



Univerzita Hradec Králové
Filozofická fakulta

E-learningový kurz

Modern quantitative methods
and shape analysis in archaeology



EVROPSKÁ UNIE
Evropské strukturální a investiční fondy
Operační program Výzkum, vývoj a vzdělávání



MINISTERSTVO ŠKOLSTVÍ,
MLÁDEŽE A TĚLOVÝCHOVY

Tento materiál vznikl v rámci realizace projektu
Strategický rozvoj Univerzity Hradec Králové,
reg. č. CZ.02.2.69/0.0/0.0/16_015/0002427.

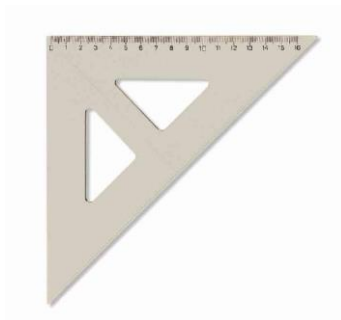
Acquisition techniques

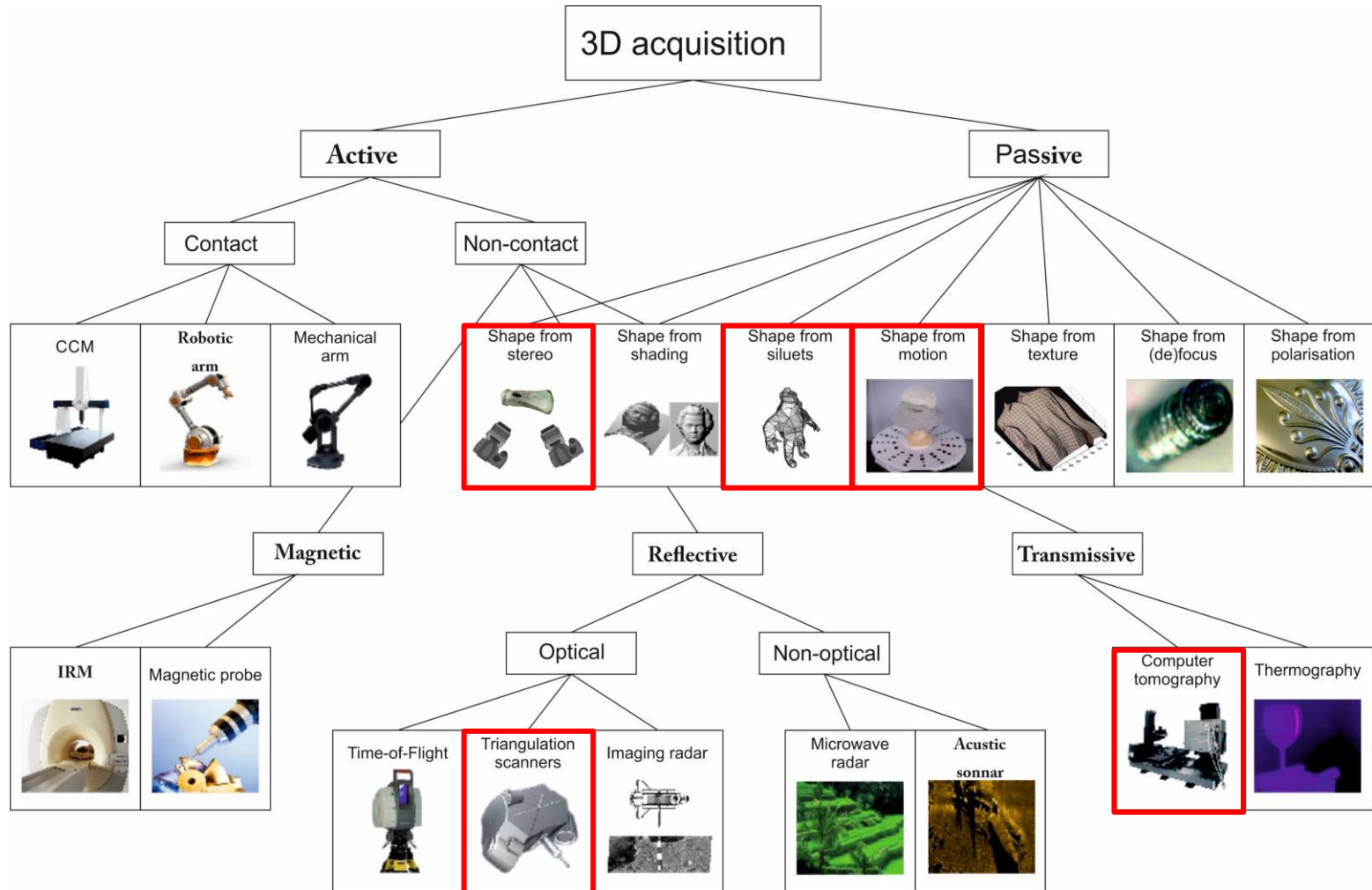
Brief introduction to modern 3D acquisition techniques

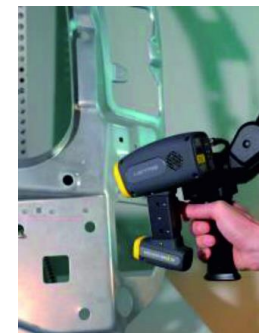
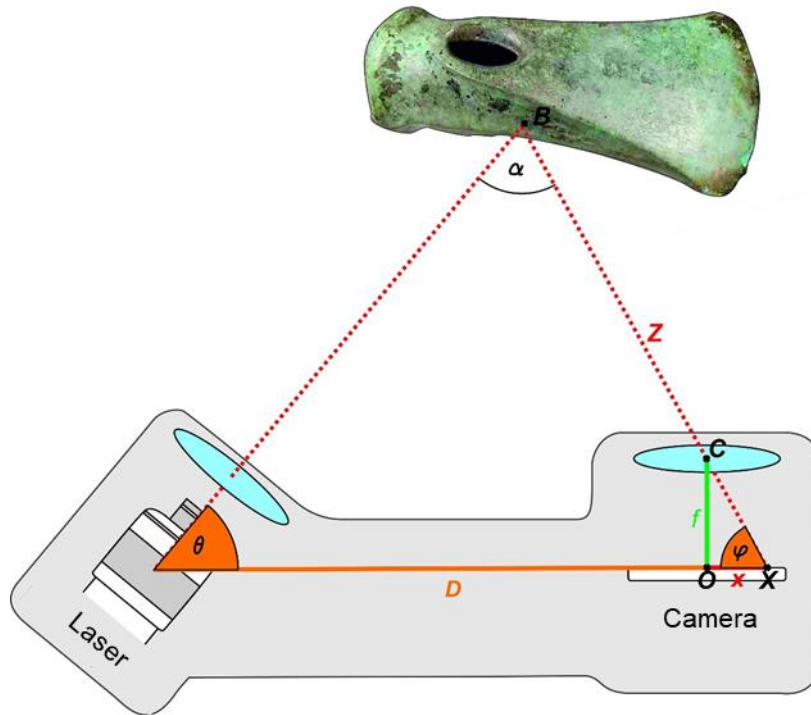


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2D acquisition techniques





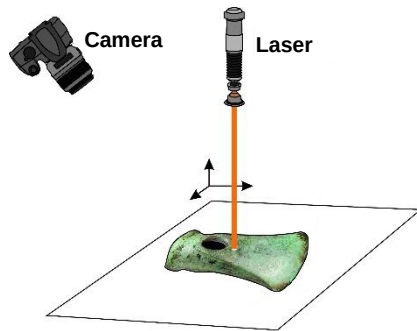


$$\frac{D+x}{\sin \alpha} = \frac{D+x}{\sin (\theta+\varphi)} = \frac{Z}{\sin \theta}$$

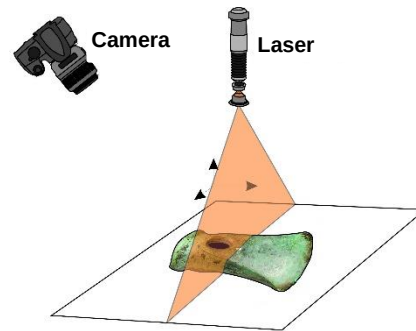
$$\varphi = \arctan \frac{f}{x}$$

$$Z = (D+x) \frac{\sin \theta}{\sin \left(\theta + \arctan \frac{f}{x} \right)}$$

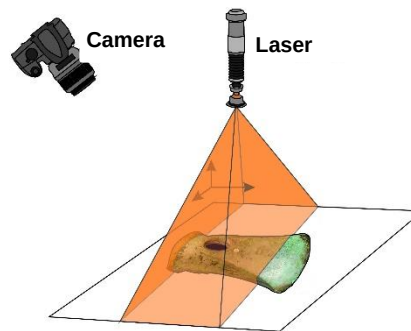
3D triangulation scanners



Point



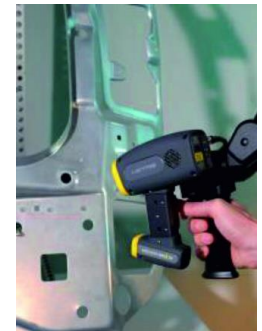
Line



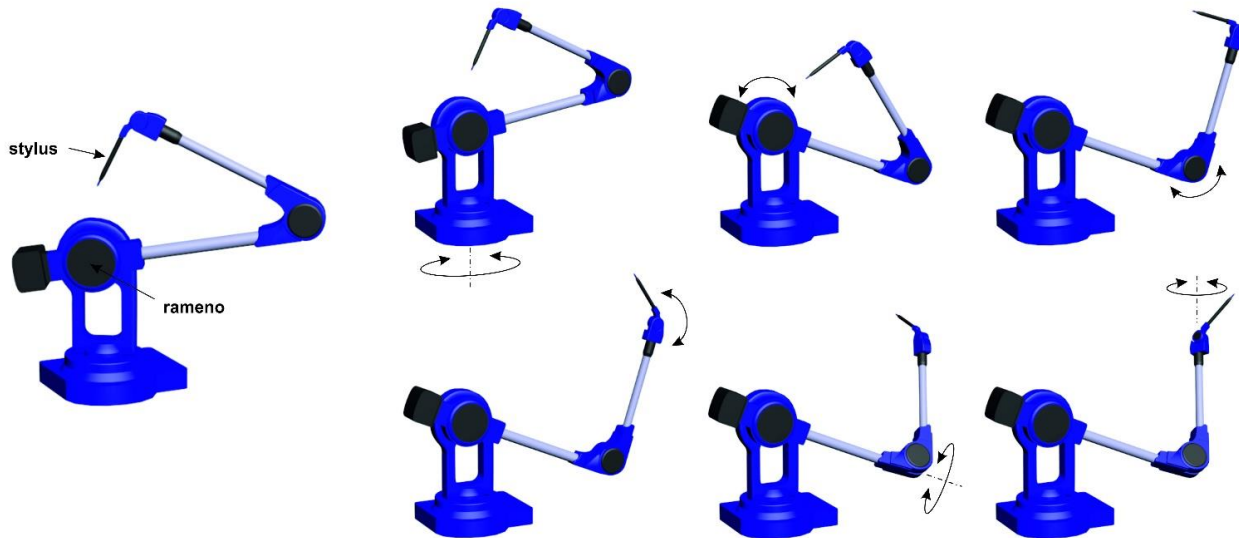
Surface



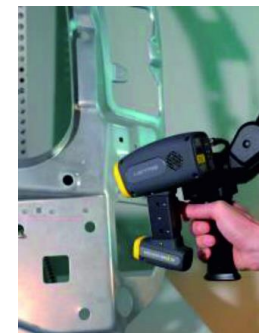
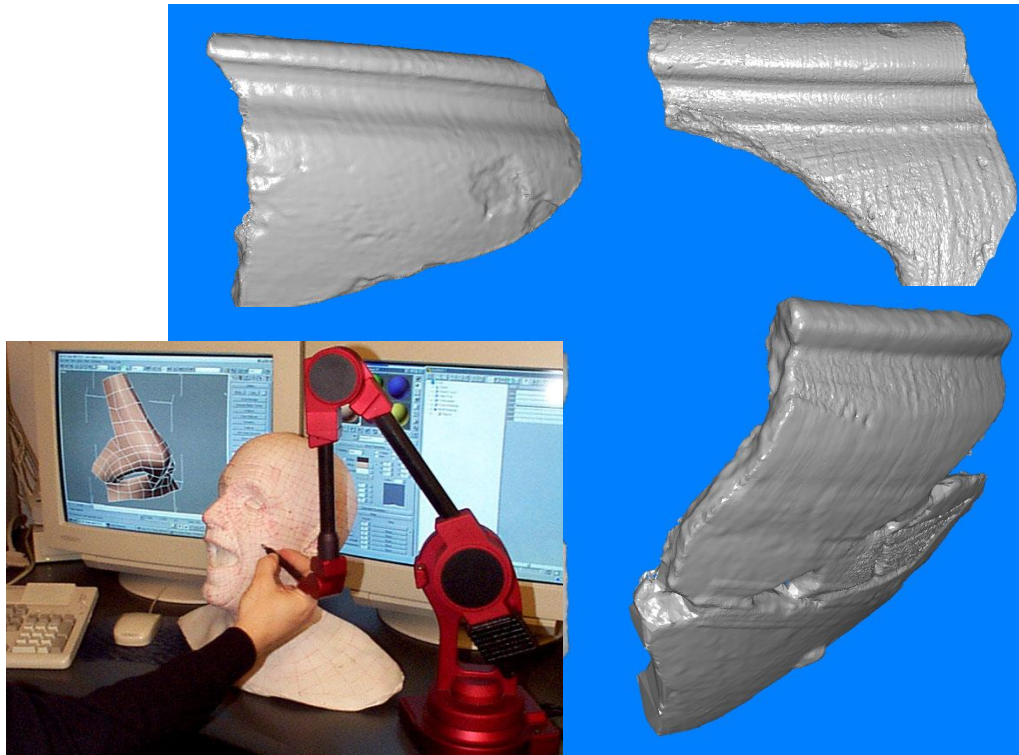
3D triangulation scanners



Microscribe + Microscan

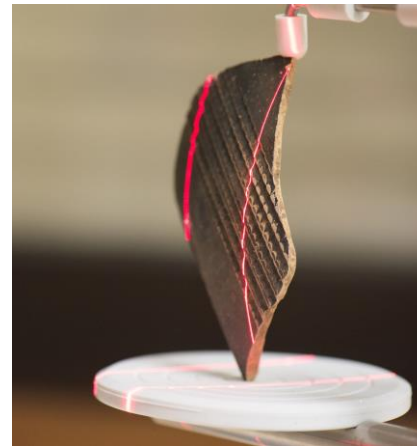
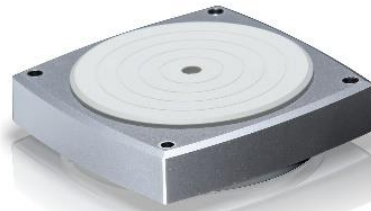


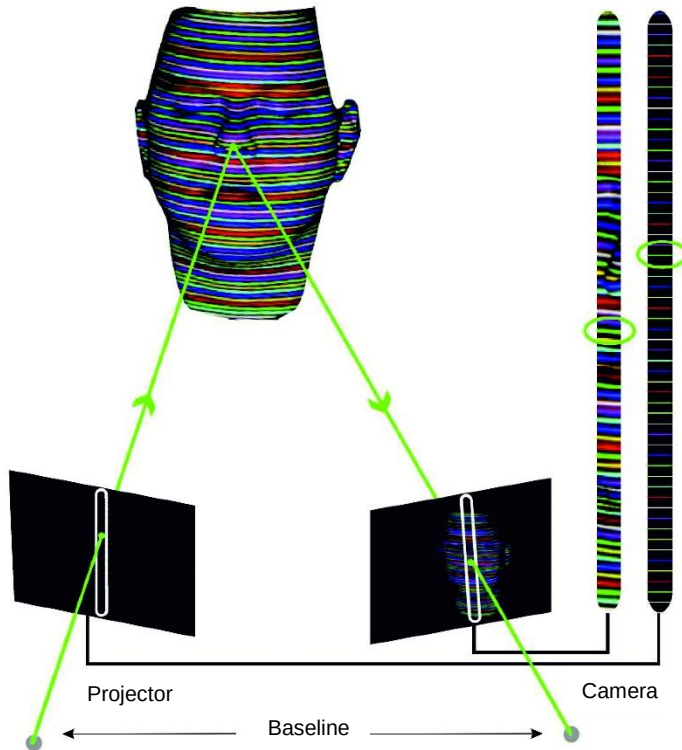
Microscribe + Microscan

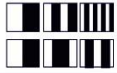


3D triangulation scanners

NextEngine

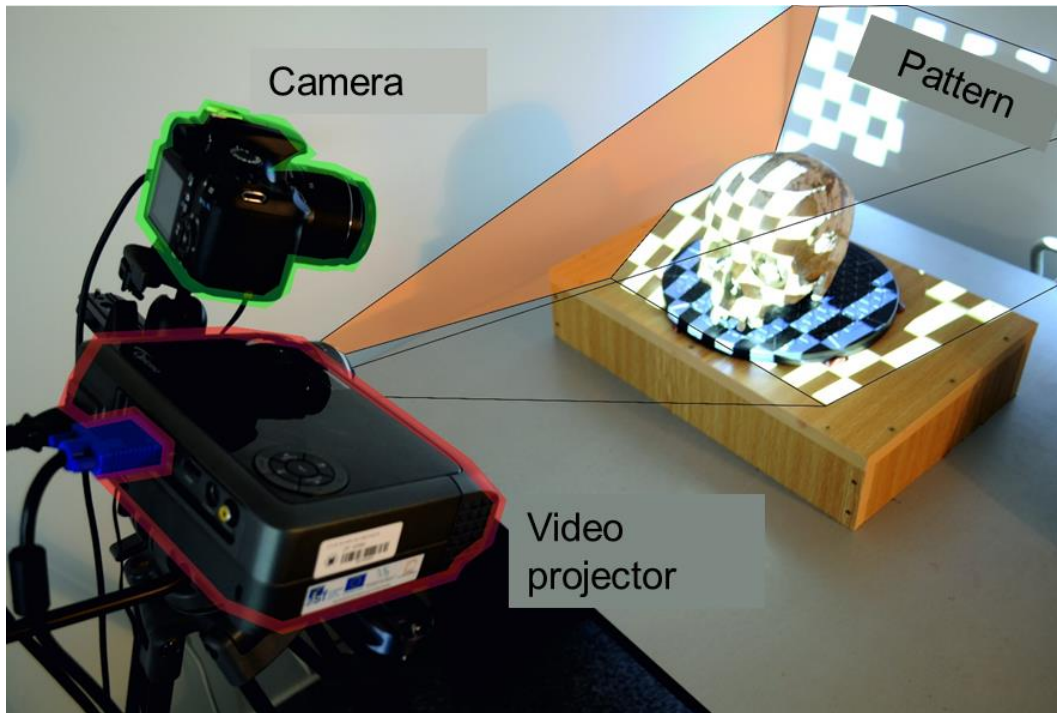




Time-multiplexing	Binary codes 	Posdamer et al. Inokuchi et al. Minou et al. Irobina Valkenburg and Meijer Skocaj and Leonardis Rocchini et al.	✓	✓	✓	✓
	n-ary codes	Caspi et al. Horn and Kiryati	✓	✓	✓	✓
	Gray code + Phase shifting	Bergmann Samsoni et al. Wiersa Gühring	✓	✓	✓	✓
	Hybrid methods	Kosuke Sato Jell-Holt and Rusinkiewicz	✓	✓	✓	✓
	Non-formal codification	Maruyama and Abe Durdle et al. Ito and Ishii Royer and Kak Chen et al.	✓	✓	✓	✓
Spatial Neighborhood	De Bruijn sequences 	Hligi and Maître Monks et al. Vuytsteke and Oosterlinck Salvi et al. Laviole et al. Zhang et al.	✓	✓	✓	✓
	M-arrays 	Morita et al. Petrin et al. Kiyasu et al. Speldler et al. Griffin and Yee Davies and Nixon Morano et al.	✓	✓	✓	✓
	Grey levels	Carrhill and Hummel Chazan and Kiryati Hung	✓	✓	✓	✓
Direct coding	Colour 	Tajima and Iwakawa Smurny and Pajdla Geng Wust and Capson Tatsuo Sato	✓	✓	✓	✓
	Scene applicability	Static Moving	✓	✓	✓	✓
	Pixel depth	Binary Grey levels Colour	✓	✓	✓	✓
	Coding strategy	Periodical Absolute	✓	✓	✓	✓

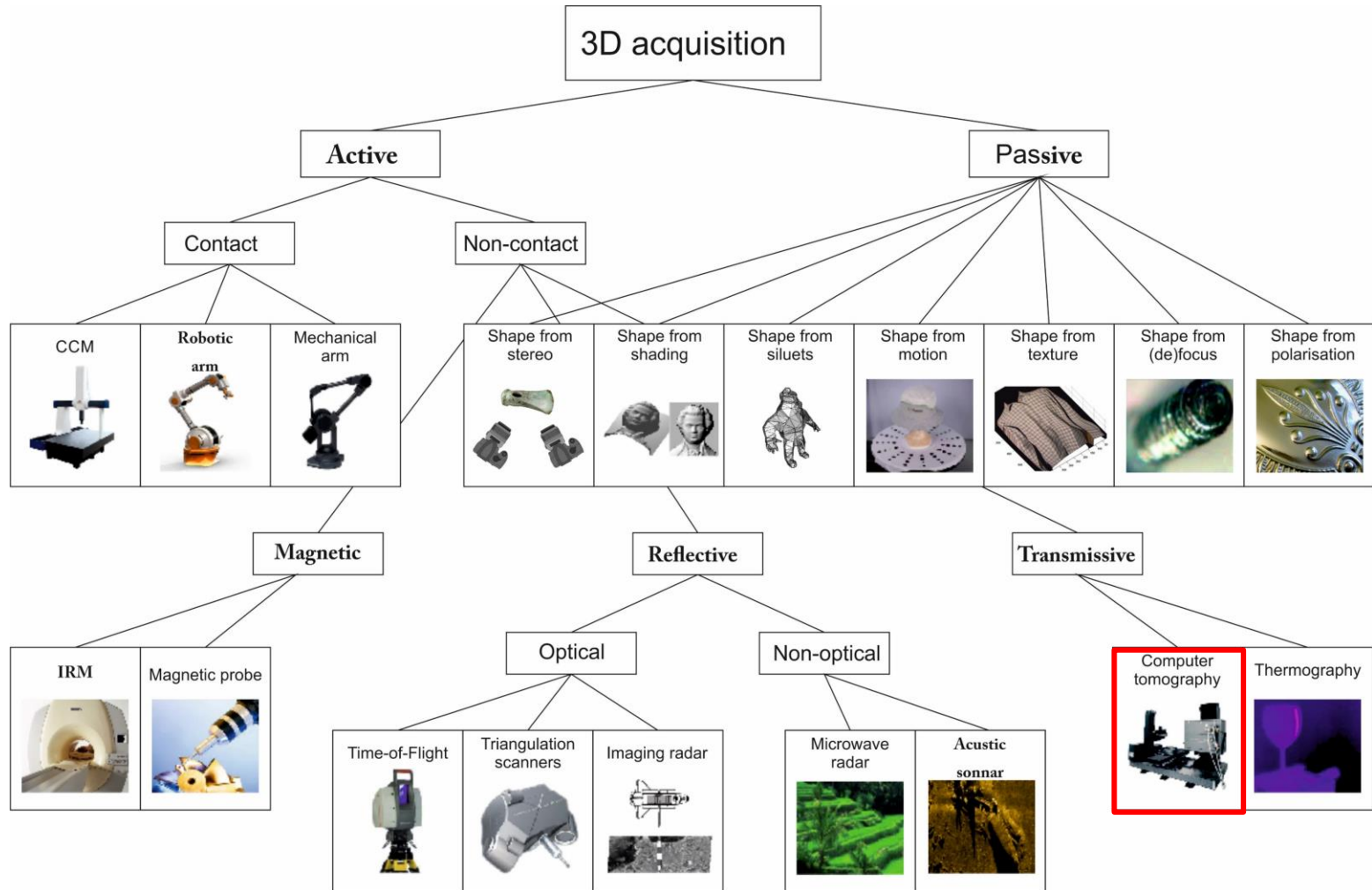


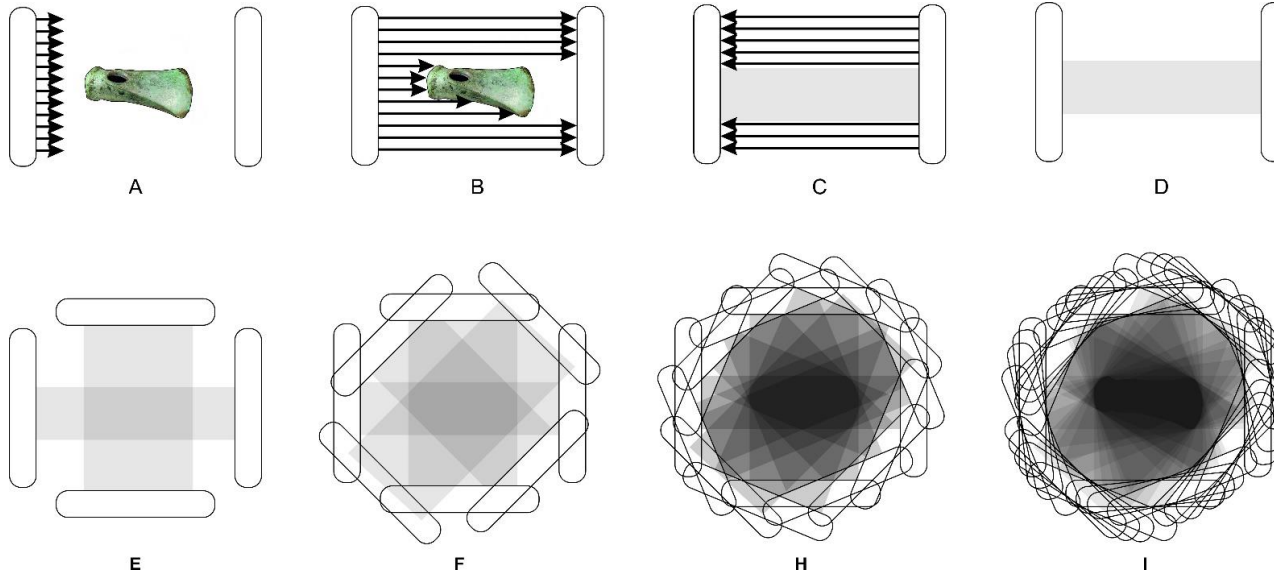
EOS Mephisto

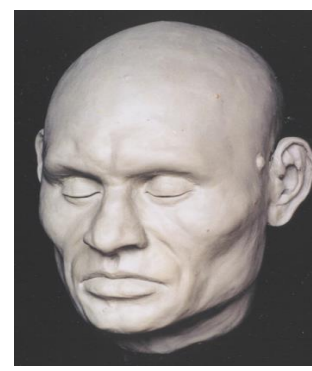
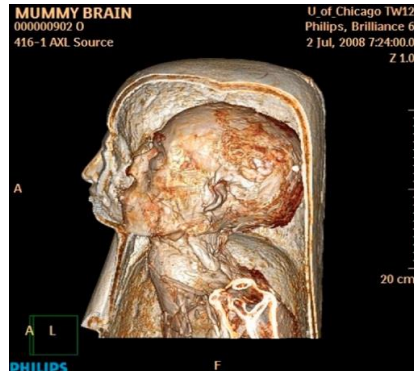
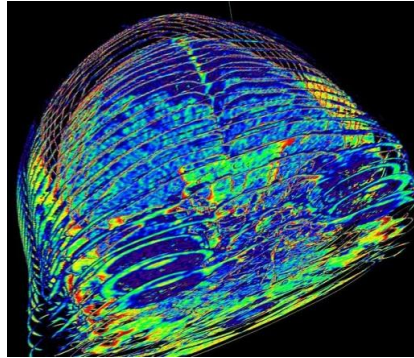


EinScan

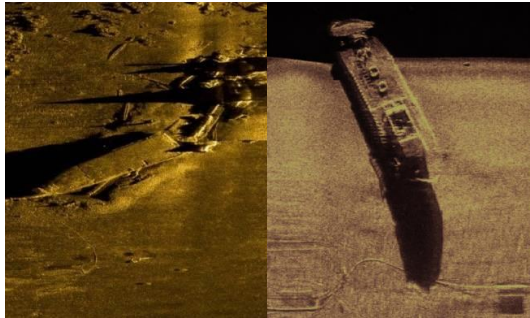




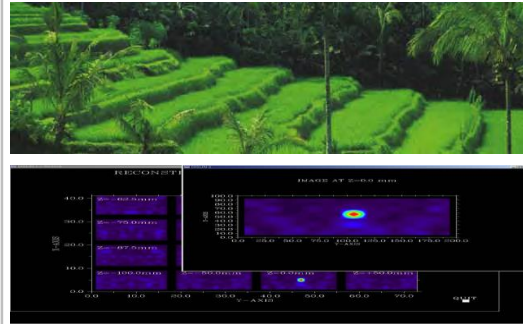




Sonar



Microwaves



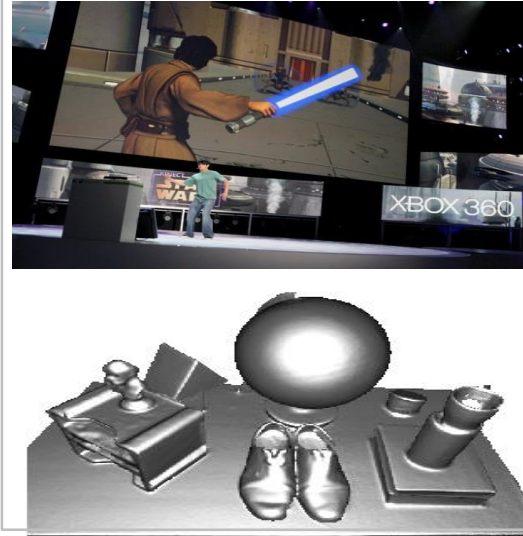
IR



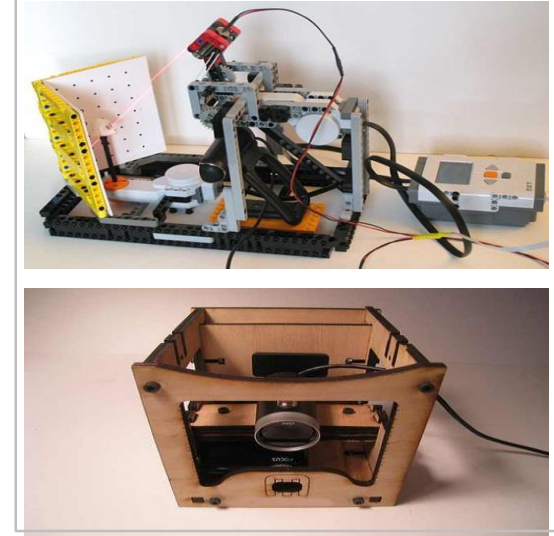
Ultrasound

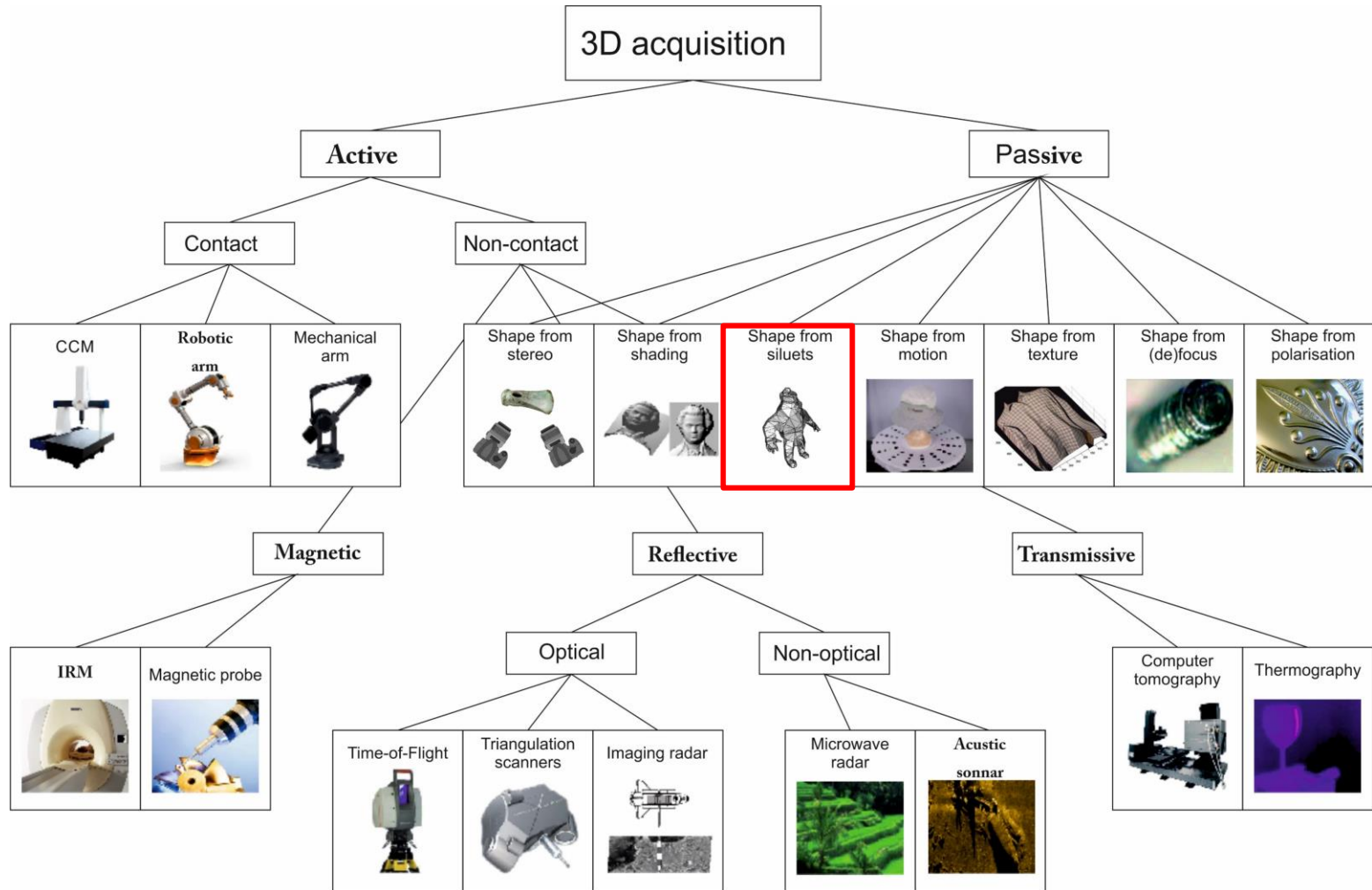


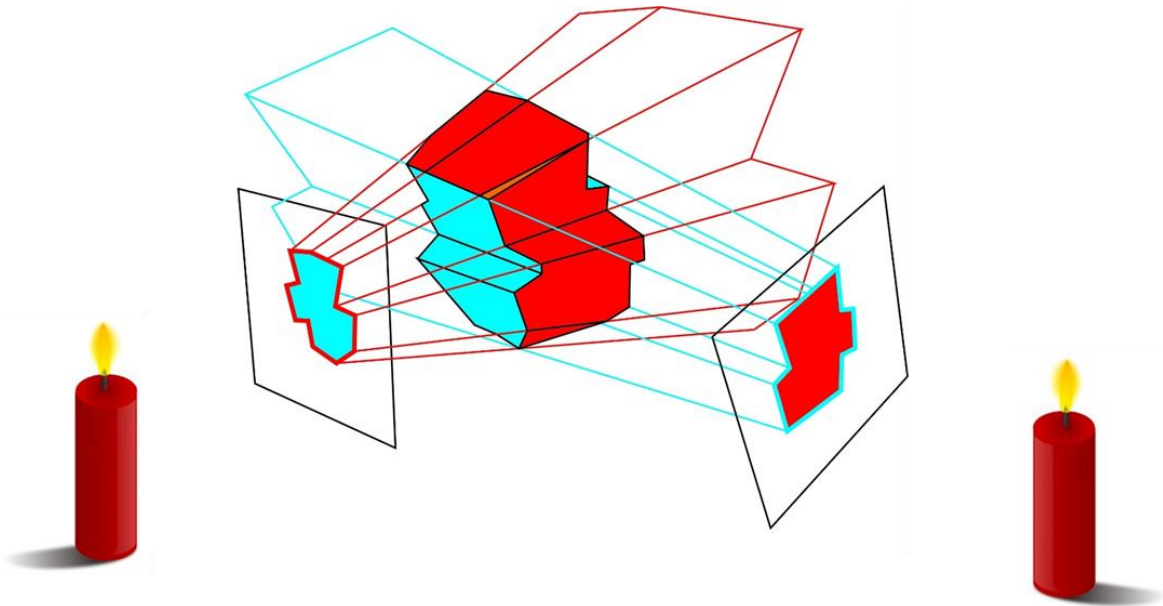
Kinect

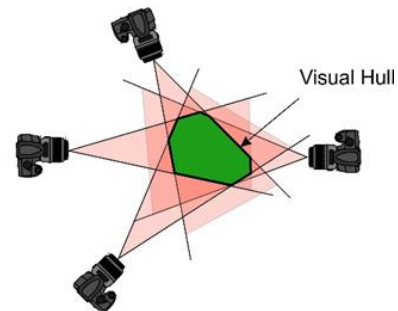
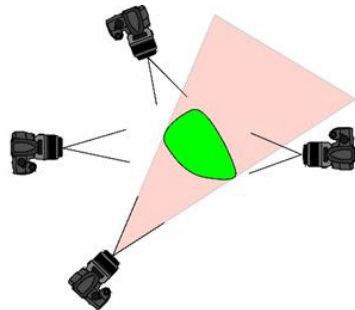
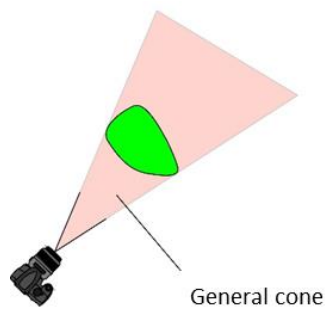


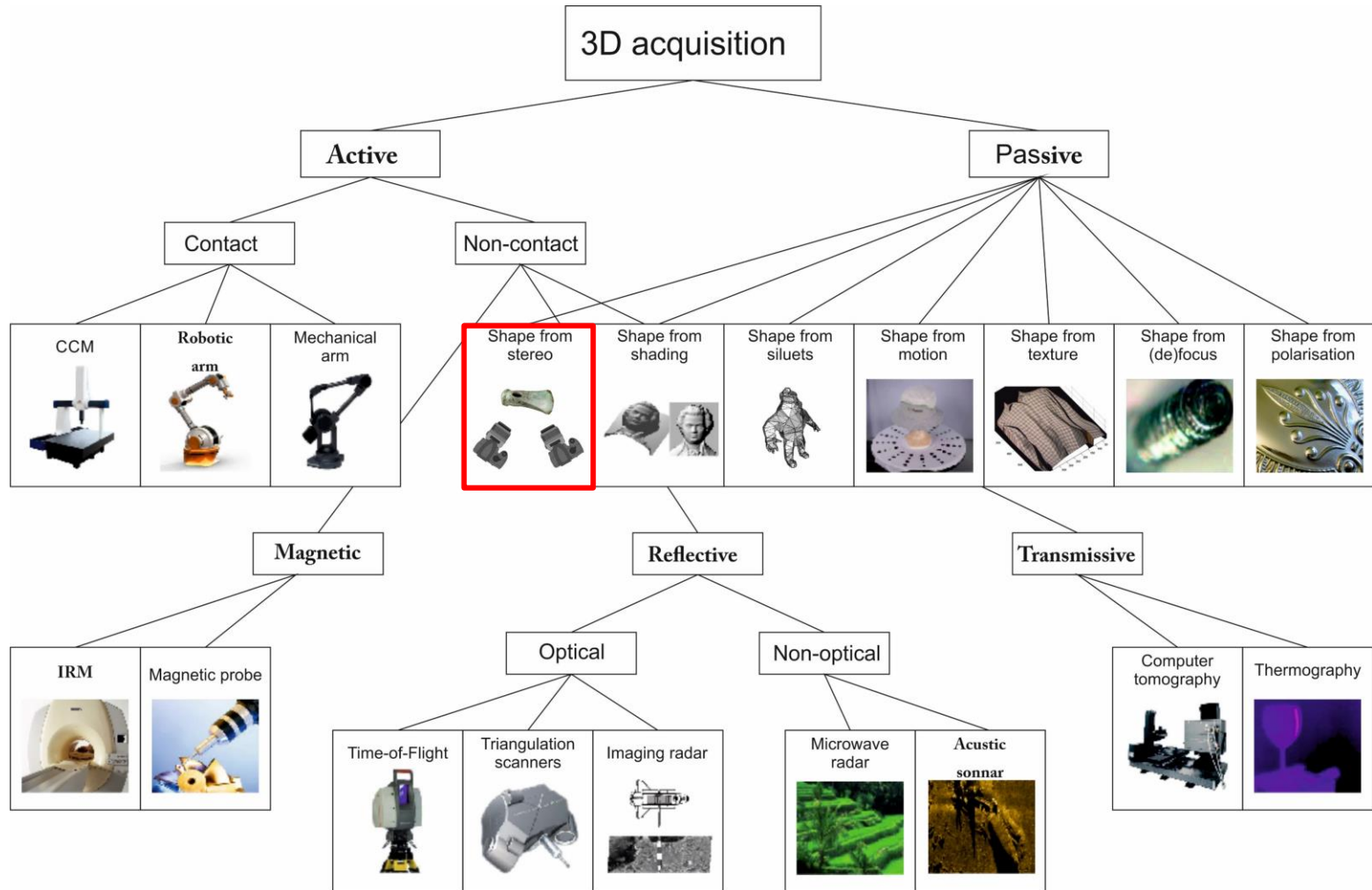
Lego 3D scanner and DIY

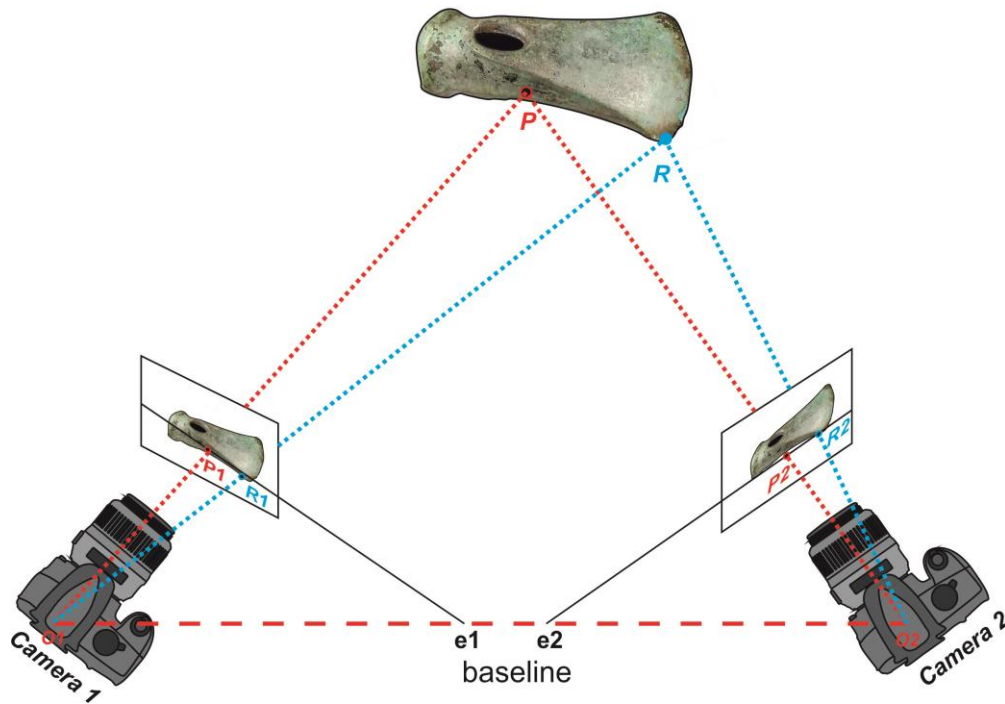


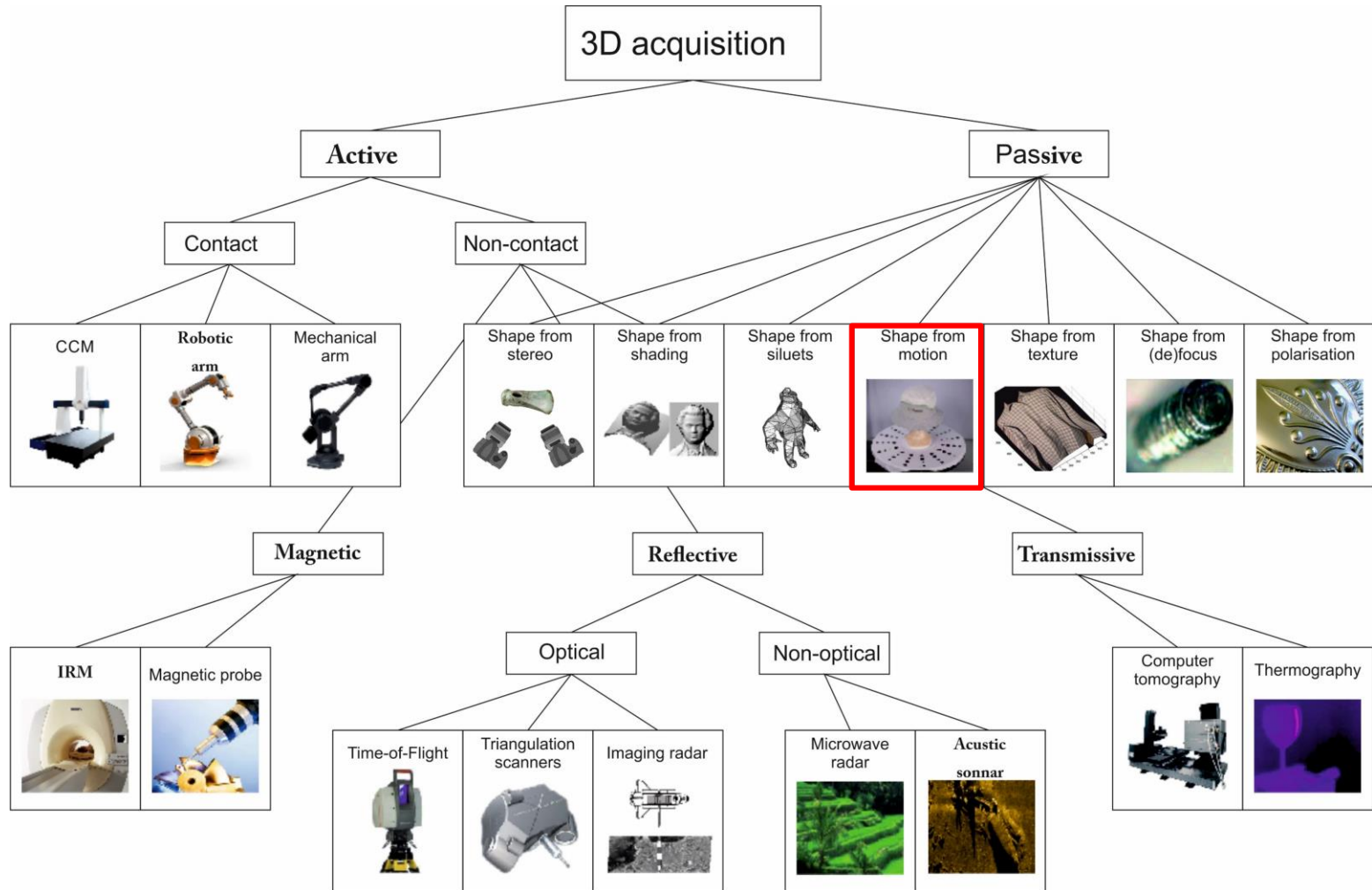


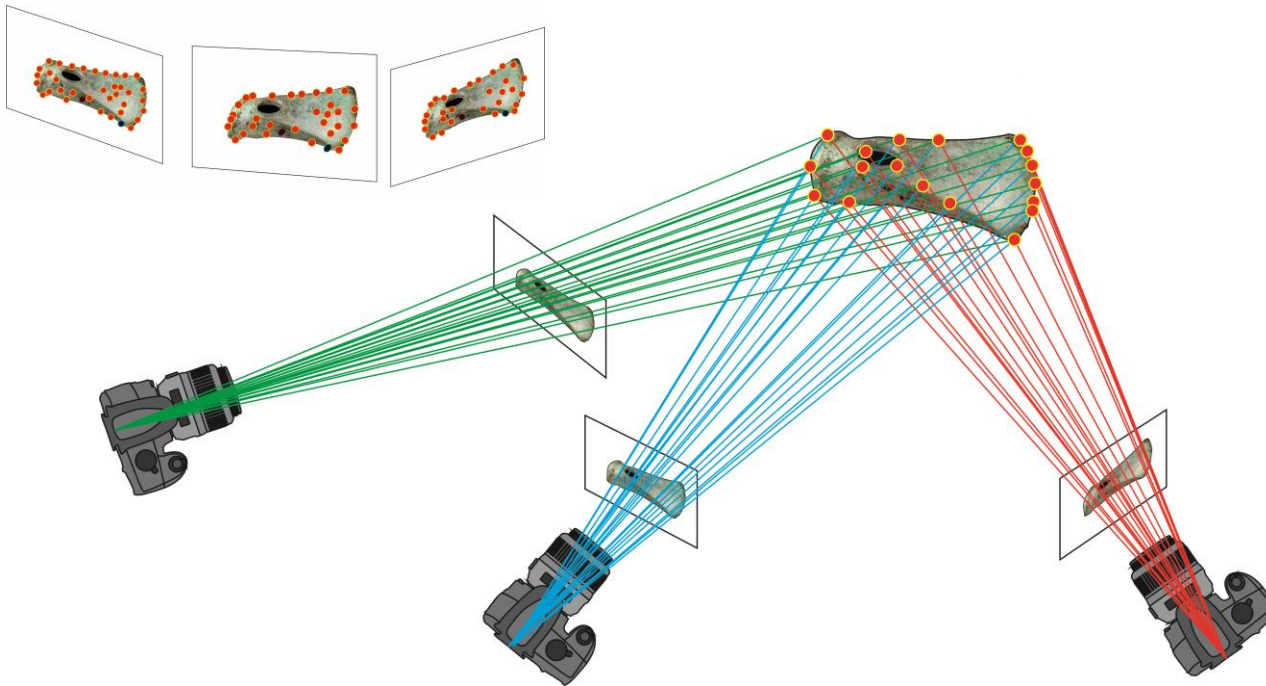




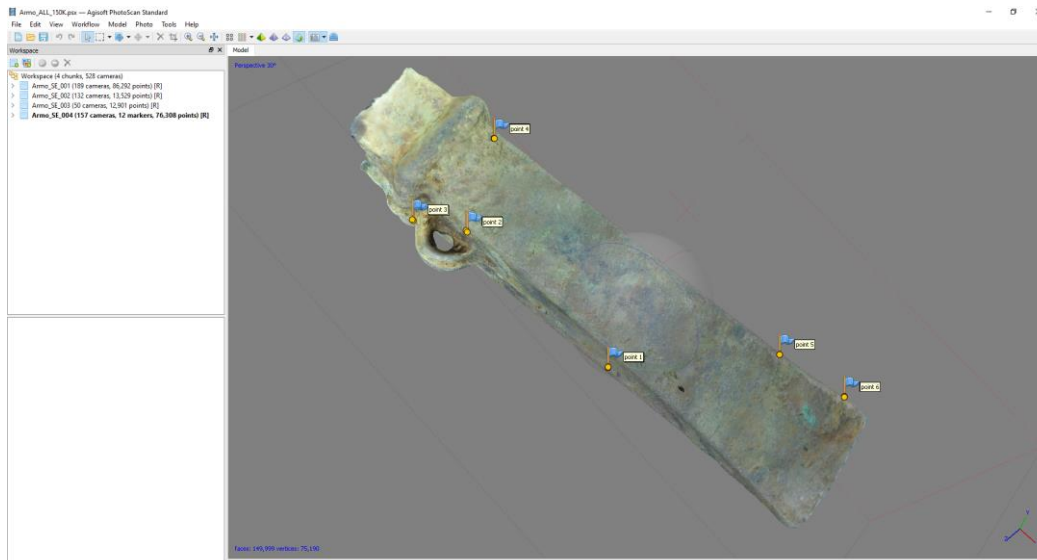




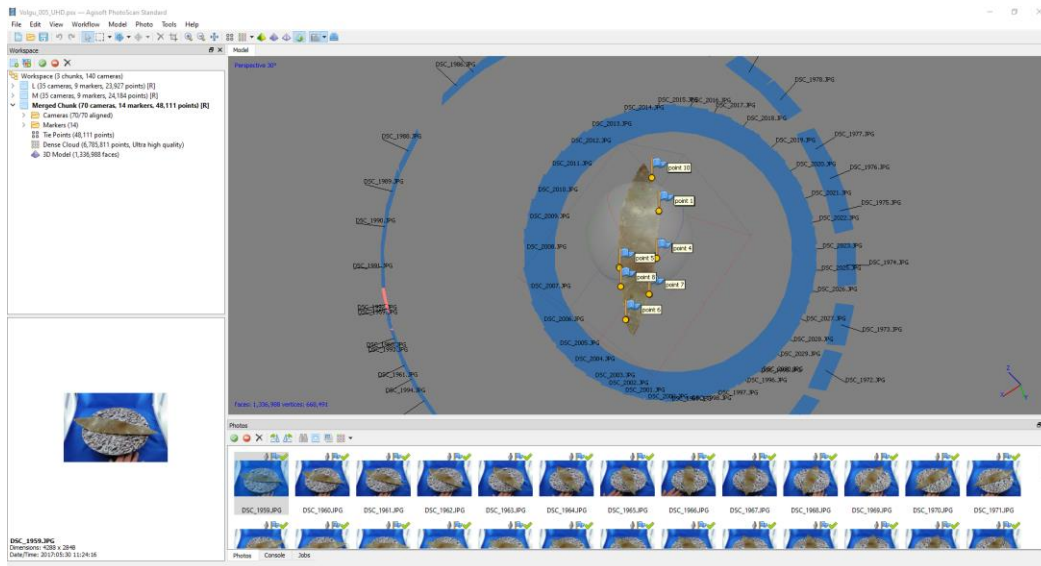




Agisoft Photoscan



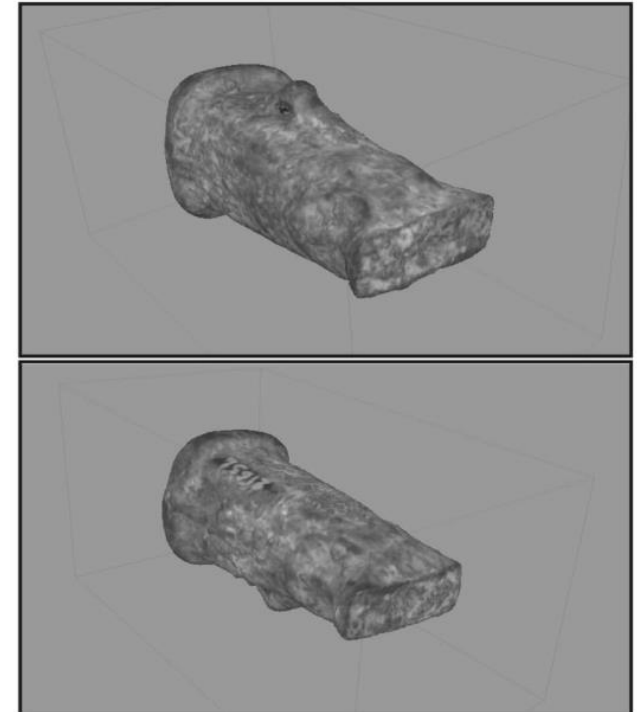
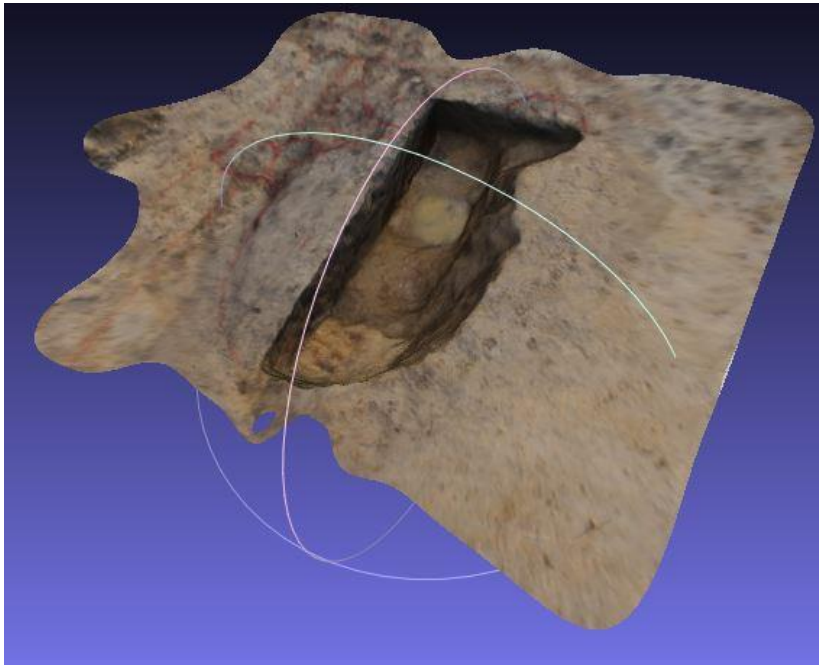
Agisoft Photoscan



MicMac



Visual SfM



References:

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- <https://jwilczek.com/teaching/prostorova-dokumentace-artefaktu/>
- <http://www.fabricemonna.com/enseignement-2/master-1-asa/photogrammetrie-m1-asa/>

