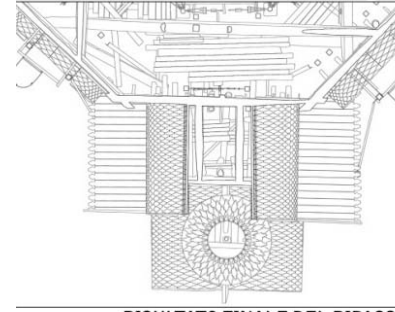
# Documentation of **W**ooden **A**rchitectural **H**eritage



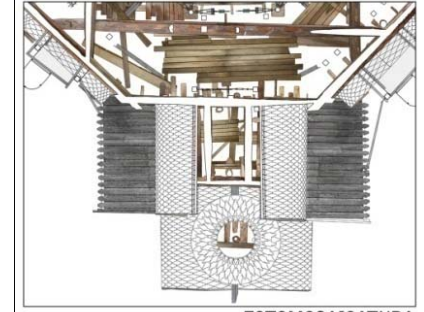
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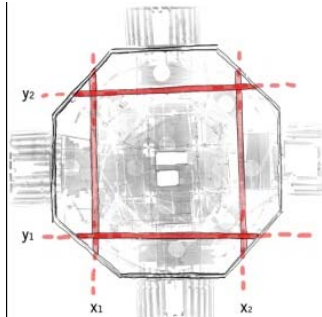
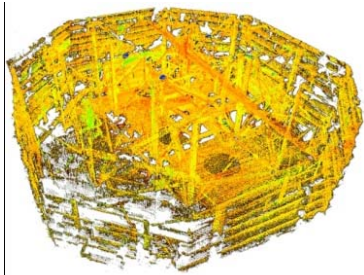
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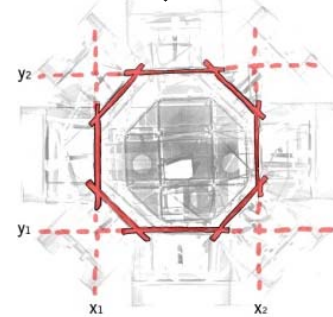
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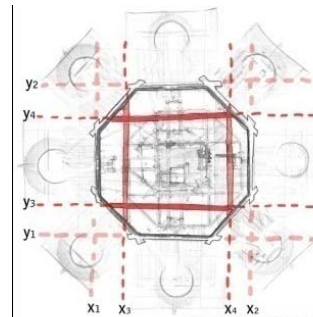
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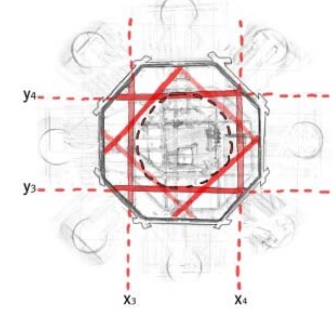
QUINTO LIVELLO



SESTO LIVELLO

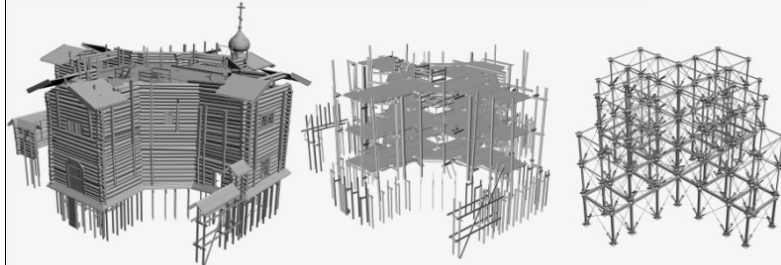


SETTIMO LIVELLO

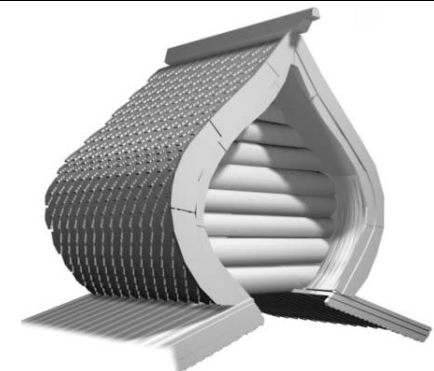


BASE TAMBURO

ELABORAZIONE DI UN MODELLO TRIDIMENSIONALE TECNOLOGICO

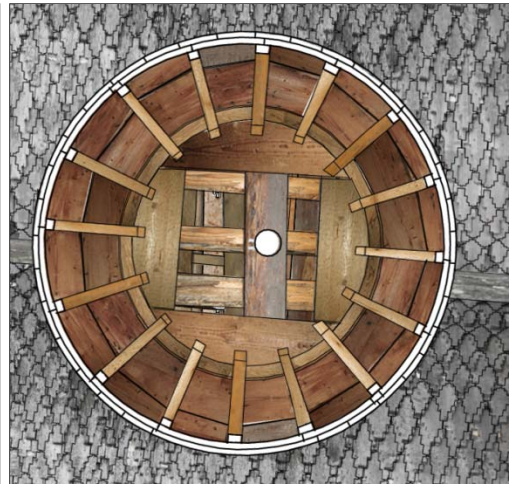
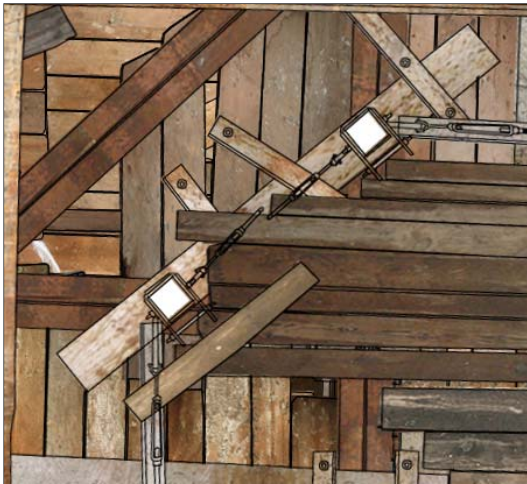
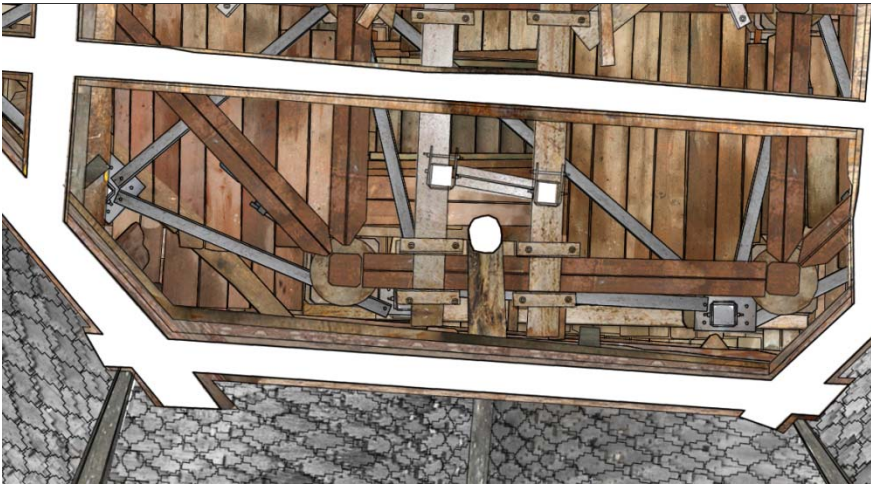


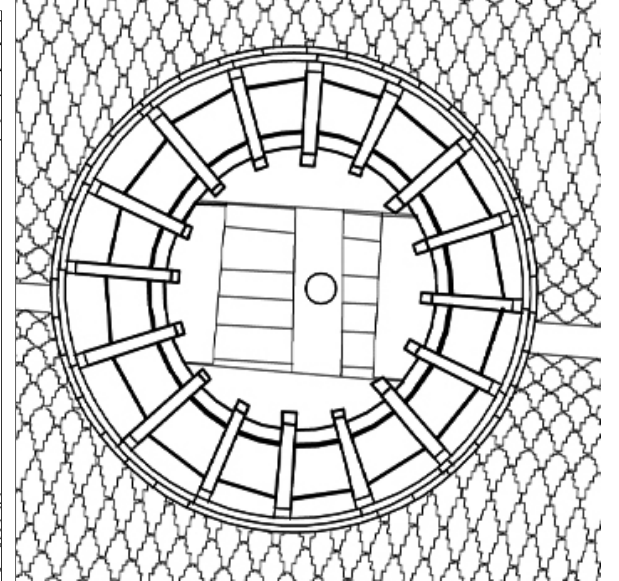
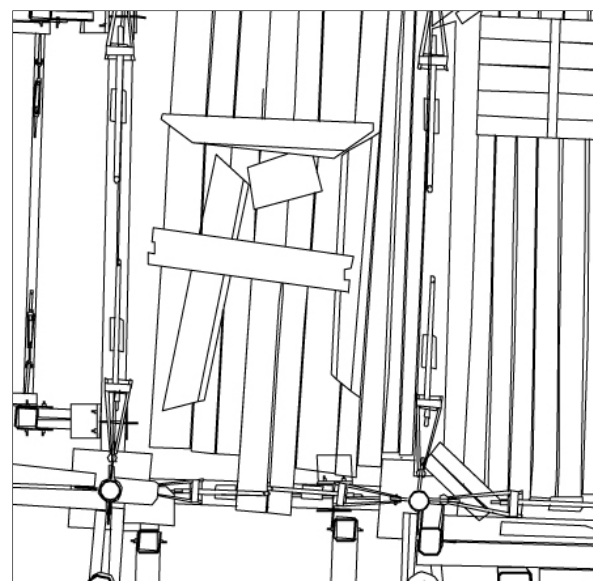
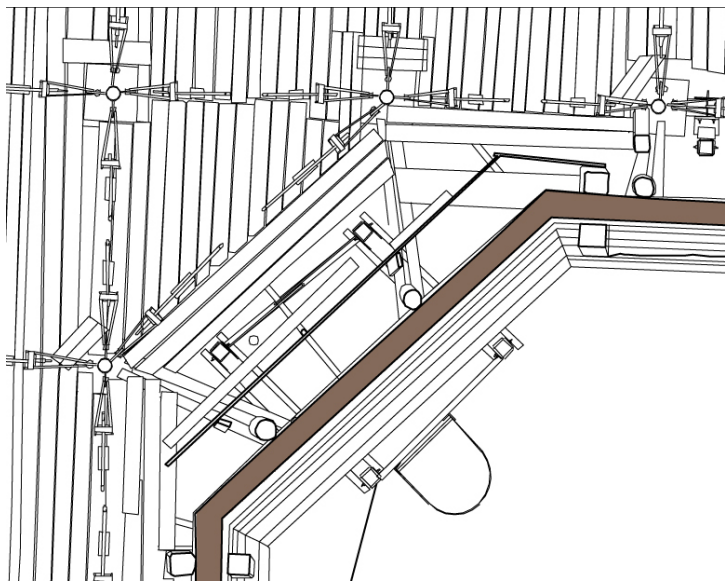
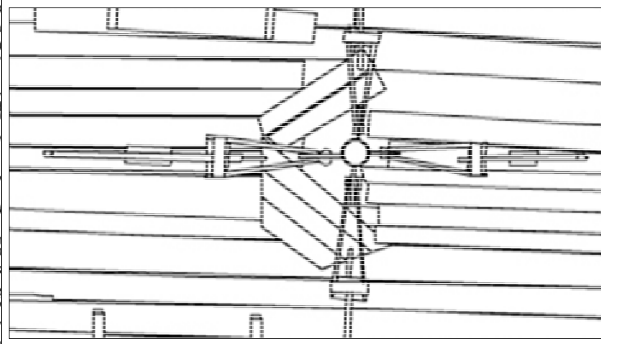
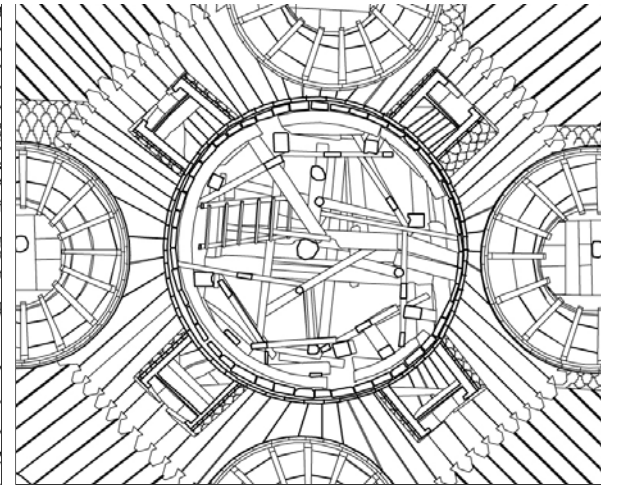
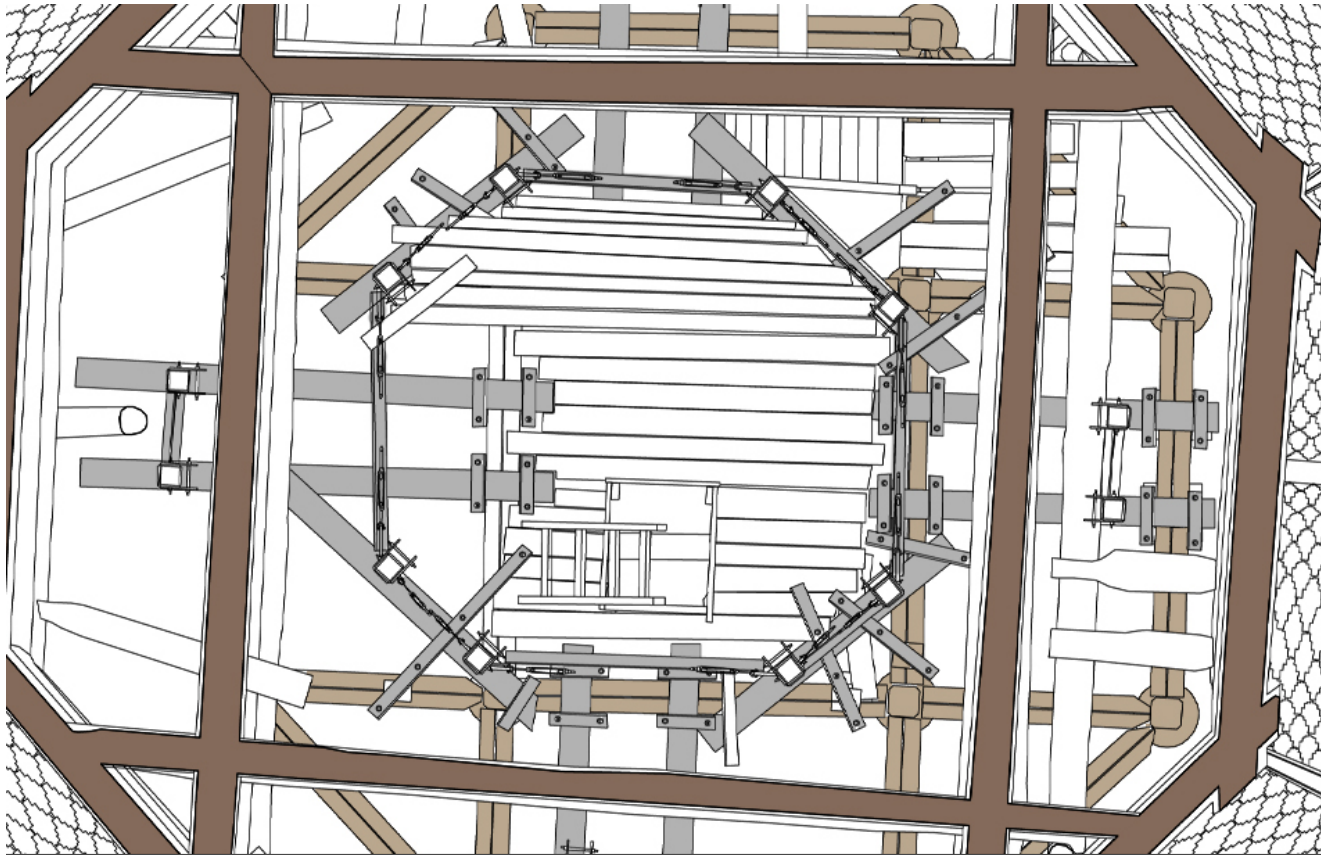
DAL GENERALE AL PARTICOLARE: discretizzare per l'analisi dei particolari costruttivi ed architettonici



**R**esearch and **T**heory of **A**rchitecture  
Linnanmaa, 2<sup>nd</sup> October 2017

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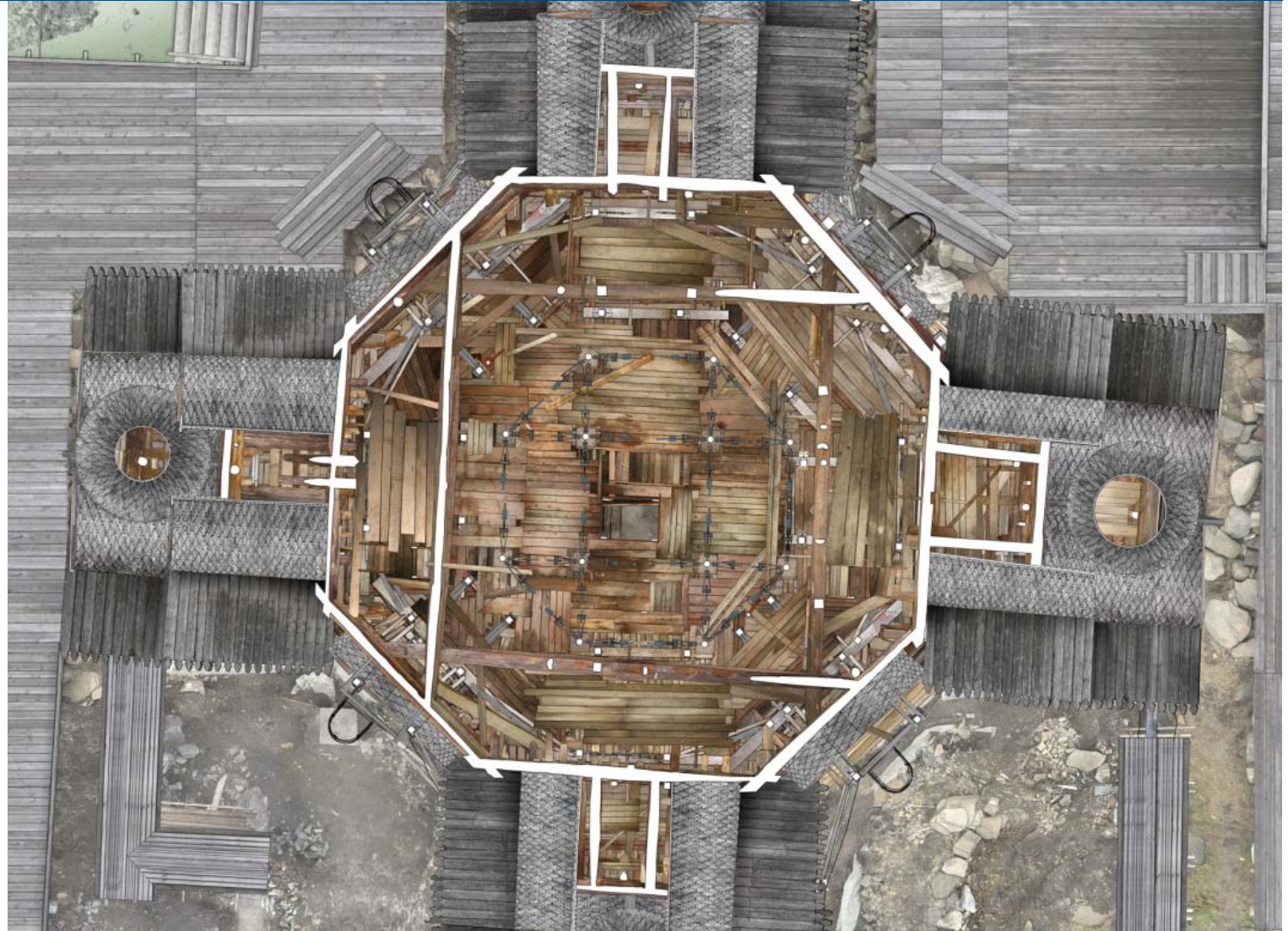
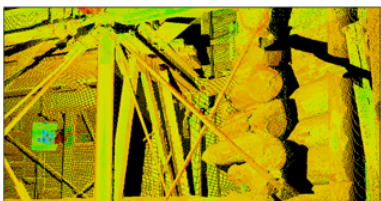
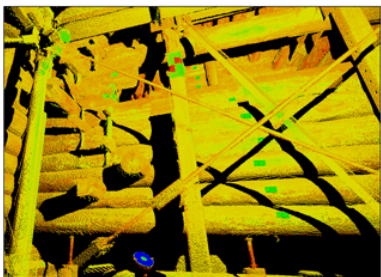
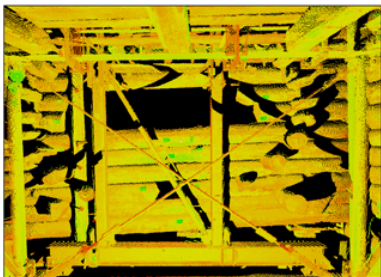
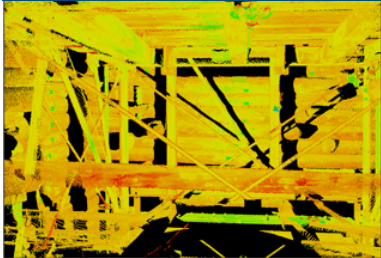




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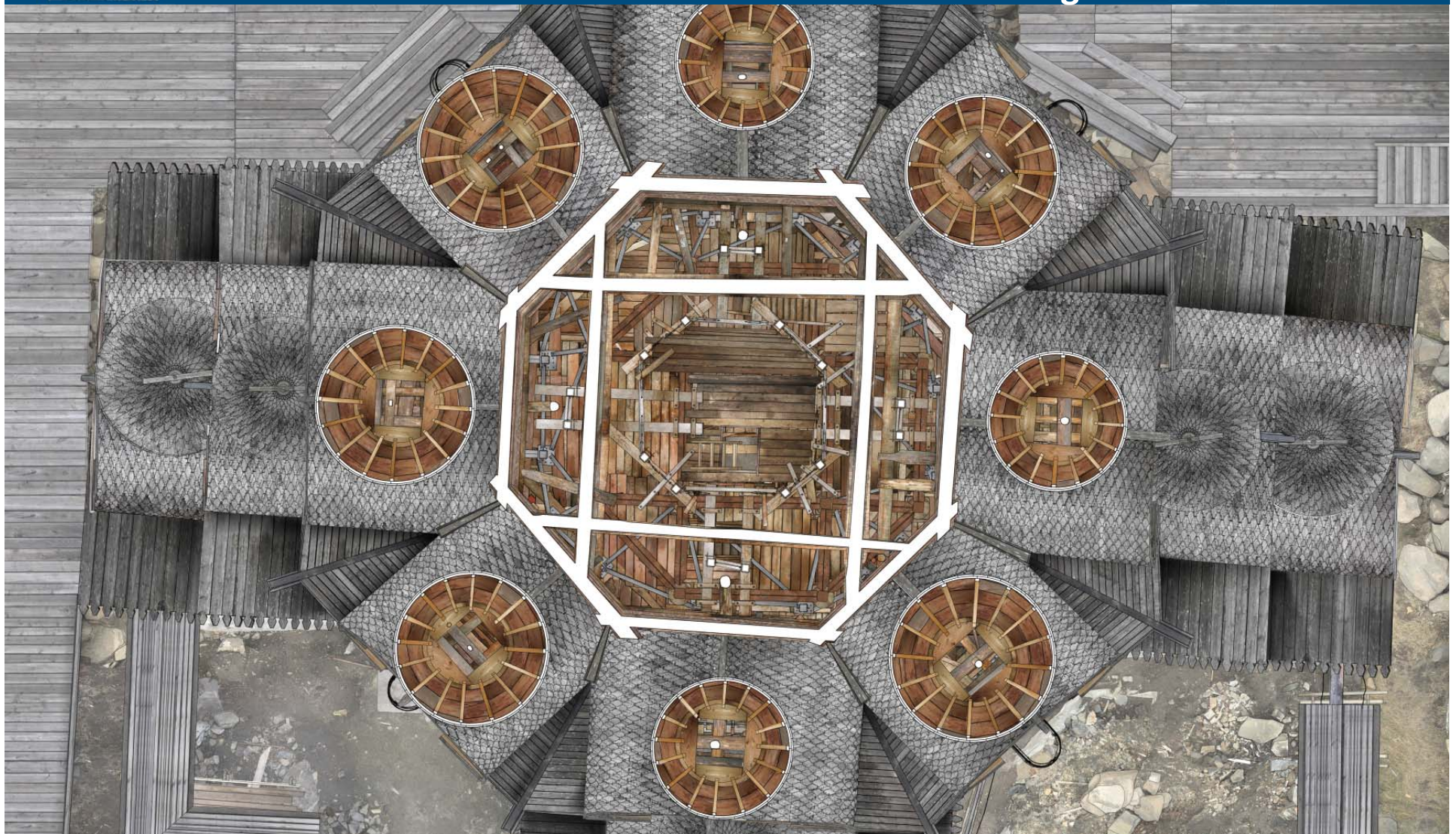




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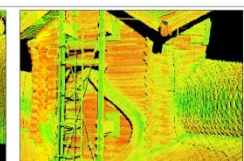
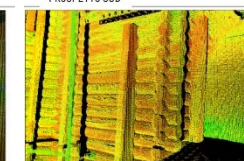
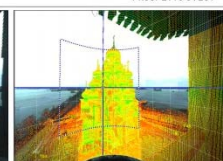
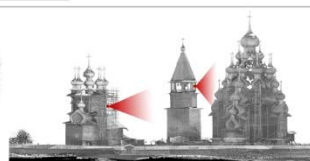
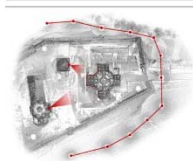
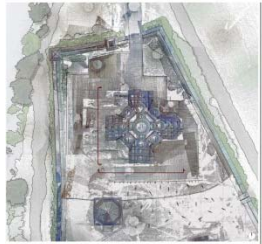
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Gli elaborati grafici che riguardano il complesso della Pogost e l'analisi della Chiesa della Trasfigurazione fanno parte della tesi di laurea magistrale in Architettura da me sostenuta insieme a A. Sorini nel 2011.

Titolo della tesi di laurea: "Il Complesso della Pogost dell'Isola di Kizhi. Rilievo laser scanner per l'analisi della struttura architettonica della Chiesa della Trasfigurazione". (Relatore: Prof. Stefano Bertocci, Correlatore: Prof. Sandro Parrinello).

## Research and Theory of Architecture

Linnanmaa, 2<sup>nd</sup> October 2017

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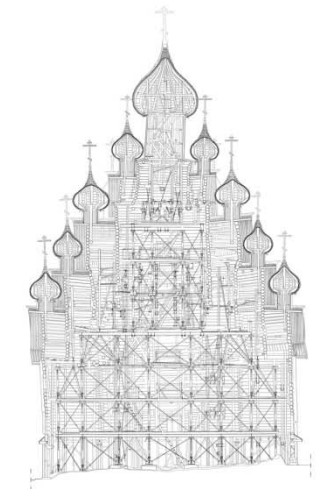
SEZIONE C-C



SEZIONE D-D



SEZIONE C-C

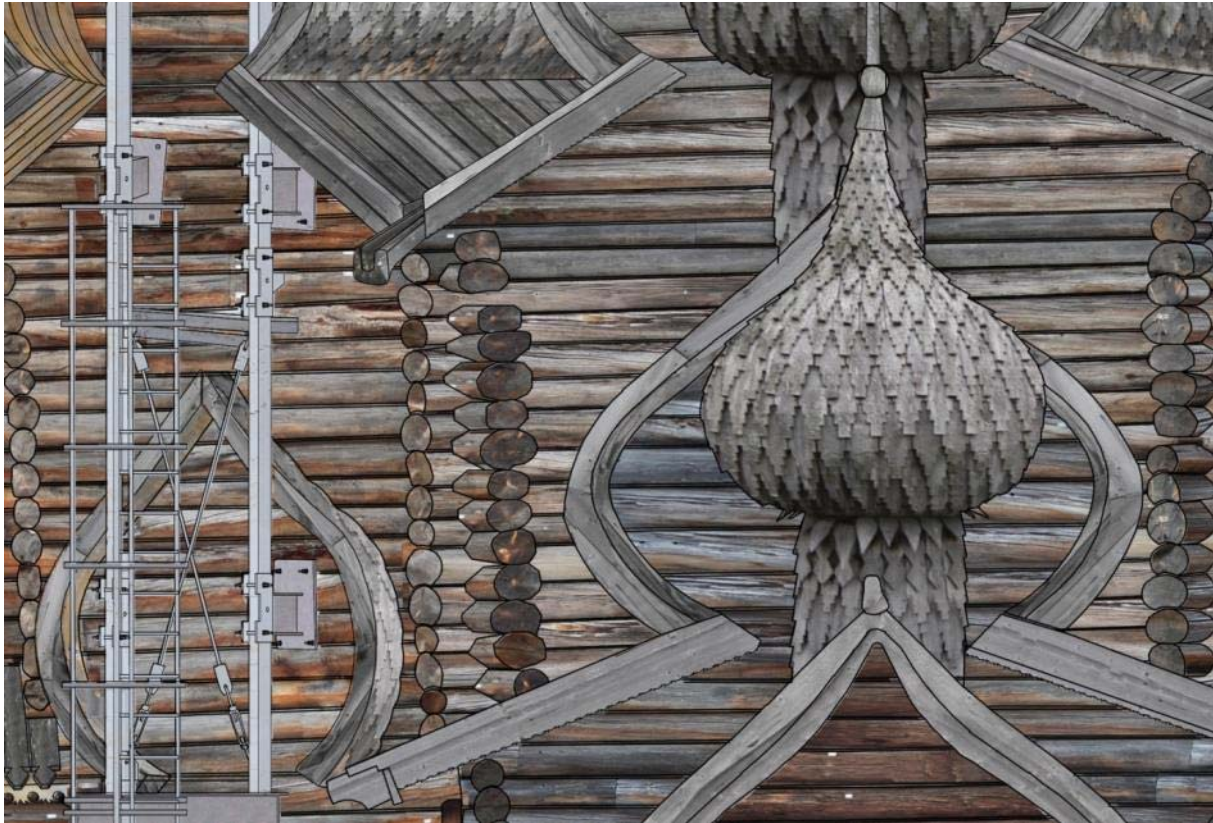


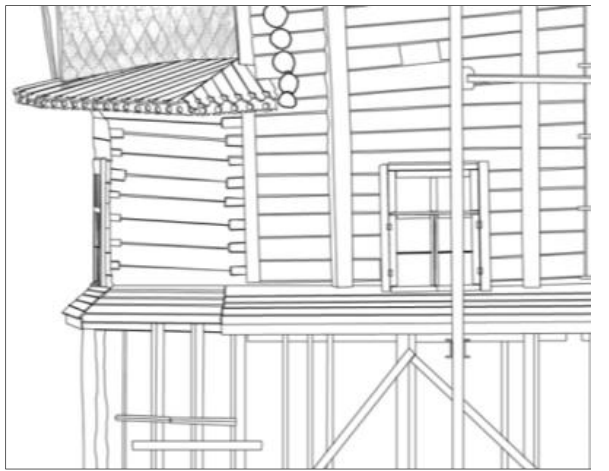
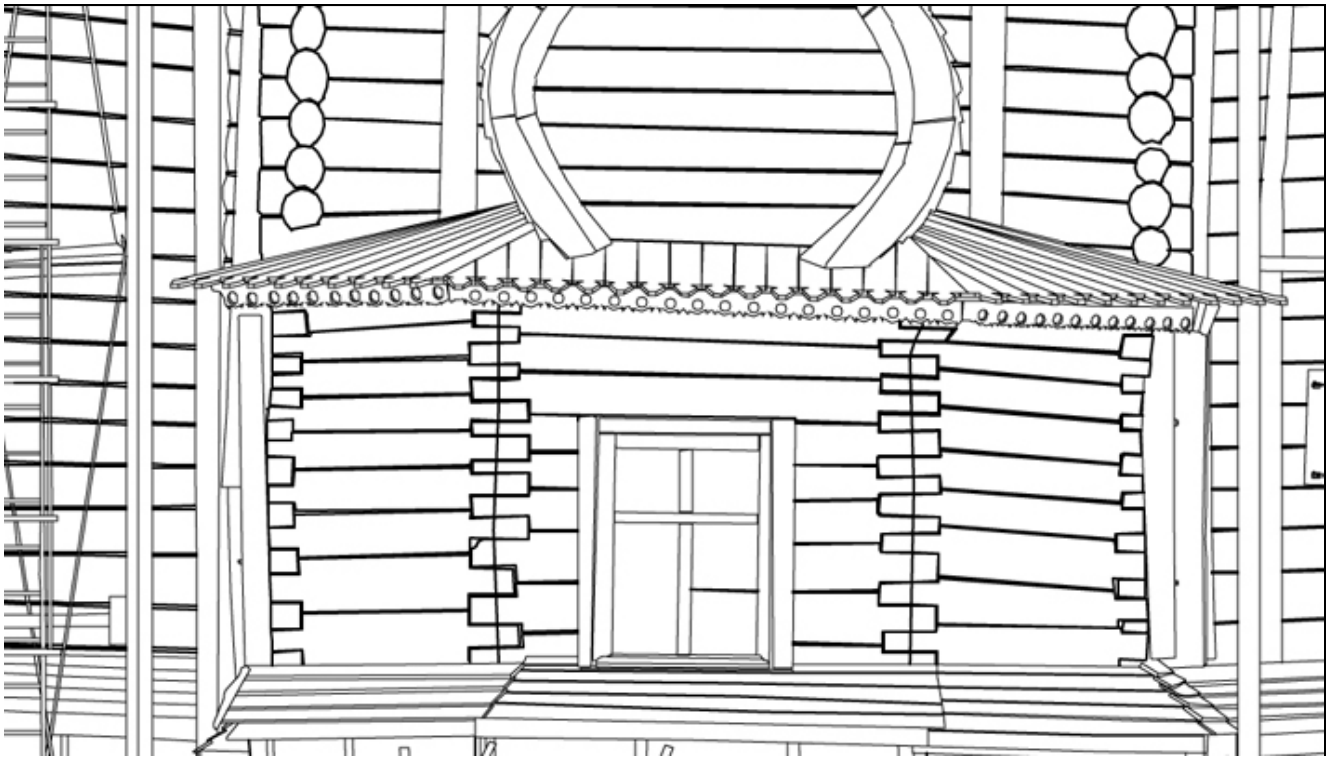
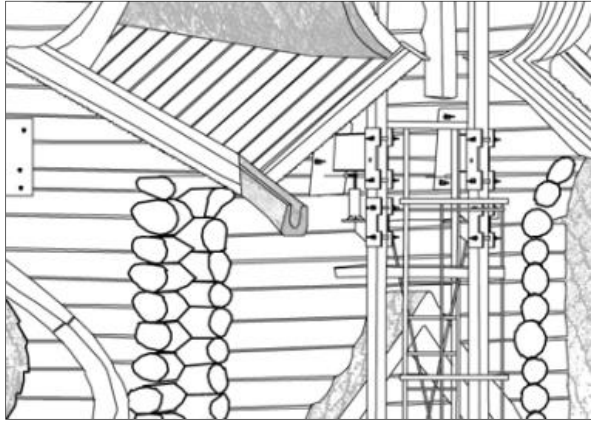
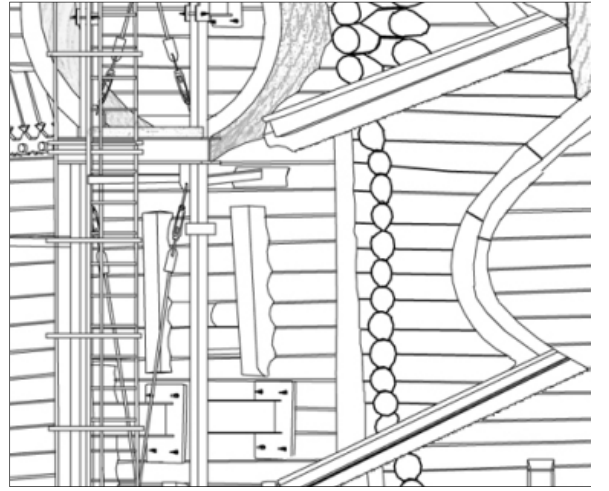
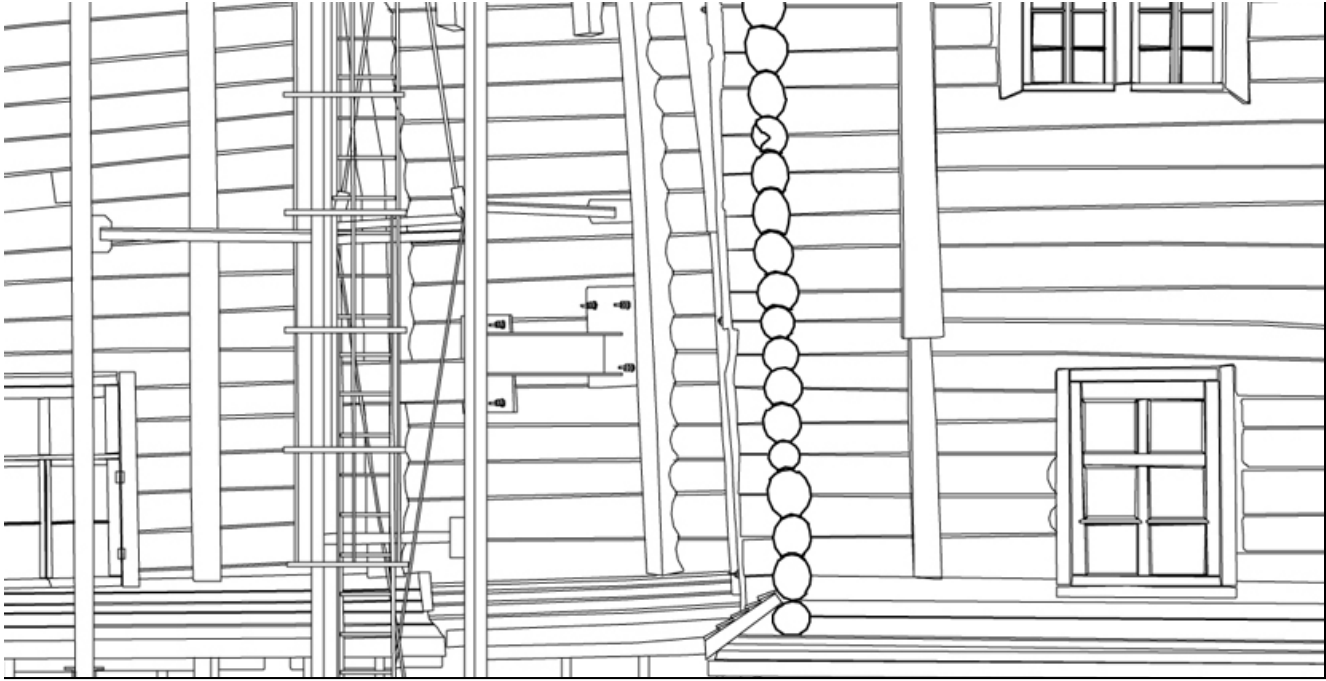
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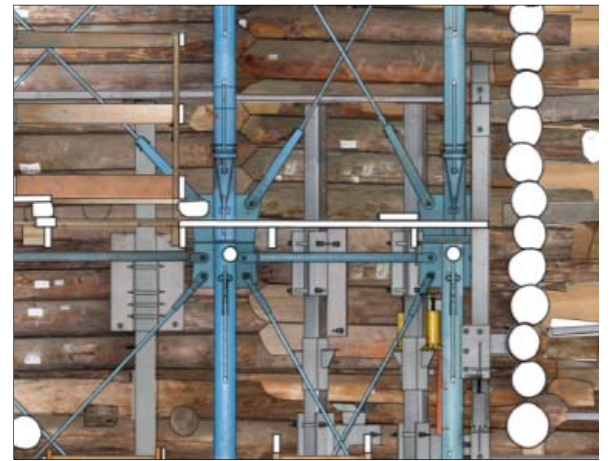
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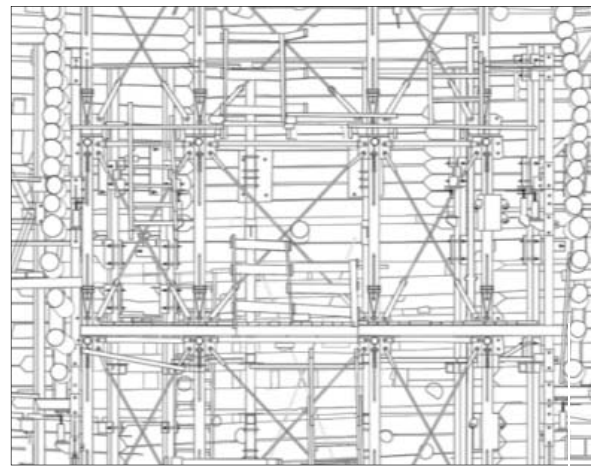
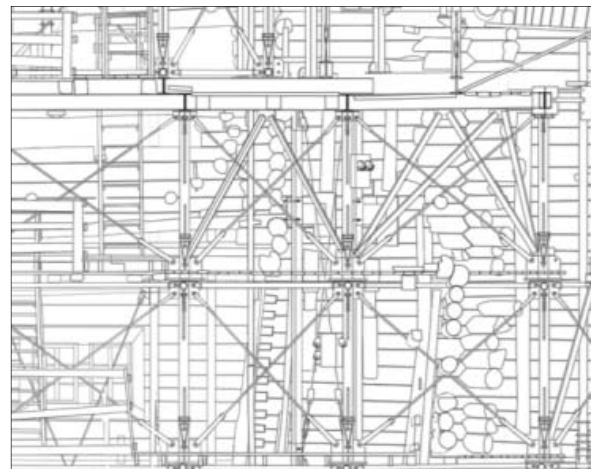
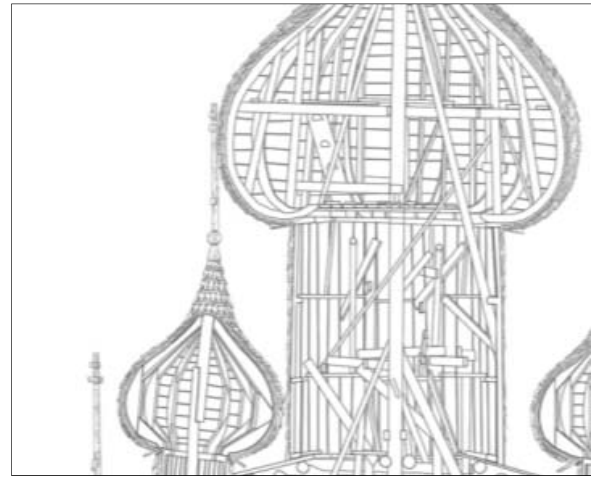
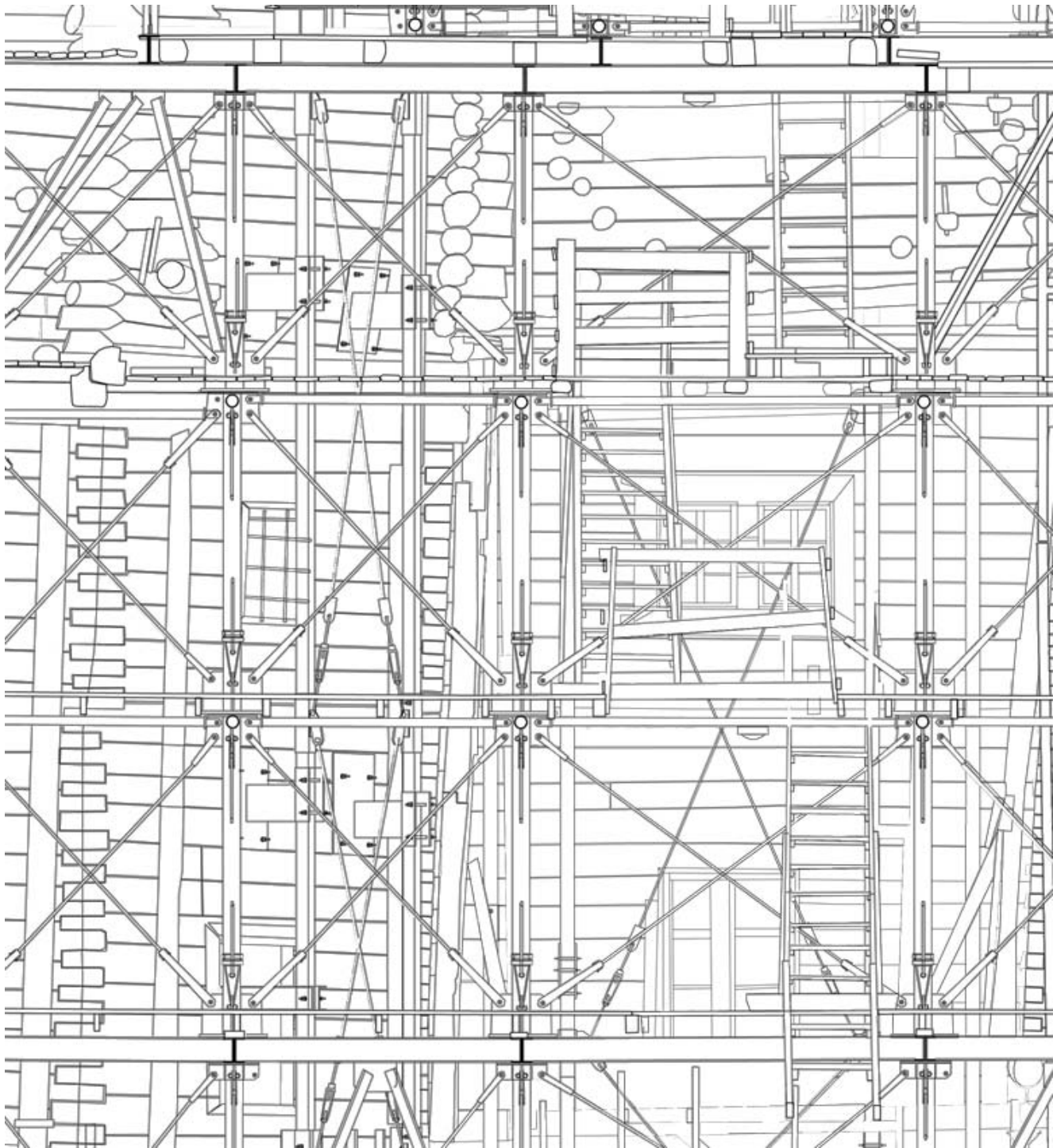
Linnanmaa, 2<sup>nd</sup> October 2017

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sara.porzilli@oulu.fi







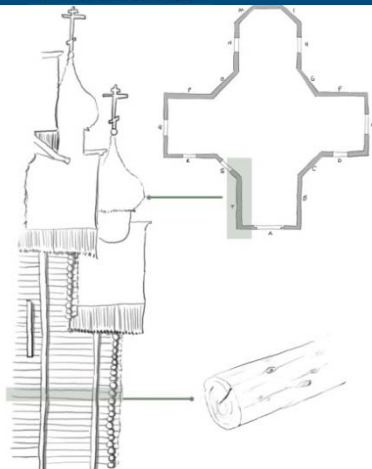




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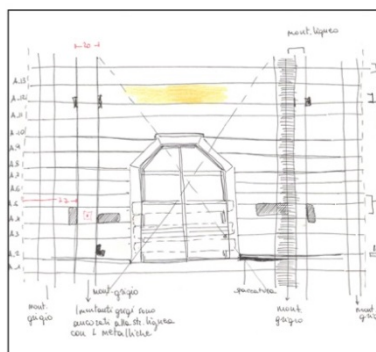
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parete numero tronco

P<sub>1\_4e</sub>

arretramento lato



INQUADRAMENTO

PLANIMETRIA

PROSPETTO ESTERNO

PROSPETTO INTERNO

SPECIFICITA' DELLE STRUTTURE LIGNEE  
Specie lignea  
Tipo di lavorazione  
Distribuzione durame / albura  
Incidenza difetti

ANALISI PRELIMINARE  
Relazione delle condizioni preliminari, ricerca delle cause del degrado, determinazione oggettiva e quantitativa delle caratteristiche strutturali.

P<sub>3e</sub>

FOTOPIANO

FIL DI FERRO

CARATTERISTICHE AMBIENTALI  
Umidità relativa: \_\_\_\_\_  
Temperatura relativa interna: \_\_\_\_\_  
Temperatura superficiale del legno: \_\_\_\_\_

ANALISI DELLE FORME DI ALTERAZIONE E MANIFESTAZIONI DI DEGRADO

SINTOMI SUL TRONCO

Nodi  
 Andamento anomalo della fibratura  
 Fessurazioni

Cipollature  
 Aggregazioni biologiche vegetali o animali  
 Alterazioni cromatiche

DEGRADO BIOLOGICO:

Funghi  
 Insetti

ficomiceti  
 ascomiceti  
 anobidi  
 carambicidi

basidiomiceti  
 deuteroomiceti  
 lictidi  
 isotteri

Licheni  
 Altro

PATOLOGIA DEL DEGRADO:  
LOCALIZZAZIONE:  puntuale  
 diffusa  
 localizzata

DESCRIZIONE DEL FENOMENO: \_\_\_\_\_  
CAUSE: \_\_\_\_\_

PATOLOGIA DEL DEGRADO:  
LOCALIZZAZIONE:  puntuale  
 diffusa  
 localizzata

DESCRIZIONE DEL FENOMENO: \_\_\_\_\_  
CAUSE: \_\_\_\_\_

PATOLOGIA DEL DEGRADO:  
LOCALIZZAZIONE:  puntuale  
 diffusa  
 localizzata

DESCRIZIONE DEL FENOMENO: \_\_\_\_\_  
CAUSE: \_\_\_\_\_

DESCRIZIONE DELLA PROCEDURA DI INTERVENTO

P<sub>3i</sub>

FOTOPIANO

CARATTERISTICHE AMBIENTALI  
Umidità relativa: \_\_\_\_\_  
Temperatura relativa interna: \_\_\_\_\_  
Temperatura superficiale del legno: \_\_\_\_\_

ANALISI DELLE FORME DI ALTERAZIONE E MANIFESTAZIONI DI DEGRADO

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CAUSE: \_\_\_\_\_

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 localizzata

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CAUSE: \_\_\_\_\_

DESCRIZIONE DELLA PROCEDURA DI INTERVENTO

Research and Theory of Architecture  
Linnanmaa, 2<sup>nd</sup> October 2017

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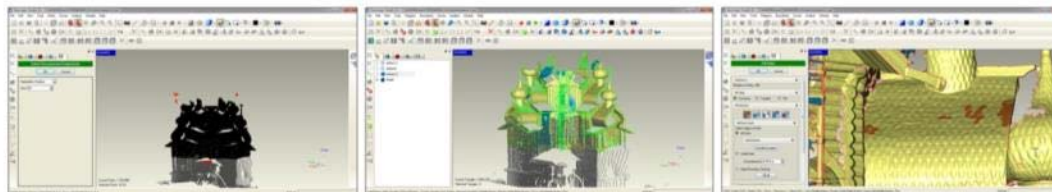
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## LA MODELLAZIONE 3D

METODOLOGIE A CONFRONTO

Supporto informatico: Geomagic Studio

Il primo approccio alla modellazione è stato effettuato con il programma Geomagic Studio. Questo software di reverse engineering permette di importare porzioni di nuvola provenienti da un progetto di scansioni laser scanner, elaborarle quando sono ancora in formato nuvola di punti quindi trasformarle in una mesh poligonale per elaborare un modello globale dell'oggetto. L'elaborato finale è buono nella sua globalità ma presenta importanti lacune nei dettagli.

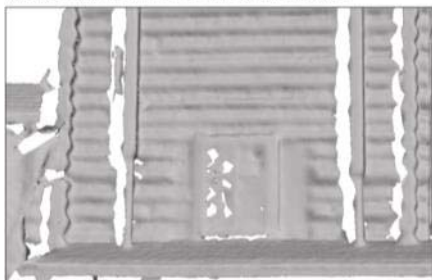


Dopo aver importato le porzioni di nuvola si eliminano tutti i punti di disturbo, che potrebbero interferire l'operazione di triangolazione.

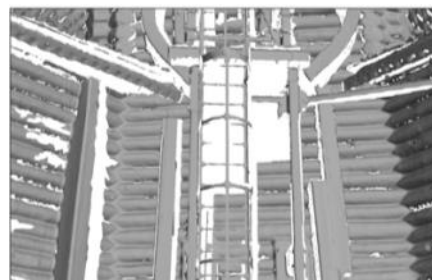
Dopo aver effettuato la trasformazione in mesh, si regolano i parametri che modificano rugosità e levigatezza delle superfici.

Le parti nelle quali non si ha alcun riempimento vengono ricostruite attraverso la creazione di mesh.

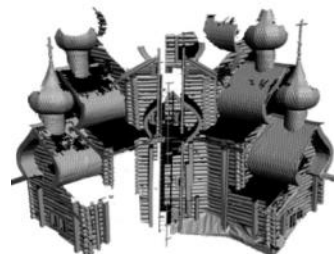
## RISULTATI DELL'ELABORAZIONE



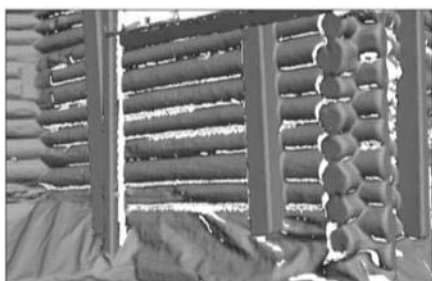
Particolare dell'infisso



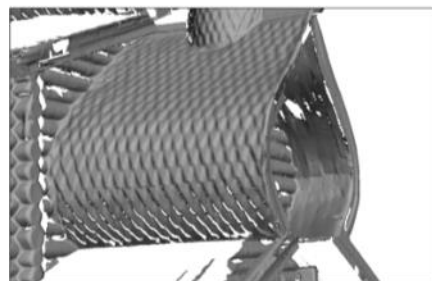
Incastro blockbau



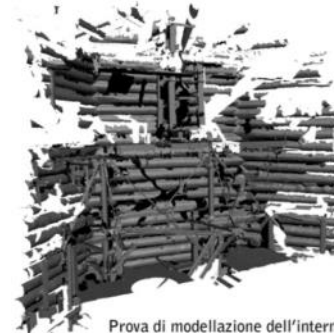
Risultati parziali



Incastro blockbau



Scandole



Prova di modellazione dell'interno



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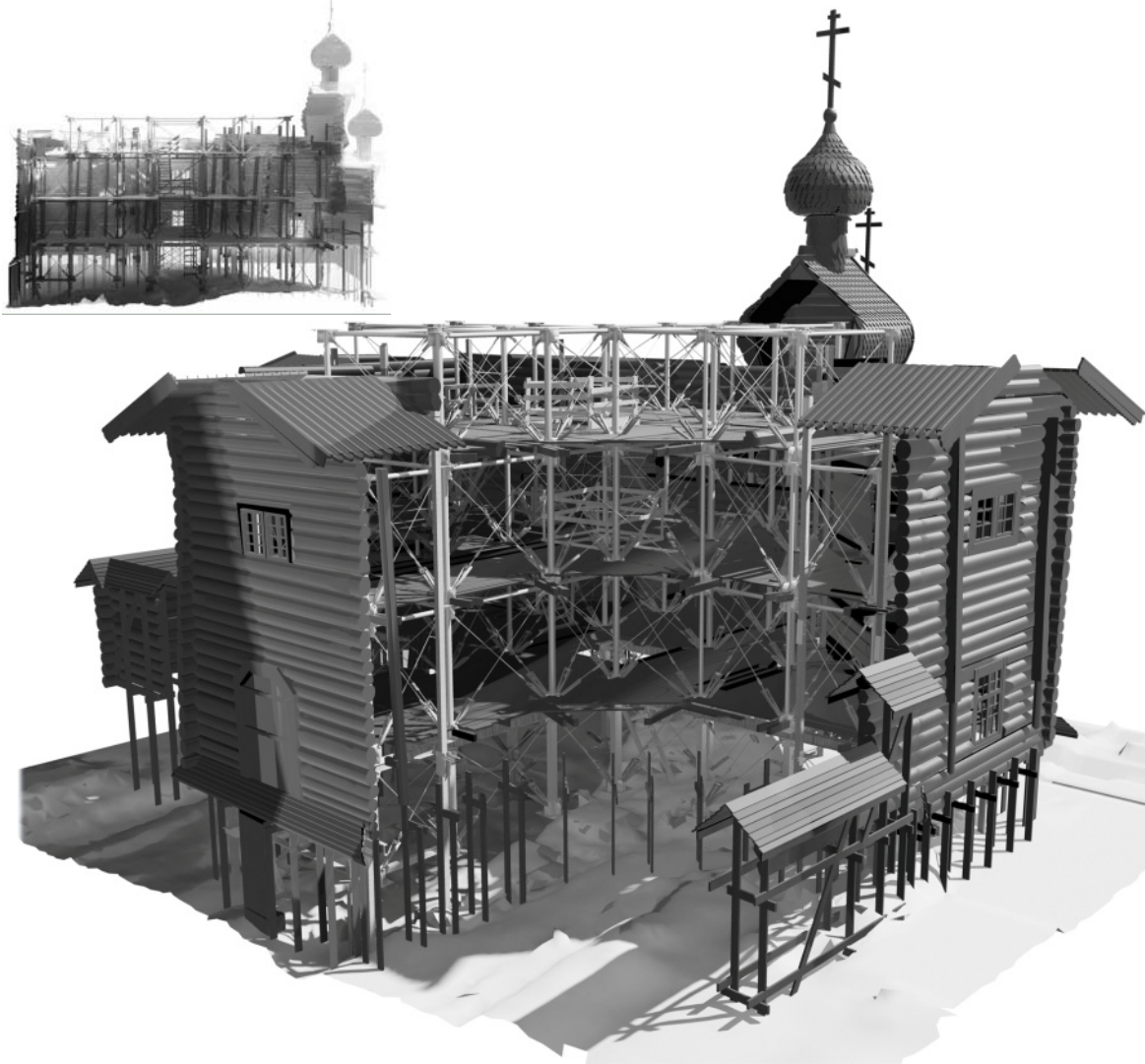
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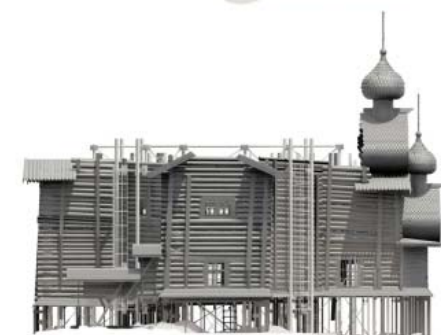
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PROSPETTO OVEST



PROSPETTO EST



PROSPETTO SUD

**R**esearch and **T**heory of **A**rchitecture

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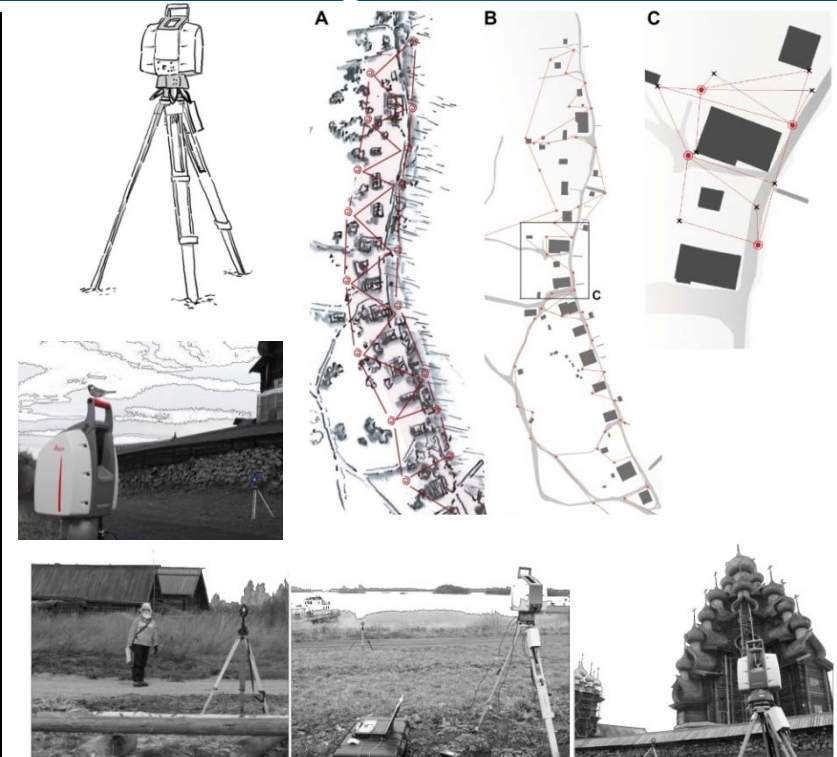
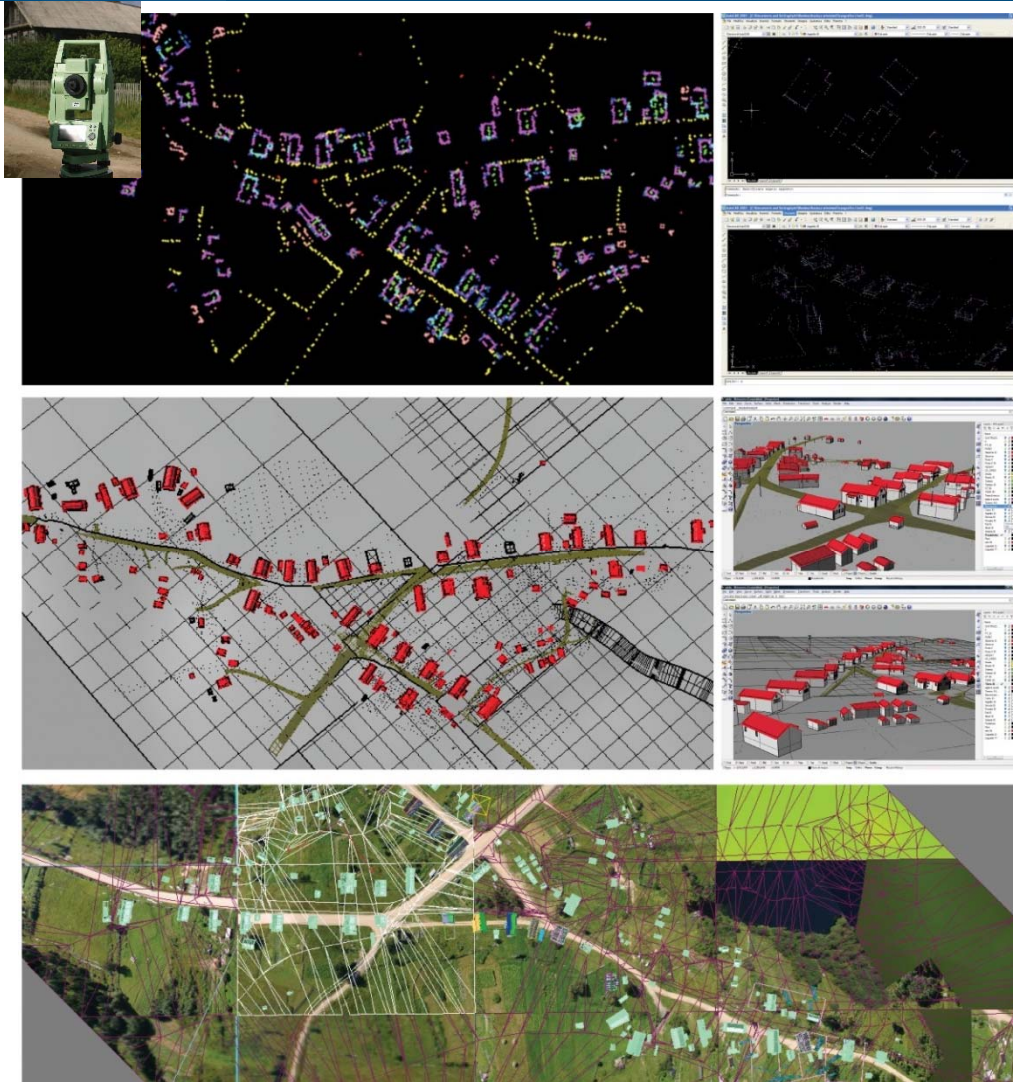
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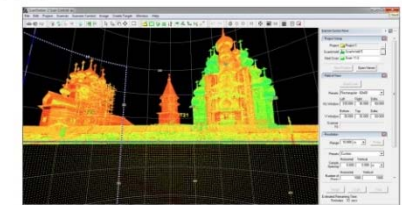
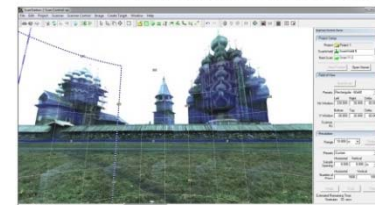


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## SCANSIONE

Fase nella quale avviene l'acquisizione da parte del laser dell'immagine del luogo e dei punti nello spazio. La scansione deve essere pre-impostata definendo la densità dei punti della nuvola e l'angolo zenitale e azimutale da effettuare rispetto all'orizzonte.



## Research and Theory of Architecture

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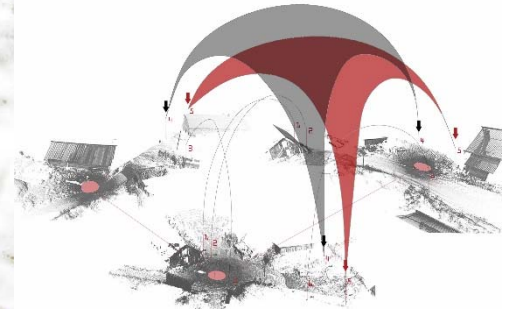
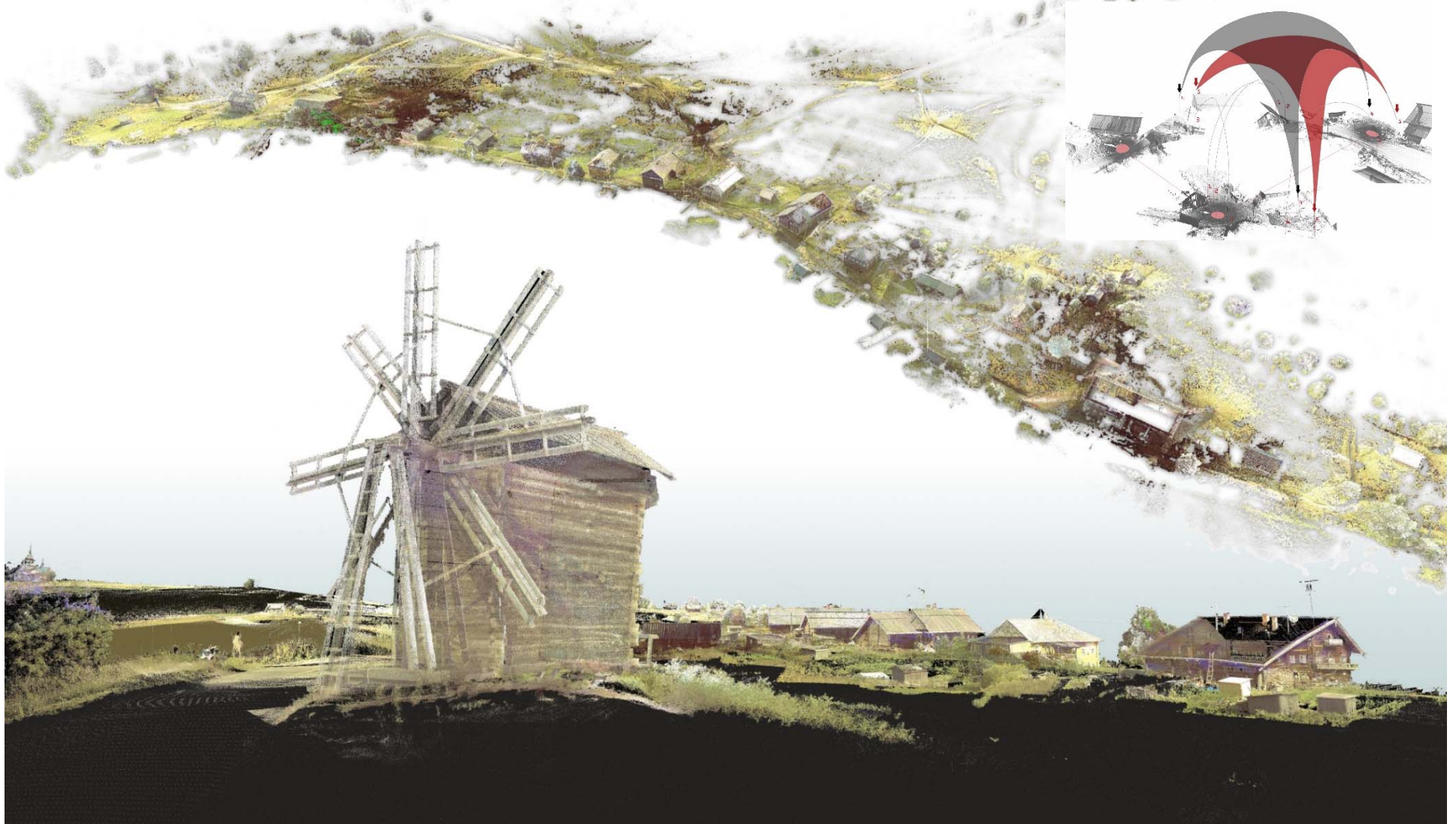
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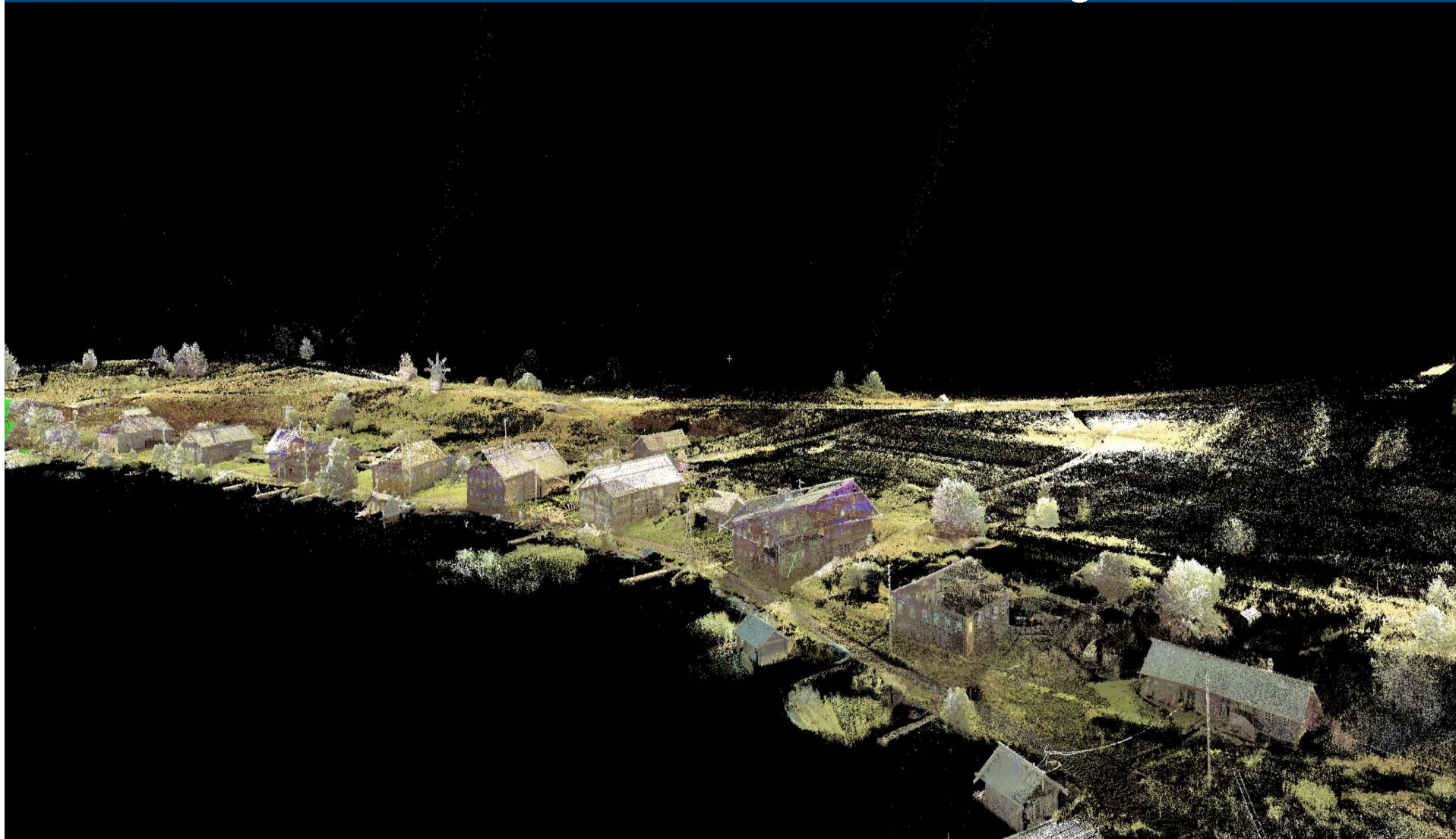


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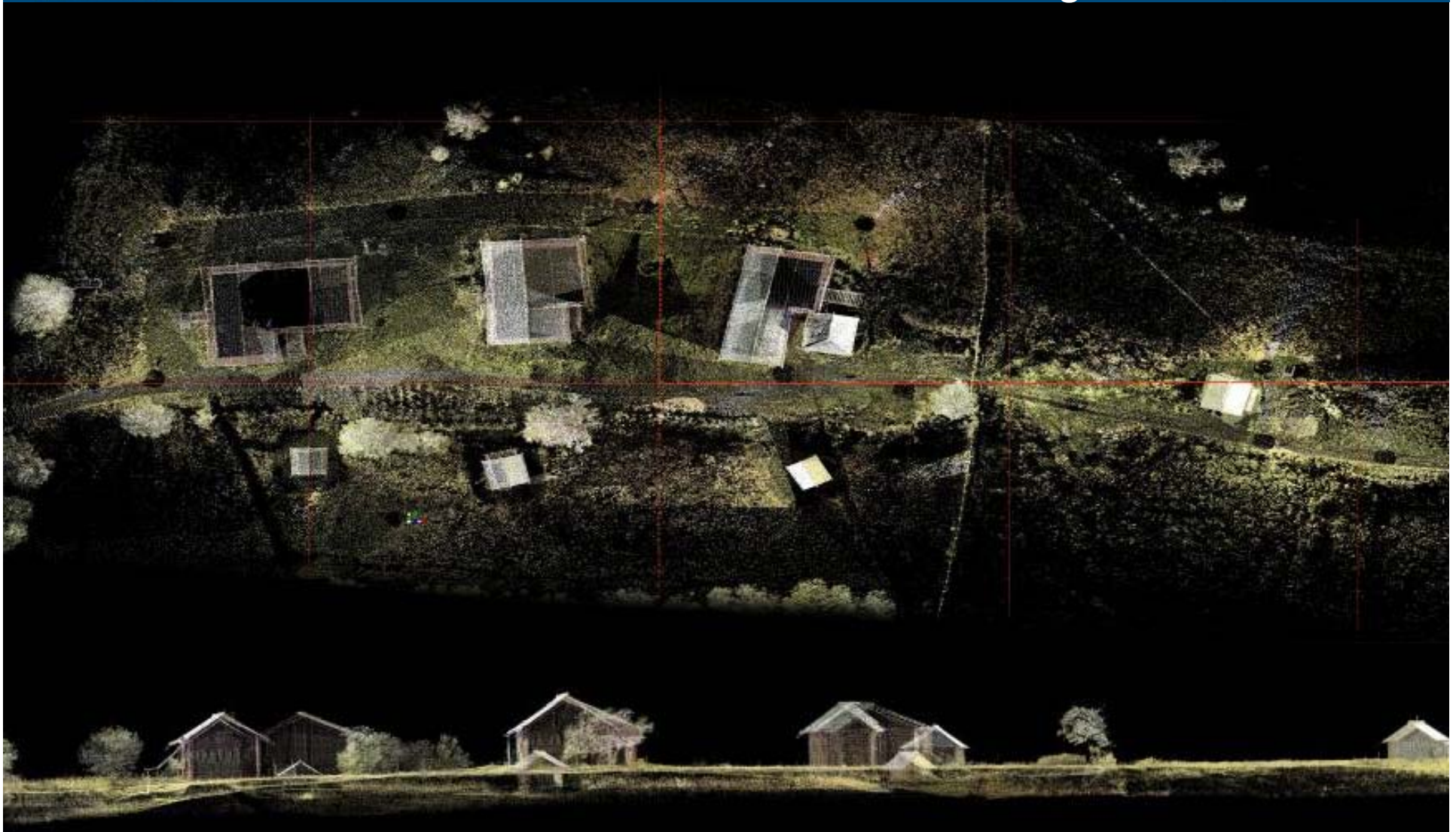
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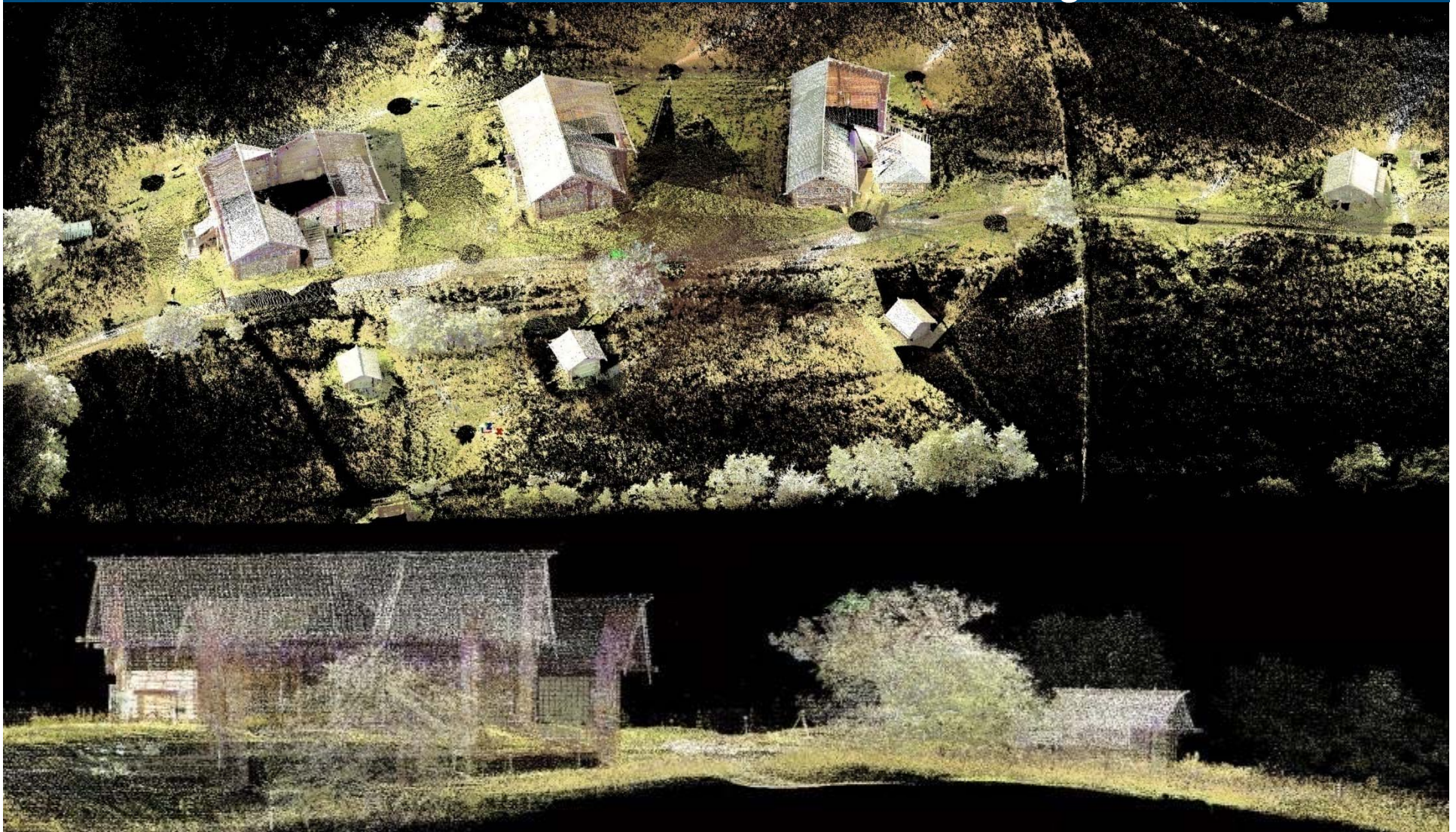
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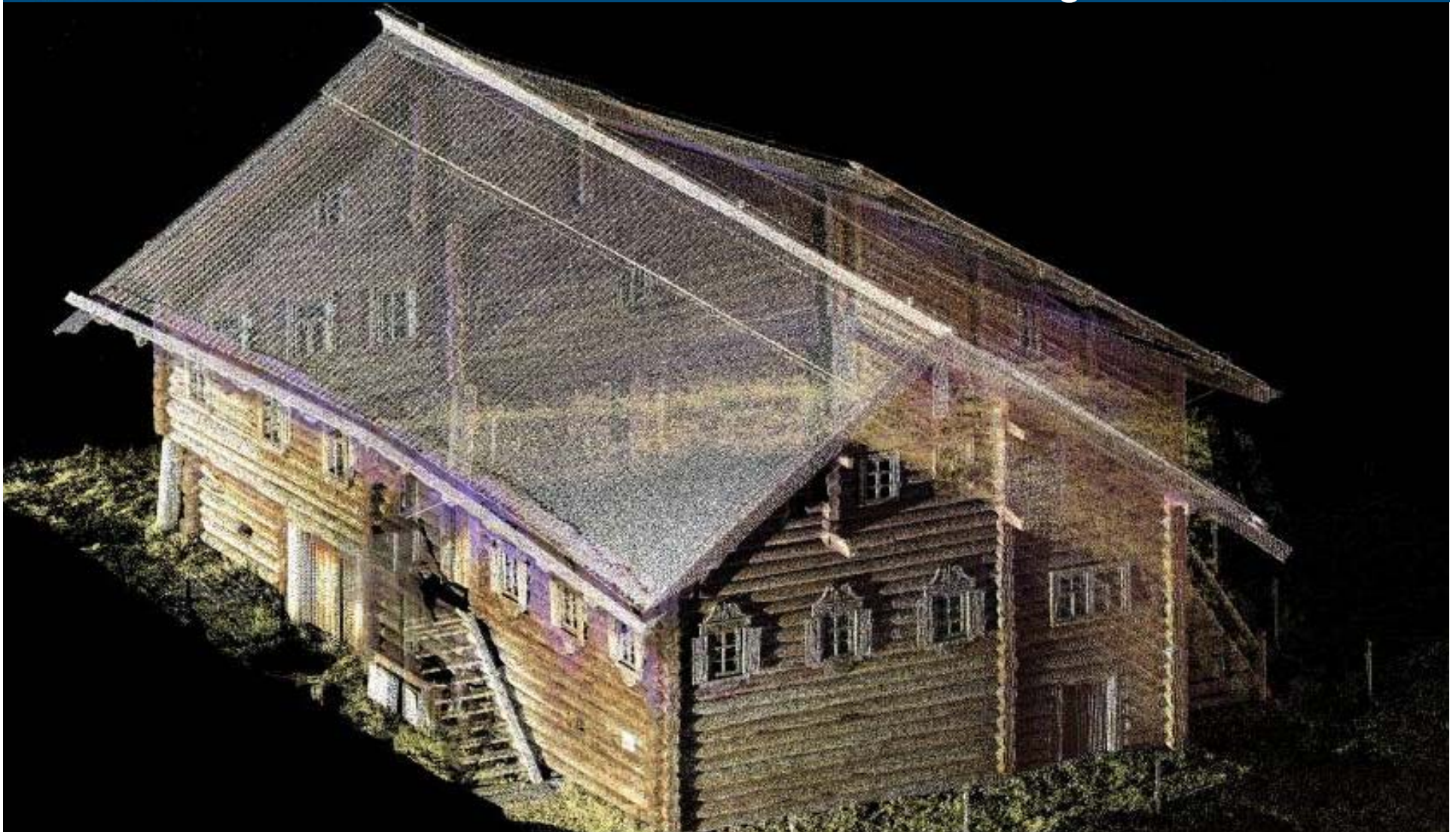




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*Il Villaggio di Yamka*



## Research and Theory of Architecture

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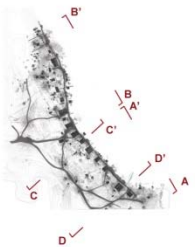
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Sezione D-D'

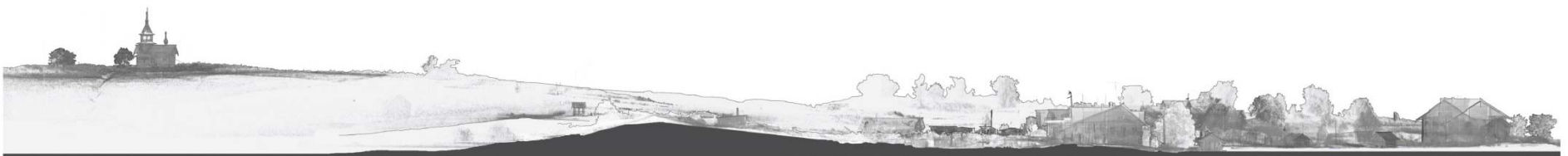
0 5 10 30m



Sezione A-A'



Sezione B-B'



Sezione C-C'

0 10 20 50m

## Research and Theory of Architecture

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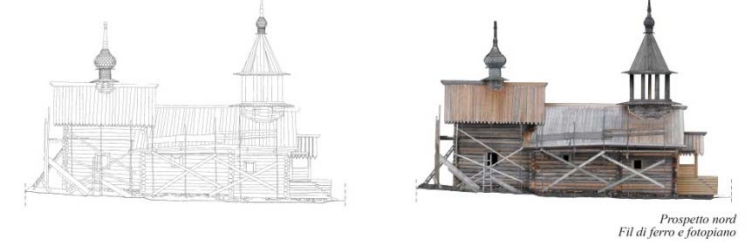
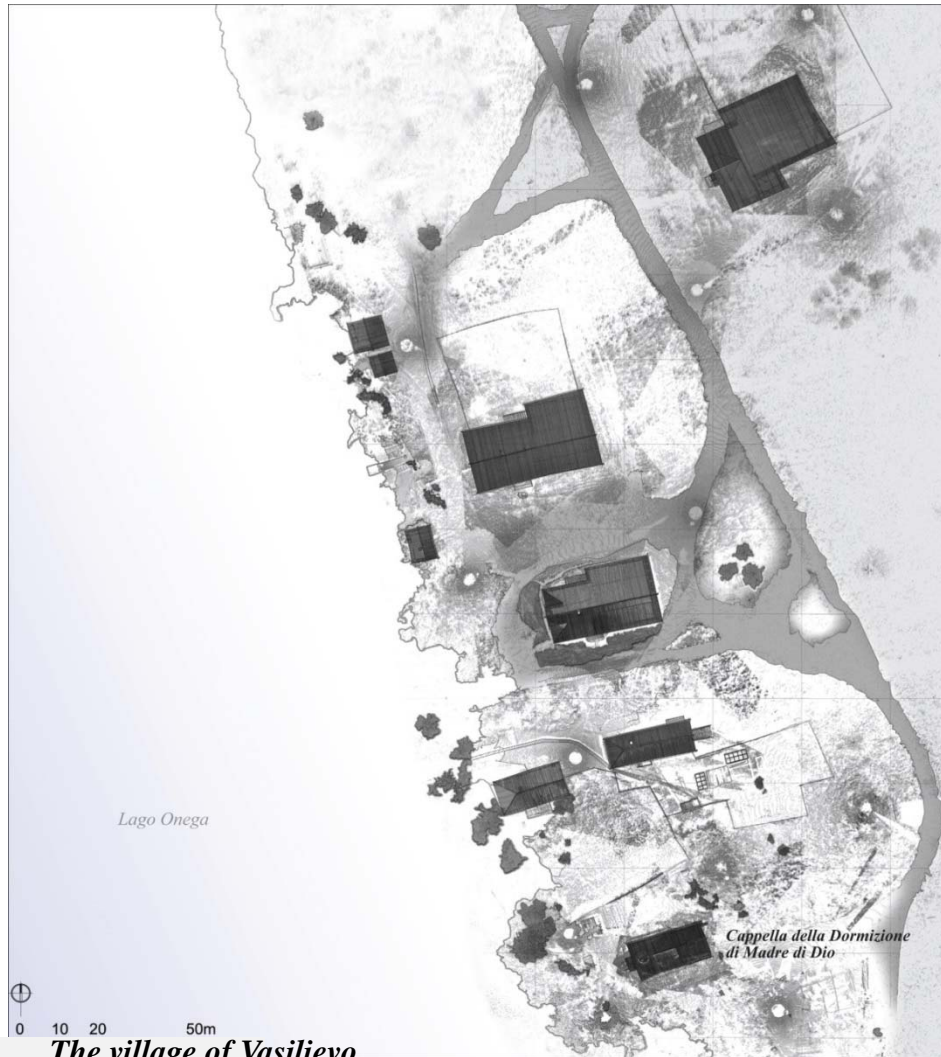
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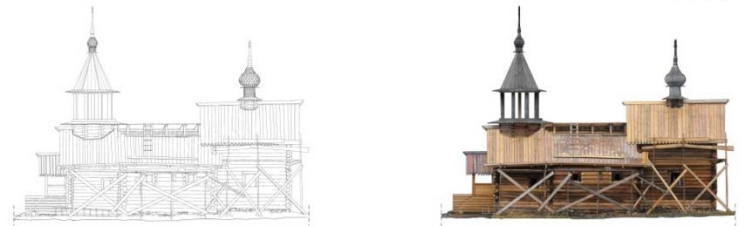


Prospetto nord  
Fil di ferro e fotopiano



Prospetto ovest  
Fil di ferro e fotopiano

Prospetto est  
Fil di ferro e fotopiano



Prospetto sud  
Fil di ferro e fotopiano



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Linnanmaa, 2<sup>nd</sup> October 2017

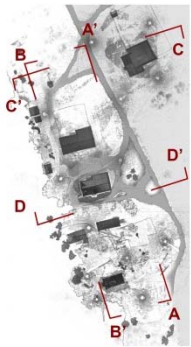
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Sezione A-A'



Sezione B-B'



Sezione C-C'



Sezione D-D'

Research and Theory of Architecture

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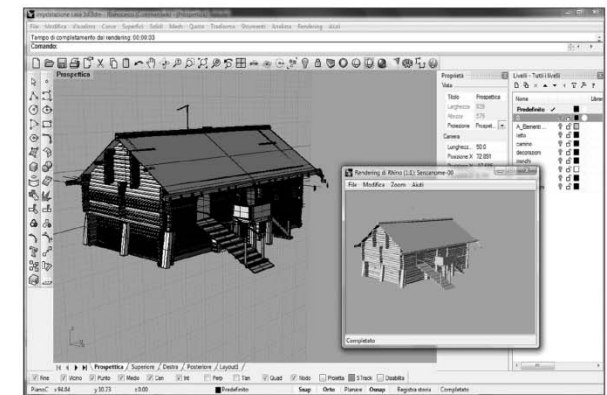
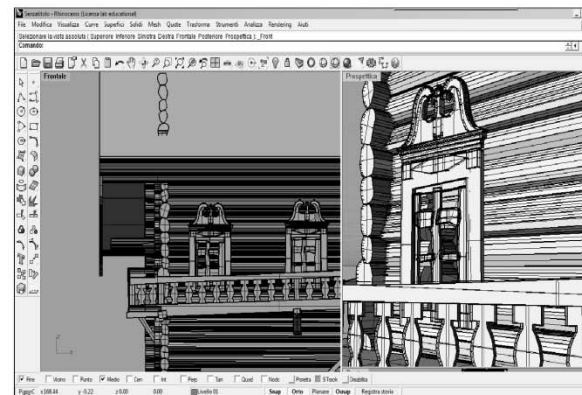
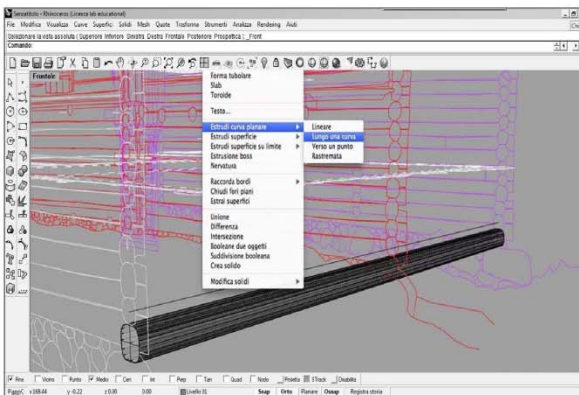
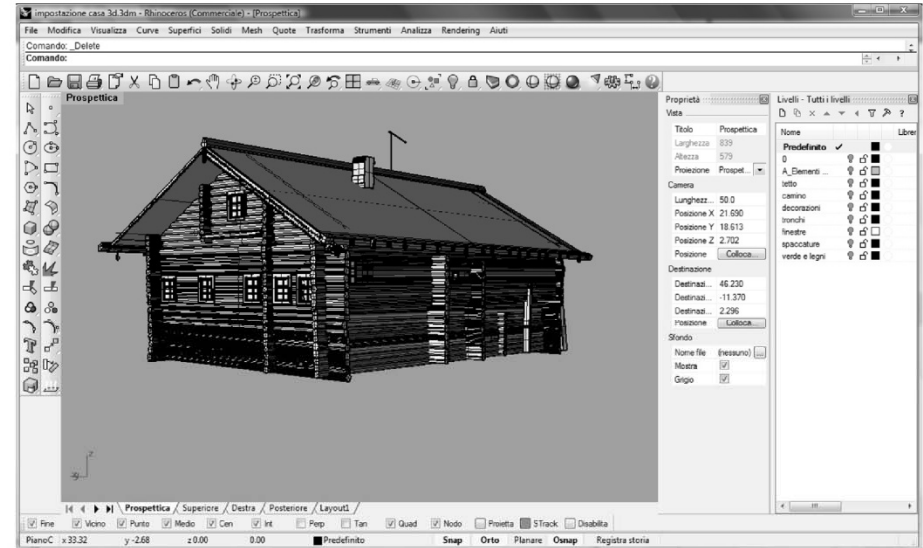
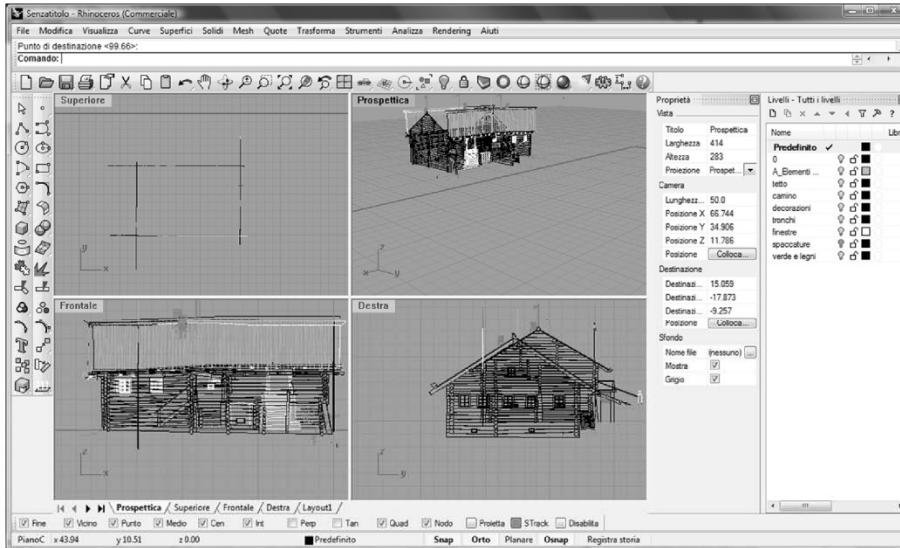
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Linnanmaa, 2<sup>nd</sup> October 2017

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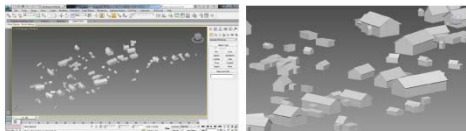
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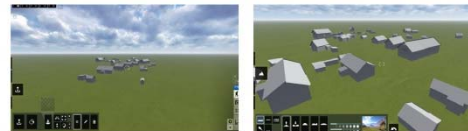
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1. Il modello 3D viene aperto in ambiente 3ds Max ed esportato in .fbx file.



2. Il modello in .fbx viene importato in ambiente Lumion.



3. Creazione del terreno attraverso il confronto con le fotografie panoramiche, generali o di dettaglio del contesto.



4. Attraverso le curve di livello elaborate su Autocad è possibile lavorare con le pendenze del terreno.



I menu a tendina messi a disposizione all'interno del programma Lumion consentono una buona gestione del trattamento del sistema ambientale, delle superfici e dei volumi precedentemente elaborati in ambiente RhinoCeros. Il programma offre inoltre della ampie e utili librerie relative alla vegetazione (dai diversi tipi di alberature, a vegetazione bassa, sino ai diversi manti erbosi o sterrati), alle textures relative a un'ampia gamma di materiali differenti. Fra i cataloghi a disposizione si ha anche la possibilità di gestire gli sfondi del cielo, la posizione del sole e il sistema delle ombre.



## Research and Theory of Architecture

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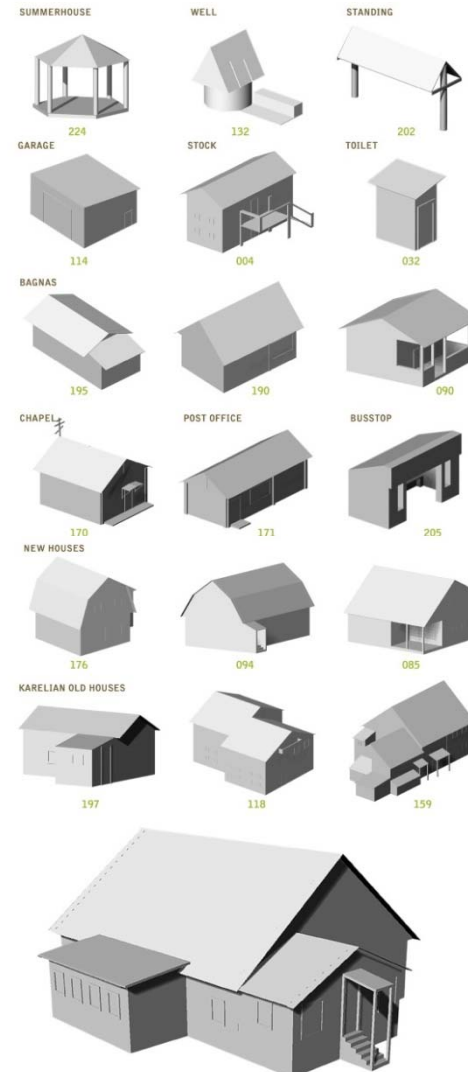
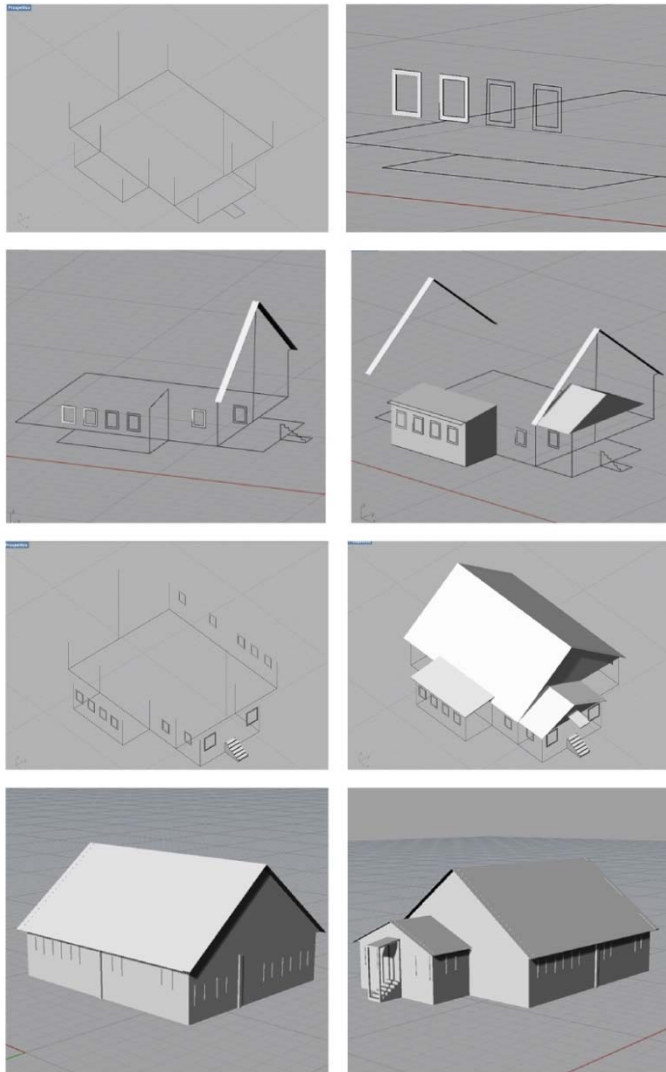




# Documentation of **W**ooden **A**rchitectural **H**eritage



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**R**esearch and **T**heory of **A**rchitecture  
Linnanmaa, 2<sup>nd</sup> October 2017

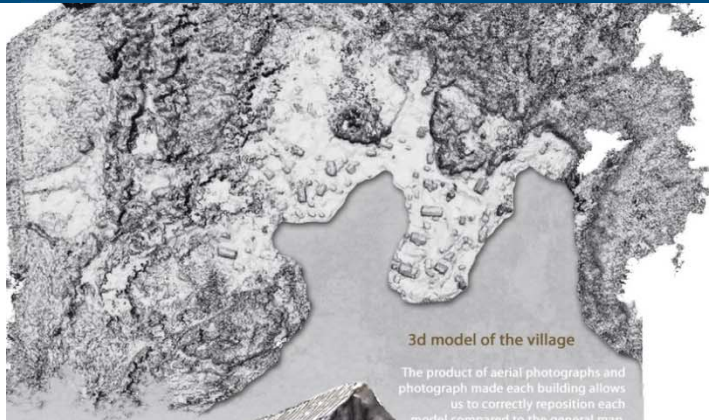
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3d model of the village

The product of aerial photographs and photograph made each building allows us to correctly reposition each model compared to the general map, and thus obtain a highly descriptive and realistic virtual environment.



Traditional house # 107

Photographs were taken to all the historic houses, round to 360°, trying to describe all the elements of traditional architecture and dwelling especially on those architectural and decorative details typical of the Karelian wood architecture.



New building # 034

Also the new buildings were photographed in order to develop models that can describe the provision volumetric and the color of surfaces.



Traditional with new elements building # 013

The historic houses with outbuildings have experienced problems for the methodology of taking photographs, with large volumes with different provisions planimetric have constrained the movement around the houses and the high number of pictures.

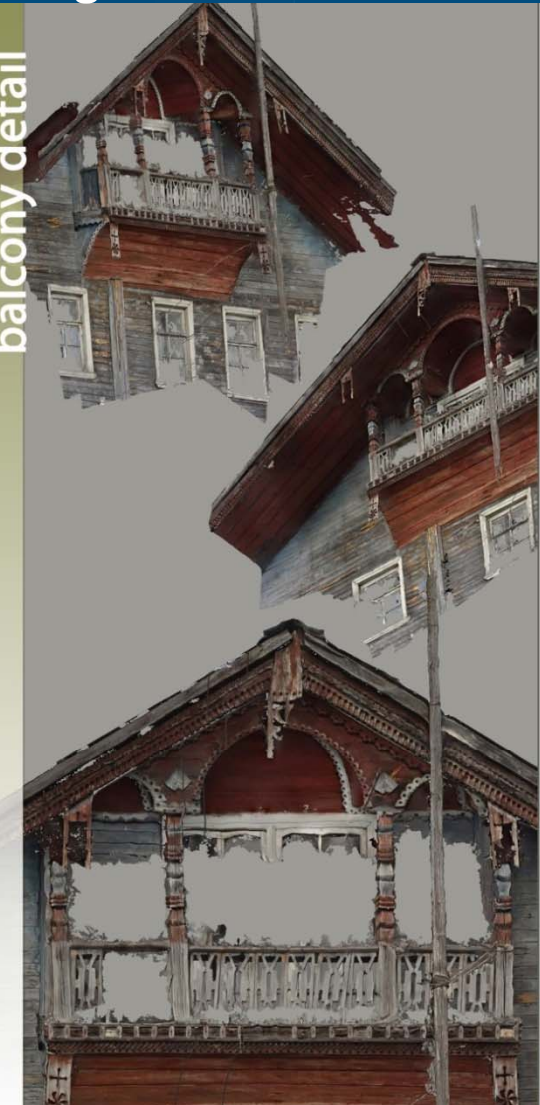


monumental building # 002

The monumental buildings such as the historic chapel of the village have called attention to the methodology of shots of the photographs. presents of trees or other obstacles has linked the shooting to more steps and important post-production.



balcony detail



## Research and Theory of Architecture

Linnanmaa, 2<sup>nd</sup> October 2017

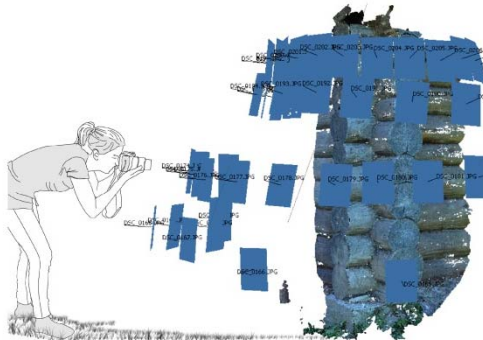
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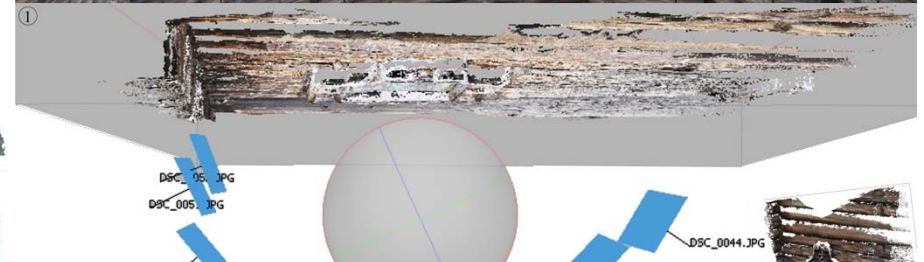
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Fase operativa di acquisizione delle foto necessarie per ricostruire tridimensionalmente un modello meshato e texturizzato dei particolari architettonici lignei dell'architettura tradizionale careliana. I semplici modelli 3D possono costituire un'importante base metricamente affidabile e cromaticamente realistica per svolgere analisi specifiche sullo stato di conservazione e comprensione dello stato di degrado del legno.



1. Allineamento delle foto: dopo aver caricato le foto all'interno del progetto di PhotoScan, deve essere eseguito l'allineamento geometrico. In questa prima fase il programma individua la posizione spaziale della telecamera per ciascun fotogramma e genera una nuvola di punti.

2. La ricostruzione tridimensionale è un'operazione computazionalmente intensiva e può richiedere molto tempo, a seconda della quantità di dati da processare e della risoluzione delle foto caricate.

3. L'operazione di texturizzazione colorizza attraverso le cromie reali tratte direttamente dalle fotografie l'oggetto analizzato. Le proprietà relative all'operazione di mappatura consentono di

## Research and Theory of Architecture

Linnanmaa, 2<sup>nd</sup> October 2017

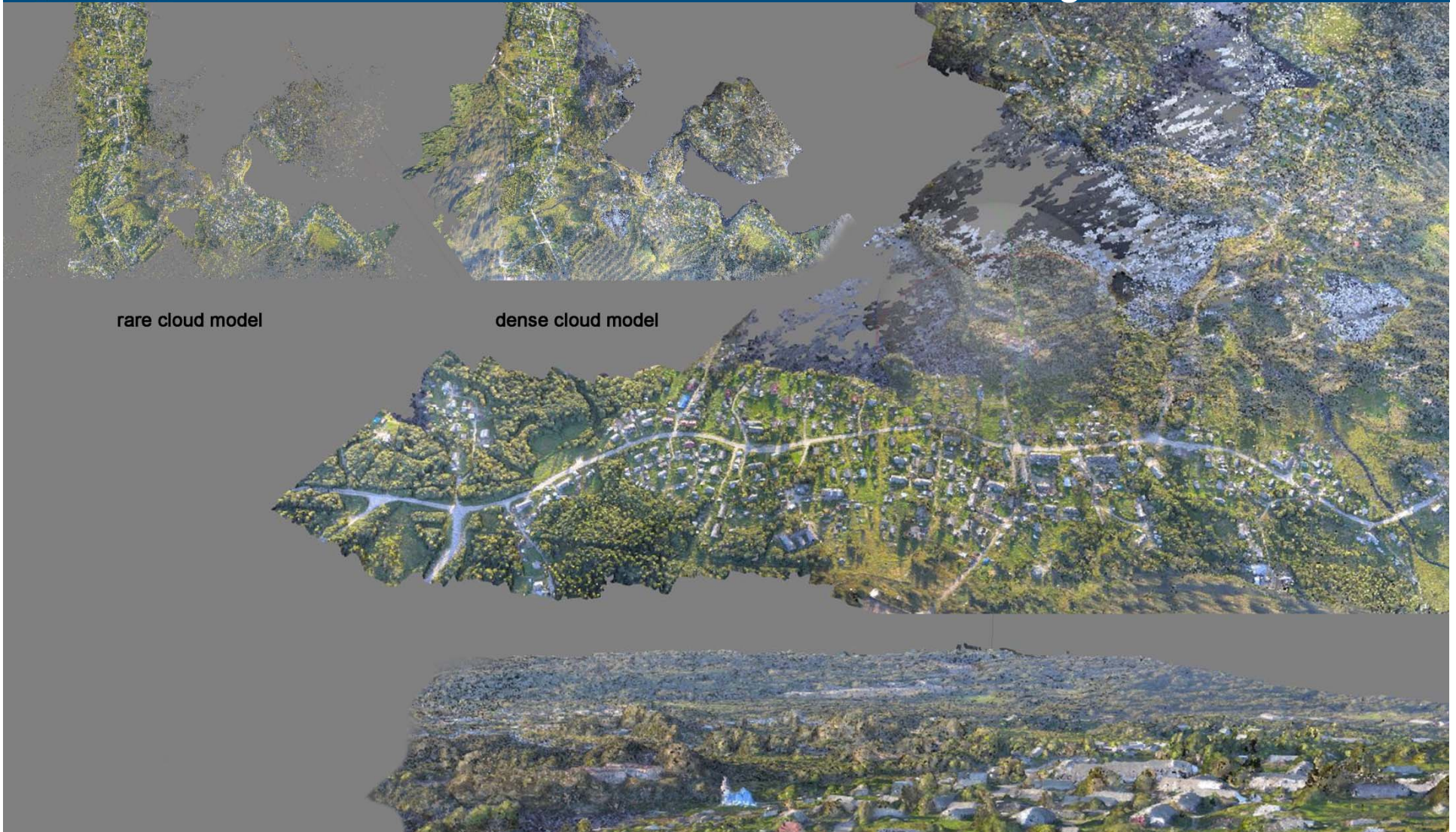
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rare cloud model

dense cloud model

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Linnanmaa, 2<sup>nd</sup> October 2017

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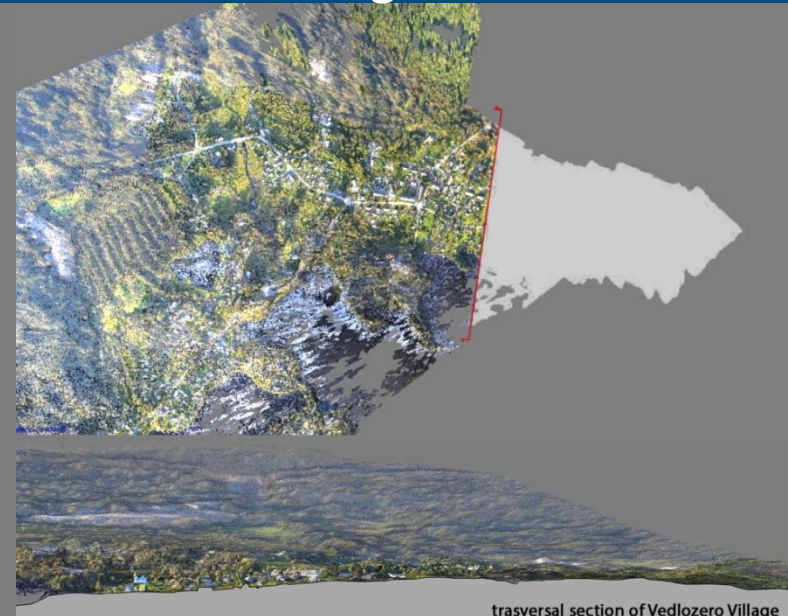


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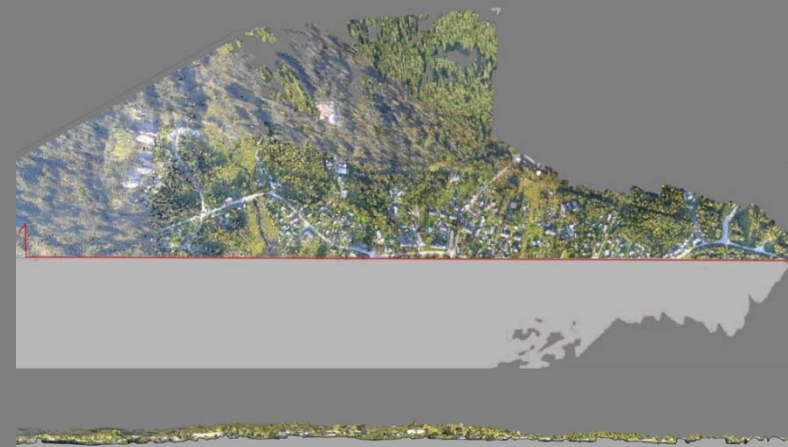
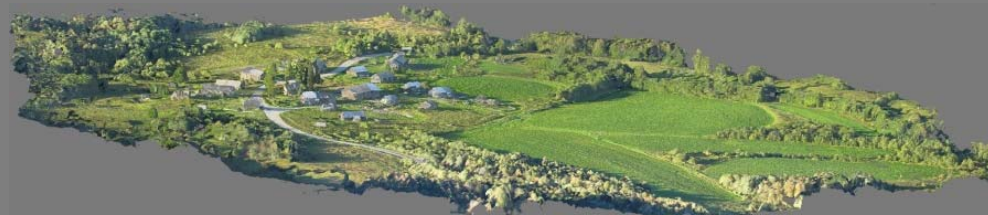


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trasversal section of Vedlozero Village



**R**esearch and **T**heory of **A**rchitecture

Linnanmaa, 2<sup>nd</sup> October 2017

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**R**esearch and **T**heory of **A**rchitecture

Linnanmaa, 2<sup>nd</sup> October 2017

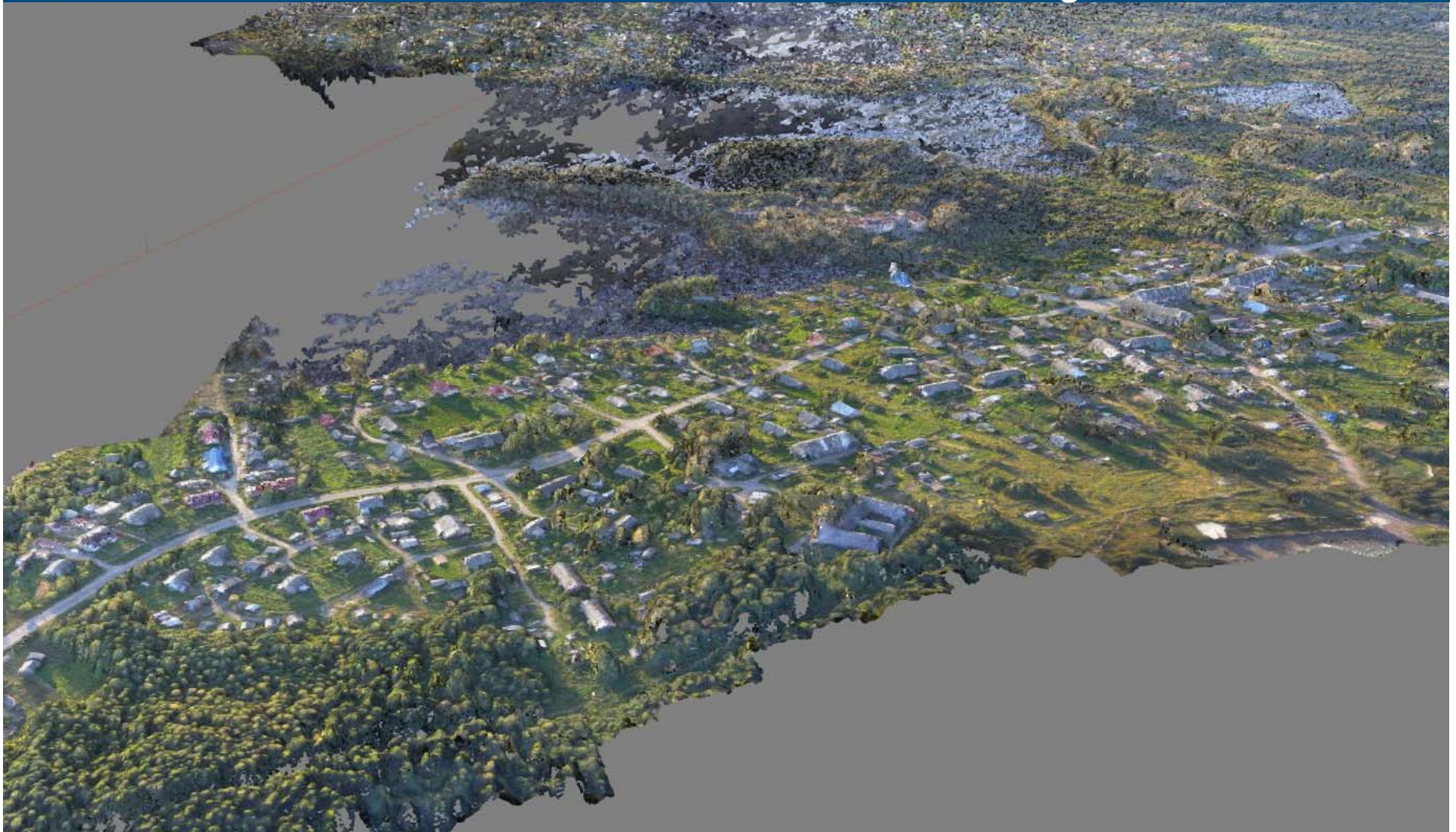
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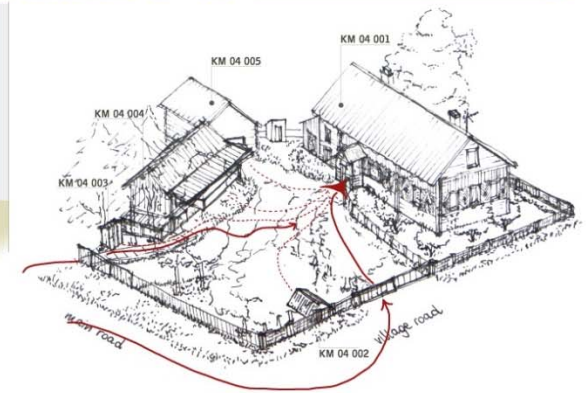
Main level of the entire village



Definition of the micro areas



Architectural unit

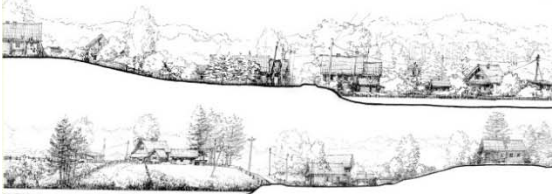


The first step of the analysis has included the study of the rural settlement from the general to the particular for understanding the plan and the different types of relations. We underline the relations of the physical structure made by full and empty spaces. Full spaces are represented by the lower level of micro areas (the space related by stocades or administrative limits to the main houses) and the natural green areas; the empty spaces are organised according with the different type of access in the place focused on principal and secondary paths.

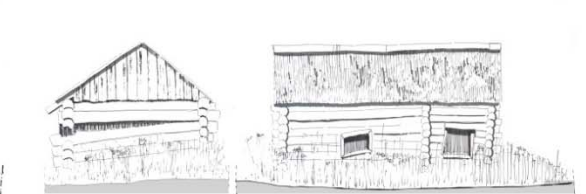
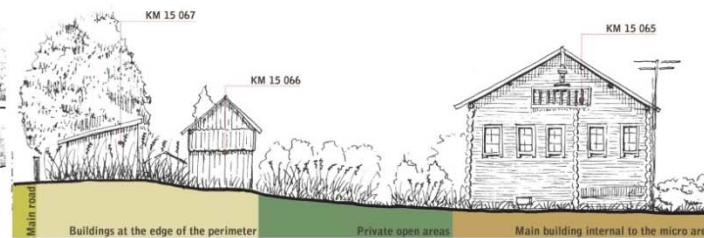
For each micro area the analysis has gone deeper until the understanding of the relations between environmental and rural systems, building-building, empty-full spaces, street system, other elements. The micro areas correspond at the organization system of the village. During the analysis is important to define the limits and the main aspects in which architectural elements are inside.

For each micro area the analysis has included the study of the singular environmental and urban situation inside this real or absent perimeter. It corresponds to each walled structure in the village. For each architectural units we define the system of census analysis designing a database schedules containing all the descriptors for describe typology, function and condition state of the building.

GENERAL LEVELS OF REPRESENTATION AND DESCRIPTION OF THE PLACE ACCORDING WITH THE DIFFERENT LEVELS OF ANALYSIS



Section of the entire village for the understanding the relations of the different micro areas according with the morphological aspects of the environmental system.



Study of each facades for the understanding of the main characteristic of buildings. Thanks to the draw it was possible to realize the first architectural and structural considerations.



The analysis has gone deeper until the realization of experimentation on the main structural and decorative

## Research and Theory of Architecture

Linnanmaa, 2<sup>nd</sup> October 2017

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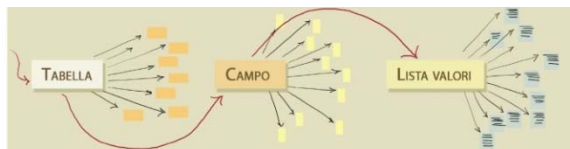


# Documentation of Wooden Architectural Heritage



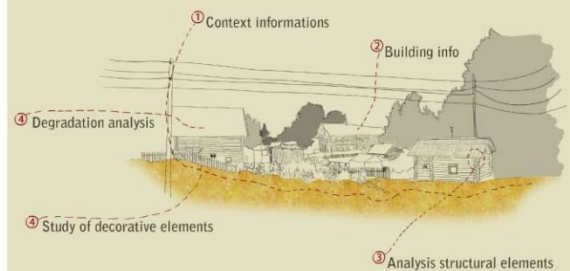
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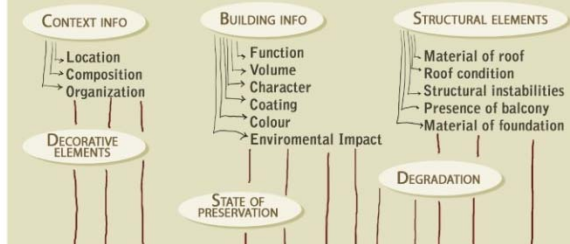


Ogni tabella è costituita da più campi. Ciascun campo è associato ad una specifica ed unica lista valori.

**1. Tabella** Le tabelle rappresentano le macrofamiglie all'interno delle quali si raggruppano campi caratterizzati da aspetti comuni. Un file può anche contenere più tabelle che, insieme, contengono tutte le informazioni su un determinato argomento o su argomenti correlati.



**2. Campo** E' una sottocategoria della tabella. Rappresenta l'argomento di dettaglio che si vuole documentare.

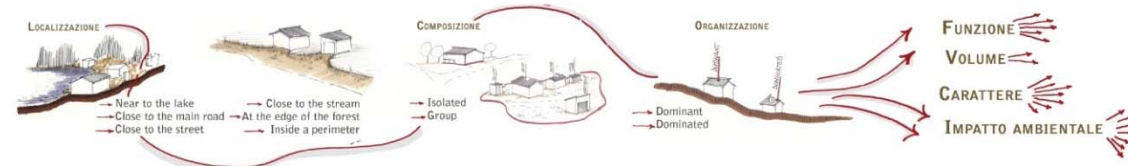


**3. Lista valore** E' l'elenco specifico relativo ad ogni campo. Rappresenta quindi l'insieme delle opzioni che ciascun campo ha a disposizione.

- Function** Residential, Pantry, Dependance, Sauna, Pantry, Warehouse, Outbuilding, Loggia, Garage, Well, Toilet, Worship, Canopy, Industrial, Hospital, Throw boat, Woodshed, Barn, Greenhouse, Commercial, Educational, Chapel
- Character** Null, Rural, Typological, Historical, Monumental
- Material of foundation** Wood and concrete, Wood and stones, Stone and concrete, Concrete and bricks, Bituminous elements, Absent, Wood, Concrete, Stones



From the analysis of the context ..... Through the environmental sections ..... Until the study of each building



I dati generali individuano quegli elementi descrittivi riferibili al contesto, al tipo di aggregazione e organizzazione, alla volumetria dell'edificio, al carattere intrinseco e all'impatto ambientale che questo ha nei confronti dell'intorno.

## Research and Theory of Architecture

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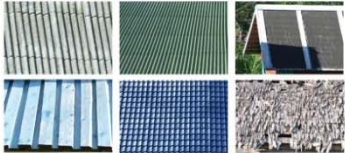
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## Main characteristics of the buildings

### Typology of the roof



The majority of the roof typologies that can be observed in Korza village are not typically Karelian; for example, a large amount of precast metallic or fibrous coverings can be counted, as well as asbestos or similar materials.

### Decorative elements



Concerning the decorative elements, there are two main typologies: structural elements that become decorative (as for example parts of the roof structure, balconies and so on), or decorations directly applied to the external surface of the construction (as for example the coating, that respond also to the functional need to preserve the structure).

### Disfiguring elements



The degradation typologies can be divided into two groups: anthropic and biological.

### State of preservation



In the village of Korza, buildings in different preservation state may be found: there are old and abandoned houses, together with new houses without any typological Karelian characteristics, and new constructions that are an attempt of integration with the landscape.

### Foundation systems



The traditional foundation system is made by stones, nevertheless it is frequent to see foundation systems entirely made by concrete, or concrete associated to stones or blouses.

## Design of the census document

**Census of Korza Village**  
Action of the Architectural and Structural Elements for the Understanding of the State of Conservation

Identification code: KM 01 001

Location:  
 Next to the lake  
 Close to the main road  
 Close to a village road  
 Close to a stream  
 Inside a defined perimeter  
 At the edge of the forest

Composition:  
 Group: \_\_\_\_\_  
 Visibility:  
 Visible  
 Invisible

Identification of the micro-area in the village context: [Map]

Identification of the analyzed building inside its micro-area: [Aerial view]

Identification of the main functions hosted in the building units:  
 Residential  
 Stable  
 Poultry  
 Warehouse  
 Garage  
 Well  
 Toilet  
 Religious  
 Canopy  
 Woodshed  
 Stable  
 Barn  
 Greenhouse  
 Doghouse  
 Absent  
 Educational  
 Laundry  
 Other

Analysis of the composition of the building unit: [Sketches]

Identification of the foundation material:  
 Simplex  
 Abant  
 Stone  
 Concrete  
 Wood  
 Stone and concrete  
 Unknown  
 Other

Identification of the construction technology:  
 Substrate  
 Other

Presence of coating:  
 Coating:  Yes

Identification of ornaments:  Yes

General analysis of the conservative state of the building unit:  
 General state of preservation:  Good  
 Without damage

Roof conditions:  Without damage

Presence of structural instabilities:  No

Roof typology:  Double pitched roof

Covering of the roof:  
 Wood  
 Double wood with bituminous insulation  
 Prefab metal panels  
 Asbestos  
 Bituminous panels  
 Wooden shingles  
 Glass

Material of the external surface of the roof:  
 Wood  
 Concrete  
 Stone  
 Bituminous panels  
 Metal  
 Glass

Analysis of degradation state of materials:  
 Moss  
 Lichens  
 Fungus  
 Mould  
 Cracks  
 Fire  
 Metal oxidation  
 Anthropogenic degradation  
 None  
 Other

Disfiguring elements:  
 Moss  
 Lichens  
 Fungus  
 Mould  
 Cracks  
 Fire  
 Metal oxidation  
 Anthropogenic degradation  
 None  
 Other

GENERAL INFORMATION

ARCHITECTURAL ANALYSIS

PRESENT STATE

Identification code: KM 01 001

Relation of the building with its context: [Map]

Example of the visibility from the main road of the village: [Image]

Sketches of the main and secondary facades: [Sketches]

Analysis of roof morphology: [Image]

Material of the external surface of the roof: [Image]

Analysis of degradation state of materials: [Image]

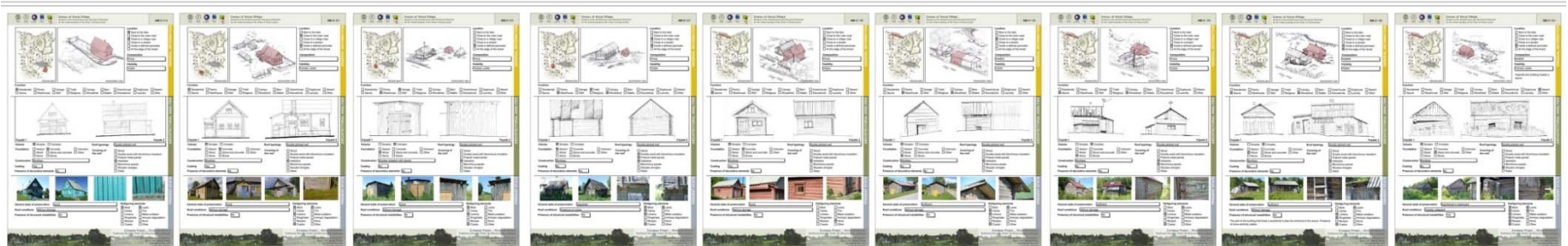
First step: INTRODUCTION  
 After a first step, which consists in a walk around the village in order to understand its general organization and the main characteristics of the buildings, the most important thing to do is to write down a list of descriptive terms that will allow to analyze from a general point of view. Each building unit has its own identification code, as the example below shows.

Second step: GENERAL INFO  
 This first section of the census document is about general information of the building unit and its relations with the surroundings and the context. After this, the visibility of every building from the main road of the village has to be analyzed, as well as the main functions that the construction hosts.

Third step: ARCHITECTURAL ANALYSIS  
 The second section of the document deals with the description of both the architectural and structural elements of the building unit. Then the analysis is about the decorative system and its materials, the typology of the roof and the materials that are used in its external surface.

Fourth step: STATE OF PRESERVATION  
 This part is about the state of the building unit in the day in which the census operation is developed. It includes some specific features, as, for example, the roof conditions, the presence of structural instabilities and the examination of the disfiguring elements that could be present.

European Project: *Wooden Architecture*  
 Traditional Karelian Timber Architecture and Landscape  
 Sara Cora, Anna Pagan, International Research Exchange School



Research and Theory of Architecture  
Linnanmaa, 2<sup>nd</sup> October 2017

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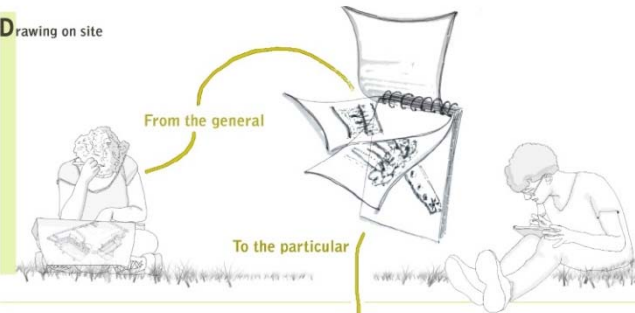


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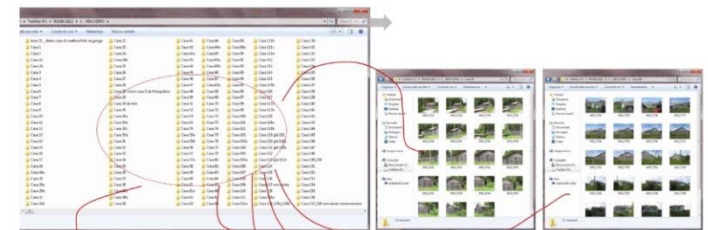
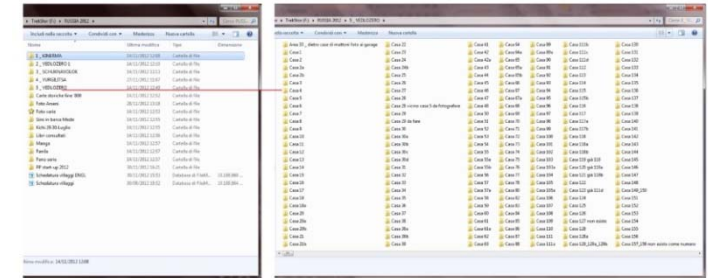
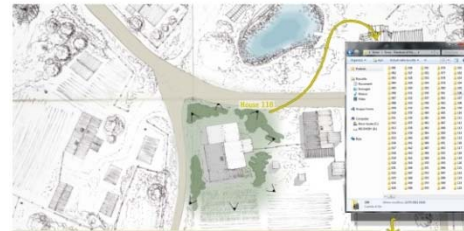
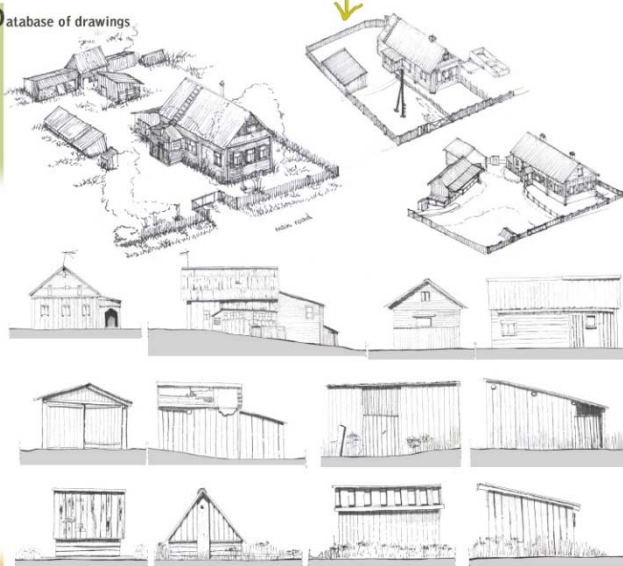
Drawing on site



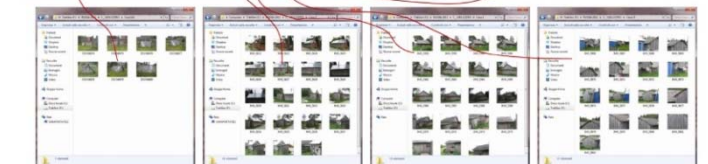
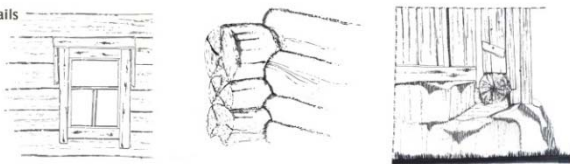
*La comprensione del paesaggio attraverso la discretizzazione dei dati acquisiti durante il lavoro sul campo. Il processo di sintesi effettuato sul villaggio di Rubচেyla è avvenuto grazie a due strumenti che hanno permesso di confrontare i dati diversi tra di loro: schedatura e analisi del paesaggio.*



Database of drawings



Details



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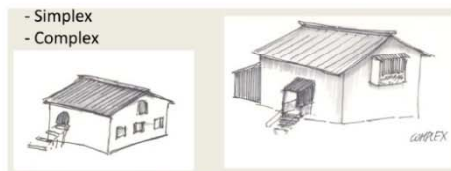
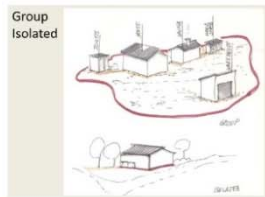
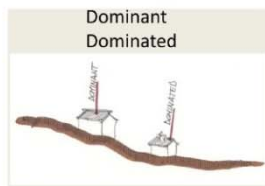
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Dati generali

Informazioni sulle strutture e sulle tecniche costruttive

**CENSUS OF THE VILLAGES AROUND THE LAKE OF VEDLOZERO** Code of the house: \_\_\_\_\_

Location: \_\_\_\_\_

Aggregation: \_\_\_\_\_

Organization: \_\_\_\_\_

Function: \_\_\_\_\_ Volume: \_\_\_\_\_

Character: \_\_\_\_\_ Num. of fronts: \_\_\_\_\_

Visibility: \_\_\_\_\_ Coating:

Colour: \_\_\_\_\_

Environmental impact: \_\_\_\_\_

Inquadramento generale: \_\_\_\_\_

**Analysis of the main structures**

Foundations: \_\_\_\_\_

Roof: \_\_\_\_\_

Presence of decorative elements:

Presence of structural instabilities:

**Analysis of the state of conservation**

State of preservation: \_\_\_\_\_

Disfiguring elements

Elements of degradation:  Molds  Lichens  Mosses  Lacks  
 Caries  Ring shake  Cracks

View 1 View 2 View 3

**WOODEN ARCHITECTURE. TRADITIONAL KARELIAN TIMBER ARCHITECTURE AND LANDSCAPE**  
 Seventh Framework Programme  
 Marie Curie Actions People  
 International Research Staff Exchange Scheme  
 Scientific coordinator: Sandro Parrinello  
 Collaborators: Sara Porzilli, Francesca Picchio

Nome del villaggio

Codice edificio

Analisi dello stato di conservazione

Riferimenti fotografici

## Funzioni individuate

- Residential
- Depandance
- Sauna
- Pantry
- Warehouse
- Luggage wet waste
- Greenhouse
- Well
- Toilet
- Building of Worship
- Commercial
- Outbuilding
- Garage
- Throw boat
- Woodshed
- Barn
- Canopy
- Tourist accommodation
- Industrial
- Educational
- Loggia
- Hospital

## Research and Theory of Architecture

Linnanmaa, 2<sup>nd</sup> October 2017

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# Documentation of Wooden Architectural Heritage



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**Census of Karva Village**  
Analysis of the Architectural and Structural Elements for the Understanding of the State of Conservation

**GENERAL INFORMATION**

Identification code: KM 01 001

Location:
 

- Next to the lake
- Close to the main road
- Close to a village road
- Close to a stream
- Inside a defined perimeter
- At the edge of the forest

Composition:
 

- Group: \_\_\_\_\_
- Visibility: \_\_\_\_\_
- Visible: \_\_\_\_\_

Function:
 

- Residential
- Partry
- Garage
- Toilet
- Canopy
- Barn
- Greenhouse
- Doghouse
- Absent
- Sauna
- Warehouse
- Well
- Religious
- Woodshed
- Stable
- Educational
- Laundry
- Other

Analysis of the micro-area in the village context: [Map]

Identification of the analyzed building inside its micro-area: [3D Model]

Identification of the main functions hosted in the building units: [Form]

Analysis of the composition of the building unit: [Diagrams]

Identification of the foundation material:
 

- Volume:  Simple  Complex
- Wood
- Concrete
- Unknown
- Stone
- Bricks

Identification of the construction technology:
 

- Construction:  Blockbau

Presence of coating: Coating:  Yes

Identification of ornaments: Presence of decorative elements:  Yes

General analysis of the conservative state of the building unit:
 

- General state of preservation:  Good
- Roof conditions:  Without damage
- Presence of structural instabilities:  No

General analysis of the conservative state of the roof:
 

- Disfiguring elements:
  - Mold
  - Lacks
  - Curves
  - Fire
  - Lichens
  - Metal oxidation
  - Ringshake
  - Antropic degradation
  - Mosses
  - None
  - Cracks
  - Other

Analysis of structural state of the building:
 

- Roof typology:  Double pitched roof
- Covering of the roof:
  - Wood
  - Double wood with bituminous insulation
  - Prefab metal panels
  - Asbestos
  - Bituminous panels
  - Wooden shingles
  - Glass

Material of the external surface of the roof: [Image]

Analysis of degradation state of materials: [Image]

European Project: **Wooden Architecture**  
Traditional Karelian Timber Architecture and Landscape  
Savannah Programme  
Marie Curie Action Program  
Innovations by words  
Evelina Schena

**Census of Karva Village**  
Analysis of the Architectural and Structural Elements for the Understanding of the State of Conservation

**ARCHITECTURAL ANALYSIS**

Location:
 

- Next to the lake
- Close to the main road
- Close to a village road
- Close to a stream
- Inside a defined perimeter
- At the edge of the forest

Composition:
 

- Group: \_\_\_\_\_
- Visibility: \_\_\_\_\_
- Visible: \_\_\_\_\_

Function:
 

- Residential
- Partry
- Garage
- Toilet
- Canopy
- Barn
- Greenhouse
- Doghouse
- Absent
- Sauna
- Warehouse
- Well
- Religious
- Woodshed
- Educational
- Laundry
- Other

Volume:  Simple  Complex

Foundation:  Wood  Stone and concrete  Other

Construction:  Blockbau

Coating:  Yes

Presence of decorative elements:  Yes

General state of preservation:  Good

Roof conditions:  Without damage

Presence of structural instabilities:  No

Disfiguring elements:
 

- Mold
- Lacks
- Curves
- Fire
- Lichens
- Metal oxidation
- Ringshake
- Antropic degradation
- Mosses
- None
- Cracks
- Other

Roof typology:  Double pitched roof

Covering of the roof:
 

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Research and Theory of Architecture  
Linnanmaa, 2<sup>nd</sup> October 2017

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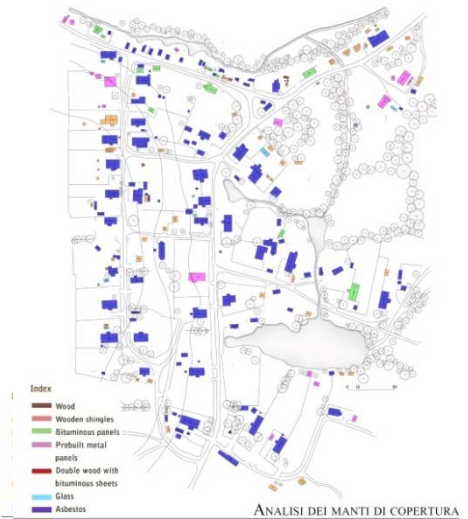
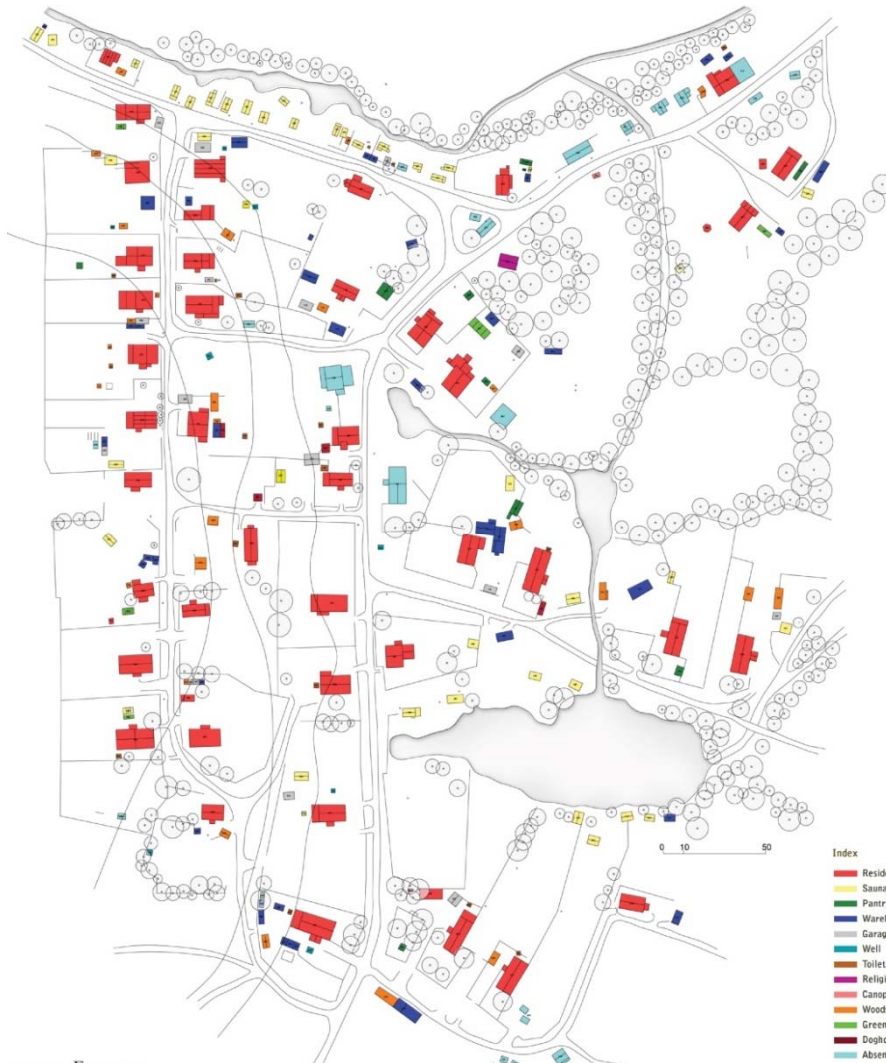




# Documentation of Wooden Architectural Heritage



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Research and Theory of Architecture  
Linnanmaa, 2<sup>nd</sup> October 2017

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## Concluding considerations on the results achieved

The results of these research activities have highlighted that the development of strategies of interventions for preservation of cultural heritage **MUST** today be based on **UPDATED DOCUMENTATION**.



**R**esearch and **T**heory of **A**rchitecture

Linnanmaa, 2<sup>nd</sup> October 2017

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# Documentation of Wooden Architectural Heritage



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It is evident that the careful acquisition of the data has a fundamental role in validating each decision. The importance of the documentation becomes even more valuable considering the conservation in its widest sense, thinking about the “physical characteristics” and the “immaterial intrinsic elements”

## Urgent needs

The use of cheap and untraditional materials is altering and undermining the structural image of these places.

Pay attention to the repairs that need to be started immediately.

Plan periodical surveys can help a technical and deep understanding of the structures studied in order to check their state of maintenance and operate with fast, safe coherent actions when needed.

The loss of knowledge of this wide wooden heritage, the disappearance of the traditional cultural identity and the memory of these places is compromising the conservation of wooden traditional architecture.

The elaboration of new typologies of analysis on the architectural and landscape heritage has represented a strong, high, urgent necessity.

**R**esearch and **T**heory of **A**rchitecture

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*Thank you for your attention*

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## CREDITS:

Research activities and results



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Karelia research project has been carried out at the Department of Architecture of Florence DIDA and Department of Civil Engineering and Architecture DICAR of the University of Pavia, Italy. Scientific Responsables: Prof. S. Bertocci, Prof. S. Parrinello. Images and data under copyrights. Sara Porzilli has been Technical Coordinator for project of Laser scanning survey and postproduction of the Pogost Complex on Kizhi Island in Karelia (Russia).



Research activities and results of Lamminaho farm house have been carried out at the School of Architecture at the University of Oulu jointly with Museovirasto and Senate Properties. Materials are under copy rights. Survey and Postproduction carried out by Sara Porzilli.



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## Research and Theory of Architecture

Linnanmaa, 2<sup>nd</sup> October 2017

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