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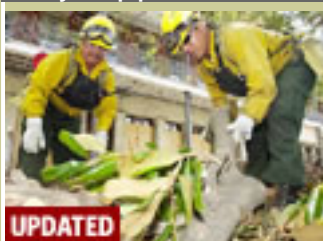
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Space exploration remains a noble goal with benefits

Home News Tribune Online 09/13/05

HAYM BENAROYA

My first essay on space exploration supported the goals of President Bush's visionary and very specific speech of January 2004, finally placing the United States back on track for the return to the Moon, this time to stay and settle, and then onward to Mars and beyond. The president resumed the journey abandoned more than 30 years ago. With this act, and assuming the goals are fulfilled, he will have initiated what can arguably be one of the most far-reaching efforts of humanity.

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I would say that going to the Moon, with manned missions, with the intent to set up settlements that eventually become cities, is something we can do. Therefore, we need to do it. The human spirit of exploration and discovery demands a venue for fulfillment. It demands a fantastic venue; lunar colonies and Martian cities are wonderful examples. But as a bonus to psychic fulfillment, this is also a clear path to continued advancement of American technical and scientific advancement.

Sometimes the argument is made that instead of spending all this money on space to develop technology, just invest in the technology. While this appears reasonable, it is important to note that science and engineering are not spiritless professions. The people who spend their days "doing" science and engineering need to be excited by the "adventure" and purpose of it all. The best and the brightest are attracted to visionary activities. They are willing to work endlessly and tirelessly for a goal they view as noble, for a goal that allows them to feel that they have made an impact on the path humanity takes.

So space exploration and settlement satisfies two crucial needs of a flourishing humanity, the needs of the spirit and the needs of sustenance — in its broadest sense — that engineering and science provide.

How can I explain the excitement of engineering problem-solving? It is not the excitement of action movies, although the movie Apollo 13 does convey the

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exhilaration of figuring out how to get three astronauts on their way to the Moon in a crippled spacecraft back to Earth alive.

Engineering problem solving is in a metaphorical sense similar to the work of a sculptor. A sculptor begins with raw material and has a vision of what the artwork is to look like. Often the sculptor sketches concepts to help guide the process of cutting away pieces of stone or wood.

An engineer goes through a similar process. The engineer's raw materials are a knowledge of math and science. These basic disciplines are the rules of what can be done and what cannot. Science is a description of the physical world. It tells the engineer what can be ideally expected from the behavior of materials or chemicals, for example. Mathematics is the language of science and engineering. It is the way that concepts are quantified, worked with, and the way to derive new understanding based on earlier knowledge.

With math and science as raw material, the engineer's vision is what is to be built, whether computer, car, space station, or Martian city. The engineer analyzes the vision and figures out how to make it a reality. This is accomplished by a design. The engineer has many options in a design; different designs can meet the same vision. To select one design path, factors such as cost and construction difficulty are taken into account.

There are thousands of problems that need to be solved in order for us to do what needs to be done for a permanent return to the Moon. Each of these solutions affects us on Earth. Each solution solves a problem here on Earth, resulting in advanced medical equipment, stronger and less expensive materials, faster manufacturing robots. These advances create new industries and new jobs, and the benefits of these "dual-use" technologies are far and wide. Space settlement is a wonderful vision around which the best and the brightest can focus their energies, with the satisfaction that they have truly made a difference.

One of the goals of a space program that places a significant number of people on the Moon and Mars is to safeguard the species; with people populating the solar system, a devastating event will not wipe out the human race. Today, do something to help those who are trying to save lives and rebuild the Gulf Coast.

Haym Benaroya is a resident of East Brunswick. He is a professor at the Mechanical and Aerospace Engineering Center for Structures in eXtreme Environments at Rutgers University, New Brunswick. He was the fifth reader to join the Home News Tribune's "Be Counted" roster of columnists.

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