



ATN Airborne Implementation

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Honeywell

ATN Airborne Implementation

- **ATN implementation**
 - Issues: technical, institutional, economical etc.
- **Honeywell**
 - Integrated avionics suites
 - ◆ All airframe types
 - ◆ Broad range of operators
 - Active involvement in the development of ATN
 - The airborne implementation & integration costs
- **This paper and presentation is about**
 - What if ATN
 - Providing same level of knowledge

ATN

- **Characteristics**

- Designed for aviation
- Connection across all sub-networks
- Capacity (Bit oriented, compression)
- Better efficiency (routing, transit delay, throughput, availability)
- QoS and Security Control (authentication, reliability etc.)

- **Benefits**

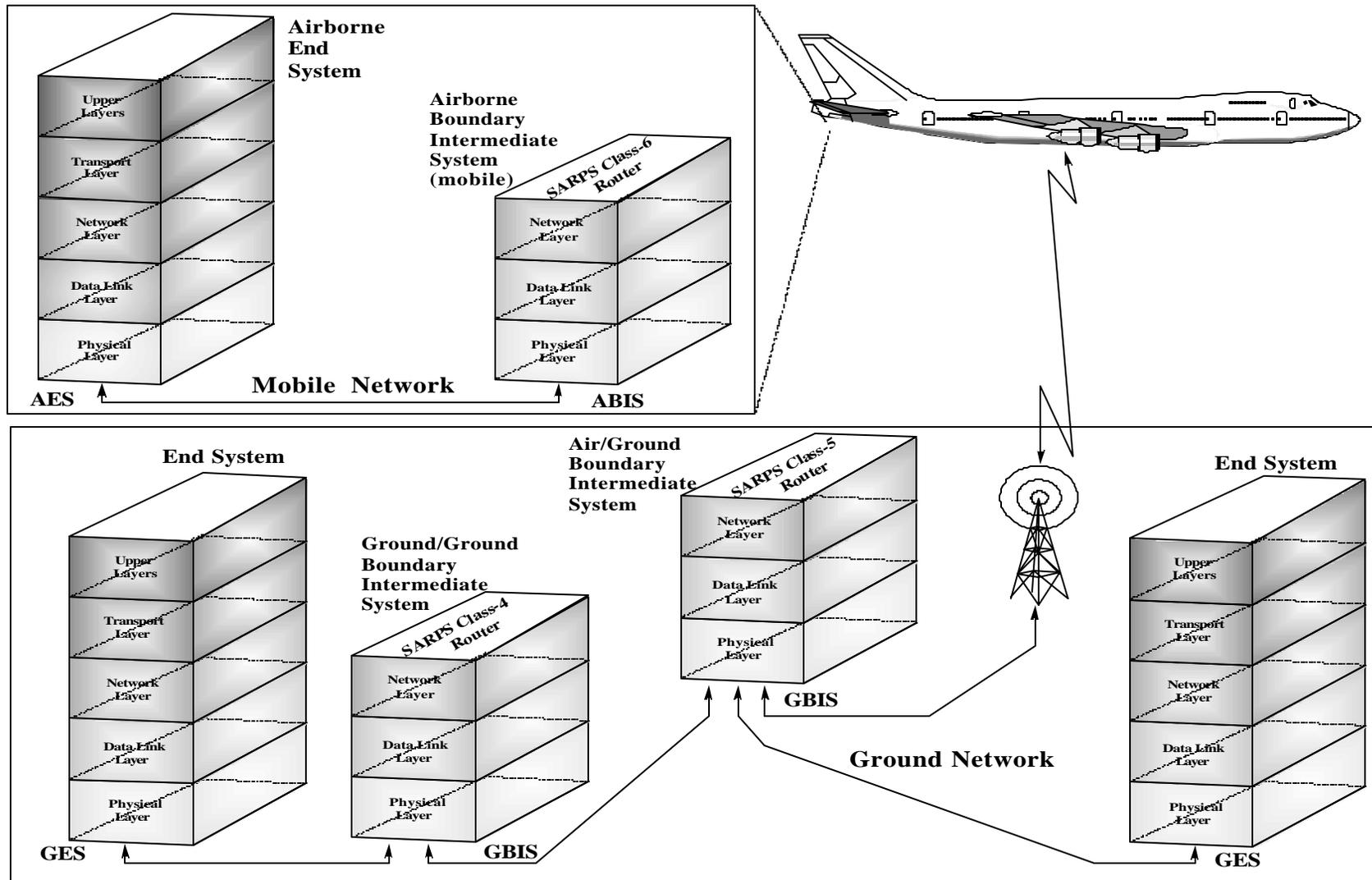
- Better access to information (policy based routing)
- Greater contribution to automation, workload reduction
- Lower operation cost

- **Honeywell Involvement**

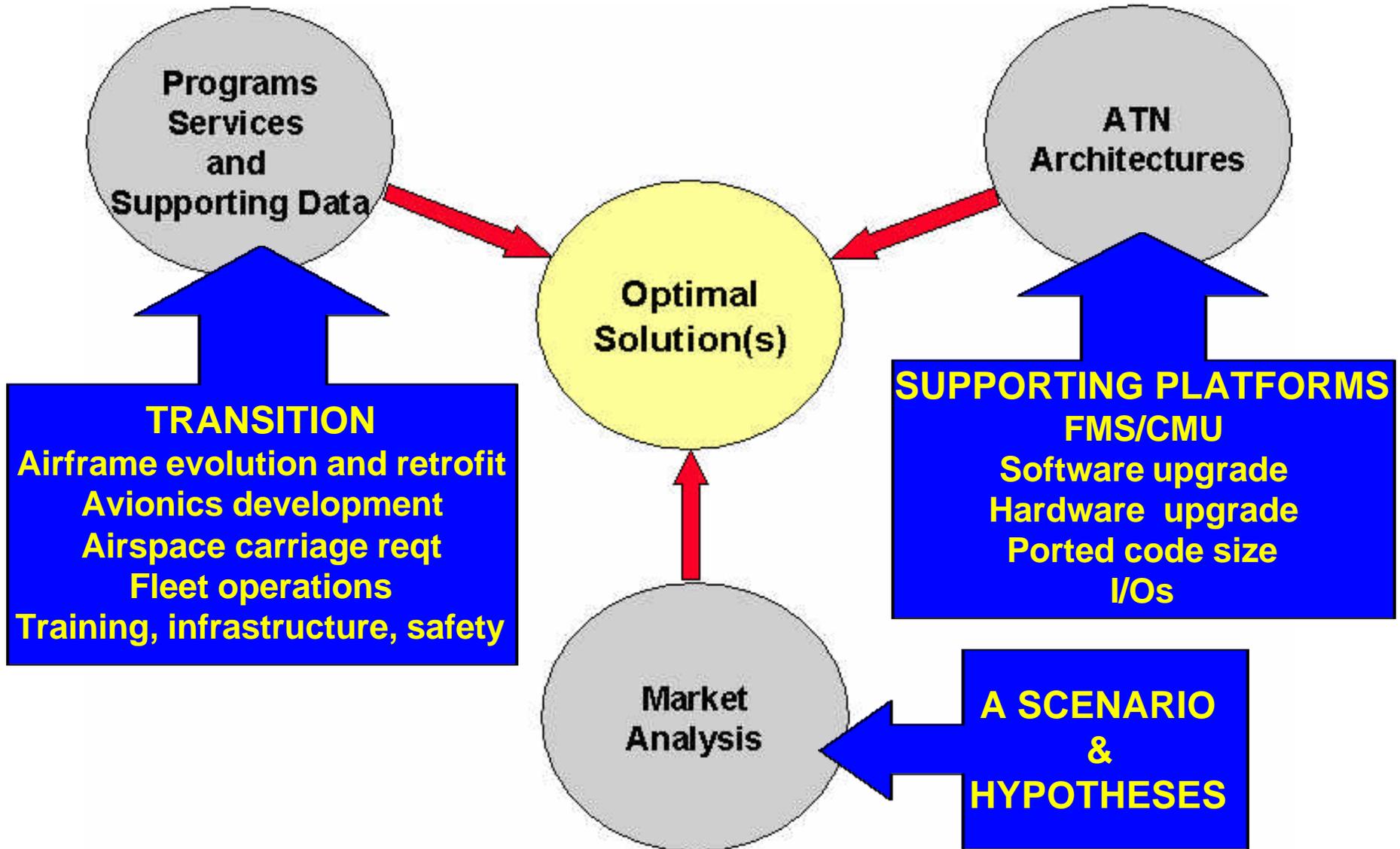
- Member of Aeronautical Communication international (ACI)
- Development of the ATN Router

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ATN Architecture



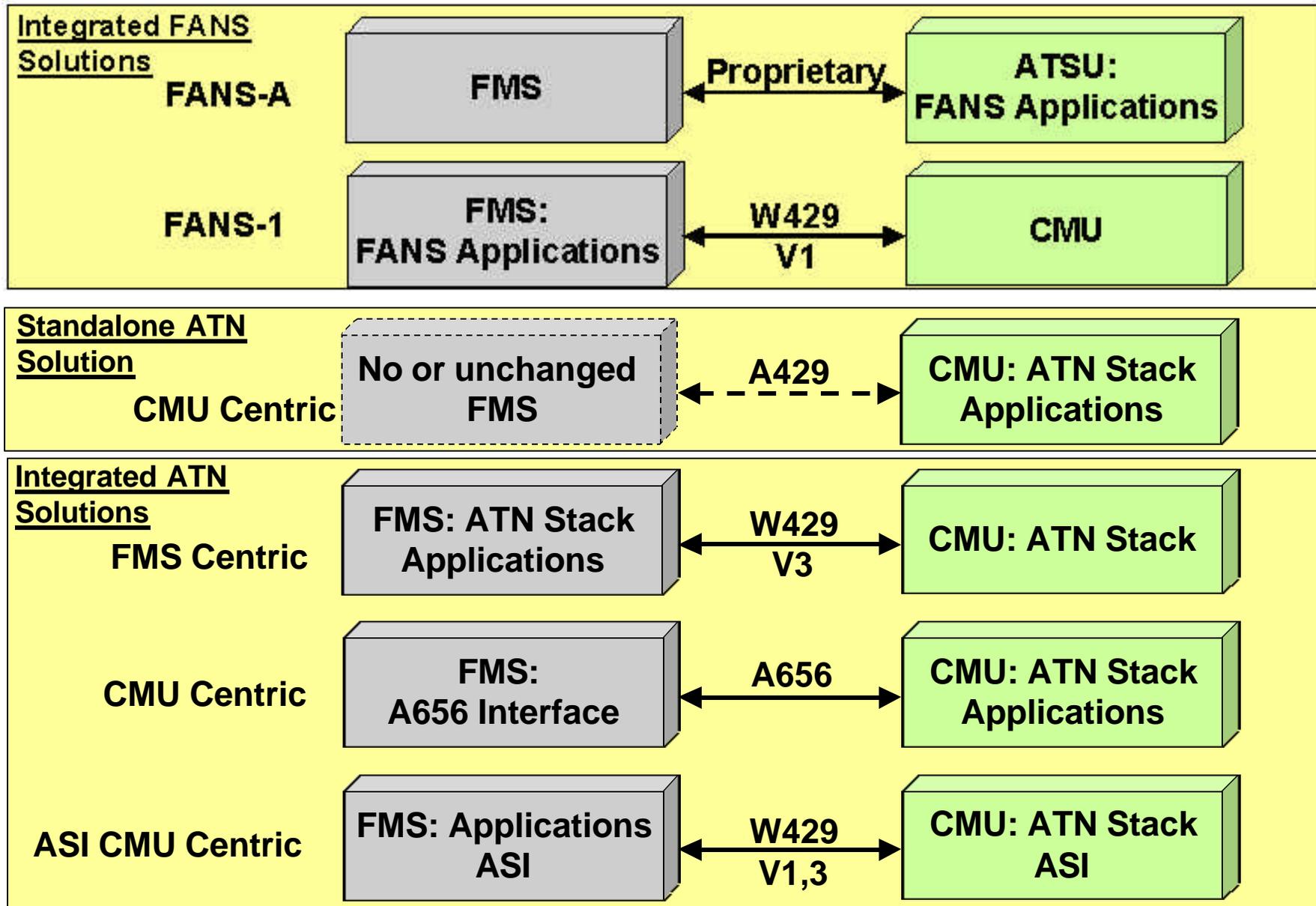
Honeywell Assessment Process



Program Services & Supporting Data

- **Services VS. Integration Levels**
 - **Integration level depends on**
 - ◆ Various programs
 - ◆ Expected benefits / Mandatory requirements
 - **Inducing message set uncertainty**
 - ◆ FMS-only parameters => need for integration
 - ◆ Error/Safety linked to pilot for data gathering & entry?
 - **Depends on**
 - ◆ FMS & CMU capabilities (throughput and memory)
 - ◆ Cost
 - ◆ Industry forces

Architectures



Market Analysis

- **“ATN customers”?**
 - Users
 - Operations
 - Fleets numbers and generations
- **Applicable platforms & A/C**
 - Forward fit
 - Retrofit
- **Current crisis and implementation schedule**
 - Non integrated
 - Inexpensive
- **Depending on all the above**
 - The best fit for the industry

=> Market analysis

Market Analysis (cont'd)

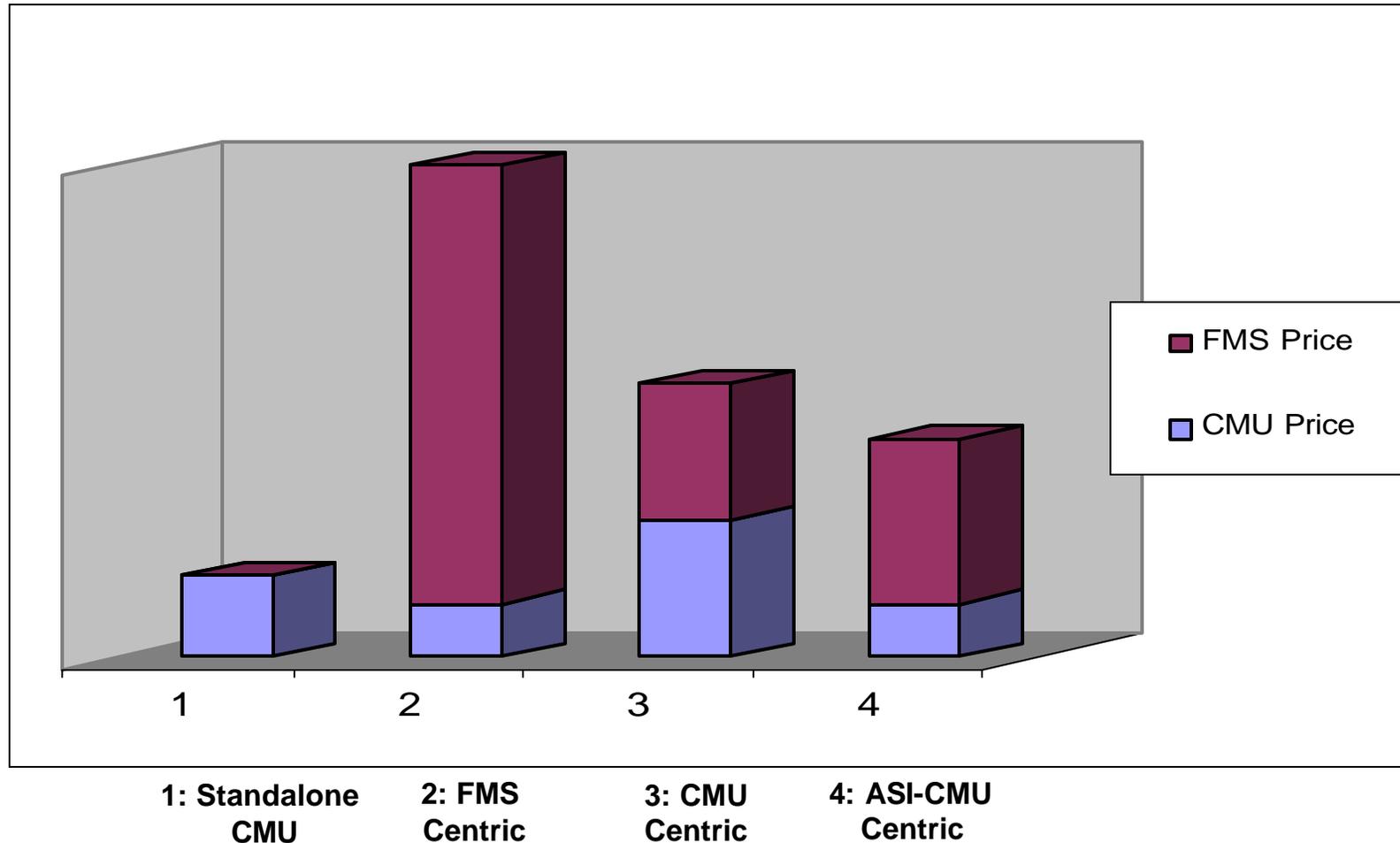
- **One scenario**
 - ‘Strong’ demand for ATN on narrow-body fleets
 - Moderate demand for ATN on wide-body fleets
 - Better opportunity to amortize ATN development costs
 - ATN solutions required for all aircraft
 - Use of continental FANS not foreseen
- **Hypothesis**
 - Prerequisite for aircraft operators to equip: ATN service availability in the US and European
 - Despite limited evidence on expected benefits, Services/applications/messages would become available in Europe and in U.S.

Market Analysis (cont'd)

- **A 10 year business case**
 - Two first years consist product development
 - Eight years for the potential fleets to get equipped
 - The two years development for the avionics is assumed to end so as to allow airframe equipage in accordance with the above availability of the service
- **different equipage rates**
 - Wide & narrow body:
 - For the different options depending on
 - ◆ Aircraft generation
 - ◆ Architecture and equipment capabilities
 - Assumes worldwide forward fit and retrofit with
 - ◆ Expected investment by airlines
 - ◆ Assessment of current developments (FAA Builds, EUROCONTROL Link2000+, RTCA/EUROCAE, AEEC, etc.)

Market Analysis (cont'd)

ATN Solutions Relative Prices



Optimal Solution(s)

- **Various Solutions & Paths to integration**
 - **Non-Integrated ATN: Standalone:**
 - ◆ Lowest cost of all ATN solutions
 - ◆ Benefits today with the initial set of messages
 - ◆ Additional expenditures to migrate towards integrated solution
 - **Integrated ATN: ASI-CMU Centric:**
 - ◆ Lowest cost of all ATN integrated solutions
 - ◆ Porting to one platform only
 - ◆ Interface adaptation to FMS
 - **Migration from Standalone: CMU Centric solution**
 - ◆ ATN and ASE are already in the CMU
 - ◆ Evolution to more complex applications
 - ◆ Interface definition

Conclusion

- **Perspective as avionics integrator & ACI member**
 - Airborne architectures & level of avionics integration drive
 - ◆ Air-ground capability and in turn,
 - ◆ Operational benefits
- **Considering affordability & lack of a compelling business case:**
 - Spread NRE over large number of platforms
 - Availability of the services & highest aircraft rate of equipage for better returns on investments
 - Phased datalink implementation then
 - Early datalink implementations with defined and cost-effective growth paths
- **Based on the various solutions and paths &**
- **With a consistent approach**
- => The cost of the ATN implementation is justifiable**

Conclusion (cont'd)

- **Development costs are minimized**
 - By isolating the ATN stack in a single & common unit
 - CMU is the most logical home for this software
- **Aircraft state and flight plan intent data is critical to longer-term CPDLC implementation**
 - Full potential of ATC datalink
 - ◆ As FMS maintains the flight plan & the navigation database
 - ◆ Cost-effective and human-centered designed functions

=>This involves interface involving FMS

It is essential to get a COLLABORATIVE decision to

=> Minimize development and implementation costs

=> Increase the chances for a successful business case.

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Thank you for your attention