Airport GIS
Applications & Implementations Issues

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Agenda

- What id Airport GIS (AGIS) & Examples
- GIS Development and Implementation Issues
- ADAC’s Plans for GIS
- Q & A
Airport GIS is about Data Sharing

**The Challenge:** Our ability to **decipher** corporate-wide data and assets  
*Decipher = decode, make sense of, interpret, translate, read, crack*

**The Solution:**
Centralized & flexible GIS system to help organize and deliver corporate-wide information

**GIS can help by:**

- Combining data locked in various existing information systems into a single user interface
- Provide for more efficient data management, sharing, and security
- Allow users to effectively manage their work activities - Improving customer service and staff satisfaction
How Airports use GIS!

The Airport As a Business

- Desktop Applications
- Planning Studies
- Maps
- Land use Planning
- Gate Management
- Assets management
- Safety
- Operations
- Construction
- Business
- ICS
- Planning
- Engineering
- Finance
- Facilities
- Security
- Noise/Flight Tracks
- Maintenance
- Leases
- Business Processes
- Information/Maps/Data
- Base Maps
- Airfield
- Buildings
- Utilities
- Raw Data
- Assets
- Navaids
- Utilities
- Transportation
- Property
- Construction Projects
- Floor Plans
- Land use/Heights Restrictions

The Airport – Physical Infrastructure
Why Airports Use GIS!

To do business **BETTER, FASTER and with LESS COST**

- Unfiltered access to up-to-date corporate-wide data
- Additional capabilities for Visualization & data analysis
- Improve facility management & maintenance
- Minimize environmental and construction conflicts
- Can generate revenue by releasing expensive floor space for other uses
- Reduce the cost of consultants by providing up-to-date data
Examples of Airport GIS utilization

GIS can aid Business/Commercial Development by:

- Leased/Lesable space inventory
- Lease, Concessions & Retail Management
- Space Allocation & Revenue Analysis
- Marketing and advertising
Examples of Airport GIS utilization

GIS can aid Emergency Management by:

- Displaying complex information in the forms of maps and images. Providing dynamic situational awareness and COP.
- Rapidly assessing impacts to critical infrastructure.
- Determining evacuation needs including shelters and appropriate routing.
- Modeling incidents and analyzing consequences.
- Interface with Dispatch Systems to provide location data when addressing calls.
Examples of Airport GIS utilization

GIS can aid Facility Management by:

- Maximize productivity/combine activities: In responding to Work Order Requests, GIS can provide accurate location data, maintenance history and other equipments in the area.

- Ability to view all utility assets at one time perform network modeling, maintenance, inspection…etc.

- Access signage location and images, track maintenance and generate reports to show compliance with safety and security requirements.

- Supply mobile situational awareness to remote field teams.
GIS Services

Three types of services can be recognized

- Graphical Presentations (Maps, Charts …etc.)
- Data Analysis and Studies
- Desktop & Web Based Interactive Applications

Examples from Las Vegas
GIS Services - Maps
GIS Services - Applications

Terminal Management System

Lease Application System

Master Utilities

Gate Management
GIS Services - Applications

Integrated Planning System

ERP Integration

Internet Mapping

3D Visualization
GIS @ ADAC

Goal: Build a Corporate-wide, enterprise GIS system, to serve all ADAC’s Departments and Subsidiaries

Mission
Develop, create, and maintain an accurate, updated and shared geospatial data resource to support decision making processes, management and operation of all ADAC facilities

Vision
GIS will be fully integrated with all ADAC business processes, enhancing efficiencies and contributing to overall staff satisfaction by making accurate and updated data available to users quickly and easily
# Airport Spatial Data Warehouse

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<tr>
<th>DB Elements</th>
<th>Sub-Surface Utilities</th>
<th>Airport Layout (ALP Layers/Surfaces &amp; Obstacles)</th>
<th>General Base Maps</th>
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<td>Buildings Footprints</td>
<td>Waste Water</td>
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<td><strong>Floor Plan Details</strong></td>
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<td>Assets</td>
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<td>Building Systems</td>
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<td>Communications</td>
<td>Security/Perimeter Fence</td>
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<th>Business Applications</th>
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| **Maintenance Systems** | **Training** | **Reports** |
| **Capacity Planning** | **Certification** | **Analysis** |
| **Emergency Response** | **Capacity Planning** | **Presentations** |
| **Inspection** | **Safety Inspection** | **General Maps** |
| **Reporting** | **Security Management** | **Noise Management** |
| **Cost Analysis** | **Airspace Planning** | **Flight Tracks Analysis** |
| **Emergency response** | **Emergency response** | **Obstacles Management** |
GIS Implementation Challenges

- Building an enterprise GIS program is NOT an easy task. Considering success at other sites, we still have to justify and explain why we should invest in a GIS Program.

- The following slides will discuss some of the development and implementation issues.
Organizational issues will determine the success of any GIS implementation *(Not the Technology)*

**To Jump Start GIS we should:**

- Marshall political support
- Clarify business objectives which GIS is expected to achieve
- Secure funding
- Enlist the co-operation of end users
The success of GIS is in the hands of the users (**not** the GIS specialists)

- GIS implementation cannot be seen as a purely technical exercise (**end users participation**)

- GIS should be driven by business demand and not by the technology itself (**Demand pull and not technology push**)

- Business managers need to be persuaded that GIS can deliver benefits that are consistent with their core business objectives (**should see Results**)
Planning GIS implementation is critical

- Failure of GIS implementation can be attributed to human/organizational factors more than technical reasons:
  - Poor GIS management structure
  - GIS staff limitation (limited staff, limited experience)
  - Lack of funding (not one time lump sum)
  - Lack of executive support (they don’t really believe in GIS)
For GIS to succeed

- Should be recognized as a corporate strategy
  (to streamline business processes, increase efficiencies by managing, organizing and sharing critical data layers)

- GIS vision should be “Top Down” approach while implementation should be “Bottom Up”

- GIS will cause major changes in the way organizations work, alter people’s working life and demand significant resources to complete
GIS Development Methodology

GIS develops in 4 major steps:

1. Initial awareness of the system & organizational needs
2. Building the business case (external & internal investigation)
3. Create/appoint GIS team (focus on internal investigation)
   - User Needs Assessment
   - Data Conversion
   - Cost-Benefit & Risk Analysis
4. Design, Build and Deliver GIS Services (Implementation)
   - Maps
   - Applications
   - Reports
GIS Development Methodology

Cost-Benefit & Risk Analysis

Cost - very easy to measure:
1. Procurement cost (*investigating the need for GIS*)
2. Start-up cost: software, hardware, space … etc.
3. Data conversion cost (*60-80% of total cost*)
4. Data maintenance and update cost (*GIS staff*)

Benefits – not so easy to measure:
1. Efficiencies in present practices (*reduce emergency response time*)
2. Expanded capabilities (*staff & organization*)
3. Benefits form sale of new products/services
4. Intangible, unquantifiable benefits (*customer & staff satisfaction. No incidents*)

Risk Analysis – identify sources of risk & plan for it:
1. Size risk (*bigger implementation means greater risk*)
2. Technology risk (*focus on proven/tested technology*)
3. Structure risk (*organizational change*)
Location of the GIS Unit

Executive Level Location (CEO):
- Corporate strategy, it is important & has the highest level of support
- Central location will cover all aspects of the company's business
- The CEO's office may be removed for the day to day business realities where GIS is expected to provide process improvement

User Department Location:
- GIS can develop quickly and will gain enthusiastic support form immediate users (Planning)
- Provide low profile beginning for the GIS, use existing staff
- Departmental set-up may be unable to grow into a corporate service

Computer Services (IS/IT):
- Neutral/can provide professional level system design/analysis
- Initial enthusiasm for GIS often come from potential users, not IT
- Users often times view central and strong IT as unresponsive, and unlikely to give GIS sufficient priority.
GIS Development Method

**OUT-Source**
- Database design, needs assessment and initial GIS data conversion
- This is the more expensive approach, but will take the least amount of time

**IN-House**
- This method will take the longest time, but will cost less
- GIS staff will be very familiar with the data created and developed methods

**IN & OUT**
- Combine and coordinate efforts of internal staff and managed consultants
- Balance between time and budget
- Maintains internal staff involvement in the full process
- Will ensure data quality and currency.
GIS Initiative started in January of 2009
GIS Manager, Surveying Manager and a GIS Specialist
Initial System procurement – April 2009 (Software, Workstations Data and Applications servers)
Initial data conversion for basic Airport Layout Plan (ALP) layers – Nov 2009
Prototype map viewers applications – March 2010
ADAC GIS – Current Efforts

We have Developed 3-year GIS strategic Plan (3 Phases)

**Phase 1**
GIS Program development, will include:

- Data Models
- Needs Assessment, strategic Plan & Implementation Study
- Core Map Viewers and Web-based Applications
- Enterprise System Architecture

**Phase 2**
Terminal Floor Plan Survey -3D Laser Scanning

**Phase 3**
Implementation phase: Corporate-wide applications to support lease management, safety, security…etc., Systems Integration (ERP)
Airport GIS - Dashboards

- Facility Management
- Master Planning
- Environmental Management
- Aerial Photo Management
- Property Management
- Safety Management
- Lease Management
- Security Management
- Space Management
- Emergency Management
- Document Management
- Maintenance Management
- Project Management
- Pavement Management
- Assets Management
- Sign Management
- Cable Management
- As-Built Management

Financial Systems
ERP Systems
Facility Maintenance Systems
Airport Operational DB AODB
ADAC-GIS
Spatial Data Warehouse
THANK You!

Q & A