‘Galaxy Moon:’ ILO Galaxy First Light Imaging Program
International Lunar Observatory Association

Galaxy Forum 2010 Hawai`i - Waimea
Canada France Hawai`i – 18 March 2010
Steve Durst / Joseph Sulla
Why Galaxy Education, Consciousness & Awareness Is Important for the 21st Century:

1. Education – for primary, secondary, higher, and highest education: Knowledge, understanding of humanity’s place in the Universe – our Milky Way Galaxy occupies a mid-position domain between Solar System finiteness and Cosmos infinity.

2. Astrophysics / Astronomy – Galaxy studies internationally are of increasing interest and value; study of our local stellar neighborhood for familiarity; center / central 10 parsecs with supermassive black hole is most dynamic region of Milky Way.

3. History of Human Civilization / Archaeoastronomy


5. Galacticity / Galactivity – may be as important for the 21st Century, as is Relativity to 20th Century.
Barbara Morgan
1st Teacher in Space
21st Century Education

We are here
Hubble Deep Field, December 1995
Hawaii Island Galaxy Education Resources

- Galaxy Garden
- Onizuka Space Center
- Kumiko Usuda, Education Outreach Scientist of Subaru Telescope
- World Class Telescopes Of Mauna Kea (including CFHT, Keck)
- `Imiloa Astronomy Center
- Galaxy Forum Series
Galaxy Education Resources:

1. Federation of Galaxy Explorers: Seeks to inspire and educate kids in space related science and engineering, including Moon Base One Initiative.
   - Nicholas Eftimiades, Founder / Chairperson of the Board

2. Challenger Center: Learning Center Network gives students hands-on experience in science, engineering, research and space missions.
   - June Scobee Rodgers, Founding Director and Chairman

3. International Space University: Graduate-level training to future leaders of the emerging global space community at locations around the world.
   - Michael Simpson, President

   - Alex Karl / Ben Baseley-Walker, Co-Chairperson

5. Students for the Exploration and Development of Space: Dedicated to expanding the role of human exploration through education.
   - Joshua Nelson, Chair
6. Galaxy Zoo: ‘Citizen Science’ online astronomy project that invites members of the public to assist in classifying over a million galaxies.
   - Dan Andreescu, Kate Land, Chris Lintott, etc.

7. UCLA Galactic Center Group: Leading Galactic Center research group, dedicated to researching the innermost regions of the Milky Way.
   - Andrea Ghez, Principal Investigator

8. Teachers in Space, Space Frontier Foundation: Giving teachers the opportunity to experience space firsthand via NewSpace companies.
   - Edward Wright, Project Manager

9. The Planetary Society: Inspires and involves the world's public in space exploration through advocacy, projects, and education.
   - Louis Friedman, Executive Director
International Lunar Observatory: Galaxy First Light Imaging Program
ILOA March 2010 Update

Joseph Sulla, Steve Durst, ILOA / Space Age Publishing Co. Hawai`i, USA

- Inter-Stellar
- Inter-Global
- Multi-Functional
- Hawaiian
ILOA – 3 Missions

- ILO-X Precursor Mission (NET 2012)
- ILO-1 Polar Mission (NET 2014)
- ILO Human Service Mission
International Lunar Observatory (ILO)

ILO-X Precursor:

- US$30M Google Lunar X Prize
- Odyssey Moon / MDA
- ILO 2 Kg Technology Demonstrator Payload
- AMIE Camera / Space-X
- Likely Destination: Equatorial Region (2012-2013)
- Communications / Broadcasting
- Galaxy First Light Imaging, Lunar / Earth Observation
- Short-term: 2 week mission
Exploring the Galaxy from the Moon: Science of the ILO

Engineering Firsts:

• 1\textsuperscript{st} Observatory on the Lunar Surface
• 1\textsuperscript{st} Commercial Broadcast from Moon (via Space Age Publishing Co.)
• Light Weight Miniature Telescope Design
• Dust Mitigation Techniques, etc.

SPACE-X, Space Exploration Inst.
Exploring the Galaxy from the Moon: Science of the ILO

- Galaxy First Light Imaging Program
- Astronomy / Astrophysics: Full-sky survey in UV wavelength, Blazar research
- Earth Observation: Full disk Earth Albedo measurement, Global Ocean PH, other Climate Studies
- Local Lunar Surface Observations: Ground Truth, Dust, Resources, Present / Future Human / Robotic Activity
ILO-X Precursor: Instrumentation

- Candidate Instrument – AMIE Camera (SMART-1 mission)
- UV / Vis / NIR CCD Imaging Array of 1024 x 1024 pixels
- Field of View – 5.3° x 5.3° = 738 parsecs on a side (0.72 pc / pixel)
- Mass = 2 kg

SPACE-X, Space Exploration Inst.
ILO-1: Long-Duration, Multi-Functional Observatory

- South Pole Destination (likely)
- Astrophysical Observatory
- Power Station
- Communications Center
- Site Characterizer
- Property Rights Agent
- Hawai`i Astronomy / Education Booster
- Toehold for Human Lunar Buildout
Landing Site Characterization: South Pole International GIS Project
A Global / Interglobal Mission
ILOA is International
With Directors and Contributions from...

- **Canada** – Optech, MDA, Canada France Hawai`i Telescope Corporation, University of British Columbia Astronomy Department, CASCA, National Research Council, Canada Space Agency
- **China** – National Astronomical Observatory of China, Chinese Academy of Sciences, Shanghai Astronomical Observatory, Chinese Society of Astronautics, China National Space Administration
- **India** – Indian Institute of Astrophysics, India Space Research Organization, Physical Research Laboratory
- **Japan** – Shimizu Corporation, JAXA
- **Europe** – Space-X Space Exploration Institute, Institut d’Astrophysique, European Space Agency
- **Russia** – Keldysh Institute, Vernadsky Institute, Sternberg State Astronomical Institute, Russia Space Agency
- **Hawai`i / USA** – Kimo Pihana, Space Age Publishing Company, SpaceDev, National Aeronautics and Space Administration
Human Service Mission

SpaceDev Inc – Dream Chaser, ALOHA Chair
ILOA is Hawaiian

With data processing center in Waimea, ILOA will:

• Advance Astronomy / Galaxy Education in Hawai`i
  – Extend HI Astronomy leadership through the 21st Century (without moving a pebble on Mauna Kea)

• Provide Resources for Education in Hawai`i
Hawaii Island Galaxy Education Resources

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