Interact with Aurora

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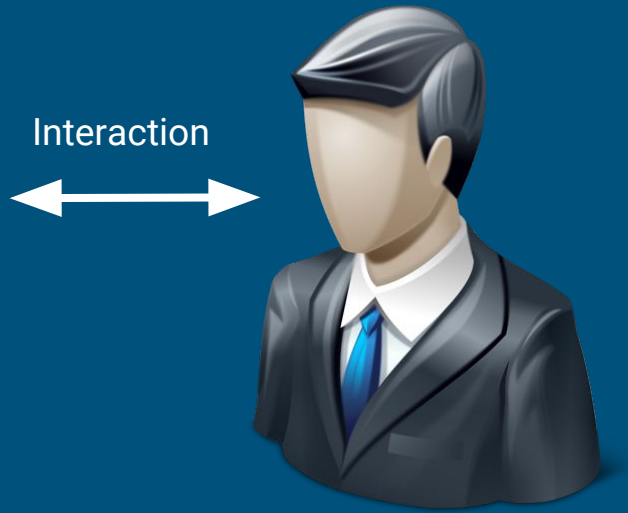
Challenge: Virtual Auroras

- Give user the experience of observing Aurora from the space station.
- Let the user interact with Aurora!

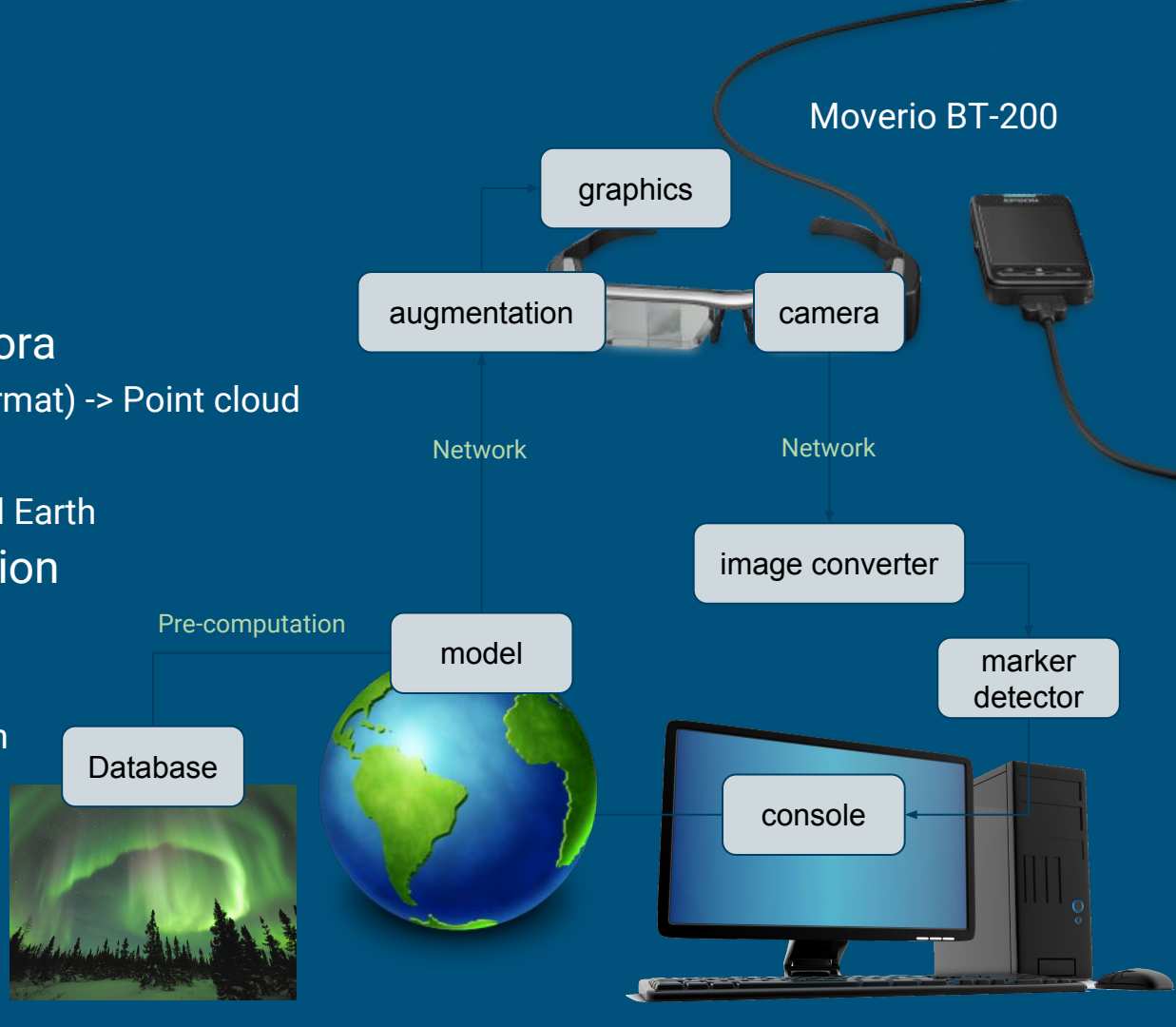
Computation

Interaction



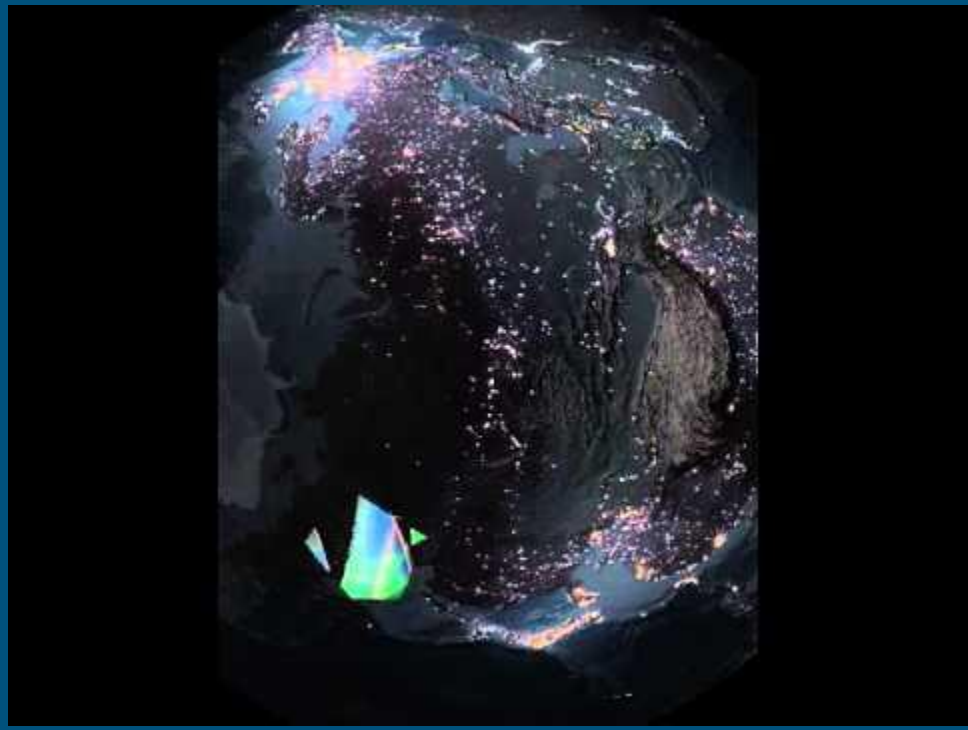
System

- Data and model of Aurora
  - CDF (Common Data Format) -> Point cloud
- Registration with Earth
  - Geometry of Aurora and Earth
- Interaction representation
  - Vision-based tracking
- System integration
  - Distributed computation
  - Augmented reality



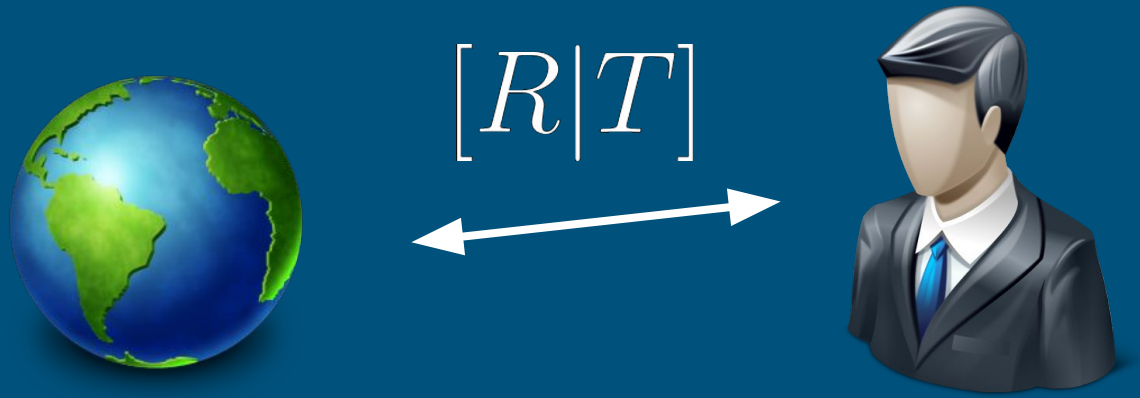
Registration with Earth

$$\frac{1}{\mathbf{r_2}\begin{bmatrix} x \\ y \\ z \end{bmatrix} + \mathbf{t}} \begin{bmatrix} f_x & 0 & c_x \\ 0 & f_y & c_y \\ 0 & 0 & 1 \end{bmatrix} \left(\mathbf{R} \begin{bmatrix} x \\ y \\ z \end{bmatrix} + \mathbf{t} \right) = \begin{bmatrix} u \\ v \\ 1 \end{bmatrix}$$



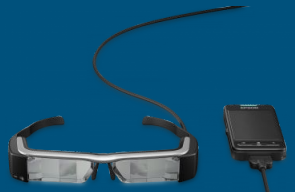
Interaction Representation

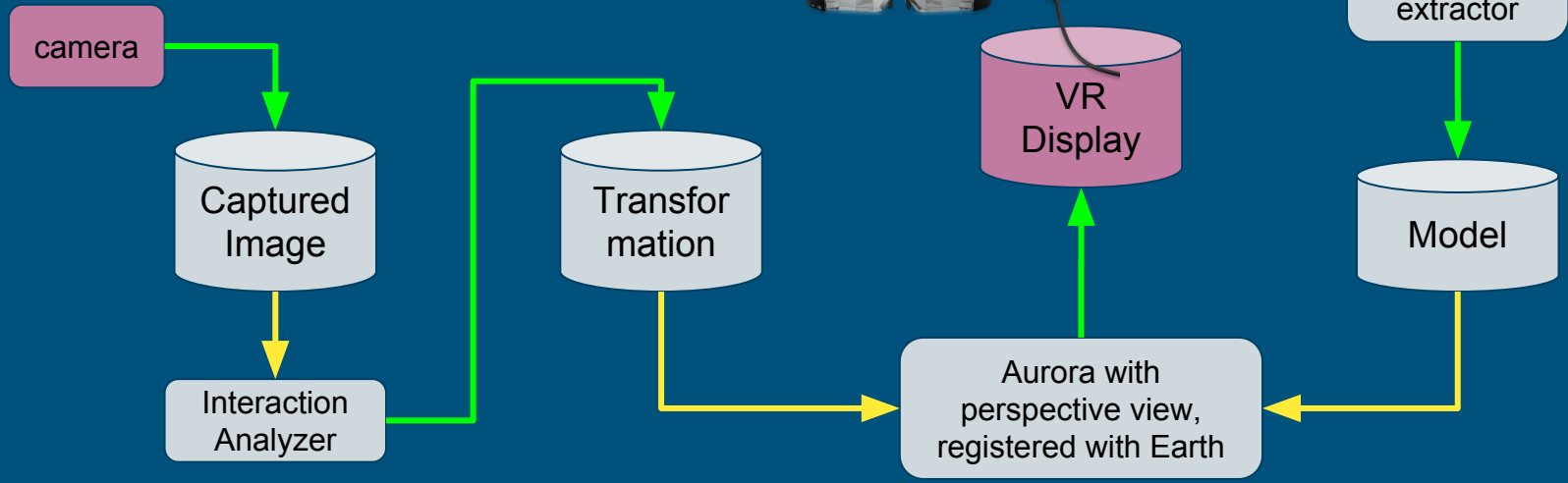
- Aruco: Lightweight vision-based tracking
- Full transformation
- Intuitive interaction



System Integration

- Publisher and Subscriber
  - Topic and message





Thank you!

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