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SSA

Office of Space Science & Applications

Congressional Staff Briefing

February 8, 1989

NASA
National Aeronautics and
Space Administration

L.A. Fisk
Associate Administrator

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THE SPACE SCIENCE AND APPLICATIONS PROGRAM

WHAT

- STUDY — UNIVERSE
  SUN AND SUN-EARTH ENVIRONMENT
  EARTH AND SUN-EARTH ENVIRONMENT
  LIVING SYSTEMS IN SPACE
- EXPLORE — PLANETS AND PRIMITIVE BODIES
- USE — SPACE TO SOLVE NATIONAL PROBLEMS
  SPACE TO AID ECONOMIC DEVELOPMENT

WHY

- ADVANCE UNDERSTANDING
- DEVELOP NEW CAPABILITIES

HOW

- FLIGHT PROJECTS
- MISSION OPERATIONS AND DATA ANALYSIS
- RESEARCH AND ANALYSIS

PARTICIPANTS

- HEADQUARTERS
- NASA CENTERS
- OTHER GOVERNMENT AGENCIES
- UNIVERSITIES
- INDUSTRY
- FOREIGN GOVERNMENTS, AGENCIES, LABORATORIES AND UNIVERSITIES

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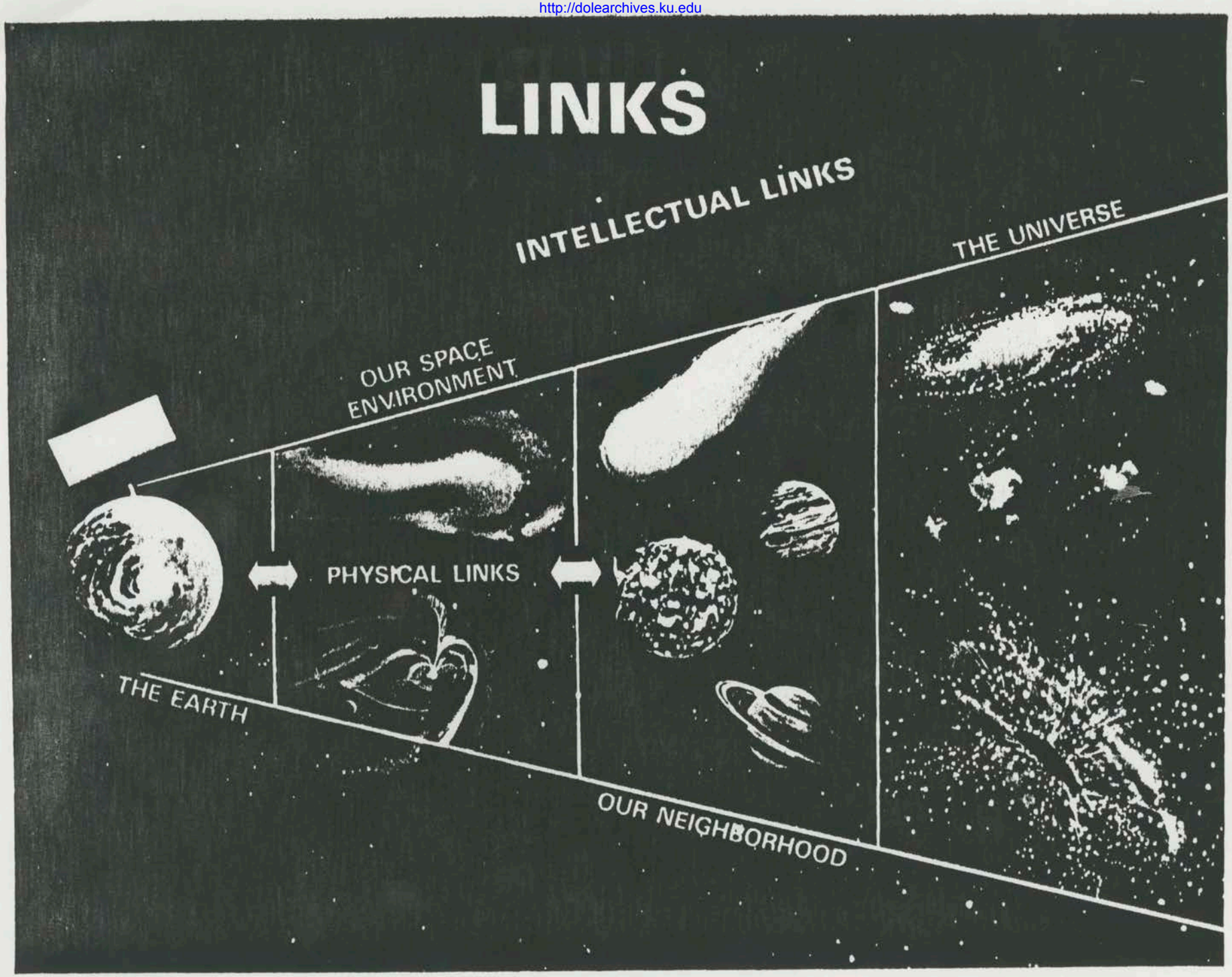

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MAJOR EVENTS
SPACE SCIENCE AND APPLICATIONS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1989	ARCTIC OZONE AIRCRAFT CAMPAIGN △△△△△△△△△△△△			MAGELLAN □		COBE ○		VOYAGER II AT NEPTUNE △		GALILEO □		HST □
1990		ROSAT ○	ASTRO-1/ BBXRT □	GRO □		SLS-1 □ CRRES ○				ULYSSES □		
1991	TSS-1 □	IML-1 □			ATLAS-1 □		S/L-J □	EUVE ○		UARS □	WAMDII □	S/L-D2 ○ □ SMALL EXPL-1
1992		ULYSSES JUPITER ENCOUNTER △	USML-1 □		SRL-1 □ ACTS □ USMP-1 □ TOPEX/ POSEIDON ○	ATLAS-2 □ SMALL EXPL-2	GEOTAIL □ SLS-2	ASTRO-2 □	SHEAL-2 □ MARS OBSERVER ○	IML-2 □		SMALL EXPL-3 WIND
1993		SRL-2 □	USMP-2 □		ATLAS-3 □	POLAR SMALL EXPL-4		USML-2 □	USMP-3 □	SLS-3 □		SMALL EXPL-5 ○

□ STS LAUNCHES ○ ELV LAUNCHES △ OTHER MAJOR EVENTS

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MAJOR SPACE SCIENCE AND APPLICATIONS PROGRAMS

GALILEO — JUPITER

MAGELLAN — VENUS

MARS OBSERVER — MARS

ULYSSES — SUN

GLOBAL GEOSPACE SCIENCE — NEAR SPACE ENVIRONMENT

GREAT OBSERVATORIES — STUDY OF THE UNIVERSE
- HUBBLE — VISIBLE
- AXAF — X-RAY
- GRO — GAMMA RAY

COSMIC BACKGROUND EXPLORER — EARLY UNIVERSE SURVEY

EXTREME ULTRAVIOLET EXPLORER — ALL SKY ULTRAVIOLET SURVEY

UPPER ATMOSPHERE RESEARCH SATELLITE — EARTH ATMOSPHERE

OCEAN TOPOGRAPHY EXPERIMENT — OCEAN MEASUREMENTS

ADVANCED COMMUNICATIONS SATELLITE — NEXT GENERATION COMMUNICATIONS

SPACE LIFE SCIENCES LAB — BIOLOGY & MEDICINE

INTERNATIONAL MICROGRAVITY LAB — MICROGRAVITY & LIFE SCIENCES

U.S. MICROGRAVITY LAB — DEDICATED MICROGRAVITY SCIENCES & APPLICATIONS

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Magellan

MISSION TO VENUS

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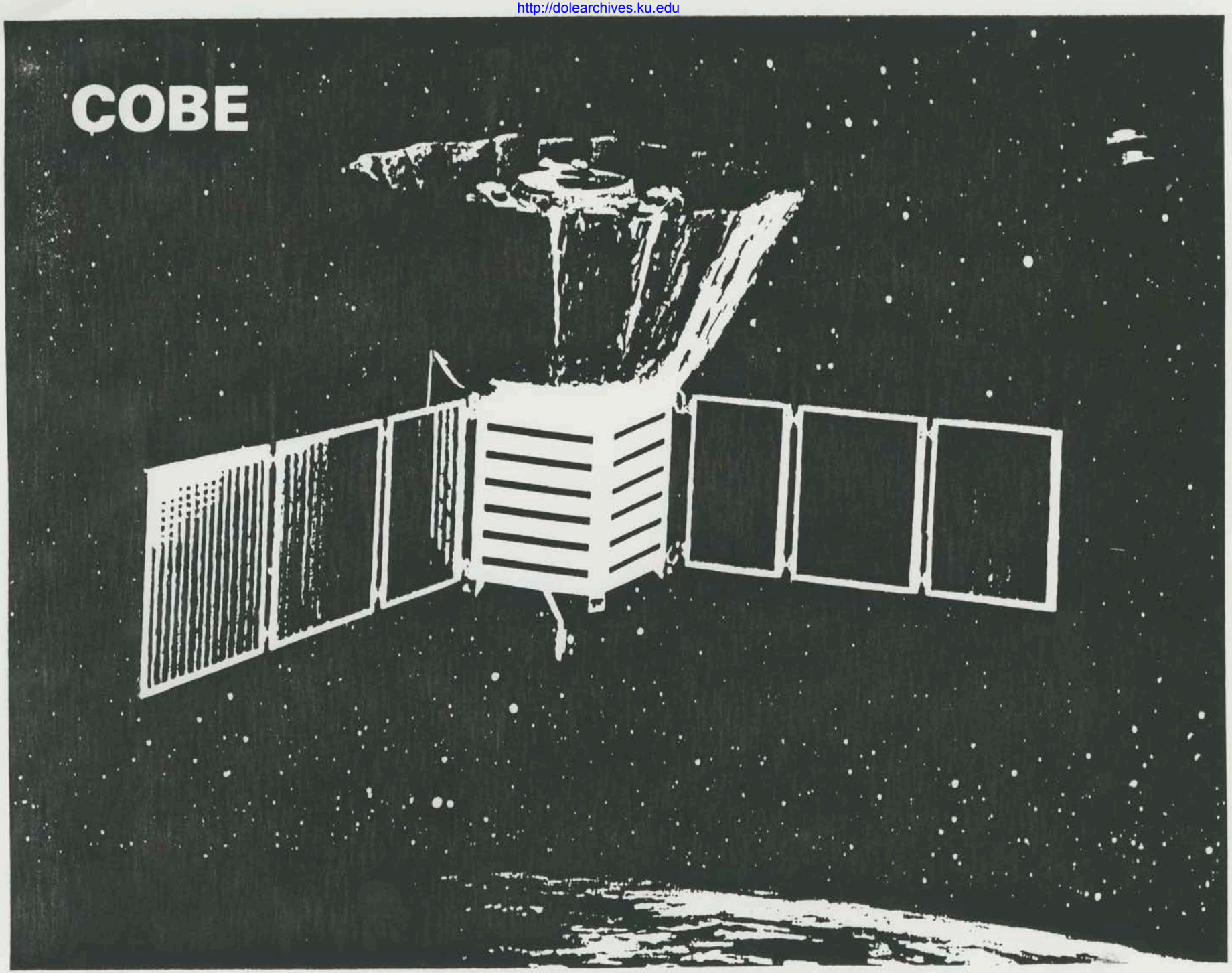

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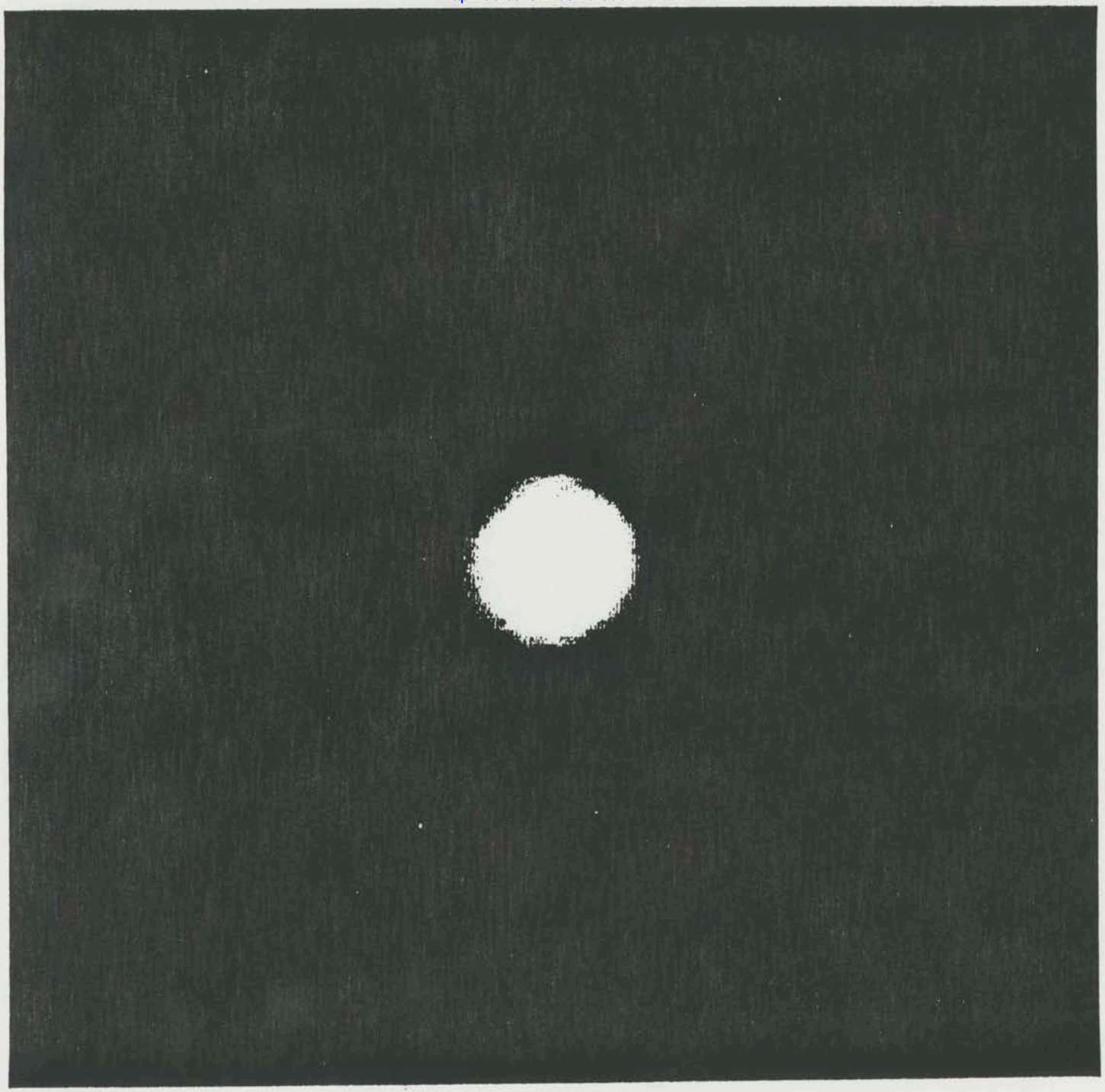

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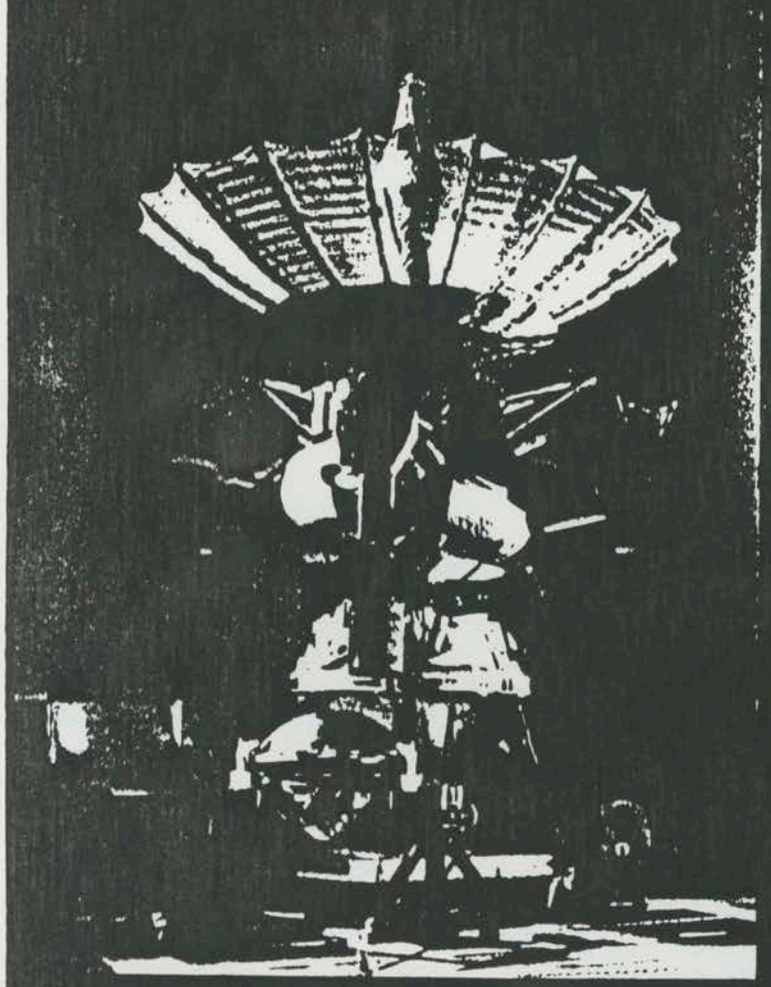
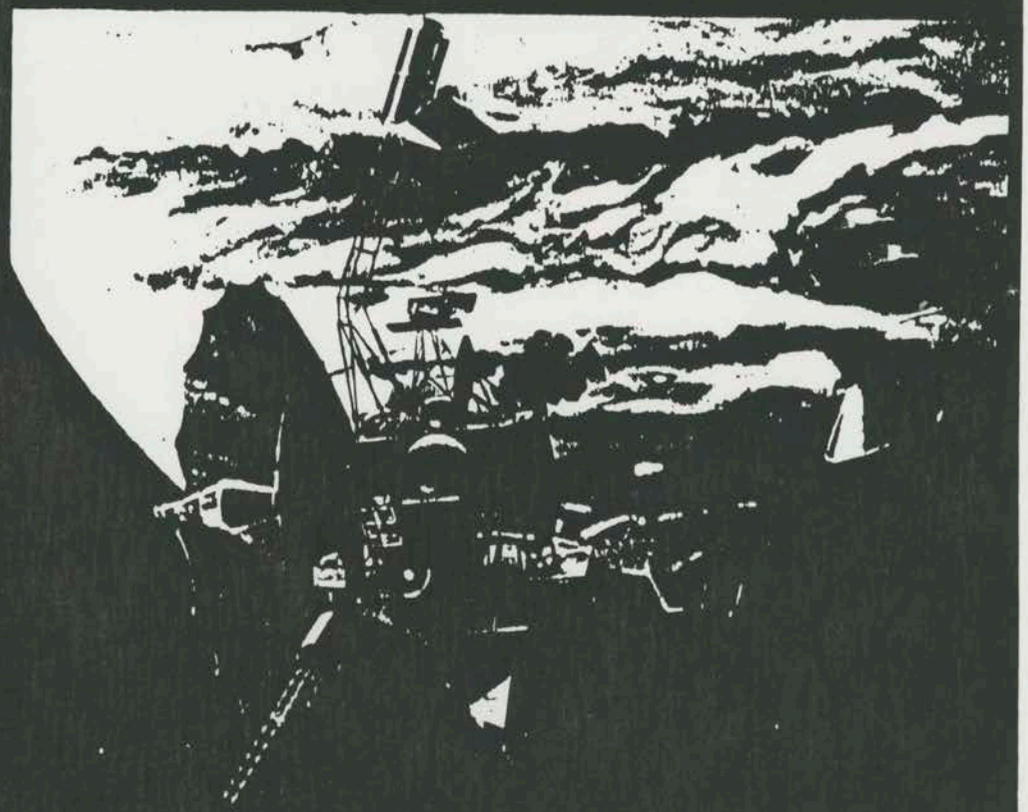
GALILEO TO JUPITER





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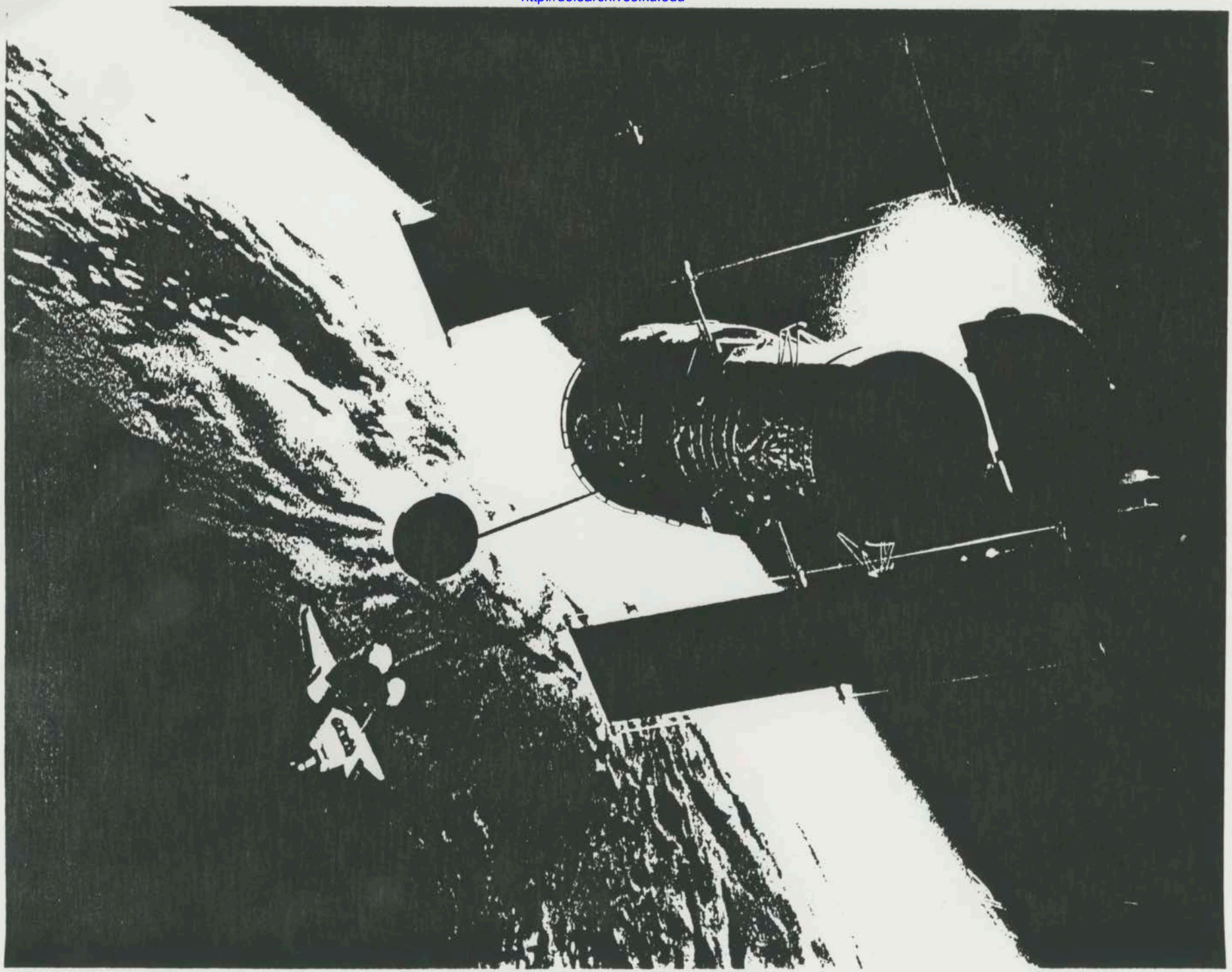

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OFFICE OF SPACE SCIENCE AND APPLICATIONS

SCIENCE DISCIPLINES

- ASTROPHYSICS
- SOLAR SYSTEM EXPLORATION
- EARTH SCIENCE & APPLICATIONS
- SPACE PHYSICS
- LIFE SCIENCES
- MICROGRAVITY SCIENCE & APPLICATIONS
- COMMUNICATIONS & INFORMATION SYSTEMS

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ASTROPHYSICS

- GOALS — TO UNDERSTAND:
  - THE ORIGIN AND FATE OF THE UNIVERSE
  - THE UNDERLYING FUNDAMENTAL LAWS OF NATURE AND PHYSICS THAT GOVERN THE UNIVERSE
  - THE BIRTH AND EVOLUTIONARY CYCLES OF GALAXIES, STARS AND PLANETS

- FOUR GREAT OBSERVATORIES
  - HUBBLE SPACE TELESCOPE — VISIBLE
  - GAMMA RAY OBSERVATORY — GAMMA RAYS
  - ADVANCED X-RAY ASTROPHYSICS FACILITY — X-RAYS
  - SPACE INFRARED TELESCOPE FACILITY — INFRARED

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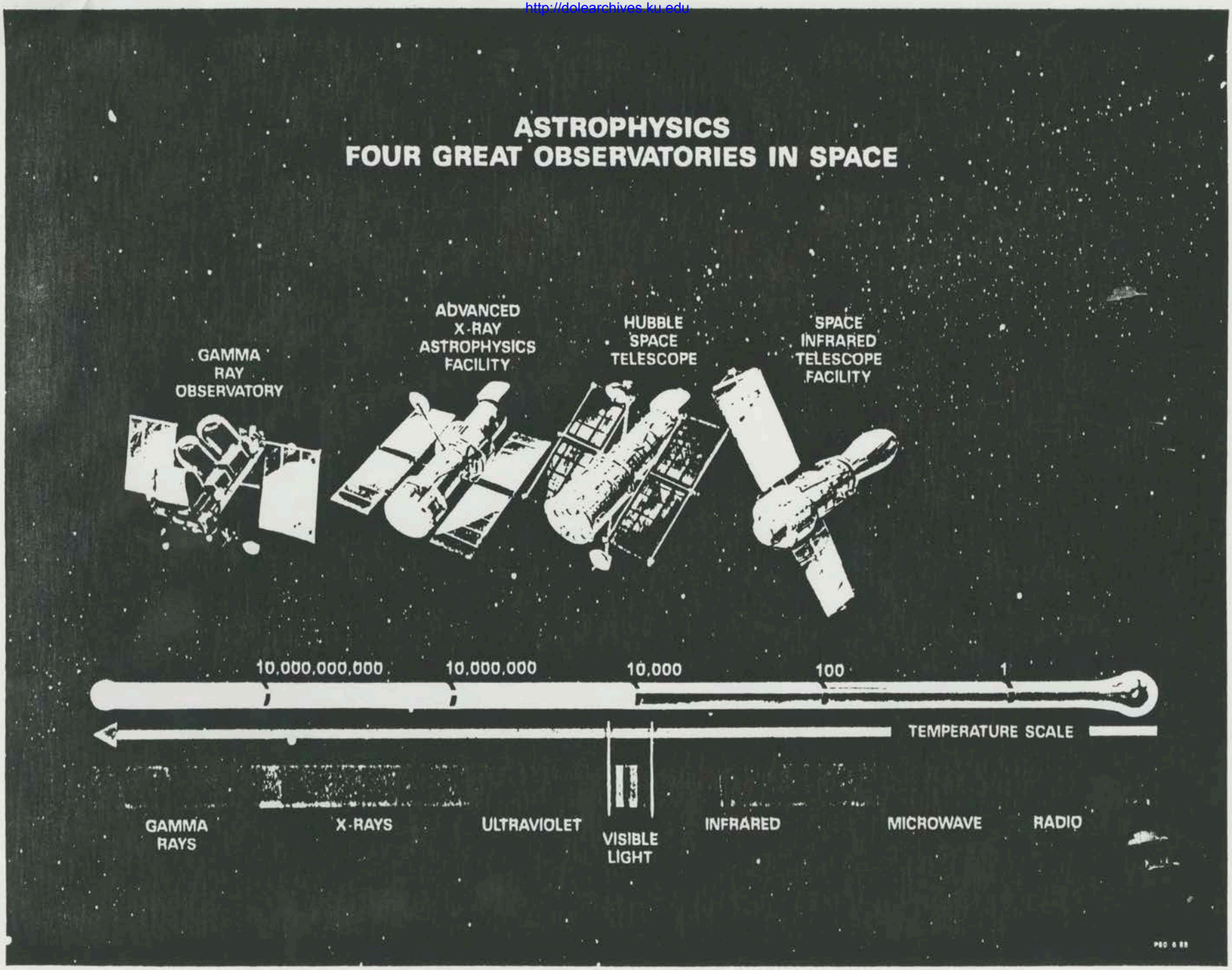

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OFFICE OF SPACE SCIENCE AND APPLICATIONS

SOLAR SYSTEM EXPLORATION

- GOALS — TO UNDERSTAND:
  - THE PRESENT NATURE OF THE SOLAR SYSTEM, ITS PLANETS, AND ITS PRIMITIVE BODIES
  - PLANET EARTH BY DETERMINING THE GENERAL PROCESSES THAT GOVERN ALL PLANETARY DEVELOPMENT AND BY UNDERSTANDING WHY THE "TERRESTRIAL PLANETS" OF THE SOLAR SYSTEM ARE SO DIFFERENT FROM EACH OTHER
  - THE SCIENTIFIC AND TECHNICAL DATA BASE REQUIRED FOR UNDERTAKING MAJOR HUMAN ENDEAVORS IN SPACE
- PLACE AN ORBITER ABOUT MOST ACCESSIBLE BODIES IN THE SOLAR SYSTEM
  - MAGELLAN — VENUS
  - GALILEO — JUPITER
  - MARS OBSERVER — MARS
  - COMET RENDEZVOUS ASTEROID FLYBY — PRIMITIVE BODIES
  - CASSINI — SATURN
  - LUNAR OBSERVER — EARTH'S MOON

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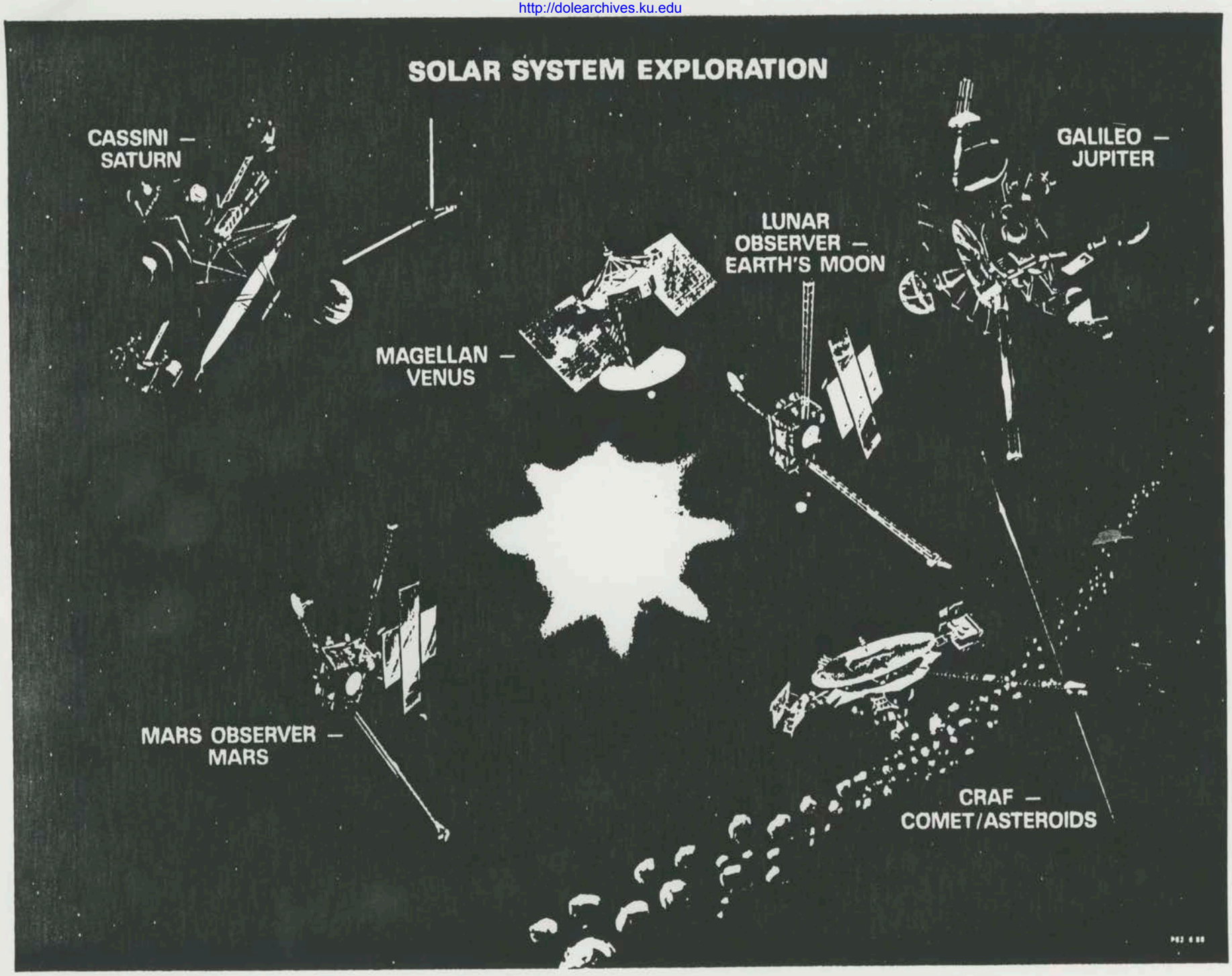

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EARTH SCIENCE & APPLICATIONS

- GOALS — TO UNDERSTAND:
  - THE ENTIRE EARTH SYSTEM ON A GLOBAL SCALE BY DESCRIBING HOW ITS COMPONENT PARTS AND THEIR INTERACTIONS HAVE EVOLVED, HOW THEY FUNCTION, AND HOW THEY MAY BE EXPECTED TO CONTINUE TO EVOLVE ON ALL TIME SCALES

- MAJOR MISSIONS
  - UPPER ATMOSPHERE RESEARCH SATELLITE — ATMOSPHERIC PROCESSES, CHEMISTRY AND DYNAMICS
  - OCEAN TOPOGRAPHY EXPERIMENT — GLOBAL OCEAN CIRCULATION
  - SCATTEROMETER — OCEAN SURFACE WINDS
  - EARTH OBSERVING SYSTEM/POLAR PLATFORM — EARTH AS A SYSTEM

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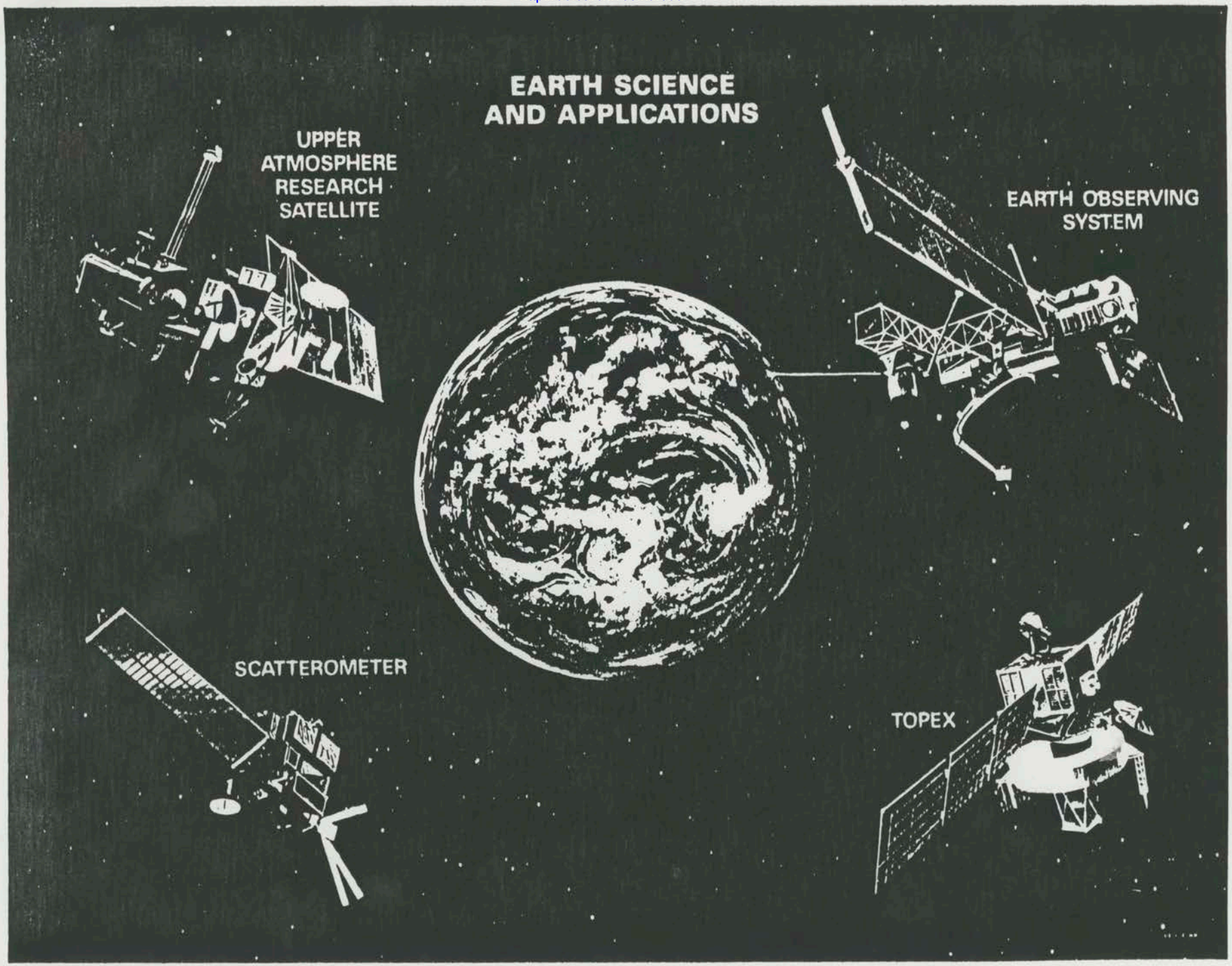

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OFFICE OF SPACE SCIENCE AND APPLICATIONS

SPACE PHYSICS

- GOALS — TO UNDERSTAND:
  - THE IONOSPHERE AND MAGNETOSPHERE OF THE EARTH AND OTHER PLANETS
  - THE SUN, BOTH AS A STAR AND AS THE DOMINANT SOURCE OF ENERGY, PLASMA AND ENERGETIC PARTICLES IN THE SOLAR SYSTEM
  - THE ACCELERATION, TRANSPORT AND PROPAGATION OF ENERGETIC PARTICLES THAT ORIGINATE BOTH WITHIN THE SOLAR SYSTEM AND OUTSIDE IT
- INTERNATIONAL SOLAR-TERRESTRIAL PHYSICS PROGRAM
  - GLOBAL GEOSPACE SCIENCE PROGRAM
    - POLAR — IONOSPHERE
    - WIND — SOLAR WIND
  - COLLABORATIVE SOLAR-TERRESTRIAL RESEARCH PROGRAM
    - CLUSTER — PLASMA MICROPHYSICS
    - GEOTAIL — EARTH'S GEOMAGNETIC TAIL
    - SOHO — SOLAR VARIABILITY

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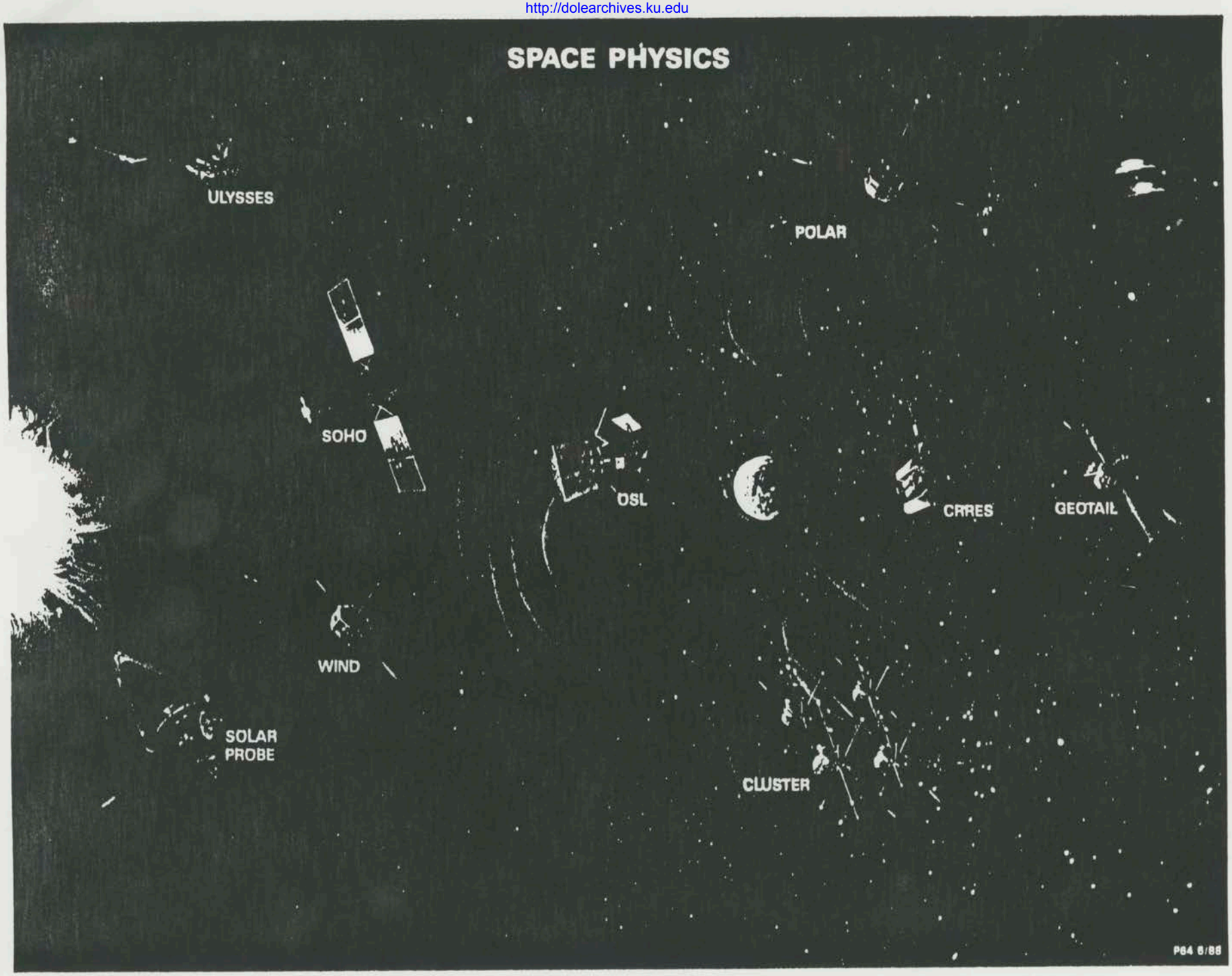

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LIFE SCIENCES

- GOALS — TO UNDERSTAND:
  - THE ORIGIN, EVOLUTION AND DISTRIBUTION OF LIFE IN THE UNIVERSE
  - THE RELATIONSHIP BETWEEN LIFE AND GRAVITY AND OTHER PLANETARY PROPERTIES
  - HOW TO DEVELOP MEDICAL AND BIOLOGICAL SYSTEMS THAT ENABLE THE HUMAN EXPLORATION AND HABITATION OF SPACE
- SPACELAB MISSIONS
  - SPACELAB LIFE SCIENCES SERIES
  - INTERNATIONAL MICROGRAVITY LABORATORY SERIES
- SECONDARY PAYLOADS
  - MIDDECK EXPERIMENTS

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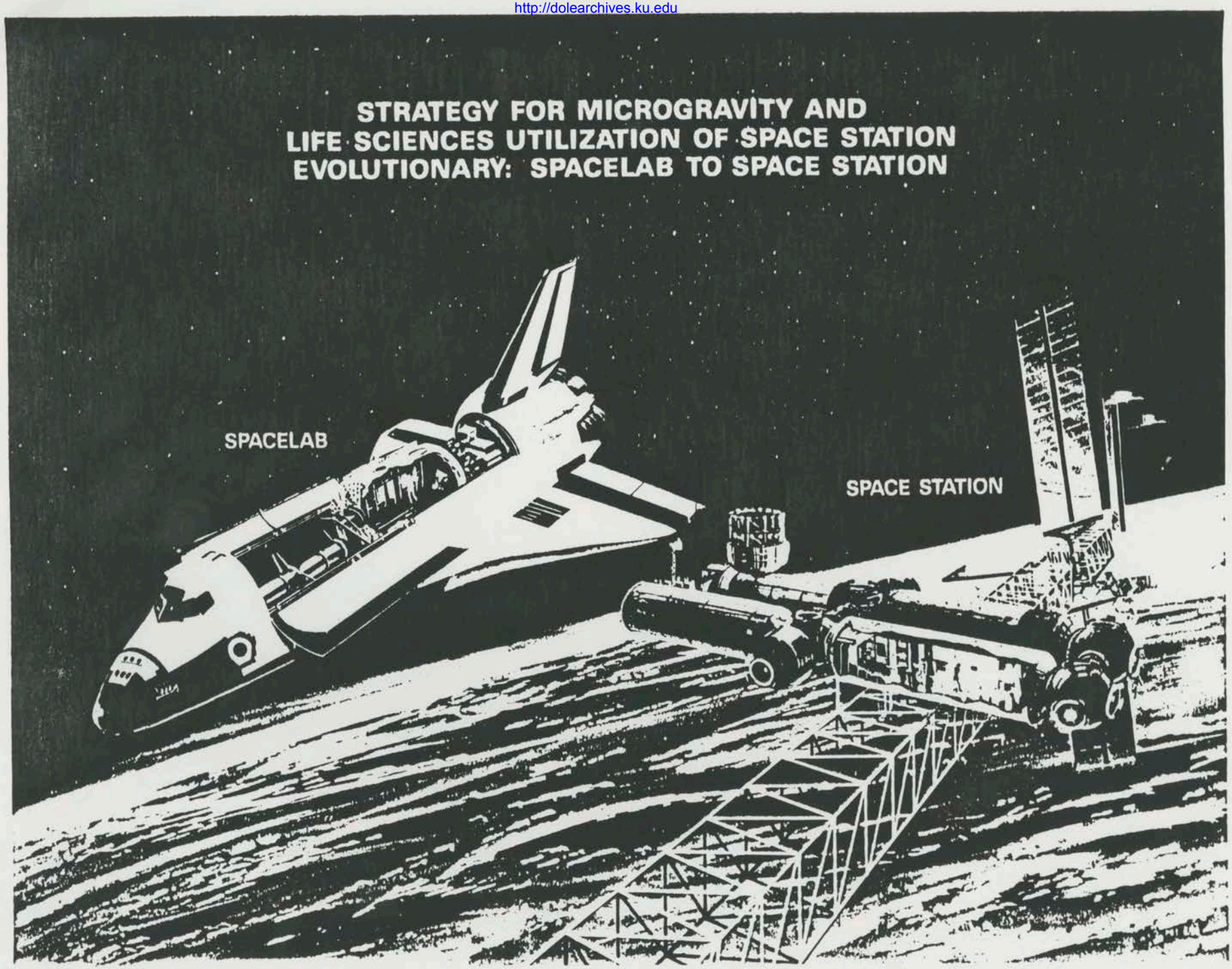

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MICROGRAVITY SCIENCE & APPLICATIONS

- GOALS — TO UNDERSTAND:
  - THE FUNDAMENTAL SCIENCE THAT GOVERNS PROCESSES ON EARTH, IN THE SOLAR SYSTEM AND IN THE UNIVERSE
  - THE INFLUENCE OF GRAVITY ON EARTH-BASED PROCESSES
  - PRODUCTION OF EXOTIC HIGH-VALUE MATERIALS WITH ENHANCED PROPERTIES
  - THE POSSIBILTIY OF PROCESSING EXTRATERRESTRIAL MATERIALS
- SPACELAB MISSIONS
  - INTERNATIONAL MICROGRAVITY LABORATORY SERIES
  - UNITED STATES MICROGRAVITY LABORATORY SERIES
- SECONDARY PAYLOADS
  - MIDDECK EXPERIMENTS
  - MATERIALS SCIENCE LABORATORY

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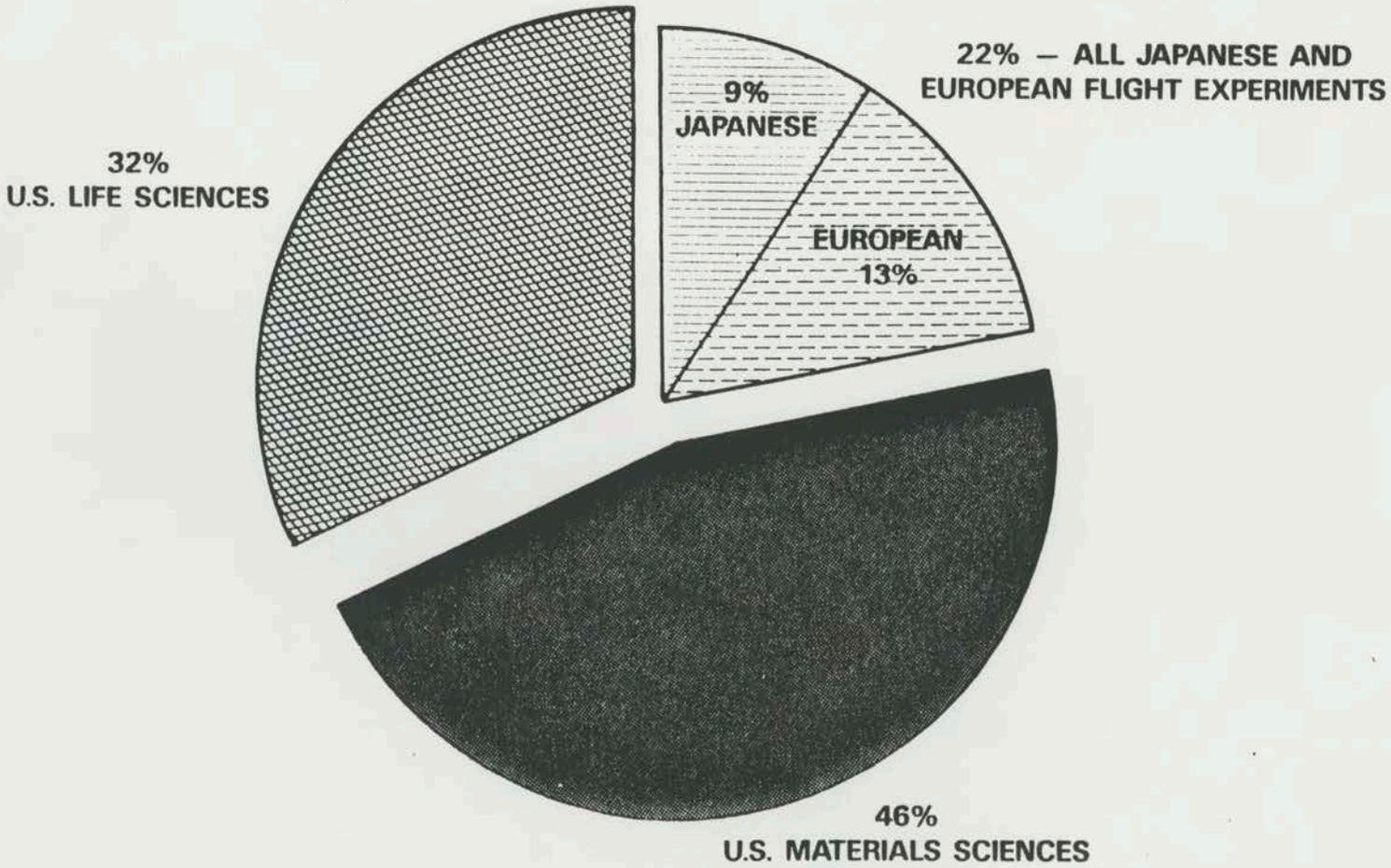
ACCUMULATED YEARLY MICROGRAVITY FLIGHT PROGRAMS FISCAL YEARS 1988–1993



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COMMUNICATIONS & INFORMATION SYSTEMS

- GOALS:
  - MAINTAIN UNITED STATES TECHNOLOGY AND ECONOMIC PREEMINANCE IN SPACE COMMUNICATIONS AND TO ENABLE INNOVATIVE SERVICES IN SUPPORT OF THE SATELLITE COMMUNICATIONS INDUSTRY, NASA'S NEEDS, AND THE NEEDS OF THE PUBLIC SECTOR

- ADVANCED COMMUNICATIONS TECHNOLOGY SATELLITE
  - INCLUDES REVOLUTIONARY TECHNOLOGIES
  - LAYS THE FOUNDATION FOR THE NEXT GENERATION OF COMMUNICATION SATELLITES

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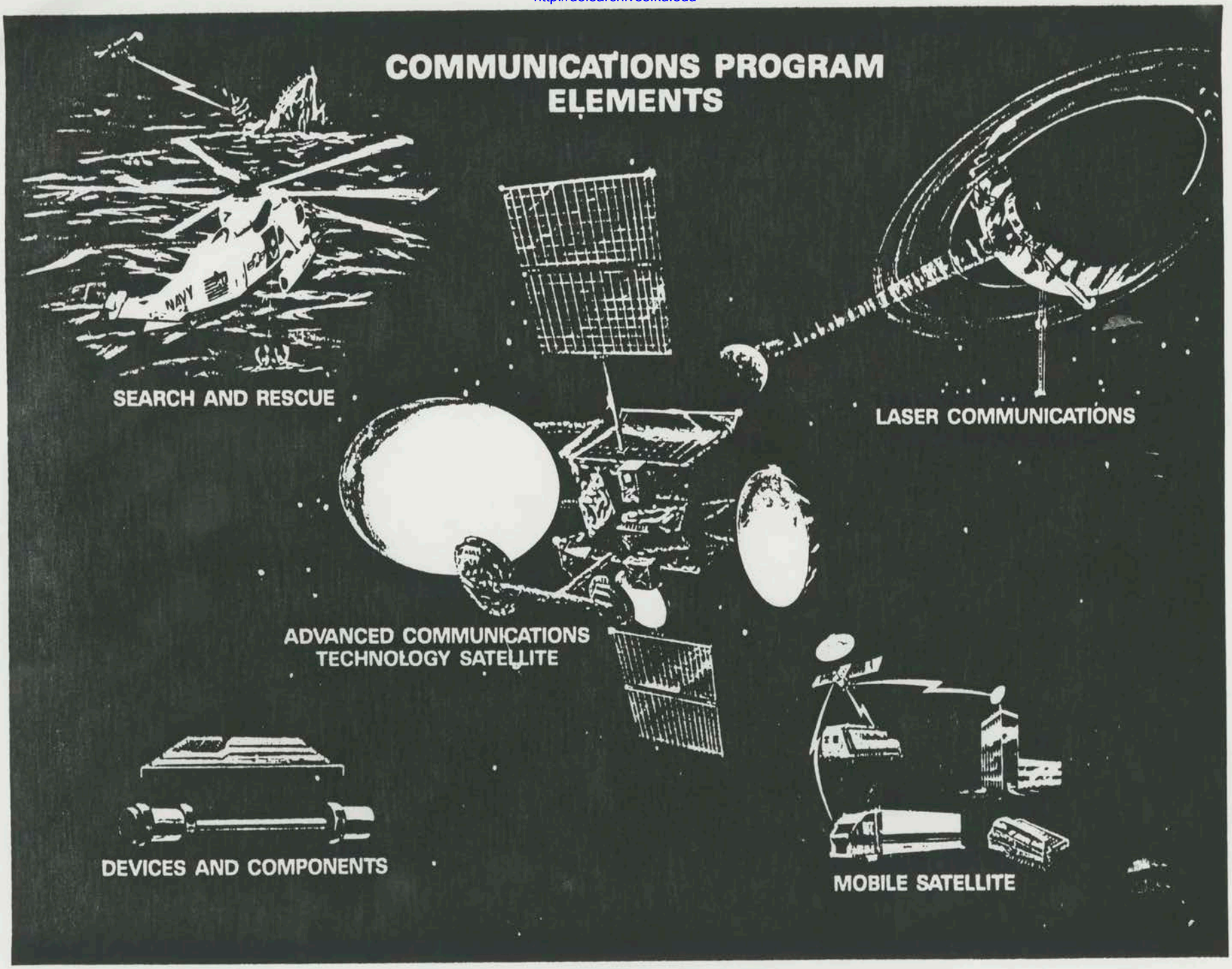

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NASA
National Aeronautics and
Space Administration

1989

BACK TO THE PLANETS

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BACK TO THE PLANETS

APRIL 1989 ..... MAGELLAN TO VENUS

AUGUST 1989 ..... VOYAGER AT NEPTUNE

OCTOBER 1989 ..... GALILEO TO JUPITER

NEW START FOR THE CRAF/CASSINI MISSION IN 1989

- CRAF — COMETS AND ASTEROIDS
- CASSINI — SATURN

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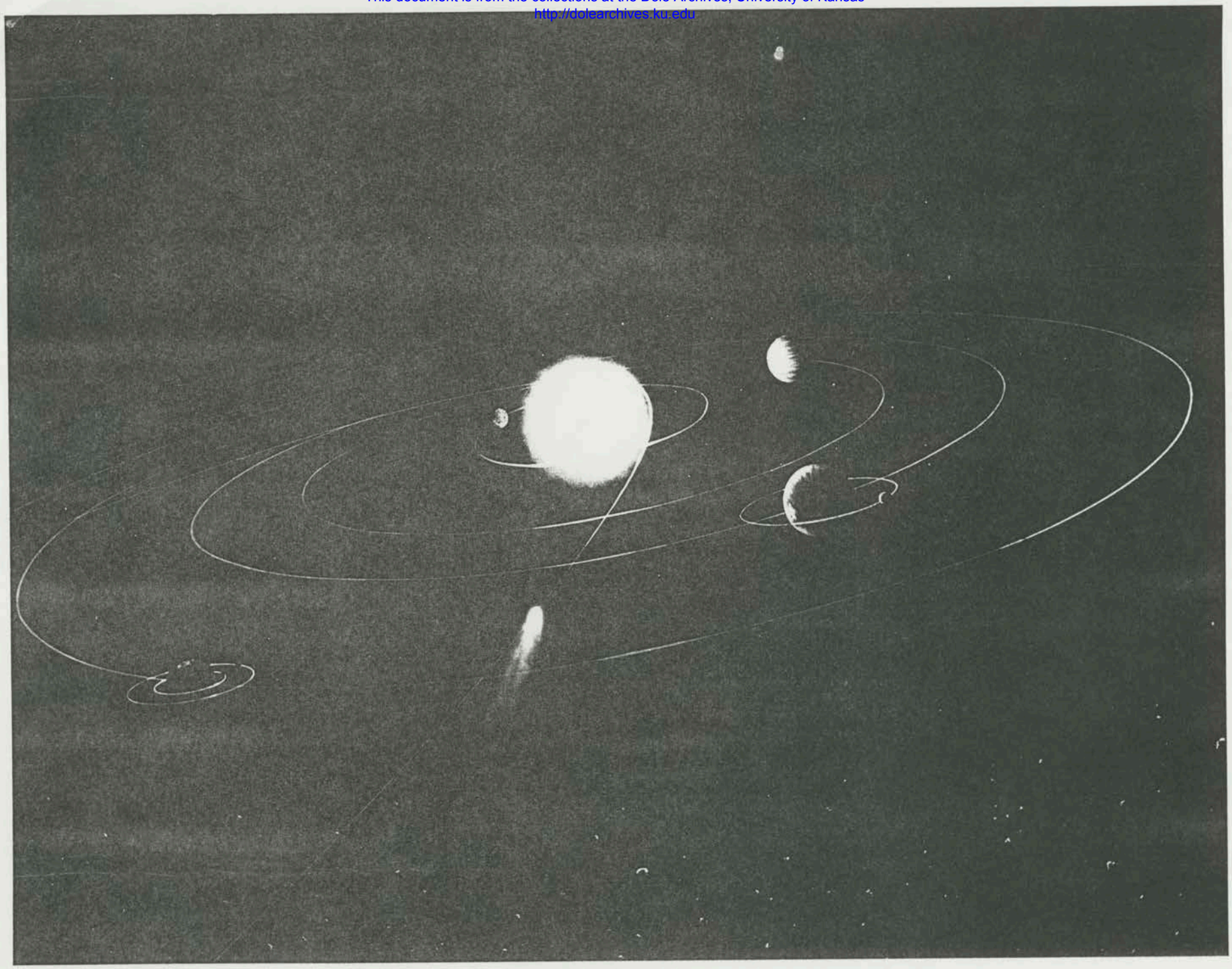

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