

Astrobiology and Founding NASA's Astrobiology Institute: A Convergence of Science, Politics, Technology and Programs*

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*Extracted from:

Astrobiology: Its Origins and Development, [NASA 50 Years of Exploration and Discovery](#)

Nasa's Astrobiology Institute: Initial Results Of Multidisciplinary Research And Virtual Collaboration, [IAF, Amsterdam, The Netherlands, 1999.](#)

Astrobiology: The First Decade, [IAF, Fukuoka, Japan, 2005](#)



- In my career at NASA Ames, I held three roles relevant to the creation of Astrobiology (AB) and the NASA Astrobiology Institute (NAI)
 - An original member of the group that saw AB as the science of the future for NASA – and the best way to define the science expertise at Ames
 - >This included being part of various studies including the Science Institute Team and Federal Lab Review
 - >You will hear from other key individuals about early conference, roadmaps and history
 - As the Interim, or maybe Founding Director of the NAI, responsible for creating a first-ever NASA Institute devoted to ground breaking science on a virtual basis
 - Together with a number of others, the recruiter of a “King Kong” biologist that would lead the NAI and help put AB “on the map”.
- The three elements necessary to make AB and NAI a success were:
 - Novel science collaborations addressing big questions of life in the Universe
 - A new organizational structure to facilitate this work
 - National and International visibility to validate the effort

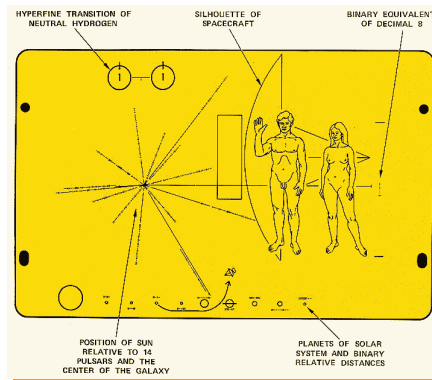
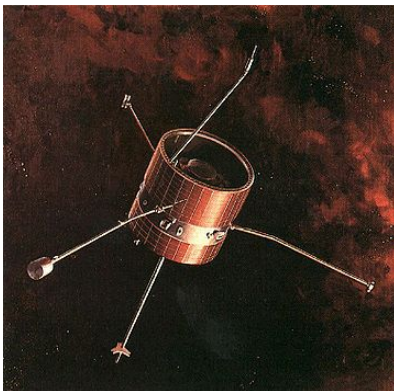
Ames Aeronautical Lab becomes Ames Research Center



Founded in 1939 as Ames
Aeronautical Laboratory



Incorporated into NASA in 1958 as
Ames Research Center



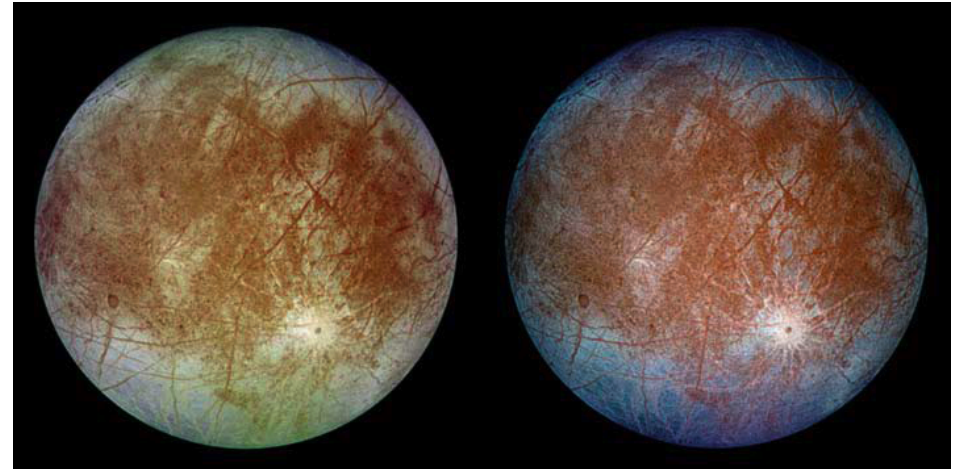
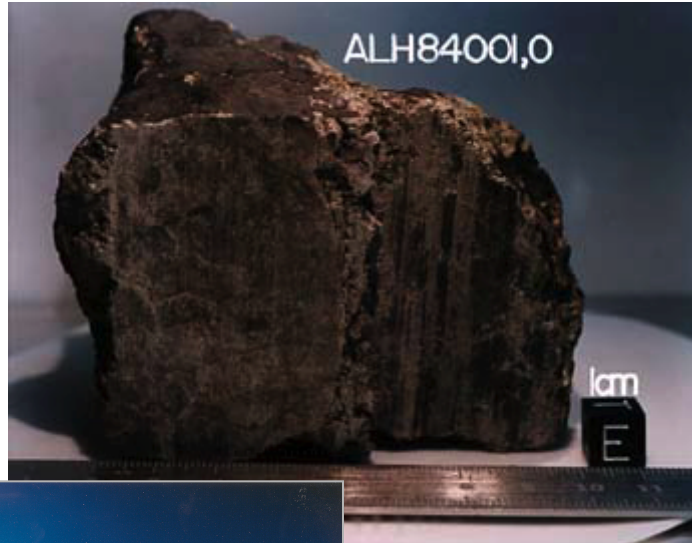
Original Space Assignments:
Space Physics - Pioneer series
(6-12)

Space Life Sciences
(Biosatellite and ground labs)

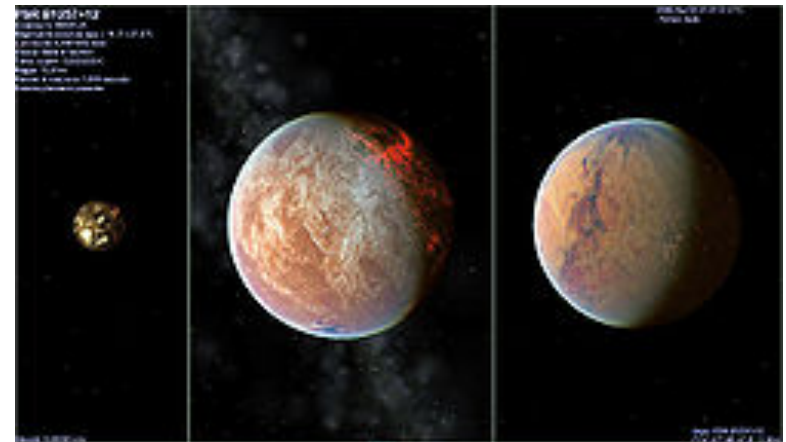


Harold (Chuck) Klein developed Exobiology
beginning in 1959

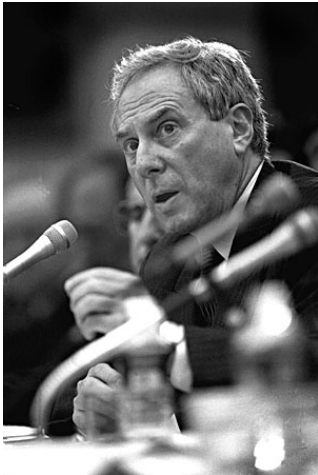
John Rummel will address this early history



Mars Rock,
Europa, Extremophiles,
First Extrasolar Planet,
Human Genome
Project



Our Roadmap team of Morrison and Desmarais will cover this



- After the historic vote June 1993, that saved the International Space Station (by one vote), several initiatives and reviews were set in motion to examine the basic structure of NASA's organization, roles and missions.

- One of these initiatives, the Zero Base Review, suggested that Ames might transfer its science capability to an Institute



- Wes Huntress, AA for Space Science - suggested term "Astrobiology" for Ames' capabilities

- In March of 1995, the NASA Chief Scientist (France Cordova) wrote a letter in support of a science institute



- May 19, 1995 Goldin announced NASA ARC lead Center for Astrobiology



Space Science

Astrobiology

Exobiology

Evolutionary Biology

Life & Microgravity
Sciences & Applications

Earth Sciences

Ames Lead Center
role in Astrobiology
announced by Goldin
in 1995.



Al Diaz, Chair of the
Science Institute
Team

- Report Of The Nasa Science Institutes Team (Feb 1996)
 - “The eleven science Institutes proposed by the Zero Base Review are in various stages of readiness and should be pursued in a phased manner.
 - Only three are ready for near term initiation:
 - >Biomedical Research Institute (JSC):
 - >Astrobiology Institute (ARC):
 - >Microgravity Institute [Fluid and Combustion] (LERC):
 - NASA should proceed immediately to:
 - >Complete detailed definition of all three institutes including review with appropriate external scientific groups;
 - >Release draft Cooperative Agreement Notice for a Biomedical Institute;
 - >Pursue legislative authorities required and recommended prior to proceeding with Astrobiology and Microgravity Institutes.”

The legislative authorities cited contemplated moving hundreds of civil servants to a new non-governmental Institute



Gen. Jack Dailey,
NASA Associate
Deputy
Administrator 1992-
1999

- Legislative authorities were sought in 1996 but denied by the Office of Government Ethics citing the criminal laws on post-employment restrictions
- By the end of 1996, Gen. Jack Dailey, Associate Deputy Administrator, advised Ames to proceed with the Astrobiology Institute but without moving any Civil Servants
- During my interview with Dan Goldin in 1997 prior to becoming selected into the Senior Executive Service, he told me: "I want you to create an Astrobiology Institute but I'm not going to give you a nickel for bricks and mortar!"
- July 26, 1997 – AA for Space Science formally assigns NAI responsibility to Ames
- From mid-1997 to October 31, there was an intense effort at Ames and HQs to craft a Cooperative Agreement Notice (CAN) that would establish a new research program.



- Form a scientific institute devoted to a new type of interdisciplinary/multidisciplinary science: Astrobiology
 - How we get physicists, astronomers, biologists, chemists to speak each other's language
- Find some way to incentivize and even require cross discipline collaboration while geographically dispersed
 - Dealing with the big questions across departments, schools, institutions
- Address Administrator's direction to "not spend a nickel on bricks and mortar"
 - Take advantage of emerging high speed connections such as Next Generation Internet and collaboration hardware and software
 - But – be aware of human nature and find ways to ameliorate "silos and stove pipes"
- Provide a function (NAI Hqs at Ames) for soliciting research, investing in virtual technology, discussing future directions, coordinating Education and Outreach without adding significant overhead or undermining a given PI's scientific freedom
 - 5% for overhead was taken as a target figure
 - NAI Director's Office to provide leadership but have a light touch

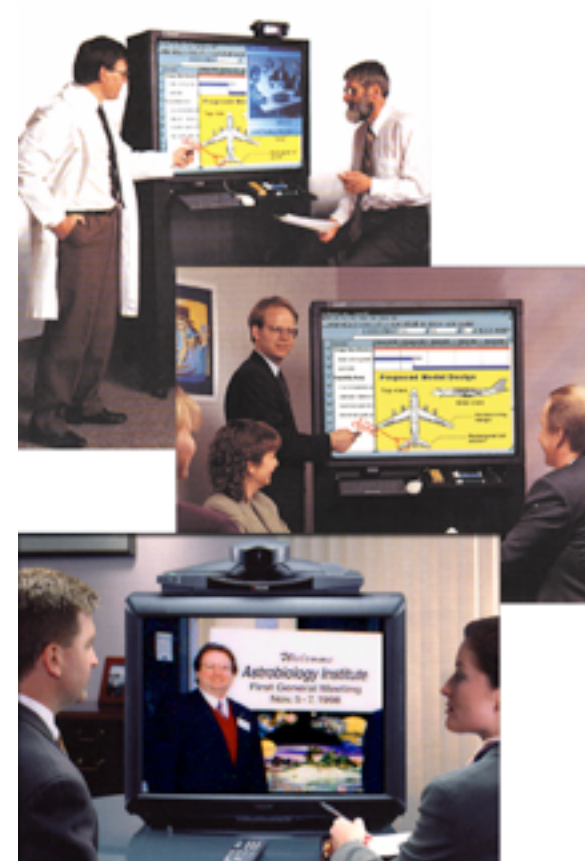


Michael Meyer,
Astrobiology
Program Scientist
at NASA HQs

- Over many months Michael Meyer and I labored on the proper approach to this new enterprise (and finding \$\$)
- A contract was too restrictive; a grant is a gift; the Cooperative Agreement Notice (CAN) provided the proper vehicle where all institutions made contributions
- But - In the introduction to CAN-1, we wrote that this solicitation represents an “experiment” in multidisciplinary science and virtual collaboration
- Rather than a single entity solicitation (e.g. Lunar and Planetary Institute), an approach seeking multiple PI-led research groups that could be renewed and allowed for a mix of science foci was adopted.
 - Proposers were required to demonstrate collaboration beyond a single group or even single department
 - Science themes were drawn from the Roadmapping work
 - Education and outreach sections were required for each
 - Institutions had to demonstrate contributions to the research and show that they would be actively engaged in a virtual collaborative

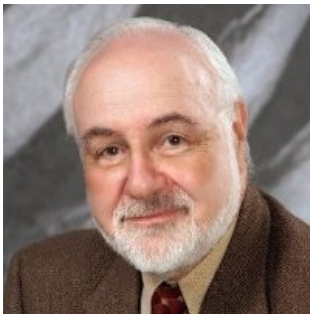


- In October 1998 a NASA Astrobiology Institute (NAI) Implementation Plan was drafted to codify all roles and responsibilities
 - Drew on experience in managing space projects
 - > Defined reports, metrics, and budget (note: Three NASA HQs organizations were contributing funding (Earth, Life and Space Science))
 - Outlined relationship between initial 11 nodes representing ~300 people and NASA
- Virtual Institute approach and technology was part of the planning
 - Videoconferencing and database tools developed by Ames Intelligent Systems and High Performance Computing groups were deployed
 - Regular virtual meetings were initiated
 - But – based on benchmarking other attempts at multidisciplinary collaboration an annual NAI face-to-face meeting was created
 - > First Institute wide meeting in November 1998.

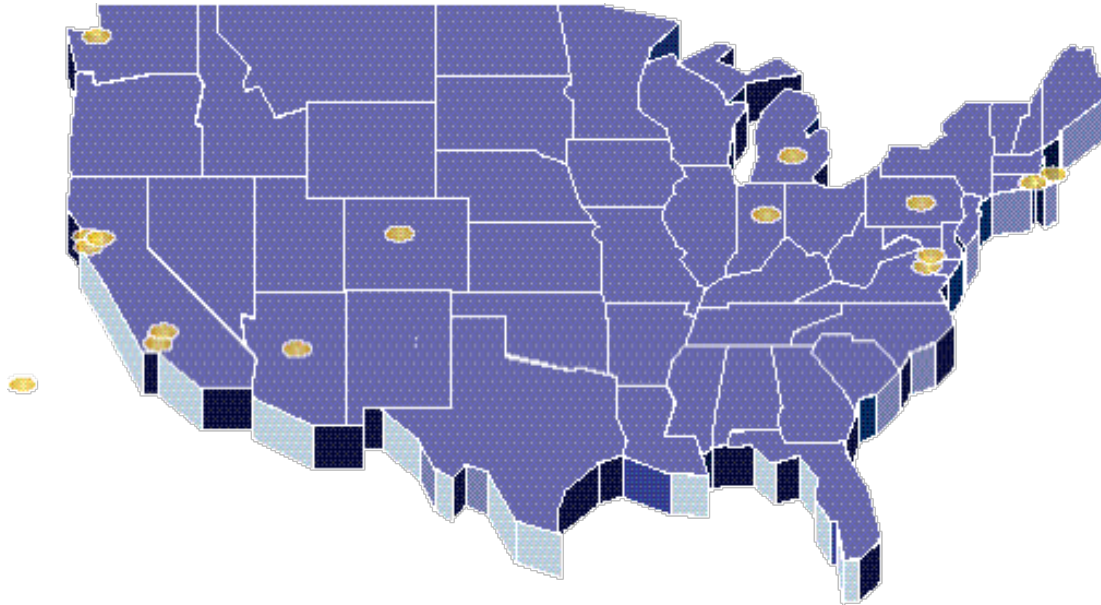




- Scientific:
 - Willing to embrace challenge of establishing new interdisciplinary science and “putting it in the map”
 - At a point in his/her career where such a risk is tenable
 - Has sufficient scientific “wheelbase” and achievements to accomplish above
- Programmatic and Legal:
 - Able to spend enough time at Ames NAI “HQs” to provide leadership
 - Sufficiently free of conflicts of interest to pass the legal review and “sniff test” of appearances
- Meeting with Administrator September 1998: “I want a King Kong biologist who will put Astrobiology and the NAI on the map”
 - First search committee initiated September 1998, but no immediate results



Enter Mal Cohen, Ames researcher: “My brother, Stanley, at Stanford is working with a Visiting Scientist who might be interested...”



Hawaii

Partnership between NASA and NAI Lead Teams

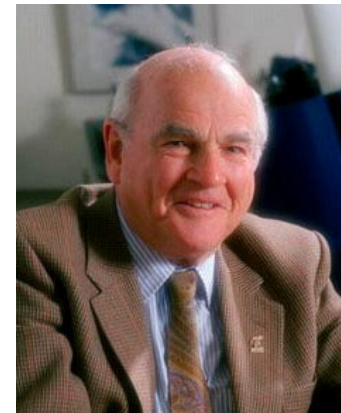
A “virtual institute” for the Study of Life in the Universe - a product of the AB Program & NASA Institute Study Team

11 Selections through peer reviewed competition

\$9M available the first year

1st research grant selections awarded: May 1998

Founding
Director Scott
Hubbard



First Permanent
Director

Barry Blumberg,
appointed May
15, 1999



- Interdisciplinary study of life in the universe created in 1995
- Three fundamental questions
 - > How does life begin and evolve?
 - > Does life exist elsewhere in the universe?
 - > What is life's future on Earth and beyond?
- Astrobiology seeks to define habitable environments and biosignatures

