

NASA News

National Aeronautics and
Space Administration

Washington, D.C. 20546
AC 202 755-8370

P81-10090

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For Release:

IMMEDIATE

RELEASE: 81-89

NASA AND DEERE TO STUDY EFFECTS OF LOW-G ON IRON PROCESSING

A Technical Exchange Agreement -- the first of its kind -- has been signed between NASA and Deere and Company, Moline, Ill., to study the effects of low-gravity on various iron alloys.

One of the new technologies which has emerged from the space program is the processing of materials in an environment where the effects of gravity are greatly reduced or eliminated. This reduced gravity is sometimes called low-gravity or microgravity. Early work done in the field has shown that low-gravity eliminates or greatly reduces the effects of buoyancy, sedimentation and convection on materials processes. This opens a new frontier for materials scientists and processors by providing new insights into the pervasive role of gravity on materials properties and process mechanisms.

(NASA-News-Release-81-89) NASA AND DEERE TO
STUDY EFFECTS OF LOW-g ON IRON PROCESSING
(National Aeronautics and Space
Administration) 3 p

CSCL 22A

00/12

July 2, 1981

Under the agreement signed with Deere, NASA's Marshall Space Flight Center, Huntsville, Ala. will use low-g facilities available to it -- including drop tubes, KC-135 and F-104 aircraft, and possibly sounding rockets -- to substantially reduce gravity conditions during alloy solidification experiments. Deere and Company will do sample preparation, ground-based characterization of the sample, extensive sample analyses and data reduction, as well as thermal characterization of the furnace used for melting and solidifying the samples.

The experiments and investigations performed under the agreement could eventually lead to Deere conducting research aboard a future Space Shuttle mission.

Data will be shared between the two parties. NASA and Deere personnel will visit each other's facilities and participate in experiment planning and analyses. The agreement is expected to be in effect for one year, but may be extended if needed.

Several other commercial firms are now involved in Technical Exchange Agreement discussions with Marshall.

The Technical Exchange Agreement represents one of several new concepts NASA has developed to involve the private sector in the definitive stages of a low-gravity research program where technological advancement is needed and there is a potential commercial application.

In these concepts for involving industry, NASA and a private company agree to be responsible for specific portions of the research effort and no funds are transferred between parties. The allocation of rights to resulting inventions and data is subject to negotiation between the parties for each effort undertaken.

NASA currently is carrying out low-g processing in such areas as alloy solidification, crystal growth, biological separations and chemical and fluid physics. NASA's Materials Processing in Space program has developed a variety of ground-based and flight facilities and experiment hardware to utilize the low-gravity environment, and has invited industry to participate in joint investigations and projects.

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