Instrument Incubator Program

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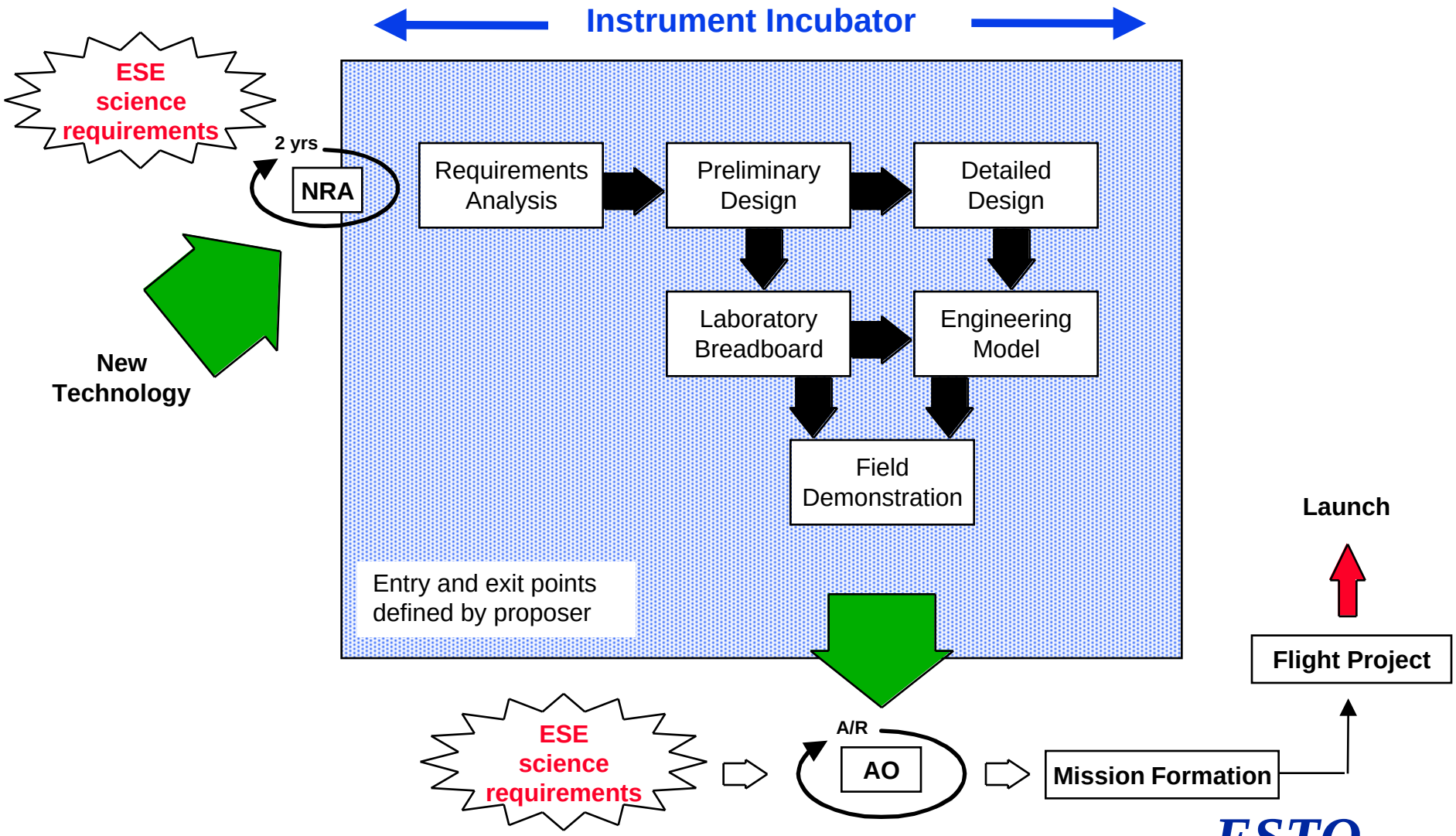
Agenda

- Background
- Solicitation Results
- IIP Program Management
- Future Plans

Purpose of IIP

- Facilitate rapid development of new, less costly, and less resource intensive scientific instruments for the Earth Science Enterprise (ESE).
- Aggressively pursue and infuse emerging and revolutionary measurement technologies.
- Reduce instrument development time and cost for future science missions.
- Prepare a suite of instruments which are capable of successfully competing in future ESE AOs and which have a flight instrument build time compatible with the shorter acquisition cycle of the new paradigm resulting from the Biennial Review.

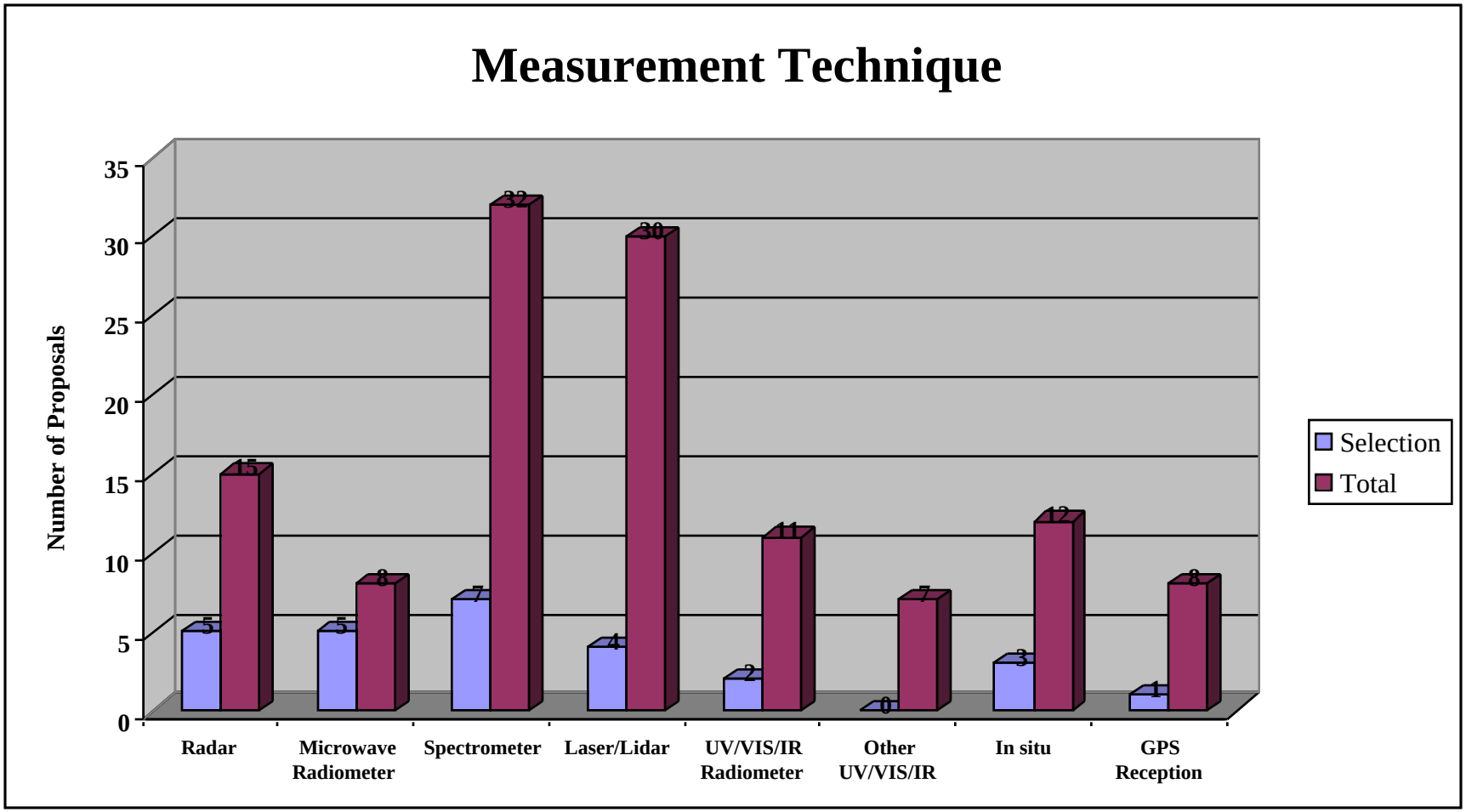
IIP Implementation Flow



Technology Readiness Levels

Basic Technology Research	**LEVEL 1**	BASIC PRINCIPLES OBSERVED AND REPORTED
	LEVEL 2	TECHNOLOGY CONCEPT AND/OR APPLICATION FORMULATED
Research To Prove Feasibility	**LEVEL 3**	ANALYTICAL & EXPERIMENTAL CRITICAL FUNCTION AND/OR CHARACTERISTIC PROOF-OF-CONCEPT
IIP *Technology Development*	**LEVEL 4**	COMPONENT AND/OR BREADBOARD VALIDATION IN LABORATORY ENVIRONMENT
	LEVEL 5	COMPONENT AND/OR BREADBOARD VALIDATION IN RELEVANT ENVIRONMENT
Technology Demonstration	**LEVEL 6**	SYSTEM/SUBSYSTEM MODEL OR PROTOTYPE DEMONSTRATION IN A RELEVANT ENVIRONMENT (Ground or Space)
System/Subsystem Development	**LEVEL 7**	SYSTEM PROTOTYPE DEMONSTRATION IN A SPACE ENVIRONMENT
	LEVEL 8	ACTUAL SYSTEM COMPLETED AND "FLIGHT QUALIFIED" THROUGH TEST AND DEMONSTRATION (Ground or Space)
System Test, Launch and Operations	**LEVEL 9**	ACTUAL SYSTEM "FLIGHT PROVEN" THROUGH SUCCESSFUL MISSION OPERATIONS

Selection Summaries



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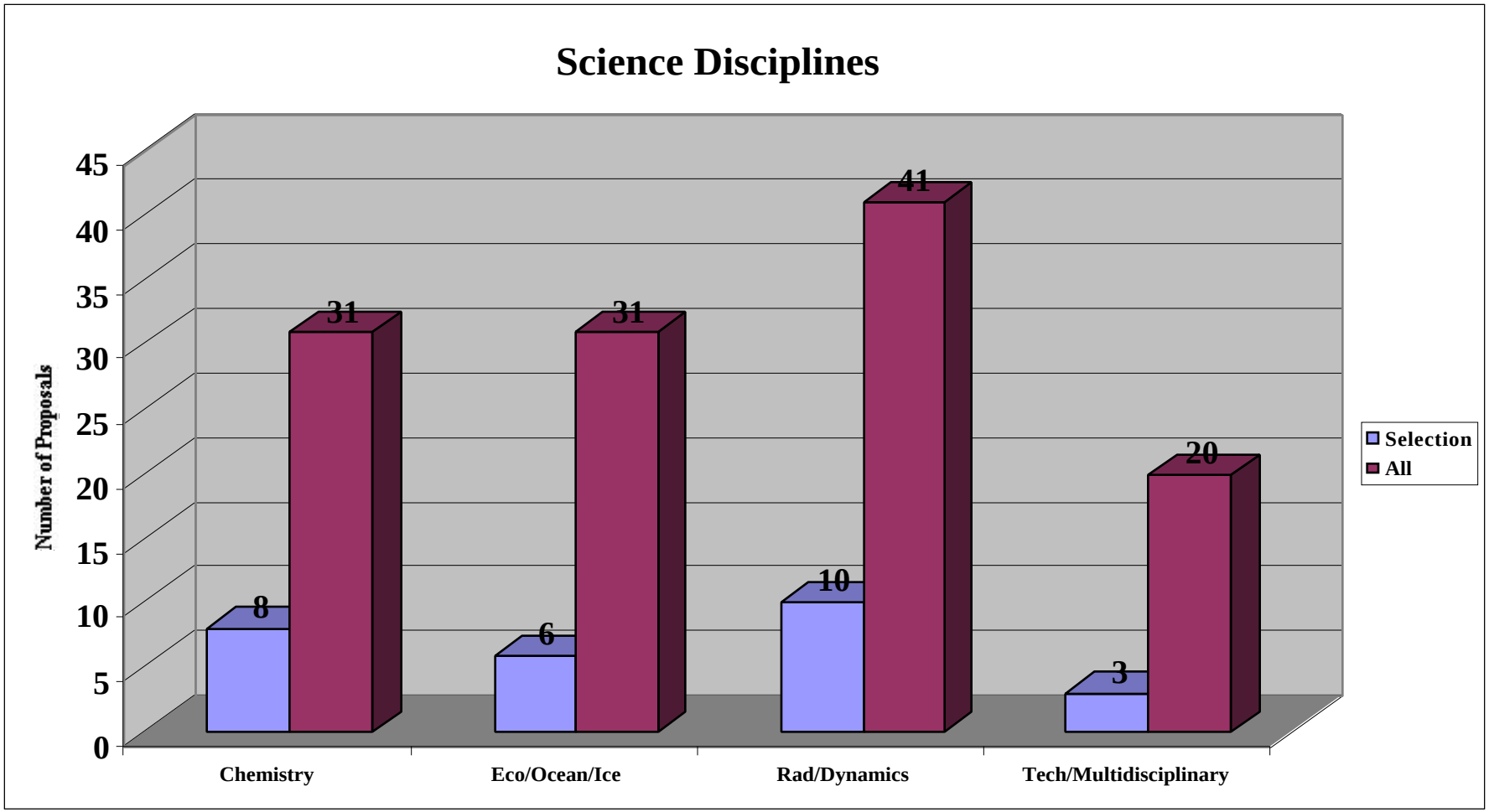


IIP Winners

Allen, Christopher T., University of Kansas
Development of a Hybrid F/Laser Radar

Aumann, Hartmut H., NASA Jet Propulsion Laboratory
The Spaceborne Infrared Atmospheric Sounder SIRAS for EOS Follow-on Missions

Cohen, Ronald C., University of California at Berkeley
Next Generation Technologies for the in-situ Detection of NOx Radicals and Their Reservoirs from Aircraft and Balloons

Degnan, John J., NASA Goddard Space Flight Center
Multikilohertz Microlaser Altimeters for Earth Science Applications

Diner, David J., NASA Jet Propulsion Laboratory
Miniaturized Advanced MISR Camera for EOS Follow-on Mission

Egdall, Mark, Lockheed, IR Imaging Systems
Atmospheric Infrared Sounder (AIRS) Light

Elkins, James W., National Oceanic and Atmospheric Administration
Airborne Measurement of New and Important Trace Gases in Support of Chemical Studies

IIP Winners

Fu, Lee-Lueng, NASA Jet Propulsion Laboratory
Advanced Altimeter for Oceans Studies

Gaier, Todd, NASA Jet Propulsion Laboratory
Millimeter-Wave MMIC Atmospheric Temperature and Humidity Sensors

Hartmann, Ulli G., Orbital Sciences Corporation
Wide Field Imaging Spectrometer Engineering Model

Herman, Benjamin M., University of Arizona
Active Tropospheric Ozone and Moisture Sounder

Im, Eastwood, NASA Jet Propulsion Laboratory
A Second generation Spaceborne Precipitation Radar

Janz, Scott, University of Maryland Baltimore County
Compact Hyperspectral Mapper for Environmental Remote Sensing Applications

Kliner, Dahv, Sandia National Laboratories
Development of a Compact, High Sensitivity Sensor for In Situ Measurements of Atmospheric SO2

IIP Winners

Kolber, Zbigniew S., Rutgers University

Airborne Lidar Induced Fluorescence Transient LIFT Method for Measuring Photosynthetic Performance and Primary Productivity in TerrestrialEcosystems

Kummerow, Christian D., NASA Goddard Space Flight Center

A Small Lightweight Radiometer to Improve the Temporal Sampling of Rainfall

Lambrigtsen, Bjorn H., NASA Jet Propulsion Laboratory

High Altitude MMIC Sounding Radiometer on a Remotely Piloted Aircraft

LeVine, David M., NASA Goddard Space Flight Center

Two Dimensional Synthetic Aperture Radiometer for Microwave Remote Sensing from Space

Lichten, Stephen M., NASA Jet Propulsion Laboratory

GOALS: GPS-Based Oceanographic and Atmospheric Low Earth Orbiting

Njoku, Eni G., NASA Jet Propulsion Laboratory

Study of a Spaceborne Microwave Instrument for High Resolution Remote Sensing of the Earth Surface Using a Large Aperture Mesh Antenna

Raney, R Keith, Johns Hopkins University, Applied Physics Laboratory

The New Generation of Radar Altimeters: Proof of Concept

IIP Winners

Roche, Aidan E., Lockheed Palo Alto Research Laboratory

Miniaturized Infrared Atmospheric Spectrometer MIRAS

Spinhirne, James D., NASA Goddard Space Flight Center

A Compact Multispectral Infrared and Visible Spectral Imaging Radiometer for Cloud Surface Observations from Small Spacecraft, Engineering ModelDevelopment

Walter, Steven J., NASA Jet Propulsion Laboratory

Submillimeter-wave Cloud Ice Radiometer

Whiteman, David N., NASA Goddard Space Flight Center

Airborne Scanning Raman Lidar System Based on a Holographic Optical Element Scanner/Receiver

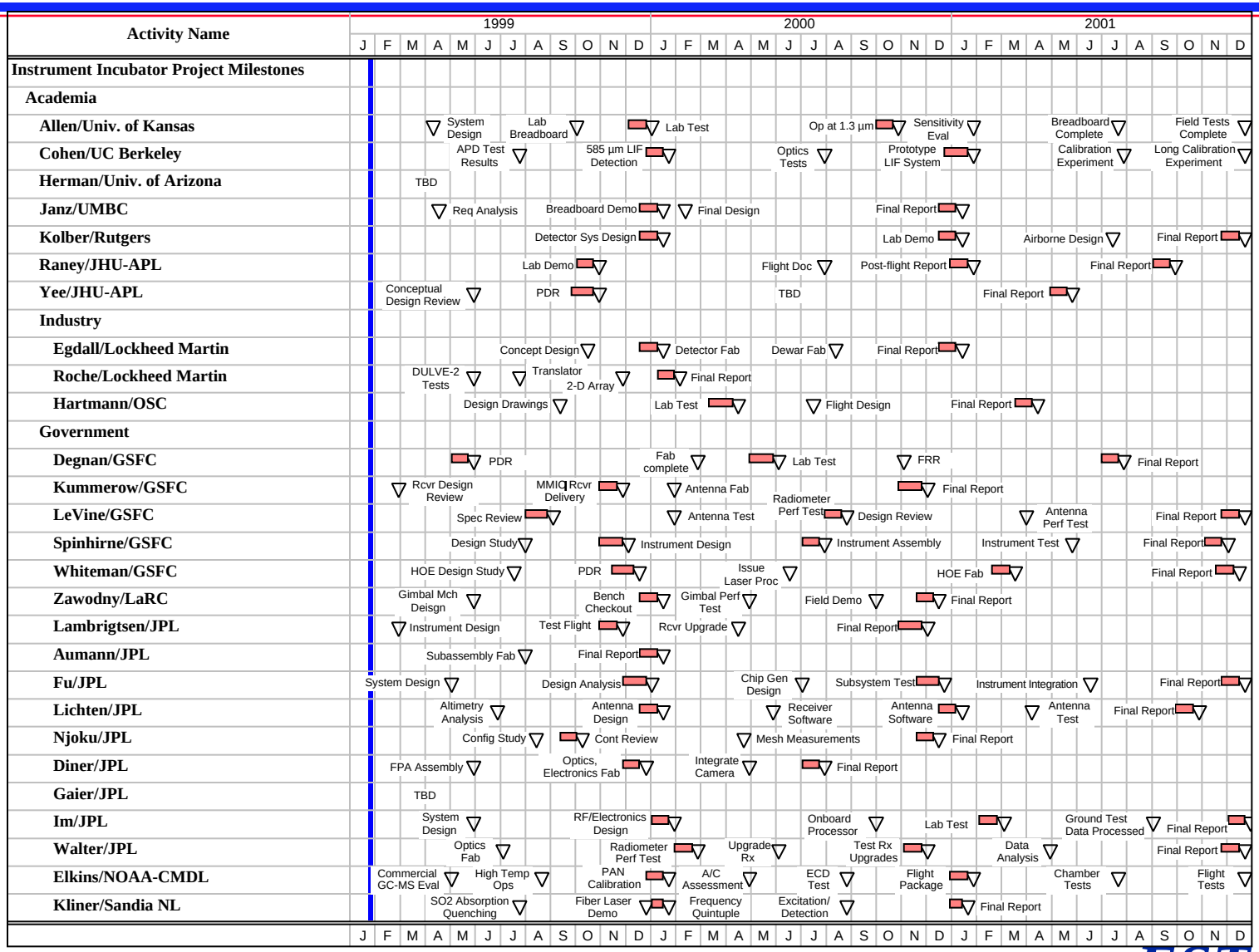
Yee, Jeng-Hwa John Hopkins University Applied Physics Laboratory.

Development of a Self-Calibrating Instrument for Monitoring Ozone and Water Vapor

Zawodny, Joseph M., NASA Langley Research Center

Gas and Aerosol Monitoring Sensorcraft : Instrument Refinement

Draft IIP Project Schedule



ESTO
Earth Science Technology Office

Management Organization

- **ESTO**
  - Monitor GSFC and selected industry/university projects

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- **ESTO - East (LaRC)**
  - Monitor LaRC and selected industry/university projects

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- **ESTO - West (JPL)**
  - Monitor JPL projects

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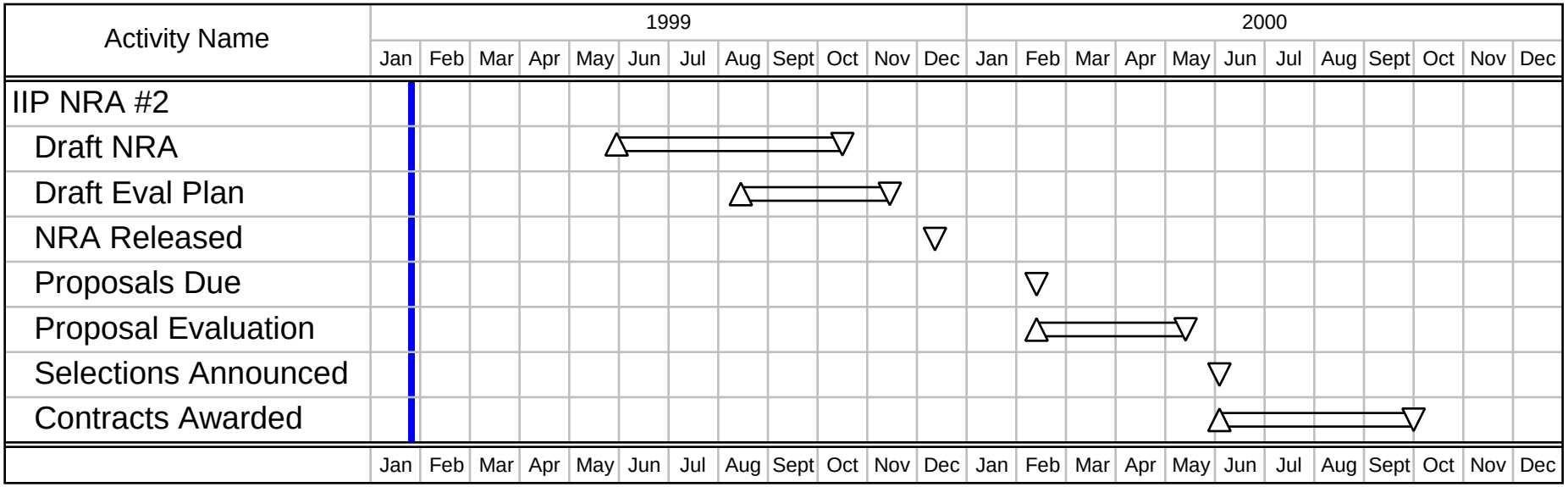
Future Plans

- **IIP NRAs approximately every 2 years**
- **Hope to get next IIP NRA out ahead of next ESSP AO**
- **Shoot for release of NRA in late fall of 1999**

Tentative Instrument Incubator Solicitation Schedule