

# **The Chongqing Air Logistics Platform: Strategic Guidelines**

Report 3

Business Plan Guidelines  
with Further Emphasis on Infrastructure  
and Facilities Needed

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### **3.1 Introduction**

In Report 1, I described how speed and agility had become 21<sup>st</sup> century priorities for business and industrial success. The ability of Chongqing's companies to respond rapidly and flexibly to market opportunities will depend not only on their internal management and operational systems but also on the creation of the external infrastructure and business environment that makes new supply chain practices possible. Exhibit 3.1 identifies the key business resource needs for a competitive business environment supporting a Chongqing Air Logistics Platform (CALP).

This environment encompasses much of the hard infrastructure and facilities described in the prior report as well as soft infrastructure. Both hard and soft infrastructure are external business resources that must be synergized if firms are to remain competitive and optimal economic development outcomes are to occur.

## **3.2 Business External Resource Needs**

### **3.2.1 *Multimodal Transportation***

First, modern manufacturers require integrated multimodal transportation systems for efficient sourcing and distribution of parts, components and manufactured products. Seamlessly connected multimodal transportation systems have therefore become a key to modern supply chain management. Raw materials, manufacturing inputs, and outputs must flow among geographically dispersed firms in a fast, flexible and synchronized fashion. Air cargo facilities that are integrated closely with efficient highways and railways are needed to support the development and prosperity of logistics parks, industrial parks, high-tech complexes, agribusiness firms, distribution centers, and to more efficiently link them to their sourcing, production and customer networks.

For example, the ability of Chongqing's agribusiness firms to get high-value fresh produce or fresh-cut flowers to and from distant markets quickly and reliably requires cool-chain processes and temperature-controlled facilities that link regional surface transport with CKG aircraft. Similarly, manufacturers require cross-docking facilities that bring raw materials, parts, components, and semifinished goods efficiently to Chongqing's production sites and facilitate the



rapid shipment of assembled products to customers throughout China and abroad.

The automotive sector ( Chongqing's largest industrial cluster) is a good example of how the proper integration of multimodal transportation networks can further improve its competitiveness. Heavy metal components would arrive via rail or through Chongqing's ports. At the same time, smaller high-value digitized parts and custom components, often made by local and regional suppliers, must be delivered on a just-in-time basis to Chongqing automotive assembly facilities. These may arrive from local suppliers by truck and from longer-distance suppliers by air. The newly assembled automobiles are then trucked or transported by rail and river to domestic markets and to sea ports for shipment to international markets.

Another example of multimodal supply chain convergence is a specific future target industry of Chongqing – aerospace manufacturing. China has a growing foothold in aircraft equipment manufacturing. Brazil's Embreair and Europe's Airbus have already established commercial aircraft equipment facilities in China's coastal areas and Boeing will not be far behind. All three aerospace firms are now requiring linkages among major modes of transport in their site selection competition for new commercial aircraft assembly facilities. They are looking for uncongested airport sites with highway and rail interfaces

that link to ports. In the U.S. in recent years, major aircraft assembly or component facilities have been constructed or approved in Charleston, South Carolina; Kinston, North Carolina; and Mobile, Alabama. All sites have air, road and rail access with connections to ports. It was for this reason that I recommended in Report 2 that a freight rail spur be developed to the Chongqing airport area.

### ***3.2.2 Advanced Telecommunications***

Second, the Chongqing Air Logistics Platform (CALP) of which the CKG Air Logistics Park is the centerpiece requires an advanced telecommunications and electronic data interchange (EDI) network (as described in the Report 2) to obtain information on markets and orders, trace, track and manage materials and inventory, and control movements of goods to customers. Such a network is also essential to attracting more sophisticated transportation-related and third-party logistics (3PL) companies and 4PLs (managers and integrators of 3PLs) to the CKG Air Logistics Park that will provide state-of-the-art logistics services to its users and tenants.

According to the Georgia Institute of Technology 2004 global survey of manufacturers and logistics providers, third party logistics firms are used by

nearly 90 percent of large manufacturers to manage their outbound transportation. The survey also showed that 3PLs now regularly use web-enabled and other advanced communications in meeting manufacturer's needs for supply chain ordering and inventory control, shipment tracing and tracking, customs clearance and warehouse management. Similarly, electronic data interchange (EDI) is used by 3PLs for route optimization and carrier selection, fleet management, order fulfillment, customs brokerage, duty and tax payments and even factoring (inventory and trade financing).

The CALP telecommunications system should feature information technologies served by fiber optics loops, RFID, Wi-Fi, Wi-WAN, and GPS satellite linkages that assist 3PLs and connect companies in the airport area and throughout the Chongqing Province to their suppliers and customers and to their own branches, offices, and partners around China and the world. Chongqing is fortunate to already have much of this fiber optics and telecommunications network in place. A teleport with advanced information and telecommunications management systems should serve the CALP and its tenant premise equipment (including rapid worldwide communication, EDI systems, business to business (B2B) exchanges, and new-generation video conferencing equipment) through communications satellites, fiber-optics, and high-speed digital networks.

Operations (manufacturing process) research is showing that the telecommunications and information technology infrastructure external to a firm

now heavily influences the effectiveness and efficiency of internal firm processes. This can be a key competitive advantage for Chongqing's logistics firms and for business and industrial recruitment.

As international air cargo grows at CKG (as is forecasted), this telecommunications system must also support even faster express customs clearance and more efficient trade data processing. It is therefore important for the air logistics park to implement software for an automated, paperless customs environment needed by 21<sup>st</sup> century fast-cycle logistics. CKG's new northern cargo area should likewise be used as a laboratory for new expedited customs clearance procedures and electronic data interchange to achieve high-speed, barrier-free international flows of agricultural products, parts and components, and manufactured goods as well as a one-stop trade data and information shop.

In the future, to speed customs clearance, the CKG and its connected bonded port's automated customs environment should be extended to the entire northern cargo complex and beta test new, even more efficient practices. Through joint determination with China Customs of appropriate technology, procedures, and staffing levels (and in partnership with participating private sector firms), CKG can take the lead in creating China's fastest and most efficient customs clearance system – 24 hours a day, 7 days a week. Instrumental to the success of the CKG Air Logistics Park will be speed and agility in moving high

value to weight products to and from the airport and throughout that Chongqing, providing its businesses with a major competitive edge in fast-cycle logistics.

### **3.2.3 Commercial Support**

Third, the CALP business environment requires 21<sup>st</sup> century commercial support services. Globally-linked manufacturers, assemblers, and distributors must have access to state-of-the-art free trade zones for value-adding activities. Tenants and external users require bonded warehouses at and near the airport, as will be the case at CKG as well as financial institutions, marketing, sales and employment agencies, legal services, and trade and exhibition centers. I noted above that expedited customs procedures are required to streamline and accelerate the import of raw materials, parts and components and the export of finished goods. One-stop government service centers (combining state, provincial, and local agency requirements) are also necessary to expeditiously provide foreign investors with all required licenses, permits, and investment promotion privileges. Trade and exhibition facilities are needed to display and market products of Chongqing's and the nation's firms.

Visiting executives require hotels with meeting rooms, high-speed data-ports and concierge business services conveniently located near the airport. In addition, the ability to attract professional managers and highly-skilled younger workers to Chongqing requires a full array of community amenities including modern housing, quality schools, upscale shopping and fine restaurants, nightlife, recreational, and cultural facilities, many of which are already available in Chongqing. A cluster of higher-end shopping, restaurants, nightlife, and leisure facilities might be developed near CKG. (These locations should be identified and elaborated in the team's report.)

#### **3.2.4 Knowledge Support**

Fourth, many high-tech and other new economy industries must be located near or have ready access to knowledge resources that can generate or stimulate innovation and provide a reliable source of trained workers and managers. Among the most important knowledge-based organizations on which global businesses depend are top-notch colleges and universities providing well-educated professionals and research capacities, and consultancy organizations that help commercialize technology, develop new products, and service local and multinational firms more effectively. Such knowledge resources, well represented in Chongqing, have proven to be a strong asset in meeting these

objectives as well as attracting technology and science park clusters such as those at XiYong HiTech Park. At the technical and vocational level, a CALP distance education and training facility drawing on CKG's telecommunications network could provide real-time audio, video and tactile worker training on-site (and, via distributed education and training, to facilities throughout China) from training centers in distant headquarter firm locations around the world. Thus, if Boeing decided to establish a major aerospace equipment manufacturing facility in the CKG area, on-site training could come directly from Seattle. Or if Mercedes wished to establish a high-value, JIT dashboard digital components assembly facility in the Airport Industrial Park, the on-site training could come directly from Stuttgart.

### **3.3 Functional Requirements of a Chongqing Air Logistics Platform**

The Chongqing Air Logistics Platform (centered in the new northern cargo sector and adjacent bonded port) should represent integrated responses to the external business resource needs described above. To succeed, it must incorporate six broad functional capabilities targeted to these needs. For each functional (business) requirement, examples of key hard and soft infrastructure

elements are noted. (Refer back to Report 2 for more detailed discussion of the design/location of these elements.)

1. *Multimodal Transportation System with Access to Local, National and Global Transportation Networks*

On-site cargo terminals and inland ports with efficient intermodal capability should be linked to Chongqing's major highway and rail systems and with its river and air transportation networks. Primary integration capability for the CALP must provide a seamless interface between transportation modes and between Chongqing's industrial parks and major air cargo and ocean shipping routes so that goods and materials can flow uninterrupted from any Chongqing location to CKG and ocean ports quickly, at low cost, and with a minimum of human handling. This applies, as well, to air passengers moving between CKG and the cities in industrial and commercial zones, especially time-sensitive business executives and professionals. Efficiently linking all the various modes of transportation is important to establishing a time-competitive infrastructure at and around CKG and to attracting businesses industrial investment to the airport area and throughout Chongqing.



Examples of such business resource infrastructure needs at CKG and the CALP include:

- Upgrades of nearby CKG highways and a CKG intermodal facility with truck cross-docks connecting to rail and to Chongqing river ports.
- Constructing internal roadways and utilities in the C<sub>3</sub> area and connecting them with the bonded port and 319 national highway.
- Removing choke points on 319 national highway and other major access routes to the new northern cargo area.

## 2. *On-site Cargo Processing Capability*

At the core of any air logistics platform must be a cargo processing facility with advanced material handling that can accommodate the needs of a variety of aircraft and industries. The air logistics park and adjacent bonded port freight area can serve these functions well. I noted that flexibility in both the processing capability and location of material handling activities is essential because of nonstandard aircraft and ground cargo-related equipment, and because of a dynamically changing cargo processing environment. Targeted mechanization of CKG's northern cargo

area operating processes, as discussed in Report 2, can be provided when it is productivity-driven and demand-justified.

Examples of key CKG Air Logistics Park infrastructure elements include:

- New Northern Cargo Facility (NNCF) with advanced material-handling systems (MHS) and intermodal interfaces (refer back to Exhibit 2.10).
- High-velocity flow-through facilities with airside cargo access and truck cross-docking.
- Automated customs clearance procedures and facilities.
- In-bound breakdown and delivery staging areas.
- Cargo inspection, security, and holding areas.
- Facilities for value-added service provision, such as pick and pack, and temperature-controlled (perishables) storage (*to be elaborated later in this report at Lyn's request*).
- E-commerce fulfillment clusters.

### 3. *On-site Cargo Transport System*

A third need for fast-cycle logistics at CKG and to efficiently link all its goods-handling facilities in the future C<sub>2</sub> and C<sub>3</sub> airport zones is an on-site cargo transfer system (CTS). The CTS, would connect CKG with all

transportation modes and terminals (air, road, and rail), with each mode inside the airport fence (air logistics park) cargo facilities, distributors and logistics providers, and with other Chongqing manufacturing and distribution complexes via highways. The CTS can be fully automated, semi-automated or manual depending on traffic flow profiles (cargo demand) and the specifics of the site and should be complemented by appropriate materials handling technologies.

Examples of such infrastructure elements include:

- Internal road and cargo tram system (CTS).
- Connecting freight rail spur for an airport area.
- Intermodal rail facility (and inland port).
- Automated storage/retrieval systems.
- Electronic RFID tagging of cargo and and EDI technology.

#### 4. *Shared Telecommunications System with Transparent User Interfaces*

Apropos the last bullet point above, computer-to-computer information transfer between companies (Electronic Data Interchange and B2B e-commerce) are quickly replacing paper and fax transmissions and even most traditional face to face supply chain transactions. This electronic interchange of data and information requires message standards,

translation software and transmission capability. Recent technology developments have created new opportunities to enhance inter-modal, inter-company and inter-industry communications with harmonization software, more powerful work stations, improved data transportation mediums, global communications networks and faster routers for electronic transmissions.

Incorporating these capabilities and new technologies through the CALP will greatly facilitate seamless relationships between air logistics park tenants and users and their suppliers and customers – regionally, nationally and worldwide. The net effect is to accelerate materials handling, customs processing and product transfers among commercial facilities, aircraft, trucks, rail cars, and Chongqing's ports. A key planning challenge, as described in Report 2, is to design a communications system that is flexible enough to support the majority of CALP users, that offers rapid connection to regional, national and global networks, that maximizes functionality (including effectively communicating across different transport modes), and that allows for continuous improvement and innovation.

Examples of key electronic commerce elements include:

- Electronic data interchange (EDI) and RFID interoperability across transportation modes
- Fiber optic, Wi-Fi, Wi-WAN and satellite networks
- Wide-area broadband
- Web-based harmonized software architectures and message standards

5. *Access to On-site and Remote Services for Commercial Support, Logistics Education and Worker Training*

In the new speed-driven economy, businesses are demanding access to a variety of support services that reduce the time and cost of logistical transactions. Desirable commercial support services include a variety of legal, financial, and government services such as the securing of permits, and export licenses. Some of these services can be provided electronically. Co-location of these services at CKG or at a strategic point nearby can provide a “one-stop-shop” support for air logistics park tenants and users.

Similarly, electronic access to education and training facilities throughout China and the world can provide substantial value to air logistics park tenants and users. As noted previously, the proposed

distance education facility at CKG would provide agile support for custom training the local labor force by offering tenant and area companies real-time audio, video, and tactile access to knowledge and training resources from around the world. So, if Rolls-Royce wanted to locate a jet engine production facility at the air logistics park or in a nearby area, worker training could be conducted on site, via simultaneous audio, video, and tactile instruction from its European production headquarters.

Examples of such business support elements:

- Interactive audio/video capability.
- Wide area broadband information exchange.
- On-line interactive and/or automated support of negotiations and contracting.
- Education and training center with distance-learning capabilities.
- One-stop shop service center for investors permits, licenses, etc.

#### 6. *Arterial Movements Unencumbered by Congestion*

Success of the Chongqing Air Logistics Platform (CALP) requires speed and agility of movement on local highway systems. As the area develops the potential for congestion rises. I discussed previously how highway

congestion is already a problem in some area's near the airport and elsewhere in Chongqing. Chongqing and Yubai planners have endorsed current and future planned upgrades including new highways and additional lanes in high-volume traffic areas. They should also consider:

- Intelligent highway system technologies.
- Truck-only lanes on certain expressway routes.
- Encouraging cluster as opposed to strip commercial and industrial development along Chongqing's airport expressways.

### **3.4 Critical Success Factors for the CALP**

Effective planning requires not only vision but also an appropriate strategy. Guiding the development of a master plan for the CALP should be a set of critical success factors that, if followed, will greatly facilitate their ultimate success. Realizing these critical success factors will also provide almost all of Chongqing with a major competitive edge in attracting business and industry. These critical factors are the ones most commonly found in successful air logistics parks and aerotropolis developments around the world.

#### Critical Factor #1

#### The CALP Must Be Designed Around Emerging 21st Century Business Practices

Beginning with my frequently repeated fundamental point, master planning of CKG air logistics park must reflect not only the best multimodal systems and aeronautical engineering practices but also the business practices and needs of 21<sup>st</sup> century global companies. I noted that dramatic changes are occurring in how companies transact their business, and especially in how today's most successful high-tech manufacturers and logistics providers move goods and materials throughout the world in a fast and flexible manner. 21<sup>st</sup> century air logistics platforms therefore cannot be designed and developed as separate infrastructures that reflect more traditional aerodrome and civil engineering objectives and traditional airport commercial practices. New business realities require new business infrastructures. The Air Logistics Park at CKG must be geared to modern supply-chain management that fuse multimodal transportation, advanced telecommunications, sophisticated materials handling systems, and state-of-the-art business support services to offer unmatched speed and agility to its tenants as well as users from throughout Chongqing and beyond.



## Critical Factor #2

### Development Plans for the CALP Must Give High Priority to Quality of Life Considerations

Unlike most other air logistics complexes around the world, the CALP should be developed as a multi-functional district that will support not only manufacturing and distribution activities, but also white-collar service functions, so important to Chongqing's economy. This raises the importance of quality of life considerations with respect to their broader built environment. By balancing industrial, commercial and environmental factors, the CALP can provide benefits not only to the companies that locate nearby, but also to nearby residents. High-quality design standards, beautified access roads, attractive industrial clusters, and environmental sustainability must be overarching objectives.

## Critical Factor #3

### Master Plans for the CALP Must Be Flexible and Reconfigurable.

I have stressed that master planning should not be viewed solely as detailed site and civil engineering plans to guide construction and development. Rather, the master plan for the CALP should be developed as a flexible framework that can accommodate a wide variety of commercial facilities, tenants, and physical layouts. As suggested above, master planning must look to the long-term, with a design that is both environmentally and economically sustainable, as well as aesthetically appealing. It must also be able to adapt to emerging business needs and incorporate new technologies and infrastructure advances.

#### Critical Factor #4

The CALP Must Establish Synchrony with Other Infrastructure Projects throughout China and the World.

We are moving into an era in which networks of firms compete rather than individual companies. In this new industrial environment, CALP tenants must be able to access their suppliers, partners and customers quickly and effectively. This requires synchrony with other air cargo systems around the world and with harmonized communications systems and surface/sea transportation networks. Major 3PLs and forwarders are racing to set up efficient and seamless international networks. By aligning and integrating more closely into their international networks, CALP goods-handling businesses will be able to participate more efficiently in the global economy that these firms themselves have become inextricably interwoven.

#### Critical Factor #5

The CALP Must Emphasize the Importance of Logistics-Based Capabilities in Attracting Globally-Oriented Businesses.

As Chongqing's companies search around the world seek quality parts and components at competitive prices, and as customers demand quick response and rapid delivery, access to multimodal air logistics platforms will be a major criterion for industrial location. Companies will certainly continue to require traditional economic incentives, such as investment offsets for land or facilities, state and local tax abatements and other promotional privileges as are present in

Chongqing. However, as the competitive priorities of speed and efficient response to changing customer demand predominate, the relative importance of these traditional factors will lessen. Increasingly, investment decisions will be made as much on the basis of the logistical capabilities of the site and access to national and global networks, as on government incentives.

#### Critical Factor #6

##### The CALP Must Demonstrate Broader Regional and National Benefits

To obtain broad-based public and governmental support, CALP development must be positioned as a vehicle for not only for Chongqing but the entire nation's competitiveness and economic growth. The development of a Chongqing Air Logistics Platform that would attract high-value industries to the airport area and all of Chongqing should be a primary goal. It is therefore critical that CALP master planning recognize this need to design and implement an integrated logistics system plan that builds synergies among region-wide and national transportation networks and industrial centers.

#### Critical Factor #7

##### CKG Connectivity to Global Markets Must Be Expanded.

Driving CALP success will be increased passenger and cargo airline connectivity measured by the numbers of global markets served by CKG airlines and the frequency of air service to and from these markets. Every effort must be made to

expand CKG's air routes, especially cargo, a point I will return to with specific recommendations.

### **3.5 Multimodal Inland Ports and Perishables Facilities**

In order for multimodal air logistics platforms to maximize their contribution to industrial development, job creation and wealth generation, two pre-conditions need to be met. First, the mechanisms of close coordination among shippers, truckers, warehousers, railroads, airports, and consignees for the rapid expedition of shipments need to be developed. The infrastructure needed for that coordination was discussed in Report 2. Second, the multi-modal facilities themselves need to be constructed and operated efficiently.

I build on the developing experience of inland ports in specifying planning guidelines and, as an exemplary case, use one successful U.S. inland port as a point of reference. The guidelines are general guidelines that will need to be adapted to Chongqing and the CALP, especially as an inland port and perishables facility may relate to its core air logistics park and bonded port freight area.

Exhibit 3.2 outlines the basic functions of such industrial support infrastructure. Ultimate success will require an eventual freight rail spur

directly to CKG or to its surrounding area connected then by an extended rail line to China's sea ports as well as a suitable site where truck cross-docking can occur. On the right side of the exhibit, supplementary functions are listed. CKG already possesses air cargo facilities and has a Free Trade Zone that could be integrated with these intermodal functions.

Four models of inland ports have been identified by U.S. researchers. These are 1) satellite marine terminals such as the Virginia Inland Port elaborated below, 2) all-cargo logistics airports such as the Global TransPark in North Carolina, 3) multi-modal logistics parks such as that found in Joliet, Illinois, and 4) cargo airports with rail intermodal developments such as those described in Report 1 for Alliance, Texas and Huntsville, Alabama.

Multimodal air logistics complexes can be successful if they are conveniently located with respect to market areas. Successful cargo airports, such as those at Alliance TX and Huntsville AL, are frequently strengthened by an inter-modal rail facility.

One possible model for Chongqing is the Virginia Inland Port (VIP, located on Virginia Highway 161 just north of Front Royal near the intersection of I-66 and I-81. VIP has been in operation since 1989. It provides an example of one potential ground layout and, despite several differences, a potential guide to operation. Exhibit 3.3 presents VIP's general layout and land uses. The inland

port is a U.S. Customs Port-of-Entry, is circumscribed with a Foreign Trade Zone, and has a 1,400 foot boundary with Norfolk Southern. VIP is served by scheduled rail service to Norfolk six days per week which gives shippers access to the trade routes of approximately 75 international shipping lines. Its strategic purpose was to capture a portion of the traffic from the U.S. Midwest that might otherwise go to Baltimore or Philadelphia.

As illustrated in Exhibit 3.4, the land set aside for the inland port needs to be long in order to facilitate loading and unloading. The site should be expandable as throughput increases. Noise buffers need to be established around the site and cargo truck traffic separated from personal automobile traffic. Immediate highway access and clustered distribution centers are critical because local drayage is sufficiently expensive as to undermine the potential efficiency advantages of many proposed logistics and distribution centers.

The viability of multimodal logistics and distribution depends upon the need for consolidation and inter-modal transfer. A Chongqing inland port linked by shuttle trains to China's sea ports will cut shipment time considerably. It is suggested that the master plan for the CALP assess the technological and market feasibility for such an inland port in the CKG area or elsewhere in Chongqing.

Inland ports, while increasingly important industrial resources, are complex organizations. Their successful operation requires the fulfillment of

many roles and responsibilities. These include those for real estate, terminal improvements, financing, providing the terminal equipment, supplying line haul and rail shuttle equipment, designing operating systems, overseeing terminal operations, coordinating railroad operations, and marketing. Should the decision be to move forward with such a facility in the future, I would recommend that the Chongqing government bring in an experienced inland port operating company from the U.S. or Europe..

### ***3.5.1 Perishables and Cool-Chain Facilities***

I have been asked to provide guidelines for cool-chain facilities to keep perishables fresh and deliver them to foreign markets maintaining highest value. The CKG Air Logistics Park may serve as an outward transfer point for the pharmaceutical and biotechnology industries which are seeking cost-effective production sites outside the U.S. and Europe. With the appropriate investments in cool chain and other perishables facilities, Chongqing will be well-positioned for the expected increase in perishables trade.

Fresh produce loses much of its value after harvest if temperatures are not carefully controlled to prevent deterioration. Perishables, in fact, were among the

first goods to be transported by air. Dutch air carriers began transporting fruit, vegetables and flowers to Great Britain in 1927.

Perishable commodities now amount to nearly 8 percent of all air cargo shipped. Time, temperature and treatment are crucial and the integrity of the cold chain must be maintained in order to prevent irreversible damage.

The movement of pharmaceuticals by air also dates back to the period before World War II. The value of the cold chain in the preservation of expensive vaccines and medical supplies only began to be recognized when specialized logistics providers started to appear. A survey commissioned by Envirotainer, an industry supplier, suggests that the shipment of valuable temperature-sensitive pharmaceuticals by air will grow by an average of 11 percent per annum for the next decade. Perhaps 80 to 90 per cent of the new drugs that are due to come on the market – possibly more than 150 – in the next five years are temperature-sensitive. Previously, temperature-sensitive shipments in the broad biotechnology field were mainly blood, vaccines and insulin. Treatments in areas such as cancer, Parkinson's disease, HIV, and cardiovascular problems increasingly use proteins and other live ingredients that must be kept at a particular temperature.

The highly perishable biopharmaceutical market is growing by 17.1 percent annually, significantly faster than traditional pharmaceutical market. The



expectations are that the market will grow exponentially in the decade ahead. Climate controlled logistics have the potential to significantly improve the operations of several ends of the biopharmaceutical industry where temperature and humidity deviations cause large costs because drugs may become ineffective or even harmful.

Like cargo handling in general, both inward and outward cool chain shipping is undergoing an organizational transformation away from a plethora of independent actors, as shown in Exhibit 3.5 (who may or may not work efficiently together) to a more streamlined organization, as illustrated in Exhibit 3.6. The latter model allows a shipment manager more direct control over every step in the supply process. Such control is imperative in the cool chain where the significant hand off delays can destroy all product value. The implication for the CALP is that only one firm, rather than a whole constellation of them, needs to be recruited. Almost all prospects can be easily found via their membership in a trade group such as the Global Cold Chain Alliance.

Apropos the perishables center appropriate for CKG's new northern cargo area, Exhibit 3.7 pictures the Hartsfield Atlanta Perishables Center at Atlanta Airport and the facility at New Orleans Airport. Cool chain facilities are essentially very well insulated big boxes. The Atlanta facility has four cold storage rooms, the New Orleans facility three. Both have direct apron access on

one side and convenient highway access on the other. The 42,000 square foot Atlanta facility is divided into four temperature-controlled rooms with ceilings more than 20 feet high. Almost half of the Atlanta facility is devoted to dry goods requiring 55 degree storage. Approximately one-fourth of the space is kept at 42 degrees for fruits and vegetables. The rest of the warehouse space is divided among flowers (33 degrees) and frozen foods (-5 degrees). As receiving and distribution centers, neither of these facilities includes the flash freezers found at the production end of the cool chain.

Chongqing Province already has a substantial Chinese trade in fresh produce. The U.S. and European markets offer potential new opportunities for agricultural growth. The perishables trade with the U.S. and Europe will need to attain a minimum threshold and find a cargo back haul in order to be viable, however. This had been a general problem and one reason Jade cargo International follows a circuitous route in CKG's connections to Europe.

Attention to both infrastructure and operation management is critical in cool chain facilities. Should a cool chain facility be constructed in the CKG Air Logistics Park, not only must it be designed to the latest standards but also refrigerated or other climate-controlled trucks must be utilized for efficient transport to CKG and other locations. Any break in the cool chain can be disastrous for highly perishable shipments. In extreme cases, only a few minutes

at ambient temperature at any point in the supply chain can destroy the entire value of a shipment.

Design of cool chain facilities depends upon the exact products to be stored and shipped. Each fruit and vegetable has its own characteristics and shelf life, sometimes requiring specific temperatures and storage conditions. Estimates of movements for each product are needed. Once the types of perishables to be grown are known, this includes the calendar of harvests, daily deliveries and shipments, and the degree of processing needed (whether the products will be shipped chilled or frozen).

Effective management is therefore critical. Even in busy cool chain distribution points, the wait for shipment consolidation often reduces the effective shelf life of products by half – severely diminishing their value. A volume sufficient for relatively frequent shipments from CKG is therefore imperative. This also means that CKG must offer substantially increased air cargo service, a point which I now address.

### **3.6 Boosting CKG's Air Exports**

In addition to stepping up efforts to attract foreign passenger airlines (which also transport cargo in their bellies) concerted effort should be made to

attract more foreign all-cargo airlines to provide better balance at CKG. This will widen and deepen Chongqing's cargo highways in the sky, providing faster and greater connectivity to many major markets (and to Chongqing industry suppliers) not served by Air China or Jade. Because of inter-airline agreements, which are heavily used in the air cargo as well as passenger arena, CKG's domestic airlines could possibly even gain cargo as CKG grows its foreign airline cargo network.

Two proposals are therefore made. The first, which is more politically challenging, is to move to total open skies for all cargo aircraft at CKG. Only the market and slot availability would set boundaries in air freighters from any country flying in and out. Dubai introduced such an open skies policy well over a decade ago and the results speak for themselves. Not only did air cargo mushroom at Dubai International Airports as described in Report 1 but the national carrier, Emirates Airlines, prospered in cargo growth becoming one of the world's top cargo airlines. Indeed, under open skies, Emirates became the most profitable and fastest growing airline in the world.

The second proposal deals with the new northern cargo facility which should be a shared facility with heavy use by foreign flag all-cargo aircraft. If planned and constructed around the guidelines described previously, it will likely be a magnet for all-cargo airlines and the freighter fleet of major global

passenger airlines. If these airlines were also provided 5<sup>th</sup>, 6<sup>th</sup>, and 7<sup>th</sup> freedom rights, as is possible with China's new liberalized air policies, it is possible that some might even establish regional cargo hubs at CKG.

Yet, all this will go for naught unless the cargo airlines can be guaranteed daily or weekly cargo loads that make them profitable, including significant backhaul. In short, cargo airlines are reactive not proactive – they go where the business is. This is why working with the logistics management companies (major international freight forwarders and 3PLs) to direct cargo to CKG is so critical. Research has shown that, aside from integrated air express companies (e.g., FedEx), these international freight forwarders and 3PLs largely determined which airport and which airline is used by shippers. Given the small amount of air exports registered at CKG, these freight forwarders and 3PLs are likely directing a good portion of Chongqing's exports to other airports (“leakage” described previously). With the rapid growth of IT production in Chongqing forecasted, it is critical that this leakage be curtailed.

### ***3.6.1 Attracting Additional Cargo-generating Industry to the CALP***

One important step in boosting cargo volumes at CKG is to successfully attract industrial users to both the airport's bonded port freight zone and

extended new northern cargo area as well as to the surrounding areas. By combining previously described tax savings and operational efficiency incentives of the Free Trade Zone and bonded port with the multimodal infrastructure and logistics facility upgrades both at the airport and surrounding areas (also previously described) a CALP magnet effect can occur. These advantages to industry could be further enhanced by the a “CALP Act.”

The objective of the CALP Act would be to catalyze the location of high-tech, time-critical industries (such as IT) and high-value perishables in the airport's surrounding areas that can be leveraged by Air Logistics Park as well as generate more cargo for CKG. Initial industry targets, in addition to IT and high-value perishables, might be aerospace equipment and pharmaceuticals. Other target industries will be listed shortly.

To coordinate business and industrial recruitment, the CALP Act would create a planning and implementation organization consisting of public-private partnerships among leading business entities and provincial and local government agencies. As a means of accomplishing this coordinated industry recruitment, the CALP Act might offer:

- I - Tax concessions to logistics rendered service providers that attract industry and facilitate the movement, distribution and storage of their goods.

- II - Facilitate the implementation of multimodal and intermodal transport and the consolidation and deconsolidation of cargo.
- III - Encourage the location of nonpolluting industries of high technology products of high aggregated value.
- IV - Promote the growth of the import and export operations of goods and related services, using air transport through CKG.
- V - Motivate the orderly development of air logistics platform zones located in CKG's surrounding areas.
- VI - Attract companies such as insurance, package delivery, express transport and logistics to CKG's surrounding areas.
- VII - Promote trade and exhibition in the airport area.

### **3.7 Target Industries**

A CALP promotional strategy is also needed that should be grounded in solid business research and planning. This will involve market research of a generic nature on likely CKG air logistics park tenants and users, given its stage of development, as well as industrial research specific to Chongqing. Research on commercial shippers from

around the world points to five generic types of shipments where air transport is the consignees' mode of first choice. These are when:

- Flexible and customized production is the norm.
- The high value of the product compared to its weight justifies the extra cost of airfreight.
- The product is perishable – either in the physical or economic sense.
- Short production cycles and/or “just-in-time” inventories require air freight.
- Immediate delivery of spare parts, time sensitive documents or products is required.

Target industry analysis for air logistics platforms conducted by the University of North Carolina's Kenan Institute of Private Enterprise identified eleven industrial groups that are most likely to utilize the facility. Most of these would no doubt also be the best target industries for the CKG Air Logistics Park and surrounding area. They include:

- Logistics service providers.
- Semi-conductor and computer chip manufacturers.



- Pharmaceuticals and contract biotech and pharmaceutical lab testing facilities.
- Computer and electronic sub-assembly manufacturers.
- Aircraft assembly, aircraft parts suppliers and aircraft maintenance services.
- Garments and fashion accessory suppliers.
- Specific elements in the scientific or medical industrial supplies business, particularly those supplying small volumes of high value products, for example aromatics.
- Optics and small precision equipment manufacturers.
- Suppliers of perishable products – for example, fresh seafood, live animals, fresh fruit and flowers.
- Digital automotive component manufacturers and spare part suppliers.
- Gems, jewelry and watch manufacturers.

I am currently in the process of developing a proprietary list of specific firms to target. In targeting these firms and others in the industries noted above, there are a number of services that need to be highlighted in a marketing plan for the Chongqing Air Logistics Park and

its environs. Many have already been discussed and some already exist, but let me provide a summary list of the key support services to be implemented and leveraged in marketing the CKG Air Logistics Park and extended multimodal air logistics platform.

- Expedited customs clearance and pre-clearance procedures.
- Full electronic data interchange capability.
- Free Trade Zones and in-transit bonded status for re-exports.
- New and improved highway and freight rail access to CKG.
- State-of-the-art materials handling services.
- Reliable utility services (e.g., electricity, natural gas, water, sewer) and CKG internal roadways in C<sub>2</sub> and C<sub>3</sub>.
- Industrial support services such as repair and maintenance and machine shops.
- Quality of life – good housing, schools, restaurants, recreation and nightlife.
- Knowledge and education support, including a distance education and worker training facility at CKG.
- Enhanced one-stop servicing for foreign investors.
- Expedited site and building permit approvals.

All of the above need to be woven into both the business plan and the implementation plan for the CKG Air Logistics Park and connecting multimodal infrastructure. They are not only essential to the marketing effort, but also to developing a successful multimodal air logistics platform that will boost Chongqing's trade, attract more foreign direct investment, and improve the competitiveness of Chongqing's home-grown goods-processing industries.

Exhibit 3.1. Proposed Hard and Soft Infrastructure for the Chongqing Air Logistics Platform

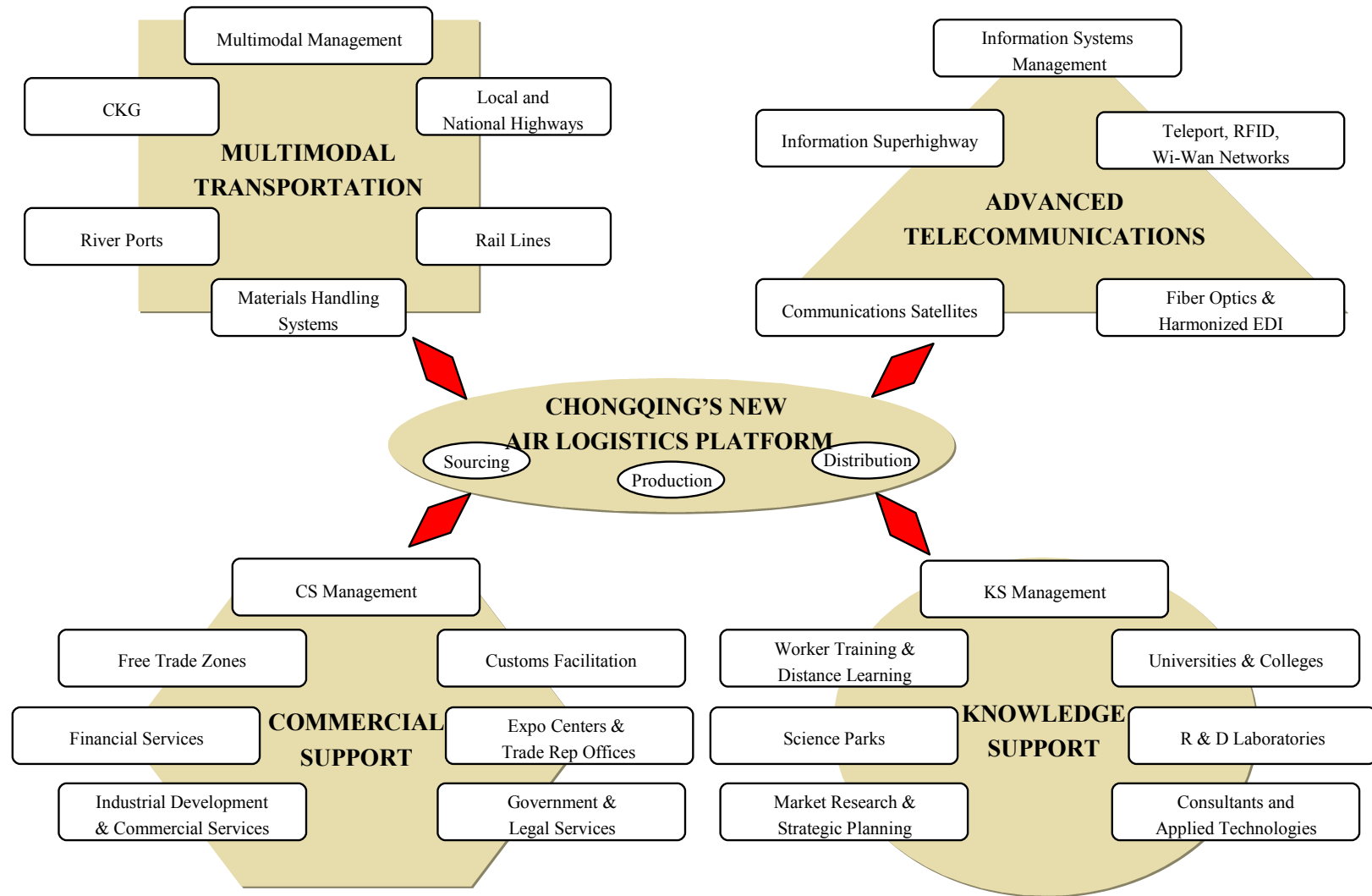
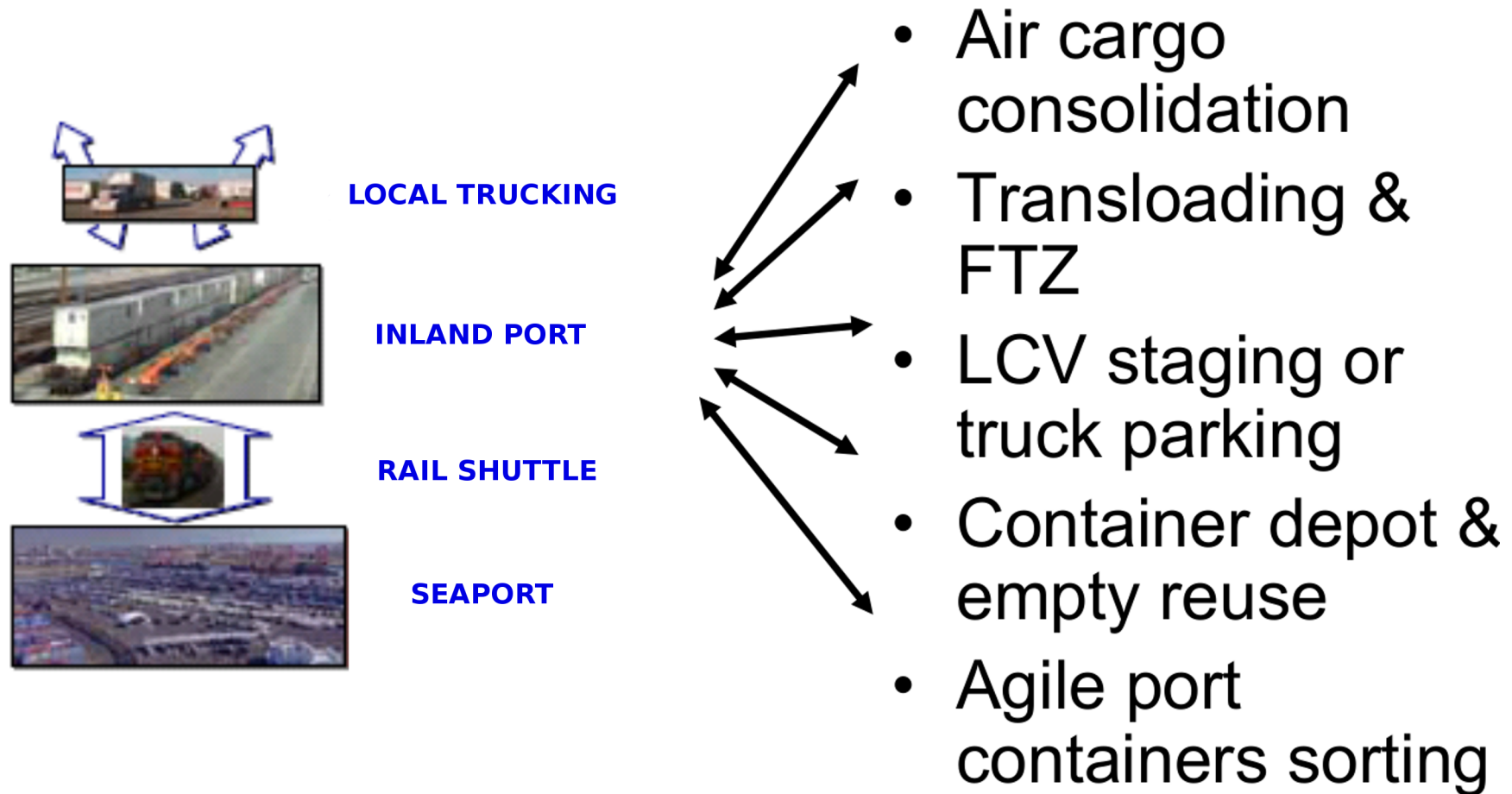
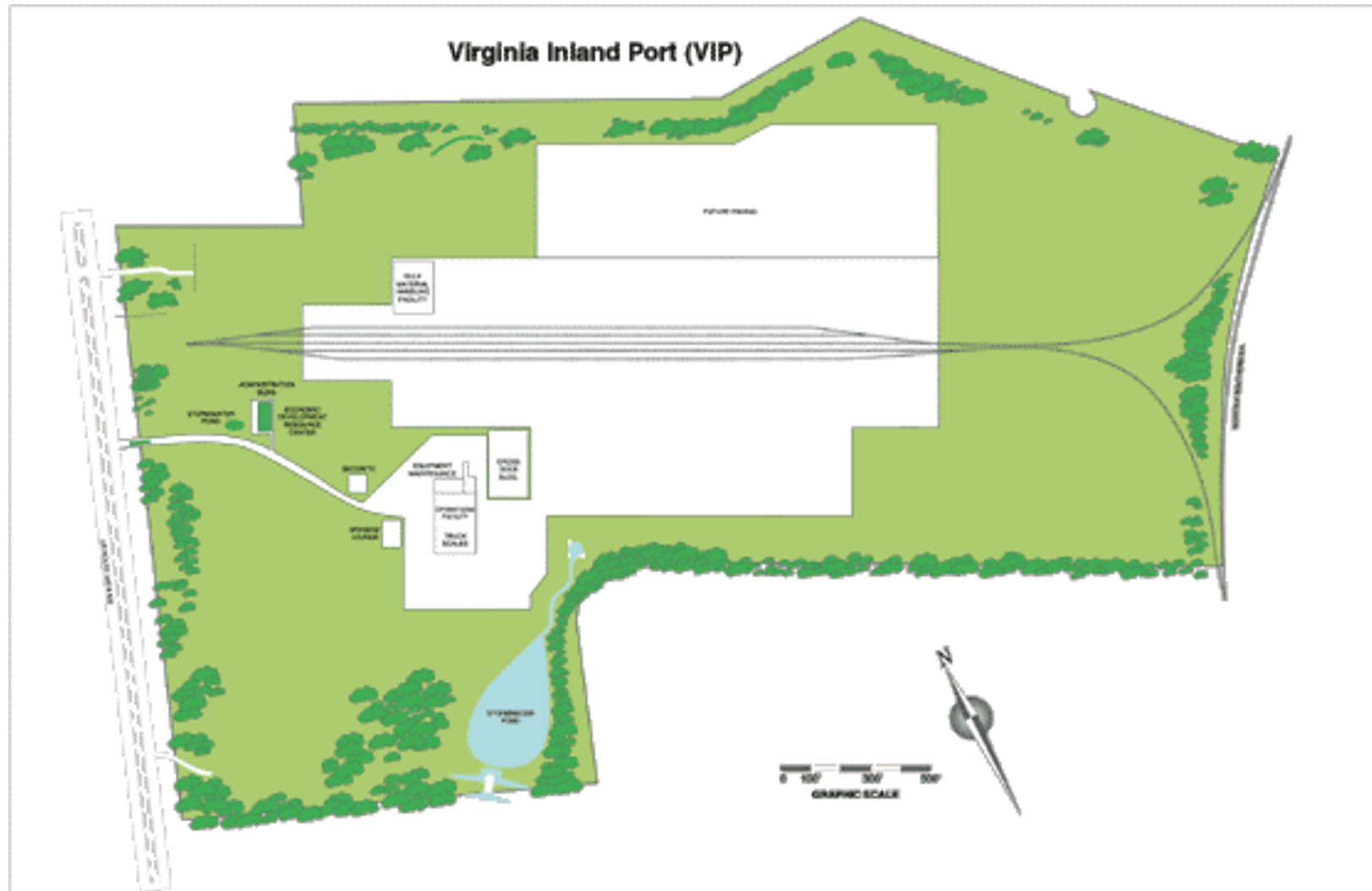


Exhibit 3.2. Basic Inland Port Functions



Source: Southern California Association of Governments

### Exhibit 3.3. Virginia Inland Port Layout



Source Virginia Port Authority

Exhibit 3.4. Schematic Layout of Inter-modal Transfer Point

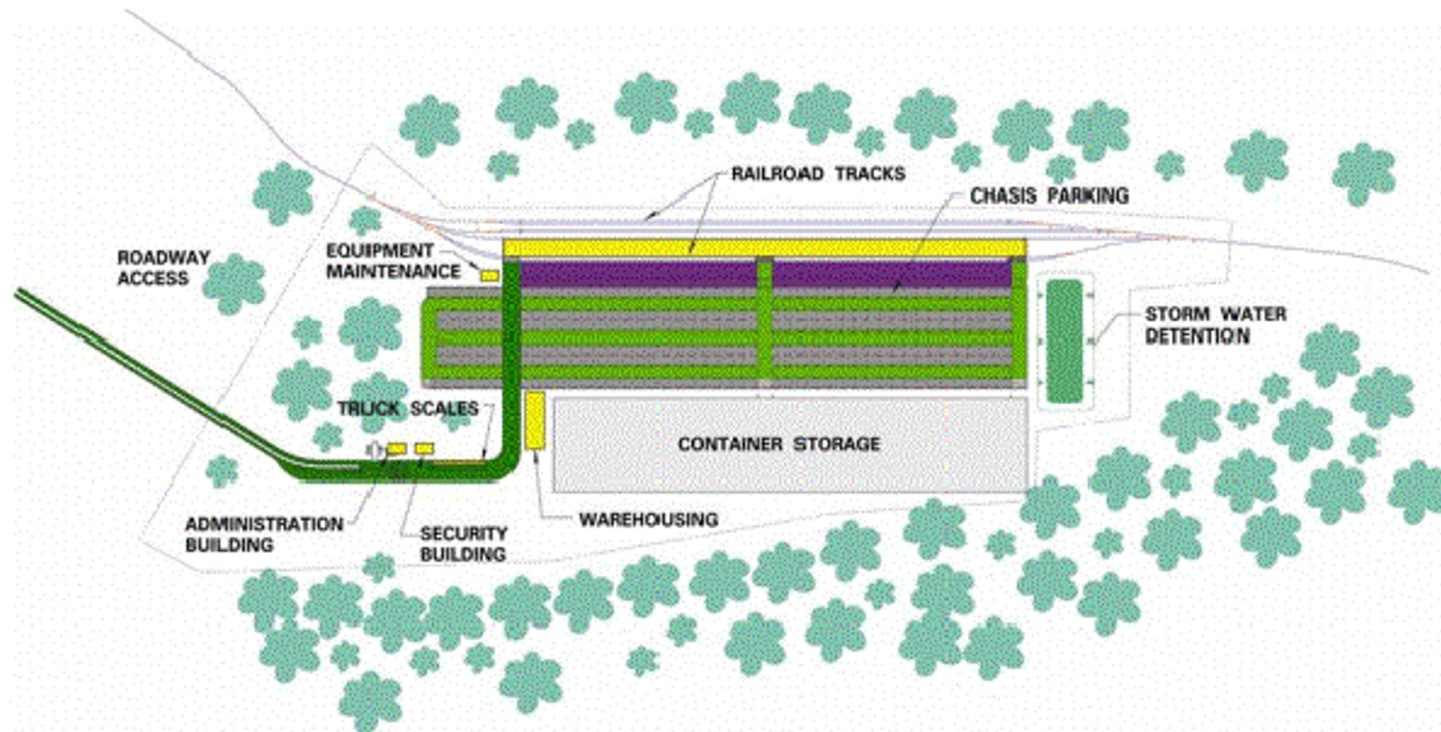


Exhibit 3.5. "Old" Organization of Perishable Supply Chain

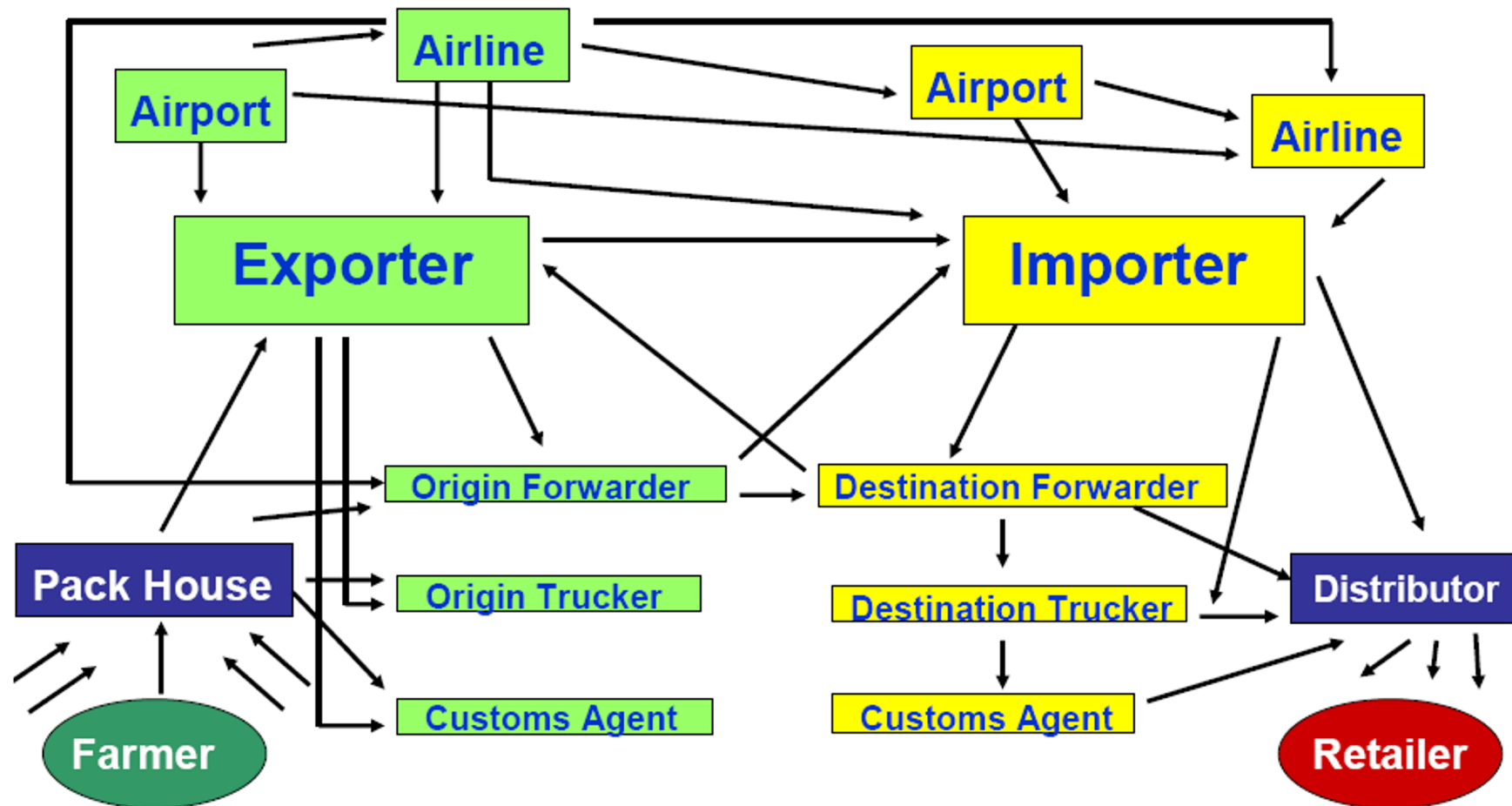




Exhibit 3.6. Emerging Organization of Perishable Supply Chain

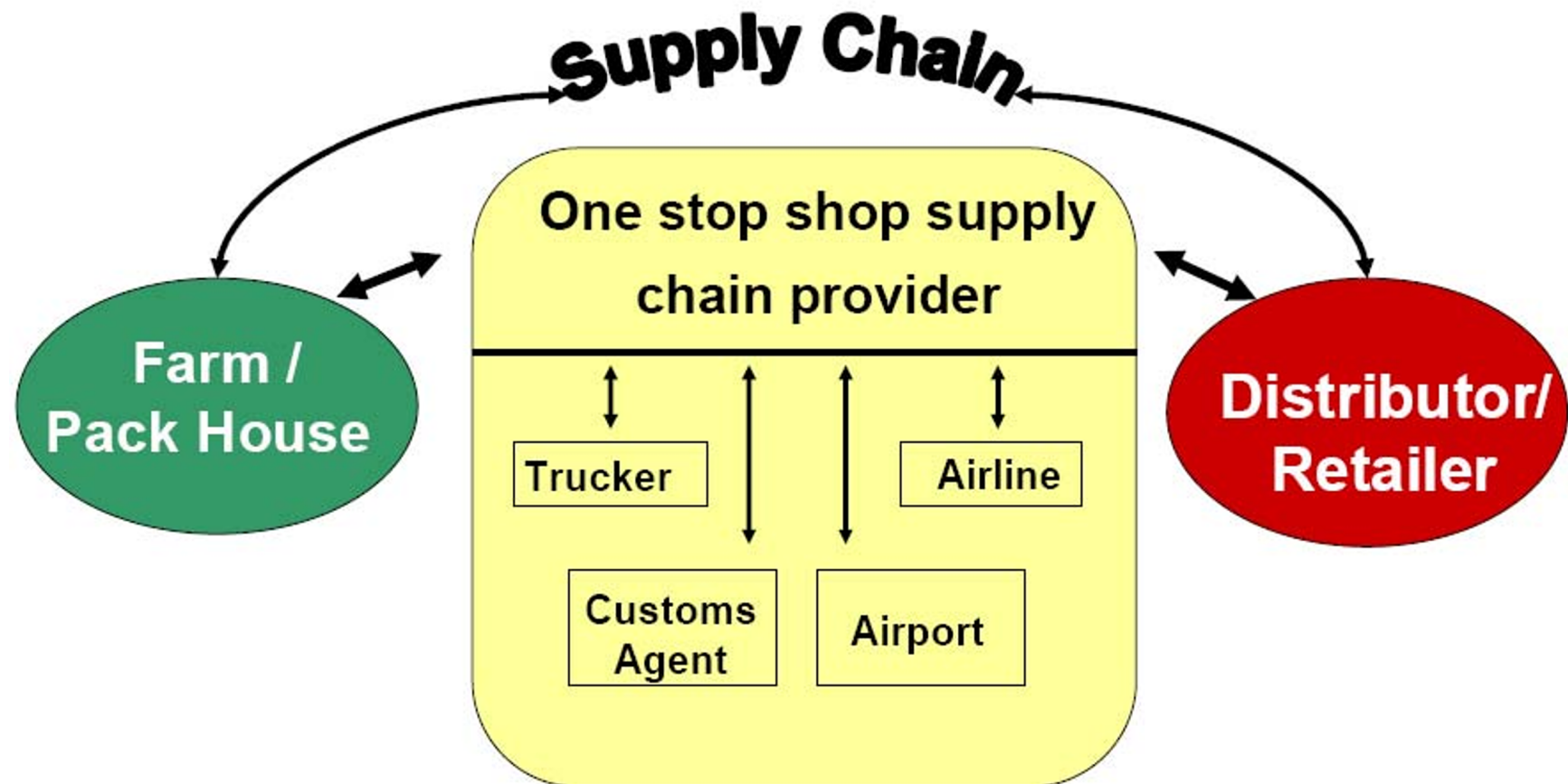


Exhibit 3.7. Hartsfield Atlanta and Armstrong New Orleans Perishables Complexes

