American Perception of Space Exploration

A Cultural Analysis
for Harmonic International and
The National Aeronautics and Space Administration

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American Perception of Space Exploration

Executive Summary

Summary: The Dynamics of Vision

- To be successfully adopted, visions must reflect the larger culture in which they must operate.
- Visions are contextual. If the context changes, the meaning of the vision changes.
- When asked to judge between two competing arguments in which they have little or no expertise, people will default to the more compelling vision.
- The vision of space exploration fits inside a larger vision: our concept of the future.
- American culture has always been future-focused.
- Future visions that have been successfully adopted in the U.S. have all depended on an alignment of certain factors and conditions:
    - A core cultural belief that the future should be better than the past
    - A core cultural belief that everything can and should be improved
    - A strong moral imperative to better the lot of the individual
    - An individualistic ethic that celebrates and rewards inventors and innovators
    - Mass media that can bring the vision to the attention of the public
    - Business interests that promote the vision of a better world in which their products play a key role
    - Popularizers--recognized experts who promote the vision as achievable fact
    - A driving external force or event that makes the vision the optimal or necessary choice

For the purposes of NASA's vision, several of these factors are missing in today's environment.

- Media have evolved. The more instantaneous flood of information makes it more, not less, difficult to promote a coherent vision.

- Business is dedicated to selling immediate gratification to a narrow spectrum of consumers rather than selling future visions to the general public.

- There are no "space" popularizers known to the general public

- The psychological center of gravity has shifted. The median age in the U.S. is 45, the oldest in our history. This means that opinion leaders have moved into an age stage where maintaining what they have is more compelling than looking to the future.

- There is no compelling external force or event that would induce people to choose NASA's vision over more immediate earth-bound choices.

- Failure of NASA's vision to resonate with the American public to the point where it inspires action is a reflection of a larger problem: the U.S. currently has no larger shared vision into which NASA's vision can fit.

In this cultural environment, the general public has defaulted to an attitude reflective of the mid-1950s. They believe space exploration is not a fantasy, but an achievable possibility. They believe it is a noble endeavor. They have a generally positive view of NASA, based primarily on the success of the manned space Mercury and Apollo programs. But they do not believe the government should spend billions of dollars to achieve it.

Summary: The NASA brand

NASA's success at achieving their goal of successful moon landings has defined not only the current popular vision of space exploration, but NASA's "brand."

Despite setbacks, NASA's "brand" as the premier space exploration program is secure, but it is still integrally bound up with the Apollo program of manned space flight. In the mind of the public, human exploration of space is NASA's brand. The space quest is a human equation, not just a technical mission.

In light of this truth, despite a strong emotional attachment to NASA, many of the agency's achievements since the end of the Apollo program have failed to resonate, or even register, with the public. While consciously aware of the shuttle, many people don't think of this project in the same mental category as exploring space. The same category error applies to public perception of the International Space Station.

Space science is seen as an outcome, not a goal. It's what you do while you are in space, not the sole reason for going. The same applies to the substitution of robots for humans (see appendix C: Robots and Exploration). Without the potential for human follow-up and exploitation, both space science and robotic exploration downshift in public perception from need-to-know to nice-to-know.

In commercial terms, a move away from human space exploration shifts NASA up from a household item to a luxury item. Cost becomes the deciding factor. In terms of popular support for funding, it's not, as the old saying goes, "No bucks; no Buck Rogers." It's "No Buck Rogers; no bucks."

It is important to understand that the public's vision of space exploration has not changed – the ongoing interest in Hubble images of other galaxies and the massive public response to the Mars landings clearly demonstrates that. But NASA's accomplishments since Apollo, however important, fall into the categories of science and technology -- categories the public consciously believes are valuable but does not have the expertise to evaluate.

When faced with multiple points of view without the expertise to judge between them, people inevitably default to the one with the most resonant vision — in this case the NASA brand established during the space race of the 1960s. NASA's current programs are unconsciously being compared to the brand established during the space race of the Cold War era, and come up wanting.

Summary: The Immediate Future

The horizon offers opportunity. A number of societal changes already taking place give promise that NASA's vision will prevail.

- The aging population is rapidly moving to a point where finding the meaning to their lives will have a greater psychological pull and positive future visions will hold greater appeal.

- The younger generations are already hungry for a positive future vision.

- Immediate-gratification marketing, developed during the Baby Boom, no longer serves the values of the aging population.

- Similarly, corporations that focus on short-term gains are in difficulty in the emerging environment. The gradually developing but definite shift back to the era of corporate social responsibility will necessitate positive future visions.

- China is gradually moving into position to be the driving outside force that could bring NASA's vision into the "optimal" or even "necessary" category--but in the minds of the public is not there yet.

Scope and Methodology

"What a man believes may be ascertained, not from his creed, but from the assumptions on which he habitually acts."

- George Bernard Shaw

Successful communications are those in which the recipient is predisposed to accept the core assumptions. The goal of this study is to understand how Americans respond to the vision of space exploration at the unconscious level. It is the unconscious drivers of choice that pre-position ideas for acceptance or rejection in the mind of the public.

Contemporary brain research has demonstrated that a test subject shown an object or picture first engages what are loosely termed the "emotional" centers of the brain, followed by the logic centers. The implications of this finding are staggering. Americans think of themselves as a logical people, rooted in fact. Yet our cognitive unconscious processes data, sets goals, judges people, evaluates products, detects danger, formulates stereotypes, and infers causes—all outside our conscious awareness. The conscious process--what we classify as critical, logical thought--is, in fact, the weighing of data that has already been pre-selected by another process, one that operates below our conscious threshold.

In short, "the facts" are what we consciously use to validate a decision we have already made at a pre-conscious level.

Since people ordinarily don't make value judgments on a conscious or rational level, it is not surprising that they have difficulty articulating them. To understand what people really believe to the degree that they will act on those beliefs can be problematic because they can't tell you with any degree of reliability what those beliefs are. This limits what you can learn from research surveys alone. It is necessary to analyze these findings against another database using a different methodology than that originally used to collect the data. Since behavior is how belief is most truly expressed, we searched out consistent patterns of behavior over time.

This does not mean that surveys are not informative, only that behavioral studies enable us to distinguish between testimony and evidence. While surveys and focus groups may report, for example, that "exploration" is a strong value proposition, patterns of behavior over time may indicate otherwise. The

question then becomes not whether the concept of exploration has value, but more in depth, which contextually recognized form of exploration is most desirable?

We therefore conducted a historical review for consistent patterns of behavior on issues relating to exploration throughout the past. Once patterns were identified, we narrowed the focus to US culture and traced their evolution for approximately the past century. The goal was to determine the intuitively recognizable form of space exploration that Americans consider valuable enough to vote for in the most meaningful way possible – with their time and dollars.

Since people make decisions in context, we searched out the stories people gravitated to--which stories were told and retold over time--and which were rejected. These change form as the context in which they are received changes, but it is possible to identify the core values (defined as preferred states of affairs) as those that are consistently retained and relayed from generation to generation.

The Center operates on the premise that you cannot validate findings using the same methodology used to collect the data from which the findings were drawn. Therefore, we also compared the historical data to proven models of psychological development, which specify what key needs drive choice at specific points in the average lifespan.

Psychology has long recognized that people change in predictable ways at predictable points in their lives. Core cultural values are firmly implanted by age seven, but how people prioritize those values evolves over their lifetime. While every individual is a distinct entity, group behavior tends to fall within predictable parameters. While you can't predict what any individual will do, you can predict the probable outcomes of what the majority of a group will do within a given set of circumstances. This data can then be compared to the results of focus groups and surveys to determine which answers are most likely to drive action. This method is a process of validation and interpolation.

The Center did not access Harmonic's research findings in advance. We were provided with a sample document solely in order to understand the current assumptions under which NASA was working. Our only mandate was to analyze how Americans viewed the concept of space exploration in general and NASA in particular within that context. As Harmonic's mission evolved, we were also asked for input into how people actually compute cost versus benefit in regard to space exploration and how they felt generally about robotic exploration.

In all, using three different methodologies--surveys and focus groups, tracing long-term historical patterns of behavior, and comparing those to proven models of psychological development--should allow NASA to triangulate their findings, reduce the signal-to-noise ratio, and identify key drivers of choice. From this platform, NASA can, with a high degree of confidence, develop and communicate a vision that will evoke a compelling resonance with NASA's constituency.

The results of this study are broken down into four main, but overlapping, topics: 1) defining the cultural ideal of the vision of space exploration, 2) how it evolved from an imaginative fantasy to an actionable reality, 3) how people mentally compute cost versus value, and 4) the immediate future.

Our study results describe not only the current state of where the values of space exploration lie and how those values are recognized, but the evolution of how they came to be--as an indicator of where they may be going.

The Cultural Drivers of Successful Visions

- In order to be successfully adopted, visions must reflect the values of the host culture.
- Cultural drivers operate at an unconscious level and often cannot be articulated.
- Behavior is how culture is expressed.
- Visions are contextual. If the context changes, the meaning of the vision changes.
- When asked to judge between competing arguments in which they have little or no expertise, people will fall back on the most compelling vision.

America is a nation based not on blood or geography but on shared visions. From "All men are created equal," through "Manifest Destiny," to "I have a dream" and "A man on the moon before the end of this decade," visions have driven both our private actions and public policy. But no idea can move from the private imagination to a shared vision that drives public policy unless it reflects the culture in which it has to operate.

The Center researched the evolutionary progression of the way people have viewed the values of space exploration and how those values have been intuitively recognized over time. By viewing across time, it is possible to differentiate between fads and trends, which are ephemeral, and patterns, which are consistent and offer predictive properties.

A successful "new" vision, one that drives social change and resultant public policy, is never new. It is built on the platform of ideas that precede it. Cultural shift is an evolutionary process. The result may be stylistically "new," but the cultural values that drive it are not. They are surprisingly stable.

As a group, Americans have a curious attitude about their own culture: they don't think they have one. We are, the argument goes, a nation of immigrants, a mix of ethnic groups so diverse that speaking of "American culture" is problematic, if not impossible. When speaking of Americans, you can't say "everyone," because everyone is different. We simply don't all believe the same things.

Ironically, all Americans believe this proposition to varying degrees. Which means that the first thing all Americans have in common is a paradox: We all

operate from the common belief that we don't all operate from common beliefs.

Of course, if this were literally true we couldn't exist as a nation, because there could be no mass-market products. We couldn't even talk to each other. The explanation of the paradox lies in the meaning of the word "culture."

In the old world, "culture" was, and still is, defined as the common history of people with shared blood ties. In the US, without the historic commonality or shared family heritage, culture is a set of shared preferences for one state of affairs over another. These values evolved over time because they worked in the environment in which the immigrants to this continent found themselves.

These preferences, for instance, viewing mobility as synonymous with freedom, were never written down. They are not even taught. Instead they are absorbed through popular culture, the universe of stories we tell ourselves in books, the press, music, and the movies. By age seven, the consistent themes within our popular culture are ingrained. They are a set of unconscious assumptions: a particular worldview of the way things "should" be. (See appendix A: The Seven Shoulds.)

Because our shared assumptions operate at an unconscious level, Americans have always focused most of their attention on our differences rather than on what we share. That focus illuminates another core belief all Americans share: the unconscious assumption that the base unit of American culture is the individual, not the family, clan, tribe, or nation.

Our ingrained assumptions about how things should be are what set us apart from other cultures. They drive our choices in everything from public policy and our social agenda to the everyday consumer choices we make, from the vision of space exploration down to which brand of toothpaste we choose.

Since the cultural beliefs that drive our choices operate below our conscious horizon, it is the almost invisible nature of culture that leads us to believe that we don't have any, just as you aren't conscious of your own accent. Therefore, culture is rarely articulated in words, but instead is expressed in behavior. By studying American popular culture over generations--what Americans "voted" for in the most meaningful way possible, with their time and dollars--we are able to identify consistent patterns of behavior over time. These behavioral patterns illuminate not just what we value, but far more important, <u>why</u> we value it.

A Brief History of the Future

The ecologist Howard Odum said, "In order to understand a system, you must first understand the system it fits into." Culture is a system; society is a subset of that system. For Americans, space exploration, in the earliest public imagination, was embedded in a larger system, the concept of *the Future*.

For more than two centuries, ever since we first started thinking of ourselves as Americans rather than colonists, the national orientation has been focused towards the future rather than the past.

At the conclusion of the American Revolution, the new American identity was based more on who they were not---English--than who they were. The median age was 16. Psychologically, the controlling dynamic was a teenage one: uncertain of their own identity, but knowing that they are distinct from their parents.

Our founding documents, the Constitution and the Bill of Rights, reflect this dynamic. They limit the power of government to determine who people are in favor of encouraging who people can be. One's identity is one's potential.

Europeans often accuse Americans of being naive. They attribute this to the fact that compared to most European states we are a relatively young country. The Bill of Rights limits the role of government in interfering with its citizens' realization of their own potential. Anyone with teenagers will recognize the echoes of the first four Amendments to the Constitution enshrined in the Bill of Rights:

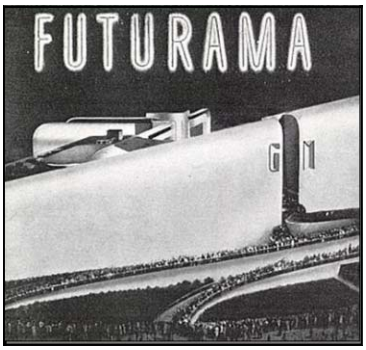
1. No restrictions on freedom of speech, print, thought, or assembly
2. The right to keep and bear arms
3. No quartering of troops in private homes
4. No illegal search or seizure of property

While many teens cannot cite these amendments, they understand them at an intuitive level as meaning:

1. Don't tell me what to say, read, think, or how to pick my friends
2. You can't make me --
3. Stay out of my room
4. Don't mess with my stuff

Working from a cultural base that sets realization of human potential as its first priority, another core American cultural assumption is that the future should

be better than the past. This unconscious assumption drives much American thinking and, as with all cultural assumptions, produces negative as well as positive effects.



While the future directive supports creative thinking and technical innovation, it also helps account for those periodic academic studies that demonstrate American students' appalling ignorance of their own history. This is not, as usually presented, a reflection on the declined state of the American educational system, but a consistent outcome since such surveys were first conducted in the first half of the last century.

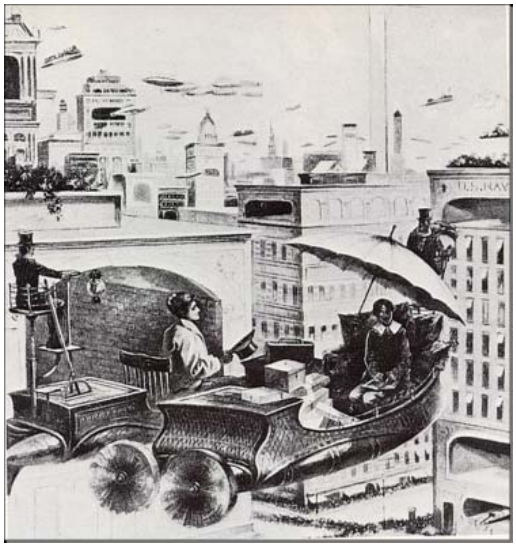
Historically and collectively, Americans have always been indifferent to their own history. Neither our parents nor our grandparents fared any better. But the reason is to be found in culture, not education. As Americans, we all simply choose to dedicate our interest to the future rather than dwell on the past.

Another outcome of our assumption that the future should (and therefore will) be better than the past results in our nation having the lowest rate of personal savings and the highest rate of personal debt in the world. This situation (much written about by financial planners and economists) lies in culture, not cost-accounting. It is the outcome of an ingrained shared assumption: that we are certain to do better in the future. So "granted" is this belief that if and when we do not, the American people historically tend to seek someone (usually the party in power) to blame. The entitlement to increased spending power is but one indication of the American attitude toward the future.

We are based on the idea of freeing human potential. Upward mobility is the goal of every American. The mechanism for maximizing human potential has always relied heavily on individual initiative in the form of technology, innovation, and invention. As a young country, we had resources but manufactured goods were costly. We closed the gap by becoming a nation of innovators, tinkerers, and inventors. Even today, with access to worldwide markets, the driving engine of the American economy is innovation. Recent surveys, for example, indicate that Baby Boomers expect it will be primarily technology that helps them cope as they meet the problems of old age.

We assume that the future should be better than the past, and rely on new and innovative technologies to make that happen.

Case Study: The City of the Future

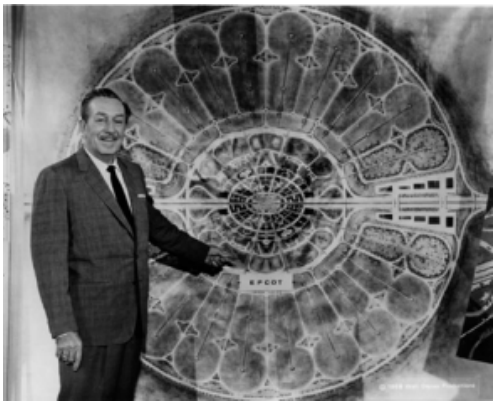


"Glimpses of the Future" 1898

In the nineteenth and early twentieth centuries, America's desired future visions reflected the context in which society found itself, the Industrial Age. Cities were the hubs of industry and popular magazines of the period published illustrations of the towering metropolis of the future, humming with machinery, fantastic transportation systems, and all the wealth and leisure time the new labor-saving creations could provide. The vision of the City of the Future was a cultural constant from the late 1800s through the illuminated, mechanized model of the future city that was a popular attraction of the 1939 New York World's Fair. Walt Disney's original 1966 plan for EPCOT (Experimental Prototype Community of Tomorrow) was a living city rather than a theme park.

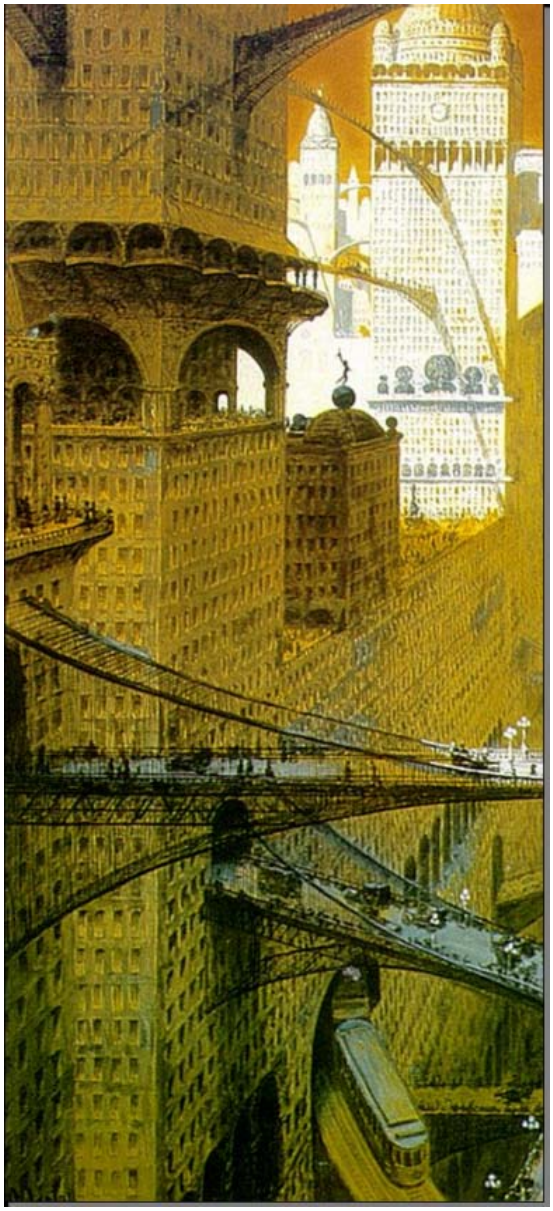
While it seems a far cry from the City of the Future to the exploration of space, the elements that turned popular imagination into an actionable vision are identical. Science and space fiction in its modern form was contemporaneous with the rise of the vision of the City of the Future. From the works of Jules Verne at the turn of the century through the pulp fiction of the 1920s and 30s, science fiction popularized visions of space travel. Unlike the City of the Future, however, such stories were perceived as works of popular imagination, not visions to be acted on.

Building the City of the Future was a consistent expression of our core assumption that everything (and everyone) can and should be improved together with our belief that the future should be better than the past. The City was the nexus of that vision because the technology was believed to be in hand to make it happen.



The original vision of Disney's EPCOT was a living city

New, life-changing inventions--the telephone, electric light, moving pictures, and the automobile--were created and aggressively



"Visionary City" 1908
magazine illustration

promoted not just in popular publications but also in three-dimensional form such as the Chicago, St Louis, and San Francisco Expositions and the brilliantly illuminated Coney Island amusement parks. People flocked to see, walk, and touch the reality of the future. Visitors to the 1939 World's Fair received lapel pins that stated, flat-out, "I Have Seen the Future."

These generations were not naïve. They were aware of the problems of urbanization and industrialization. Their core belief in improvability and a better future also drove actionable visions of wilderness preservation, safe food supply, and the rights of labor. But for the era, the City of the Future was a comparable equivalent to space exploration. The driving vision caused individuals, media, private industry, and government to dedicate their resources to turning that vision into a reality.

The importance of popular vision cannot be exaggerated. The most remarkable aspect of viewing the popular images of these future cities of the past is that, with the single exception of the personal flying transport, every other element--skyscrapers, mass transit, elevated highways and trains, and automobiles--have all come to pass. The vision both drove the execution and shaped the reality.

Case Study: From Aviation to Space Exploration

In the case of space exploration, as noted above, science fiction had been popularizing space travel since the end of the nineteenth century. These stories, however, were considered to be works of romantic imagination. Before we could reach for the stars, we first had to learn how to fly. But even the Wright Brothers' 1903 flight was originally interpreted by many as an inspiring aesthetic demonstration rather than a technology to be applied.

The cultural engines were already in place. But to take aviation from just one of a set of possible futures to an action-driving vision required popularizers and a driving event.

It took twenty years and the First World War to relocate the perception of aviation out of the aesthetic realm of imagination and into public consciousness as a viable vision of the future. Barnstormers, former Army Air Corps pilots in surplus biplanes, were the first popularizers. They literally landed the future in the middle of the Midwestern farmers' fields and sold samples. Appealing to the American values of innovation, mobility as freedom, and a better future, the Golden Age of aviation was born. Governments, the military, and business consortiums offered cash prizes for aviation "firsts." (Lindbergh's "Spirit of St. Louis" was funded by a St. Louis bank as a business investment in publicity.) The government supported the fledgling industry with mail contracts, just as the railroads were subsidized with the same contracts in an earlier era. Competitions caught the public imagination and the media made stars of pioneer aviators. Wiley Post, Amelia Earhart, Jimmy Doolittle, and their colleagues were celebrated as the Mercury and Apollo astronauts of their day.

World War I demonstrated the military advantage of seizing the high ground, but that was the limit of military vision. Visionaries such as Billy Mitchell who advocated air power as more than aerial observation were ignored (and in Mitchell's case, court-martialed) until Pearl Harbor proved them right. In an interesting parallel, the Eisenhower administration also viewed early space flight as valuable only in terms of satellites--again, taking the high ground--and manned space exploration as an unnecessary luxury. This view was tenable until the Soviets, our primary competitor, launched their first man into space.

World War II was the outside driving force that pushed rapid advances in aviation to the point where the vision could transform into reality. Suddenly flight went from something pilots did to something people on the ground, the airline industry's millions of potential passengers, could see themselves doing.

Due to advances in mass media, particularly television, the cultural shift from imagination to vision to action for space exploration happened even more rapidly, within a decade rather than a half-century.

To make it happen, the elements of all previous successful visions had to be in place:

- compatible and supportive cultural beliefs
- popularizers in the form of experts who could explain or demonstrate the immediate reality of the vision
- appropriate media outlets to publicize the vision
- an outside driving event making the choice of the vision an immediate priority

Among a cast of hundreds, three of the most prominent popularizers were space science author Willy Ley, former German rocket engineer Werner von Braun, and entertainment giant Walt Disney. Ley, Von Braun, and their science colleagues were acknowledged experts who reached a mass audience through biweekly popular magazines, an important source of public information of the era. These included a lavishly illustrated eight-part series on the possibilities of space travel in Collier's Magazine, which sold 3.1 million issues in 1953. With the pass-along rate of magazines at the time, it can be estimated that the authors' views reached into virtually every household in America.

Walt Disney popularized Space

Disney was an accomplished visual storyteller who followed up the Collier's article by producing three "Tomorrowland" segments, "Man in Space," "Man and the Moon," and "Mars and Beyond," on his popular "Disneyland" TV program. With a mix of animation, models, and von Braun as co-host, Disney beamed his vision of space travel directly into millions of American living rooms.

In 1955 Disney followed up with the opening of a three-dimensional Tomorrowland in his Disneyland theme park where visitors could actually walk though Monsanto's House of the Future, drive miniature cars on the freeways of tomorrow, and, as the ultimate thrill, fly a simulated Mission to the Moon. The centerpiece of the arena was a gleaming passenger "moonliner" rocket ship painted in the red-and-white livery of the very real Trans World Airlines.

The conjunction of these and many other scientific authorities, popular storytellers, and corporate sponsors rapidly made the vision of space travel a genuine possibility in the minds of the general public. By the mid 1950s, most Americans reported that they believed a manned trip to the moon was possible. However, they also cautioned that they did not think the government should spend millions of dollars to do it. It took a driving event to turn popular vision into public policy.

On the 4th of October, 1957, the Soviet Union launched Sputnik, the world's first man-made satellite. While the US had its own satellite program in the works, the Soviet achievement put the US on the defensive, militarily and politically. Cold War fears ran high; the very thought of the Soviet Union gaining the space high ground forced the Eisenhower administration to reorder its priorities.

Even with this new sense of urgency, three months after the Kennedy administration inauguration, no one from the White House had called NASA to be briefed. Then the Soviets put a man in space. President Kennedy, no mean popularizer himself, quickly approved a crash program to leapfrog ahead of the Soviets to put a man on the moon "before the end of this decade." For the American public, in fear of living under a "Red Moon," money was no longer an object.

The Operational Dynamics of Implemented Visions

Tracing the evolution of past successful visions reveals a consistent pattern of intersecting elements. The alignment of <u>all of these</u> is required in order to encourage a cultural shift from popular imagination to a viable vision--and ultimately, action.

- A core cultural belief that the future should be better than the past
- A core cultural belief that anything can, and should, be improved
- A strong moral imperative to better the lot of the individual
- An individualistic culture that celebrates and rewards innovators and inventors
- Mass media capable of bringing the vision to large numbers of people simultaneously, including an entertainment industry that adopts the vision and presents it as a reality
- Business interests that promote and advertise, not just products, but a total vision of a better world in which their products play an integral part
- Popularizers – innovators, educators, and scientists who promote the vision, not as fantasy, but as an achievable goal

Advertising products in the context of the greater vision

- A driving outside force or event that makes selection of the vision the optimal, if not necessary, choice

From Imagination to Vision to Action

CAUSE	IMAGINATION POPULARIZERS	VISION POPULARIZERS	MEDIA	OUTSIDE DRIVING FORCE
Wilderness Conservation Movement	Henry Thoreau James Fenimore Cooper Fredrick Remington	Albert Bierstadt Thomas Moran Hudson River school Theodore Roosevelt James Muir	Landscape Art Museums Chicago/San Francisco Expositions US capitol exhibition	Urbanization Mechanization
Aviation	Wright Bros Barnstormers Pulp Magazines	Charles Lindburg Amelia Earhart Wiley Post Jimmy Doolittle Army/Navy competition Industry	Newspapers Radio Magazines Film Air races international competition	World War II
"The Space Race"	Jules Verne Georges Méliès Buck Rogers Flash Gordon Science Fiction	Werner von Braun Willy Ley Walt Disney Chesley Bonestel Hans Heber Carl Sagan Gene Rodenberry Industry	Television Newspapers Bi-weekly magazines Worlds Fairs Tomorrowland	Cold War
NASA today	Star Wars Science Fiction UFO's	?	Television Newspapers Film Internet	?

The NASA Brand

People don't buy products; they buy values. Values are simply broad tendencies to prefer one set of conditions over another. A "brand" is simply a mental shortcut that represents the desired values. Even the strongest brand loyalty can disappear when the product is changed so that the original values are no longer recognizable, or when the buyer evolves to an age stage where the associated values no longer have priority.

Brands exist in the mind of the buyers, who control your brand. They will tell you what you can or cannot do with it. While values are broad tendencies, moving too far from their core tenets will inevitably result in brand erosion. Disney, for instance, is currently struggling with a stockholder rebellion whose principal compelling argument is that the company's reduced performance in the marketplace is the consequence of straying from its core values.

NASA has one of the most recognizable brands in the world, on a par with Disney or Coke. The brand was firmly established during the "space race" of the 1960s. Our most popular films and television programs of space exploration for the past four decades have fallen into three categories:

1. Historical – "The Right Stuff," "Apollo 13," and the HBO Series "From the Earth to the Moon" – all re-living the defining decade in NASA history.

2. Human Exploration – The Star Trek TV and film series – but these are set in the far future. The closer the series drew to the present ("Enterprise," the franchise's last incarnation), the less popular it became.

3. Fantasy – "Star Wars," set in another galaxy "far, far away." These are the current incarnations of the Buck Rogers/Flash Gordon sword-and-ray-gun adventure fantasies of the 1920s and 30s.

The NASA "brand" worldwide is manned space exploration and discovery. This is also the Brand for Americans but it is assumed that missions should be led by Americans in primarily American spacecraft. Americans, unlike the rest of the

world, are almost totally ignorant of Soviet achievements in space, with the sole exception of the early days of Soviet and American competition. We don't have strong issues with international cooperation. But Americans are always expected to assume the lead in any sort of international venture, whether business, sports, war, or space exploration.

Within the overarching brand are subsets that support the brand but taken alone, are not sufficiently compelling to promote action. Americans view explorers as interesting and often exciting, but not compelling, unless there is some clear utility to their discoveries. Most Americans profess admiration for explorers, but cannot name more than three. On the other hand, Americans respect achievement and competition in areas where success can be clearly measured, which is why most teens, who are actively seeking role models to emulate, can name far more pop stars, entertainers, and athletes than astronauts. Without a compelling human perspective and vision to give meaning to their actions, even with a clear mission of measurable results, astronauts can be considered the most wasted asset in NASA's inventory.

Similarly, robotic exploration is interesting to Americans only so long as it is viewed as an adjunct, not a substitute for human exploration. There is little interest in robotic exploration per se unless as a precursor of manned exploration and exploitation of robotic discoveries.

The allure of NASA's brand is strongest in the first age stage of the Baby Boom generation, then fluctuates from generation to generation depending on the value sets that have priority in their age groups. Pre-teens, for instance, are searching for role models and a moral cause, while Baby Boomers are moving into a period in their lives when the search for meaning becomes paramount. NASA's brand encompasses both these and other age-stage priorities searching for values comprised in the NASA brand. As another item on the plus side, the Baby Boom is our largest age segment and currently dominates (as it has for decades now) the social and political agenda of the U.S.

A strong brand is as much belief system as statement of quality recognition. We know the NASA brand is strong because people want to believe in it. One example is that while people are concerned over the price tag (weighted inversely to their belief in its vision), they generally concede that the space program has paid for itself in spin-off technology. This is despite the fact that few can name any examples besides Teflon and Tang, two products that seem as if they must have come from the space program, but didn't.

NASA does not have a branding problem; it has a communications problem, in that people do not understand the connection between the NASA brand and its current activities. While NASA has many stories to tell about their accomplishments, people don't have the scientific training to evaluate their technical importance within the brand. Again, when asked to judge between

two competing arguments in which they have little or no expertise, people will default to the more compelling vision. NASA is not currently communicating a compelling overarching vision that reflects their brand in the minds of the public.

The Immediate Future

Today American society seems to have returned to the attitudes of the mid-1950s. The public believes manned space flight to Mars and other planets is possible. But they don't believe the government should spend billions of dollars to do it.

As a group, the public entertainments we tend to buy into are either nostalgic visions of the "space race" period ("The Right Stuff," "Apollo 13," "From the Earth to the Moon") or fantasies reflecting the romantic imagination of the Flash Gordon/Buck Rogers era ("Star Wars" rather than "Star Trek"). These are the visions people support in the most meaningful way possible: with their time and dollars.

Several factors affect the public's default to a 50-year-old vision:

- There are very few popularizers of space exploration in the media or entertainment industry. The film and TV industries have reduced their focus to a narrow audience segment, 18- to 35-year-old consumers, rather than the general population.
- Some mass media, particularly those with a social dynamic, no longer exist.
    - Mass-circulation magazines such as Collier's, Life, Look, and The Saturday Evening Post had a long shelf life and were passed from hand to hand as part of the social dynamic of information. (Today the process is called viral marketing.) Collier's put the same text and images in front of millions of Americans on the same day, sparking instant conversation and debate. While the internet can reach hundreds of millions, this communication must occur person by person over time, not simultaneously. Magazines were social instruments, whereas the internet is an individual tool.
    - The original virtual reality, the World's Fair, a three-dimensional, hands-on, walkable vision of the future, is a dying form.
    - Disneyland and Walt Disney World redesigned their Tomorrowland sectors (which rapidly and expensively became Todayland and then Yesterdayland as their visions became reality) into a retro fantasy-styled future which won't necessitate frequent updates, in effect abandoning the future vision business entirely.
    - There has been no widely-recognized popularizer from the scientific community since the death of Carl Sagan.

- The structure and focus of corporate America and the way they market products has changed. No longer do they offer visions of a better future with their products featured as integral to that vision. Instead, they sell immediate gratification.
- The end of the Cold War. America is now the sole superpower. There is no one to compete against. Our threats are earth-based. There is no driving force to select space exploration over competing visions.
- Above all, the cultural center of gravity has shifted. The demographic driving force in America is still the Baby Boom, at 76 million, our largest single age cohort. The oldest were barely in their teens at the start of the Apollo Program; this cohort is in its mid-fifties today. The median age of our population is now 45, the oldest in American history. Boomers have a great nostalgic affection for NASA, but their own priorities have shifted from a future focus to maintaining what they have. They see money spent on space exploration as threatening their future entitlements (for how people compute such costs, see appendix D: Cognitive Finance and Mental Accounting).

People develop mentally in predictable stages as they move through life. While their operating values remain the same, the rank order of those values shifts according to which ones serve each age stage best (see appendix B: Stages of Personal Development). These priority shifts are well-documented and happen at predictable times over a normal lifespan. There are regular periods of review and transformation; these unconscious evaluation stages can result in a sense of disappointment and shortcoming. Comparing where you thought you would be with where you actually ended up can give a negative appraisal.

Our largest age cohort, the one shaping our social agenda, is currently moving through these stages of review and reappraisal. While no grand vision can fully live up to its promise, we as a nation are passing through a period when a large segment of the population is particularly sensitive to the gap between the vision and the outcome. The response runs from cynicism to apathy.

In the final analysis, the lack of resonance of NASA's accomplishments is reflective of the state of the larger system. NASA's difficulty in projecting a compelling future vision is, in fact, a reflection of the larger national context. As a country, the shifting cultural center of gravity--to maintaining what we have rather than looking to the future--means that the US itself has stalled in its shared vision. At the moment, there is no overarching compelling vision for NASA's vision to fit into.

Conclusion: Opportunity

Although the present state seems a bleak portrait, there are opportunities. America is still a country that thrives on shared visions. The cultural drivers that support this--the moral imperative, the assumption that the future should be better than the past, the celebration of the innovator and inventor--are still firmly in place. Only the context in which the vision is perceived has changed. And there are indicators that it will shift again in the not-so-distant future.

The future visions projected in the 1960s could be summed up as life in a world of "rocket ships, robots, and computers." The popular visions of today are still based on that world of rocket ships, robots, and computers. NASA has not so much fallen behind as simply kept in step with a society that has temporarily lost its vision. Opportunities to launch a revitalized vision are based on a short list of realizable or upcoming social conditions:

- Popularizers in the scientific community can be found.

- Popularizers among the entertainment and corporate communities are few, but this will change in response to emerging market forces.

- The rules of marketing and advertising in place today--the selling of immediate gratification--were developed in reaction to the massive economic clout of the millions of children of the 1950s Baby Boom generation. This was a demographic anomaly. The 18-to-35-year-old age stage is the most socially mobile period in our lives. Each time our lives change--from student to employee, work to promotion, through relationships and childrearing--our sense of self changes. The material things around us must then change to reflect that fact. That is why these are the peak consuming years of our lives. But even the youngest Baby Boomer is now well past that peak consumer stage. The old rules of marketing are consequently breaking down. The advertising industry is in trouble. There are no corresponding generations in the pipeline to carry on the economic clout tradition of the Boomers.

- The goal of business has also changed across the Boomer years, from a focus on long-term planning and involvement with the community to short-term return on investment and increasing shareholder value. Visions in business today are limited largely to Vision Statements.

This strategy is also being revisited in light of the shifting cultural center of gravity. In addition to stock dividends, people 40 and older also demand concepts such as good corporate citizen, engagement in the community, responsibility, and an ethical platform--all elements that could be found in successful traditional pre-Boomer corporate ideals.

Business strategy is influenced by the continued Baby Boomer migration through the stages of development. As larger and larger numbers move through their reflection and transformation stages, the psychological center of gravity will again shift. In commercial terms, people move from buying goods through buying experiences to buying meaning, seeking an answer to the question: why am I here and what is my place in the larger scheme of things?

Corporations that begin selling a vision of a better future--one with meaning, rather than a narrow focus on products--will find a receptive audience.

- China is positioned to become the driving outside force, but it has not yet appeared on the average American's horizon. This will change in the next decade. The Chinese are moving aggressively to become an economic power. They have already become the world's manufacturing center, not only producing but innovating. They are competing on the brand level on the Pacific Rim. This is not aggression so much as necessity. For three millennia, China has primarily followed a policy concentrated on balancing internal forces, with little interest in the rest of the world unless they perceived that their vital interests were threatened. China's cultural ideal is to view itself as central and self-contained.

  The primary Chinese concern was balancing population with food supply. In area, China is slightly smaller than the US, but with a population of 1.2 billion compared with our 290+ million. Only a bit more than 13% of China's land is arable compared to nearly 20% of the US, and the arable US land is conducive to mass agriculture while China's geography limits much of its production to far less efficient small farming. In China, an imbalance between the food supply and population has always resulted in disaster.

  This drives China's population policy of one family, one child. Medical technology that allows parents to know before birth the gender of their child and terminate unwanted ones (female), combined with an agrarian and industrial society that still relies heavily on muscle power, particularly in the provinces, means the population is becoming more out-of-balance in favor of males. While this will work to China's advantage in their long-run goal of reducing population, it also raises social problems for the immediate future. China has to keep this male

overpopulation occupied, hence China's move to the outside world to find new outlets for this energy. To maintain full employment, they will need new customers outside their own country.

In comparison to the US, which has 5% of the world's population and consumes up to 30% of the world's resources (much of which is used to produce food and products for world consumption), imagine a competing country with the buying power, consumption, and production of five to ten Americas.

At the moment, despite the loss of manufacturing jobs to China, this is all happening below the average American's conscious horizon. They still see China through the old paradigms. Therefore China's first space flight was viewed as an interesting novelty. Many commentators noted that their first successful space flight was "40 years behind us," but those are "old" years. They can build on what we have learned, without having to conceive and develop concepts, tools, new materials, and technologies. The idea of China on the moon will not sit well with the American public, particularly if the US has no comparable – and preferable – capability.

Despite international claims of "American unilateralism," Americans have historically been slow to move to group action. This is reflected in the model for an American hero as someone who endures multiple provocations before being moved to action – and then only in defense of the community, never himself. It took a Pearl Harbor to move us into WWII and 9/11 to move us to action against Islamic militants--who had declared war on us over a decade ago.

Even these actions had to be viewed against perception of a greater threat. Americans were aware that Japan and China had been at war since 1937. The Middle East has been in turmoil since the late 1960s. When China is seen as a serious competitor, their activities in space will take on a compelling resonance. That will be within the next decade.

Americans cannot be without a compelling vision of a markedly better future for long. Our culture won't allow it. We have always been a proactive society, not a reactive one. NASA has the opportunity to provide a vision that fits with the emergent larger vision of understanding our place in the greater scheme of things. The success of NASA's vision will depend on how well it is tailored to fit within the newly emerging vision of the society it serves.

Appendix A: The Seven "Shoulds"

Cultural values are simply broad tendencies by members of any group to prefer one state over others. Values are rarely articulated, since they operate at a pre-conscious level, but they are instantly recognized in their violation. They are expressed over time as a consistent pattern of movement in the direction of a desired state. They express a deeply held feeling for the way things "should" be.

In the US, some of the key "shoulds" are:

1. Individuals should determine their own destiny.
2. Individuals should control their social and physical mobility.
3. Actions should be judged in a moral light.
4. Authority or "bigness" should be viewed with suspicion.
5. We should have as many choices as possible.
6. Anything can and should be improved.
7. The future should be better than the past.

Appendix B: Stages of Personal Development

A large body of work by both physiologists and psychologists documents the evolution of human needs over a lifespan. By comparing this process to the consistent cultural patterns of behavior over time, it is possible to outline a picture of the human lifespan as the development of a decision-making being.

Human beings are a species that continues to learn and adapt throughout its entire life, a process that is not linear, but cyclical--a repeating progression of learning, applying, adapting, and transforming. Modern humans go through at least three transformation stages at predictable points in their lifetimes. The dynamic of these stages is a quite predictable sequence of changes in development, needs, thinking, and values.

We imprint on values when they first stir emotions: for example, nurturing from infancy, basic values from childhood, music from teenage years, and fashion from the mate-seeking period.

As we transition from one developmental stage to the next we edit the database, dropping what no longer works, making and testing new discoveries, adding information found to be useful in our new operating environment, and developing new recognition patterns.

This editing process occurs in four progressive stages of development: Awareness, Learning, Reconciliation, and Transformation, each lasting an average of five years. As we edit, we reprioritize our values, as in when we exchange the freedom of individuality for the compromise and commitment of family. Freedom is still a value, but other values have moved up to dominate.

In addition, every twenty years we go through what can be thought of in computer terms as a "systems upgrade." These twenty-year cycles are identified as Growth (birth-age 19), Conflict (ages 19-40), Maturity (ages 40ansition-60), and Resolution (ages 60+). We emerge from the transformation stage of each cycle in a distinctive new phase of identity: from teenager to young adult, from young adult to maturity, from maturity to a cycle of reflection and resolution of the contradictions of our own character.

Each transformation carries economic implications. Ages 19 to 35 are the hot demographic for consumer sales because these are the most socially mobile years in American life. Just as soon as teens develop an identity independent

from the parents, they immediately have several other identities thrust upon them in rapid succession—student, employee, peer-group member, partner, parent.

During this period, you can be, as far as your brain is concerned, a different person every few months. As human beings, whenever we change, our environment must change around us (like a stage-set in the theater) in order to validate our new self-image. Therefore a majority of people between the ages of 19 and 35, as socially mobile beings, are more inclined to buy a new and wider range of "stuff" than the older self-actualized person.

Once Americans progress through their second transformation, mobility slows as they achieve a more complete sense of self. They stop buying new stuff; now they only replace or upgrade, and so may skip whole generations of technology, as from tape deck directly to DVD player or satellite radio, bypassing CDs entirely. But as the material goods that reflect their identity now remain relatively stable, they can start buying experiences. This will continue until reaching the next transformation stage, when they go beyond experience to begin buying meaning.

At any stage of this process, brand loyalty can disappear when the consumer moves into a new development stage where the values originally perceived in the product no longer hold high priority.

Reconciliation stages (10 - 15, 30 - 35, 50 - 55, and 70 - 75) are particularly significant. During these periods the brain is preparing for transformation by unconsciously scanning for significant patterns within the group ahead, while also scanning behind for significant moments in the past. Thus you find young teens at Disneyland rushing to test themselves against the roller-coasters of Splash, Space, and Big Thunder Mountains, but they equally gravitate to, in the words of one 11-year-old, "the stuff I liked as a kid." This backscanning process makes the 10-15-year age group a key player in building lifelong brand loyalty.

Age stage determines not only which values the consumer is drawn to, but how those values are recognized and acted on. The definer of how values are perceived is tied in to the level of self-actualization of the perceiver. 'Self-actualization" is simply a strong positive sense of who you are—your likes, dislikes, capabilities, and direction. It is a positive proactive viewpoint (you know who you are) rather than the negative reactive viewpoint (you know who you don't want to be) of early adulthood. Most reach this stage after the transformation from the age stages of Conflict to Maturity, in their early forties.

Prior to Maturity, values tend to be viewed as derivative—"I'm cool because I'm wearing this jacket." After Maturity values tend to be reflective—"This looks like me."

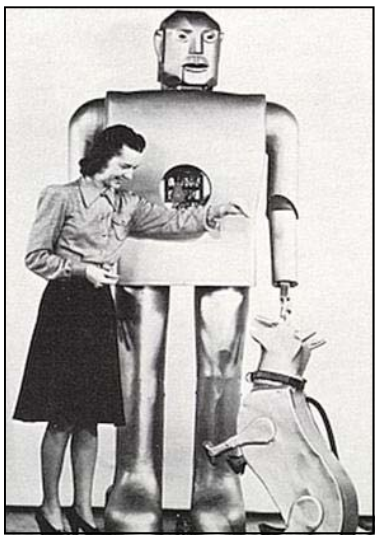
Understanding age as a process, rather than an event, not only tells you what and why the majority of any particular age group behaves the way they do; it also tells you where they are going and what they will gravitate to in the future.

(See Chart next page)

Stages of Personal Development

Basic Characteristics of Life Development Stages				
	Growth	Conflict	Maturity	Resolution
Awareness	**Infancy** **Birth-4 Years**	**Individuality** **19-23 Years**	**Self-awareness** **40-43 Years**	**Reflection** **60-65 Years**
	Infants live in the present in a bonded state of absolute dependence with mother as the provider of all needs. The infant's relationship to its mother will change rapidly as the infant develops mobility, but the mother's relationship as nurturer to the infant will not.	The fundamentals of taste in music, clothing, partners, and personal concepts such as what is attractive or sexy are set here. However, just as your personal identity is emerging you take on other social identities: employee, spouse, and/or parent. The value in learning tilts from Experience to Utility.	This is a nuanced, experienced, and edited version of the individual at 23. Depending on the degree of change necessary to bring the mature self into alignment, this process can be dramatic or simple. The final shakeout will fall back to more nuanced preferences confirmed at 23.	This stage marks the beginning of a search for meaning. A renewed interest in religion of youth or popular philosophy or spirituality is common. Value is found in experiences such as non-utilitarian learning, travel, and personal development. As in childhood, goods are valued for their Affiliation.
Learning	**Childhood** **4-10 years**	**Alliance** **23-30 Years**	**Readjustment** **43-50 Years**	**Recognition** **65-70 Years**
	Children are experiential learning machines, gathering and manipulating data until all possibilities are exhausted, then moving on (play.) The nature of play limits long-term brand loyalty. Children look to role models to validate discoveries. Value in consumer goods lies in Affiliation.	The learning stage of a long period of conflict and resolution between the individual and overlaying social identities. Shared meals emerge as an important social collaboration for gauging relationships. Value of consumer goods lies in Validation of rapidly evolving social mobility.	The learning stage of the maturity period. Products and practices that do not fit are dropped. There is a new openness to new alliances and ideas compatible with examined and refined values. Consistency and reliability are high priority values.	The learning stage of the resolution period. Practices and products that do not meet the new standards of core value for cost (money or spiritual) are dropped. Brand loyalty for valued products is fixed unless the product changes or cost increases negate value.
Application	**Preadolescence** **10-14 Years**	**Practice** **30-35 Years**	**Mastery** **50-55 Years**	**Accommodation** **70-75 Years**
	The first nostalgia age as children look to establish lifelong values. Preadolescents work to strike a balance between present and future states, actively seeking new role models while finding security and investing value in the icons of childhood.	As life gets more complex, imbalances come to the fore. This period marks the second nostalgia age as icons of childhood reemerge as symbols of value. The core values of nostalgia are reliability, consistency, and security.	The third nostalgia age as we reflect on life's path. A period of fine-tuning of alliances and practices. The editing-out process is rapid. As social mobility slows, acquisition of goods also slows. Value is found by a return to a nuanced version of the childhood play stage of Experience.	The final fine-tuning period of stripping away what doesn't work and valuing what does. A sense of freedom not experienced since childhood drives us to explore for intrinsic motivation alone. Nostalgia is commonly expressed in unfavorable comparison the present to the past.
Transformation	**Adolescence** **14-19 Years**	**Evaluation** **35-40 Years**	**Reevaluation** **55-60 Years**	**Acceptance** **75+ Years**
	The emergent identity is driven to sever the dependent relationship with the parent. Validation shifts from parent to peer group. Self-testing and the "trying on" of mediated identities drives both the consumer good and experience markets.	A time of identity-driven separation similar to the adolescent stage. A period of reexamination of the web of relationships that comprise the social whole, with a rejection of those that do not fit the individual identity.	A third period of reexamination of identity based on the realization that you are now most likely operating at maximum capability in all areas of your life. Value is placed on understanding and security. De-accessioning consumer goods begins.	A period of confirmation of identity and an acceptance that some things are beyond your control. Intrinsic reward is high value: learning, continuity (sharing experiences with grandchildren), self-actualization, etc.

Appendix C: Public Perception of Robots and Exploration



The word “robot” (which supplanted the word “automaton”) was popularized by the 1920 play R.U.R. (Rossum's Universal Robots) by Czech writer Karel Capek. The play set the unconscious archetype or model for robots that continues to this day.

Robots (from the Czech word robota: "drudgery" or "servitude”) have been a staple figure in any American popular culture that focuses on the future. But their role across time conforms to strict cultural conventions.

What the general public perceives as robots are general-purpose anthropomorphic creations (mostly human, with a few patterned after animals). It is this anthropomorphic quality that makes it difficult for many people to recognize that they live in a world where robots are a reality. Real robots are specialized machines of any size or shape built for dedicated tasks. There is no reason for them to mimic the general human form. There are also excellent cultural reasons why they should not.

Capek’s play ended with the robots destroying and replacing their human masters, reflecting humankind’s long-standing fear of being supplanted by machines. This has been a recurring theme since the beginning of the industrial age and prevails to the present. Robots that have captured the attention of the public in science-fiction novels, TV, and film fall into two narrow categories:

- helpers for humans
- threats to humans

In no case have people favorably viewed robots as substitutes for human beings. No matter how sophisticated the robot, and despite all evidence to the contrary, human beings do not trust the judgment of machines over their own.

However, in their role as helpers to humans and deferring to human judgment, robots are acceptable, even desirable. The Mars Rovers are excellent examples as their general size and shape, as well as the name "rover," evokes man's oldest companion, the working dog. But here again, the mental model holds true: dogs work, but humans are in control.

Robots are also perceived as ideal for filling the role of explorers. The traditional role of first-stage exploration is better filled by robots than by humans in every area except judgment. They break the trail, map the terrain, search out resources and hazards, and send the information back to civilization. (NASA may have missed an opportunity to drive this point home by not naming the twin Mars Rovers "Lewis" and "Clark.") Americans believe that they can do all these things more safely than humans, but they do not believe that robots can determine what it all means.

Although people use the two terms interchangeably, the ultimate vision for the astronaut role is perceived as more in keeping with the role of "pioneer" as opposed to "explorer." America is a nation built on the mythology of the pioneer. Americans are hard-pressed to name any explorers other than Lewis and Clark.

Pioneers follow the explorer and exploit their discoveries. Without human exploitation, exploring for its own sake loses critical mass as a compelling vision. Internally, NASA's constituent parts are competing for scarce dollars for science, seeing manned spaceflight as inefficient, with robots as a more economical and practical alternative. But this ignores the human factor: the pragmatic approach ultimately will not sell because it violates the cultural archetype. Again, when faced with competing points of view without the expertise to judge between them, people inevitably default to the one with the most resonant vision. For NASA's purposes, that resonance is the outcome of an applied result involving humans.

From this specialized viewpoint the machine-instead-of-human proponents are following a path in conflict with the general public, and in the long run, they are undercutting their own best interests. The public is not interested in paying for pure science, only for applied science. Without manned space flight, and space flight with a perceived applied outcome (i.e., not science experiments aboard a shuttle in low earth orbit), the money budgeted for space is judged to be better spent on applied science here on earth in more immediately compelling areas such as health-care research.

Appendix D: Cognitive Finance and Mental Accounting

The human brain is the most complex organism in the universe, but it is not equally good at all operations. Our ancestors evolved to be very good at evaluating short-term events: picking safe food, a prospective mate, or a dishonest trader, because these are survival and reproductive strategies. People are not equally adept at identifying long-term trends, drawing conclusions from complex data, or focusing on many factors at once. It seems we are not built to focus on the distant future at all. We are coping in the twenty-first century with a brain that evolved for survival in a hunter-gatherer society 160,000 years ago.

Anything our brain can't do instantly is a recent program, something we must be trained to perform. Since the space program is a long-term effort, with complex and academic subroutines, it is difficult for people to compare costs and benefits across long time frames punctuated with seemingly random high-profile events.

The field of Cognitive or Behavioral Finance, coming out of cognitive psychology and microeconomics, has pointed up many decision-making areas where the human brain behaves less than optimally, particularly when compared to that ideal of economics and law, the "rational" "reasonable man."

One of these cognitive problem zones is a simple failure to comprehend how the government actually spends money. We complain that the government "gives" millions in aid to Israel or Egypt because most people do not understand that the money is given in the form of credits — which can only be spent here in the U.S. for goods and services produced by American workers. On the other hand, we will buy a Japanese-made TV without realizing that some of the money actually flows out of the country to Japan. In the case of NASA, people think and speak of the money literally being shot into space, not flowing as it does into the pockets of the American workers who build the rockets and systems.

A second problem is one of scale. On an unconscious level we assume that NASA's share of the Federal budget is bigger than it is simply because the rockets are massive, flight distances enormous, and the missions so spectacular. Human mental accounting operates by simple rules of thumb based on experience, and one of the fundamentals is that big stuff costs more than small stuff.

Cognitive Finance demonstrates that these human emotions and cognitive errors are far from random "mistakes." Instead these behaviors form out of ingrained and systematic patterns. These patterns, like those of culture, are consistent, predictable, and can be (and routinely are) exploited for profit. Amos Twersky, the father of Behavioral Finance, showed that people make completely different determinations from identical data depending on whether the equation is simply cast in terms of bottom-line gain or loss.

We're not good at investments because the stock market is a complex phenomenon: the Warren Buffets and Peter Lynches of the finance world are famous because they are exceptional investors. The rest of us tend to buy high, sell low. This is because investor behavior (at the aggregate level) is driven not by utility value, but by other principles: fear and greed.

There is a basic conflict between rational processing (numbers, cost accounting, evaluation, and cost comparison) and cultural values (based not on math but on "cultural logic" that ranks people, things, events, and experiences along a scale of preference). The difference is often expressed as an inefficiency, because they are not calculated in the same way and don't compare the same functions. In looking at the human values that drive decision making, however, these tendencies can be viewed not as errors but as something higher and more powerful: value-driven logic, in contrast to cost-driven calculation.

Human heuristics, or "rules of thumb" for decision making, obey the dictates of our basic brain wiring in conjunction with the values and assumptions of our shared cultural beliefs.

For instance, while people "know" that they should invest in their retirement, that saving is necessary for their children's education, and that time is finite and should be saved and spent wisely, they rarely behave as if these things were true. Most don't save, pay off debt, or have any idea what college will cost the family a decade from now, let alone have any realistic idea of where their time goes. These are not rational slips or irrational biases. Instead, they are culturally driven defaults, powered largely by the very American assumption that the future will be better than the past. This future orientation is important to understand because it drives so many of our collective decisions about resource allocation.

"Mental accounting" describes a thinking process for regulating spending by keeping cost centers separate. It refers to the ways in which people code and impose restrictions on monetary assets. Rather than treating money as fungible --which technically, it is--mental accounting treats money as existing within file folders, envelopes, cookie jars, buckets, or baskets: discrete containers separate from the general fund and from one another.

Within and between these mental accounts, we think of money as if it had different relative values attached to each spending department. This understanding allows us to predict human behavior as it relates to the way people think about and act on the world of assets, including income, investments, savings, and purchasing. The difficulty people encounter with the transition from micro to the macro is that there is no easy correspondence between a household budget and a national budget.

Spending parameters are even set differently depending on the method of spending: cash versus credit card, long- versus short-term debt, credit versus debit card. Companies and governments think in terms of department budgets, not their overall financial position. People behave differently when consumption is separated from payment, as in flat rates, prix fixe menus, and advance and delayed payments. Besides the acquisition utility (the goods or services), there is value in "transaction utility": the deal itself and its effect on other parts of the financial picture. If anything proves that microfinance runs by values rather than cost accounting, mental accounting does.

Under mental accounting, funds are distributed by mental categories even though there is no financially logical basis for the categorization. For example, individuals often segregate their savings into separate accounts to meet different goals, whereas of course funds from any of the accounts can actually be applied at any time to any one or more of the goals.

Money is thus treated as distinctive for each cookie-jar or mental file folder, which has its own budget and price-points. Missing the overall picture is easy, since the budget is fragmented (to prevent overspending in any one area). But failure to compare funds within each category, or to consider moving funds from one to another, has the potential of missed opportunities by spending or saving in the wrong places to serve the category, not the overall situation. For example, the couple who feel they cannot touch their child's college fund to cover a down payment may overspend to buy their next house. The school fund could be duly replenished at less expense than the higher interest rate that results from the lower down payment. But once the college fund becomes a moral category, any exchanges within it carry a moralistic negative charge.

To bring the NASA budget into perspective, making cost comparisons across mental file folders allows for a more intuitive frame of reference. Placing categories and their costs side by side for contrast gives a sense of proportion among them, since each mental account has a different risk tolerance, benefit, and importance, as ruled by different cultural values.

When we do this we confront another operating principle of mental accounting: each category has a different moral weight, or social benefit, and these can be weighted to show which ones outrank others on the moral scale.

Using the moral scale to compare NASA dollars to dollars in categories within the average American's experience reveals 1) a dramatic discrepancy between the moral values we assign to domains and what we actually spend on them, and 2) the favorable position of the NASA budget with respect to other far less "deserving" budgets — those with a strongly perceived negative social value. Contrasted to US consumer spending on beer, fast food, gambling, cigarettes, and related tinged pursuits, it is not difficult to make an excellent case that we don't spend nearly enough on the space program in view of the legions of trivial, semi-legal, or morally questionable spending centers.

Contrasting between lottery spending and education, fast food and dieting--categories not ordinarily compared--gives an idea of their relative importance in behavioral finance: how people actually spend their money. For NASA, favorable comparisons can be drawn between their annual budget to annual consumer spending on potato chips ($4.4 B) or pet care ($18.2 B), or the $14 B spent by US companies on marketing directly to children.

Comparing short-term discretionary spending, especially spending on "frivolous" or morally questionable things, as against long-term dedicated budgets, points to the quite reasonable size of the space budget, especially when seen as "investment capital" for the culturally assumed better future.

Americans carry $1.7 trillion in consumer debt. Annual spending on fast food is $110B, money spent every day by a quarter of the adult population. Americans also spend $34B annually on weight-loss and diet products, an interesting cause-and-effect scenario. The total for fast-food spending--$1 a day per everyone in the US population--exceeds spending on higher education or new cars, and outpaces the total for movies, books, magazines, newspapers, videos, and recorded music combined.

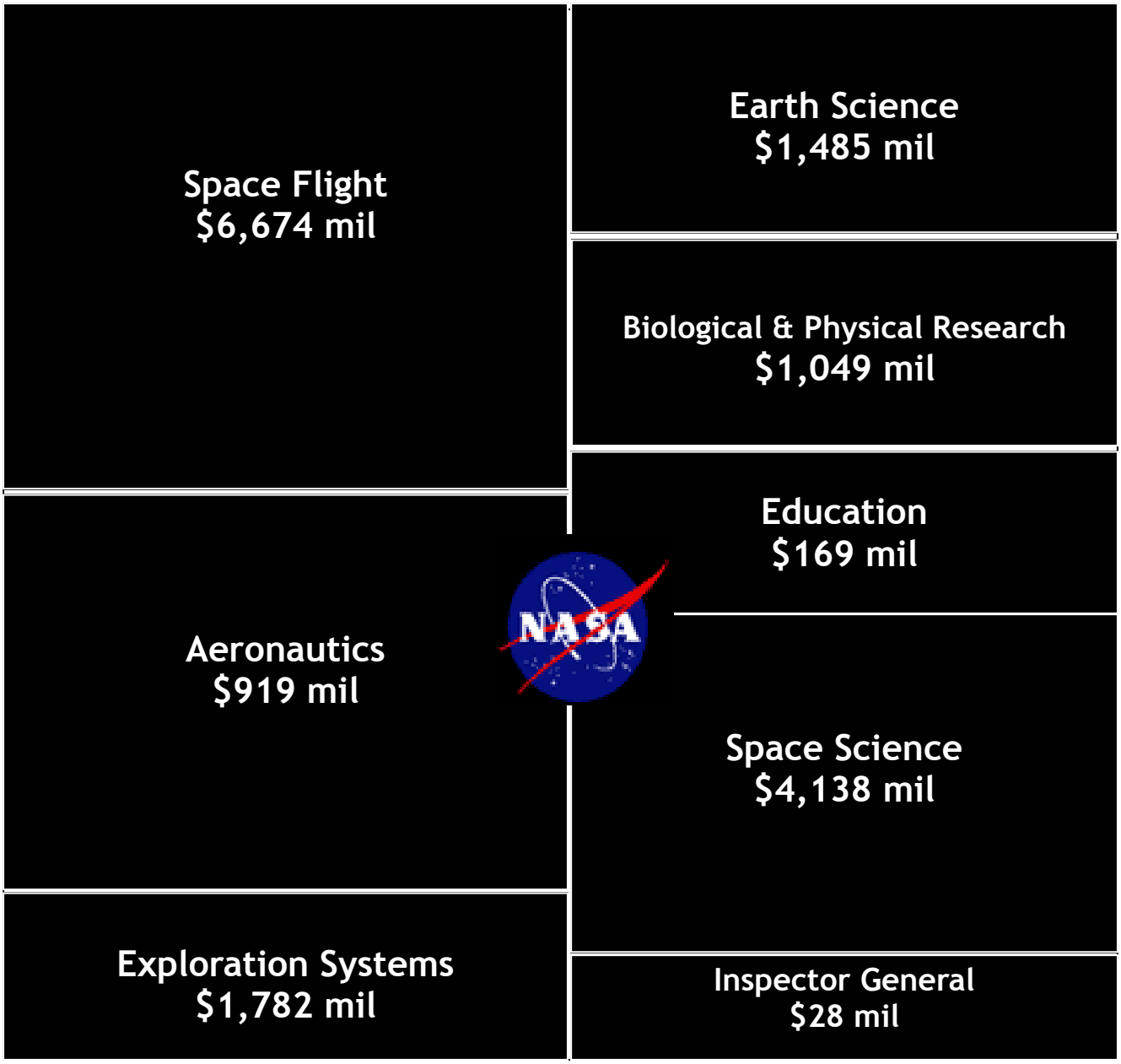
It is important to note that this is not an either/or proposition: NASA is not asking the public to give up cable television or potato chips or diet aids to pay for the space program. They are just being asked to consider that a nation that can afford these things can certainly also afford to fund its future.

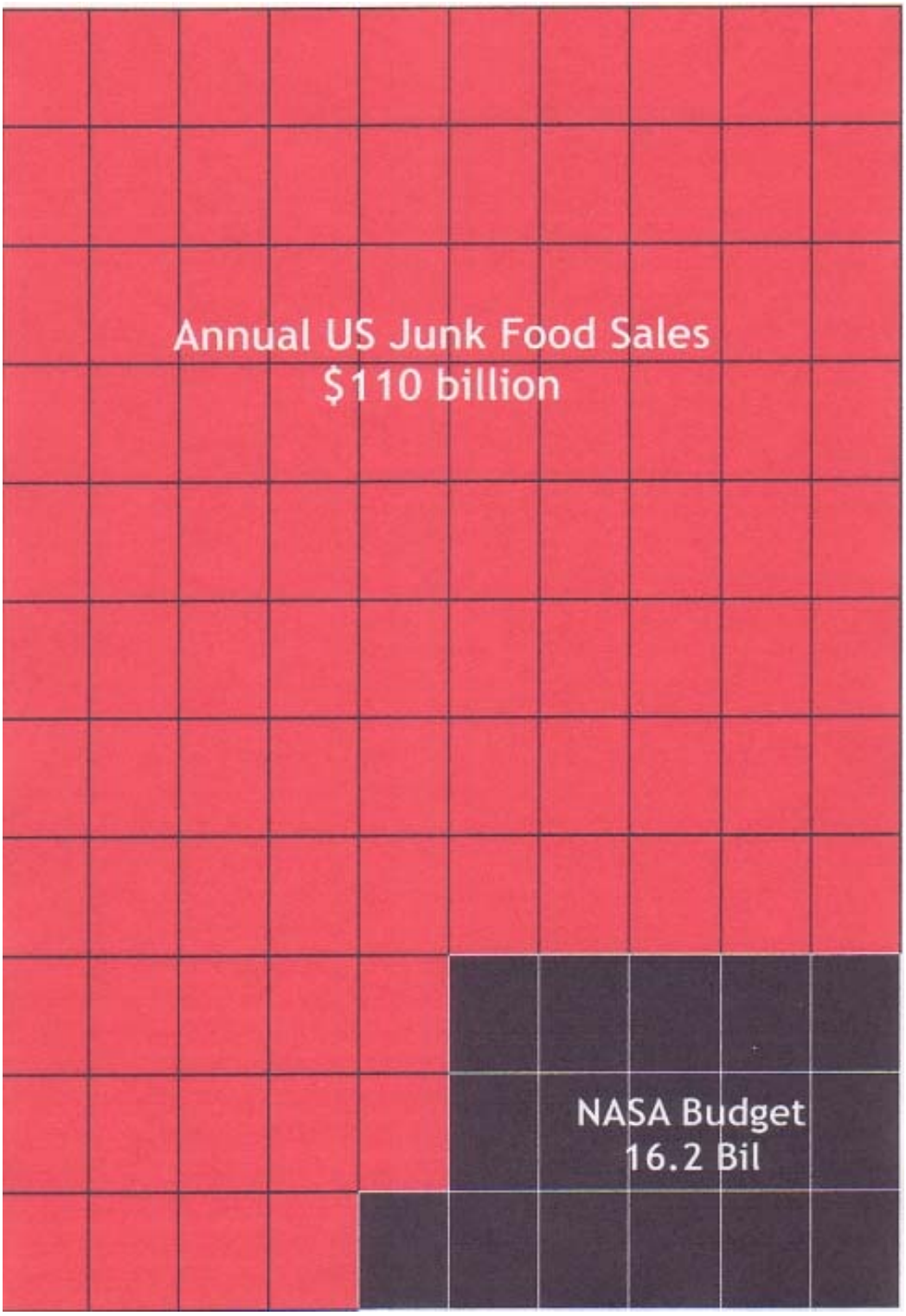
Comparing the NASA budget – less that 1% of the federal budget - to items perceived as discretionary spending with a high negative moral return or social cost is more than an accounting or public relations trick. It is a more accurate representation of how people actually count cost and value received than federal budget figures can reveal.

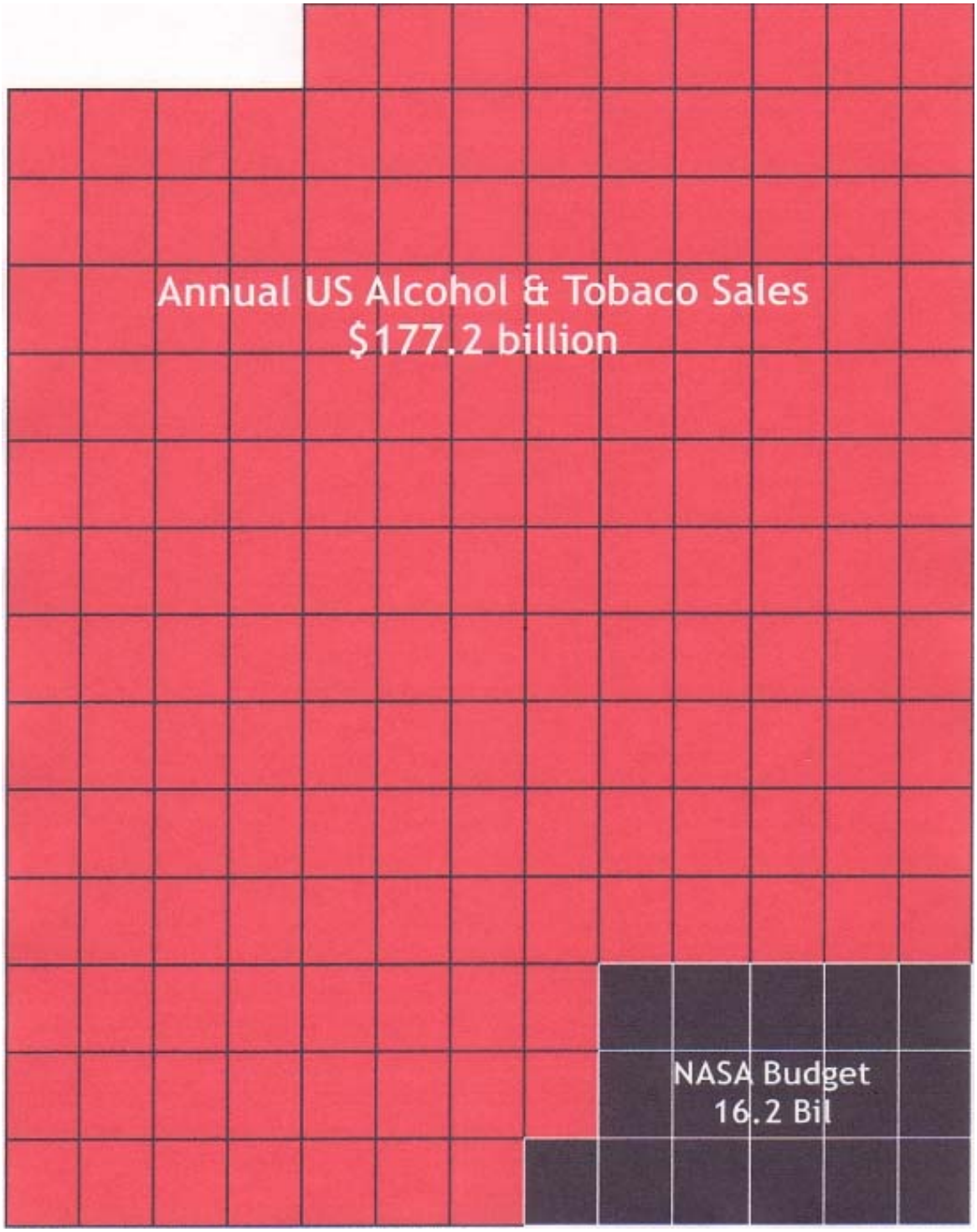
NASA dollars can be compared across many such categories for contrast to clarify the relationship between NASA's small slice of the national budget and everyday out-of-pocket expenses as components of the household budget. On an expanded level, industry expenditures such as the $14 B spent by US companies just on marketing to children can be compared for favorable results.

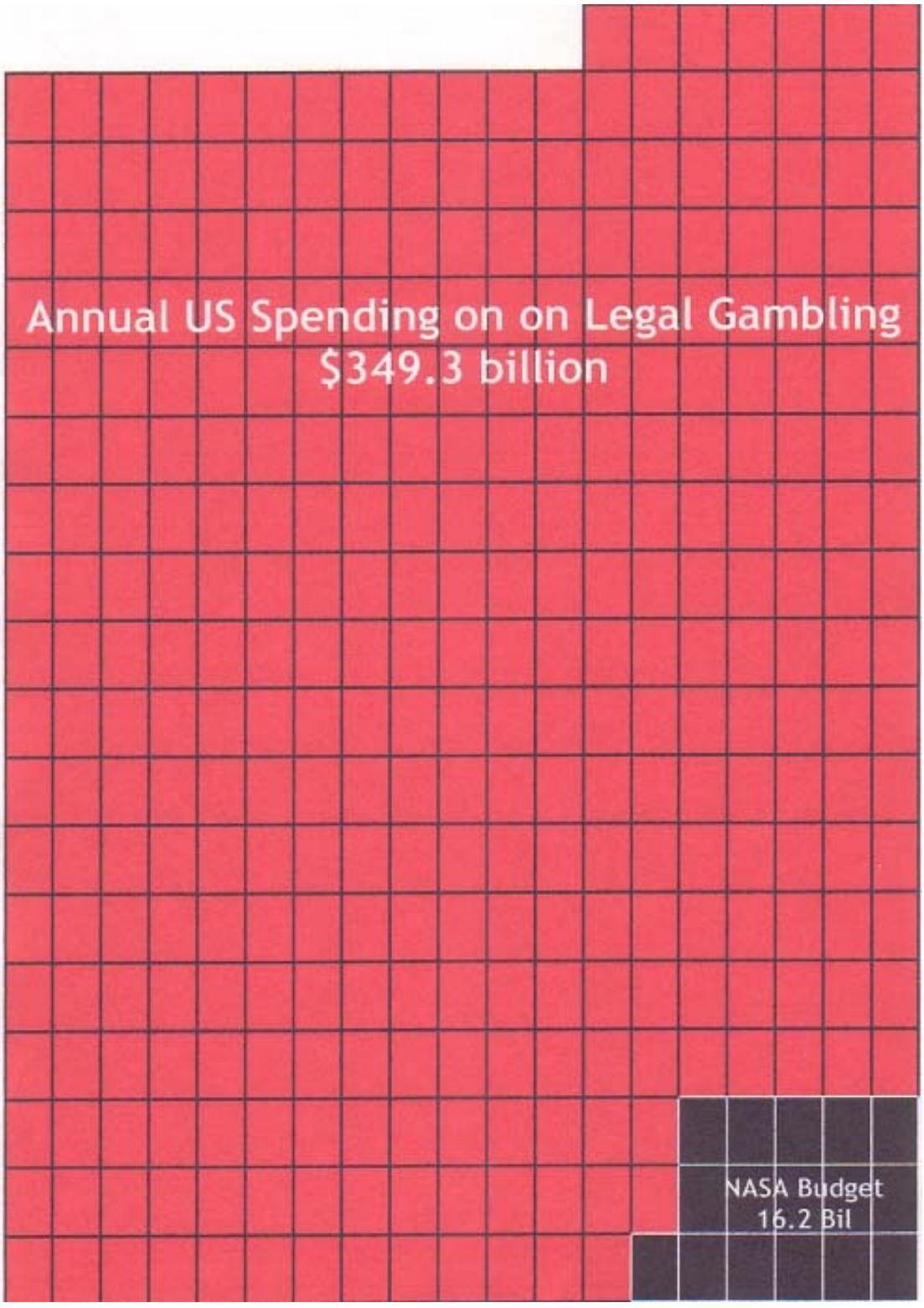
Chart 1

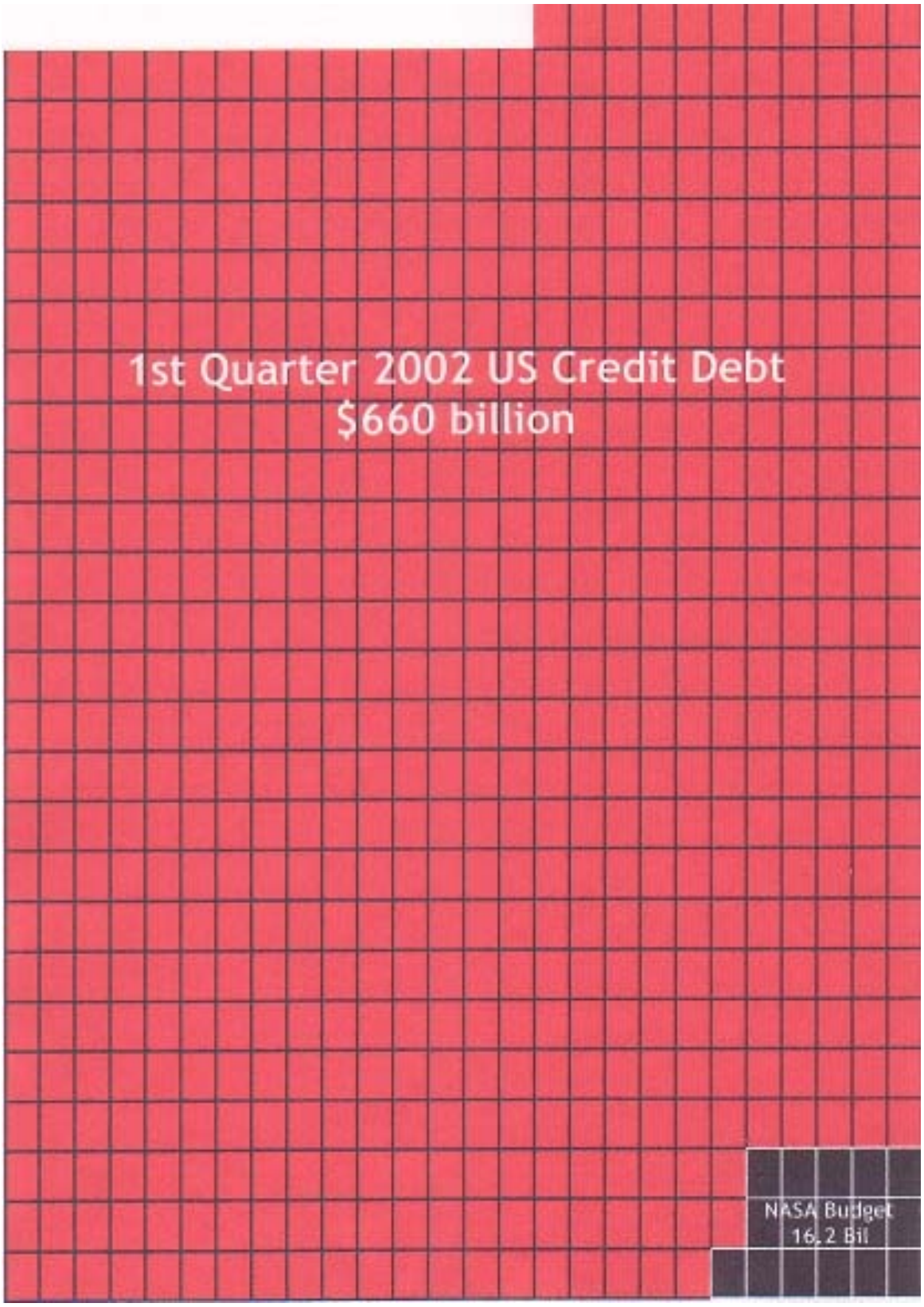
NASA BUDGET FY 2005
$ in Millions
Total $16.2 Billion




Annual US Junk Food Sales
$110 billion
NASA Budget
16.2 Bil


Annual US Alcohol & Tobaco Sales
$177.2 billion
NASA Budget
16.2 Bil


Annual US Spending on on Legal Gambling
$349.3 billion
NASA Budget
16.2 Bil


1st Quarter 2002 US Credit Debt
$660 billion
NASA Budget
16.2 Bil

his research analysis was compiled for Harmonic International and NASA by:

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The Center for Cultural Studies and Analysis is a Philadelphia-based think tank that studies how Americans make decisions. Research is our tool; analysis is our product.

Just as the most effective form of communication is one in which the recipient is already predisposed to believe the information, the most effective form of marketing is one in which the recipient is already predisposed to value the product.

The Center for Cultural Studies & Analysis identifies and describes how consumers determine value in products, concepts, and ideas.

- We identify the unconscious elements that cue value and drive consumer choice.
- We help our clients optimally design and market products that consumers recognize as valuable at a pre-conscious level.

Who Uses Us?

Businesses and institutions that market and/or design products, concepts, and ideas for the consumer market. Our clients apply the intelligence gathered by the Center to new product development, marketing, advertising, and strategic planning initiatives.

Since the Center's expertise is the American decision-making process rather than a product area, our client list includes companies and institutions as diverse as: Walt Disney Imagineering, Best Buy, Procter & Gamble, Thomas Jefferson University, Dupont, Compaq computers, Helzberg Diamonds, Six Flags theme parks, AAMCO, the International Dairy Foods Association, General Mills, and Pfizer pharmaceuticals

Key Personnel:

Margaret J. King, Ph.D., Director

Margaret J. King is a nationally recognized expert on consumer behavior and wrote the seminal appreciation of theme parks as cultural products. She received the first graduate degree ever earned in Popular Culture from the Center for the Study of Popular Culture and the Ph.D. in American Studies from the University of Hawaii. Research at the Culture Learning Institute at the East-West Center included fieldwork in Tokyo and Kyoto.

Her research areas range from theme parks, museums, the popular arts, the nature of creativity, film, television, cross-cultural issues, and marketing, to consumer psychology, decision-making, and culture theory.

Dr. King's studies of culture appear in over fifty publications including *Industry Week, The Futurist, Museum News, American Marketing Association Newsletter, Antioch Review, The Conference Board, Journal of American Culture, International Popular Culture, Journal of Creative Behavior, Innovative Leader, Mature Marketing Media,* and *Marketing Insights.* She wrote the entries for Disneyland and Walt Disney World for the *Dictionary of Popular Culture,* and defined the theme park for *The Guide to U.S. Popular Culture.* Her body of work includes contributions to numerous books, including *The Cultures of Celebration, The World of Ronald McDonald, Research in Culture Learning: Language and Conceptual Studies; The American Mosaic,* and *Advertising and Popular Culture.*

J.G. O'Boyle, Senior Analyst

Jamie O'Boyle has done cross-cultural field studies and written on global culture from areas as wide-ranging as the Middle and Far East, West Africa, the former Soviet Union, and Northern Ireland. He developed the complex systems model used to identify and track patterns of behavior and decision making within national and institutional cultures

He is on the Boards of the Global Futures Forum: North America, and the American Creativity Association, Area Chair of the Popular Culture Association, and is Vice President of Fellows in American Studies. He has lectured on the unconscious assumptions that drive American decision-making at institutions such as The University of Greenwich at the Old Royal Naval College (UK), The University of the Americas (Mexico), and Harvard University.

His work in human perception, shared values, and behavior has been used by clients as diverse as Walt Disney Imagineering, Dupont, Thomas Jefferson University, General Mills, Best Buy, Pfizer, 3M, The Autry Museum of Western Heritage, Helzberg Diamonds, and Six Flags.

Bret H. Rigby, Director of Operations

Bret Rigby spent more than 13 years developing programs to improve category growth in the food sector. This growth has come through the use of innovative traditional (in-store promotions, advertising, public relations, etc.) and nontraditional (school classrooms, celebrity sponsorships, museums, etc.) marketing tools.

His organizational specialties include organizational growth, human capital management, and executive team development. He has an MBA from George Washington University and a BA in Political Science from Brigham Young University.

Chris Randolph, Director of Research and Development

Chris Randolph majored in Political Science at the University of Pennsylvania. He served as Research Manager for an NGO, where he was instrumental in creating one of the world's largest repositories of global demographic and economic data, and led global studies workshops in several countries and across the US. He has worked for the Organization for Security and Cooperation in Europe (OSCE) in Bosnia and has taught in the Arabian Gulf. Chris has visited dozens of nations in work and travel.