Digital Twins for the Built Environment

How to utilize Digital Twins in daily operations of Smart Cities?

5.9.2023 Tiina Talvitie
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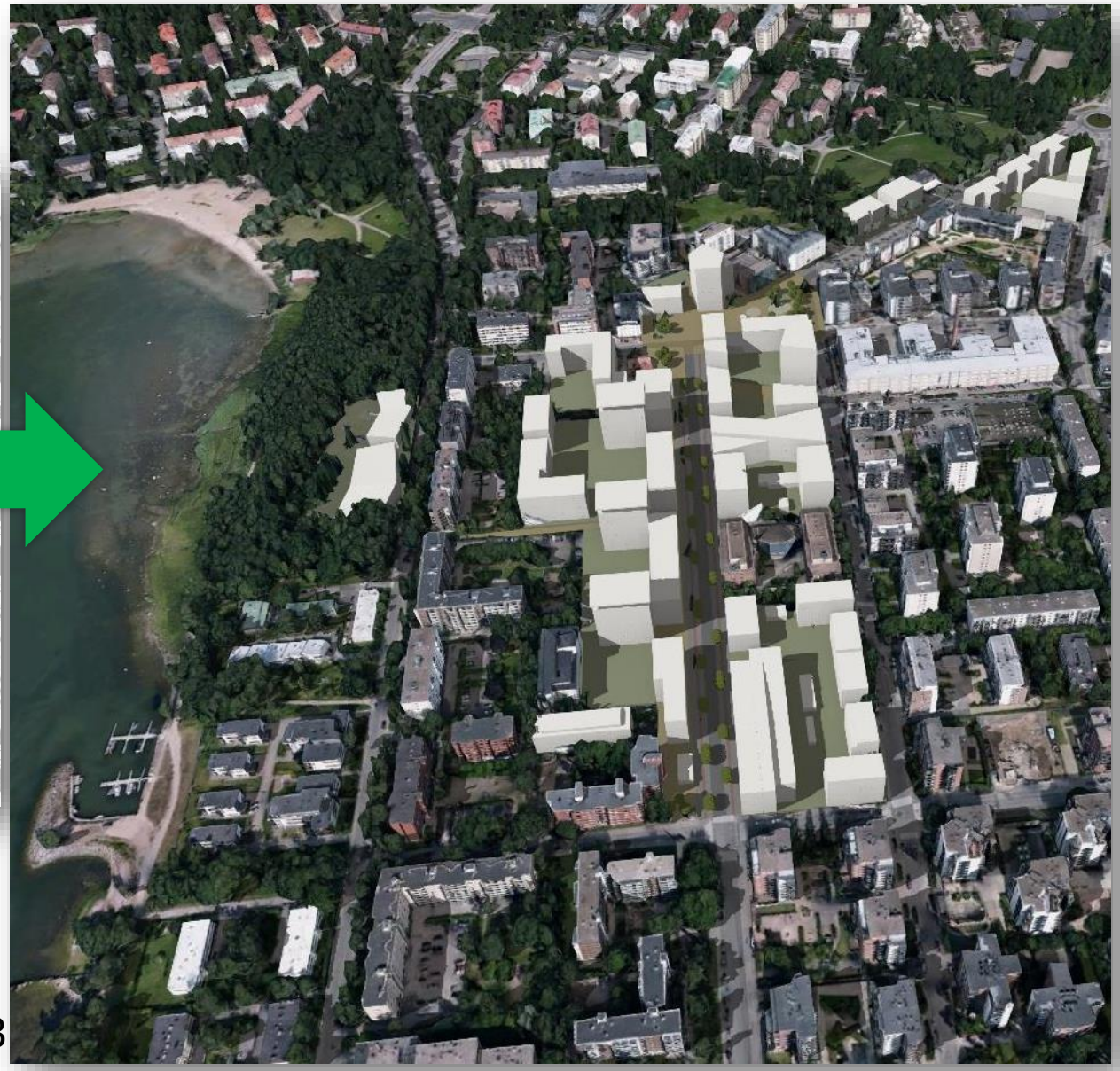
How do we Design our Cities?
Digital Twin as a City Design Studio



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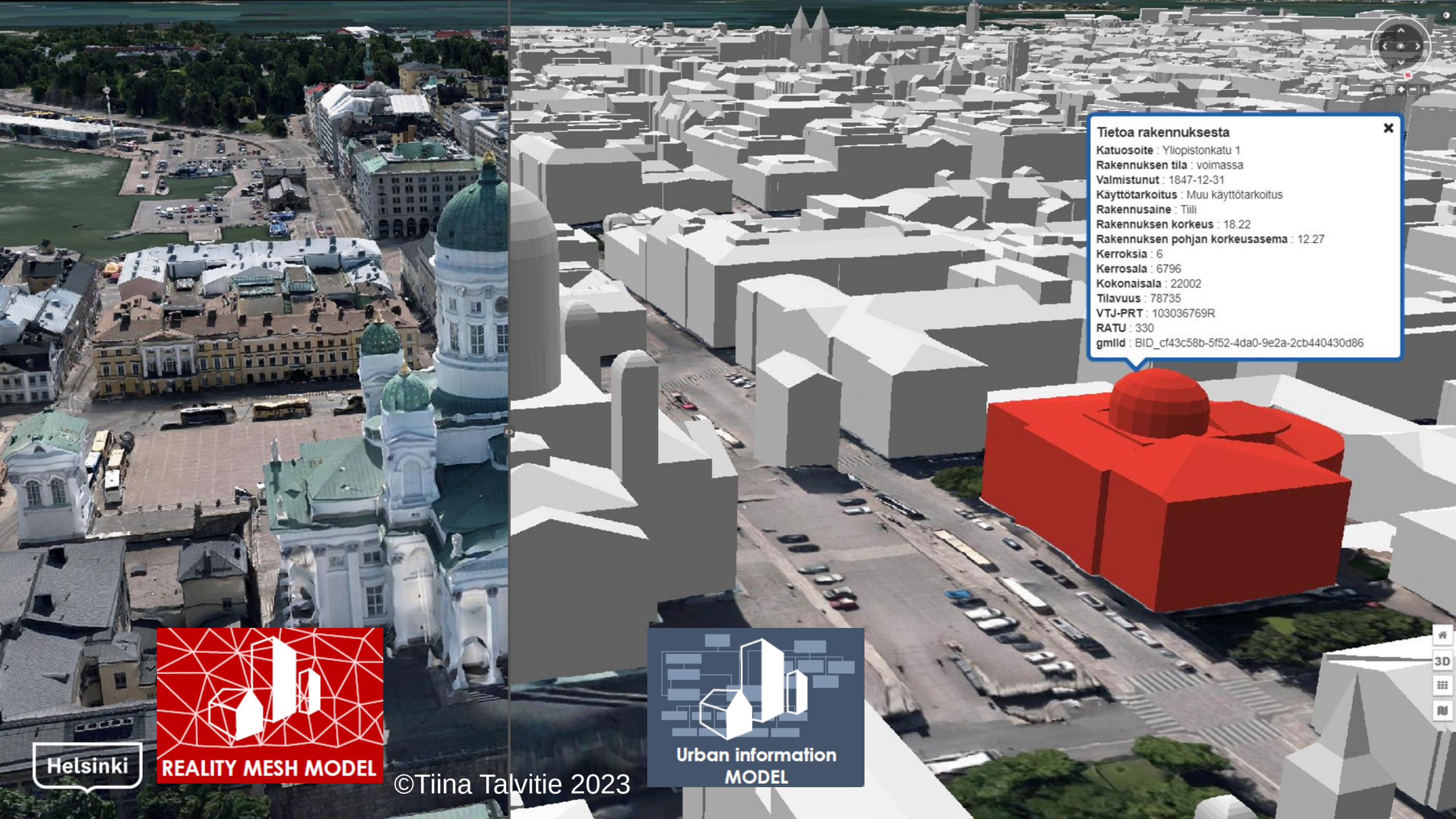

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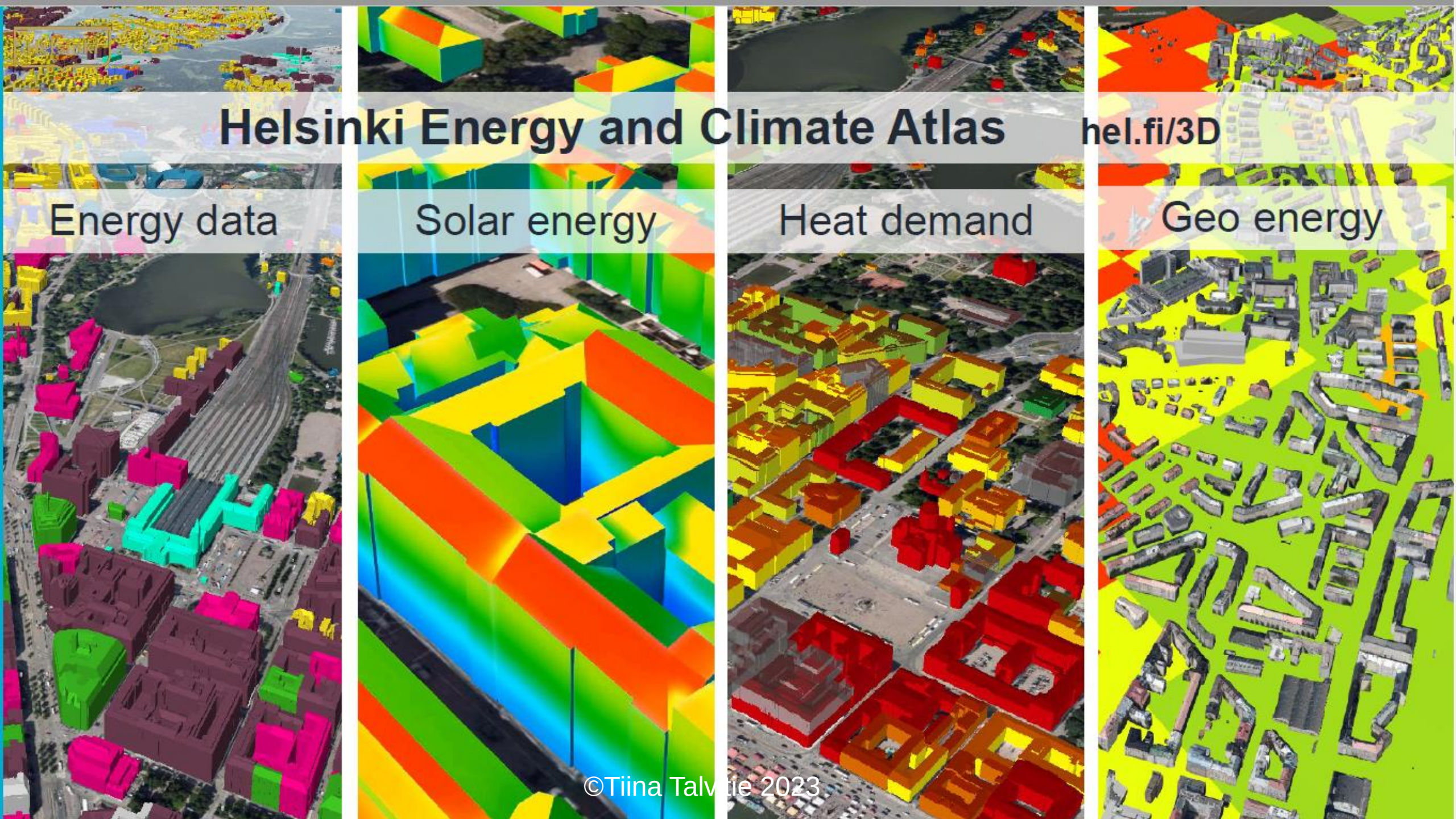
Helsinki Energy and Climate Atlas

hel.fi/3D



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“The Smart City Maturity”

How capable are we at utilizing Digital Twins in daily operations in our cities?

Why is deployment struggling?

Technology development is fast

We also have advanced software available

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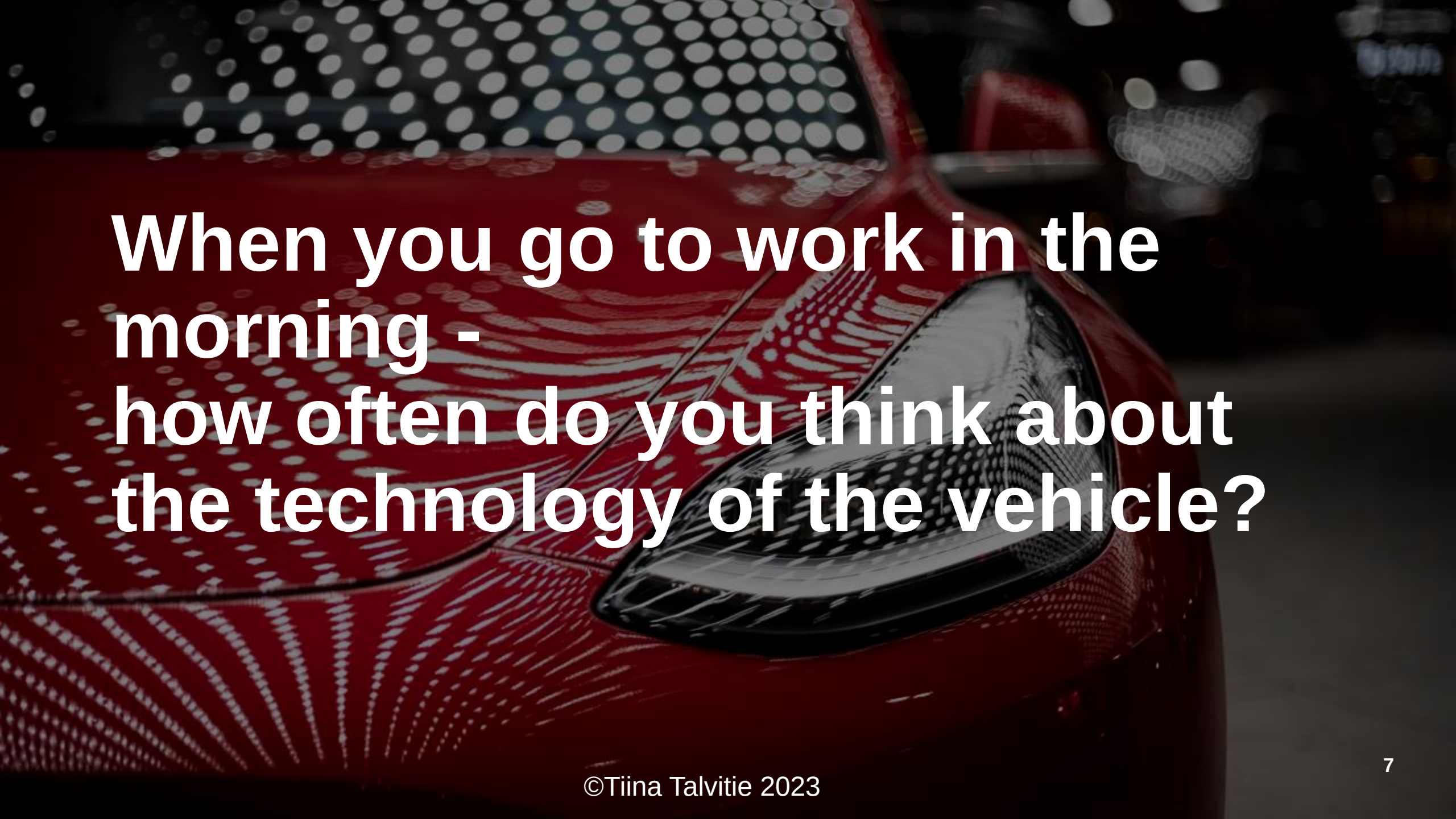

When you go to work in the morning - how often do you think about the technology of the vehicle?

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Do we need a cultural change in our mindset?

Leadership

for promoting digital transformation

Experimental culture

Creating enthusiasm
by involving the users

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Decision making based on knowledge
Digital Twins in the center of city operations

Digital Twin as a **dashboard** to information

Data should be **integrated** to the operational customer **processes**

Business and **customer needs** should be driving development

Decision making based on knowledge should support employees' daily work

Need for **data analysis** and dynamically visualized **situational data** over the whole city

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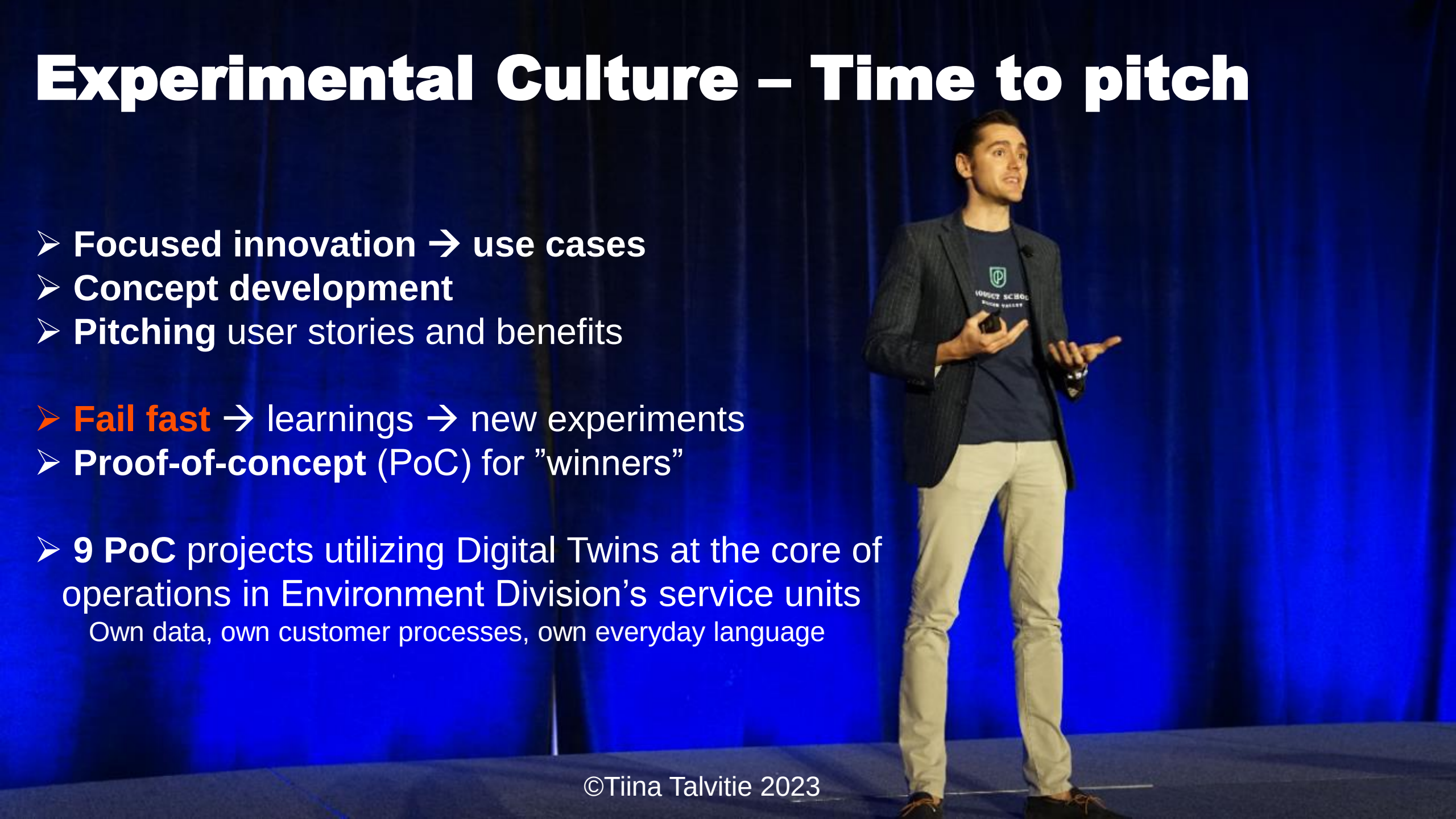
Experimental Culture – Time to pitch



- **Focused innovation → use cases**
- **Concept development**
- **Pitching** user stories and benefits

- **Fail fast** → learnings → new experiments
- **Proof-of-concept** (PoC) for ”winners”

- **9 PoC** projects utilizing Digital Twins at the core of operations in Environment Division’s service units
  - Own data, own customer processes, own everyday language

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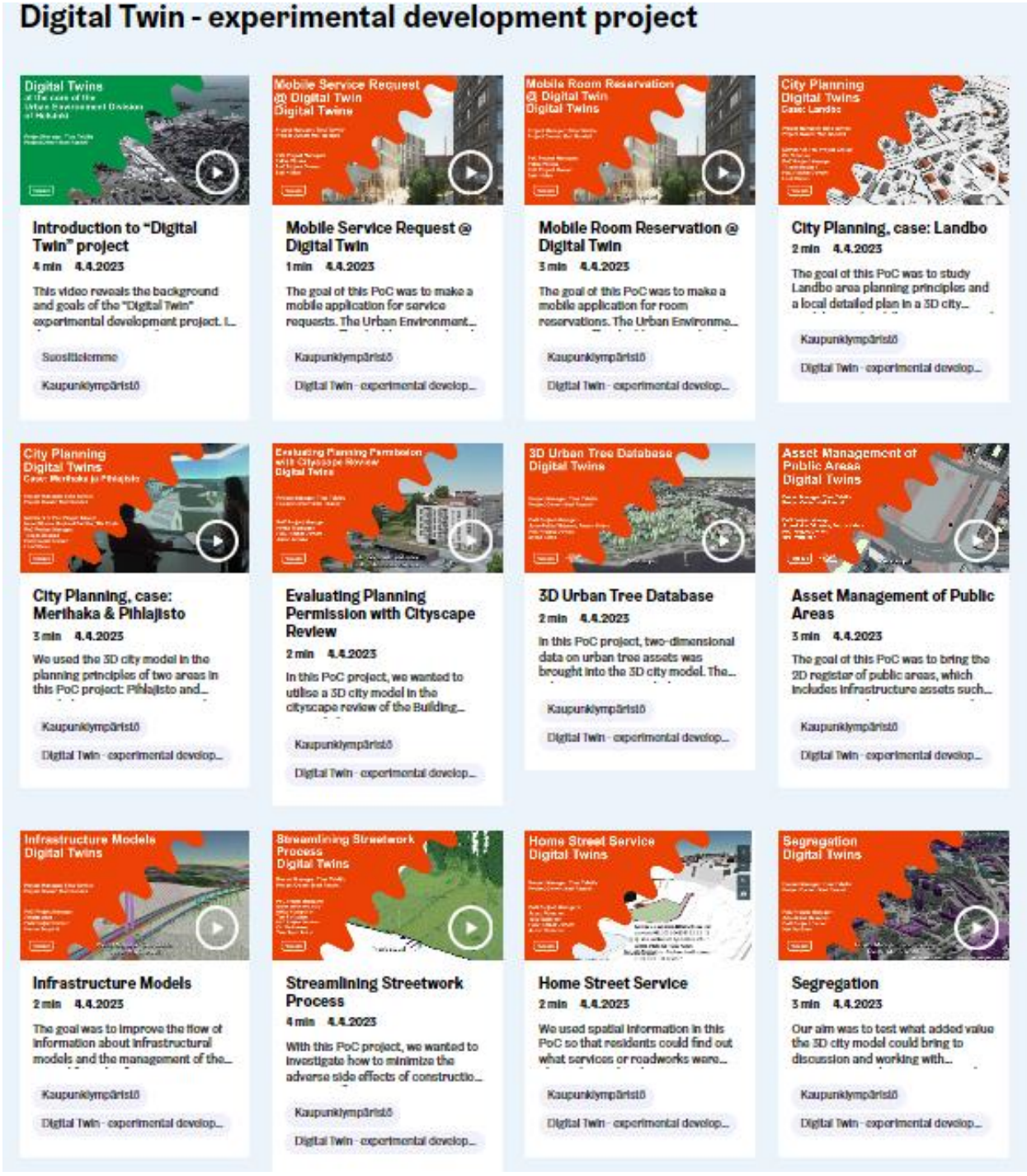
Digital Twin PoC videos are published in Helsinki channel https://www.helsinkikanava.fi/en_US/series “Digital Twin - experimental development project”

1. Introduction to the “Digital Twin” project
2. Mobile service request @ Digital Twin
3. Mobile Room Reservation @ Digital Twin
4. City planning, case: Landbo
5. City planning, case: Merihaka & Pihlajisto
6. Evaluating planning permission with cityscape review
7. 3D urban tree database
8. Asset management of public areas
9. Infrastructure models
10. Streamlining street work process
11. Home street service
12. Segregation



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Experiments continue with new topics

1. Neighbor hearing in the building control process
2. Visualization of the detailed city plan database information in the 3D city model
3. Green infrastructure in digital twins (tree extraction with laser scanning data)
4. Public areas in digital twins (road damage data)
5. Visualization and simulation of vegetation and lighting in urban planning
6. Common approaches to drone photography and data sharing
7. Mobile app for maintenance and user services
8. Helsinki 3D City Model for authorities
9. Helsinki U-Space

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Helsinki U-space PoC

- **Simulations** on a digital twin platform:
  - The prohibited, restricted and allowed **geo-zones** with codes for the complex unmanned, electronic and digitalized aviation with air navigation services (USSP).
  - **Vertiports, flight paths, corridors**
  - **Event information** causing time-limited restrictions
- Showing **possibilities** and **opening discussion** related to
  - **Business** possibilities
  - Proactive **land use planning**
  - **Co-operation** involving the **national aviation authority** and **industry forerunners**

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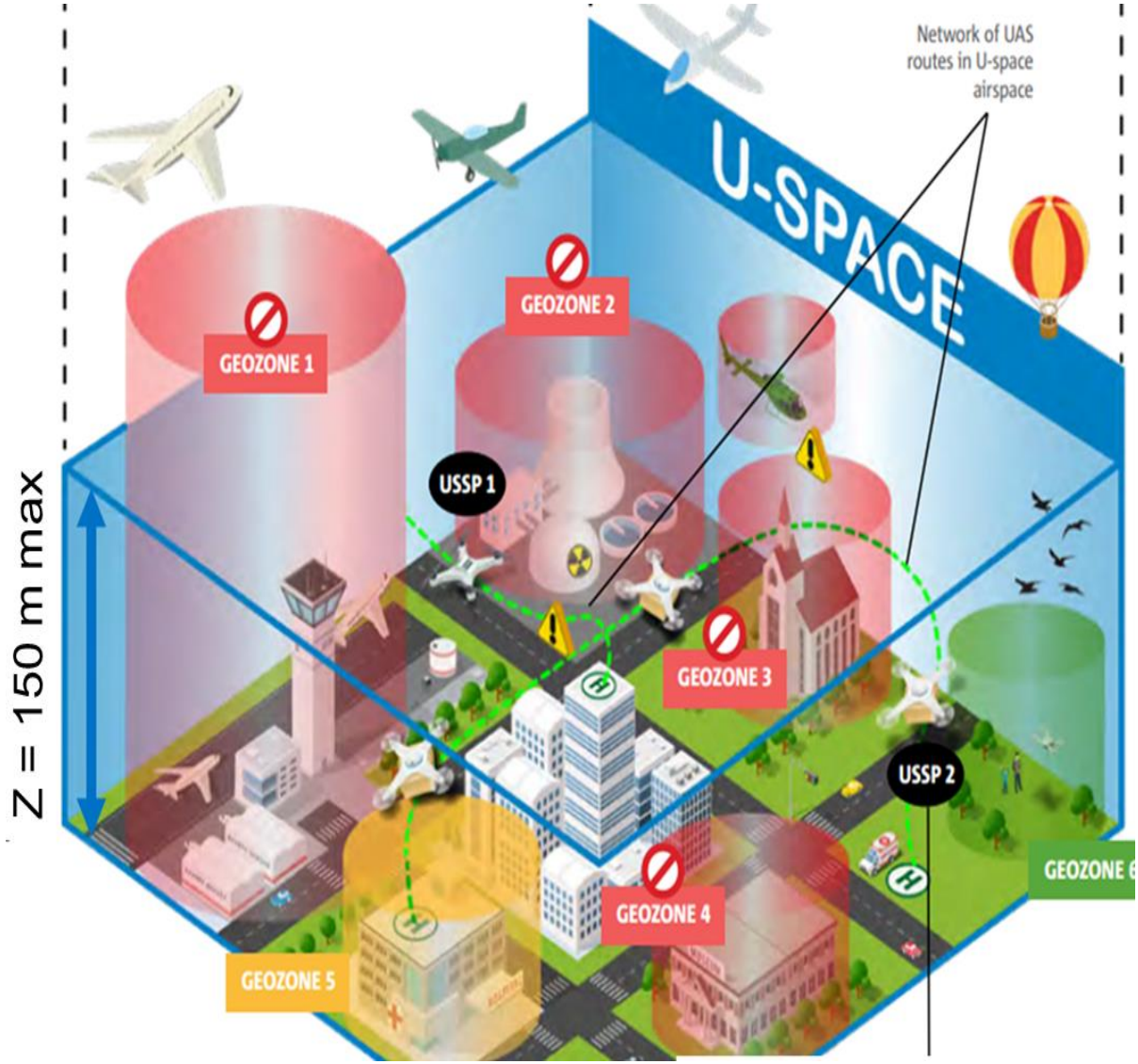
U-space is an European framework for **unmanned airspace**, max h=150m. Framework enables simultaneous, dynamic and safe aerial operations **above** urban **areas**.



Digital Twins for the Built Environment help to run a Smart City

Instead of development in silos, digital twins combine both static and dynamic city objects as well as circumstances and phenomenon, time perspective and life-cycle information

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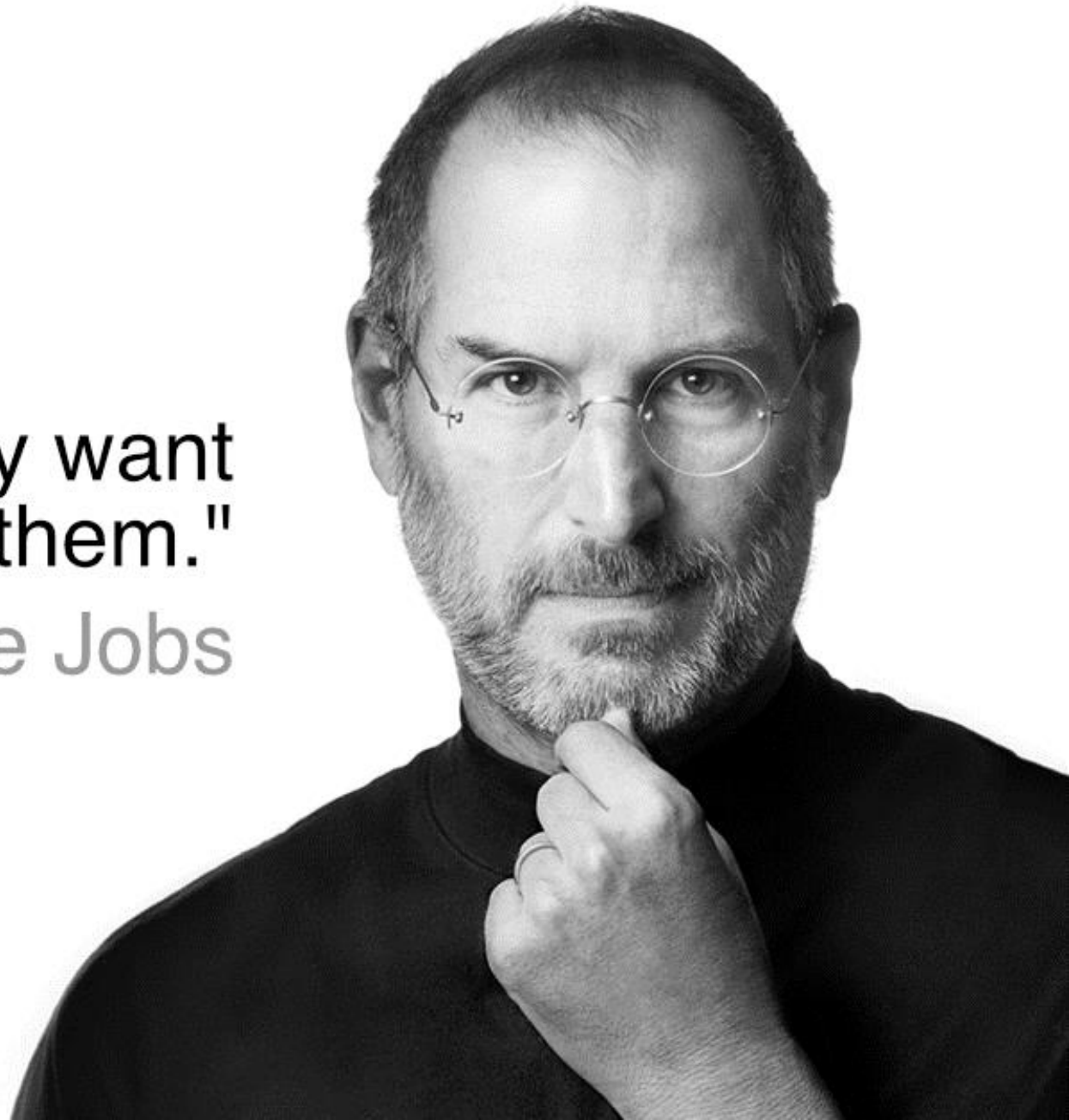
"People don't know what they want
until you show it to them."

- Steve Jobs



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Thank you!

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