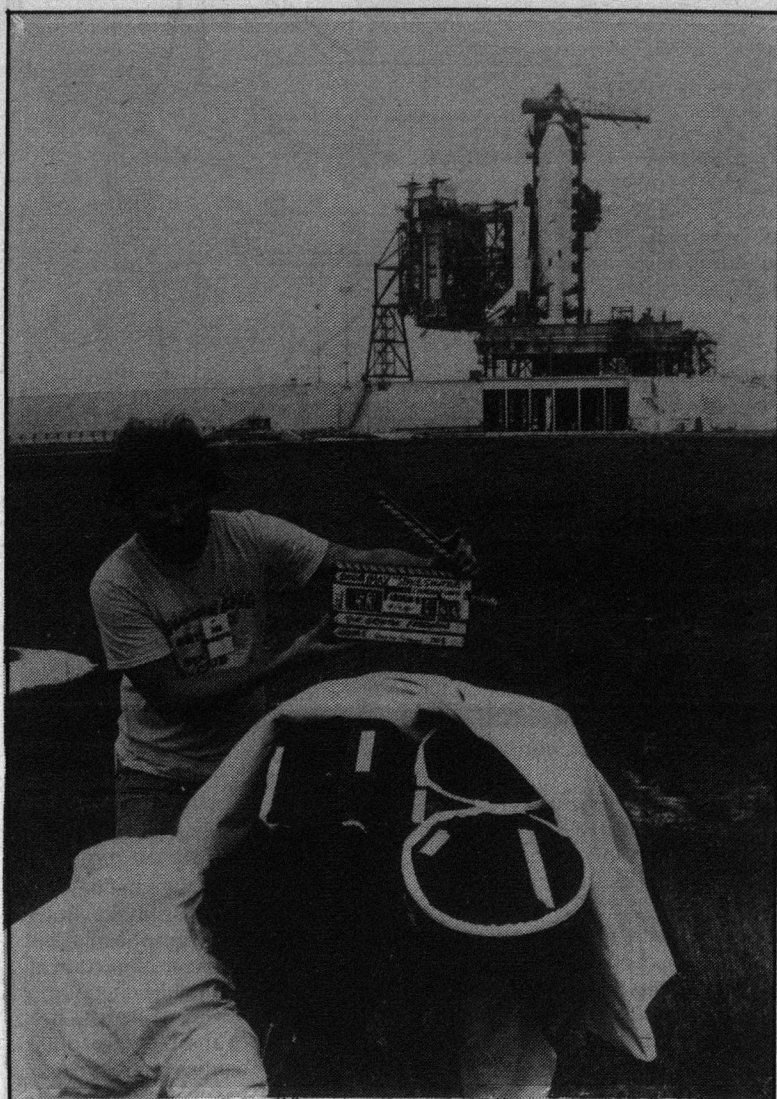


...Up, up, and away!!



The causes and characteristics of the glow — which may develop on the surfaces of any spacecraft in a low-earth orbit — are not fully understood; but, under suitable conditions, it may be photographed. This experiment involves the use of very high-resolution optical filters and an image intensifier to obtain photographs which can be analyzed to identify the reactions which produce these emissions.

During the mission, Marc Garneau will repeatedly photograph the glow. He will also use the special equipment to photograph naturally-occurring emissions in the earth's upper atmosphere (at wavelengths specific to the WAMDII experiment). Throughout, he will note times, locations, related events and conditions to provide the data necessary to permit researchers to interpret the pictures.

Life Sciences

Space Adaptation Syndrome Experiment Studies

Several elements make up the space Adaptation Syndrome experiment package.

a) Measurement of the Vestibulo-Ocular Reflex

This reflex, which helps us maintain a directed gaze in spite of motion of the head, seems to be less effective when astronauts encounter weightlessness. It may result in a slip of the visual image on the eye's retina which, in turn, can result in motion sickness. The experiment will use a novel technique to measure this reflex and the amount of image slip.

Marc Garneau will first place a cloth cross measuring about one meter by one meter (three feet by three feet) on the mid-deck lockers. The arms of the cross are marked to indicate up, down, left and right and points along each arm are numbered from zero at the centre to 20 at the end. Zero is the cross-point. Shielding his eyes with a piece of paper, he will make a quick head movement while trying

to maintain the direction of his gaze towards the zero. When he removes the piece of paper, he will see whether his eyes are still directed on the zero or have wandered. At the same time, the beam of a light pointer, attached to his head band and projecting on the same scales, will indicate where his head is pointing.

b) Survey of Sensory Function in Limbs

Some astronauts have described the legs as "useless appendages" during weightless flight and have reported difficulty in assessing exactly where their arms and legs were in darkness or when their muscles were relaxed. It may be that sensory function in limbs gradually deteriorates during space flight. This experiment will attempt to detect any changes in sensory characteristics.

The first test is conducted with eyes open and, again, with eyes closed. It involves Garneau's skin sensations when specially-ridged cubes are pressed by one of the other crew members against his index finger and his big toe. This will be done before flight and at intervals during several days of the

mission. They had the sensation that they were stationary and the floor was moving down and up beneath them. This experiment will assess the occurrence of such illusions during the flight and after landing.

First with eyes open, then with eyes closed, Garneau will perform a series of arm bends and knee bends with his feet tied down to the floor. He will also move his hand and then a bare foot back and forth against a surface. He will then move his eyes back and forth with his head fixed. He will record any illusions of the world moving (floor, wall or surface).

d) Test of Awareness of Position of External Objects

Reports from previous space flights suggest there is considerable loss of orientation in the absence of gravity and visual cues. During a previous mission, several crew members made gross errors when attempting to point while blindfolded at targets above and in front of them. This experiment seeks to determine how fast these phenomena occur following loss of a visual reference and whether they become more or less prominent during the course of the flight.

"Some astronauts have described legs as 'useless appendages'."

mission. Finer and finer sets of ridges will be used to determine his ability to differentiate ridge-spacing.

The second test is conducted with eyes closed. A crew member will bend Garneau's finger, toe, elbow and knee joints and ask him to estimate the extent of movement or angle.

c) Assessment of "Proprioceptive" Illusions

During tests following the Space-lab I flight (Nov. 28-Dec. 8, 1983) some astronauts reported a bizarre illusion when asked to hop up and down. Even with their eyes open,

Garneau will look at several targets, and then be blindfolded. Five minutes afterwards, he will be asked to point several times at each target, using a light pointer. Another crew member will record the locations of the light beam on a line drawing of the mid-deck area. Finally, Garneau will point at each target again, opening his eyes each time he feels he is aiming correctly and confirming whether the target and his arm are where he thought they would be.

e) Studies of Space Motion Sickness (SMS)

SMS is a short-term health prob-

Have a good cup of coffee at

JAVA JIVE

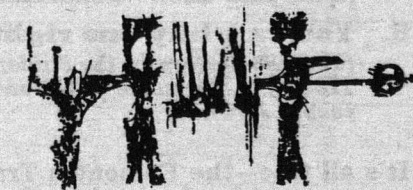
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