

**DTN/PROGRESSIVE FARMER**  
**CHICAGO, IL**  
**DEC. 11, 2013**



**THE WORLD OF UAVs IN**  
**AGRICULTURE**

# ROBERT BLAIR – KENDRICK, IDAHO, U.S.A.

- ❖ Farm Started in 1903
- ❖ 1,500 Acres (607 ha)
- ❖ Non Irrigated
- ❖ Steep Slopes
- ❖ Wheat, barley, peas, lentils, garbanzo beans, alfalfa, & cow/calf
- ❖ Mom, wife, 2 sons, hired man



# MY BACKGROUND

- ❖ Lifetime of farming experience
- ❖ U of Idaho BS Ag Business
- ❖ 2009 Precision Farmer of the Year
- ❖ 2011 Eisenhower Ag Fellow
- ❖ 2012 McCloy Ag Fellow
- ❖ 2013 Governor's Award Ag Tech
- ❖ IGPA Executive Board
- ❖ NAWG Research & Tech Chairman
- ❖ US Wheat/NAWG Biotech Committee
- ❖ Domestic & International Speaker
- ❖ Precision Ag since 2003
- ❖ UAV Research & Use since 2006



# THE FUTURE IS HERE!



# WHAT IS PRECISION AGRICULTURE?

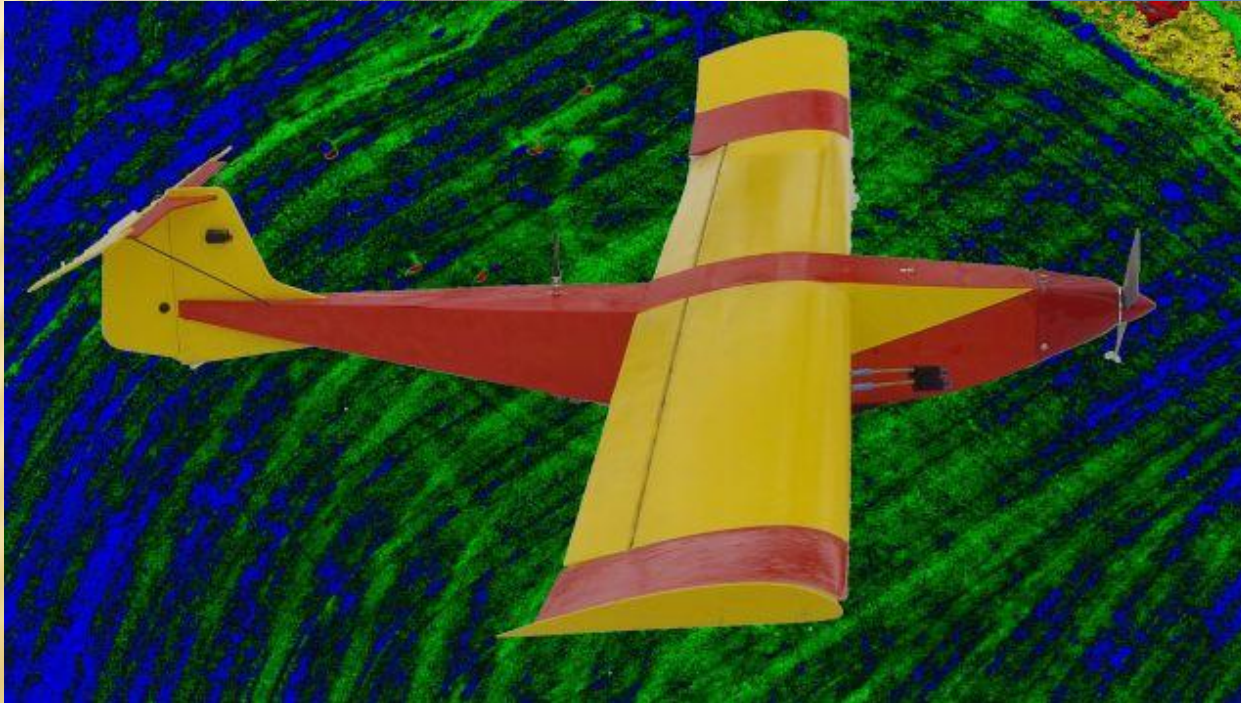
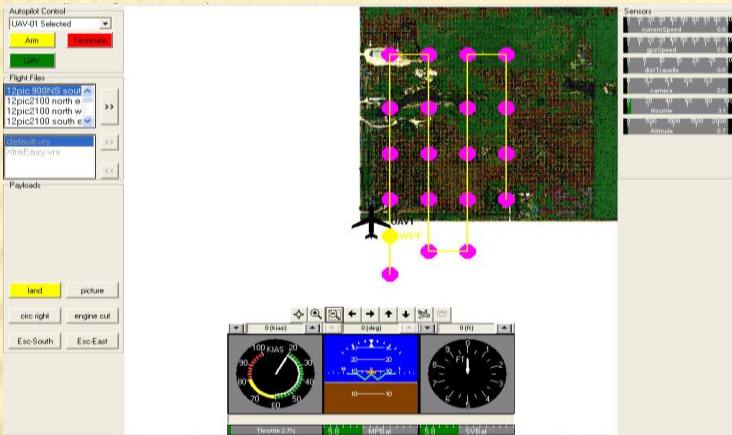
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**The use of technology to gather information in order to make better management decisions to reduce costs, increase profit, increase productivity, and to reduce impacts on the environment.**

# WHERE HAVE WE BEEN?



# UNMANNED AIR VEHICLES (UAV)



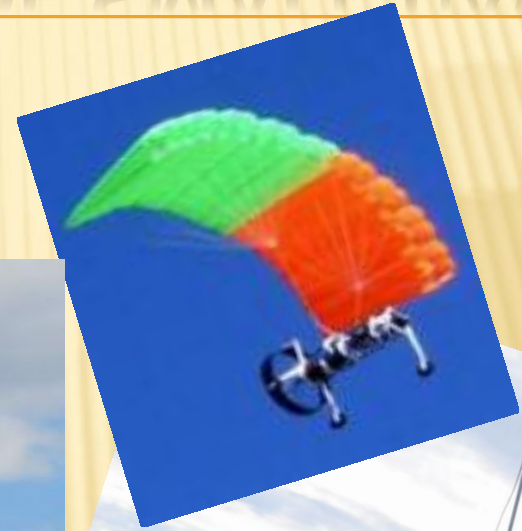
# WHAT IS A UAV?

- ❖ Flies Autonomously
- ❖ On Demand
- ❖ Flies Under Cloud Cover
- ❖ Battery Powered
- ❖ Remote sensing
- ❖ Higher Resolution
- ❖ Lower cost for data





# MANY DIFFERENT TYPES OF SMALL UAVS

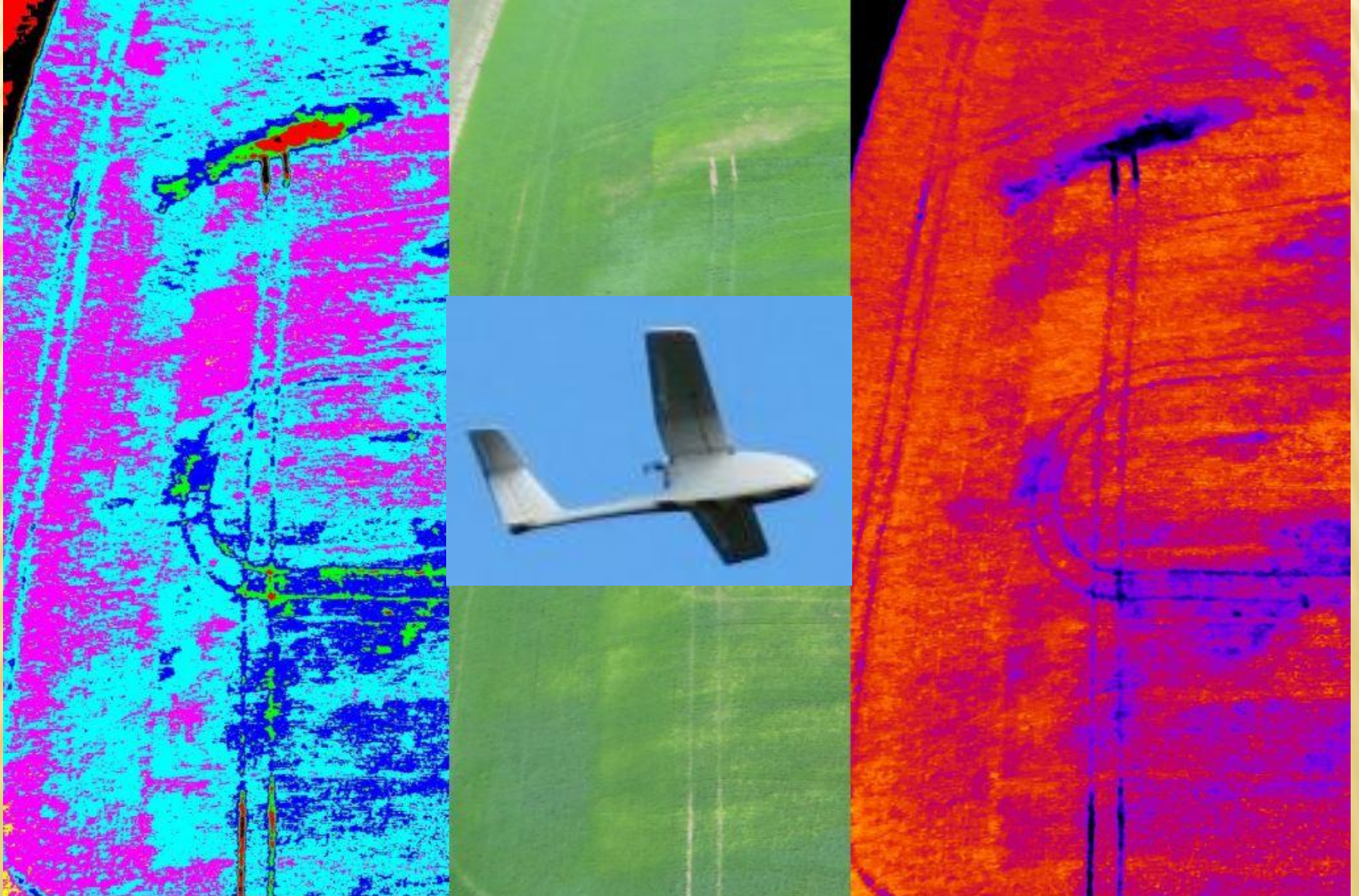


# MULTIPLE IMAGES STITCHED TOGETHER

- ❖ Low altitude:
  - Higher resolution
  - More images
  - More time
- ❖ Can identify problems with just color image
- ❖ Need better stitching software



# CROP SCOUTING



# QUAD COPTERS

- ❖ Zoom in capabilities
- ❖ Lower flying for area analysis
- ❖ Fast and stable
- ❖ Easier than a helicopter
- ❖ Shorter battery life

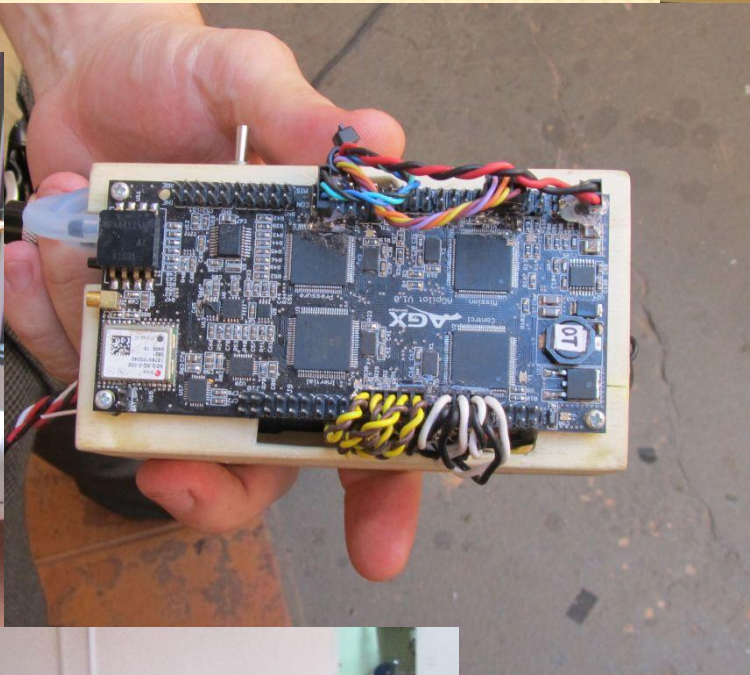


# BENEFITS OF IMAGE DATA

- ❖ Historical record
- ❖ The “eyes” can see
- ❖ Proactive data verses yield monitor (reactive)
- ❖ Can make adjustments on crop during the growing season



# UAVS AROUND THE WORLD



# UAVS AROUND THE WORLD

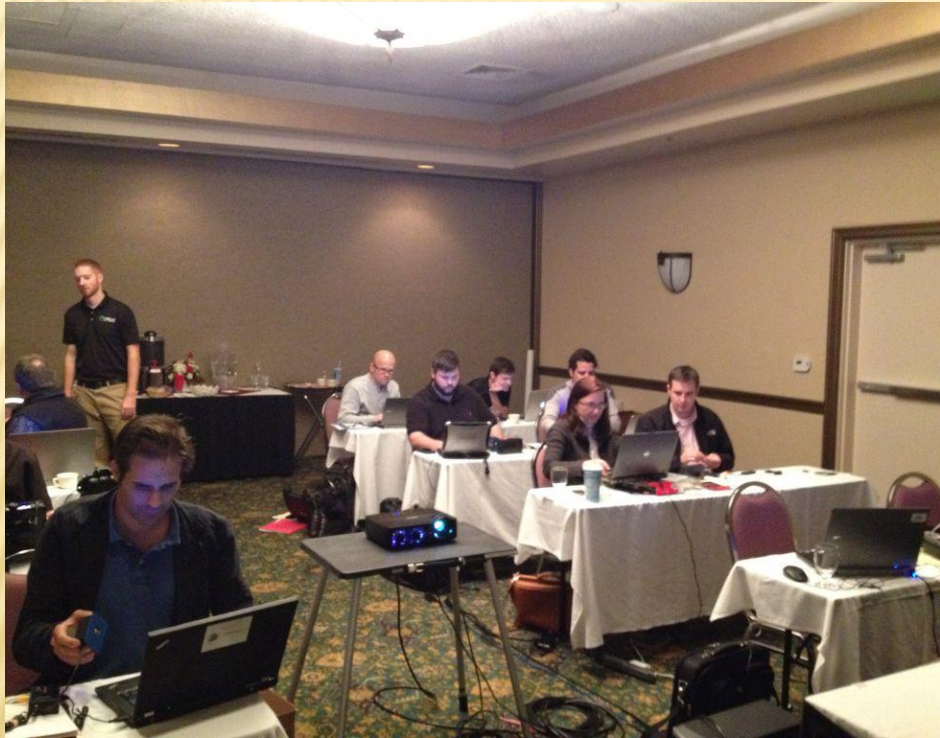


# UAVS AROUND THE WORLD





# UAVS AROUND THE WORLD



# FLY THE FRIENDLY SKIES

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- ❑ **Canada** (*UAV-Friendly Rating: 2/5*)
- ❑ **Mexico** (*UAV-Friendly Rating: 5/5*)
- ❑ **United Kingdom** (*UAV-Friendly Rating: 3/5*)
- ❑ **Europe** (*UAV-Friendly Rating: 2/5*)
- ❑ **Brazil** (*UAV-Friendly Rating: 5/5*)
- ❑ **Australia** (*UAV-Friendly Rating: 4/5*)
- ❑ **New Zealand** (*UAV-Friendly Rating: 5/5*)
- ❑ **Asia** (*UAV-Friendly Rating: an indifferent 1/5*)

# UNITED STATES

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**“....the pending  
new regulations  
will not be out till  
Spring 2012.”**

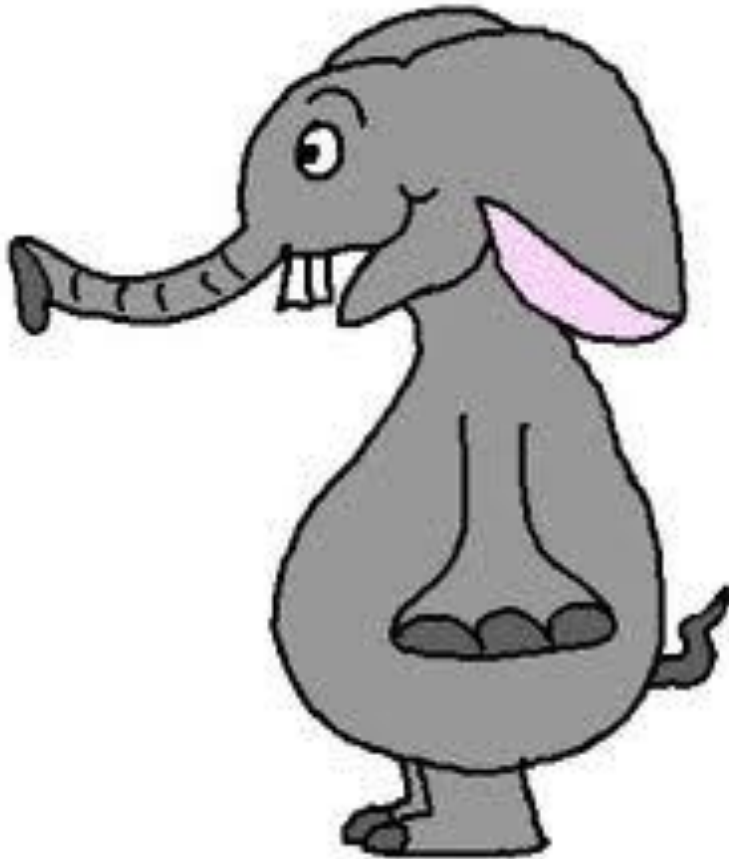
**THIS WAS IN 2011**

# UNITED STATES

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**In discussions with staffers about FAA regulations they indicated that a first time offense minimum fine is \$10,000, up to \$100,000, plus carries a possible 3 to 10 years in the pen.**

# UNITED STATES



# HOW DO YOU SEE IT?



# OTHERS ARE WANTING IT MORE



# UNITED STATES LEGISLATION 2013

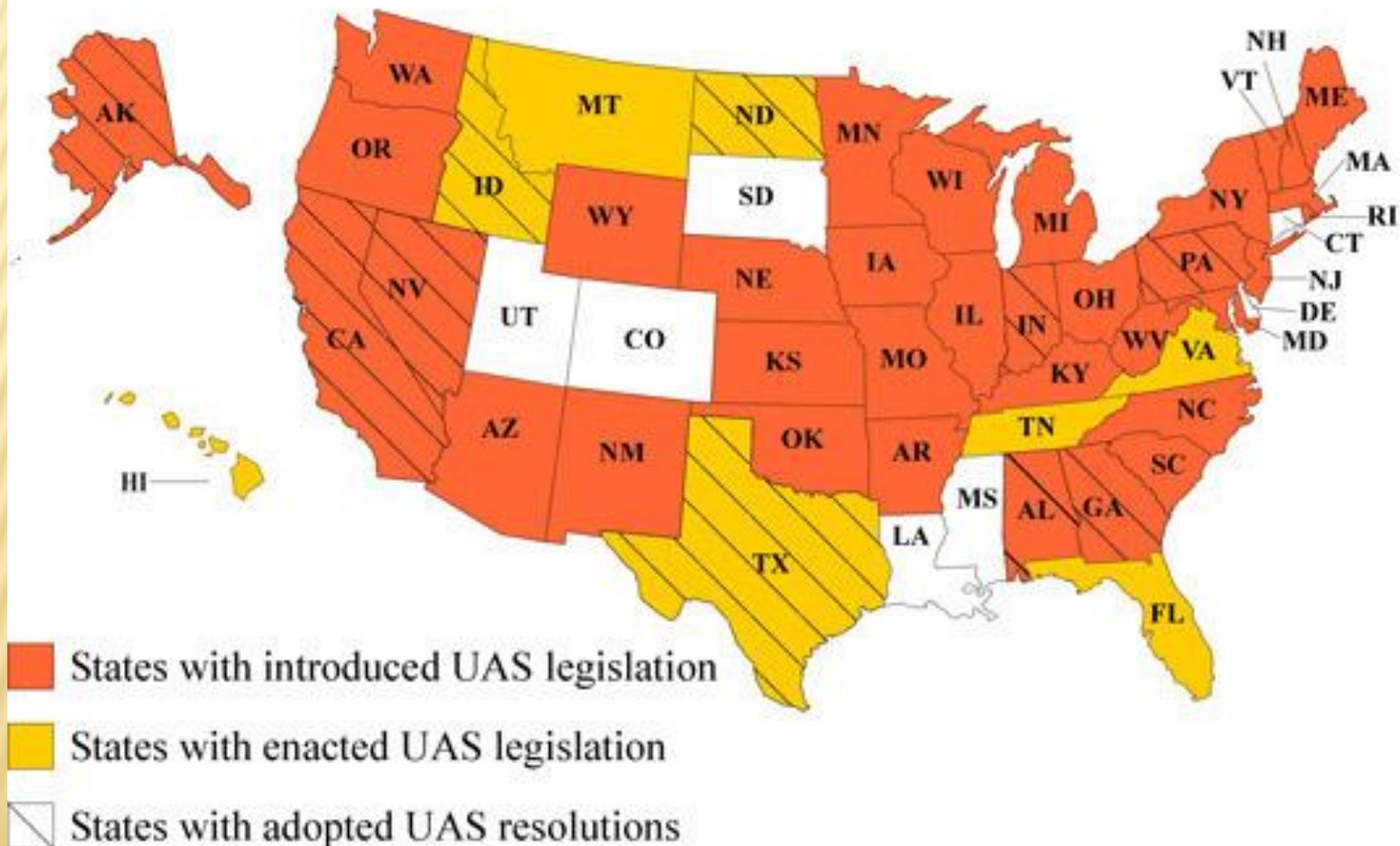
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- ❑ **43 STATES** have introduced Legislation
- ❑ **115 Bills** and resolutions concerning UAV issues
- ❑ **10 Bills** have been enacted in eight states
- ❑ **10 States** adopted resolutions
- ❑ **2 States** are waiting for Governor signatures
- ❑ **1 State** has pre-filed a bill for 2014



# UNITED STATES LEGISLATION 2013

## States With UAS Legislation



# UNITED STATES

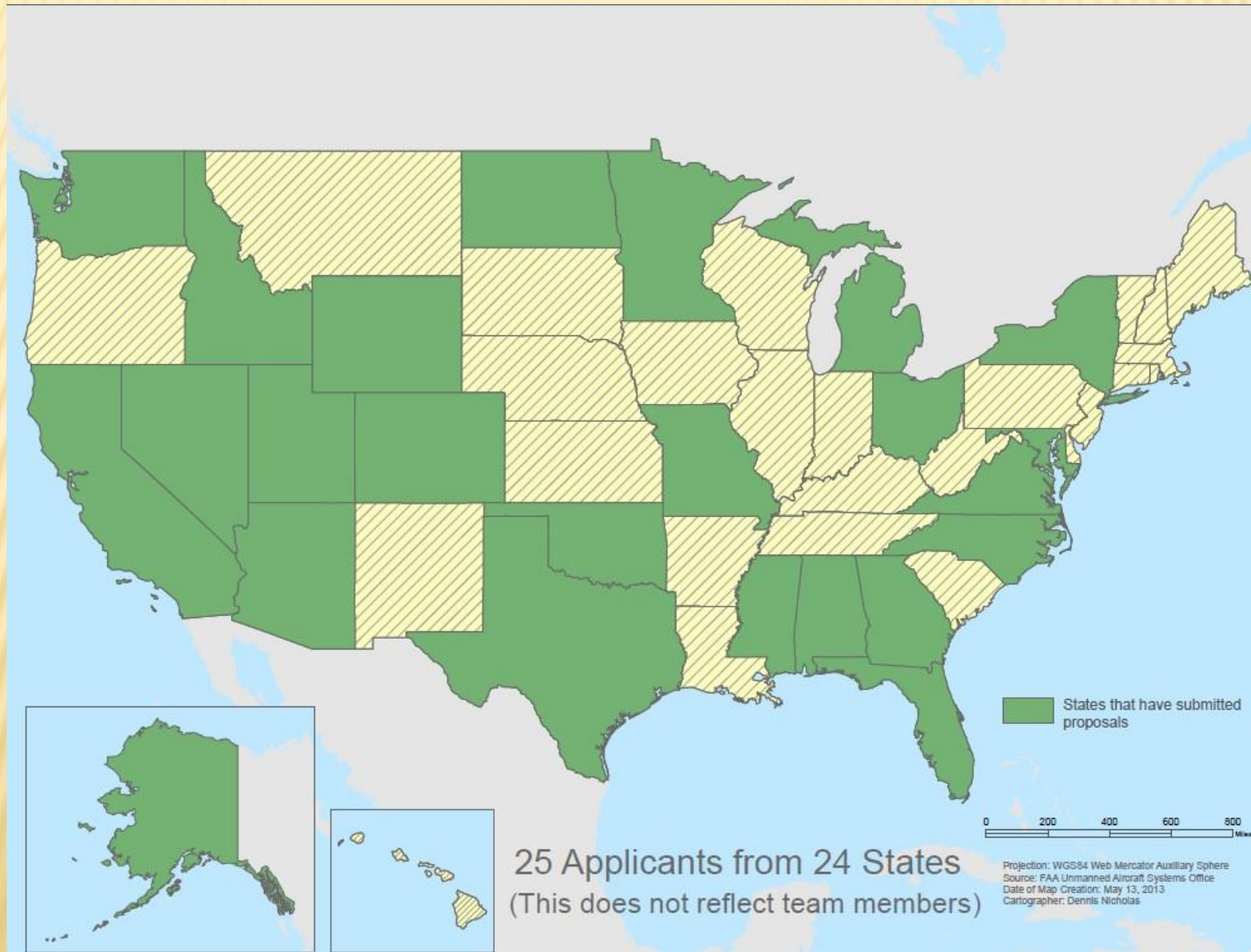
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**State legislation currently being considered could catapult the U.S. up to one of the most highly restricted countries for UAVs out there.**

# WHY ALL THE LEGISLATION?



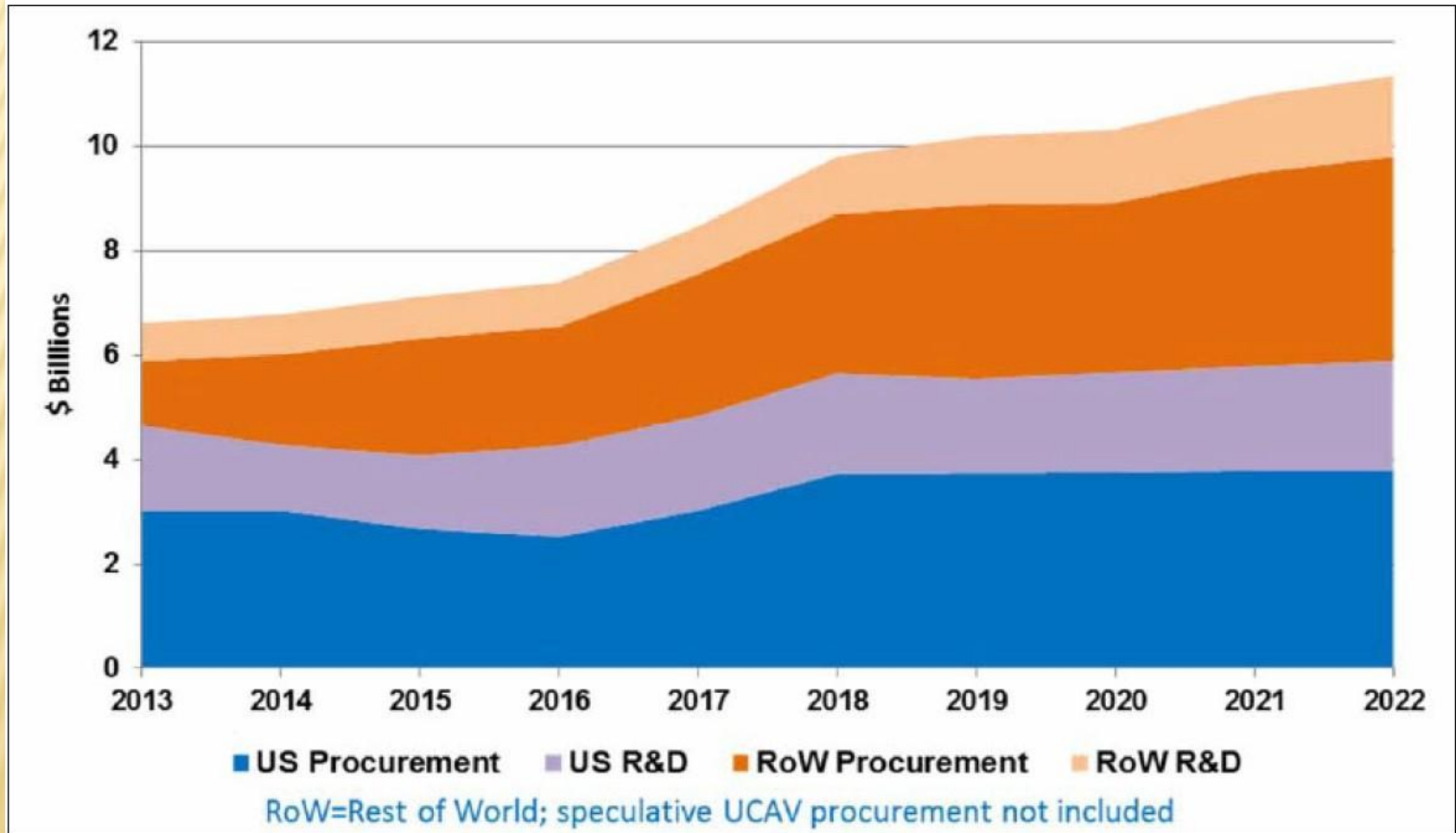
# UAV TEST SIGHT BATTLE



# TEST SIGHT DRIVER

Figure I. World UAV Budget Forecast

R&D and Procurement



Source: Teal Group, *World UAV Systems 2012: Market Profile and Forecast*.

# DRIVING FORCES FOR PRECISION TECHNOLOGY & UAVs



WATER  
WARS



9.5  
BILLION  
PEOPLE  
BY  
2050

DEPLETING  
RESOURCES



# DRIVERS OR CHALLENGES?

Government



Insurance  
Claims



Kinder to Wildlife



Prove Environmentalists  
Wrong



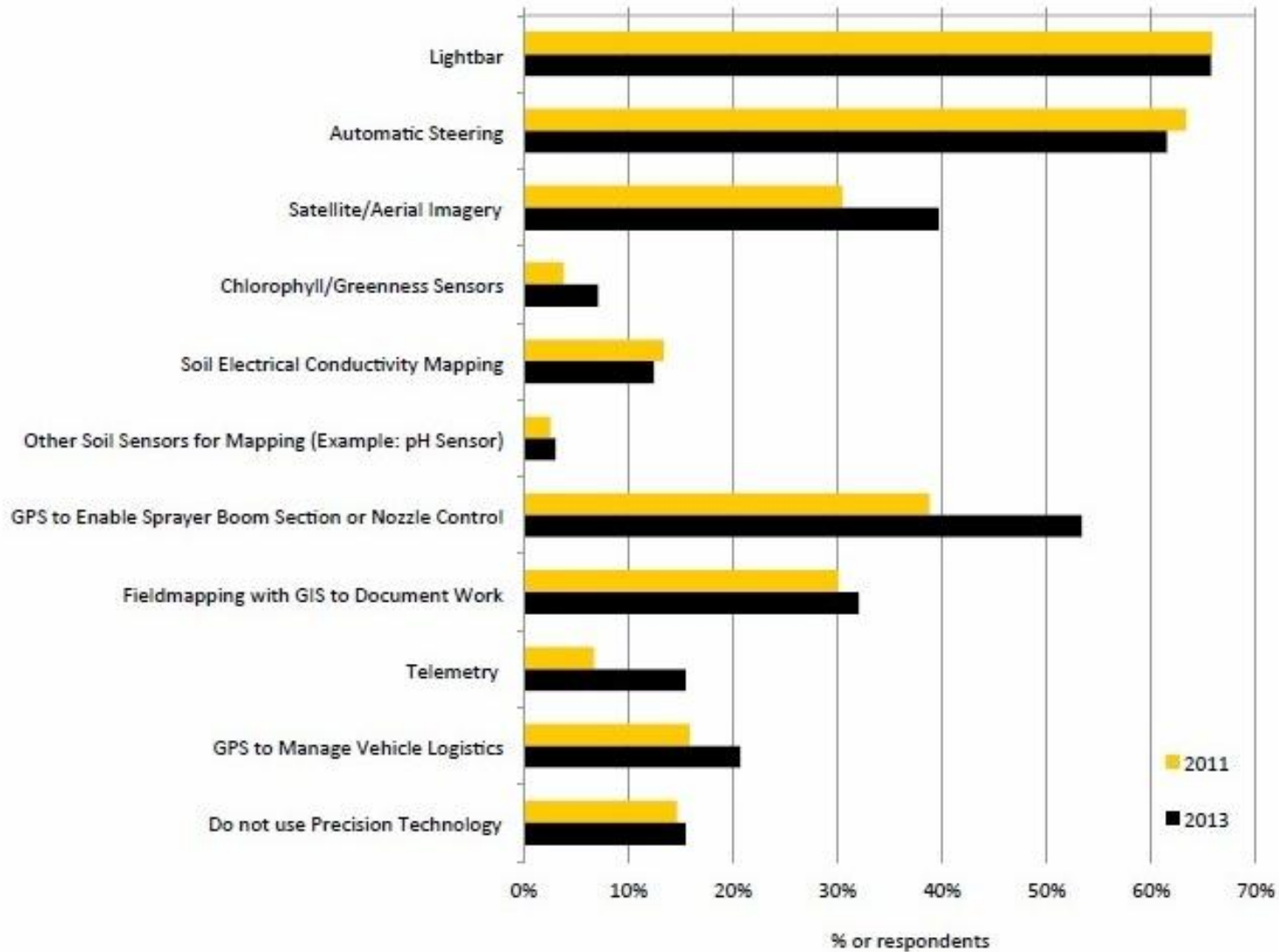
Technology is  
not Going Away



Regulations

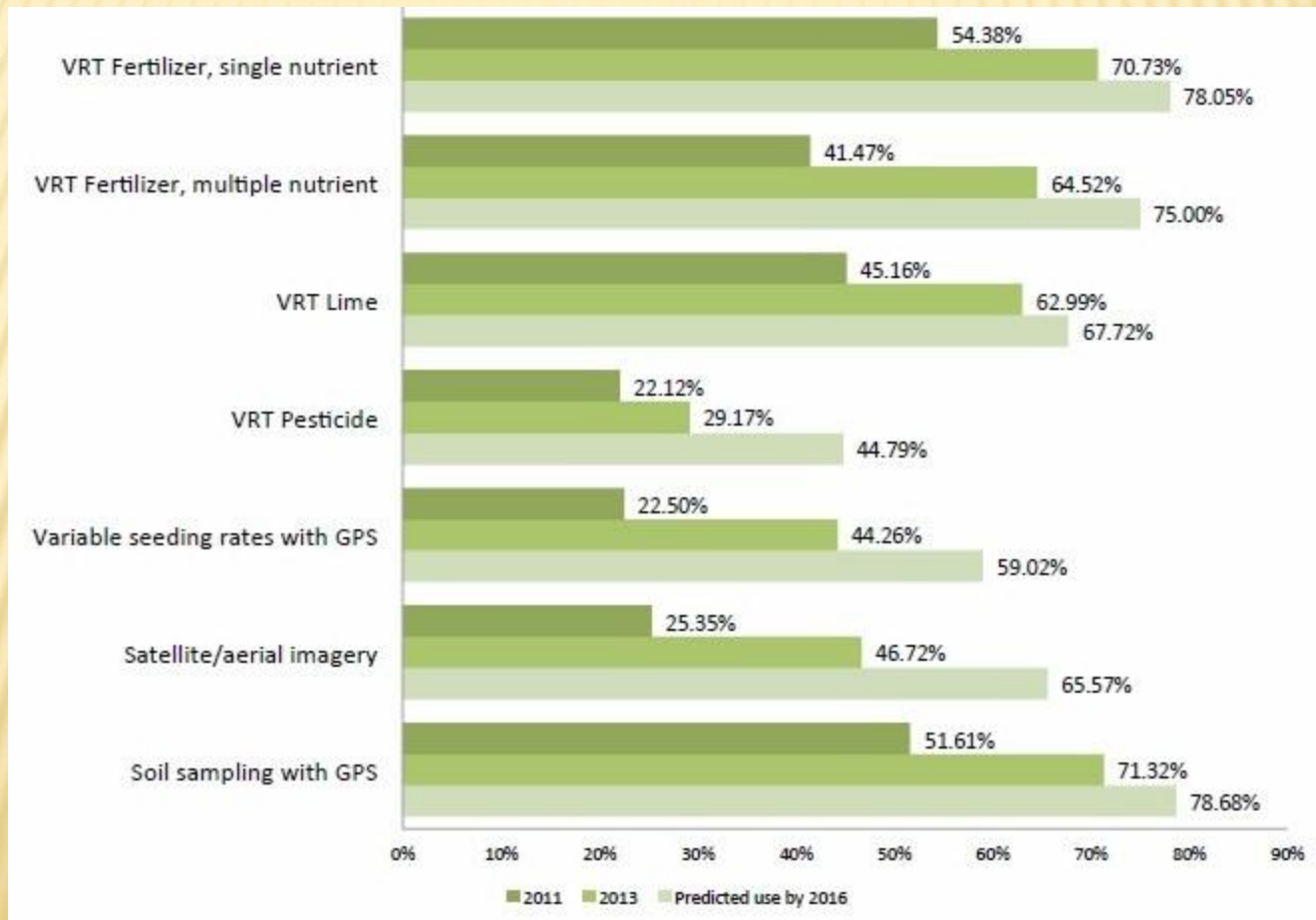


# TECH USE IN AGRIBUSINESSES

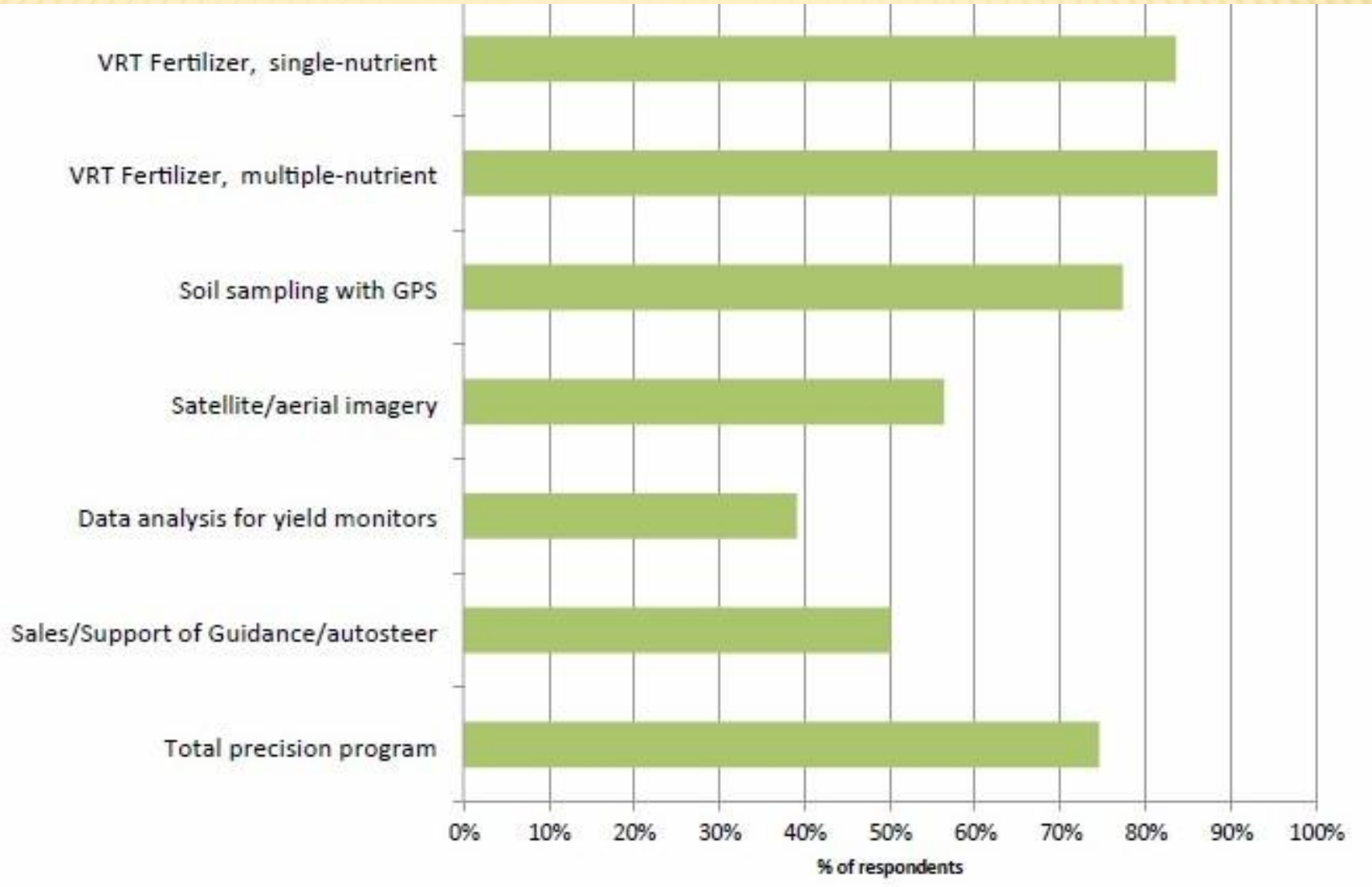




# OFFERED BY SERVICE PROVIDER



# PROFIT OF SERVICE OFFERED



# FARM BILL!!!



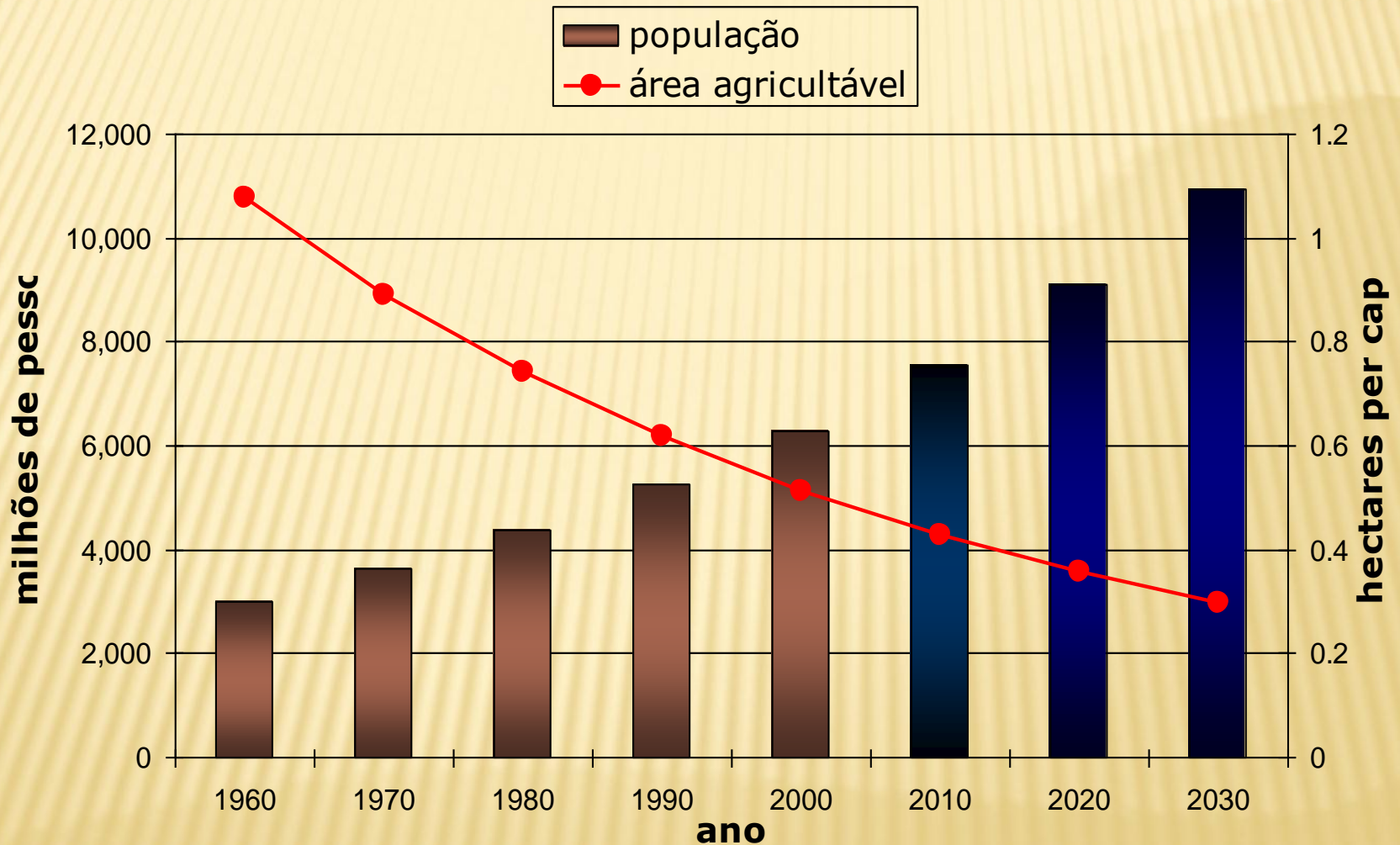
# **TOP 3 CHALLENGES**

- 1) GOVERNMENT & REGULATIONS**
- 2) ENVIRONMENTALISTS**
- 3) FEEDING 9.5 BILLION PEOPLE**

# **TOP 3 OPPORTUNITIES**

- 1) FEEDING 9.5 BILLION PEOPLE**
- 2) ROOM TO EXPAND AGRICULTURE**
- 3) PRECISION AG AND BIOTECH**

## World: Agriculture area per capita



**Total agricultural area= 3,23 billion ha**

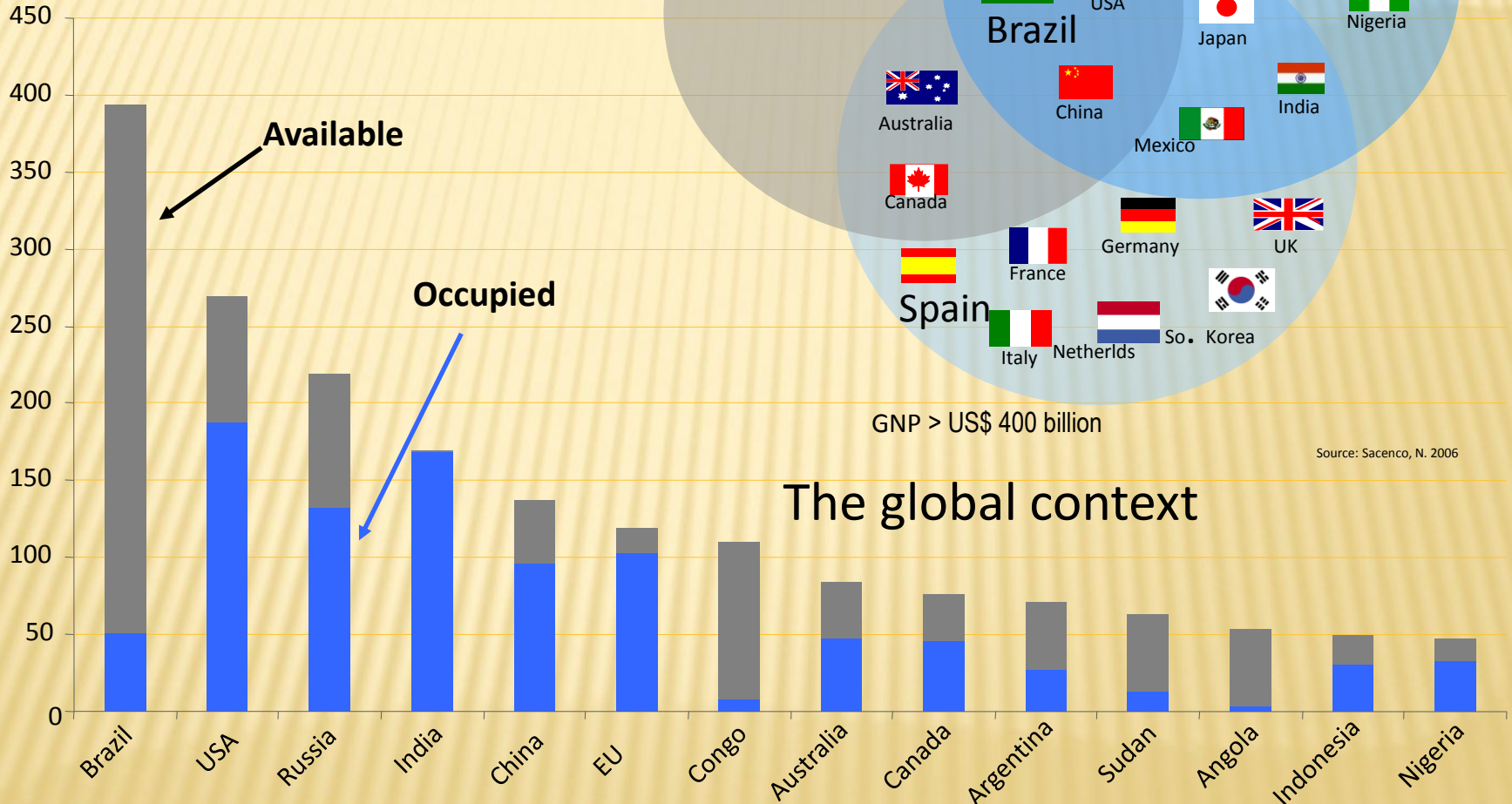
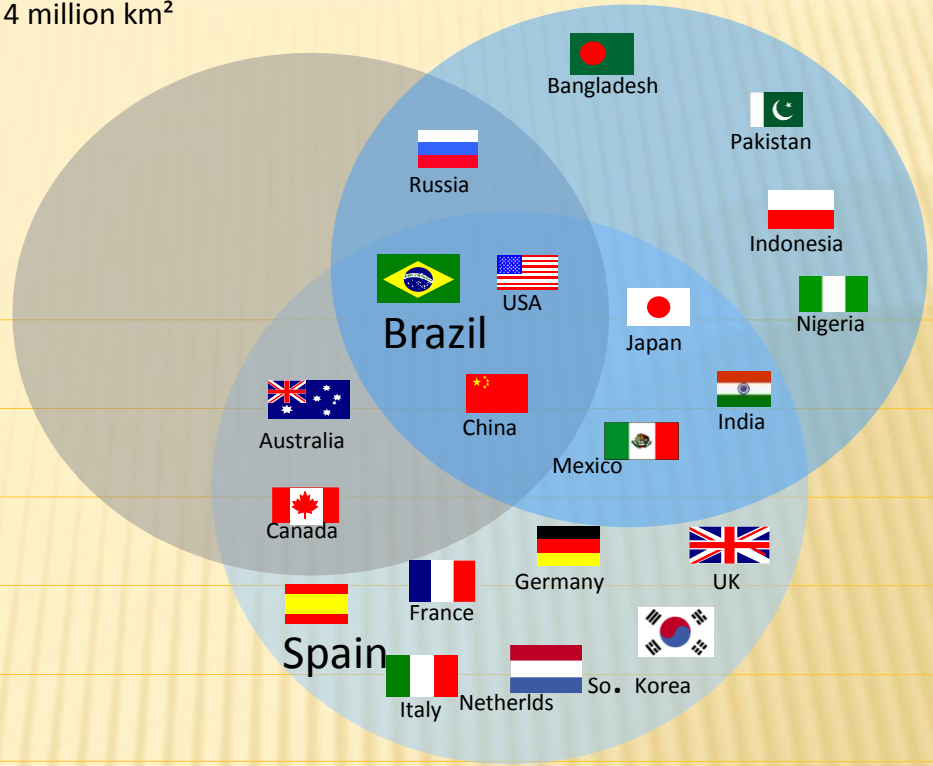
# Agriculture expansion

Area > 4 million km<sup>2</sup>

Population > 100 million

GNP > US\$ 400 billion

Source: Sacenco, N. 2006



## Land availability

Source: FAO

# **WORLD AGRICULTURE NEEDS TO GROW AND BE EFFICIENT AT THE SAME TIME**





# THE FUTURE OF AGRICULTURE; THE FUTURE OF IDAHO UNMANNED AIR SYSTEMS



# QUESTIONS?



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