

Disruptive technologies, hurdles and opportunities

October 23



Earth at Night

More information available at:

<http://apod.nasa.gov/ap081005.html>

Astronomy Picture of the Day

2008 October 5

<http://apod.nasa.gov/>

Silo Effect

“breaking down silos can spark innovation in unexpected ways.”

– *Gillian Tett*



New Farming
Systems

eGrocery

Biomaterials

Predictive
Analytics

Robotics

Ag Biotech

Bioenergy

Biocontrols

Farm Mgmt
Software

Agribusiness
Marketplaces

IoT

Blockchain

Sensing

Farm Equipment

Drones

What is just now possible.

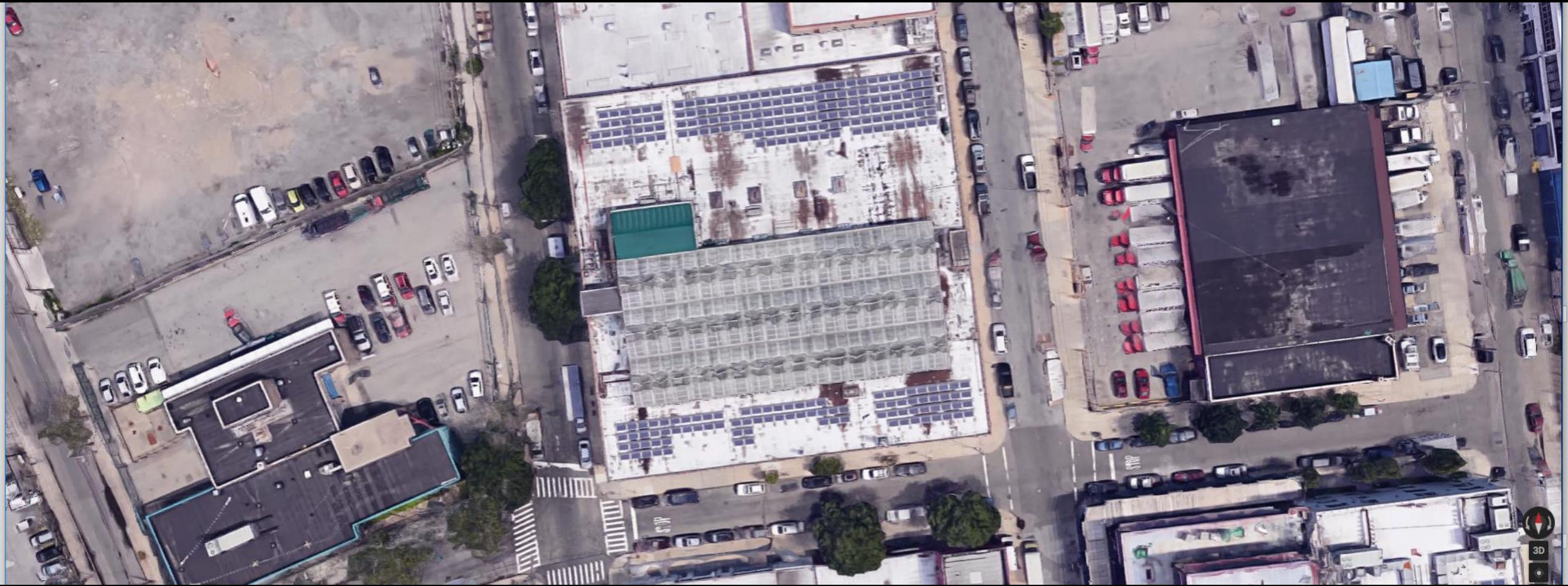
New
Farming
Systems



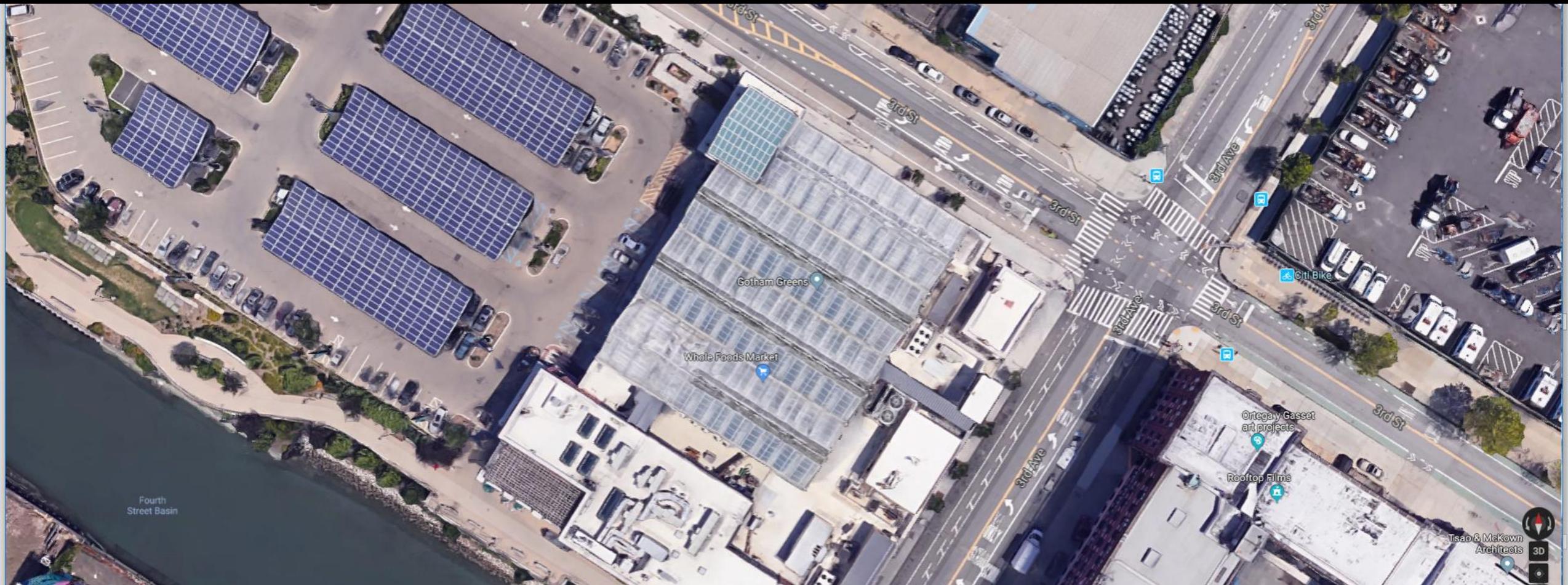
Courtesy Google Maps



Courtesy Google Maps



Courtesy Google Maps



Courtesy Google Maps

Freight Farms

Bright Farms

Plenty

Gotham Greens

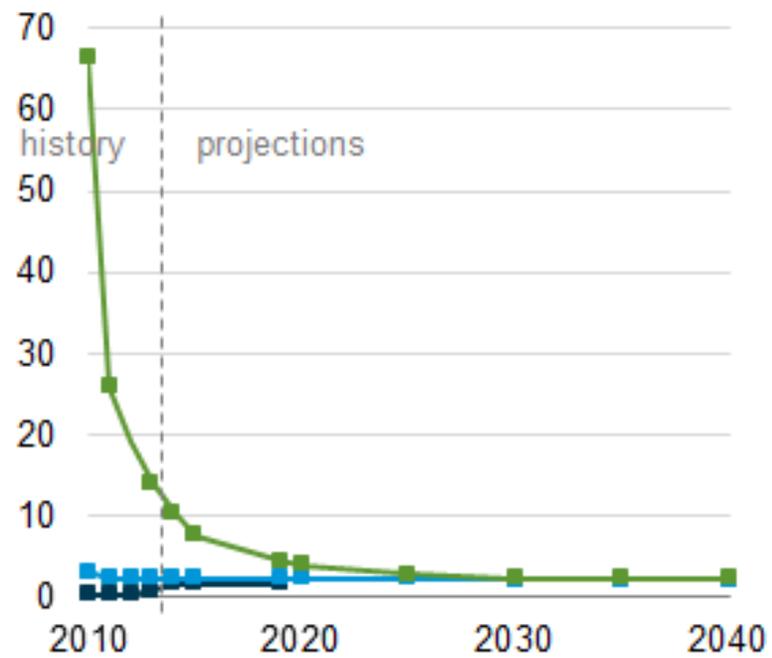
Aerofarms

Bowery Farming

InFarm

Fresh Box Farms

Smart Aeroponics.
Smart Lights.
Smart Nutrition.
Smart Data.
Smart Substrate.
Smart Pest Management.
Smart Scaling.



Source: LED bulb efficiency expected to continue improving as cost declines, Annual Energy Outlook, U.S. Energy Information Administration.



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New Farming Systems

Opportunity for biocontrol growth?

What do you think of biologicals?

What is just now possible.

Sensor Technology



Courtesy Google Maps

Sentek

Waterbit

Davis

Watermark

Arable

Aquacheck

Sentek

Banner

Decagon



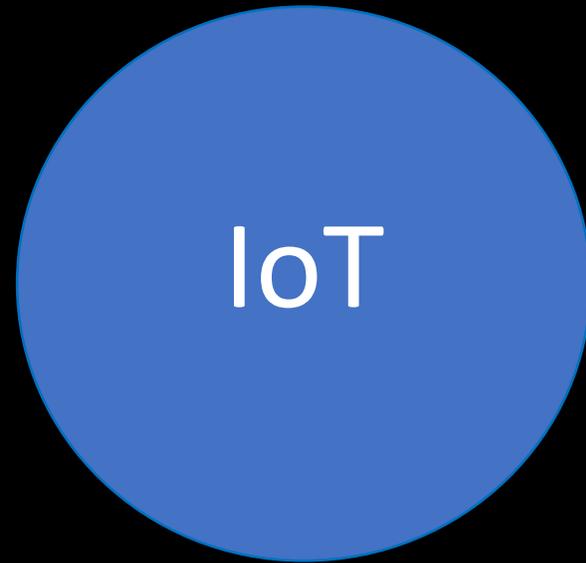
Courtesy Arable Labs

- Precipitation – Rainfall to within 0.2mm/hr. Dew detection.
- Evapotranspiration – Dynamic Kc, Canopy temp, full radiation budget.
- Radiation – Solar radiation, PAR, net radiation.
- Plant health – NDVI, chlorophyll index, seven band spectrometer.
- Weather – Temp to 0.75 C, relative humidity, pressure
- Growing degree days.
- Cellular connectivity – US & international

Sensor Technology

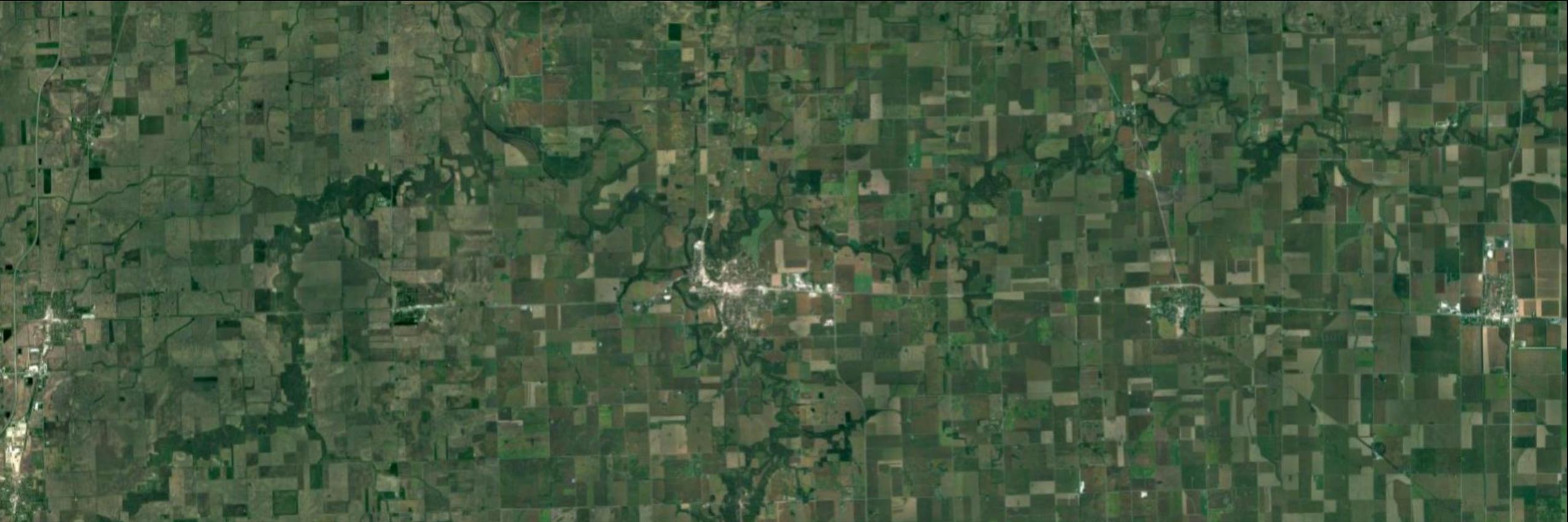
Opportunity to drive biocontrol growth?

What is just now possible.





Courtesy Google Maps



Courtesy Google Maps

IoT

Distance

Bluetooth

Zigbee

Wi-Fi

3G

LoRaWAN

LTE

Sigfox

5G

NB-IoT

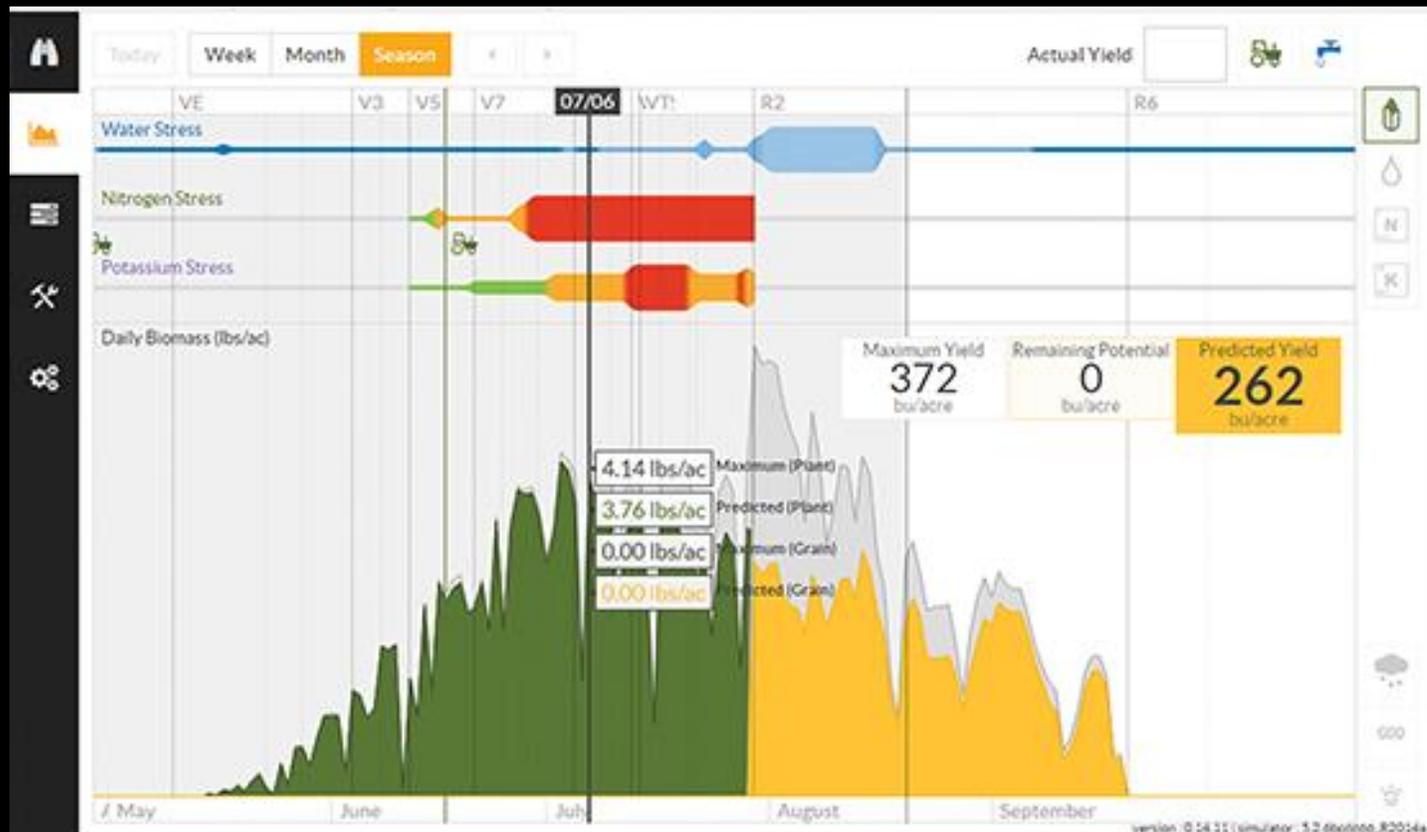
LTE Cat-M1

IoT

Opportunity to drive biocontrol growth?

What is just now possible.

Big Data Predictive Analytics

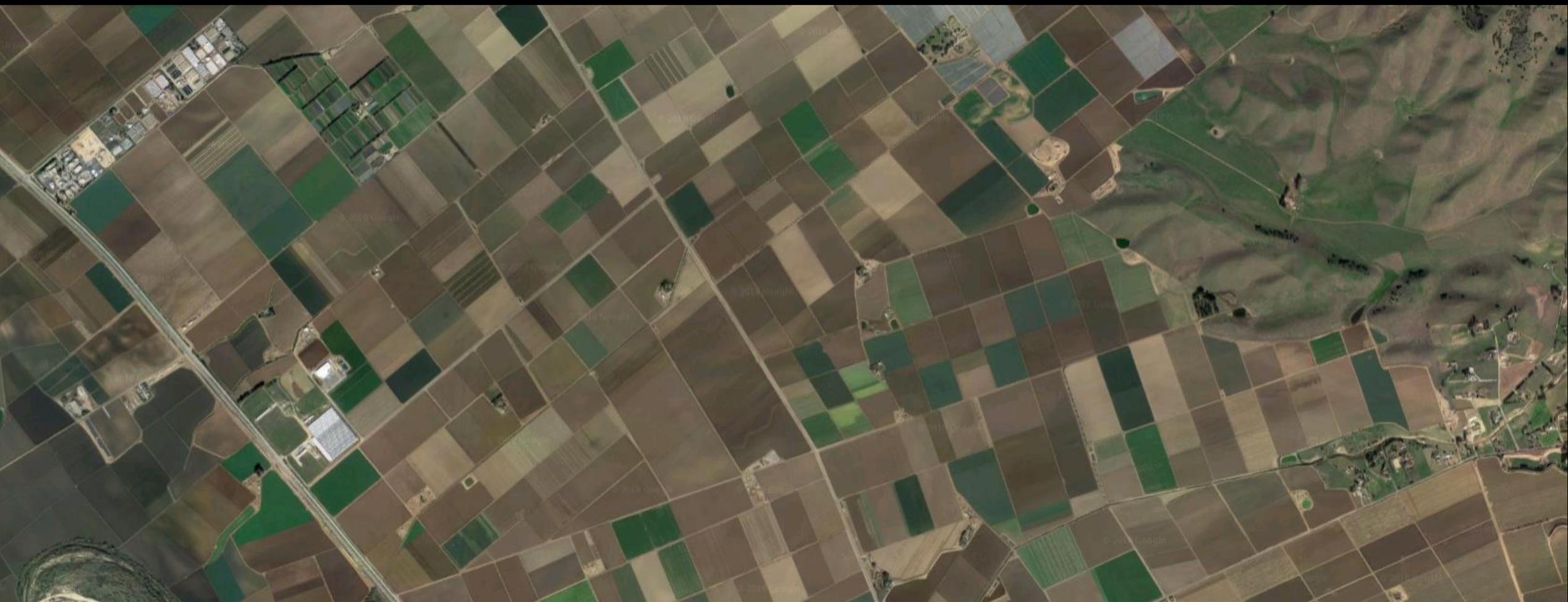


Big Data Predictive Analytics

Opportunity to drive biocontrol growth?

What is just now possible.

Blockchain



Monero

Bitcoin

EOS.IO

Dash

Ethereum

XRP

NEO

Cardano

Tether

IOTA

Stellar

Tron

What is Blockchain?

Distributed ledger.

Immutable record.

Updated by individuals on the network.

Open and closed blockchains.

The New York Times

**“From Farm to Blockchain:
Walmart Tracks Its Lettuce.”**

— Corkery and Popper, September 24, 2018.

Blockchain

Opportunity to drive biocontrol growth?

Silo Effect

“breaking down silos can spark innovation in unexpected ways.”

– Gillian Tett



“If people are not laughing at your goals,
your goals are too small.”

– *Azim Premji*

“If you never want to be criticized,
for goodness’ sake don’t do anything new.”

– *Jeff Bezos*

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Thank You