

ADS-B

**A New Air Traffic Management
Technology For Africa**

**Addis Ababa
April, 2006**

**Skip Nelson
skip@ads-b.com**



**Alaska is a VERY big
place, with similar
problems...**

Alaska was also a very dangerous place to fly...

- The State of Alaska has the highest percentage of licensed pilots and aviation activity in the United States:

- 1 out of every 15 men (18-80 yrs) fly an airplane;
- There is one airplane for every 12 pilots;
- 45% of the commerce outside the two major cities, involves air transportation

- In 1995, Alaska had the highest accident rate in North America:

- 1 accident every 3 days and 1 FATAL accident every 9 days;
- In a 30 year flying career an Alaskan pilot had a 75% chance of having an accident and a 30% chance of dying in his profession

But,

By 2004, we had reduced the accident rate by 48% and the fatal accident rate by 90%.



**Pardon our passion for the subject -
But, we fly with ADS-B every day!**



Automatic Dependent Surveillance – Broadcast

"ADS-B"

"The most significant advancement in Air Traffic Control technology, since the introduction of RADAR, more than fifty years ago..."

Jane Garvey, FAA Administrator, 2001

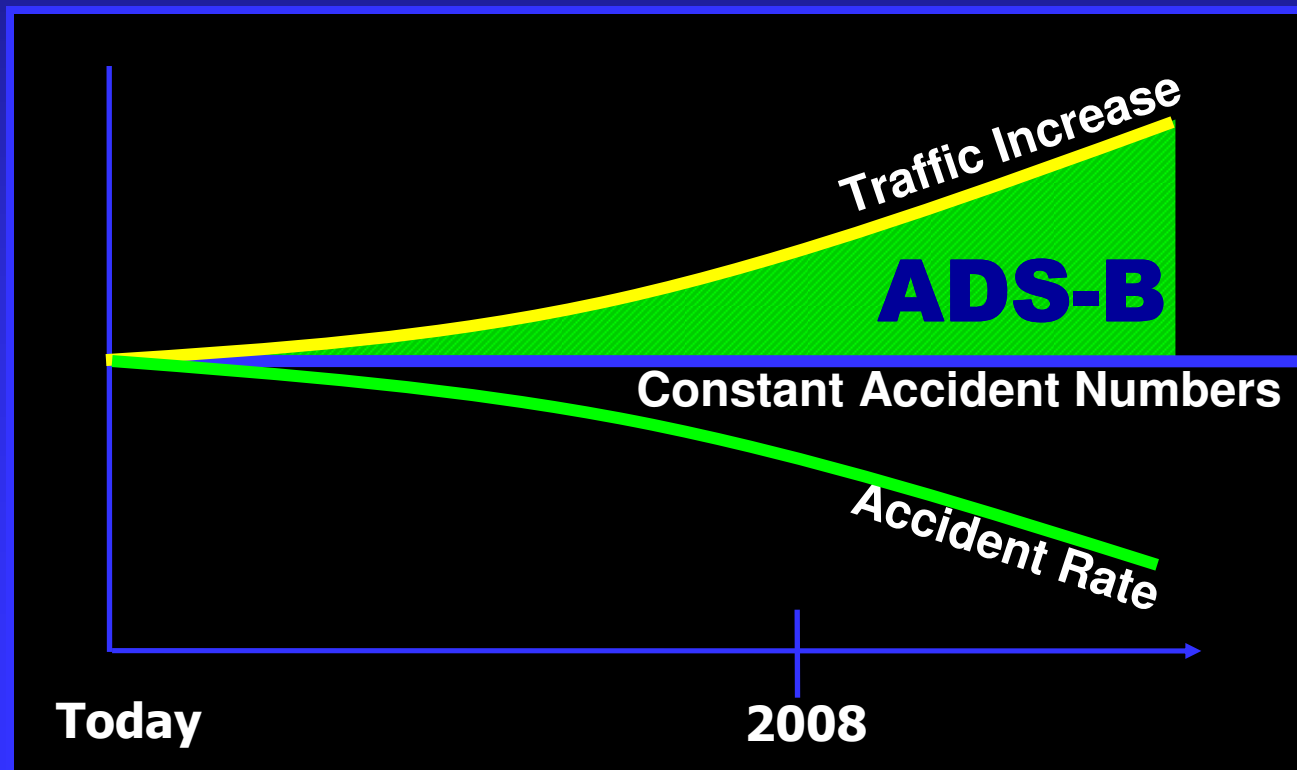
INTERNATIONAL APPROVALS



RTCA

CAAC

ADS-B Fills An Important "Gap" In the Growth Equation



What is ADS-B ?

ADS-B is radically new technology that is redefining the paradigm of COMMUNICATIONS - NAVIGATION - SURVEILLANCE in Air Traffic Management today.

"ADS-B"

Automatic -

- ✓ "Always ON" – No operator attention is required

Dependent -

- ✓ It relies on very accurate GNSS position data
(*Either GPS or Galileo*)

Surveillance -

- ✓ Provides aircraft position, altitude, speed, heading ,
identification and other data

Broadcast -

- ✓ It does not require interrogation, or triggering by other
stations – data is broadcast to any aircraft or ground station
equipped to receive the data link signal

ADS-B Provides ALL the Services of Conventional Surface Surveillance Radar Except:

- ✓ It is 100% digital technology
- ✓ It is $\sim$ 12 times as accurate, especially at ranges > 50 nm
- ✓ Construction costs are $\sim 1/18^{\text{th}}$ as expensive as conventional radar
- ✓ Maintenance and operation costs are $\sim 1/25^{\text{th}}$ as high!

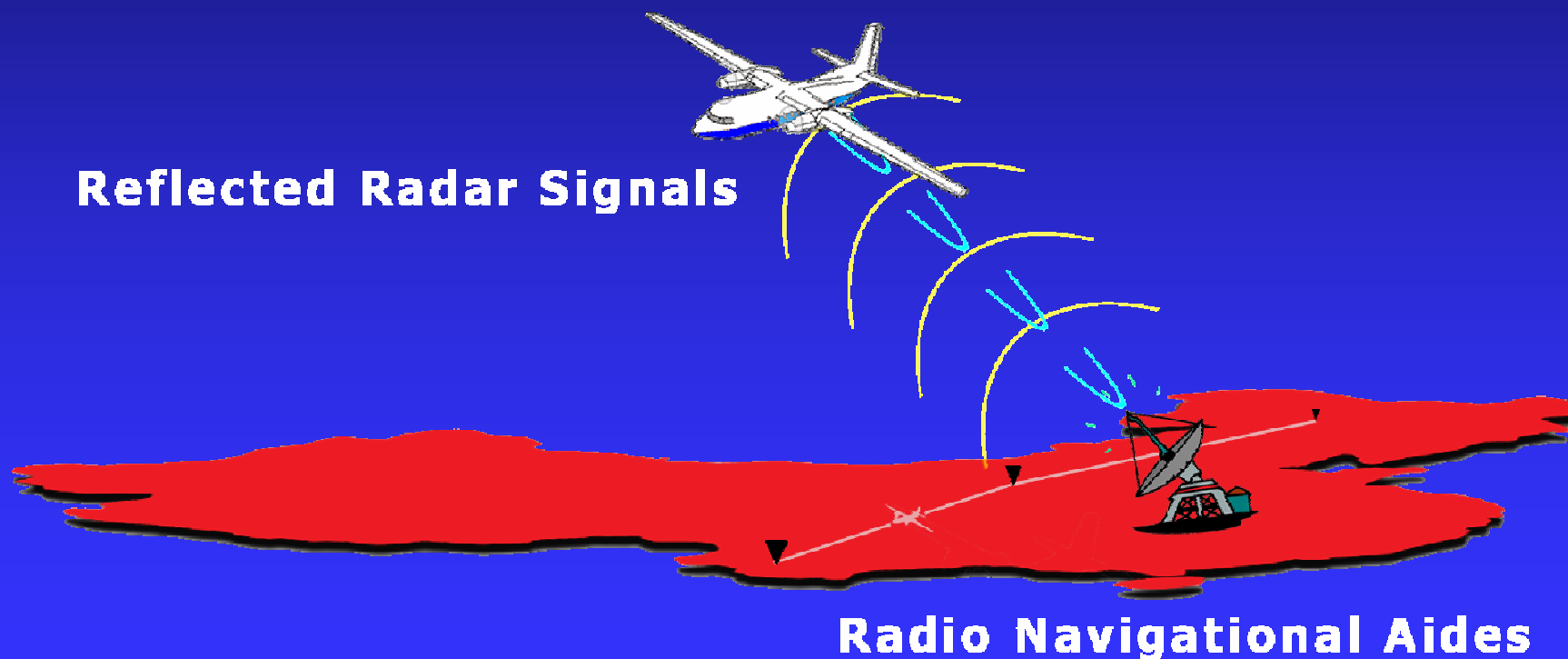
NO moving parts

Continuous position updates (radars turn at ~ 6 times/minute)

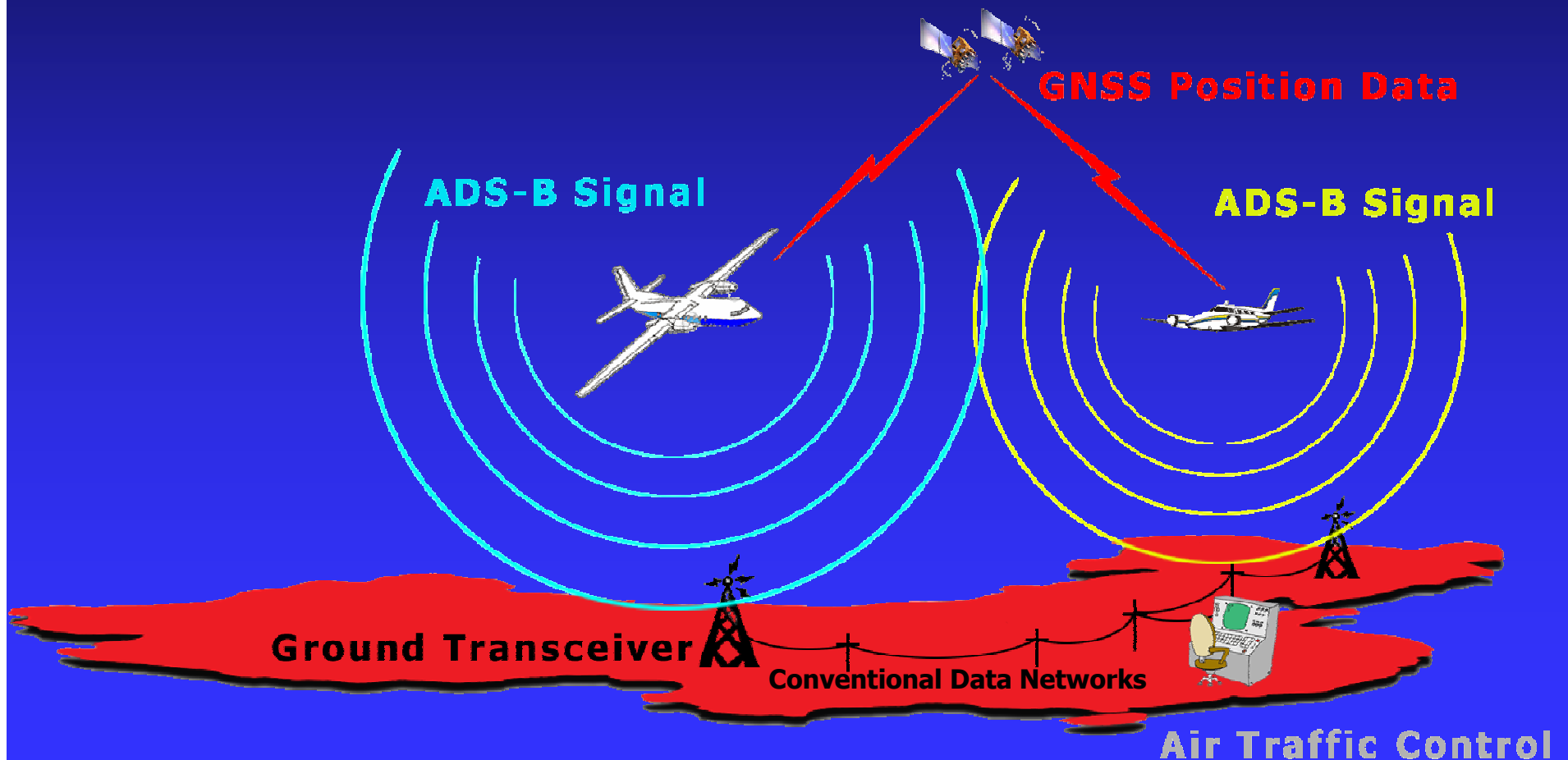
Not affected by Range, or Weather

CONVENTIONAL RADAR

Air Traffic Management Systems



ADS-B Air Traffic Management Systems



INDUSTRY STANDARDS

"1090" 1090 MHz Mode-S

- 1090 MHz datalink
- Mode-S based system
- Currently, only compatible with large aircraft avionics systems
- Cost > \$75,000 USD per installation



"UAT" Universal Access Transceiver

- 978 MHz datalink
- Current standard for smaller aircraft
- Light weight
- Relatively simple interfaces
- Cost ~ \$20,000 USD per avionics installation

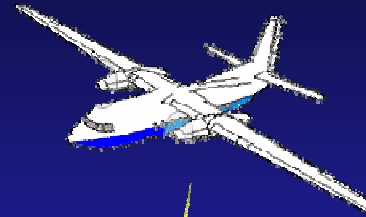




Mode-S Traffic

- Transient
- Corporate
- Commercial
- Turbojet

INCOME !



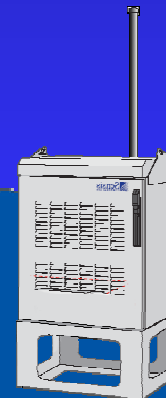
UAT Traffic

- Resident
- Part 135
- Part 91

SAFETY !

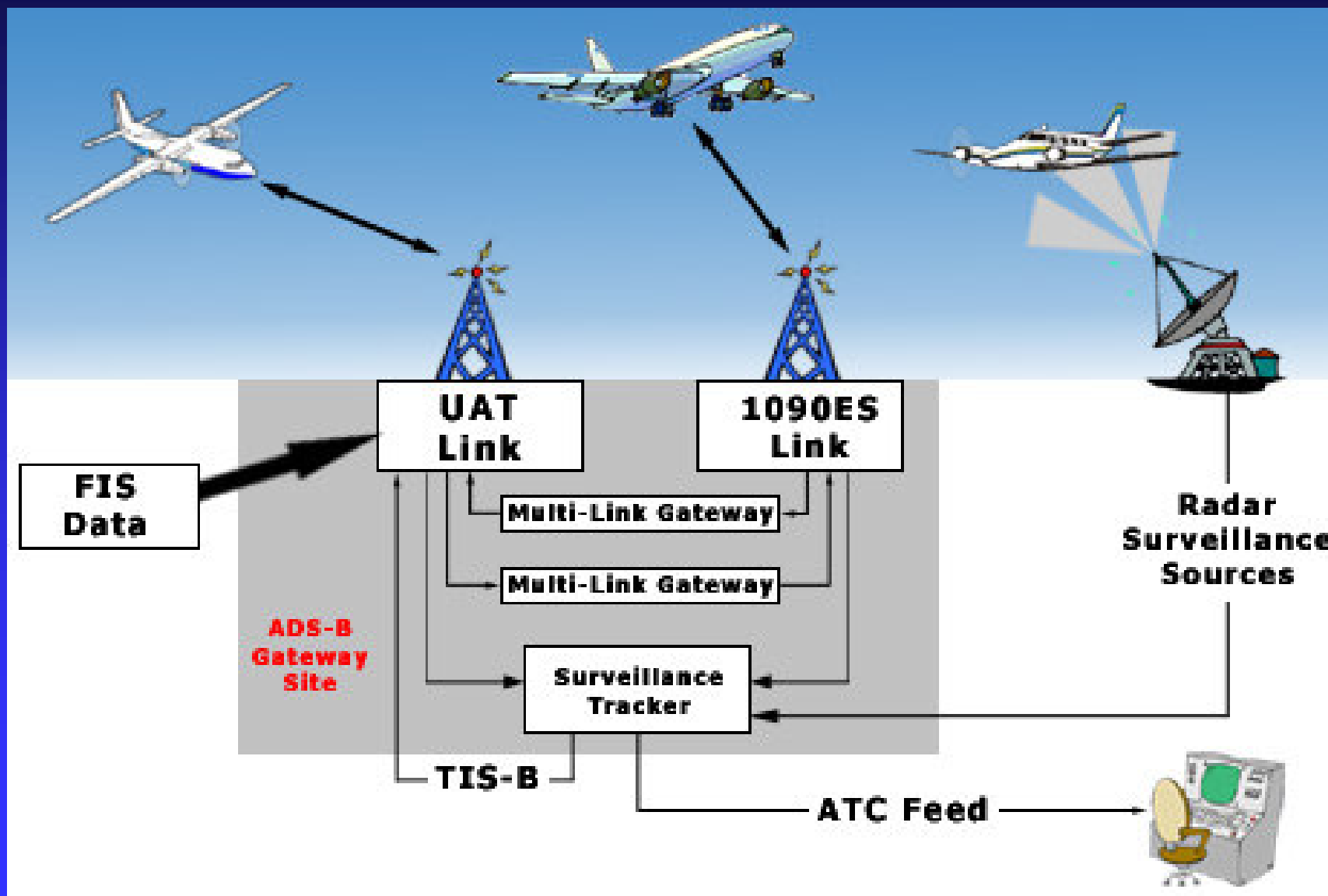


1090 MHz Ground Based Transceiver



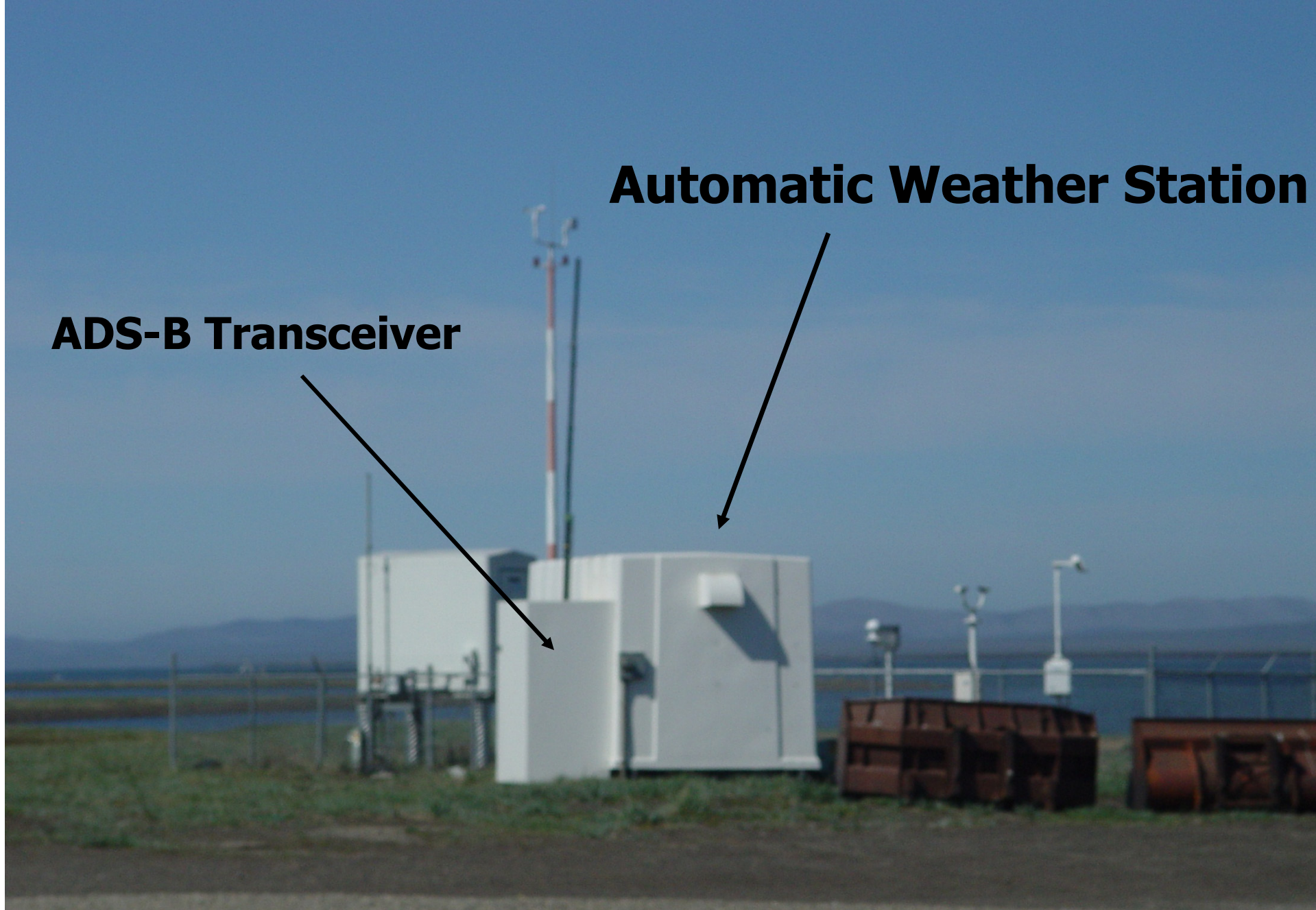
978 MHz Ground Based Transceiver

Dual-Link Architecture



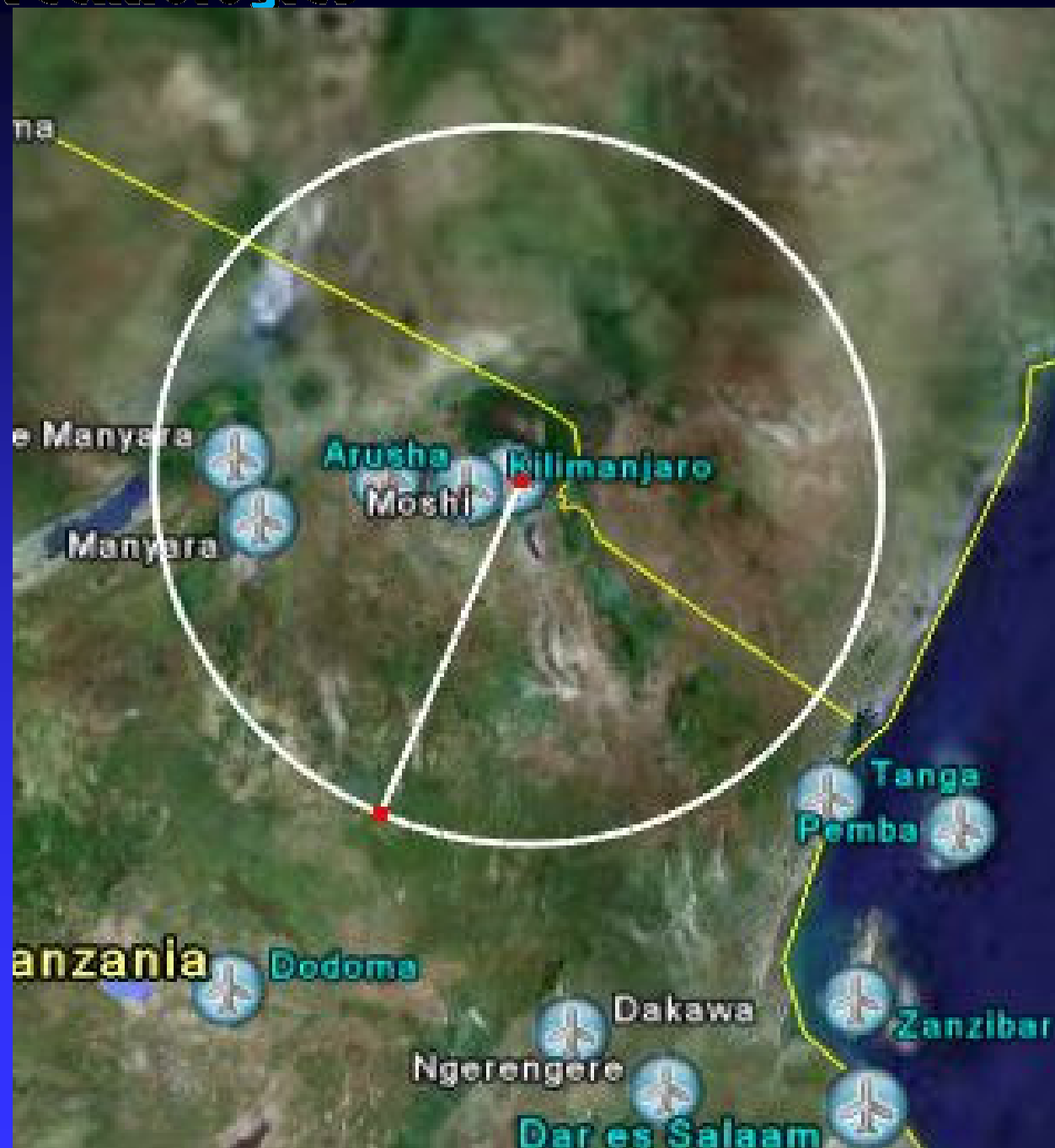
Automatic Weather Station

ADS-B Transceiver



Strong Equipment !





Example: Tanzania

Conventional Radar = ~ \$200 Million

- Annual Maintenance & Operation Costs = \$5-8 Million
- Cost / Benefit Analysis: Impossible!

ADS-B = ~ \$11 Million

- Annual Maintenance & Operation Costs = \$0.5 Million
- Cost / Benefit Analysis: Excellent!

GBT Range .vs. Target Altitude

- 3,000 Meter Coverage
- 1,000 Meter Coverage

Questions ?

