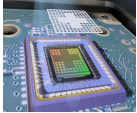


Nanotracking for image-guided microsurgery



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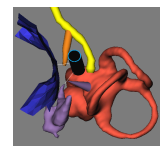
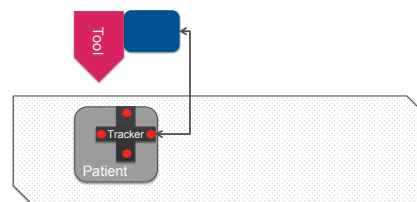
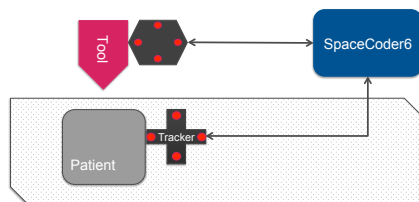


The spaceCoder technology for clinical applications

Goal of the project:

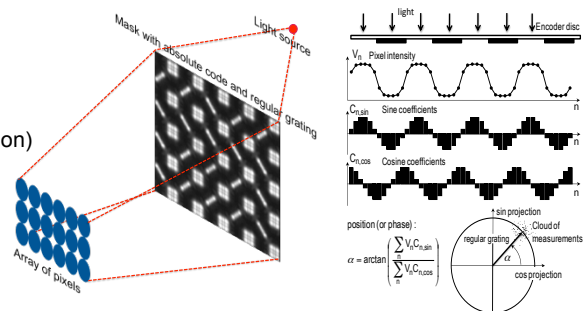
- Provide a highly precise and accurate (80 µm or less) tracking tool for minimally invasive microsurguries, such as cochlear implant
- Need to know the position of the tool with respect to the patient at all times under highly varying conditions

Two tracking strategies



Basic principle of the spaceCoder technology

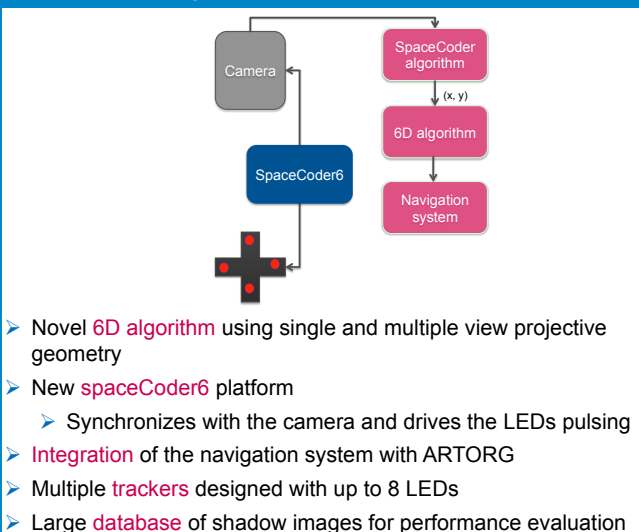
- Uses **shadow imaging** to measure absolute positions of a light source with very high precision (up to 10 nm)
- Two types of markings: An **absolute** code and a **regular** grating
- The absolute code provides the MSB of the measurement (coarse position)
- The phase of regular grating gives the LSB (high resolution)
- Each pixel acts as a single sensor



Advantages

- The phase information is **redundantly** distributed over the field of view
- Contactless measurements
- **Compact**, low cost, flexible, **no lens**

Results after year 1: First demonstrator



What's next

- Remove the need for an external camera sensor
- Improve accuracy and precision via calibration techniques, optimization methods and novel algorithms
- Improve the accuracy along the z axis by increasing the baseline and/or using two spaceCoder6
- Embed the computation of the (x,y) to improve frame rate

