

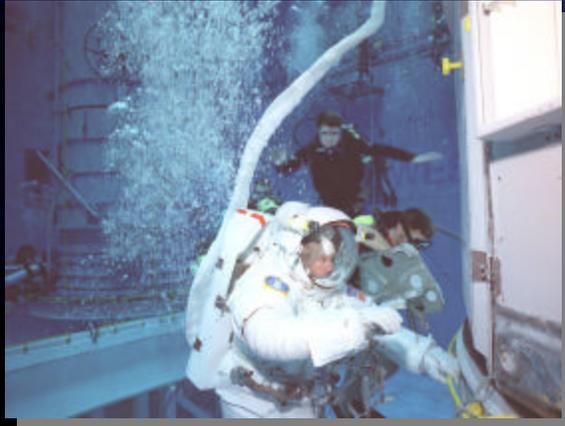


Solar Safe

NASA's Initiative to Promote Skin
Cancer Awareness and Safety



NASA Medical Care



Underwater...



..on the ground...

...through the air...

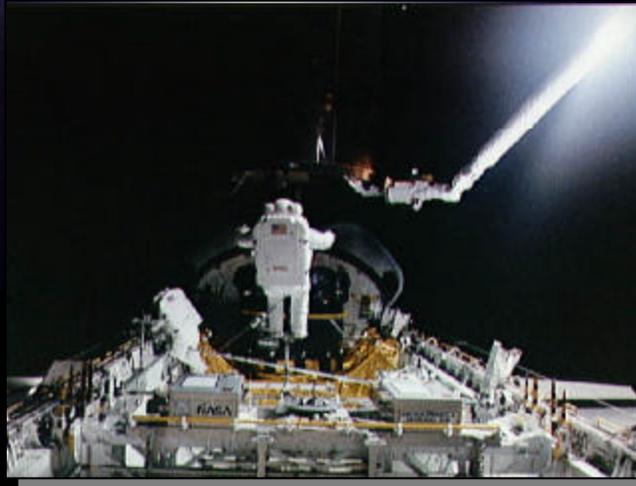


...and into space



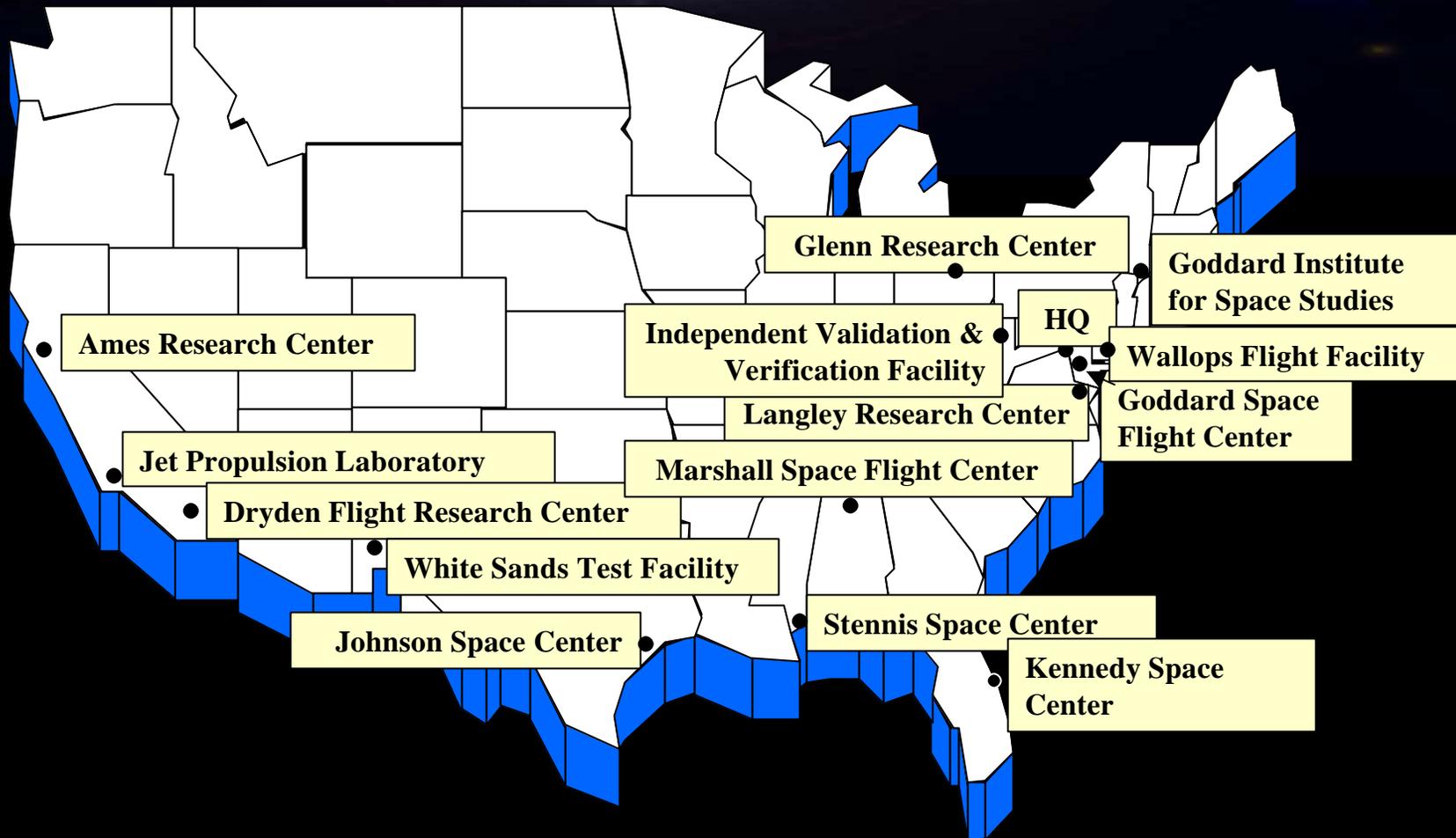


Hazardous Exposures





On the Ground: NASA Centers



Ames Research Center

Jet Propulsion Laboratory

Dryden Flight Research Center

White Sands Test Facility

Johnson Space Center

Glenn Research Center

Independent Validation &
Verification Facility

Langley Research Center

Marshall Space Flight Center

Stennis Space Center

Kennedy Space
Center

HQ

Goddard Institute
for Space Studies

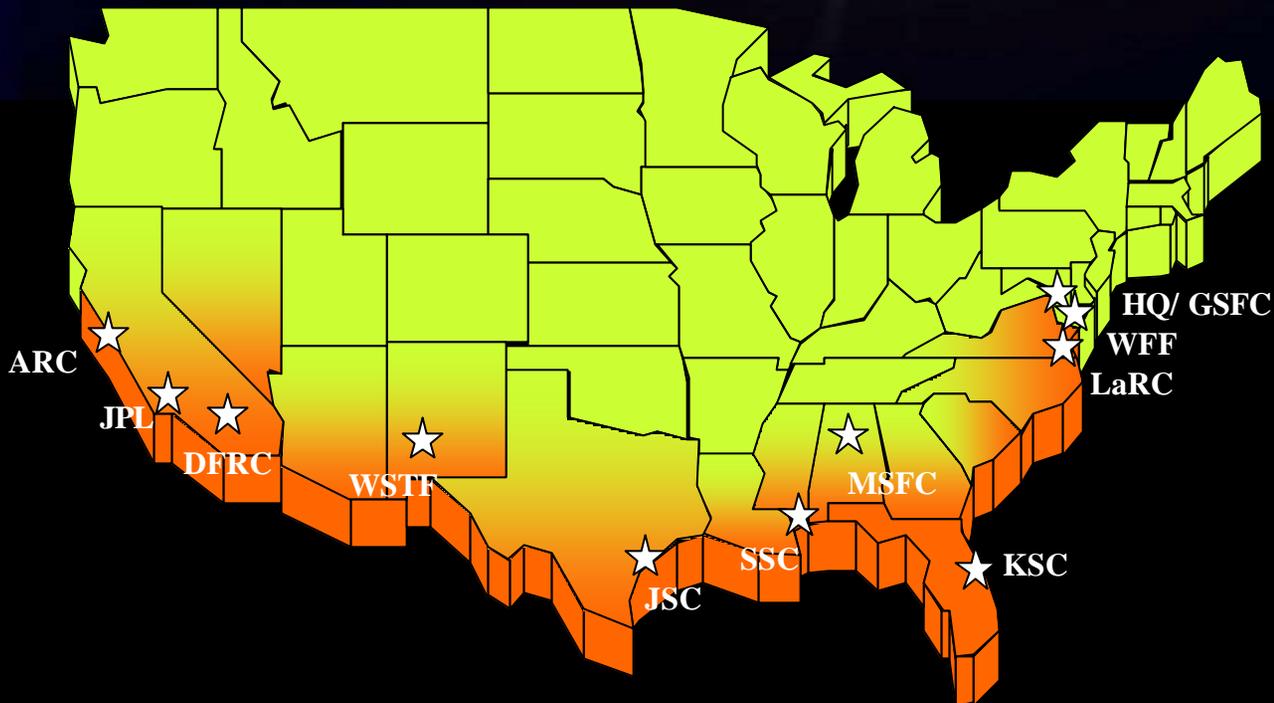
Wallops Flight Facility

Goddard Space
Flight Center



Skin Cancer Risk Factors

- Location (Sunbelt)



...and also...

- Complexion
- Previous sunburn
- Family history of skin cancer



Space Radiation

- Sources
 - Galactic cosmic radiation
 - Solar particle events
- Risk
 - Cataracts
 - Cancer
 - Chromosomal mutation
- Correlation between health and radiation exposure during space flight objective of NASA Space Radiation Health Program
- Comparison with terrestrial exposures:
 - One x-ray: 0.1 mGy (=0.1mSv)
 - Natural background: 2 mSv/yr

- Previous exposure levels¹

Mission	Duration (days)	Mission dose (mGy)	Daily dose (mGy/d)
Skylab 2	28	15.96	0.54+0.3
Skylab 3	59	38.35	0.65+0.5
Skylab 4	90	77.4	0.86+0.9

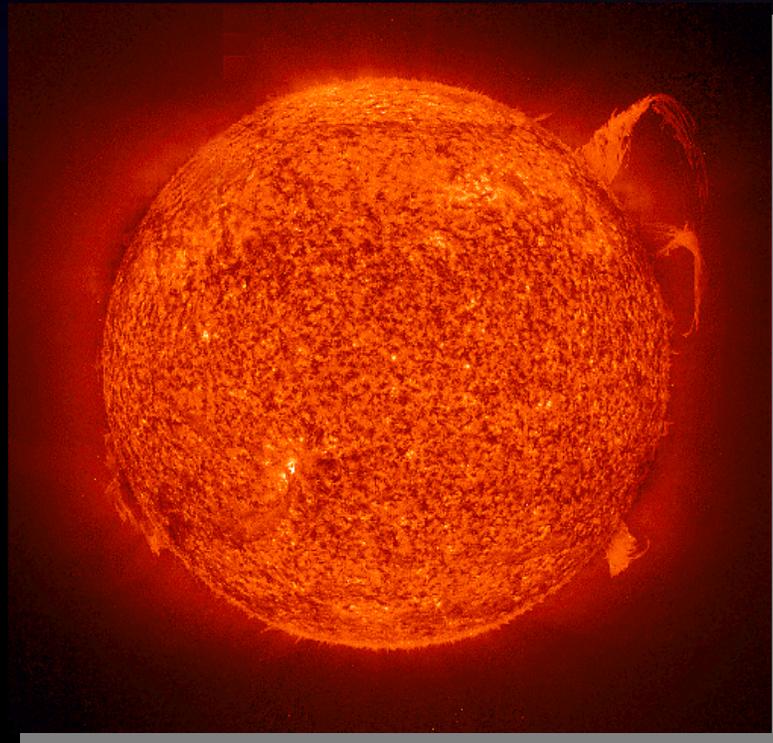
Mission	Duration (days)	Altitude(km)	Proton equivalent dose rate, mSv/d	Neutron equivalent dose rate, mSv/d
STS-4	7.0	297	0.54	0.22
STS-5	5.1	297	0.043	0.023
STS-6	5.0	284	0.048	0.013
STS-31	5.0	617	1.66	0.188



¹D.E. Robbins et al., "Ionizing Radiation." In *Space Biology & Medicine*, A. E. Nicogossian, S. Mohler, O. Gazonko, and A. Grigoriev (eds.). AIAA, 1996.



Previous Sun Protection Measures

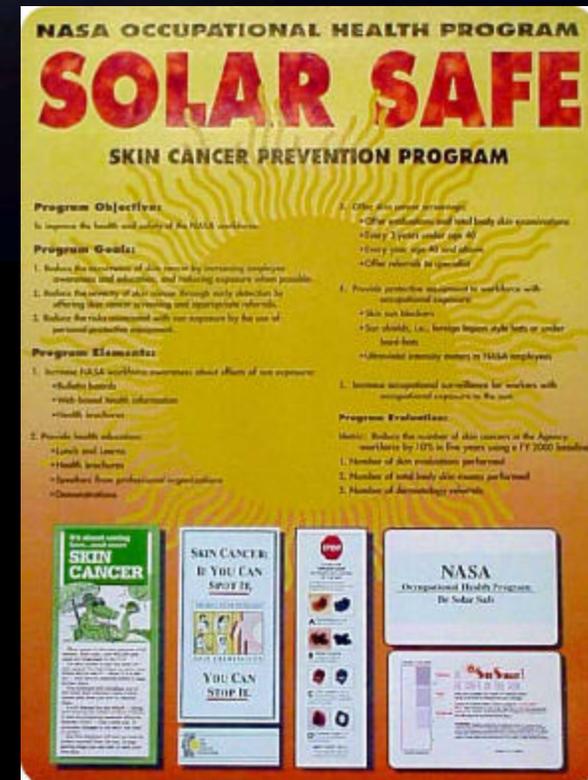


- ALARA operational concept: As Low As Reasonably Achievable
- Reduction approaches
 - Avoid exposure
 - Reduce exposure time
 - Shield
 - Reduce exposed area



Solar Safe

- Created in response to concern for employees' increased risk of excessive and prolonged sun exposure
- Focuses on reducing risks, early detection, and skin cancer education



Goal: Solar Safe will reduce the number of skin cancers in the next five years by 10%



Multifaceted Approach

- Awareness & education
- Administrative controls
- Personal protection
- Medical surveillance
- Metrics

NASA OCCUPATIONAL HEALTH PROGRAM

Solar Safe Tips for Solaris

SKIN CANCER PREVENTION PROGRAM

Program Objective:
To improve the health and safety of the NASA workforce.

Program Goals:

1. Reduce the occurrence of skin cancer by increasing employee awareness and education, and reducing exposure when possible.
2. Reduce the severity of skin cancer through early detection by offering skin cancer screening and appropriate referrals.
3. Reduce the risks associated with sun exposure by the use of personal protection equipment.

Program Elements:

1. Increase NASA workforce awareness about effects of sun exposure:
 - Bulletin boards
 - Web-based health information
 - Health brochures
2. Provide health education:
 - Lunch and Learn
 - Health brochures
3. Offer skin cancer screenings:
 - Offer evaluations and total body skin examinations
 - Every 3 years under age 40
 - Every year age 40 and above
 - Offer referrals to specialist
4. Provide protective equipment to workforce with occupational exposure:
 - Skin sun blockers
 - Sun shields, i.e., foreign legion style hats or under hand hats
 - Ultraviolet intensity meters to NASA employees
5. Increase occupational surveillance for workers with occupational exposure to the sun.

Program Evaluation:

Metric: Reduce the number of skin cancers in the Agency workforce by 10% in five years using a FY 2000 baseline.

1. Number of skin evaluations performed
2. Number of total body skin exams performed
3. Number of dermoscopy referrals

Logos: SunSmart, NASA Occupational Health Program, Be Solar Safe.



Awareness & Education

Solar Safe will educate NASA personnel about...

- The threat of skin cancer
- Effects of sun exposure
 - Non-cancerous (aging, cataracts, etc.)
 - Cancerous
- Proper clothing, UV index, and use of sunscreen
- Self-examination, types, and diagnosis of skin cancer

...while leveraging the experience of other organizations to maximize effectiveness

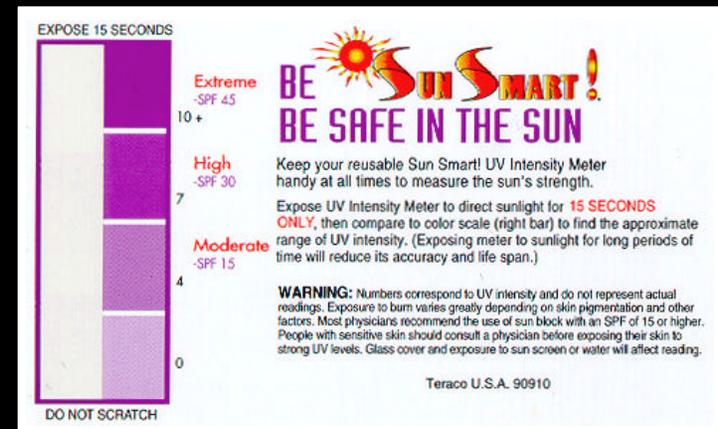




Administrative Controls

Centers and component organizations will...

- Evaluate feasibility of limiting outside work during prime solar exposure without affecting mission, cost-efficiency, or safety
- Encourage flexibility in timing of outside fitness activity (e.g. jogging)
- Incorporate UV index information
 - Individual UV badges
 - Local weather information

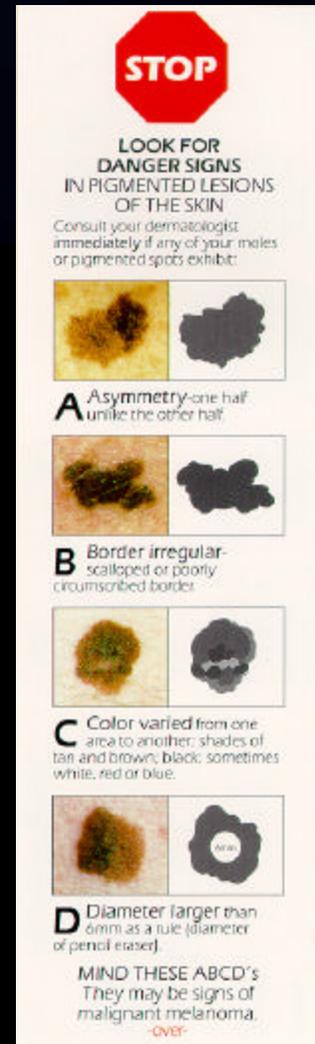




Personal Protection

The Solar Safe program encourages Centers and employees to...

- Consider canopies or other methods of safe solar shading
- Provide sun screen to those occupationally exposed
- Plan for proper protective clothing and skin coverage both on and off site, during work and free time
 - Sunshields or “foreign legion” style hat (wide brim)
 - Sunblock/ sunscreen on exposed skin and under lightweight, light-colored, loosely-woven clothing
- Promote cultural change
 - Discourage weekend/vacation tanning
 - Wear hat outdoors

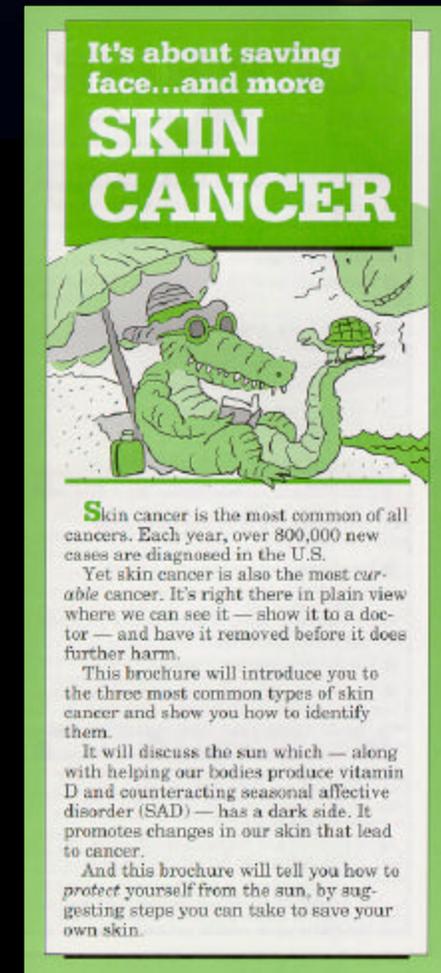




Medical Surveillance

NASA medical personnel contribute to skin cancer awareness by...

- Incorporating skin cancer screening and education into regular clinic visits
 - Offer skin cancer information
 - Train clinic physicians in screening and recognition
- Offering periodic or annual “Total Body Examinations” to screen for skin cancers
 - Detection of malignant melanoma 2-6 times more likely with TBE
 - Yearly for employees 40 years or older; every three years for employees younger than 40
- Referring suspicious lesions to skin or cancer specialists
 - Improve ease of referrals





Metrics

- Number of total body skin examinations performed
- Number of referrals made for possible skin cancer
- Number of skin cancers detected



Solar Safe in Action: JSC

JSC Teledermatology Clinic

- February 2000 kickoff
- 12 patients screened (through Mar 31, 2000)
 - 4 of 12 had suspicious lesions (33%)
 - 1 suspected malignant melanoma (clinical diagnosis, biopsy pending)
 - 1 suspected squamous cell carcinoma (clinical diagnosis, biopsy recommended)



Biopsy pending
probable malignant melanoma



Biopsy pending



Biopsy recommended
probable squamous cell carcinoma



Where We Are Today

- Solar Safe planning complete 1999
- Solar Safe plan kicked off March 2000
- HQ support for initial efforts at all Centers in progress
- Implementation of total body screenings in progress
- Enhancement of outdoor shading and flexible outdoor activity hours TBD