

Bringing **RADIANCE** Power to the people

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** pdf version, some images differ from original presentation **



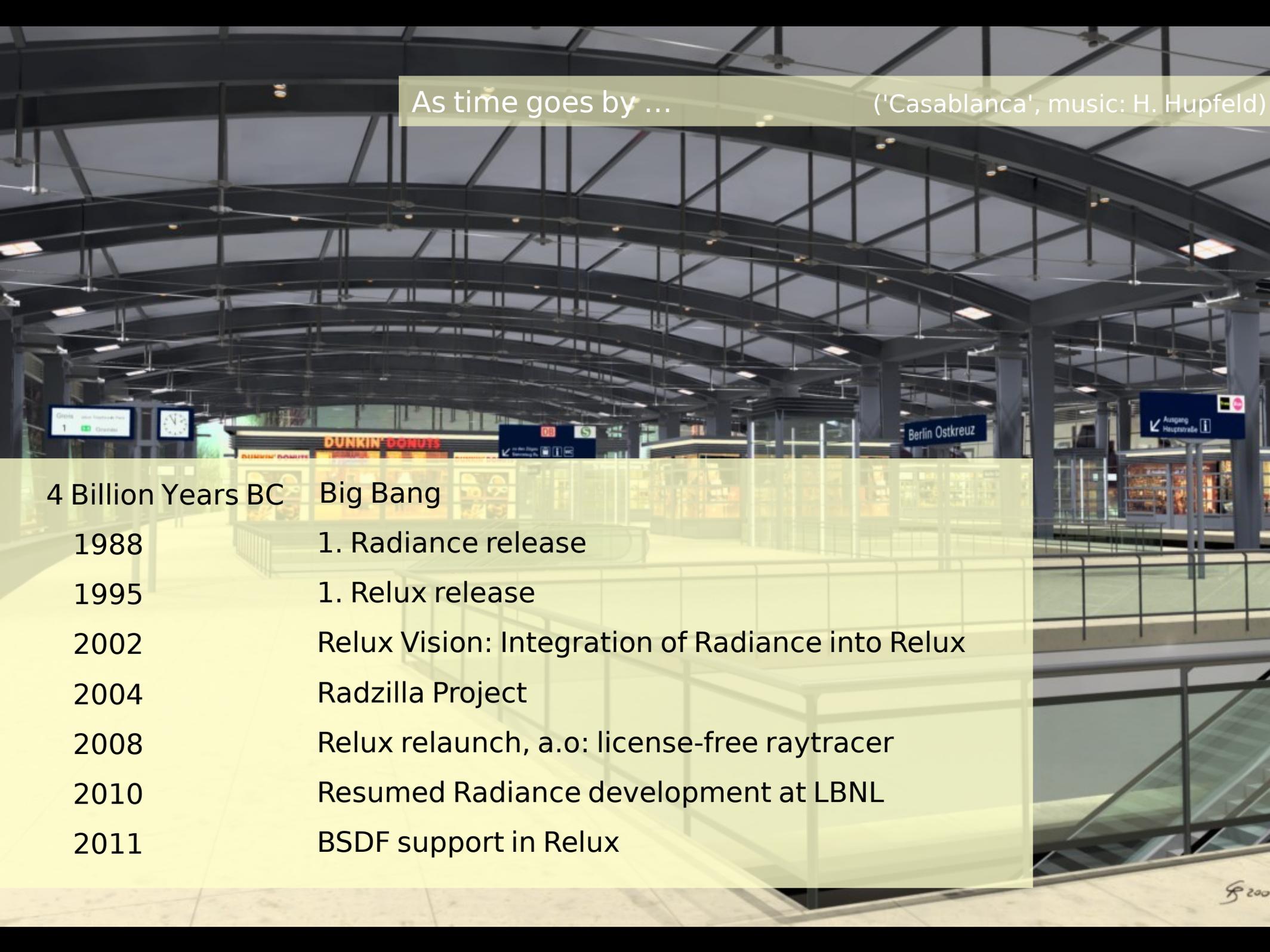
The Good



The Bad & the Ugly

As time goes by ...

('Casablanca', music: H. Hupfeld)

- 
- 4 Billion Years BC Big Bang
 - 1988 1. Radiance release
 - 1995 1. Relux release
 - 2002 Relux Vision: Integration of Radiance into Relux
 - 2004 Radzilla Project
 - 2008 Relux relaunch, a.o: license-free raytracer
 - 2010 Resumed Radiance development at LBNL
 - 2011 BSDF support in Relux

One Step beyond ...

(Madness)

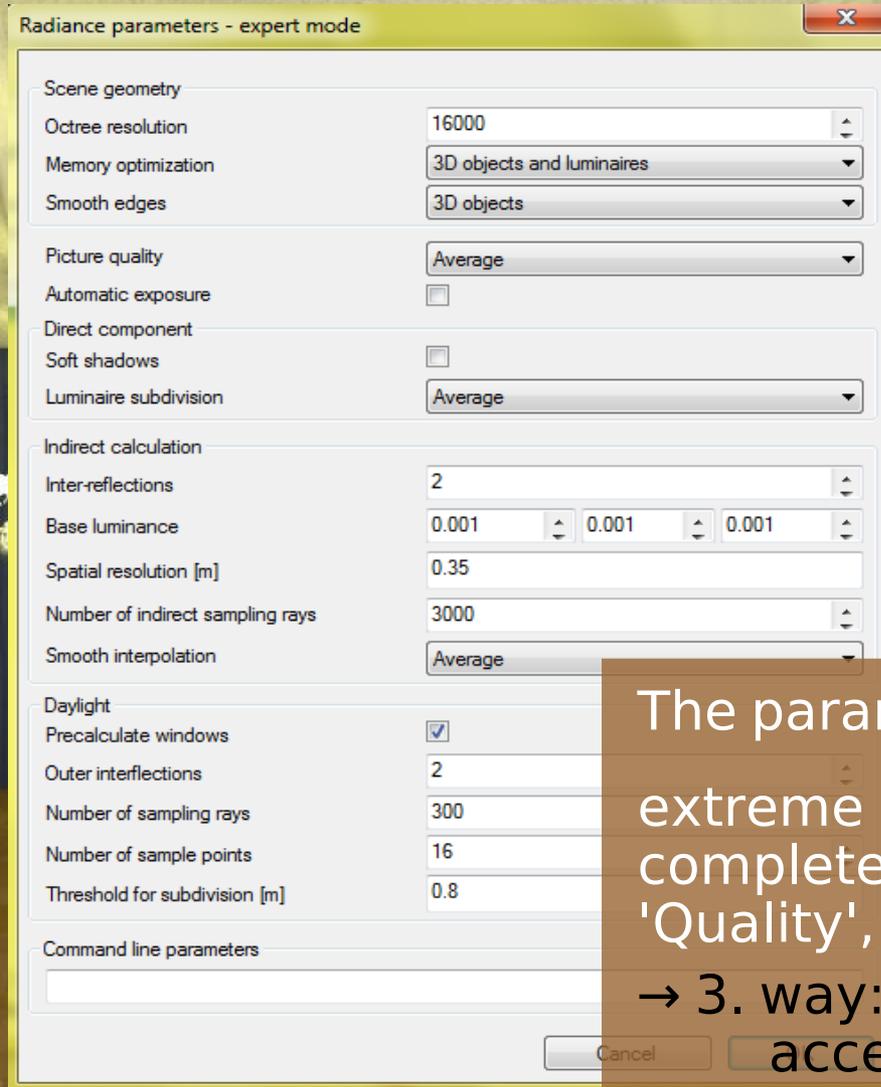
Different user group, different tasks, different framework,
different demands ...

So bringing RADIANCE power to the people needs:

- interface, guidelines, manual
- 'peripheral' changes, enhancements of existing functionality
- new modules, new features

We're absolute beginners ...

(David Bowie)



The parameters :

extreme 1)

complete shielding, use only 'Quality', 'Variability', etc

→ 3. way:

access to a small selection with most important & most intuitive ones accompagnied with automatic settings of others

extreme 2) complete access to all

We don't need no education ...

(Pink Floyd: 'The Wall')

M ... The Raytracing Manual

roduction into the Raytracing method for
rs without academic background

THE RAYTRACING METHOD

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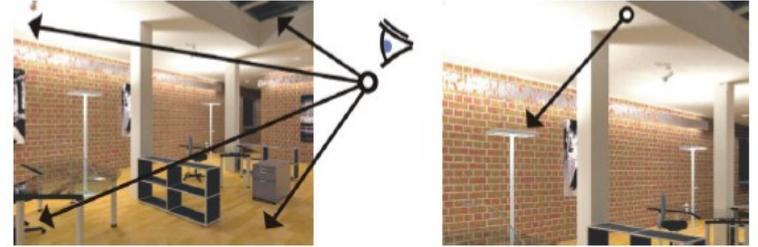


Fig. 3 Raytracing scenarios: examples for ray starting points

Primary view rays emitted from the observers point of view (left) and shadow testing rays sent out from points within the scene.



Fig. 4 Raytracing scenarios: examples for varying numbers of rays

Indirect sample rays for determining the surrounding luminance (left, see chapt. 5) and a bunch of shadow testing rays to simulate penumbras (right, see chapt. 4).



Fig. 5 Raytracing scenarios: examples for ray continuation

Several bounces of rays for the diffuse indirect illumination (left, see chapt. 5) and pursuing rays through transparent objects (right).

The 3 knowledge gaps of lighting simulation:

- 1) the lighting (physics) gap
- 2) the daylighting gap
- 3) the (lighting) simulation gap

A nighttime architectural rendering of a modern building with a brick facade and large windows. The building is illuminated from within, and the windows reflect the interior lights. In the foreground, there is a water feature with a concrete edge and a small fountain. The water is dark with ripples, and the surrounding area is lit with warm, yellow lights. The sky is dark, and there are some trees in the background.

Get your motor running, head out on the highway ... (Steppenwolf: 'Born to be wild')

Give it into the hands of everybody, from newbie to experienced. Various enhancements ensure robustness, usability and a better connection to Relux:

- multidim. scaling
- error codes (for translation)
- RTM mesh optimizations
- status message output
- etc.

Mirror, mirror, on the wall, who's the fairest of them all? (Cinderella)

Stray specular rays & Gaussian model:

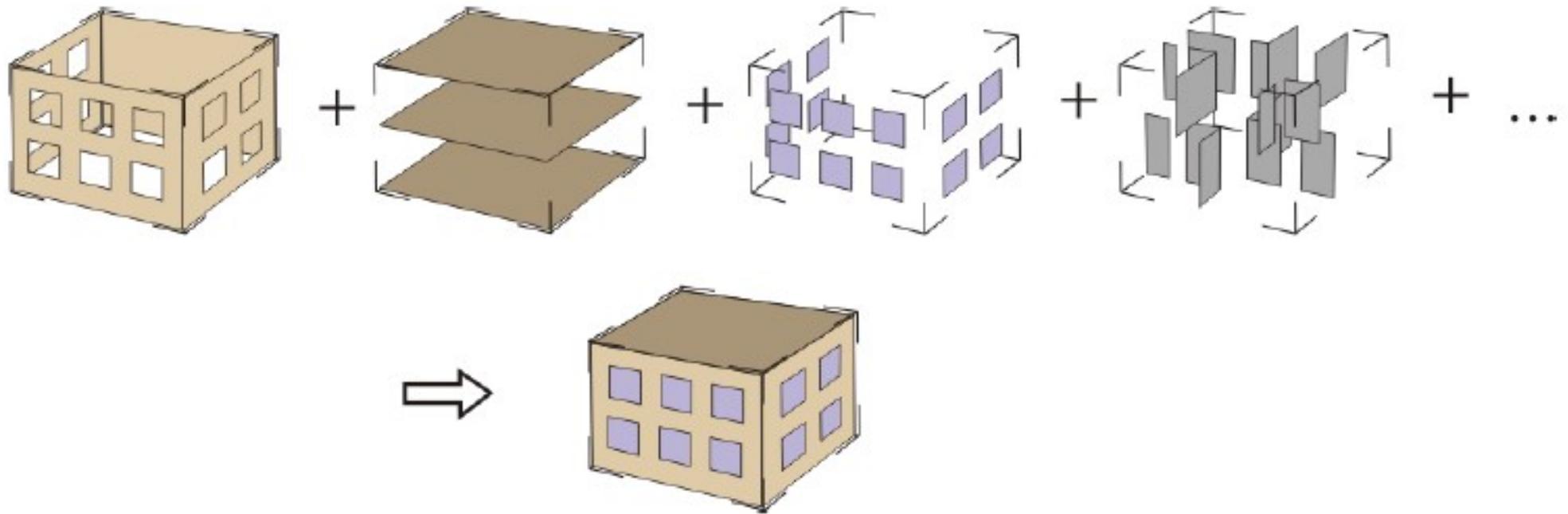
Correct appearance of reflexions on surfaces with roughness > 0 also for light/glow/illums.

- somewhat tricky to implement without overcounting
- switch between raytracing and Gauss model dep. on angular threshold



Wir können peepen bis es piept...

(Die Ärzte)

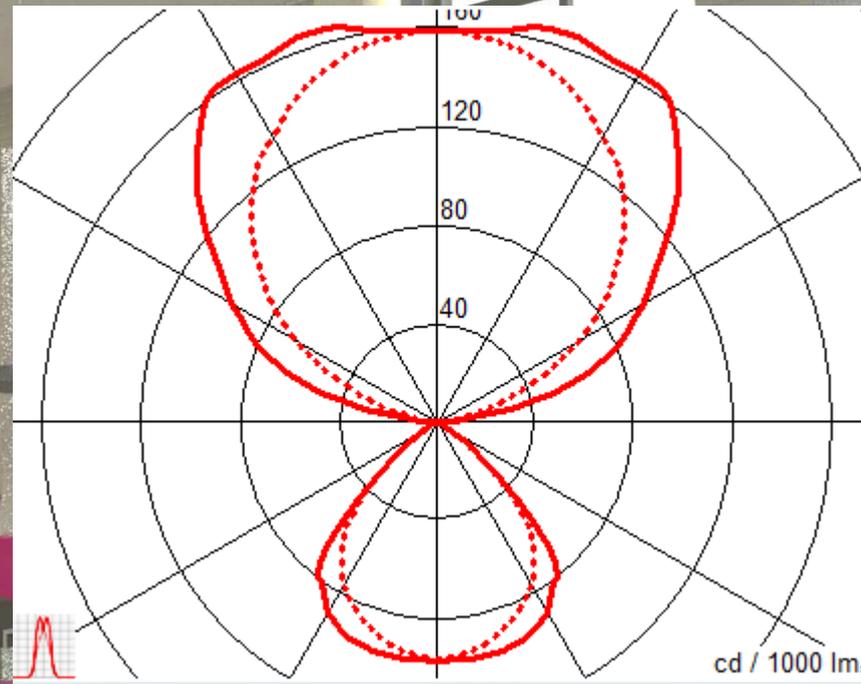


The 'overlapping bounding box problem':

- peeping into the octree of instances/RTM meshes needed to increase robustness in scene setups with instanced geometry

Don't touch the light ...

(Accept)



New luminaire model (NLM)

Special primitive family based on RTM mesh or instance for fixtures with 'measured geometry'

Accompanied by some optimizations in shadow testing & partitioning.

Take nothing less than the second best .

(Curtis Mayfield, 'Move on up')

The 'direct cache' (radiosity approximation)

- presented in RW 2002 & 2004.
- proved itself an important and reliable 'workhorse' for usual Relux scenes.





No need to ask he's a smooth operator ...

(Sade)

The ambient calculation as continuous construction site.

- more self-adaptation capabilities
- experimental 'smooth interpolation' feature (first try, needs improvement):
- curr. working on a comprehensive revision

The window precalculation:

- changed data output to classic luminaire LDC format with C-planes & g-angles
- improvements to produce smoother LDC appearance for standard scenarios with much fewer sample points & directions

Aquarius - Let the sunshine in ... (from 'Hair')

Properties

Designation

X [m] 0.45

Y [m] 2

Width [m] 1.25

Height [m] 0.8

Material / texture

35 Lumitop	100%
16 defaultGlass	74.4%
32 defaultGlass	70%
35 Lumitop	100%

Pollution Attenuation factor 0.9

Additional geometry (raytracing calculations only)

Window geometry2

Number of elements 7

Distance between the elements [m] 0.4

Wall element

Help Close

- New: BTDF materials (data measured at LESO/EPFL)
- simple usage, select from material database
- problem: visualisation
- depends on participation of manufacturers

I'll be back ...

('The Terminator' , A. Schwarzenegger)

Tentative outlook:

- improved material models (cf. pres. By PAB & D. G. Moroder)
- re-vitalize broken features (e.g. classic 'mist', radzilla 'scene')
- self-adaptation capabilities ('auto' mode for parameters)
- replace stochastic with deterministic techniques

The End