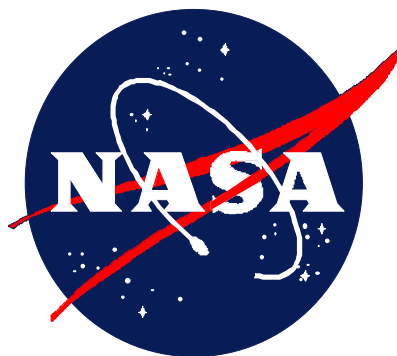


Office Work Instruction

HQOWI 7040-Y002B
Effective Date: October 28, 1999

Responsible Office: YS/Research Division
Subject: Plan Science Research



OFFICE WORK INSTRUCTION

PLAN SCIENCE RESEARCH

Original Approved and Signed by:

Ghassem R. Asrar
Associate Administrator
Office of Earth Science

Office Work Instruction

HQOWI 7040-Y002B

Effective Date: October 28, 1999

Responsible Office: YS/Research Division

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(Conforming to ISO 9001 Quality System Requirements)

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DOCUMENT HISTORY LOG

Status (Baseline/ Revision/ Canceled)	Document Revision	Effective Date	Description
Baseline		11/30/98	
Revision	A	5/11/99	<p>Section 4.0: Deleted references not called out in the procedure.</p> <p>Section 5.0: Added "Coordinate" to the title of Activity # 4. Added a note indicating coordination with the Technology Strategy. Added a feedback loop after Activity # 5 to before Activity # 4 to handle negative feasibility assessments. Added a quality record to Activity # 7 (Package of Collected Comments).</p> <p>Section 6.0: Minor clarification and accuracy edits. Added coordination text to Activity # 4. Added text in Activity # 5 dealing with feedback loop following a negative assessment. Added text to Activity # 7 regarding the new quality record, Package of Collected Comments. Elaborated on the role of the AA Control Board in the AA's process for approving the Science Implementation Plan (see activity # 8).</p> <p>Section 7.0: Added NPG 1441.1 reference. Changed owner of <i>Science Implementation Plan</i> to Research Division Director.</p>
Revision	B	10/28/99	<p>Section 6.0 Added reference to Biennial Review to activity #2.</p> <p>Added decision diamond for approval between block 8 and 9 of flowchart.</p> <p>Block 10 of flowchart was revised to loop back to the review and approval activities.</p> <p>Added the workds "Original Signed By" to cover page of OWI.</p>

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PREFACE

The NASA Office Work Instruction (OWI) for Plan Science Research documents the tasks and activities in conformance with the International Organization for Standardization's (ISO) 9001 requirements for quality systems. The OWI supplements the *NASA Strategic Plan*, the *NASA Strategic Management Handbook*, and other higher level NASA directives, which form the basis for how NASA conducts business.

This OWI is not intended to duplicate or contradict any other NASA policy, procedures or guidelines, which currently exist. As such, the OWI will reference prevailing documents where a topic is addressed and existing coverage is deemed adequate. Additional information provided within is intended to supplement existing documentation regarding Headquarters (HQ) implementation of strategic and program/project management, as well as HQ conformance with the ISO 9001 Quality Management System (QMS) requirements.

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1.0 PURPOSE

This OWI documents the NASA Earth Science Enterprise (ESE) procedure for developing Earth science requirements and the *ESE Science Implementation Plan*.

2.0 SCOPE AND APPLICABILITY

2.1 Scope. This work instruction describes procedures for the NASA ESE science research planning process. This process involves identifying major scientific issues, questions, and themes; defining ESE science requirements; and publishing the *ESE Science Implementation Plan*. The Plan is reviewed and, as required, updated periodically.

2.2 Applicability. This work instruction for Plan Science Research applies to the NASA Office of Earth Science (OES, Code Y) offices and divisions. The Associate Administrator for Earth Science is responsible for maintaining this document. The controlled version of this OWI is available on the World Wide Web (WWW) via the HQ ISO 9000 Document Library at <http://hqiso9000.hq.nasa.gov>. Any printed version of this OWI is uncontrolled (reference: HCP 1400.1, *Document and Data Control*). Proposed revisions will be accomplished by following HQOWI 1410-Y015, *Approve Quality Documents*.

3.0 DEFINITIONS

Appendix B of the *Earth Science Enterprise Management Handbook* provides ESE-specific terms and definitions.

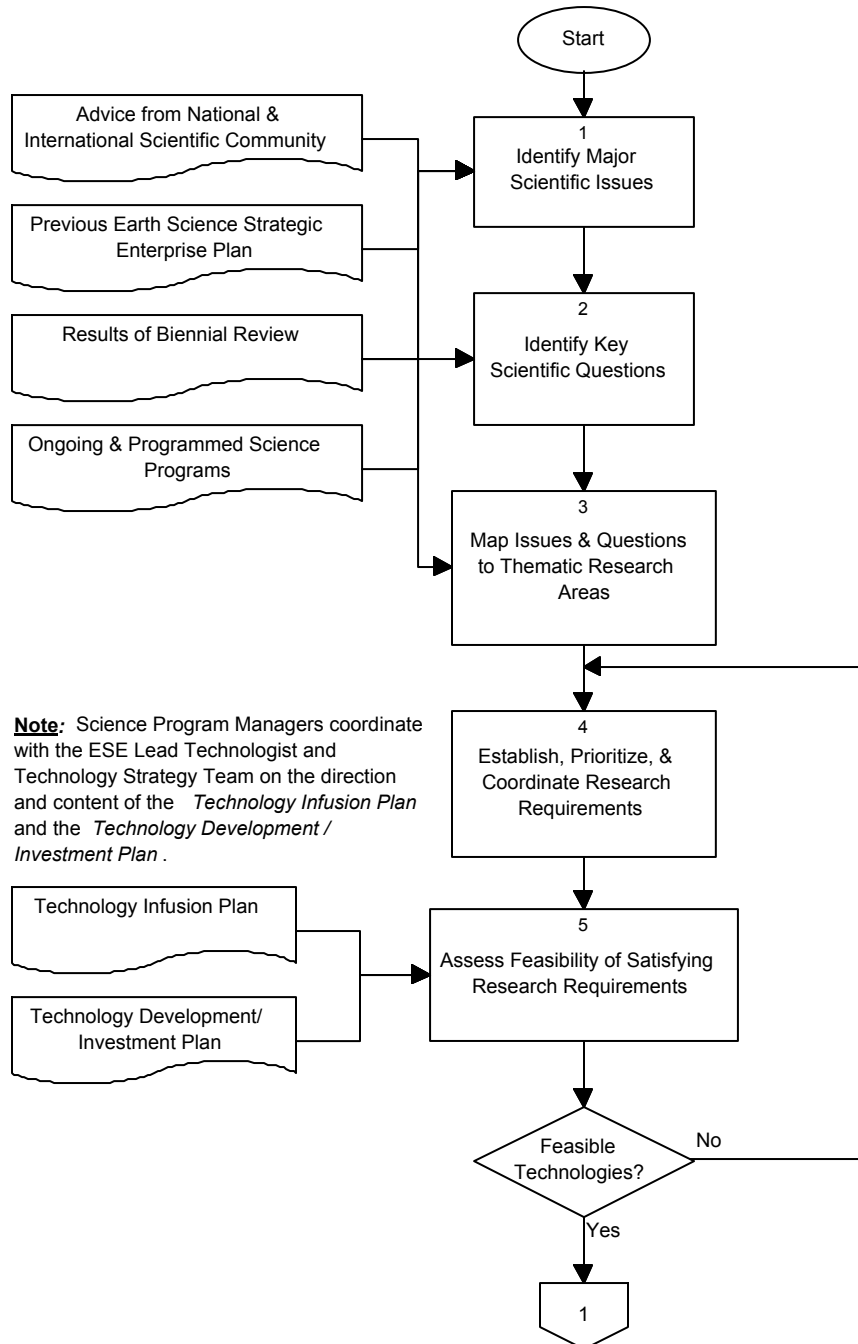
4.0 REFERENCES

None.

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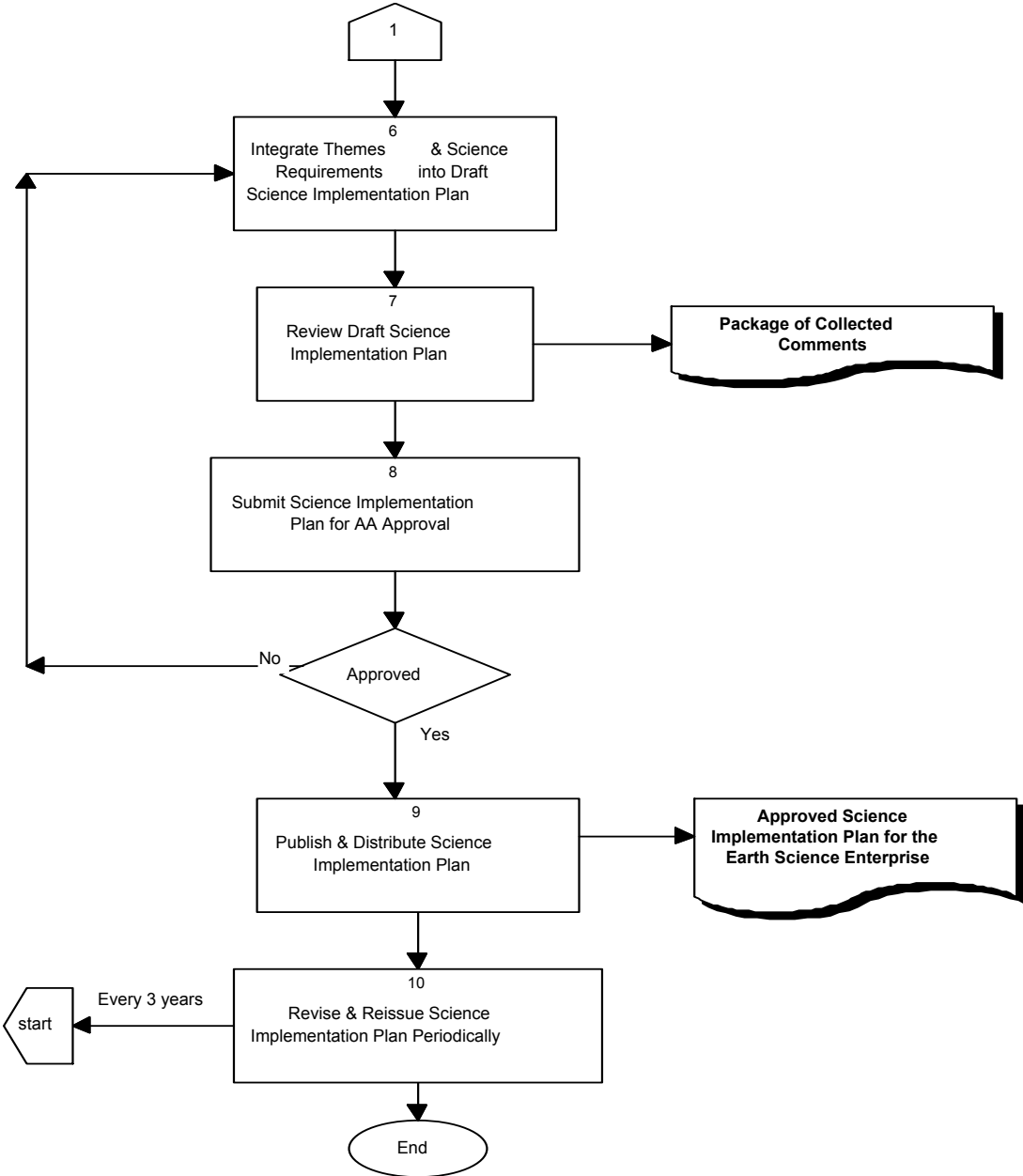
5.0 FLOWCHART

The following flowchart depicts the procedure described in Section 6. Outputs in boldface type represent the quality records listed in Section 7.



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5.0 FLOWCHART (CONTINUED)



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6.0 PROCEDURE

This process bridges enterprise strategic planning and execution of the strategy. In particular, enterprise goals, objectives, and strategies are transformed into science requirements and guidance that are published in the *ESE Science Implementation Plan*. The following table describes the flowchart of Section 5.

<u>Actionee</u>		<u>Action</u>
Science Program Managers	1	<u>Identify Major Scientific Issues</u> . Identify major contemporary scientific issues to which NASA sponsored research can contribute. Examples include ozone depletion, global warming, deforestation effects, carbon sequestration, and climate variability.
Science Program Managers	2	<u>Identify Key Scientific Questions</u> . For each issue, identify key scientific questions which can be answered fully or in part by NASA sponsored research. These questions come from National Research Council (NRC) reports, scientific journals, scientific conferences and symposia, and through routine interactions with the broad scientific community. Additional guidance resulting from the Biennial Review Process will be considered in the course of periodic revisions to the Science Implementation Plan.
Science Program Managers	3	<u>Map Issues and Questions to Thematic Research Areas</u> . Map these scientific issues and related scientific questions into principal thematic research areas for detailed planning and program implementation. Current NASA/ESE thematic areas are: <ul style="list-style-type: none"> • Global Carbon Cycle (including terrestrial and oceanic ecosystems), • Global Water cycle (including radiation and atmospheric dynamics), • Climate Variability and Prediction (at all time scales), • Atmospheric Chemistry (including ozone and global pollution), and • Solid Earth Science (including geodynamics and geology).
Science Program Managers	4	<u>Establish, Prioritize, and Coordinate Research Requirements</u> . Within each research theme, establish and prioritize research requirements addressing the key scientific questions outlined. Requirements may cover theory and modeling, observations (space-based, airborne, and ground-based), laboratory studies, and field campaigns. These requirements can be specified over a broad range of detail ranging from those that are well defined (e.g. remote sensor spectral channels, spatial and temporal resolution) to those relating to the general search for knowledge (e.g., leading to improved understanding). As deemed necessary by the Science Program Manager, this process is aided by consultations with experts, scientific workshops, and/or recommendations by ad hoc scientific teams established specifically to address the issues. The prioritization within a scientific discipline is driven by a combination of urgency, recognition of NASA's capabilities and enterprise priorities, and readiness for implementation.

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In order to influence the development of appropriate technologies, Science Program Managers also coordinate with the ESE Lead Technologist and Technology Strategy Team on the priorities of the science requirements and the direction and content of the Technology Infusion Plan and the Technology Development / Investment Plan. Activity 3, Establish Program-Level Technology Requirements, of HQOWI 7120-Y011, *Formulate the ESE Technology Development Program*, is where the effect of this coordination occurs in the development of technologies.

- | | | |
|-----------------------------------------------------------------------|----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Science Program Managers | 5 | <u>Assess Feasibility of Satisfying Research Requirements</u> . Assess the feasibility of satisfying the research requirements in terms of technological readiness, including computational technology. In the event that the developing technologies cannot satisfy the science requirements in the desired timeframe, then the process must return to Activity 4 for a re-evaluation of the science priorities. |
| Science Program Managers | 6 | <u>Integrate Themes and Science Requirements into Draft Science Implementation Plan</u> . Integrate the themes and science requirements into a draft <i>Science Implementation Plan for the Earth Science Enterprise</i> . This document serves as the primary information source for ESE (systematic and experimental) mission and technology (e.g. Instrument Incubator) development planning. |
| Division Directors
Science Program Managers
Advisory Committees | 7 | <u>Review Draft Science Implementation Plan</u> . Review by a variety of bodies including the ESE divisions, NASA Advisory Council's Earth System Science and Applications Advisory Committee (ESSAAC), selected NRC boards and committees and/or other such representatives of the NASA research community depending on the topics covered in the <i>Science Implementation Plan for the Earth Science Enterprise</i> . Factor in constructive comments. Sign-off by the Research Division Director. A package of collected comments from various review bodies is kept by the Research Division Director as a Quality Record. |
| Science Division Director
ESE AA
AA Control Board | 8 | <u>Submit Science Implementation Plan for AA Approval</u> . Submit to AA for approval. The ESE AA's approval process includes review of the <i>Science Implementation Plan for the Earth Science Enterprise</i> by the ESE AA Control Board to ensure full enterprise concurrence and commitment. The AA Control Board reviews the <i>Science Implementation Plan</i> for balance, and consistency relative to the ESE mission, goals, and objectives, and for affordability relative to the ESE budget. Based on recommendations provided by the AA Control Board, the ESE AA approves or directs revisions to the <i>Science Implementation Plan for the Earth Science Enterprise</i> . |
| Science Program Managers | 9 | <u>Publish & Distribute Science Implementation Plan</u> . Publish and distribute the <i>Science Implementation Plan for the Earth Science Enterprise</i> , to include posting on the ESE Home page. |
| Science Program Managers | 10 | <u>Revise and Reissue Science Implementation Plan Periodically</u> . Revise and reissue periodically (e.g., every three (3) years) based on new scientific insight or changing national scientific priorities, as well as technological advancements. |

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7.0 QUALITY RECORDS

RECORD IDENTIFICATION	OWNER	LOCATION	MEDIA Electronic or Hardcopy	SCHEDULE AND ITEM NUMBERS*	RETENTION / DISPOSITION
Package of Collected Comments	Research Division Director	Research Division	Hardcopy	Schedule 7, Item 4, "R&D Long Range Planning Files," paragraph B.	Destroy 5 years after supersession or completion.
Approved <i>Science Implementation Plan for the Earth Science Enterprise</i>	Research Division Director	Research Division	Hardcopy	Schedule 7, Item 4, "R&D Long Range Planning Files," paragraph A.	Permanent. Retire to Federal Records Center 5 years after supersession or completion. Transfer to National Archives and Records Administration when 10 years old.

* Quality Records are retained in accordance with the referenced schedule and item numbers from NPG 1441.1, *NASA Records Retention Schedules*.

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APPENDIX A. EXTERNAL GROUPS

ESE obtains information, advice, and guidance via conferences, workshops, information exchange meetings, and reports from the following organizations:

- ❑ *Committee on the Environment and Natural Resources (CENR), Subcommittee on Global Change Research (SGCR)*. This subcommittee coordinates the U.S. Global Change Research Program (USGCRP). The U.S. Global Change Research Program is an interagency effort to understand the processes and patterns of global change. ESE is NASA's contribution to this program. ESE may obtain science requirements from this subcommittee.
- ❑ *Intergovernmental Panel on Climate Change (IPCC)*. An international scientific forum, this group conducts assessments of the human influence on global climate and may influence nations' energy policies.
- ❑ *National Academy of Sciences/National Research Council (NAS/NRC)*. Conducts a wide range of reviews through, for example, the Board on Atmospheric Sciences and Climate (BASC), and provides advice on research priorities to ESE. ESE also works closely with the Academy's Board on Sustainable Development¹, which governs its environment and natural resources work, and the Space Studies Board which deals with issues of space programs.
- ❑ *NASA Advisory Council's Earth System Science and Applications Advisory Committee (ESSAAC)*. Established to work closely with ESE managers to ensure that ESE program planning and direction are consistent with the Enterprise's mission, national priorities, and interests of ESE commercial and international partners. Various ESSAAC subcommittees address ESE-related topics. For example, the ESSAAC Technology Subcommittee provides advice and recommendations to the NASA Advisory Council, through the ESSAAC, on the relationships between ESE science goals and potential solutions. This Subcommittee consists of individuals from universities, other federal agencies and laboratories, and private industry.
- ❑ *Ad Hoc Working Groups*. On an as-needed basis, ad hoc working groups are formed for the purpose of reviewing special aspects of the *Science Implementation Plan for the Earth Science Enterprise*.

¹ Sustainable Development -- economic development that meets the needs of the present without compromising the ability of future generations to meet their own needs.