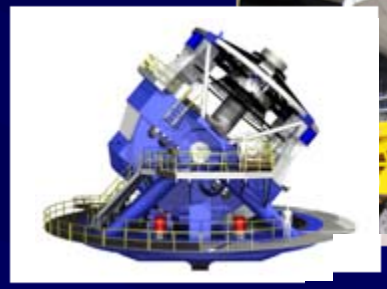
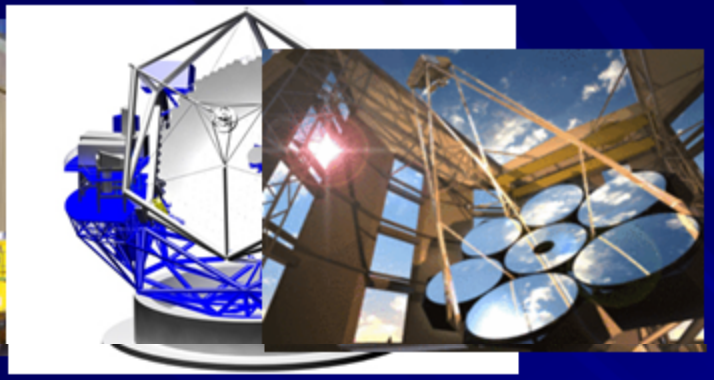
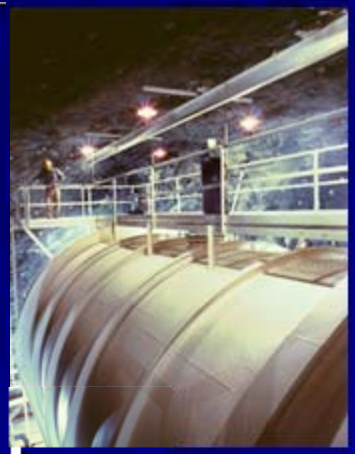
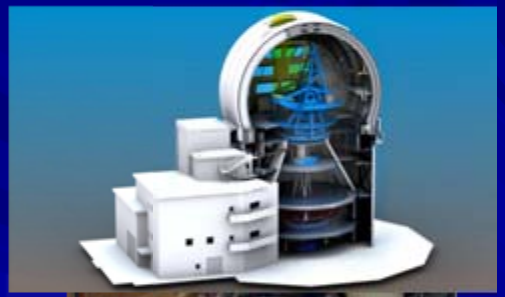


MPS Facilities Planning

Putting the pieces together




Why an MPS Facilities Plan?

- Project costs outpacing divisional budget growth
  - Scientific, fiscal, managerial, political impacts
  - *Projects of this magnitude can no longer **just happen** <u>to</u> MPS*
  - Concept to operations stretches 10 – 15 years
  - *If we do not do careful planning, these projects will not happen at all*
- Must design and use a *process* of active life-cycle management
  - Actively plan from concept to operations
  - Measure progress, formulate contingency plans
  - Maintain as a living document
- Overarching view of ALL MPS facilities

Objectives

- Serve as one aspect of a joint venture of facilities stewardship within NSF
- Provide useful management tools for MPS/ NSF
- Versions at different levels of detail will convey status to:
  - OAD, OD, NSB, OMB, OSTP, Congress
  - **Scientific community** – transparent process to help manage expectations
- Provide vehicle for communication, negotiation, and coordination with prospective partners
- Facilitate interface with Large Facilities Projects Office and MREFC process

Major Planning Functions

- Regularly evaluate the current inventory of facilities
  - Scientific niche and environment
  - Management issues such as recompetition or phase out
- Track status of facilities in planning, development, and construction
- Maintain an evolving MPS “roadmap”
  - Clear priorities established; decision points detailed
  - Realistic development and decision process timescales
  - *Dynamic - must adapt to changing environments and circumstance*

Priority Setting

- Must take into account all projects under development
  - Not just first over the transom; today's action could negate tomorrow's opportunity
  - Facility plan must support modeling under various assumptions
- Must ensure we can follow through on what we start – build, maintain, and use our facilities effectively
- Ultimate MPS decision rests with AD

Elements of MPS Priority Decisions

- Science case
- Role of facility in discipline
- Role of division in discipline
- Priority as established by discipline(s)
- Technological and management readiness
- Manageable financial scale throughout life-cycle?
  - Divisional, MPS, NSF financial planning
- Strength and nature of partnerships
- Alternatives analysis
  - What if NSF did nothing?
  - De-scoping options and impact on scientific case?
  - Other paths to the same end?
- Balance among MPS divisions
- MPSAC input

Steps to a Plan

- First draft of plan – Nov
- Discussed with MPS AC - Nov
- MPS Program Officers Working Group – Nov 15
  - Begin to flesh out details
  - Refine tracking tools definition and use
- Discussion with NSF MREFC Panel – Jan
- Discussion with AAAC – this meeting
- Adopt budget assumptions and begin prioritization process ~ March
- Discussion with MPS AC - April

MPS Facilities in Play

- Under construction
  - ALMA
  - Adv LIGO
- “Ready”
  - ATST
- Under development or study
  - Coherent light source (CLS)
  - DUSEL
  - LHC Upgrade
  - GSMT
  - LSST
  - SKA
  - ILC

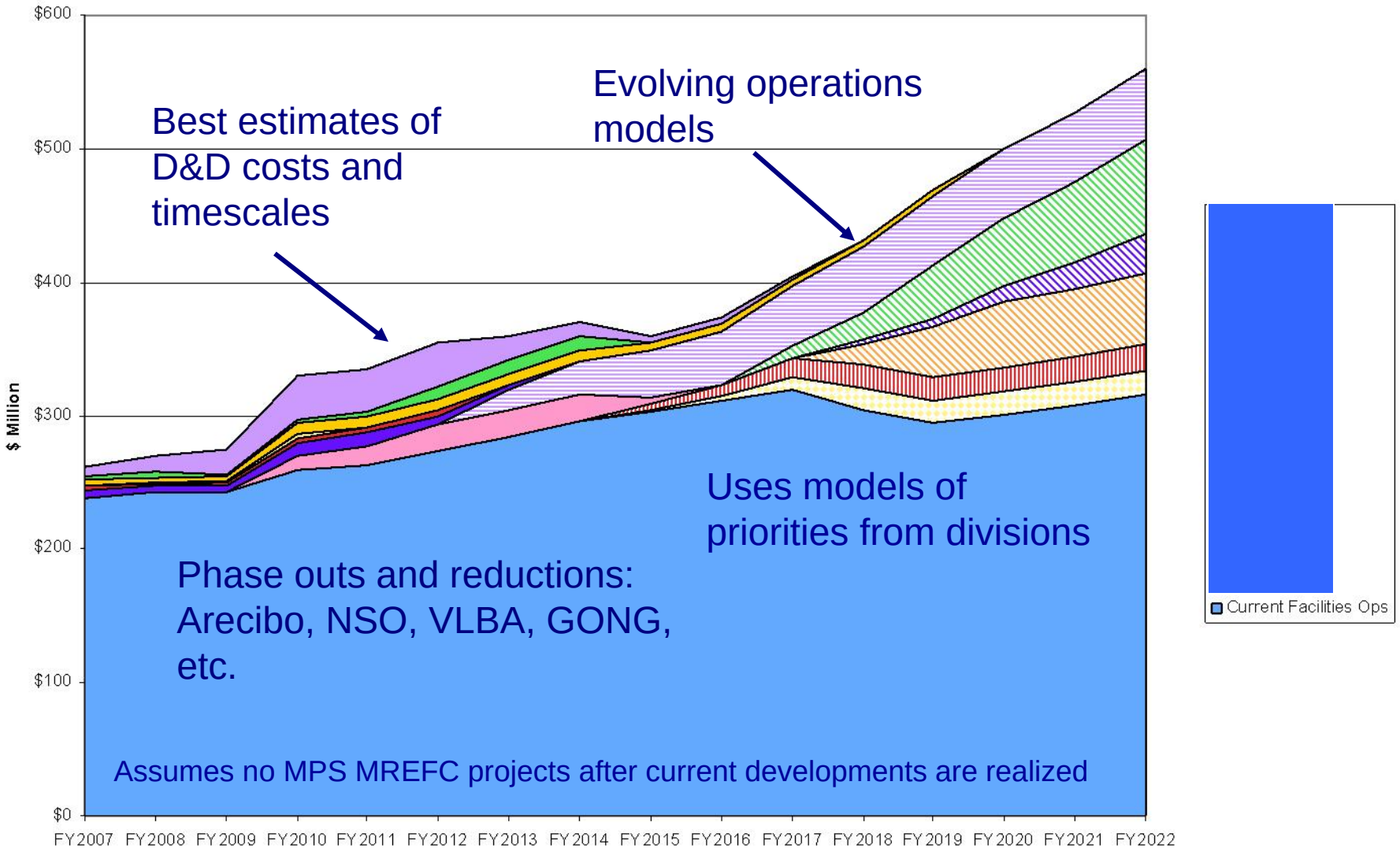
Major Planning Functions

- Regularly evaluate the current inventory of facilities
  - Scientific niche and environment
  - Management issues such as recompetition or phase out
- Track status of facilities in planning, development, and construction
- Maintain an evolving MPS “roadmap”
  - Clear priorities established; decision points detailed
  - Realistic development and decision process timescales
  - ***Dynamic - must adapt to changing environments and circumstance***

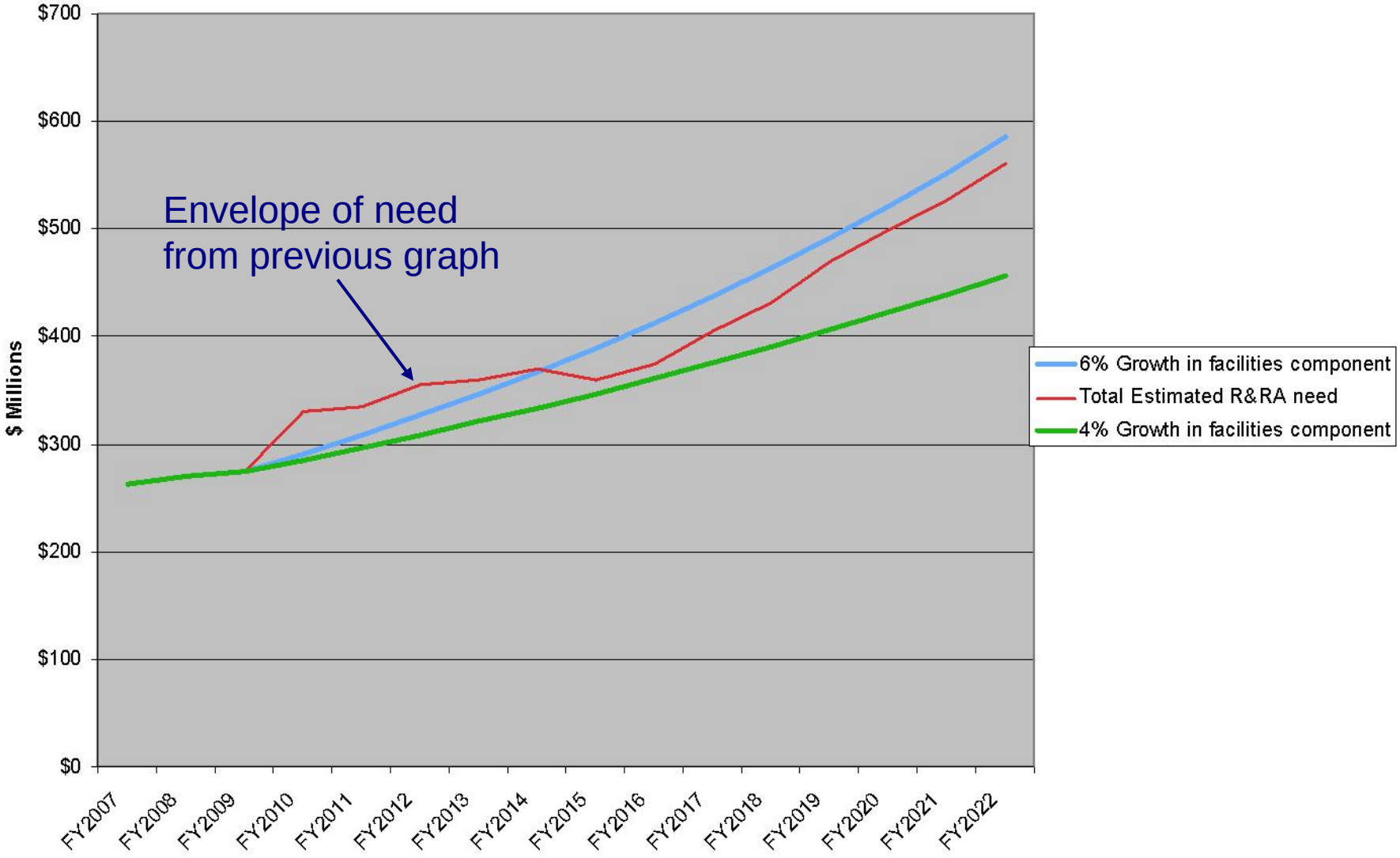
Inputs to Model

- Cost of operating existing facilities
- Projected closings of facilities
  - Community advice, e.g., Senior Review
  - Division projections based on current priorities
- Cost of D&D for new facilities
  - Reviewed proposals in hand
  - Rule of thumb projections
- Operations cost for new facilities
  - Proposals in hand
  - Evolving operations models
- “Realistic” budget projections

Total R&RA Costs for Existing and Developing MPS Facilities



Total R&RA Costs for Existing and Developing MPS Facilities



Observations

- Historically MPS growth has averaged 6%
- Model of currently operating facilities includes phase outs/reductions as new capabilities come on line: Arecibo, NSO, VLBA, GONG, [AST Senior Review], etc.
- Despite this, 4% growth in facilities-related spending falls *far* short of projected need
- Without redistribution, 6% growth may meet future ops needs, but with insufficient headroom
- Even 6% growth leaves large gap from now to 2015, primarily in R&D, D&D activity *essential* to responsible planning for the future.

Issues Raised

- Both total D&D and annual ops costs for even a single $1B project will be ~$100M, an MREFC-scale expenditure that will distort division budgets
- Redistribution of recovered ops costs from phase outs will not cover future need
- MPS need requires a directorate-wide cooperative stewardship function and resource reallocation scheme

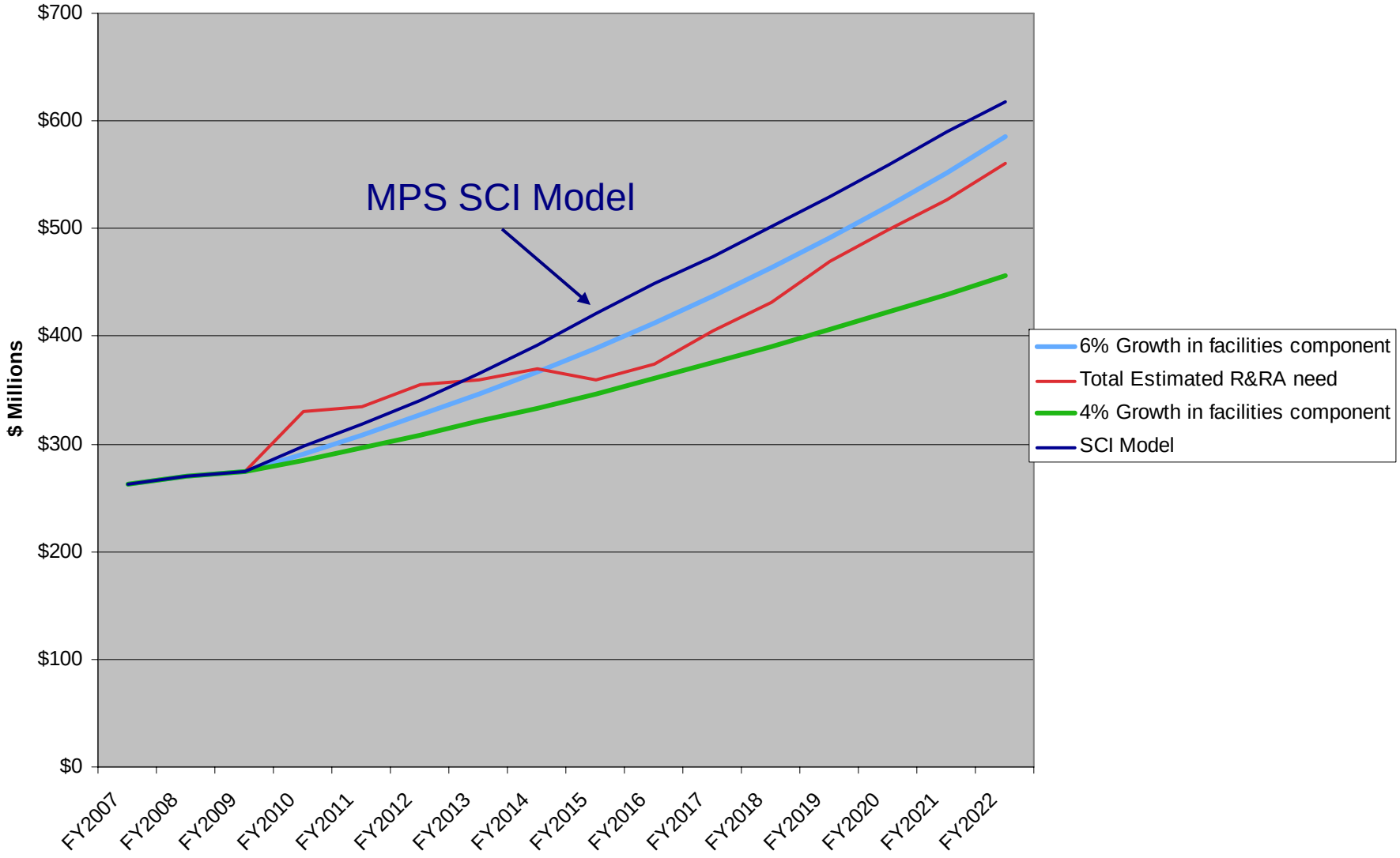
MPS Strategic Co-Investment Model

- Balance opportunities across divisions
  - Minimize impact on core programs
  - Not just for facilities
- Provides budget stability and long-term commitment
- Allows build-up of budget for strategic initiatives beyond single division capability (e.g., ops cost for facilities)

MPS Strategic Co-Investment Model

- Assumes MPS budget grows at a reasonable rate (e.g., 6% historical)
- Assumes MPS/OMA co-invests in R&D for new facilities at ~15% of total annual OMA budget
- Open competition is held among all divisions
  - For maximum of 1% of MPS budget per year
  - Balanced between facilities development and new programs/activities (SOLAR, e.g.)
  - Directorate SCI investment stays in division base
  - ***Requires division co-investment***

Total R&RA Costs for Existing and Developing MPS Facilities



SCI “Features”

- Implies some re-distribution from core to MPS strategic initiatives (including facilities)
- Overall MPS fraction for facilities only increases from 23% to 25% (minimum impact on core programs)
- By 2015, when ops for current developments ramp up, model provides headroom for major new development
- Even at maximum SCI levels, it takes until 2013 to build to level required for current aspirations
- Requires options to handle near-term deficit (~$60M total)

Nature of Options

- Delay/de-scope D&D?
  - Would require roughly a two-year slip – overall cost and schedule impact?
- Use stimulus package R&RA funding for some D&D
- Increased intra-agency, interagency, international involvement

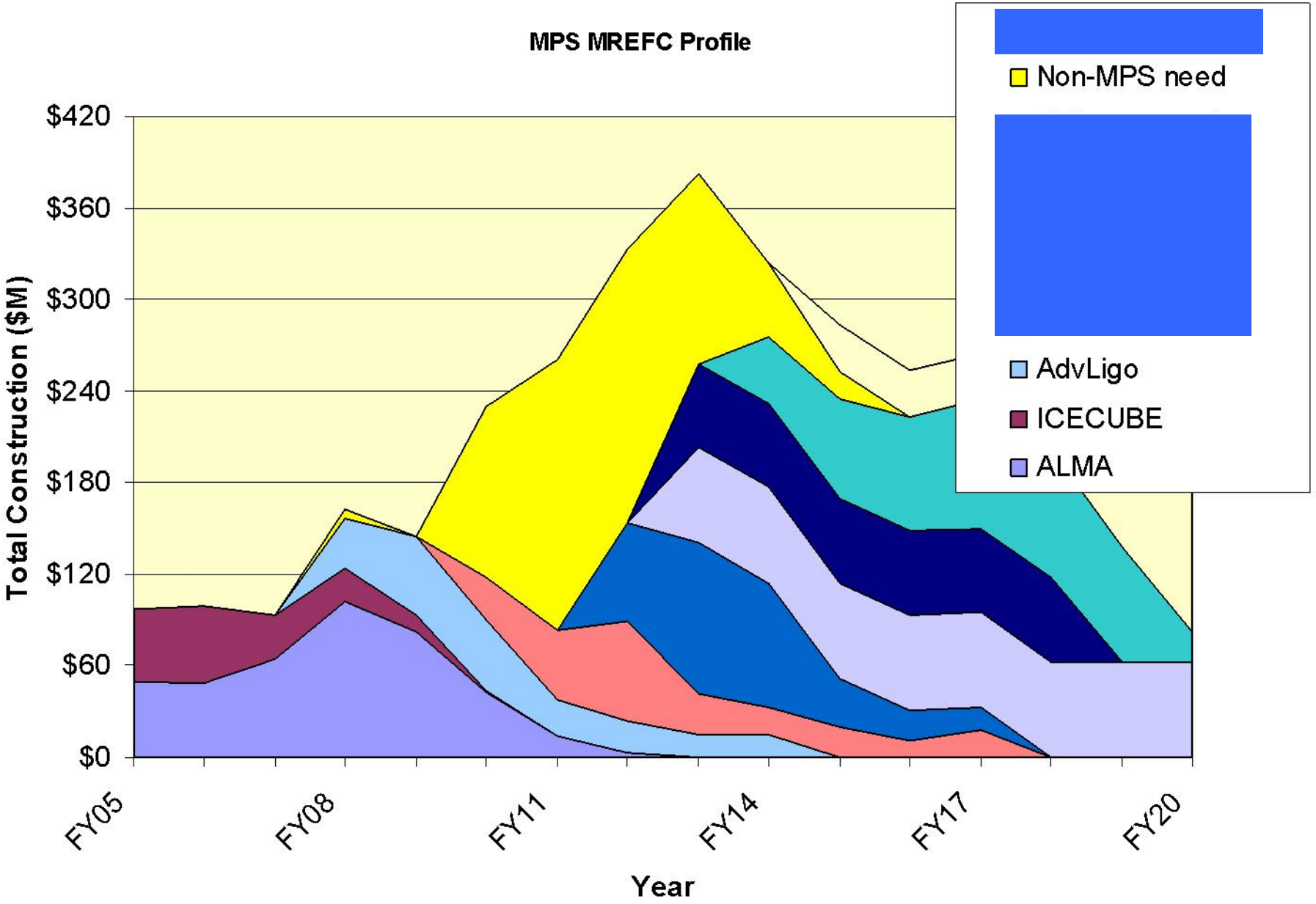
Summary

- MPS facilities planning allows us to assess the problems and investigate solutions
- Ops cost for facilities a challenge – SCI model meets it
- Rising D&D costs an increasing, critical problem
- Potential solutions
  - Delays and off-ramps?
  - Partnerships?
  - Stimulus package?

Next Steps

- Decadal Survey for AST projects (due Spring 2010)
- Further engagement with DOE
  - DUSEL
  - Light Source
  - LSST
- Refine divisional prioritization
- Coordination with NSB prioritization
- Further discussion of co-investment models (MPS, OD,…)
- Develop a public version of MPS Facilities Plan
- Discussion with MPS AC (April)

Back up


MPS MREFC Profile
Non-MPS need
AdvLigo
ICECUBE
ALMA
$420
$360
$300
$240
$180
$120
$60
$0
Total Construction ($M)
FY05
FY08
FY11
FY14
FY17
FY20
Year