

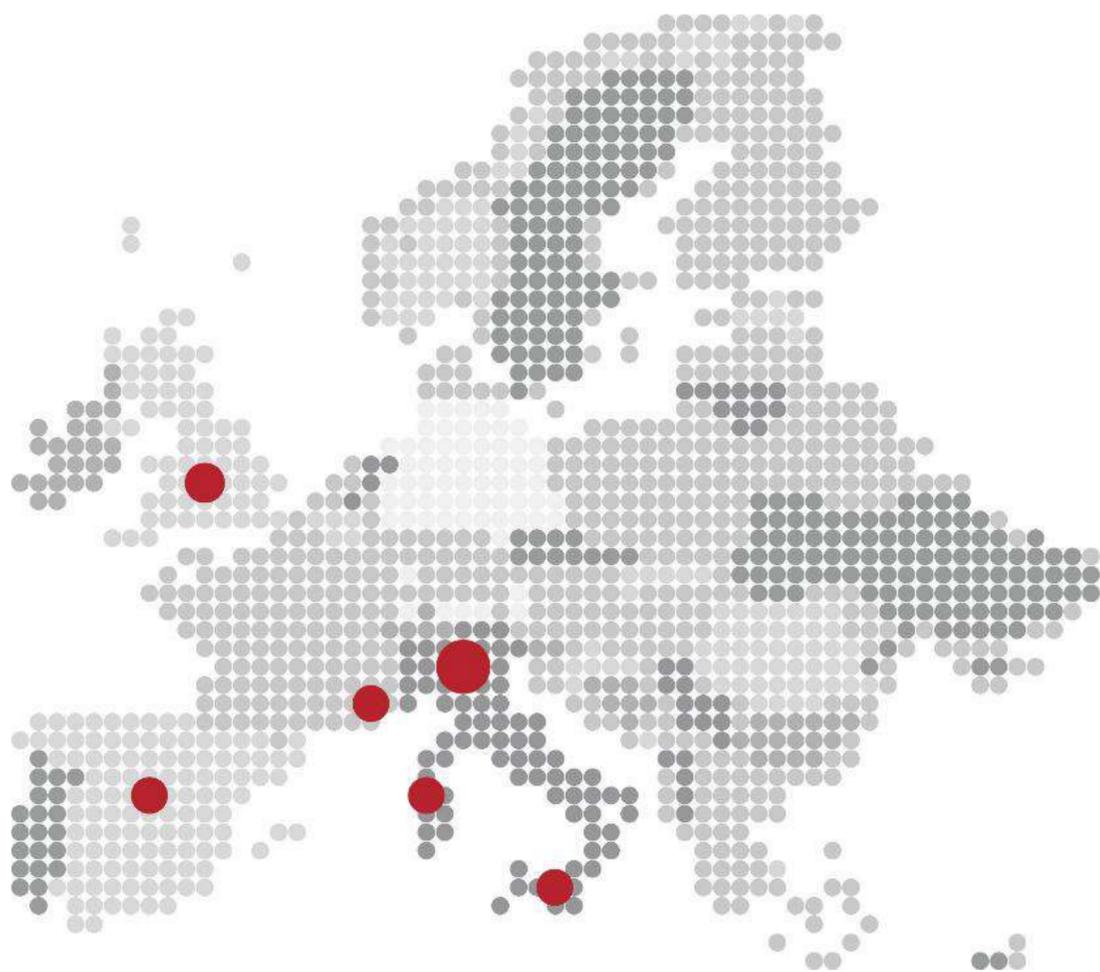


Research to Market: From Results to Innovative Product/Service offerings SP 2020



R2M Solution

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Innovation Consulting



Sustainability Consulting



Innovative Products



ESCO and Smart Grid





Innovative Products & Services





ZUTEC: REAL ESTATE
information
management



IES ICL: Intelligent
Communities
Lifecycle



Synavision:
Monitoring Based
Commissioning



BRAINBOX AI

BrainBox AI:
Autonomous AI
HVAC technology



Matterport: Virtual
tours, 3D survey and
digital twin



BIMcollab: cloud
based BIM issue
management



GREENPASS: asses
the greenery impact
on resilience



Onyx Solar:
photovoltaic glass for
buildings



ZUTEC: REAL ESTATE
information
management



Matterport: Virtual
tours, 3D survey and
digital twin



BIMcollab: cloud
based BIM issue
management

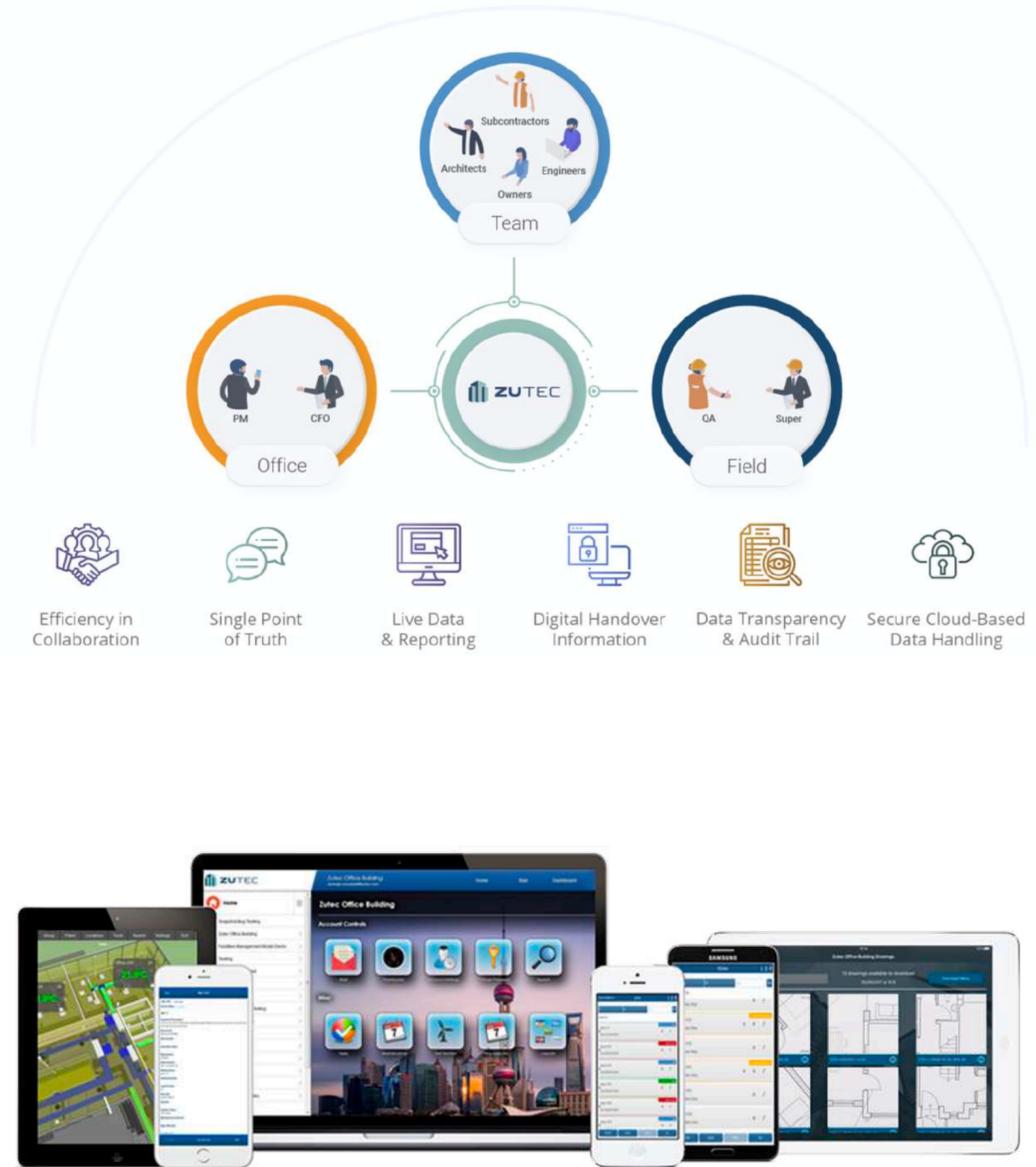


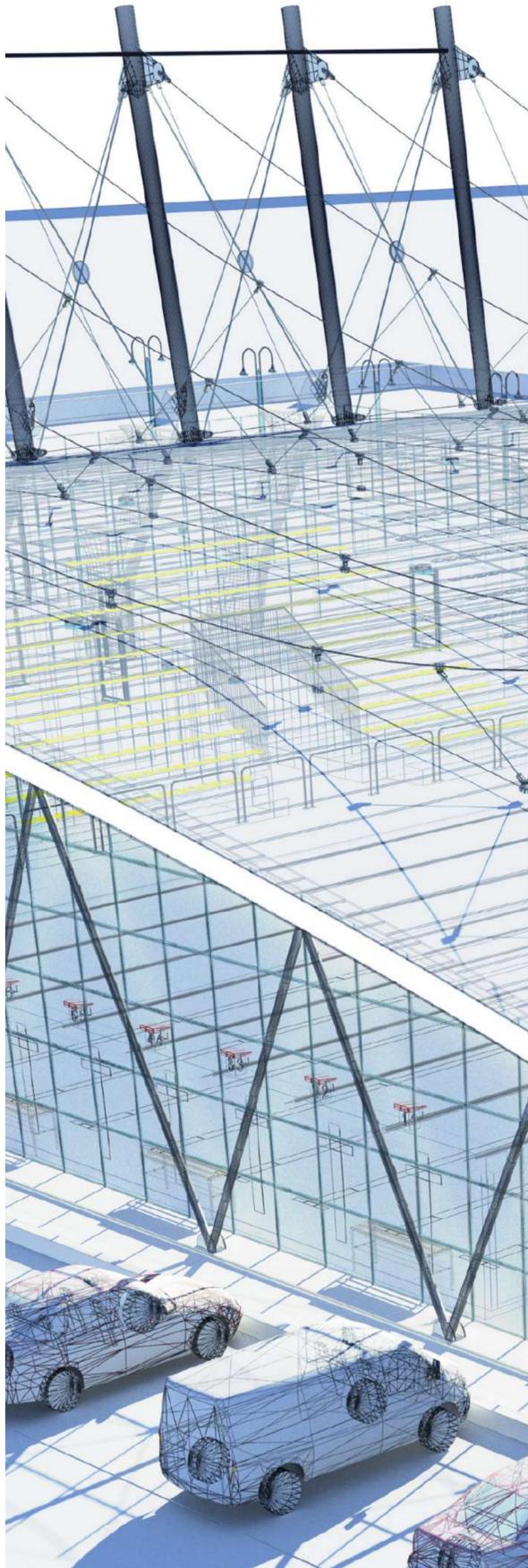
Digital Construction



REAL ESTATE information management

Cloud platform for property and site management and software connected to BIM.
Improves quality, increases productivity and reduces costs throughout the project lifecycle.
By building knowledge, you don't lose anything.

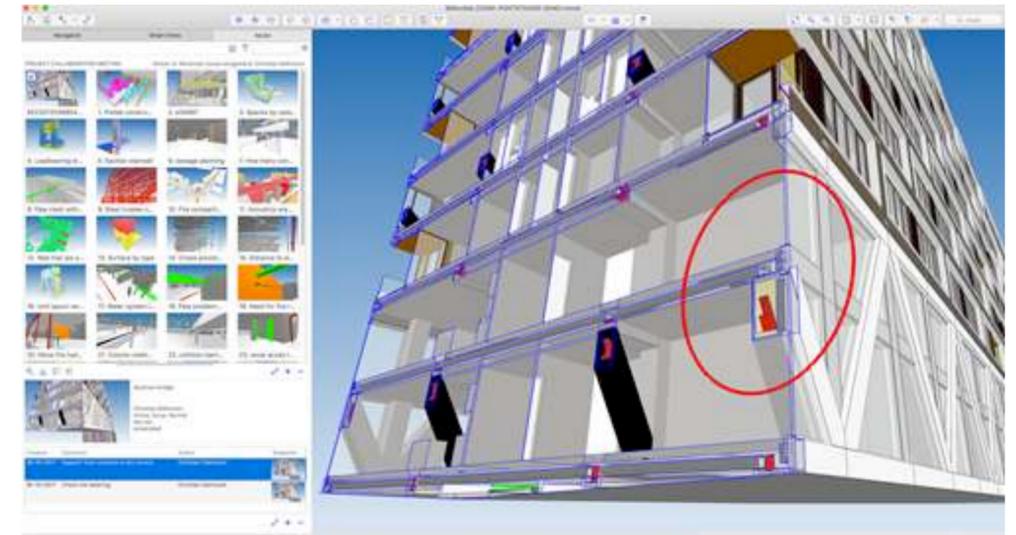
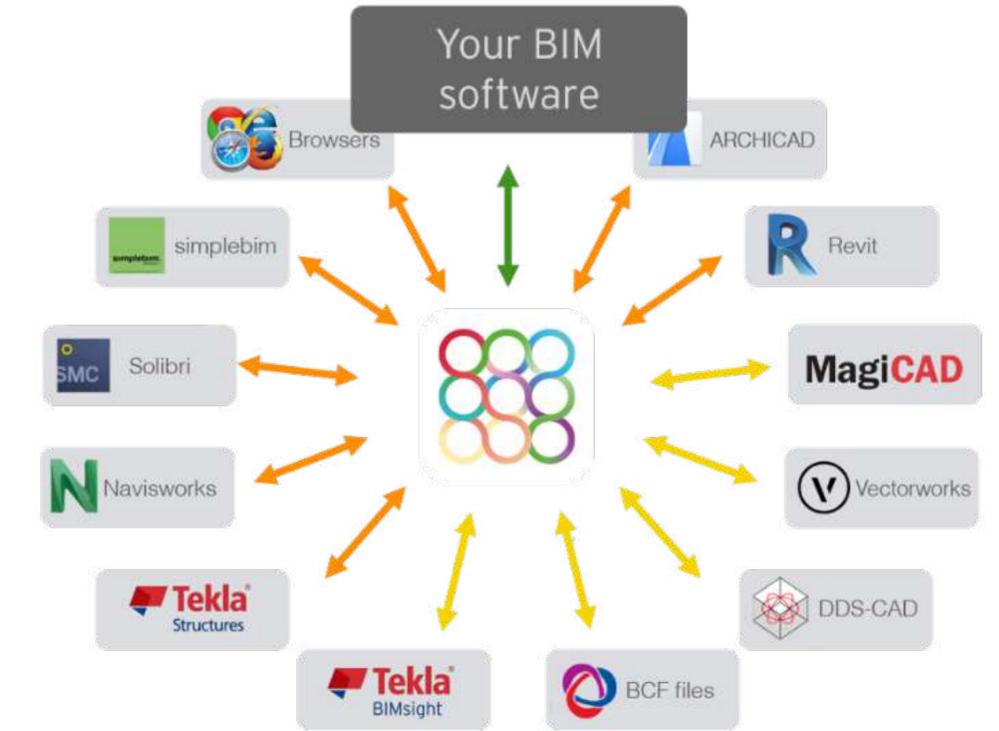




BIMcollab

Cloud based BIM issue management

An issue management environment, BIMcollab offers a comprehensive set of software to simplify BIM collaboration so you no longer have to use calculation, email and other tools.





Matterport™

Virtual tours, 3D survey and digital twin

The powerful 3D all-in-one of Matterport virtual tour and spatial data platform allow companies to turn any building into an accurate and engaging digital twin. Taking spatial awareness and visualization to a new level, Matterport enables stakeholders throughout the building's life-cycle to connect and collaborate in 3D.



Indoor surveys

Cameras



Precision

99% of accuracy

Specialized high-accuracy 3D reality capture
Scanning large or outdoor spaces in 2K
Applications that need highest accuracy



High resolution

99% of accuracy

Best-in-class all-inclusive 3D capture system
Creating highest-quality 3D scans with unlimited 4K photography
Long battery life for multiple scans per day



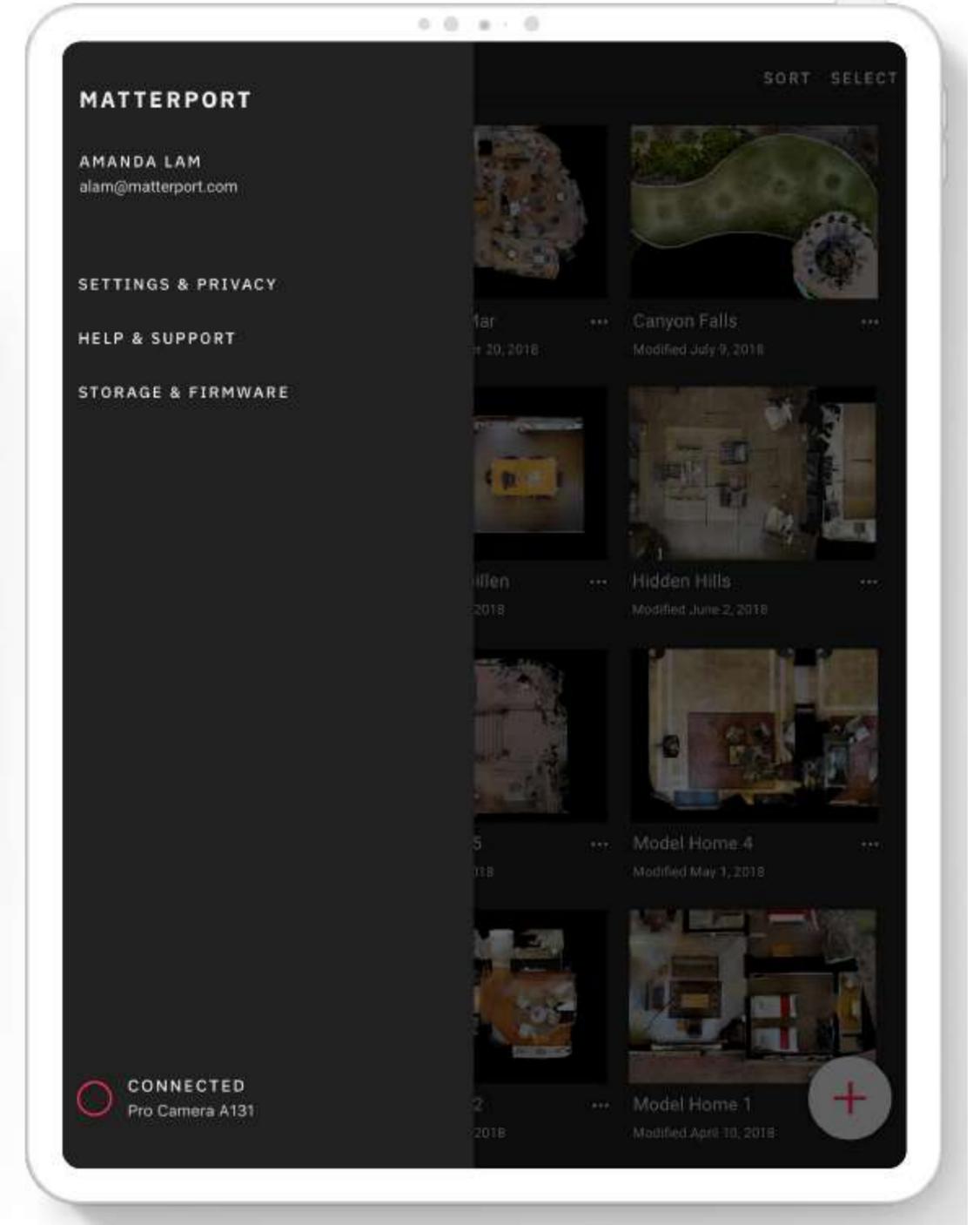
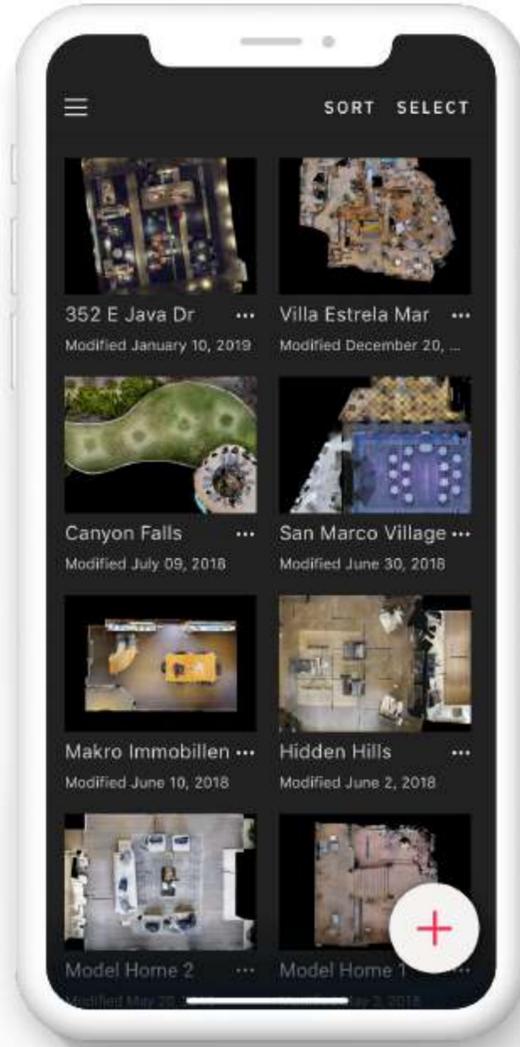
Velocity and portability

92-96% of accuracy

Scanning several rooms or an entire home
High portability
Good entry-level camera

Indoor surveys

App Capture 3.0



Indoor surveys



1 Design

Save time by capturing existing site conditions. Improves the efficiency of Building Information Modeling (BIM) and remodeling processes.



2 Build

Simplifies document flow, material estimates and stakeholder cooperation



3 Promote

Improves revenues with greater involvement, visibility and occupancy rate and reduces the adays spent in the market.



4 Operate

Increases ROI by reducing plant management, maintenance and asset documentation costs. .



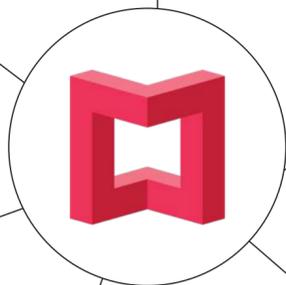
5 Insure

Reduce risks with accurate 3D documentation. Improve the quality of subscriptions, speed of refunds and customer satisfaction.



6 Repair

Reduce time and disputes in the field by making estimates and settlements remotely.



Construction site monitoring

Comparison between phases and monitoring of works

PHASE 1



PHASE 2



PHASE 4



PHASE 3

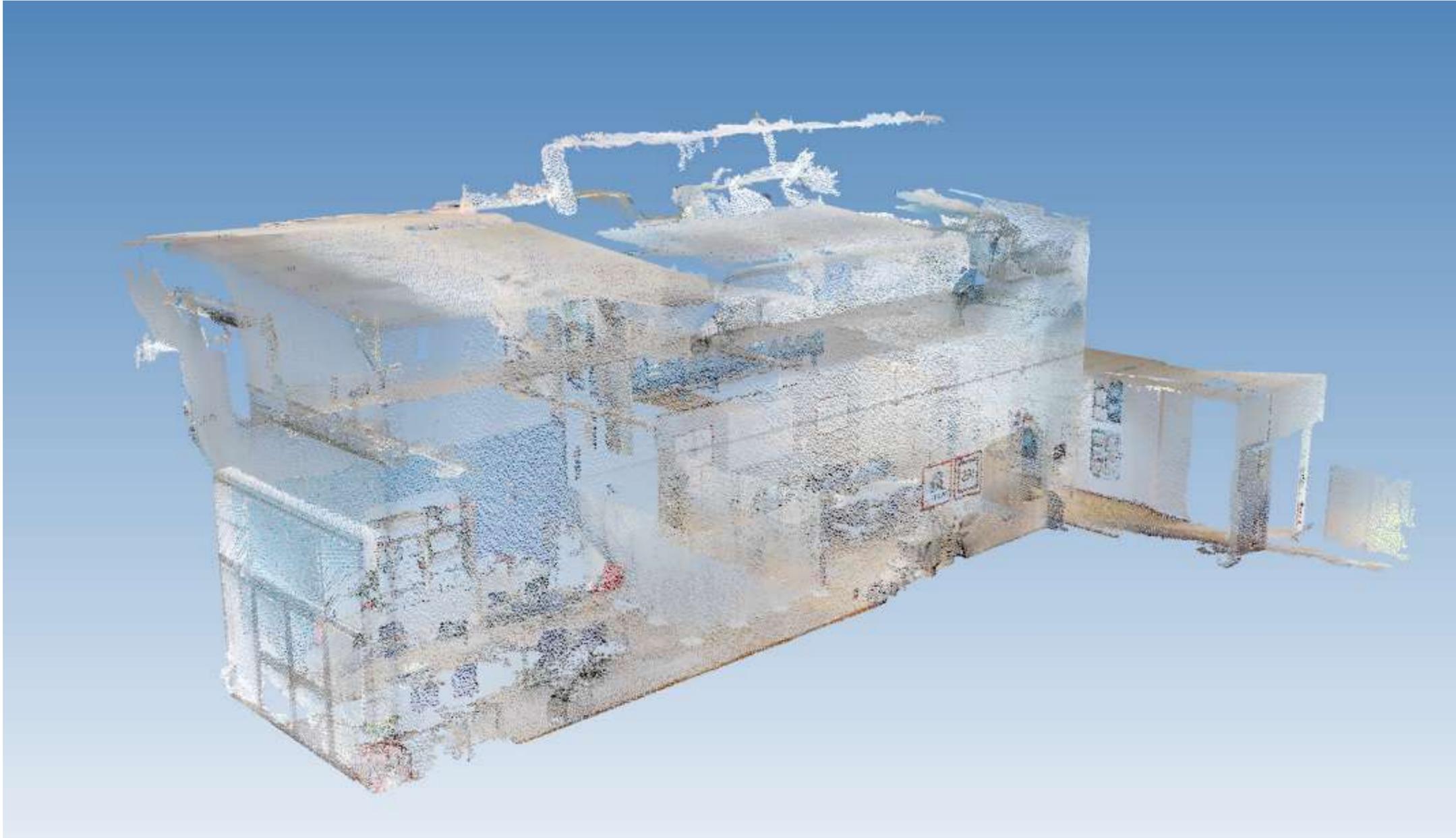


Construction site monitoring

Comparison between phases and monitoring of works



Augmented reality and point clouds



Example of a point cloud from a indoor scanning

More scanning points means more accuracy of the point cloud

The point cloud can be compared with the BIM Model of the design

The point cloud can be a starting point to build up a BIM model

Augmented reality and point clouds



Comparison between an area scanned by a 3D scanner and a picture taken in the same place

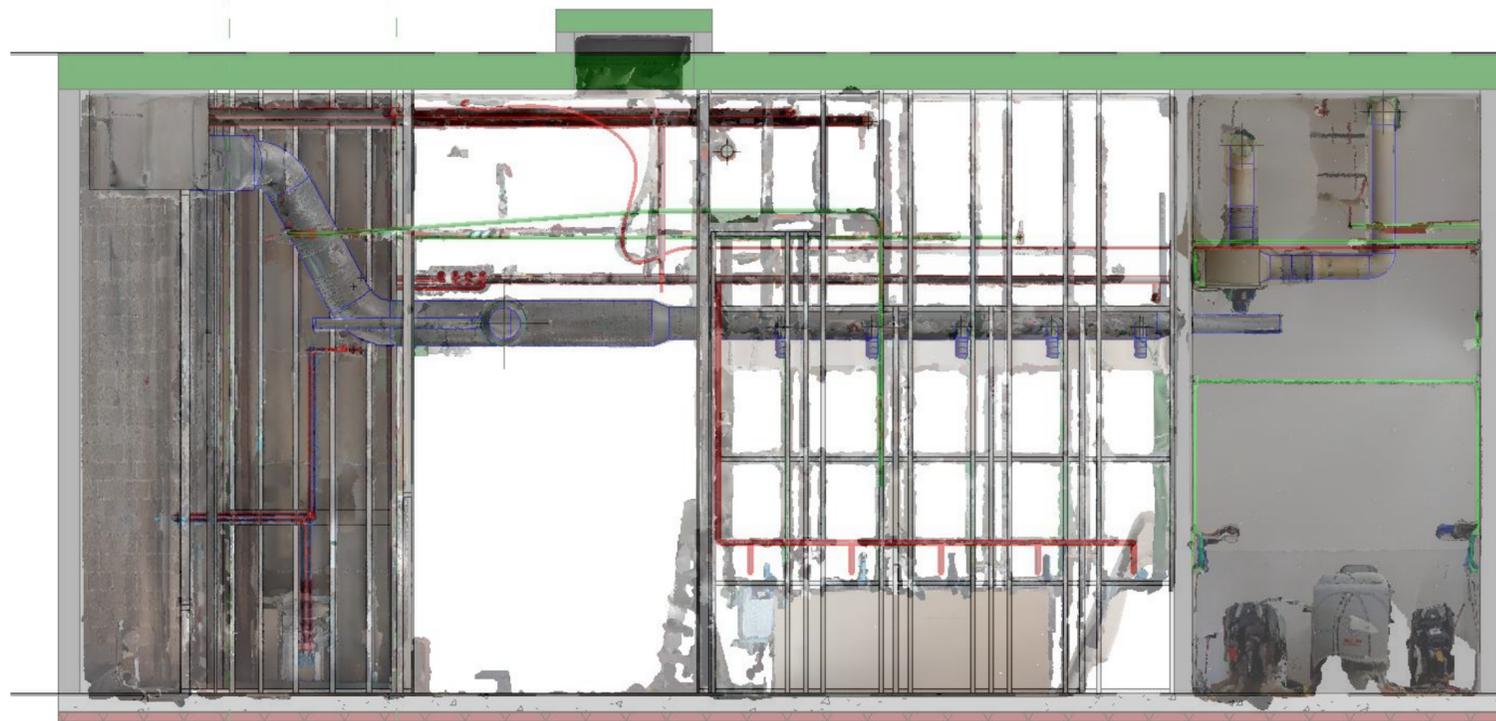
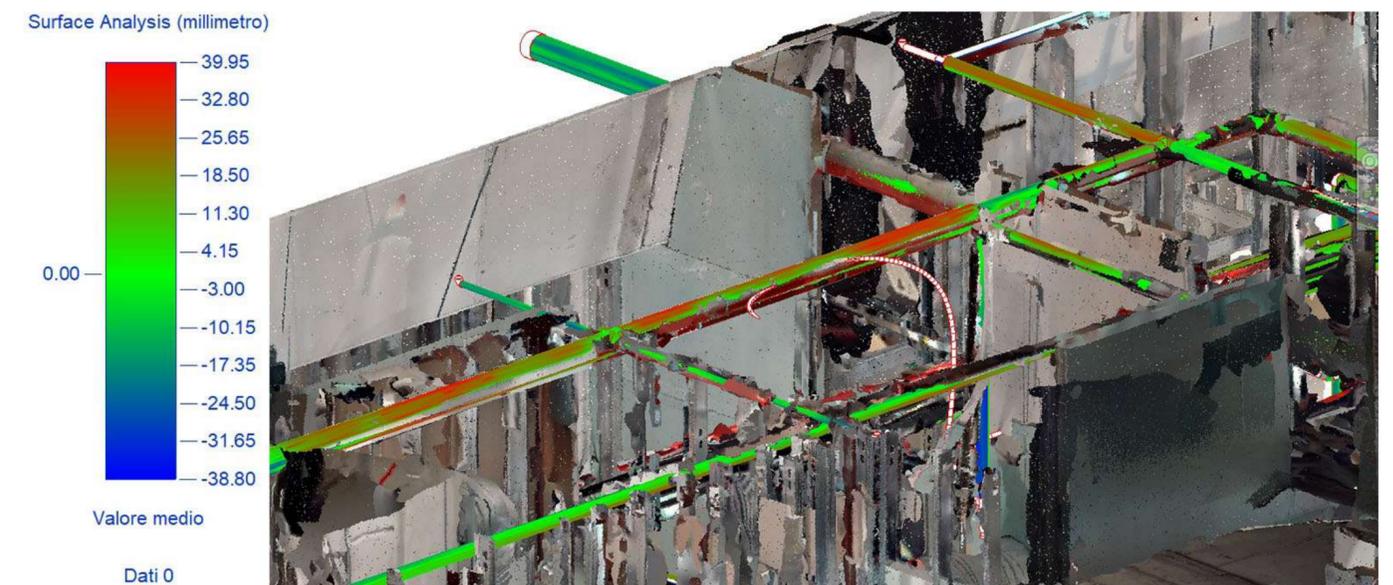
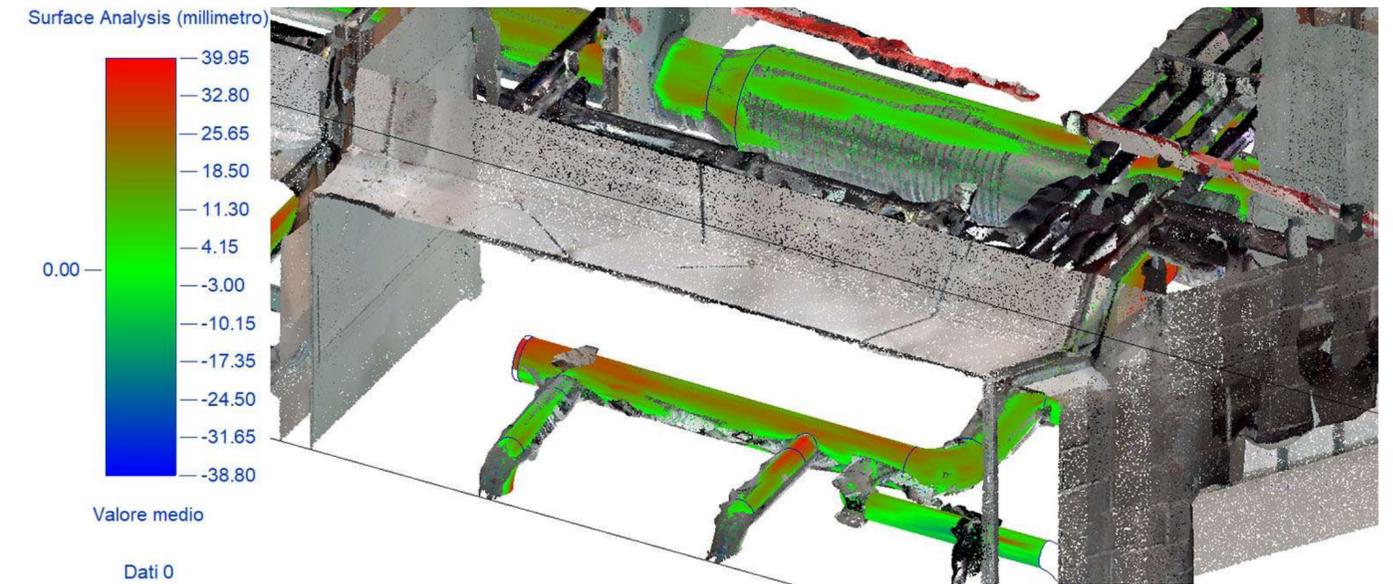
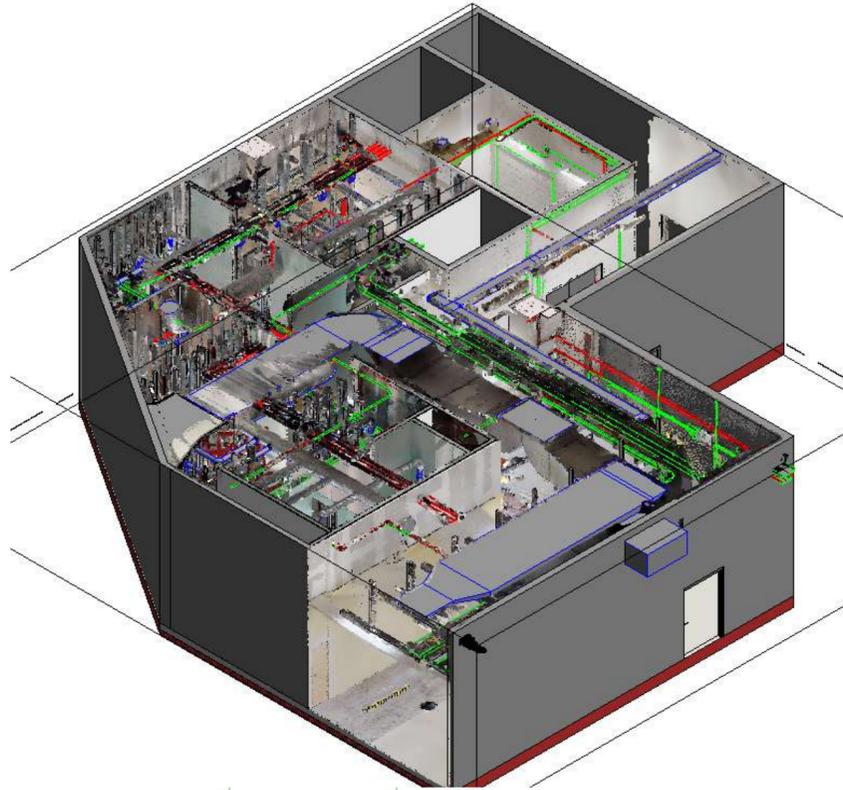


Scan to BIM & BIM to scan



Quality check

Modeling



Innovative tools supporting BIM Modeling



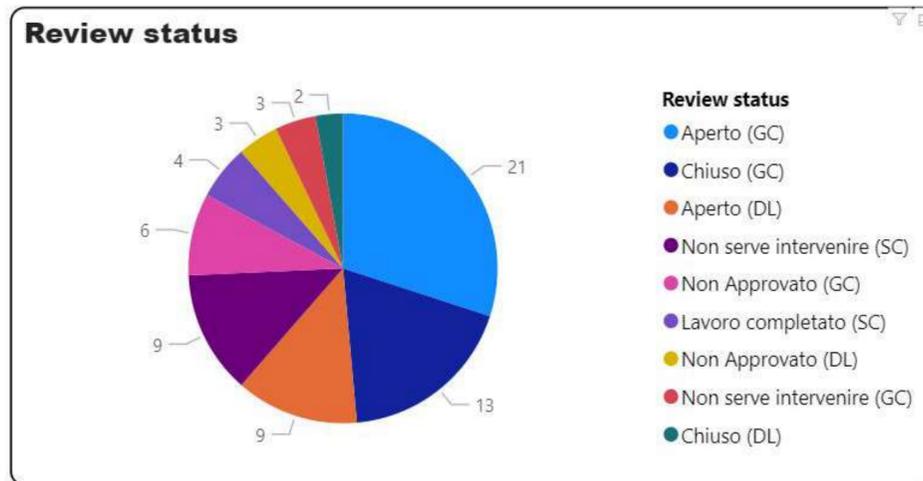
BIM Modelling Services



Modelling

- Modelling service using BIM software Authoring "Autodesk Revit" e "Archicad".
- Departmentalization of the models according to the different disciplines
- Management of project parameters to be shared with stakeholders
- Test the quality of the model

Zutec Analytics



70
Totale

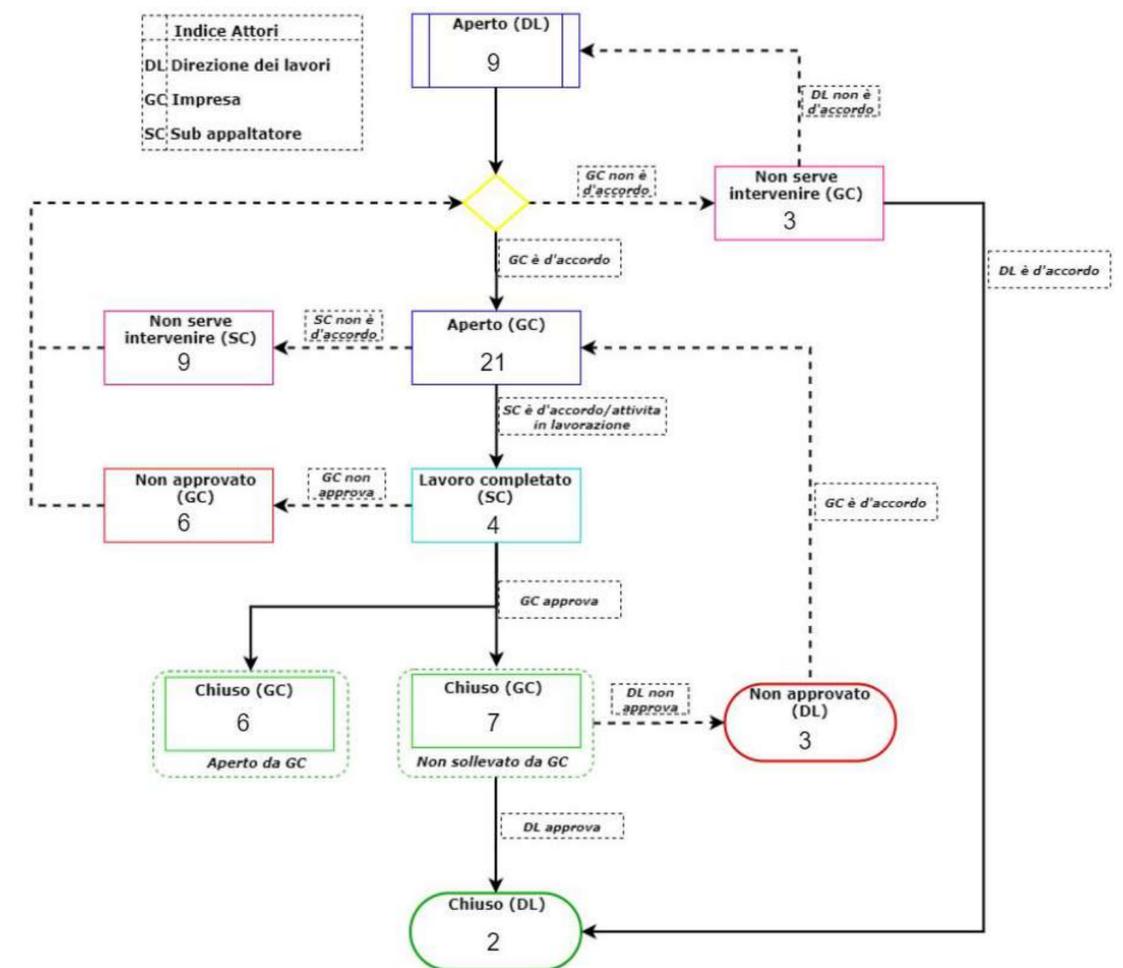
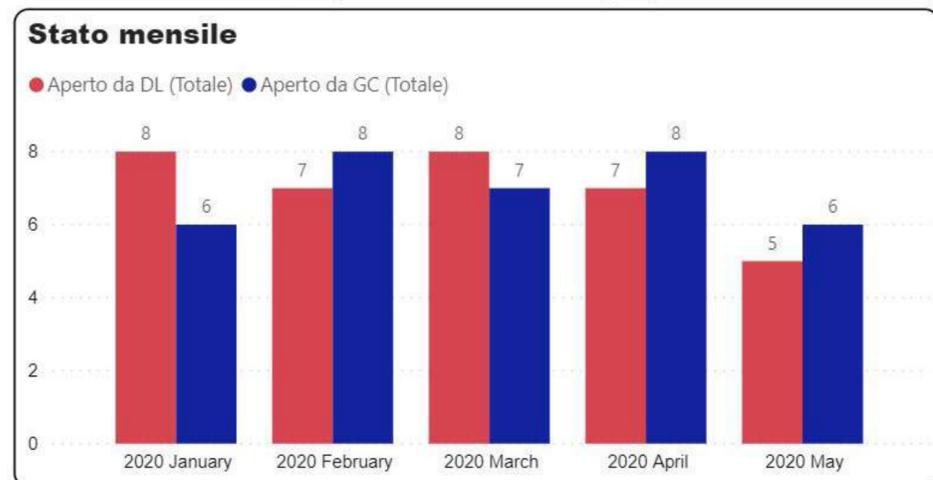
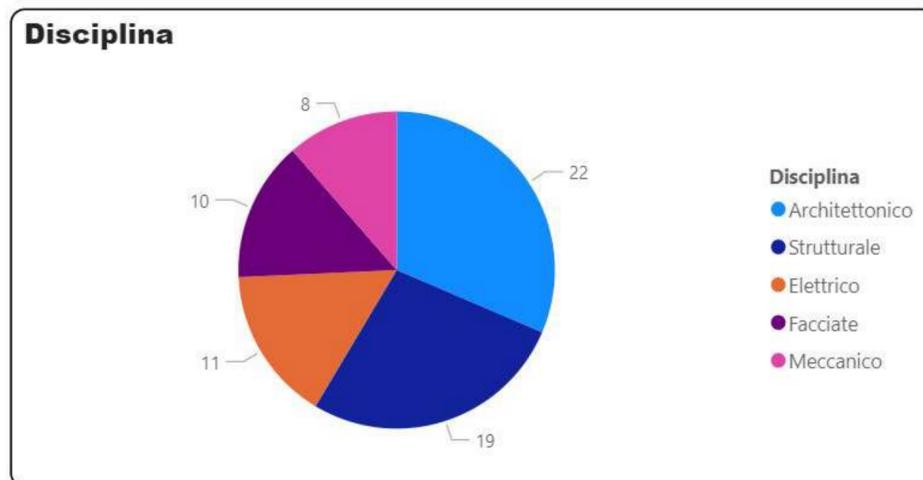
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Aperti da DL

35
Aperti da GC

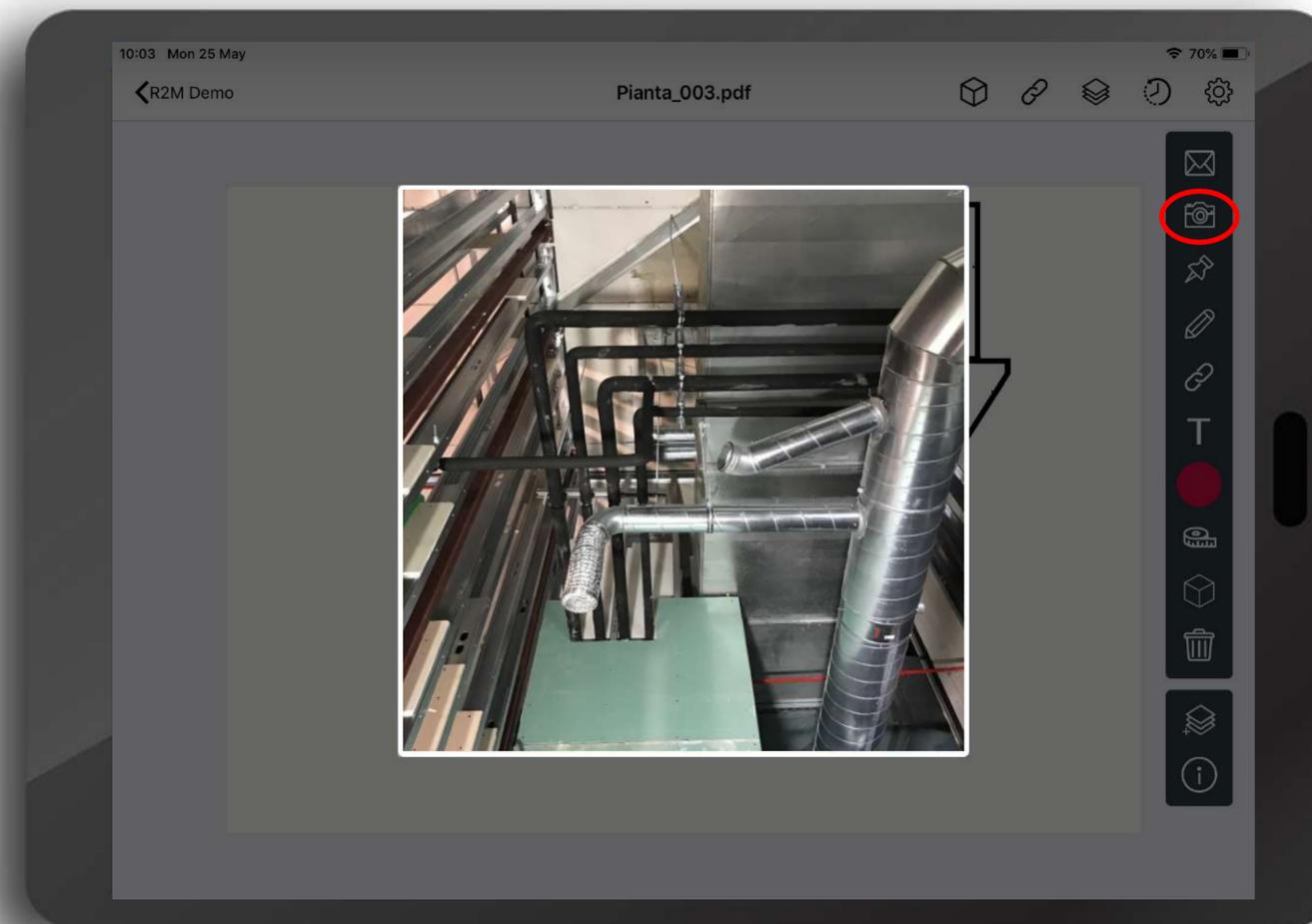
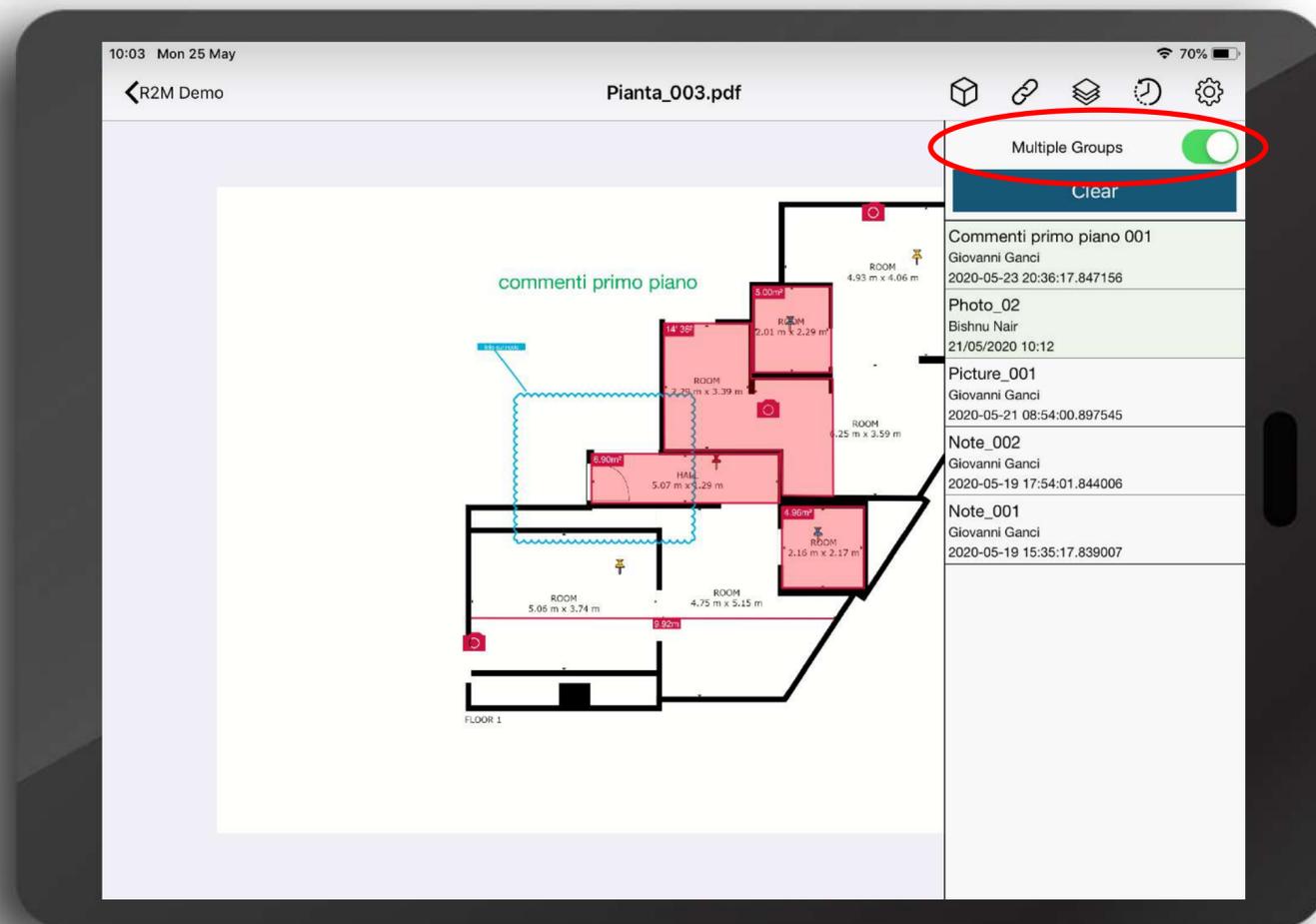
- #### Assegnato a
- R2M-Catania
 - R2M-France
 - R2M-Pavia
 - R2M-Spain
 - R2M-UK

- #### Priorita
- Alto
 - Basso
 - Medio

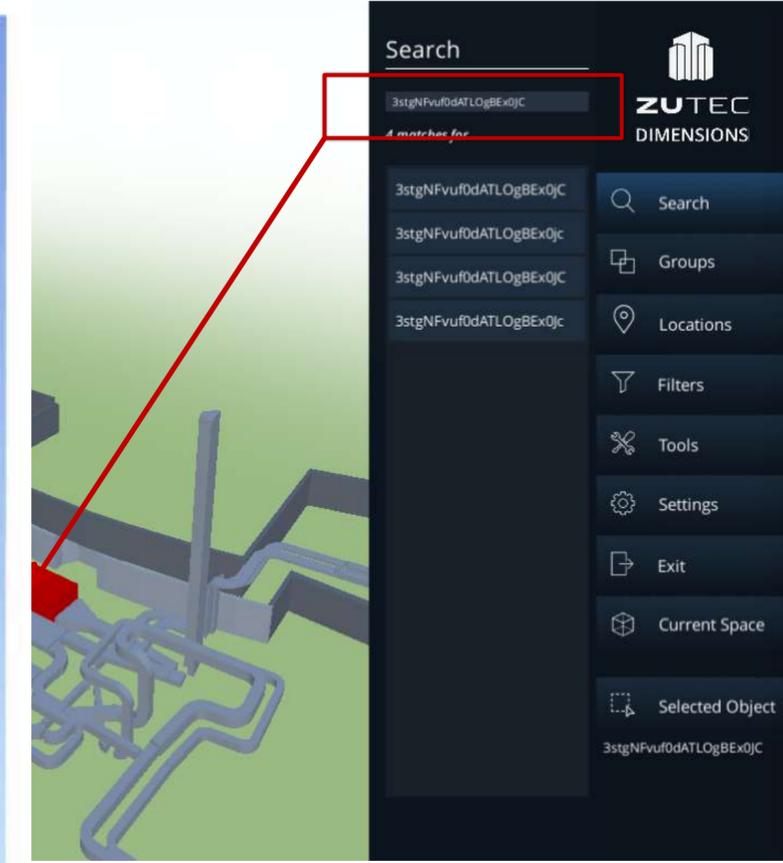
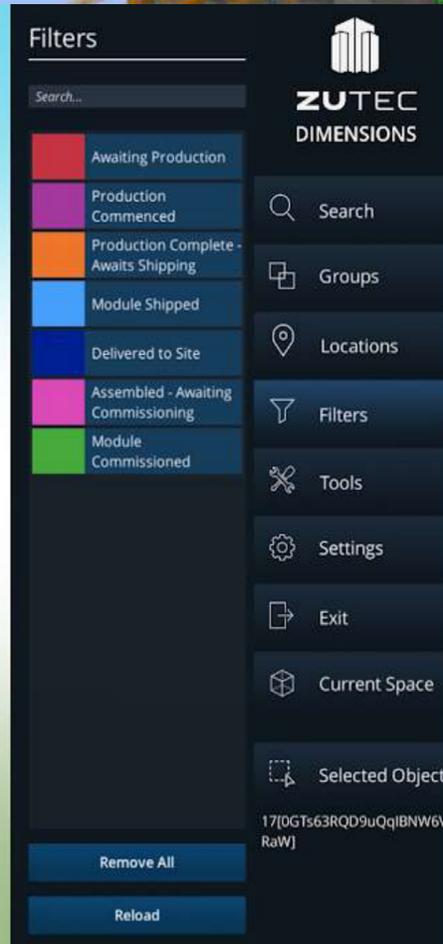
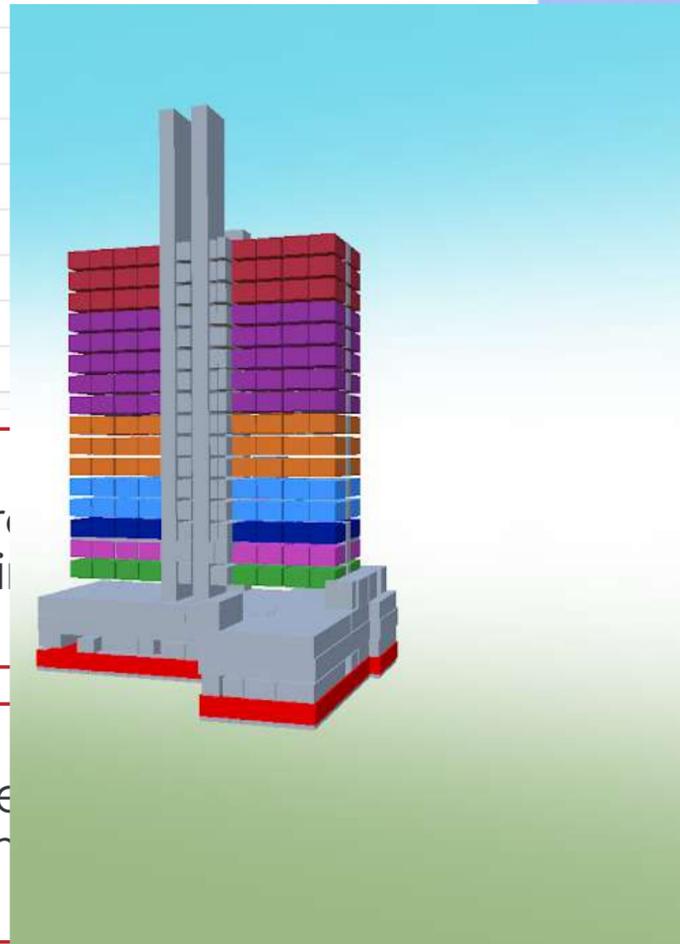
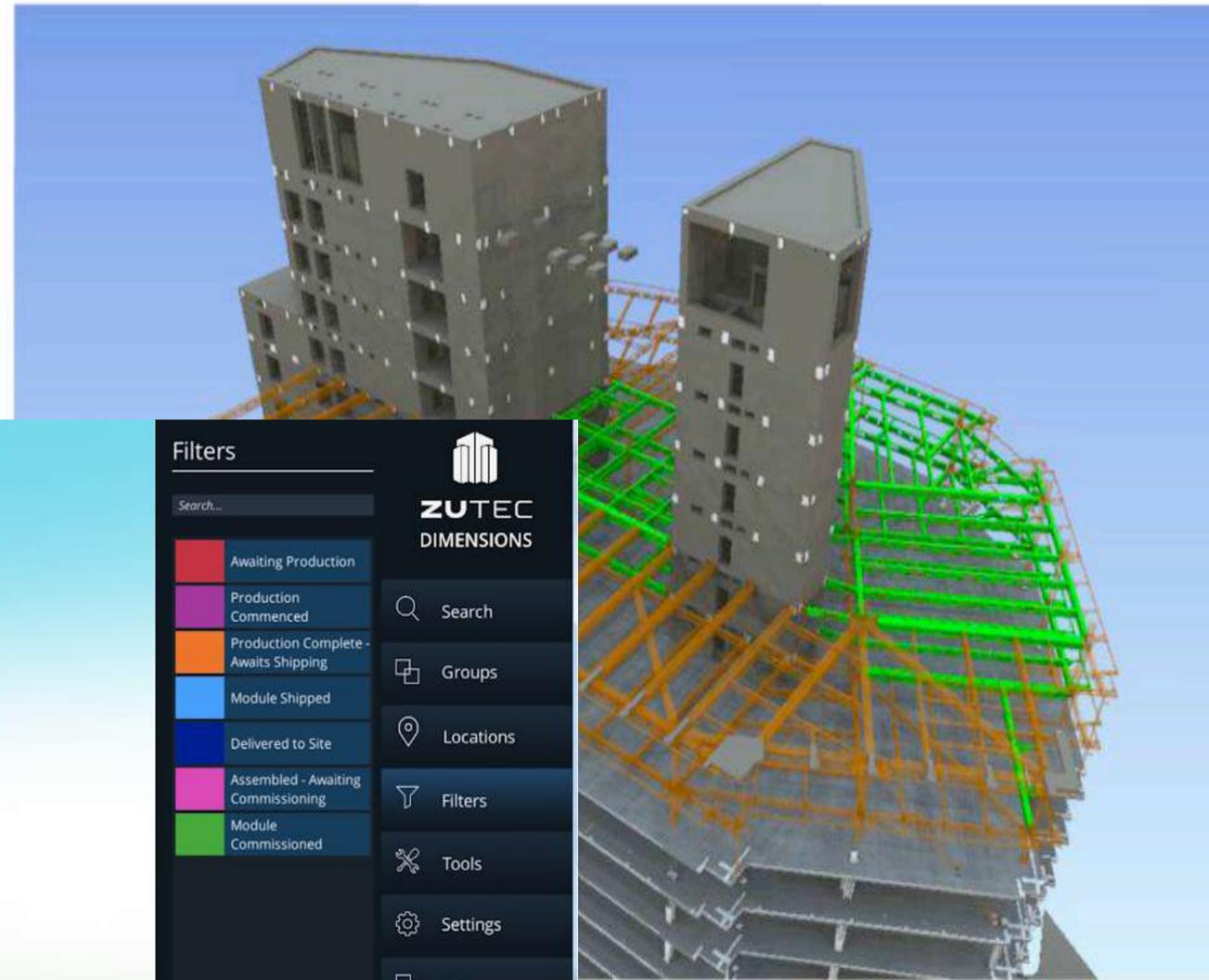
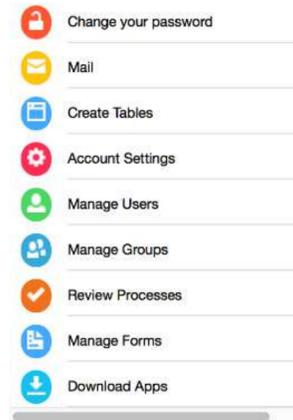
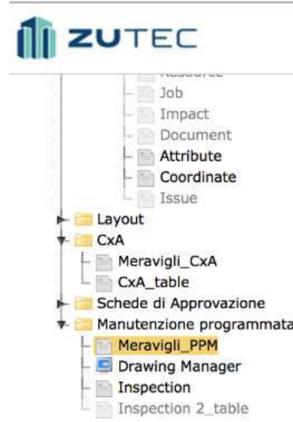
- #### Piano
- P1
 - P-1
 - P2
 - P3
 - P4
 - P5
 - P6
 - P7
 - P-Copertura
 - P-Servizi
 - PT



ZUTEC FIELD App



ZUTEC BIM integration



Dati di produzione salvati in

Documentazione di garanzia

DL

Documentazione di collaudo

Operazione di commissioning

Pianificazione Manutenzione programmata

Gestione eventi di Manutenzione reattiva

Innovative tool to support BIM model



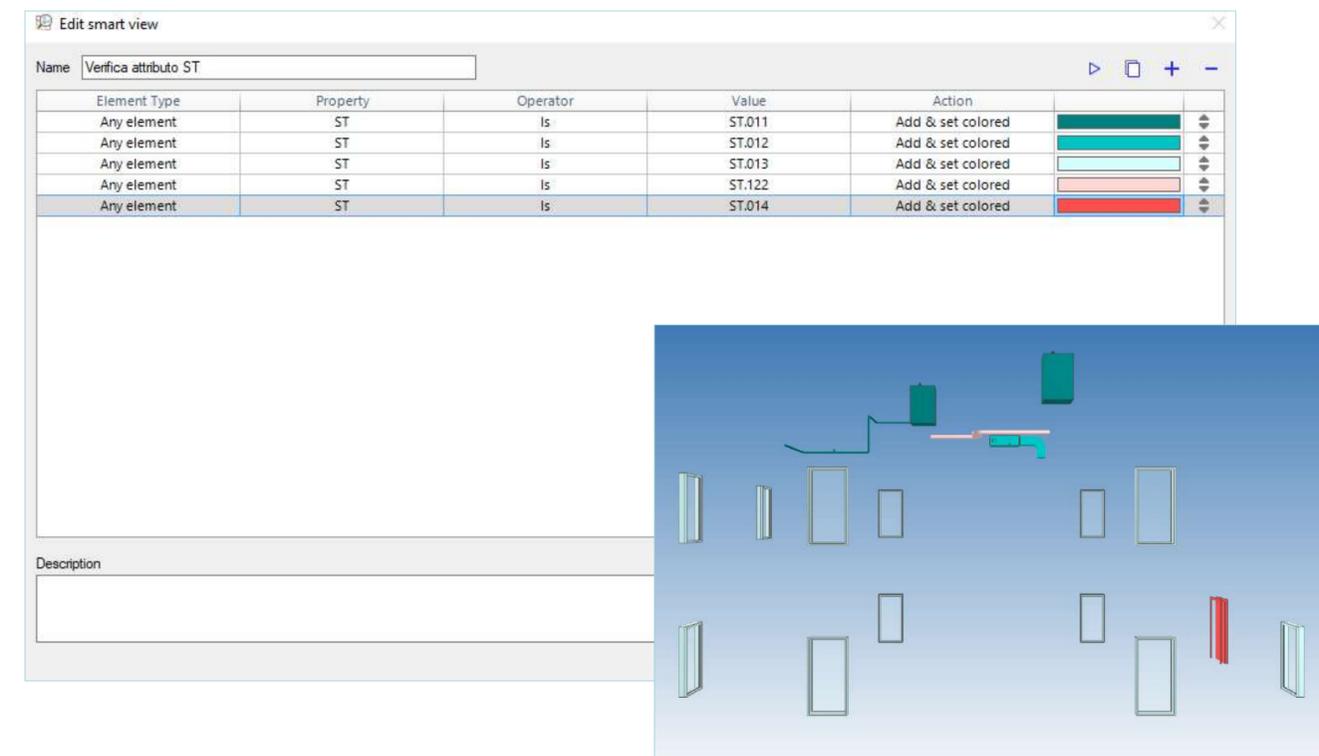
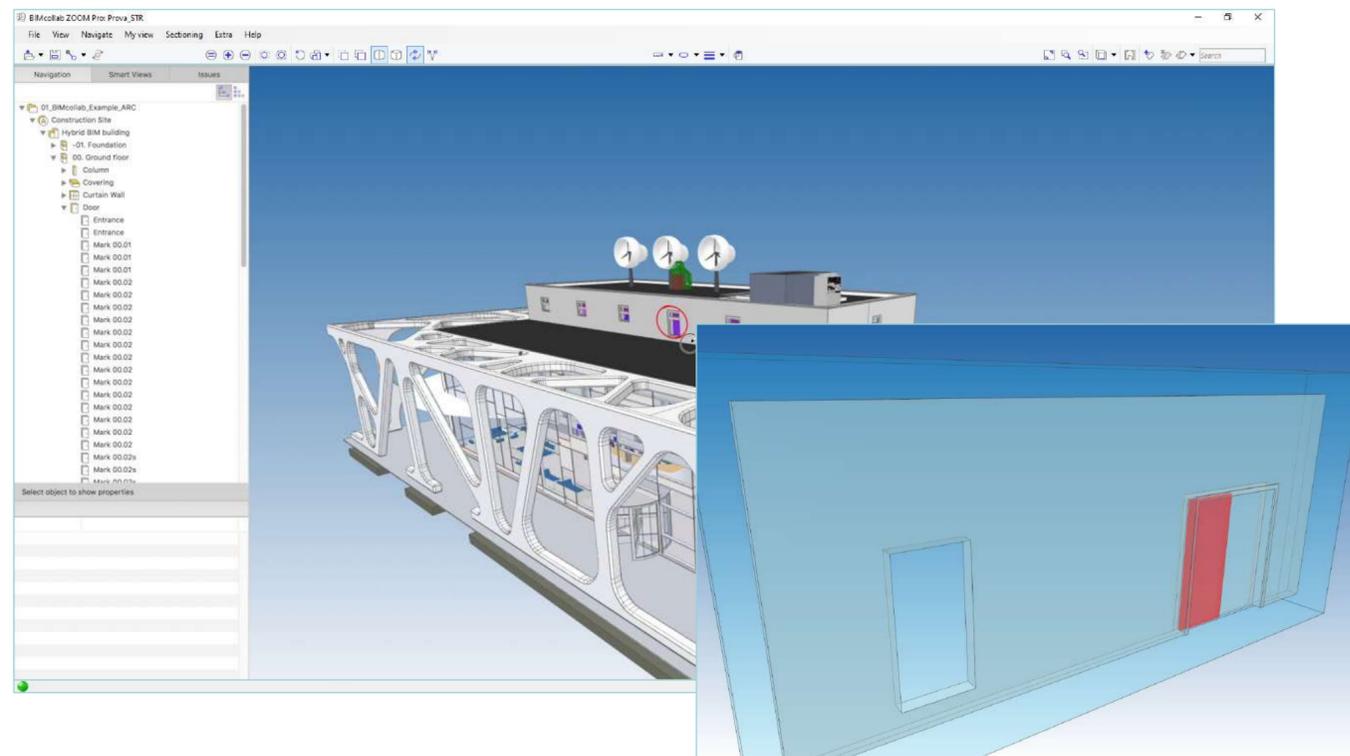
Model Quality Verification

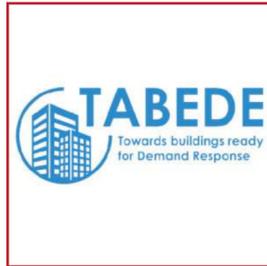
CLASH DETECTION

BIMcollab ZOOM allows you to check the interference between the IFC models coming from the BIM Authoring software.

PROJECT PARAMETERS CHECKS

The Smart Views allow you to assign conditional based rules and verify the correct set of the parameters entered during the modeling phase.





IES ICL: Intelligent Communities Lifecycle

Synavision: Monitoring Based Commissioning

BrainBox AI: Autonomous AI HVAC technology

Modeling Commissioning Operation



Intelligent Communities Lifecycle

A range of “digital twin” technologies to support you in creating your own sustainable and intelligent community, from detailed building simulation to urban scale.

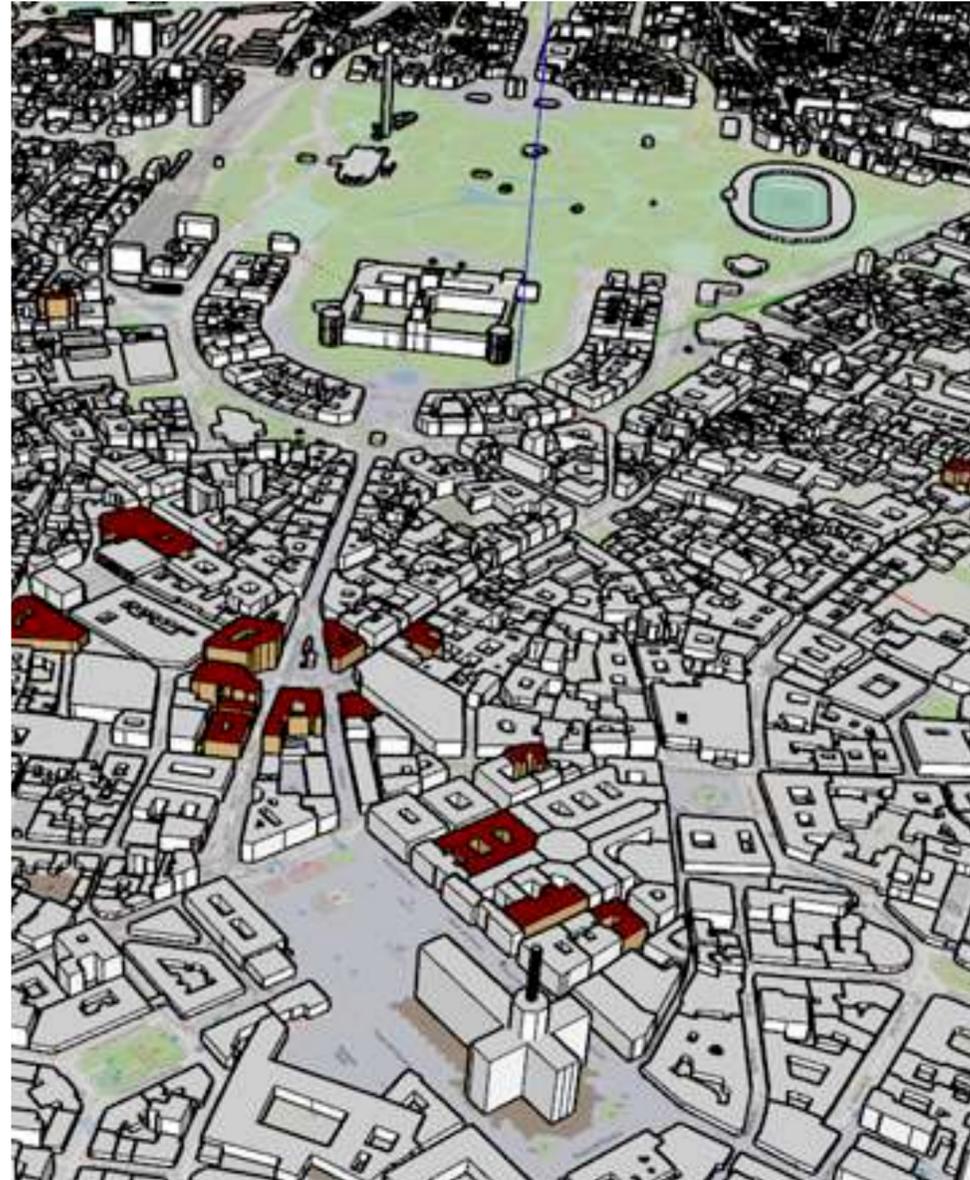




iCD



Intelligent Community Design (ICD)





3D rendering

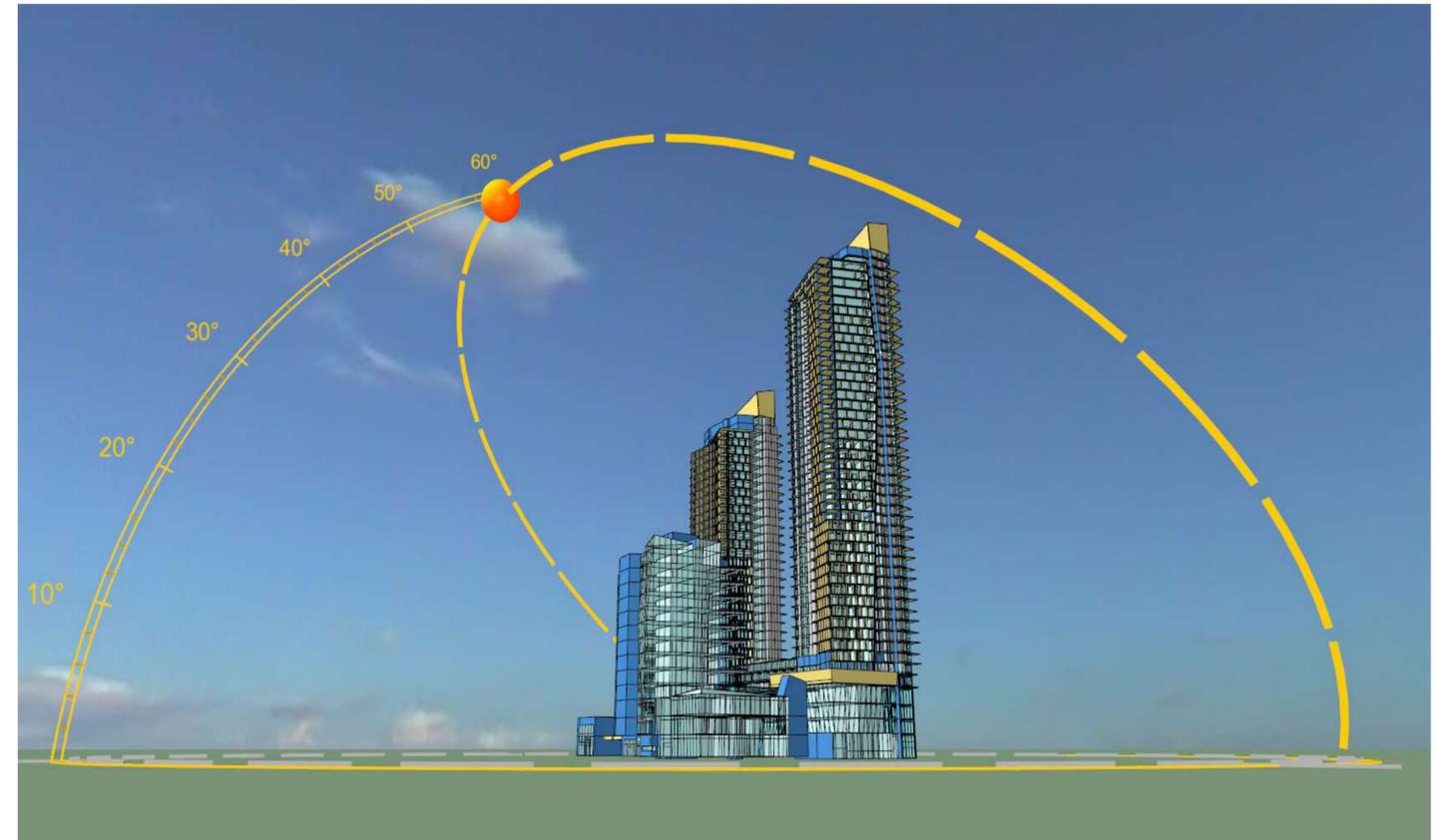
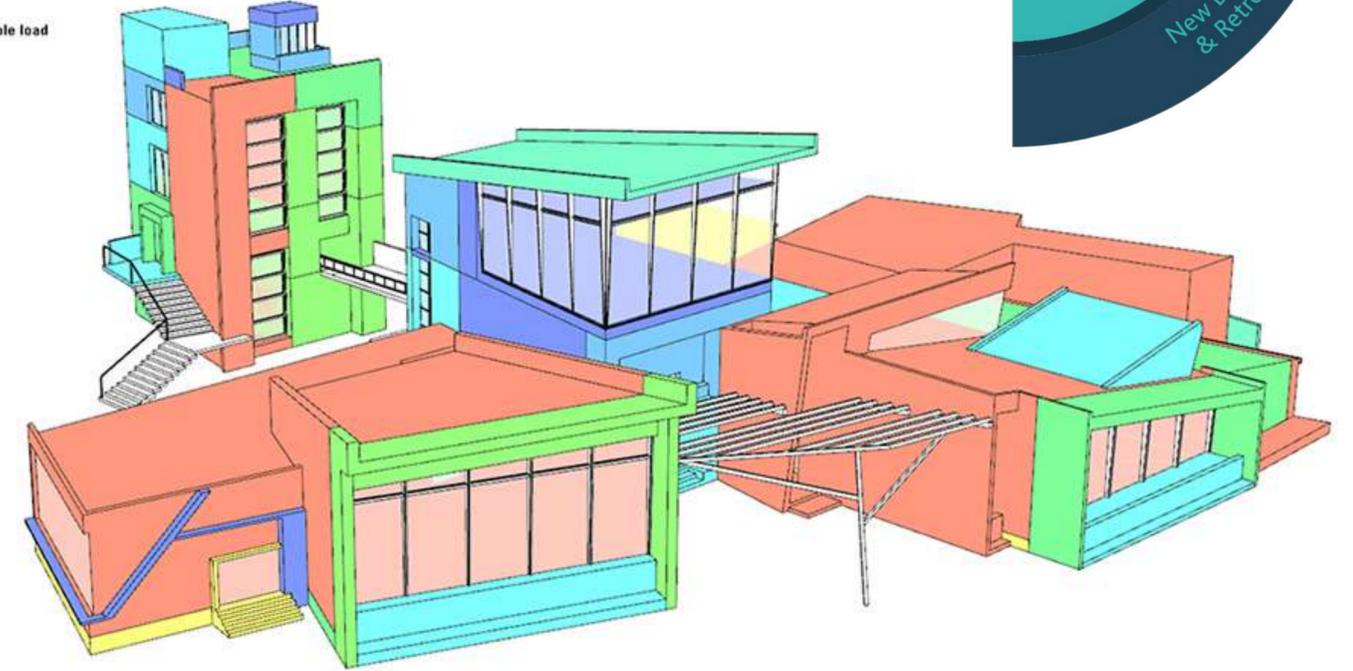
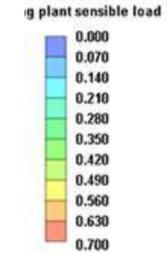


Final iCD model



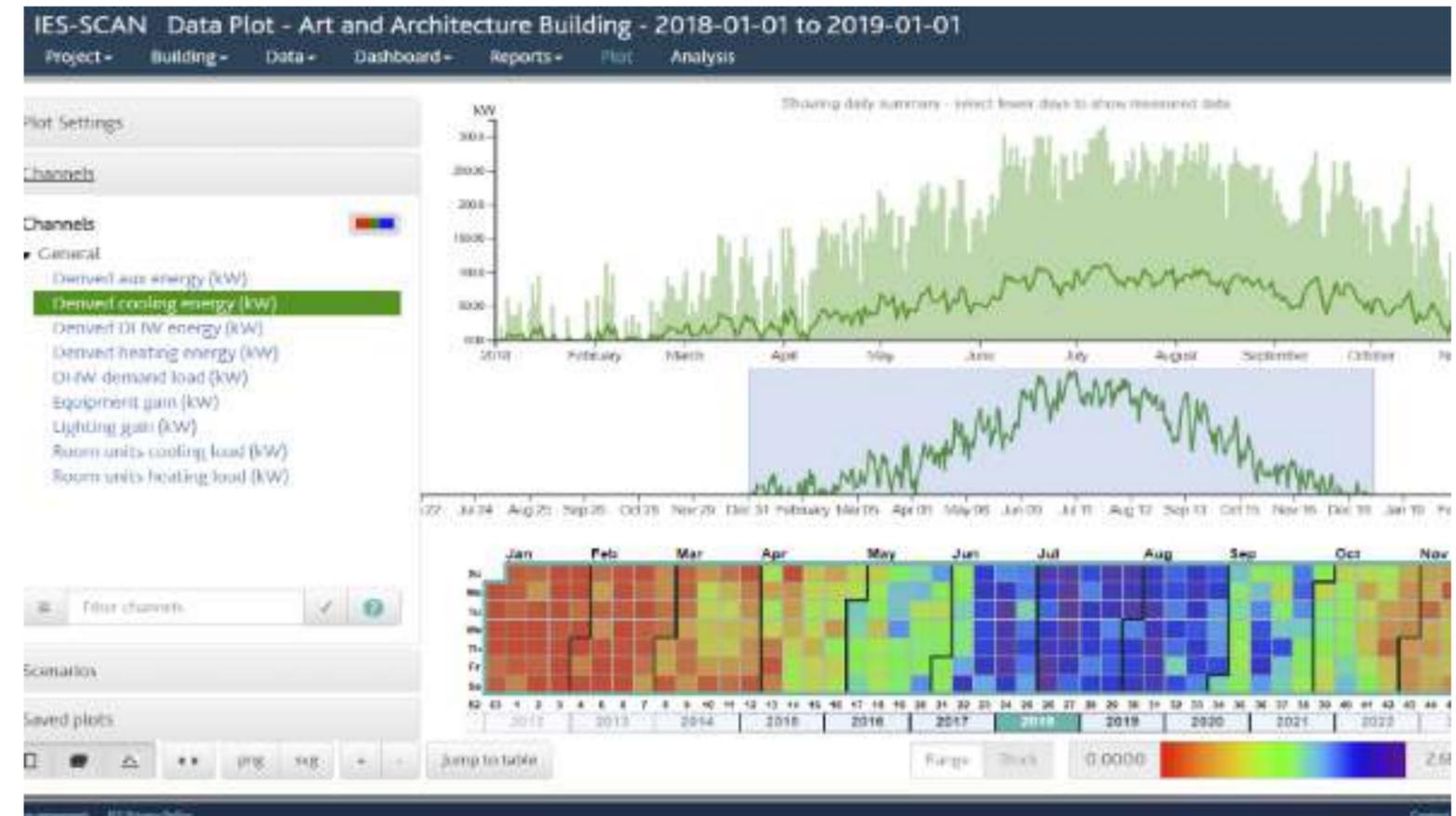


Virtual Environment (VE)





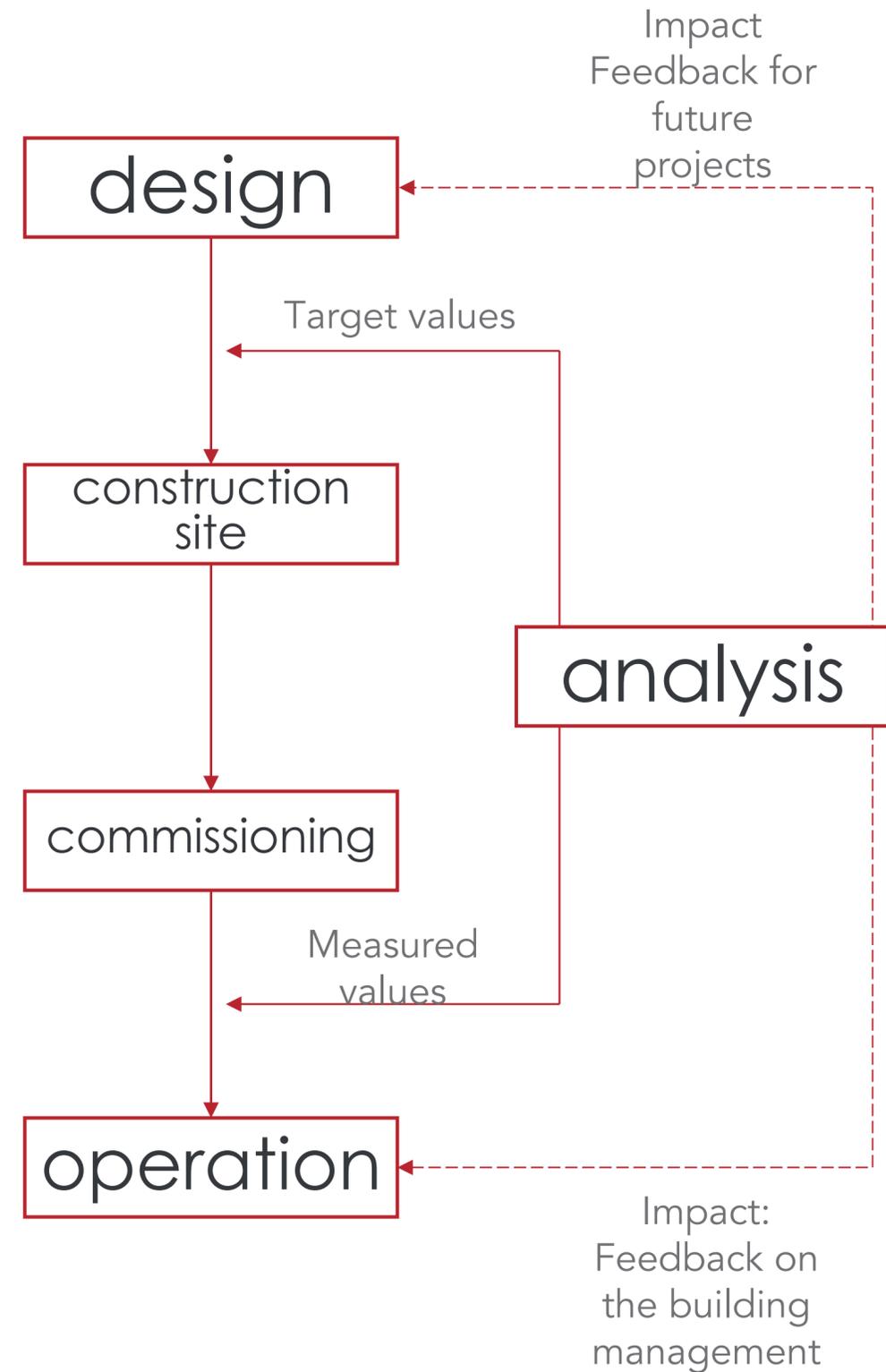
Intelligent Control and Analysis (iSCAN)





Monitoring Based Commissioning

Digital Test Bench is the first cloud analysis and calculation software for the design, commissioning and monitoring of performance and proper operation of plants and buildings, to implement Quality Management and Building Automation in a concrete, effective, integrated and sustainable way.



synavision developer and first provider of the world's first building operation quality certificate



COPILOT shareholders



REHVA
Federation of European Heating,
Ventilation and Air Conditioning Associations

European Federation of HVAC
associations
> 120 000 HVAC engineers



**Eurovent
Services Company**

> 40 HVAC certification schemes
> 40 countries




synavision
Perfekte Gebäudeperformance

German engineering & software
company

Majority
shareholder



De-risk your real estate projects and investments!

The Digital Test Bench: IoT-platform for numerous use cases

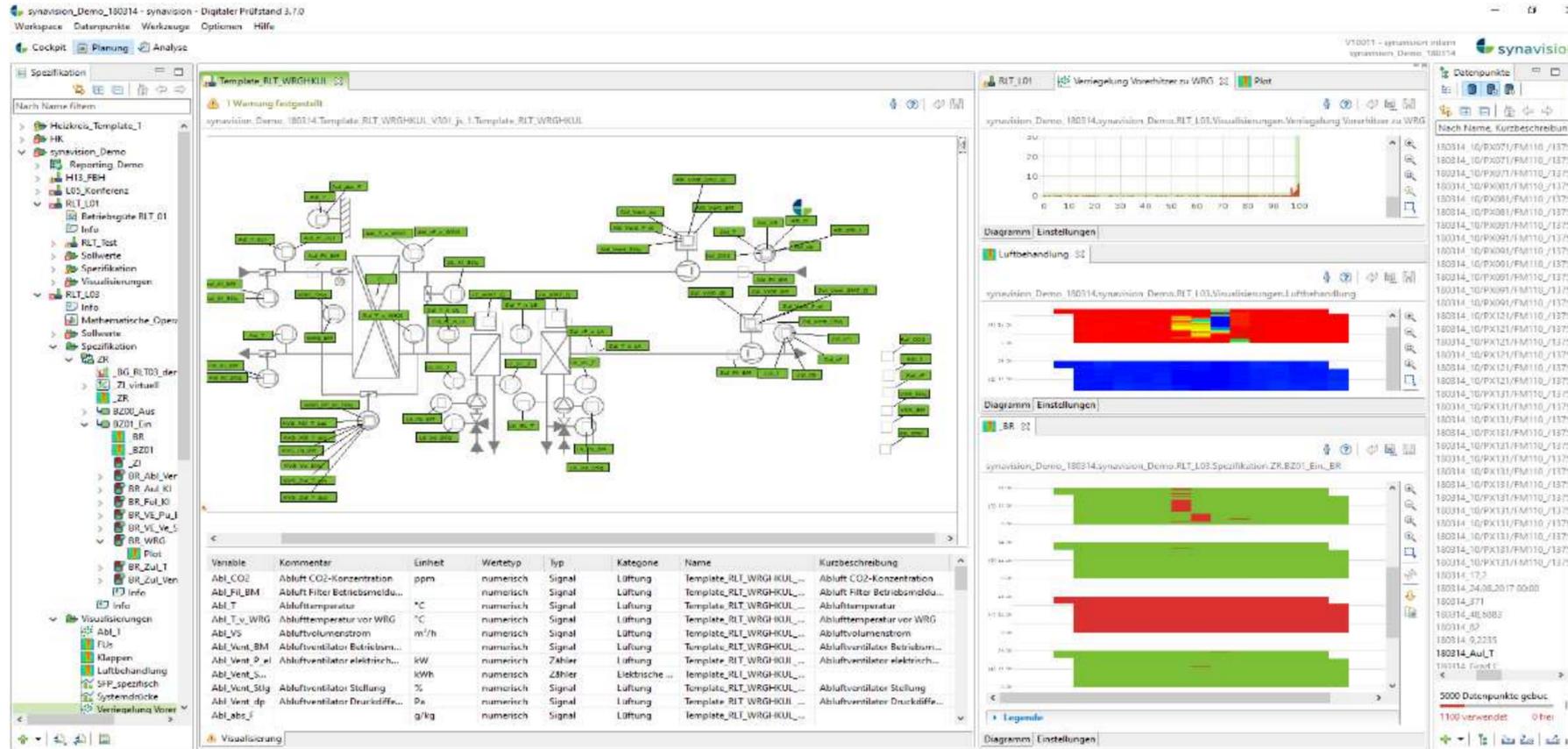
Definition and monitoring of service level agreements for operational success

Technical Monitoring

Energy Management in acc. With ISO 50001

Design of digital functional descriptions („Digital Twin“) in the context of BIM-projects

Toolbox for fast results and data management



The screenshot displays the synavision software interface. On the left, there is a project tree with folders like 'Spezifikation' and 'Visualisierungen'. The main area shows a detailed system diagram with various components and connections. Below the diagram is a table with columns for 'Variable', 'Kommentar', 'Einheit', 'Werttyp', 'Typ', 'Kategorie', 'Name', and 'Kurzbeschreibung'. To the right, there are several data visualization panels, including a line chart and a bar chart, both showing data trends over time. The interface is clean and professional, with a clear focus on data analysis and system monitoring.

Corrosion-monitoring in hydraulic systems

Build your own algorithms for superior data analyses

Automated data quality check for consistency, ranges, completeness

Digital testing of fire protection devices and systems

Performance certifications according to LEED, BREEAM, DGNB and COPILOT!

How it works: Putting data to work at Munich Airport.

Workflow (1/2)



2 Designing of Digital Twin

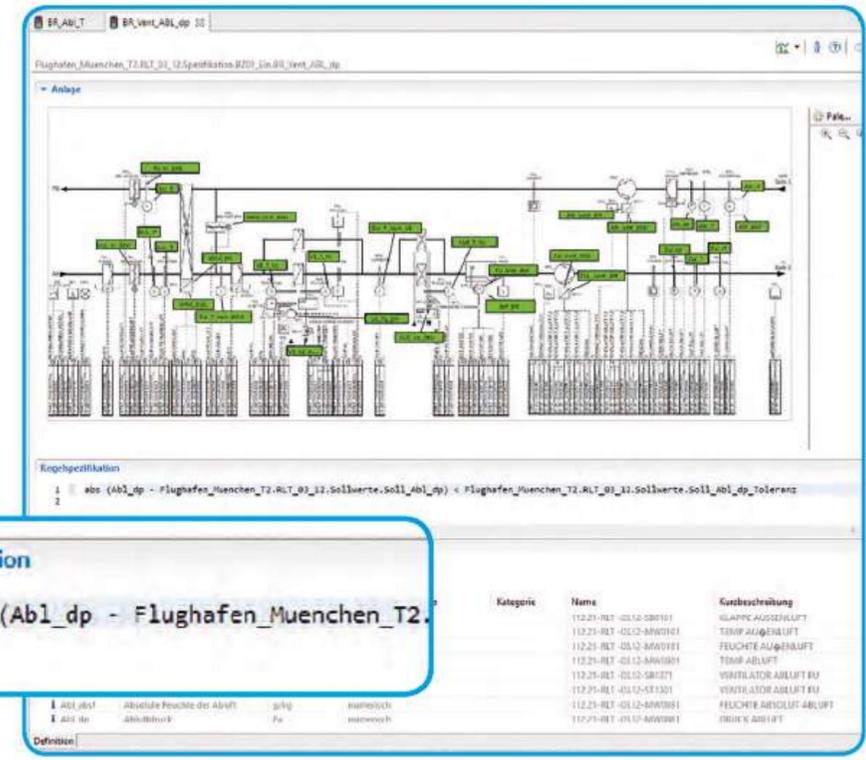


1



Kickoff

R2M Solution



Regelspezifikation

Kategorie	Name	Kurzbeschreibung
1	abs (Ab1_dp - Flughafen_Muenchen_T2)	KLAPPEN AUSGESCHLUPFT
2		TEMPERATUR ABGELUFT
		FEUCHTIGKEIT ABGELUFT
		TEMPERATUR ABGELUFT
		VENTILATOR ABGELUFT EU
		VENTILATOR ABGELUFT EU
		FEUCHTIGKEIT ABSOLUT ABGELUFT
		DRUCK ABGELUFT



3

Dash-board



How it works: Putting data to work at Munich Airport

Workflow (2/2)



6 Reporting & Monitoring



1. Zusammenfassung der Prüfergebnisse

Dieser Bericht dokumentiert die Prüfergebnisse des Technischen Monitorings für den Prüfzeitraum 03.04.2019 bis 17.04.2019. Es wurden das Gebäude und 8 Anlagen geprüft. Abbildung 1 zeigt die angestrebte und erreichte Betriebsgüte¹ für die geprüften Anlagen im Prüfzeitraum.

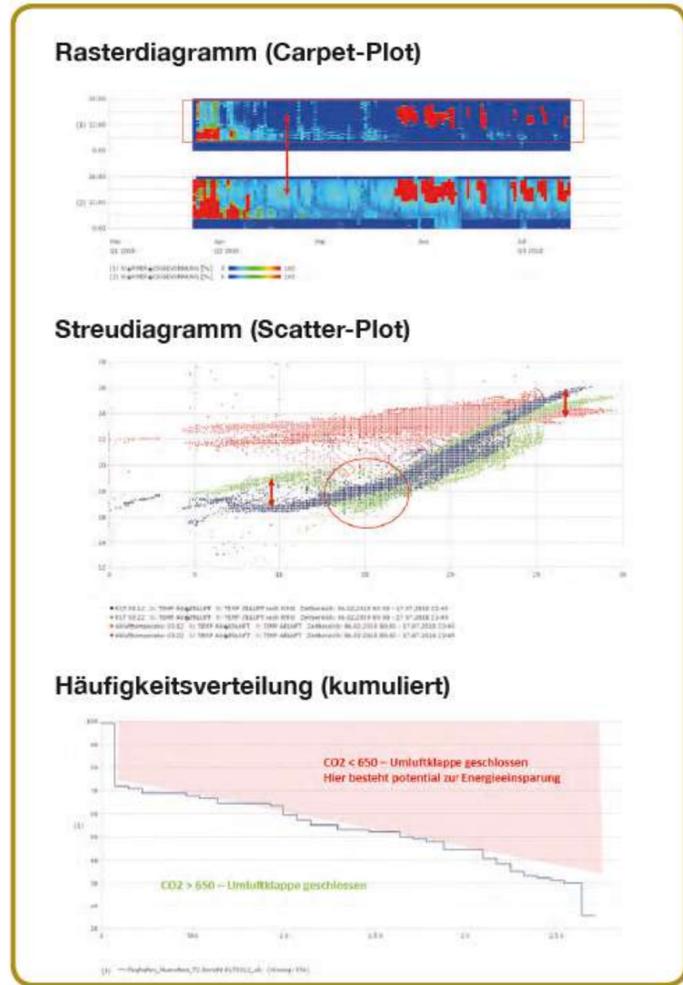


Abbildung 1 Betriebsgüte der geprüften Anlagen im Prüfzeitraum

Die angestrebten Betriebsgüten wurden im Prüfzeitraum überwiegend nicht erreicht.

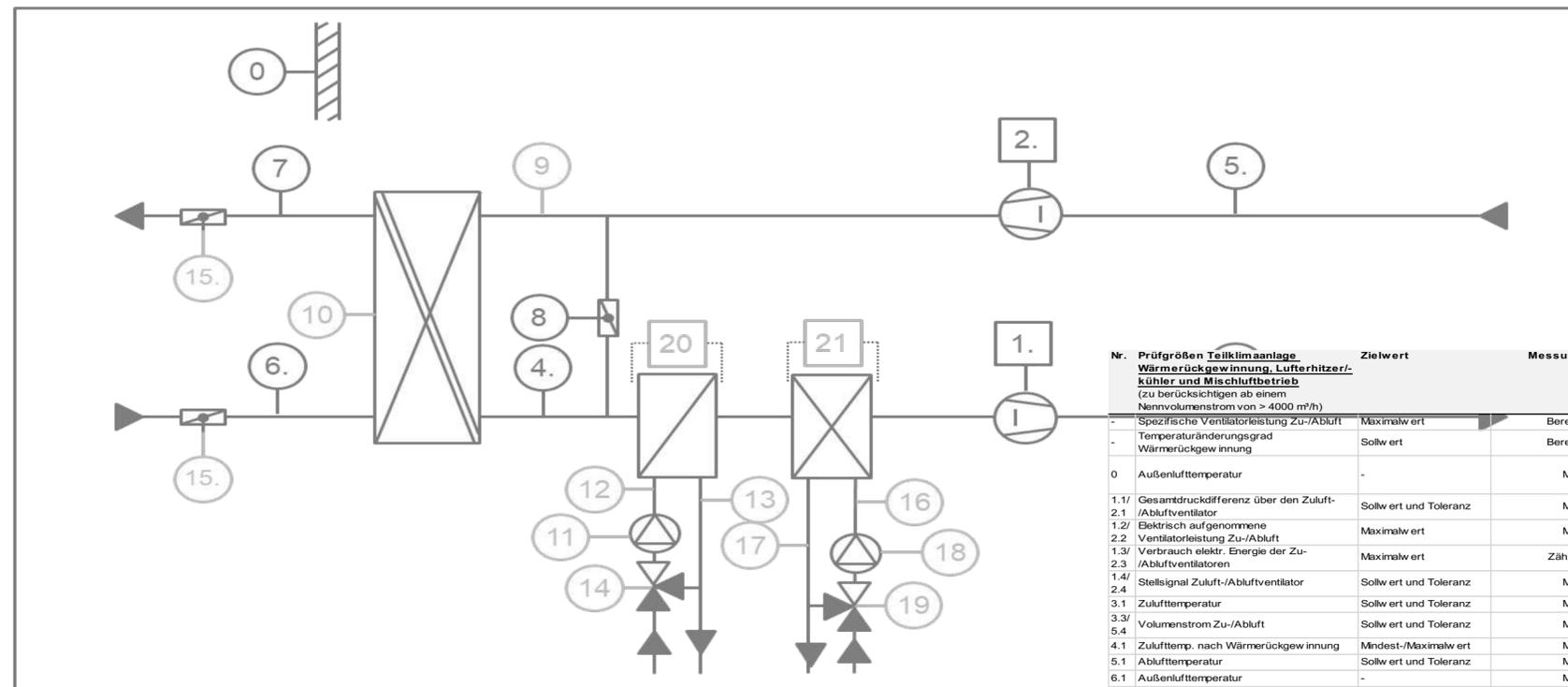


4 Automatic evaluation of trial operation's data



5 Deep dive

Standardized minimum instrumentation of operating parameters and measurement concepts in the design phase

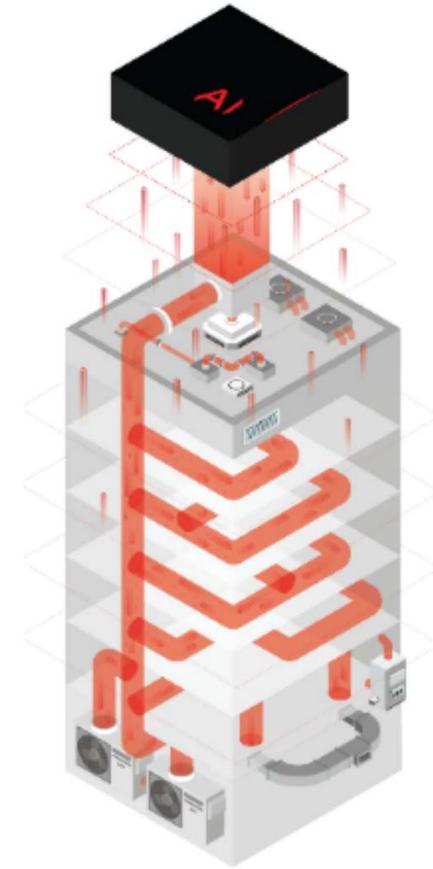
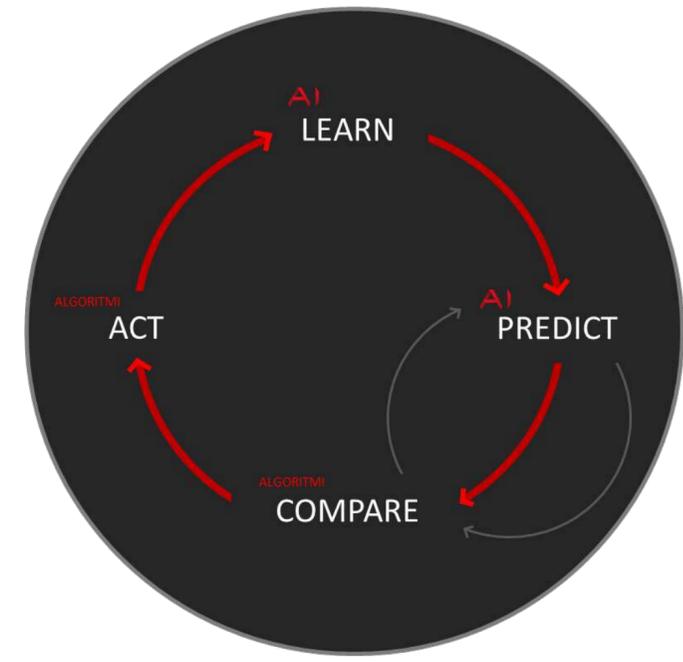


Nr.	Prüfgrößen Teilklimaanlage Wärmerückgewinnung, Lüfterhitzer/-kühler und Mischluftbetrieb (zu berücksichtigen ab einem Nennvolumenstrom von > 4000 m³/h)	Zielwert	Messung [Einheit]	Anmerkung
-	Spezifische Ventilatorleistung Zu-/Abluft	Maximalwert	Berechnung	[W/m³/s] Bewertung nach Klassifizierung DIN EN 16798-3
-	Temperaturänderungsgrad Wärmerückgewinnung	Sollwert	Berechnung	[-] Berechnung nach EN 308
0	Außenlufttemperatur	-	Messung	[°C] Wetterstation; ggf. zusätzlich für die Regelung notwendige Umrechnungen, z.B. als gleitender Mittelwert
1.1/	Gesamtdruckdifferenz über den Zuluft-/Abluftventilator	Sollwert und Toleranz	Messung	[Pa] Zielwert ggf. als Kennlinie mit Toleranz
1.2/	Elektrisch aufgenommene Ventilatorleistung Zu-/Abluft	Maximalwert	Messung	[kW] -
1.3/	Verbrauch elektr. Energie der Zu-/Abluftventilatoren	Maximalwert	Zählerstand	[kWh] Bewertung als Monats- oder Jahreswerte
1.4/	Stellsignal Zuluft-/Abluftventilator	Sollwert und Toleranz	Messung	[%] Zielwert ggf. als Kennlinie mit Toleranz
2.1/	Zulufttemperatur	Sollwert und Toleranz	Messung	[°C] Zielwert ggf. als Kennlinie mit Toleranz
2.2/	Volumenstrom Zu-/Abluft	Sollwert und Toleranz	Messung	[m³/h] Zielwert ggf. als Kennlinie mit Toleranz
2.3/	Zulufttemp. nach Wärmerückgewinnung	Mindest-/Maximalwert	Messung	[°C] Zielwert ggf. als Kennlinie für Temperaturveränderung
2.4/	Ablufttemperatur	Sollwert und Toleranz	Messung	[°C] Zielwert ggf. als Kennlinie mit Toleranz
3.1/	Außenlufttemperatur	-	Messung	[°C] -
3.2/	Fortlufttemperatur	Mindest-/Maximalwert	Messung	[°C] Zielwert ggf. als Kennlinie für Temperaturveränderung
3.3/	Stellsignal Mischluftklappe	Sollwert und Toleranz	Messung	[%] -
3.4/	Relative Feuchte der Zuluft	Konzeptabhängig; - Min-/Maxwerte	Messung	[%] (optional) Zielwert ggf. als Kennlinie mit Toleranz. Für Luftkühler mit Entfeuchtungsfunktion.
4.1/	Relative Feuchte der Zuluft nach der Wärmerückgewinnung	Mindest-/Maximalwert	Messung	[%] (optional) Für Luftkühler mit Entfeuchtungsfunktion.
4.2/	Relative Feuchte der Abluft	Konzeptabhängig; - Min-/Maxwerte	Messung	[%] (optional) Zielwert ggf. als Kennlinie mit Toleranz. Für Luftfeuchteregelelung.
4.3/	CO ₂ Konzentration Abluft	Sollwert und Toleranz	Messung	ppm (optional) Anwendung wenn Regelung über CO ₂ Konzentration
5.1/	Relative Feuchte der Außenluft	-	Messung	[%] (optional) für Wärmerückgewinnungssystem mit Rotationswärmeübertrager
6.1/	Ablufttemp. vor Wärmerückgewinnung	-	Messung	[°C] (optional)
6.2/	Betriebsmeldung Wärmerückgewinnung	-	Messung	[0/1] (optional)
6.3/	Betriebsmeldung Lüfterhitzerpumpe	-	Messung	[0/1] (optional) Prüfung von Dauerläufern
6.4/	Vorlauftemperatur Lüfterhitzers	Sollwert und Toleranz	Messung	[°C] (optional) Zielwert ggf. als Kennlinie mit Toleranz
6.5/	Rücklauftemperatur Lüfterhitzers	Sollwert und Toleranz	Messung	[°C] (optional) Zielwert ggf. als Kennlinie mit Toleranz
6.6/	Stellsignal Lüfterhitzerventil	-	Messung	[%] (optional)
6.7/	Betriebsmeldung Au-/Fortluftklappe	-	Messung	[0/1] (optional)
6.8/	Vorlauftemperatur Luftkühler	Sollwert und Toleranz	Messung	[°C] (optional) Zielwert ggf. als Kennlinie mit Toleranz
6.9/	Rücklauftemperatur Luftkühler	Sollwert und Toleranz	Messung	[°C] (optional) Zielwert ggf. als Kennlinie mit Toleranz
6.10/	Betriebsmeldung Luftkühlerpumpe	-	Messung	[0/1] (optional) Prüfung von Dauerläufern
6.11/	Stellsignal Luftkühlerventil	-	Messung	[%] (optional)
6.12/	Thermische Energie Lüfterhitzer	Maximalwert	Zählerstand	[kWh] (optional)
6.13/	Thermische Energie Luftkühler	Maximalwert	Zählerstand	[kWh] (optional)



BrainBox AI: Autonomous AI HVAC technology

BrainBox AI is the world's first autonomous AI HVAC technology. Thanks to the application of advanced deep learning models, our solution is the most powerful and nimble on the market. BrainBox AI literally studies your building and learns how it operates, identifies every potential improvement opportunity and then acts on it. It requires no human intervention and reacts to changes in the built environment immediately to ensure the highest tenant comfort and energy efficiency, at all times.



AI TECHNOLOGY IS HERE

BrainBox AI is the leader in autonomous building control



Uses **deep learning** artificial intelligence (AI) models

Adapts to a building's behavior during the **learning period**

Transforms HVAC systems from reactive to **predictive or "self-driving"**

Utilizes **existing data** from building systems (e.g. BMS, access control systems) and third-party sources (e.g. weather, occupancy) to drive decision-making

Autonomously drives HVAC systems by directly writing back to the controller **in real-time**

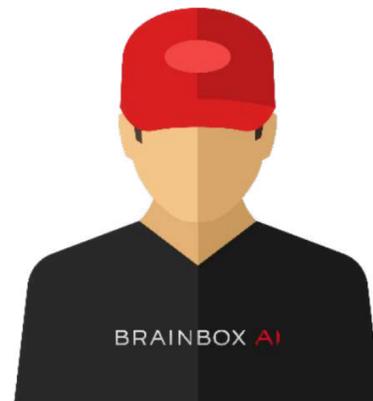
Requires **no human intervention**

R2M Solution

LOW EFFORT/LOW RISK/NO CAPEX

STEP 1

INSTALLATION

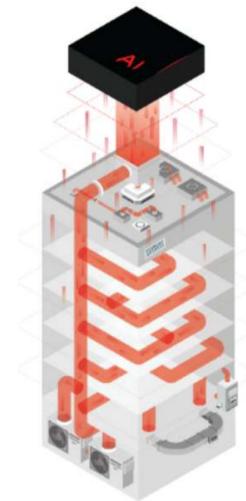


The BrainBox connects to your HVAC network **in 3 hours**

Minimal customer **onboarding time** required (overall less than 10 hours for the full end to end process)

STEP 2

AI TRAINING

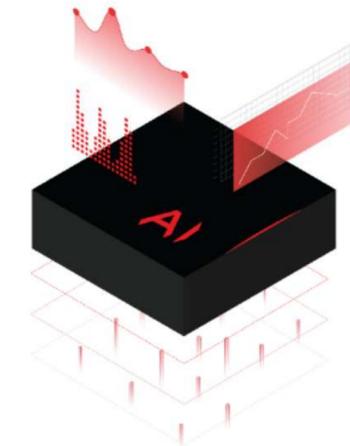


For a period of 4-8 weeks the AI learns the building. It creates an energy profile **unique to your building.**

At the end of the AI training period, a total savings estimate is produced for your review.

STEP 3

AUTO-PILOT



At your discretion you can take possession of those savings by authorising **Auto-pilot mode.**

Auto-pilot can be disengaged at any time (and system will revert back to its previous state)

RESULTS



Up to 25%
reduction in total energy
costs



20-40%
decrease in carbon
footprint



60%
improvement in occupant
comfort



2-3
hours to install



Energy active envelope



Onyx Solar:
photovoltaic glass for
buildings



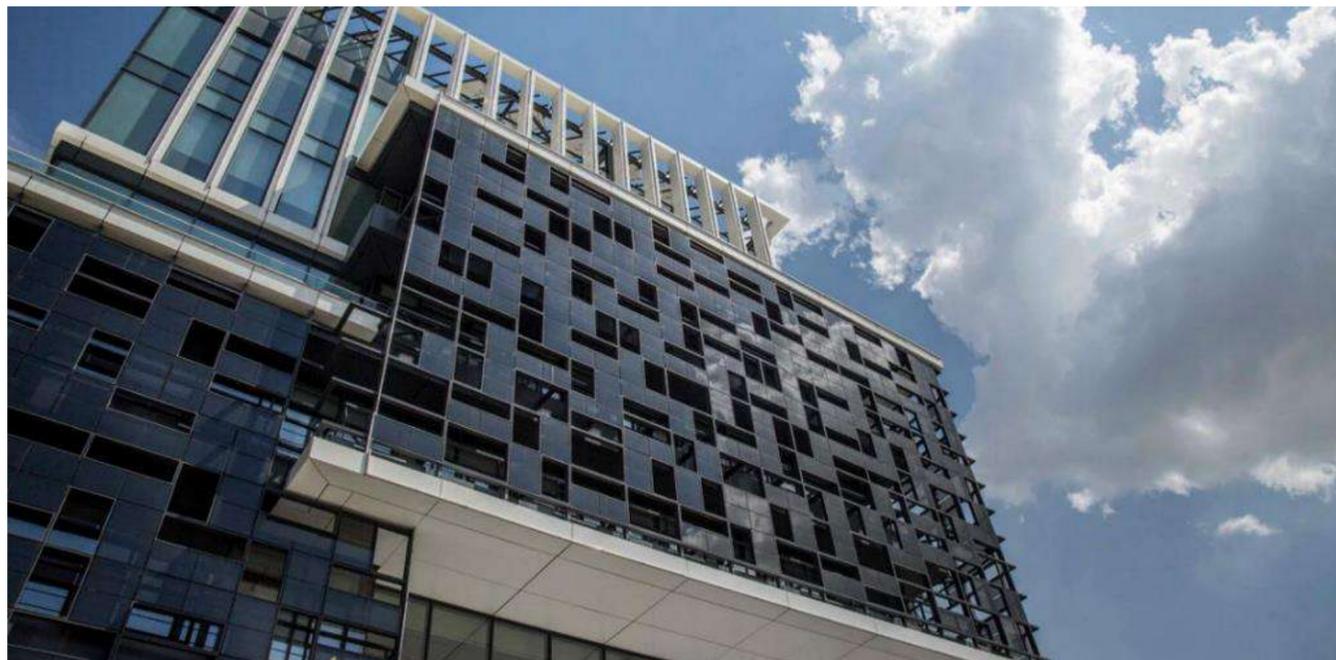
Photovoltaic glass for buildings

Architectural glass not only provides the building with the same passive properties as conventional glass, but also generates renewable energy.

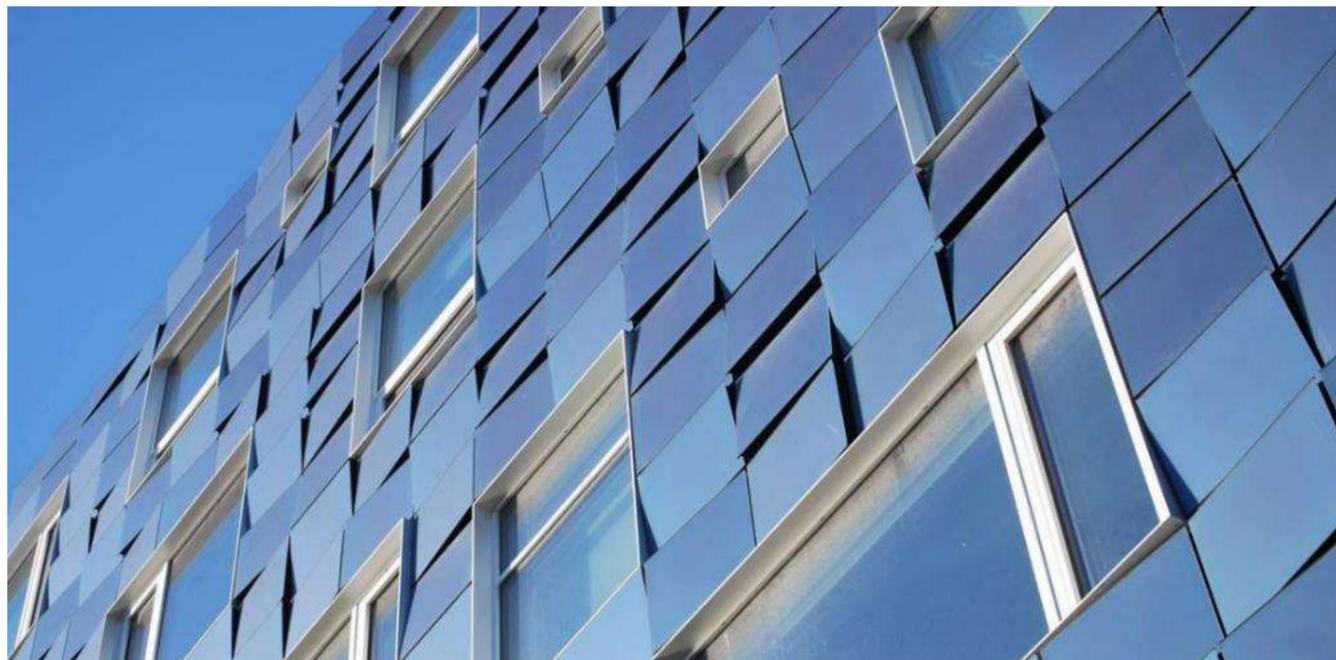
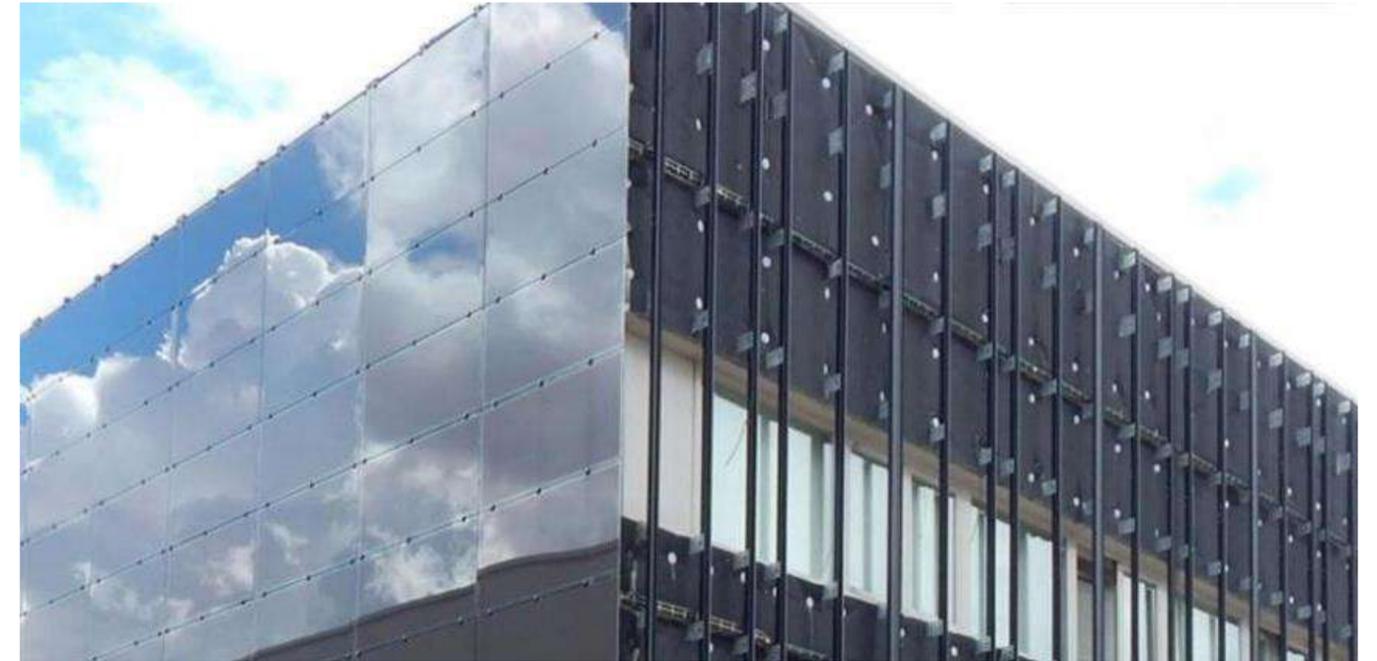
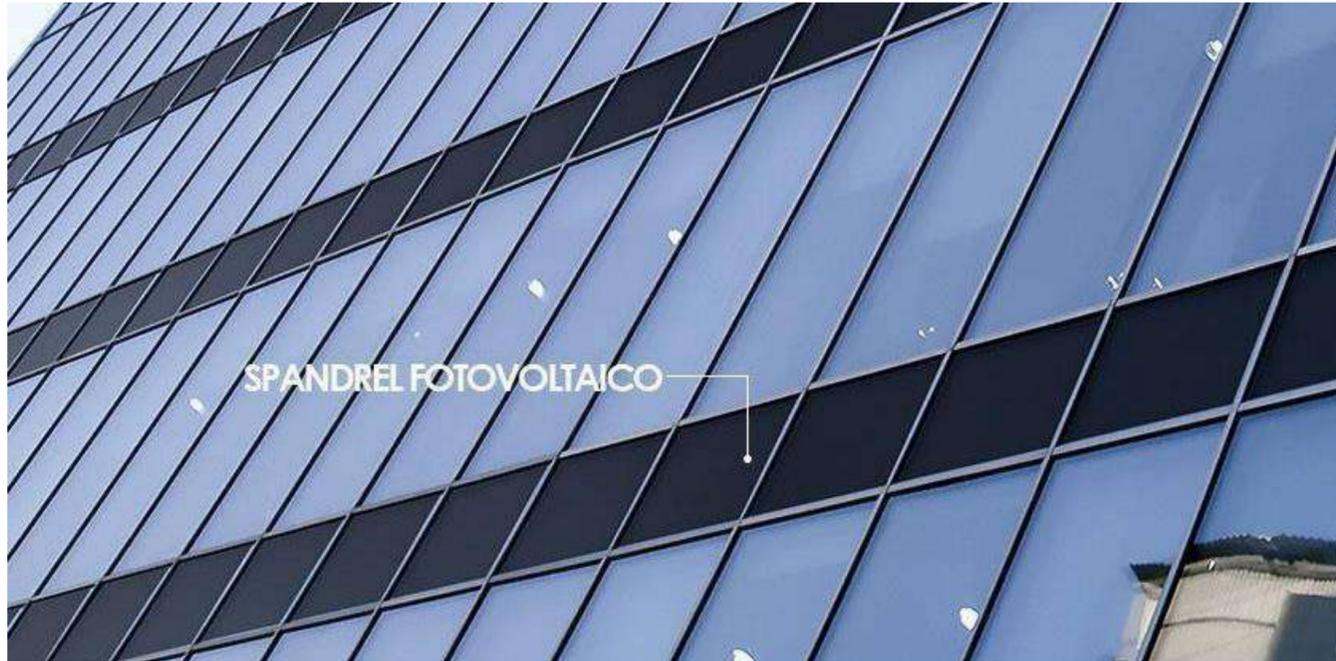
The only construction material available on the market that provides your building with an economic return on investment.



Ventilated Façade - Spandrel



Ventilated Façade - Spandrel

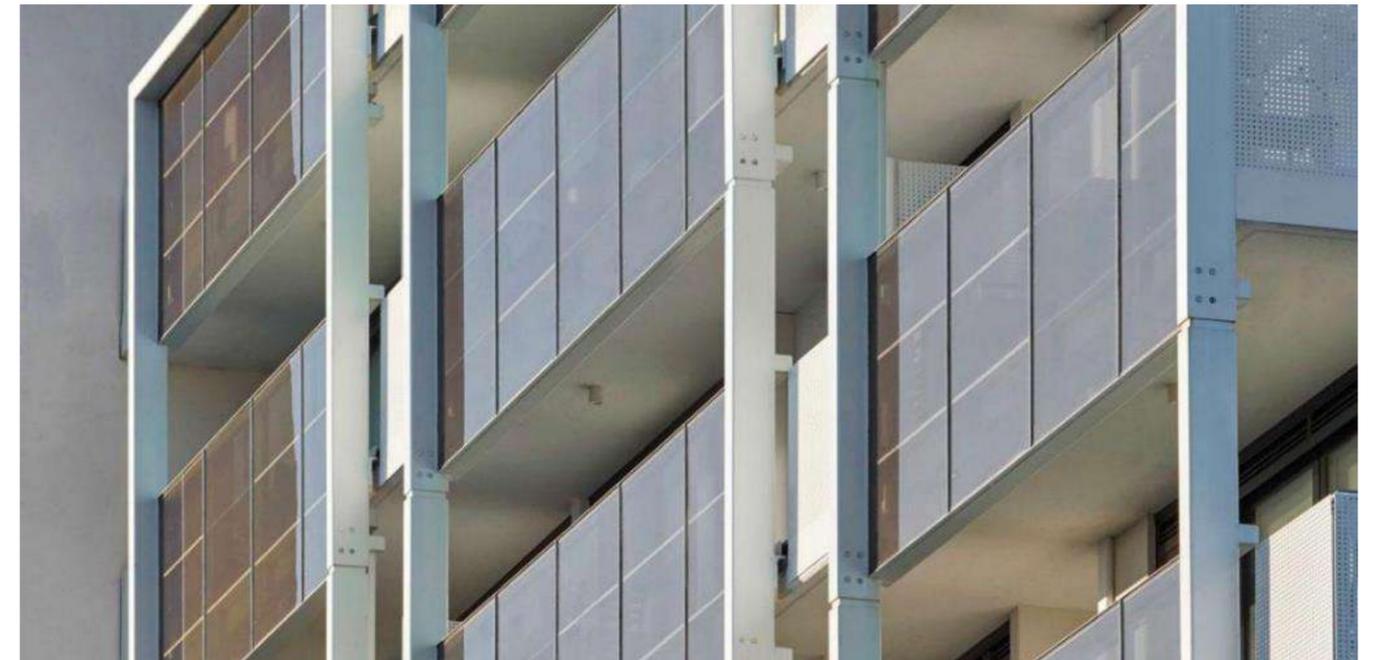


BIPV Roofs



Parapets

Company Profile



45 R2M Solution

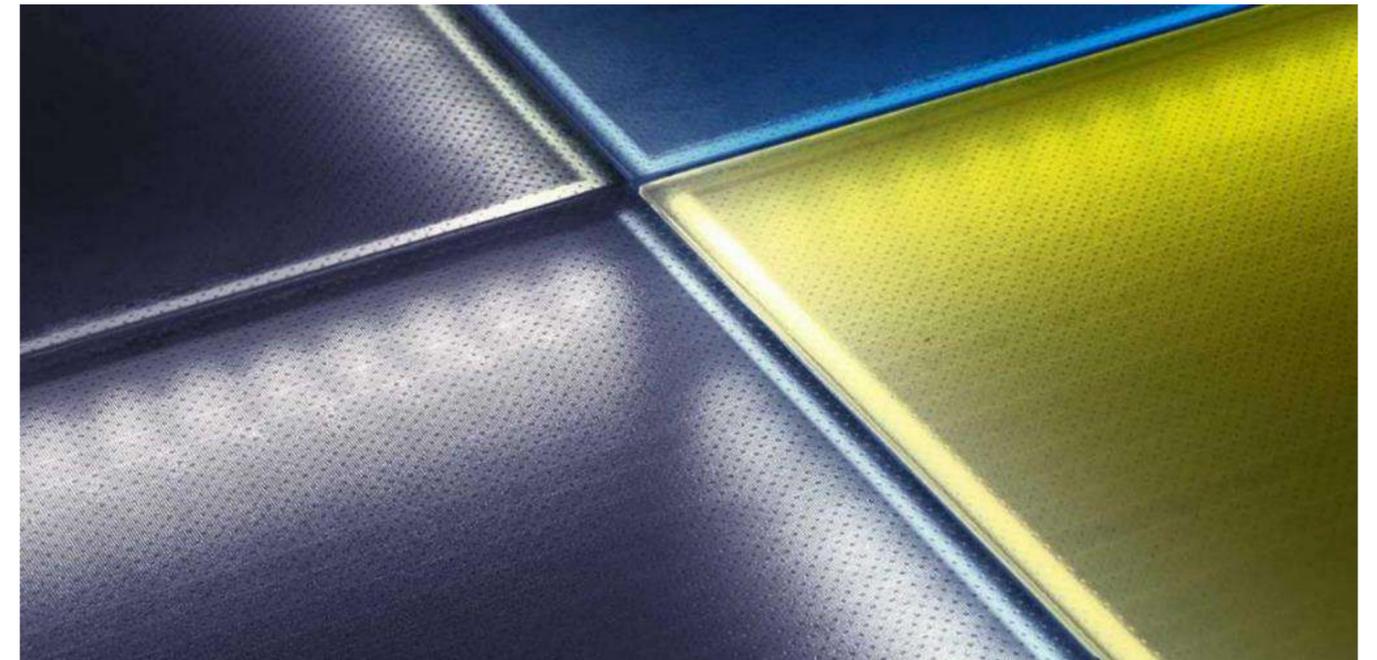
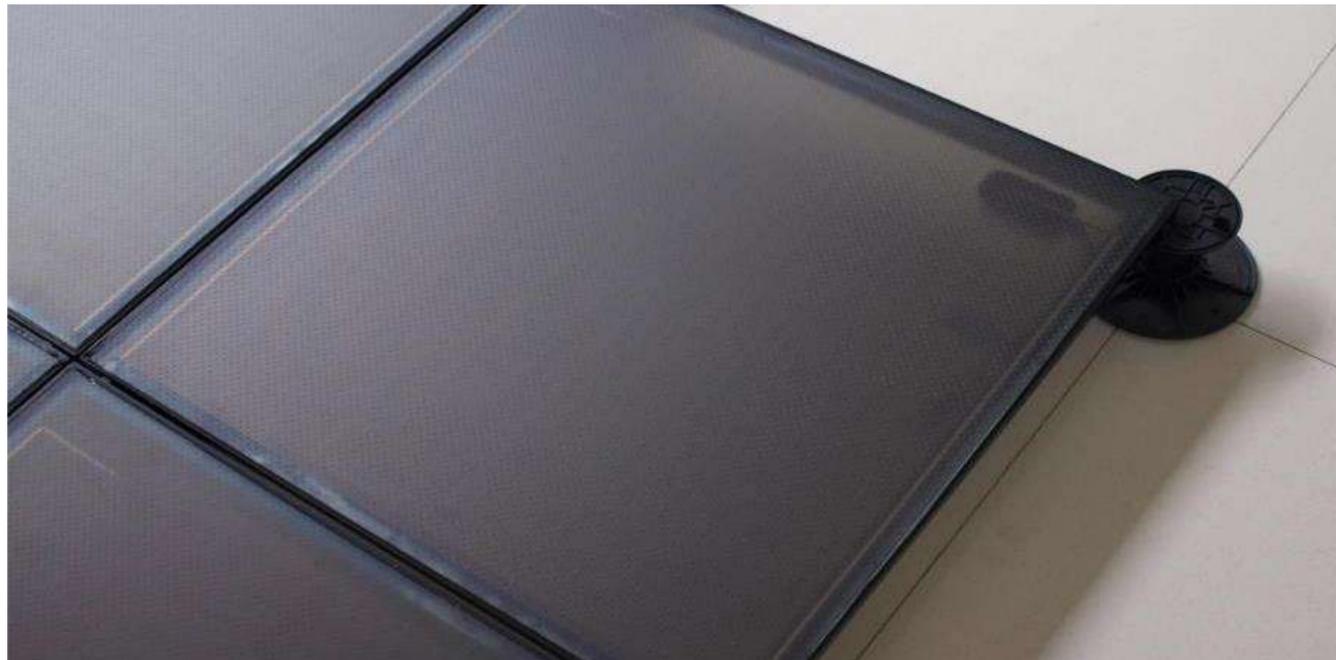
Skylights



Brise Soleil



Pavements



NBS Green & Resilient Cities

Innovative Products



49 R2M Solution

GREENPASS®

GREENPASS: asses the greenery impact on resilience

The block contains the 'GREENPASS' logo, which includes a green circular icon with a white 'P' and the text 'GREENPASS' in bold green. Below the logo is a text box with a light gray background and a red border containing the description: 'GREENPASS: asses the greenery impact on resilience'.

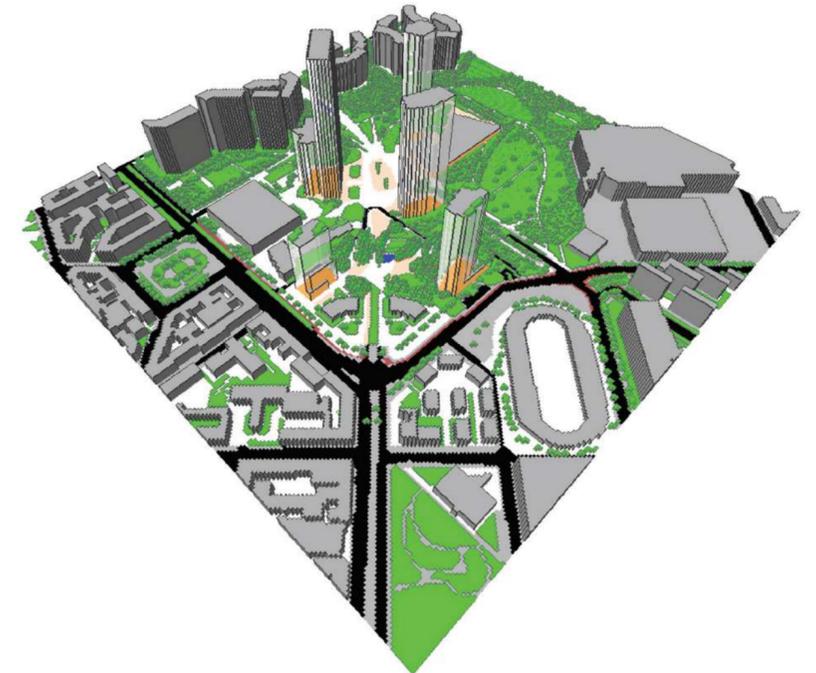


GREENPASS®

Asses the greenery impact on resilience

GREENPASS® is the first “easy-to-use” software for architectural design and planning of urban areas resilient to climate change.

Nature to design “green cities”, livable and resilient cities.



Urbanisation

The continuous urbanization is a phenomena difficult to stop and that entails the decrease of green areas, contributing to a series of critical issues

Air pollution



Urban Heat Island Effect



Biodiversity reduction

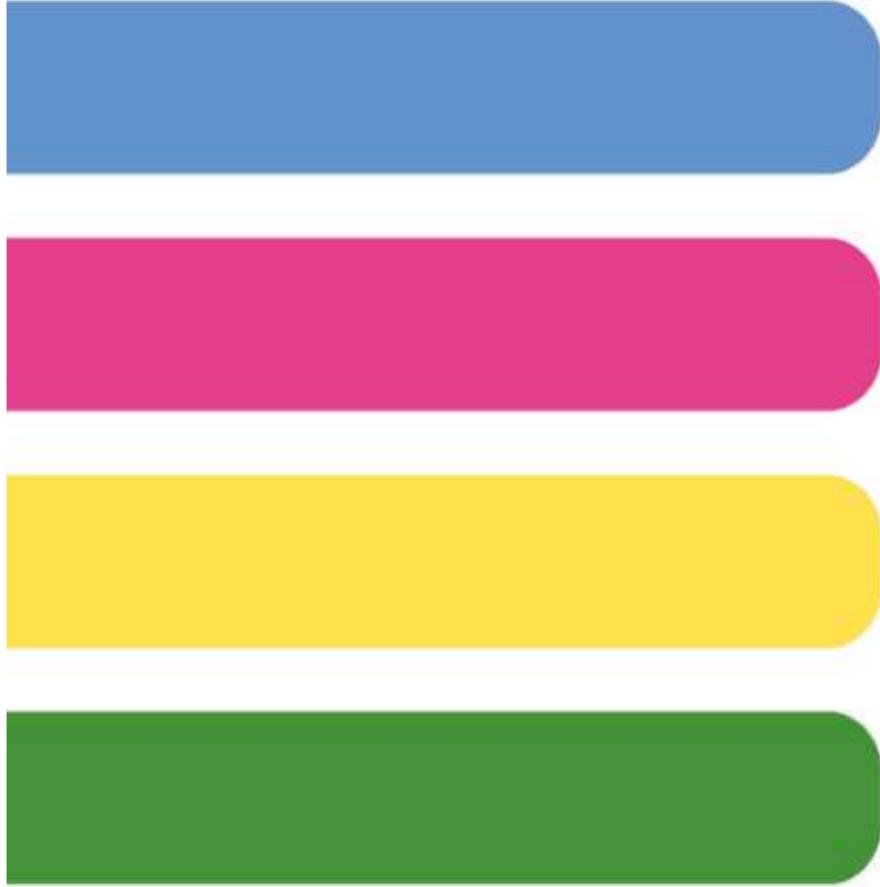


Floodings



Enables livable cities





GREEN Performance Assessment Software System



UNSTUDIO – Citylife in Milan (IT)



Where: Milano (IT)

Who: UNSTUDIO

Level: Competition

Area: 3,8 ha

Time: 2 weeks



Design



Evaluation



Optimisation



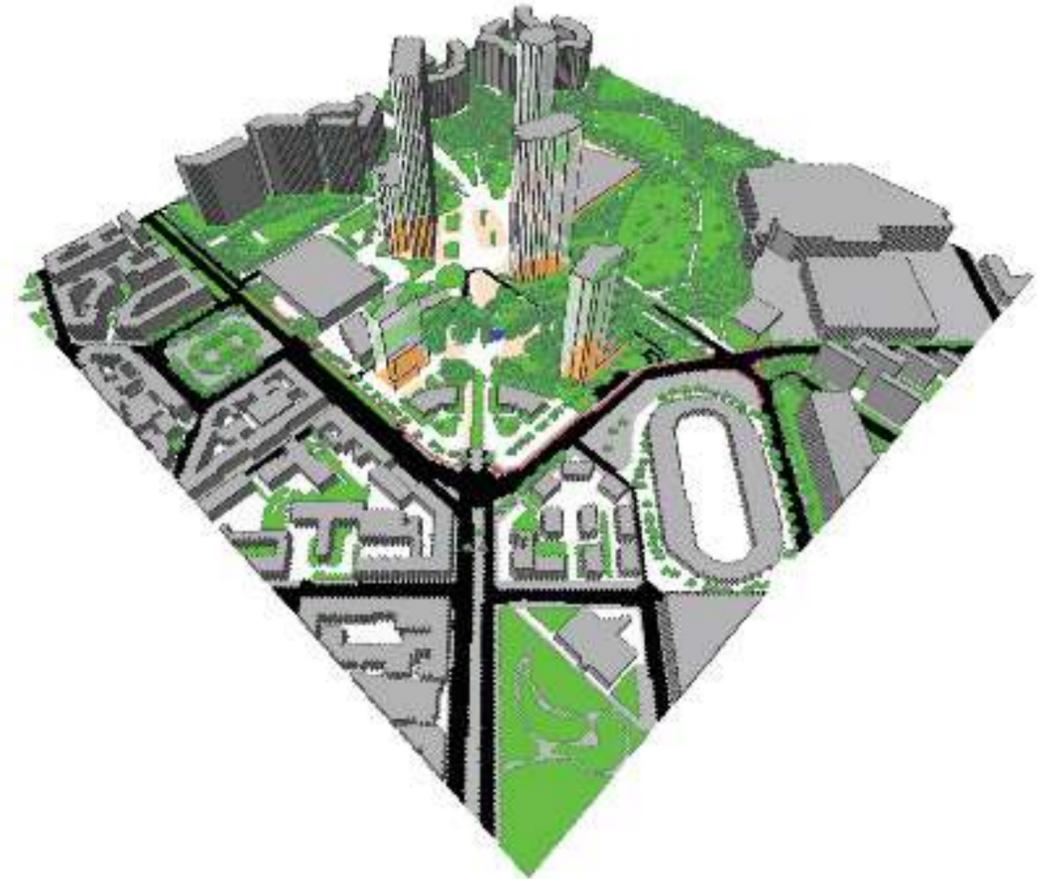
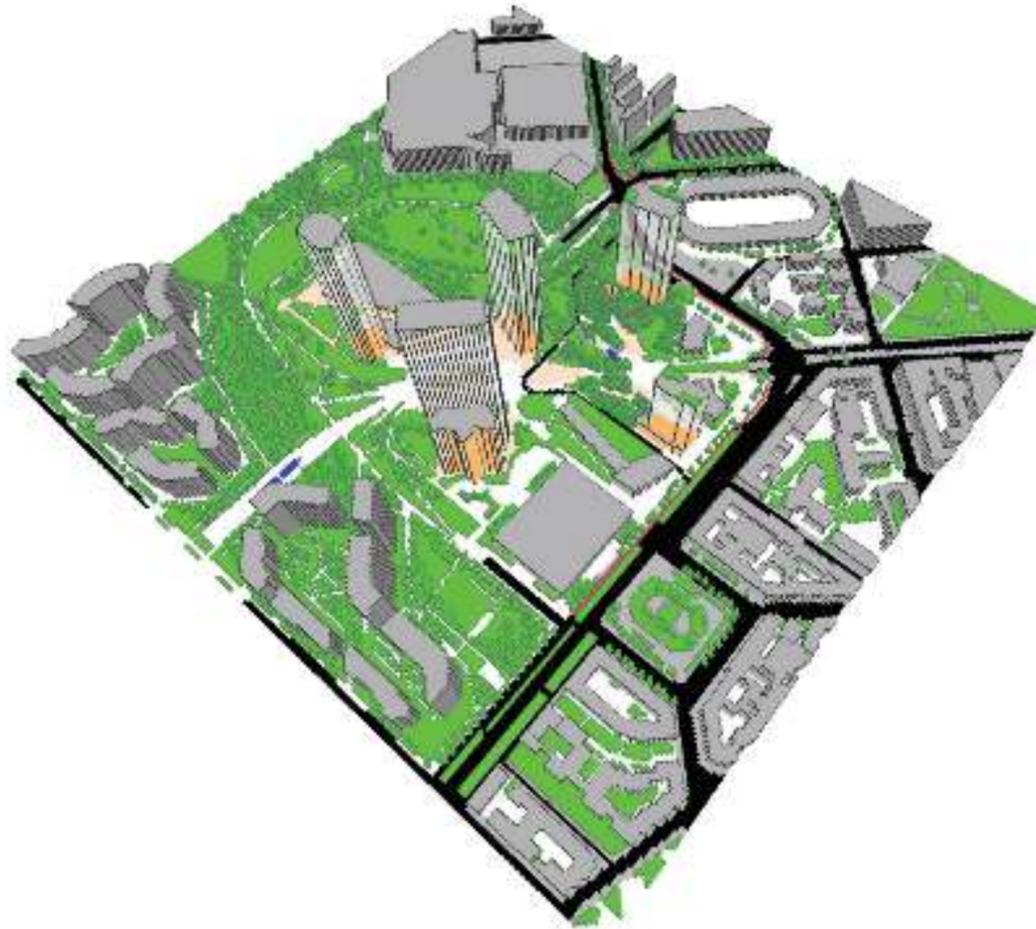
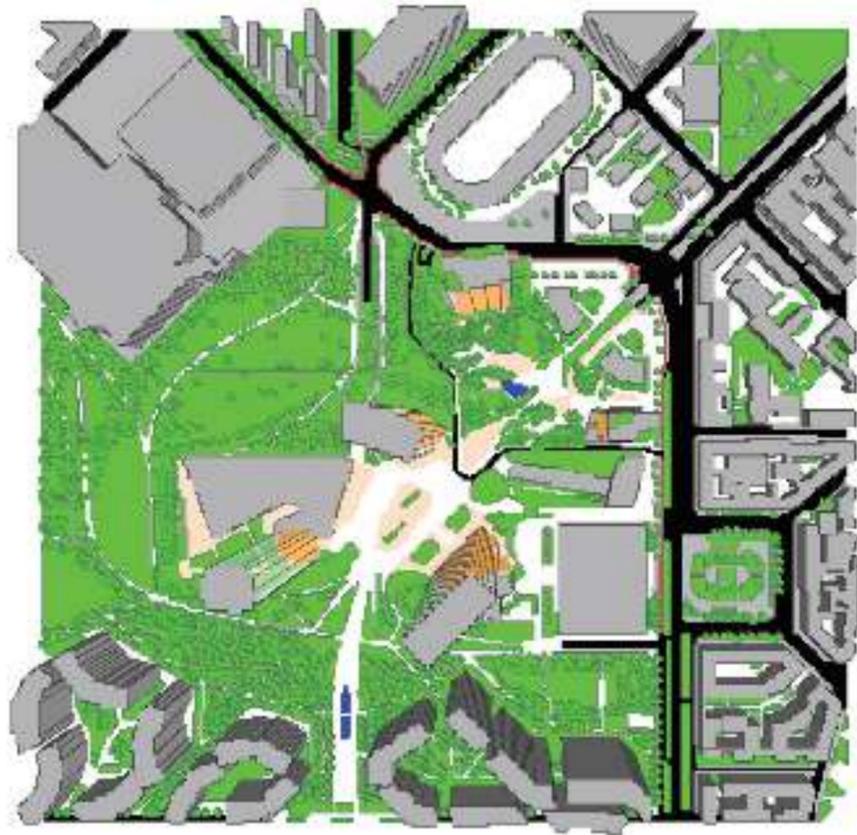
Certification



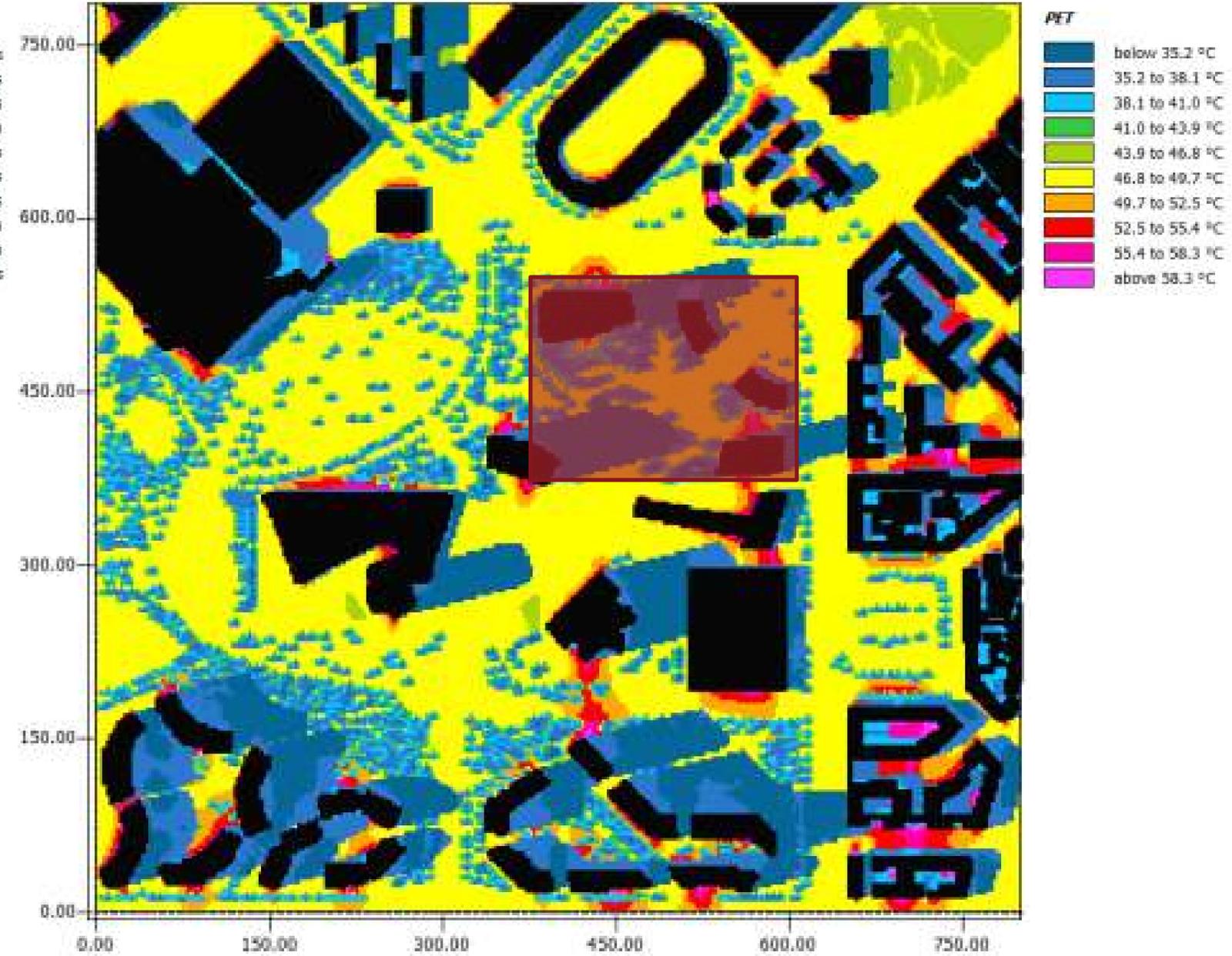
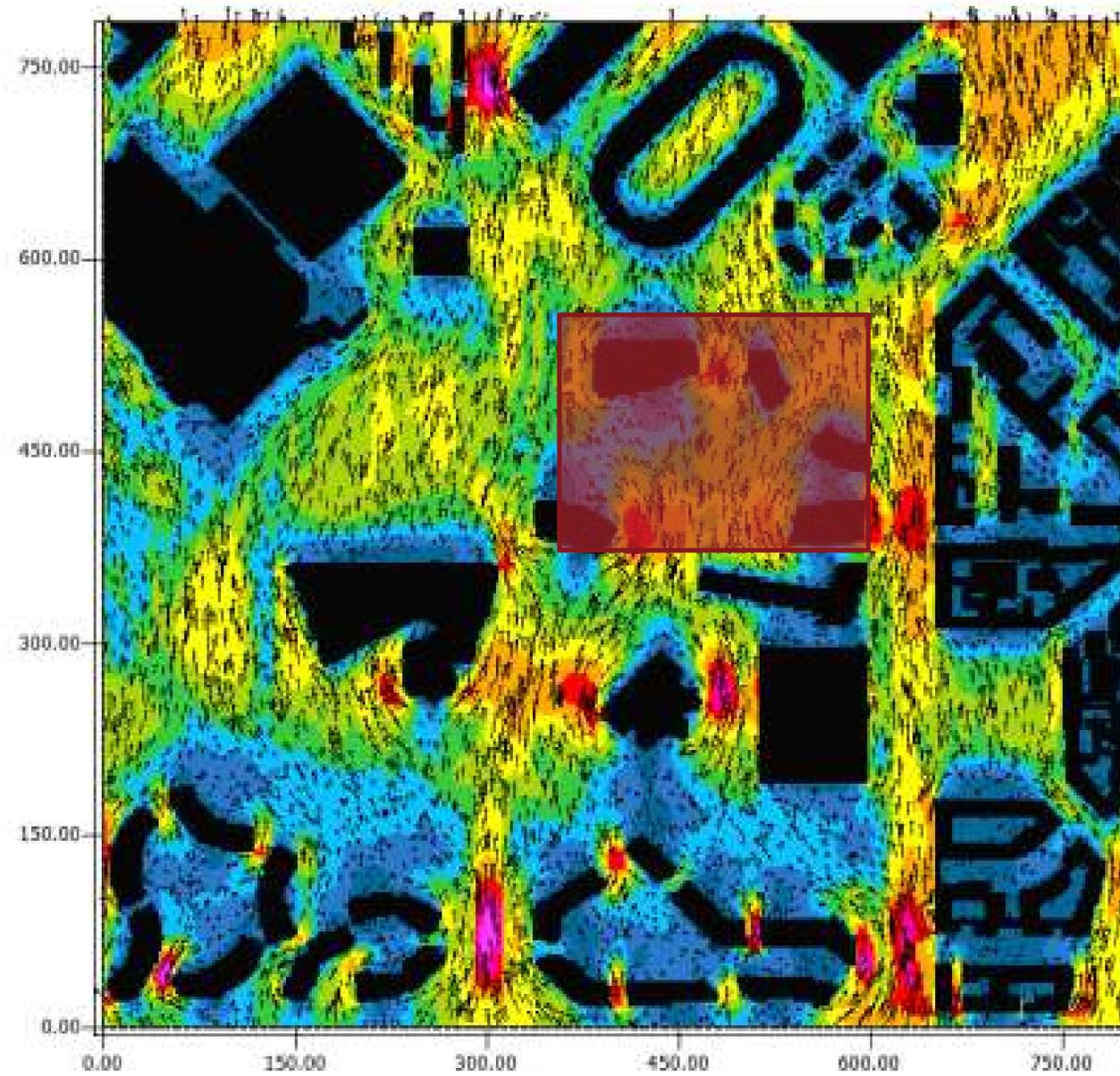
UNSTUDIO – Citylife in Milan (IT)



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Grazie

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