Third Set of Locks Project - Panama Canal Expansion Plan
A history of dreams, achievements and challenges
Canal Traffic & Capacity Issues
### Transits vs. Tonnage FY 1915 – FY 2005

<table>
<thead>
<tr>
<th>Fiscal Year</th>
<th>PCUMS Tonnage in millions</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY 1915</td>
<td>4,832</td>
</tr>
<tr>
<td>FY 1955</td>
<td>9,931</td>
</tr>
<tr>
<td>FY 1975</td>
<td>18,940</td>
</tr>
<tr>
<td>FY 1995</td>
<td>22,064</td>
</tr>
<tr>
<td>FY 2005</td>
<td>279.1</td>
</tr>
</tbody>
</table>

The chart above illustrates the trend of PCUMS tonnage and transits from FY 1915 to FY 2005.
Growth of Panamax Vessel Transits
(with beam of 100 ft or more)
FY 1995 – Projected FY 2006
Transits of Vessels of Length 900 ft or more

FY 1995 - Projected FY 2006

<table>
<thead>
<tr>
<th>Year</th>
<th>Transits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AF95</td>
<td>222</td>
</tr>
<tr>
<td>AF96</td>
<td>284</td>
</tr>
<tr>
<td>AF97</td>
<td>292</td>
</tr>
<tr>
<td>AF98</td>
<td>301</td>
</tr>
<tr>
<td>AF99</td>
<td>340</td>
</tr>
<tr>
<td>AF00</td>
<td>364</td>
</tr>
<tr>
<td>AF01</td>
<td>528</td>
</tr>
<tr>
<td>AF02</td>
<td>715</td>
</tr>
<tr>
<td>AF03</td>
<td>980</td>
</tr>
<tr>
<td>AF04</td>
<td>1190</td>
</tr>
<tr>
<td>AF05</td>
<td>1310</td>
</tr>
<tr>
<td>AF06 Projected</td>
<td>1536</td>
</tr>
</tbody>
</table>
Impact and Requirements by Vessel Type and Size

- **Gatun Lockage in One Hour**
  - Requires 4 Locomotives
  - Assisted by 3 Tugs
  - 1 Pilot
  - No Transit Restriction

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< 80’ BEAM

- **Gatun Lockage in 2 Hours**
  - Requires 6-8 Locomotives
  - Assisted by 7-10 Tugs
  - 2-3 Pilots
  - Daylight one-way traffic through Gaillard Cut, and daylight transit through the locks of vessels 900’ in length

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PANAMAX
Average Canal Waters Time
FY 1996 – FY 2005

<table>
<thead>
<tr>
<th>Fiscal Year</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1996</td>
<td>31.7</td>
</tr>
<tr>
<td>1997</td>
<td>28.4</td>
</tr>
<tr>
<td>1998</td>
<td>30.6</td>
</tr>
<tr>
<td>1999</td>
<td>32.9</td>
</tr>
<tr>
<td>2000</td>
<td>29.4</td>
</tr>
<tr>
<td>2001</td>
<td>23.9</td>
</tr>
<tr>
<td>2002</td>
<td>27.4</td>
</tr>
<tr>
<td>2003</td>
<td>22.7</td>
</tr>
<tr>
<td>2004</td>
<td>26.7</td>
</tr>
<tr>
<td>2005</td>
<td>24.6</td>
</tr>
</tbody>
</table>
Main Factors Affecting Canal Capacity

Atlantic Entrance

Gatun Approach

Navigational Channels and Locks Restrictions

Gaillard Cut
Extended waiting time to transit jeopardizes the business

During some periods of the year, provided there are maintenance works undertaken or during the high (arrival) season, long queues form at each entrance of the Canal.

June 2004
119 vessels waiting
Waiting time: up to 7 days
Cause: maintenance work

April 2006
111 vessels waiting
Waiting time: up to 10 days
Cause: high season
Long-term demand
The passage at the Panama Canal has many growth opportunities.
Panama: More than a Canal, part of the Global Network

Source: ACP and ComPairData, Sep 2005
Panama Canal Market Share in the Asia - U.S. East Coast Trade

Panama Canal: 38%

US intermodal System: 61%

Suez Canal: 1%

Source: Estimate based on different industry sources (PIERS, AAR, ACP Ship Data Bank)
The containership is revolutionizing the maritime industry

1 containership
10,000 TEUs

5,800 trucks
97 Km

18 trains each of 8,000 ft
43.5 Km

570 planes
Boeing 747
Transits Requesting Reservation Slots
The number of rejected requests increases....
Light improvements at the Locks
The Plan for the Future: Meet Current and Future Demand

Adding a Third Lane of Traffic
Canal Expansion Project Criteria

- Maximize use of existing infrastructure
- Use proven technology to minimize technical risks
- Emphasis on system reliability and maintainability
- Financing and execution strategy that leverages on ACP strengths and experience to minimize implementation risks
Canal Expansion Program
Major Components

- New and bigger locks
- Alignment channels for new locks
- Improvements to existing navigational channels
- Water management to increase yield of watershed
Canal Expansion Program

- Deepening and Widening of the Atlantic Entrance
- Atlantic Post Panamax Locks Complex
- Widening of Channel Reaches and Turns at Gatun Lake
- Access Channel to the Pacific Post Panamax Locks
- Pacific Post Panamax Locks Complex
- Deepening and Widening of the Pacific Entrance
**Existing Lock**

- Length: 32.3m (106')
- Ship length: 12m (39.5')
- Width: 33.5m (110')

**Post Panamax Conceptual Lock**

- Length: 49m (160')
- Ship length: 18.3m (60')
- Height: 31.08m (102')
- Length: 55m (180')

**Existing Lock**
- Length: 305m (1,000')
- Ship length: 294.3m (965')

**Post Panamax Conceptual Lock**
- Length: 427m (1,400')
- Ship length: 385.8m (1,265')
Proposed Water Saving Basins Operation
Proposed Post-Panamax Locks Operation

Preliminary Engineering Design

Water level difference: 48.8m (160')

Chamber: 18.3m ('')

Culvert: 55m (180')

Valve

WSB 1, WSB 2, WSB 3

Side View

Sea

Chamber

Main Culvert

Culvert to WSB

Lake
Animation of Water Saving Basins
Water Saving Basins

Water saving basins used in Germany help reduce water usage
Conceptual Design
Project ends in 2014

- Designs, tests and contracts
- Construction of new locks and water saving basins
- Approach channels, improvement of current channels, deepening and widening entrances
- Raising maximum operational level of Gatún Lake

Operation of the third set of locks begins
Financial Analysis
## Project cost estimates

<table>
<thead>
<tr>
<th>Category</th>
<th>Estimate (in $)</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Locks</td>
<td>2,730</td>
</tr>
<tr>
<td>Improvements to the navigational channel</td>
<td>620</td>
</tr>
<tr>
<td>Approach channels and navigational channels</td>
<td>820</td>
</tr>
<tr>
<td>Water saving basins</td>
<td>2,730</td>
</tr>
<tr>
<td>Inflation during the construction</td>
<td>530</td>
</tr>
<tr>
<td>Total Investment</td>
<td>5,250</td>
</tr>
</tbody>
</table>

Each investment estimate includes contingency costs.
Panama: More than a Canal, part of the Global Transportation Network

Source: ACP and ComPairData, Sep 2005
Strategic Changes in the Panama Canal

**BEFORE PCC**
- Under U.S. jurisdiction
- Managed by its principal user
- Responded to U.S. interests
- Non-profit organization
- Budget driven
- Ample capacity
- Almost a monopoly

**PRESENT ACP**
- Part of the Republic of Panama
- Panama is not a user of the Canal
- Integrated to the National Maritime Strategy
- Competitive and profitable
- Administration of resources efficiently
- Operating near capacity
- Facing competition
Vision Statement

WORLD LEADER in services to the maritime industry and in the sustainable development for the conservation of the Canal watershed;

CORNERSTONE of the global transportation system and driving force of Panama’s progress and growth;

MODEL of excellence, integrity, and transparency, committed to the full development of our work force.
Panama Canal Authority
Mission Statement

To produce the maximum sustainable benefit from our geographical position.
Principal Route for World Commerce

80 kilometers
8 - 10 hours transit time
24 hours Canal Waters Time (CWT)
The Panama Canal in Numbers

- 3 lakes
- 3 locks
- 12 chambers

Chambers:
- 1,000 ft of length
- 110 feet of width
- 39.5 feet of draft
Main Clients

- United States of America
- People’s Republic of China
- Japan
- Chile
- South Korea
- Ecuador
- Peru
- Canada
- Venezuela
- Taiwan
Principal Commodities

- Containerized Cargo
- Dry bulk
- Vehicles
- Liquid Bulk
The Panama Canal has been under a continuous improvement process

- **1914-1996**  Incremental Improvements. Improvements to maintain and optimize the existing asset.

- **1996-2003**  Modernization Program. Improvements to modernize and improve the capacity of the existing asset and reduce operating and maintenance costs.

- **2003-2025**  Master Plan. Improvements to reduce operating and maintenance costs, provide additional capacity to service new markets and larger vessels, and improve reliability and operational slack.
PERIOD
1914-1995
Projects during Period 1914-1995
Excavation Projects

🔺 Original excavation of 205 million cubic meters

🔺 1957 – 1971 widening
The Gaillard Cut was widened from 91.5 to 152.4 meters

🔺 1992 – 2002 widening
The Gaillard Cut was widened to at least 192 meters along straight stretches and 213 meters on curves (27 millions of cubic meters)
Built in 1935, the reservoir includes an area of 57 square km.
PERIOD
1996-2004
Projects during Period 1996-2004

Modernization Program

- Gaillard Cut Widening
- Increase and Upgrade of Locomotive Fleet
- Tow Track Replacement
- Increase of Tugboat Fleet
- Hydraulic Conversion of Locks Machinery
Thank You