

goals and objectives

The Space Act of 1958, which charters NASA as a Federal agency, defines a broad spectrum of goals and purposes for the Agency. The NASA Strategic Plan separates responsibility for its programs into Strategic Enterprises, which identify at the most fundamental level what we do and for whom. Each Strategic Enterprise has a unique set of goals, objectives, and strategies that address the requirements of its primary external customers.

Within NASA's Enterprise structure, the space sciences are gathered together into the Space Science Enterprise. These space sciences include space astronomy, planetary exploration, the physics of the Sun and the space between the Sun and planets, and fundamental physics experimentation carried out in space. This document is the enterprise-level Strategic Plan for the Space Science Enterprise.

The Agency Plan establishes a three-part Agency mission: advancing and communicating knowledge, human exploration of space, and developing new technology. Our Enterprise's programs contribute directly to these three Agency missions. Our role in technology development serves not only our Enterprise's and NASA's purposes, but also the broader purpose of strengthening our Nation's technology base.

The Space Science Enterprise works closely with the scientific community to articulate science goals that

NASA Mission

- To advance and communicate scientific knowledge and understanding of Earth, the Solar System, and the universe
- To advance human exploration, use, and development of space
- To research, develop, verify, and transfer advanced aeronautics and space technologies

The Space Science Enterprise's foremost role in support of the NASA mission is the discovery of new scientific knowledge about the universe. The Space Science Enterprise will:

Discover how the universe began and evolved, how we got here, where we are going, and whether we are alone.

directly support the Agency research mission. To address the other elements of the NASA mission, we also establish Enterprise goals for education and public outreach, support to human space flight, and technology. These four goals define the framework for formu-

lating and managing the space science program.

Within this context, all of our strategic planning and management, including selections for mission implementation and related research activities, are

Table I—Enterprise Goals and Objectives

NASA Mission	Enterprise Goals	Enterprise Objectives
<p>To advance and communicate scientific knowledge and understanding of Earth, the Solar System, and the universe</p>	<p>Chart the evolution of the universe, from origins to destiny, and understand its galaxies, stars, planets, and life</p>	<p style="text-align: center;"><u>Science Objectives</u></p> <ul style="list-style-type: none"> • Understand the structure of the universe, from its earliest beginnings to its ultimate fate • Explore the ultimate limits of gravity and energy in the universe • Learn how galaxies, stars, and planets form, interact, and evolve • Look for signs of life in other planetary systems • Understand the formation and evolution of the Solar System and Earth within it • Probe the origin and evolution of life on Earth and determine if life exists elsewhere in our Solar System • Understand our changing Sun and its effects throughout the Solar System • Chart our destiny in the Solar System
	<p>Share the excitement and knowledge generated by scientific discovery and improve science education</p>	<p style="text-align: center;"><u>Education and Public Outreach Objectives*</u></p> <ul style="list-style-type: none"> • Share the excitement of space science discoveries with the public • Enhance the quality of science, mathematics, and technology education, particularly at the pre-college level • Help create our 21st century scientific and technical workforce
<p>To advance human exploration, use, and development of space</p>	<p>Use robotic science missions as forerunners to human exploration beyond low-Earth orbit</p>	<p style="text-align: center;"><u>Human Space Flight Objectives</u></p> <ul style="list-style-type: none"> • Investigate the composition, evolution, and resources of Mars, the Moon, and small bodies • Develop the knowledge to improve space weather forecasting
<p>To research, develop, verify, and transfer advanced aeronautics and space technologies</p>	<p>Develop new technologies to enable innovative and less expensive research and flight missions</p>	<p style="text-align: center;"><u>Technology Objectives*</u></p> <ul style="list-style-type: none"> • Acquire new technical approaches and capabilities • Validate new technologies in space • Apply and transfer technology <p style="font-size: small; margin-top: 10px;">* Associated activities are discussed in Sections I-3 and I-4</p>

Table II—Science Objectives and Research Focus Areas

Science Objectives	Research Focus Areas
Understand the structure of the universe, from its earliest beginnings to its ultimate fate	<ul style="list-style-type: none"> • Identify dark matter and learn how it shapes galaxies and systems of galaxies • Determine the size, shape, age, and energy content of the universe
Explore the ultimate limits of gravity and energy in the universe	<ul style="list-style-type: none"> • Discover the sources of gamma ray bursts and high energy cosmic rays • Test the general theory of relativity near black holes and in the early universe, and search for new physical laws using the universe as a laboratory • Reveal the nature of cosmic jets and relativistic flows
Learn how galaxies, stars, and planets form, interact, and evolve	<ul style="list-style-type: none"> • Observe the formation of galaxies and determine the role of gravity in this process • Establish how the evolution of a galaxy and the life cycle of stars influence the chemical composition of material available for making stars, planets, and living organisms • Observe the formation of planetary systems and characterize their properties • Use the exotic space environments within our Solar System as natural science laboratories and cross the outer boundary of the Solar System to explore the nearby environment of our galaxy
Look for signs of life in other planetary systems	<ul style="list-style-type: none"> • Discover planetary systems of other stars and their physical characteristics • Search for worlds that could or do harbor life
Understand the formation and evolution of the Solar System and Earth within it	<ul style="list-style-type: none"> • Inventory and characterize the remnants of the original material from which the Solar System formed • Learn why the planets in our Solar System are so different from each other • Learn how the Solar System evolves
Probe the origin and evolution of life on Earth and determine if life exists elsewhere in our Solar System	<ul style="list-style-type: none"> • Investigate the origin and early evolution of life on Earth, and explore the limits of life in terrestrial environments that might provide analogues for conditions on other worlds • Determine the general principles governing the organization of matter into living systems and the conditions required for the emergence and maintenance of life • Chart the distribution of life-sustaining environments within our Solar System, and search for evidence of past and present life • Identify plausible signatures of life on other worlds
Understand our changing Sun and its effects throughout the Solar System	<ul style="list-style-type: none"> • Understand the origins of long- and short-term solar variability • Understand the effects of solar variability on the solar atmosphere and heliosphere • Understand the space environment of Earth and other planets
Chart our destiny in the Solar System	<ul style="list-style-type: none"> • Understand forces and processes, such as impacts, that affect habitability of Earth • Develop the capability to predict space weather • Find extraterrestrial resources and assess the suitability of Solar System locales for future human exploration

Another major function of the triennial review of our Enterprise Strategic Plan is to articulate nearer-term focus areas for research that provide more specific guidance over 5-10 year periods.

founded on our science goals and objectives (Table I). While these are formulated at a high enough level that we expect them to remain stable over many decades, we continue to refine their articulation. In doing so, we work with our research community to update our strategic plan, rephrasing our objectives periodically to reflect our growing knowledge.

Another major function of the triennial review of our Enterprise Strategic Plan is to articulate nearer-term focus areas for research that provide more specific guidance over

a 5-10 year period (Table II). These research focus areas are derived from our science objectives in consultation with our research communities, and are phrased to help mission and research decisionmaking and progress assessment.

The next two sections (I-3 and I-4) describe the roles of technology and education and public outreach in the space science program. Part II of the plan presents the program itself, beginning in section II-1 with our fundamental principles. Sections II-2 and II-3 of the plan describe our current program and

our proposed flight mission program for the future. To be as clear as possible about how these missions will advance us toward our long-range science aspirations, the presentation organizes the missions in these sections by the eight Enterprise science objectives laid out above. Appendix A maps the missions onto the more specific Enterprise research activity areas. The remainder of Part II presents our programs in technology, basic research, and education and public outreach, as well as our overall strategies for partnering with other entities to reach our goals.