TPA FUSION TECHNOLOGY

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TPA MEETING
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TECHNOLOGY STEERING COMMITTEE (TSC)

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FUSION TECHNOLOGY CAN BE ORGANIZED IN SEVERAL WAYS

COMPONENTS	TECHNICAL DISCIPLINES	FUNCTIONS	OBJECTIVES
MAGNETS	NUCLEAR PHYSICS	ENERGY EXTRACTION AND CONVERSION	BETTER ECONOMICS
HEATING	NEUTRON TRANSPORT	FUEL PRODUCTION AND PROCESSING	BETTER SAFETY
FUELING	THERMODYNAMICS	PLASMA HEATING	BETTER ENVIRONMENTAL IMPACT
PLASMA INTERACTIVE COMPONENTS	FLUID MECHANICS	PLASMA FUELING	LOWER R&D COST
BLANKET	CHEMISTRY	PROVIDE MAGNETIC FIELD	
TRITIUM PROCESSING COMPONENTS	ELECTROMAGNETICS		
REMOTE MAINTENANCE EQUIPMENT	STRUCTURAL MECHANICS		
POWER CONVERSION SYSTEM	METALLURGY		
	RADIATION DAMAGE		
	NUCLEAR ENGR.		
	MECHANICAL ENGR.		
	CHEMICAL ENGR.		

FUSION TECHNOLOGY
BASIC ORGANIZATIONAL STRUCTURE
WILL BE BY COMPONENT

Main Components

- Magnets
- Heating/Fueling
- Blanket/First Wall/Shield
- Plasma Interactive Components (PIC)
- Tritium Processing and Vacuum Systems
- Power Conversion System
- Remote Maintenance Equipment

RELATION OF R&D FOR COMPONENTS
TO THE FOUR TECHNICAL ISSUES WILL BE SHOWN

MFPP Issue \ Component	Magnets	Heating/ Fueling	Blanket	PIC	Tritium	Remote Maint.
Confinement	X	X		X	X	X
Burning Plasma	X	X		X	X	
Materials	X	X	X	X		
Nuclear Technology	X	X	X	X	X	X

ORGANIZATIONAL RESPONSIBILITIES

- MEMBERS OF THE STEERING COMMITTEE (SC) WILL BE COLLECTIVELY RESPONSIBLE FOR DEVELOPING THE KEY ASPECTS OF THE PLAN

- FOR EACH COMPONENT, ONE OR MORE SC MEMBERS WILL LEAD THE DAY-TO-DAY WORK

- FOR EACH COMPONENT, A CORE GROUP OF TECHNICAL EXPERTS WILL DEVELOP THE NECESSARY INFORMATION

- OTHER EXPERTS IN THE COMMUNITY WILL BE CONSULTED; WILL ENSURE THAT DIFFERENT IDEAS, VIEWS, ETC. ARE DISCUSSED

- ONE OR MORE COMMUNITY-WIDE WORKSHOPS WILL PROVIDE USEFUL FEEDBACK AND BUILD CONSENSUS

- PREVIOUS WORK WILL BE USED WHEN AND WHERE RELEVANT

- INPUT FROM EXISTING PROJECTS, STUDIES, TASK GROUPS, ETC. WILL BE SOUGHT

KEY SCM(S)

- MAGNETS — HENNING/BERRY
- HEATING/FUELING — BERRY/SCHMIDT
- BLANKET/FIRST WALL/SHIELD — ABDOU/SMITH/KORENKO
- PLASMA INTERACTIVE COMPONENTS (PIC) — GAUSTER/SCHMIDT
- TRITIUM PROCESSING, VACUUM SYSTEMS — (BARTLIT)
- POWER CONVERSION SYSTEM — HENNING/MANISCALCO
- REMOTE MAINTENANCE EQUIPMENT — GAUSTER/KORENKO

A "STRUCTURED" METHODOLOGY/APPROACH WILL BE USED FOR PLANNING TECHNOLOGY

INCENTIVES

- TO ENCOURAGE CREATIVE THINKING ABOUT VARIOUS R&D PATHWAYS (ALTERNATIVES) TO ACCOMPLISH OBJECTIVES

- TO ENCOURAGE UNCOVERING AND UNDERSTANDING KEY ASSUMPTIONS, DECISION POINTS AND LIKELY OUTCOME (CONSEQUENCES) OF VARIOUS ALTERNATIVES

- TO PROVIDE A "COMMON SCALE" FOR COMPARING:

  - VARIOUS ALTERNATIVES

  - RELATIVE "WORTH" OF MAJOR FACILITIES, EXPERIMENTS (FOR EACH COMPONENT, AMONG DIFFERENT COMPONENTS?)

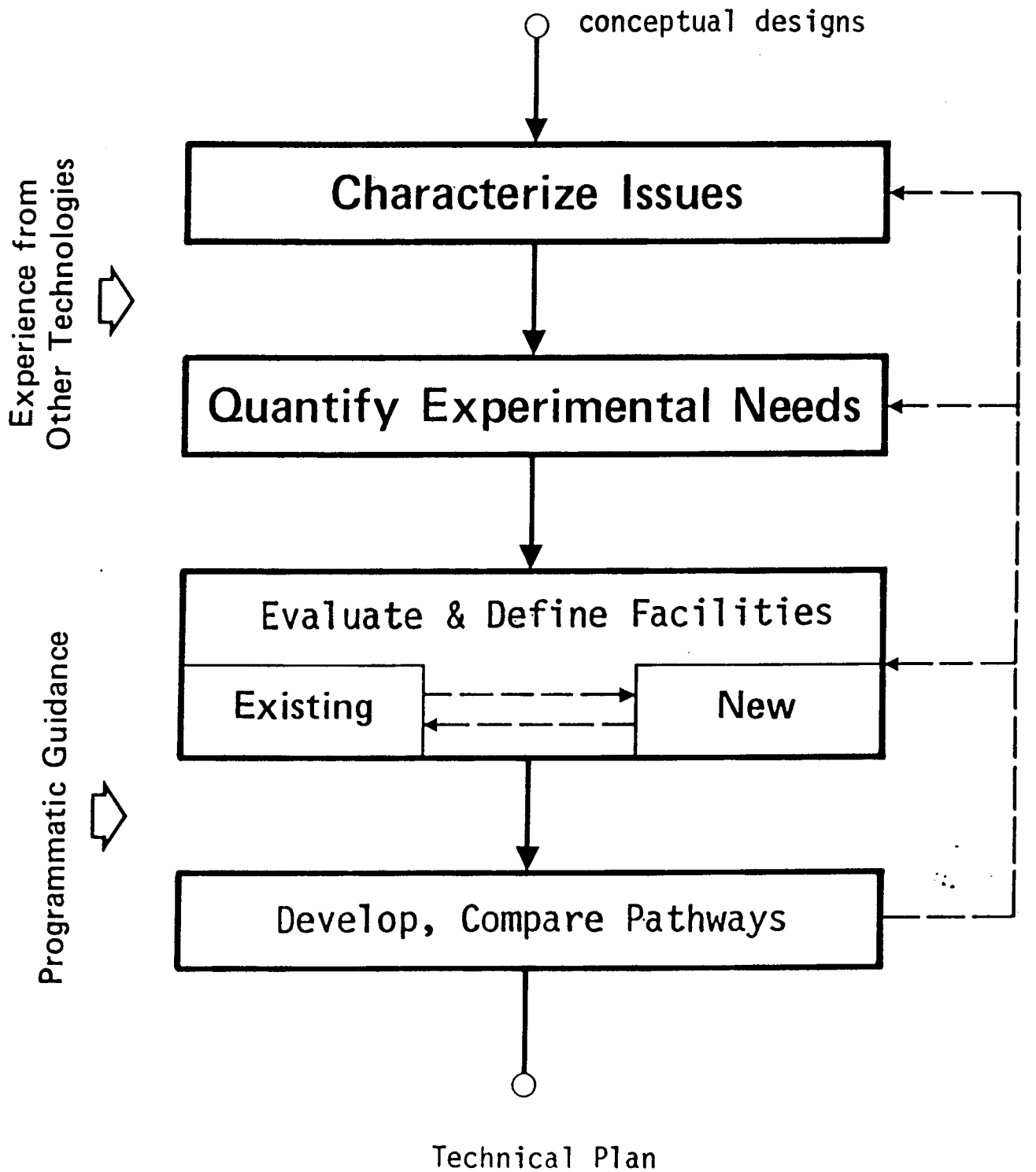
THE "STRUCTURED" PLANNING PROCESS SHOULD POSSESS CERTAIN DESIRABLE CHARACTERISTICS:

- SYSTEMMATIC AND LOGICAL
- DEFENSIBLE
- EXPLAINABLE
- QUANTIFIES THE VALUE OF PROGRAM ELEMENTS VS. OBJECTIVES
- QUANTIFIES SUBJECTIVE JUDGMENTS (E.G., COST, TIME. TECHNICAL UNCERTAINTY)
- FACILITATES CREATION OF CONSENSUS
- ALLOWS FOR CHANGES IN POLICY AND NEW INNOVATIONS

"STRUCTURED" METHODOLOGY

- KEY ELEMENTS OF METHODOLOGY DISCUSSED
- WILL EVOLVE THIS SUMMER
- PRESENTLY TRYING FOR ONE COMPONENT, ON AN "EXPERIMENTAL/LEARNING" BASIS, A PROMISING APPROACH BASED ON:
  - "FINESSE TYPE" PROCESS FOR <u>DEVELOPING</u> ALTERNATIVE PATHWAYS
  - "ANALYTIC-DECISION MAKING" PROCESS FOR <u>COMPARING</u> ALTERNATIVE PATHWAYS

FINESSE PROCESS For Experiment Planning



GENERAL PROCEDURE OF "DECISION ANALYSIS" APPROACH

1. DEFINE AND STRUCTURE THE DECISION PROBLEM.

2. SPECIFY OBJECTIVES AND ATTRIBUTES:
   A. OVERALL OBJECTIVES FROM MFPP;
   B. DEVELOP MEASURABLE (SUB)OBJECTIVES FOR EACH TECHNOLOGY COMPONENT;
   C. DEVELOP ATTRIBUTES (EVALUATION SCALES).

3. DETERMINE PREFERENCES (VALUES) OF DECISION MAKERS.

4. GENERATE ALTERNATIVES.

5. ASSESS THE POSSIBLE CONSEQUENCES OF EACH ALTERNATIVE (DEGREE TO WHICH ALTERNATIVES MEET OBJECTIVES).

6. EVALUATE AND COMPARE ALTERNATIVES (BASED ON DEGREE OF MEETING OBJECTIVES AND PREFERENCES FOR OBJECTIVES).

FUSION TECHNOLOGY GROUP
ACTIVITIES/SCHEDULE

SUMMER 1985

- ORGANIZE SUBGROUPS
- CHARACTERIZE ISSUES
- IDENTIFY, QUANTIFY EXPERIMENTS NEEDED (NOT FACILITIES, BUT MAJOR FEATURES OF EXPERIMENTS, EXPERIMENTAL CONDITIONS) TO RESOLVE ISSUES
- EVOLVE METHODOLOGY FOR PLANNING

FALL 1985

- EVALUATE EXISTING FACILITIES CAPABILITIES AND LIMITATIONS
- CHARACTERIZE, SELECT NEW FACILITIES
- DEVELOP ALTERNATIVE PATHWAYS

WINTER 1986

- COMPARE ALTERNATIVES FOR EACH COMPONENT
- COMPARE "RELATIVE WORTH" AMONG COMPONENTS?
- DEVELOP BASIC ELEMENTS/FEATURES OF TECHNOLOGY TECHNICAL PLAN

SPRING 1986

- FOCUS ON SPECIFIC PLANS FOR NEXT FIVE YEARS WITH MFPP ISSUES ORIENTATION
- REFINEMENT
- WRITING

EXPECTED REPORTS

- INTERIM REPORT, OCTOBER 1985
  CHARACTERIZATION OF ISSUES AND NEEDED EXPERIMENTS

- FINAL REPORT, LATE SPRING 1986