

INNOVATION

2007 Yearbook of Design Excellence



Bank of America's "Keep the Change" Program

THE SAVING GRACE



Photo: ©Bank of America

For the first time since the Great Depression, the average savings rate in the US is negative, meaning that people are spending their savings instead of contributing to them. In order to expand the number of products that could better serve its existing customers, as well as attract new ones, Bank of America wanted to focus on the banking habits of an underserved market: boomer women with kids. This group's behaviors around saving and managing finances—a tendency to live in the moment, a need to multitask, a dislike of the overly technical experience offered by many banks—help explain why people are saving less. Bank of America first needed to understand these insights in order to revive its customer base.

“Keep the Change is an example of design used to drive social change. It builds opportunities and encourages active participation. This is service design at its best, and it makes a true difference!”

—Annette Schömmel, CEO, arthesia AG

By Roshi Givechi of IDEO, and Bank of America

Roshi Givechi is a design director at IDEO with a background in new media/communication. She's selfishly hoping the insights from this financial project will reshape her own spending and saving habits for the better.



Ultimately dubbed “Keep the Change,” the concept is based on rounding up purchases to the nearest dollar—a tendency the design team observed when conducting user research. By rounding up purchases made with the Bank of America Visa Check Card and transferring the difference to a savings account, Keep the Change formalizes what is typically a casual behavior—saving loose change in jars, ashtrays and piggy banks. It automates saving money by building on preexisting behaviors and piggybacking on people’s daily transactions.

Money Talks

At IDEO, it’s quite natural for us to seek extreme users when we conduct qualitative research. Moving off topic helps spark our thinking and rattle our assumptions about potential solutions. Bank of America asked us to focus on boomer women with kids. Knowing that boomers typically span the ages of 46 to 64, we stretched the limits to under-

stand how younger women learn about and manage financial responsibility differently, if at all. The research ultimately concentrated on women between 35 and 57 and from all walks of life: well-to-do, lower income, married with kids, single parent, at-home mom, working professional.

What was particularly challenging about this research topic, however, was the essence of the topic itself: money. Given that speaking about personal finances can be taboo, even between close friends, how were we to encourage people to open up to us? We approached the problem from many angles.

Naturally we learned from site visits and customers at various banks. We also tempered extensive in-home interviews with impromptu women-on-the-street conversations in grocery stores and public establishments, balancing the intimate stories with the more immediate responses around banking.

Photo and notebook surveys enabled us to complement our localized hands-on research with supplementary stories and visual evidence from remote participants. On banking, the participants were asked to photograph how they handle banking from home. Beyond banking, the women were asked to identify activities or tasks that took away from their personal time during the week.

Group discussions among acquaintances over dinner enabled women to speak more candidly about their hopes, wishes and fears about money. Their familiarity with each other surfaced private details that informed our understanding of what matters to this market.

In addition, informal group discussions between strangers provided a healthy contrast to the previously noted “whine-and-dine” session and proved to be pivotal to our final understanding of how to better serve this population. Participants were asked to bring in their financial records, a physical ice breaker that would enable us to discuss how they track and organize finances (or not). They were also asked to develop financial tool kits for their kids and devise their ideal bank statement using paper (a tool familiar enough for simple communication).

Based on the original objectives, our research revealed numerous insights that became the foundation of Bank of America's Keep the Change product. For instance, many women are in charge of finances, challenging the stereotype that men typically satisfy that role. However, while money is at the forefront of moms' minds, banking is not. **Moms disassociate money from their bank. Yet banks believe the two are synonymous.** Creating an emotional connection between money and banking would be critical.

Also, moms go through different modes of banking, ranging from errand mode to monitoring mode to teaching mode to problem-solving mode, with different touchpoints that support each mode with varying levels of success. We also found that it's not the age of the mom but the age of her kids that most affects women's financial needs and behaviors. Finally, the banking experience often feels technical, even intimidating to some, which revealed an opportunity to humanize the banking process.

Packaging a Service to Everyone

So what shape did the design take? We were essentially designing what most of us view as a service, which has no inherent form factor. As such, the success of Keep the Change highlights the significance of effective communication and storytelling in making a robust financial offering digestible by the public.

In positioning what a bank may call a product, Bank of America bundled multiple products—a checking account, savings account and debit card—so that from the consumer's perspective it felt like one distinct service offering. To the customers, Keep the Change transforms a technical and sometimes intimidating process of banking into one that is intuitive and fun.

How do we relay the essence of this concept in a name? By documenting what we saw with digital images, we were better able to keep individual research anecdotes elevated and visible. In the case of the concept that inspired Keep the Change, we have a photograph of a participant's checkbook showing how she rounded up when she paid

her utility bills. That image, coupled with the stories we gathered and the underlying emotional need for saving, helped us shape the concept. Originally called "Round Up" to describe the human behavior represented in that photograph, the concept matured as a public-facing offering and was thus rightfully renamed Keep the Change.

Beyond the name, the marketing and advertising surrounding Keep the Change has a friendly, everyday tone, peppered with easily recognizable images—jars of change, checkbooks, cups of coffee, sandwiches—to convey how little things can add up. Much of the informational graphics are formatted as simple equations to show how the purchase of a daily latte, at \$3.43, automatically results in a savings of .57 cents, which over the span of a month would result in \$17 in savings. This easy-to-understand, linear thinking underlines the product's theme of working with people's normal practices rather than against them.

Good Will, Good Business

The way we see it, this banking product is a win-win. Through Keep the Change, Bank of America matches 100 percent of round-up transfers for the first three months and 5 percent of the annual total up to \$250.

Of course the ideas have to make sense on a business level too. After Bank of America's extensive testing, refinement and validation of prototypes, Keep the Change launched in October 2005. In less than one year, it attracted 2.5 million customers, translating into more than 700,000 new checking accounts and 1 million new savings accounts. Now in its second year, customers continue to sign up for Keep the Change—enrollment now totals more than 5 million customers, who have saved over \$500 million. The product proves to be a great success story for both Bank of America and its customers.

But does Keep the Change have lasting power? Impressed by the unique and intuitive nature of the program, to date 95 percent of its customers have chosen to retain the service—now that's a saving grace. ■

In addition to the Catalyst Award, this design received a Bronze IDEA in the Design Research category.

CATALYST WINNER

Pangea Organics

NATURAL-BORN LEADER

The market for natural and organic body care is expected to reach \$5.8 billion by 2008, up from \$3 billion in 2003. As more and more natural and organic body-care products enter the marketplace, consumers, in their quest for wellness, must increasingly be discerning, sifting through inauthentic terminology and inflated claims. This choosy consumerism is especially championed by the socially conscious millennial generation, who celebrate progressive values-driven brands by voicing their choice with their dollars.



Photos: ©IDEO/Nicola Zurcher

Article by Brenda Natoli of IDEO, and Pangea Organics

bnatoli@ideo.com

Brenda Natoli is the marketing editor at IDEO, where she helps shape the firm's communications from a shockingly messy desk in Palo Alto, CA.

A Hype-Free Brand

Founded in 2001, Colorado-based Pangea Organics represents a new model of organic standards and sustainable practices with its organic skincare line and 100 percent wind-powered manufacturing facilities. While 70 percent of the ingredients used in regular cosmetics and body-care products are unregulated chemicals, all of Pangea Organics' formulations are free of genetically modified organisms (GMOs), preservatives and chemicals, including petroleum, sulfates and detergents. In addition to its line of handcrafted skin and body-care products, Pangea Organics supports the fledgling Pangea Institute, the non-profit arm of the company to which a generous portion of profits go to support sustainability research and education.

When Pangea Organics approached IDEO for help increasing sales and distribution, its sales channels consisted primarily of small natural-foods stores dotted throughout the US. To help the brand reach a larger audience, IDEO began looking at ways to expand Pangea Organics' presence, focusing largely on identity and packaging.

To become more familiar with the infrastructure and objectives of its client, a small team from IDEO comprised of a graphic designer, writer, and a manufacturing and quality control specialist spent a week at Pangea Organics' headquarters and manufacturing facilities. Here, the group conducted various interviews with company stakeholders, including production staff, herbalists and board members, to understand the full scope of its capabilities and manufacturing processes. What the team found were a passionate company and passionate people who are striving for transparency, authenticity and human-centered values in a category of consumer goods that is becoming increasingly more hype than heartfelt. As Pangea Organics' CEO and founder Joshua Onysko has said, "Consumers today want authenticity at every level. Too often, when you see a great brand, you scratch the surface and it's ugly. I wanted to create a brand where the deeper you dig, the happier you get."

Inspired by Pangea Organics' commitment to sustainability and wellness, IDEO next hosted a collaborative workshop to promote idea sharing between the two companies. With this even closer look into the ideals and objectives of Pangea Organics, IDEO set out to do the following: revitalize the company's brand image and create a packaging program that would stand out in a retail setting; enable sustainability-minded decisions to be made throughout all business, marketing and manufacturing processes; expand brand recognition beyond the natural market in order to attract new consumers; create an integrated brand identity that would appeal to Whole Foods Market and progressive spas; and break into the international market.

Engaging Consumers

Believing that the product is the message, Pangea Organics has traditionally relied on viral marketing efforts to "teach, not preach." With this approach in mind, IDEO designed an overall brand strategy, an identity guideline, sales collateral and packaging solutions for 35 products that would inspire a conversation with the consumer and promote conscientious consumption. At the center of this work was an emphasis on storytelling as a means of touting the brand's distinct value and differentiating the products on the shelves. Each bottle and package is labeled with the full list of ingredients as well as Pangea Organics' pledge to use only all-natural, organic ingredients. The tone of the language is casual but caring, meant to engage rather than persuade.

Under the guidance of Onysko, the IDEO team analyzed the materials and specified glass, the most efficiently recyclable material available; #2 HDPE plastic, also widely recyclable; and shipping materials sourced from a local printing press that would otherwise be discarded. Also included in the packaging overhaul was the use of screen printing to apply text directly to the bottles in lieu of glue-on labels, which are typically made from petroleum products. In making this switch, IDEO included a small note on the bottle to educate

Designed by Ian Groulx, Amy Leventhal, Marc Woolard, Soren DeOrlow and Phil Stob of IDEO and Joshua Onysko and Heather Lieder of Pangea Organics



the user about Pangea Organics' labeling solution, again supporting the brand's goal of true transparency.

In addition to specifying Pangea Organics' packaging materials, IDEO designed an award-winning compostable soap box inspired by egg cartons and made from 100 percent post-consumer content. Unlike the traditional manufacturing process for such a package, which involves stamping out the form using a die tool and discarding the excess material, IDEO and Pangea Organics devised a zero-waste method that reuses all excess material by reconstituting it in water and using it to form new boxes. This design-driven approach has led to a 28 percent savings in material costs for Pangea Organics' soap packaging and enabled a proprietary visual statement in the marketplace.

Since the launch of Pangea Organics' new identity and packaging in October 2005, revenues have grown three-fold, to approximately \$1.2 million—a remarkable pace given that full distribution of the new line was only achieved in January 2006. This distribution—having tripled since the relaunch—now includes nearly all Whole Foods and Wild Oats Marketplace locations, in addition to such specialty retailers as Cost Plus World Market. Pangea Organics has also gained distribution in 13 new international markets, from the UK to Dubai. In 2007, Pangea Organics plans to introduce four new products, each to be branded and packaged in accordance with IDEO's design and identity guidelines—and each committed to the sustainability of the planet and the wellness of its customers. ■

“There are some companies that are truly enlightened about design. Pangea Organics is clearly one of them. Design informs every facet of its work to create new value for consumers while also protecting Mother Earth.”

—Keith Yamashita, Chair, Stone Yamashita Partners

HONORABLE MENTION

Designed by Michael Meyer, Florian Altmann, Ela Ben-Ur, Kate Schreiber and Bill Stewart, IDSA of IDEO and Vern Raburn of Eclipse Aviation

Eclipse 500 Very Light Jet

FREEDOM TO FLY

Very light jets (VLJ) are the newest addition to the aviation industry. With such innovative capabilities as short runway take-offs and a 370-knot cruising speed, VLJs are expected to significantly change the way people travel. At the forefront of this change is Eclipse Aviation, a US-based company that manufactures jets that defy the old rules of hub-and-spoke air travel. To solidify its position at the forefront of lightweight aviation innovation, Eclipse approached IDEO to design the cockpit and cabin configurations for the Eclipse 500 jet.

Challenged by such constraints as the small size of the jet's pressurized cabin, IDEO's team of human-factors specialists, industrial designers and mechanical engineers began looking at ways to maximize the space and provide intuitive interactions for pilots and passengers. IDEO worked with pilots, aircraft owners and potential Eclipse 500 buyers to understand that even though the functions and requirements differ between cockpit and cabin, both zones can embrace common design principles. The resulting solution minimizes visual clutter and superfluous details, creating an interior that

is both user-friendly and elegant.

To appeal to seasoned jet pilots and newcomers alike, IDEO designed the Eclipse 500's cockpit to feature a harmonized instrument panel to reduce complexity, with controls grouped and labeled according to flow, reach and handedness considerations. A military-style sidestick control offers the pilot a more natural feel and easier operation. LED lighting illuminates the cockpit with a serene, glare-free glow.

Using full-scale prototypes and real flight times, IDEO utilized a number of methods to design the configuration of the cabin. Designers leveraged the interior geometry, a variety of materials and clever lighting that make the cabin feel bigger than it actually is.

Since 2000, Eclipse Aviation has sold more than 2,600 jets worth a record-breaking \$3.8 billion. The first Eclipse air-taxi service is scheduled to begin this fall with a league of more than 300 Eclipse 500s operated by Florida-based DayJet. In 2005, the Eclipse 500 won the prestigious Robert J. Collier Trophy for "leadership, innovation and the advancement of general aviation." ■

—Brenda Natoli of IDEO and Eclipse Aviation
bnatoli@ideo.com

Photo © Eclipse Aviation

HONORABLE MENTION



LifePort® Kidney Transporter

EXTENDING LIVES

Photo: ©Organ Recovery Systems

Approximately 55,000 Americans are waiting to receive kidneys. The wait list could double in the next 10 years, creating an acute need for new technology that would increase the quality and number of organs available for transplant. These pressures have left the industry ripe for practical innovations that can be easily and swiftly implemented. One area of opportunity is preservation: the organ's critical *ex vivo* time between donor and recipient where the common standard of care is a cooler filled with ice.

The LifePort® Kidney Transporter is a new high-tech alternative to the conventional method of organ storage and transport. LifePort gently perfuses, or pumps, the kidney with a cold liquid solution before transplantation, improving patient outcomes. In addition, LifePort may increase the number of usable kidneys suitable for transplant. The device also provides critical data for monitoring and evaluating kidneys during transport.

IDEO helped Organ Recovery Systems with user research and industrial, thermal and mechanical design activities and provided prototypes of two working systems to meet critical launch deadlines. Understanding the kidney's journey from donation to transplantation helped the team design a product that can meet the demands of the organ procurement organization, the surgeons and the operating-room staff.

Several iterations of the component designs and care-

ful thermal studies led to a highly compact mechanical layout. The ergonomics of the system setup and user interface were carefully considered to communicate only essential information and minimize the possibility of errors. The overall design was conceived to clearly convey the importance of the cargo and to serve as a platform for a family of organ-specific transporters.

LifePort has become the prevailing machine perfusion system in the world, substantially displacing all previous technologies and creating a robust new market. Since 2003, more than 8,100 kidneys have been perfused on LifePort. Presently, the company is developing LifePorts for the heart, liver, lung and pancreas.

With a design that so elegantly offers ease of use, safety and portability, LifePort puts superior organ preservation technology into the hands of transplant professionals worldwide. Because users require only basic clinical skills and minimal training, machine perfusion is fast becoming the standard of preservation for kidneys in the US. Perfusion has the potential to increase the use of donated organs and the number of kidneys considered for transplant, improve outcomes (better long-term graft survival and a lower rate of delayed graft function) and reduce medical system costs.

As aesthetically refined as it is functional, the LifePort Kidney Transporter is also part of the permanent architecture and design collection at MoMA. ■

—Eric Stangorone of IDEO and Organ Recovery Systems

Designed by Andrew Burroughs, Dickon Isaacs, Stacy Benjamin, Dick Grant, John Grimley, Jerry O'Leary, Anton Schubert, Amy Schwartz, Paul South and Eric Sugalski of IDEO and John Brassil of Organ Recovery Systems

Eclipse 500 Very Light Jet

INNOVATION

In 2002, Eclipse Aviation asked a team of IDEO designers in Boston to configure and refine the instrument panel and interior spaces of its premier offering, the six-seat Eclipse 500 Very Light Jet (VLJ). A combination of advanced instrumentation, high performance, compact scale (it weighs about 25 percent less than a Chevy Suburban) and an unprecedented low price, the Eclipse 500 has the potential to completely change the face of air travel by making private jet travel a more personal and affordable experience.

From a narrative standpoint, the Eclipse 500 had all of the dramatic tension of a Horatio Alger protagonist: It rose out of a struggling industry in which four major airlines declared bankruptcy following 9/11, leaving standards and efficiencies suffering and travelers standing by—literally—to watch as air travel became less and less synonymous with convenience and service. Also on its side was the Eclipse 500's unassuming newcomer status. Not to mention, it was the world's first VLJ and the first offering from a start-up founded by former Microsoft executive Vern Raburn.

While not exactly hailing from humble beginnings (Raburn raised millions in funding from former software industry colleagues and other high-tech investors to build a state-of-the-art manufacturing facility), the challenge of building a lightweight jet with a price tag under \$2 million was considerable. Even beyond the cost and time hurdles of advanced aeronautics, **the Eclipse 500 had to persuade a conservative and jaded market of its ability to herald a**

new category of aircraft—one that represents the return to point-to-point service and makes the concept of the one-day business trip a near reality.

A New Way to Fly

When Eclipse Aviation approached IDEO, the first Eclipse 500 was already being built for test flight. Following in the footsteps of manufacturers of high-end, mass-produced capital goods, Eclipse Aviation was using the latest in lean manufacturing techniques, including multiple digital (CAD) iterations to optimize for weight, cost and maintenance; outsourcing labor-intensive work; automotive-inspired airframe construction with half the parts of similarly sized aircraft; a rivet-free, friction-stir welded aluminum body that eliminates two-thirds of the assembly labor hours; and a high-tech storage system that keeps enough small parts on hand to produce more than 1,000 jets a year (in a market segment that considers 100 aircraft a year a success). And perhaps the

Designed by Michael Meyer, Florian Altmann, IDSA, Ele Ben-Ur, Kate Schreiber
and Bill Stewart, IDSA of **IDEO** and Vern Raburn of **Eclipse Aviation**

TAKES WING



“The Eclipse cockpit provides precisely the assurance passengers pray for when they put their lives in the hands of a pilot: that the chance of an accident or pilot error has been engineered away.”

—Michael Schrage, Research Associate, MIT Media Lab



Photo: ©Eclipse Aviation

The design of the instrument panel is more intuitive, less cluttered, less fatiguing and more motion efficient with an aesthetic that evokes the cool austerity of a high-tech aircraft.

biggest contributor to the Eclipse 500's performance promise was a low-emission jet engine from Pratt & Whitney Canada that allows the aircraft to cruise at a speed of 430 mph, climb to 41,000 feet and accelerate and decelerate quickly enough to operate on runways as short as 2,300 feet. The latter gives the Eclipse 500 access to approximately 10,000 secondary airports in the US, while keeping its price approximately half that of any plane in its class.

With all this promise at hand, IDEO was tasked with communicating the principles of technology and performance in the jet's interior spaces and user interfaces, including the cockpit and instrument panel, cabin and option packages. While Eclipse Aviation had already generated many initial design solutions for these areas, IDEO was asked to evaluate and provide alternate user-validated design solutions that spoke to a broad audience of potential buyers:

private pilot-owners, air taxi companies, corporate flight departments, charters, and training and air-freight companies.

To develop a framework for evaluating potential design solutions, a multidisciplinary team of IDEO engineers, human-factors specialists and industrial designers conducted research to reveal stakeholder needs around the appropriate layout for the controls on the instrument panel for optimal pilot convenience and workflow, the appropriate task lighting in both cockpit and cabin for legibility and clarity, the desired/required storage and stowage in the cockpit and cabin, and the placement of and access to emergency equipment for both pilots and passengers. In addition, IDEO looked at possible interior configurations to maximize the jet's small spaces, developed a design for the lavatory, investigated the need and design for an onboard entertainment system and refreshment center, and finally, deter-

By Brenda Natoli of IDEO, and Eclipse Aviation

bnatoli@ideo.com

Brenda Natoli is the marketing editor at IDEO, where she helps shape the firm's communications from a shockingly messy desk in Palo Alto, CA.

mined how all these components could be best integrated as a comfortable, cohesive system.

Of all the areas demanding answers, the configuration of the instrument panel was the most challenging. With only eight weeks to pinpoint ways to optimize and communicate the jet's sophisticated integration of aircraft systems, IDEO began working in tandem with Eclipse Aviation engineers at its New Mexico headquarters. The team conducted in-context cockpit interviews with fleet owners, fleet employees and private pilots using the owners' planes and 3D mock-ups of the Eclipse 500 cockpit and cabin. When rough and ready would suffice, paper prototypes of the evolving Eclipse 500 instrument panel were used. The team also spent a significant amount of time with Eclipse Aviation's chief test pilot, Bill Bubb, conducting mock flights and interviews to understand the checklists and workflow demands of a cockpit that is a mix of "glass" (CPU) and hard controls.

These sessions enabled IDEO to become familiar with the flight process from take off to touch down in both standard and emergency situations and to understand FAA requirements. In reviewing the tapes of the mock flights, the team was able to map the flow of actions across the instrument panel and highlight opportunities for improvement. As a result of these and other research methods, **IDEO was able to optimize the instrument panel layout while taking into account both experienced jet pilots and those who would be transitioning from steam gauges to a glass cockpit.**

The layout of the instrument panel offers many benefits for pilots, including quick access to controls in both normal and emergency situations, due to panel groups and labels that are oriented according to flow, reach and handedness considerations. A sidestick control on the window armrest offers improved ergonomics and allows for an unhindered view of the three large displays, which contain a minimal number of knobs, backlit text and grouping lines for legibility. Emergency equipment is also closer at hand—never more than arm's reach. A streamlined throttle quadrant and pedestal gives pilots added clearance around the equipment, and a recessed panel on the glareshield provides improved impact protection for the head.

Luxury in a Small Package

Much like the instrument panel configuration, IDEO's work in the remainder of the jet centered on telegraphing the Eclipse 500's high performance and user-friendliness. To do this, IDEO focused on three themes to guide its overall design rationale: seamless integration of function, form and manufacturing; clean and simple forms; and intuitive interaction.

Taking cues from the automobile industry, the Eclipse 500 was designed to have a fully integrated exterior and interior design that exhibits a consistent design language and functional overlap between the airframe, engine, landing gear, avionics and other components. This consistency serves to unite the cabin and cockpit—two very different zones with diverse functions and requirements.

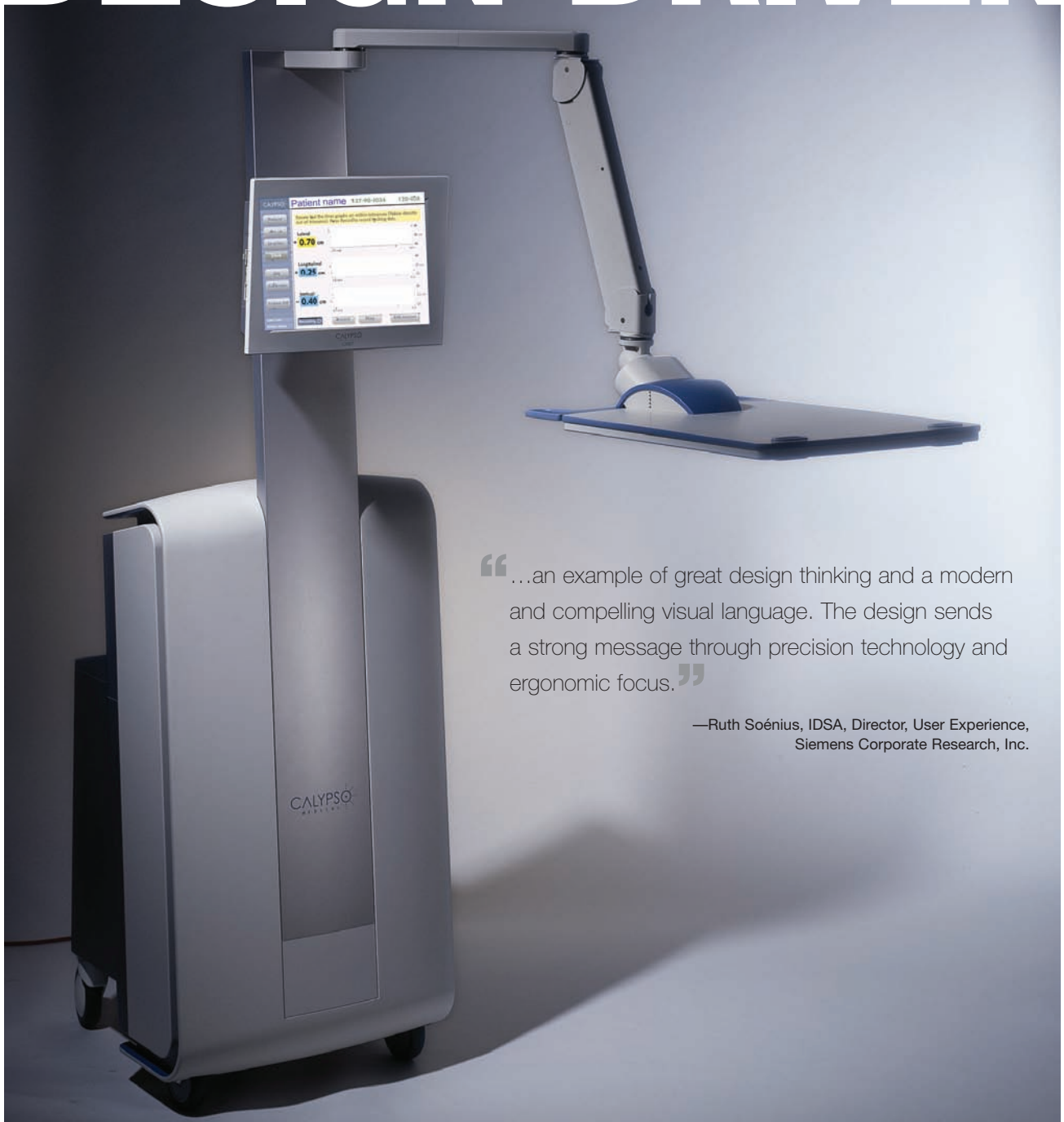
In the tight confines of a pressurized cabin, the design team needed to use interior geometry, materials and lighting to make the space feel bigger than it actually is. The general approach involved reducing visual complexity and superfluous detail using 3D models. **Nearly every square inch of the Eclipse 500's interior is put to use in service of the pilot or passengers.** To incorporate features like reading lamps, accent lighting, overhead and floor lamps, and the associated lighting controls, in addition to storage areas and cockpit controls, the design team considered user needs and behaviors as they relate to the small interior.

Validation of the final instrument panel layout and interior configurations came from stakeholders and from the formal FAA approval process. Since 2000, Eclipse Aviation has sold more than 2,600 jets—an industry record worth more than \$3.8 billion. Raburn commented on the success of the Eclipse 500, saying, "Our customers value not only the excellent economic benefits of the Eclipse 500, but they also appreciate the comfort, accessibility and ease of use of the interior. This is truly reflected in our order book and by numerous prospect and customer demonstration flights." The Eclipse 500 is piloting a new way to fly. ■

This design also received a Gold IDEA in the Interaction Design category as well as a Silver award in the Transportation category.

Calypso® 4D Localization System

DESIGN-DRIVEN



“...an example of great design thinking and a modern and compelling visual language. The design sends a strong message through precision technology and ergonomic focus.”

—Ruth Soénius, IDSA, Director, User Experience,
Siemens Corporate Research, Inc.

Designed by Opher Yom-Tov, Matt Adams, Dennis Boyle, IDSA, Jon Lefors, John Stoddard, IDSA, Sam Truslow and Bryan White of **IDEO**; Douglas Cooke, IDSA, Josh Hoyt, Sabrina Jetton and Jonathan Dalton, IDSA of **Ziba Design, Inc.**; and Steven Dimmer, Matt Herron, Eric Meier, Lynn Purdy and J. Nelson Wright of **Calypso® Medical Technologies, Inc.**

CONFIDENCE

In the US, more than 1 million patients receive radiation treatment annually. Radiation oncologists and therapists face the daily challenge of accurately delivering radiation to mobile tumors and minimizing the collateral damage to surrounding tissue. Working at the forefront of this effort is Calypso® Medical, an emerging life-science, medical-device company dedicated to shaping the future of radiation therapy. With working laboratory prototype components, Calypso Medical approached IDEO for assistance developing a product architecture, functionality and design language appropriate for the radiation therapy environment.

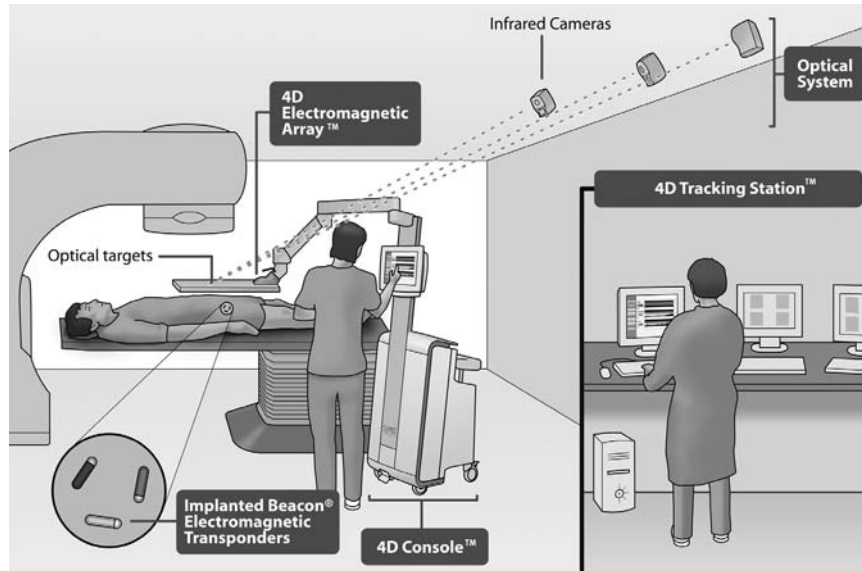
Specifically, Calypso Medical enlisted IDEO to assist in framing the clinical issues and developing design concepts for implementing important components of its new technologies. IDEO successfully integrated its expertise in materials science with the workflow and clinical information previously gathered by Ziba Design. Calypso Medical also hand selected a small group of employees and consultants, including experts in signal processing, to serve on the project team along with industrial design project manager Matt Herron, a former IDEO engineer. Believing that good design and a well-conceived user interface would be important, Calypso Medical's president and CEO, Eric R. Meier, made sure that the core project team included a human-factors engineer as well as a marketing manager and a clinical researcher.

Technical and Clinical Challenges

In early research with clinicians, Calypso Medical learned that accurately predicting the location of a radiation treatment target day after day is a serious challenge. To be able to con-

tinuously identify the location of the treatment site without delivering extraneous ionizing radiation would be a monumental accomplishment. Since patients typically receive radiation therapy over the course of several weeks in 10- to 20-minute sessions, the product had to be efficient and easy to use and offer real-time sub-millimeter accuracy. With this in mind, Calypso's GPS for the Body® technology was developed, which consists of an implantable sensor and an electronic console that sits near the patient during treatment.

The project team also faced many technical challenges: miniaturization of the implantable sensor, internal electronics robust enough to survive the harsh radiation treatment environment and patient throughput. In radiation therapy, throughput relies on the treatment rooms turning over every 10 to 20 minutes, with anywhere from 30 to 50 patients being treated in a single day. Radiation therapists would be motivated to adopt Calypso's technology if it consistently delivered accurate guidance for readying patients for treatment and monitoring the tumor target during radia-



The 4D Localization System not only delivers accurate guidance for monitoring the tumor target during radiation therapy, it also easily integrates into current workflow processes so treatment time is not increased.

tion therapy—all without increasing the treatment time.

The team felt that the key to success was to create a product that would integrate into and enhance existing workflow. In order to understand the radiation workflow, the team studied the roles and responsibilities of all members of the clinical team, including the implanting physician, radiation oncologist, medical physicist, dosimetrist and radiation therapist.

Learning how the physicians would implant the sensors, or Beacon® electromagnetic transponders, was an important part of the workflow that needed to be defined. Working with multiple physician specialists, the team developed techniques similar to prostate implantation for prostate biopsies. Although the FDA hasn't yet approved Calypso's technology for non-prostate applications, such as breast, lung, head and neck, the project team worked on the implant procedures for multiple tumor types in order to gain a broader understanding of how the technology would be integrated into clinical practice.

The user interface was designed with the end users in mind, particularly the radiation therapist. Early in the design process Calypso Medical mocked up various software application designs and physical product concepts. Multiple

focus groups were conducted in the radiation therapy environment at Seattle-area hospitals. A multidisciplinary team of engineers, clinical researchers and marketing product managers were able to observe how the product operated. Using the product in a mock treatment set-up session also allowed the therapist to provide critical feedback about the design and its functionality. The rapid turnaround time between product concepts was a matter of weeks instead of months.

Business Challenges

Competitive solutions were emerging that were designed to integrate with

the existing treatment delivery system, such as the linear accelerator, used by most clinics. Calypso Medical knew that if its solution was to be a winner, it would need to be capable of working with any linear accelerator as well as integrate seamlessly into the radiation therapy workflow. And, as with any unmet need, there was the pressure of the time-to-market window.

The resulting Calypso 4D Localization System provides clinicians with a breakthrough means to measure and monitor tumor motion during radiation therapy. Coupled with the advantage of providing the only method for continuous, real-time tumor tracking, the Calypso system does not require expertise in interpreting x-rays, greatly reducing the time to prep patients—a common bottleneck in radiation workflow. Additionally, the design's iconic language ensured a high profile for Calypso Medical's debut product.

The FDA cleared the technology for use in prostate cancer treatment in July 2006. Since its launch in early 2007, the Calypso 4D Localization System has been in use at leading cancer treatment centers across the country. During that time, it has been extremely well received by both physician and patient communities for its ability to provide peace of mind for the patient and confidence for the physician. ■