ATW Target-Blanket
Technical Working Group

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Interim Status Report

AGENDA

- TWG organization
- Group progress
  - Target-Blanket Baseline Technology and Alternatives
  - Report Preparation
- Steering Committee issues

Target Blanket TWG Organization

Francesco Vanneri and Doug Crawford
Co-Chairs

H. Khalil
Nuclear Design and Control

K. Woloshun
Heat Removal and Ancillary Systems

N. Li
Pb-Bi Technology

M. Cappiello
Spallation Target

S. Hayes
Fuel Technology

Baseline Technology

- Solid metallic fuel
- Liquid lead-bismuth eutectic (LBE) coolant
- LBE spallation target
- Subcritical, fast-spectrum core
- Moderated LLFP transmutation assemblies
- Power management through accelerator current and core reactivity control

Fuel Alternatives and Issues

- Issues
  - Retention of actinides during fabrication
  - Irradiation performance
  - Compatibility with pyroprocess technology
- Options
  - Stainless Clad Zr-25 actinide, injection cast
  - Stainless Clad Zr-25 actinide, dispersion
  - TBD (nitride, cermet, oxide)

Materials
Alternatives and Issues

- Issues
  - Selection for core internals, cladding, target and window, reactor vessel, components
  - LBE compatibility (Russian data acceptance)
  - Irradiation effects (neutron & proton damage)
- Options
  - Russian Alloys (EP823, Austenitic)
  - U.S. Alloys (HT9, SS316, 2 1/4 Cr-1Mo)

Heat Removal and Ancillary Systems Alternatives and Issues

- Issues
  - Extent of natural convection
  - Transfer of Russian technology for LBE
- Options
  - Coolant (LBE, Lead, Sodium)
  - Component options (e.g., pump, steam generator, IHX)
  - Decay heat removal

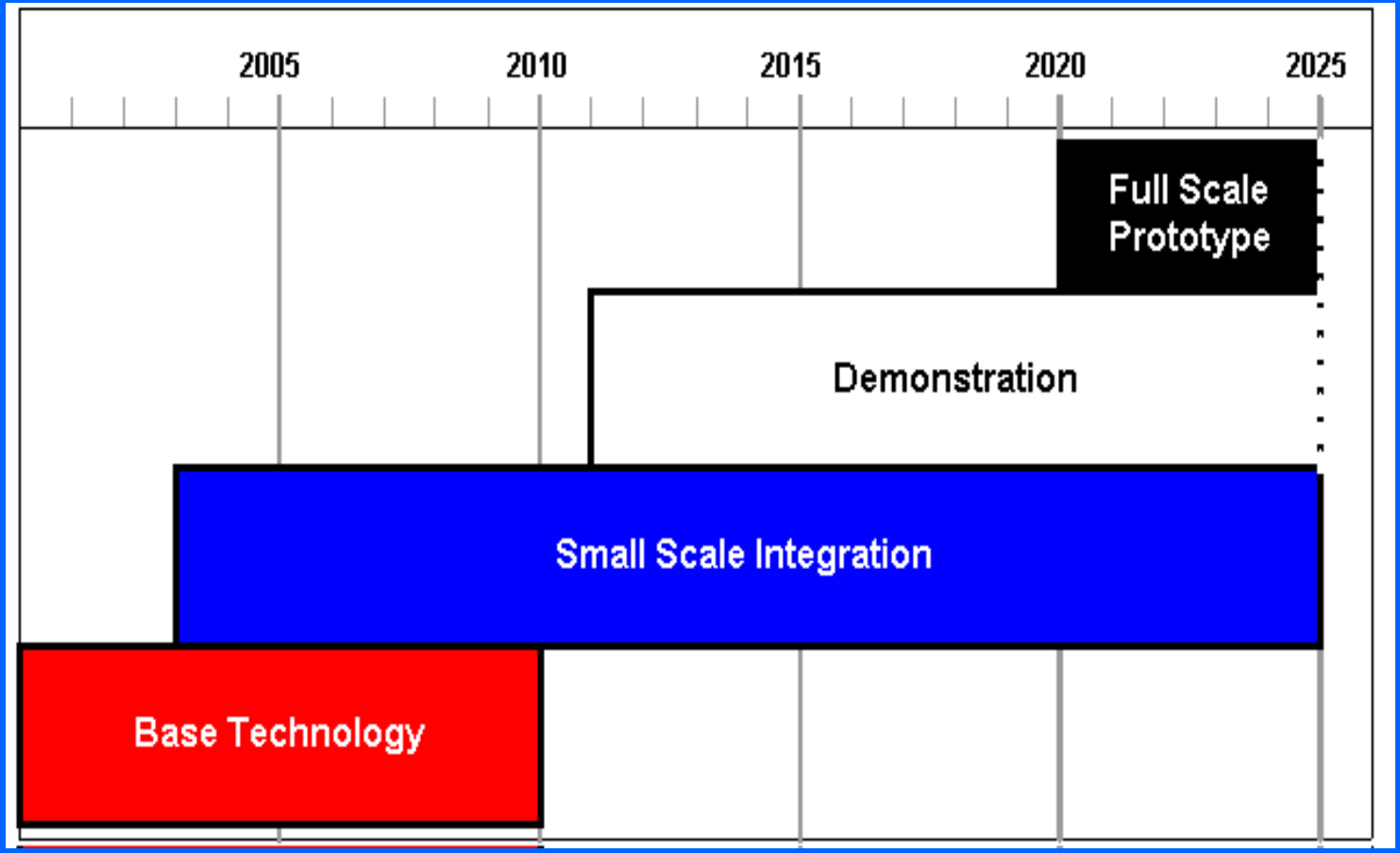
Target Alternatives and Issues

- Issues
  - Radiation damage to materials
  - Spallation product effects
  - Interface with accelerator
- Options
  - Separate or integral with coolant

Nuclear Design and Safety Alternatives and Issues

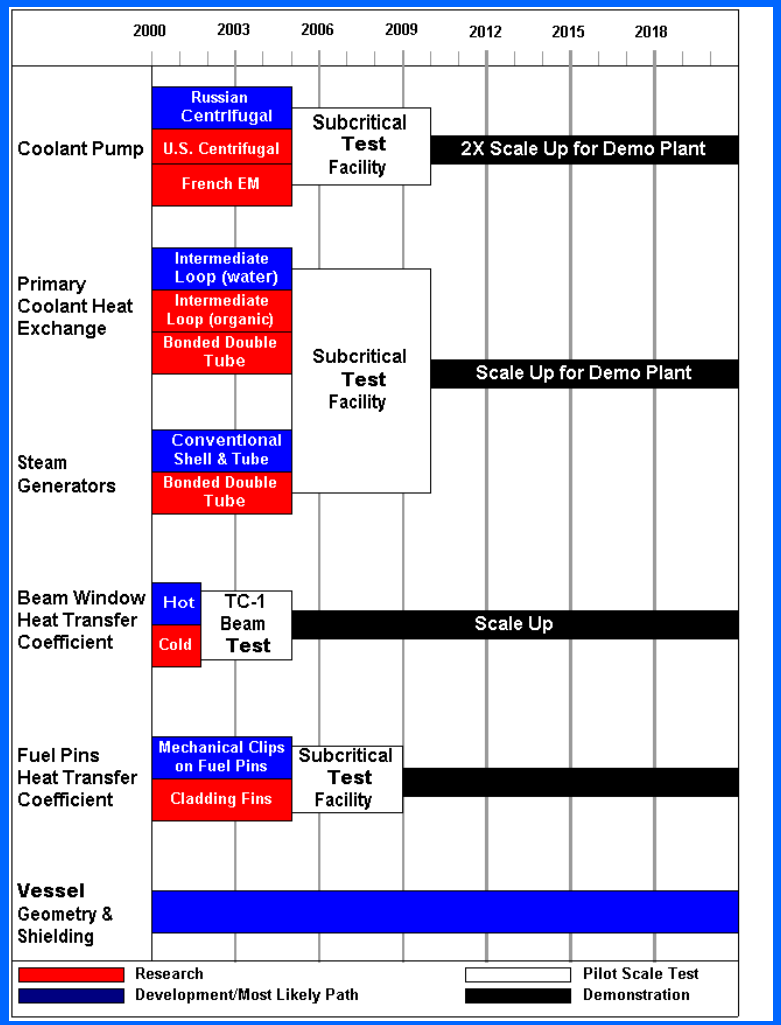
- Issues
  - Dynamic behavior
  - Fuel composition variations
  - Burnup reactivity compensation
- Options
  - Degree of subcriticality
  - Accelerator beam and core reactivity adjustment

Phased Technology Development

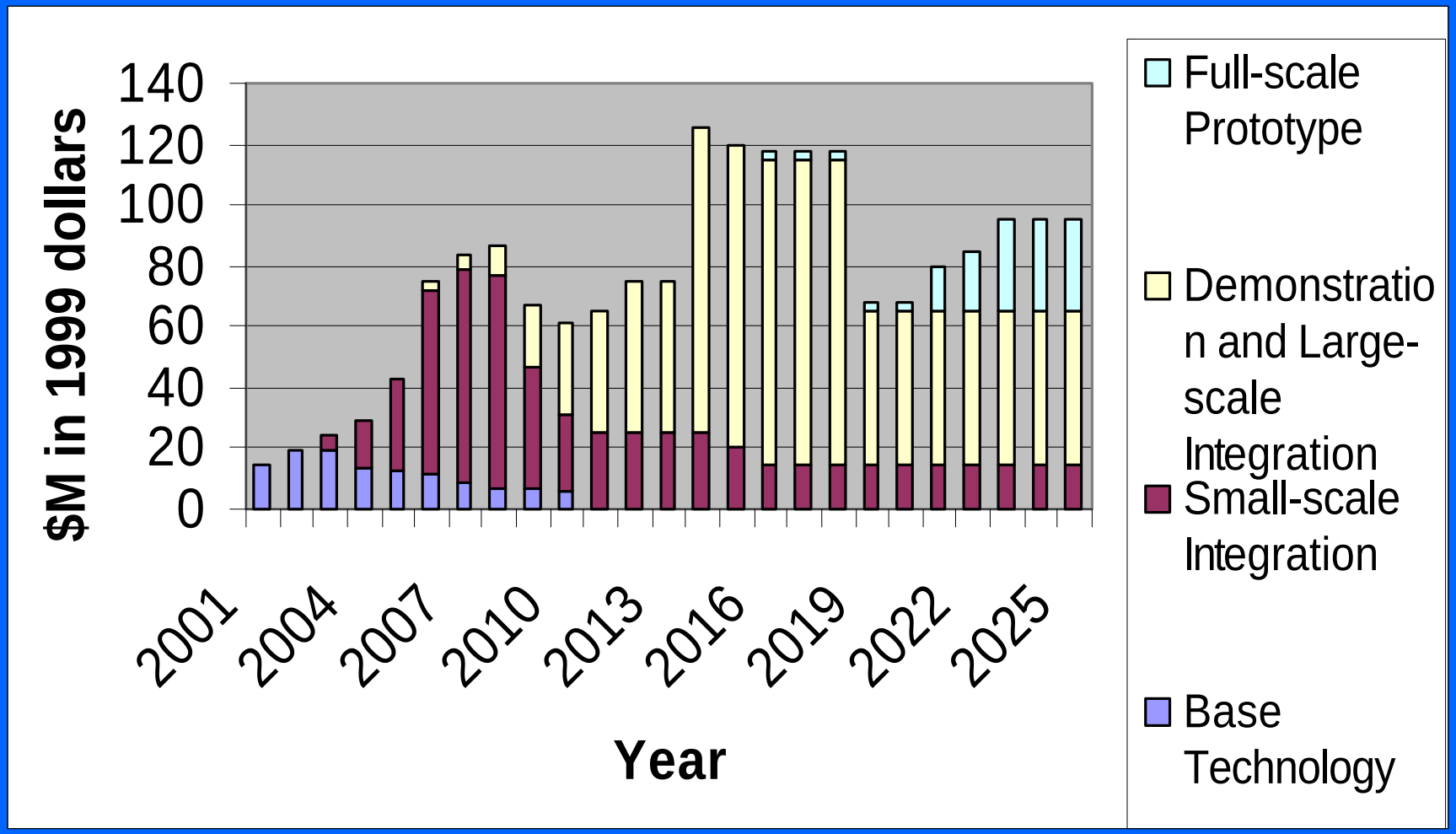


Report Status

- Text and graphics 75% complete



Preliminary Budget Estimate



Preliminary Budget

year	Base Technology ($M)	Small-scale Integration ($M)	Demonstration & Large-scale Integration ($M)	Full-scale Prototype ($M)	Total ($M)
2001	15				15
2002	19				19
2003	19	5			24
2004	14	15			29
2005	13	30			43
2006	12	60	3		75
2007	9	70	5		84
2008	7	70	10		87
2009	7	40	20		67
2010	6	25	30		61
2011		25	40		65
2012		25	50		75
2013		25	50		75
2014		25	100		125
2015		20	100		120
2016		15	100	3	118
2017		15	100	3	118
2018		15	100	3	118
2019		15	50	3	68
2020		15	50	3	68
2021		15	50	15	80
2022		15	50	20	85
2023		15	50	30	95
2024		15	50	30	95
2025		15	50	30	95
Total ($M)	121	585	1058	140	1904