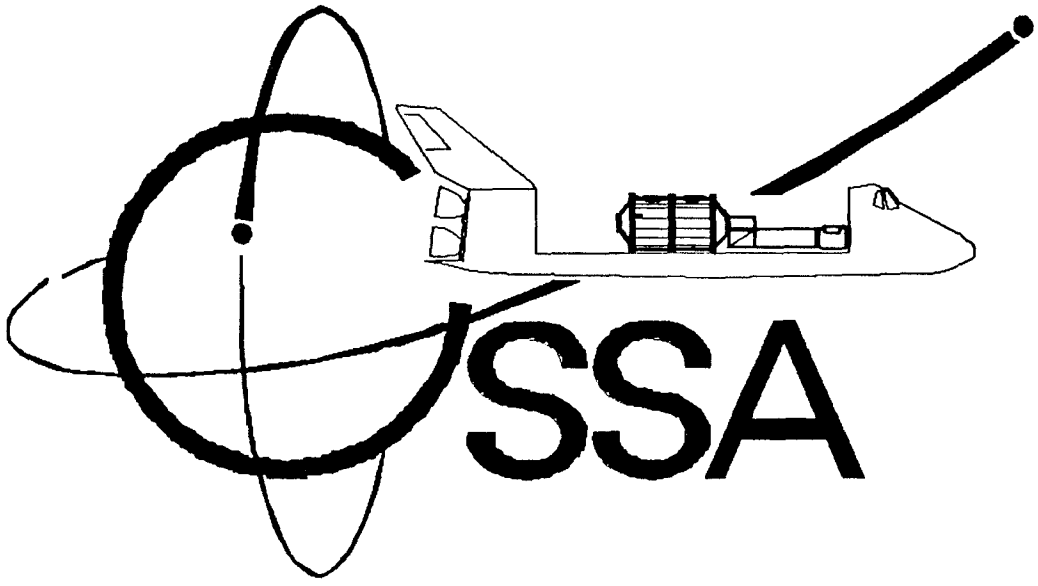
OFFICE OF SPACE SCIENCE AND APPLICATIONS



OSSA UTILIZATION OF A COMMERCIALLY DEVELOPED SPACE FACILITY (CDSF)

MAY 19, 1988

FLIGHT SYSTEMS DIVISION

2-88ACTITL

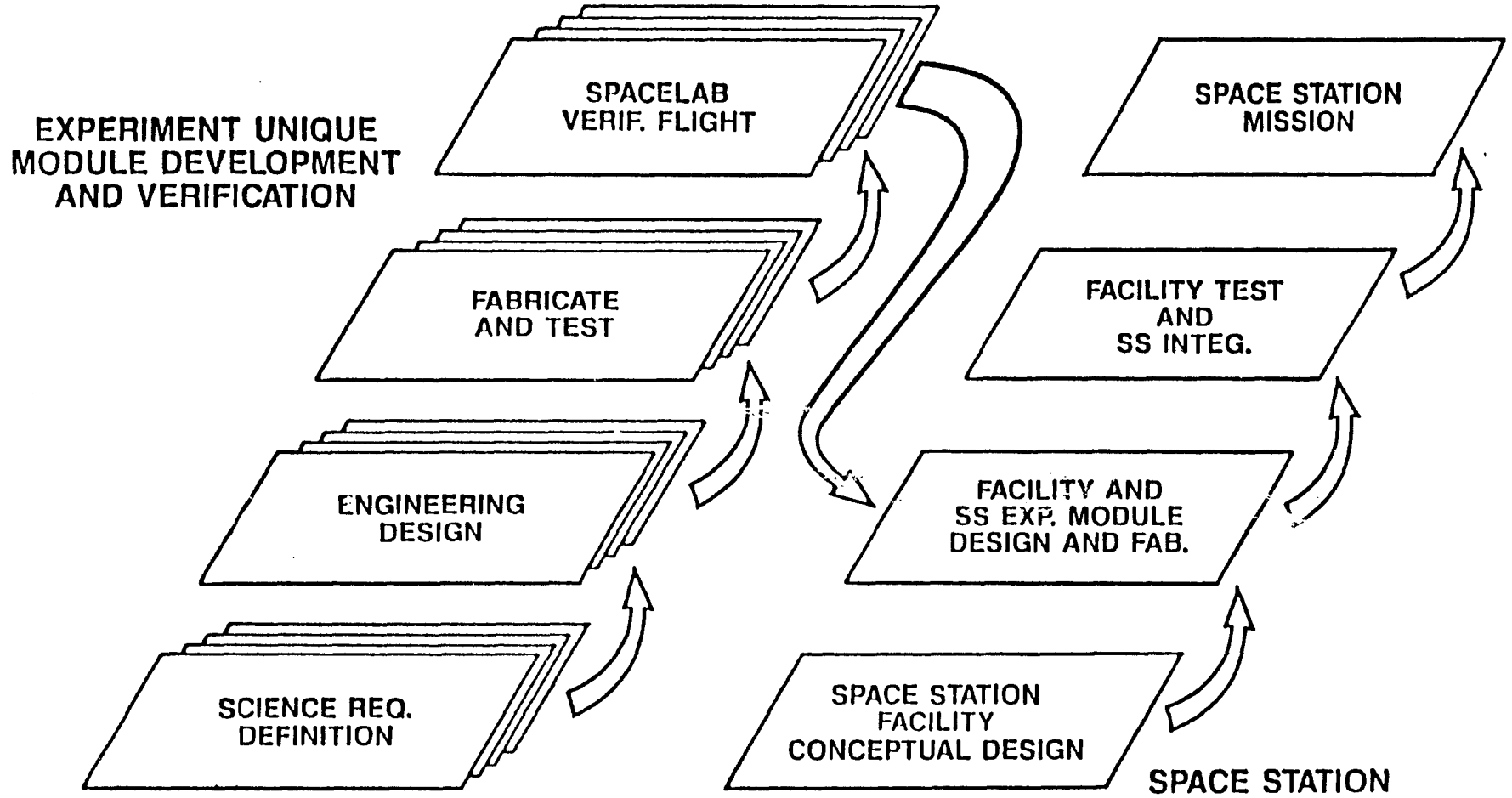
OSSA Microgravity Payload Strategy

CONCEPT

In evolving from Spacelab to Space Station, OSSA's strategy calls for:

- **Increasing the frequency of hands-on science opportunities in space,**
- **Extending the orbital stay time of the scientist and engineer teams, and**
- **Evolution of experiment hardware to Space Station facilities.**

Evolution to Space Station Facility



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Microgravity Sciences Space Station Activities

SPACE STATION FURNACE FACILITY (SSFF)

Materials research in metals and alloy solidification and crystal growth

Higher quality crystals for advanced electronic devices

Materials with unique or improved properties

SSFF

ADVANCED PROTEIN CRYSTAL GROWTH FACILITY (APCGF)

High quality crystals grown under controlled conditions

Increased understanding of processes involved

Pharmaceutical, medical, chemical and biotechnology applications

APCGF

MODULAR CONTAINERLESS PROCESSING FACILITY (MCPF)

Provide a basic support for a wide range of experiments through use of hybrid design of levitation techniques

MCPF

BIOTECHNOLOGY FACILITY (BTF)

Enhance separation processes for purification of biological materials

Obtain basic information on effects of microgravity on biological processes & living organisms at the cellular level

Enhance production of complex biomaterials

BTF

MODULAR COMBUSTION FACILITY (MCF)

Understanding of fundamental theories of combustion processes and phenomena

Provide data for combustion related applications (fire safety/ control, improved processes, advanced furnaces and boilers)

MCF

ORGANIC/POLYMER CRYSTAL GROWTH EXPERIMENTATION

Understanding the influence of gravity on the processes of ordering organic and polymer molecules

Establishes relationships between materials structures and their properties

OPCGE

FLUID PHYSICS/DYNAMICS FACILITY (FP/DF)

Develop further understanding of fundamental theories of fluid behavior

Provide improvements in thermo-physical property measurements

Provide data related to fluids applications/systems (in-space fluid management)

FP/DF

FUNDAMENTAL PHENOMENA EXPERIMENTATION

Challenges and improves existing scientific theory

FPE

FLIGHT SYSTEMS DIVISION

EM 05/18/8

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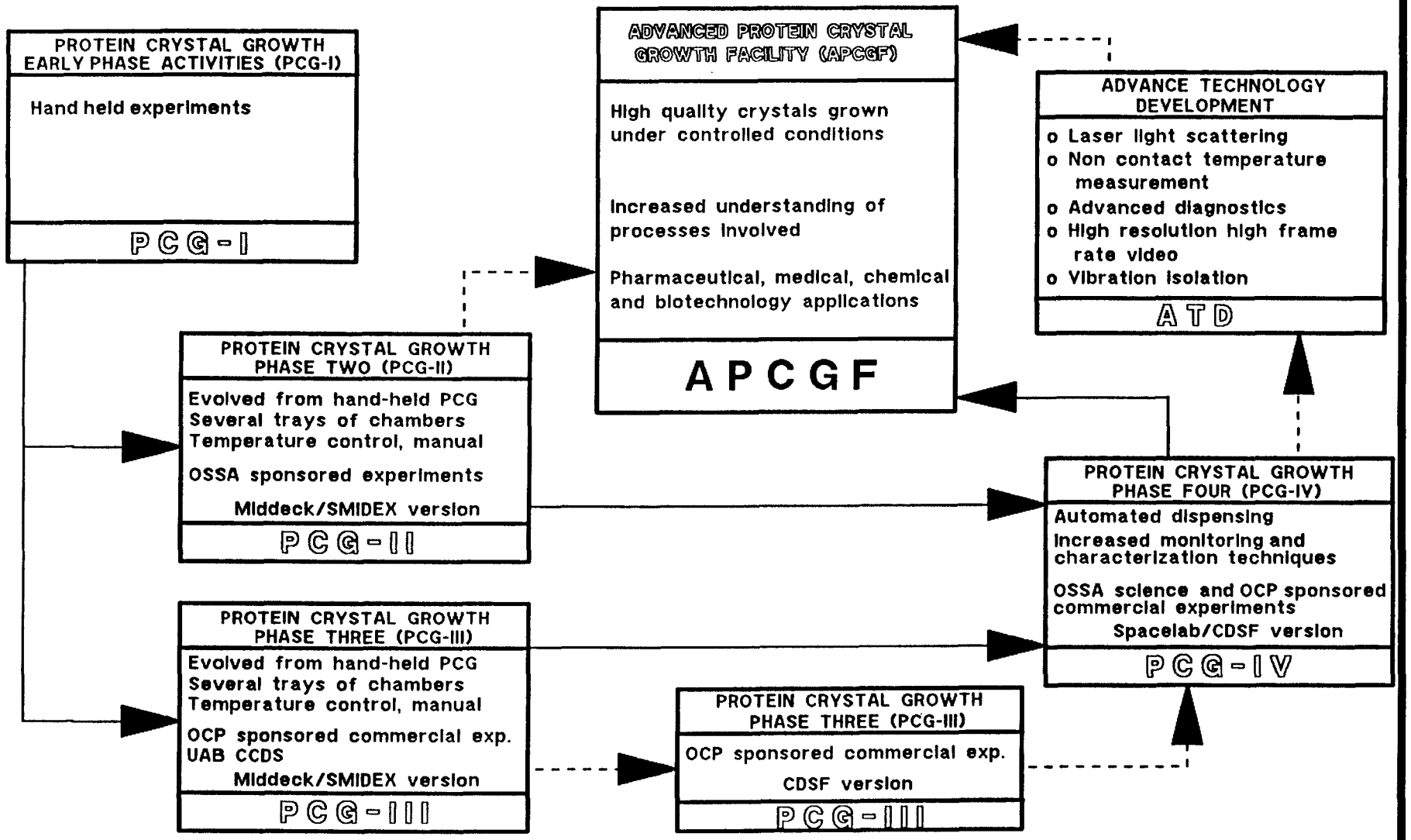
MICROGRAVITY SCIENCES PRECURSOR FACILITIES



FLIGHT SYSTEMS DIVISION

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Life Sciences Space Station Activities

1.8 METER CENTRIFUGE FACILITY

- Verify functional/checkout of flight hardware
- Conduct long term science investigations on small animals and plants
  - Countermeasures using artificial gravity
  - Used for control studies
  - Variable gravity studies to measure threshold responses
- Types of research planned:
  - Cardiovascular
  - Neurovestibular
  - Muscle/Skeleton
  - Gravitational biology

LIFE SCIENCES RESEARCH FACILITIES

- Equipment verification
- Conduct long term scientific investigations
- Exobiology
- Gravitational biology
- Space physiology
- Controlled Ecological Life Support Sys. (CELSS)

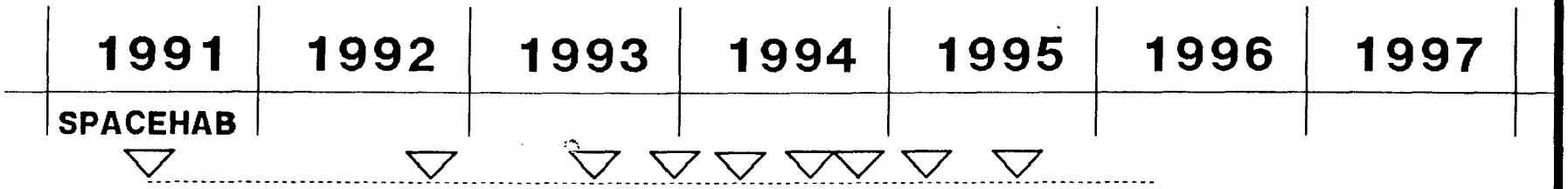
SPACE BIO - 1	SPACE BIO - 2	SPACE BIO - 3
	SPACE BIO - 4	SPACE BIO - 5
	SPACE BIO - 6	SPACE BIO - 7

LONG DURATION CREW OPERATIONS COUNTERMEASURIES STUDIES

- Equipment verification
- Observational studies
- Verify long term countermeasures effectiveness

OFFICE OF SPACE SCIENCE AND APPLICATIONS

OSSA CDSF Utilization Plan



Spacelab Operational Era

CDSF Attached Opns & Free Flyer
(Self-powered attached EDO and orbiting free flyer)

CDSF Free Flyer

Spacelab Program Augmentation

Extended Duration Opportunities

Space Station Test Bed

Space Station U.S. Man Tended Free Flyer

Space Station Era

FLIGHT SYSTEMS DIVISION

05/18/88

29-SSAC03

Life Sciences Space Station Activities

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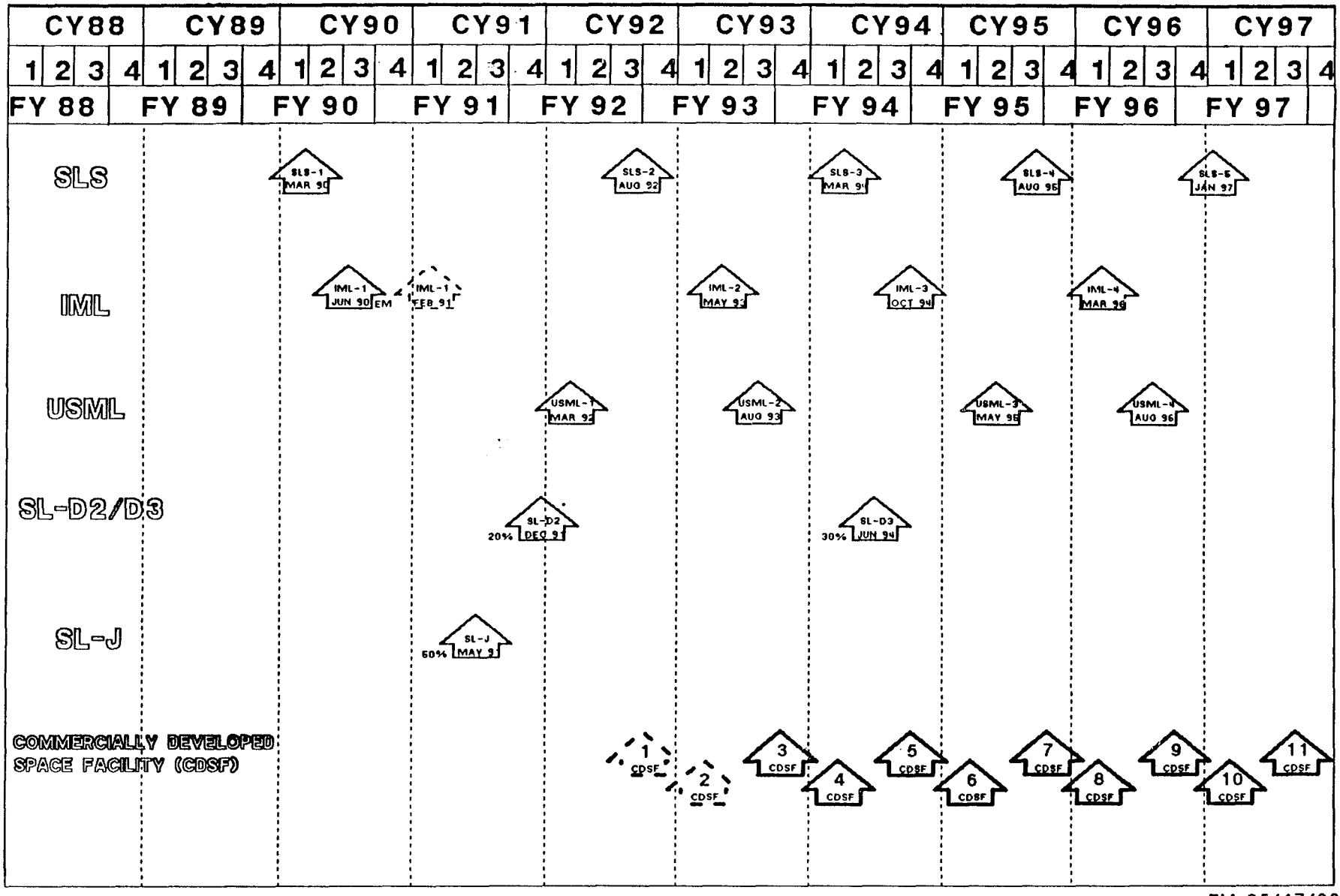
CDSF Utilization

Primary OSSA use in the attached mode

- **Represents opportunity to obtain up to 25-days of attached hands-on science and perform some automatic flyer activities**
  - **Supplements Spacelab science opportunities**
  - **Represents initial test of man-tended free flyer**
  - **Offers timely return of selected samples**
- **Remote/automatic operational test bed for Space Station**
- **Use as free flyer when need materializes**

OFFICE OF SPACE SCIENCE AND APPLICATIONS PROJECTION

MODULE OPPORTUNITIES PRIOR TO SPACE STATION



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