

# SOFIA Program Overview

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SOFIA Project Scientist

# **SOFIA**

Stratospheric Observatory  
for Infrared Astronomy

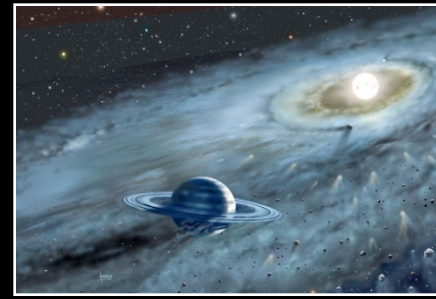
Interstellar Medium



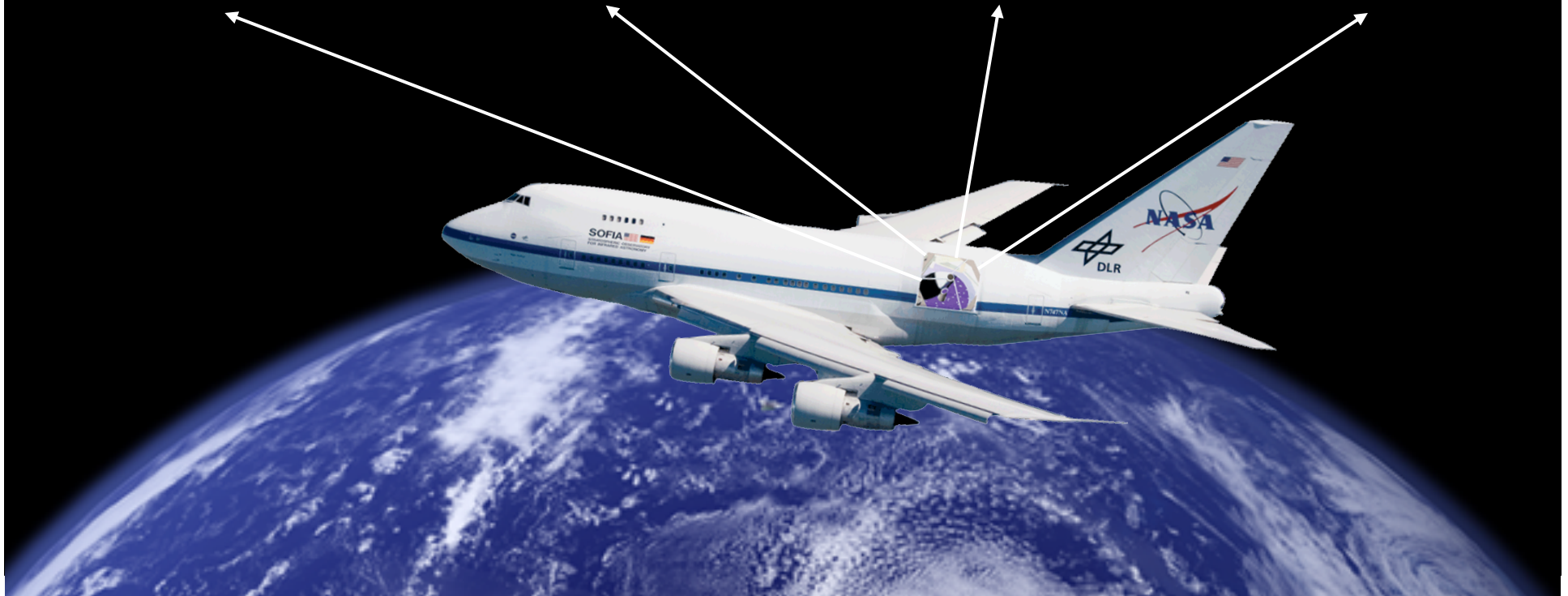
Planetary Science



Formation of Stars  
and Planets



Galaxies and the  
Galactic Center





## Outline



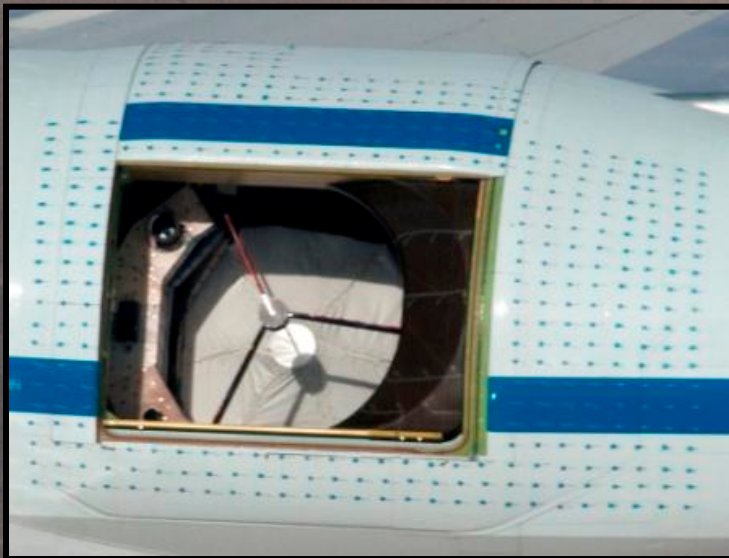
- 
- SOFIA 101 (for the newcomers)
  - Recent Achievements
  - Milestones Ahead
  - Program Status Summary

# SOFIA

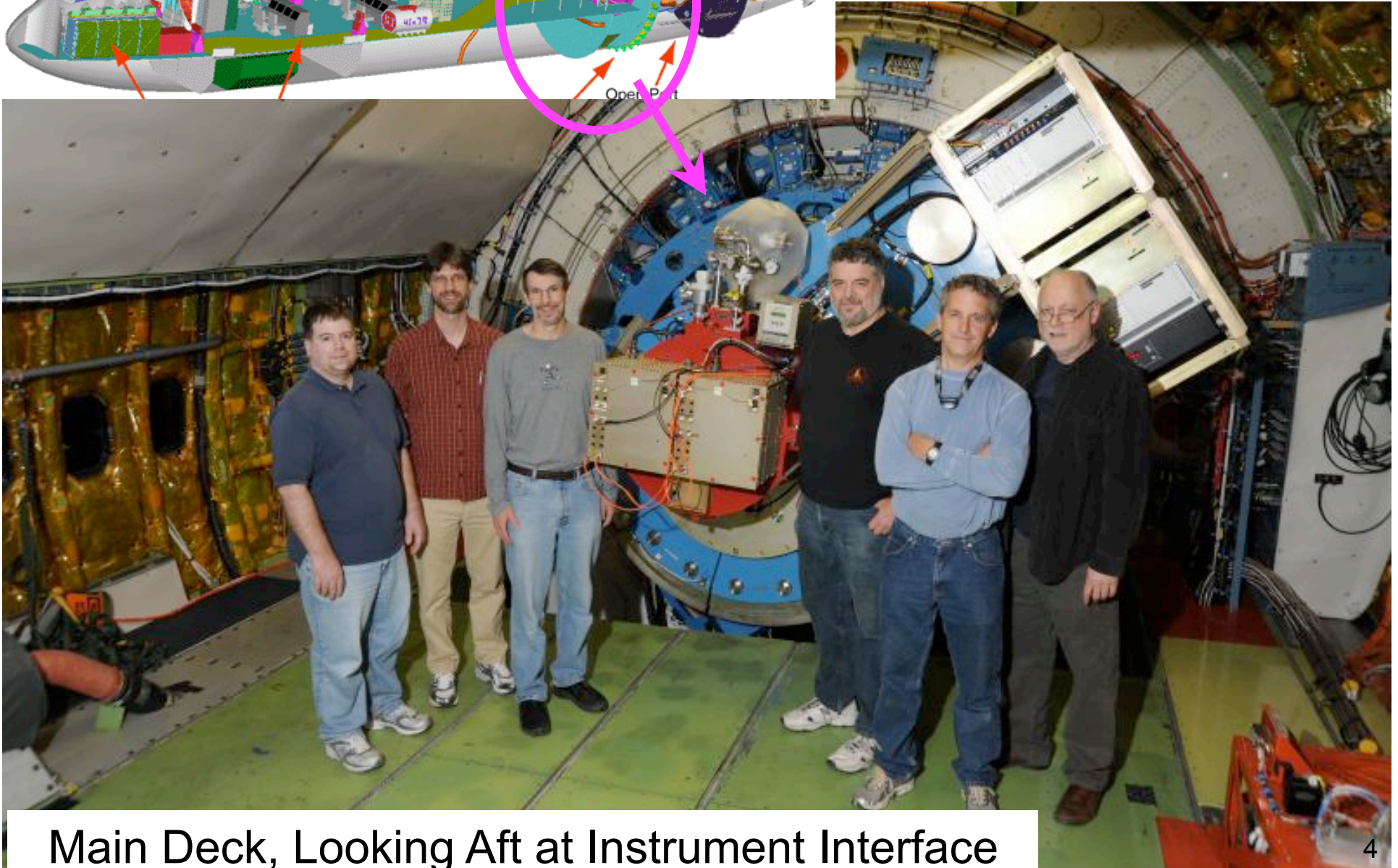
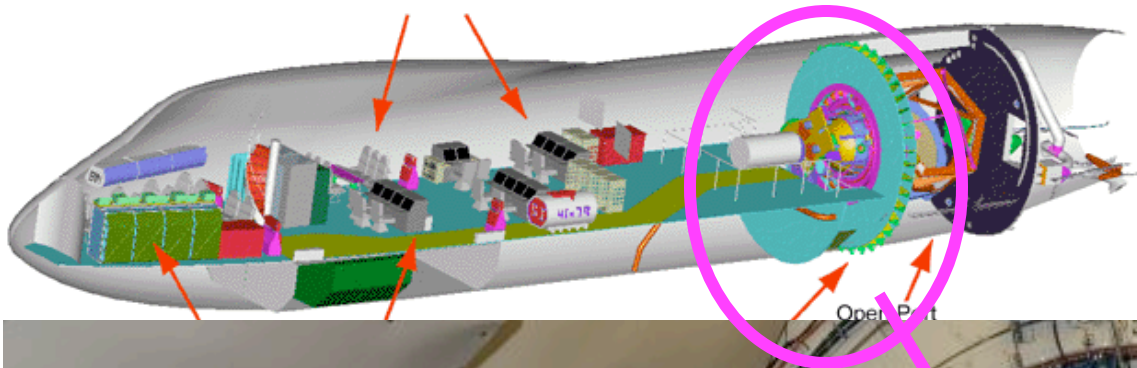
## Stratospheric Observatory for Infrared Astronomy

2.7-meter  
8 science instruments  
6 US  
2 German

Boeing 747SP

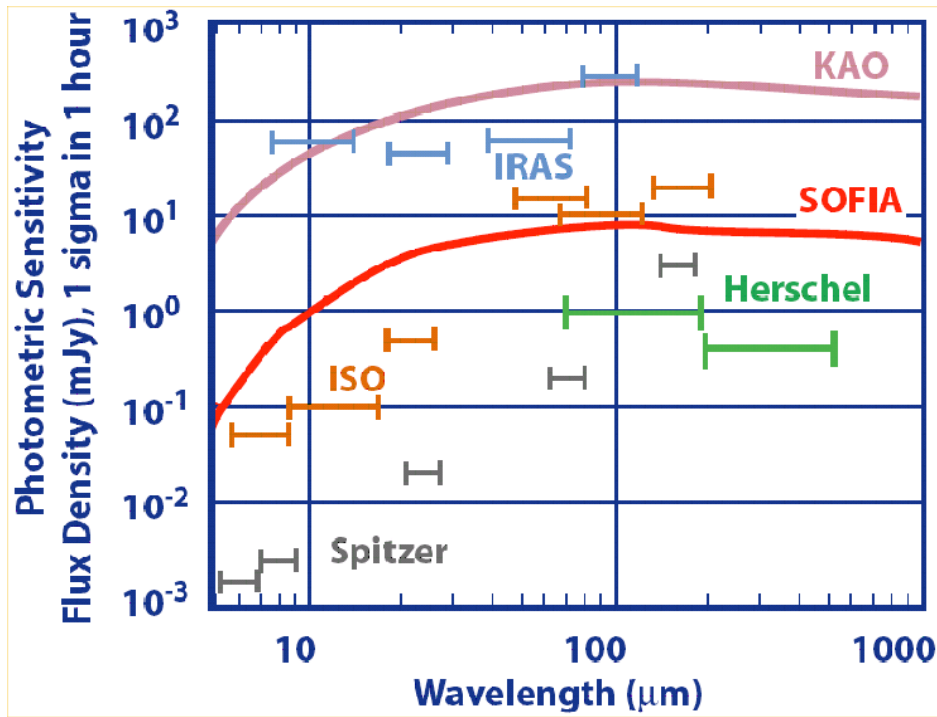


- International partnership:
  - 80% -- NASA (US)
  - 20% -- DLR (Germany)
- Global deployments including the Southern Hemisphere
- 120 eight-hour flights per year

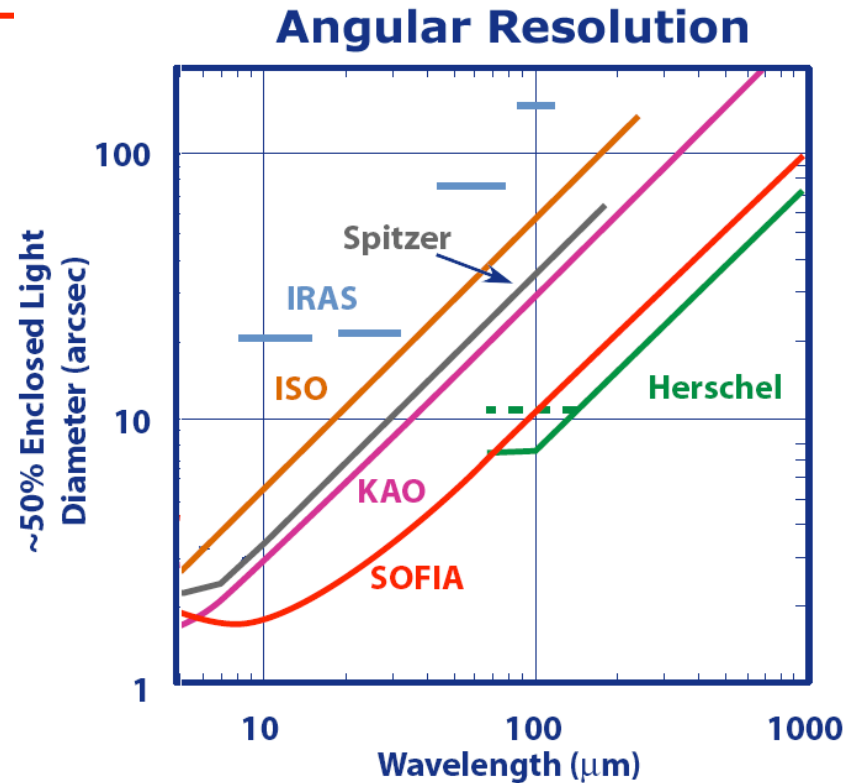


Main Deck, Looking Aft at Instrument Interface

# SO Photometric Sensitivity and Angular resolution



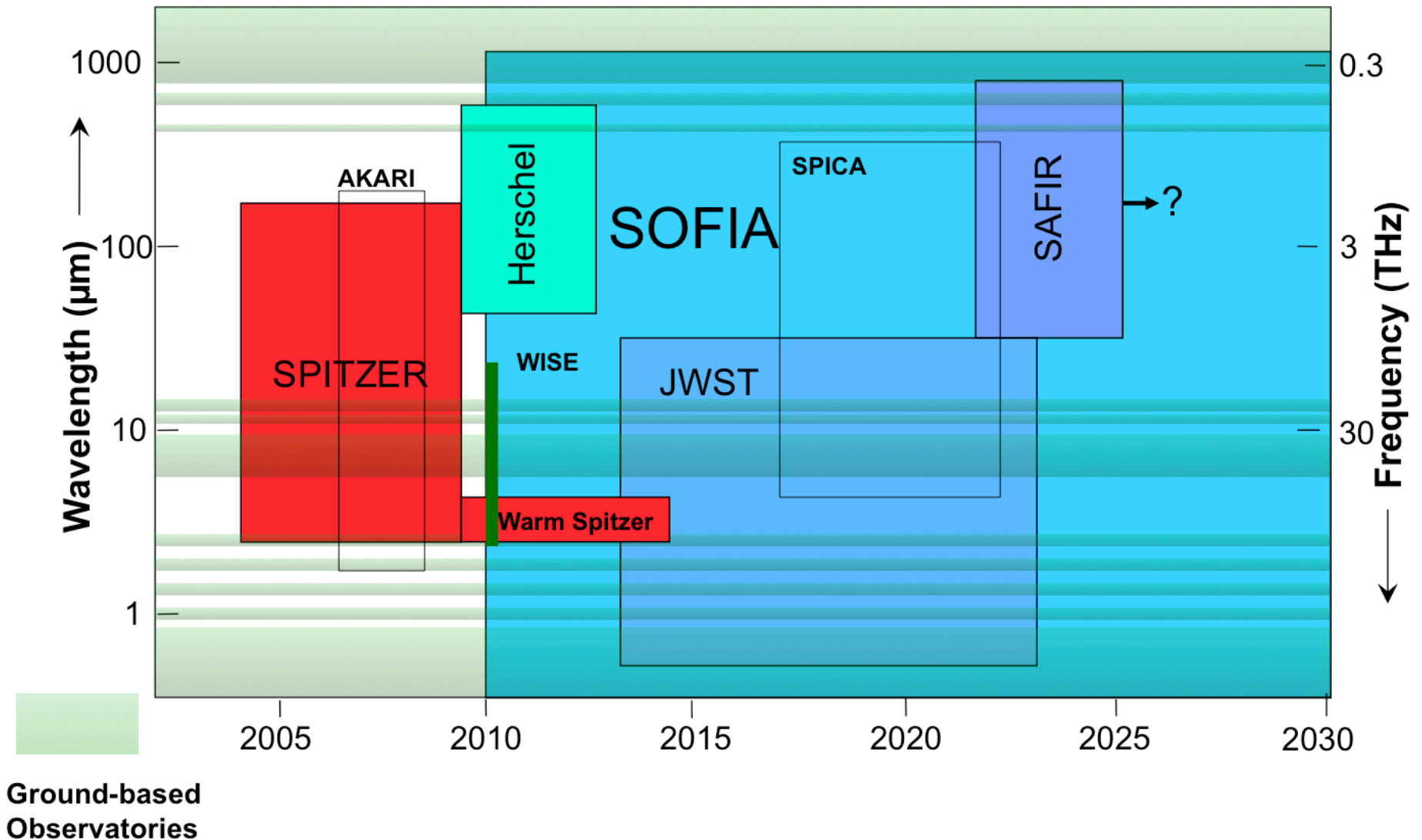
*SOFIA is as  
sensitive as ISO*



*SOFIA is diffraction limited  
beyond 25  $\mu\text{m}$  ( $\theta_{\text{min}} \sim \lambda/10$  in  
arcseconds) and can produce  
images **three times sharper**  
than those made by Spitzer*

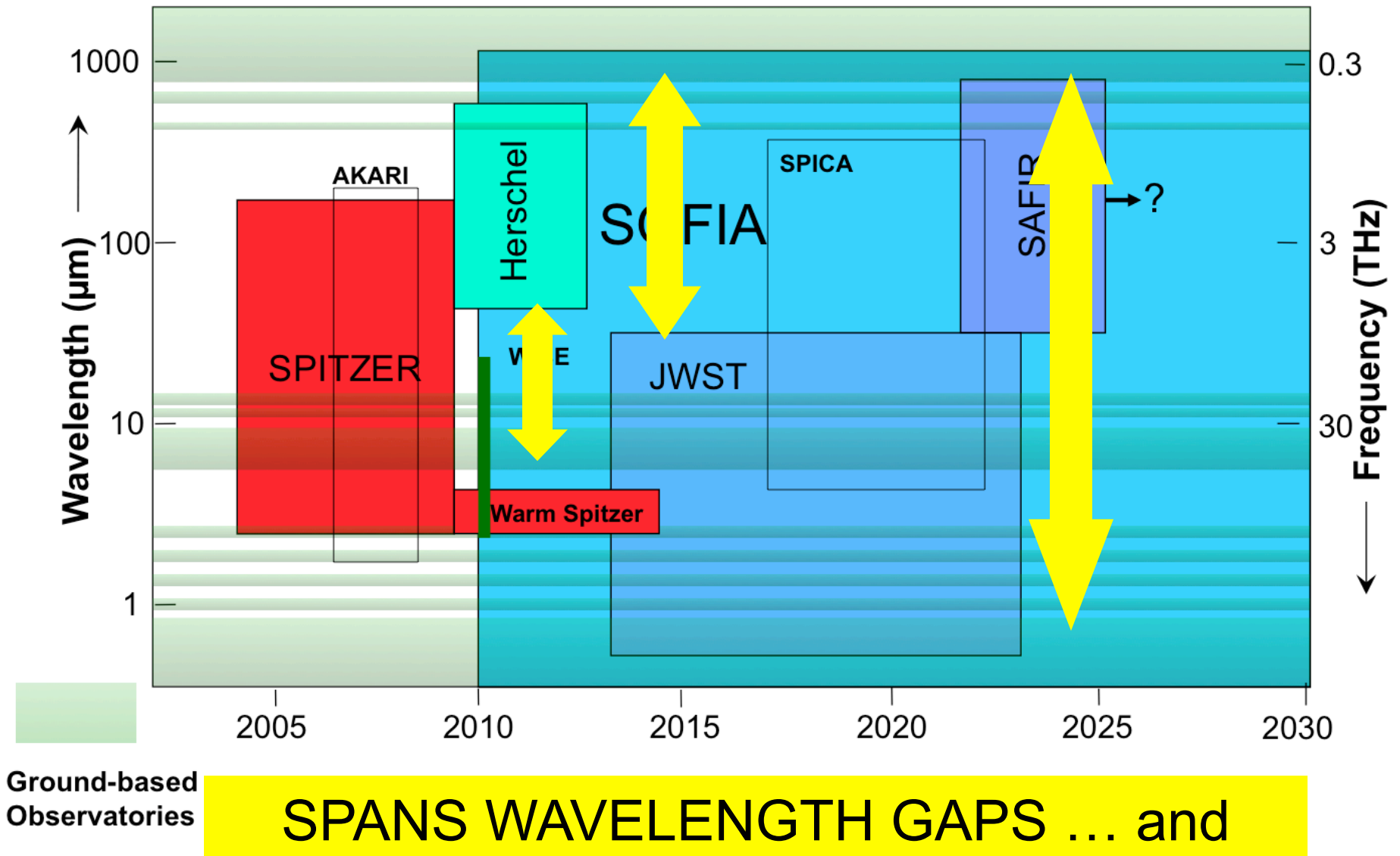


# SOFIA and Major IR Imaging/Spectroscopic Space Observatories



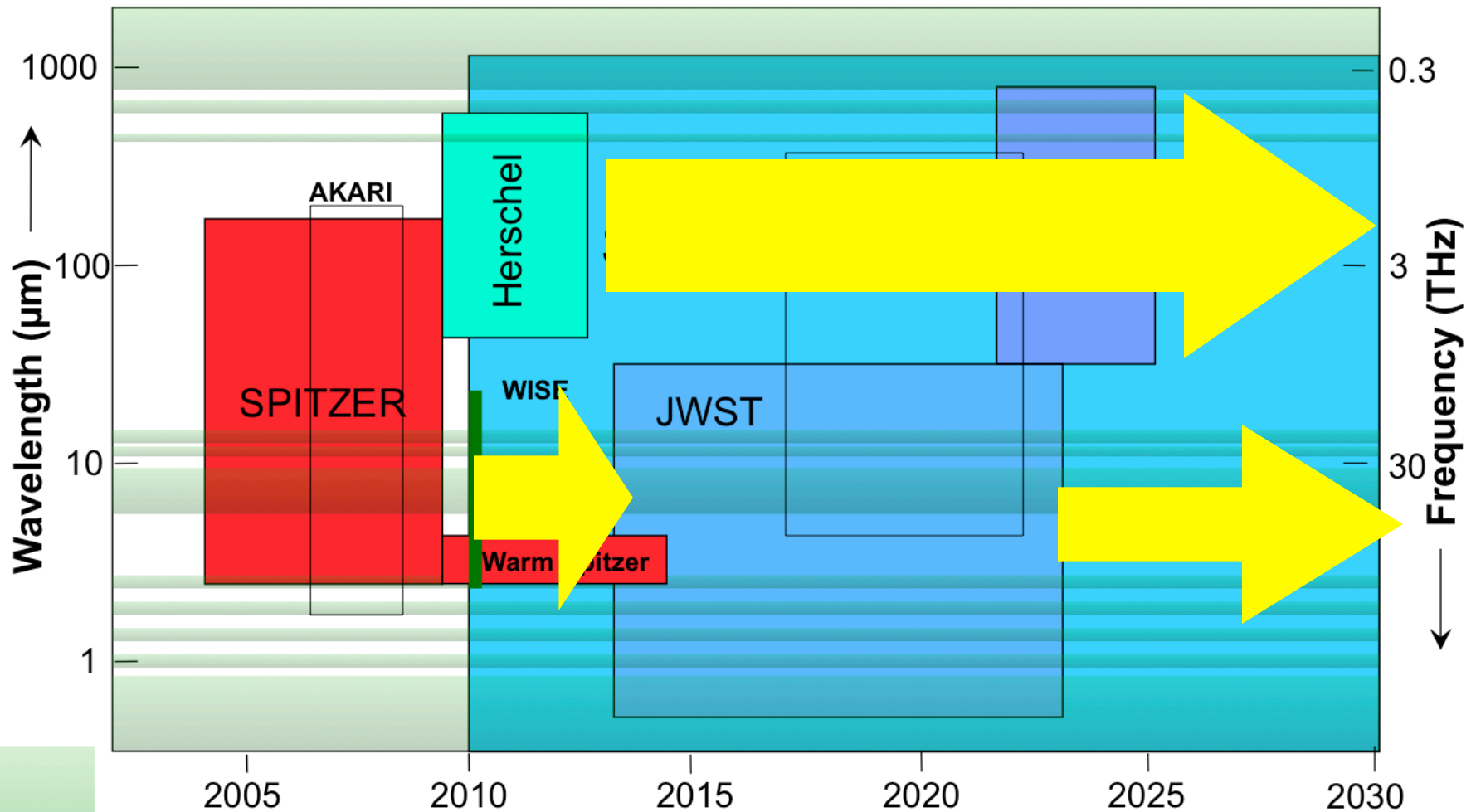


# SOFIA and Major IR Imaging/Spectroscopic Space Observatories





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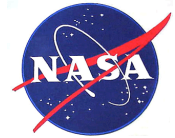


... PROVIDES LONG TEMPORAL BASELINE: LONG-TERM MONITORING PROGRAMS AND FOLLOW UP FOR SHORTER-LIVED SPACE-BASED MISSIONS





# Significant Recent Successes and Milestones!



- ✓ Functional Check Flight (FCF) on December 9, 2009
- ✓ 10% Open-Door test flight on December 14, 2009
- ✓ **100% Open-Door test flight on December 18, 2009**
- ✓ “Misalignment” flight on April 30, 2010
- ✓ **Open Door envelope expansion with TA at 23° elevation completed**
  - 100% Door Open envelope cleared up to 35 kft, Mach=0.87 (normal observing Mach=0.85)
  - **No cavity acoustics or aircraft issues in flight**
  - **2 unplanned 40% Door-Open Landings without incident**
  - **Planned 100% Door-Open Landing accomplished successfully**
- ✓ Telescope activation; Jan 15, 2010
- ✓ Call for Basic Science; April 2010
  - Call for Proposals released on Apr 19, 2010;
  - **Proposal deadline July 30, 2010**
- ✓ **Telescope characterization/First light; night of May 25, 2010**
  - Observatory Line Operations, Summer 2010
  - Additional envelop expansion flights (increase TA elevation range, observatory altitude); 2010
  - Short Science #1 flights (FORCAST); fall 2010
  - Short Science #2 flights (GREAT); early 2011
  - Basic Science flights; 2011
  - Proposal call for new instruments (focus of Paul Hertz’s talk tomorrow)

initial series of flights to test aircraft modifications and provide flight safety assurance

TA=“Telescope Assembly”



# SOFIA FIRST LIGHT!

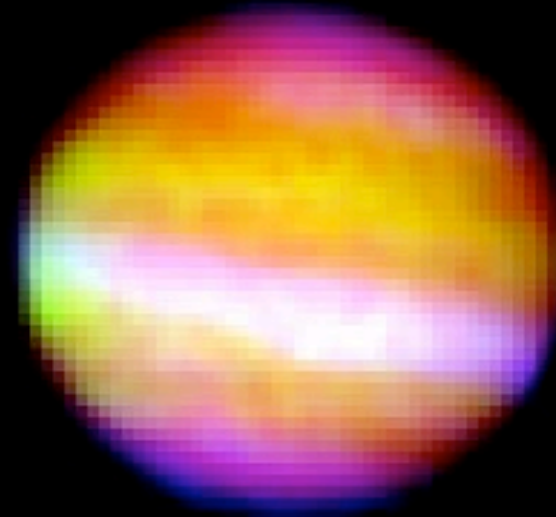


May 25, 2010



Visible light image

SOFIA infrared image  
(5.4, 24, and 37  $\mu\text{m}$ )

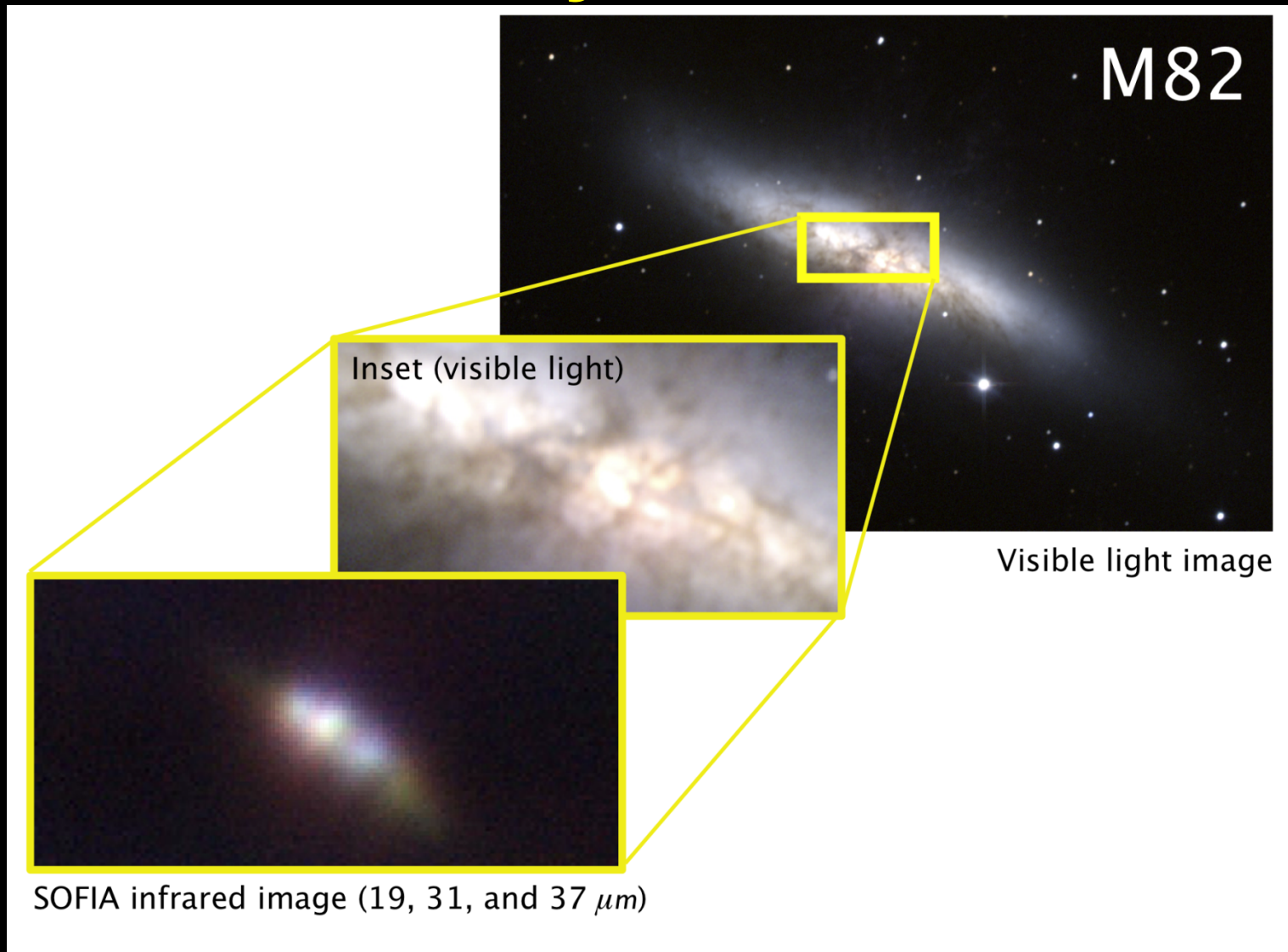




# SOFIA FIRST LIGHT!



May 25, 2010





# What's Left to Do in the Near Term...



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**"Early Science"**



## Early Science Definitions



- **Early Science flights occur before the flight envelop is fully cleared and while some onboard mission systems are still in development.**
  - a shared-risk activity
  - the science community gains earlier access to SOFIA
  - early tests of astronomical observing

				EARLY SCIENCE	
		SHORT SCIENCE	BASIC SCIENCE		
<b>FORCAST</b> mid-IR imager (US)	3 flights GIs selected	12 flights -- <b>80% NASA share</b>		<b>US Guest Investigators</b> US, international proposals (except from German institutions) accepted.	
<b>GREAT</b> sub-mm heterodyne receiver (German)	3 flights GIs selected	3 flights <b>20% DLR share</b> GREAT consortium			
FIFI-LS Integral field FIR spectrometer (German)	3 flights Instrument team				



## Early Science Definitions



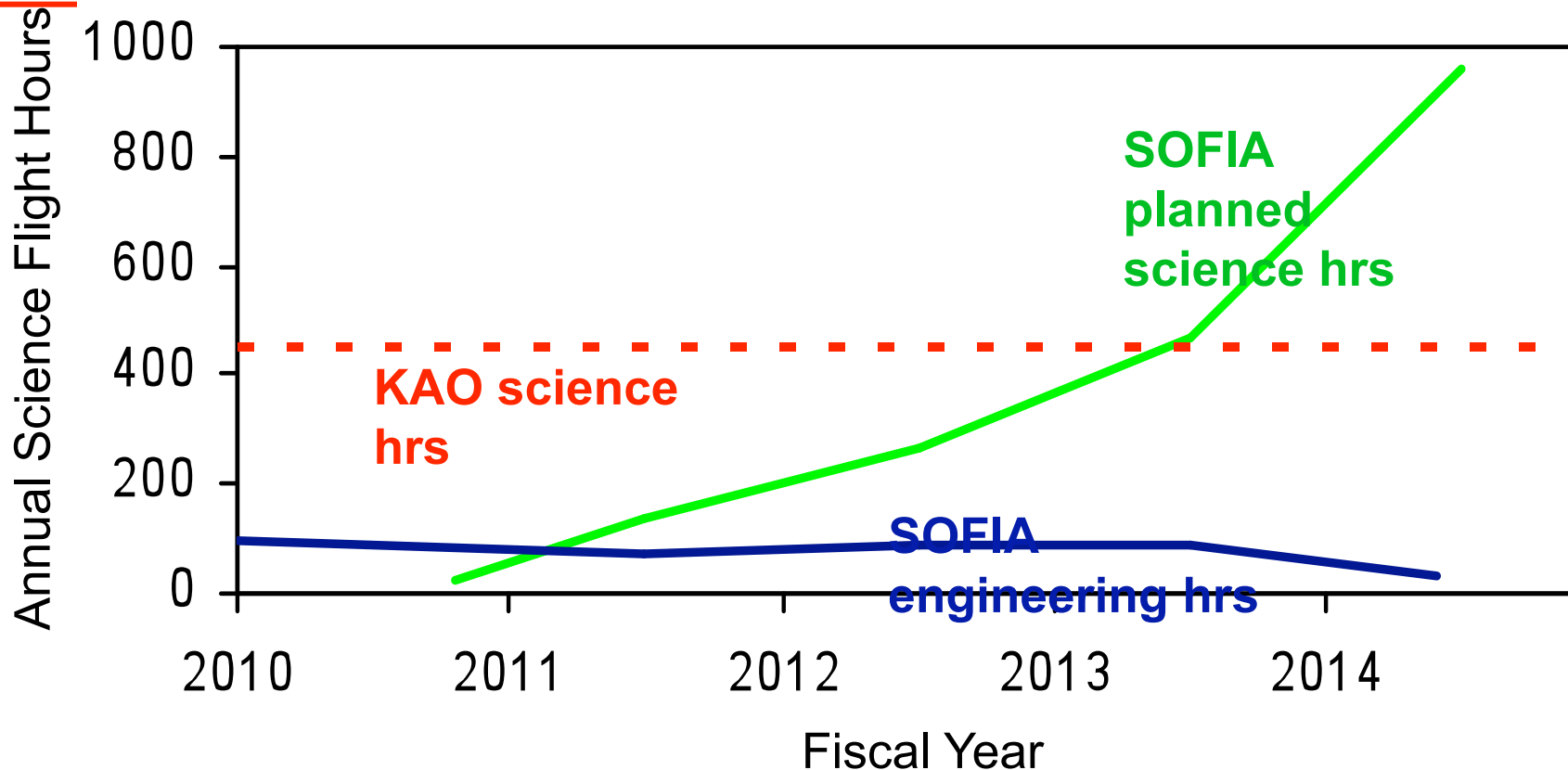
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**Eric Becklin's following presentation to describe 1<sup>st</sup>-Generation Instruments; also see Poster Session #1**



## Science Flight Hours Ramp Up



With the onset of science flights in 2010, science hours available using SOFIA will steadily increase as all of the 8 first-generation instruments are commissioned, envelop expansion flights conclude, and aircraft system development is completed.



# Program Summary



The SOFIA Program has made significant progress:

- A series of door-open test flights and a TA characterization/ First Light flight milestone have been achieved, significantly reducing overall technical risk associated with the cavity door open during flight.

Upcoming events/activities to watch for:

- Basic Science proposal deadline; July 30, 2010
  - Basic Science flights, 2011
- Proposal call for new instruments

Focus Groups → Please sign up on flip charts in the back!





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BACK UP