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NASA TECH BRIEF

Integrated Mobility Measurement and Notation System

In order to design a space suit to best afford use of man's mobility capability within strict geometric limits, it is necessary to derive accurate determinations of a man's potential expendable speed, force, and range of movement while wearing both pressurized and unpressurized space suits. In a ventilated condition, the current Gemini space suit presents only a few specific mobility restrictions since the material is somewhat limited as to sleeve length and general coverage. However, when pressurized to relatively nominal levels above ambient, the suit poses some very severe mobility limitations. While several studies have been made and reported using various data derivations involving differing systems of notation based on diverse mobility measurement methods, no single set of sources has synthesized a complete, integrated system of movement identification, measurement technique and specification applicable to pressurized space suit mobility.

A tentative solution to the problem has been reached by a committee of aerospace personnel that has employed empirical methods to derive a synthesis of an integrated mobility measurement and notation system based on the following requirements:

(1) The system of description of movement and position should be compatible with common methods of engineering analysis, such as engineering drafting layouts, trigonometric analysis, and machine computations. It should be capable of extreme abbreviation and use of "shorthand" nomenclature, as in mathematics.

(2) The system of description of movements and positions should be clear, precise, concise and unequivocal, and readable. It should be related to common experience and stereotypes of description where feasible, but not necessarily dependent upon earth-bound conceptions.

(3) The descriptions of measurement techniques for joint and limb positions should be clear, simple, and reproducible. The measurement techniques should use a minimum of special equipment to accomplish the job.

(4) The system as a whole should be capable of a wide range of detail and accuracy of description according to the specific need. It should be sufficiently general and flexible to be used as a structure for extensive growth in number and type of space suits. It should permit refinement of detailed studies of specified joint motions, or extension to complex movement descriptions where necessary, and yet retain use of gross simplifications where appropriate.

Note:

Inquiries concerning this innovation may be directed to:

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Patent status:

No patent action is contemplated by NASA.

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