

USRA ID # CFP97-001

STRATOSPHERIC OBSERVATORY FOR INFRARED
ASTRONOMY (SOFIA)

**CALL FOR PROPOSALS FOR
SOFIA INSTRUMENT DEVELOPMENT PROGRAM**

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SOFIA INSTRUMENT DEVELOPMENT PROGRAM

This Universities Space Research Association (USRA) Call For Proposals (CFP) solicits research proposals for the design, development, and initial operation of scientific instruments for the Stratospheric Observatory For Infrared Astronomy (SOFIA). The Observatory is being developed under the auspices of the National Aeronautics and Space Administration (NASA) under Prime Contract No. NAS2- 97001 and the Deutsche Agentur für Raumfahrtangelegenheiten (DARA), the German Space Agency. Instruments are being developed separately under the auspices of NASA and DARA.

Participation in this program is open to all categories of organizations, both domestic and foreign: industry, educational institutions, other nonprofit organizations, NASA centers, and other U.S. government agencies. Proposals must be received by **5PM CDT on July 15, 1997**. Late proposals will be handled as correspondence and returned to the sender. The proposals will be evaluated by a USRA-selected peer review panel early in September, 1997, and notification of results will be made approximately one month later.

Details relevant to this program are included in the appendices to this announcement and on the SOFIA-USRA website.

<http://sofia-usra.arc.nasa.gov/>

Paper copies of the CFP are available from: J. Kolonko, Science Administrator: Department of Physics and Astronomy ~ UCLA, 405 Hilgard Ave., Los Angeles~ CA 90095, Phone: (310) 206-4548) FAX~ (310) 206-1091, E-MAIL: kolonko@physics.ucla.edu.

Appendix A describes the classes of instruments being solicited and evaluation criteria. Appendix B contains the general guidelines for participation in the SOFIA Science Instrument Program. Appendix C is the proposal abstract and summary sheet. Appendix D provides a Budget Summary format with instructions for its completion. Appendix E provides technical information on SOFIA to aid in planning instrument proposals. The certification forms in the Attachments should be filled out and attached to the original copy of the proposal to reduce grant processing time.

Schedule of Events:

- | | |
|---|-----------------|
| 1. Release of Call for Proposal | April 7, 1997 |
| 2. Letters of Intent Due | May 1, 1997 |
| 3. FAA Workshop | May 7, 1997 |
| 4. Proposal Deadline | July 15, 1997 |
| 5. Peer review | Sept. 3-5, 1997 |
| 6. Target Date for Announcement of Proposals Selected | Oct. 1, 1997 |

Future SOFIA CFP's are anticipated. An additional call for major instruments will occur in about 3 years. A technology development program specific to SOFIA, most likely including detector development, will be initiated after the first round of instruments have been selected. Detector development proposals will not be considered in response to this solicitation.

The following items apply only to this Announcement:

CFP Identifier: **USRA ID# CFP97-001**

Letters of Intent to participate in the CFP are due **May 1, 1997**. Letters of Intent must specify the PI's name and institution, the class of instrument to be proposed (e.g. facility class science instrument, principal investigator class science instrument, etc.) a brief description of the science instrument) and the science expected from the instrument. The Letter of Intent should also list the names of co-investigators and other collaborative members of the proposing team.

Letters of Intent are to be sent to:

SOFIA Peer Review
Lunar and Planetary Institute
3600 Bay Area Blvd.
Houston, TX 77058-1113

Letters of Intent may be mailed, e-mailed, or telefaxed to the recipient. FAX: (281) 486-2160,
E-Mail: cloud@lpi.jsc.nasa.gov

Submit Proposals to:

SOFIA Peer Review
Attn: Mary Cloud
Lunar and Planetary Institute
3600 Bay Area Blvd.
Houston, TX 77058-1113

Copies Required:

Original plus twenty (20) copies to the address above plus one courtesy copy as discussed below.

Obtain Further Information From:

Technical:

Dr. Jacqueline Davidson
Universities Space Research Association
Project Scientist for SOFIA
c/o NASA-Ames Research Center
M/S 245-6
Moffett Field, CA 94035-1000
Telephone: (415) 604-5531
E-mail: Davidson @cma.arc.nasa.gov

Administrative:

Mary Cloud
Lunar and Planetary Institute
3600 Bay Area Blvd.
Houston, TX 77058-1113
Telephone: 281-486-2143
Fax: 281-486-2160
E-Mail: cloud@lpi.jsc.nasa.gov

In order to facilitate the review process, proposers are strongly urged to send one courtesy copy of their proposal to:

Dr. Eric Becklin
SOFIA Chief Scientist
UCLA
Department of Physics and Astronomy
405 N. Hilgard Ave.
Los Angeles, CA 90095-1562

Your interest and cooperation in participating in the SOFIA program are appreciated.

Dr. Paul Coleman, President
Universities Space Research Association

Appendix A

CLASSES OF INSTRUMENTS BEING SOLICITED AND EVALUATION CRITERIA

In this initial Call For Proposals (CCFP) for SOFIA, four classes of science instruments will be considered for development: Facility-class instruments (FSI), Principal Investigator-class instruments (PSI), Special Purpose PI-class instruments (SSI) and Facility Support Equipment. For the purpose of this Call for Proposals, the four classes of instruments are defined as follows:

1. Facility-class Science Instrument (FSI): A general purpose, reliable and robust instrument that provides state-of-the-art science performance at commissioning, through the use of modern, but mature technologies. The capabilities of a PSI should be focused on a single well-defined science and technology theme. It is expected that this instrument will routinely be operated by the designated SSMOC (SOFIA Science and Mission Operations Center) FSI scientist in support of Guest Investigators (GI's) who will not be required to have extensive knowledge or experience in infrared instrumentation or observing techniques. Routine maintenance will be provided by the SSMOC, where the instrument will be housed during extended periods. Major maintenance and/or upgrades may be provided by either the PI or the SSMOC, as proposed. Descriptive documentation must be clear, thorough, and intuitive so that a GI can propose a science investigation without the necessity of extensive discussion with the SSMOC FSI scientist or the PI team. The process of data acquisition, reduction, and calibration should be straightforward and transparent to the GI, with the assistance of the SSMOC PSI scientist. The GI should be able to perform data analysis of calibrated data using standard software routines, without requiring the assistance of the SSMOC FSI scientist. A simple method of archiving a summary of the observations and the science data will be required. A preliminary design review, a critical design review; and an acceptance review will be held by USRA for FSIs. The instrument will be delivered to the SSMOC.

2. Principal Investigator-class Science Instrument (PSI): A general purpose instrument that is developed and maintained at the state of the art throughout its useful operating life. It is expected that this instrument will be operated by the PI team; both for its own research as well as for that of successful GI's. The interaction of the PI and GI teams is to be determined by mutual consensus for each GI proposal. Normally the instrument will reside at the PI's institution, where all maintenance and upgrades will be accomplished. Descriptive documentation must be clear, thorough, and intuitive so that a GI can propose a science investigation without the necessity of extensive discussion with the PI team. The process of data acquisition, reduction, and calibration should be straightforward and transparent to the GI, requiring only a minimal level of assistance from the PI team. The GI should be able to perform data analysis of calibrated data using standard software routines, such as IRAF, without requiring the assistance of the PI team. A simple method of archiving a summary of the observations will be required.

3. Special Purpose Principal Investigator-class Science Instrument (SSI): A special purpose instrument, specifically designed for a particular observation or set of observations not possible or practical with FSI or PSI instruments. This instrument may incorporate technologies at the

"edge-of-the-art" that would be too risky to include in a general purpose instrument. It is expected that this instrument will be operated by the PI team. Normally the instrument will reside at the PI's institution, where all maintenance and upgrades will be accomplished. Descriptive documentation must be extensive enough so that a potential GI can determine the feasibility of his/her proposed observation.

4. Facility Support Equipment: In addition, consideration will be given to proposals for general purpose devices for the facility. For example; at least four of the successful SOFIA study grants indicated an interest in an instrument rotator. It is not cost effective to build independent instrument rotators for each instrument. Therefore, USRA would welcome proposals for a facility rotator. A similar situation could also occur with common back ends for heterodyne spectrometers. Proposals for facility support equipment must: (1) clearly show the demand for the equipment being proposed; and (2) summarize equipment specifications required in order to meet this demand. The estimated cost for the equipment should be compared to the cost that would have been accrued by USRA if similar equipment had been built by each PI team who required it.

Any approved SOFIA science instrument must also be accompanied by the complete set of documentation required for FAA certification, as well as documentation showing compliance with the Interface Control Documents that assure compatibility with the Observatory (See Appendix E). This documentation is NOT required for purposes of this proposal.

In the case of FSI's, commissioning time will be granted. The proposer should put in a draft plan for the commissioning and the expected flight hours needed. The actual number of commissioning flight hours granted will be negotiated between the P .I. and USRA during development. To compensate for the large effort needed to build a FSI, a flight reward of 50 Successful Flight Hours (SFH) will be given the successful P .I. Team, during the first 2 years. This assumes the nominal 600 SFH/year is achieved in the first two years of operation. Upon review of the instrument performance, additional grant awards of no more than \$100K per year for two years will be considered for PIs that have successfully delivered an instrument. The P.I. must supply a cost proposal for these awards through a future CFP.

For PSI's and SSI's, 30 hours of engineering time on SOFIA will be provided to bring the instrument on line. This time will also be considered as a reward for building the instrument. Additional science time can be requested once the instrument is operational, through future CFP's.

Proposals for the development of FSI' s may also include an option for a PSI, in the event that the instrument is not selected as an FSI. In the proposal review process, all proposals will be considered and discussed at once. At that point a decision will be made to select one to three FSI's. Unsuccessful FSI proposals that have included the PSI option will then be considered for selection with the remaining PSI proposals. Such proposals must include a clear statement of how the PSI would differ from the PSI and must also include a detailed budget for the PSI option.

Finally, because funds are very limited for this CFP, USRA would like to strongly encourage cost and science effectiveness in the proposed instruments. Examples would be:

- 1) real cost sharing with the proposers institution.
- 2) building extensively on past space and ground-based experience and equipment.
- 3) building extensively on past KAO experience and equipment.

EVALUATION CRITERIA

(In approximate order of importance)

1. Scientific merit and technical feasibility.
 - a. For FSI's: Scientific merit across a broad range of science that will serve the general astronomy community, plus specific merit of the science proposed by the PI team. The case for significant demand of the instrument by the community should be made. Technical feasibility will include reliability, ease of operation, robustness of design and fabrication, and maturity of the technology.
 - b. For PSI's: Scientific merit of the PI team's proposed investigation; capability of the instrument to support science investigations other than the PI team's science. Technical feasibility will include reliability, robustness of design, maximum scientific performance.
 - c. For SSI's: Scientific merit of the PI team's proposed investigation. Technical feasibility will include reliability and design for maximum scientific performance.
2. Need for SOFIA to carry out the proposed research program
3. The estimated development and two-year operational cost of the instrument. For PSI instruments this should include estimated costs for the SSMOC and SSMOC personnel, as well as the PI team.
4. The capabilities and experience of the investigators, and the suitability of available facilities and support staff for the proposed instrument development.
5. For PSI's and SSI's: The potential benefits of new technology developments that will be incorporated in the instrument, together with their associated risks and cost impacts. Technology development specific to the instrument should be clearly described.
6. Education and Public Outreach. It is advantageous for proposals submitted in response to this CFP to include a plan for interfacing with, and complementing, the SOFIA Education and Public Outreach Activities (E/PO). Two examples of the items to incorporate are: 1) a channel to make, selected and prepared data publicly available for purposes of education and public information (including formats appropriate for the press) and 2) a time commitment by instrument team members to interact locally with teachers and students in a specified manner that furthers the goals of E/PO. Further examples will be posted on the website.

The points listed above should be addressed in a direct, organized and concise manner.

For Facility Support equipment, only 3, 4, and 5 above are appropriate.

Functional overlap of a science instrument proposed in response to this CFP with a proposed SOFIA German instrument will NOT be an issue and will NOT be considered in the evaluation for this CFP. A current list of possible German instruments can be obtained by request to USRA.

Appendix B

GUIDELINES FOR PARTICIPATION IN THE SOFIA Science Instrument Program.

I. PURPOSE

These guidelines provide procedural and format information for submission of proposals to the SOFIA Science Instrument Program.

II. PERIOD OF PERFORMANCE

All proposals will be considered for a period of performance necessary to design and develop the proposed instrument, and to operate the instrument for the first two years of SOFIA science operations. (See Appendix E for schedule)

III. PROPOSAL FORMAT AND CONTENT

The proposal should contain at least the following material assembled in the order given:

- A. Cover Letter: One copy of the proposal shall be designated as the official copy and should be prefaced by a cover letter signed by an official of the investigator's organization who is authorized to commit the organization to the proposal and its content. The cover letter should refer to the proposal for "SOFIA Science Instrument Development" and reference USRA ID# CFP97 -001.
- B. Title page: The title page must contain:
- (1) Identification of the CFP, by number and title, to which title proposer is responding;
 - (2) A brief, scientifically valid project title intelligible to a scientifically literate reader and suitable for use in the public press;
 - (3) The legal name and address of the organization and specific division or campus identification if part of a larger organization;
 - (4) Names and telephone numbers of the principal investigator and of appropriate business personnel who may be contacted during evaluation or negotiation;
 - (5) The name(s) and affiliation of co-investigator(s). (Use a second page if necessary)
 - (6) Date of submission; and
 - (7) Signature of a responsible official or authorized representative of the organization, or any other person authorized to legally bind the organization.

C. Abstract and Proposal Summary: The title page should be followed by the Abstract and Proposal Summary page. The format for this page is given in Appendix C.

D. Description of Proposed Research (FSI Proposals): The main body of the technical proposal should follow the Abstract and Proposal Summary page. FSI proposals should contain concise descriptions of: (1) the key scientific research areas that the instrument will explore; (2) the scientific strength of the community that will be served by the instrument; (3) the instrument concept, its potential, performance, reliability, and user-friendliness; (4) why the instrument is well-suited to the research goals; (5) why SOFIA is required to carry out the research; (6) a discussion of the construction and operating costs of the instrument; (7) a description of the facilities and personnel available for the instrument development; (8) the management plan for the instrument development and operation; and (9) the proposed Education and Public Outreach activities. FSI proposals may optionally contain a discussion of how the instrument and its development and operation plans would change if the proposers wish to have it considered as a PSI if it is not selected as an PSI.

PSI and SSI Proposals: PSI and SSI proposals should contain concise descriptions of: (1) the key scientific research areas that the instrument will explore; (2) the instrument concept, its potential performance, and reliability; (3) the technology readiness and technology development plan; (4) why the instrument is well-suited to the research goals; (5) why SOFIA is required to carry out the research; (6) a discussion of the construction and operating costs of the instrument and the uncertainties in these costs; (7) a description of the facilities and personnel available for the instrument development; and (8) the proposed Education and Public Outreach activities.

The difficult choices that must be made between instrument study proposals will require an evaluation of estimated system performance, including sensitivity, field of view, spectra] range, and resolution. Each proposal should provide an estimate of these quantities that is understandable to the peer review panel. .

E. Proposal Length: The proposal body should be double-spaced using a 12 point font and have 1 inch margins on all sides. Pages that fold-out are not acceptable. Each page should be numbered consecutively and a table of contents should be provided. Facility Class Science Instrument proposals shall be limited to 60 pages. Principal Investigator Class Science Instrument and Special Purpose Principal Investigator Class Science Instrument proposals shall be limited to 30 pages. Facility Support Equipment shall be limited to 15 pages. The page limit for all proposals includes the abstract, text, figures, tables, references and any appendices, but does not include the title page, the table of contents page, the budget and its explanation, vitae, and certification attachments. Reprints and preprints should **not** be included with the proposal. Prior results that are relevant to the proposal should be referenced and/or concisely summarized in the text. **All proposals that do not meet these page requirements will be returned to the proposer.**

F. Cost Plan: If USRA funding support is required, a cost plan prepared as shown in Appendix D should be submitted. The total cost of the proposed development should also

be reported on the Abstract and Summary Page. Instructions for preparing cost plans are as follows:

- (1) Proposals should contain cost and technical parts in one volume: do not use separate "confidential" salary pages. As applicable, include separate cost estimates for salaries and wages; fringe benefits; equipment; expendable materials and supplies; services; domestic and foreign travel; publication or page charges; consultants; subcontracts; other miscellaneous identifiable direct costs; and indirect costs. List salaries and wages in appropriate organizational categories (e.g., principal investigator, other scientific and engineering professionals, graduate students, research assistants, and technicians and other non-professional personnel). Estimate all manpower data in terms of man-months. The cost plan for SOFIA instrument development proposals should include the cost of one trip per year to a SOFIA Instrument Proposers' Meeting at Moffett Field, CA or Waco, TX.
- (2) Explanatory notes should accompany the cost proposal to provide identification and estimated cost of major capital equipment items to be acquired; purpose and estimated number and lengths of trips planned; basis for indirect cost computation (including date of most recent negotiation and cognizant agency); and clarification of other items in the cost proposal that are not self-evident. List estimated expenses as yearly requirements by major work phases.
- (3) For all questions concerning allowable costs, proposers should contact: Robert Senter, USRA, 10227 Wincopin Circle, Suite 212, Columbia, MD 21044, Phone: (410) 730-2656") Fax: (410) 730-3496, E- mail: rsenter@hq.usra.edu.

G. Current Support: For other current projects being conducted by the principal investigator, provide title of project sponsoring agency, and ending date.

H. Vitae: Vitae and publications together are limited to a minimum of **one page per individual** for the PI and CoI's, and the individual publications are limited to the five most relevant to the proposal plus five others that the PI or CoI may wish to include.

I. Certifications: The Certifications provided in the Attachments should be filled out and attached to the original copy of the proposal. This will reduce the amount of time required to process grants.

IV. ADDITIONAL GUIDELINES FOR FOREIGN PROPOSERS AND PROPOSALS WITH FOREIGN PARTICIPATION

In this Call for Proposals, USRA is not soliciting proposals for instrument development from PI teams from non-U.S. institutions. Should such a non-U.S. PI team wish to develop an instrument for use on SOFIA, USRA will provide them with the same technical information made available to U.S. proposers. Such non-U.S. teams may then propose for time on SOFIA with their instrument on a future Call for Proposals. Should a U.S. proposal with non-U.S. participation be

selected, USRA will arrange with the non-U.S. sponsoring agency for the proposed participation on a no exchange of funds basis, in which USRA and the non-U.S. sponsoring agency will each bear the cost of discharging its respective responsibilities. U.S. proposals which include non-U.S. participation must be endorsed by the respective government agency or funding/sponsoring institution of the country from which the non-U.S. participant is proposing. Such endorsement should be in the form of a letter attached to each copy of the proposal and should indicate:

1. The proposal merits careful consideration by USRA; and
2. If the proposal is selected, sufficient funds will be made available to undertake the activity as proposed.

Proposals must be forwarded to USRA in sufficient time to arrive before deadline established for this Call For Proposals.

All proposals must be in English. All U.S. proposals which include non-U.S. participation must follow all other guidelines and requirements described in this CFP.

V. ADDITIONAL POLICIES AND PROCEDURES

- A. Restriction on Use and Disclosure of Proposal Information: In order to protect trade secrets or other proprietary "information that is confidential or privileged, such information should be clearly identified and marked in the proposal. In any event, all efforts will be made to protect information contained in proposals; but USRA assumes no liability for use and disclosure of information not clearly marked as proprietary. A solicited proposal that results in a USRA award becomes part of the record of that transaction and may be available to the public on specific request; however, information or material that USRA and the awardee mutually agree to be of a privileged nature will be held in confidence to the extent permitted by law.
- B. Conformance to Guidance: USRA does not have mandatory forms or formats for responses to CFPs; however, it is requested that proposals conform to the guidelines in these instructions. USRA may accept proposals without discussion; hence, proposals should initially be as complete as possible and be submitted on the proposers' most favorable terms.
- C. Joint Proposals: Where multiple organizations are involved, the proposal must be submitted by only one of them. It should clearly describe the role to be played by the other organizations and indicate the legal and managerial arrangements contemplated.
- D. Late proposals: A proposal or modification received after the due date specified in this CFP will not be considered.
- E. Withdrawal: Proposals may be withdrawn by the proposer at any time. Offerors are requested **to** notify USRA if the proposal is funded by another organization or of other changed circumstances which dictate termination of evaluation.

- F. Selection for Award: When a proposal is not selected for award, the proposer will be notified. USRA will explain generally why the proposal was not selected. Proposers desiring additional information may contact the Chief Scientist who will arrange a debriefing. When a proposal is selected for award, negotiation and award will be handled by the USRA Contracts Manager.
- G. Cancellation of CFP: USRA reserves the right to make no awards under this CFP and to cancel this CFP. USRA assumes no liability for canceling the CFP or for anyone's failure to receive actual notice of cancellation. Cancellation may be followed by issuance and synopsis of a revised CFP, if that is appropriate.

Appendix C:

_____ Proposal Reference No.
(To be filled in by USRA)

TITLE OF PROPOSAL: _____

ABSTRACT

SOFIA INSTRUMENT DEVELOPMENT PROPOSAL SUMMARY

Principal Investigator: _____

Organization: _____

Phone / Fax / Email: _____

Type of Organization (e.g. profit, non-profit, educational, small business, minority, woman-owned, etc.): _____

Identification of other organizations, if any, that are currently evaluating a proposal for the same efforts: _____

Instrument Type: _____

Detector Type: _____

Detector Format: _____

Wavelength Range: _____

Resolution/Pass Bands: _____

Funds Requested from USRA for Duration of Project and the Desired Starting

Date: _____

Appendix D

Budget Summary

From _____ To _____

		USRA USE ONLY	
		A	
1. Direct Labor (salaries, wages, and fringe benefits)	_____		
2. Other Direct Costs:	_____		
a. Subcontracts	_____		
b. Consultants	_____		
c. Equipment	_____		
d. Supplies	_____		
e. Travel i) Domestic	_____		
ii) Foreign	_____		
f. Publication	_____		
g. Other	_____		
3. Indirect Costs	_____		
4. Other Applicable Costs	_____		
5. Subtotal -- Estimated Costs	_____		
6. Less Proposed Cost Sharing (if any)	_____		
7. Total Estimated Costs	_____		
APPROVED BUDGET	XXXXXXXXXX		

Instructions

1. Provide a separate budget summary sheet **for** each year of the proposed development program.
2. Estimated costs should be entered in Column A. Columns B and C are for USRA use only.
3. Provide in attachments to the budget summary the detailed computations of estimates in each cost category, along with any narrative explanation required to fully explain proposed costs.

Specific Costs

1. Direct Labor (salaries, wages, and fringe benefits). Attachments should list number and titles of personnel, amount of time to be devoted to the grant, rates of pay, and an estimate of labor hours for: each position.
2. Other Direct Costs:
 - a. Subcontracts - Attachments should describe the work to be subcontracted, estimated amount, recipient (if known), and the reason for subcontracting this effort.
 - b. Consultants - Identify consultants to be used, why they are necessary, time to be spent on the project, and rates of pay.
 - c. Equipment - List separately and explain the need for items of equipment exceeding \$5,000. Describe the basis for the estimated cost. General purpose; non-technical equipment is not allowable as a direct cost to USRA grants unless specifically approved by the contracting officer.
 - d. Supplies - Provide general categories of needed supplies, the method of acquisition, estimated cost, add the basis for the estimate.
 - e. Travel - List proposed trips individually, describe their purpose in relation to the grant, provide dates, destination, and number of travelers where known, and explain how the cost for each was derived.
 - f. Publications - Detail publication costs, if any, listing page changes, etc.
 - g. Other - Enter the total of any other direct costs not covered by 2.a through 2.f. Attach an itemized list explaining the need for each item and the basis for the estimate.
3. Indirect Costs - Identify indirect cost rate,(s) and base(s) as approved by the cognizant Federal agency, including the effective period of the rate. Provide the name, address, and telephone number of the Federal agency and official having cognizance over such matters for the institution. If unapproved rates are used, explain why and include the computational basis for the indirect expense pool and corresponding allocation base for each rate.

4. Other Applicable Costs - Enter the total of any other applicable costs. Attach an itemized list explaining the need for each item and the basis for the estimate.
5. Subtotal-Estimated Costs - Enter the sum of items 1., 2.a. through 2.f., 3., and 4.
6. Less Proposed Cost Sharing (if any) - Enter the amount proposed, if any. If cost sharing is based on specific cost items, identify each item and amount in attachment.
7. Total Estimated Costs - Enter the total after subtracting item 6 from item 5.

Appendix E

Additional Information for SOFIA Instrument Proposers

GENERAL TELESCOPE CONFIGURATION

The Stratospheric Observatory For Infrared Astronomy (SOFIA) will be a 2.5 meter clear aperture infrared-optimized telescope mounted in an open cavity behind the port wing of a Boeing 747-SP aircraft. SOFIA is scheduled to make its first research flights in October, 2001.

Figure E-1 is a drawing of the current concept of the telescope. The optical configuration sends infrared light to the focal plane Science Instrument (SI) from a dichroic tertiary beamsplitter, and visible light to the focal plane imager for tracking. This configuration minimizes the IR background seen at the focal plane, while providing parfocal stellar tracking to compensate for low frequency telescope bending. The SI will be accessible in flight, since it will be mounted at the bent Cassegrain focus which is located in the cabin of the aircraft, which will be maintained in a “shirtsleeve” environment. The dichroic beamsplitter may be replaced with a fully reflective tertiary mirror. However, in this case, tracking information must either be provided by the SI or degraded pointing derived from the fine-field camera (attached to the telescope head ring) must be accepted (see below).

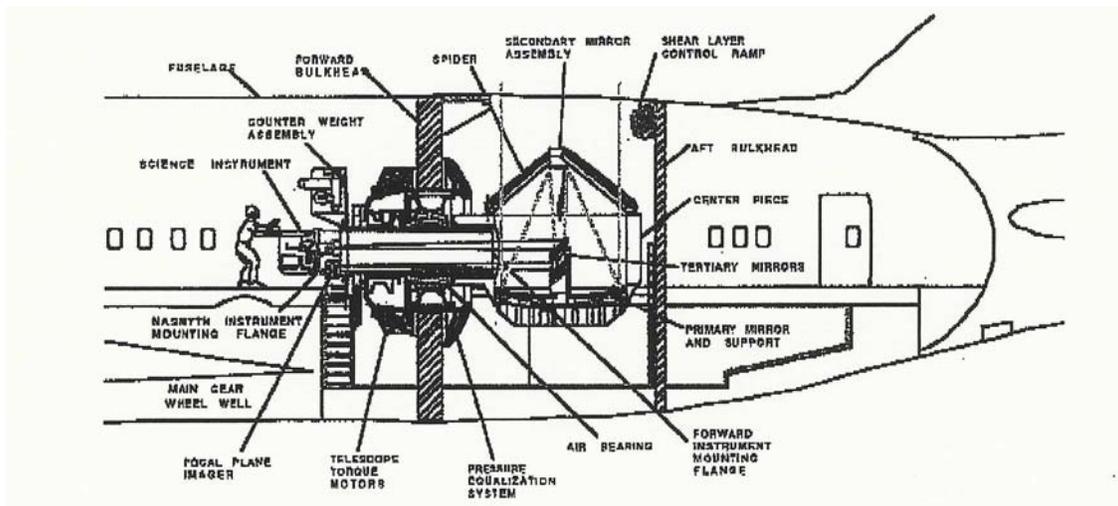


Figure E1: Anticipated telescope configuration.

EXPECTED TELESCOPE CHARACTERISTICS:

Nominal Operational Wavelength Range: 0.3 to 1600 microns

Primary Mirror Diameter = 2.7 meters

System Clear Aperture Diameter = 2.5 meters

Nominal System f-ratio = 19.6

Primary Mirror f-ratio ~ 1.28

Telescope's Unvignetted Elevation Range: 20 - 60 degrees

Optical Configuration: Bent Cassegrain with oscillating secondary mirror and flat folding tertiary.

Unvignetted Field-of-View Diameter = 8 arcmin

Maximum Chop Throw on Sky = +/- 5 is arcmin (vignetted); +/- 4 arcmin (unvignetted)

Chopper Frequencies = 1 to 20. Hz for 2-point square wave chop

Pointing Stability = 0."2 rms when using on-axis Focal Plane tracking
= 0."8 rms when using on-axis Fine-Field tracking

Pointing Accuracy = 0."5 when using on-axis Focal Plane tracking
= 3" when using on-axis Fine-Field tracking

Sky Rotation Freeze Mode available for a sky rotation range of +/- 3 degrees
(i.e., 6 minutes in time for fast rotators)

Diffraction-Limited Wavelengths \geq 15 microns

Image Quality of Telescope Optics at 0.6 microns
= 1.5 arcsec on-axis (80% encircled energy)

Predicted Point Spread Functions due to seeing caused by the Shear Layer over the telescope cavity: See Figure E2

Chopped Image Quality due to coma for +/- 4' Chop Throw
= 9."1 for 80% encircled energy diameter
= 5."8 for 50% encircled energy diameter

(Chopped Image Quality for other chop throws scale linearly with throw, down to the diffraction-limit or optical image quality of the optics.)

Total Emissivity of Telescope (Goal):

= 15% at 10 microns with dichroic tertiary

= 10% at 10 microns with aluminized tertiary

Recovery Air Temperature in Cavity' (and Optics Temperature) = 240K

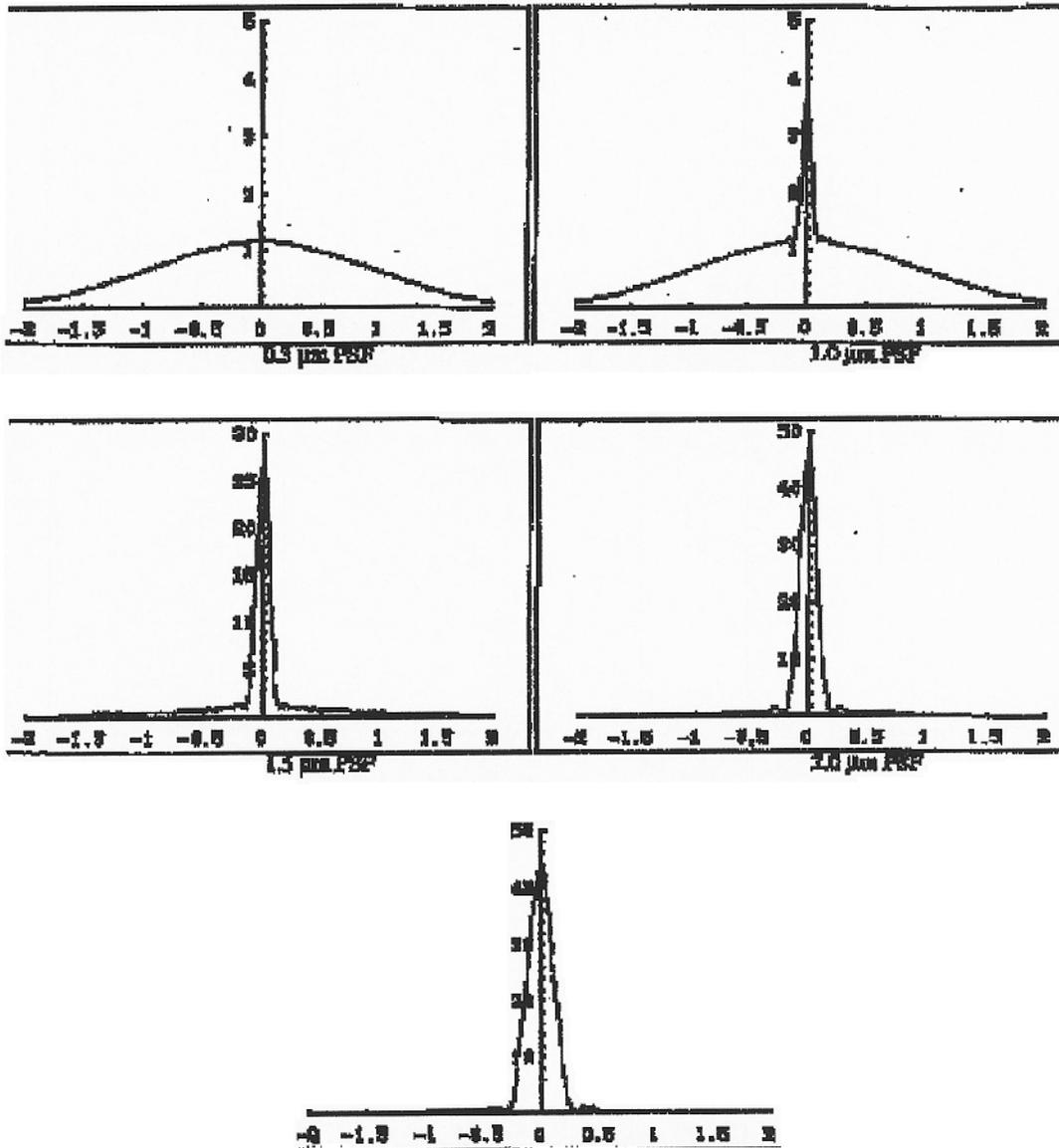


Figure E2. Shear Layer Point Spread Functions

SCIENCE INSTRUMENT DEVELOPMENT SCHEDULE

The SOFIA Observatory is a sophisticated facility with major components being developed by different organizations. The observatory will be successfully integrated only if each participant follows the Interface Control Documents (ICDs) being prepared by the USRA Team and the Gennan Telescope Consortium. By proposing to develop a SOFIA science instrument, you are proposing to be part of the SOFIA development effort and you must build your science instrument within the guidelines of the ICD's and agree to a schedule of reviews and tests outlined (but not finalized) below:

- Oct., '97: 1st Round of Science Instruments (SI) Funded
- * Dec. '97: Review of SI ICD's & Envelope
Review of SOFIA Operations Concept
Review of SI FAA Certification Process
- July, '98: FSI Preliminary Design Review (PDR for Facility Science Instruments only)
- Feb., '99 SI FAA Design Approval Granted (see FAA Procedures outlined below)
- July, '99: FSI Critical Design Review (CDR for Facility Science Instruments only)
- Oct., '00: SI Fabrication & Assembly Review (informal for PSI's and SSI's)
- Mar., '01: FSI Performance Verification Review (for Facility Science Instruments only)
- May, '01: SI FAA Conformance Approval Granted
- July, '01 SI Operation Plan & Operation Requirements Documented
- July, '02: SSMOC Acceptance of FSI

* The reviews by December 1997 *are* informal, and are to confirm that the instrument developer understands the USRA/German documentation and procedures.

SCIENCE INSTRUMENT INTERFACES

Interface Documents are actively being prepared as of this writing and will not be in draft form until September 1997 and finalized form until July 1998. However, as a guide for writing your proposal we have compiled the following SI interfaces:

- (1) Science Instrument Envelope

Figures E3 and E4 show how SI's will mount to the telescope, and outline the 81 "not-to-exceed" limits. This volume is defined by a cylinder of 1.5 meters in diameter and 2 meters in length. The mounting flange for the SI is centered on the IR beam (which is not centered on the Nasmyth tube)", and has an OD of 41 inches with a bolt circle of 40 inches diameter. The SI volume shown will not interfere with the floor of the aircraft, even with the most extreme motion of the telescope, if the bottom edge of the SI is no more than 35 cm from the optical axis of the IR beam when the telescope is at 40 degrees elevation.

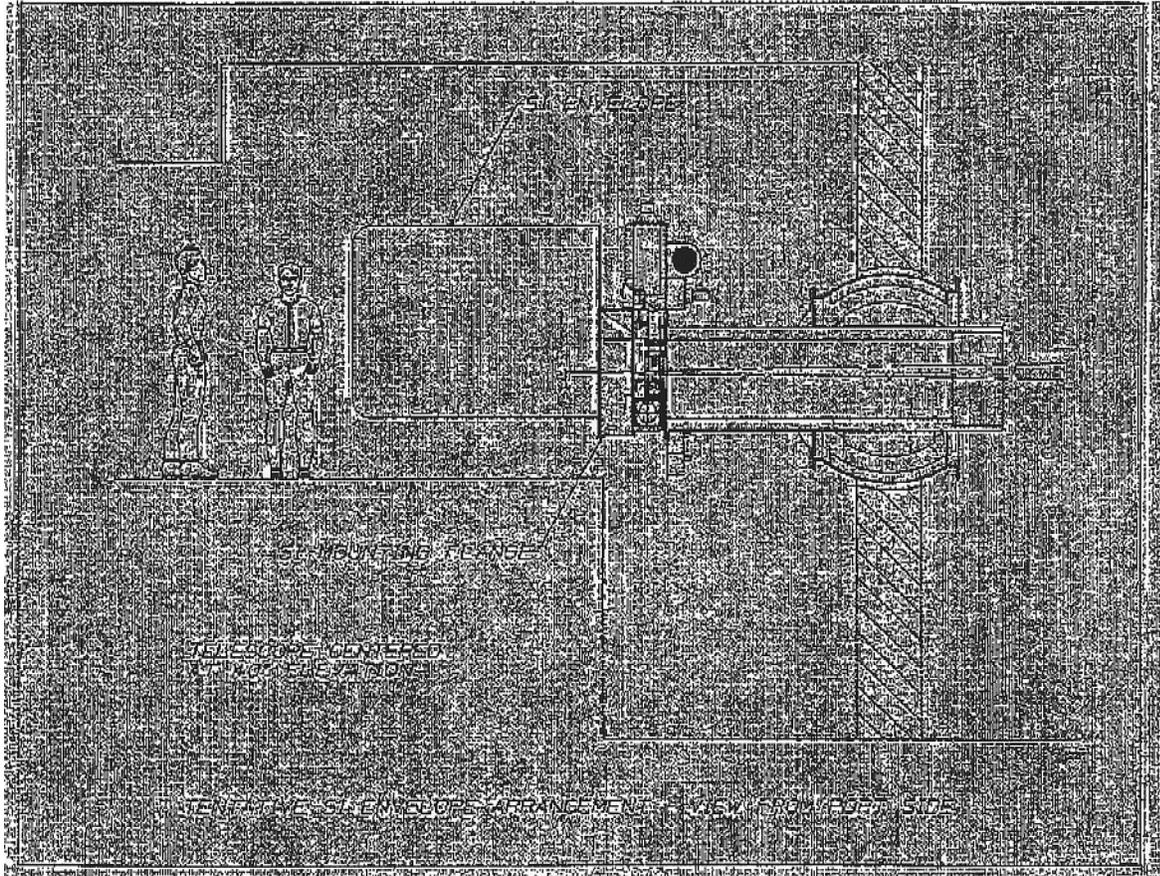


Figure E3. Tentative SI Envelope Arrangement ~ View From Port Side

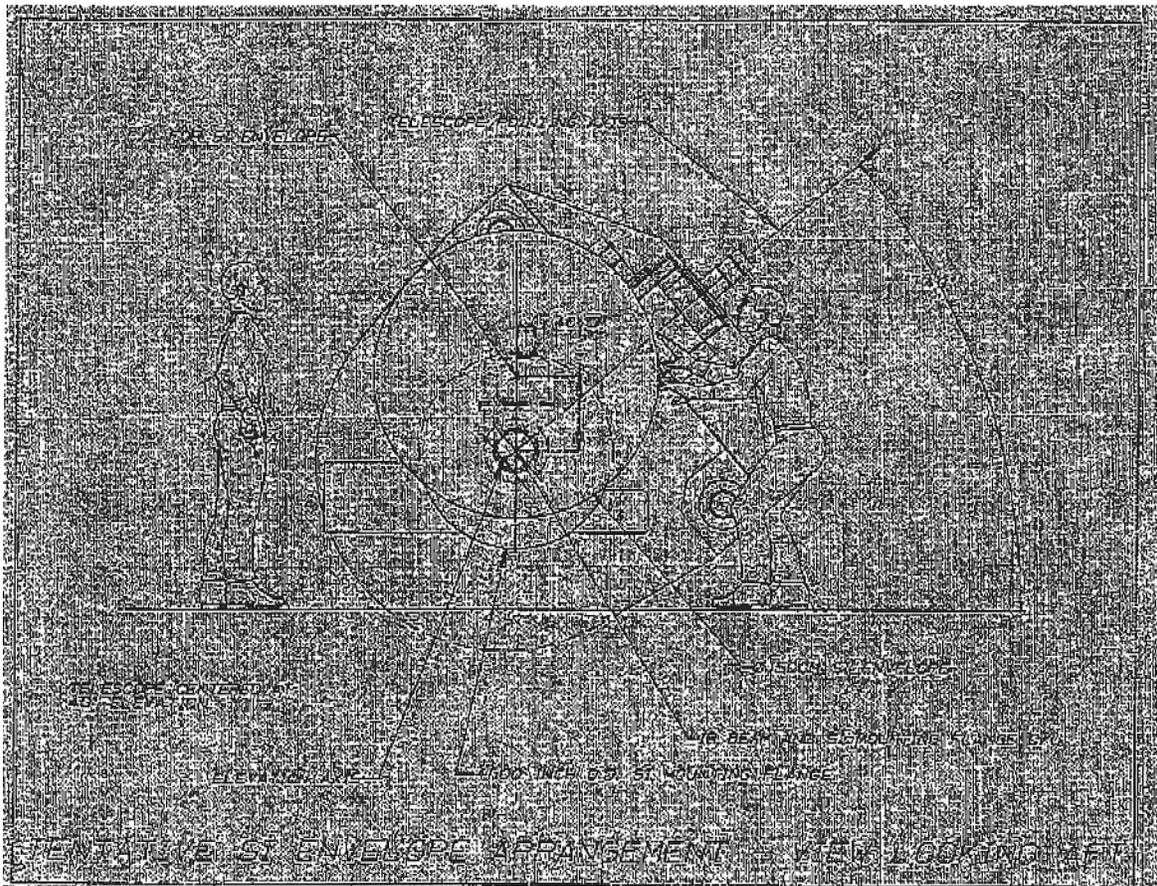


Figure E4. Tentative S1 Envelope Arrangement - View Looking Aft

It should be noted that this SI volume is larger in cross-section than the entrance door to the aircraft which is 41 inches wide and 76 inches high. This entrance defines the size of the SI components which can be transported from the Ground Facility into the aircraft. Assembly of SI components within the aircraft is possible as long as the S1 is contained within the volume defined by Figures E3 and E4; however, the SI should be designed such that the alignment and electrical/mechanical interfaces, established on the TA/MCCS simulator are (see below) unchanged by said disassembly and re-assembly.

The total mass allowed for the SI attached to the telescope is 600kg, The SI c.g. must be located within a volume defined by a cylinder with a diameter of 85 cm and a length of 1.5 meters, centered 25 cm forward (i.e., into the cabin away from the telescope) of the mounting flange and 10 cm above the IR beam when the telescope is at 40 degrees elevation.. The nominal Nasmyth focus will be located 30 cm forward of the mounting flange. The range of the adjustment of the focus will be +/-60 cm about the nominal focus.

The seal between the cabin and the cavity is an important FAA item. Either it can be an FAA approved window placed in the gate-valve, or the SI will form a seal, with the gate-valve open. The gate-valve must be able to be closed within flight, so, unlike on the KAO, no protrusions by the SI past the gate-valve will be allowed.

Large SI's will have to be transported from the PI labs to the telescope by carts designed to have the collect aircraft floor loading and with fixtures to enable the 81 to be mounted to the telescope by two technicians. These carts will be built by the USRA team.

(2) Vacuum Pumps at the Telescope

A vacuum pumping system shall be provided to support SI's:

- (a) One 100 liter/rom free flow vacuum pump (blank-off pressure 8.7×10^{-2} Torr).
- (b) Two 500 liter/min free flow vacuum pumps (blank-off pressure 9.2×10^{-2} Torr).

(1) Science Instrument Racks

Two standard racks (42" wide, 41" high, and 24" deep) per SI for support of electronics and equipment mountable to the aircraft floor near the telescope area, will be supplied by the SSMOC. These racks accommodate 19" panel mounts and when fully loaded can weigh up to 325 kg each. Two computer workstations connected to SOFIA's onboard computer network will be made available to PI's and GI's during flight. A future ICD will define the information which can be accessed from the MCCS (Mission Controls and Communications System) at the PI/GI racks and workstations.

(4) Power available to the Science Instrument and 81 Racks

60 Hz, 11 SV AC, single phase power will be made available to the 81 and SI rack up to about 4 KV A. A limited amount (about 1 KV A) of power from an uninterruptible power supply (UPS) win be automatically available to the 3I and 81 racks in case the normal supply of power is interrupted. There is also a supply of 28 VDC. The above power budget does not include the power required to run the vacuum pumps and computer consoles. Power for these items is budgeted elsewhere.

(5) Cables and Hoses to t11e Science Instrument

For the telescope to meet its pointing and tracking requirements; the SI's must use standard cables and hoses within a telescope supplied cable drape. In order to aid in the specification of such a standard cable drape, proposers should list clearly in their proposals, the required number and type of cables and hoses between their SI, which is mounted to the telescope~ and the aircraft (e.g., to the SI racks or the vacuum pumps).

(6) Science Instrument and Science Rack Environment

The SI and SI rack will be in a 'shirtsleeve' environment of ~8,000 ft atmospheric pressure and ~300 K temperature. The cabin air will have a humidity of < 1%. The telescope is pointed using torquer motors, and so some non-negligible level of EMI is expected. Values on the expected EMI are not currently available, but will be made available as soon as they have been estimated. The noise and vibration levels in the cabin are likely to be comparable to conditions in a commercial Boeing 747 aircraft. Vibration levels on the telescope are caused by aircraft vibrations and wind loads on the telescope in the cavity. The effect of aircraft vibrations will be significantly reduced by the telescope's vibration isolation system (for frequencies of 10 Hz and higher), but the wind loads are not significantly attenuated. Current modeling of the TA in flight (including the vibration isolation system) predicts that the combined effect of aircraft and wind-load vibrations at the location of the mounting flange will be on the order of (TBD, will be placed on website by 4/9/97) g-squared (where g is the acceleration of gravity at sea level). Mechanical vibrations at this level would not be apparent to the touch.

(7) Direct Telescope Communications

Most communication between the TA and the SI will occur via the MCCA (Mission Controls and Communications System) on SOFIA. However, there will be limited direct communication links with the telescope's tracker processor and the PI computer. The physical connection will be provided via an MCCA patch panel. The definition of the communication parameters exchanged between the PI computer and the TA tracker and communication protocols will be covered in a future ICD. Similarly, there will be a direct link (via a patch panel) between the telescope secondary chopper and the PI rack to allow a direct input of an analog chopper waveform. Details of this interface will be given in a future ICD.

(8) Close-Cycle Refrigerators

At this time we are investigating the use of closed-cycle refrigerators for SOFIA Science Instruments. The compressors for these refrigerators would be attached to the floor of the aircraft. Refrigeration hoses will be included in the standard cable drape set (see interface item 5 above). FAA certification issues for close-cycle refrigerators are also being studied. The most severe problem facing the use of closed-cycle refrigerators on the aircraft is the need for continuous electrical power. Issues relating to keeping aircraft power on for extended periods of time for this and other purposes are under study.

In summary, at present, passive refrigeration of SI's is preferred. Hybrid close-cycle refrigerators with the ability to be powered down and passively cooled for substantial periods of time (e.g., over the weekends) are also acceptable.

OUTLINE OF OPERATIONS CONCEPT

The SOFIA Science and Mission Operations Center (the SSMOC) will be managed and operated by USRA. It will be located in Hangar N211 at NASA Ames Research Center and will house the SOFIA aircraft, all the support and operations personnel for the aircraft and observatory, the

SSMOC management and administrative staff, and the SSMOC science and education staff. It will also contain two to three PI labs/office areas; and three GI offices. The multi sets of offices and labs are nominally intended for the incoming, current, and outgoing science teams using SOFIA. Each lab will be about 20' x 30' in area with 12' high ceilings, containing a sink area essential lab equipment (e.g., pumping stations), and having 6 KVA of 208 VAC, 60 Hz, 3 phase power and 4 KVA of 115 VAC, 60Hz, single phase power per lab. Liquid nitrogen and liquid helium will be made available upon request. All labs and offices will have phone and computer access, and there will be access to the SSMOC machine shop. The SSMOC will have a data center which will include the observatory library, data on the observatory and science instruments, and astronomical catalogs.

The incoming science team will have about a week or two to ready their 81 for installation onto the aircraft. The PI labs will be on the ground floor of the SSMOC, and once an SI has been checked out in the lab, it will be wheeled on a SI cart to the Telescope/MCCS simulator room (also on the ground level) where the SI/telescope optical alignment will be established and integration with the MCCS will occur. Once the 81 is thus aligned and integrated, it will be wheeled from the simulator room to an elevator, to the second floor of the SSMOC, where a permanent personnel bridge to the aircraft will be used to wheel the SI into the aircraft. Telescope technicians will assist with mounting the 81 to the telescope and will balance the telescope. MCCS technicians/programmers will install and check the SI/MCCS interfaces. United personnel will check for airworthiness. There will be a short-version, dry-run of the first flight carried out in the aircraft on the ground

This peer review cycle is expected to select between one and three Facility Science Instruments (FSI's) . The FSI's will be delivered to the SSMOC and accepted by USRA before July 2001. Operation and support of the FSI will be the responsibility of the SSMOC. During the first two years of operations, it is expected that most GI's will propose and use FSI's.

Starting in FY 2002 the SOFIA science flight schedule for an observing year will be made public on the WWW as soon as possible after the observing time has been awarded for that year (including both U.S. and German science flights). Preliminary flight planning will be the responsibility of the PI and GI teams. Assistance in this preliminary planning and the final filing of the flight plan will be carried out by SSMOC staff. The USRA team envisions two possible flight profiles for science flights: The first is a 9.2 hour flight with 8.4 hours at 41,000 ft.; the second is an 8.8 hour flight with 2.55 hours at 41,000 ft., 2.5 hours at 43,000 ft., and 2.7 hours at 45,000 ft. With these long flight profiles, an average of 3 flights per week will meet the required 960 successful flight hours per year for SOFIA. Currently the plan is to install the SI on the aircraft on one of the weekend days (after it has been through the TA/MCCS simulator), have a dry-run of the first flight on Monday during the day, and fly Monday night. The remainder of the week will have three possible scheduled flight times, with one being a contingency flight night only. Most SI's will be de-installed on a Friday, readying the aircraft for the installation of a new SI over the weekend,

Every PI and OJ team will be assigned a SSMOC support scientist to be the SSMOC point-of-contact while each team is preparing for a flight series. Once at the SSMOC, the flights will be coordinated between the science teams, the observatory and aircraft staff, the educators, and the

flight crew by the SSMOC flight mission directors. The Observer's Handbook will be kept up to date on the WWW and will list all the SOFIA SI performance characteristics, SSMOC procedures, and Call for Proposal information. The Data Center WWW-site will retain and make readily available summary information on past observations made from SOFIA, and resulting publications.

FAA CERTIFICATION OF SOFIA SCIENCE INSTRUMENTS

The SOFIA aircraft, telescope systems, and science instruments will be certified to a FAA Air Worthiness Standard as specified in Federal Aircraft Regulations (FAR) Part 25.

EXCERPTS OF PART 25, WHICH ARE OF PARTICULAR INTEREST TO THE INSTRUMENT BUILDER, ARE TO BE FOUND ON THE USRA-SOFIA WEB-SITE.

It is understood that certification is a concern among installment builders, particularly those located at Universities or other institutions which have not previously fabricated apparatus to FAA standards. To this end, USRA has formed a small committee of scientists and engineers to assist SOFIA instrument builders through the FAA certification process, which will commence once grants are awarded. Likewise, this group will work with personnel at Raytheon and United to help them better understand the scientists' position.

The grantee should concern him or herself with four basic categories: Structural, Cryogenics/Gas, Electrical/EMI and Hazardous materials. Each instrument will be reviewed and managed separately for FAA certification by USRA/Raytheon/United. To this end, each proposal should contain at least conceptual drawings of the instrument and how it will install onto the telescope and aircraft.

IT IS THE INTENT OF THE USRA TEAM TO WORK WITH THE FAA SO THAT ONLY THE EXTERNAL SUPPORT STRUCTURE AND/OR CASE/HOUSING OF ANY SCIENCE INSTRUMENT WILL NEED TO BE FAA CERTIFIED. In short, what happens to components inside the containment structure will be of no concern to the FAA as long as those parts are prevented from escaping the containment and impacting the safety of aircraft systems and personnel. External support structure and feed-throughs of all instruments must show by analysis that they meet the requirements set forth in the FAR. If it is impractical to do this, controlled tests may be performed on the flight hardware or an equivalent model to prove compliance. It will be necessary to use certified materials and shop practices for all structural components. It may be required that external support structure test procedures (or fabrication procedures, such as gluing or welding) are overseen by appropriate personnel. Early on in the grant period, personnel at Raytheon will be identified as point of contacts to assist the grantee.

The instrument external support structure and all exposed external experimenter hardware~ including any tanks, hoses, cables, and other equipment to be used in flight, must be designed, constructed and installed on the aircraft so as to withstand the g-loads listed in FAR Part 25 (summarized elsewhere on this Web-site). These loads, when applied one at a time, in addition to the cabin pressure loads x 1.33 F.S., must not produce a stress in any element or component of the equipment beyond the ultimate or tensile strength of the constructed or fabricated material. It

is not required that alignment, calibration or other instrumental functions be maintained under the indicated load conditions. The external support structure and any penetrations will also have to be designed to not fail due to fatigue or corrosion over the life of the instrument.

Of primary concern is a catastrophic failure of a cryostat resulting in either spraying of liquid onto personnel and equipment or displacement of enough volume of air within the cabin so as to cause asphyxiation. Analysis must show that either it is not a concern (as in the case of small amounts) or that special means have been taken to vent unwanted or hazardous gases in a safe manner. A study is underway to determine the practicality of providing a means of venting gases overboard.

Safety devices will be required on all containers to afford a slow release of gas into the environments specified above in the event of failure of the container. Certified safety devices will be specified by Raytheon. Design and fabrication of all safety systems will be reviewed for compliance to standards (yet to be determined). Compressed gases will be stored in facilities provided inside the aircraft and piped to a convenient location as mutually determined by aircraft safety personnel and instrument builder. Since some gases may pose special problems for certification, the PI should provide early notification to USRA of all gases required for operation of the SI.

Each instrument group will be provided with instrumentation racks which meet the requirements of FAR Part 25. Installation of racks into the aircraft will be accomplished by SSMOC personnel. With regard to FAA certification, specifics of connections will be the responsibility of the instrument provider and United during installation. Review of structural integrity of all rack components will be done during design and construction and prior to each flight. Wire trays will be provided by the facility to a convenient location near the instrument. Generally it should be assumed that access to wires during flight will be discouraged.

ELECTROMAGNETIC INTERFERENCE (EMI): Electronic noise or signals from scientific instrument (SI) packages may in no way interfere with the aircraft's navigation, communication, or any other electronic systems. Commercial electronics must meet applicable FCC (or equivalent) standards for radiated power levels. Radio-frequency and microwave components within SI packages must be connected, shielded, and decoupled in such a way that their signals cannot interfere with any aircraft system. Raytheon/United will provide lists of aircraft receiver and transmitter frequency bands and transmitter maximum power and harmonic specification's on request. The pilot retains the authority to have SI electronic equipment shut down in cases of suspected interference that affects safe aircraft operation or during critical flight phases such as takeoffs and landings.

Laser system structural elements must meet FAA structural standards. Safety procedures for lasers will be similar to standard laboratory practice. To protect crew, science teams, and aircraft, there will be increased attention to scattered light. Class 3 and Class 4 laser beams must be completely contained within nonflammable opaque enclosures during operation.

Of particular interest to builders, should be the sections in FAR Part 25 relating to batteries and power supplies; specifically: how they are secured, operated and interfaced with aircraft systems. When needed, assistance will be provided by appropriate personnel.

Proposers are cautioned that FAA certification may require a more rigid standard for workmanship and documentation than they normally are accustomed to, which should be reflected in their budgets. Exact requirements will be determined by review meetings between builders and personnel responsible for formal certification.

As part of the certification process, supporting documentation must include the following information:

- (1) Build-to-Design drawings, photos, lists, descriptions or other documentation of all the science instrument components in sufficient detail to determine structural integrity and to allow a Raytheon Designated Engineering Representative (DER) to grant FAA Design Engineering Approval;
- (2) Drawings, photos, etc., to allow appropriate preflight installation and inspection (i.e., FAA Field Approval) by United; and
- (3) Weight and c.g. data for all experiment components, rack(s) and other assemblies.

TIMELINE OF THE FAA CERTIFICATION PROCESS FOR SOFIA SCIENCE INSTRUMENTS

- (1) By February 1999, the instrument builder must submit to USRA a set of "build-to-design" drawings, photos etc. of the science instrument components for Design Engineering Approval. If this approval is not given, a Raytheon engineer will work with the instrument builder to satisfy the FAR Part 25 requirements, so approval may be given.
- (2) By May 2001, the instrument builder must demonstrate that structurally, electrically, and with respect to safety the completed science instrument conforms to the FAR Part 25 requirements. This review will be performed at the instrument builder's institution by a Raytheon DER. Upon meeting FAR Part 25 requirements a "FAA Conformity Approval" will be given, and Raytheon will seek from the FAA a change of the Supplementary Type Certificate (STC) for SOFIA) which will include the science instruments which were reviewed.
- (3) Upon FAA granting the change of STC (taking no more than a month), United Airlines will be the responsible party to grant a "Field Approval after the installation of the science instrument in the aircraft before each flight.

PROGRAMMATIC INFORMATION

Guest Investigator support

SOFIA will support ~50 Guest Investigator (GI) observational projects per year in full operation. Most of the investigators, especially in the first two years, will use FSI's. However, to cover the full range of SOFIA capabilities, it will be necessary for PSI and SSI to support GI programs. The demands placed on the instrument team by this requirement should be taken into account when defining the instrument concept and its operational plan.

Documentation

Instruments selected for flight will need to be defined in an up-to-date facility handbook in enough detail that a GI can write a successful proposal without having to consult with the instrument team. It is anticipated that instrument team members will participate in GI flights, but proposal preparation and data analysis should be possible without instrument team intervention. It is further anticipated that SOFIA data will be archived, although the exact process has not been determined.

Multiple Instruments

At this time, there are no provisions to include or preclude multiple SI's on a single flight.

CERTIFICATION REGARDING DEBARMENT, SUSPENSION,
AND
OTHER RESPONSIBILITY MATTERS

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PRIMARY COVERED TRANSACTIONS

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This certification is required by the regulations implementing Executive Order 12549, Debarment and Suspension, 34 CFR Part 85, Section 85.510, Participants' responsibilities. The regulations were published as Part VII of the May 28, 1988, Federal Register (pages 19160~19211). Copies of the regulations may be obtained by contacting the U.S. Department of Education, Grants and Contracts Service, 400 Maryland Avenue, S.W. (Room 3633 GSA Regional Office Building No.3), Washington, D.C. 20202-4725, telephone (202) 732- 2505.

A. The applicant certifies that it and its principals:

(a) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;

(b) Have not within a three-year period preceding this application been convicted or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State, or Local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, Or receiving stolen property;

(c) Are not presently indicted for or otherwise criminally or civilly charged by a government entity (Federal, State, or Local) with commission of any of the offenses enumerated in paragraph A.(b) of this certification;

(d) Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State, or Local) terminated for cause or default; and

B. Where the applicant is unable to certify to any of the statements in this certification, he or she shall attach an explanation to this application.

C. Certification Regarding Debarment, Suspension; Ineligibility and Voluntary Exclusion - Lowered Tier Covered Transactions (Sub grants or Subcontracts)

(a) The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principles is presently debarred, suspended, proposed for debarment, declared ineligible or voluntarily excluded from participation in this transaction by any federal department of agency.

(b) Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

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Organization Name CFP or AD Number and Title

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Printed Name and Title of Authorized Representative

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Signature Date

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Printed Principal Investigator Name Proposal Title

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## CERTIFICATION REGARDING DRUG-FREE WORKPLACE REQUIREMENTS

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This certification is required by the regulations implementing the Drug- Free Workplace Act of 1988, 34 CFR Part 85. Subpart F. The regulations, published in the January 31, 1989 Federal Register, require certification by grantees prior to award, that they will maintain a drug-free workplace. The certification set out below is a material representation of fact upon which reliance will be placed when the agency determines to award the grant. False certification or violation of the certification shall be grounds for suspension of payments~ suspension or termination of , grants, or government-wide suspension ,or debarment (see 34 CFR Part 85, Sections 85.615 and 85.620).

### I. GRANTEES OTHER THAN INDIVIDUALS

- A. The grantee certifies that it will provide a drug-free workplace by:
- (a) Publishing a statement notifying employees that the unlawful manufacture, distribution, dispensing, possession or use of a controlled substance is prohibited in the grantee's workplace and specifying the actions that will be taken against employees for violation of such prohibition;
  - (b) Establishing a drug-free awareness program to inform employees about—
    - (1) The dangers of drug abuse in the workplace;
    - (2) The grantee's policy of maintaining a drug-free workplace;
    - (3) Any available drug counseling, rehabilitation, and employee assistance programs; and
    - (4) The penalties that may be imposed upon employees for drug abuse violations occurring in the workplace;
  - (c) Making it a requirement that each employee to be engaged in the performance of the grant be given a copy of the statement required by paragraph (a);
  - (d) Notifying the employee in the statement required by paragraph (a) that, as a condition of employment under the grant, the employee will
    - (1) Abide by the terms of the statement; and
    - (2) Notify the employer of any criminal drug statute conviction for a violation occurring in the workplace no later than .five days after such conviction;
  - (e) Notifying the agency within ten days after receiving notice under subparagraph (d) (2) from an employee or otherwise receiving actual notice of such conviction;
  - (f) Taking one of the following actions, within 30 days of receiving notice under subparagraph (d) (2), with respect to any employee who is so convicted --
    - (1) Taking appropriate personnel action against such an employee, up to and including termination; or
    - (2) Requiring such employee to participate satisfactorily in a drug abuse assistance or rehabilitation program approved for such purposes by a federal, State, or Local health, Law enforcement, or other appropriate agency;
  - (g) Making a good faith effort to continue to maintain a drug-free workplace through implementation of paragraphs (a), (b), (c), (d), (e), and (f)

B. The grantee shall insert in the space provided below the site(s) for the performance or work done in connection with tile specific grant:

Place of Performance (Street address, city, county, state, zip code)

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Check \_\_\_\_\_if there are workplaces on file that are not identified here.

## II. GRANTEES WHO ARE INDIVIDUALS

The grantee certifies that, as a condition of the grant, he or she will not engage in the unlawful manufacture, distribution, dispensing, possession or use of a controlled substance in conducting any activity with the grant.

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Organization Name CFP or AD Number and Title

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Printed Name and Title of Authorized Representative

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Signature Date

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Printed Principal Investigator Name Proposal Title

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## CERTIFICATION REGARDING LOBBYING

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As required by S 1352 Title 31 of the U.S. Code for persons entering into a grant or cooperative agreement over \$100,000, the applicant certifies that:

- (a) No Federal appropriated funds have been paid or will be paid by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, in connection with making of any Federal grant, the entering into of any cooperative, and the extension, continuation, renewal, amendment) or modification of any Federal grant or Cooperative agreement;
- (b) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting an officer or employee of any agency, Member of Congress, or an employee of a Member of Congress in connection with this Federal grant or cooperative agreement, the undersigned shall complete Standard Form ~ LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.
- (c) The undersigned shall require that the language of this certification be included in the award documents for all sub-awards at all tiers (including sub-grants, contracts under grants and cooperative agreements, and subcontracts), and that all sub-recipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 51352, title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

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Organization Name CFP or AO Number and Title

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Printed Name and Title of Authorized Representative

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Signature

Date

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Printed Principal Investigator Name

Proposal Title