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Good morning.

Thank you, Lt. Gov. Ivey.

I'm honored to be here.

Perhaps some of you are familiar with *Aviation Week & Space Technology*. It is ***the*** authoritative journal for aerospace professionals worldwide, and will celebrate its 100th anniversary next year. After a 25-year career with the publication, including nearly 10 years as editor-in-chief, I decided at the end of 2012 it was time to pass the baton.

But I have continued to remain deeply engaged in the sector.

I would like to thank the Aerospace States Association, Charlie Huetner, and Bob Mansfield, in particular, for this opportunity to share some of my thoughts on *The State of Aerospace and The Outlook for* ***Non-U.S. Investment*** in our nation's aerospace sector.

Aerospace hasn't quite reached the point where the automotive industry is at in terms of a blurring of what defines an American-made motor vehicle versus a foreign-made vehicle, but it is certainly headed in that general direction.

As supply chains, strategic partnerships and manufacturing centers have become more globalized during the last 20 years; non-U.S. content — especially in civil aviation — has dramatically increased. Moreover, the number of companies headquartered outside the U.S. that supply critical subsystems and components for most U.S. weapons systems is quite significant.

My point is that globalization is not something to be accepted or denied; for better or worse, it is a permanent part of the economic and aerospace landscape. It will continue to accelerate in coming years, and in many cases — like automotive — redefine what constitutes a … *quote/unquote* … American-made product.

The goal for state and federal lawmakers and policy makers — not to mention industry leaders — should be to understand the phenomenon and harness it, not just for the benefit of the nation as a whole, but also to ensure the long-term vitality of the nation's aerospace industry — traditionally a huge wellspring of innovation and a steward of national security.

As you know, China and Mexico have attracted substantial investments by aerospace companies over the last 10 to 15 years — but it is the United States that has become the location of choice for aerospace manufacturing investment. Everybody else — China and Mexico included — pale in comparison.

Hot spot for manufacturing investments

And there is a compelling reason for that.

This is home to the world's largest defense marketplace in which allies and friends can compete for a piece of a gargantuan pie. We have the world's largest market for maintenance, repair and overhaul — or MRO — services.

U.S.-based airlines generally are behind the power curve when it comes to modernizing their fleets, which means those carriers will be purchasing billions of dollars worth of new aircraft in coming years. This is also home to the world's largest business aviation market.

If a company or an investment group headquartered in another part of the world wants to compete for a share of U.S. market, they need to have more than a token presence here.

There is no better example than Airbus's decision to build its first ever U.S. manufacturing facility for the A320 family of commercial aircraft in Alabama **...**

or Honda's Aircraft Company's decision to invest in an all-new manufacturing and service facility for its new HondaJet in North Carolina …

or Embraer's decision to move all of its business aircraft production to Florida,

or the fact that no less than eight Thales business units across the U.S. generate about $2 billion in annual revenue serving both defense and commercial markets.

And these are just a few of many examples.

But before I go any deeper into the future of foreign direct investment in the United States, it's worth reviewing the state of the industry from the proverbial 50,000-foot level and the investment prospects that the major market segments represent.

What I will present is not meant to be exhaustive. But it will provide an accurate, updated overview of the current state of U.S. aerospace and where it fits into the global marketplace.

To be sure, there are challenges as well as opportunities. There are also wild cards that could affect the near- to mid-term. For example, I've seen and heard forecasts for commercial aviation ranging from wildly optimistic to worst-case scenarios.

I'm reminded of the satirical story comparing the *Wall Street Journal*, the *New York Times*, and the *Washington Post*.

God decides that His world has gone too bananas to be saved, so he decides to wipe the slate clean and start over. But He wants to give people one

last chance to repent. Two days before Armageddon he leaks it to these publications. As you might imagine, each one plays the story according to their own unique style, as reflected in the headlines.

In the *Wall Street Journal*, the banner head on page one reads: **"God To End World in Two Days … Markets To Close Early."**

In the *New York Times,* the headline reads: **"God Will End World Friday … News Analysis Begins on A26 … Special Coverage Pullout Section, pages E1 thru 48."**

The banner head in the *Washington Post* screams: **"God Is Ending World in Two Days … Women and Minorities Hit Hardest."**

In *Aviation Week & Space Technology*, the banner head might go something like this: **"God to Alter Earth's Orbital Plane in 48 Hours … Pentagon Presses Darpa and Industry for Solutions."**

You'll be delighted to hear that I foresee no scenario anywhere near this dire. In fact, the macro outlook is quite encouraging, with a few caveats thrown into the mix.

Making sense of the state of commercial aviation requires knowing what drives the market for new jetliners — namely, GDP and by extension, air travel demand, and of course the ability of

airlines to make enough money to modernize their fleets with more fuel-efficient airplanes.

On the financial front, the commercial air transport industry is making money — a lot of money by airline industry standards. As Tony Tyler, the Director General and CEO of the International Air Transport Association, recently put it — and I quote — "After many years of hard work and restructuring, the industry is on a path toward financial sustainability."

In 2015, the industry is poised to generate a net profit of more than $29 billion, for a net profit margin of 4% and a return on invested capital of 7.5%. To put these numbers into perspective, this will be the first time since deregulation in 1978 that U.S. airlines on average will be creating value for its equity investors.

Obviously this is very good news for airframe builders and other equipment suppliers.

The latest revised projection of average annual global air traffic growth is 3.9% through 2023, according to my industry sources. That's down about a full percentage point from a year ago, and factors in slower economic growth in Brazil and Europe, as well as in China and other parts of Asia.

It also takes into account dramatically lower fuel prices.

Fuel price slide

In the first ten months of 2015, U.S. airlines paid an average of around $1.60 per gallon for jet fuel, down more than 40% from the average price in 2014, according to Airlines4America.

Thus far, operators are largely sticking to long-term fleet-planning assumptions. But it is conceivable that airlines could begin to defer current-generation aircraft they have on order if fuel goes much lower, and here's why:

At around $2 a gallon, 10- to 15-year-old narrow body aircraft, like the Boeing 737 and A320, are as much as 15% more cost-effective than new, current generation aircraft, and they are as much as 10% more cost- effective than next-generation narrow bodies, according to an analysis by UBS Investment Research.

Warnings of a so-called order bubble have been sounded for years, even as Airbus and Boeing backlogs have swelled to the equivalent of at least eight years worth of production at current build rates. The thinking in some circles is that there are too many buyers placing orders in the belief that their competitors will drop out of the market.

To be clear, Airbus and Boeing are adamant that there is no bubble. Indeed, they have become very adept at taking more orders than they can

fill, and forecasting with amazing precision how many will actually materialize.

Typically, the jetliner business is cyclical, with roughly seven good years followed by about three bad ones. But this pattern has been disrupted. Currently we're in a super cycle, a term being used more and more by industry insiders.

Commercial aviation is in its 11th straight year of growth, with a record number of deliveries in each of the last five years. In the aviation world, that's epic.

Commercial aircraft demand by region.

At current production rates, Airbus and Boeing expect to deliver nearly 1,900 commercial jets in 2018, up from about 1,400 in 2015, to meet projected demand for more seats. That's more than double the number in 2008.

Add Canada's Bombardier and Brazil's Embraer into the mix — they're the two leading producers of regional jets — and more than 2,100 commercial aircraft could be delivered in 2018. Another historical high.

Again, the primary driver is the growth in air traffic demand worldwide. Increasingly, though, stringent international targets for reducing emissions by 2050 will become at least as compelling a reason for airlines to modernize

their fleets and the Pratts, GEs and Snecmas of the world to continue developing more efficient engines.

The wild cards of greatest concern to me are the following:

Potential market disruptors.

First, whether OEMs will execute on their huge order backlogs. This by no means is a foregone conclusion. The Big Two have stumbled badly in some past ramp-up cycles. Program management in the aerospace industry is as much an art as it is a science.

No less of a risk is whether the global supply chain that all OEMs use will be able to adjust to the enormous pressure of production-rate increases. They too have faltered badly in some past ramp-up cycles, and they have never been under the kind of strain they're feeling now.

However, coordination between OEMs and suppliers has advanced light years in the past decade, and suppliers continue to improve their productivity largely as a result of automation, adherence to lean manufacturing principles and much improved communications with their OEM customers.

Third, you have to worry about some exogenous event. Although out of industry's control — whether it's another global recession or another

terrorist-related calamity — such an event can put commercial aviation into a tail spin, as we experienced in 2002, marked by sizeable order and delivery cancellations.

A fourth wildcard is a decline in foreign currency values versus the U.S. dollar, which is the currency of the aviation industry. I'm less concerned here.

A recent analysis of Boeing's backlog of firm orders by Wells Fargo equity research concluded that no more than 10% face any significant risk of deferral or cancellation due to a decline in foreign currency values.

Having said that all that, my money is on the long game and the need for many more fuel-efficient aircraft in coming years. The latter is what will drive more strategic partnerships between U.S. and foreign-based companies, as well as a requirement for more non-U.S.-based suppliers and OEMs to establish or expand their presence in the United States.

As for fuel prices, I do not believe they will remain as low as they are now, any more than I expect to continue paying under $2 a gallon at the gas pump indefinitely.

The world economy has been slow to recover from the global financial crisis, as emerging markets lose steam and advanced economies

remain stuck in a pattern of weak growth or virtually no growth.

But here at home, the economy has been growing for the last six years and looks like it's going to continue to grow, albeit at a slower rate than any of us would like to see. All the same, the medium-term prospects are probably the best of any industrial country.

And that bodes well for foreign direct investment in the U.S. aerospace industry in general and commercial aviation, in particular

Speaking of the economy, let's talk about business aviation. As I stated earlier, the U.S. is the world's largest market for business aircraft. As many of you know, the sector went into a free fall soon after the financial crisis.

If corporate profits were still the principle driver of the purchase of business aircraft, the segment's recovery since we exited the crisis in 2009 would have been much stronger. Prior to 2008, there was a close correlation between profits and business aircraft demand. That no longer is true.

Moreover, what recovery we've seen in business aviation in the last six years has been pretty uneven. The top half of the market — the long-range and ultra-long-range jets produced by Gulfstream Aerospace, Bombardier and Dassault — are doing pretty well. In fact,

this was true throughout the financial crisis. Heavy iron — as long-distance, large-cabin jets are known in the trade — barely skipped a beat.

Perhaps you've heard that small and mid-size jets are just muddling along in terms of sales. Well, that's sort of true. But the next time you hear someone make this observation, just keep this in mind: Embraer's Phenom 300 — what's known as a light jet — was the most delivered business aircraft in the world in 2013 and 2014.

So, what's ahead for the business aviation market? Honeywell Aerospace, which produces a very credible market outlook every year, forecasts that operators will commit to the purchase of new business jets equivalent to about 23% of their fleets over the next five years, either as a replacement or in addition to their current fleet.

Longer term…

Purchase plans by aircraft class.

Honeywell forecasts up to 9,450 new business jet deliveries worth some $280 billion through 2024.

That's a 7% to 8% increase in projected delivery value over what Honeywell forecast in 2013. Large-cabin, long- and ultra-long-range jets are expected to lead the way.

And where will most of the activity be centered?

Business jet demand by region

Right here in the USA. I'm talking about production, new aircraft deliveries and investment. And I would like to point out that it is business aviation that spawns a lot of the technology innovation — particularly avionics — that winds up in commercial airliners.

Turing to the defense market…

It should come as no surprise that every major military contractor in the world is trying to access the U.S. market. The desire to be physically close to U.S. customers has been behind the establishment of U.S. operations by most, if not all major European defense firms. That trend will continue, with U.S. defense spending entering a new "up" cycle — although it remains to be seen what that growth curve will look like.

Two assessments can be made of the impact of the current round of globalization on the defense industrial base. The first observation is that the level of international integration has risen across the entire industry. The second observation is that the level of globalization varies widely by industry segment.

For states, that translates into virtual assurance of greater foreign direct investment in the U.S. defense marketplace.

Even with the spending caps known as sequestration, defense spending probably is on the way up, but it will be driven largely by requirements and programs, with investment opportunities for both domestic and non-U.S. suppliers.

Keep your eye on the LRS-B, the long-range strike bomber, awarded yesterday to Northrop Grumman. You will see a scramble by non-U.S. companies to win a spot on that massive, multiyear project.

Under the Pentagon's Better Buying Power 1.0 in 2010, DoD acquisition reform emphasized more competition in defense services, in particular, and the use of lowest-price technically acceptable contracts. While the Pentagon backed away from the latter, there has been greater focus on competing service-oriented contracts. This could be a particularly lucrative set of opportunities for direct investment in the U.S.

In the maintenance, repair and overhaul segment, I'm going to focus on the commercial side of MRO.

It is, in a word, "robust."

MRO slide

Within 10 years, the demand for these services is forecast to grow to more than $85 billion from about $57 billion currently. End-of-life services stand to become more important as the world's fleet undergoes a massive renewal, pushing the retirement of older aircraft to record levels.

As airlines take delivery of a new generation of commercial jets, the more successful MRO providers will be ones equipped and staffed to service aircraft in which there has been a step change in technology — things like advanced composites and complex metal alloys, advanced avionics suites, more sophisticated cabin connectivity, and more electric systems.

Such opportunities will be just as open to non-U.S. companies who have made, or are willing to invest in the appropriate infrastructure.

The next largest MRO market behind the U.S. is Asia/Pacific, and many of the service providers based in that region are seeking to expand their global footprint. This, coupled with the fact that the MRO playing field is in full consolidation mode in response to customers seeking fewer vendors, suggests Asia/Pacific players and their financial backers will be prime candidates for investing in the U.S.

Just two weeks ago, for example, China's Yingling Aviation announced a significant expansion of its

propeller MRO operation with the completion of a 10,000-sq-ft facility in Wichita.

In the space sector, a new generation of launch vehicles is on the horizon, with many being designed and produced under business models that favor commercial development and operation, and away from traditional government support.

This is an area where the U.S. by no means is the dominant player.

Launch-vehicle providers

Between 2011 and 2014, Russia (41.4%), China (21.6%), the U.S. (20.8%), and Europe (7.9%) accounted for about 92% of all launch vehicles manufactured.

The other major segment of commercial space is satellites.

Satellite builders

A technology transition is under way in this area — with additive manufacturing, electric propulsion, and laser communications among the advances being rolled out. The goal is to reduce satellite and launch costs, increase spacecraft performance and launch flexibility, enable new markets and services, and increase the resilience of space assets.

Even as satellites get larger, orders for smaller spacecraft enabled by new technologies are growing. For example, Europe's NeoSat next-generation satellite platform, which is planned to fly toward the end of this decade and designed to reduce costs by 30%, is being optimized for electric propulsion.

Increasing commercialization, the growing popularity of small satellites and human spaceflight are factors that will fuel the growth of the space-launch business, with production of launch vehicles worth some $67 billion over the next 10 years.

Due to the level of global competition in this arena, individual states, in collaboration with U.S. launch-service providers, will have to work hard to attract foreign investment

We often hear that market access is the principle reason why America's broader aviation and aerospace industry is such a magnet for foreign direct investment. But it's not the only reason … not by a long stretch.

Another strong appeal is the opportunity to strengthen ties with U.S. OEMs and locate in close proximity to major assembly lines, which can improve a supplier's cost-competitiveness. Another reason is the opportunity for non-U.S. companies to diversify into business areas that are adjacent to their core competencies.

Access to technology, low-cost energy, a flexible labor market and the opportunity to better manage Euro and U.S. dollar fluctuations also hold strong appeal, as Airbus' Barry Eccleston told us yesterday in his keynote address.

In addition, companies increasingly are identifying less and less with one country of origin. Which gets back to the rapid globalization that we are seeing across the aerospace industry.

I should also mention a mega-trend that's facilitating foreign direct investment, — and not just in the United States. I'm referring to the changing nature of engineering and technical services. They are becoming more de-centralized. Companies are tapping the global pool of engineers to spread risk and compensate for skills shortages in key areas in their own countries.

For all the appeal of investing in the U.S., there are certain companies — and countries — that are conspicuously absent or have done very little direct investment in the U.S.

Targets of opportunities for states.

Among them are Japanese, Taiwanese, South Korean, Malaysian and Indonesian companies. Japanese and South Korea enterprises, in particular, are ones you otherwise might expect to be well represented here. HondaJet in North Carolina is one of the more notable exceptions.

There also has been relatively little activity on the part of lower-tier European aerospace suppliers.

What's holding them back?

More than likely it's their corporate culture — chances are they tend to be inward looking and have a skewed sense of what it will take to succeed long term.

You might think about that as Mitsubishi produces its regional jet in Japan and vies for North American market share. Yesterday, we heard Mr. Yamagami acknowledge it would make sense to location production in the U.S., but instead his company likely will keep assembly in Japan for the foreseeable future. s

The good news is that these companies represent targets of opportunity for states seeking to attract more foreign investment, and eventually we will see a lot of movement within these groups — Asia/Pacific companies and small- to medium-size European suppliers.

Earlier in my remarks, I made a brief reference to the correlation between the state of the industry and how I thought it relates to you. I would like to wind down my presentation by sharing some thoughts on how I see the states' role.

The central point to be made is that while all states want to do everything possible to grow their aerospace industry — in part, by attracting more foreign direct investment — this is not a "one-size-fits-all" endeavor. The goal, therefore, becomes to look for areas where there may be a disconnect between the industry's increasing globalization and how you differentiate what your particular state has to offer.

Creating the right set of initiatives that are aligned with your goals requires several key actions:

Creating right initiatives slide

- Determine what is strategic. What provides an asymmetric advantage in order to identify what represents the best you have to offer to an Airbus, a Thales, an Embraer, or any number of other Asian, European and Latin American companies? Without an accurate assessment of what is strategic, it becomes impossible to prioritize.

- Understand the value chain of the aerospace industry sectors.

- Understand the technology cycle. The appropriate strategy for attracting foreign direct investment will differ based on how rapidly a particular technology, or set of technologies, is evolving.

For example, manufacturing technology is advancing faster than the next generation of civil aircraft and military platforms. What resources does your state have to offer that might present a compelling value proposition?

- Replenish the seed corn by fostering investment in research and development wherever you can throughout your state. Central to this imperative is striving to sustain a deep and wide pool of human, physical and intellectual capital that will help make aerospace companies — both foreign and domestic — want to locate to your state to tap into these resources.

  One other thing — and this may be counterintuitive — but don't expect major U.S. aerospace companies to put much of their own capital at risk for the purpose of investing in R&D. The U.S. aerospace industry as a whole — and larger companies, in particular — have lost their way in trying to strike a sensible balance between short-term and long-term objectives.

  Some of our nation's largest aerospace companies invest virtually nothing — zilch! — in company-funded R&D. But they talk a good game. That's in contrast to Europe's aerospace industry, which is putting more of their own capital at risk investing in their future, according to findings in Aviation

Week's annual Top-Performing Companies study.

As a whole, the U.S. industry's top-tier companies are much more focused on buying back their own stock and boosting earnings per share, largely at the expense of R&D investment. This is an area where states need to step up, in your own enlightened self-interest, and I know many of you are doing just that.

R&D investment slide

To drive the point home, I pulled together the table you currently are viewing, with the help of Capital Alpha Partners, a leading provider of strategic policy research to financial institutions.

These 10 U.S. companies invest the most in R&D as a percentage of sales. With all of the institutional advertising by U.S. aerospace companies — you know, the ones who sponsor the Sunday morning talk shows and pontificate about their vision for the future and their commitment to technology and innovation — not a single one made the list. In fact, not a single one made the top 20.

- Another key action: Align investment incentives with areas that matter to business.

- Exploit the role that foreign-based companies can play as a partner to U.S. primes and original equipment manufacturers. Not only does it help foreign companies win spots on U.S. programs, but these relationships also help in pursuing overseas business too.

- Use the full range of tools at your disposal, bearing in mind that each of you are competing against 49 other states and multiple regional aerospace clusters. So be tenacious, be creative and be resourceful.

As members of ASA, you know full well the tremendous advantages of having a vibrant aerospace industry within your state — high-paying jobs, increased tax revenue, workforce education/training opportunities, and economic growth.

For the good of your home state … for the good of the country … and for the good of a vital industry…. I urge all of you to do everything within your power to nurture your aerospace sectors, including going the distance to attract as much foreign direct investment as you can.

Thank you for your attention. I'll be happy to field questions.

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