A composite space-themed image featuring Earth, the Moon, Mars, Jupiter, a comet, a satellite, and a galaxy. The background is a dark blue space filled with stars and a spiral galaxy in the upper right. In the foreground, Earth is on the left, showing continents and clouds. The Moon is in the center, and Mars is below it. Jupiter is on the right, showing its characteristic bands. A comet with a long tail is in the upper right, and a satellite is in the upper left. A bright orange and yellow nebula or solar wind is in the center.

# NASA Research Park: Briefing to Carnegie Mellon University



Michael Marlaire  
Director NASA Research Park  
November 8, 2010



## Executive Summary

- **NA SA Research Park (NRP) is located on property at NASA Ames Research Center in California's Silicon Valley**
  - In 1994 NA SA took over ownership of the 1300-acre property of the former Naval Air Station Moffett Field adjacent to the original 500-acre NA SA campus
  - NA SA has developed the property into the NA SA Research Park to create a world-class, shared-use R&D campus for government, academia, non-profits and industry
  - Partnership with Mountain View and Sunnyvale (local cities) from the beginning
- **The NRP brings academia, industry and NASA together into a collaborative and profitable partnership to advance the NASA mission**
  - 70 onsite partners (including 15 universities and over 45 companies)
  - Developed culture of collaboration
  - Proven business management and processes
  - Environmental entitlement completed approx 5 million sf new construction
  - Large-scale leases--Google (42 acres 1.2M sf) and University Associates (72 acres 3M sf)
    - › Both organizations planning to build green campuses
  - Overall emphasis on R&D and STEM education, with major focus on clean technology companies
- **Internal and external reviews indicate that the NRP will have direct programmatic and financial benefits for NASA and the nation**
  - 2003 U.S. Government "Best Innovative Policy" national award
  - National Research Council Review, "new model of industry-government partnerships."
  - National Academy of Sciences "NRP a NA SA and National A sset" Paper Presentation 2008
  - National Research Council "Understanding Research, Science and Technology Parks: Global Best Practices" 2009

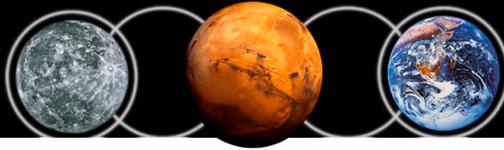


## NRP Collaboration Strengthens Key Partnerships

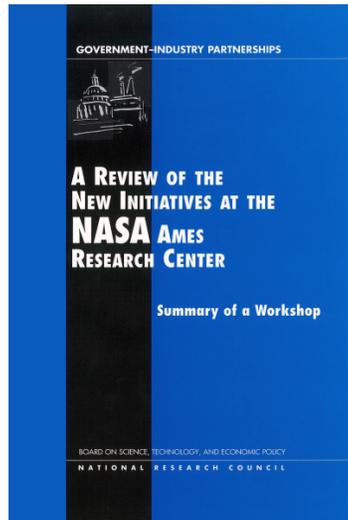


*NASA Research Park: 2020 Campus Plan*

- **NASA Research Park is uniquely positioned as a nourishing and dynamic environment for cutting-edge research and education.**
- **Through this NRP initiative, NASA Ames is creating:**
  - **A world-class shared-use R&D and education campus for industry, academia, non-profits, and government;**
  - **A center for innovation and entrepreneurship;**
  - **A unique community of scientists, engineers, students and educators with a shared mission.**
  - **As a physical place, NRP fosters both informal and formal interactions through careful master planning and site planning of streets, sidewalks and public spaces as well as careful selection of tenants. It is widely acknowledged that innovation depends on bringing multiple disciplines together to engage in collaborative projects that often yield unpredictable, but highly productive results.**
  - **Located in the heart of Silicon Valley, NRP draws upon a deep pool of well-respected researchers both at NASA Ames and in the regional community of colleges and universities, technology-oriented nonprofits and high-tech R&D companies**
  - **Improves NASA performance by onsite R&D collaborations**
  - **Actively promotes innovation**
  - **Enhances human capital development**



## National Research Council Reports on NRP



*A Review of the New  
initiatives at the NASA  
Ames Research Center  
NRC (2001)*



*Understanding  
Research, Science and  
Technology Parks  
NRC (2009)*

- NRP represented a “new model for Industry-Government Partnerships” in its 2001 report
- NRP as having “made great progress, exceeding expectations and enacting NASA plans with remarkable effectiveness.”
- NRP is different from traditional science and technology parks in the following ways:
  - Traditional science and technology parks are oriented toward transferring technology and knowledge out to the external community;
  - NRP provides a two-direction channel focused on (i) traditional NASA technology commercialization “out” to industry, and (ii) technology infusion “into” NASA by gaining access to knowledge and leading-edge technology from the external community;
  - NRP serves as NASA access to Silicon Valley and California’s research universities.



# Ames Research Center

in Silicon Valley

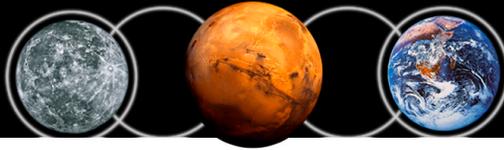




## General Approach to Partnerships

- **Authority of Space Act allows partnering with NASA Centers for collaborative activities**
  - Use Reimbursable Space Act Agreements/leases/permits as implementing mechanisms
- **Ames Utilizing Enhanced Use Leasing Authority**
  - Increased flexibility, retain portion rent payments at Center
  - Open and fair process
  - Multiple university, industrial and other entities sought through publicity and focus group meetings
  - Direct marketing—advertisement of specific opportunities
- **Partners may create new facilities to stimulate collaborative activities**
- **Anticipate partners will invest funds in future collaborative research ventures**
  - NASA will fund its share of collaborative activities
- **Forums and conferences**
  - Nanotechnology Forum August 2003/Nanotechnology and Homeland Security Forum December 2003
  - NRP Exploration Lecture Series began 2004
  - International Space Station as a National Lab 2007
  - Exploration and Sustainability Expo 2009 video on NRP website <http://researchpark.arc.nasa.gov/>
  - Economic Benefits Study of NASA Ames and the NRP 2010 on NRP website





# Ames Research Center

in Silicon Valley



## NASA Programmatic Benefits From the NASA Research Park

- **R&D: bringing the best new ideas for technology through ongoing long-term onsite partnerships**
  - › with universities (more fundamental new R&D) Carnegie Mellon University-IT, dependable software, robotics; UC bio-info-nano, space sciences and engineering
  - › with over 40+ small companies on-site (need for new products immediately or company fails) and more coming in
  - › with large companies both fundamental research and technology insertion/missions
- **Space Exploration/Science**
  - › Universities- Center for Robotics Exploration Space Technology (CREST) already operating -- with 6 universities developing small satellites
  - › Small companies-focus on space exploration products--examples life sciences (Changene-bone density; Tibion-muscle augmentation) , IT (IISC-neuro nets: Intelligent Tek-human machine interface; Intrinsic), UAV (UAV Collaborative); nano and power (Bloom Energy-fuel cells),
  - › Large companies like Google potential to be major partners in space exploration and commercialization
- **Entrepreneurial Space/new space economy**
  - › All of the above--**an integrated program** to pursue NASA mission and policy goals, R&D, space exploration, establishing new space economy
  - › Commercial space--involve universities, small companies, large companies and Ky Science and Tech Center, Alliance for Commercial Enterprises in Space (ACES) and biotech
  - › Ready source for innovative applied technology to respond to exploration and science objectives
- **Education**
  - › Key element of universities on-site encouraging Science, Technology, Engineering and Math (STEM). Collaborative for Higher Education.
  - › United Negro College Fund (SP) Academy on-site, minority focus with students and faculty



# Ames Research Center

in Silicon Valley



## NASA Research Park Exploration Lecture Series

"Our mission is to inspire the explorer in everyone."



The Exploration Lecture Series informs the public about NASA's Exploration Vision and how the NRP supports it.



NASA Research Park

[www.researchpark.arc.nasa.gov](http://www.researchpark.arc.nasa.gov)

**NASA Research Park**  
Exploration Lecture Series  
March 11, 2004  
7-9 pm  
NASA Ames Research Center  
Building 943  
NASA Research Park, CA

**Andrew Chaisin**  
Associate Administrator  
NASA Research Park

**NASA Research Park Exploration Lecture Series**  
"Rocketman: The Conundrum of Risk to the Moon, Mars & Beyond"  
Nancy Conrad, Author of Rocketman, will be moderating a panel of NASA's vision of Moon, Mars exploration and how it relates to the current space commercialization efforts of entrepreneurs like Richard Branson and Burt Rutan.  
Tuesday, January 31, 2006  
7-9 pm  
Building 943, Eagle Room  
www.nasa.gov

**NASA Research Park Exploration Lecture Series**  
International Space Station: Your Lab of the Future  
1) Research Overview  
2) Building Life  
3) Security Watch  
Tuesday, Oct 3, 2007 7:00 pm  
NASA Ames Research Center  
15156 San Ramon Avenue, Redwood City, CA  
94067-0001  
Building 943 - National Public Club

**SKY WALKING**  
AN ASTRONAUT'S MEMOIR  
TOM JONES  
Scribner Books

**NASA Research Park Exploration Lecture Series**  
Life Out There: What happens if we find it?  
A Lecture and Panel Discussion by Three Top Members of SETI Institute  
NASA Ames Research Center  
Moffett Field, CA  
Hosted by Mission Collaborations  
Co-Sponsored by SETI Institute  
Wednesday, May 19, 7-9 pm  
www.nasa.gov

**NASA Research Park Exploration Lecture Series**  
Extreme Exploration: The Moon, Mars and Beyond: The Science of Risk  
March 15, 2005 - 7:20 pm  
NASA Ames Research Center  
Moffett Field, CA  
Building 943 - Eagle Room  
Open to the Public - Free Admission  
NASA Ames Research Center  
Public activities require reservations  
Advance seating is required  
www.nasa.gov

**NASA Research Park Exploration Lecture Series**  
SPACE EXPLORATION: Can gravity reverse aging?  
May 4, 2005 6:30 pm  
NASA Ames Research Center  
Building 943 - Eagle Room  
Admission Free  
Open to the Public - Free Admission  
www.nasa.gov

**NASA Research Park Exploration Lecture Series**  
Revolutionizing Space For ALL Humanity  
Jeff Bezos, Co-Founder, Chairman and CEO of SpaceShipOne, will talk about colonizing the space. Former being small, low-cost missions to Earth orbit and beyond.  
Tuesday, July 27, 2009 7 pm  
Bldg. 943 Eagle Room  
FREE Open to the public

**NASA Research Park Exploration Lecture Series**  
The View from the Center of the Universe  
Cosmologist Dr. Joel R. Primack and author of 'The View from the Center of the Universe' will discuss what he knows about the universe and how it fits into the larger picture of the universe.  
Wednesday, Oct 26, 2006  
7 pm - 8 pm, Bldg. 943 Eagle Room  
FREE Open to the public

**NASA Research Park Exploration Lecture Series**  
In partnership with Carnegie Mellon University presents  
The 2005 Grand Challenge RACING FOR THE FUTURE  
Featuring Dr. William "Red" Whittaker  
9:00 - 10:00 pm, September 20, 2005  
NASA Ames Research Center  
The Vehicle School at SpaceShip One  
Moffett Field, CA  
Open to the Public - Free Admission  
NASA Ames Research Center  
www.nasa.gov



## Co-Location Why Partner On Site?

- **NRP can be seen as a microcosm of the Bay Area**
- **Silicon Valley's example**
  - **Studies have shown its success is based upon physical concentration of scientists, academics, entrepreneurs, and venture capitalists.**
- **Formal and informal interactions among scientists lead to knowledge-building and research breakthroughs.**
- **Bio-info-nano convergence, or any complex, multi-discipline technology, requires close collaboration best accomplished with co-located, multi-disciplined teams and science specialties.**
- **Top research universities have built multi-discipline research facilities to encourage formation of a “research community” to advance knowledge across traditional boundaries.**
- **Leading edge technology companies design their buildings and campuses to encourage physical interaction among their scientists and engineers.**
- **NRP is adopting these best practices to stimulate research, innovation, and technology infusion.**



**Ames Research Center**

*in Silicon Valley*



## **NRP Office**

### **Mission Statement**

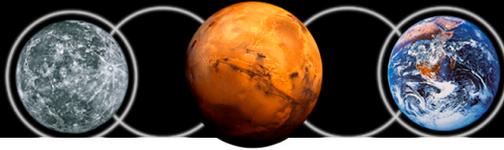
The NASA Research Park Office manages the planning, marketing, and development of Ames real estate and is committed to establishing an integrated dynamic research and education community consisting of academic, industry and non-profit partners.

### **Resources**

- The Office has the right mix of talent and expertise (civil service and consultants) to pursue and implement the business and real estate functions of the NRP.
- The Office convenes a multidisciplinary Integrated Product Team (IPT) that meets weekly to ensure EUL coordination and information sharing across ARC support organizations (legal, environmental, safety, facilities, financial, and planning).

### **Organizational Philosophy**

- ARC implemented best practices for organizational structure as identified by the GAO in its 1999 review of public-private partnerships (GAO/GGD-99-23).
- To make partnerships work, the GAO found that dedicated units established outside the traditional structure are best to interface with the private sector and think “outside the box.”



## Partnership Selection Criteria

- **Mission Compatibility**
  - Is the potential partner compatible with NASA's strategic mission?
- **Program Support Capacity**
  - Can the potential partner directly support research programs at Ames?
- **Financial Productivity**
  - Will the potential partner assist in sharing our fixed costs of operations?
- **Organizational Quality**
  - Is the potential partner of the desired quality and integrity?
- **Other NASA Benefits**
  - Does the potential partner bring any additional core benefits?



## Major Partners and Status

Partner	Objective	MOU	Onsite	Building*
University of California	Education R&D Collaboration	■	■	■
Carnegie Mellon University	Education R&D Collaboration	■	■	■
Foothill-De Anza Community College	Education R&D Collaboration	■		■
United Negro College Fund SP	R&D Collaboration	■	■	
CREST	R&D Collaboration	■	■	■
Singularity University	Education	■	■	
Bloom Energy	R&D Collaboration	■	■	■
UAV Collaborative	R&D Collaboration	■	■	
Google	R&D Collaboration	■	■	■
University Associates	R&D and Education	■	■	■

\*Agreement involving building renovation or new construction



# Ames Research Center

*in Silicon Valley*



## Carnegie Mellon University at Silicon Valley



- Renovated historic building 23 and recently added a state of the art “classroom of future”
- Offers world-class graduate programs in software engineering and management
  - 400th graduate this summer
  - Started new PhD. program
- The Carnegie Mellon Innovation Lab (CMIL) is a think tank for high performance, small, unmanned vehicles
- MAX, a laptop on wheels, supports NASA science and education missions in remote hostile environments - analogues for moon and Mars Exploration
- Developed the Disaster Management Initiative



# Ames Research Center

in Silicon Valley



## University Associates - Silicon Valley LLC

- A partnership with the University of California Santa Cruz and Foothill DeAnza Community College District  
Other universities considering joining
- A major step toward NASA's vision of creating a world class center for research, education, innovation and related commercial development
- UA LLC released an RFQ to select a Master Developer this year and begin their CEQA process
- Lease total 77 acres and up to 3 million sf of new labs, classrooms and housing – “green” Development
- UCSC Silicon Valley Center operating in Bldg 19 for 3 years

Development of new technologies emerging from the convergence of bio-info-nano scientific research

- Autonomous systems and advanced robotics
- Highly efficient and renewable energy sources
- Technologies for long term sustainability of human life
- Educating and developing the work force of the future
- Managing innovation in the emerging world
- Associated academic public policy centers





# Ames Research Center

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## United Negro College Fund Special Programs Corporation: Summer Scholars and Faculty Fellows



- The United Negro College Fund Special Programs Corporation established a Summer Scholars and Faculty Fellows program at NASA Ames.
- In their fifth year of operation, these two programs bring together students and faculty from historically Black Colleges and Universities, Hispanic-serving Institutions, Tribal Colleges and Universities, and other minority institutions to get hands-on research experiences at NASA centers, as well as experience in grant writing and for career advancement.
- These programs are successfully engaging the minority higher education community in government and industry research and contributing to STEM education in populations that are underrepresented in America's scientific and research community.
- After starting at NASA Ames, the program has been expanded to include scholar placements at Johnson Space Center in Texas and Glenn Research Center in Ohio.

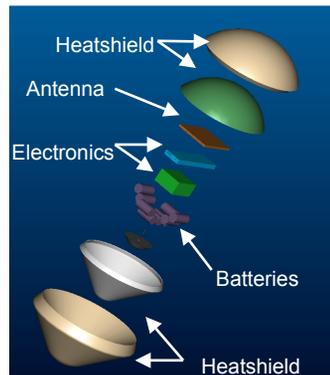
## Center for Robotic Exploration And Space Technology (CREST)



- Santa Clara University (SCU) led consortium of educational institutions for development of pathfinding terrestrial and space hardware & missions.
- Originally formed in 2003 as Space Tech Center (STC).

## Current/Past ARC project support

- ◆ GeneBox
- ◆ GeneSat-1
- ◆ PharmaSat
- ◆ MicroSat FF-2
- ◆ ESPA Launch Lode Monitor
- ◆ BioNanoSat-II / NUSat prototype
- ◆ Integrated Design Network
- ◆ REBR
- ◆ Mission ops systems (installed in Bldg 240)



## CREST Partners

- ◆ Academic (Local): Santa Clara, Stanford, SJSU, Cal Poly, Ohlone (with Mills College, Nat'l Hosp. U. and UCSC in development)
- ◆ Academic (National): Montana State, Washington U. (St. Louis), Northeastern U., Kentucky academic consortium, Iowa State U., Mid-Atlantic Academic consortium
- ◆ Industry: Lockheed-Martin, Aerospace Corp., CSA Engineering Inc., Mitsubishi, BMW
- ◆ Non-profit: CA Space Grant Consortium, Institute for Sub-Surface Exploration, Monterey Bay Aquarium Research Institute, Marine Technology Society, IEEE
- ◆ Government: NASA ARC, USGS, AFRL, NSF, NOAA

## CREST Status and Plans

- ◆ Genesat primary mission ops completed
- ◆ New primary SAA signed with SCU November 2006 for operations in building 583C
- ◆ Remainder of building operations anticipated January, 2007
- ◆ **New educational certificate program in development through SCU, anticipated start Spring 2007**
  - To be offered to ARC staff
- ◆ **Space Portal Development Laboratory (for student small spacecraft fab.) to be inaugurated January, 2007**
- ◆ **Micro-satellite Development Class-graduate credit**
- ◆ **Located in Building 583C**



## Singularity University



*"If I was a student today, this is where I would want to be." - Larry Page*



- Mission is to assemble, educate and inspire a cadre of leaders who strive to understand and facilitate the development of exponentially advancing technologies to address humanity's grand challenges
- Attracting top graduate and postgraduate students from all over the world
- Each summer, students are asked to design a product or service that will positively impact 1 billion people within 10 years by leveraging accelerating technologies (a program called 10<sup>9+</sup>)

# Kentucky Space

## Kentucky State Partnership

- Partnership with state of Kentucky (through Kentucky Science and Technology Corporation) to develop space-related technology, mission and education initiatives
- Signed by ARC and Kentucky governor March 2004
- Major projects:
  - Kentucky Space
  - Institute for Sub-Surface Exploration



## Institute for Sub-Surface Exploration

- ◆ Partnership between NASA and universities, industry in Kentucky to leverage on Kentucky's experience in mining engineering and develop new dual use technologies
- ◆ Formed in late 2004 with 4 subsequent workshops at Ames and various Kentucky locations
- ◆ Mission: To advance the science, technology and processes needed for planetary sub-surface exploration, access and development
- ◆ Initial modest funding received from NASA and Appalachian Regional Commission for technology road mapping

## Kentucky Space

Kentucky Space is a non-profit enterprise involving a consortium of universities and private organizations for the purpose of pursuing space related education, R&D, small satellite design, launch and operation.

Kentucky Space has launched an ambitious program that includes an array of flight opportunities including near space, sub-orbital, orbital and deep space missions and partnerships with organizations world-wide, space agencies and commercial organizations.

## Status

- ◆ Kentucky has office in building 19 to further local interests, support education opportunities for Kentucky Space students and partners
- ◆ First Kentucky Space orbital satellite schedule for launched in 2010
- ◆ Partnered with Nanoracks to use the ISS for research



**Ames Research Center**

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# **NASA Research Park: Emphasis on Developing Sustainable Companies**



## Executive Summary

### Current NASA Research Park 15-year Plan

- **Continue to bring in partners to use land, Moffett Federal Airfield and the Hangars surrounding the Airfield in a secure federal R&D context and in the context of the NRP**
  - Allows for remarkable potential synergy for the development of green technologies, airships and green aircraft, and operations
  - A unique infrastructure for airship R&D, high-altitude wind power generation R&D
- **A Center of Excellence for Sustainable Technologies (Clean Tech)**
  - Utilize unique system of hangars, eastside land and Airfield in the NRP to pursue critical national need with NRP industry partners
    - › Hangars 2 & 3 and adjacent land initially then Hangar 1 when renovated
- **Many NRP partners are engaged in sustainable technologies, including fuel cells, airships, high-altitude wind power generation, land based wind power generation, personal rapid transit systems, UAVs, electric cars**
- **Complement NASA Aeronautics emphasis on green aviation and green technology (including NASA project OMEGA)**
- **NASA Ames opening in 2011 new Platinum LEEDS most energy efficient building in the federal government**

National Aeronautics and  
Space Administration



# NASA Research Park and Ames Research Center Exploration and Sustainability Expo

The Technology Showcase is a great opportunity to network with Ames and Silicon Valley communities. NASA and NRP partners will exhibit their technologies and discuss collaborations.

Tuesday, April 21, 2009

Building 943

9am to 4pm

Open to the public

**FREE**

Additional Info:

[www.researchpark.arc.nasa.gov](http://www.researchpark.arc.nasa.gov)

Co-Sponsored by NASA Ames Innovative Partnerships Program





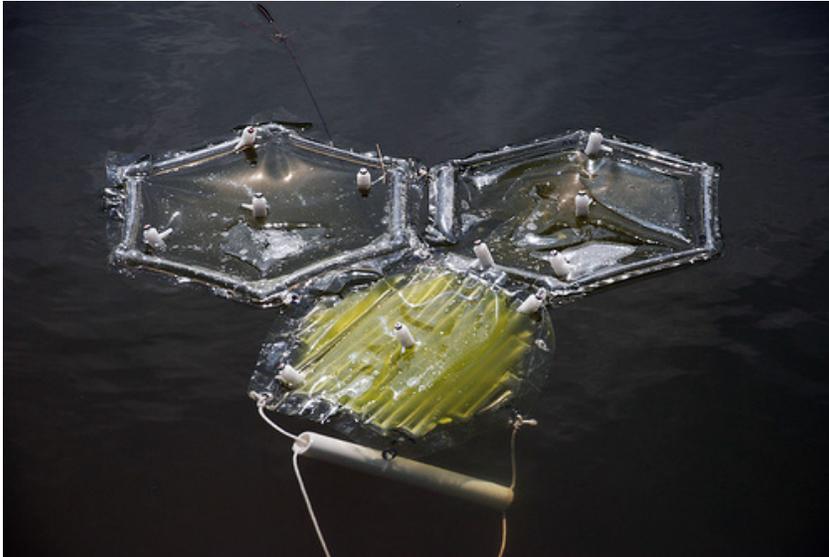
## Most Energy-Efficient Federal Building

- LEED Platinum
- Uses 90 percent less water than a conventional building by recycling its own water and using rainwater for irrigation of native plants.
- Uses solar panels, fuel cells, and 72 geothermal wells which take advantage of the earth's temperature for cooling and heating.
- Utilizes a NASA-developed computer system that will measure wind velocity using sensors developed for space to determine if and when to open windows for ventilation; get "Web" weather forecasts to optimize energy use in real time; and turn on air-conditioning in conference rooms only when they are scheduled for use.
- Net zero energy use –
  - a near zero carbon footprint.





## OMEGA: Algae Bioreactor as a Sustainable Energy Source

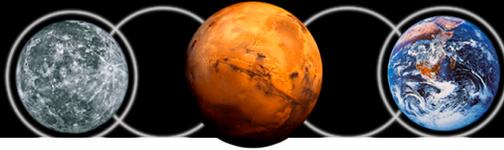


Supported by NASA Aeronautics Research Mission Directorate and the California Energy Commission:

- The project's goal is to demonstrate the feasibility and scalability of OMEGA (Offshore Membrane Enclosure for Growing Algae) with respect to the biology, engineering, and economics, and to insure that its environmental impact remains beneficial at the large scale needed to replace our dependence on fossil fuels. The hope is that, based on this demonstration, people worldwide will realize the potential of OMEGA, and adapt and develop versions of OMEGA for the good of all

- OMEGA website: <http://www.nasa.gov/centers/ames/research/OMEGA/index.html>

- The Green Space Initiative: <http://www.nasa.gov/centers/ames/GreenSpace/>



# Ames Research Center

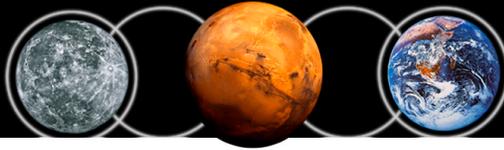
in Silicon Valley



## University Associates - Silicon Valley LLC

- A partnership with the University of California Santa Cruz and Foothill DeAnza Community College District  
Other universities considering joining
- A major step toward NASA's vision of creating a world class center for research, education, innovation and related commercial development
- Lease total 77 acres and up to 3 million sf of new labs, classrooms and housing – “green” Development
- UCSC Silicon Valley Center operating in Bldg 19 for 3 years
  - Development of new technologies emerging from the convergence of bio-info-nano scientific research
  - Autonomous systems and advanced robotics
  - Highly efficient and renewable energy sources
  - Technologies for long term sustainability of human life
  - Educating and developing the work force of the future
  - Managing innovation in the emerging world
  - Associated academic public policy centers





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in Silicon Valley



## Existing Sustainable NRP Companies



Airship Ventures



UNIMODAL  
SYSTEMS™

Bloomenergy™

- Bloom Energy
- E-Green Technologies
- Airship Ventures
- Airship Earth and Magenn Power
- UAV Collaborative
- Green Transportation
  - Tesla Motors
  - Kleenspeed
  - Unimodal
- Pending new lease
  - Russo Industries



# Ames Research Center

in Silicon Valley



## Bloom Energy Corporation: Breakthrough Fuel Cell Technology

Bloomenergy™



- Bloom Energy can trace its roots to work performed at the University of Arizona as part of the NASA Mars space program. Dr. KR Sridhar and his team were charged with creating a technology that could sustain life on Mars. They built a device capable of producing air and fuel from electricity, and/or electricity from air and fuel.
- Bloom Energy reports that its NRP location has provided many benefits including:
  - Ability to maintain and build close relationships with senior NASA staff, opening the door for continued collaborative partnerships;
  - Proximity to the scientific, engineering, and business talent;
  - A strategic physical location in the center of Silicon Valley;
  - Access to networks of entrepreneurial companies and venture capitalists;
  - Enhanced security through staffed gates at NASA Parkway and Ellis Street.
- In 2005, Bloom Energy expanded to a new corporate headquarters and manufacturing facility in Sunnyvale, a short five-minute drive from NRP.
- Since its founding in 2002 with a small technical team, Bloom Energy has grown to a workforce of over 700 people both locally and at its facility in India, employing a diverse and talented team of researchers, engineers, and business people.



## E-Green Technologies

**E-Green Technologies is dedicated to excellence in the development and manufacturing of low-altitude, mid-altitude and high-altitude airships. Company is dedicated to delivering superior technology and effective solutions to a broad range of markets, including military, government and private sectors.**

### **Applications include:**

- **Defense and Homeland Security**
- **Telecommunications**
- **Natural Resources**
- **Agriculture Assessments**
- **Forest Fire Monitoring**
- **Advertising**

**Prototype 125-ft Bullet Airship**



**Bullet Class 580 Airship Test Inflation**



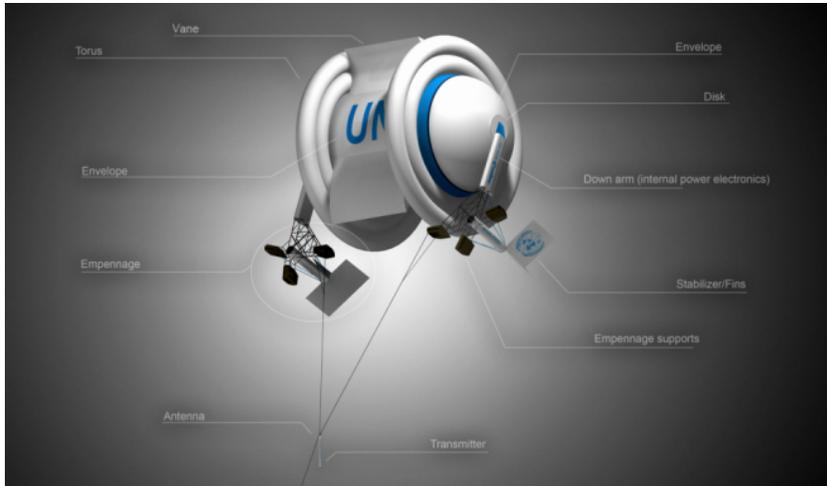
## Airship Ventures: Promotes Regional Tourism



- One of the more visible promotional opportunities serving the entertainment, tourism and research markets
- As the nation's first commercial passenger airship service in over 70 years, this "lighter than air" airship has been profiled repeatedly in regional and national media
- This unique commercial venture offers a new perspective on the planet, with "flightseeing" destinations in the South Bay, San Francisco, Monterey Bay, Los Angeles and San Diego.
- The 246-foot-long Zeppelin NT is the largest airship flying in the United States, carrying up to twelve passengers at a time. It is available for special events and corporate rental.
- Through its partnership with Airship Ventures, NASA not only supports the regional tourism infrastructure but also provides other direct benefits to the Agency. The firm has restored airship use of historic Hangar 2, originally constructed as a Moffett Field airdock in 1943, and re-used historic Building 20, the former Bachelor Officer Quarters.
- Airship Ventures and NASA have identified over 50 potential collaborative projects including using the airship as a platform for airborne science and in disaster response scenarios.
- The airship has already conducted a research project with NASA and SETI program in support of the South Bay Salt Ponds reclamation engineering, which garnered national media coverage.



## Airship Earth and Magenn Power: Infrastructure for Emergency Response



*The MARS 30X, a wind powered aerostat generator developed by Magenn Power, rotates about a horizontal axis in response to the wind, generating electrical energy which is transferred down a tether to the ground. The 30X deploys at 1,000 feet where the wind speed generally doubles, increasing the potential wind power four fold. In partnership with Magenn, Airship Earth is designing antenna and sensor systems as powered aerostat rotor payloads.*

- Airship Earth, a new media production, technology and telecommunications group.
- Central focus is building highly interactive, ultra-scale visualization display systems and support networks. The displays and associated programs are being developed to acquire, compress, stream, synchronize, fuse and visualize multidimensional/multivariate datasets used in emergency response, education and entertainment.
- Near-term goals include developing more powerful and intuitive tools to visualize and fuse data linked to cross-platform communications systems, through interactive displays that are referred to as Common Operating Pictures, which serve “Communities of Trust” involved with emergency response.
- The display systems will provide Incident Commanders and First Responders with ever more effective ways of exploring, analyzing and processing massive and complex data and converting data into “actionable intelligence” and coordinated, coherent response.
- Collaborating with Carnegie Mellon Silicon Valley, also based at NRP, Geodan, Geoinformatics specialists based in the Netherlands, ESRI, Microsoft and researchers at NASA Ames Research Center in this effort.
- Entered into a Teaming Agreement with Magenn Power to co-develop lighter-than-air, wind powered aerostats that can provide emergency power in disaster areas. Airship Earth's objective in teaming with Magenn is to develop rapidly deployable emergency power generation systems. Additionally antenna and surveillance payloads on the aerostats are being developed by Airship Earth to restore cellular and radio communication and provide high resolution, continuous surveillance over landscapes impacted by natural and manmade disasters.



## Russo Industries USA

To develop and commercialize a revolutionary, environmentally superior wind turbine and related slow-speed electric generator.

### The Windcrank

Turbine operates at 1mph wind speed and faster. Units are stackable and deployable in 3 towers of 10 units (30 units total) for every one large rotary turbine blade.



#### Advantages of the design:

- Exceptionally high torque
- Two power take-offs
- Very low avian (bird) and bat mortality
- Significantly reduced noise and vibration
- Stackable applications
- Long service life (minimum of 20 years)
- High stability
- Slow speed
- Low cost



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## UAV Collaborative: Using Drones to Aid Rescuers



- The nonprofit UAV Collaborative has been based in NRP since 2004 and boasts San Jose State University, Honeywell International, Cirrus Digital Systems, Xtreme Aerial Concepts, MLB Company, Empirical Systems Aerospace and Lockheed Martin among its partners.
- Fuel efficient, reasonably priced unmanned aerial vehicles (UAVs) also known as “drones”, have the potential to stay aloft for significantly longer time periods than piloted craft.
- Low altitude UAVs flying under 5000 ft. have tremendous potential for effective emergency response and disaster assistance when multiple craft in the sky stream data 24 hours a day, aiding the success of challenging missions such as atmospheric sampling, fire fighting and urgent search-and-rescue operations.
- By showcasing and advancing NASA-developed technologies, the UAV Collaborative provides tangible benefits to other federal and state agencies, including the National Forest Service for which UAVs can collect fire-related thermal imagery during a major wildfire event to help improve real-time information.



## Green Transportation

- **Tesla Motors (still testing roadster and soon another less expensive model)**
  - use of Airfield for car tests
- **Kleenspeed (will build \$20k electric car)**
  - Initially established to win LeMans race with an all-electric race car
  - Already setting new electric car speed records at Laguna Seca Raceway
  - office and R&D in NRP, now planning new electric car
    - › planned to cost less than \$20k
  - use of Airfield for electric car testing
- **Skytran (personal rapid transit)**
  - Currently in NRP Historic District Office (Bldg 14)
  - Pursuing grant proposal to build 500ft test maglev test track near Hangar 3 on Eastside of Airfield



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## KleenSpeed Technologies Inc.: Scalable Electric Propulsion Systems

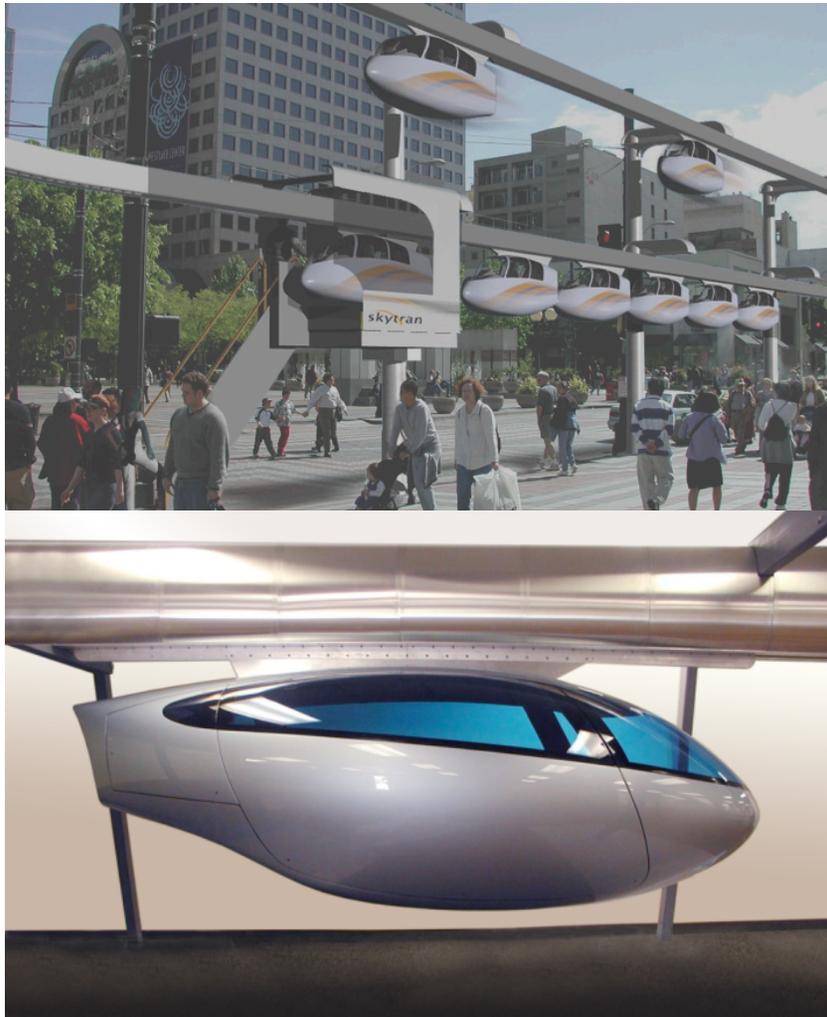


- **KleenSpeed Technologies, Inc. was founded in November 2007 to develop technology, products and systems for the rapidly emerging electric vehicle industry:**

- A partner at NRP since 2008;
- KleenSpeed uses racing cars converted to total electric power utilizing KleenSpeed systems;
- Vehicles are a laboratory and test bench to develop and test products;
- KleenSpeed brings state-of-the-art technologies to a range of other consumer and industrial vehicles.
- Uses Airfield tarmac to test electric vehicles
- Plans to begin manufacturing a \$20k electric car at NUMMI



## SkyTran: Maglev Integrated Mobility



SkyTran™ is a next generation high-speed transportation system that will revolutionize mobility. The prototype is being developed at NRP:

- The SkyTran™ system uses small vehicles running on elevated, magnetically levitated guideways. This enables speeds up to 150 mph and distinguishes it from first-generation wheeled Personal Rapid Transit (PRT) systems that are limited to average speeds of 30 mph;
- The vehicles are lightweight, personal compartments that can transport up to three passengers;
- Using intelligent control system software, a SkyTran™

MIM system will run nonstop point-to-point service without interrupting the flow of traffic;

- Capacity of the system is 14,000 people per hour, both locally and regionally;
- SkyTran™ can serve as a feeder system to other transit systems and high-speed rail;
- The developers of SkyTran™ will collaborate with NASA on the use of NASA control software, prognostic tools and human factors techniques to develop autonomous vehicle control that provides safe and reliable operation of the SkyTran™ system.



## Summary Clean Tech

- **The NRP focus on clean tech is accelerating these new companies development**
- **The opportunity with hundreds of grad students onsite in the many NRP partner universities programs allows for easy hiring for these companies as they expand**
- **This systemic approach to the pursuit of the establishment of a “green economy” is developing**
- **From technology ideas, to start-up companies, to collaborations with other industry, university and federal lab organizations, to hiring of the many students is unique**
- **The opportunities for use of clean tech is expanding into disaster assistance, aerial observation for earth sciences, safer ways of assessing disaster conditions**
- **The opportunity for STEM inspiration for a new variety of careers is also enhanced by these new clean tech companies**



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## National Disaster Resiliency Center

- **Leaders believe to respond to the challenges of disasters a state of the art Disaster Resiliency Center (DRC) should be located in NASA Research Park**
  - NRP home to several partners providing services and products to the emergency management community, multiple universities pursuing R&D and a regionally recognized disaster education and training center
  - NRP CMU, Foothill-DeAnza, UAV Collaborative, Airship Earth
  - FEMA Warehouse
- **Integrating these existing operations the DRC has three focus areas designed to improve preparedness, training, response and recovery efforts:**
  - Disaster Resilience and Response Hub
    - A centralized and protected location for the staging, logistics, management and coordination of resources in the event of a disaster
  - Applied Research and Technology Laboratory
    - To develop, deploy, test and validate the tools and systems focused on capabilities that Incident Commanders, EOC directors, first responders and the citizens and business with our communities need to more effectively undertake disaster response and recovery operations
  - Advanced Emergency Response Education and Training Center
    - Developing and delivering advanced education and training programs supporting national and regional efforts for emergency and medical personnel in advance of their need
- **DRC Leadership led by Steve Jordan and retired General Peter Gravett**
  - Coordinated through funded DHS grant by Joint Venture Silicon Valley CEO Dr. Russ Hancock
- **Silicon Valley/State Partners:**
  - Google, Lockheed Martin Space Systems, Industrial Emergency Council, Accenture, California Emergency Management Agency, Applied Materials, Juniper Networks (all attended first two meetings)
- **DRC will provide a collaborative public-private hub for coordinated regional, state and national disaster response while developing the model programs and technologies for widespread deployment**
  - Requires use of Airfield, Emergency Operations Center, Hangars and land



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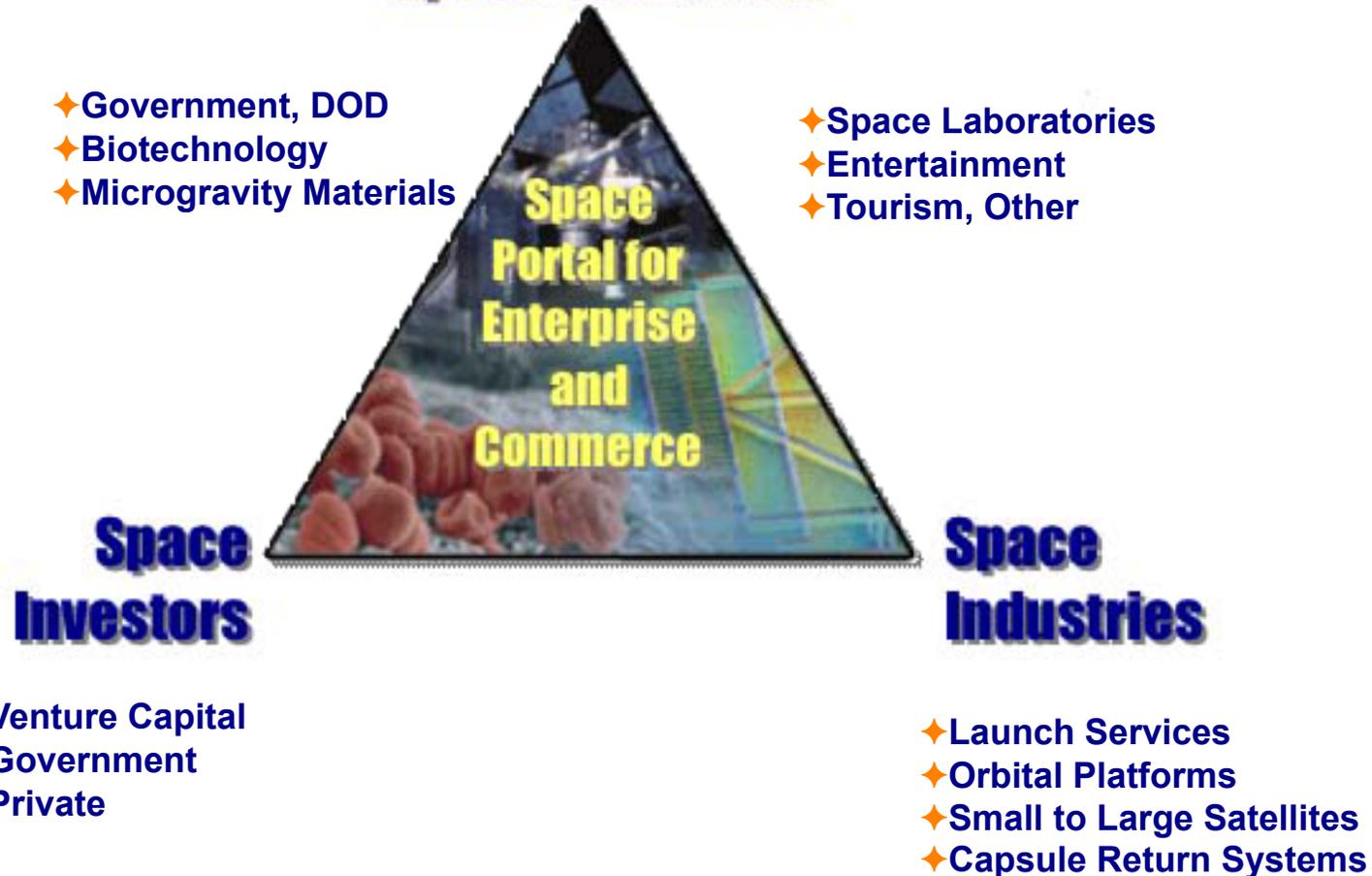


## Space Portal

- **Established in 2006 in the NASA Research Park at Moffett Field**
- **Formed to serve as a “Friendly Front Door” to companies interested in working with NASA**
- **Goals:**
  - Promote the vision of the President, Congress and NASA to establish a self-sustaining commercial space economy
  - Infuse entrepreneurial practices into the civil space program
  - Accelerate development of the new space economy for public benefit, economic advancement and exploration
  - Act as a catalyst for mutually beneficial partnerships that leverage resources among NASA, industry, universities, nonprofits and government
  - Organize and execute pioneering developments and demonstrations that open new markets
  - Engage the public and inspire the next generation of space scientists, engineers, explorers and entrepreneurs



## Entrepreneurial Space Paradigm Space Customers



*Fostering development of Space Customers and Emerging Space Industries will attract Space Investment and lead us to the tipping point for commercial space*



## Summary

### NASA Research Park

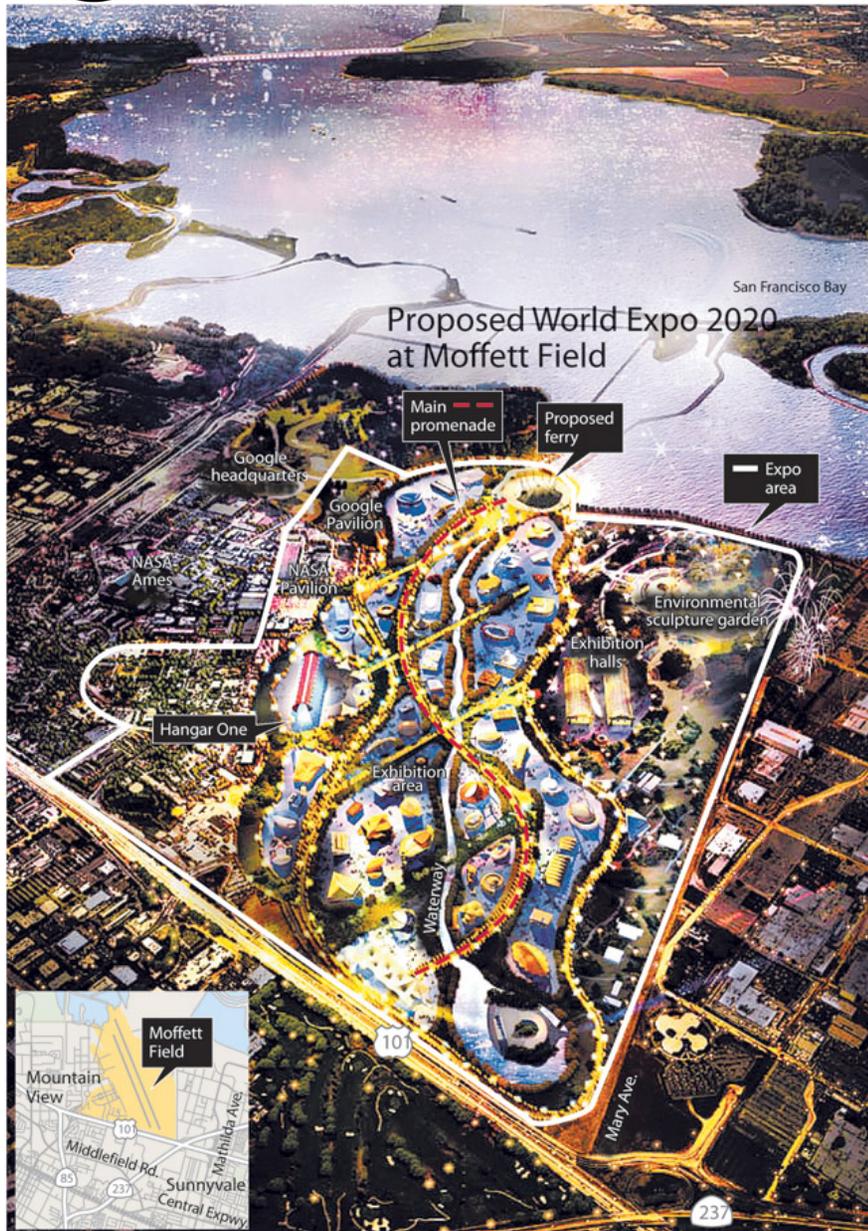
- •Establishes a new world-class R&D and education campus for the nation
- •Leverages NASA resources for greater mission benefit
- •Enhances scientific research, technology advancement and transfer of research knowledge
- •Pursues NASA's education and outreach goals
- •Provides workforce development for high-tech careers
- •Increases public involvement and understanding of science technology and exploration





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## Proposed World Expo 2020 at Moffett Field

Source: Bay Area Council, image courtesy of Heller Manus Architects via Bay Area Council

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