



# EAA Chapter 100

## February 2013 Newsletter

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#### Chapter Website / Forum:

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<http://groups.yahoo.com/group/eaa100/>

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Reader submissions and comments are strongly encouraged.

### 2013 Chapter Banquet

The banquet is this Friday February 22<sup>nd</sup> at Willow Creek Golf Course. It will be a combined event this year between the chapter and the Southeast MN Flying Club.

The speaker is going to be Captain Michael T. Schilz. He is the director of safety instruction and analysis programs for Delta Airlines. He is also a 747 and A330 captain.

5:30 Social Hour

6:30 Dinner

7:30 Speaker

Menu:

Entrée: London Broil and Teriyaki Salmon

Salad: Mixed Greens

Potato: Parsley Buttered

Vegetable: Broccoli with Lemon Butter

I believe last call has gone out but if you feel lucky you can try contacting Tom Hall at [tomwhall@charter.net](mailto:tomwhall@charter.net) or by calling 282-9682.

### 2013 Chapter Dues

2013 chapter dues (\$10.00) are now being collected.

### 2013 Meeting Locations Needed

We are still in need for volunteers to sign up to host the monthly hangar flying events. Pick a month to show us your project – no matter what state it's in.

### Chapter Website

We are in the process of changing the Chapter website. Do to changes made by our original website provider, we are moving the website to a free one provided by EAA. The new website address is:

[www.100.eaachapter.org](http://www.100.eaachapter.org)

While the old address [www.eaa100.org](http://www.eaa100.org) will forward you on to the new one, the old address containing 44RF will not work. For the time being, the new website will contain only basic chapter information and newsletter posting. We are discussing what the future of the website will be and would like feedback from chapter members as to how and how much it is used.

Bottom line is that in its current (or previous) format, the website is a lot of work to maintain and I do not have the time or web skills to maintain it properly. As it is, Dick Fechter has done all of the website transition and setup. Thank you Dick – your efforts are much appreciated.

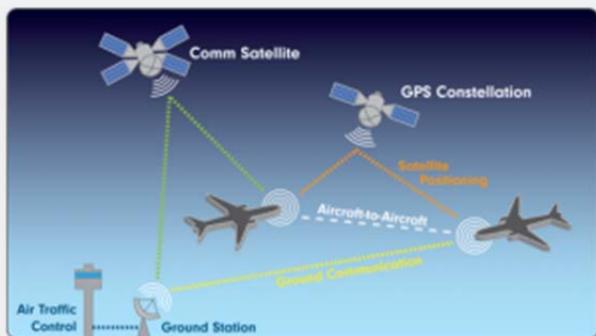
# ADS-B 101: what it is and why you should care

- JANUARY 17, 2013 10:45 PM
- JOHN ZIMMERMAN

In an industry famous for its ridiculous acronyms, ADS-B stands out for being uniquely confusing. Everybody uses the term, but few really know what it means. And who can blame them—it's incredibly complicated. Unlike WAAS or LORAN, you can't even pronounce it!

So what is ADS-B? Why should you care about it? Can you just ignore it?

No. While ADS-B may be confusing, it's probably the most important technological change you will have to deal with as a pilot over the next two decades. So suck it up and spend some time learning the language.



ADS-B involves ground stations, GPS satellites and panel-installed avionics.

## What is it?

At heart, ADS-B is really just a new way to manage air traffic. As such, it will eventually replace radar as Air Traffic Control's (ATC) primary tool for separating aircraft. It's different from radar in that it does not depend on controllers in a central location watching radar scopes. Instead, aircraft self-report their GPS position in a networked environment, so pilots can see the entire air traffic picture around them. There is also the added benefit of datalink weather available through ADS-B.

ADS-B stands for Automatic Dependent Surveillance-Broadcast. It's a dreadful name that only an engineer could love, but it happens to be fairly descriptive. Let's look at each part of it:

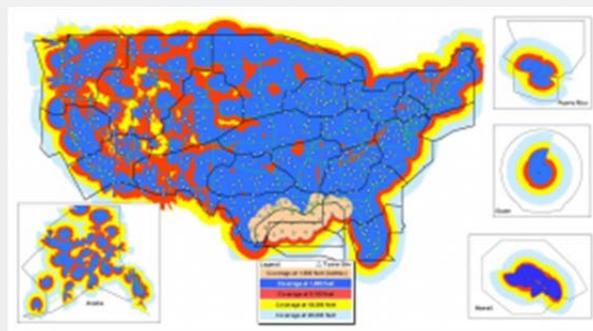
- Automatic—properly-equipped aircraft automatically report their position, without need for a radar interrogation
- Dependent—ADS-B depends on aircraft having an approved WAAS GPS on board and an ADS-B Out transmitter
- Surveillance—it is a surveillance technology that allows ATC to watch airplanes move around

- Broadcast—aircraft broadcast their position information to airplanes and ATC  
This system doesn't need radar to work properly, but it will depend on a network of ground stations to receive aircraft reports and send them back to ATC. These stations also transmit weather and traffic information back up to properly-equipped aircraft. This network currently consists of over 400 stations, and the complete network is supposed to be finished by early 2014. So when you hear that ADS-B moves from a "ground-based" radar system to a "satellite-based" system, it's only partially true.

By the way, you'll often hear the phrase NextGen used interchangeably with ADS-B. Technically, [NextGen](#) (or the Next Generation Air Transportation System) is the FAA's omnibus plan for modernizing air traffic control. ADS-B is a critical part of NextGen, but it's only one part of it. Now that we know what ADS-B is, how does it work?

## Out vs. In

ADS-B is made up of two main parts: ADS-B Out and ADS-B In. Out is of interest to controllers, while In is mostly of interest to pilots.



When completed in early 2014, the network of ADS-B ground stations will provide nearly nationwide coverage.

ADS-B Out is a surveillance technology for tracking aircraft—it's what ATC needs to manage traffic. It reports your aircraft's position, velocity and altitude once per second. This transmission is received by ATC and nearby aircraft and this data makes up the equivalent of a radar display. Most aircraft will be required to have ADS-B Out by 2020 (see below).

ADS-B In allows an aircraft to receive transmissions from ADS-B ground stations and other aircraft. This is how pilots can get subscription-free weather and traffic in the cockpit. Adding ADS-B In is strictly optional. While it offers some great benefits, the FAA is only concerned about you equipping with ADS-B Out—the free weather and traffic is simply the carrot to get you to write a check.

Note that there are various combinations of these two: Out-only equipment that simply meets the FAA requirement, In-only portable devices that receive weather, and ADS-B In/Out products that do it all. One thing to keep in mind—there is no

such thing as a portable ADS-B Out device. All Out equipment must be panel-installed.

## 1090 vs. 978

You would think that would be the end of the confusion with ADS-B, but unfortunately you would be wrong. Due to concerns about frequency congestion (and other issues too boring to detail here), there are two different datalink technologies that meet the ADS-B requirement: 1090 MHz ES and 978 MHz UAT. As the names imply, these are simply different frequencies used by the equipment to transmit and receive data.



*Mode S transponders like Garmin's GTX 330 can sometimes be upgraded to ADS-B Out.*

1090 Extended Squitter (ES) is based on 1090 MHz, just like our Mode A/C/S transponders. In fact, some Mode S transponders (like Garmin's GTX 330) can be upgraded to an ES transponder by upgrading the software and adding a WAAS GPS. This is the only technology accepted outside the US and above 18,000 feet, so it will be popular with turbine airplanes. ES receivers can detect other aircraft with ES transmitters air-to-air, and they can receive other traffic information uplinked from ADS-B ground stations. But there is no weather datalink on 1090.

978 products are sometimes called UAT, for Universal Access Transceiver. This is only available in the US, and only below 18,000 feet, so it is aimed mostly at piston aircraft. Like a 1090 ES receiver, UATs can detect other airplanes with transmitters on the same frequency (978 MHz) air-to-air and also receive the rest of the traffic picture from ADS-B ground stations. But weather is also transmitted over 978 MHz, an added bonus.

This ends up being a real mess. You can have all kinds of different equipment: 978 Out only, 978 Out/In, 1090ES Out only and even a combined 1090ES Out/978 In. At the end of the day, you should choose the Out frequency that matches your flying. If you fly above 18,000 feet or outside the US, 1090ES is your only option. If you don't, a 978 UAT could work. After you've chosen your Out frequency, the only other decision is whether you want ADS-B weather; since that's only available on 978, that's a simpler decision.



*Portable ADS-B receivers like Appareo's Stratus allow pilots to receive free datalink weather via 978 MHz.*

## Weather and Traffic

Since weather and traffic come into play so much during any discussion of ADS-B, let's define some terms: FIS-B and TIS-B. These are the two products that we can receive via ADS-B In.

Flight Information Services-Broadcast (FIS-B) is just a fancy name for datalink weather. Only available with a 978 MHz receiver, the end product is very similar to what we're used to seeing with XM Weather. NEXRAD radar, METARs, TAFs, TFRs, AIRMETs and other information is continuously updated in flight, and all this can be displayed on either a panel-mount MFD or a portable device like an iPad. There is no monthly subscription fee with FIS-B (your tax dollars paid for it), which is a nice feature. But unlike XM Weather, ADS-B weather uses the network of ground stations, not satellites. That means coverage, while pretty good now and getting a lot better, is not as universal as XM.

Traffic Information Services-Broadcast (TIS-B) is what the name suggests—datalink traffic. But leave it to the FAA to make this complicated. Unlike ADS-B weather, which is broadcast to anyone in range of the ground stations, ADS-B traffic is a custom report that is only sent to aircraft with ADS-B Out. If you're flying with an ADS-B Out transmitter in your airplane, you'll get an excellent picture of all traffic within roughly 30 miles of you. But if you're not flying with an ADS-B Out transmitter (say, with a portable ADS-B In receiver), TIS-B is fairly unreliable. Read [this article](#) for complete details on this confusing subject.

## Changes for ATC

Remember that, while datalink weather and traffic are nice, the whole point of ADS-B is for ATC. And the FAA has some grand plans for how ADS-B will transform the way it does

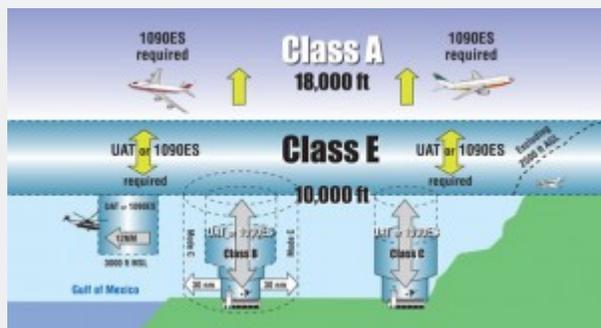
business, claiming it will reduce aviation's environmental impact, improve safety and increase capacity at airports. A lot of this seems awfully optimistic, and will not be a reality for many years (if ever).

But there are some more realistic improvements that will probably come to pass sooner. Since ADS-B is so much more accurate than radar, separation minimums can be reduced. This should lead to at least a little more direct routing and some increased capacity. Because ADS-B does not require radar, air traffic control will be available in many remote areas that cannot be served by radar. ADS-B will also impact ground operations, giving controllers the ability to prevent runway incursions and ground traffic conflicts.

But of course this won't come free.

## Regulations

Final [ADS-B Out rules](#) were finalized only in 2011. Those rules say that by 2020, all aircraft will be required to have ADS-B Out equipment to fly in Class A, B and C airspace, plus Class E airspace above 10,000 feet but not below 2,500 feet. So in general you'll need ADS-B Out most of the places you need a Mode C transponder today—and you'll need to keep that Mode C transponder, because radar will be the backup for ADS-B.



*ADS-B Out will be required by 2020 for flight in most controlled airspace.*

That does mean some pilots will not have to upgrade to ADS-B Out. If you fly a Cub on sunny Saturdays away from major airports, you'll be exempt. But if you use your airplane for any type of transportation flying, plan on equipping with ADS-B Out by 2020.

This ADS-B Out transmitter must be a panel-installed, certified solution (again, no portable ADS-B Out option). An approved WAAS GPS source is also required, to make sure your reported position is accurate. Remember, though, there is no mandate for ADS-B In equipment.

There are a number of products available now to satisfy this requirement, from major avionics manufacturers like Garmin, as well as new products on the drawing board from Avidyne and others. Prices vary significantly, but average about \$5000 (plus installation).

## What should I do?

This may all sound overwhelming, and the FAA certainly has made things complicated. But the end result is pretty simple: by 2020, you will most likely need to install an ADS-B Out transmitter in your panel (or upgrade your Mode S transponder if you have one). The only questions are what solution to install and when to do it.

The market for ADS-B products is finally starting to heat up, with features going up and prices coming down.

Garmin's [GDL 88](#) announcement at Oshkosh last year showed that the avionics giant is serious about owning the ADS-B market, but there are a number of smaller companies either shipping or working on ADS-B boxes of their own. Some of these are Out-only, in an attempt to check the box for 2020 compliance as cheaply as possible. Others are full-featured Out/In products that can connect to a variety of MFDs. Of course there is already a red hot market in portable ADS-B receivers, like the [Stratus](#), [GDL 39](#) and [Dual 170](#). These are easy and inexpensive ways to get subscription-free weather on your iPad or portable GPS, and have become quite popular over the past year. But they do not address the 2020 mandate for ADS-B Out.

One option that could become more appealing is to combine these two products: install an ADS-B Out transponder in the panel, but use a portable receiver for ADS-B In. That would comply with the 2020 rule at a fairly low cost, but give you complete weather and traffic datalink. The only major drawback here is that your weather and traffic would not be displayed on the panel, but rather on an iPad or other portable device. And remember that you'll need an approved GPS source for your ADS-B Out box—either a WAAS GPS or a GPS receiver built-in to your transponder.

When to purchase an ADS-B Out solution is a tougher decision. If your transponder breaks in the next few years, it's probably sensible to replace it with a full ADS-B Out unit instead of spending the money on a soon-to-be-outdated Mode C transponder. And if you want free in-flight weather and traffic, it may also be worth it.

But in many ways, 2020 is still a long way off. Will you still be flying in 2020? Will you own the same airplane in 2020? If there's nothing wrong with your transponder and you already have a weather and traffic solution, you can probably wait until closer to 2020 to make the move to ADS-B.

No matter what decision you make, it seems clear that ADS-B is coming to US airspace—eventually. In time, it might even be a good thing.

From: [airfactsjournal.com](http://airfactsjournal.com)

## Good Links

Some good ol' fighter flying:

<http://www.military.com/video/aircraft/jet-fighters/amazing-video-shot-by-f-15-pilots/1836540543001/>

\*\*If you have problems with the link, just copy/paste the address into your web browser.



*He who demands everything that his aircraft can give him is a pilot; he that demands one iota more is a fool.*