

## PICS: Post-Image-Collection Specification for Agricultural Remote Sensing



### PICS in a Nutshell

PICS seeks to take the friction and guesswork out of using remote sensing in agriculture.

It uses an existing format (GeoTIFF) and metadata tags defined within it to specify what images *mean*.

The main deliverable of PICS is a freely-available implementation guideline.

*"Before PICS we had to talk to the customer for hours, even days, to understand the content of their images, and everyone got frustrated. With PICS it takes seconds, and the computer does it alone." –Nathan Stein, senseFly*

## Maximize the Value of your PICS! *Implement this new standard to better extract data from remote images*

Remote sensing imagery has the potential to deliver great value to growers. Images from satellites, airplanes, and unmanned aerial systems ("drones") can be used to detect drought, pest damage, flooding, spatial patterns of canopy growth, and provide growers with an edge in crop management.

**Growers need seamless interoperability** to bring the images into their farm management information systems (FMIS) and convert them into actionable information in a straightforward way. This should happen regardless of the system manufacturer.

Remote sensing data formats have reached a point where they can describe the **geometry** of an image very accurately: the location of any image pixel is typically very clear to an FMIS without any human intervention. This is the natural consequence of decades of industry experience using imagery for photogrammetry and other mapping-related purposes.

The **meaning** of the data is a different problem, however. Over time images have become more complex: the black-and-white pictures used in photo-grammetry have given way to complex multispectral images involving red, green, blue, and infrared bands, often with very specific wavelengths and band widths. **The usability and scalability of remote sensing solutions in ag are often limited by incomplete descriptions (metadata) of this complexity;** i.e., the grower's FMIS can't automatically understand what the image means. The user has to get involved, and that leads to inefficiency and frustration.

**PICS, a project of AgGateway's Precision Ag Council** was chartered to tackle the problem. It was organized following a simple plan:

- Agree on gaps in current remote sensing image data that lead to interoperability pain points.
- Agree on a stepwise strategy to tackle the problem, based as much as possible on existing standards.
- Narrow the scope; focus initially on a single, popular image format.
- Create implementation guidelines as PICS' main deliverable.

### Gaps and pain points

PICS focused on fundamentals with immediate impact for the industry: ensuring we can understand **when** an image was taken, **where** it was taken, **what** bands it contains and in what order, and identifying if the writing software is PICS-aware. Future PICS phases may involve creating a registry of derivative products (NDVI, etc.), expressing mathematical conversions from digital values to reflectances or irradiances, and so forth.

