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## TECHNOLOGY

# I, Robot: The Man Behind the Google Phone

By JOHN MARKOFF NOV. 4, 2007

Mountain View, Calif.

A RETINAL scanner emitting a blue glow monitors the entrance to Andy Rubin's home in the foothills overlooking Silicon Valley. If the scanner recognizes you, the door unlocks automatically. (The system makes it easier to deal with former girlfriends, Mr. Rubin likes to joke. No messy scenes retrieving keys — it's just a simple database update.)

Those forced to use the doorbell are greeted with another technological marvel: a robotic arm inside the glass foyer grips a mallet and then strikes a large gong. Although Mr. Rubin won't reveal its cost, it may be one of the world's most expensive doorbells.

"It's not about the cost," said Zarko Draganic, a former colleague of Mr. Rubin's at Apple Inc. "It's the classic Rubin thing: You do it for the sake of doing it and because it's cool, and as a result there's a childlike innocence about it."

Mr. Rubin is one of the primary architects behind another product that also smacks of potential über-coolness — the Google Phone. As Google's "director of mobile platforms," Mr. Rubin oversees dozens of engineers who are developing the software at the company's sprawling campus here. The software embodies the promise of extending Google's reach at a time when cellphones allow consumers to increasingly untether themselves from their desktop computers, as well as the threat that greater digital mobility poses to Google's domination of Internet search.

The Google Phone — which, according to several reports, will be made by Google partners and will be available by the middle of 2008 — is likely to provide a stark contrast to the approaches of both Apple and Microsoft to the growing market for smartphones. Google, according to several people with direct knowledge of its efforts, will give away its software to hand-set makers and then use the Google Phone's openness as an invitation for software developers and content distributors to design applications for it.

If the effort succeeds, it will be the most drastic challenge to date of the assertion by Microsoft — the godfather of the desktop PC — that Google and other members of the so-called open-source world can imitate but not innovate.

And as the cellphone morphs further into a mobile personal computer, a new software standard is likely taking shape. Whoever takes the lead in this market may become a technological gatekeeper wielding the same power, and reaping the same profits, that Microsoft does through its Windows operating system.

As the industry shifts, Google doesn't want to fall behind, and the Google Phone reflects its bid to remain at the center of things. It plans to do that, industry executives said, by offering free mobile software and then presumably cashing in by providing a menu of services linked to those products, like e-mail, photos, news and other services.

"Instead of making money on software, you have someone who is saying they're trying to make their money on services," said Michael Kleeman, a technology strategist at the California Institute for Telecommunications and Information Technology at the University of California at San Diego. "The interesting question is whether the carriers will authorize the Google hand-sets on their networks."

ALL of these developments and uncertainties underscore why visitors to Mr. Rubin's office here get an immediate sense of his project's importance for Google. Large signs in the corridors leading to his laboratory warn that only employees are allowed to pass.

The company refuses to comment on the Google Phone, but Mr. Rubin's responsibilities, as well as recent leaks from the as-yet-unannounced alliance that Google is building to develop the software, indicate that the company plans to do more than merely develop an operating system for cellular phones: it plans to muscle its way into the center of the business at a time when people worldwide are searching

the Web from just about anywhere they happen to be.

Consumers are using smartphones to find directions, meet their friends and locate nearby stores, restaurants and movie theaters. That simple business and cultural shift has touched off an information-age gold rush, as Google, its search competitors, hand-set makers and cellphone operators all try to stake their claims to the mobile Web.

Already this year, Apple has redefined what people expect from a cellphone by introducing the iPhone, just as it did previously with its Macintosh computer. Microsoft is making progress as well, projecting that 20 million phones will be sold with its Windows Mobile software next year. Nokia, Palm, Research in Motion and a number of other hand-set makers are fashioning ever more datacentric phones.

With these battle lines drawn, Google is placing its mobile bets in the hands of Mr. Rubin, 44, an engineer who has proved adept at designing the highly integrated hardware and software ensembles that are the hallmarks of Silicon Valley companies.

And even though he is in charge of developing Google's answer to the Internet phone of the future, Mr. Rubin is a throwback. While Silicon Valley is now in the midst of a "Web 2.0" entrepreneurial frenzy, with an emphasis on clever business ideas that quickly attract millions of Internet users, Mr. Rubin is a proven member of an earlier group of engineers-turned-entrepreneurs who have a passion for building complete digital systems.

"Today Silicon Valley is full of 'network-effect entrepreneurs,' but Andy represents a generation that is equally comfortable with a soldering gun, writing software programs or designing a business," said Steve Perlman, another former Apple engineer who was a co-founder of WebTV and a handful of other technology-oriented companies.

In that regard, Mr. Rubin may be one of the clearest links between the computing industry's recent past and its rapidly emerging future — and the embodiment of how Google hopes to bridge the two realms.

In the spring of 2002, the Google co-founders Sergey Brin and Larry Page began sporting flashy smartphones on their belts that could gain access to the Internet and their popular search engine wherever they roamed.

With a switchblade-style flip-out screen revealing a tiny keyboard, the phone, known as the Sidekick, became a fashion accoutrement for urban hipsters and Silicon Valley's digerati. More versatile than e-mail-centric BlackBerrys, it was one of the first smartphones to seamlessly integrate the Web, instant messaging, mail and other PC applications.

The Sidekick was made by Danger Inc., a start-up in Palo Alto, Calif.; Mr. Rubin, one of its founders, named the company after the glass-tube-topped robot on "Lost in Space," the old science-fiction TV series. (On the show, the robot rolled across quasi-lunar sets issuing "Danger!" warnings to the cast.)

Mr. Rubin grew up in Chappaqua, N.Y., the son of a psychologist who later founded his own direct-marketing firm. His father drummed up business by sending offers of electronic gadgets with credit card bills, so Mr. Rubin's bedroom was festooned with the latest devices.

"After the products were photographed to go in the marketing catalogs, they ended up in my room," he recalls. "I got the first of everything, and the gene was definitely set."

Mr. Rubin evolved into a computer and electronics hobbyist. After college he went to work for **Carl Zeiss A.G.**, a maker of industrial and consumer optical products, as a robot engineer, focusing his talents on the digital communications between networks of manufacturing and measurement machines. He moved to Switzerland and went to work for another robotics concern, where he says he would have happily remained but for a chance encounter in the Cayman Islands.

Walking on the beach there very early one morning in 1989, Mr. Rubin said, he came across someone asleep in a chair — a vacationing Apple engineer named Bill Caswell who had been evicted from his beach cottage after a fight with a girlfriend. Mr. Rubin gave him a place to stay. Mr. Caswell reciprocated by offering him a job at Apple, at the very moment the company was enjoying the first heady peak of the Macintosh's popularity.

At the time, Apple was a hothouse of wild ideas, and engineers basically ran the company. High-tech high jinks were common, and Mr. Rubin got into trouble with the company's I.T. department after he reprogrammed the company's internal phone system to make it appear as if calls were coming from the chief executive, John Sculley, offering special stock grants to Mr. Rubin's colleagues in engineering.

Mr. Rubin started out as a manufacturing engineer at Apple before taking on research-and-development tasks including development of the Quadra, a desktop computer, as well as an early effort to develop a software modem. In 1990, Apple spun off a unit of the company that was exploring hand-held computing and communications devices into a separate entity called General Magic.

Mr. Rubin joined the new company two years later; he says he thrived in General Magic's total-immersion engineering culture. He and several other engineers built loft beds above their cubicles so they could essentially live at the office and work around the clock developing Magic Cap, a groundbreaking operating system and interface for hand-helds and smart cellphones.

When General Magic went public in 1995, its stock almost doubled on its first day of trading. But Magic Cap was a great idea that was about a decade ahead of its time. Just a handful of manufacturers and telecommunications companies adopted it — and only briefly — and General Magic's engineering team gradually dissolved to join other start-ups.

"It was like being in grad school," recalls Mr. Draganic, who worked at General Magic with Mr. Rubin. "We all worked really hard and we bonded, and built the cool things we wanted, but the market wasn't interested."

A portion of the General Magic team reunited when three veteran Apple and General Magic engineers, Steve Perlman, Bruce Leak and Phil Goldman, set up Artemis Research, a company that ultimately became WebTV — an early attempt to build a consumer device that could marry the Internet and television.

Mr. Rubin joined Artemis, reconstructed his loft in his new office, and went back to working around the clock. Microsoft bought Artemis in 1997 and Mr. Rubin stayed on, quietly fiddling on the side with his robots.

Yet another corporate misadventure from that period has gained legendary status among his pals: Trying to build a supergadget that could unobtrusively record the sights and sounds behind the creation of a new consumer product, he modified a mobile robot with an articulating, arm-mounted Web camera and microphone and turned it loose to scurry around the company.

But there was a small problem. The robot was also connected to the Internet.

One weekend, Microsoft security officials called Mr. Perlman to tell him that hackers had broken into the computer powering the robot. The hackers hadn't yet discovered that the computer they had taken over was mobile and had video capabilities, but the security team was outraged and Mr. Rubin was ordered to corral the wayward robot.

Mr. Rubin left WebTV in 1999. He rented a retail store he called "the laboratory" in downtown Palo Alto, populating it with robots that he brought back from frequent trips to Japan. The space became a clubhouse for Mr. Rubin and his engineer friends to congregate late at night and to brainstorm about ideas for new products; they eventually decided to make a device about the size of a small candy bar that cost less than \$10 and allowed users to scan objects and unearth information about them on the Internet.

"The idea was to create a digital sponge to draw people back to online Web sites," Mr. Rubin recalled.

Cool idea. But no one would fund it.

Undeterred, Mr. Rubin's team, which had by then named itself Danger Inc., added a radio receiver and transmitter to the device, which in mocked-up form was about the size of a bar of soap. They pitched it as an Internet-savvy smartphone called the Sidekick. A novice venture capitalist, Greg Galanos, financed it as his first deal shortly after the dot-com bubble burst.

In early 2002, Mr. Rubin gave a talk on the development of the Sidekick to an engineering class at Stanford. Mr. Page and Mr. Brin attended the lecture. It was the first time they had met Mr. Rubin; after the lecture, Mr. Page walked up to examine the Sidekick and found that Google was the default search engine. "Cool," he said.

At the time of Mr. Rubin's talk, the idea of a hand-held device that included cellphone capability was already in the air, but the recent emergence of digital wireless networks was giving it new life. Mr. Page, in particular, soon became enamored with the idea of a Google Phone and a complete operating system for mobile devices.

For Mr. Rubin, his time at Danger transformed him from an engineer into a manager. He was deeply involved in both defining a product and building a business from the bottom up. "We worked hard at developing a strategy," he says. "It was the

first time I switched on that part of my brain.”

Mr. Rubin had also figured out a way to break through the tension between wireless carriers and the manufacturers of cellphone hand-sets. Until then, the two groups had been sharply divided: cellphone makers wanted to sell loads of expensive hand-sets, while carriers wanted to control access to the devices and to lasso customers to a single device for long stretches of time.

The Danger designers came up with another model, one that Apple and AT&T recently emulated in part through their iPhone deal. Rather than placing itself in competition with wireless carriers, Danger aligned its goals with theirs by sharing in the revenue generated from service fees and not making its financial success dependent on the sale of phones.

“We were giving devices away and taking a share of revenue,” Mr. Rubin says.

Despite the Sidekick’s cult following, it never generated huge sales.

THREE years ago, Danger’s board decided it was time to replace Mr. Rubin as chief executive. Mr. Rubin says he agreed with the board’s decision. Although neither Mr. Rubin nor board members would discuss the specific reasons, they agreed that a replacement was needed, and Mr. Rubin participated in the search.

After a new C.E.O. joined Danger, Mr. Rubin decided to leave. He says that he had met his goals at the company and wanted to move on. Other people close to the matter, however, said he became disillusioned with the new arrangement.

Mr. Rubin then became an entrepreneur in residence at a Silicon Valley venture firm and retreated for a few months to the Cayman Islands, where he began writing software and tried developing a digital camera. But he could not find a backer for the camera, so he returned to his original idea of creating a next-generation smart cellphone. Using a domain name that he had owned for several years, Android.com, he started a new business and assembled a small team of engineers and product planners. Their goal was to design a mobile hand-set platform open to any and all software designers.

Mr. Rubin spent all his savings on that project. He called his friend Mr. Perlman and told him he was broke.

“How soon do you need the money?” Mr. Perlman asked.

“Now!” was the answer.

Mr. Perlman went to the bank and withdrew \$10,000 in \$100 bills, brought them to Mr. Rubin’s office and set them in a stack on Mr. Rubin’s desk. Ultimately, he lent him a total of \$100,000, which helped Android complete its business plan.

This time, venture capitalists loved the idea. So did Craig McCaw, the early cellular telecommunications pioneer who is now chairman of Clearwire, a wireless network operator. As Mr. Rubin was negotiating terms with Mr. McCaw, he sent an e-mail message to Mr. Page informing him of the potential partnership. Within weeks, Google acquired Android for an undisclosed sum. Mr. McCaw declined to comment on the sale.

AS a testament to Mr. Rubin’s inner robot, a kitchen cabinet in his home bears a long scar from a laser-controlled Segway, the self-balancing, two-wheeled scooter, that crashed into it recently. It’s just one example of the web of computer technology that he lives in. Mr. Rubin has also tricked out his home theater system to slightly brighten his living-room lights once the screen credits roll at the end of a movie. Several model helicopters are parked downstairs in his house, all programmed to fly autonomously.

Mr. Rubin readily acknowledges his obsession with consumer gadgets and even more expensive toys — an obsession that put him at odds with Google’s stated aversion to conspicuous consumption.

The day before Google went public in 2004, Wayne Rosing, then the vice president for engineering, stood on a stage during a companywide meeting and brandished a baseball bat. He threatened to use it on anyone’s car in the Google parking lot that was anything flashier than a 3 Series BMW.

As a result, Mr. Rubin had to buy a new car when he came to Google. (A souped-up German sports car that he recently acquired sits at home in his garage.) He acknowledges the discomfort created by the situation. “One of the things that Google’s really good at is not encouraging conspicuous consumption,” he says. “I’m a big fan of well-engineered things, and so I’m wrestling with how those two things can coexist.”

Mr. Rubin is also wrestling with another responsibility: trying to reinvent the cellphone on his second try. He declined to offer any insights into his strategy, and



whether he has the answer won't be clear for about a year — perhaps longer. Google has a tremendous amount of corporate momentum, and its search service is a huge consumer magnet. At the same time, wireless carriers jealously guard their networks and worry constantly about the possibility of losing control to potential competitors like Google.

Moreover, the market is already crowded. Microsoft got a head-start with its Windows Mobile platform a half-decade ago and in the past year has accelerated its efforts by persuading hand-set makers like Motorola, Palm and Samsung to include the software with its phones. Microsoft is certain to invest heavily to ward off Google's incursions into the market.

An irony in all of this, of course, is that Google, though not in a dominant position in this field, might be able to replay the strategy that Microsoft itself used to bulldoze Netscape in the mid-1990s. Just as Microsoft successfully “cut off” Netscape's air supply by giving away its Explorer Web browser as part of the Windows operating system, Google may shove Windows Mobile aside if the Google Phone is given away to hand-set makers.

And if the strategy works, it will be because a robotics fanatic named Andy Rubin and his team will have successfully developed the smartphone of the future. That's what Mr. Rubin says means the most to him.

“The thing that gets me going is touching a large number of people — if there's 3.1 billion phones out there, it's a great way to touch people,” he says. “I want to find something that delights people so they use it, and they use it for the merits of it being it.”

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