Why do we need to Modernize?

January 1, 1914 marks the beginning of commercial aviation.
65 Billion passengers the first 100 years.
65 Billion passengers in the next 15 years.

Aviation employs **11 million people** and makes up 5.6% of our gross domestic product. It enables $1.3 trillion in travel and tourism and ships 40% of the world's goods.

On any given day, more than **70,000 flights** are in the skies in the United States. On an average day, air traffic controllers handle more than 25,000 commercial flights (major and regional airlines), 25,000 general aviation flights (private planes), 20,000 air taxi flights (planes for hire), 5,000 military flights and 2,000 air cargo flights (Federal Express, UPS, etc.).

At any given moment, roughly **5,000 planes** are in the skies above the United States.

In one year, air traffic handles an average of **64 million takeoffs and landings**.

We are modernizing because we have to.
Modernization means greater safety, efficiency, fuel savings, and a better environment.

Building A Modern Airspace

In 2009, Congress first appropriated funding to begin the task of transforming our national airspace from a ground-based system to a satellite-based system.

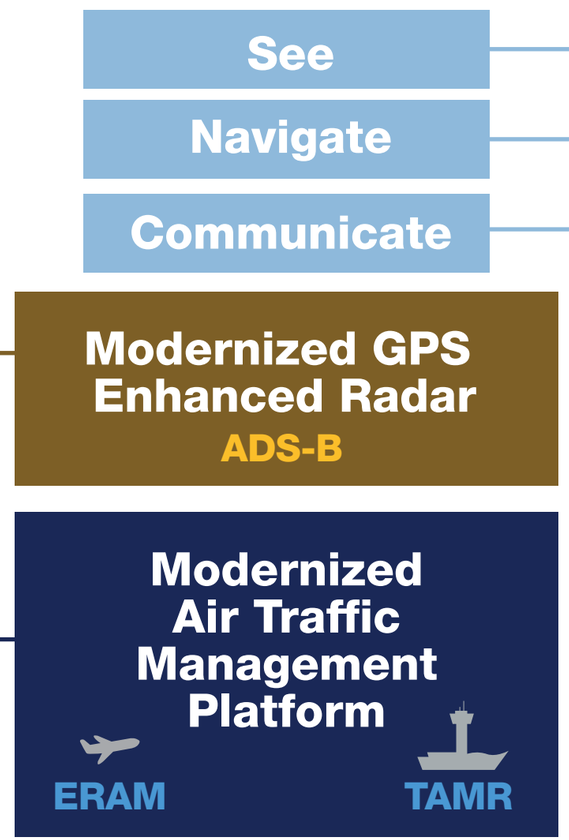
The move to satellite technology changes how we **see**, **navigate** and **communicate** with aircraft from gate to gate. These new capabilities are enabled by the investment in the infrastructure of NextGen — the foundational elements on which the rest of the system is built.

Strong Foundation

The new air traffic management system – called ERAM and TAMR – supports and integrates all the programs that create the benefits of NextGen and gives controllers a suite of new tools to better manage the airspace.

Precision and Predictability

Automatic Dependent Surveillance Broadcast (ADS-B) is the successor to radar and coupled with GPS technology creates the precise and predictable environment to allow for more efficient movement of planes across the skies.



See, Navigate, and Communicate

Building on this infrastructure NextGen programs create the precision and predictability that enable smarter and safer travel.

See: Knowing exactly where an aircraft is every second allows for more precision and predictability. That predictability allows air traffic controllers to use new systems that make the flow of aircraft throughout the entire national airspace more efficient.

Navigate: Delays at any major airport have a ripple effect that can impact the entire system. More precise navigation at Atlanta Hartsfield-Jackson International Airport enable 8-12 more on time, direct and fuel efficient departures per hour. More on time departures at the world's busiest airport keep the whole system running on time.

Communicate: Transiting from Voice to Text between the flight deck and air traffic control means more efficient movement on the ground and the ability to make quick changes if weather rolls in. Air traffic Controllers can now send digital flight clearance to the airline operations center and the pilot so important decisions about departures, fuel and connections can be made quickly, and safely. Flights cleared digitally get their information in seconds versus several minutes of detailed voice communication. This frees up the pilot and air traffic control.

Every day these programs are being integrated in the national airspace and they are delivering benefits today

It is making skies greener and air cleaner in Seattle

Alaska Airlines estimates the Greener Skies procedures will cut fuel consumption by 2.1 million gallons annually and reduce carbon emissions by 22,000 metric tons, the equivalent of taking 4,100 cars off the road every year.

It is making flight operations more efficient in Denver

The FAA estimates Denver's network of satellite-based procedures will save operators $9.8 million annually by using 3.2 million fewer gallons of fuel.

It is improving airline on time arrivals in Alaska

With satellite navigation Alaska Airlines can land safely in Juneau even when clouds obscure visibility.

Alaska Airlines estimates NextGen:

- Saved the airline $15 million
- Landed 820 flights that would have been cancelled or diverted
- Increased on time arrival by reducing diversions.

It is helping business in Memphis

NextGen delivers on time benefits to FedEx with new separation standards:

- Average taxi time from the gate during the busiest departure periods is 2.8 minutes less — a 27% reduction
- FedEx has been able to add an additional nine flight operations per hour — a 17%increase

Helping the congested airspace in the Northeast

The FAA has reduced landing visibility requirements from 2,400 feet to 1,800 feet at more than 500 runways

- At Philadelphia International Airport, reduced visibility requirements added around 85 arrivals per day
- With a reduced visibility procedure at Boston Logan International Airport, the benefit of avoiding flight diversions or cancellations was estimated at $5.7 million per year

It is saving time in Atlanta

With added precision routes, air traffic controllers have the ability to get between 8-12 additional aircraft off the ground every hour, clearing aircraft to take off from the same runway one minute apart compared to the previous two minutes between take-offs.

It is improving safety in the Gulf

ADS-B in the Gulf means that equipped aircraft can be "seen" by air traffic control and that equates to a better and safer business model for helicopter operations and the oil companies that operate the rigs in the Gulf.

Saves fuel in Houston

- Created 2 new "gateways" in to the Houston Metroplex to ease congestion
- Created new more direct fuel saving approaches that will save airlines $9.2M year
- Reducing CO2 emissions by 31,000 metric tons per year
- Making flight operation in Houston more efficient

Work completed and operating in the National Airspace (NAS) under this Administration

Modernized Air Traffic Management Platform	Modernized GPS Enhanced Radar			
ERAM 100%	ADS-B 100%	**Data Comm**	**Trials are ongoing in Newark**	*"Data Comm is a game changer!"* GREGG KASTMAN / UPS, PILOT
		Performance Based Navigation	**More than 7,000 satellite based procedures operating today in the National Air Space (NAS)**	*"Watching the gas gauge on a legacy procedure then watching the gas gauge on the OPD procedure – it was mind blowing how little gas they were burning"* STEVEN PRICHARD / HOUSTON TRACON
		Time Based Flow Management	**Adjacent air traffic control centers are currently spacing and metering traffic into the overhead stream and to optimized descents in several targeted metroplexs**	*"This redesigned airspace allows us to take full advantage of technology we already have on our aircraft, while simultaneously reducing fuel burn and emissions"* JIM COMPTON / UNITED AIRLINES, VICE CHAIRMAN AND CHIEF REVENUE OFFICER
		Multiple Runway Operations	**Successful wake turbulence mitigation work is being rolled out to targeted airports, crossing and converging runway operations are providing increased capacity and improved safety standards**	*"I've been looking at these numbers for eight years, and the first night I couldn't believe what I was reading... In the daytime now, we are rarely seeing a queue of airplanes waiting to take off. We are trying to figure out ways to get planes to the runway fast enough to feed what the new program allows us to do."* JIM BOWMAN / FEDEX, VICE PRESIDENT OF FLIGHT OPERATIONS
		Improved Surface Operations	**30 major airports have ASDE-x. Surface Viewer Technology is providing key data for airline decision making**	
		SWIM	**Key NAS-wide weather and Surface Surveillance Event Data is available today**	

Why is this important?

Where is it taking us?

Today we know that remotely piloted aircraft and commercial space travel will be part of the future – but we do not know what else innovation may bring.

The signature of aviation is innovation. The jet engine was invented in the 30's but did not become the standard for commercial aviation until the 70's. Early detractors commented that **"no one would want to go that far and that fast"**.

Yet 65 billion passengers flew in the first 100 years, and we'll see another 65 billion within the next 15 years.

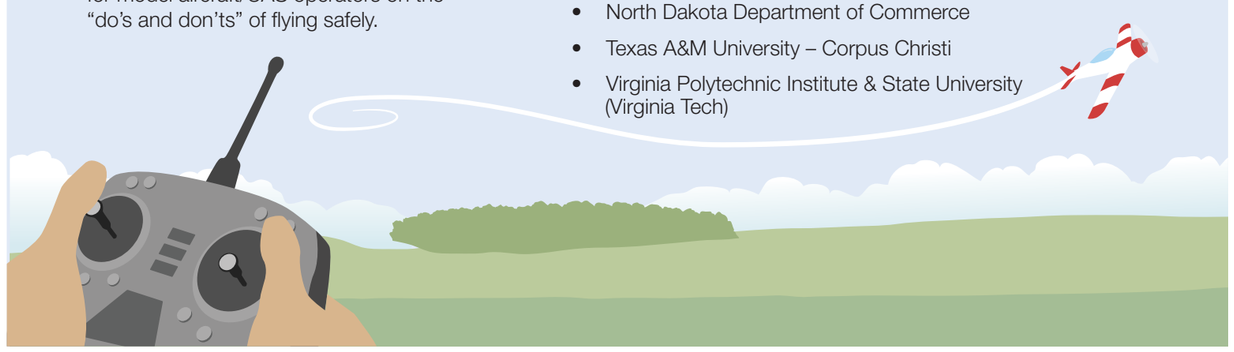
UAS (Unmanned Air Systems)

We're making progress with integration:

- The FAA plans to issue a proposed rule for small UAS—less than 55 pounds—by the end of this year.
- Section 333 of the FAA Modernization of Reform Act authorizes the Secretary of Transportation to approve certain unmanned aircraft for specific, limited, low-risk operations without requiring certification of the aircraft.
- On June 23, 2014, the FAA issued the "Interpretation of the Special Rule for Model Aircraft" to provide clear guidance for model aircraft/UAS operators on the "do's and don'ts" of flying safely.

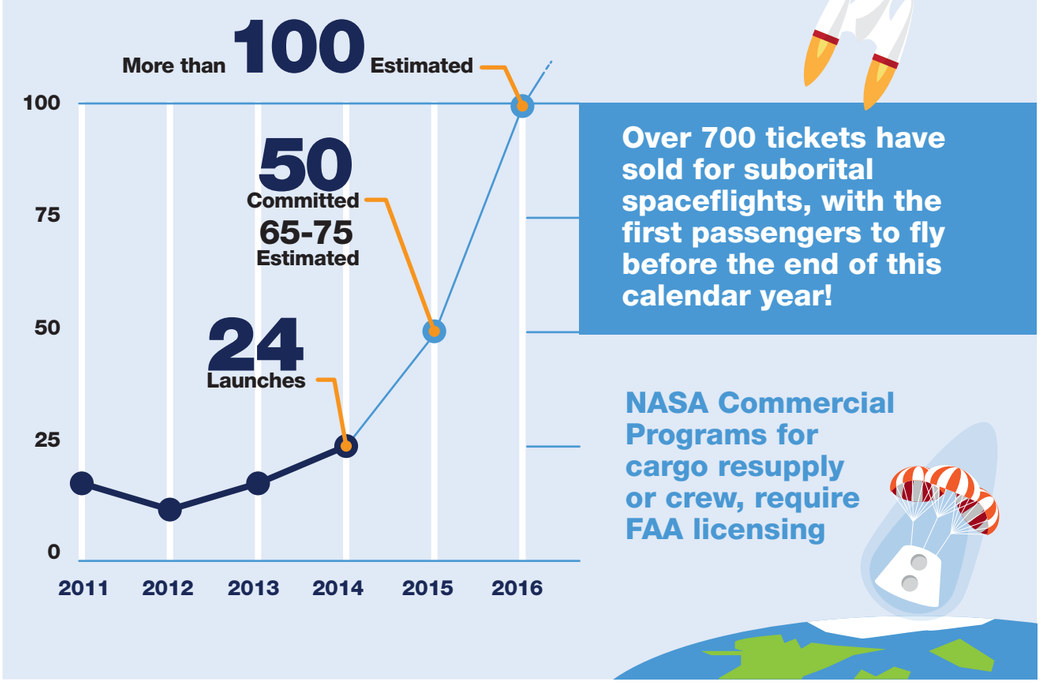
On December 30, 2013, the FAA announced the following six applicants had been selected to operate the UAS test sites. As of August 13, 2014, all six test sites were operational.

- University of Alaska - Fairbanks
- State of Nevada
- New York's Griffiss International Airport
- North Dakota Department of Commerce
- Texas A&M University – Corpus Christi
- Virginia Polytechnic Institute & State University (Virginia Tech)



Commercial space

Number of Launches Licensed & Permitted



Over 700 tickets have sold for suborital spaceflights, with the first passengers to fly before the end of this calendar year!

NASA Commercial Programs for cargo resupply or crew, require FAA licensing

We need to be ready for what the future will bring