



PRECISION AG'S FUTURE WITH SATELLITE IMAGERY

☰ CONTENTS

INTRODUCTION >



INTRODUCTION

Precision agriculture is all about smart decision-making. And smart decision-making rests on timely access to pertinent data.

Agronomists understand that data is critical to helping farmers achieve their goals of optimizing inputs, maximizing yields, and improving sustainability.

With the right data, agronomists and growers can have a clear, current understanding of what is happening in every field at each crop growth stage, enabling them to monitor crops, detect issues, and take smart, timely actions.

Despite the industry's increasing reliance on data, many key data sources come

with trade-offs that limit their use and applicability for precision ag.

This ebook will cover these data demands and explore how technological shifts are resolving these trade-offs - with sweeping implications for innovators in precision ag.



Optimize costs



Maximize yields



Farm Sustainably



CONTENTS



Introduction

1. Limitations of today's precision ag data sources

2. The promise of satellite imagery

3. Key advancements in satellite imagery

4. Satellite imagery's growing impact on precision ag

5. Planet Monitoring for Precision Ag

Contact



CHAPTER 1





1. LIMITATIONS OF TODAY'S PRECISION AG DATA SOURCES

Today, data from sources such as aerial imagery, tractor-mounted sensors, drones, and ground scouting all play a role in providing agronomists and farmers with valuable and actionable information, allowing for the identification and mapping of spatial variability and field issues across the season.



FINDING A SINGLE DATA SOURCE



The aforementioned data sources enable a wide range of precision ag applications, including:

- Delineating management zones
- Monitoring plant vitality
- Identifying field drainage issues
- Variable Rate Application strategies
- Detecting early signs of crop stress
- Optimizing crop inputs
- Scouting crops
- Mapping damage

However, to date, each of these data sources has come with challenges that limit their use and effectiveness.

No one source has been suitable for covering broad areas frequently with spatially-detailed, field-specific data.

In some cases, the data is not quickly and easily accessible, adding friction to a process in which timeliness is critical for detecting crop anomalies early and making swift management decisions.

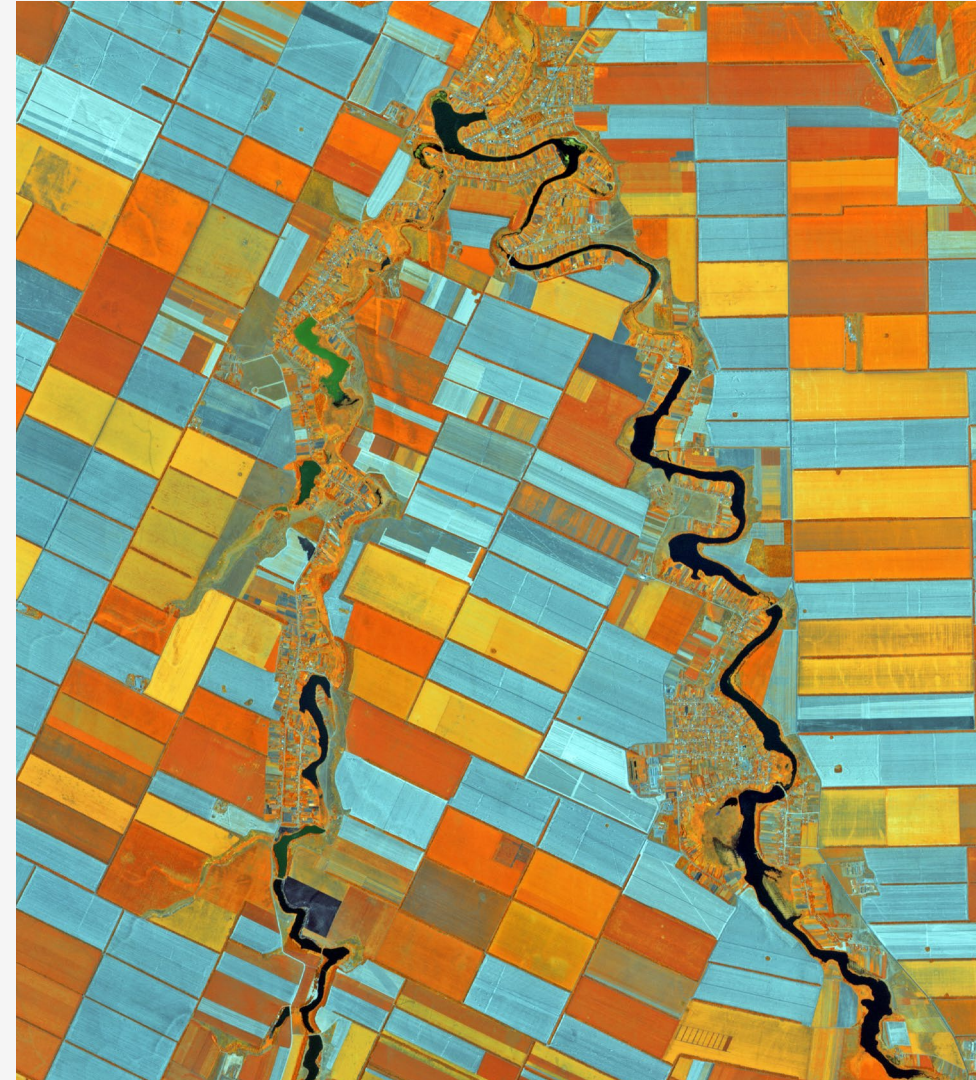





MEETING NEW DATA DEMANDS

As data becomes more central to precision agriculture, it is increasingly important to make the data:

- Available across broad areas
- Able to show field-level detail
- Frequently updated and available when decisions must be made
- Quickly and easily accessible by users
- Cost effective





”Building on top of Planet’s world-class imagery collection infrastructure enables us to offer unprecedented field-level intelligence that cannot be found elsewhere.”

JESSE VOLLMAR, CEO and Co-founder, Farmlogs

FarmLogs



2. THE PROMISE OF SATELLITE IMAGERY

Of all the key data sources, satellite imagery has perhaps held the greatest promise for precision agriculture.

Optical satellite sensors can measure the reflectance of crop canopies in the visible and near-infrared region of the electromagnetic spectrum, enabling agronomists to assess crop vitality and uncover potential issues before symptoms become visible to the human eye.





RESOLUTION & COVERAGE

DETAIL OVER BROAD AREAS

The spatial resolution of modern sensors can provide highly detailed, in-field data, enabling directed field scouting, diagnostics, and localized treatment applications, among other uses.

However, until recently, most satellite systems lacked the necessary combination of broad-area coverage, imaging frequency, and spatial resolution to make satellite imagery as powerful a tool as it could be for precision ag.



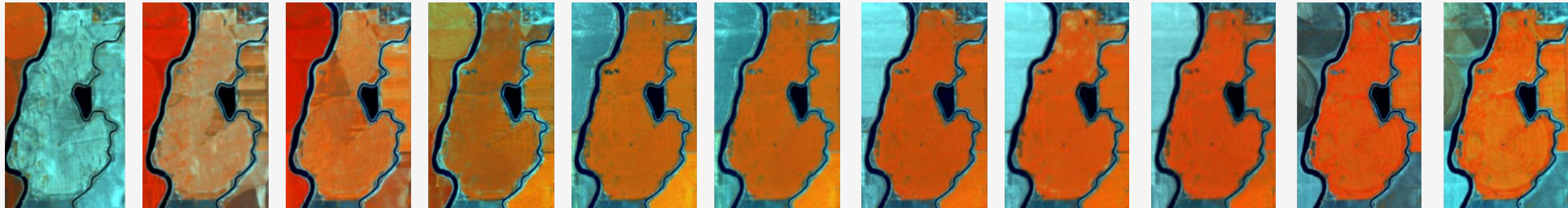


DELIVERING CURRENT IMAGERY

FREQUENTLY UPDATED DATA

Previously, slow and inefficient access to data has limited satellite imagery's usefulness for making swift decisions. Recent imagery delivered quickly ensures timely insights.

Shifts in the satellite industry are beginning to resolve these trade-offs, making it a game-changing source of data for agronomists - especially for those looking to innovate and push boundaries in the precision ag industry.



Many images taken over the course of one month ensure a cloud-free picture and enable growers to detect changes quickly and respond in-field.

”I think one of the most important things for our growers and agronomists is timely and accurate information. The more information we have and the better the quality of the information, the better predictions, and prescriptions, we can make. Having a provider like Planet to give us that revisit time every few days so that we can take action and provide accurate data at high resolution is invaluable to Farmers Edge, and more importantly, it’s critical to the work of growers in the field”

KEVIN GRANT, CTO, FarmersEdge





3. KEY ADVANCEMENTS IN SATELLITE IMAGERY

Advancements in computing and satellite technology - such as the advent of cloud technology and the decreasing costs of building satellites and sending them into orbit - are beginning to have major implications for precision agriculture.

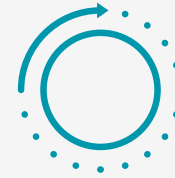
As a result, satellite imagery is becoming a data source without trade-offs: one that provides broad coverage with field-level detail, is frequently collected and quickly delivered - all while remaining cost-effective. The following three key advancements demonstrate why satellite data is rapidly becoming a critical source of information for precision agriculture.



COMBINING HIGH FREQUENCY & HIGH RESOLUTION GLOBAL COVERAGE & FIELD DETAIL

Historically, no single source of satellite imagery has been able to cover large growing areas at field-level resolution, with enough frequency, to inform in-season field management decisions. Recent advancements in satellite technology are resolving these trade-offs.

New satellite technology makes it possible to deliver the right balance of coverage, frequency and resolution for agriculture.



High Frequency



Global Coverage



High Resolution

Precision ag providers now have the ingredients to build innovative services that support daily agronomic decisions.



EASY AND EFFICIENT DATA ACCESS INTEGRATE INTO WORKFLOW AND TOOLS

It is not enough to simply have access to the right information; timely and easy access to imagery is also critical. The lag time between information capture and access can mean the difference between making a timely field management decision or not. Agronomists and farmers need information in their hands quickly, in ways that fit with their workflows, so they can focus on identifying in-season crop anomalies and take immediate action before it is too late.



Developments in cloud computing and software technology make it possible today to build an automated infrastructure to handle terabytes of daily imagery, and deliver this data in near-real time, in easy-to-use formats.



ACCESS ALL RELEVANT DATA RECENT AND HISTORICAL IMAGERY

Historical satellite imagery spanning multiple growing seasons can help agronomists identify in-field patterns and regional trends. When mined for predictive insights, an imagery archive that can help growers optimize field productivity by:

- Creating management zones
- Setting site-specific crop performance baselines
- Designing field management strategies that optimize future season productivity





4. SATELLITE IMAGERY'S GROWING IMPACT ON PRECISION AG

Satellite imagery and cloud technology are rapidly becoming the foundation of a data solution for precision ag without trade-offs: one that provides broad coverage with field-level detail, is frequently collected, and is delivered with speed and ease - all while remaining cost-effective. And when archived, satellite data from prior seasons is enabling trend and predictive analysis over time.

These advancements are making a significant impact on precision agriculture, and this new solution is being rapidly adopted, especially by forward-thinking agronomists and industry innovators.



5. PLANET MONITORING FOR PRECISION AG

Planet is the only satellite imagery provider that brings all the pieces together in a **comprehensive solution: global coverage, frequent imaging and easy access.**

Planet's cost-effective, subscription-based service provides all the necessary imagery over the areas of interest multiple times throughout the growing season. Planet's cloud-based platform provides a consistent flow of information in near-real time, allowing users to spend less time waiting for decision making inputs and more time taking action.





THE PLANET SOLUTION



Global Coverage

Broad-area, daily coverage of global agricultural regions



Providing field-level detail

At high resolution to provide field-level detail



High Frequency

Sub-weekly in-season revisit rates powered by 140+ satellites - the largest fleet of its kind



Cloud Storage & Processing

Swift data access within 48 hours after acquisition via Planet's automated pipeline



Easy & Efficient Access

Seamless integration of imagery into applications via Planet's cloud-based platform and APIs



Extensive Archive

Growing imagery archive dating back to 2009

SMARTER FARMING. EVERY FIELD. EVERY DAY.

To learn how to access the most current global agriculture imagery available, visit www.planet.com/ag

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