SIGGRAPH2010

The People Behind the Pixels

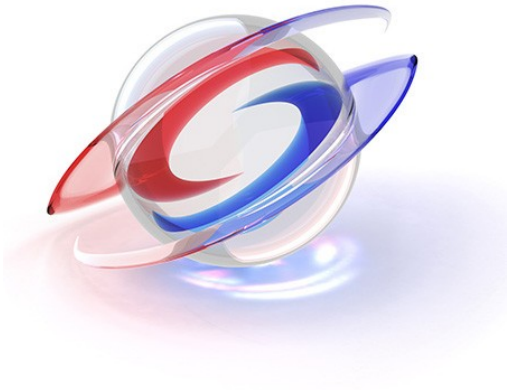
SIGGRAPH 2010

Mirror's Edge

Henrik Halen

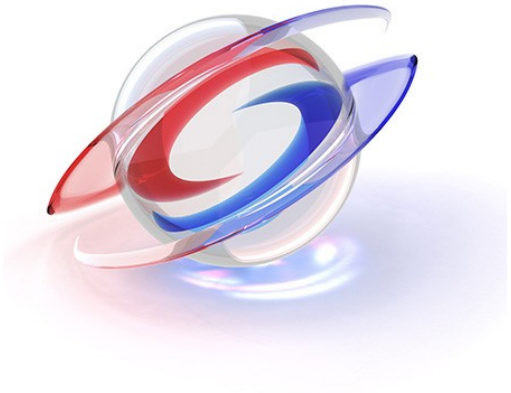
Electronic Arts

Mirror's Edge



- Action Adventure
- A new take on first person movement
  - First person free running
  - No more gun-on-a-stick
- You play Faith
  - Free running information courier

Heightened senses

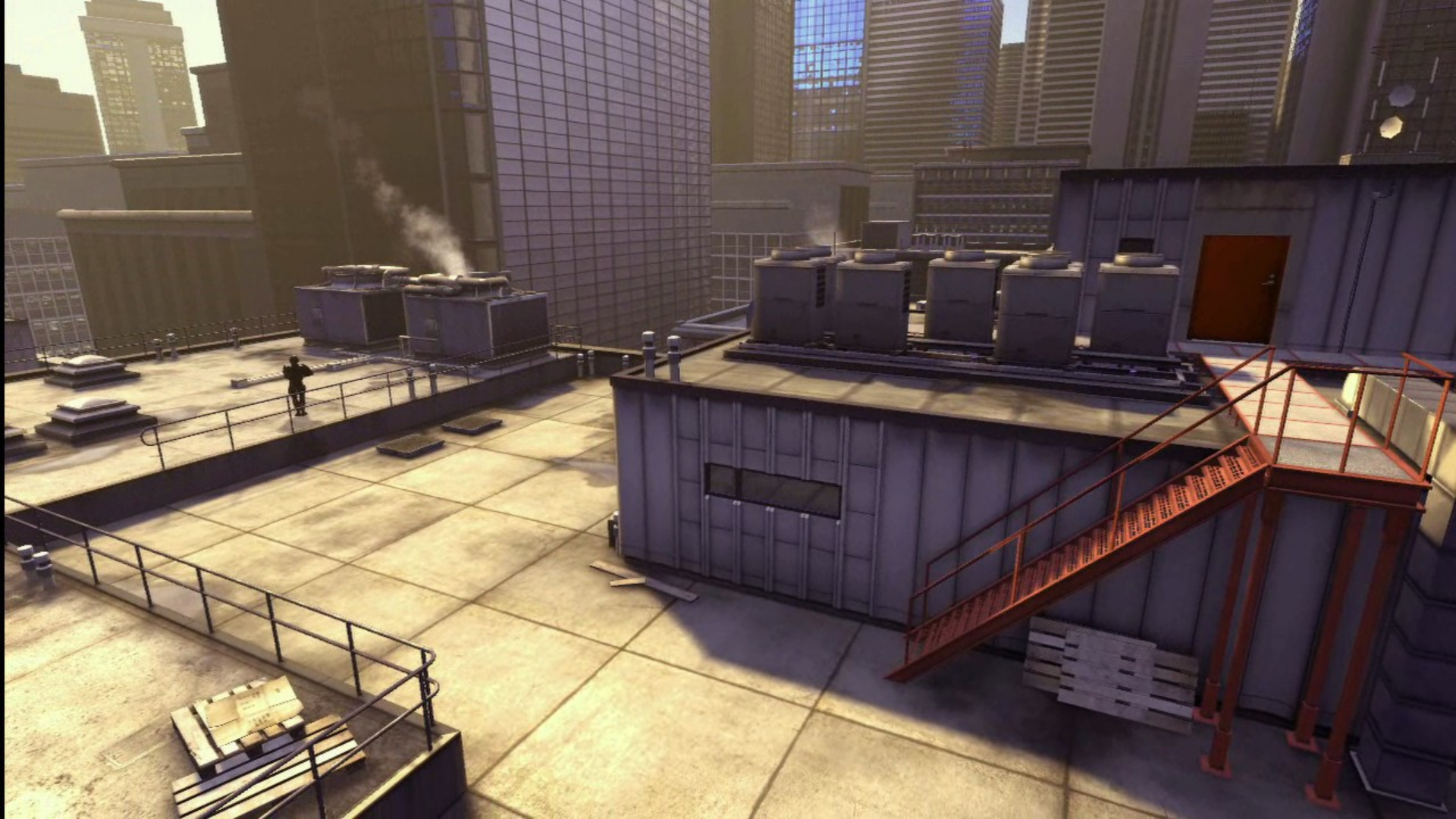


- Strong colors
- A stylized graphical simplicity
- Contrast in light and color
- Full screen effects and filters

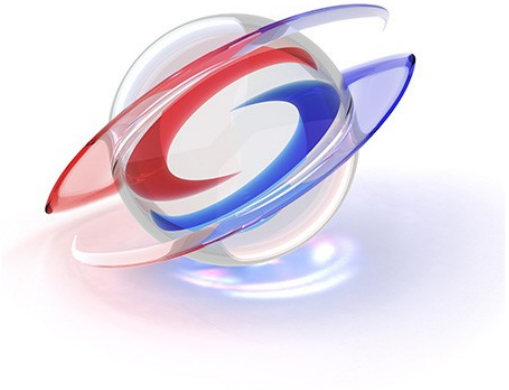
Mirror’s Edge

- Three cities
  - New York
  - Rio
  - Tokyo

NO
PARKING
HAMPTON
A
721



Tokyo



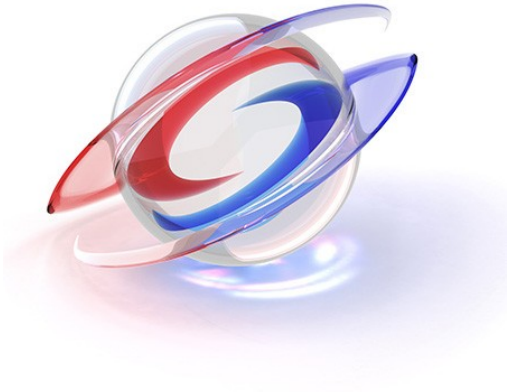
- Reference art
- One city instead of three
  - Rio, New York and Tokyo become one

都大橋

新栄開発
杉ノ郷
カントリークラブ
新栄開発

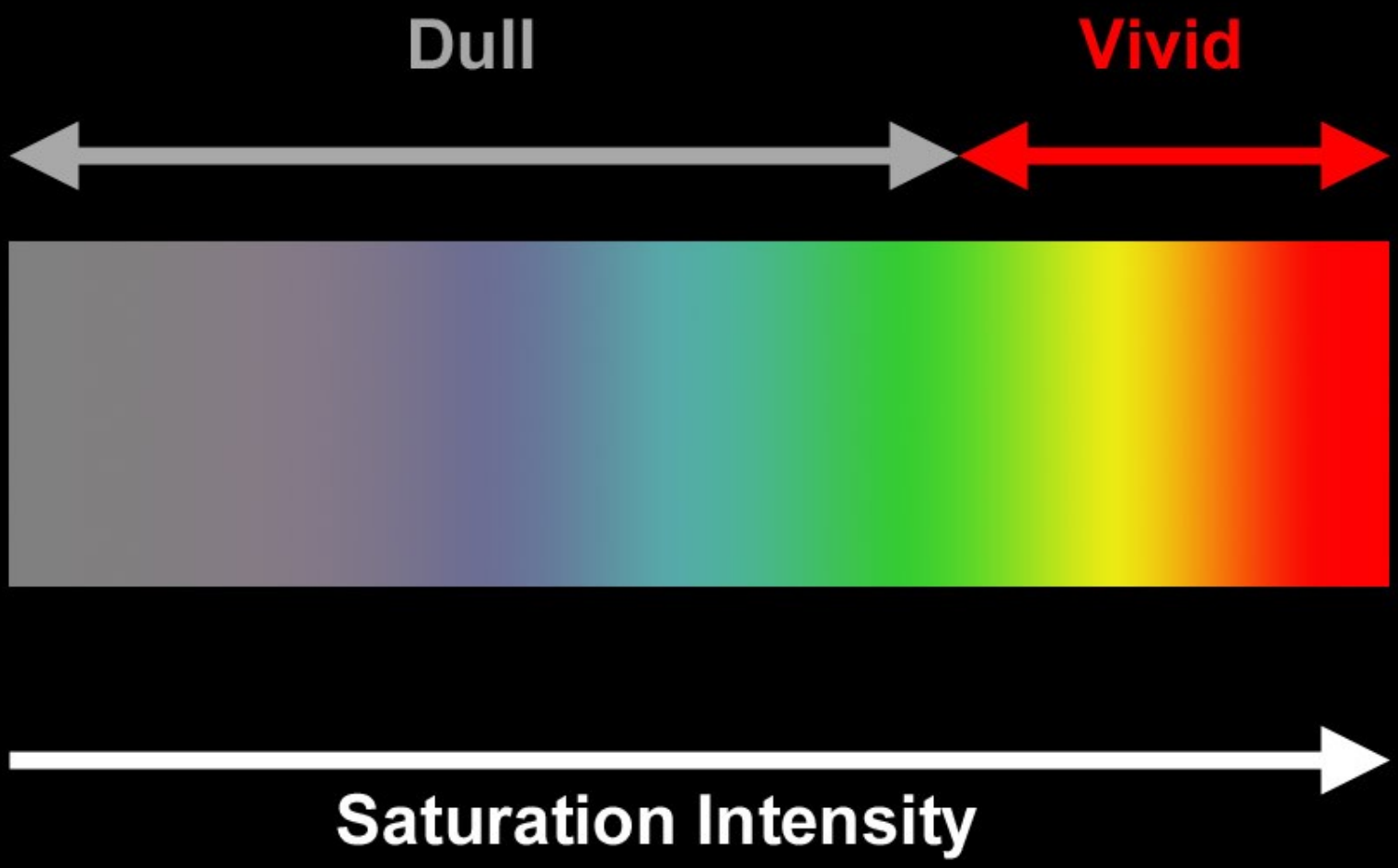
レコード針
ナガオカ

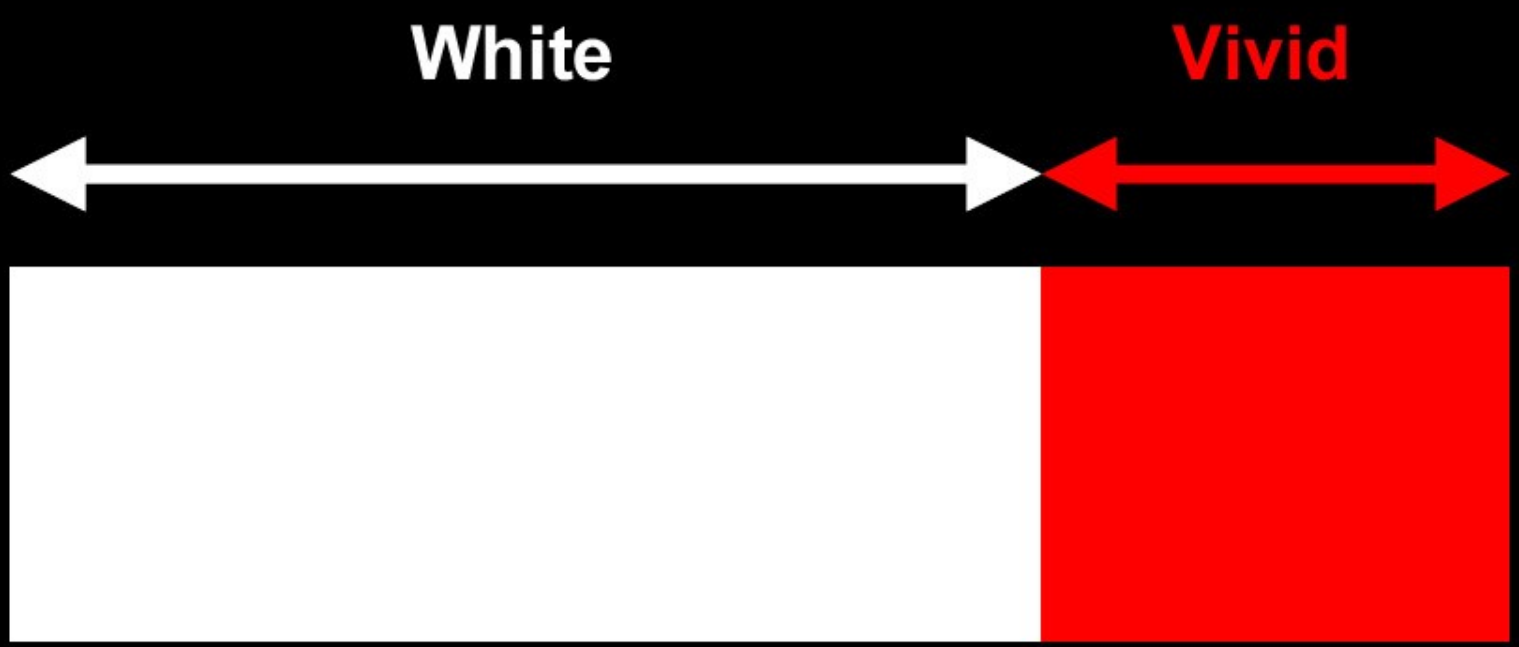
Faith color vision



- Color deficiency
- Super power

Saturation Intensity


Dull
Vivid
Saturation Intensity


White
Vivid

HAMPTON
A
721
PARKING

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A
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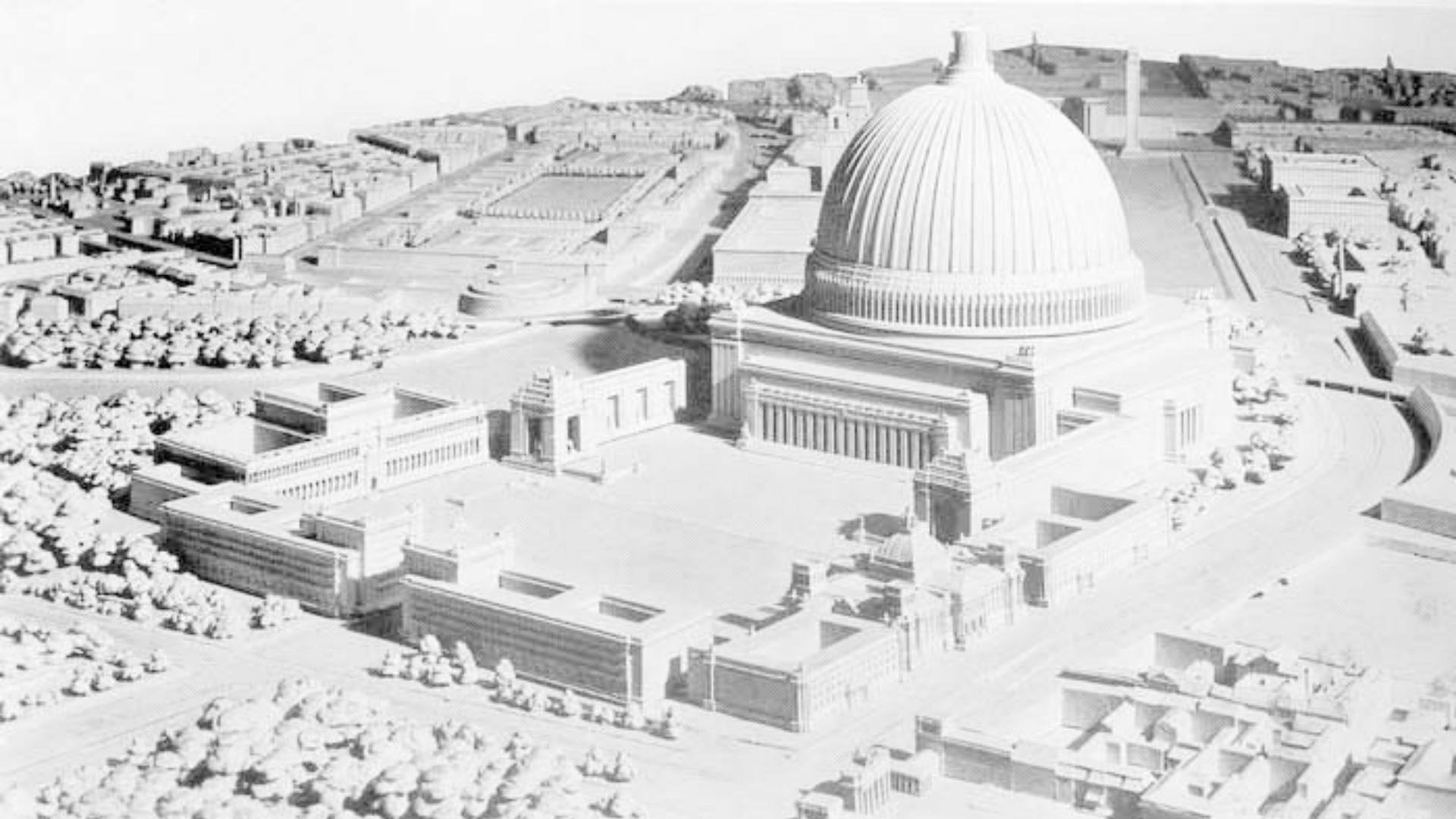

Simer
Simer

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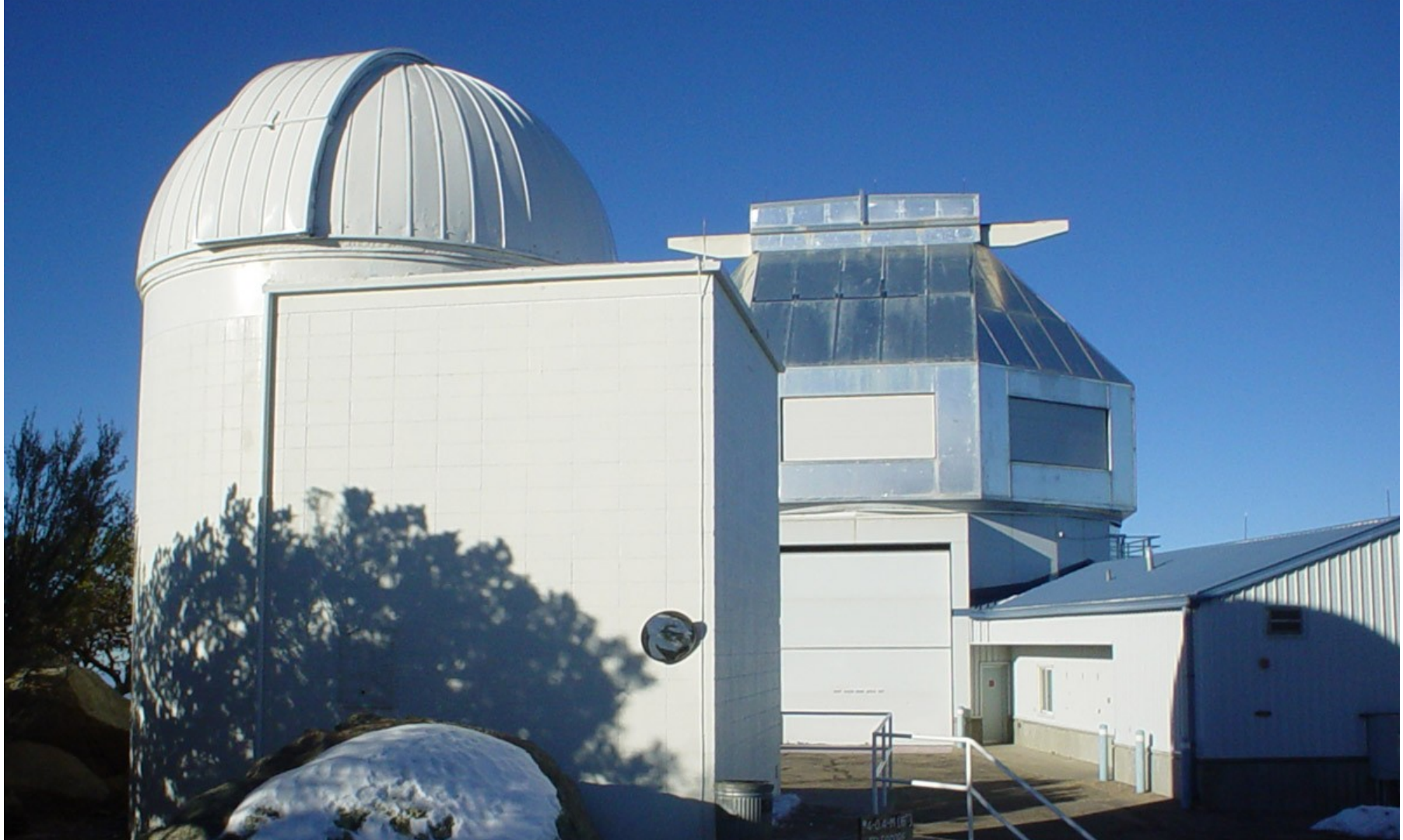
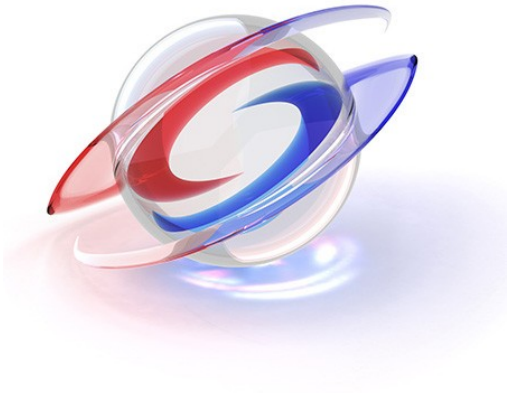
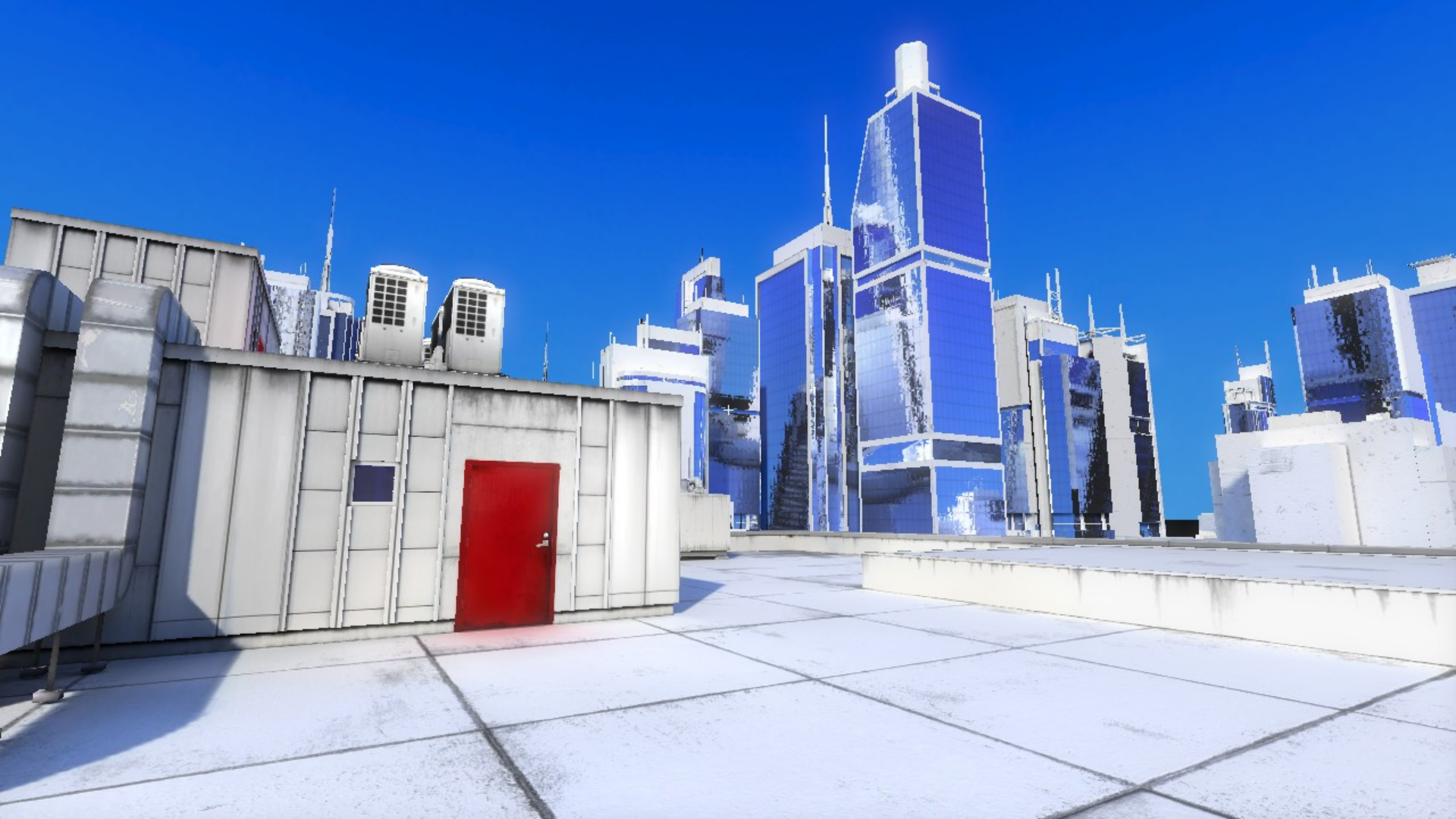
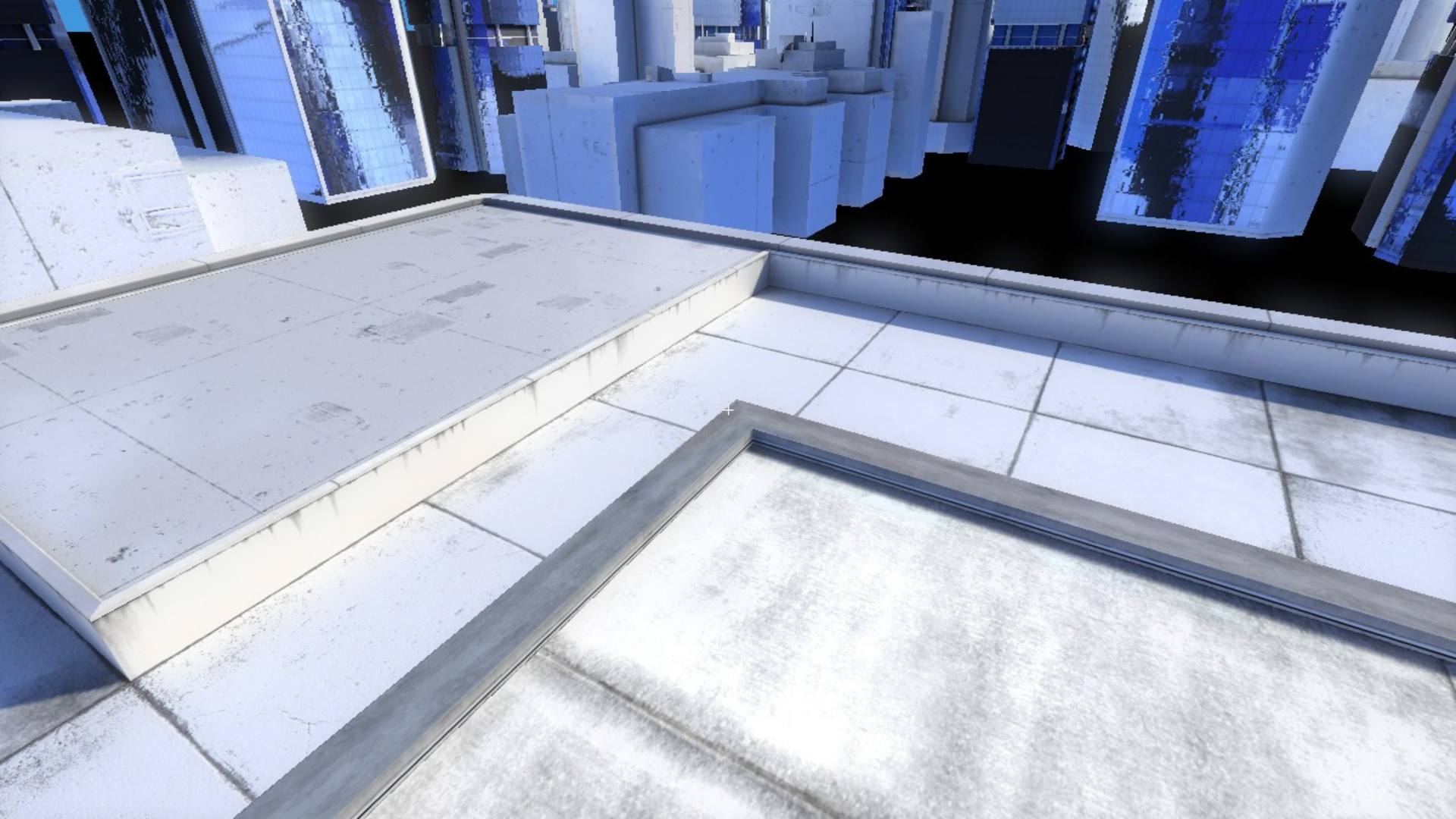


Mirror’s Edge



- New visual target
- Experimentation with color
- Fully operational beast





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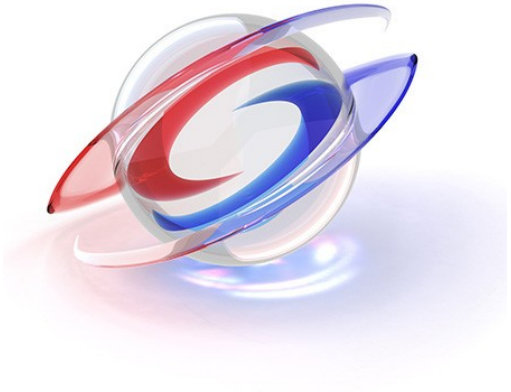
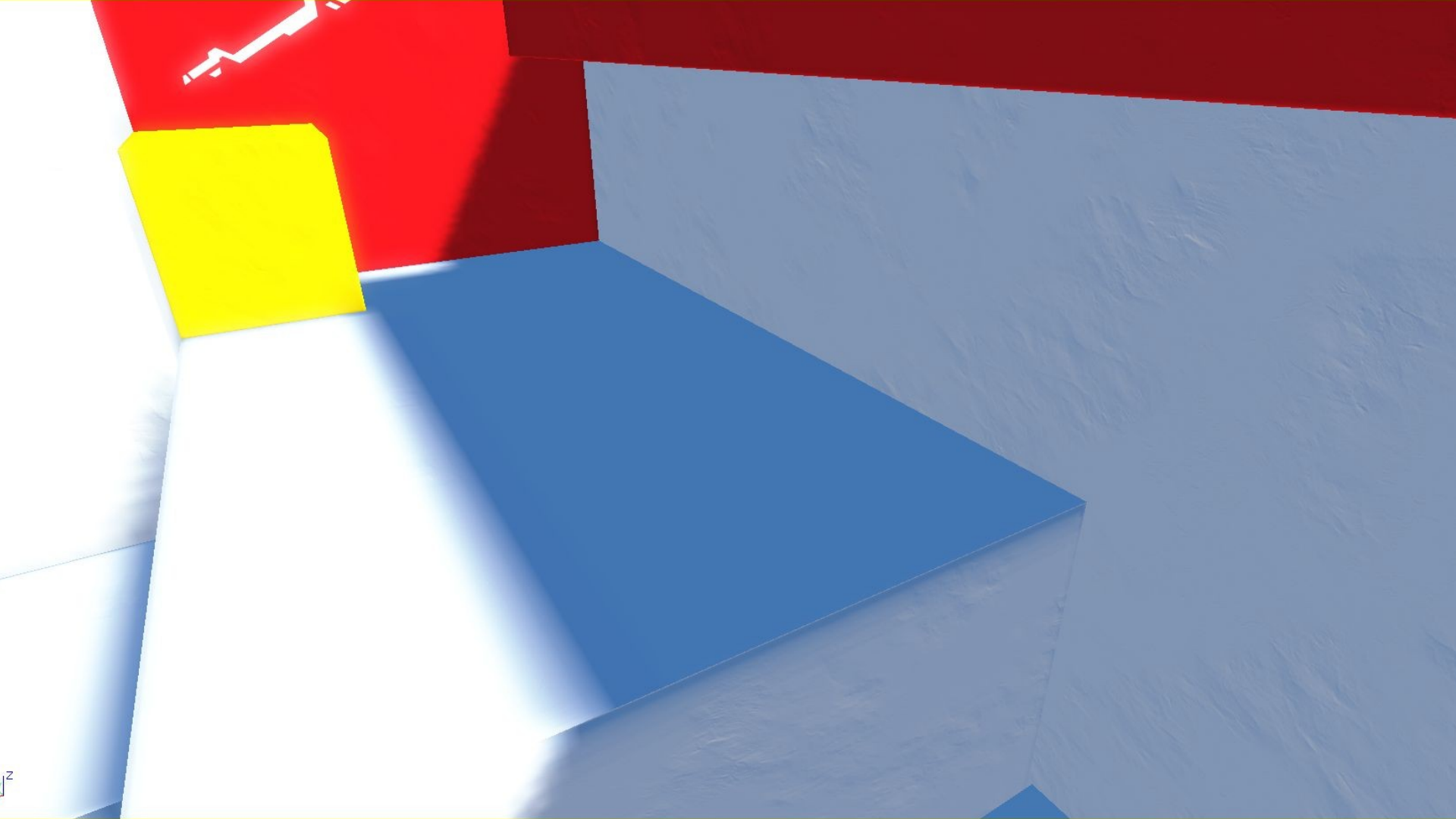
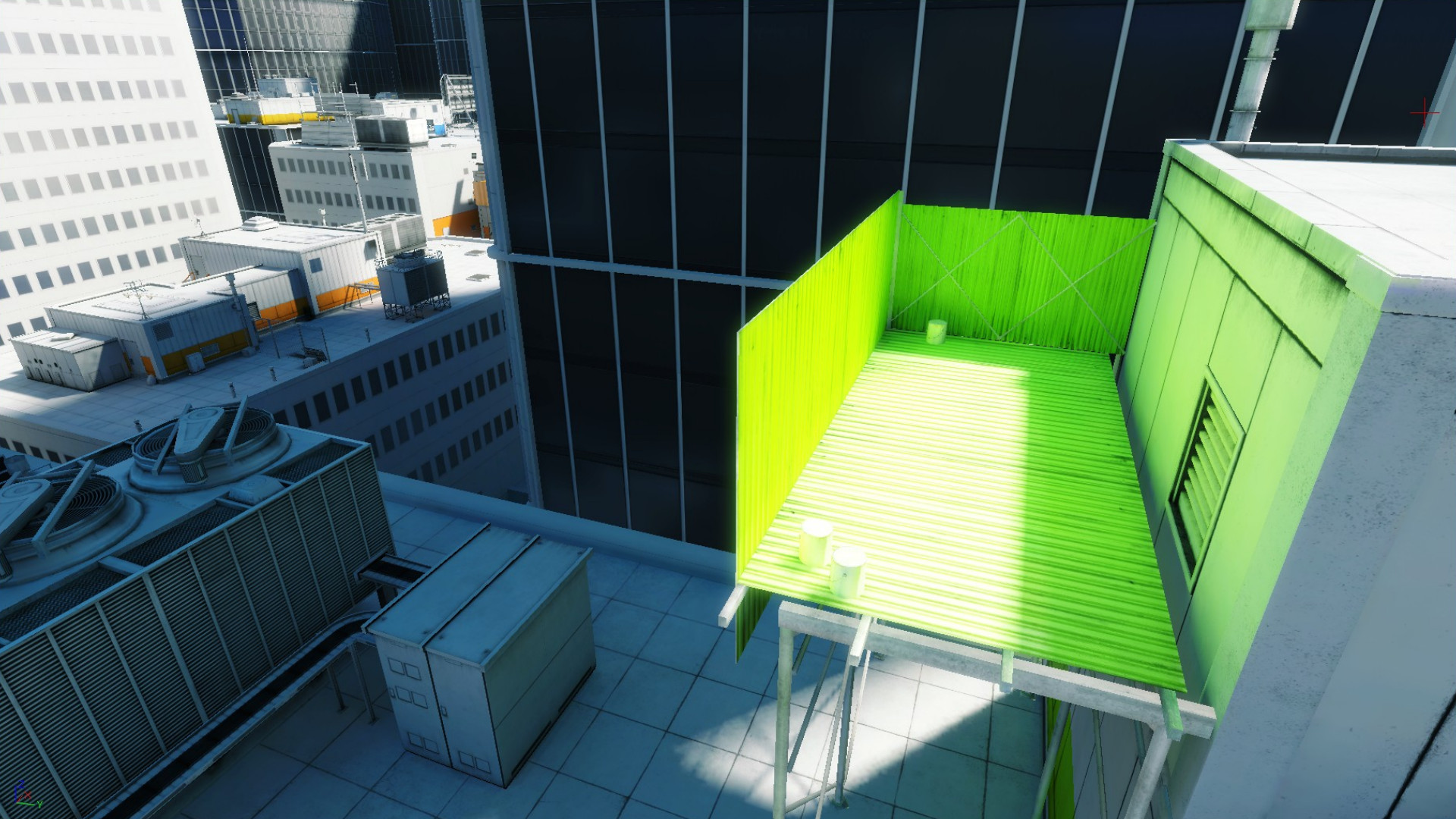
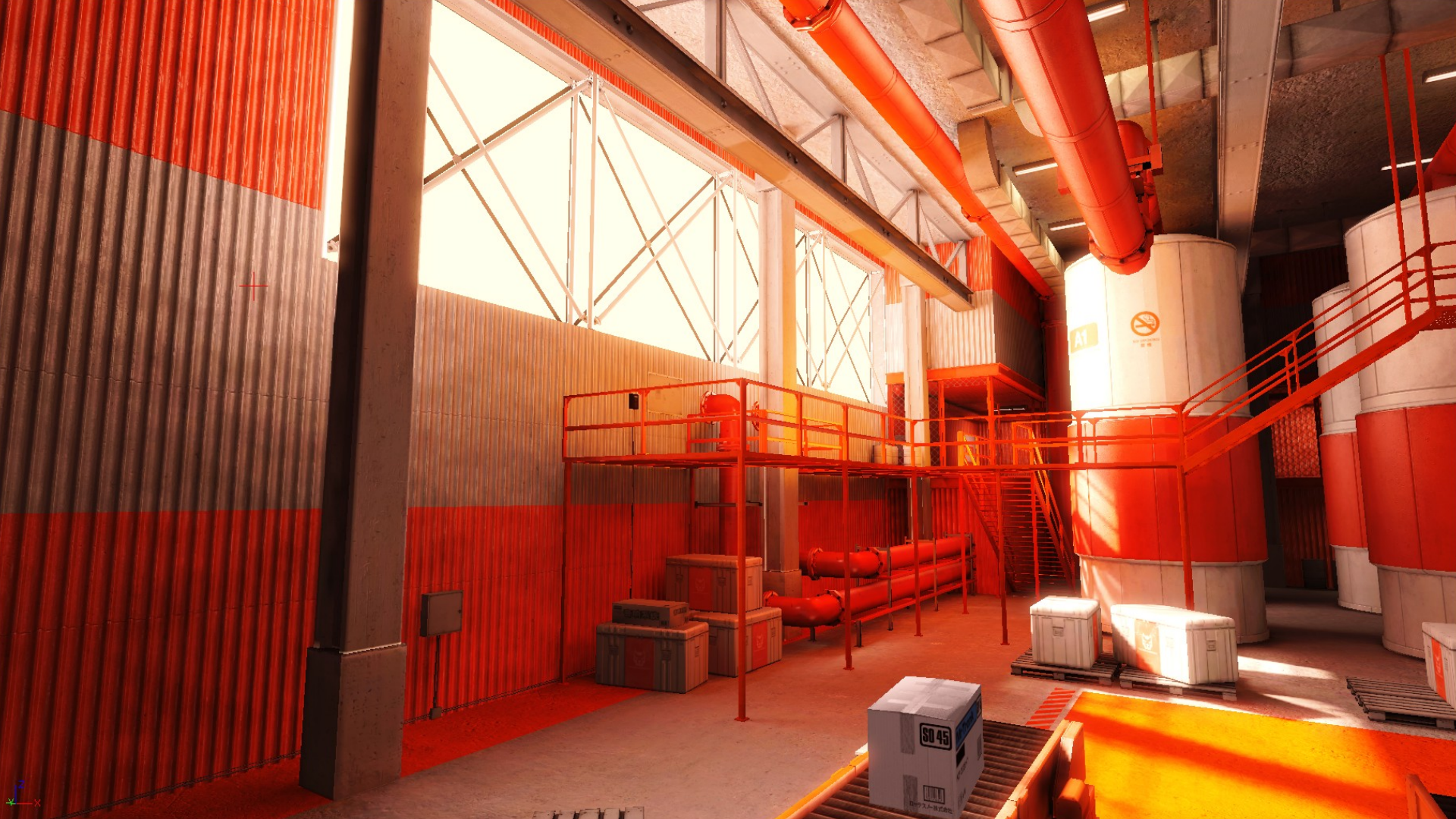


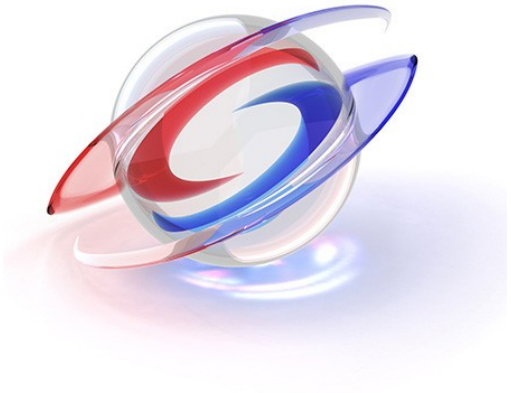
- GI
- Color balance
- Roughness, whiteness
- Runner vision





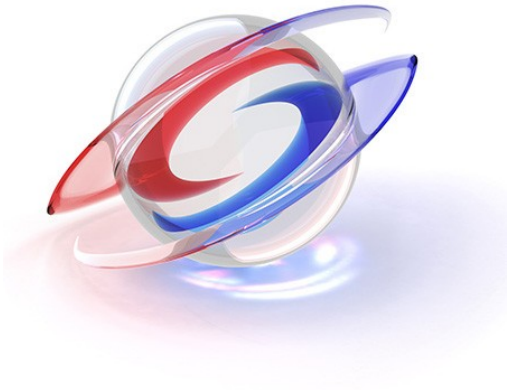

SD 45

Global Illumination



- Beast offline renderer
- Distributed
- Directional lightmaps

Mirror's Edge

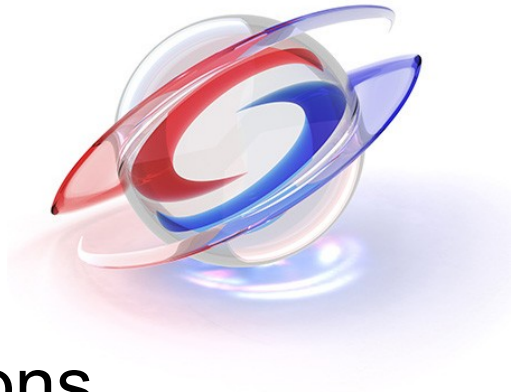


- Some stats (the Shard):
  - ~200x3 Lightmaps (1024x1024 DXT1)
  - ~15000 meshes (12000 RNM + 4000 Vertex)
  - ~2000 lights

Mirror's Edge

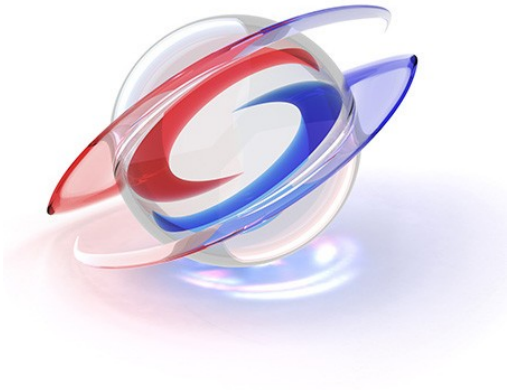
- Heavily optimized for minimum memory footprint
- Possible to distribute to workstations
- Reduce network bandwidth
  500 mb for largest levels

Mirror's Edge



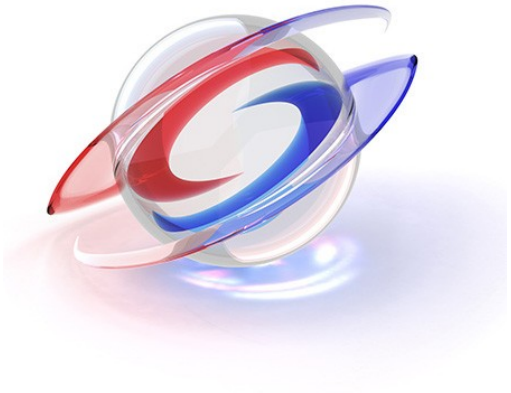
- Rendering farm. Mostly on workstations
  - 50 cores per bake
  - Efficiency depends on many factors
  - Usually 15 times faster than local

Mirror’s Edge



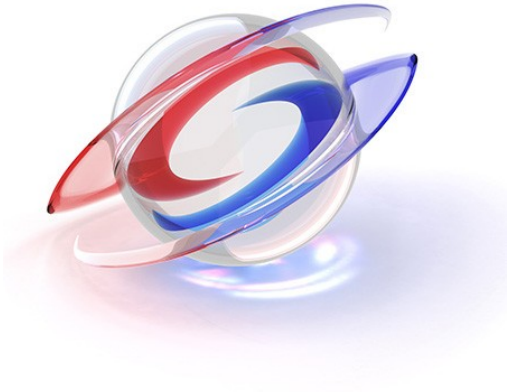
- Plan for GI renderer
  - Use renderer with small footprint
  - Or make sub levels self contained

Global Illumination

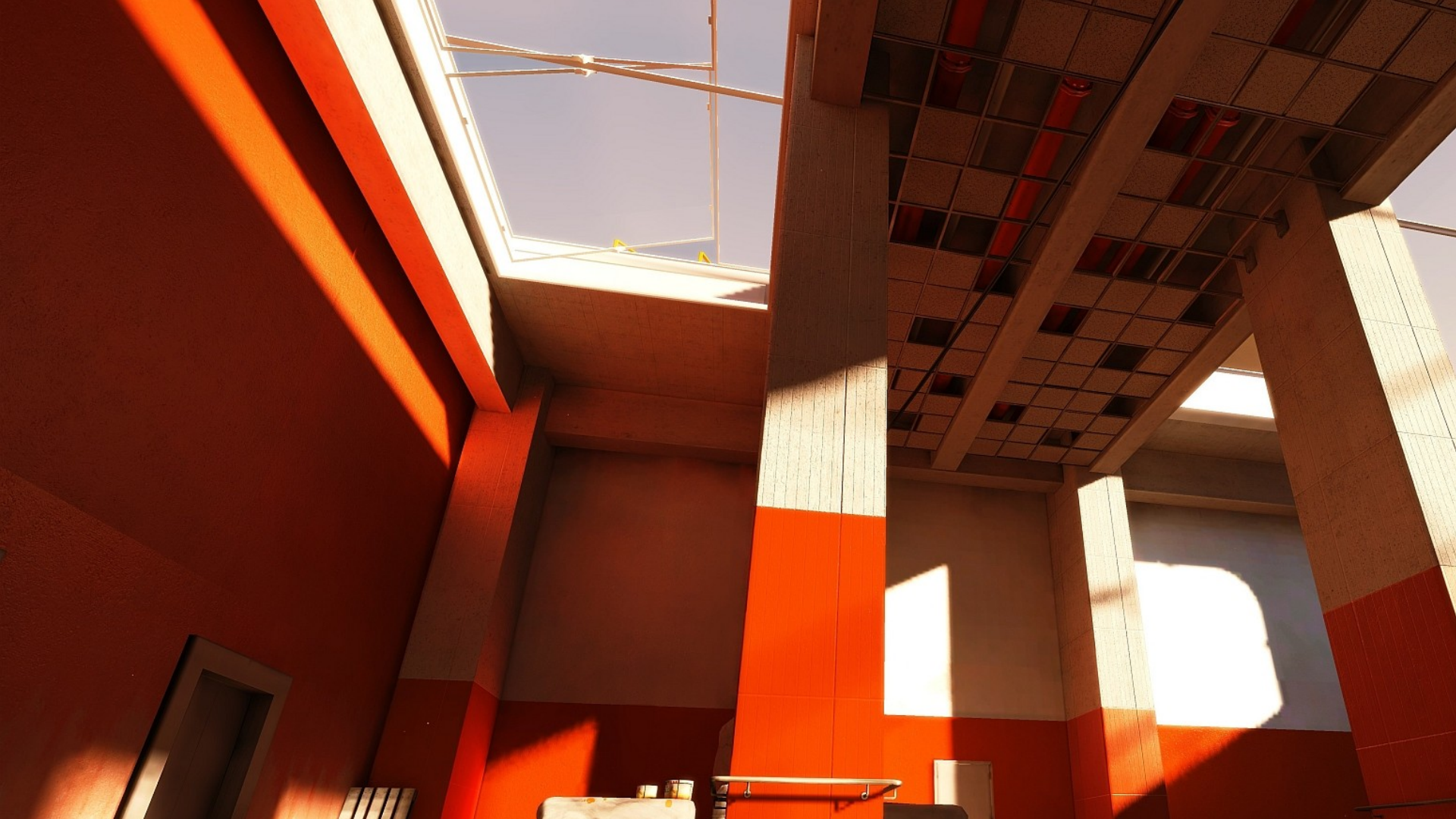


- Spend time tweaking your renderer
- Decide on algorithm
- Coherent believable impression
- Not a set of techniques or phenomena
- Fidelity is important!

White balance



- Realistic lighting
- Neutral materials
- Brain is a good
- Don’t alter the end result



Z
bunnello

bug spray
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Disintegration guaranteed. No Mess!
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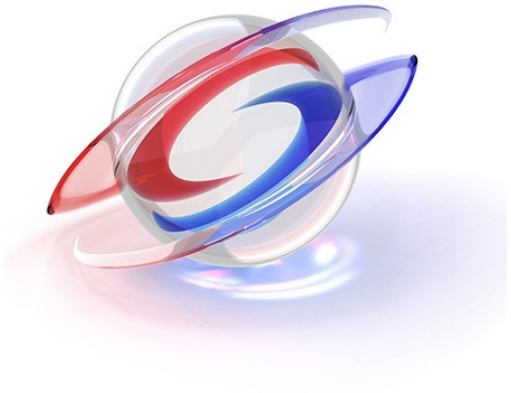
Make a
difference!
vote Pope!

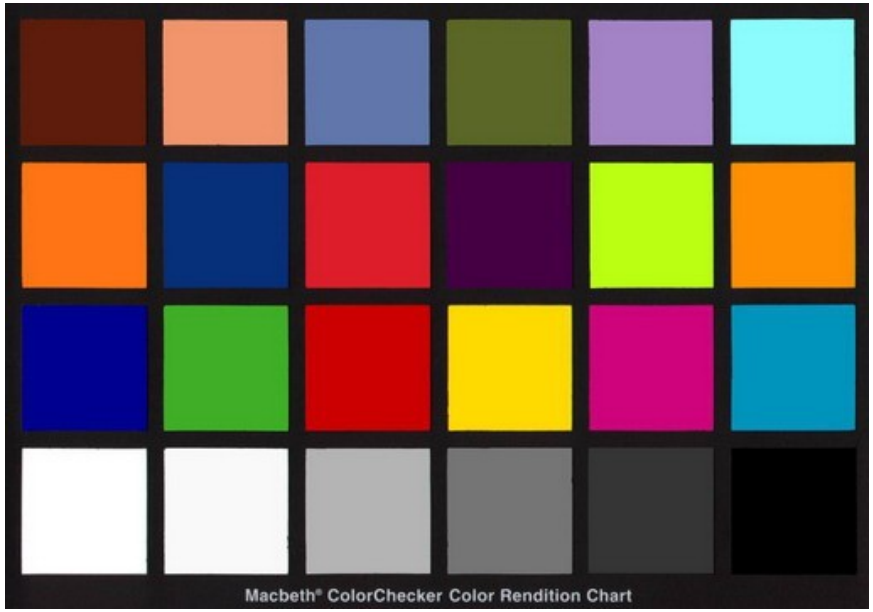
Make a difference!
vote Pope!
Make a difference!
vote Pope!

White Balance

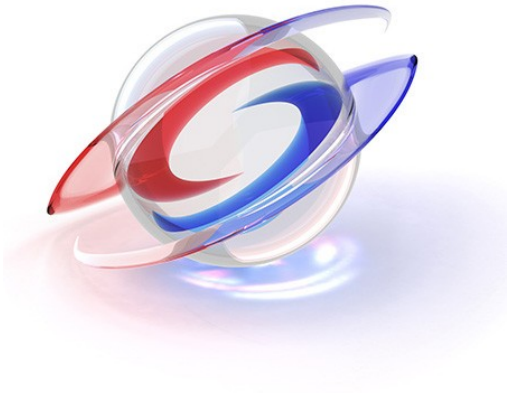


- Use neutral materials
- Decide early
- Resist tweaking individual surfaces
- Trust your lighting
- Trust the human brain!

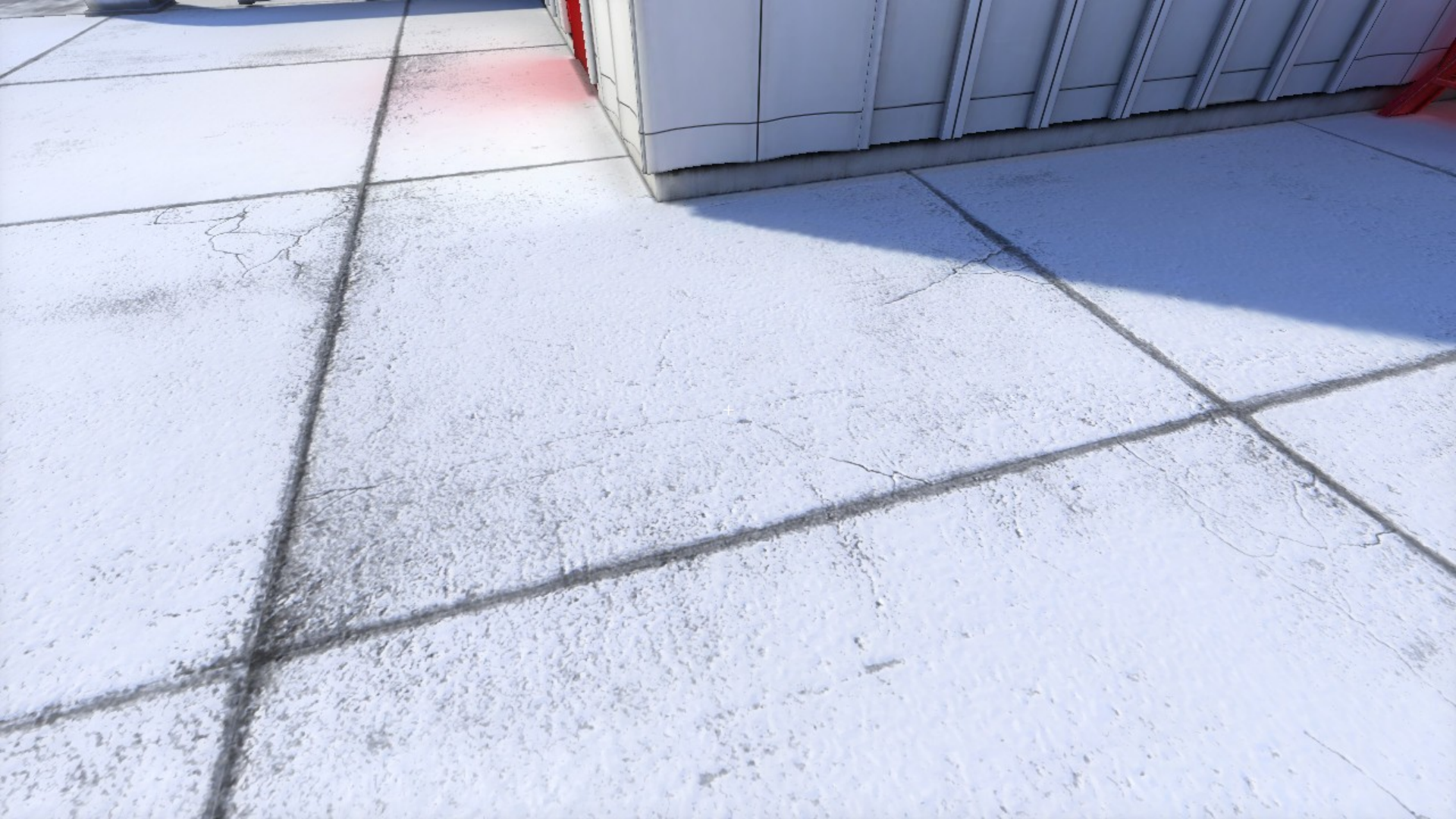
Macbeth Color Checker



Roughness and whiteness



- We want super white surfaces WITH PRESERVED DETAILS!
- Clean white surfaces look artificial
- Real life is imperfect



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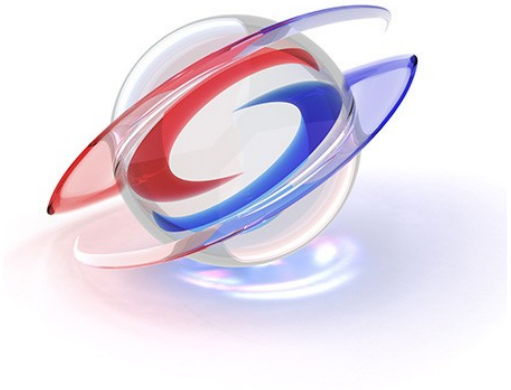
Curves

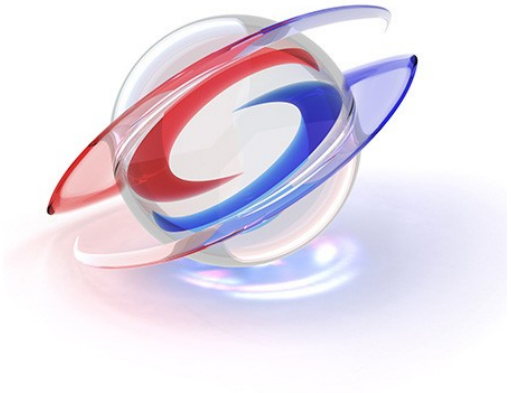
- Converted to three (RGB) curves with 16 linear segments for runtime
- Realtime in-editor preview
- Compared to cubes:
  - More GPU ALU
  - Less CPU and less data to GPU
  - Possibly more precision
  - No transformations across color channels

Roughness



- 16 segments go a long way
- Two 16 bit 16x1 RGBA textures sent to GPU
- Segment lookup with color as UV
- Interpolation between sets of curves on CPU
- Result always continuous
- Easy and fast to add curves
- Allows for smooth transitions and effects

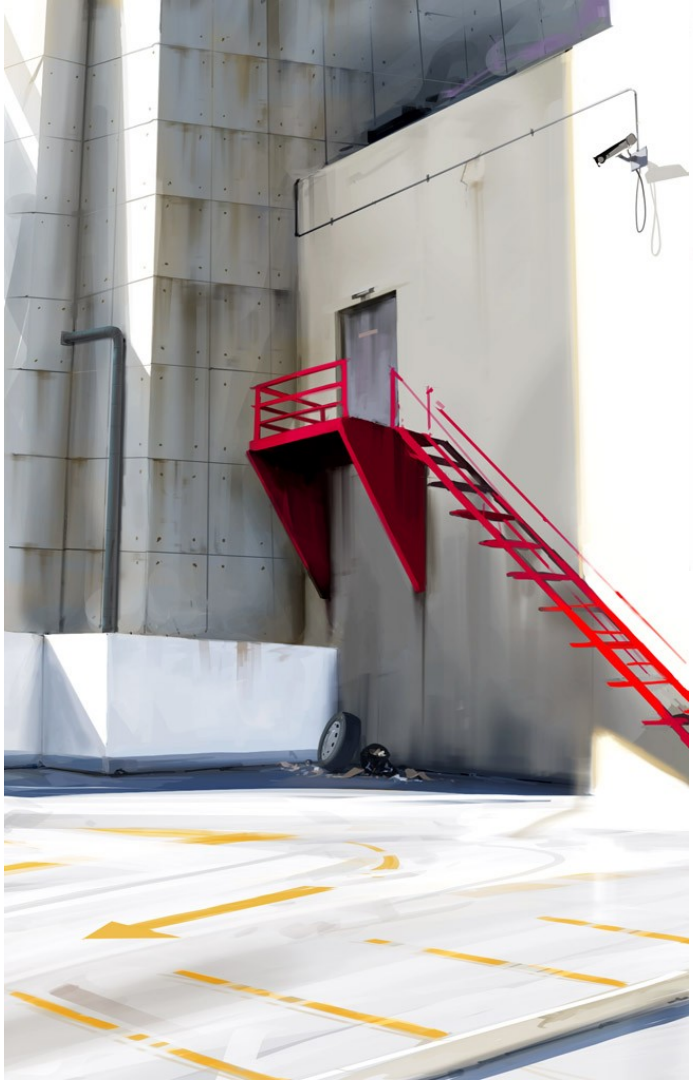
Heightened senses



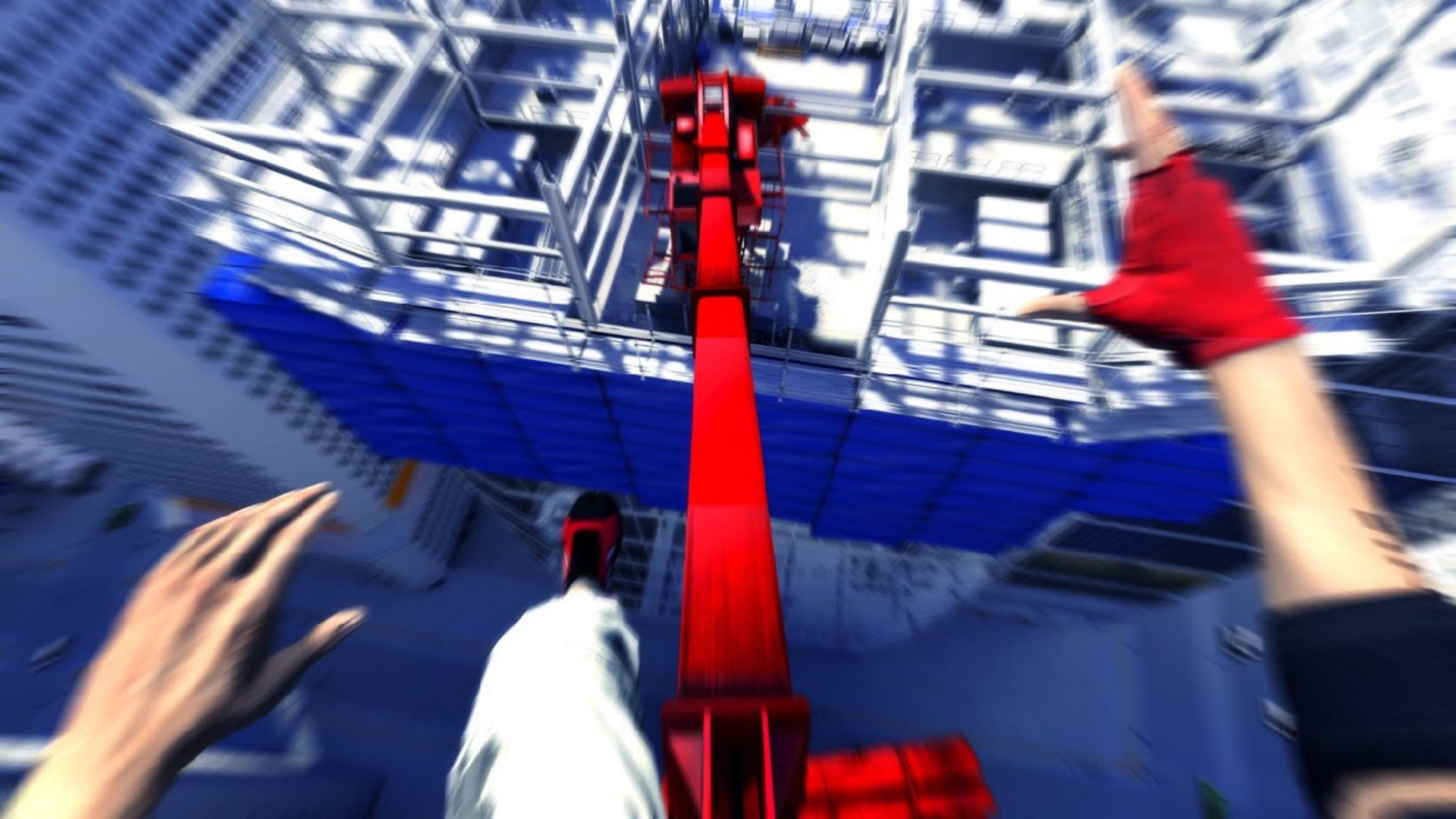
- Sound
- Body
- Runner vision
- Red guides player

Embody the Character

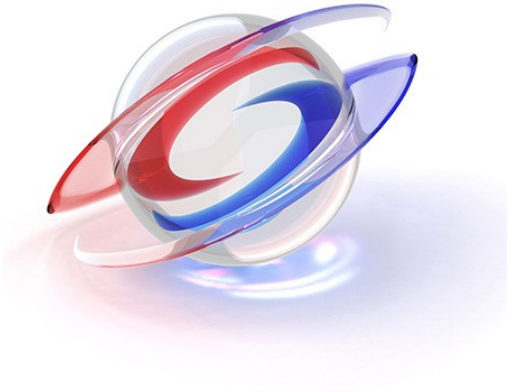
- Feel like you are part of the body
- Breathing
- Sound of air with speed
- Footsteps, hand impacts etc
- Camera movement



VULPES
VULPES



Interiors



- Stronger colors
- Less white

禁煙室