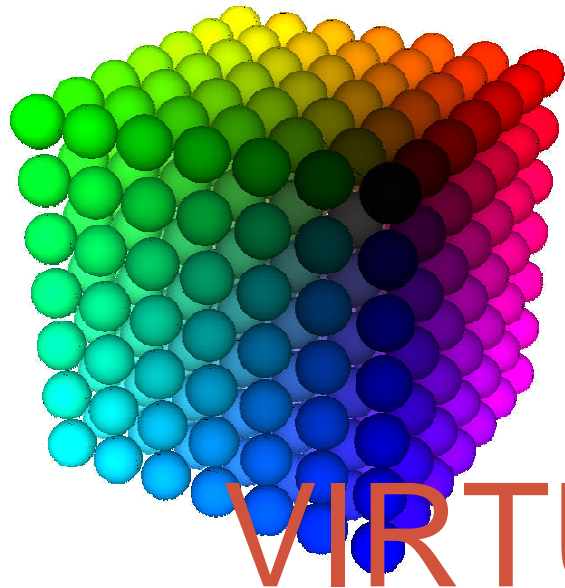
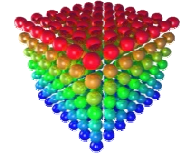


© 2014

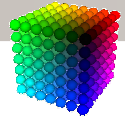


VIRTUÁLNA REALITA

doc. Ing. Branislav Sobota, PhD.

Katedra počítačov a informatiky

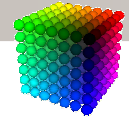
FEI TU Košice



Virtuálna realita

Virtuálno-realityný systém predstavuje interaktívny počítačový systém, vytvárajúci ilúziu v danom čase neexistujúceho len syntetizovaného priestoru alebo ešte presnejšie môžeme hovoriť o tzv. dokonalej simulácii v prostredí tesného spojenia človek-výpočtový systém

má interdisciplinárny charakter

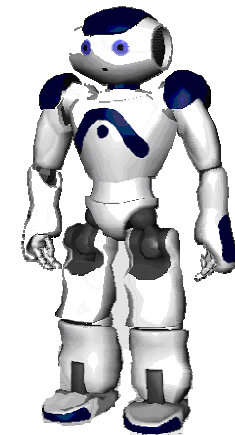


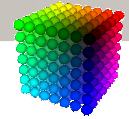
Používané pojmy

- Virtual reality
- Fuzzy reality
- Mixed reality (augmented, extended)

- cyberspace
- Pozorovateľ, cybernaut
- Avatar (zástupca pozorovateľa vo virtuálnom prostredí)

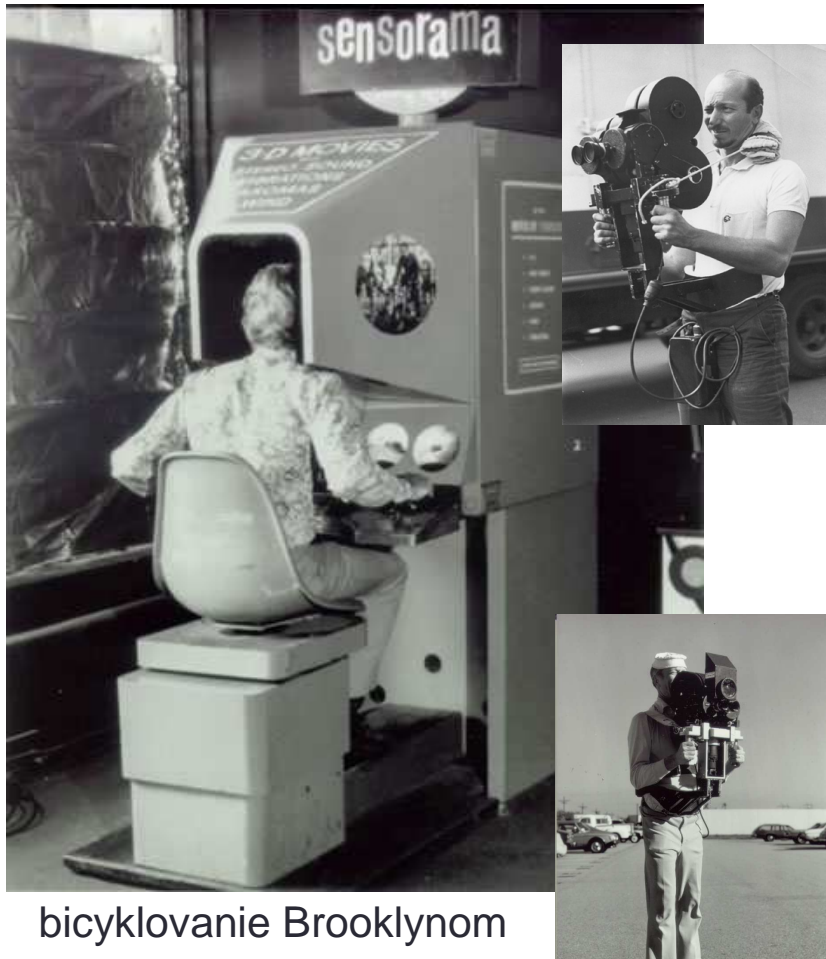
- HCI – Human Computer Interacrction





Historické náväznosti

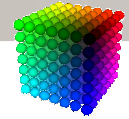
Sensorama (Morton L. Heilig, 1950s)



bicyklovanie Brooklynom



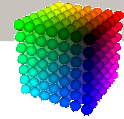
Telespheremask (Morton L. Heilig, 1960s)



Historické náväznosti



Ivan Sutherland, prof. Brooks, Ronald T. Azuma, Jaron Lanier



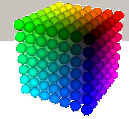
Avatar



z Avatára (sanskrit)

inkarnácia naj/vyššej bytosti
(boha) na Zemi

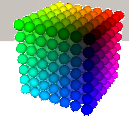




Avatar

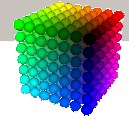
Štruktúra reprezentujúca používateľa vo virtuálnom svete





Niektoré technológie spadajúce do oblasti VR

- telerobotika
- teleprezencia
- teleriadenie (t.j. účasť na vzdialenom deji, forma virtuálnej výuky alebo forma virtuálnej konštrukčnej kancelárie)
- zmiešaná realita (mixed reality)



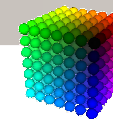
Kategorizácia VR systémov

Podľa úrovne V/V prvkov

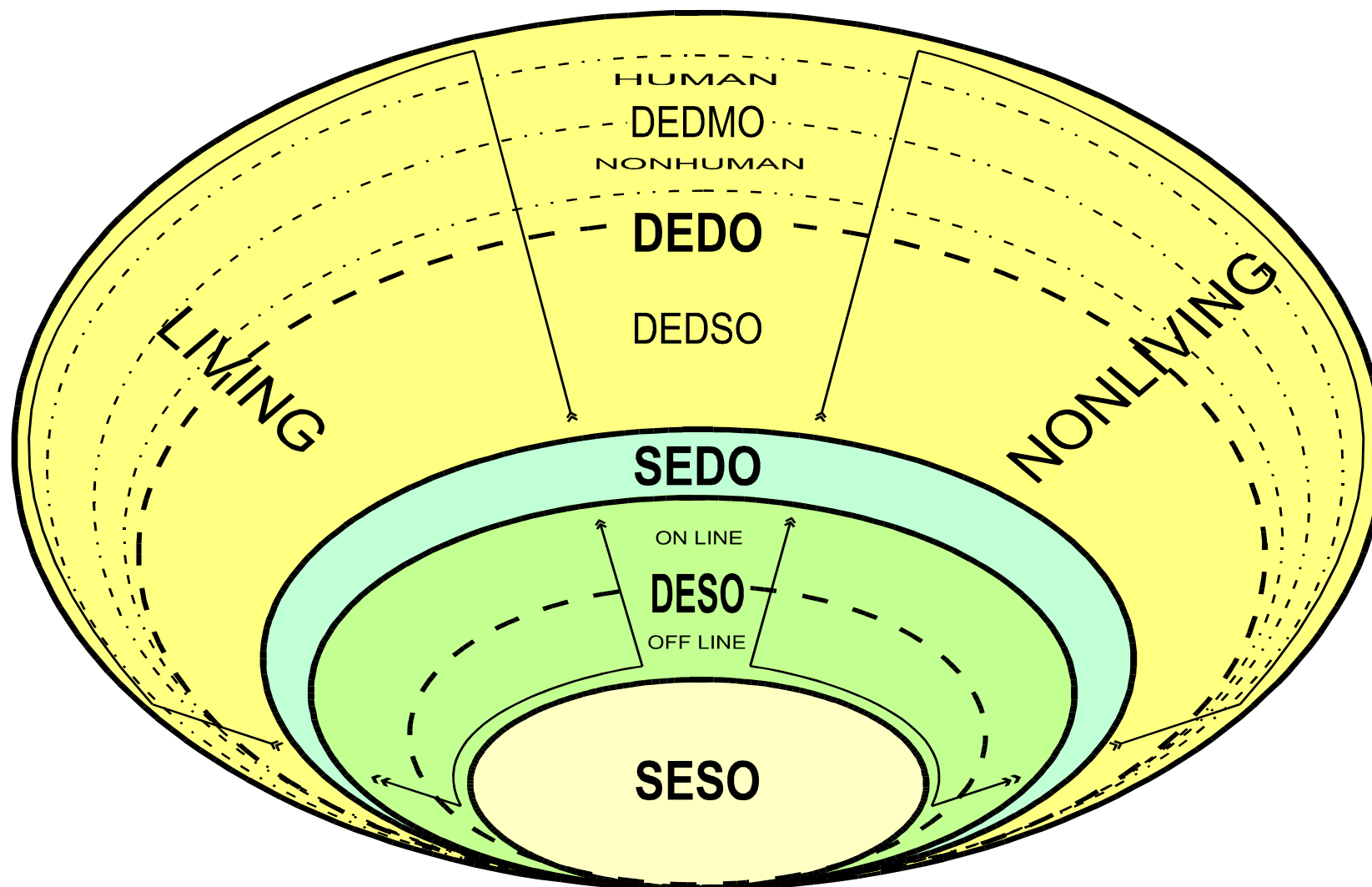
- Entry VR
- Basic VR
- Medium VR
- Immersive VR

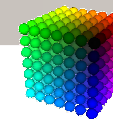
Podľa dynamiky prostredia a pozorovateľa

- SESO – Static Environment Static Observer
- DESO – Dynamic Environment Static Observer
- SEDO – Static Environment Dynamic Observer
- DEDO – Dynamic Environment Dynamic Observer

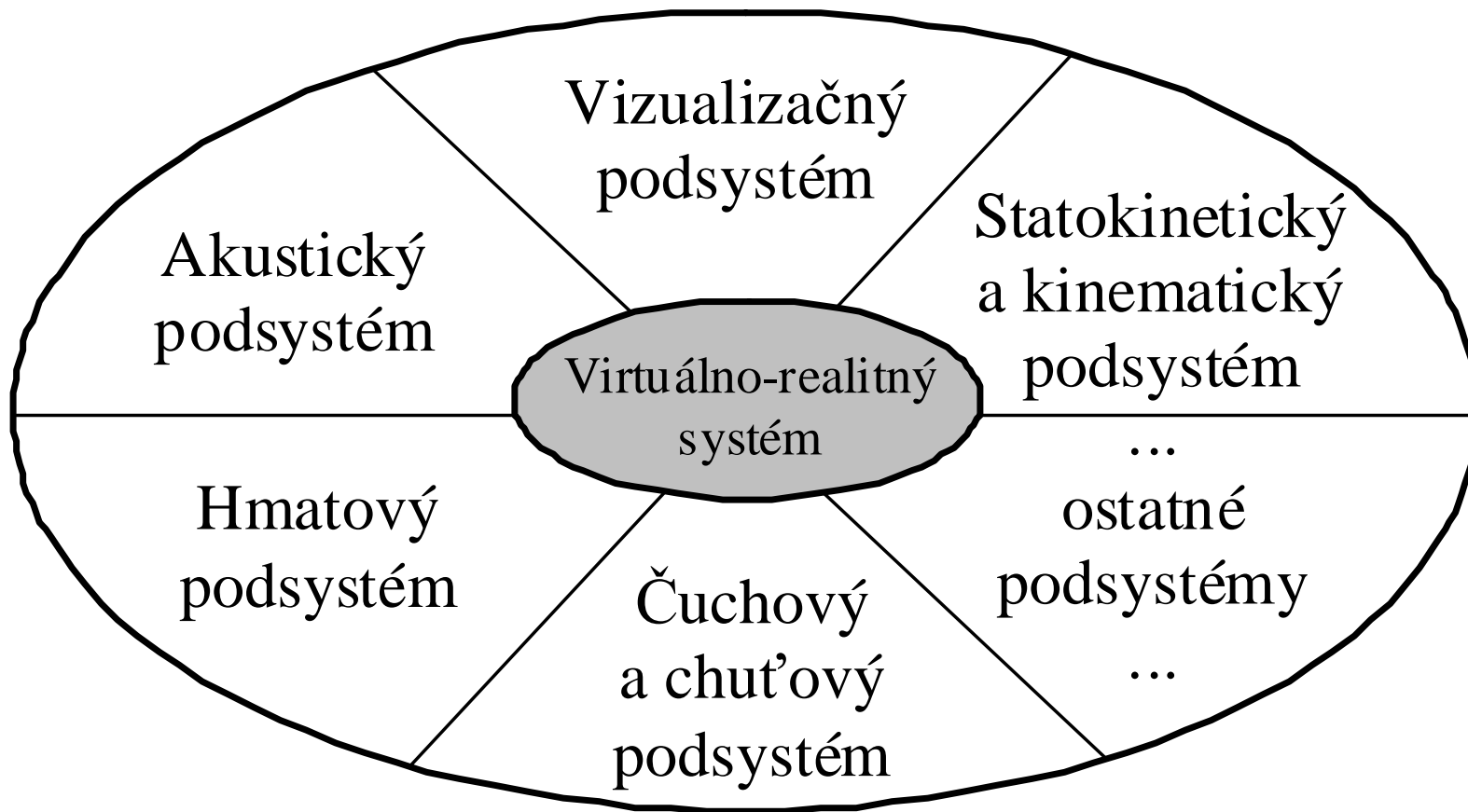


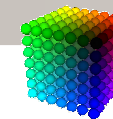
Kategorizácia VR systémov



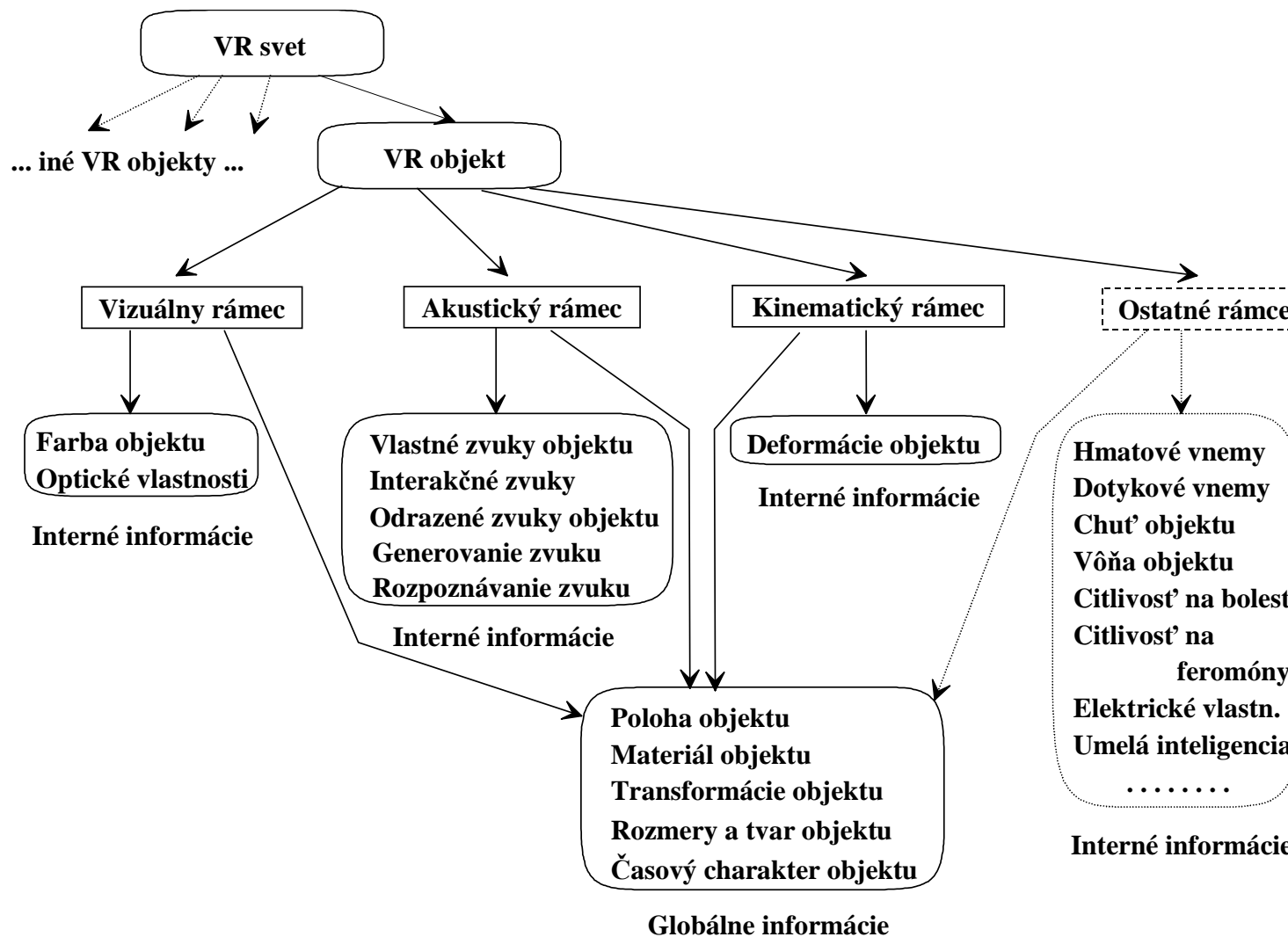


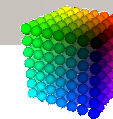
Podsystemy VR systému



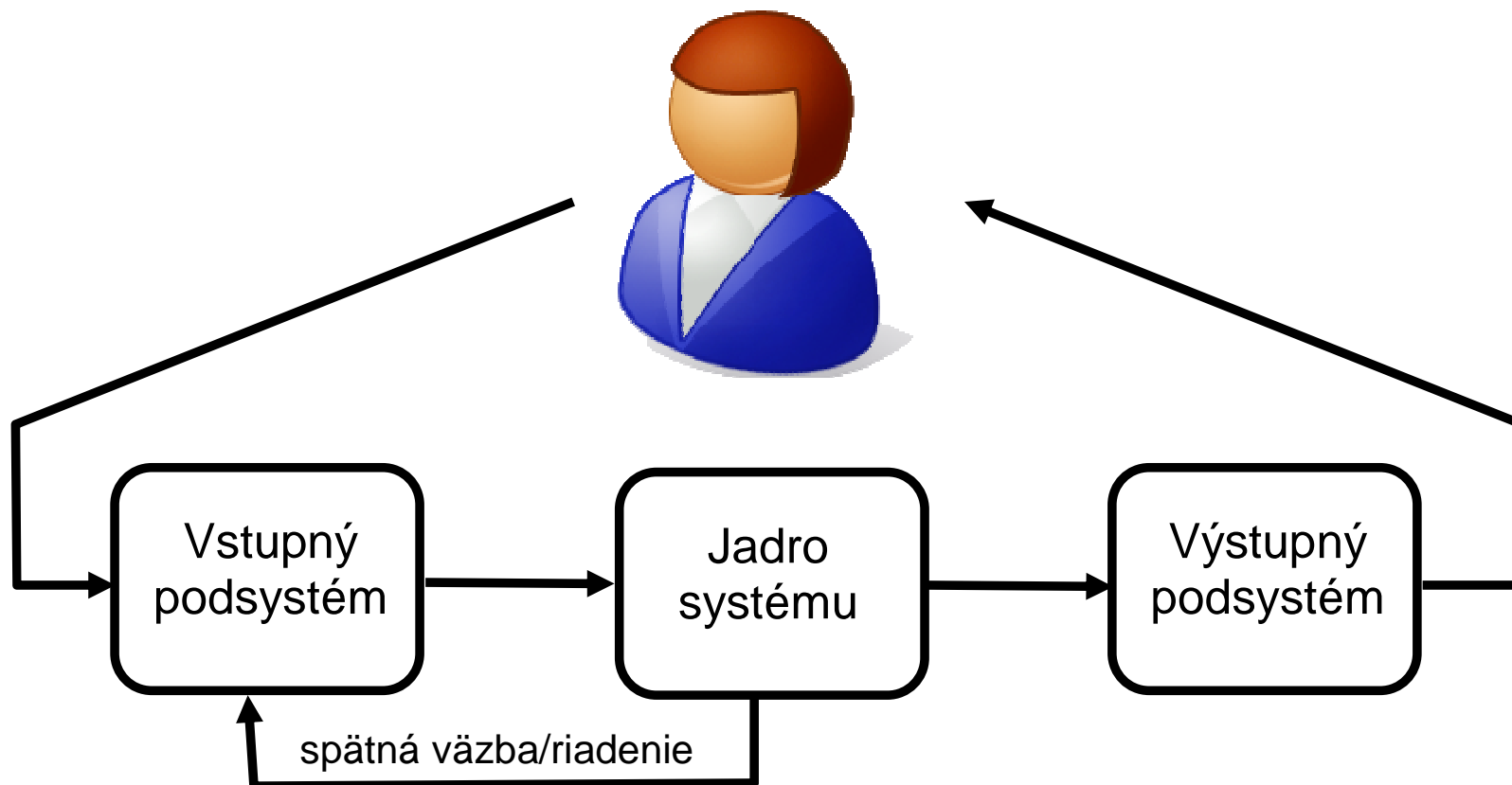


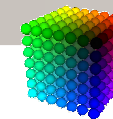
Štruktúra objektu VR systému



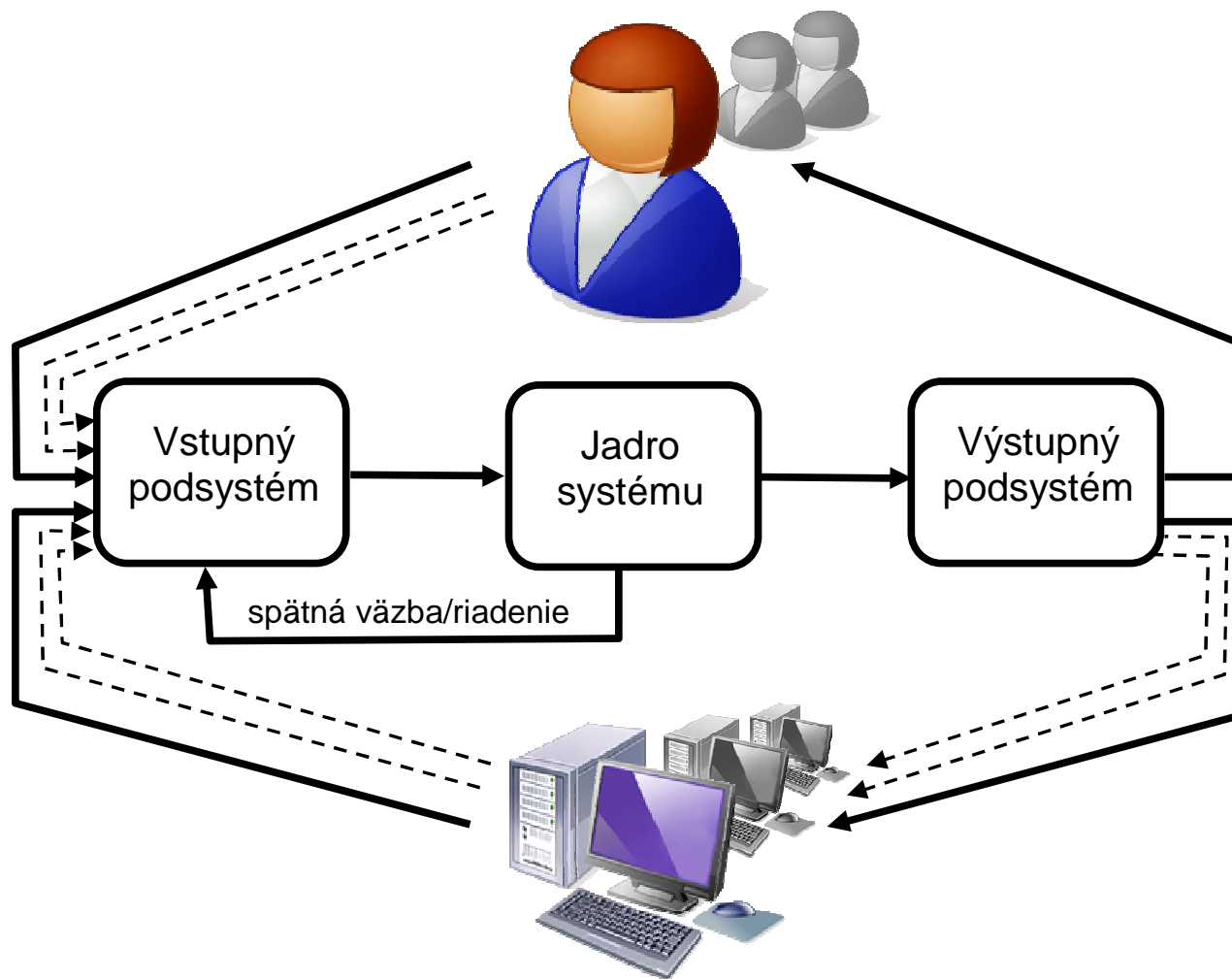


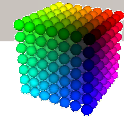
System interakcie VR systému (DEDSHO)





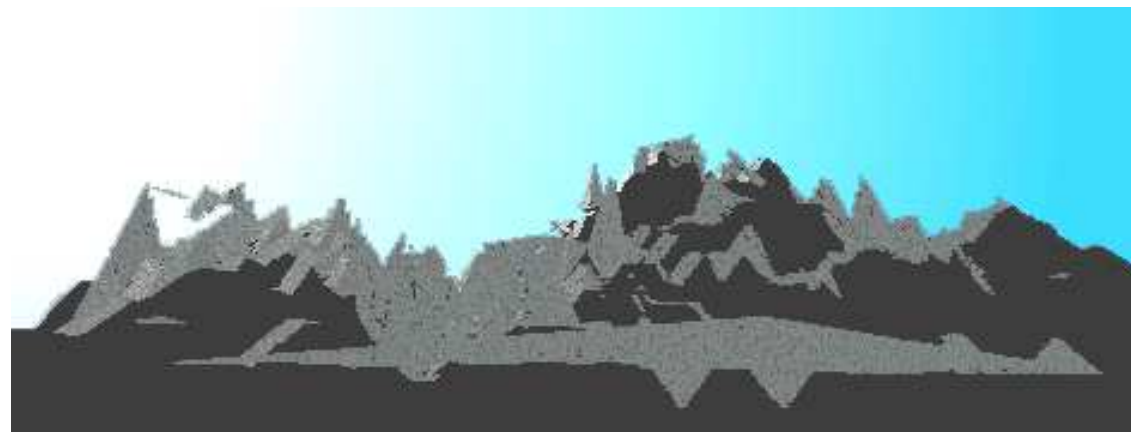
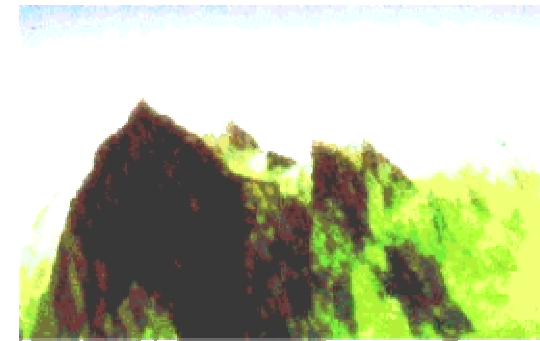
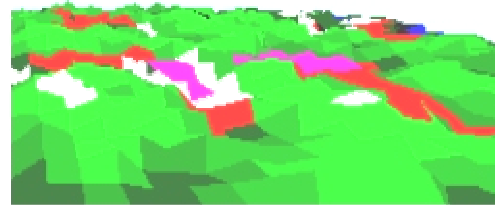
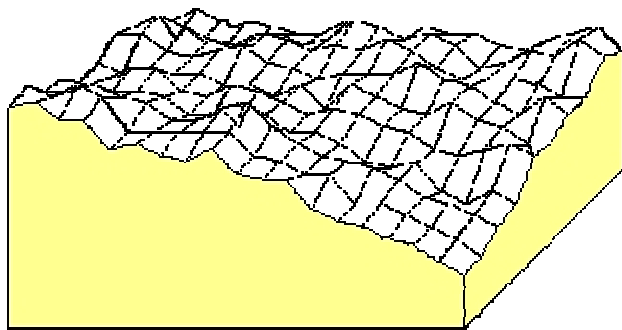
System interakcie VR systému (DEDMNO)

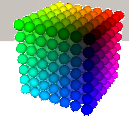




Používané objekty

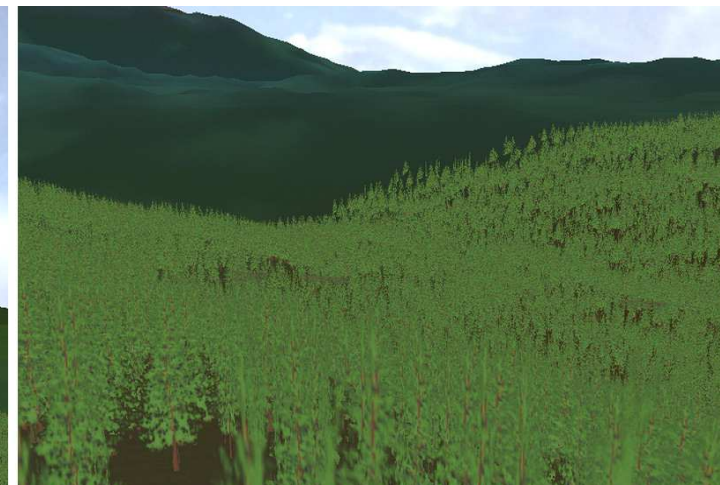
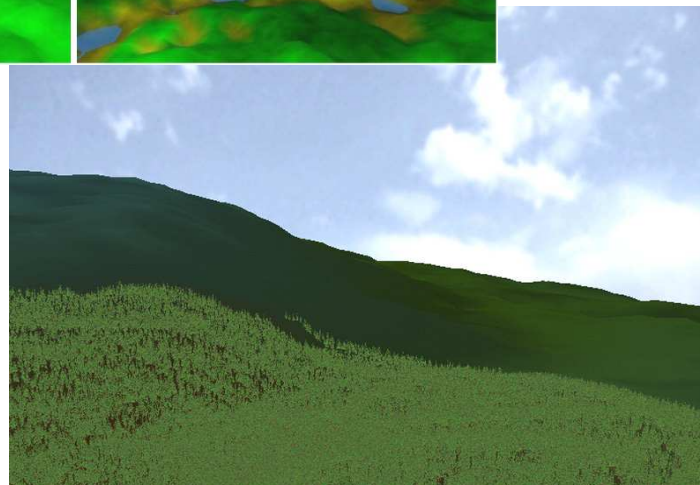
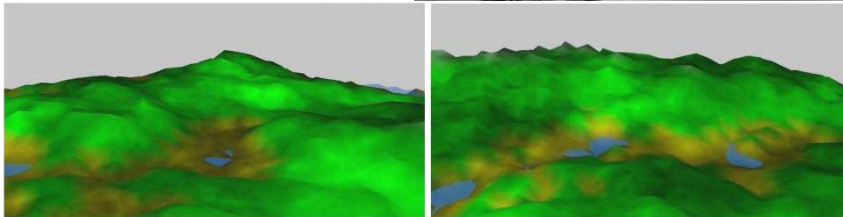
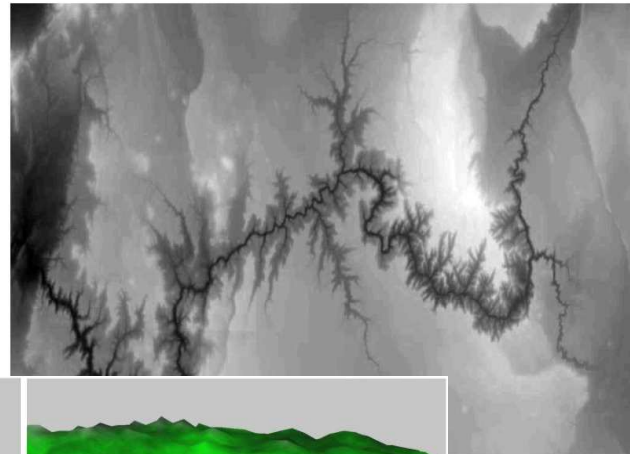
Krajina

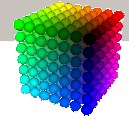




Používané objekty

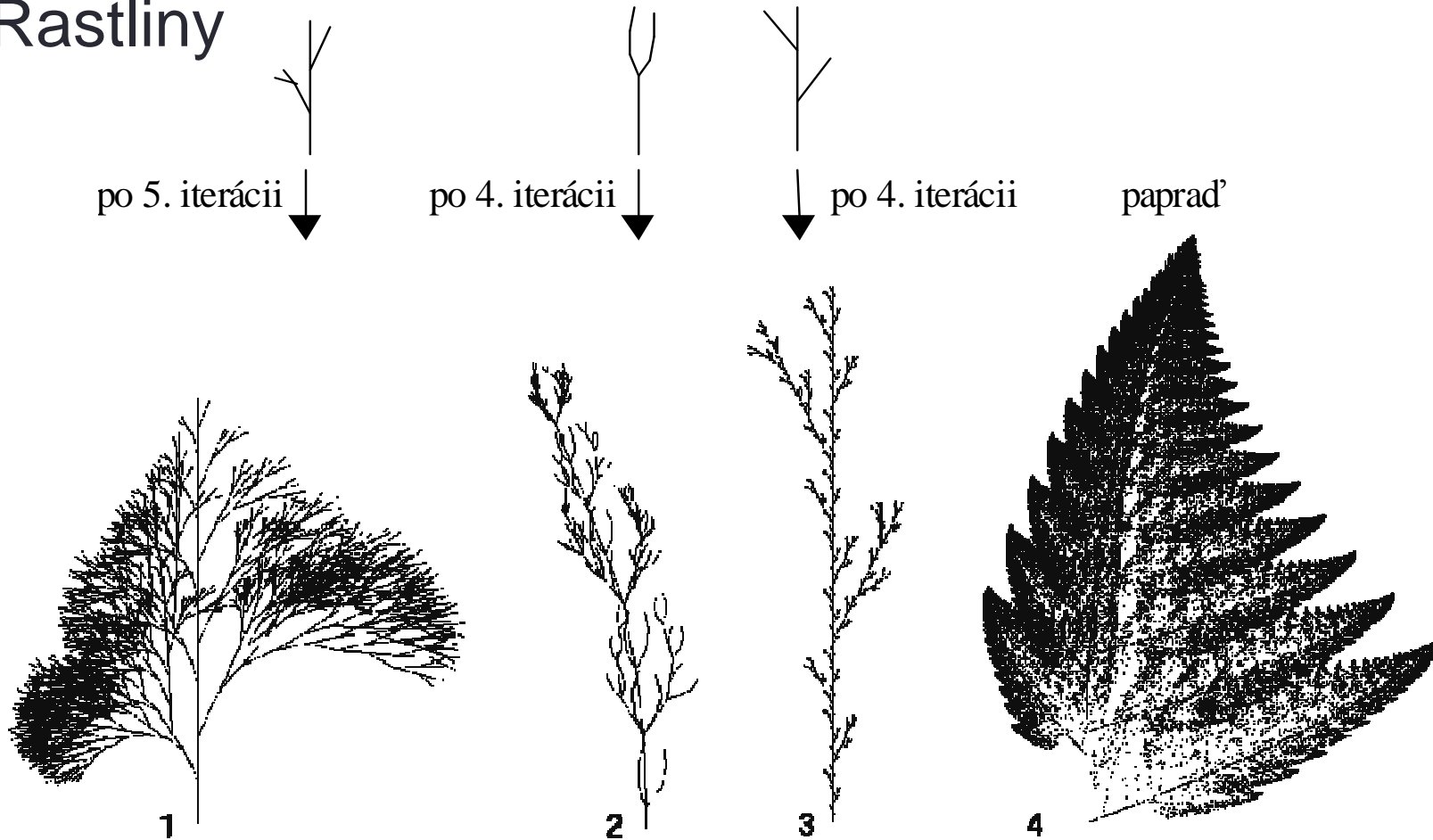
Krajina

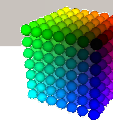




Používané objekty

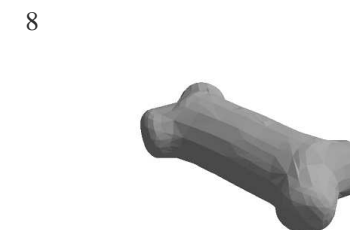
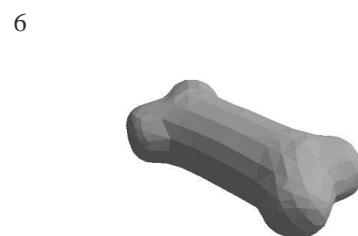
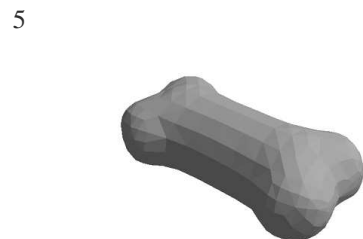
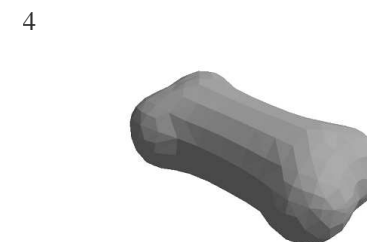
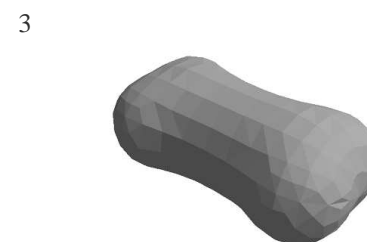
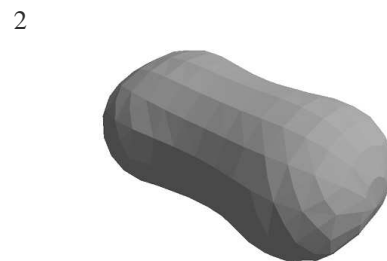
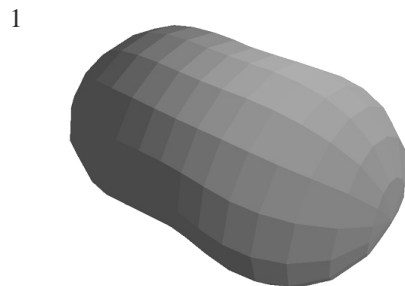
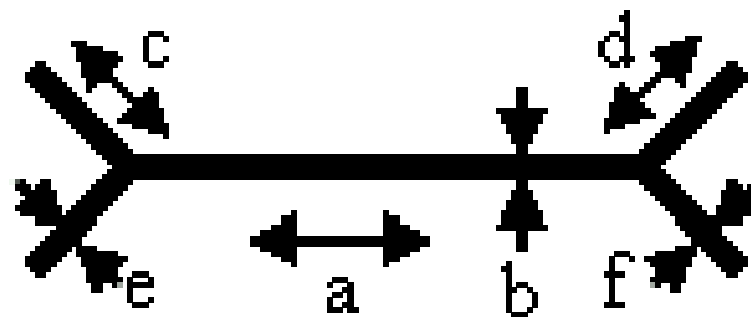
Rastliny

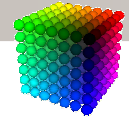




Používané objekty

Kosti

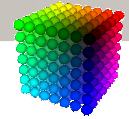




Používané objekty

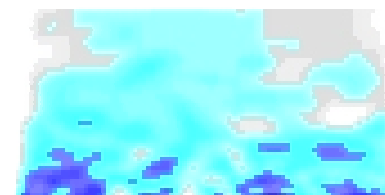
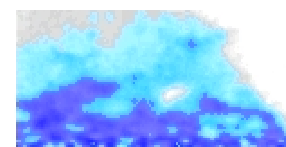
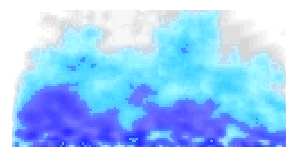
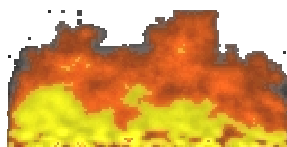
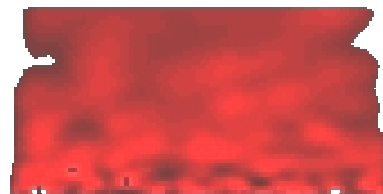
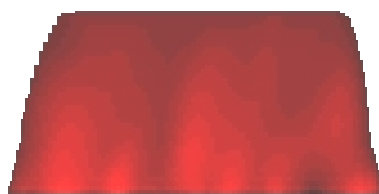
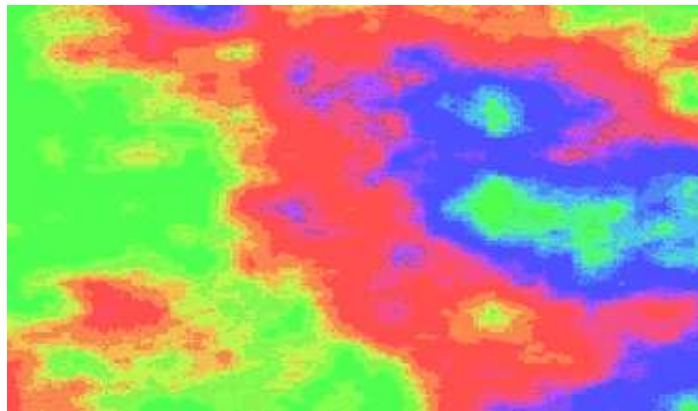


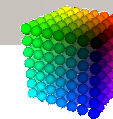
Ukážka vizualizácie modelu ruky



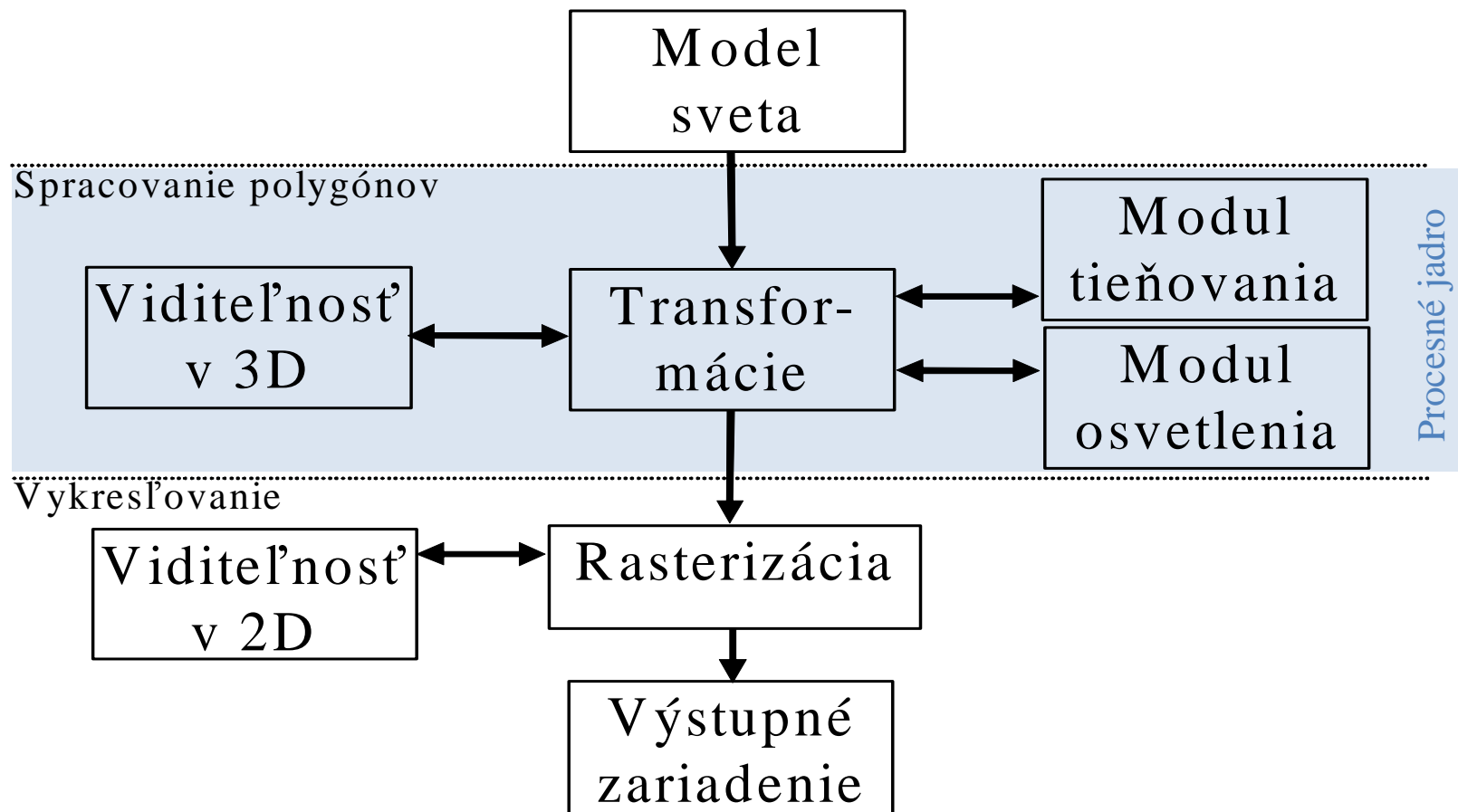
Používané objekty

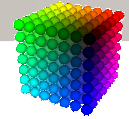
Plazma (amorfné tvary, obloha, oheň)



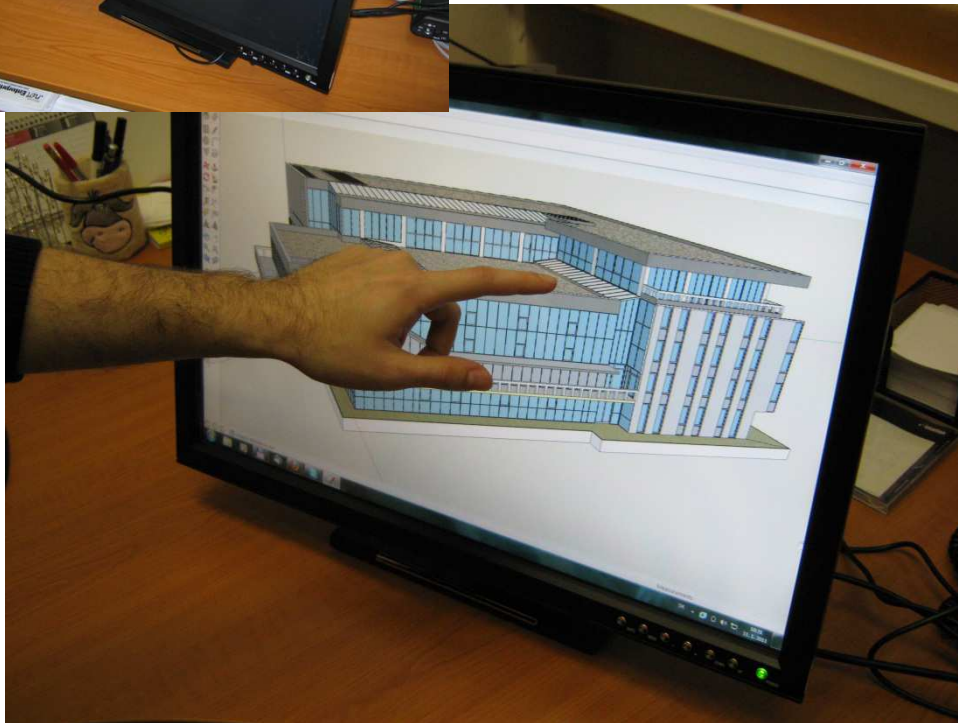


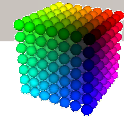
Vizualizačný podsystem



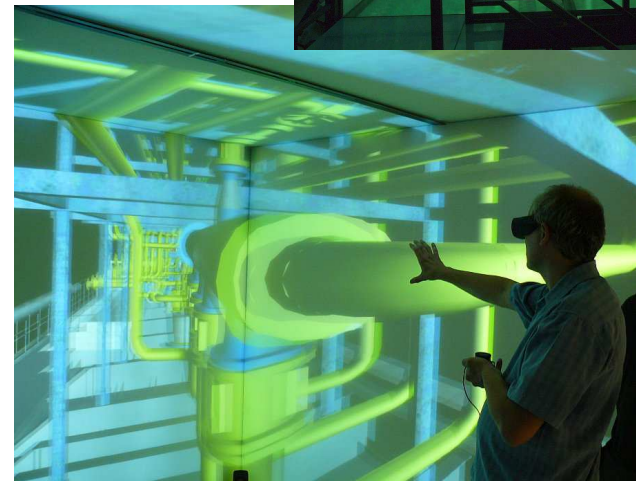
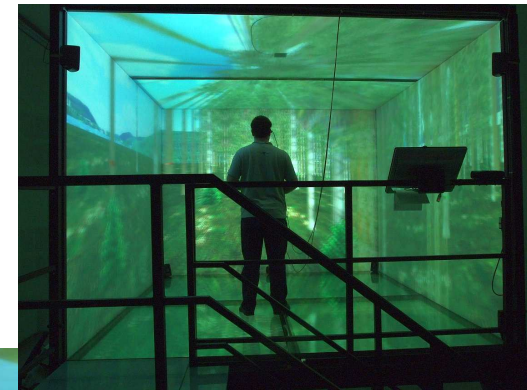
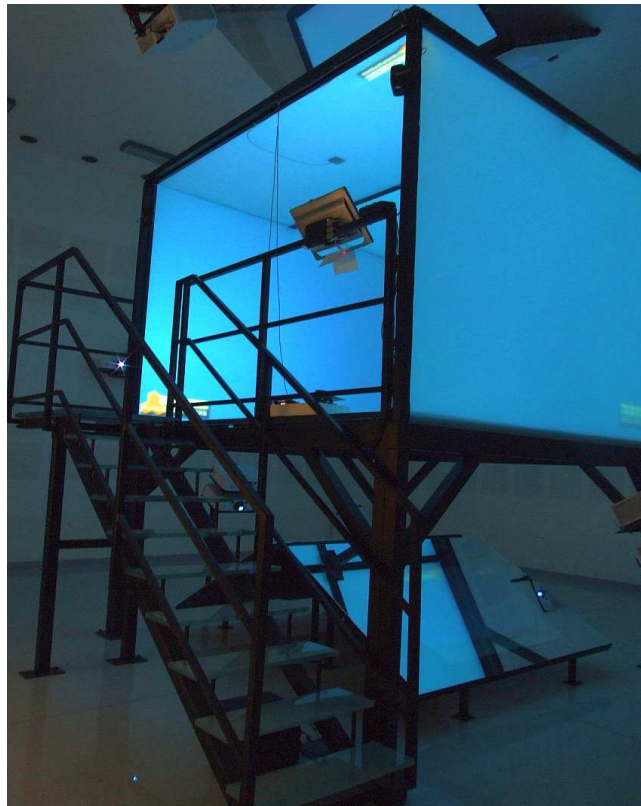


Výstupné prostriedky vizualizačného podsystemu

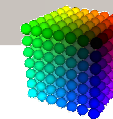




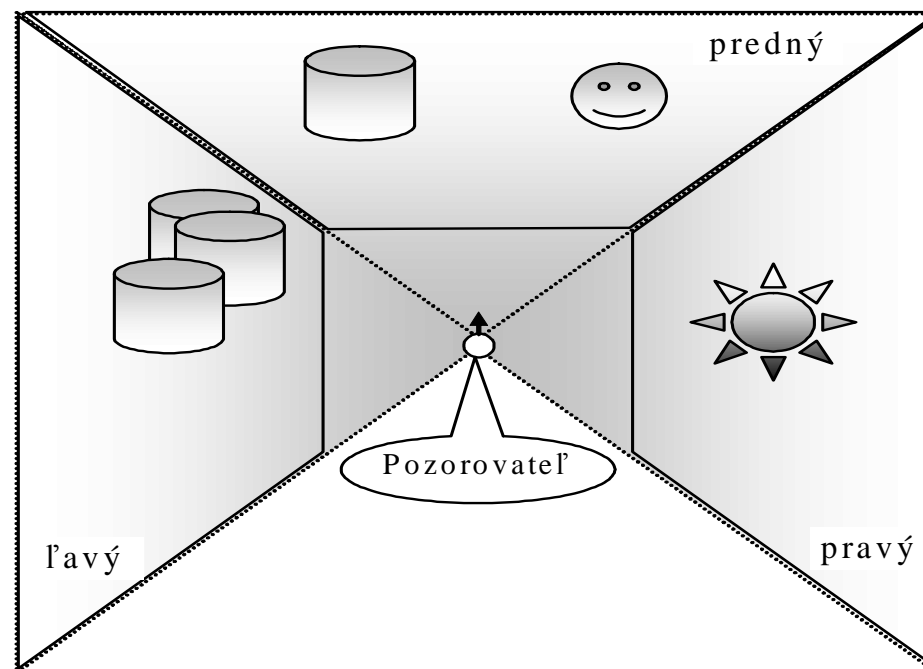
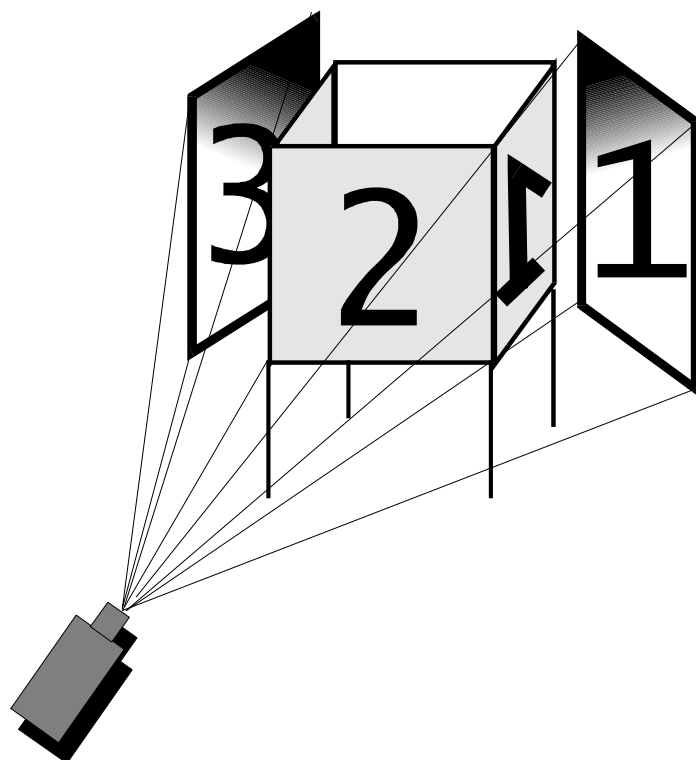
Výstupné prostriedky vizualizačného podsystemu

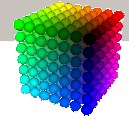


(Virtuálna jaskyňa, TU Zvolen)



Výstupné prostriedky vizualizačného podsystemu

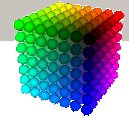




Statokinetický a kinematický podsystem

Snímače a afektory

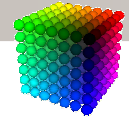
- ***mechanicko - gyroskopické***
- bowdenové
- ultrazvukové
- infračervené a laserové
- ***indukčno – magnetické***
- ***optické***



Statokinetický a kinematický podsystem

Snímače a afektory

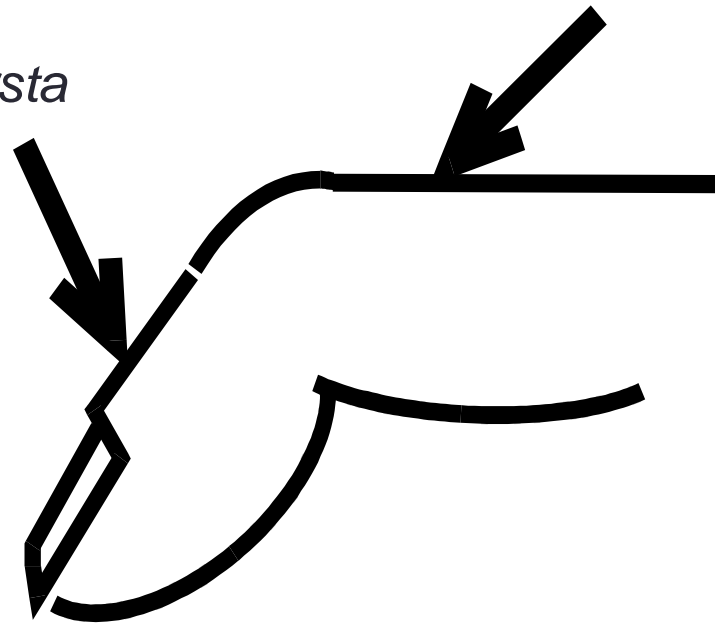
- *tesneviazané*
- *vol'neviazané*

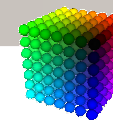


Dátová rukavica

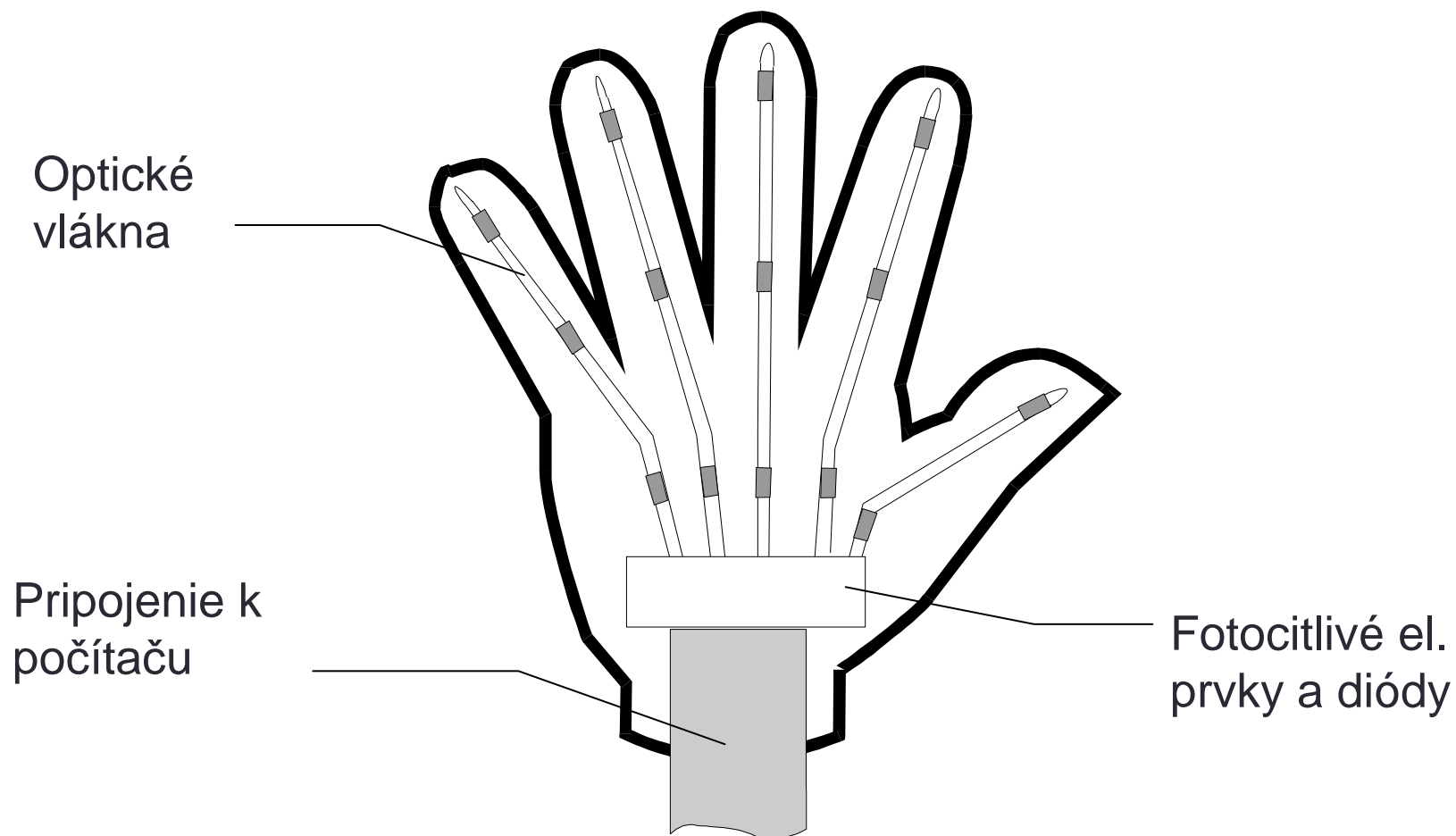
Snímaný článok prsta

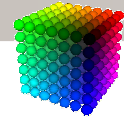
*Vhodné miesto na
umiestnenie snímača*



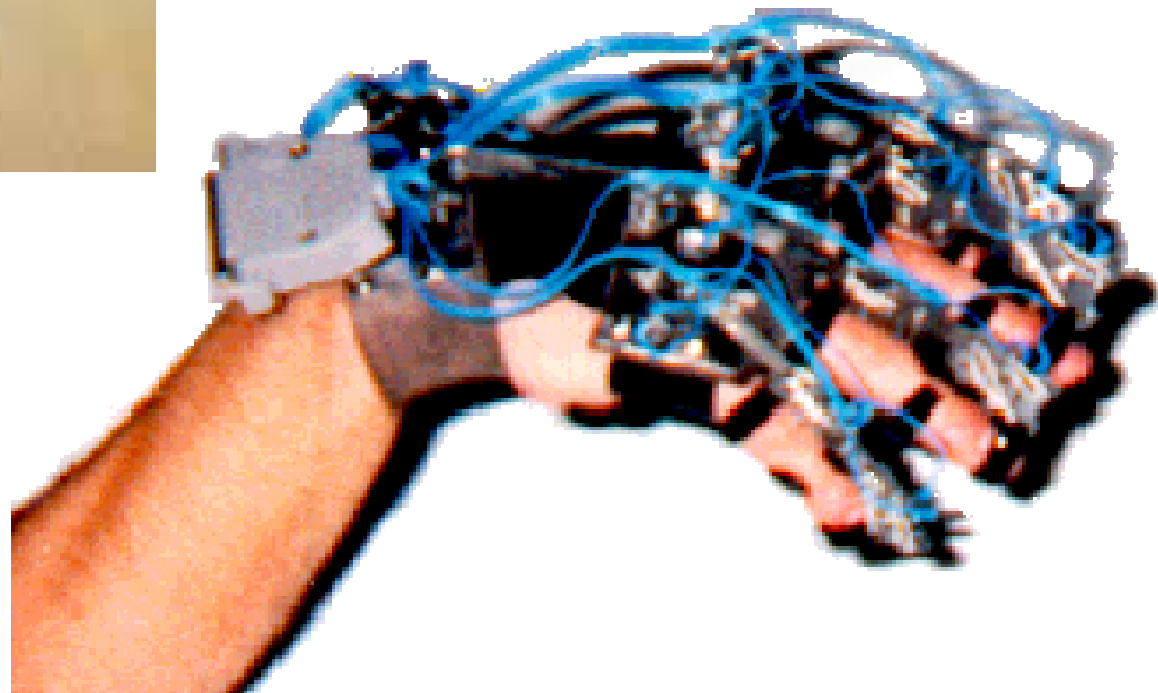
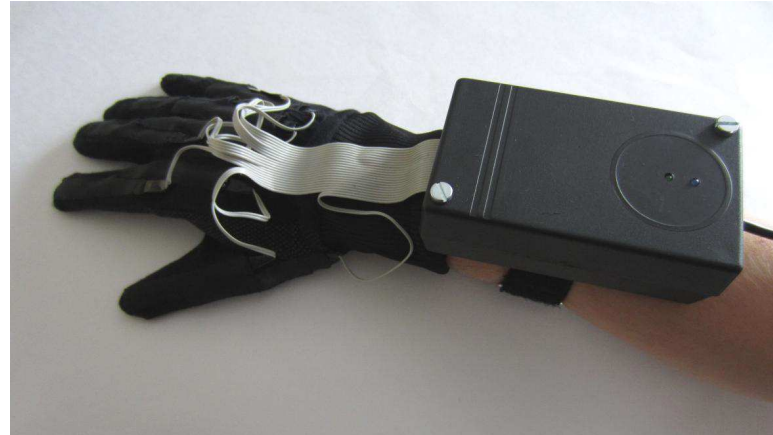


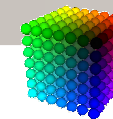
Dátová rukavica



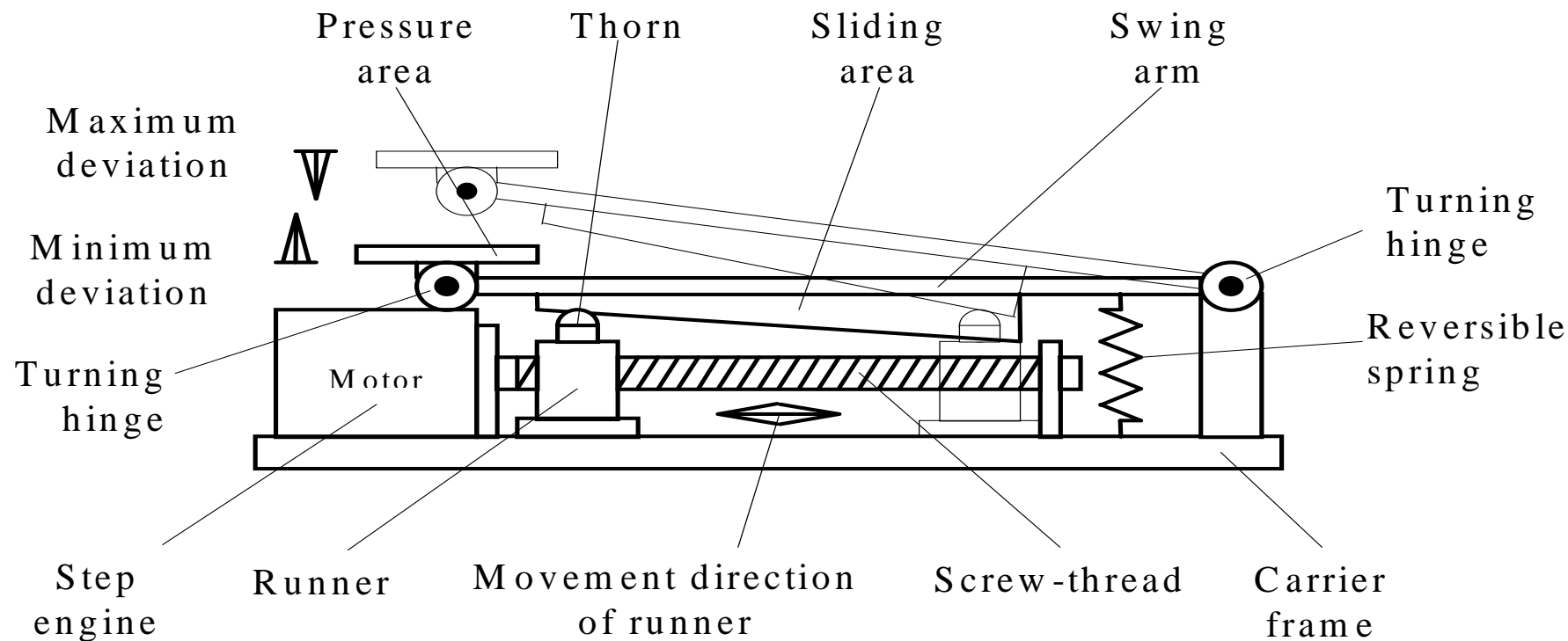


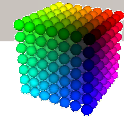
Dátová rukavica



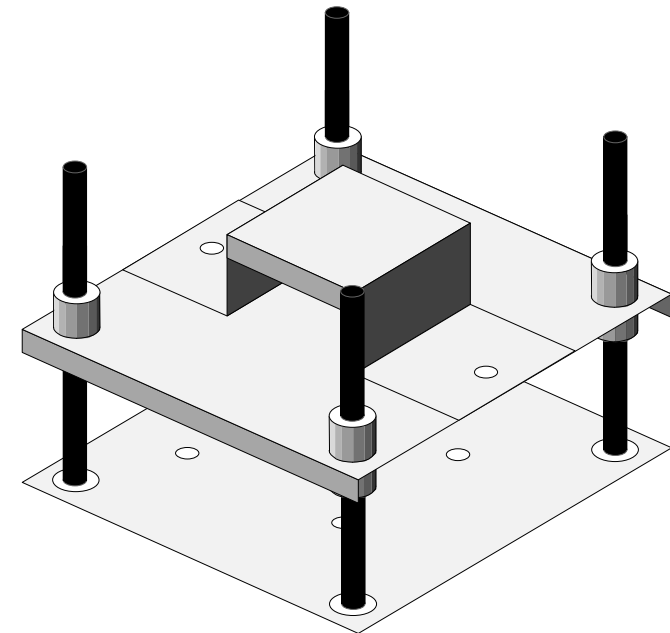


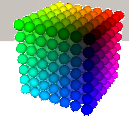
Tlakový afektor





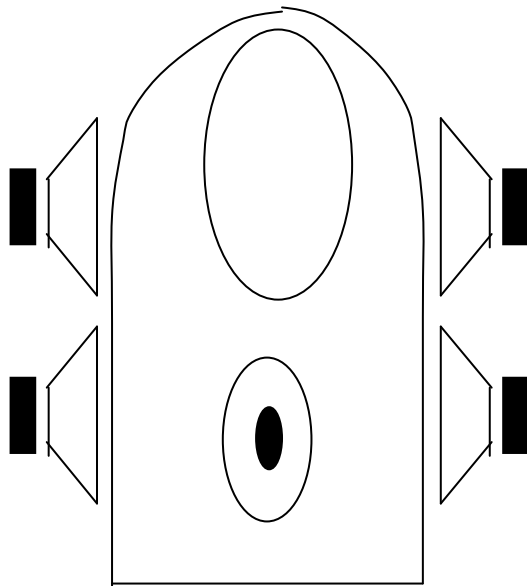
Tlakový afektor



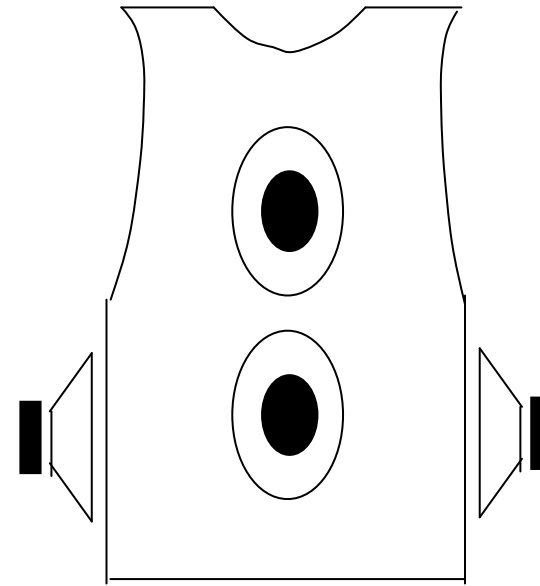


Pulzný tlakový afektor

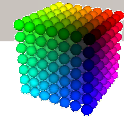
tlaková vesta



a) pohľad z boku



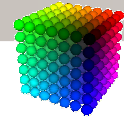
b) pohľad z predu



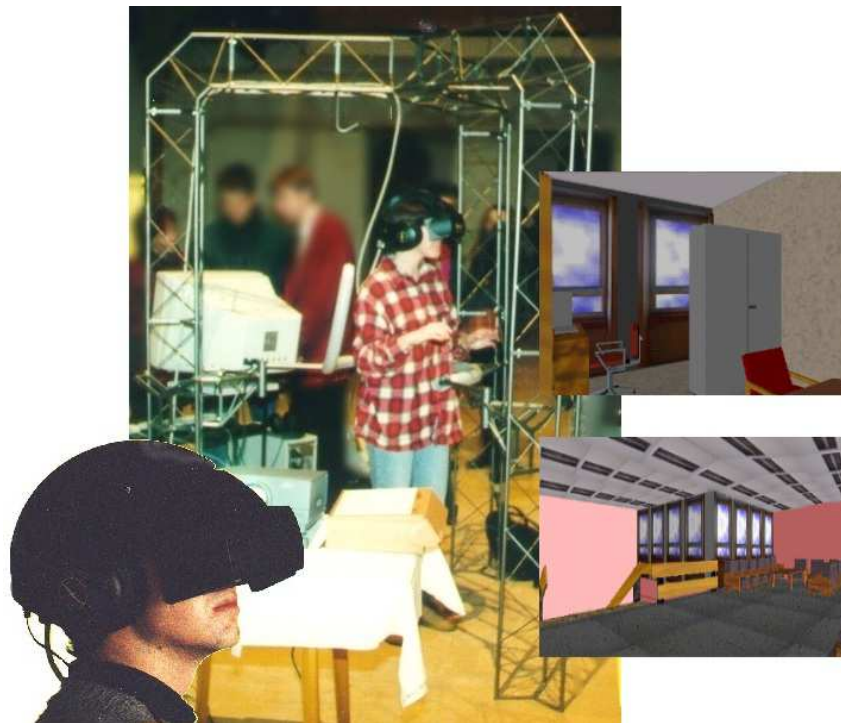
Pulzný tlakový afektor

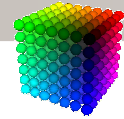
tlaková vesta





Pracovisko VR systému (1. generácia, 1995)





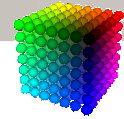
Pracovisko VR systému



Počítač + aplikácia



Pár rukavíc VHand 2.0



Pracovisko VR systému



Notebook + mobil

+



3D model

+



nVisor ST60



Rozšírená realita

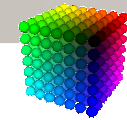


Microsoft Surface

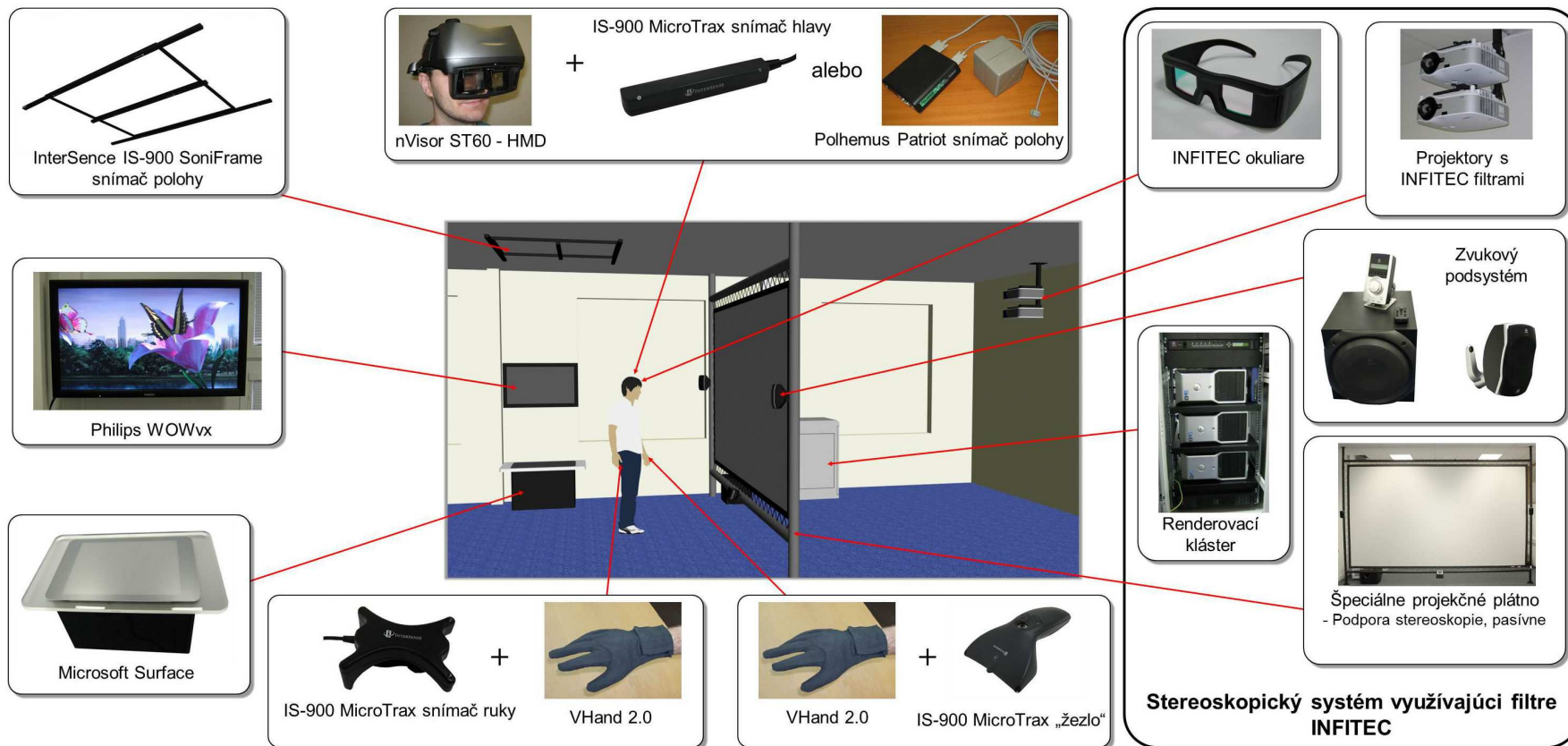
+

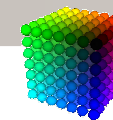


nVisor ST60

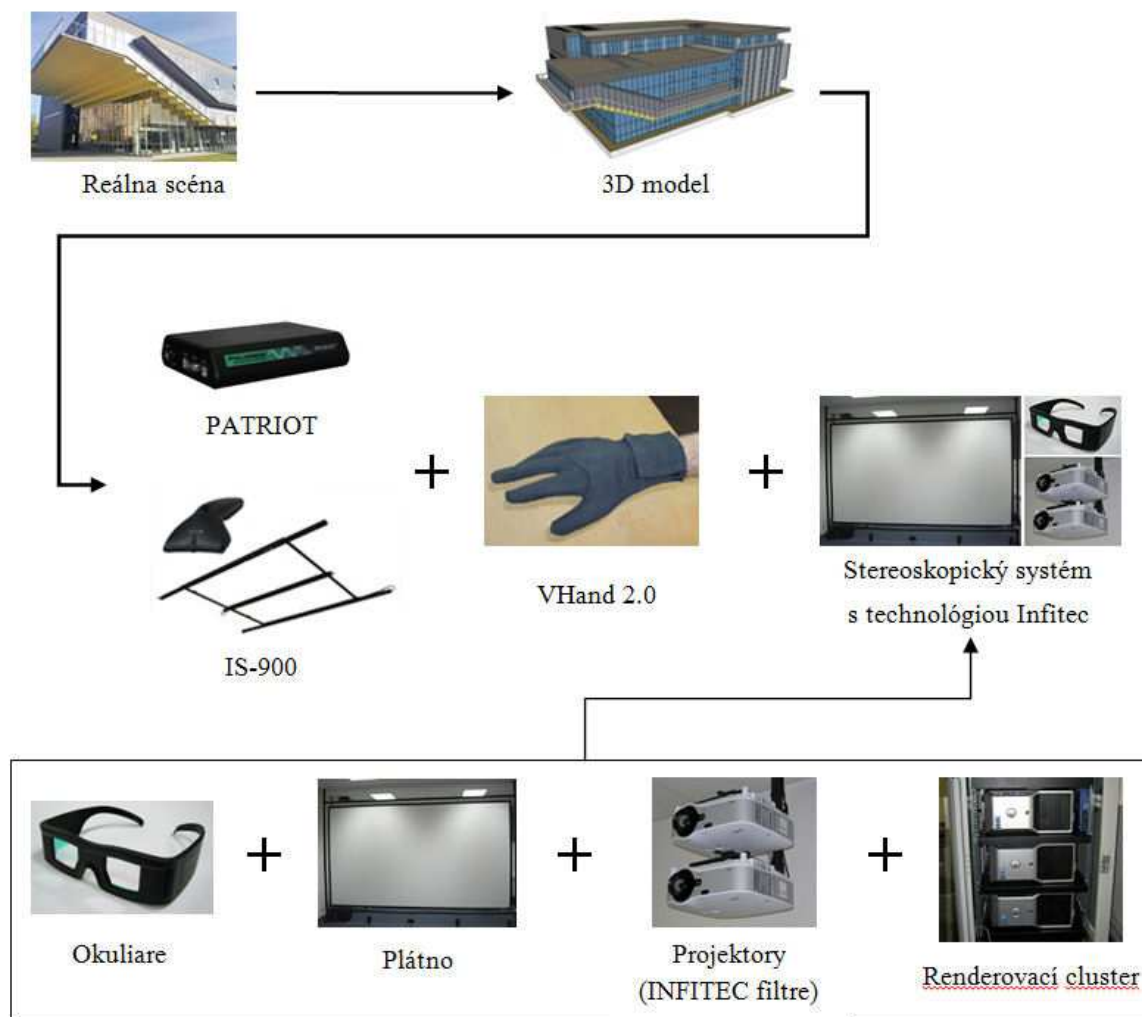


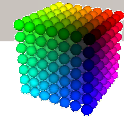
Pracovisko VR systému (4.generácia, 2011)



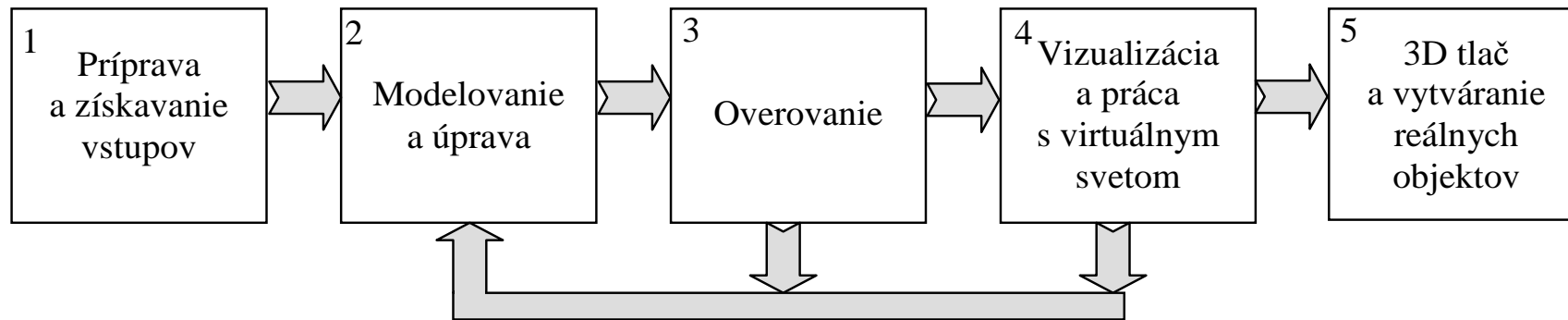


Proces VR systému

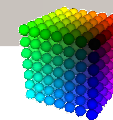




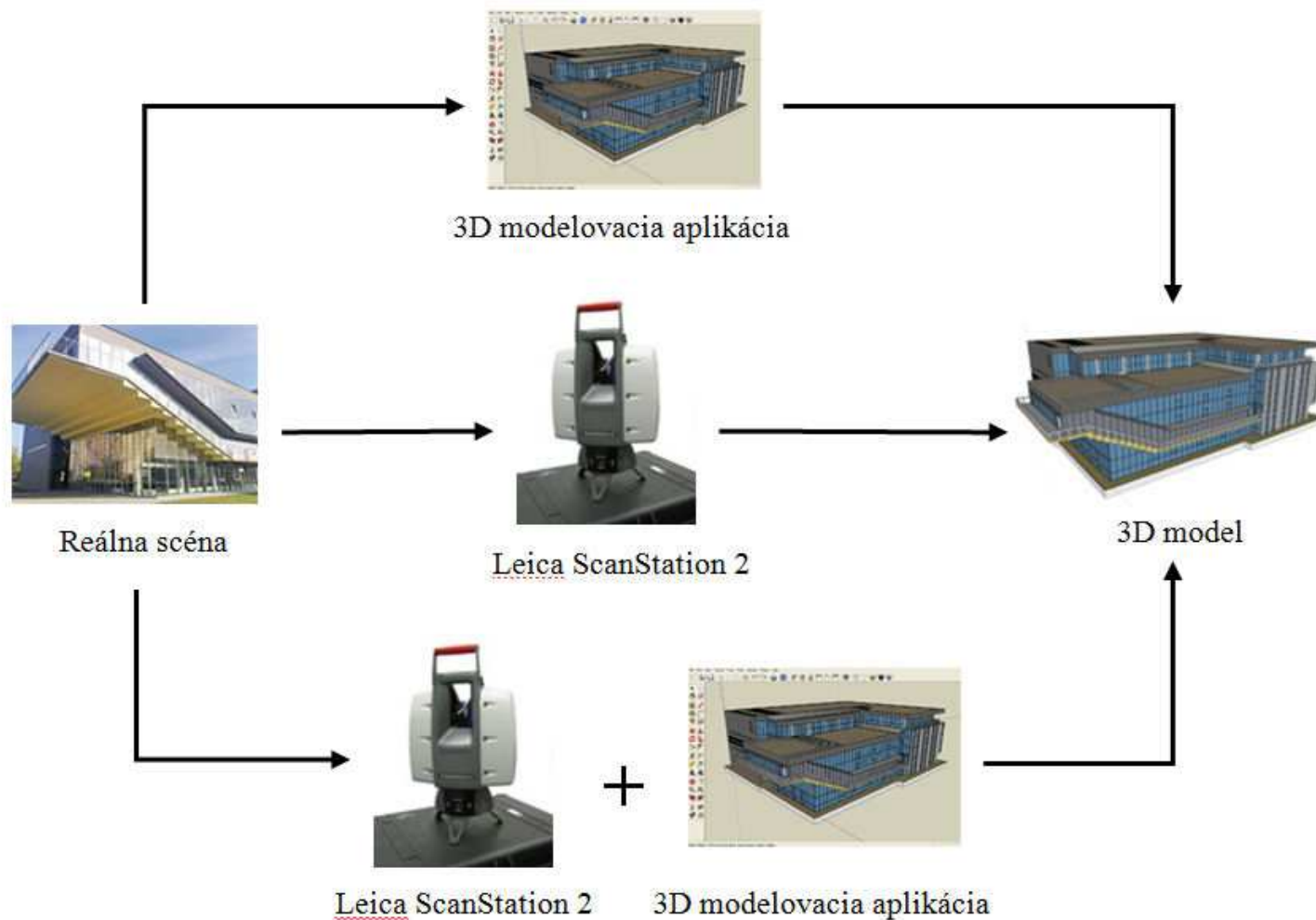
Proces tvorby virtuálnej scény

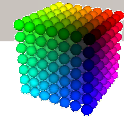


3D virtualizačný reťazec



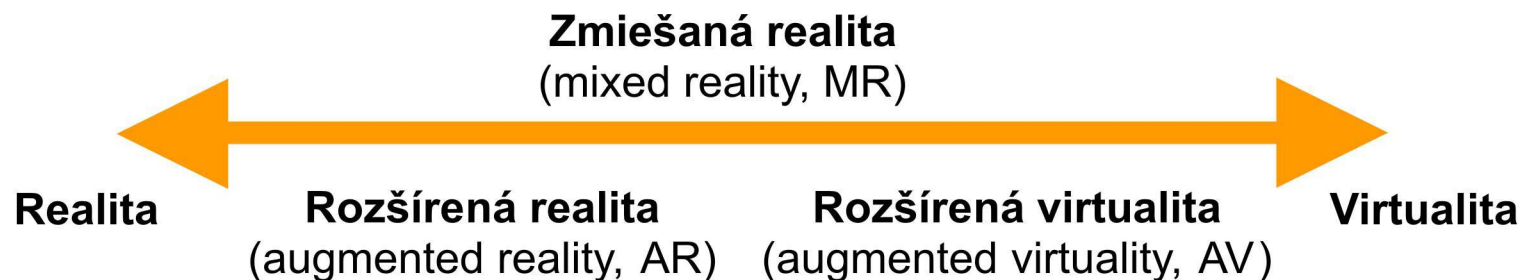
Proces tvorby virtuálnej scény



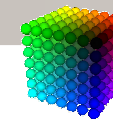


Zmiešaná realita

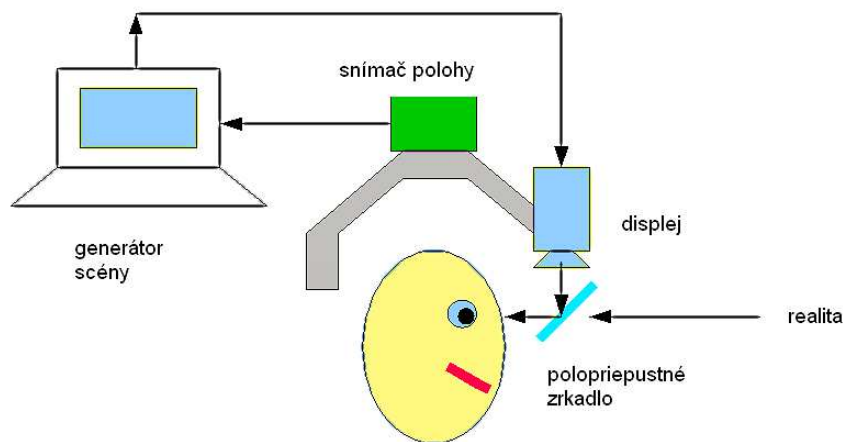
- Rozšírená realita (augmented reality) – vkladanie syntetizovaných objektov do reálneho sveta
- Rozšírená virtualita (augmented virtuality) – vkladanie reálnych objektov do syntetizovaného sveta



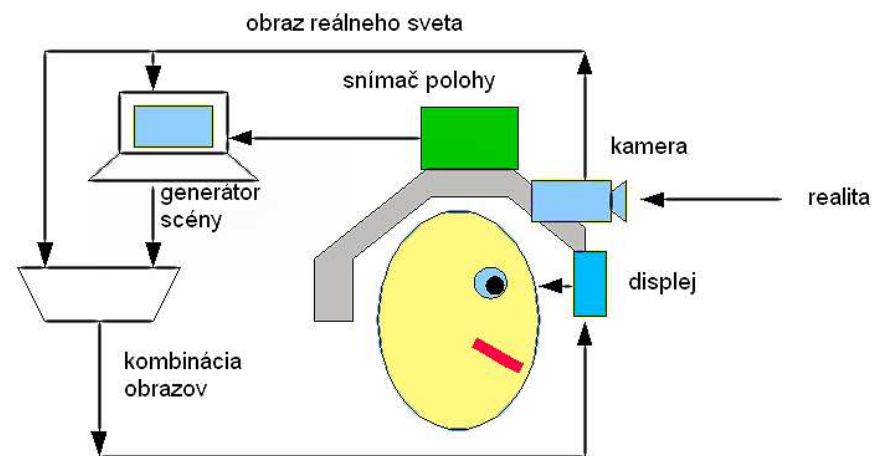
Milgramov prechod medzi reálnym a virtuálnym prostredím



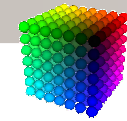
Zmiešaná realita



s polopriepustným displejom

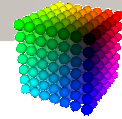


s HMD



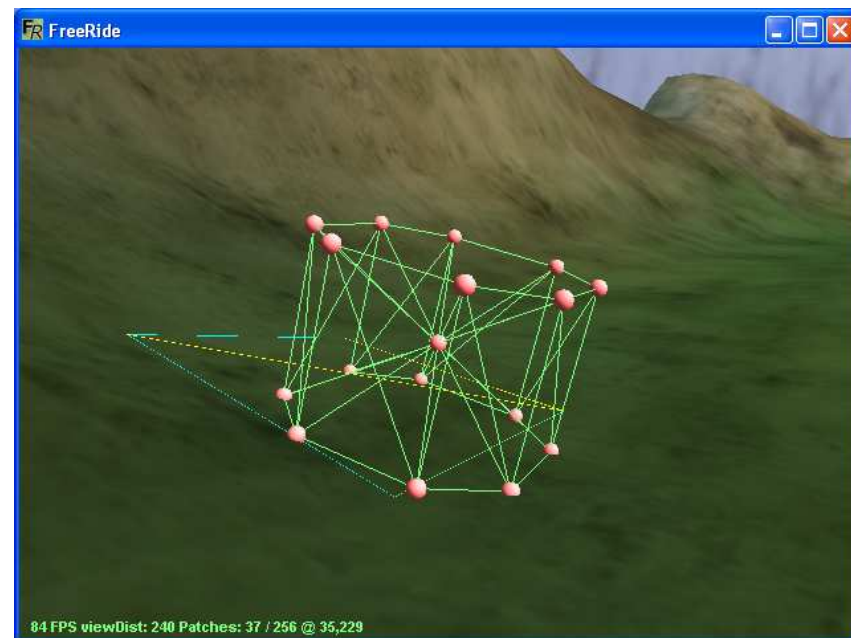
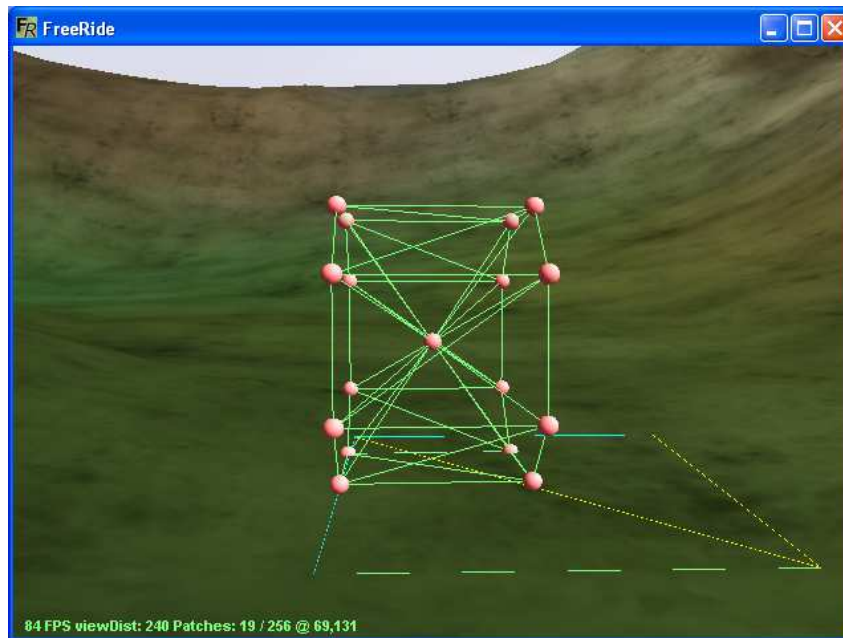
Zmiešaná realita

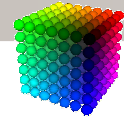




Príklady aplikácií

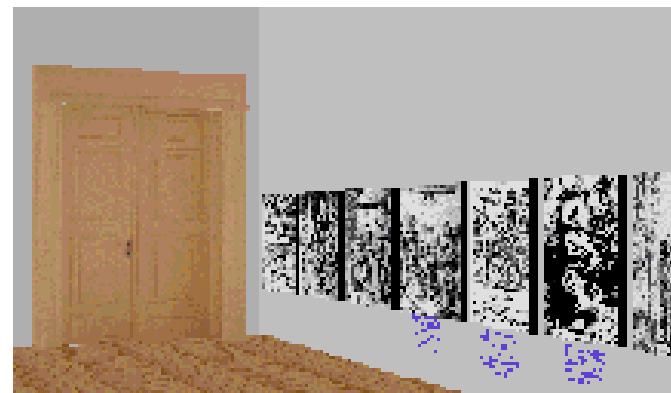
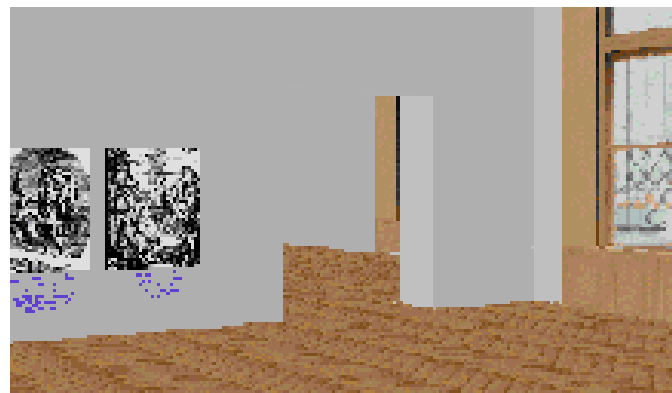
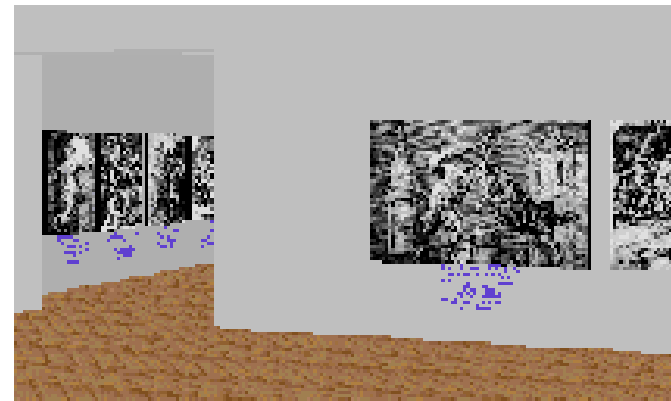
Testovací fyzikálny model

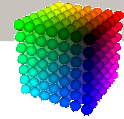




Príklady aplikácií

Východoslovenské múzeum

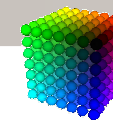




Príklady aplikácií

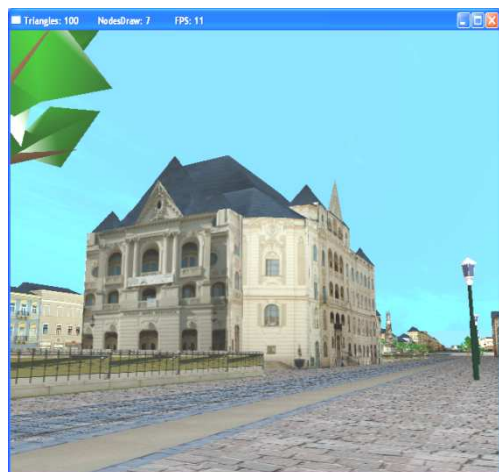
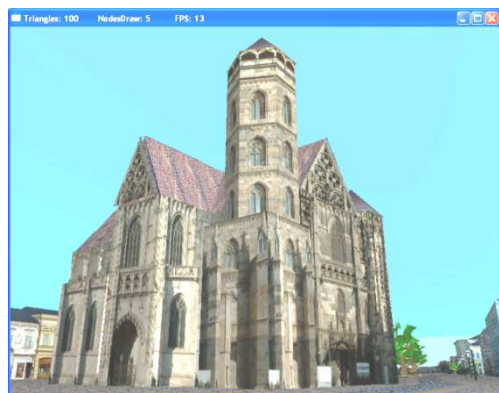
Virtuálna katedrála

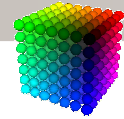




Príklady aplikácií

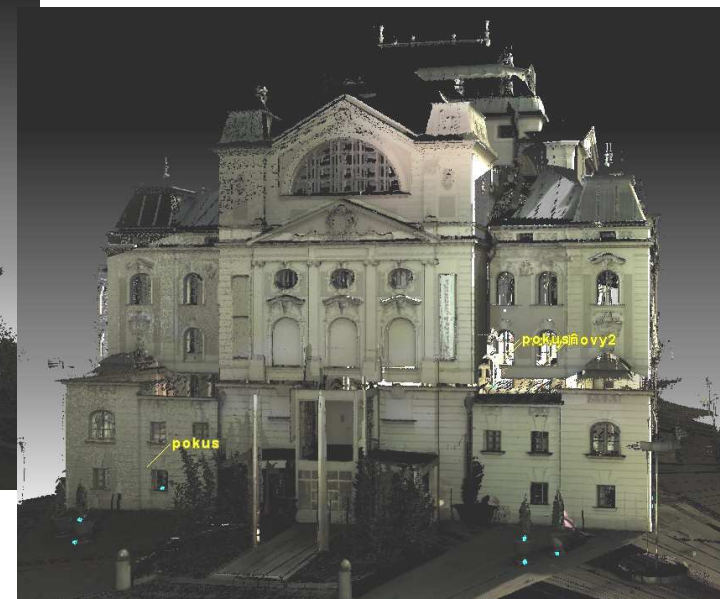
Košice – Hlavná ulica

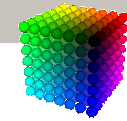




Príklady aplikácií

Košice – Hlavná ulica

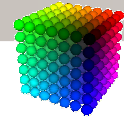




Príklady aplikácií

Areál TU v Košiciach

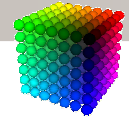




Príklady aplikácií

Spišský hrad

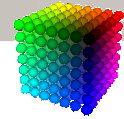




Príklady aplikácií

Fotorealistická vizualizácia priestorov KPI

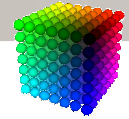




Príklady aplikácií

Fotorealistická vizualizácia priestorov KPI

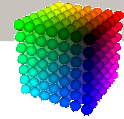




Príklady aplikácií

Fotorealistická vizualizácia priestorov KPI

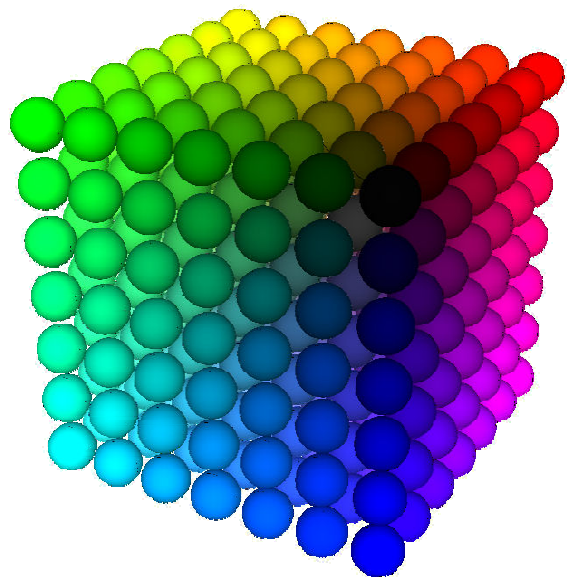




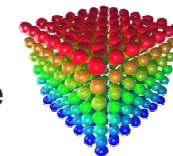
Príklady aplikácií

Práca s VR systémom (LIRKIS – KPI)





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OTÁZKY ?
