



SPACEWATCH

JOURNAL OF THE CHICAGO SOCIETY FOR SPACE STUDIES

WINTER 2007

VOLUME 23

NUMBER 1

CSSS Efforts Add to Lunar Knowledge

In *Space News* on December 11, 2006, a report on the [Second Space Exploration Conference](#) stated that “most of what NASA knows about the lunar poles comes from the 1998 [Lunar Prospector Mission](#).” In the 1980s CSSS members contributed generously as a group to the non-profit sponsored Lunar Prospector development before NASA took notice. The strength of the non-profit effort helped inspire NASA to fund the probe.

Lunar Prospector



In This Issue



[Space Year in Review](#)

Learn about major space development and exploration events 2006.

Polar region of Enceladus

[OutPlan Project: The Business Case for Lunar Settlement](#)

David Koch, new member and long time participant in the space movement, shares his story and his roadmap towards extraterrestrial settlement.

[Upcoming Events Calendar](#)

A list of talks given by members of our Speakers' Bureau.

[Member Biographies](#)

With cyberspace sometimes being the only contact members share, we will feature short autobiographies of new members.

2006 Space Year in Review

By Larry Boyle

In 2006 more than \$50 billion dollars were spent on space. This article will review the non-military projects as well as the money spent by nation states, other than the U.S. These nations include Russia and China who, like the U.S., have the ability to put humans into space. It also includes the European Space Agency, Japan, Israel and Brazil who, though unable to put humans in space, are active in the advance of space exploration and use.

NASA reviews its [accomplishments](#) for 2006 stating in its introduction:

“NASA moved forward in 2006 to extend humanity's exploration of the solar system and learn more about the universe and our home planet. The space shuttle got back to work building the International Space Station, and the agency began developing the next generation of spacecraft and outlined plans for returning to the moon as a stepping stone toward Mars. Space science missions found new evidence of water on Mars, sent the first-ever probes toward Pluto, brought back dust from a comet and launched new instruments to study the sun and the weather on Earth.”

The U.S. restarted construction of the International Space Station (ISS) when, between September 9-21, the Space Shuttle Atlantis delivered a large truss and enlarged solar arrays. In July a supply mission was flown by Discovery. All partners in the ISS agreed on 16 more shuttle flights between now and 2010, when the shuttle will be retired. A shuttle will be sent to repair the Hubble Space Telescope in 2008. This decision, made in October, took up all the remaining space shuttle missions.

NASA announced what the replacement for the shuttle will look like and gave the replacement the name "Orion". Orion was described as "Apollo on steroids." The rocket that will launch Orion will be called "Ares". Both the Ares and the Orion will be built using as much of the space shuttle technology as possible. The overall exploration program, designed to put President Bush's "Vision for Space" into action, is called "Constellation".

Unmanned exploration had several important events in 2006. At Mars, the Mars Reconnaissance Orbiter entered Mars orbit on March 10. It began its two year scientific mission in November. The Mars Rovers, Spirit and Opportunity, went into the third year of their 90 day mission. The Mars Global Surveyor stopped transmitting in November. The spacecraft had lasted much longer than planned; 7 years beyond its 2 year mission. Analysis of the data showed what could be current water flows on Martian surface. Cassini is half way through its 4 year mission. It reportedly found evidence of liquid water just under the south pole of the moon Enceladus. Radar images of Titan showed lakes of liquid methane. The unmanned Stardust probe returned to Earth on January 15. It had samples of the comet Wild 2, which the craft encountered in 2004.

The military side of the U.S. space program released some photos taken by spy satellites. They were imaged in 1962. This example shows that the military is not looking to have everything it does open to the public. In September the National Reconnaissance Office announced that a laser, "based in China" had illuminated a U.S. satellite. Improvements on GPS continued, with a 3rd generation of satellites ready to go. In June, the Department of Defense told Congress that it planned to continue a military weather satellite program. The cost of the satellite system has grown from \$8.4 billion to \$11 billion. The Pentagon's space programs have all been running over budget. It has gotten worst in the last 5 years. The Congress is said to be very unhappy with military.

The Russian program in the last few years has participated in the ISS and little else. In September, the first female space tourist was taken to the ISS in a Soyuz rocket. Anousheh Ansari, an Iranian born telecommunications businesswoman, completed a life long dream. Tickets, at \$20 million each, are sold out until 2009. At the end of the year, plans to allow the tourist to walk in space were under discussion. Cost of the EVA would be about \$5 million over the ticket price. Work was begun on a new launch pad for the Soyuz, but it will not be in Russia. The European Space Agency and Russia have made a deal to launch the Soyuz from ESA's South American base in French Guinea.

China continued its plans for manned spaceflight. Its second manned mission will have two astronauts. In September, a laser based in China illuminated a U.S. satellite. No damage was done to the satellite. This has the U.S. Military space community very worried.

Japan put up a reconnaissance satellite in 2006. The Japanese were making final preparations for the launch of its part of the International Space Station, called JEM (Japanese Exploration Module).

The European Space Agency (ESA) put an unmanned spacecraft into orbit around Venus. Since 1989, no spacecraft have been put into orbit around Venus. This was only the fourth time ESA has gone to another extraterrestrial body. ESA continued to work on plans to go to the Moon. A launch site for the Russian rocket, Soyuz, was started at the ESA spaceport in South America.

India had a launch failure in July. The GSLV is India's biggest launcher. In November, the Indian Space Research Organization) decided to ask the government for the money to begin a manned space program. If the plan is approved, ISRO wants to put a man on the moon by 2014 and on Mars by 2020.

Private companies were active in 2006. Bigelow, a company based in Nevada, put up a satellite, Genesis 1, in July using a Russian rocket. It is a demonstrator for a space station Bigelow plans to send up in the future. A company called Blue Origin, started by Jeff Bezos, the founder of Amazon.com, launched its first rocket in November. This was the first launch from its spaceport in Texas. The flight was a suborbital test. Another private spaceport is being built in New Mexico.

OutPlan Project: The Business Case For Lunar Settlement

By David Koch

I would like to thank Bob Jeske for inviting me to share with you some thoughts on the book I'm currently working on. But before I get to the book, I'd like to recall a little history. My first contact with the Chicago Society for Space Studies was in the late 1970s. At the time, I was a special assistant to the president of United Airlines for Space Shuttle acquisition. I was impressed with the group's enthusiasm for space settlement and the extensive knowledge of space development possessed by the members of CSSS. Now that I have reconnected with CSSS, I am equally impressed with the tenacity of its members. Thank you for carrying the fire for all these years.

In addition to joining CSSS, I recently renewed my membership in the National Space Society (I was a member back in the NSI days). Al Globus, the chairman of the NSS Space Settlement Advocacy Committee (SSAC), asked me to join the committee to help further the cause of space settlement. I accepted Al's invitation and I am now working with the very talented members of the committee to help craft NSS's strategy for the advocacy of space settlement. I can assure you that the members of the SSAC have several very insightful and exciting ideas on how to go about convincing the people of the world to get on the space-settlement bandwagon.

My interest in space settlement stems from my youth. I grew up in the post-WWII era. As you know, this was the time when science fiction and spaceflight took root in the American psyche. I had a voracious appetite for science fiction, and avidly read Heinlein, Clarke, Assimov and the other practitioners of that art. Werner Von Braun's vision of spaceflight, as presented to us by the master teacher Walt Disney, painted a vivid picture of aerospaceplanes, orbiting stations and lunar settlements. The certainty of humankind's expansion into space became a part of my world view.

I chose a career as a professional pilot, and I was very lucky to be hired by United Airlines in 1968. The release of 2001: A Space Odyssey in that year served to reinforce my belief that commercial spacelines were going to be a reality in the very near future. I could easily see myself piloting an aerospaceplane for United.

Like most airline pilots, I had the luxury of pursuing additional interests. I learned the fine art of entrepreneurship through participation in various aviation-related start-up ventures like an aircraft-charter company, a flight school and a hang-gliding school. I fed my interest in spaceflight by visiting the NASA centers and closely following the evolution of the U.S. space program. Unfortunately, I didn't attend the launch of Apollo 11, but I did view in person the last Saturn launch (the Apollo-Soyuz mission). Of course, I was glued to the television for the first lunar landing in 1969. During the 1970s, I earned my wings as a writer by writing articles about aviation that were published in various periodicals.

With the rapid development of aerospace capabilities in the 1960s and early 1970s, I became even more convinced that commercial, passenger-carrying spaceflight was just around the corner. I looked forward to participating in that exciting adventure as a spacecraft commander for the spacelines that I believed would be a natural evolution of the airlines.

In the mid 1970s, my belief was reinforced by NASA's announcement that they were going to hire a new breed of astronaut to fly the Space Shuttle. NASA announced that it was looking for professional pilots who did not necessarily have to have a test-pilot background. Commercial-jet-pilot experience would suffice. When I saw this announcement in Air Line Pilot Magazine, I immediately launched for Houston to find out more about becoming a Space Shuttle pilot.

It didn't take long to find out that there was a disconnect between the official NASA job announcement and the real politics of the astronaut corps. I soon became convinced that it would be sometime before NASA would hire anyone to pilot the Space Shuttle who was not part of the "old-boys" network of military test pilots. However, opportunities to learn more about the space business and flying the Space Shuttle fortunately materialized.

From the mid-1970s through the mid-1980s, I had the chance to learn a lot about spaceflight, the aerospace business and how to (or I should say how not to) "sell" the idea of space settlement to the public. In addition to learning how to fly the Space Shuttle and serving United Airlines as its Space Shuttle expert, I was also the Founding National Chairman of the American Society of Aerospace Pilots, Chairman of the Public Relations Committee of the Houston Chapter of the American Institute of Aeronautics and Astronautics, Founding President of the Houston Chapter of the Aviation/Space Writers Association and the Founding Chairman of the Air Line Pilots Association's Professional Outlook Committee. I also participated in numerous ad hoc committees and activities that promoted the space program. I wrote several articles and technical papers about spaceflight and space development, and I appeared on numerous TV and radio programs as an expert of commercial spaceflight. I was also instrumental in developing the world's first Basic Spaceflight Ground School for airline pilots who wanted to transition to spaceflight operations.

Unfortunately, United's efforts to take over Space Shuttle operations from NASA were terminated in 1984 due to internal politics (that's another story). With the Challenger

tragedy in 1986, I more or less retired from active involvement in promoting space settlement. However, I have continued to harbor the hope that someday we will become a space-faring civilization. I even maintained a back-burner project that has been aimed at refining a plan to make lunar settlement a reality. My working title for that project is "OutPlan". I recently made the decision to bring OutPlan from the "back burner" to the "middle burner". The result of that decision is the new book I mentioned.

The underlying theme of the book is: If we have a clear vision of lunar settlement, if that vision can be realized in the next 20 years, if that vision is attractive to the relatively affluent baby boomers of planet Earth, and if those baby boomers can see themselves participating in that vision, then we will be able muster the resources to make that vision a reality. Of course, we must underpin our vision with an easily understandable, reasonable and believable plan for making it a reality. I believe the plan must be based upon private-sector development of an earth-moon transportation system and lunar resorts and retirement communities.

In my opinion, the first step in defining the plan for realizing the vision of lunar settlement must be the creation of a business case. That is the project that I am working on now. Its output will be the book "The OutPlan Report: The Business Case For Lunar Settlement".

After the business case is completed, business plans, based upon the business case, must be created for the companies that are going to develop and operate the transportation system and the lunar settlements. Those business plans must clearly describe how those companies will be capitalized and how they will generate a decent profit and an attractive return on investment. When the business plans are complete, we'll need to capitalize the companies and implement the business plans.

I have been working on some pretty precise ideas on how to go about making the business case for lunar settlement, and I have already completed detailed early stage business plans for two of the companies that I believe will be needed to realize the vision. I am currently in the research phase of developing the business case.

To my mind, the key to space settlement is access to low-earth orbit. The cost must be low enough to allow for space tourism. And the vehicle providing the access must be safe and reliable, and it must be capable of operating like an airliner. I believe the aerospaceplane will be the vehicle of choice. My back-of-the-envelope calculations show that round-trip fares to/from low-earth orbit could be as low as \$5,000 per person. In my opinion, a commercial aerospaceplane is within our grasp. All we need is the leadership and vision to drive its development.

My experience in starting new business ventures has taught me that it is invaluable to have as much good input as possible during the initial planning phase. I would like to invite you to share your thoughts with me on the "OutPlan Report". I would also like to set up a "brain trust" here in Chicago to generate ideas for the project (We could call it "The Chicago Working Group for Lunar Settlement"). If you're interested in joining such a group and/or contributing your thoughts to the project, please let me know. I can be reached at 847.628.9557 and davek60@gmail.com.

Keep the faith and remember: The meek shall inherit the Earth. The rest of us will be leaving. And our departure may be sooner than you think. I hope to be able to keep you abreast of developments with the OutPlan project through SpaceWatch.

Member Biographies

Steve Koppes



Steve Koppes is the author of *Killer Rocks from Outer Space: Asteroids, Comets and Meteorites*. Published in 2004 by Lerner Publications, *Killer Rocks* is a non-fiction science book about catastrophic meteorite impact for adolescent readers. Recognition for *Killer Rocks* includes its selection as A Best Book for Children 2004 by *Science Books & Films* magazine, and as an Outstanding Science Trade Book 2004 jointly by the National Science Teachers Association and the Children's Book Council. For more information, see mrmeteor.com.

Writing about space research is among Koppes's duties as a science writer at the University of Chicago News Office. In a previous job at Arizona State University, Koppes wrote extensively about planetary geology research. As a result, a reproduction of his signature is on a metal plate attached to the Thermal Emission Spectrometer (TES) aboard the Mars Global Surveyor spacecraft in orbit around Mars.

Alexander Savchenko

I was born in Moscow, Russia, May 19, 1952. In 1953 the family moved to Leningrad (now St. Petersburg), Russia. From 1957 to 1960, my time was spent in China with my family. I vividly remember April 12, 1961, when Gagarin made his first space flight. This was the most exciting event in my life.

I received my BS/MS in Physics (Mechanics) and Automatic Control Systems (closest to American degree in Electrical Engineering) with Honors from Leningrad Polytechnic Institute (LPI) in 1975, and I got my PhD in Applied Math from the same institution in 1984.

From 1975 through 1989 I worked for LPI (researcher, assistant professor) and its subsidiary, Robotics Institute (senior researcher). While with the Robotics Institute, I was involved in the Soviet space program.

We designed the space robotic arm for Buran (Russian version of Space Shuttle) and the ground simulator for the cosmonauts' training. I was responsible for the control algorithms and computer simulation. In December of 1987, I visited the Star City near Moscow where we presented our design. Valery Bykovsky, cosmonaut #5, was in the audience. While in Star City, I visited the cosmonauts' training facilities, including the mockup of Mir space station, and Mission Control Center backup. At that time the old Mir crew was replaced with the fresh one after more than 400 days in orbit, and we witnessed the docking process in real time.

In 1990, I moved to the U.S. (Chicago) with my wife and two children (my son Michael got his MS degree in Aerospace Engineering from UIUC last year). Since then, I've been working as a computer programmer/architect mostly in accounting industry (last 8 years with Deloitte & Touche). From 1993 through 2000, I also taught programming courses at Roosevelt University part time.

My hobbies include mountaineering, rock climbing, hiking, downhill and cross country skiing, sports orienteering, running (ran 8 marathons, including 100th Boston Marathon in 1996), biking, traveling, stamp collecting, and of course reading science fiction. Science and space are two life-long loves.

Member of NSS and The Planetary Society.

Rodney Ramos

I am an insurance professional. Senior partner in an insurance marketing company called Alliance 1, Inc.

Owner of Midwest Performance Headquarters - MPH.
Specialty Automotive high-performance equipment.

Member of the BMW Club. Autocross and Safety Driving Instructor.

Member of USABDA's 2005 Latin Formation Dance Team National Champion's.
Dancing is a hobby.

Why am I interested in space? I love toys. Biggest toys available - space stuff! NASA employees are lucky. LOL. My interests in space are just like everybody else. I believe frontiers are my biggest interest. Nothing like being the first.

Kent Nebergall

Kent is the son of a former test pilot and an artist and has been an avid follower of space technology since Apollo-Soyuz, when he was seven years old. He has soloed an aircraft at age sixteen and has flown off and on since.

In 2004, he won The Kepler Prize for Mars Mission Design from The Mars Society. He was later astronomer for Mars Desert Research Station Crew 32. He has done space technology presentations for Mensa, The Mars Society, Toastmasters, and several science fiction conventions around the Midwest. His Mars Society design papers are included in On To Mars, Volume 2 from Apogee Press. For 2006, he was made a JPL Solar System Ambassador.

His day job is as a contractor in technical communications, business analysis, and knowledge management. He also enjoys all forms of writing, hiking, some biking, stunt kites, filmmaking, swordfighting, and studying art, science, and theology. His guilty pleasure is enjoying really good and really bad sci fi films.

Upcoming Events Calendar

<u>Apollo Missions: From the Earth to the Moon</u>
Date: April 4, 2007 Time: 7:00 p.m.
Location: Prospect Heights Public Library, 12 North Elm Street, Prospect Heights, IL 60070
Description: A presentation by Larry Boyle on the history of Project Apollo which put humans on the moon, including six men on in the early 1970's. The program is open to the public. For details contact Terri Campbell, 847-259-3500 or visit http://www.phl.alibrary.com/
<u>Cassini Mission to Saturn</u>
Date: May 3, 2007 Time: 7:00 p.m.
Location: Grayslake public Library, 100 Library Lane Grayslake, IL 60030
Description: A presentation by John Vittallo that is open to the public. For details contact Allison Wilmes, 847-223-5313 x433 or visit http://www.grayslake.lib.il.us/
<u>Cassini Mission to Saturn</u>
Date: June 13, 2007 Time: 7:00 p.m.
Location: Naperville Public Library, Nichols Library, 200 W. Jefferson Ave, Naperville,

IL 60540

Description: A presentation by John Vittalto that is open to the public. For details contact Mary Bannon, 630-637-2231 or visit <http://www.naperville-lib.org/>

Cassini Mission to Saturn

Date: June 21, 2007 **Time:** 7:30 p.m.

Location: Plainfield Public Library, 15025 South Illinois Street Plainfield, Illinois 60544

Description: A presentation by John Vittalto that is open to the public. For details contact Karen Pfeifer, 815-436-6639 x30 or visit <http://plainfield.lib.il.us/index.asp>