



# Building Systems Integration

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Security    Automation    Fire Alarm    Intelligent Buildings

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# Building Systems Integration

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- Why Integrate Anything?
- What System(s) Will Be The Backbone?
- What Systems Should Be Considered?
- Customized vs. “Off of the Shelf”
- Case Study – International Airport



# Why Integrate Anything?

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- Develop an “Owner Design Requirement”
- What is the intent of the systems?
- There should be a perceived benefit for interaction between building systems.
- Integration between two systems should result in the exchange of information that aids in the operations of the facility.



# The System Backbone

- Backbone – the system that will be the centralized host for passing information between systems
- Options
  - Automation System (i.e., building temperature control systems)
  - Access Control System
  - Separate Dedicated System
  - One of the “other” facility systems



# The System Backbone

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- What type of reliability is required?
- What protocols are anticipated?
- Are any of these choices for a backbone existing?



# What Systems Should Be Considered for Integration?

- It's simple...only the ones that are required
  - Building Management and Control System (HVAC temperature controls)
  - Access Control
  - Lighting Control
  - Elevator Control
  - Electrical Controls & Monitoring
  - Thermal Metering
  - CCTV Surveillance
  - Parking Control
  - Fire Alarm
  - Point of Sale
  - Electrical Metering
  - Other special systems



# What Systems Should Be Considered for Integration?

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- Revisit the “Owner’s Design Requirement”
- Define specific information that can be shared between the candidate systems to achieve the Owner’s goals
- Define the method that the information will be shared
  - Hardwired relays
  - Software interaction over an industry standard protocol
  - Software interaction with custom programming



# Customized vs. “Off of the Shelf”

- Common “standard” software exchange protocols
  - Modbus, Modbus RTU
  - BacNET
  - LonTalk
  - Vendor specific standard protocols
    - Johnson Controls – N2
    - Siemens - FLN
- Common “open” software exchange protocols
  - ASCII
  - Modbus, Modbus RTU
  - TCP/IP





# Customized vs. “Off of the Shelf”

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- Common software exchange architectures
  - RS 485
  - RS 232
  - Ethernet
  - MSTP
  - LonWorks
  - Arcnet



# Customized vs. “Off of the Shelf”

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- Strive to solve your integration needs with standard architectures using open protocols
- If this can't be easily sourced for your solutions, use standard protocols
- Minimize, at all costs, the use of custom programming

# Case Study

## International Airport

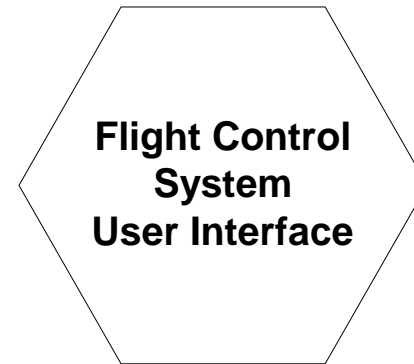
- Step by step follow through of one of the Owner's Design Requirements



# Case Study

## International Airport

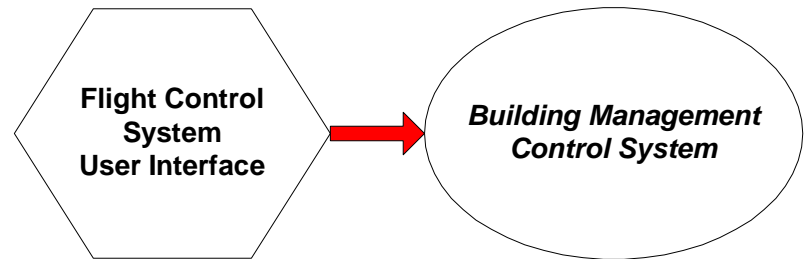
- The Goal: Schedule gate operations automatically without any human intervention
- Flight Control is entered and updated by Airline Operations Personnel



# Case Study

## International Airport

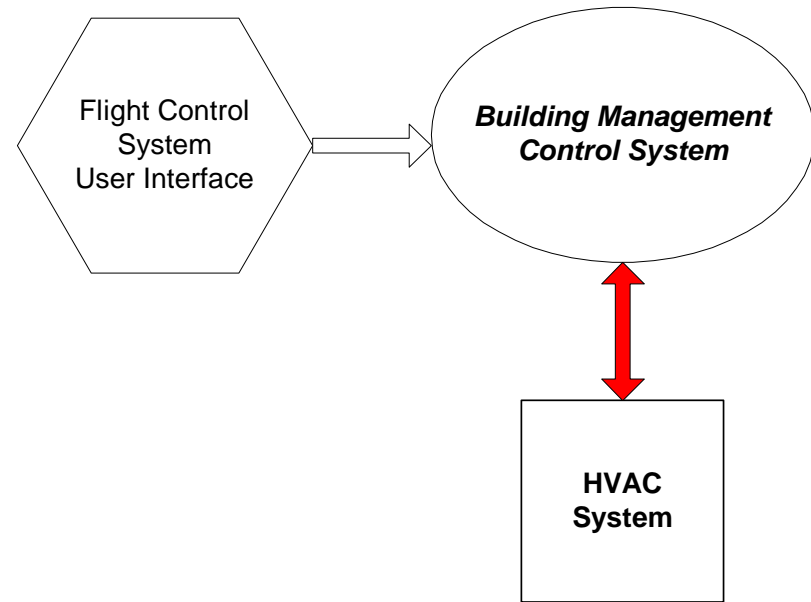
- Flight Control tells BMCS the schedule arrival and departure times for each gate



# Case Study

## International Airport

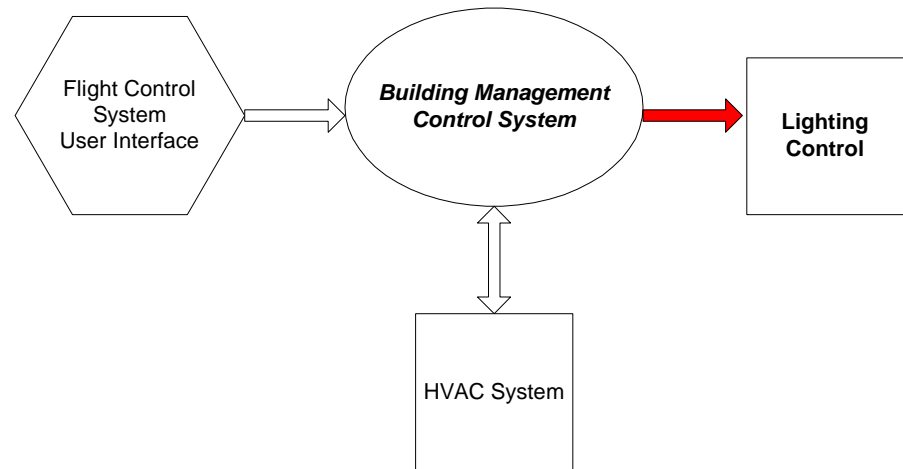
- BMCS uses the optimized start and stop algorithm routines to reset the air conditioning to be within desired comfort limits 2 hours before departure



# Case Study

## International Airport

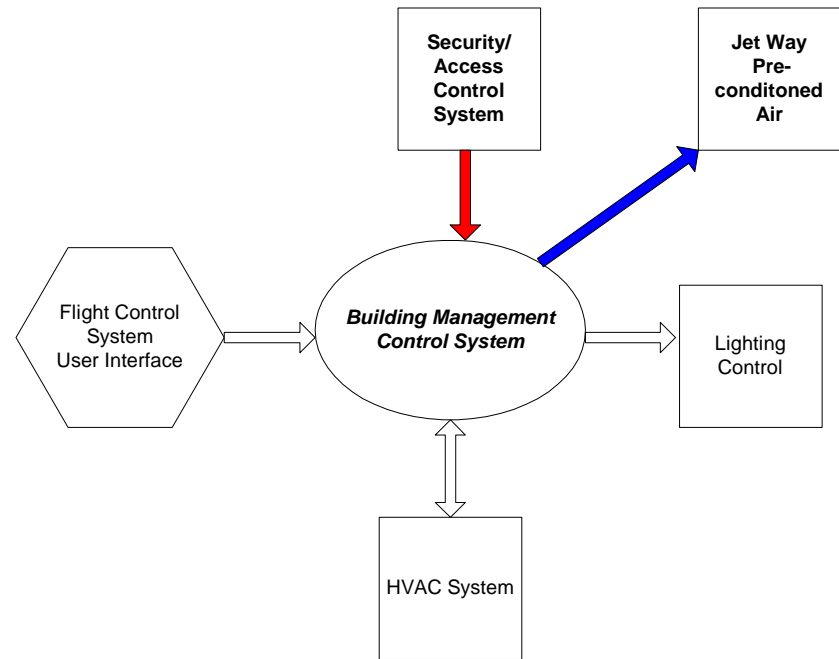
- BMCS tells the lighting control system when full level lighting is required – otherwise, lighting is at a reduced level



# Case Study

## International Airport

- Access control system tells BMCS that jetway system has been used
- BMCS enables jetway HVAC systems for defined period

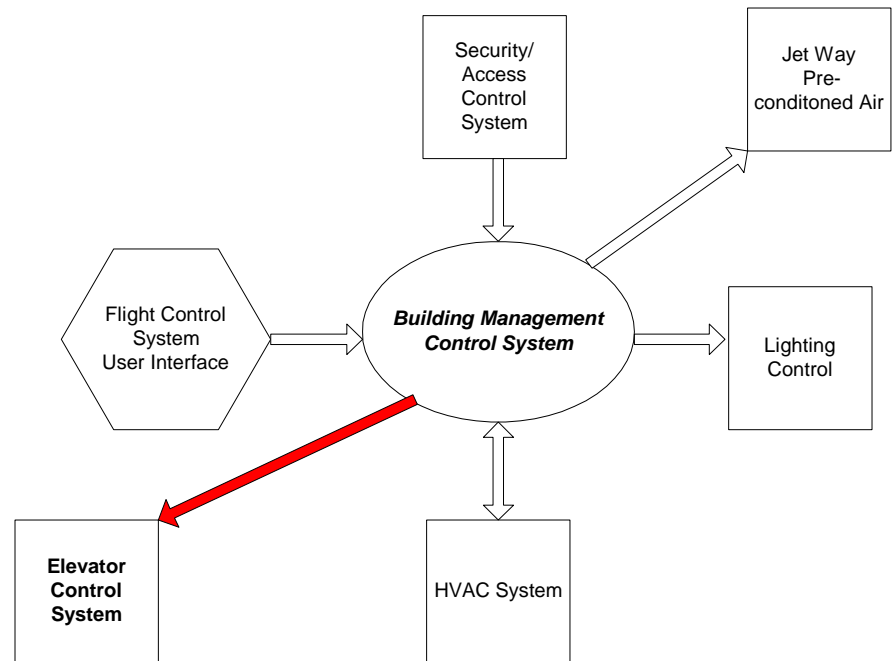




# Case Study

## International Airport

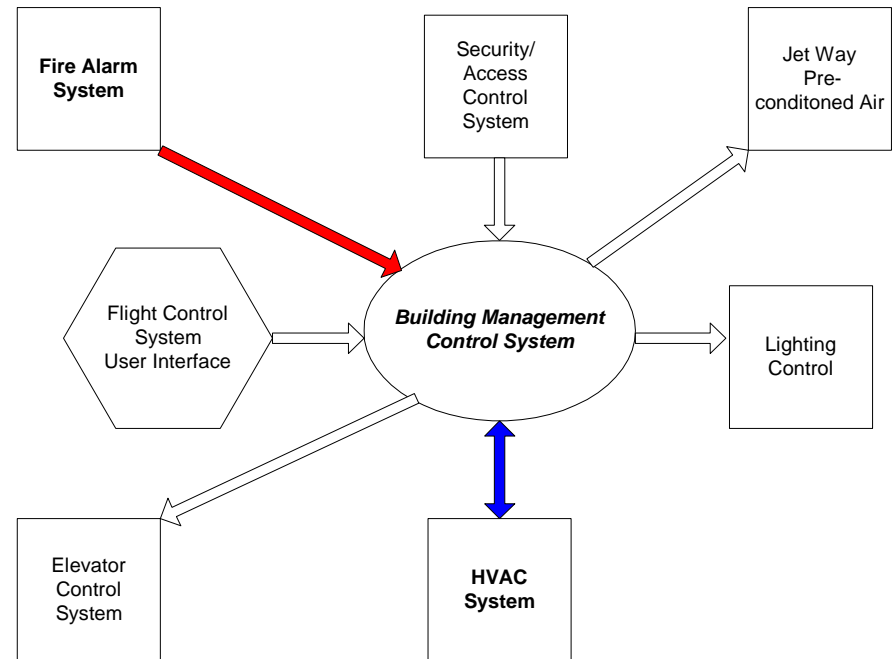
- BMCS enables elevator access to the area once the proper access control entry is made



# Case Study

## International Airport

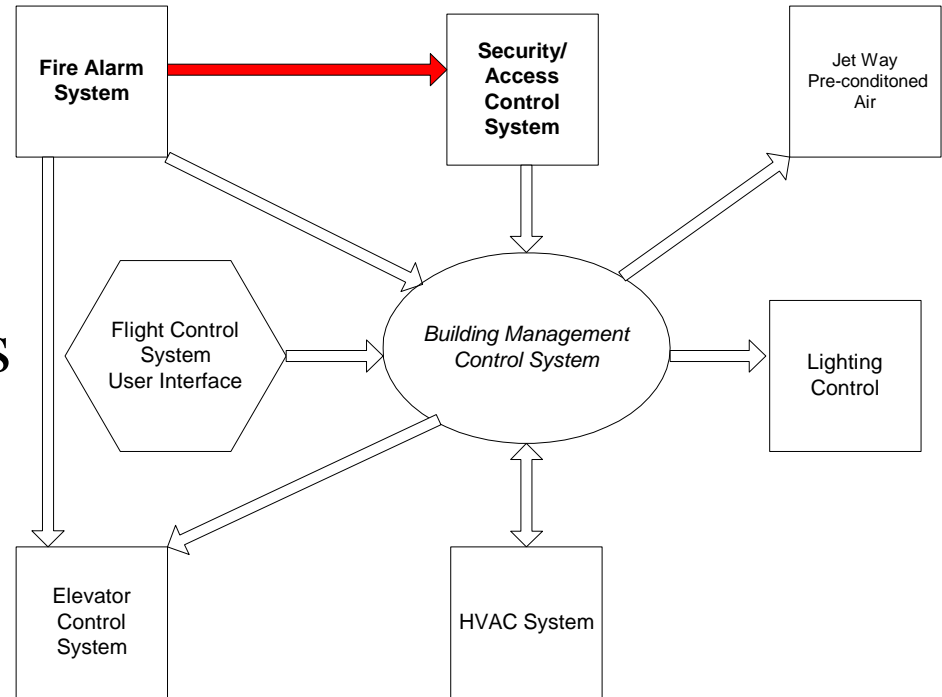
- Upon detection of an alarm, the FAS tells the BMCS that the area is in alarm
- The BMCS enables the mechanical smoke control sequence by positioning dampers and operating fans



# Case Study

## International Airport

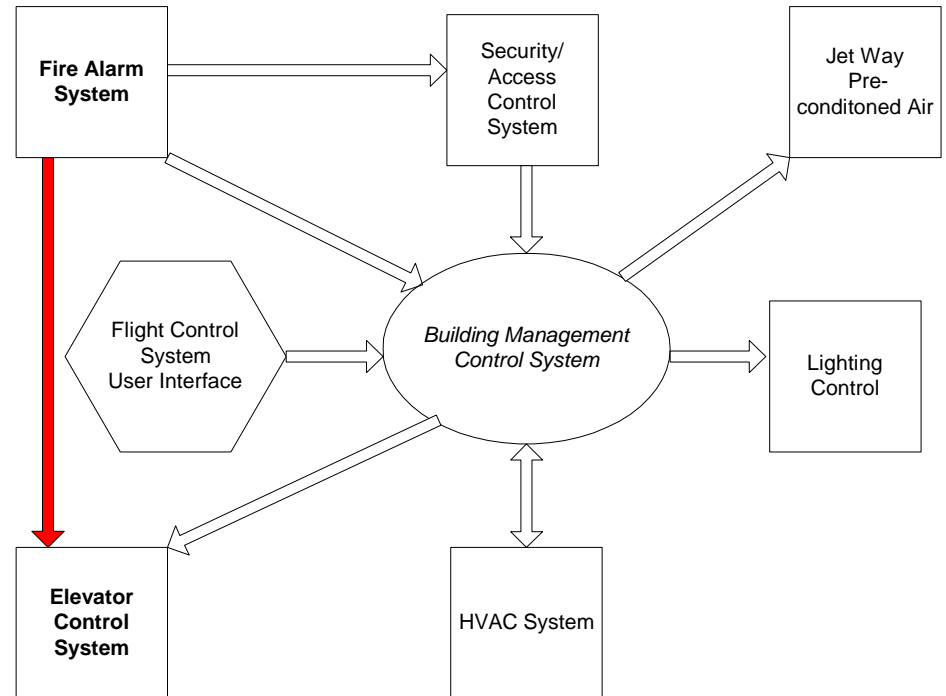
- Upon detection of an alarm, the FAS tells the access control system that the area is in alarm
- The access control system disables all locks in the path of egress



# Case Study

## International Airport

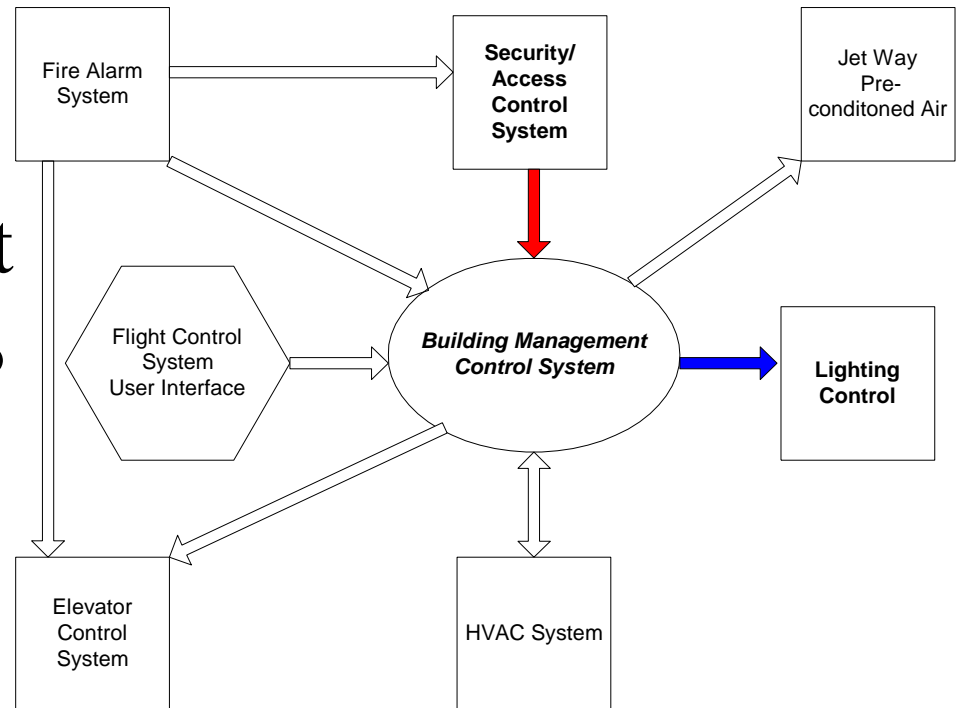
- Upon detection of an alarm, the FAS tells the elevator control system
- The elevator control system positions the cabs to the desired positions



# Case Study

## International Airport

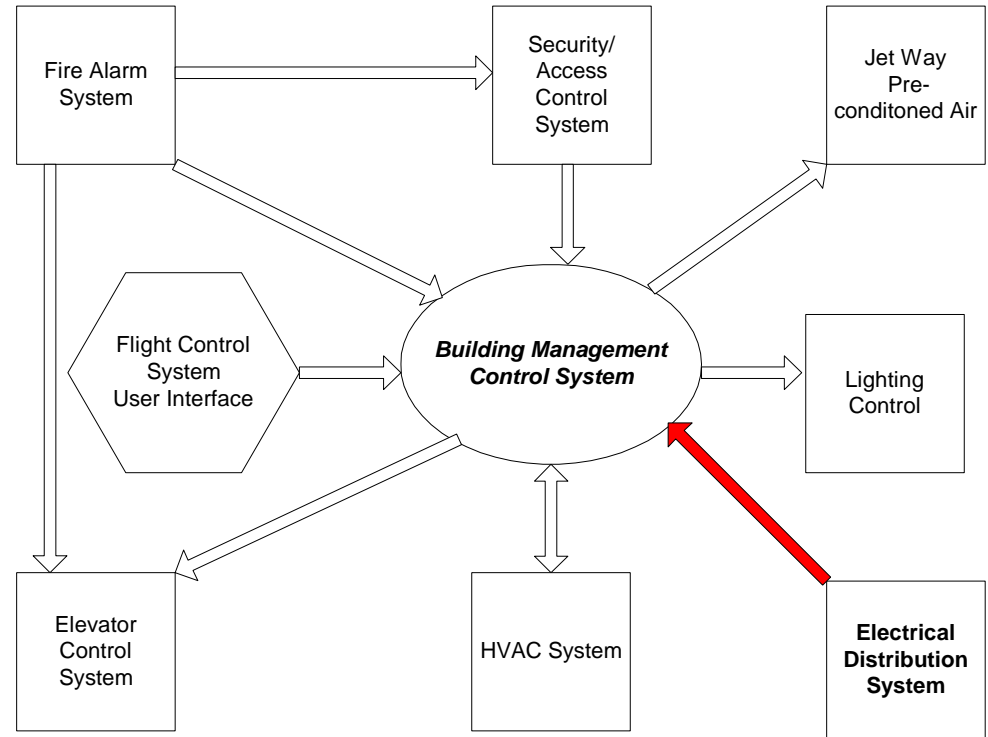
- If the access control system detects an alarm, it notifies the BMCS
- The BMCS raises the light level in that area



# Case Study

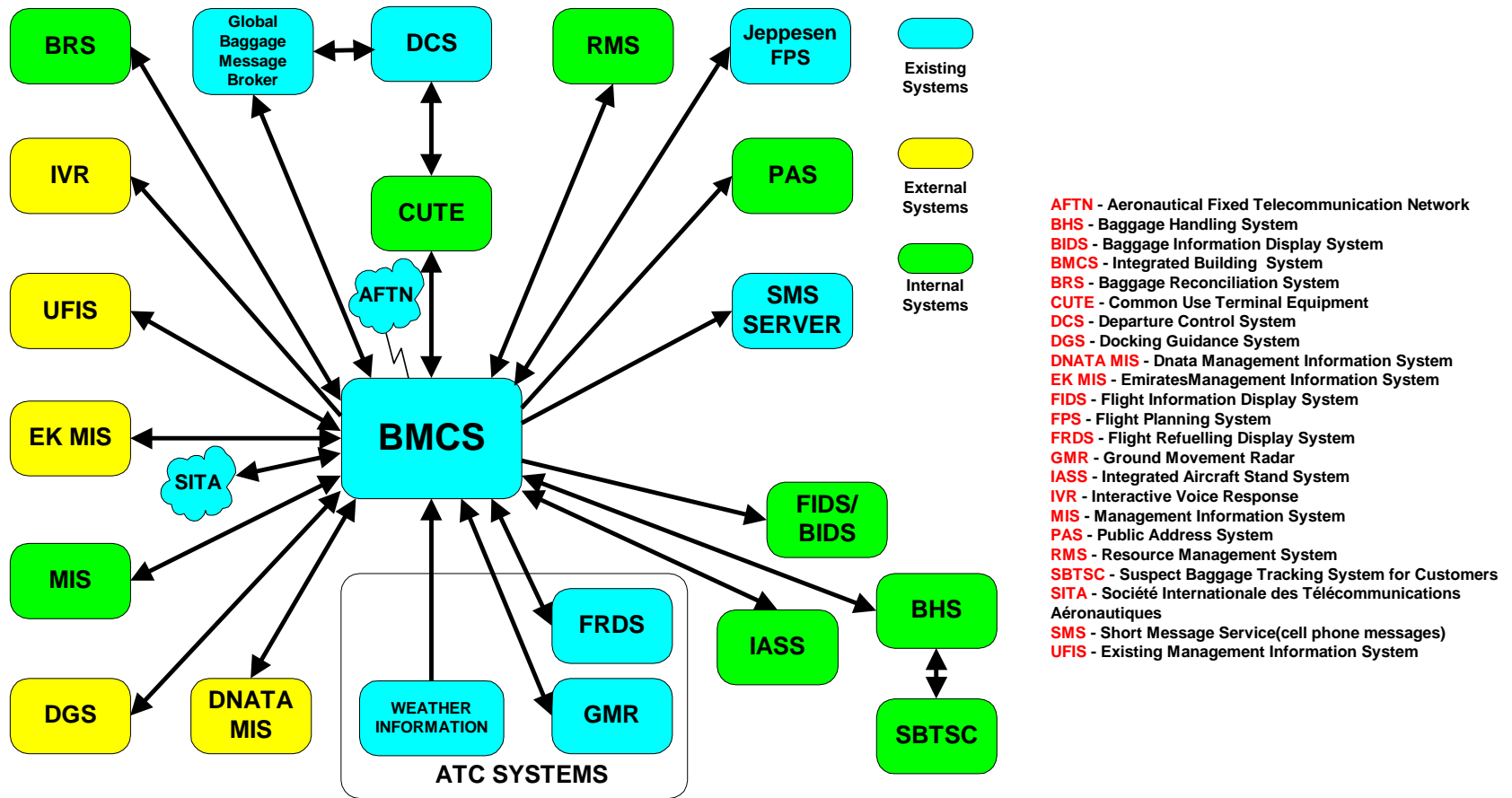
## International Airport

- BMCS monitors electrical distribution system for metering and electrical characteristics



# Case Study

## International Airport



### AVIATION SERVICES INFORMATION SYSTEMS



# Contracting Methods

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- Single contractor responsible for all system
- Multiple contractors responsible for their system only with a third party contractor as integrator





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