New Generation in Capital Program & Construction Management
What is MOCA?

MOCA Systems is a nationally recognized program and construction management firm that provides a specialized project control service based on an innovative project control technology platform that includes MOCABuild™.

The MOCABuild™ software application actually simulates the construction of horizontal and vertical projects based on identified material content and prescribed construction means and methods to generate cost-loaded, resource-driven schedules that establish feasible construction durations with the associated daily labor requirements by trade.

**MOCA** stands for **Management Of Construction Activities**.
Some Recent Clients

Healthcare
- Brigham and Women's Hospital
- Massachusetts General Hospital
- Department of Veterans Affairs
- Emerson Hospital

Commercial & Developers
- General Growth Properties, Inc.
- Starwood
- Transamn Co.

Government
- US Army Corps of Engineers
- U.S. Air Force
- GSA
- U.S. General Services Administration

Institutional
- MIT
- Trinity College
- Harvard University
- Duke University

Industrial
- GM
- Intel
- Genzyme
- Dahlgren
- Hyatt

Over the past few years, MOCA has provided these services to over $12 billion in construction project value.
“The services provided by MOCA Systems have allowed General Growth Properties to better plan, forecast, and execute our capital expenditures. The use of MOCABuild provides us with a level of detail currently not available from traditional techniques. MOCABuild gives us the information we need to properly manage and monitor our project schedule and cost. In addition, this technology and the professionals at MOCA have been able to save us millions through the use of MOCABuild.”

— Sharon Tom, Director of Construction, General Growth Properties

General Growth Properties is the second largest REIT, and owns, develops, operates, and/or manages shopping malls in 44 states, as well as Master Planned Communities in three states. GGP has ownership interests in and/or management responsibility for more than 200 regional shopping malls totaling approximately 200 million square feet of retail space.

Headquartered in Chicago, Illinois, GGP has approximately 4,700 employees nationwide. Our malls feature more than 24,000 retail stores and anchor department stores, as well as theaters, sit-down restaurants, ice skating rinks and other forms of family entertainment.
Over the past few years, MOCA has supported / is supporting:

- **Approx. $9 billion and over 50 different MILCON & BRAC Programs** across US Air Force, US Army and US Navy.

- **Approx. $30% of the BRAC 2005 Programs** estimated at $21 billion
  - Fort Sam Houston / San Antonio - $3,000 million
  - Fort Lee, VA - $1,000 million
  - Fort Belvoir Community Hospital, VA - $650 million
  - Aberdeen Proving Grounds, MD - $500 million
  - Fort Hood, TX & Fort Polk, LA ~ $500 million
  - Andrews AFB Admin, Wash DC - $200 million
  - Scott AFB Transcom, MO - $80 million

- **The US Air Force $750 million** ISR/Strike Phase I Program at Guam
MOCA Systems (MOCA) provided AFCEE with excellent consulting services by reviewing documentation for a proposed project for a vertical extension of an existing landfill at Andersen Air Force Base in Guam. MOCA also provided AFCEE with Request for Proposal (RFP) documentation and an independent government estimate for this project. MOCA’s engineers were very knowledgeable in the design of landfills and provided AFCEE valuable input on the feasibility of the project. MOCA was able to identify a flaw in the original conceptual design of this landfill project that enabled the RFP document to be more definitive and reduced the risk to the government.

— John Rhoden, Supervisory Contracting Officer, AFCEE Hawaii
“I first learned of MOCA through a colleague I've known and respected for 18 years. At first I was a little skeptical when he told me about the great things MOCA was able to do and decided to "test the waters" for myself by giving them a minor task at first. We had them develop the construction cost estimates for two upcoming design-build BRAC facilities at one of our installations. One was a $50 million headquarters' building and the other was a $110 million training facility. The estimates they developed were "right on the money" and enabled us to successfully award two major construction contracts that comprise the start of a billion dollar BRAC expansion. Their ability to accurately adjust their estimates to reflect the true construction market conditions is noteworthy...

…Based on their performance, we have decided to utilize MOCA not only to develop construction cost estimates for the remaining BRAC projects but to have them assist us in reviewing the contractors' proposed construction schedules and monitoring their progress during the life of the construction contract.”

Leonard M. Tucker, Chief Structural Section, Design Team Leader, Ft Lee BRAC
Owner Challenges

- **Issues**
  - Overruns in cost and schedule (throughout design and construction phases)
  - Small design / construction teams with significant workloads (BRAC, USACE Transformation)
  - Lack of information to collaborate with and manage contractors

- **Objectives**
  - Leverage in-house expertise (alleviate time pressure)
  - Eliminate overruns in cost and schedule
  - Develop more efficient way to plan, track and control project performance (costs and time)
  - Apply industry best practices and technologies to continuously improve
Typical Project Controls

Engineering News-Record (ENR) estimates that 25-30% of total construction costs are wasted through inefficiencies.

Preconstruction Issues
• Reliance on historic cost databases and rules of thumb without labor and local market validation
• General Contractor providing pre-construction cost /scheduling guidance is part of negotiations (conflict of interest)
• Lack of detailed quantities, local pricing and constructability guidance result in too many unknowns, cost /schedule overruns and late value engineering efforts

Construction Issues
• Reliance on contractor for schedule of values & labor requirements (Resource-loaded schedules difficult to create and maintain!)
• Claims and change order resolution without quantifiable cost and labor schedule assessments

Owners lack an effective construction project control system
MOCA Introduction

Strong Team Coupled with Innovative Technology Results in Proven Value

MOCA Systems Team
- Strong Program and Construction Management Expertise
- Deep Understanding of Project & Cost Control Requirements
- Conflict of Interest Free Support

MOCABuild™ Technology
- Project Control System Initially Researched at MIT
- Software Simulation to Develop Verifiable Labor Schedules Fully Integrated with Costs
- Augments Existing Cost and Scheduling Applications

Proven Value
- Significant ROI with Historic 5% of Construction Cost Savings
- Greatly Improves Within Budget and On-Time Project Performance
- ID and Resolve Issues Before Becoming Crises
MOCA’s Capabilities & Services

MOCA SYSTEMS CAPABILITIES

Full Range of Services and Software to Most Client Sectors
In 1999, Professor S. Slaughter stepped down from the MIT Department of Civil Engineering to commercialize 10 years of research into a software platform for innovative project control.

Three patents are pending - a fourth patent application is in progress.

MOCABuild augments applications such as Timberline, PACES, MCACES, and Primavera. MOCA has established technology partnerships with both Primavera and Sage Software (Timberline) to ensure seamless data integration.

What distinguishes MOCABuild from other project management applications is that we can provide the owner of a building project -- or of a multiple project program -- visibility into the complex and real-time interaction between schedule, labor and costs.

MOCABuild will be on the market in the form of an enterprise software product in 2008.
### MOCA Project Control Platform

<table>
<thead>
<tr>
<th>Cost Estimating Application</th>
<th>Project Intelligence Application</th>
<th>Project Management Application</th>
</tr>
</thead>
</table>

- **SAGE TIMBERLINE OFFICE**

- TRACES

> • Quantity Definition / Take-off
> • Unit Pricing and Local validation
> • Project Estimating

> • Means & Method Definition
> • Simulation of Labor-Driven Schedule
> • Cost Estimate Verification
> • Cash Flow & Earned Value
> • Multi-Project Integration
> • Alternatives and Optimization


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**Innovative Technology Integrated with Existing Applications Creates a Powerful Platform.**

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**Project & Cost Control**

**Capital Project Phases**

0%  20%  35%  65%  100%  Start Construction

- **PROGRAM & PLAN**
- **CONCEPT DESIGN**
- **FINAL DESIGN**
- **CONSTRUCTION**
- **CLOSE OUT**

**MOCABuild™ Project Control Services**

**Program Mgmt**
- Cost and Schedule Validation
- Requirement Integration & Docs
- Phasing Definition and Optimization

**Design and Contracting Mgmt**
- Cost Estimating and Mgmt
- Scheduling
- Design Constructability
- Value Engineering
- Contract Delivery Support
- Contractor Negotiations

**Construction Mgmt**
- Baseline Development
- Project Controls & Oversight
- Labor & Schedule Assessments
- Forecast Completion Dates & Recovery
- Change Order Assessments
- Claims Avoidance and Assessments

**ONE Control System Throughout All Phases**
Program Baseline Development

0%  20%  35%  65%  100%  Start Construction

PROGRAM & PLAN  CONCEPT DESIGN  FINAL DESIGN  CONSTRUCTION  CLOSE OUT

Locally Validated Cost Estimate

<table>
<thead>
<tr>
<th>Description</th>
<th>MOCA Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>01 General Requirements</td>
<td>$33,888</td>
</tr>
<tr>
<td>02 Site Construction</td>
<td>$2,826,427</td>
</tr>
<tr>
<td>03 Concrete</td>
<td>$4,874,075</td>
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<tr>
<td>04 Masonry</td>
<td>$3,371,193</td>
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<tr>
<td>05 Metals</td>
<td>$17,206,025</td>
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<tr>
<td>06 Wood and Plastics</td>
<td>$2,350,944</td>
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<tr>
<td>07 Structural and Architectural</td>
<td>$1,541,471</td>
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<tr>
<td>08 Doors and Windows</td>
<td>$2,220,092</td>
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<td>09 Fencing</td>
<td>$12,026,035</td>
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<tr>
<td>108 Special Tests</td>
<td>$1,650,245</td>
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<tr>
<td>11 Equipment</td>
<td>$3,930,565</td>
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<tr>
<td>12 Plumbing</td>
<td>$3,930,565</td>
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<tr>
<td>13 Special Construction</td>
<td>$5,754,092</td>
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<tr>
<td>14 Civil Engineering Systems</td>
<td>$231,310</td>
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<tr>
<td>15 Mechanical</td>
<td>$10,608,760</td>
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<tr>
<td>16 Electrical</td>
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<td>Subtotal Primary Structure</td>
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<tr>
<td>Subtotal Primary Structure</td>
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<td>Site Comp</td>
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<td>Design Fees</td>
<td>$8,200,932</td>
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<tr>
<td>Design Contingencies</td>
<td>$8,317,232</td>
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<td>Market Volatility</td>
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<td>General Contractors</td>
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<td>Architectural</td>
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<td>Engineering</td>
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<td>Subtotal Allowance</td>
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<td>Subtotal Construction</td>
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<td>Contingency</td>
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<tr>
<td>Total Contract Cost</td>
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<tr>
<td>Surplus/Inspection/Overhead</td>
<td>$8,206,918</td>
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<tr>
<td>Total Budget</td>
<td>$205,690,163</td>
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FULLY INTEGRATED
Scenario-Based Assessments Enable Better Programming Decision-Making
Multi-Project Program Integration

Powerful Insight to Optimize Multiple Project Build-outs
## Cost Estimate

<table>
<thead>
<tr>
<th>Task Description</th>
<th>Revised</th>
<th>15%</th>
<th>65%</th>
<th>95%</th>
<th>Contract Award (SOV)</th>
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<tbody>
<tr>
<td>01 General Requirements</td>
<td>$19,461,780</td>
<td>$15,709,226</td>
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<td>$17,280,149</td>
<td>10% $17,280,149</td>
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<tr>
<td>02 Site Construction</td>
<td>$972,645</td>
<td>$1,103,478</td>
<td>13%</td>
<td>$1,324,174</td>
<td>0% $1,244,724</td>
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<tr>
<td>03 Concrete</td>
<td>$1,505,002</td>
<td>$1,294,191</td>
<td>-14%</td>
<td>$1,598,326</td>
<td>-5% $1,324,174</td>
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<tr>
<td>04 Masonry</td>
<td>$17,941,397</td>
<td>$15,883,553</td>
<td>-11%</td>
<td>$17,471,909</td>
<td>10% $15,724,718</td>
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<tr>
<td>05 Metals</td>
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<td>$1,346,785</td>
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<td>$1,481,464</td>
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<tr>
<td>06 Wood &amp; Plastics</td>
<td>$4,866,245</td>
<td>$4,285,565</td>
<td>-12%</td>
<td>$4,285,565</td>
<td>0% $3,985,576</td>
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<tr>
<td>07 Thermal &amp; Moisture Protection</td>
<td>$7,712,094</td>
<td>$7,277,547</td>
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<td>$7,059,220</td>
<td>-3% $6,988,628</td>
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<tr>
<td>08 Doors &amp; Windows</td>
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<td>$10,432,622</td>
<td>-4%</td>
<td>$9,806,665</td>
<td>-6% $9,610,531</td>
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<td>09 Finishes</td>
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<td>$7,264,964</td>
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<td>10 Specialties</td>
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<tr>
<td>11 Equipment</td>
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<td>$74,305</td>
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<tr>
<td>12 Furnishings</td>
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<td>$2,923,412</td>
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<td>$2,864,944</td>
<td>-2% $3,006,191</td>
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<tr>
<td>14 Conveying Systems</td>
<td>$1,628,432</td>
<td>$1,555,210</td>
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<td>$1,430,793</td>
<td>-8% $1,359,254</td>
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<tr>
<td>15 Mechanical</td>
<td>$29,928,775</td>
<td>$31,065,875</td>
<td>4%</td>
<td>$32,308,510</td>
<td>4% $32,308,510</td>
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<tr>
<td>16 Electrical</td>
<td>$15,092,432</td>
<td>$13,658,405</td>
<td>-10%</td>
<td>$14,341,326</td>
<td>5% $17,771,566</td>
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<tr>
<td><strong>TOTAL COSTS</strong></td>
<td>$126,682,804</td>
<td>$117,965,487</td>
<td>-7%</td>
<td>$121,513,488</td>
<td>3% $119,886,189</td>
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<tr>
<td><strong>AREA (SF)</strong></td>
<td>410,000</td>
<td>319,000</td>
<td>319,000</td>
<td>319,000</td>
<td>319,000</td>
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<tr>
<td><strong>CONSTRUCTION SCHEDULE</strong></td>
<td>23 months</td>
<td>26 months</td>
<td>27 months</td>
<td>26 months</td>
<td>26 months</td>
</tr>
</tbody>
</table>

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**Proactive Pre-construction Support**

**Program & Plan**
- 0% Start Date
- 20% Concept Design
- 35% Final Design
- 65% Construction
- 100% Close Out

**MOCA Systems, Inc. Confidential & Proprietary**
More Effective Construction Oversight

Verifiable Baseline Schedule and Earned Value Development
Owner Stays in Control

ID and resolve issues before they become crises... and avoid claims.
Proven Results

• More efficient programming, planning and design
  – scenario-based constructability simulations for earlier visibility into costs and schedule requirements.
  – accelerated decision-making to avoid late-stage value engineering and changes.

• Improved project ROI
  – verifiable trade-off decision-making throughout project based on detailed cost and schedule impacts.

• Lower contractor awarded pricing
  – better understanding of project labor and material content reduces risks to contractors and allows owners to better negotiate pricing.

• Lower claims and change orders
  – simulating contractor proposals to validate cost and schedule impacts before payment approval.

• Earlier project completion date
  – proactive decisions based on labor, sequencing and recovery options for changes and events.
  – fast-track to enable projects to meet business requirements and goals.

• Improved project cash flow
  – pay contractors for actual work completed and stored material, not just submitted invoices.

Over 5% of Construction Cost Savings... 10X ROI
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