

FORUM FOR MAJOR NEXT-STEP
FUSION EXPERIMENTS
SUMMARY OF PROGRESS

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Goals of Forum

- Identify set of candidate “credible” strategy options for advancing fusion energy which have broad community support.
- Take a step towards a more effective method of building a community consensus and set stage for continuing this process
- Provide a sense of the US fusion community views on potential major next steps in fusion energy research as input into the ITER SWG discussions.

Forum Agenda Structure

Monday

**Background Briefings:
Outside Views and Input
Breakout Group Assignment**

Tuesday

**Strategy Option Introduction and
Charge to Breakout Groups
Key Physics & Technology Issues**

**Tues.PM -
Wednesday**

**Review and Discussion of
Major Next Step Experiment Options**

**Wed. Evening
- Thursday**

**Discussion & Breakout Groups:
Formulation of a set of 'credible' strategy
options for advancing fusion energy**

Friday

**Summarize Progress and
Discuss Plans for Follow-on Activity
(Martha Krebs Participates in Discussion)**

Charge to Breakout Groups

- ① Formulate a set of credible strategies within your group, which your group supports, for the fusion energy science and technology leg of our program.
 - ② Identify the strengths and weaknesses of each strategy.
-

Your group should take into consideration primarily scientific and technical issues such as:

- Status of fusion energy science and technology today
- Relationship to and integration with the other elements of the fusion program in the U.S.

and, secondarily, other issues such as:

- Ability to muster support of the scientific, environmental, and energy policy communities
- ITER process & our partnership in the international effort
- FESAC/Grunder panel recommendations & options

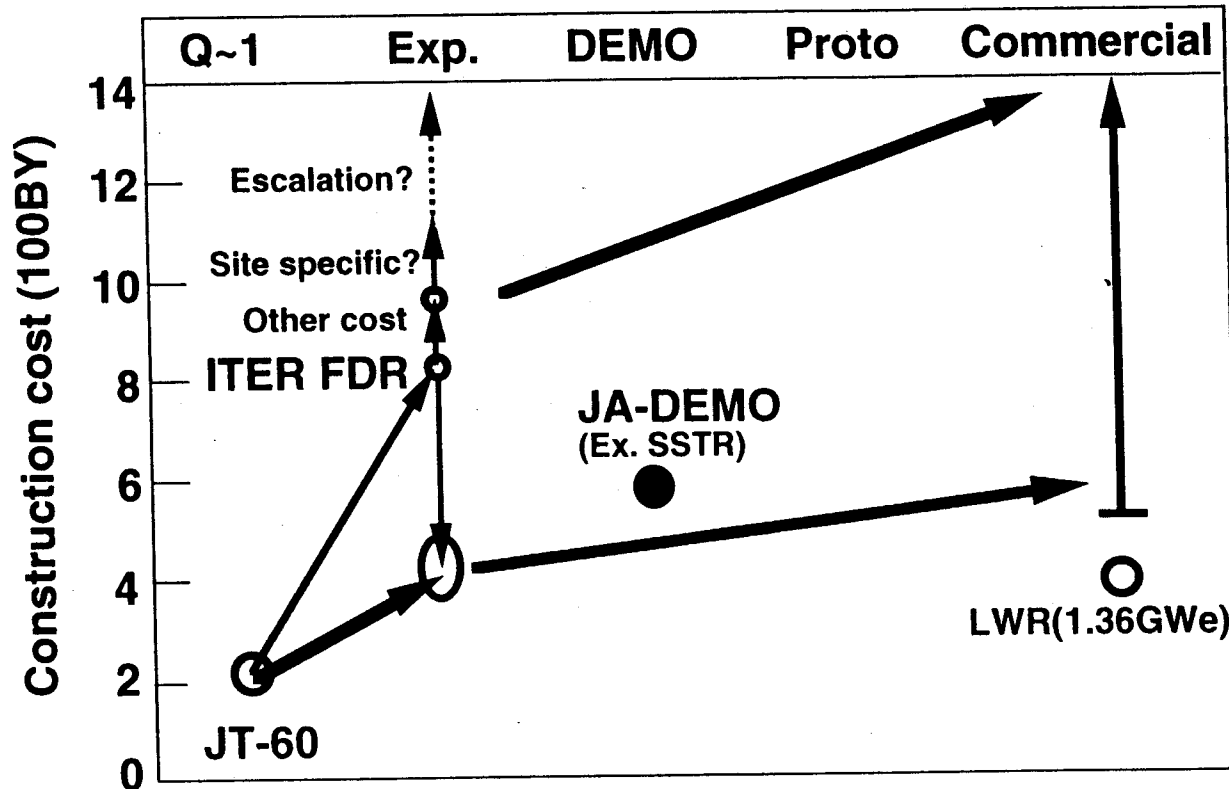
General Findings

- Need to reduce the cost of the individual development steps in our program to develop scientific and technical basis for a practical source of fusion energy:
 - “Cost of major steps characterizes the cost of the final product”.
- Attractiveness of a Next Step experiment is a primary concern: must emphasize innovation in our plan
- Exploration of a Burning Plasma was the primary priority for a strategy for a major next step experiment.

Approach toward DEMO and Fusion Power Reactor



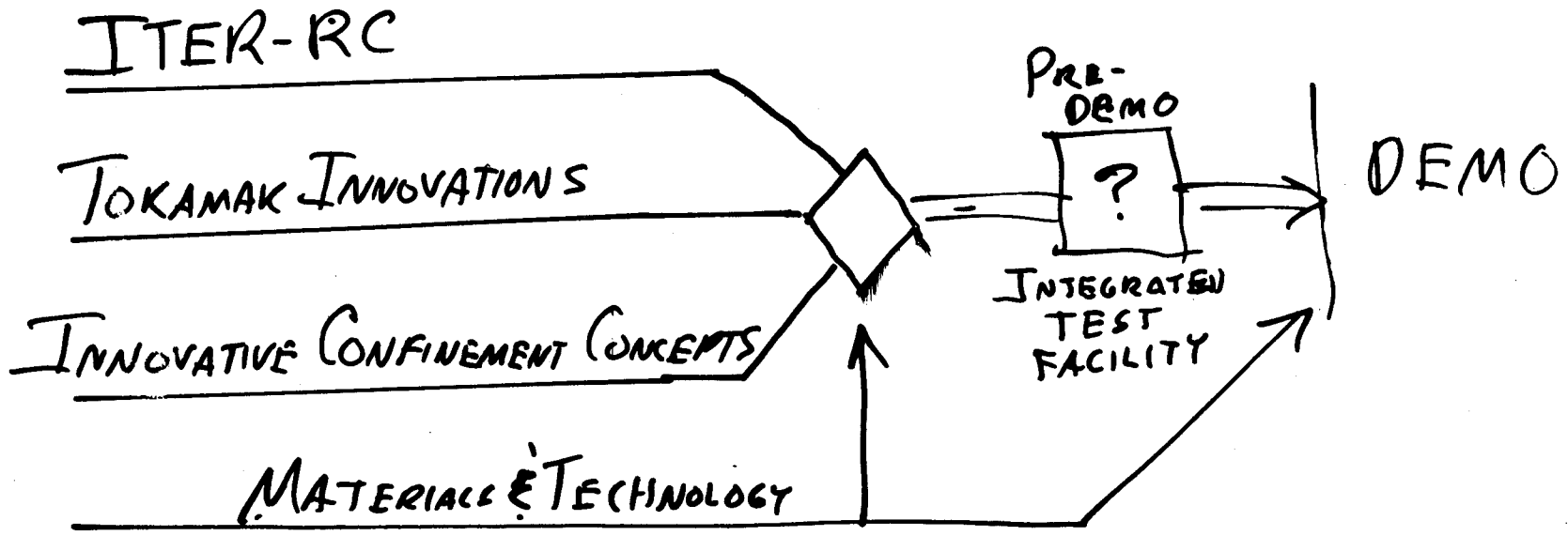
Fusion power development should be made so that people agree the cost as "rational expenditure" for the energy development.



Three Strategy Options

- **Single Machine:** take an integrated step forward now with the tokamak .
- **Multiple machine:** split mission elements and take a number of smaller parallel, phased, or sequential steps.
- **Defer major next step:** emphasize existing programs & innovative concept development

SINGLE MACHINE

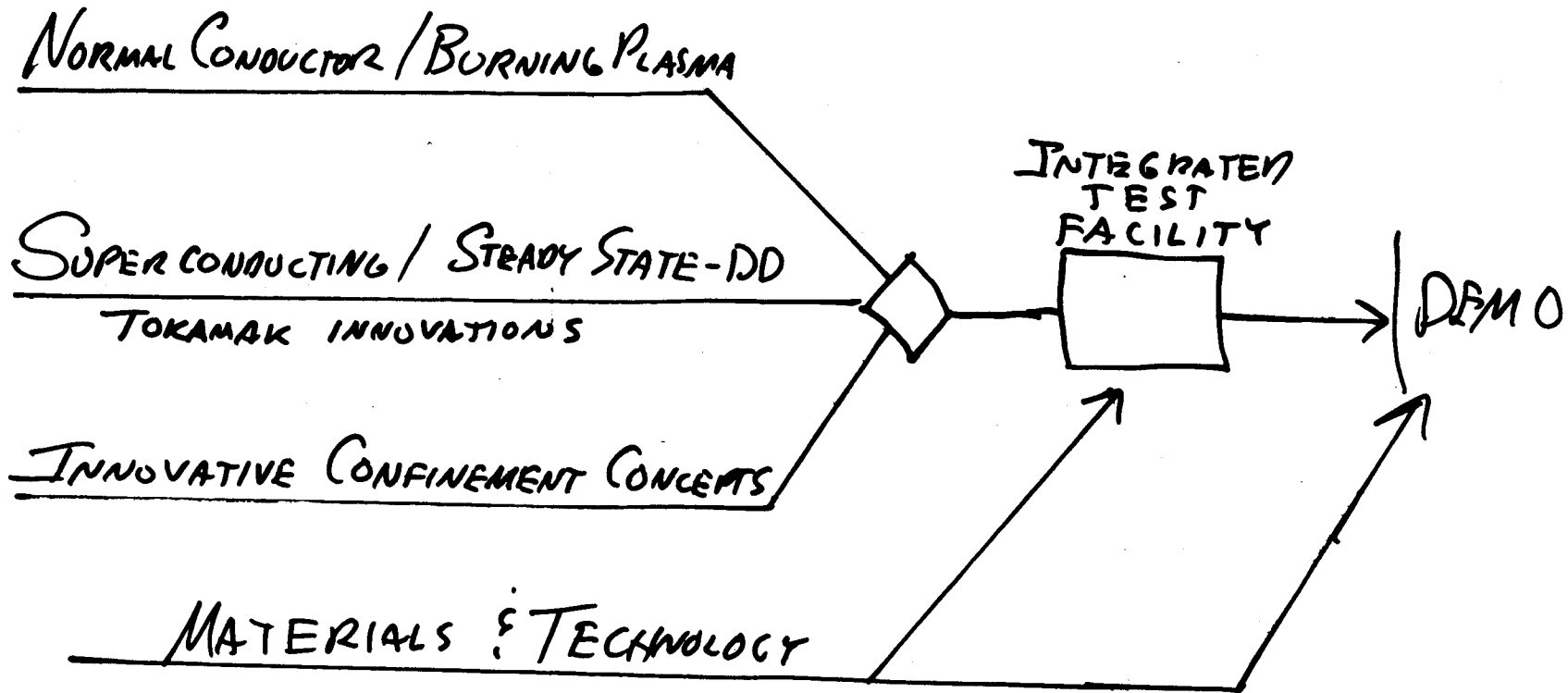


REDUCED COST ITER: MORE FLEXIBILITY AND AT CAPABILITY

PRO: EARLIEST PHYSICS/TECHNOLOGY INTEGRATION
BUILDS ON ESTABLISHED INTERNATIONAL STRUCTURE

CON: LESS FLEXIBILITY
COSTLY SINGLE STEP

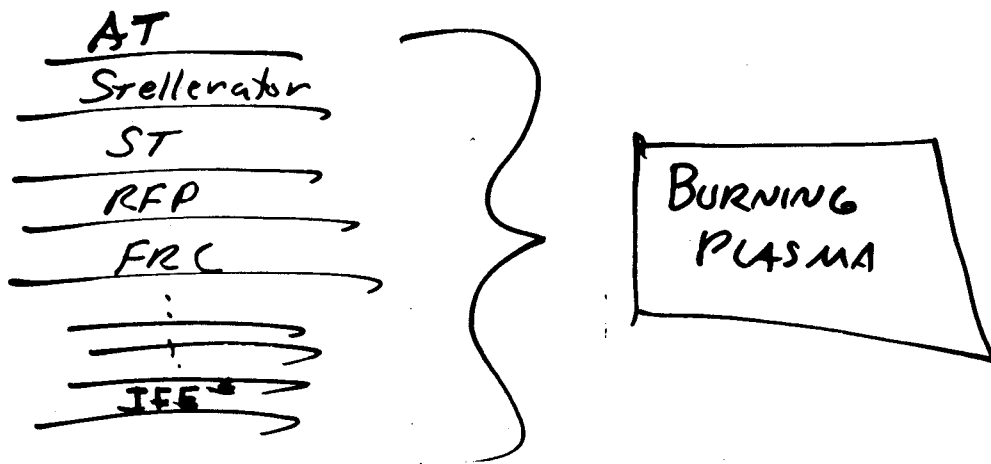
MULTIPLE-MACHINE | INTERNATIONAL PROGRAM



PRO: GREATER FLEXIBILITY
LESS COSTLY ELEMENTS

CON: DELAYS INTEGRATION
NOT IN PRESENT INTERNATIONAL GAME PLAN

DEFER MAJOR NEXT STEP



PRO: MAY LEAD TO GREATLY IMPROVED APPROACH

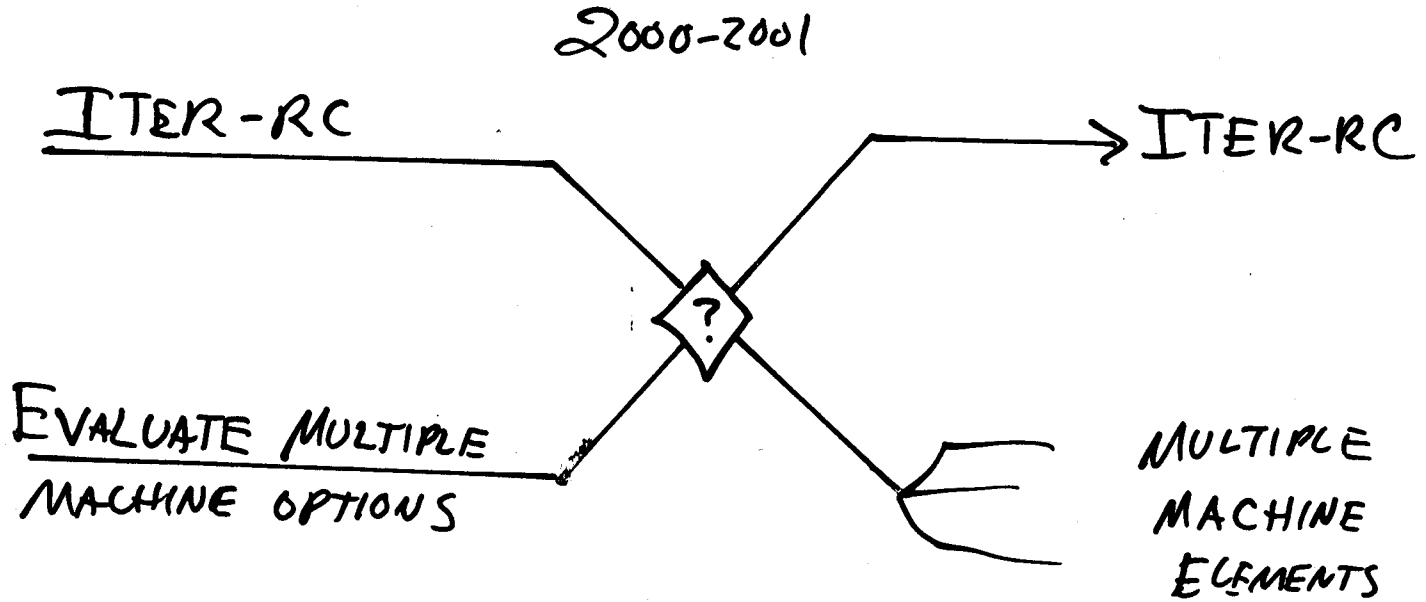
CON: NOT MOVING TOWARDS FUSION ENERGY

*IFE: not the appropriate forum

Views on the Strategies

- Both the Single-Machine and Multiple-Machine Strategies had substantial support.
- The Defer Strategy had no broad support and was opposed by several groups.
- Multiple-Machine strategy was preferred over the Single-Machine Strategy, and a minority was opposed to the Single-Machine Strategy.
- Consensus that we should not withdraw from the ITER process at this time: support for ITER contingent on improved flexibility to explore Advanced Tokamak physics in a reduced cost ITER.

COMBINED PARALLEL STRATEGY (NEAR-TERM)



Three Wishes

1) LISTEN to our colleagues.

Consensus is not achieved chiefly by speaking, but by listening.

2) LEARN and understand...

... to see our community as others see us.

... what goals we share in common, even if we differ on optimal means of achieving those goals.

3) Begin to ACT as a true 'community'.

Given the range of options on the agenda, we can't all be right...or can we? We agree on the importance of developing fusion energy and on many of the issues which must be addressed to make that a happen.

Build on these and develop a set of strategies which we can generally support.