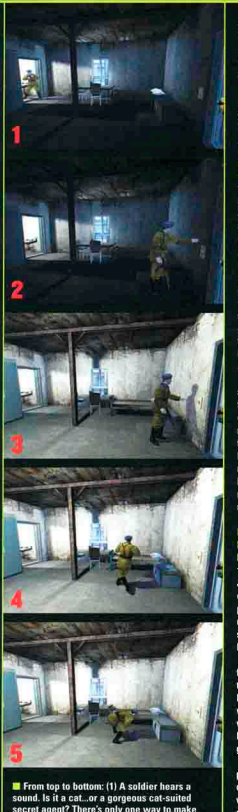


■ From top to bottom: (1) A soldier hears a sound. Is it a cat...or a gorgeous cat-suited secret agent? There's only one way to make sure. (2) It's dark, so he immediately heads toward the nearest light switch and turns it on. (3) Now that he can "see" clearly, the guard searches the room to find the source of the noise. (4) Looking for options, he slowly scans the room for possible hiding spots as well as objects to interact with. (5) Peekaboo — Cate's not there! Guess it's time for a coffee break.

world itself as well as its contents. *[John gave a fascinating (and huge) description of a gameplay situation that had the AIs reacting on-the-fly to a variety of events. Read the full transcript at* www.pcgamer.com. *— Ed.]*

We've designed our systems so that we can essentially "wind it up and let it go." The emergent gameplay is determined by the circumstances of the setting and the actions of the player.

PCG: What are the practical limitations and issues you face trying to create "realistic" AI in game worlds?

JO: There are many layers to understanding our surroundings that we typically take for granted. Our first attempt at autonomous characters exposed some oversights. For a simple example, AIs with the Work Goal are attracted to sit down and work at Desk SmartObjects. Initially we ran into a problem wherein one AI got up from his desk to use the bathroom, and then another AI would notice an open desk and immediately sit down and start working. We needed to teach our AIs about ownership, so that AIs understood that one desk belonged to one AI (at least until death do us part), the way things usually work in the real world.

We also took for granted the human understanding of purpose. When AIs are alerted, reinforcements will run in and possibly engage in combat. If the player gets away, the reinforcements will either leave, or take the place of a fallen ally, guarding, working, or patrolling. Initially we ran into a problem wherein reinforcements would come in and notice that a scientist had been killed and left a vacant microscope. The reinforcement would then proceed to do some research, which seemed odd for an armed soldier!

PCG: How closely do you work with the level designers to ensure that realistic behaviors will be visible to the player?

JO: Very closely. The process consists of rapid cycles of brainstorming, implementation, and play-testing. AI systems by their nature are unpredictable, so the trick is to fine-tune them to strike a balance between control and chaos. Level Designer feedback is key in this process.

Ideally, Goal-driven autonomous AI should free Level Designers from needing to spend their time writing scripts for individual AI. Instead, the designers' job is to pack the world with opportunities for the AI to showcase their various behaviors. When Engineers provide Level Designers with the control they need, truly emergent gameplay is born.

A player can trip an AI with a banana peel, pick up his unconscious body, and throw him in a closet on the other side of the level. The AI will wake up dazed, look around for the attacker, and alert his allies that he's suspicious. If his allies join the search and find nothing, they will assume he was crazy and return to their relaxed behaviors napping and smoking cigarettes.

PCG: Which comes first: the game ideas for new weapons and gadgets, or producing the AI routines?

CH: It's an organic process. Designing a game is very much like outlining a novel: You have to decide what sorts of challenges your hero must overcome to achieve his or her goals. You can't really settle on the challenges if you don't know what tools the hero will have at his or her disposal. Likewise, you can't decide on the tools if you don't have a concept of the sorts of obstacles the hero will face.

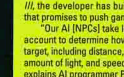
In practice, there ends up being a lot of give and take. Sometimes weapon concepts necessitate specific AI behaviors. Sometimes AI behaviors lead to weapon concepts. The banana is an excellent example of the latter. Someone had proposed having NPC patrols randomly and very occasionally trip and fall, which led to ideas about how the player could interact with the environment to create conditions that would cause NPCs to slip. From there, the logical next step was to add a banana to the player's arsenal.

PCG: What are the next-step possibilities for game AI? What kind of actions and activities should we expect to see in games like *NOLF 3*?

JO: *NOLF 2* has given us a crash course in developing autonomous characters and emergent gameplay. The next step is to build on our technologies to expand the gameplay possibilities.

Eventually, SmartObjects could allow AIs to use any object as a weapon or to make clever use of their surroundings. AIs would perhaps be able to cause fires, throw dishes, perform flying kicks by swinging on rafters, or hoist each other over unreachable walls. In addition to basing Goal selections on visual and audio stimuli, AI might also eventually choose Goals based on their feelings toward other characters, on their current emotional needs, or their long-term individual desires.

Thief III



DEVELOPER
Ion Storm

PUBLISHER
Eidos

RELEASE DATE
2003

ION STORM BILLS ITSELF as the "home of the immersive simulation." For its action/RPG *Thief III*, the developer has built a custom system that promises to push game AI to new limits.

"Our AI [NPCs] take lots of factors into account to determine how well they can see a target, including distance, line-of-sight, occlusion, amount of light, and speed and size of the target," explains AI programmer Paul Tozour. All of which are necessary traits for enemies tracking a silent intruder like *Thief III*'s hero/burglar, Garrett.

"In *Thief III*, the AI will have an evidence-tracking system, which means it will retain information about which events made it suspicious and where," adds Tozour. "The AI will be able to draw better conclusions about which areas should be searched for intruders. When the AIs say 'It must have been rats,' they'll have really deduced that, although if you're playing the game well, they probably won't be right."