



MTM Man Vehicle Lab

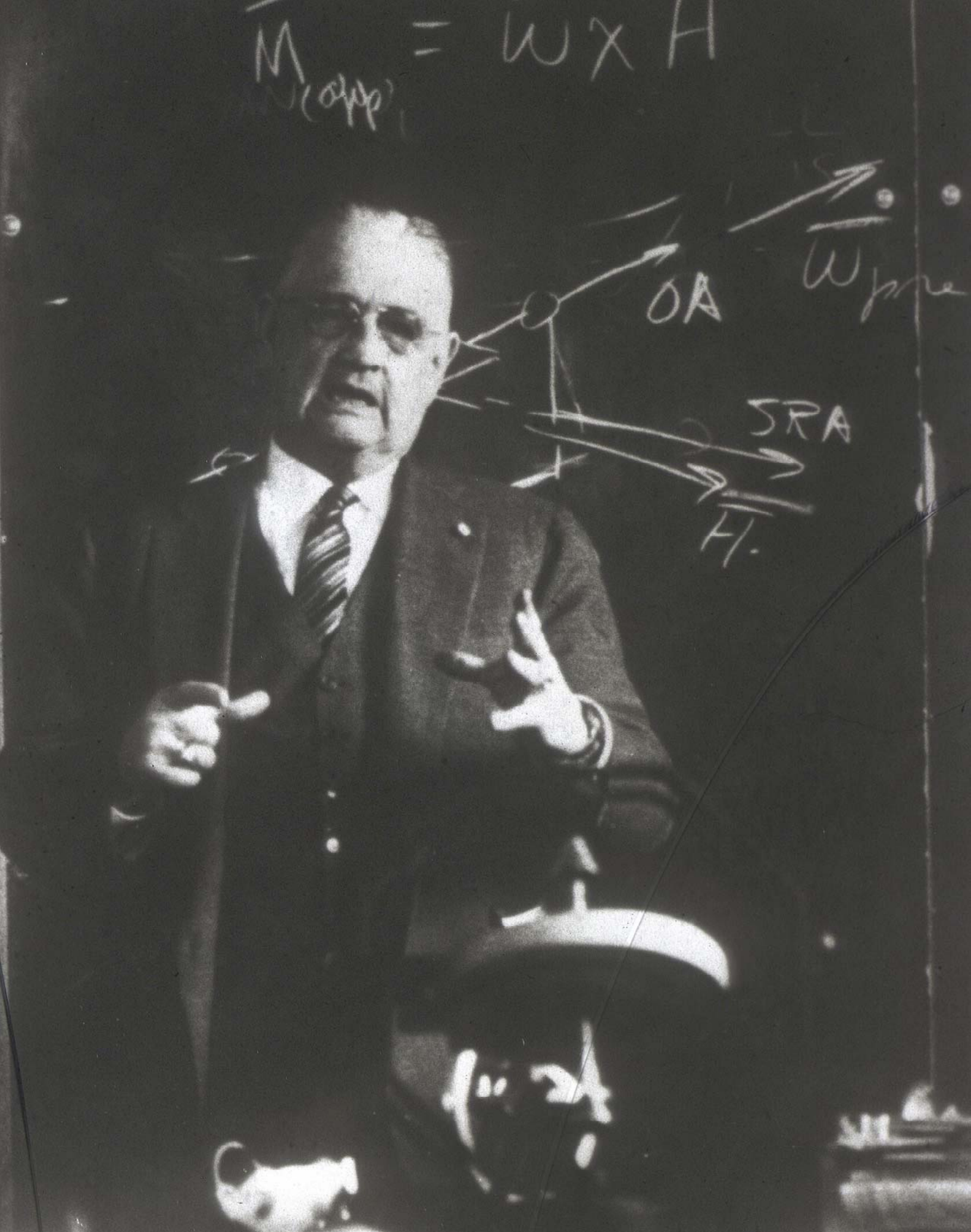
50



Larry Young & Larry Stark ca 1960



Larry Stark in USVI 1960



$$M_{(app)} = W_{(app)} \times H$$

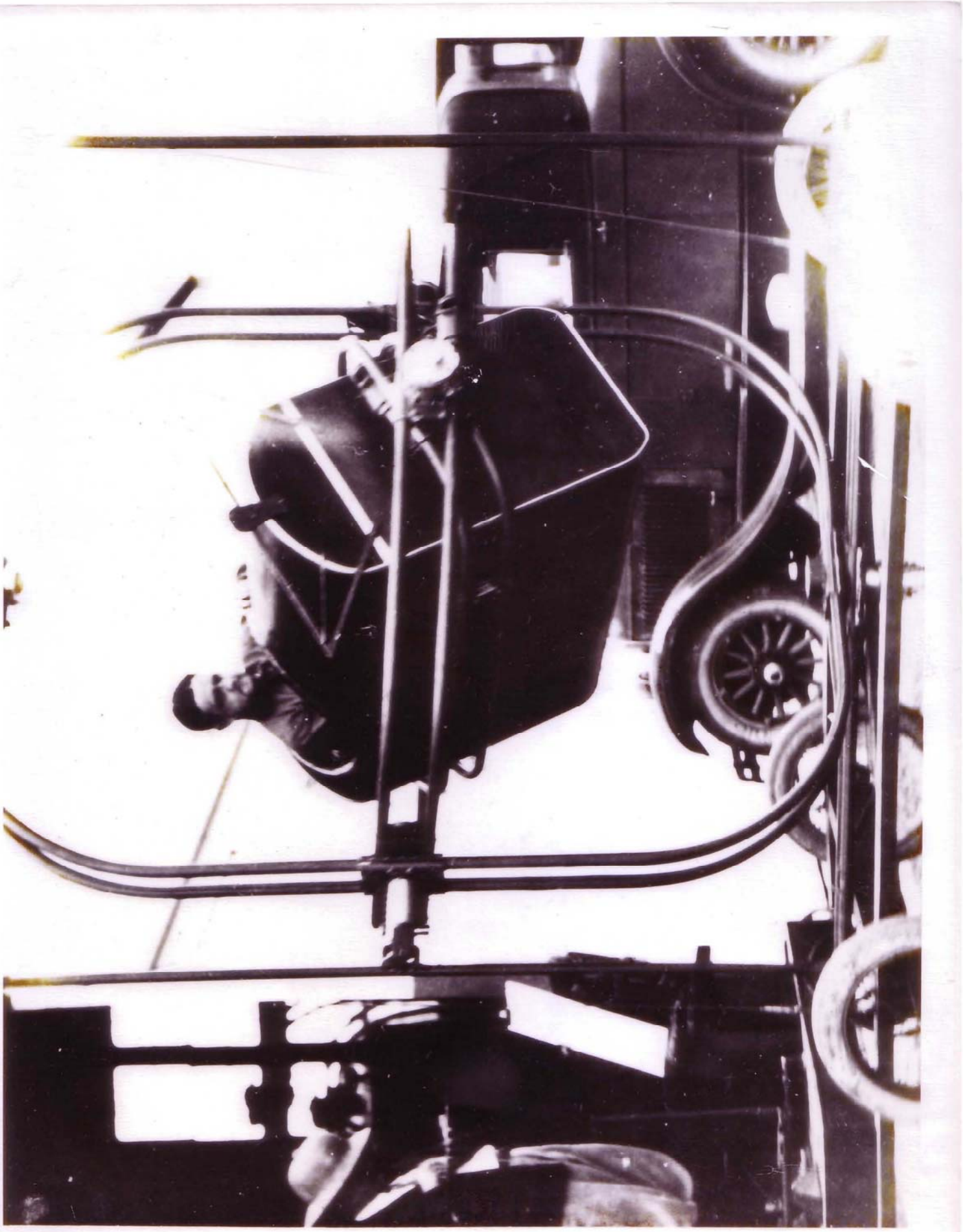
OA

Wpne

SRA

H.

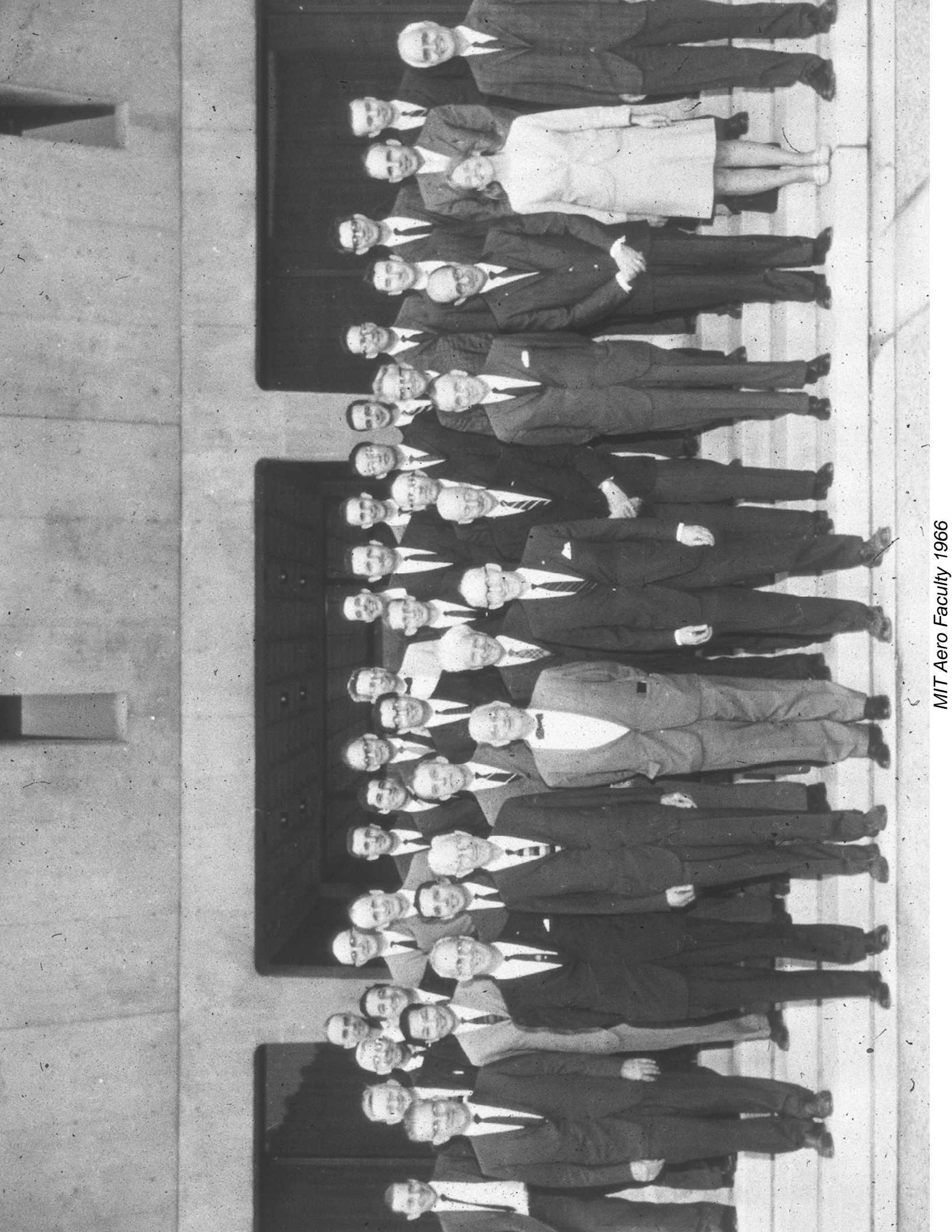
Stark Draper about 1960



Roots of Man-Vehicle Lab Doc Draper in a flight trainer 1926- Brooks Field (Now Brooks AFB) Pilot Training



YT Li, MVL's First Director



MIT Aero Faculty 1966



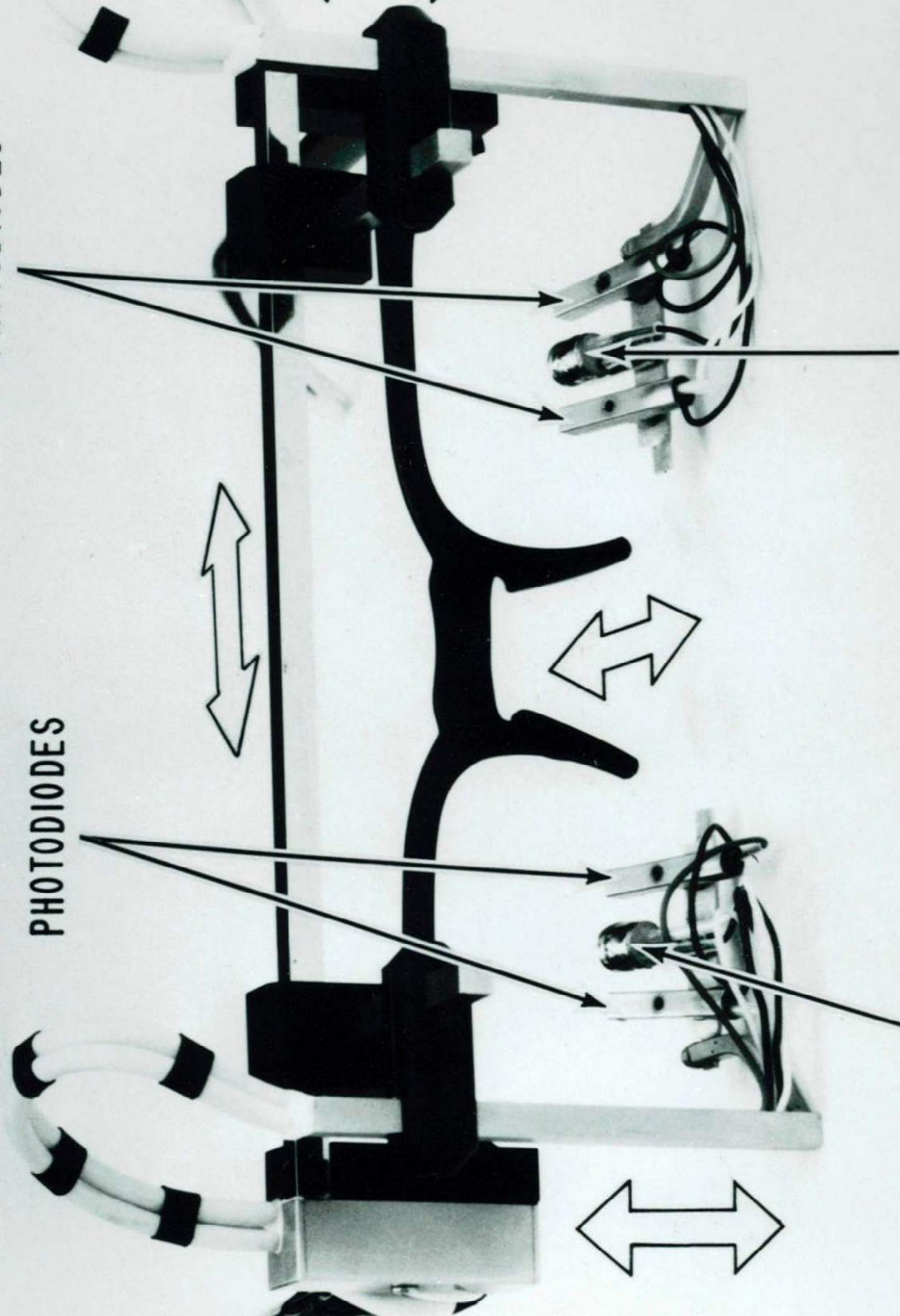
YT and Nancy Li, Larry Young Hawaii 1965

PHOTODIODES

IR SOURCE

PHOTODIODES

IR SOURCE



Young's pulsed IR eye movement monitor 1962



MVL Party in Newton 1965



Jody and Leslie Young and Nancy Li, 1965



MASSACHUSETTS INSTITUTE OF TECHNOLOGY

T-66-1

VISUAL AND MOTION CUES
IN HELICOPTER FLIGHT

by

PETER BENJAMIN

MAN-VEHICLE CONTROL LABORATORY

CENTER FOR SPACE RESEARCH

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

CAMBRIDGE, MASSACHUSETTS 02139

A Hierarchical Model of a Helicopter Pilot
(Determining how a pilot uses visual and motion cues to control an aircraft)

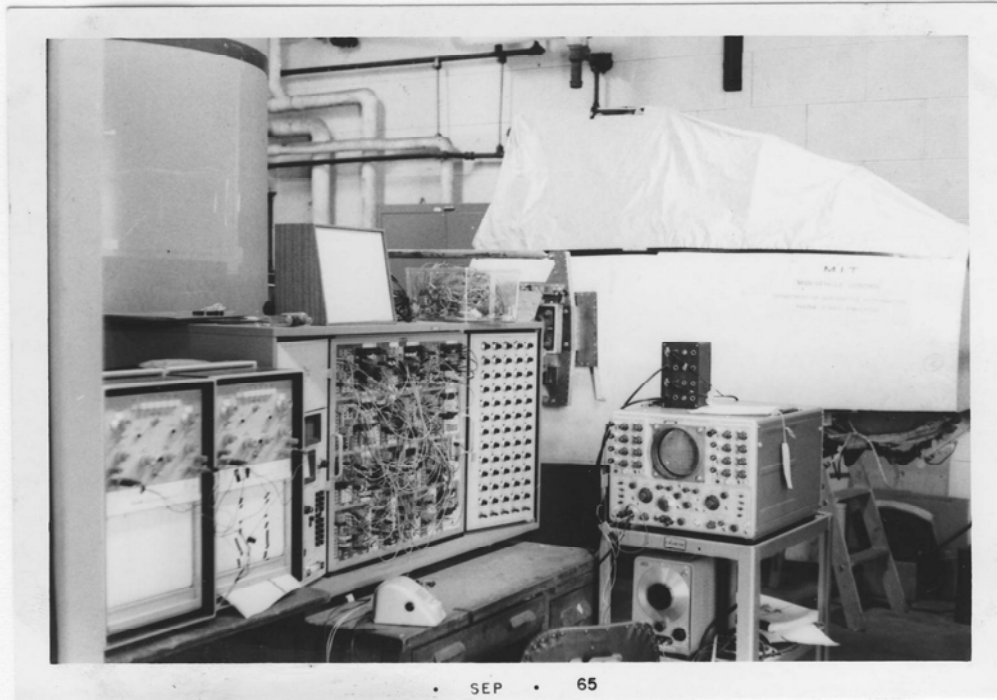


Hybrid computer, pilot control input recorder, gimbal power conditioner and controller.

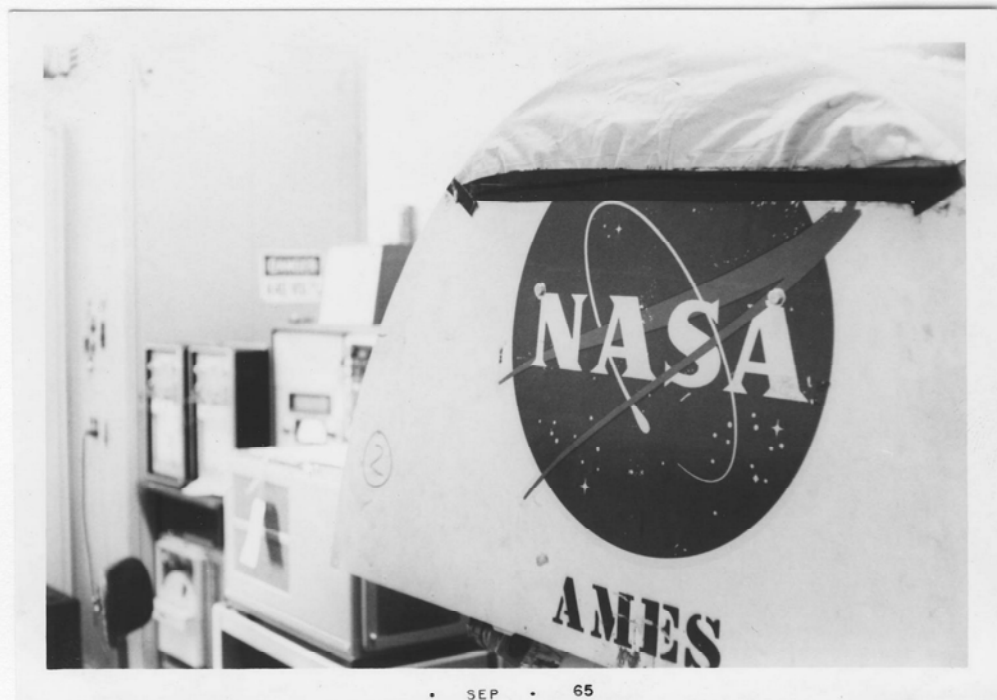


Peter Benjamin SM 66

A Hierarchical Model of a Helicopter Pilot
(Determining how a pilot uses visual and motion cues to control an aircraft)



Jet cockpit mounted on gimbals to permit pitch, roll, yaw. Hybrid (digital/analog) computer used to control aircraft movements, visual simulation, record pilot stick and rudder movements.



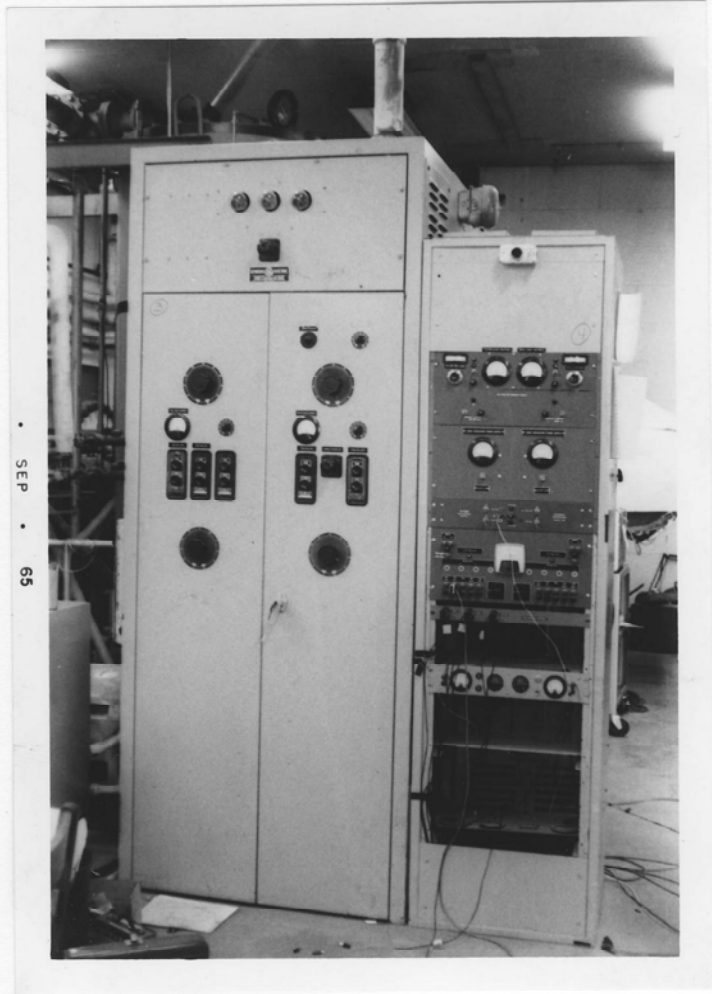
Peter Benjamin SM 66

SEP 65



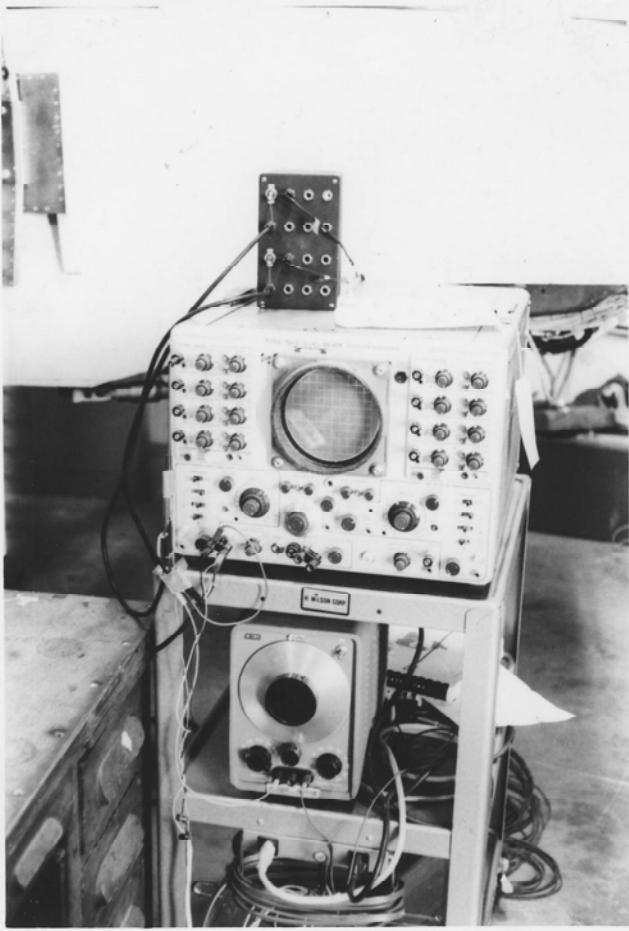
Cockpit with controls, visual simulator display

SEP 65



Gimbal power conditioner, controller

SEP 65

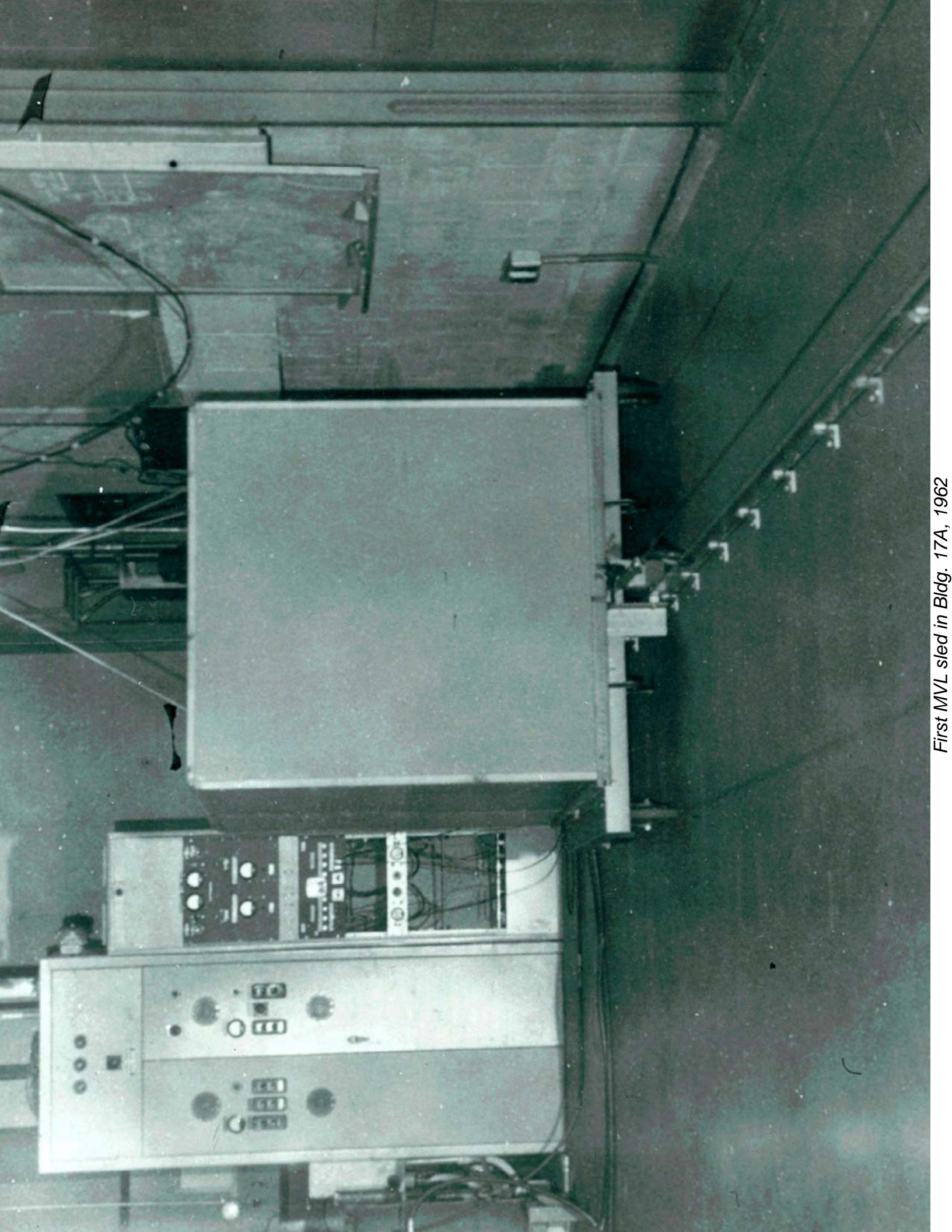


Visual display monitor

Peter Benjamin SM 66



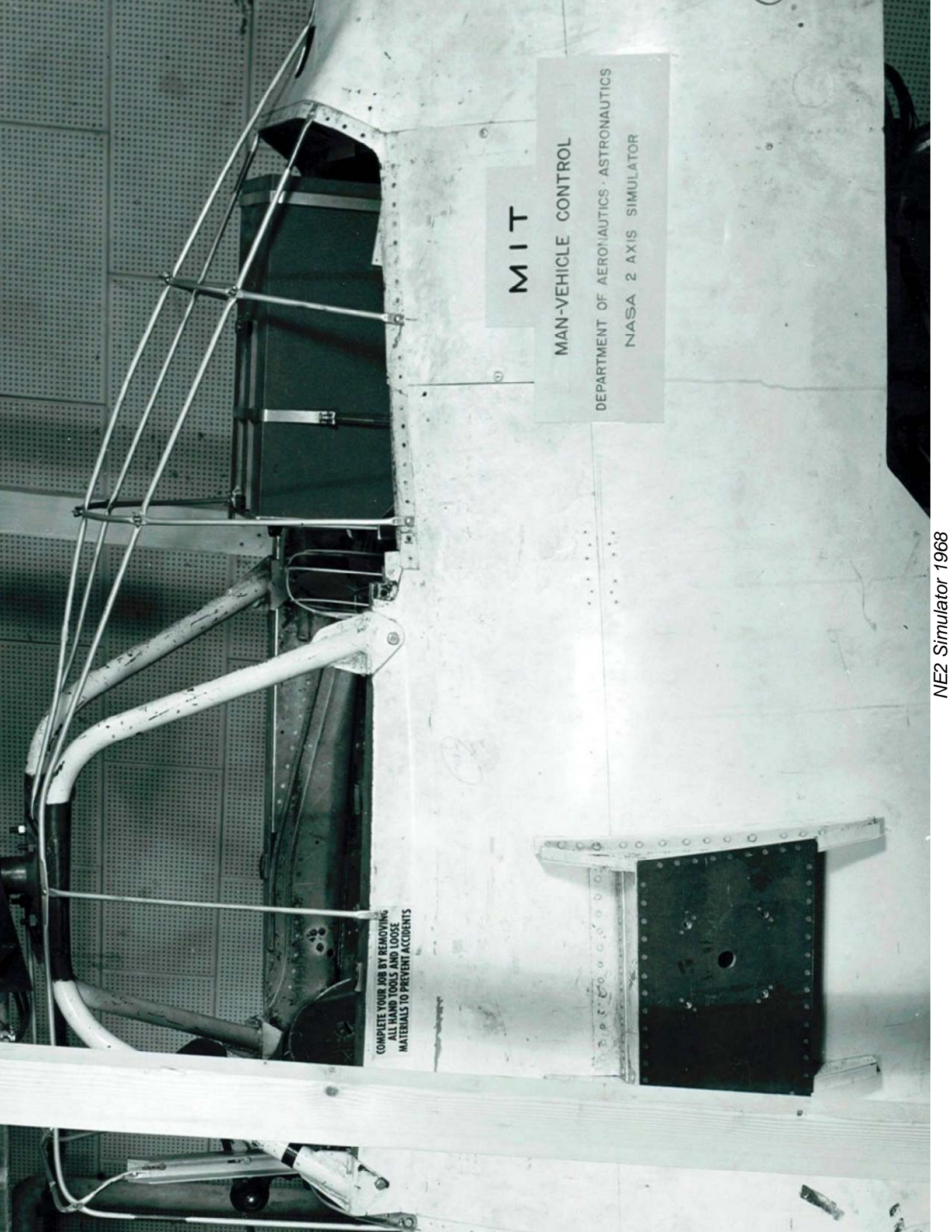
Al Pryess's F-106 1960s



First MVL sled in Bldg. 17A, 1962



1965 MVL sled interior



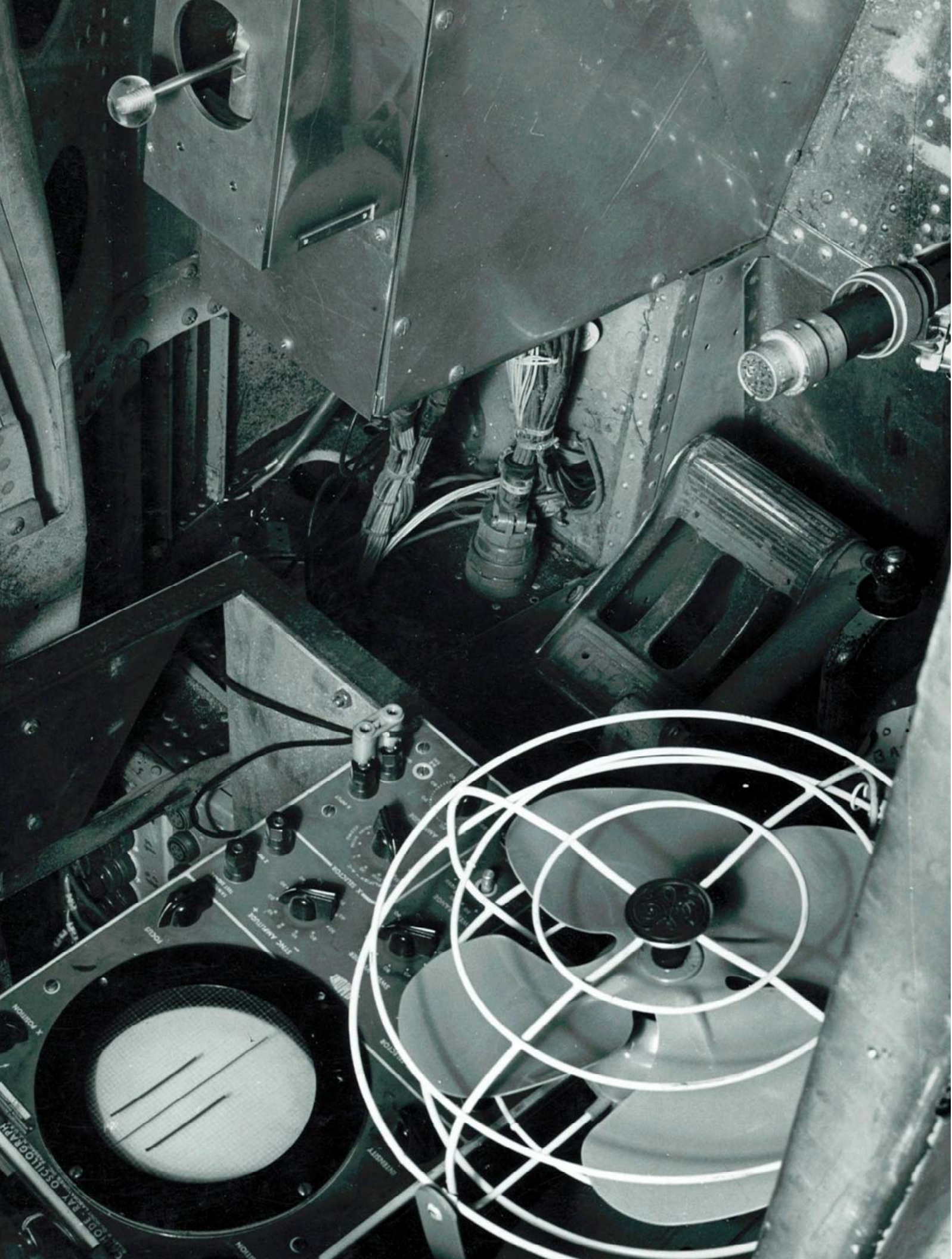
MIT

MAN-VEHICLE CONTROL

DEPARTMENT OF AERONAUTICS · ASTRONAUTICS

NASA 2 AXIS SIMULATOR

COMPLETE YOUR JOB BY REMOVING
ALL HAND TOOLS AND LOOSE
MATERIALS TO PREVENT ACCIDENTS



1968 Interior of the NE-2 Simulator

*Nasa Style.
Attw: Benjamin*

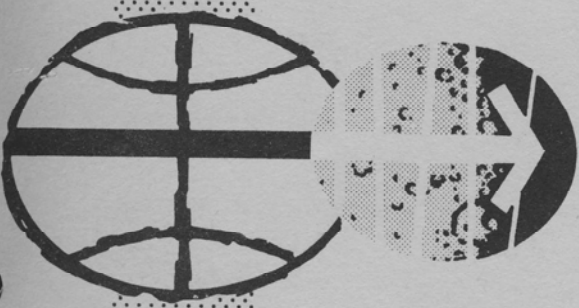


NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

FINAL EVA PROCEDURES APOLLO 11

MAY 26, 1969

PREPARED BY
EVA BRANCH
FLIGHT CREW SUPPORT DIVISION



MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

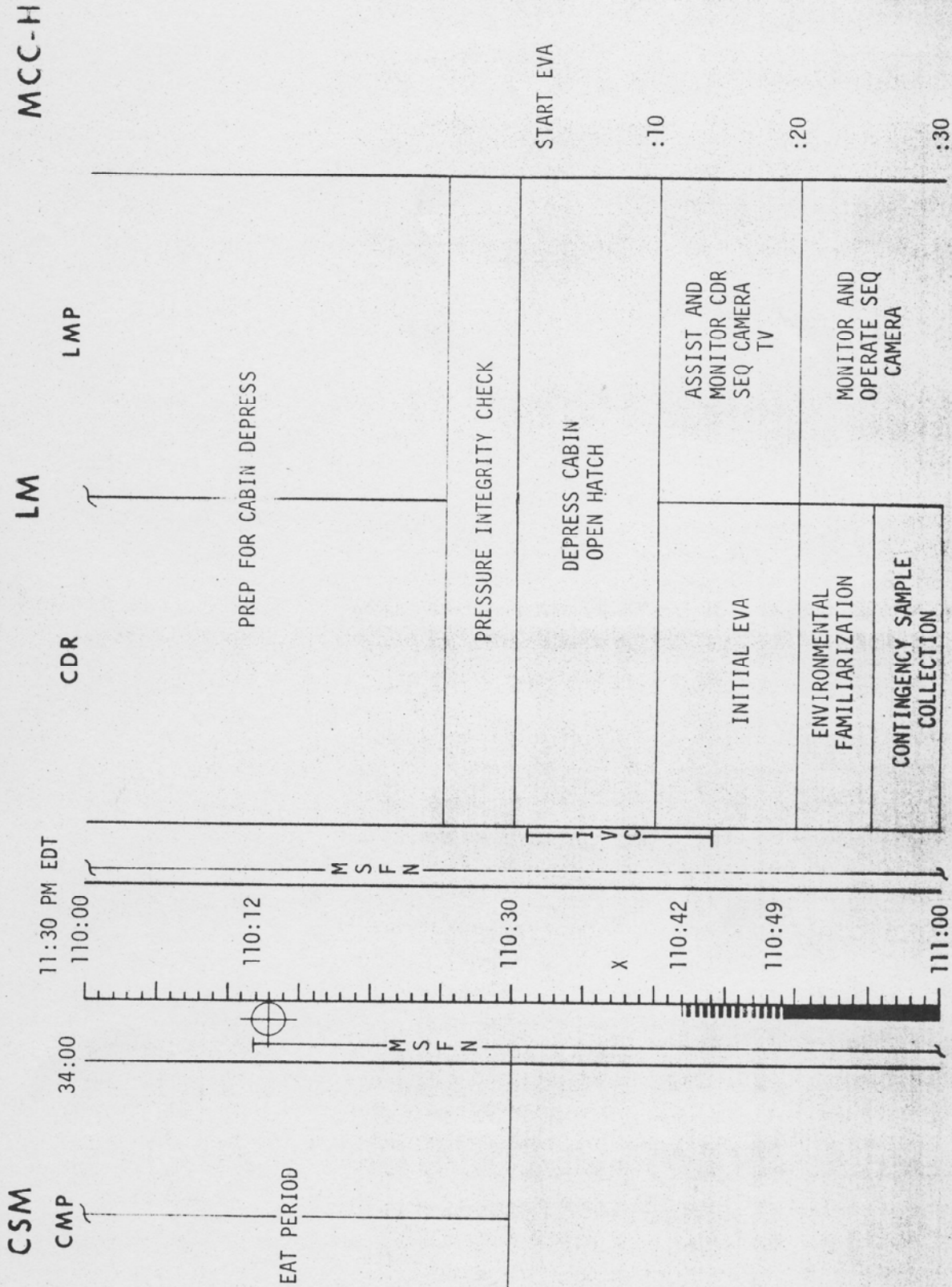


Apollo 11

July 20, 1969

Neil Armstrong

FLIGHT PLAN



MISSION	EDITION	DATE	TIME	DAY/REV	PAGE
APOLLO 11	PRELIMINARY	APRIL 15, 1969	110:00 - 111:00	5/18	3-78

FLIGHT PLANNING BRANCH

The National Aeronautics and Space Administration
presents the

Apollo Achievement Award

to

P. Benjamín

In appreciation of dedicated service to the nation as a member of the team which has advanced the nation's capabilities in aeronautics and space and demonstrated them in many outstanding accomplishments culminating in Apollo 11's successful achievement of man's first landing on the moon, July 20, 1969.



Signed at Washington, D.C.

W. F. Sullivan
ADMINISTRATOR, NASA

FIRST DAY
OF ISSUE

MAN'S FIRST LANDING ON THE MOON

JULY 20, 1969



NASA

APOLLO 11 ASTRONAUTS
ARMSTRONG · COLLINS · ALDRIN



UNITED STATES

FIRST MAN ON THE MOON

FIRST DAY OF ISSUE

Mr. P. Benjamin
215 Lakeside Drive
Greenbelt, Md. 20770



MVL Vermont outing 1979



MVL Skiing in Vermont 1969



MVL Party in Newton 1969



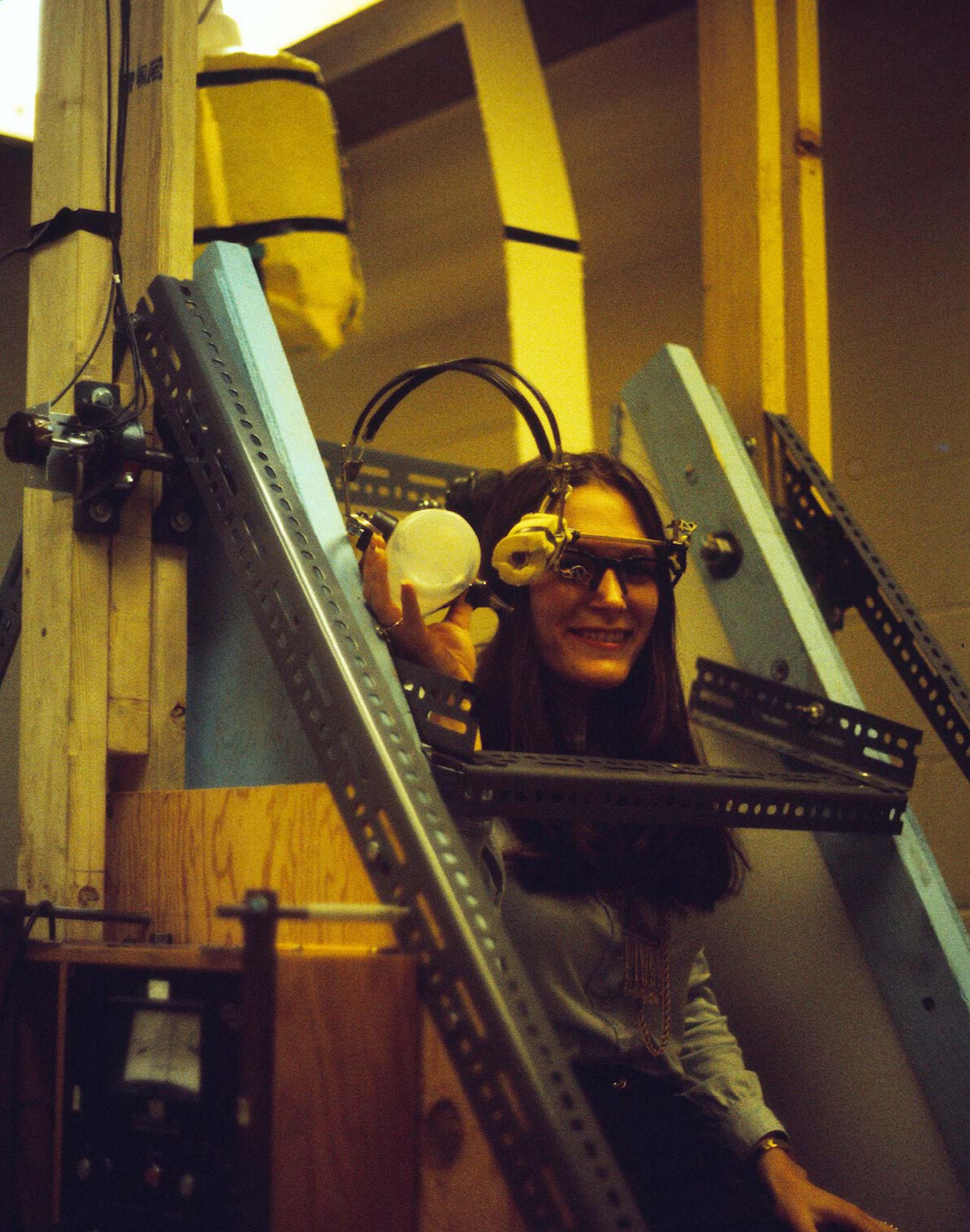
MVL Party in Newton 1969



Arye Ephrath in ADAGE simulator ca 1974



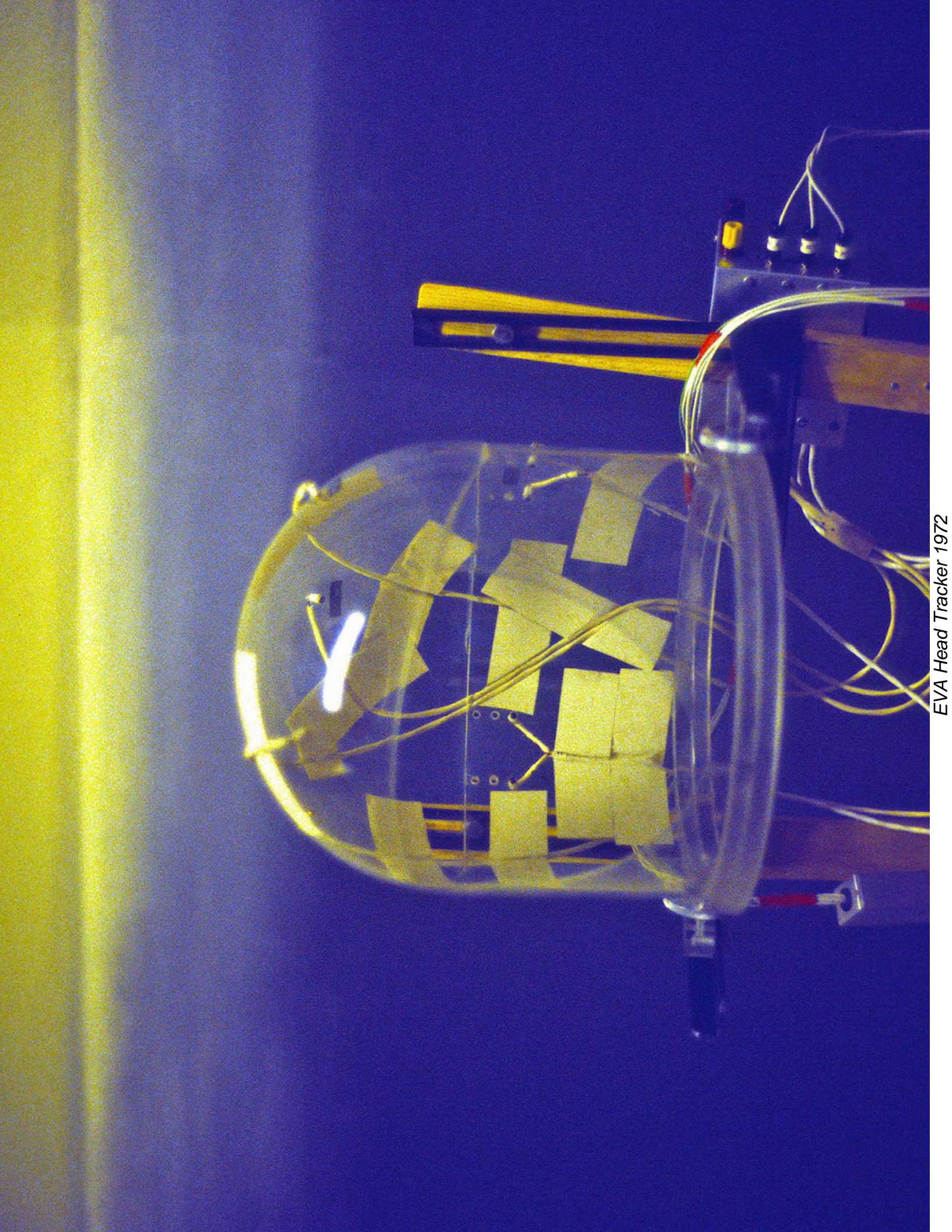
Thomas Brandt MVL GAT trainer 1972



Roberta Stearns in Oman's Caloric Experiment 1972



Motion sickness bags 1972



EVA Head Tracker 1972



~1975 USAF SAB MAC Panel Korea



1975 Young & USAF SAB at play (HI)



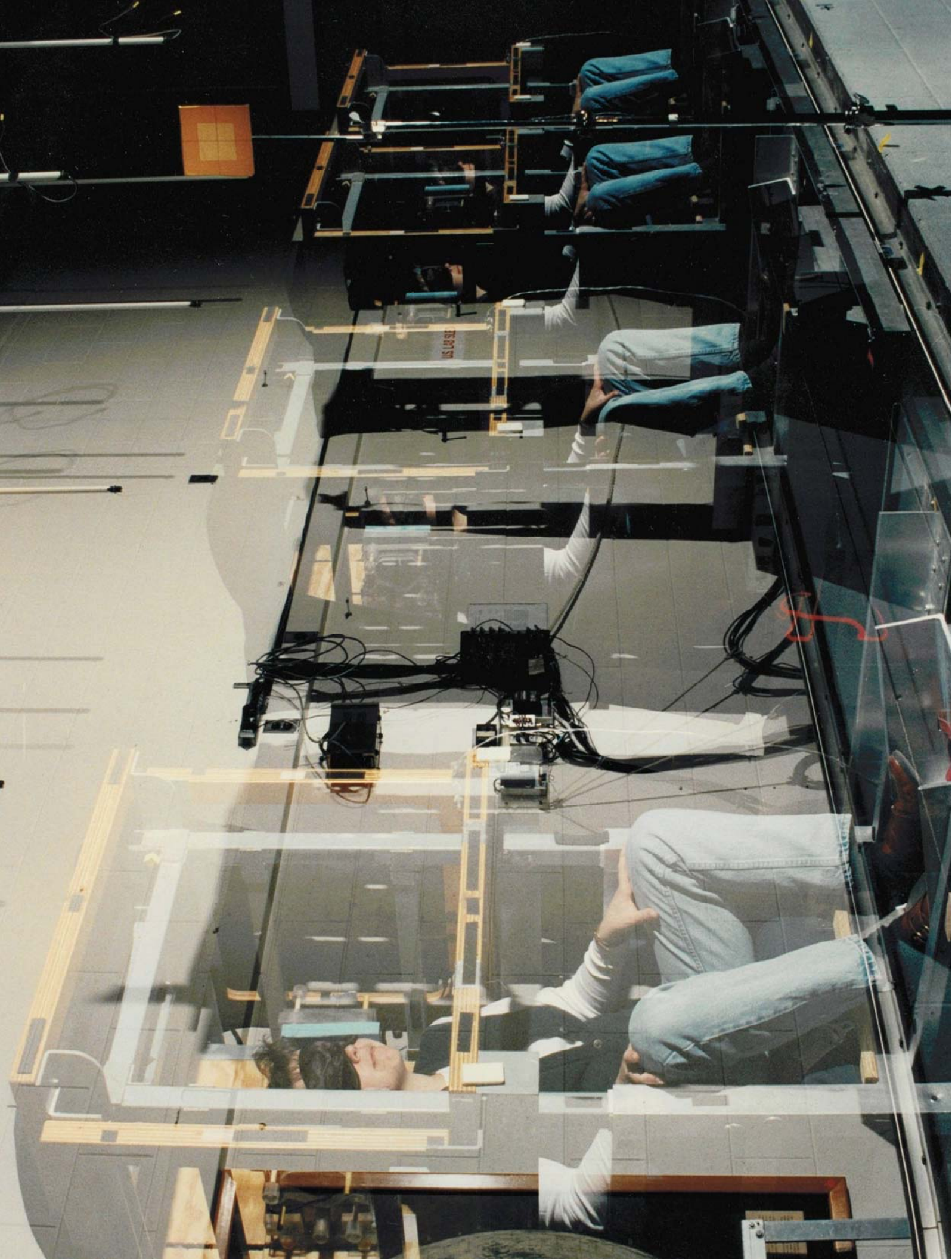
1978 Syozo Yasui and wife, entertain Larry in Tokyo



~1974 Elliot, Leslie and Robbie Young in a boat ...needing repair



Nashner posture platform 1972



MVL Lab Sled 1976



Bill Morrison, Wubbo Ockels & John Tole SL-1 Training BMEC Chair 1978



1979 Bob Parker and Larry Houg



Oman and Garrlott SL-1 prisms 1979



Ulf Merbold DCIEM PAM 1978



Pete Tappan Dome prototype 1978



MVL Sled about 1977



1978 Young, Oman & Watt



1978 Arrott testing Oman KC-135 Dome



1978 Watt & Hoffman in SL-1 KC-135 drop test



1980 Bob Kenyon and Antonio Elias at Larry's in Newton



~1980 Annual Young's Yankees vs. Kenyon's Killer Softball Rumney, NH



~1980 Johannes Dichgans



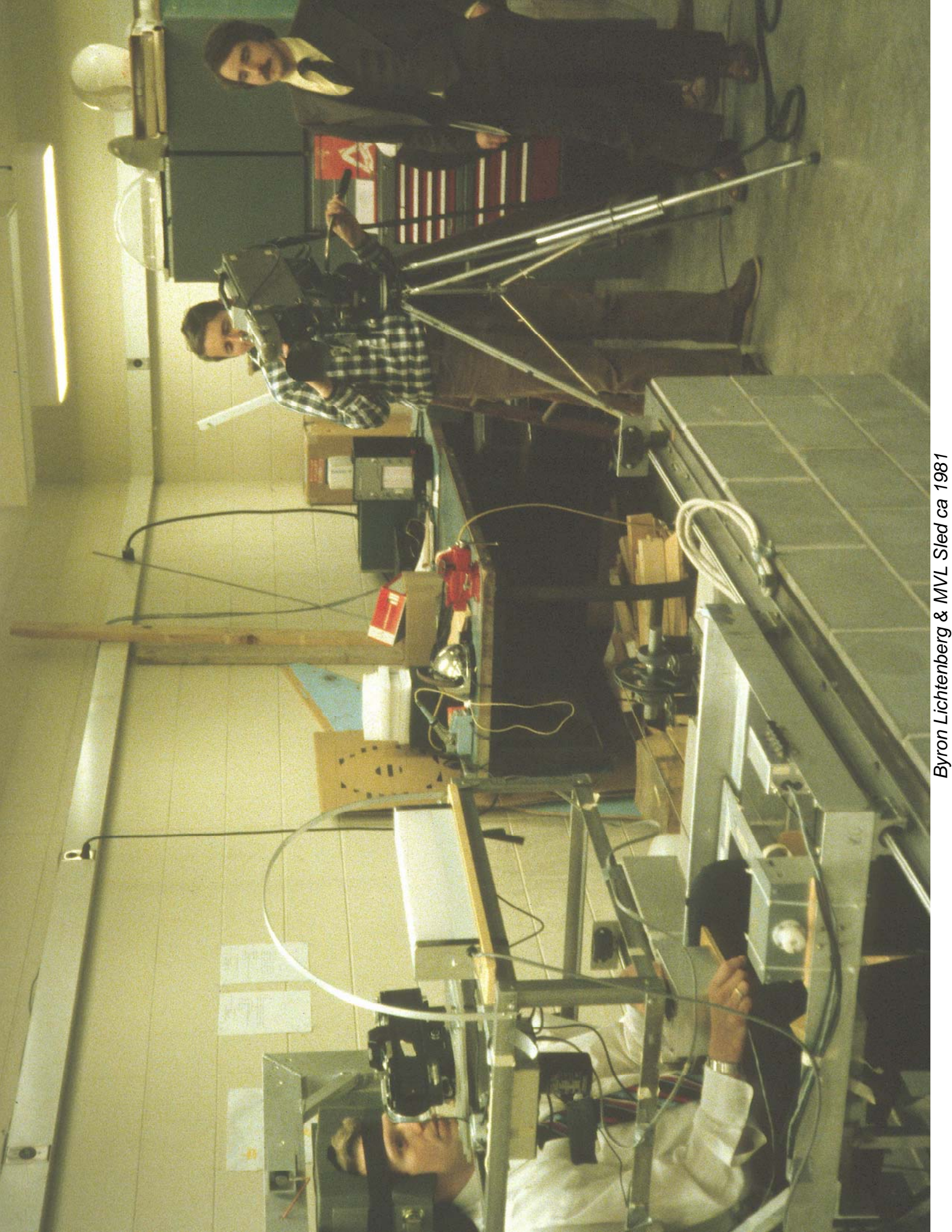
Bob Kenyon O-G flight ca 1980



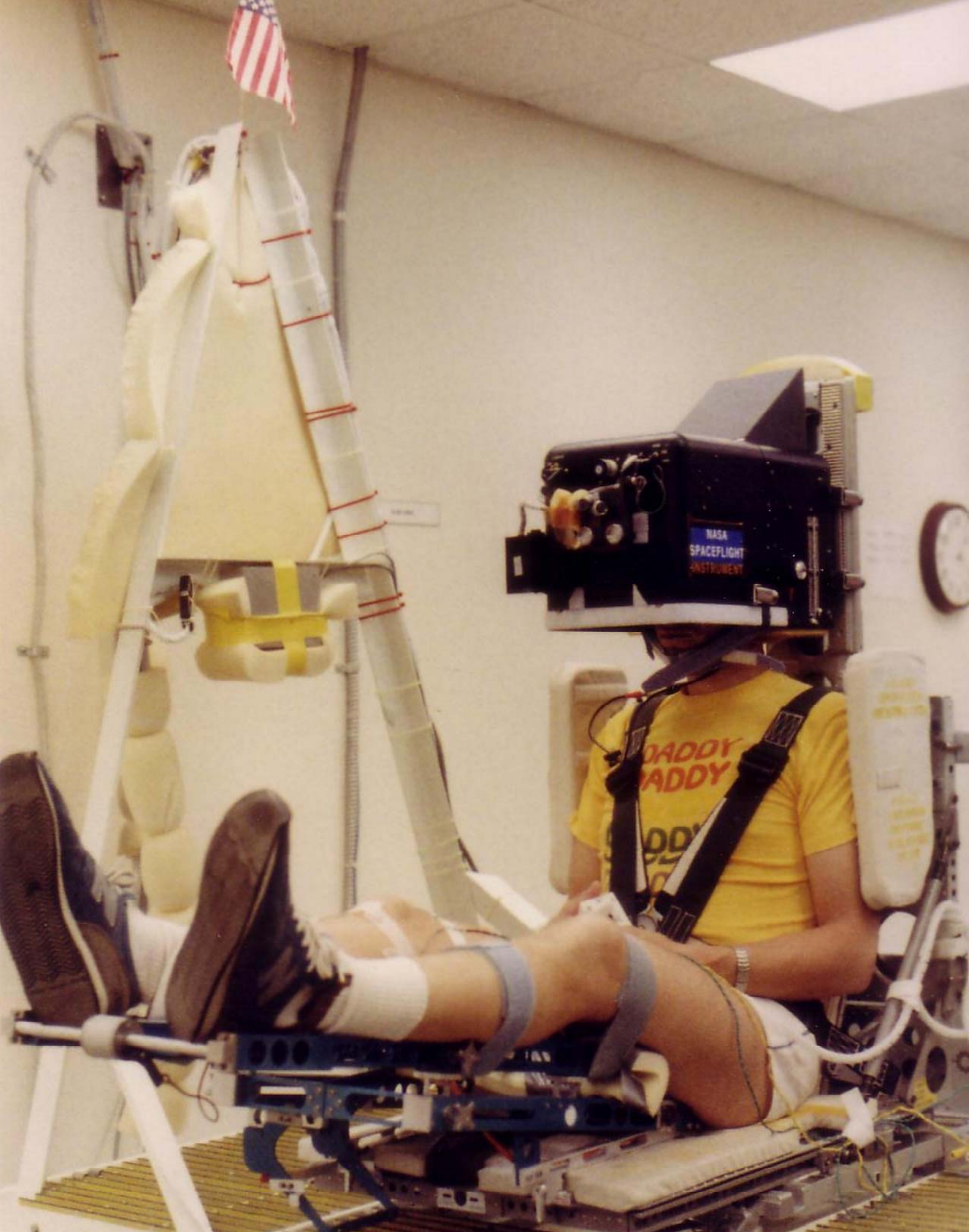
1981 - First Shuttle Launch



1981 First Shuttle Landing



Byron Lichtenberg & MVL Sled ca 1981



1980 Lichtenberg - NASA sled



1982 Bill Thornton learning contact lens technique



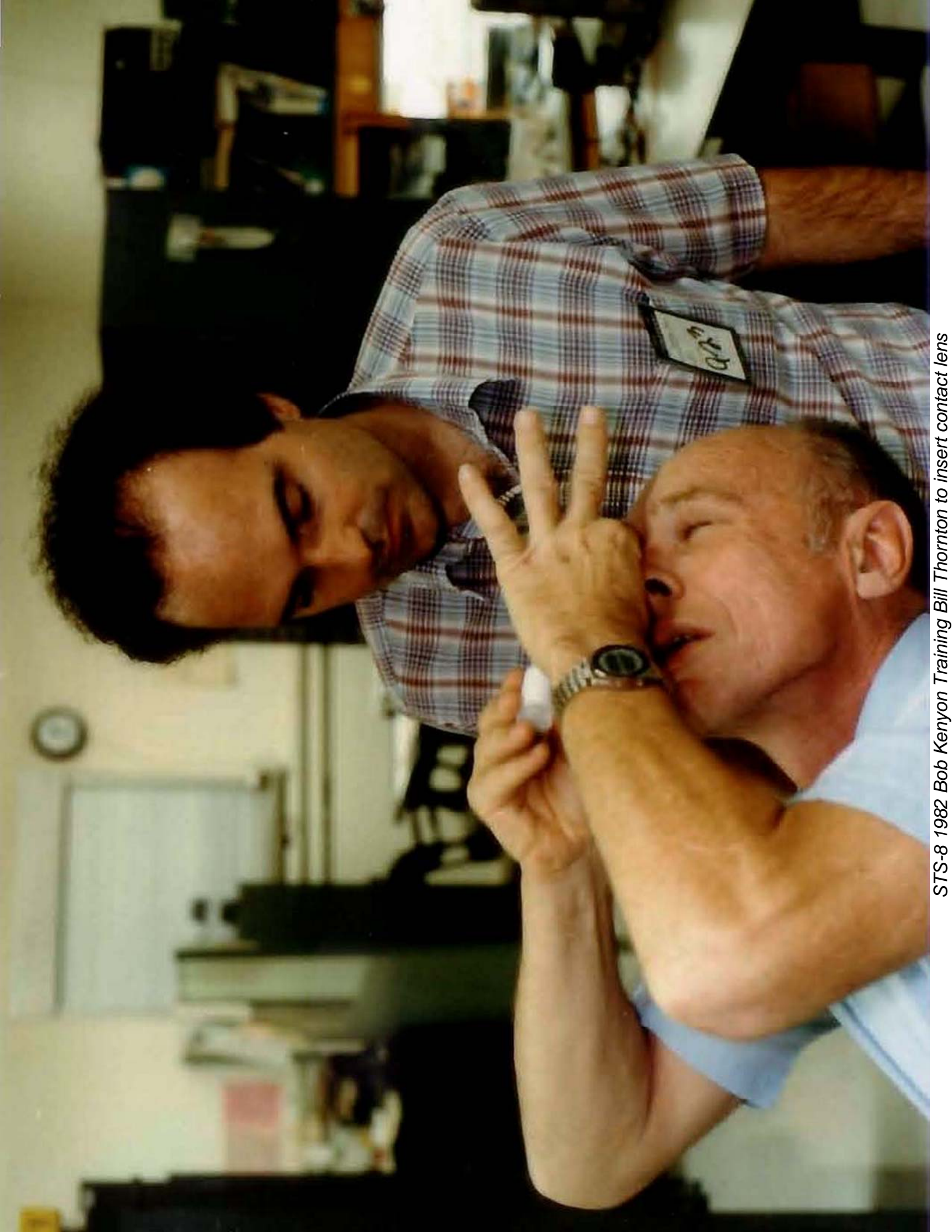
~1980 Kenyon & Thornton striped contact lens



1982 Bill Thornton



Bob Kenyon and Bill Thornton STS-8 contact lens trials



STS-8 1982 Bob Kenyon Training Bill Thornton to insert contact lens



STS-8 Bill Thornton contact lens training



1982 Thornton putting in contacts



1982 Bill Thornton



Anthony Arrott SL-1 KC flight



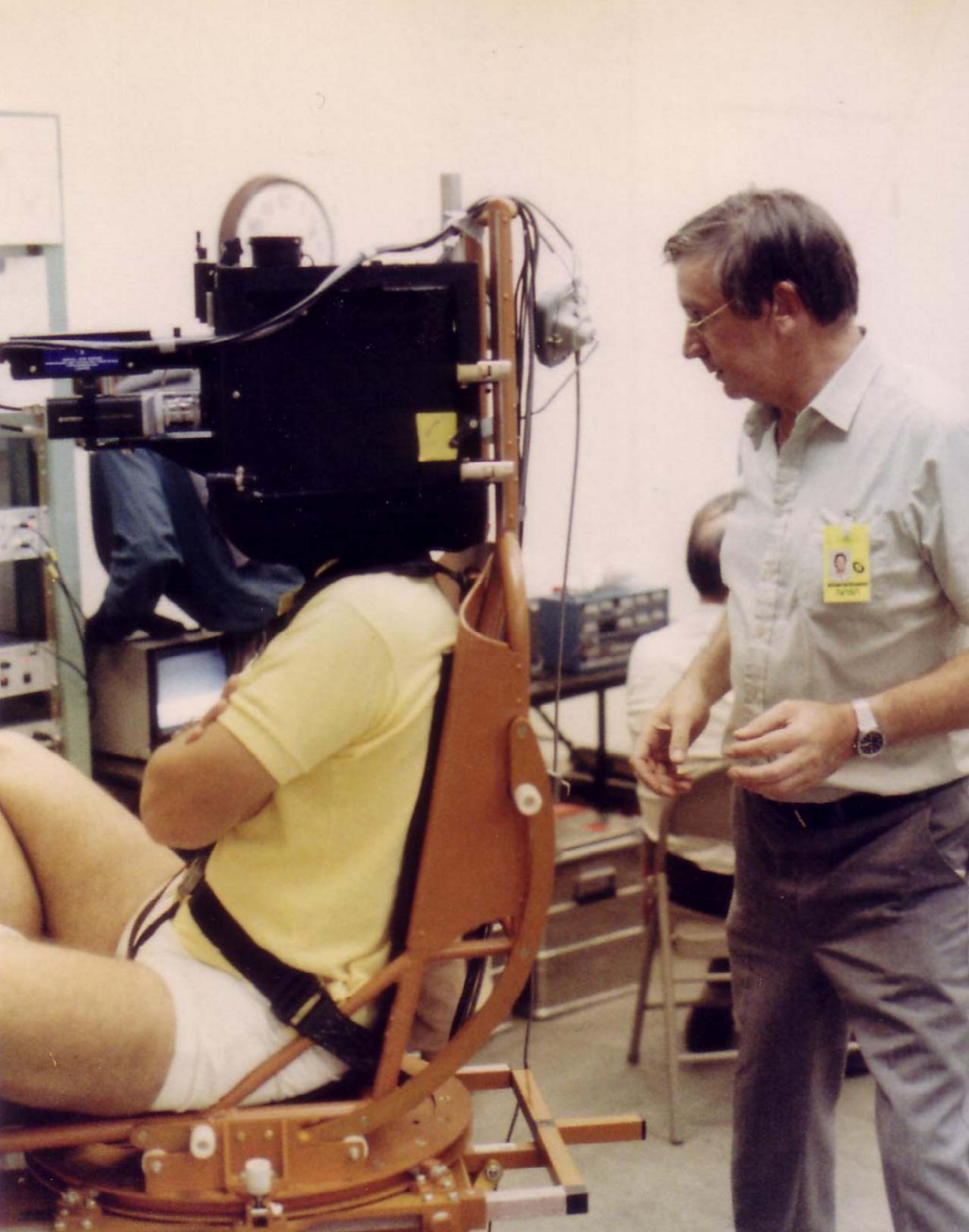
1982 Dome on KC135, Renshaw testing Oman



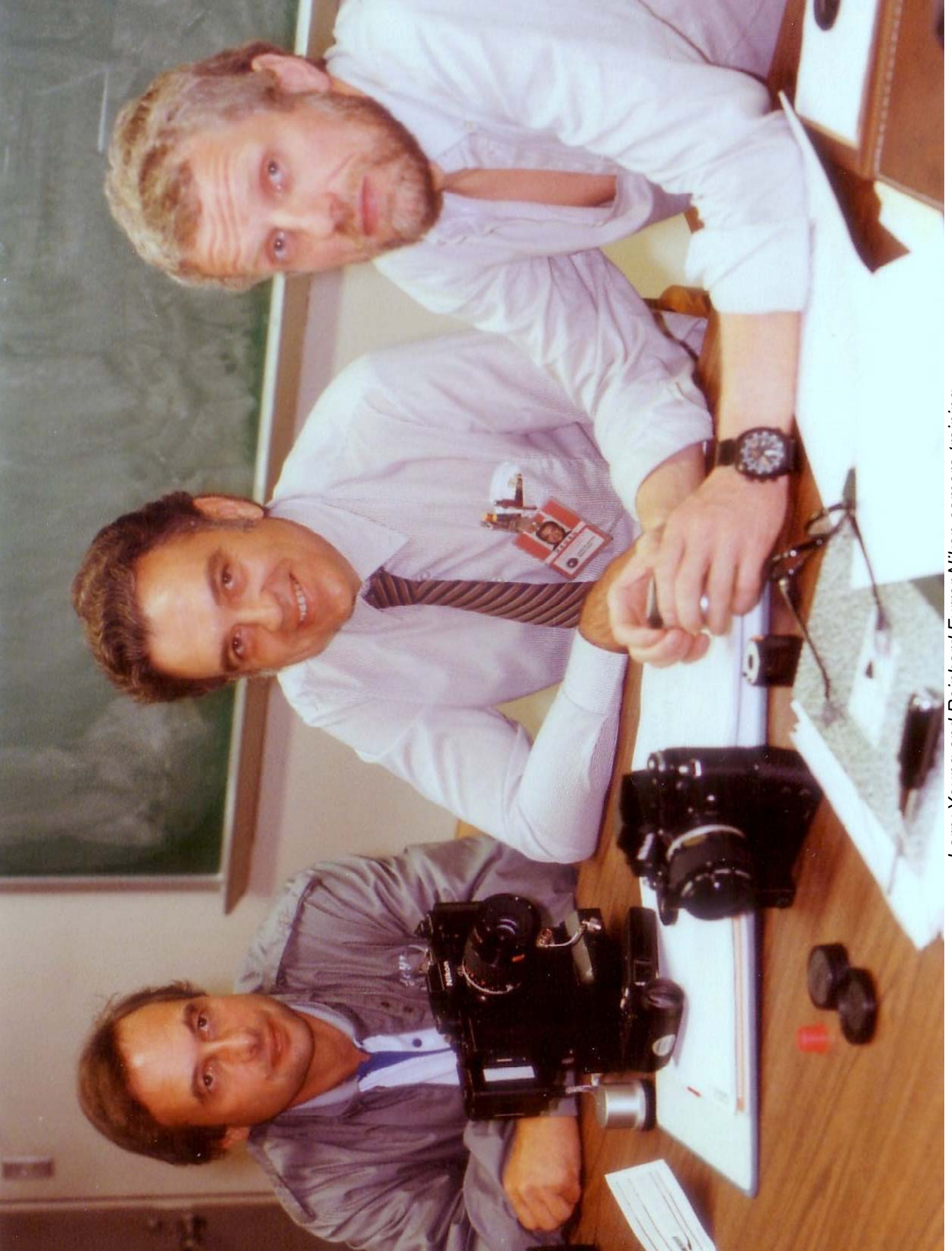
Owen Garratt SL-1 Chair training



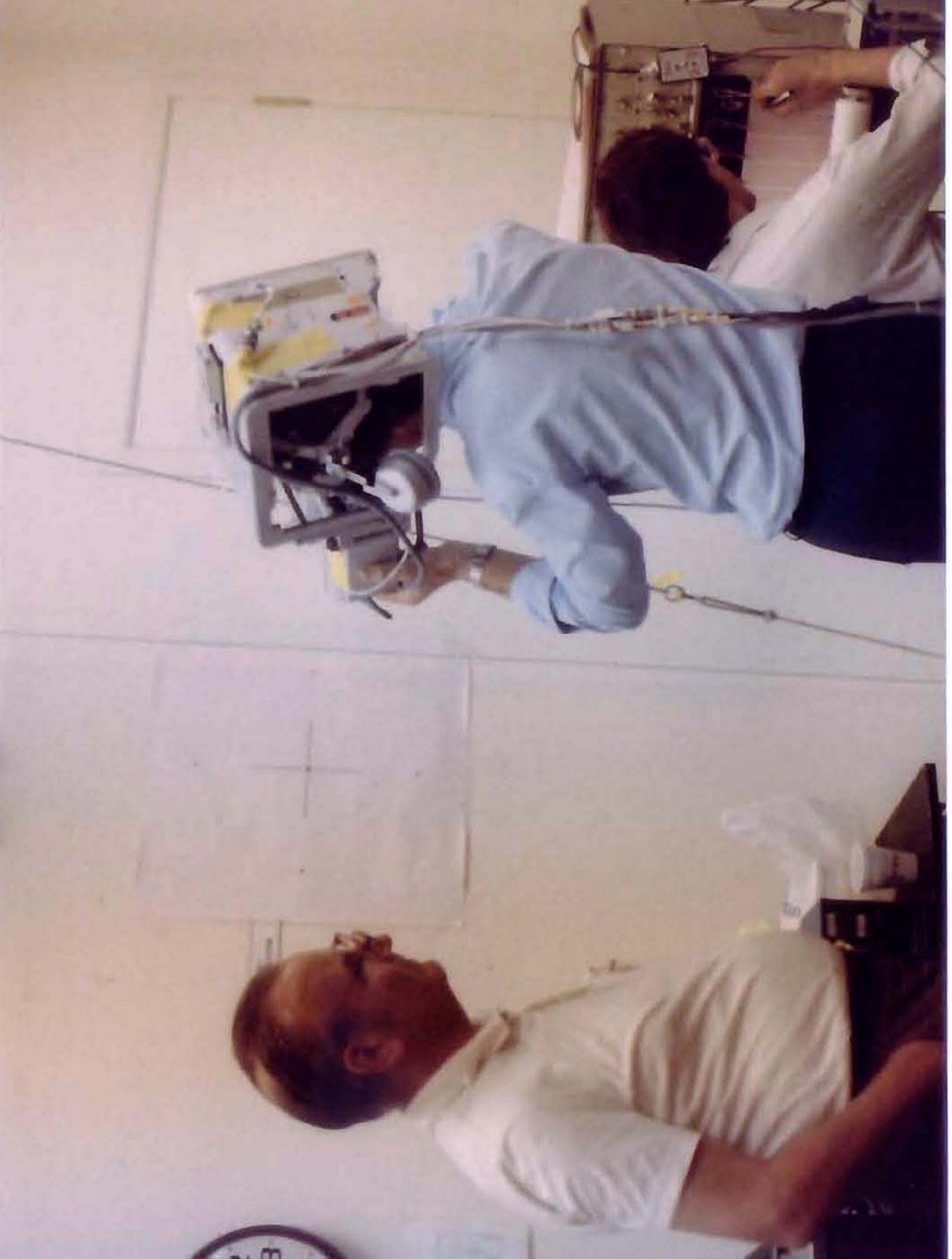
1980 Young, Renshaw and the NASA "Guppy"



1980 Alan Benson and locast rotator SL-1



Larry Young and Reinhard Furrer Nikon camera training



1982 Juri von Baumgarten testing SL-1 helmet



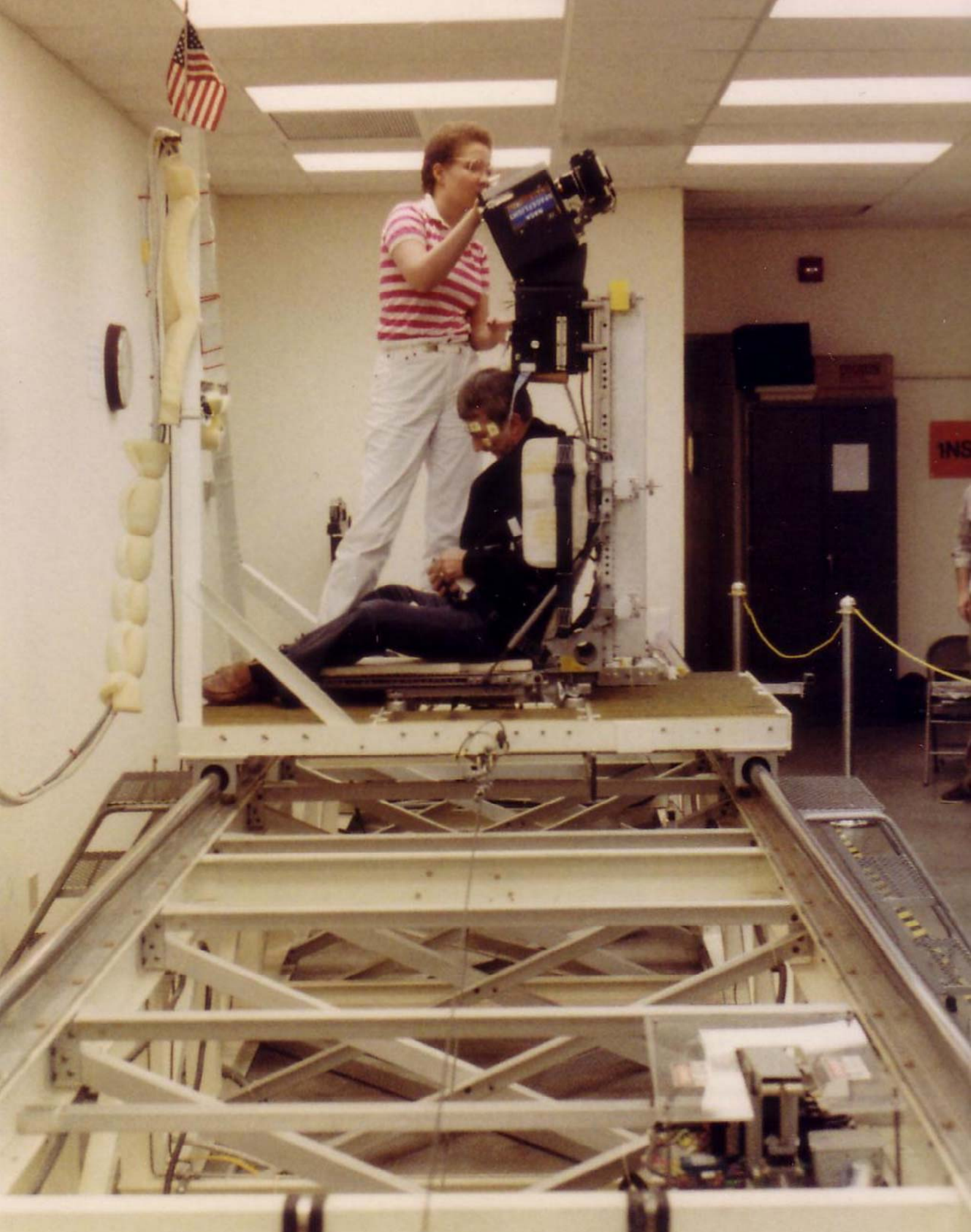
Ed Boughan and Larry Young MIT Helmet ca 1981



~1981 MIT Sled Training



~1981 MIT Sled Training



1983 NASA Sled



1983 Brenda Kitchen (?) SL-1 sled



1980 Owen Garriott SL-1



1985 MVL's Leader Cap - Larry



~1980 Larry and Byron Reception in Newton



~1980 Reception at Newton - Byron, Vicky and Jack Kerrebrock



1980 Chuck, Steve, Susie Fennely, and Cherry Oman



~1980 Reception in Newton John Dugundji, Byron Lichtenberg, Cherry Oman



~1980 in Newton Jack Kerrebrock, Bob O'Donnel, Chuck, Byron



~1980 Will Yelle, Carl Deluca, Vicky Kerrebrock, Gene Covert



~1980 SL-1 Reception in Newton, Joe Binsack, Ed and Joan Boughan



~1980 Ed Boughan, Ed Crawley, John Hansman, Steve Bussolari



1984 Nagoya Space Medicine Meeting- Igarashi & Young



MVL baseball Cochituate 1985



Remy Malan 1985



WEIGHTLESS WONDER IV
JOHNSON SPACE CENTER

WEIGHTLESS WONDER IV
JOHNSON SPACE CENTER

ZERO GRAVITY
30 SEC. BURN/LOAD

PUSH SEAT
TO CLIMB

PARACHUTE
UNTIL THROAT
PARACHUTE
PARACHUTE

2.6 PRELODE
5.11 - 20000 FT.
5.12 - 20000 FT.
5.13 - 20000 FT.

STAIRS - 30000 FT.
SEE ABOVE
5.14 - 11000 FT.

THE ROCKET
Crew Chief
B. Williams

D-1 KC135 Flight 1985 Howard Better, Dan Merfeld, Sherry Modestino, Bob Renshaw, Doug Watt, Ken Money, Chuck Oman, Larry Young



AnthonyArrott DFRC Sled 1985

100% AIR FORCE MS - 1988
K-15 FROM 1980-85 - 1988
SPECIFIC THIS AIRCRAFT
WAS ORIGINALLY 20 - 4 FUEL
WAS BURNED 1.0 - 4281-1-14

WEIGHTLESS WONDER IV JOHNSON SPACE CENTER

ZERO GRAVITY
30 SEC WEIGHTLESS



34000 FT.
325 KNOTS TRUE
AIRSPEED AT APEX

HOLD ZERO GRAVITY
TO 45° DIVE



2.G PULL-OUT

EXIT 26000 FT.
510 KNOTS
TRUE AIR SPEED

PUSH OVER
TO ZERO G

POWER REDUCED
UNTIL THRUST
EQUALS DRAG



PULL-UP 45°

START 26000 FT.
510 KNOTS
TRUE AIR SPEED





Gail Standish, Mark Shelhamer, and Larry Young in the KC135



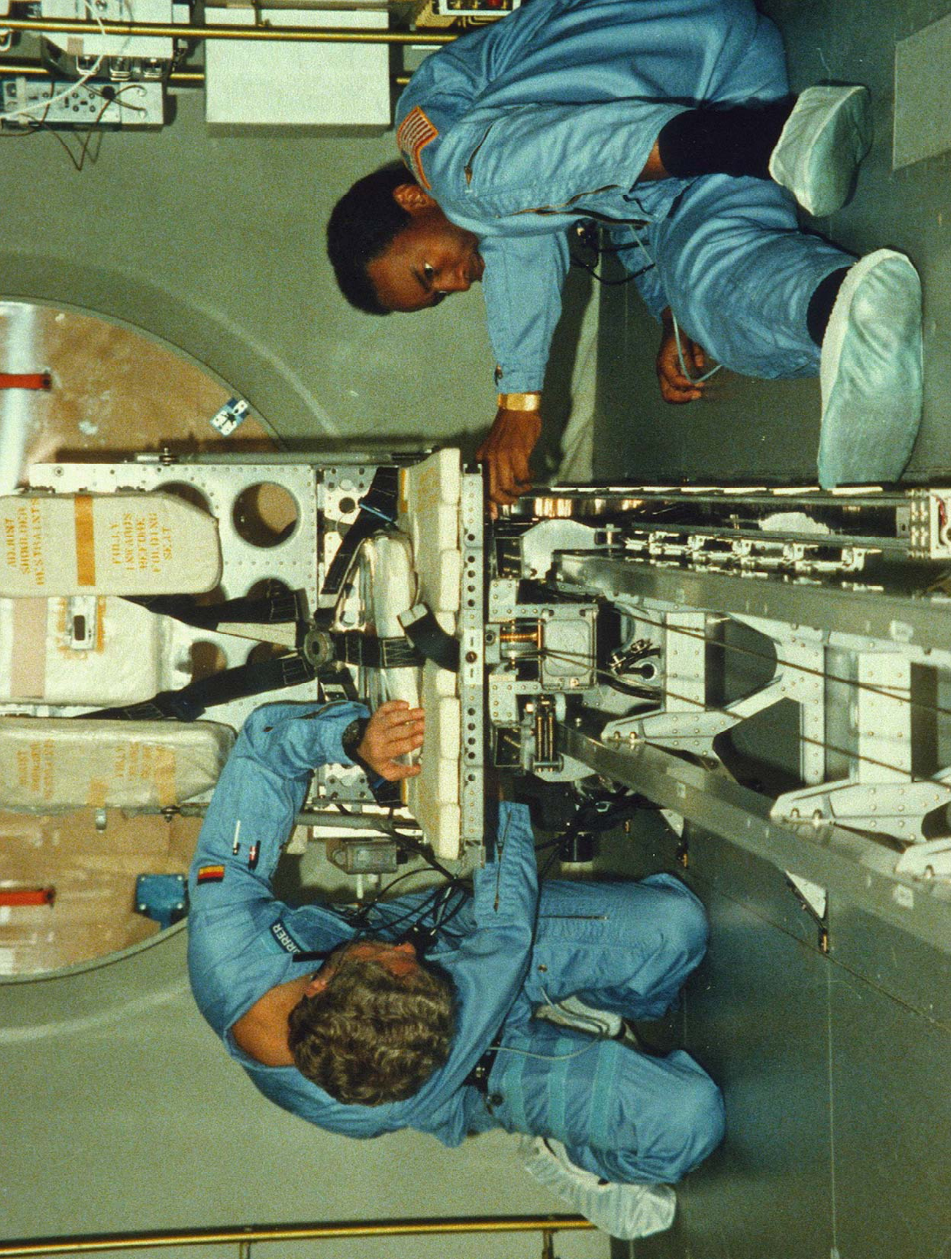
Dan Merfeld and Sherry Modestino Dryden BDCF Sled 1985



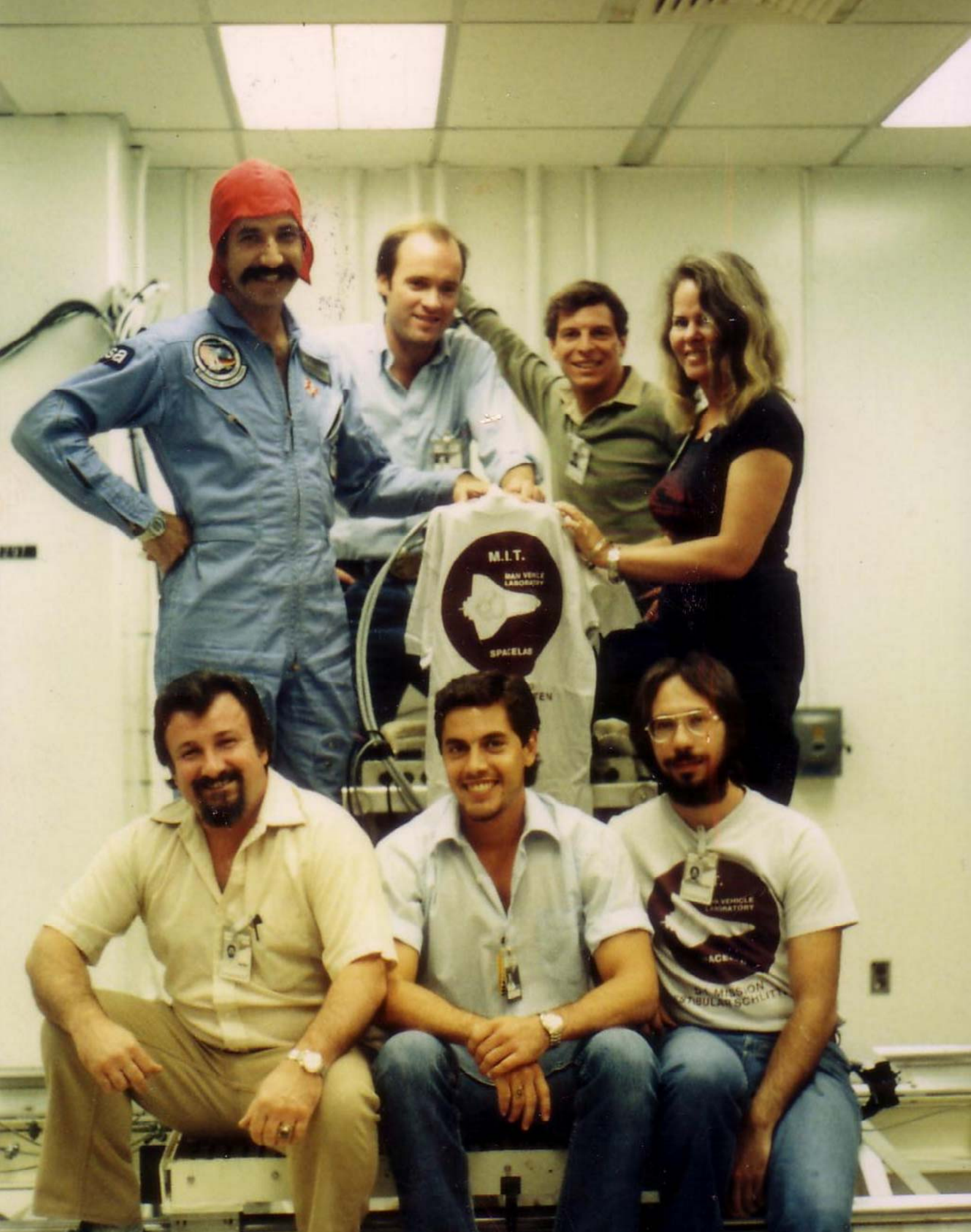
1985 Bob Renshaw testing Young in D-1 Sled, Cologne



Remy Malan and Anthony Arrott 1985



Reinhard Furrer & Guy Bluford D-1 Training Cologne 1984



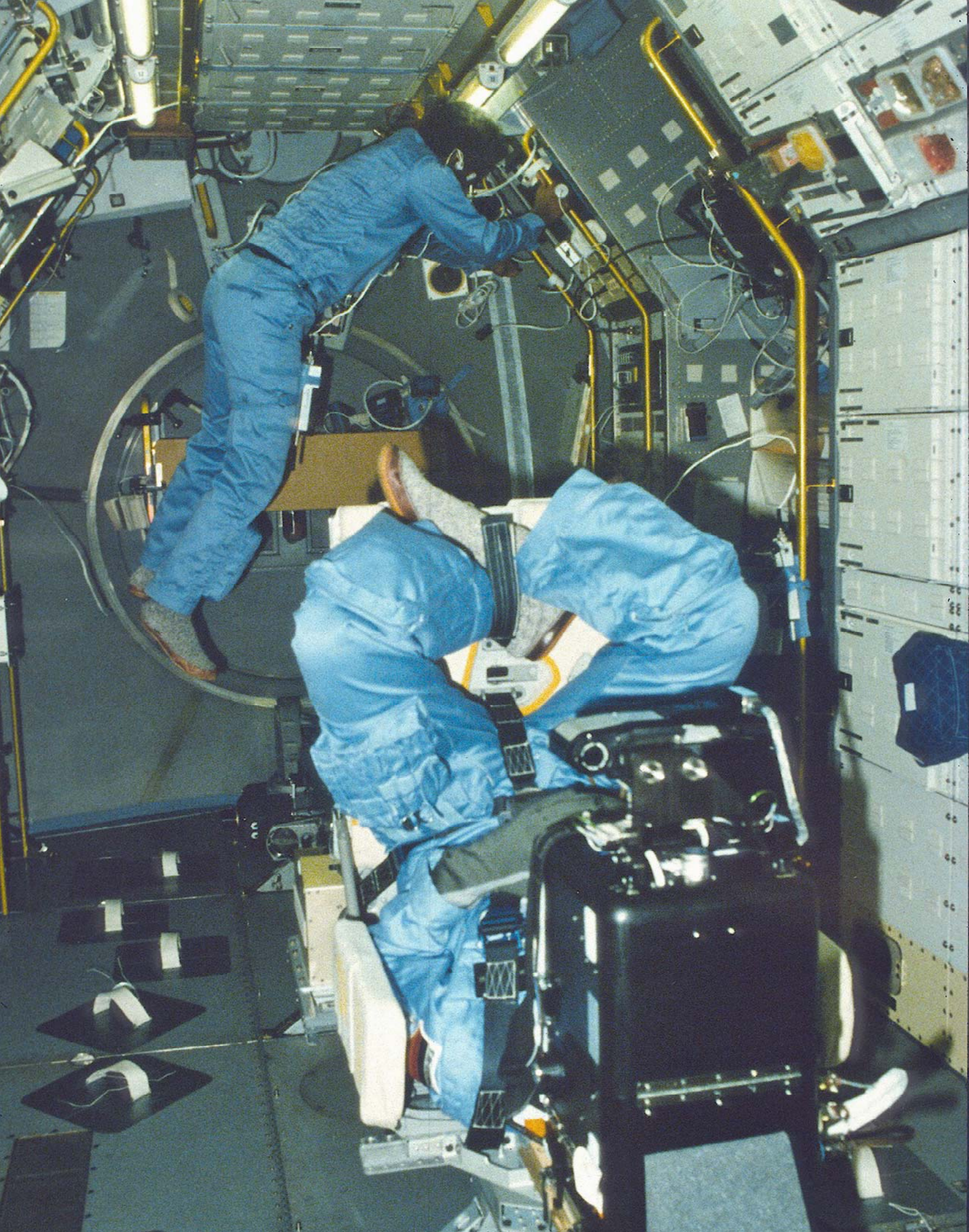
D-1 Sled Team at DFRC ca 1985



~1985 Dr. Bob Donahue fitting biteboard to Ernst Messerschmid for D1 Mission



Wubbo Ockels 1985



D1 Space Sled 1985



1985 Stuart Johnson and Vanessa Ellerbe JSC



1985 Ever cheerful ESA Sled Team - Cologne



Dman and Barbara Glas of MIT demonstrate the Barany chair, which is used to induce for research.

Chuck & Barbara G.



MVL SLS-1 team ca 1989



At a video display terminal in Building 11, astronaut Dr. Byron K. Lichtenberg (left) and Dr. Charles M. Oman of the Man-Vehicle Laboratory monitor a life-sciences experiment in progress at the Kennedy Spaceflight Center.

—Photo by Donna Coveney



Telescience 1988 Byron Lichtenberg



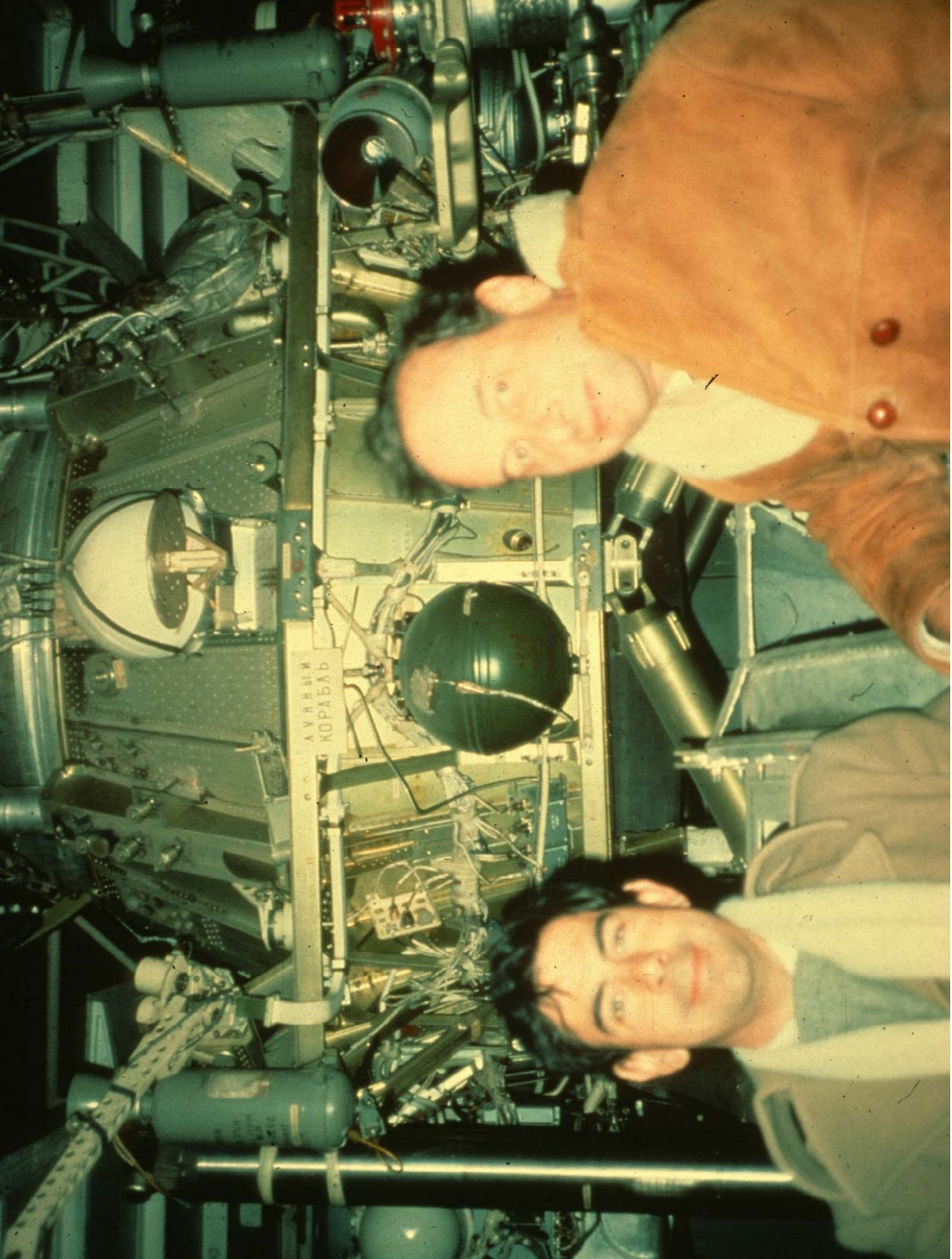
Barbara Glas & Byron Lichtenberg, MIT Telescience 1988



ca 1985 MWPE Dava Newman, Brad McGrath, Sherry Modestinp



Seddon & Young, SLS-1, 1989



Ed Crowley & Larry Young MAI Lunar Module Moscow 1989



1990 Prof. Lena Valavani - EKF Observer Modeling

Lyndon B. Johnson Space Center
Houston, Texas 77058

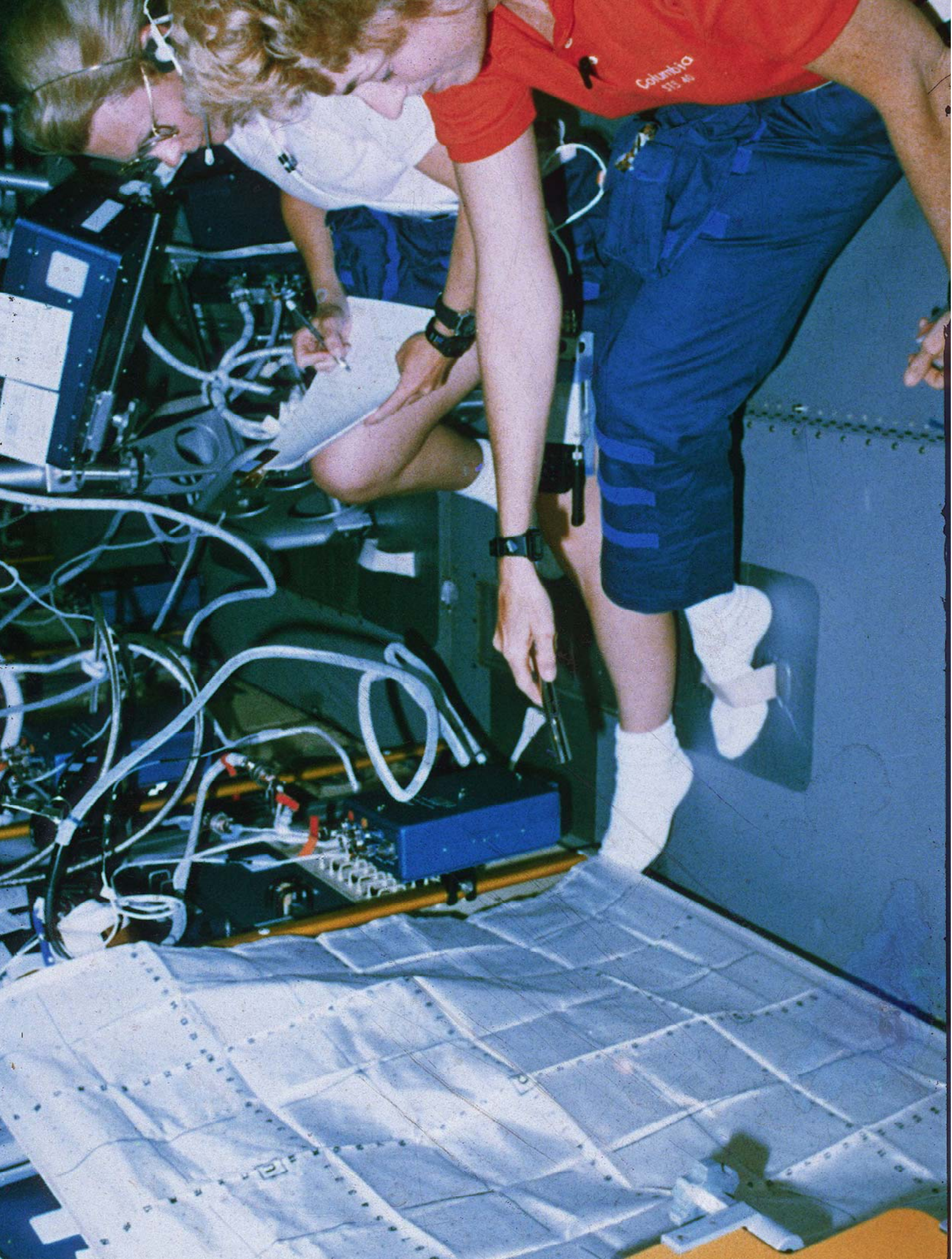
590 41701

National Aeronautics and
Space Administration



Spacelab SLS-1 Crew 1991





Rhea Seddon and Millie Fulford SLS-1 Pointing Expt 1991



Ed Boughan and Larry Young Dome ca 1993



1992 SLS-1 Rotating Chair at KSC Chris Pouliot, Ted Liefeld and Chuck Oman



1991 Jock Christie SLS-1

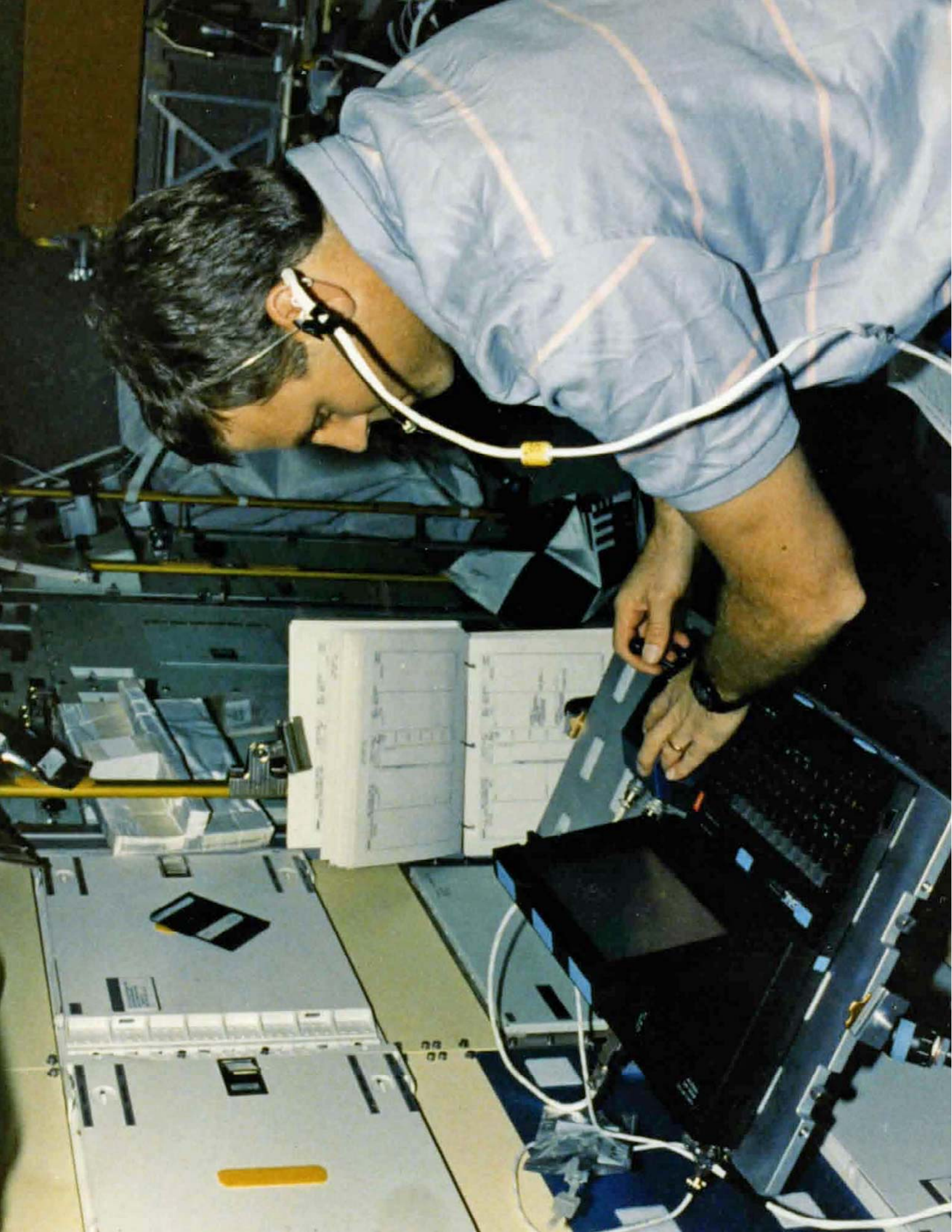


1991 Keoki Jackson SLS-1 Dome



1991 Gail Standish, Tom Mullen, Dan Merfeld,.....





ental orkload and erformance xperiment



18-IML-1
CRYOSTAT

18-IML-1
CRYOSTAT

18-IML-1
CRYOSTAT

Space
Physiology
Experiments

SPE
Space
Physiology
Experiments

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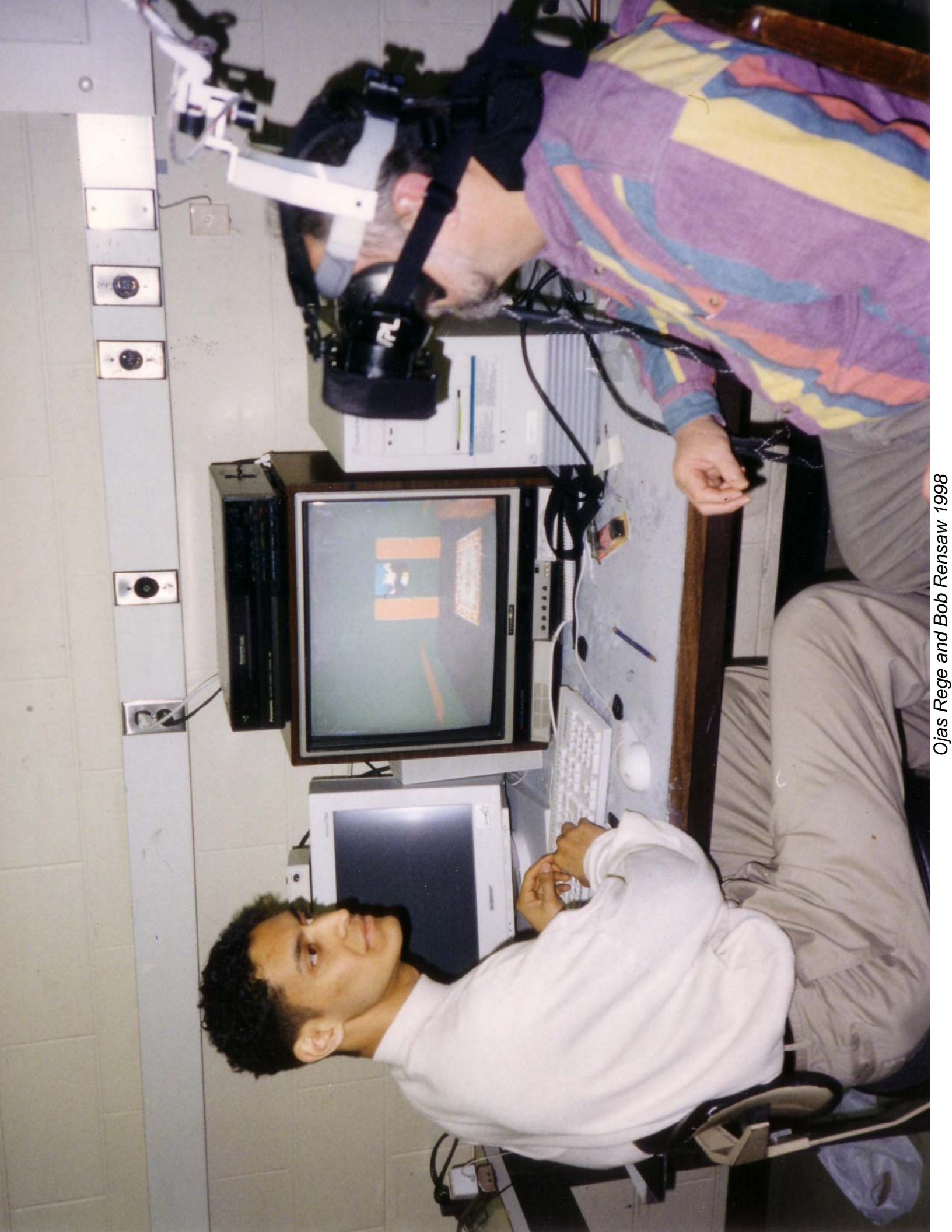
1992 IML-1 MWPE Byron Lichtenberg, Dava Newman, Bob Renshaw



1992 PS's SLS-2 Young, Buckey, Fettman



Scott Rasmussen GPS approach project 1997



Ojas Rege and Bob Rensaw 1998



Senator John Glen, Chuck Czesler, Steve Robinson, & Luca Callini



Luca Callini



Luca Callini 1998 Sleep Training Experiment



Senator John Glenn, Astronaut Steve Robinson, Prof. Chuck Czeisler, Luca Callini, 1998 Sleep Instrumentation applied to John Glenn for STS-95PI-in-a-box expert system developed by Larry Young



1991 Nick Groleau [PI]



Pease AFB Physiological Training Chuck Oman and Chris Tovee ca 1998



Steve Robinson with NASA T-38



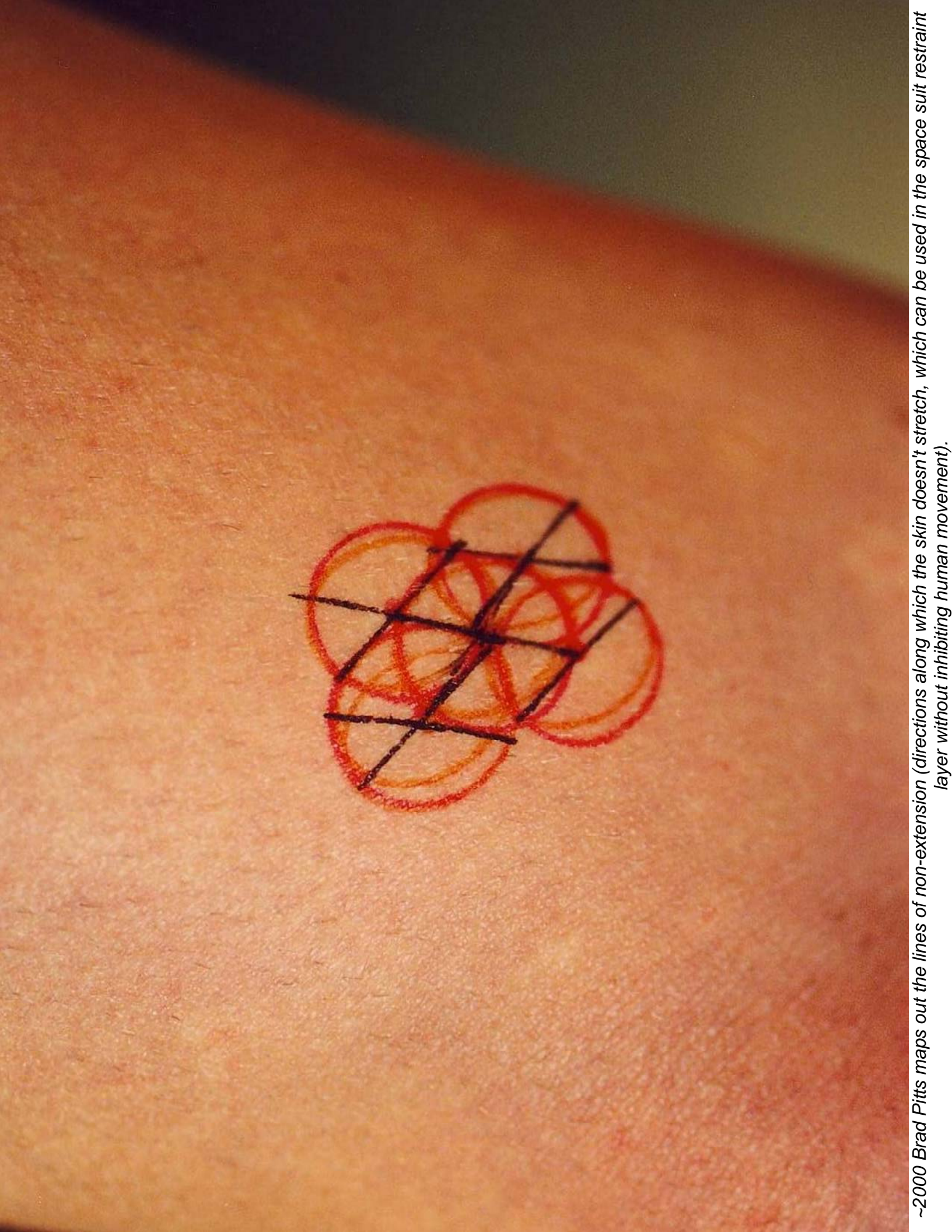
Dava and Gui sailing Galatea



~2000 One of many MVL sailing trips aboard Dava and Gui's Galatea: Chris, Dava, Anton, Julie, Bruce



~2000 MVL goes caving (in Vermont) with cam Brensinger (left)



~2000 Brad Pitts maps out the lines of non-extension (directions along which the skin doesn't stretch, which can be used in the space suit restraint layer without inhibiting human movement).



2002 Kevin Duda, Joe McIntyre, Andy Liu on ESA 0-G flight



~2000 NASA rapid decompression training in preparation for a KC-135 flight; Kevin Duda and Chris Carr





Mission Control in Star City, Russia: Jessica (Edmonds) Duda and Erik Wagner, 2004

Squat Exercise Biomechanics During Short-Radius Centrifugation





2007 Kevin and Larry on Graduation Day



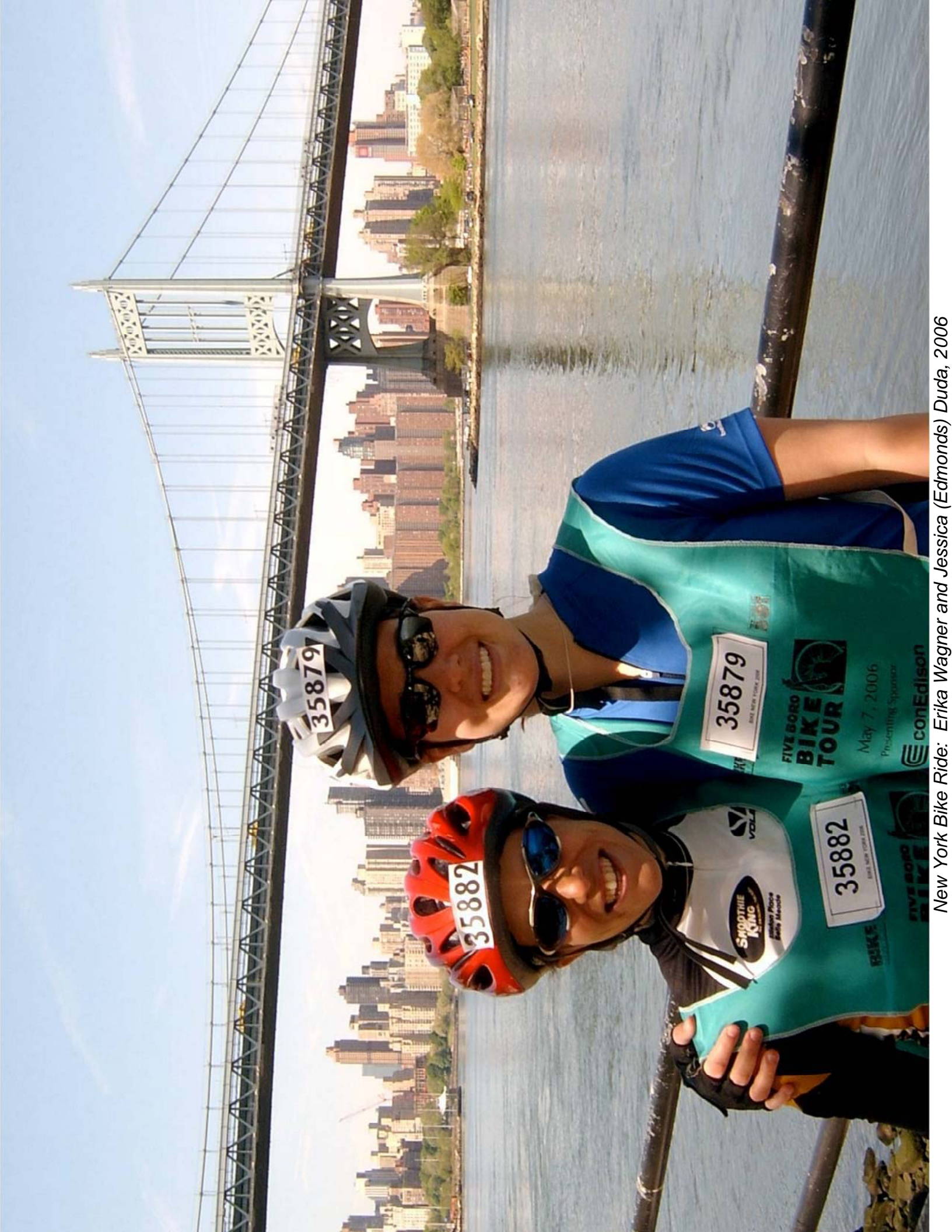
Red Sox win the World Series: Liang Sim, Kevin Duda, Jessica (Edmonds) Duda, and Jessica Marquez, 2004



Skating: Jeremie Pouly, Kevin Duda, Jessica (Edmonds) Duda, 2006



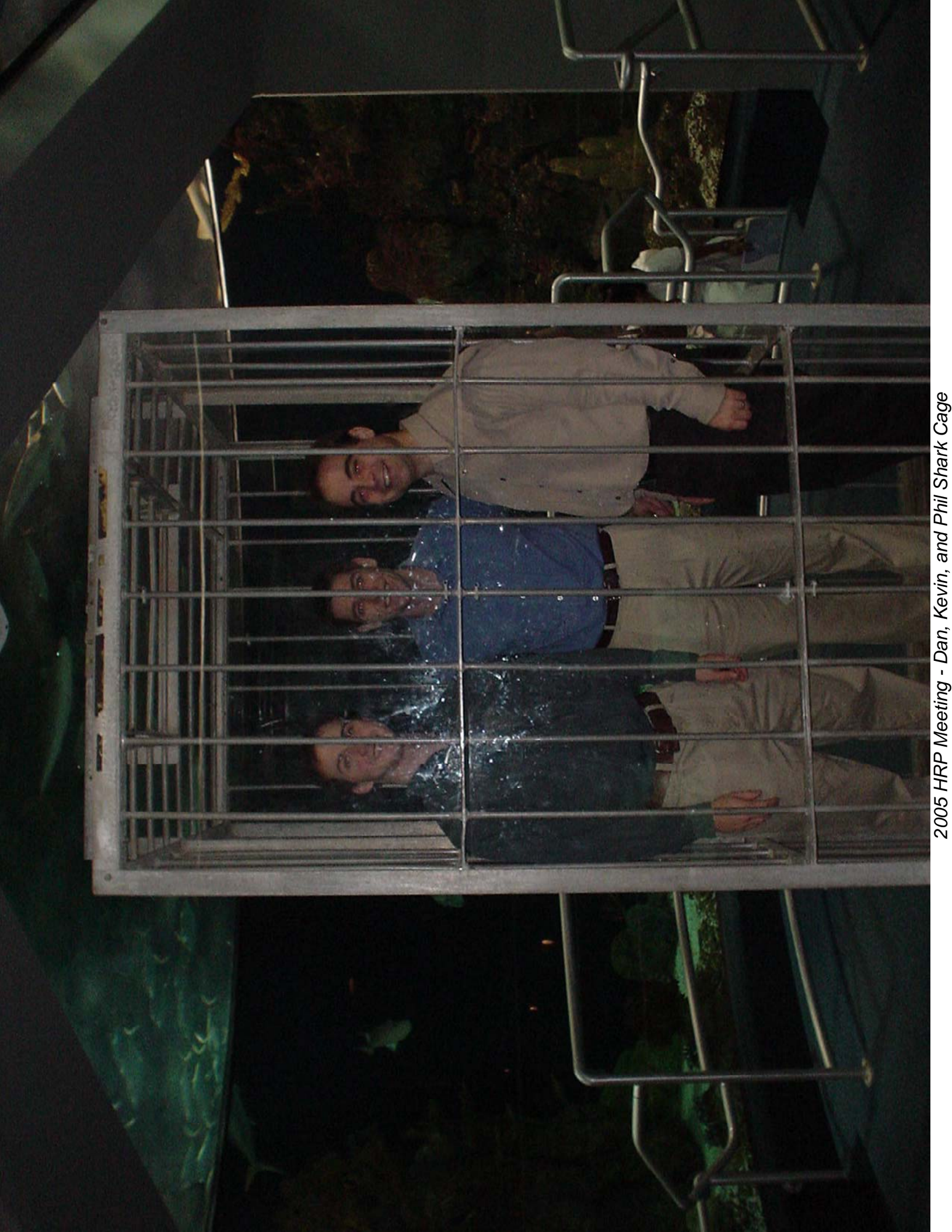
MVL Bake-off: Kevin Duda, 2005



New York Bike Ride: Erika Wagner and Jessica (Edmonds) Duda, 2006

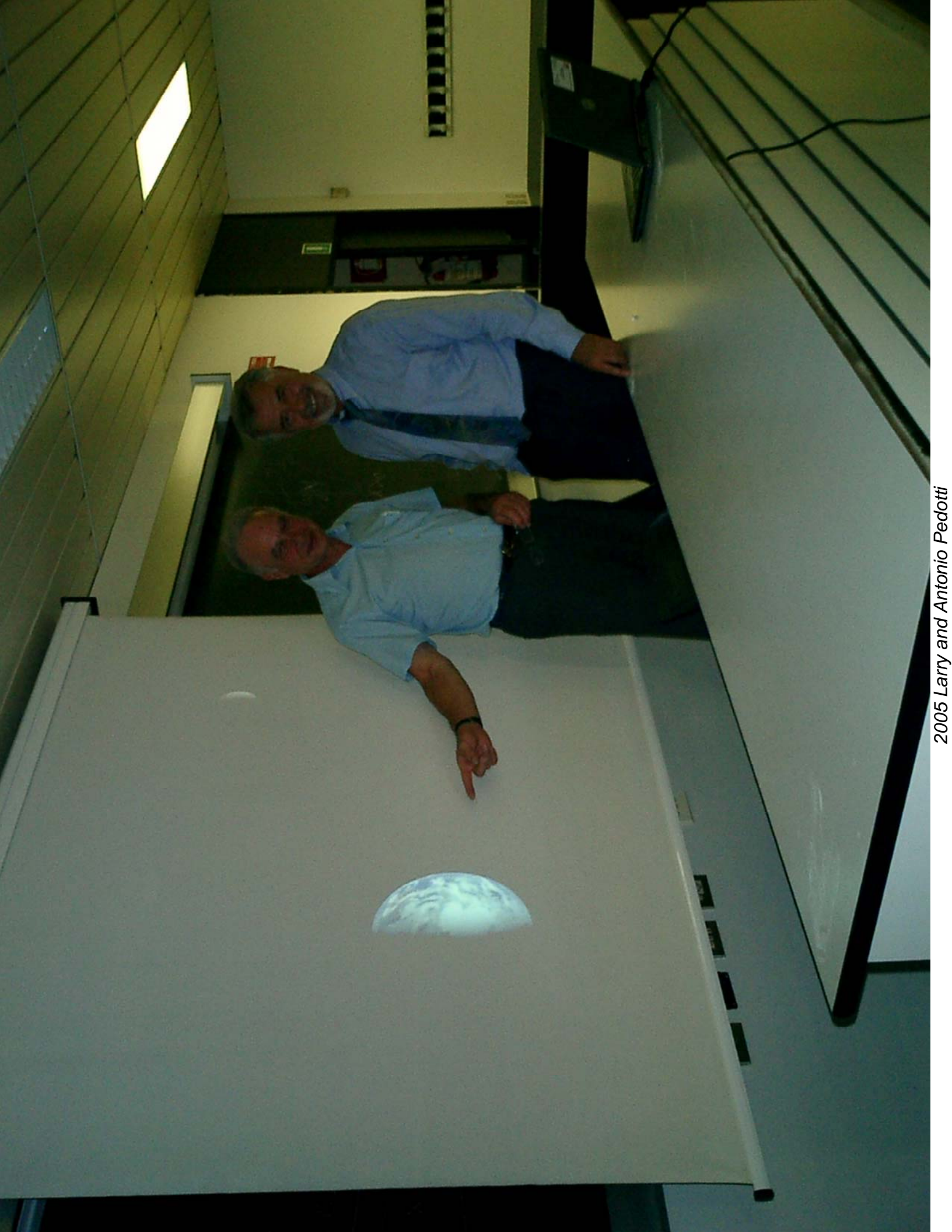


2000 Jessica, Kevin, David



2005 HRP Meeting - Dan, Kevin, and Phil Shark Cage





2005 Larry and Antonio Pedotti



2006 TBMLab Kevin Duda



2004 MVL Bike Ride



2006 Liang Sim and Kevin Duda at a Houston Astros game



2006 Paul Elias



2006 Kevin Duda



2006 Liang Sim, Phil Ferguson, Kevin Duda



March 2006 Phil Ferguson testing Kevin Duda on MICRO-G experiment



Three MVL Directors March 2009



2009 Buzz Aldrin ('63) with MVLers Johnson, Anderson, Opperman, Holschuh, Newman, Clark, Wagner, Waldie, Mateus, Duda, Buckland



2009 Apollo 15 geologist-astronaut Jack Schmitt with: Johnson, Goel, Buckland, Holschuh, Opperman, Waldie, Anderson



2009 MVL microbrew testers Stimpson, Johnson, Clark, Mateus, Anderson, Waldies, Kaderka



2009 Brad Holschuh, Allie Anderson, Aaron Johnson, Dava Newman, Mike Massimino, Jaime Mateus



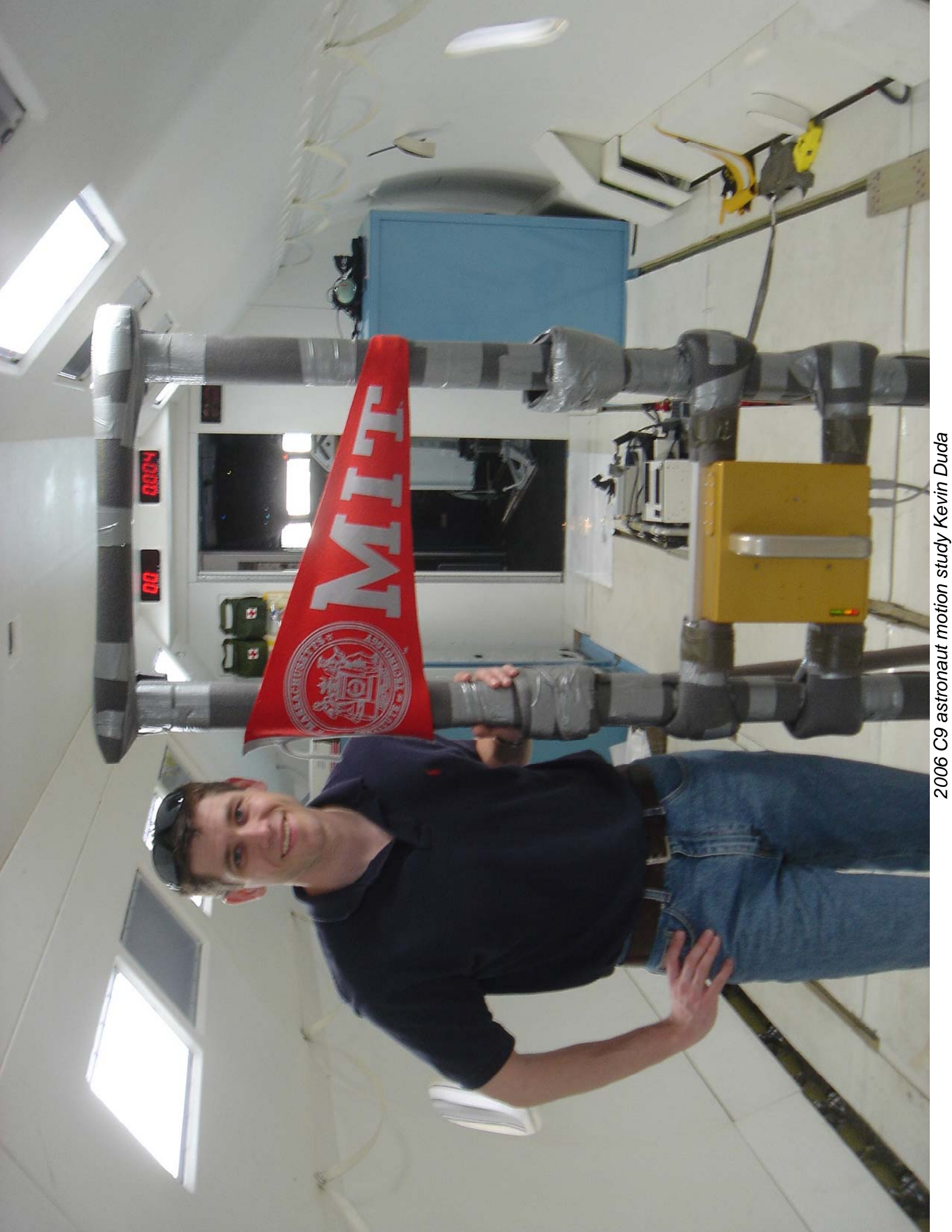
2009 Galatea sailing: Opperman, Mateus, Anderson, Natalie and James Waldie



2009 Galatea Sailing: Justin Kaderka, Jaime Mateus, Rahul Goel, Chuck Oman, Caroline Lowenthal (steering), Dava Newman, Jeff Hoffman



2010 Mike Massimino '88 with d'Orey, Clark, Goel, Johnson, Massimino, Newman, Opperman, Kaderka, Anderson



2006 C9 astronaut motion study Kevin Duda



2009 C9 load suit eval Brad Holschuh



2009 C9 load suit eval: Brad Holschuh, Richard Garriott, James Waldie, Allie Anderson



2006 DLS C9: Cady Coleman (XVI'83), Karen Willcox, Phil Ferguson, Leia Sterling, Dava Newman



2006 C9 DLS experiment Gui Trotti, Karen Willcox, Phil Ferguson, Dava Newman



2006 Leia Sterling C9 DLS C9 Experiment



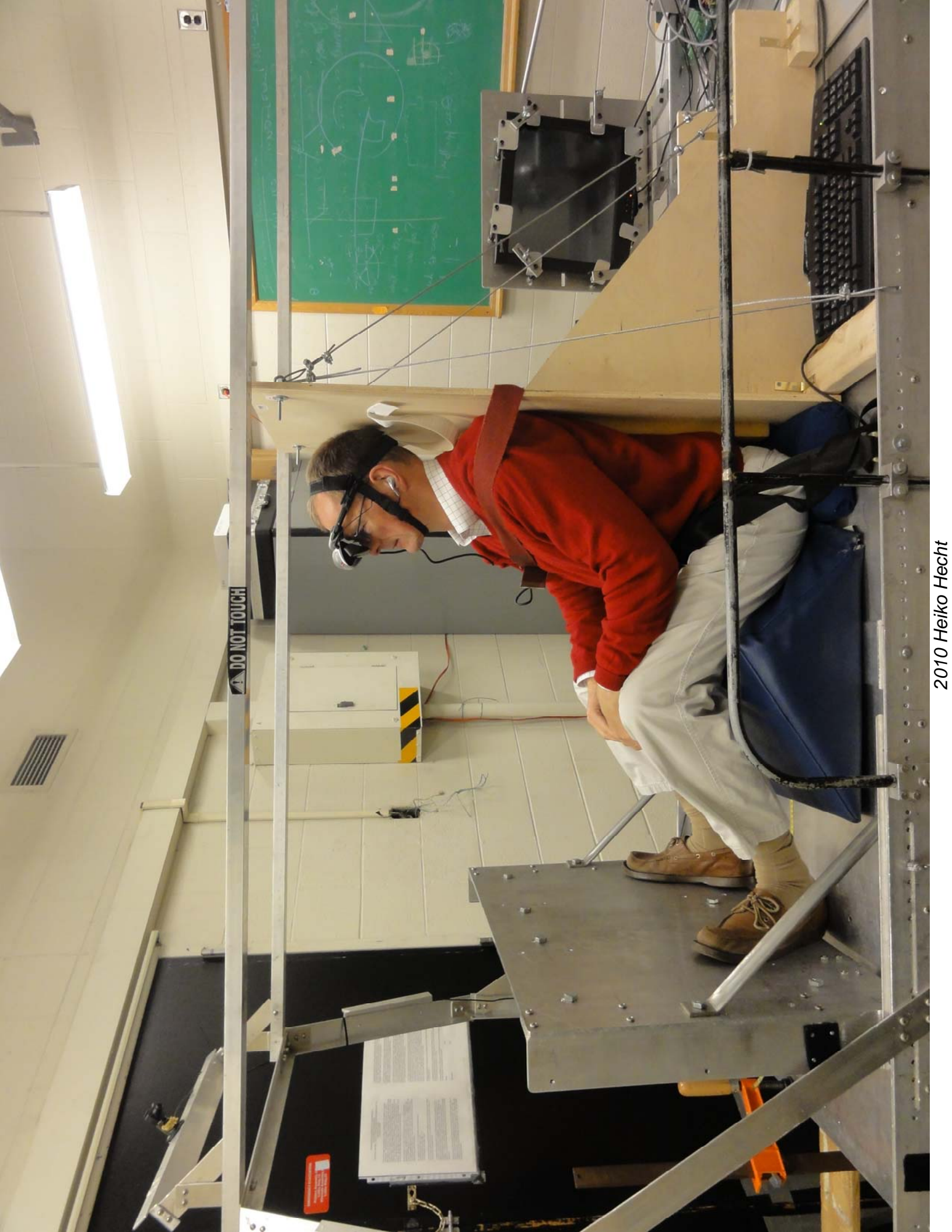
2006 Dava Newman. Look ma, no hands!



2010 MVL Solar System team wins XVI Halloween Costume competition



2011 MVL Solar System team: XVI Halloween: Johnson, Kaderka, Domingues, Diaz, Kobrick, Trichler, Galvan, Melo, Clark, Anderson, Lowenthal, Wessendorf, Yost



DO NOT TOUCH



Rachel Ellman, Justin Kaderka, Paulo Melo, Alex Stimpson, Michael Kracki, Hui Ying Wen, Allie Anderson, Raquel Galvan, Caroline Lowenthal



MVL Thanksgiving 2010 Andie Gilkey, Erika Wagner, Rachel Forman, Allie Anderson, Ashley Wessendorf



MVL Thanksgiving 2010 Caroline Lowenthal



Hui Ying Wen, Justin Kaderka, Allie Anderson



Allie Anderson, Rachel Forman



Rachel Forman



Erika Wagner, Victor Wang, Rahul Goel



Rahul Goel - Helmet project



Raquel Galvan, Paulo Melo



Jaime Mateus thesis defense 5.2011



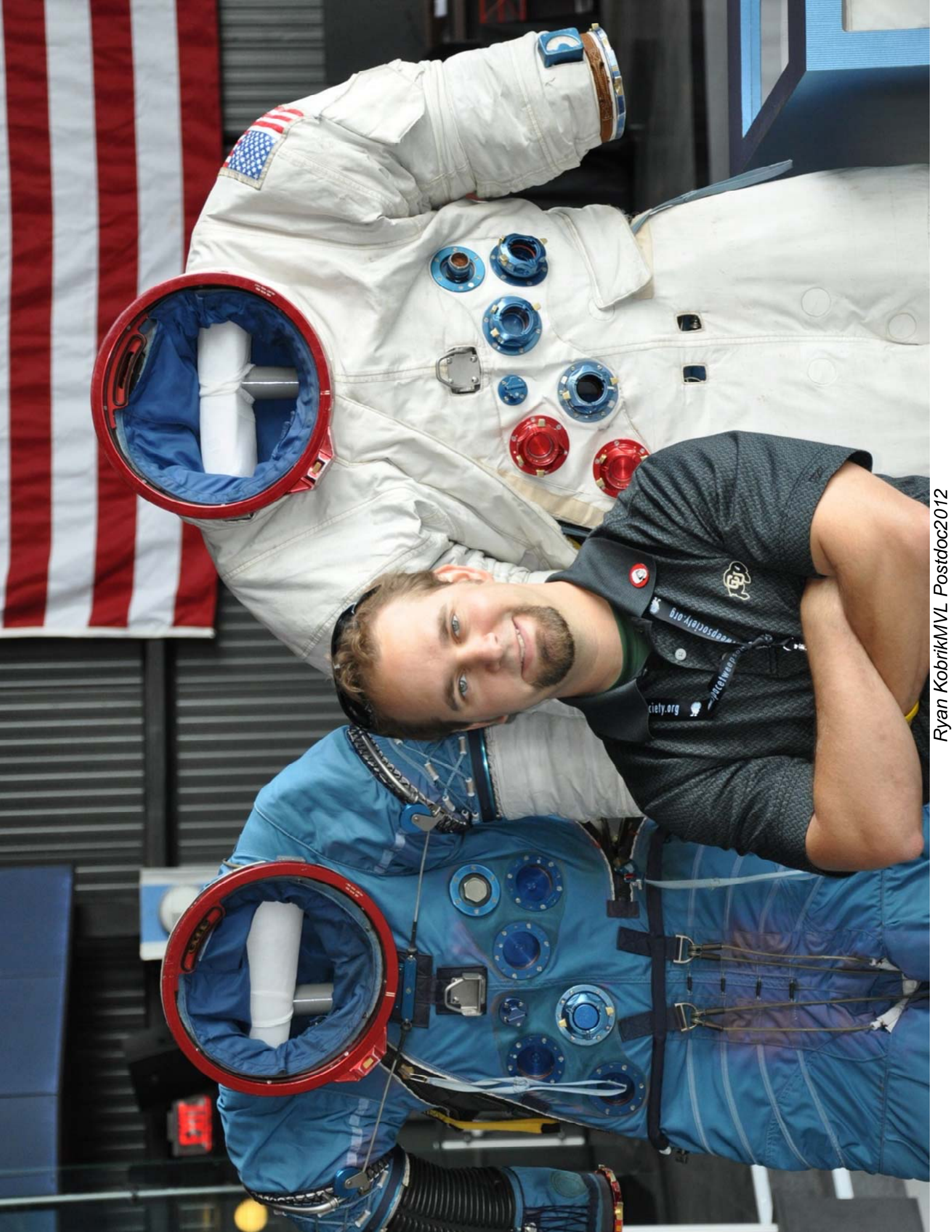
Oct 2010 Cabridge 5K: Yost, Wessendorf, Kobricks, Jeffrey, Jason, Domingues, Anderson, Waller, Meyen, Kendrick, Kaderkas, Johnson, Selva, Diaz



2011 Andie Gilkey (Nebraska) - Aaron Johnson (Michigan) game bet.



June 2011 STS 135 Launch : Aaron Johnson, Justin Kaderka, Torin Clark



Ryan KobrikMVL Postdoc2012



2012 Brad Holschuh wearing Mark III suit



2012 Allie Anderson and Brad Holschuh in EMU



Ryan Kobric 2011

Atlantis



RUD

20

ATLANTIS





2011 Boston Museum of Science Robotics Weekend: Chuck Oman, Andy Liu & Steve Lockley



2011 October MVL outing at Waterville Valley





Skolkovo planning Dec 2011: Irina & Sasha Efremov, Larry, Chuck, Cherry, Alan, Vicki



Irina and Sasha Efremov, December 2011



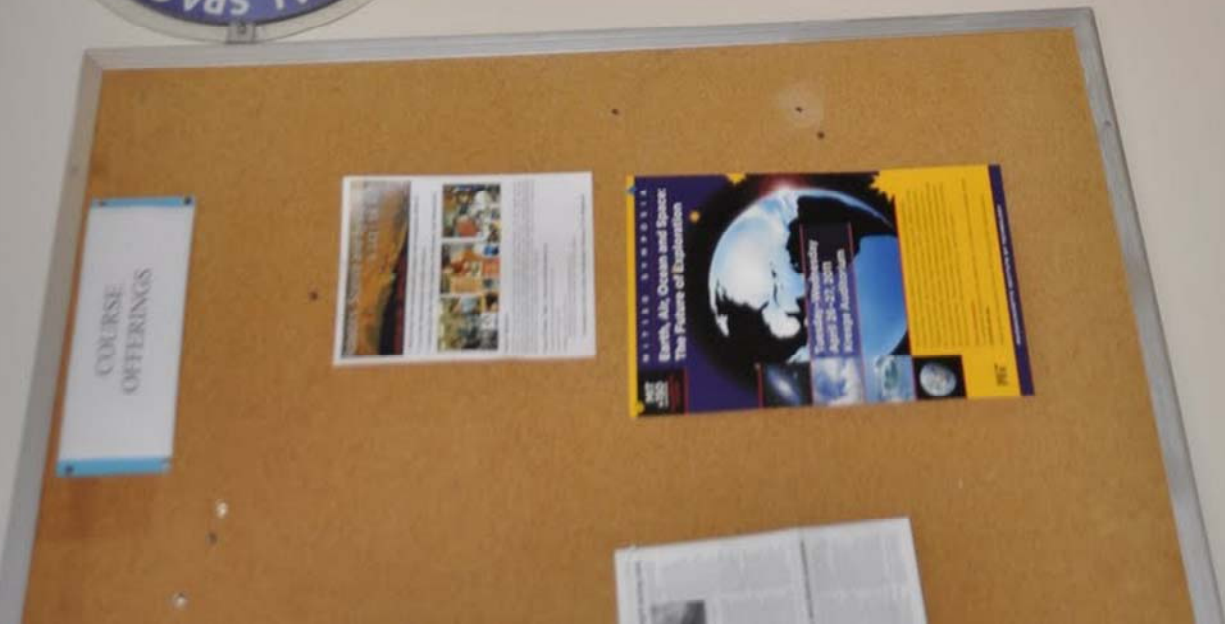
2012 US-Russian SkTech project



2012 Honduras Rita, Brad Holschuh, Dustin Kendrick, Forrest Meyen, Ryan Kobrick, Allie Andersan, Gui Trotti



Larry Young 2010





Liz Zotos 2012



Larry Young April 2011



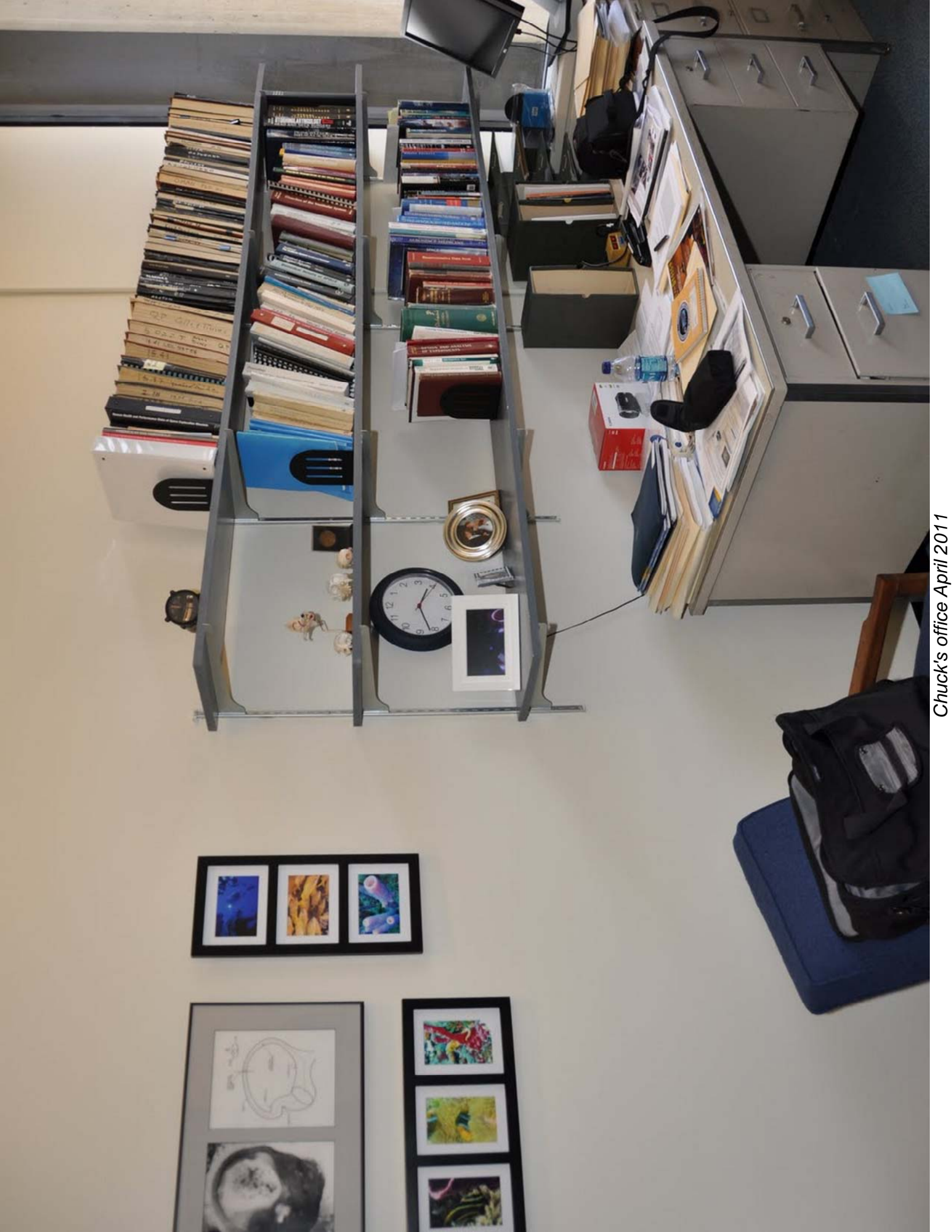
Larry's office April 2011



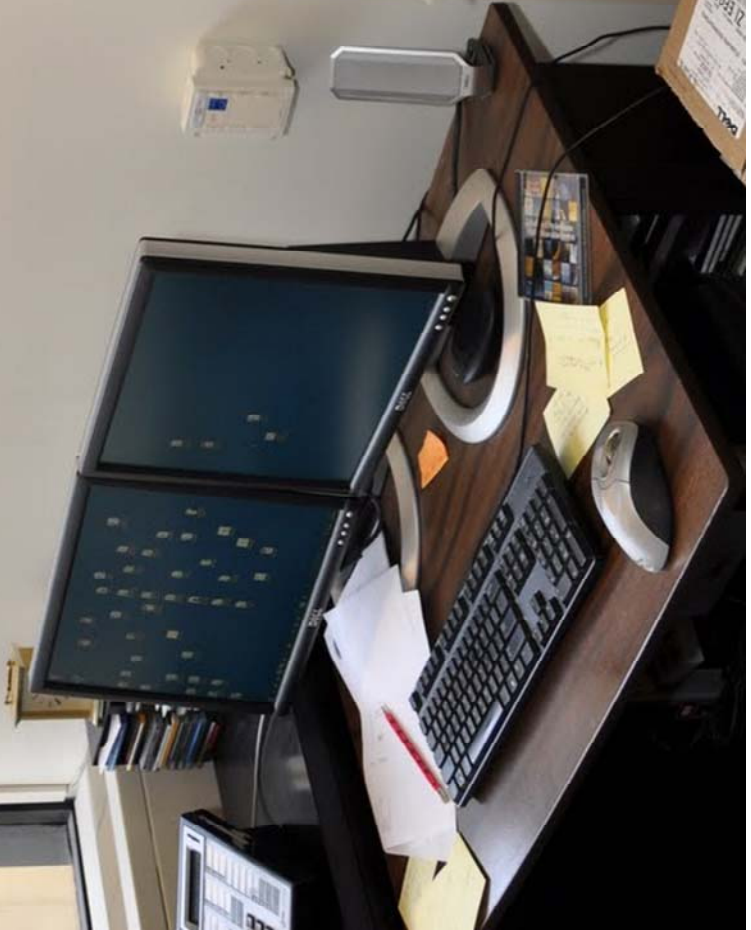
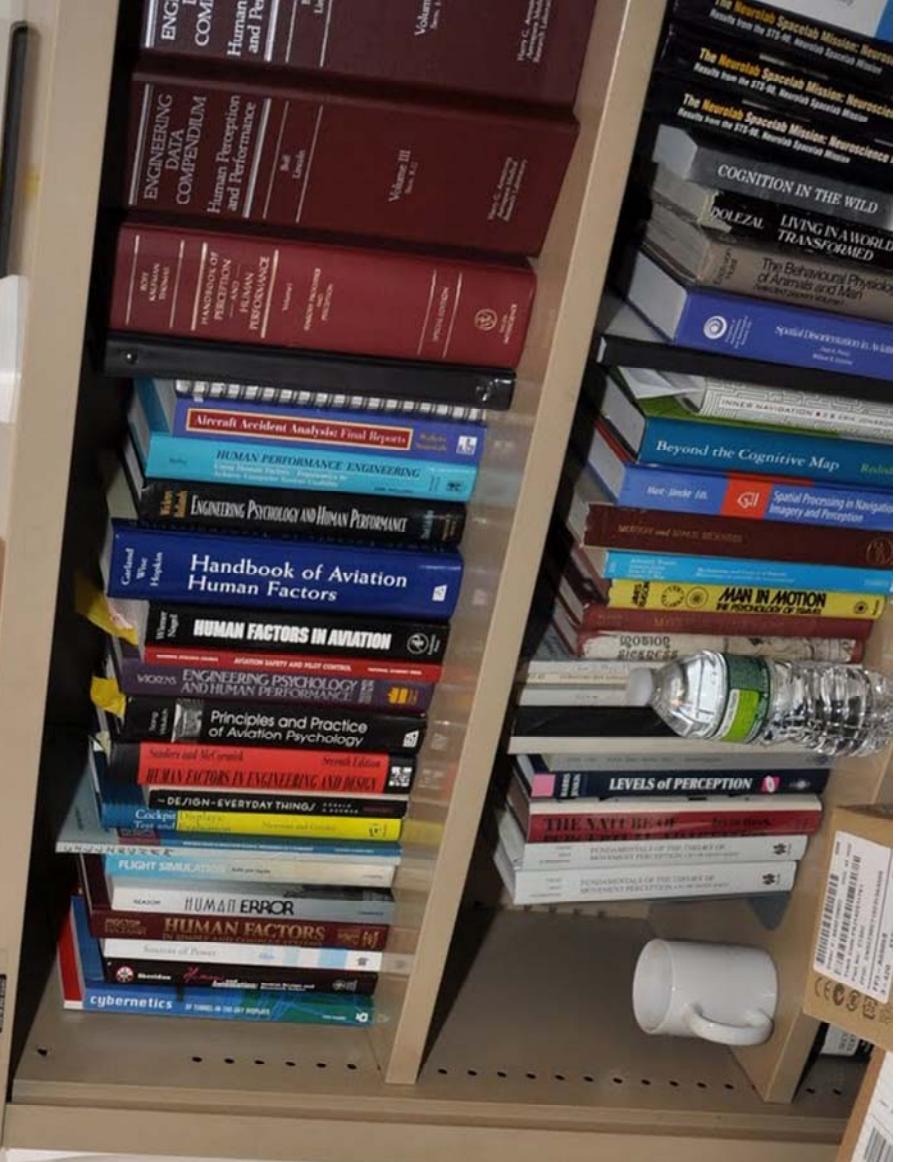
Larry's office, April 2011



Chuck Oman



Chuck's office April 2011



2011 Chuck's office





High Places



MVL office door 32-219

