Research Center. Further information is contained in a TSP (see page 1).

Inquiries concerning rights for the commercial use of this invention should be addressed to NASA Glenn Research Center, Innovative Partnerships Office, Attn: Steve Fedor, Mail Stop 4–8, 21000 Brookpark Road, Cleveland, Ohio 44135. Refer to LEW-18187-1.

Automated Identification of Nucleotide Sequences

STITCH is a computer program that processes raw nucleotide-sequence data to automatically remove unwanted vector information, perform reverse-complement comparison, stitch shorter sequences together to make longer ones to which the shorter ones presumably belong, and search against the user's choice of private and Internet-accessible public 16S rRNA databases. ["16S rRNA" denotes a ribosomal ribonucleic acid (rRNA) sequence that is common to all organisms.] In STITCH, a template 16S rRNA sequence is used to position forward and reverse reads. STITCH then automatically searches known 16S rRNA sequences in the user's chosen database(s) to find the sequence most similar to (the sequence that lies at the smallest edit distance from) each spliced sequence.

The result of processing by STITCH is the identification of the most similar well-described bacterium. Whereas previously commercially available software for analyzing genetic sequences operates on one sequence at a time, STITCH can manipulate multiple sequences simultaneously to perform the aforementioned operations. A typical analysis of several dozen sequences (length of the order of 10^3 base pairs) by use of STITCH is completed in a few minutes, whereas such an analysis performed by use of prior software takes hours or days.

This program was written by Shariff Osman and Kasthuri Venkateswaran of Caltech; George Fox of Dept. of Biology and Biochemistry, University of Texas, Houston; and Dianhui Zhu of Dept. of Computer Sciences, University of Texas, Houston for NASA's Jet Propulsion Laboratory. Further information is contained in a TSP (see page 1).

In accordance with Public Law 96-517, the contractor has elected to retain title to this invention. Inquiries concerning rights for its commercial use should be addressed to:

Innovative Technology Assets Management JPL
Mail Stop 202-233
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Pasadena, CA 91109-8099
E-mail: iaoffice@jpl.nasa.gov
Refer to NPO-44785, volume and number of this NASA Tech Briefs *issue, and the page number.*

Balloon Design Software

PlanetaryBalloon Version 5.0 is a software package for the design of meridionally lobed planetary balloons. It operates in a Windows environment, and programming was done in Visual Basic 6. By including the effects of circular lobes with load tapes, skin mass, hoop and meridional stress, and elasticity in the structural elements, a more accurate balloon shape of practical construction can be determined as well as the room-temperature cut pattern for the gore shapes. The computer algorithm is formulated for sizing meridionally lobed balloons for any generalized atmosphere or planet. This also covers zero-pressure, over-pressure, and super-pressure balloons. Low circumferential loads with meridionally reinforced load tapes will produce shapes close to what are known as the "natural shape."

The software allows for the design of constant angle, constant radius, or constant hoop stress balloons. It uses the desired payload capacity for given atmospheric conditions and determines the required volume, allowing users to design exactly to their requirements. The formulations are generalized to use any lift gas (or mixture of gases), any atmosphere, or any planet as described by the local acceleration of gravity.

PlanetaryBalloon software has a comprehensive user manual that covers features ranging from, but not limited to, buoyancy and super-pressure, convenient design equations, shape formulation, and orthotropic stress/strain.

This program was written by Rodger Farley of Goddard Space Flight Center. Further information is contained in a TSP (see page 1).GSC-15112-1

Rocket Science 101 Interactive Educational Program

To better educate the public on the basic design of NASA's current mission rockets, Rocket Science 101 software has been developed as an interactive program designed to retain a user's attention and to teach about basic rocket parts. This program also has helped to expand NASA's presence on the Web regarding educating the public about the Agency's goals and accomplishments.

The software was designed using Macromedia's Flash 8. It allows the user to select which type of rocket they want to learn about, interact with the basic parts, assemble the parts to create the whole rocket, and then review the basic flight profile of the rocket they have built.

This program was written by Dennis Armstrong of Space Gateway Support and Deborah Funkhouser and Donald DiMarzio of Kennedy Space Center. For further information, contact:

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Refer to KSC-12942, volume and number of this NASA Tech Briefs *issue, and the page number.*