



*... for a brighter future*

# *Improved Theory & Computing Sciences Capability at Argonne National Laboratory*

*prepared for  
Scientific User Facilities (SUF)*

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Director*

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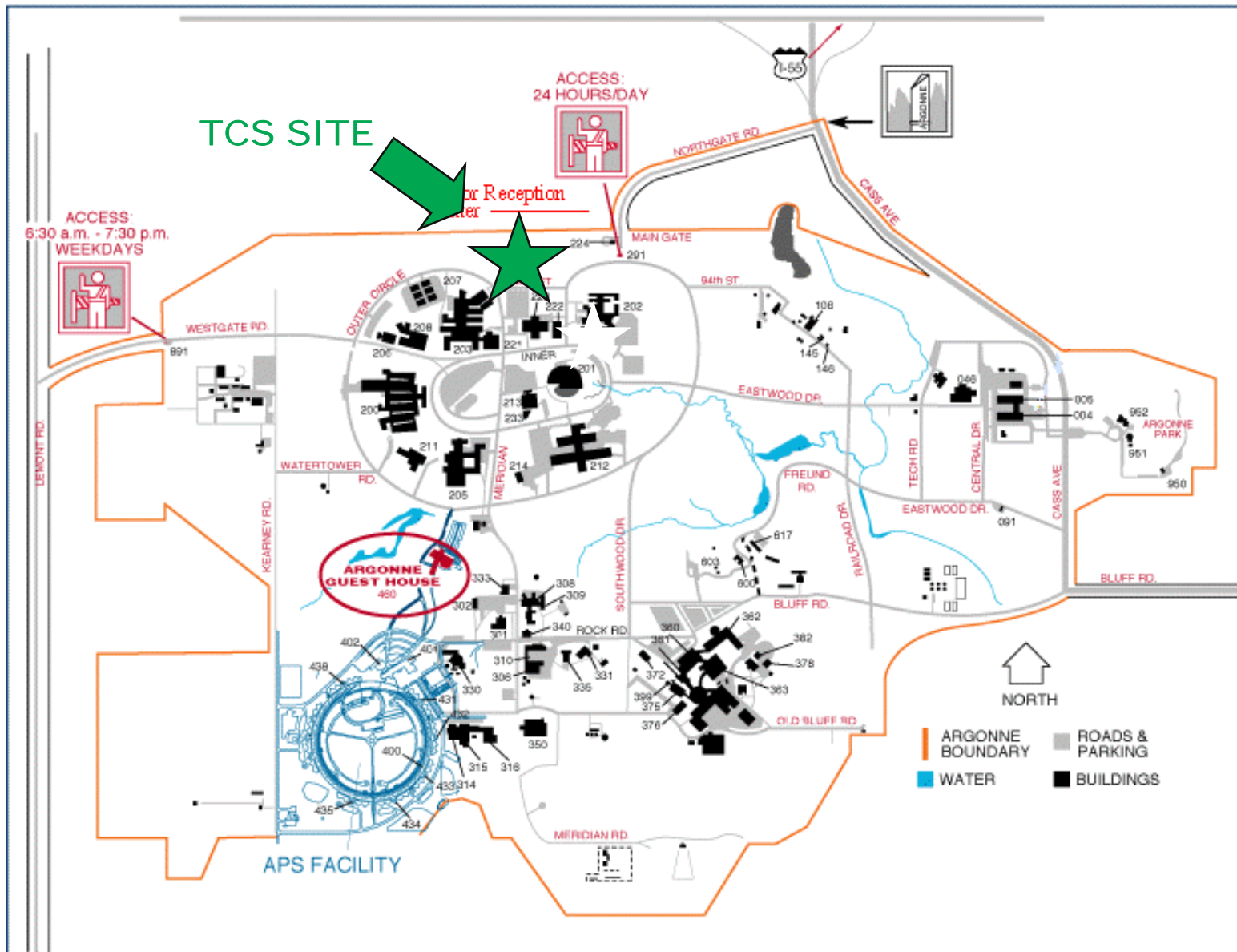


U.S. Department  
of Energy



*April 30, 2008*

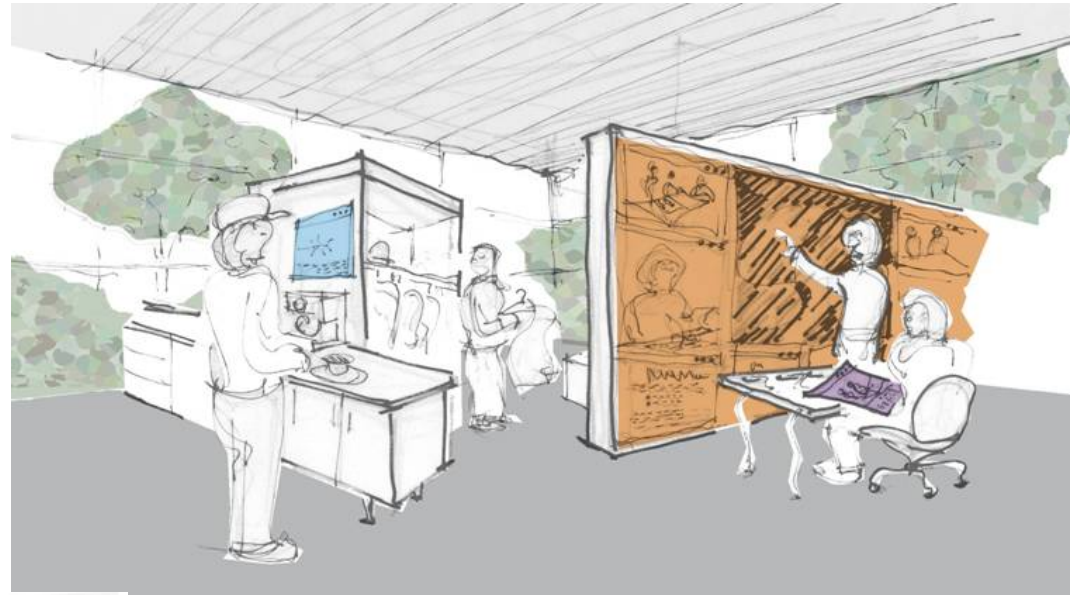
# TCS Facility Location



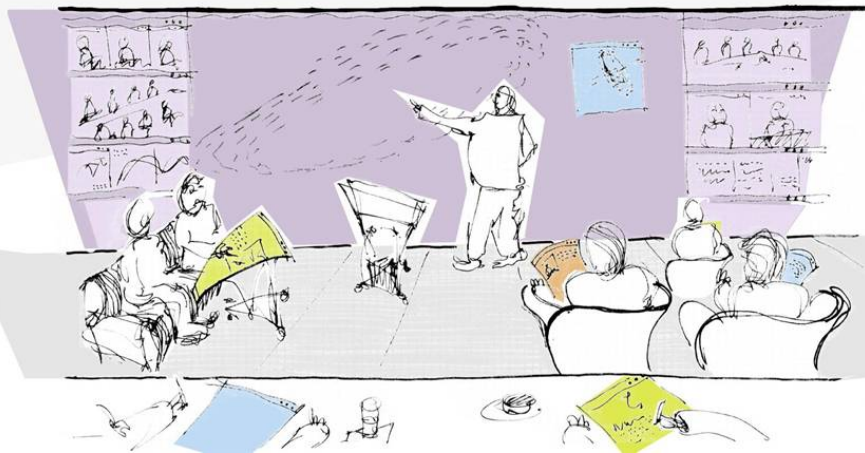


# TCS Facility Requirements to Support Mission

- Population: up to 750
- Gross space: approx. 200,000 SF



- Types of spaces:
  - **Office area:** 100K ft<sup>2</sup> net
  - **Computer Support Facility:** 25K ft<sup>2</sup> net
  - **Laboratories** (computational science): 6 - 9K ft<sup>2</sup> net
  - **Conference area:** 5 - 7K ft<sup>2</sup> net
  - **Library:** 18.5K ft<sup>2</sup> net





## *Delivering Science Requires Infrastructure*

- Quality and impact of DOE science and technology mission is critically dependent on the computers and the ability to house them efficiently
  - DOE-SC objective is to ensure sufficient infrastructure to host computational capability required by programs (e.g., servers & large-scale systems)
  - To extend frontiers of science as prioritized by DOE, Argonne must deliver forefront computational and networking tools to scientists – collaborating closely to address the world’s most complex problems
  - Collocation of computer scientists, mathematicians, computational scientists and theoreticians – forming a critical theory and computational capability – uniquely catalyzes advances across scientific domains
- At Argonne, existing facilities are inadequate to support requisite computational and related infrastructure
  - Existing infrastructure overtaxed and outdated
  - Additional benefit to improve operational efficiency in modern-day facility

## CD-O Approval

- TCS CD-0 was approved on October 12, 2004 by Dr. Raymond L. Orbach.

### Mission Performance Parameters

1. **Centralization** of large-scale computing capabilities.
2. **Collocation** of computer scientists, mathematicians, computational scientists, and theoreticians, forming a critical theory and computational capability with immediate access to the computational capability.
3. **Accommodation** of ANL staff (located in off-site, leased space) **on the ANL site**.
4. Creation of space supporting the improvement of operational efficiencies through the **consolidation of common functions**, such as the library function and through improved energy efficiency for high demand systems
5. **FY07 occupancy**.

- Estimated TPC: \$30-\$60 million.
- Functional and technical requirements:
  - Accommodate a population of approximately 260-290 people (including ANL staff and students, visiting researchers, and other short-term visitors) with offices;
  - Provide a supercomputer support facility (further defined below) for centralized computing resources;
  - Provide advanced digital conferencing areas for both small and large meetings;
  - Provide computer-intensive laboratory spaces, and
  - Provide appropriate facilities to house a centralized ANL library.

## ***Alternatives Analysis – evaluating possible acquisition approaches***

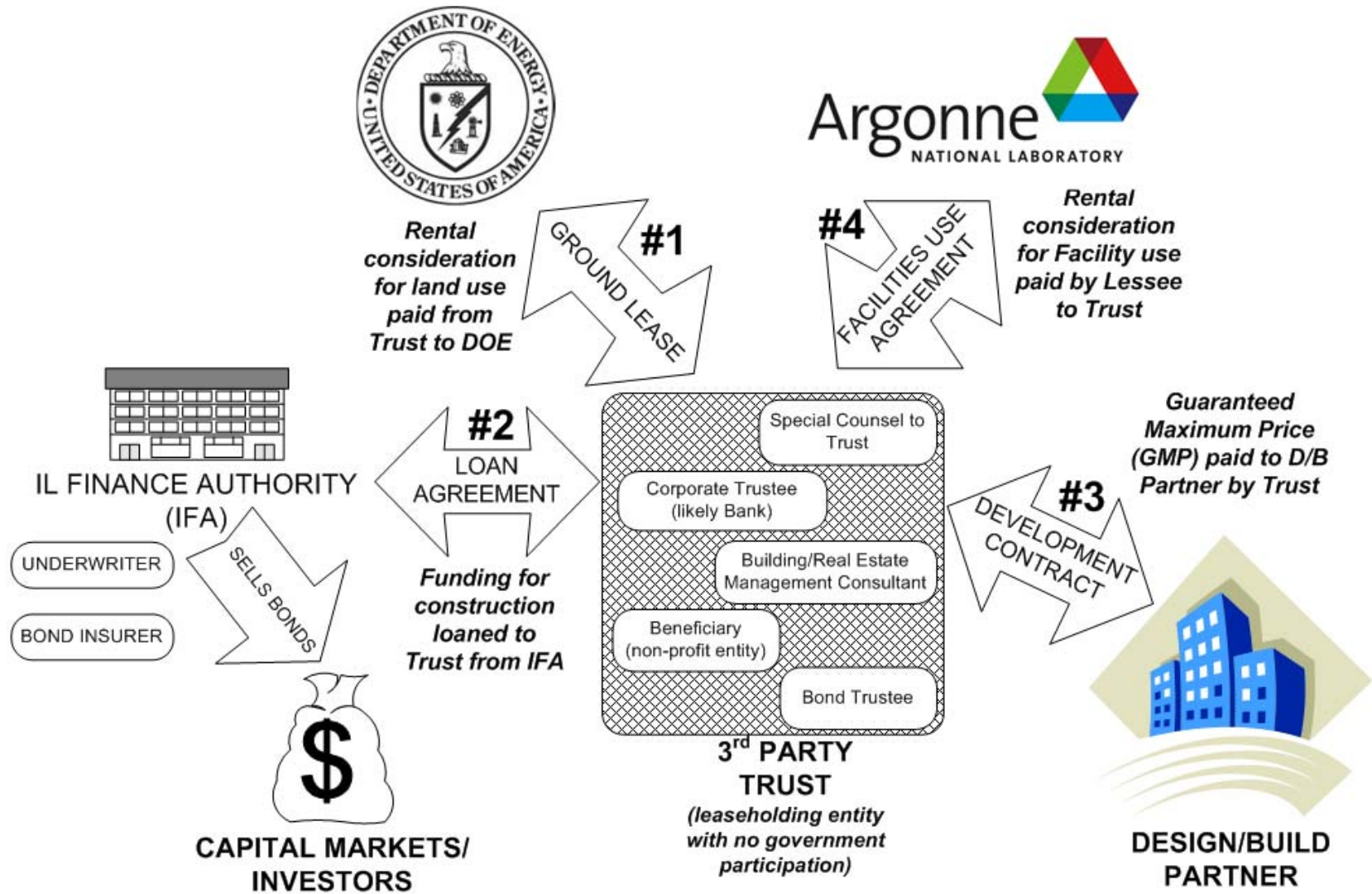
- Detailed comparison of all possible approaches to acquiring capability
- Each scenario evaluated against primary considerations:
  - Ability to achieve Mission Performance Parameters
  - Ability to address the Functional and Technical Requirements for the capability
  - Investment within cost range
  - Life cycle costs

*NOTE: Secondary, more tactical, considerations were also evaluated against those scenarios that met the primary considerations.*

- Viable alternatives were also evaluated in terms of:
  - DOE's role and responsibility
  - potential liability (fiscal, contractual, environmental and investment).



# TCS Acquisition - Transactional Overview



## *OMB A-11 Analysis: Meeting Operating Lease Definition*

1. Ownership of asset remains with the lessor during the term of the lease and is not transferred to the Government at or shortly after the end of the lease term.
2. Lease does not contain a bargain-price purchase option.
3. The lease term does not exceed 75 percent of the estimated economic life of the asset.
4. The present value of the minimum lease payments over the life of the lease does not exceed 90 percent of the fair market value of the asset\* at the beginning of the lease term.
5. The asset is a general-purpose asset rather than being for a special purpose of the Government and not built to the unique specifications of the Government as lessee.
6. There is a private sector market for the asset.

\* Strict Constructionist Definition



# DOE Alternative Financing Review/Approval Process

