

Large Space Apertures Kick-Off Workshop

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KISS 11/08

Why KISS?

- Space remains a rich source of fundamental problems in science and technology
- Space technology and the space program are presently undergoing rapid and profound changes
- There is a critical need for a strong coherent effort by the science and engineering communities to develop the enabling technologies for the next generation of space missions



KISS mission statement

“To lead the world toward addressing and answering fundamental questions in space science and technology”

“To bring together a broad spectrum of scientists and engineers for sustained scientific and technical interaction aimed at developing new space mission concepts and technology”

KISS aim is to function as a “think tank” and as a “think-and-do” tank



How will KISS fulfill its mission?

- The Institute will convene world experts around highly visible studies focused on the most challenging and pressing questions in space science and technology
- The objective of these studies is to develop and assess new approaches and paradigms that promise to revolutionize future space missions
- The most promising ideas identified in the studies will be the target of follow-on in-depth technical investigations

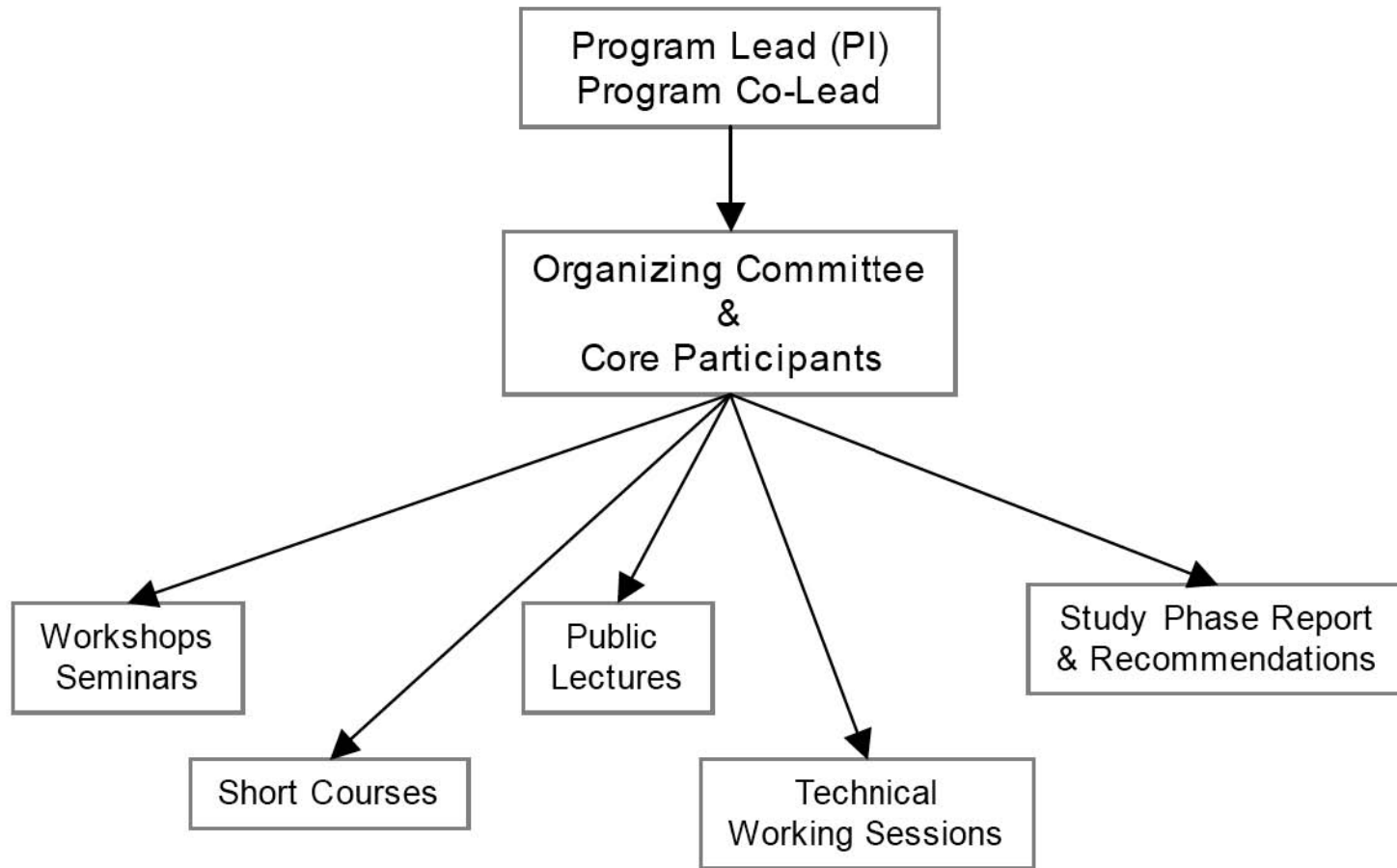


KISS Programs

- KISS Programs consist of a Study Phase and a Technical Follow-up Phase.
- Study Phase (~1 year):
 - *An initial Kick-off Workshop*
 - *A Short Course covering the current state of knowledge in relevant areas*
 - *Working Periods of informal daily discussion sessions and seminars*
 - *A Closing Workshop to present results of the study, including recommendations on next steps*



KISS Programs



Study Phase Organization

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KISS Programs

- Follow-up Phase (1-2 years): Targeted technical work to follow-up on the recommendations and findings of the study phase
- Funds to support the technical investigations will come from two sources:
 - *JPL to fund proposals at the level of \$1.5-1.9M per year under its Research and Technology Development (R&TD) fund*
 - *KISS Development Fund at a level of \$1.2-1.5M per year*



First-year programs

*New Directions in
Robotic Exploration of Mars*

Large Space Apertures

*Coherent Instrumentation for
Cosmic Microwave Background
Polarization Observations*



Large Space Apertures Program

- Key strategic goals require measurements/ observation with extremely large apertures across the electromagnetic spectrum
- Requirements/challenges:
 - *Extreme cooling to less than 4 Kelvin*
 - *Reliable and precision deployment*
 - *Structural stability under diverse operating conditions*
 - *Precision pointing and active wavefront control*
 - *Integrated radiation-hard radar electronics*
 - *Distributed power generation and metrology systems*
 - *Extremely lightweight structures*
 - *Not capable of being fully evaluated at 1g testing*



Large Space Apertures Program

- Addressing these technological challenges requires advances and innovation in:
 - *Materials science*
 - *In situ manufacturing*
 - *Optimization and control*
 - *Dynamics and orbit design*
 - *Lightweight structures*
 - *Modeling and simulation*
 - *Reliability analysis*
 - ...



Large Space Apertures Program

Think big (sky is the limit!)

Think hard (out of the box...)

Think long (next generation...)

Think broad (beyond pet projects...)

“Our job is to move the frontier”

“We are going to pick the missions which are really difficult to do, almost at the edge of impossible”

Charles Elachi, JPL Director, in: “Mission Impossible: Charles Elachi’s Vision”,
Space.com, 08 August 2001

