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FINAL REPORT

NASA Grant: NAG2-6001

Principal Investigator: Dr. Doyal A. Harper

Project Title: Real Time Data/Video/Voice Uplink & Downlink for the
Kuiper Airborne ObservatoryGrant Period: From 1 July 1995 – 30 June 1997 (includes one year no-cost
extension)

NAG2-6001 supported the University of Chicago's participation in "Live from the Stratosphere" (LFS), a NASA-sponsored project involving scientists, teacher, students, NASA personnel, a private company, Geoff Haines Styles Productions, and a number of science museums and schools throughout the United State. LFS was an educational outreach adventure which brought the excitement of astronomical exploration on NASA's Kuiper Airborne Observatory (KAO) to a nationwide audience of children, parents and children through live, interactive television, broadcast from the KAO at an altitude of 41,000 feet during an actual scientific observing mission.

The project encompassed three KAO flights during the fall of 1995, including a short practice mission, a daytime observing flight between Moffett Field, California to Houston, Texas, and a nighttime mission from Houston back to Moffett Field. The University of Chicago infrared research team participated in planning the program, developing auxiliary materials including background information and lesson plans, developing software which allowed students on the ground to control the telescope and on-board cameras via the Internet from the Adler Planetarium in Chicago, and acting as on-camera correspondents to explain and answer questions about the scientific research conducted during the flights.

University of Chicago personnel participating in the flights included D.M. Cole (graduate student), R.H. Evans (Research Associate), D.A. Harper (Professor), R.F. Loewenstein (Senior Research Associate), T.J. McMahon (Engineer), J.S. Sweitzer (Outreach Coordinator), and C. Wirth (Engineer).

Products of the project include:

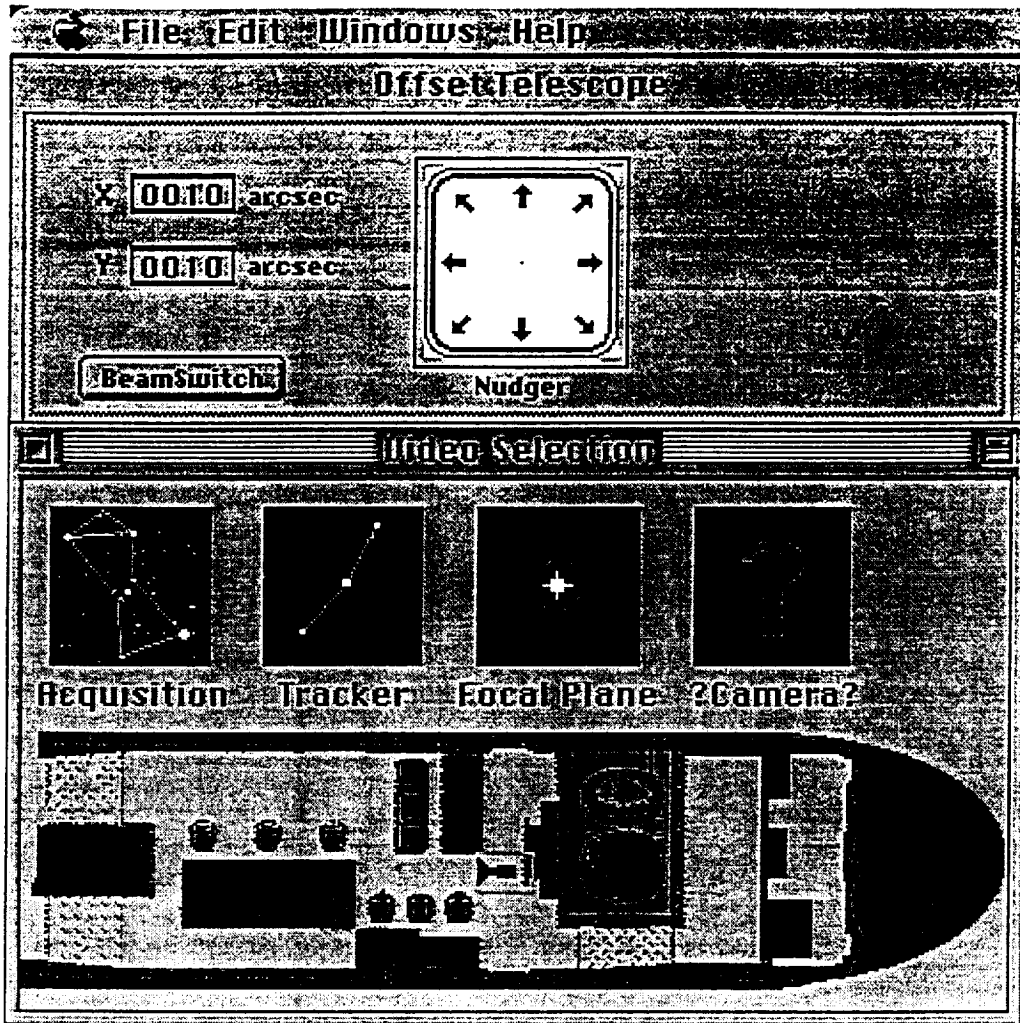
1. A professionally published coursebook including lessons introducing students to airborne and infrared astronomy and worksheets designed to allow students to analyze data from the flights.
2. Software for a graphical interface which allowed students at Adler Planetarium in Chicago to select one of five on-board cameras to view events within the aircraft cabin, to view through one of three cameras mounted on the telescope, and to actually control the KAO telescope itself during flight via an Internet connection established through NASA's ATS satellite. A screen snapshot of one of the graphical user interfaces used during the flight is shown in Figure 1.

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3. Questions posted by students to the project Website at Ames Research Center were answered through e-mail by scientists, engineers, graduate students, technicians, and KAO flight crew members.
4. Data collected during the flights were made available on the project Website so that students could view and analyze them after the flight.
5. A professionally produced videotape which recorded and documented the project and the observing flights for use in follow-on activities and future educational programs.
6. Webpages maintained at NASA's Ames Research Center which Document the program and provide a base for ongoing and future Activities based on the LFS project.

Additional details on the program and associated reference materials may be found on these webpages: Live from the Stratosphere Homepage: <http://passport.ivv.nasa.gov/lfs/Passport> to Knowledge Live from the Stratosphere Homepage: http://passport.ivv.nasa.gov/ptk_lfs.html Hardcopies of selected pages from these websites are also included as an appendix to this report.

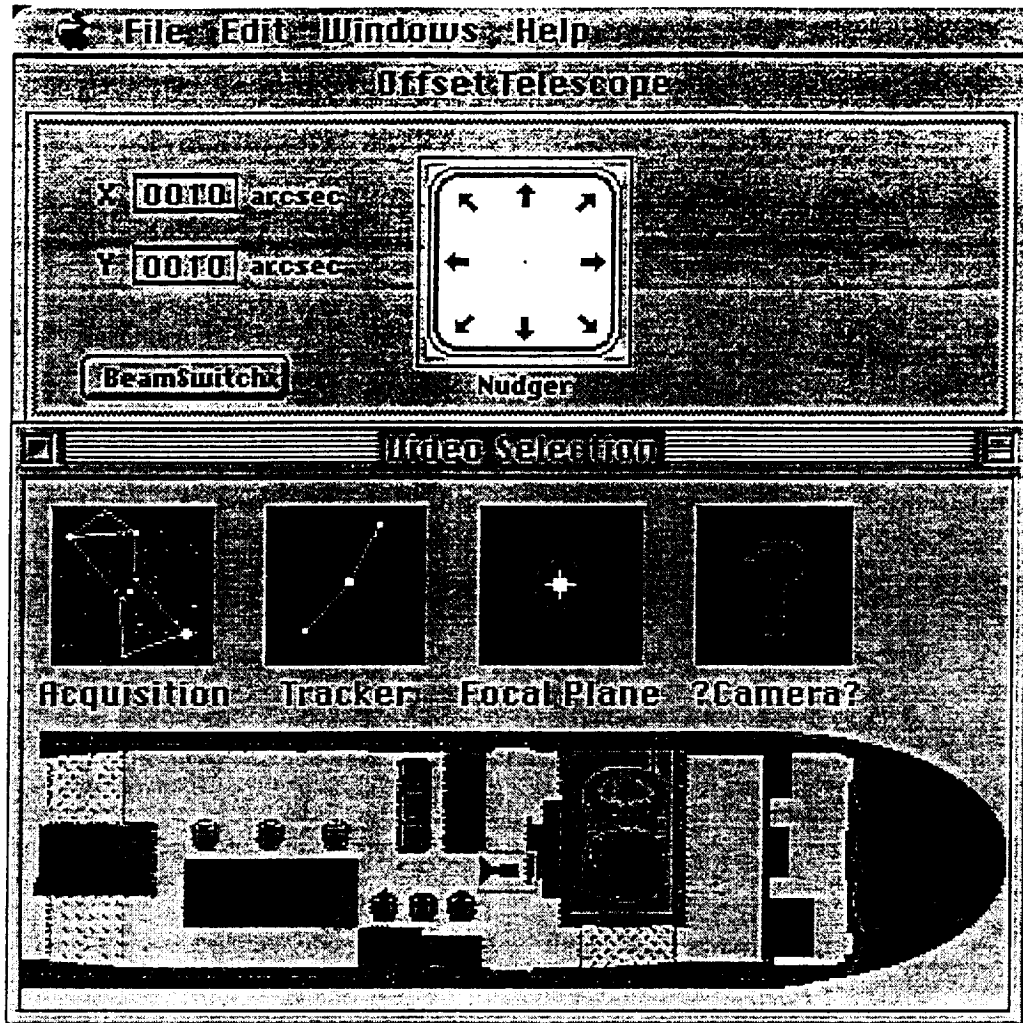
/ Figure 1.



Display of the Graphical User Interface written for the LFS flights.

The upper panel permitted small offset commands to be sent to the KAO telescope. Students could select the video view returned in a CUSeeMe window by clicking on one of the blue cameras in the KAO floorplan. A click on one of the four named boxes selected one of three cameras looking out through the various KAO telescopes or a roving camera inside the plane.

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Welcome to *Live From the Stratosphere*

LIVE FROM THE STRATOSPHERE took off in Fall 1995, for the last flights of NASA's Kuiper Airborne Observatory, but the materials still provide a comprehensive resource on infrared astronomy, and what it's like to live and work 41,000 feet above the earth!

NASA's successor aircraft, SOFIA (a converted Boeing 747), is due to begin observational flights in the first years of the 21st Century.

"Researcher Q&A" is not currently Inter/Active.

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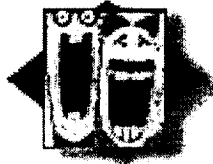
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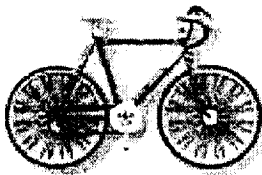
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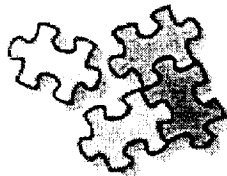
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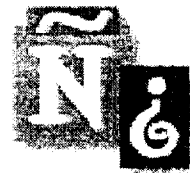
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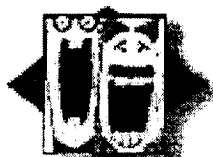
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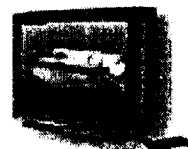
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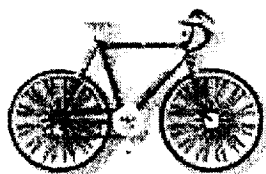
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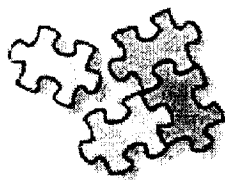
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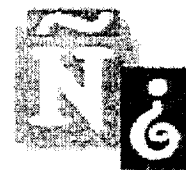
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Live From the Stratosphere Project News

Thursday, December 14

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Engineers: [Paul Keas](#), [Walter Miller](#), [Mark Elston](#), [Kaiser Adani](#), [Tom Conners](#), [Paul DeLeon](#)

Telescope Operators: [Juan Rivera](#), [Rick Doll](#), [Terry Richardson](#)

Tracker Operators: [Ben Burress](#), [Allan Meyer](#)

Computer Operators: [Jim Cockrell](#), [Dennis Kelley](#), [Terry Duncan](#), [Jeff King](#)

Technician: [Alan Dunn](#)

Flight Operations

Pilot: [Terry Rager](#), [Geary Tiffany](#), [Allan McCrary](#)

Navigator: [Gene Moniz](#)

Flight Engineer: [Bill Hoss](#)

Ground Crew: [Louie Russo](#), [Chico Rijfkoel](#), [Monte Hodges](#), [Jim Mills](#), [Mario Garcia](#), [Randy Hobbs](#), [Lee Mountz](#)

Principal Investigators, Scientists, Astronomers

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