

# Organizational Alignment in Standards Development

Seelbach Hilton, Louisville KY

February 10, 2016



International  
Organization for  
Standardization



ASSOCIATION OF  
EQUIPMENT MANUFACTURERS



AGRICULTURAL INDUSTRY  
ELECTRONICS FOUNDATION

## **Main goals for this session**

- 1) Provide awareness of the roles of respective organizations,**
- 2) Engage the right experts to minimize any duplication of effort,**
- 3) Identify key alignments for present and future work.**



# Overview of Session

## Roles and Characteristics of Organizations

- National
- International

## AgGateway: SPADE, PAIL and ADAPT

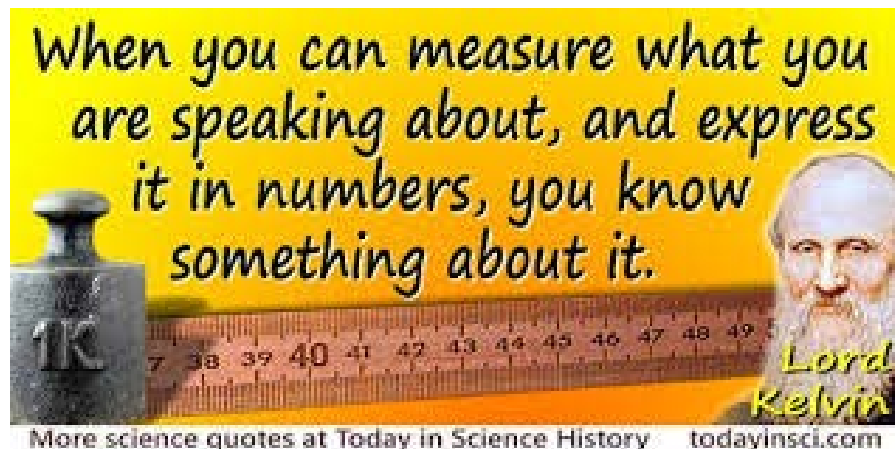
## Data flow, ownership and security

- Ag Data Transparency Evaluator

## Current Example

## Other topics

## Wrap up



# **Roles and Characteristics of Organizations**



# What are the differentiating characteristics of organizations?

Vision, Mission, Role, Core

Membership

- Open
- Closed

Funding

- Public
- Private

Authority

- Regulatory
- International
- National
- Informally aligned

Expertise



# ISO

## International Organization for Standardization



ISO is an international standard-setting body composed of representatives from various national standards organizations.

### Membership

- Open
- ISO has 162 national members

### Funding

- Organizations that manage the specific projects or loan experts to participate in the technical work.
- Subscriptions from member bodies.
- Sale of standards.

### Authority

- International consensus standards, Only given authority when adopted or referenced in other national regulation

### Expertise

- All topics, all disciplines



# ASABE

American Society of Agricultural and Biological Engineers



An ANSI accredited SDO and an educational / scientific organization dedicated to the advancement of engineering applicable to agricultural, food, and biological systems.

## Membership

- Open
- ASABE comprises 8,000 members in more than 100 countries.

## Funding

- Direct organizational support
- Subscriptions from organizations.
- Sale of standards.

## Authority

- North America consensus standards, no legal authority unless referenced in US or Canadian regulation

## Expertise

- Agriculture, all aspects of production and supporting systems



# AgGateway



Vision: Become the recognized North American source for enabling the use of information and communication technologies for agriculture.

Mission: Promote, enable and expand eBusiness in eAgriculture.

## Membership

- Open; over 240 members, primarily businesses.
- Other organizations typically join as Associate members
- There is a category for individual memberships.

## Funding

- Member dues, project fees, and service subscriptions, dependent on volume of business.

## Authority

- *De facto*: Implementation by stakeholders.

## Expertise

- Supply chain and field operations business processes





# AEF

## Agricultural Industry Electronics Foundation



### Role

- Direct and prioritize standards development effort
- Support standards adoption
- Fund prototyping and tests

### Membership

- Open to industry
- Equipment, hardware and FMIS manufacturers

### Funding

- Service fee
- No cost to universities

### Authority

- Supportive of consensus standards,

### Expertise

- Electronics and connectivity



# AEM

Association of Equipment Manufacturers



## Mission Statement

AEM will serve equipment manufacturers operating in North America to create a strong voice for its members and the industries it represents in the global marketplace by delivering superior services in public policy, market information, trade shows, technical and safety services, education and market support.

## Membership

- Equipment manufacturers

## Funding

- Member dues, tradeshow






## Authority

- Influence public policy, Promote use of consensus standards

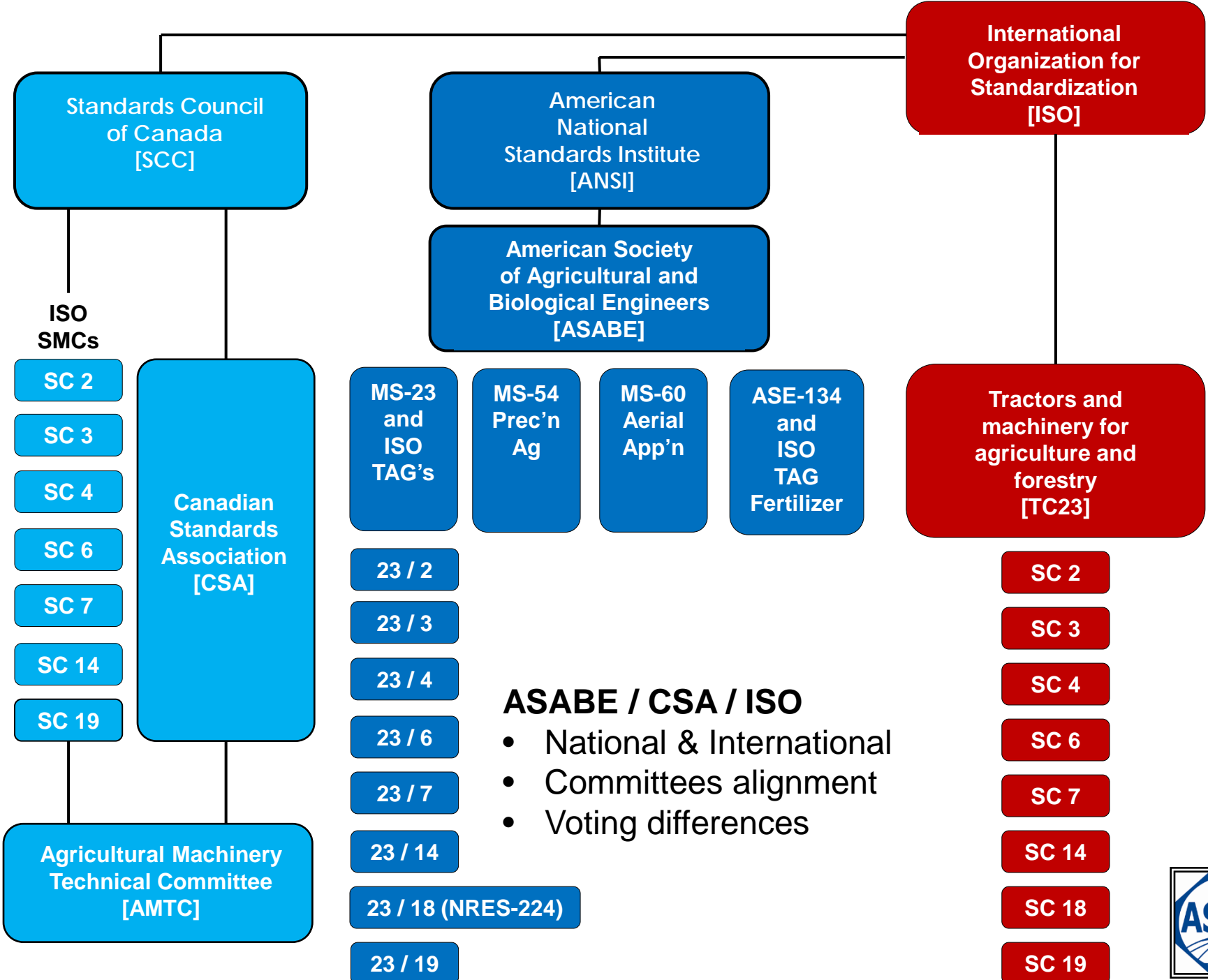
## Expertise

- Agricultural, construction, forestry, mining and utility industries



Organization	Role	Membership
ISO 	<ul style="list-style-type: none"> <li>• International standards</li> </ul>	Open
ASABE 	<ul style="list-style-type: none"> <li>• National standards</li> </ul>	Open
AgGateway 	<ul style="list-style-type: none"> <li>• Business processes</li> <li>• Industry identifiers</li> <li>• Message definitions</li> </ul>	Open
AEF 	<ul style="list-style-type: none"> <li>• Electronics</li> </ul>	Industry
AEM 	<ul style="list-style-type: none"> <li>• Industry support</li> <li>• Public policy</li> </ul>	Industry



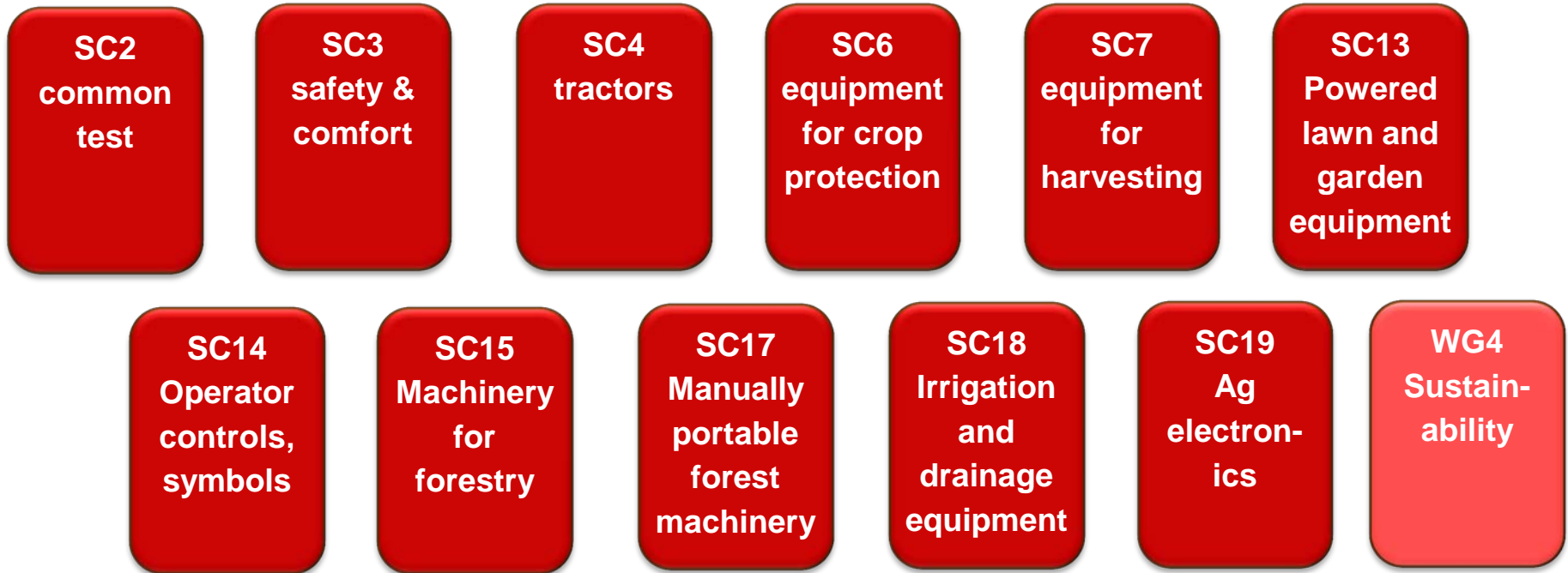


**ASABE / CSA / ISO**

- National & International
- Committees alignment
- Voting differences



# ISO

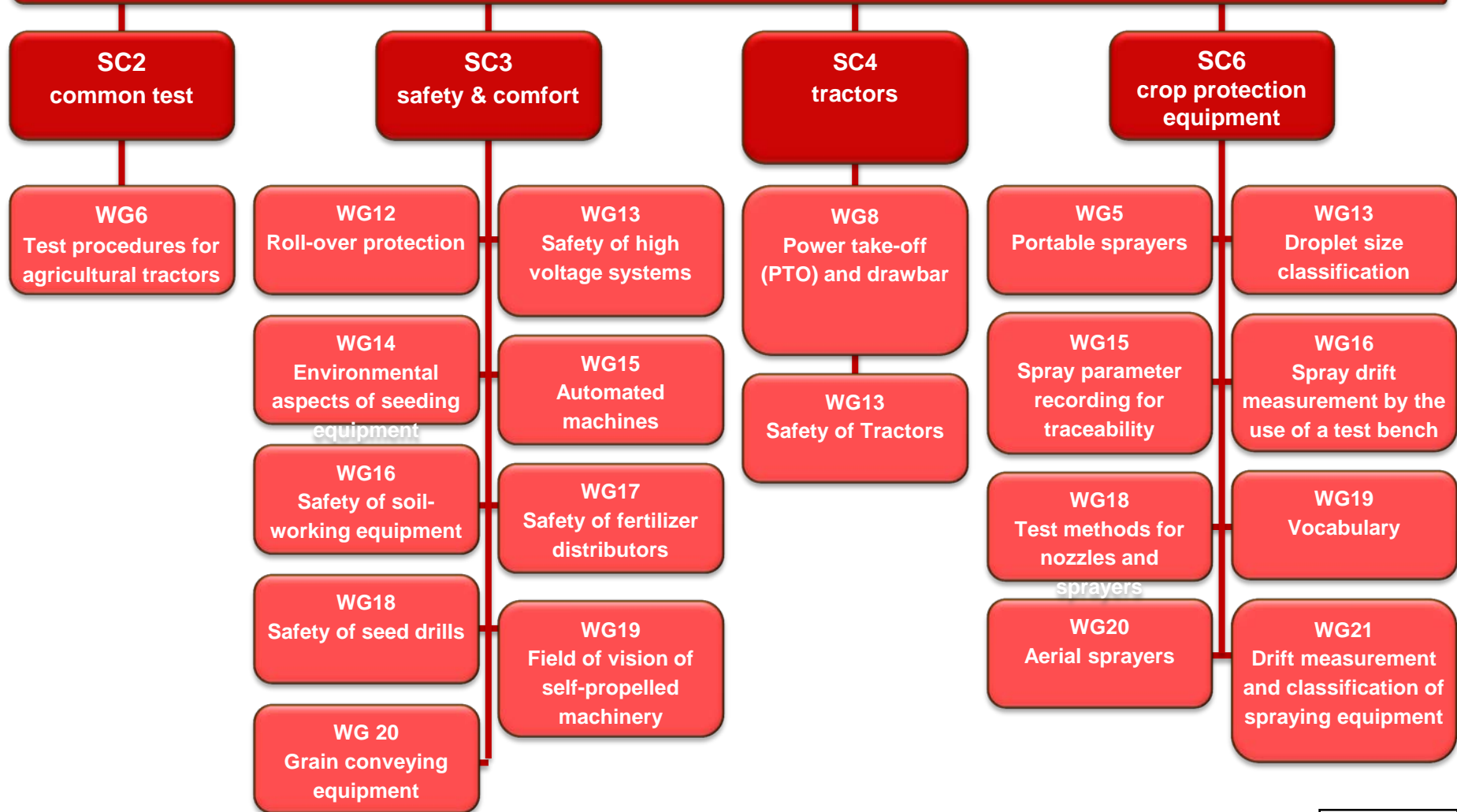


TC → Technical Committee    SC → Sub Committee    WG → Working Group



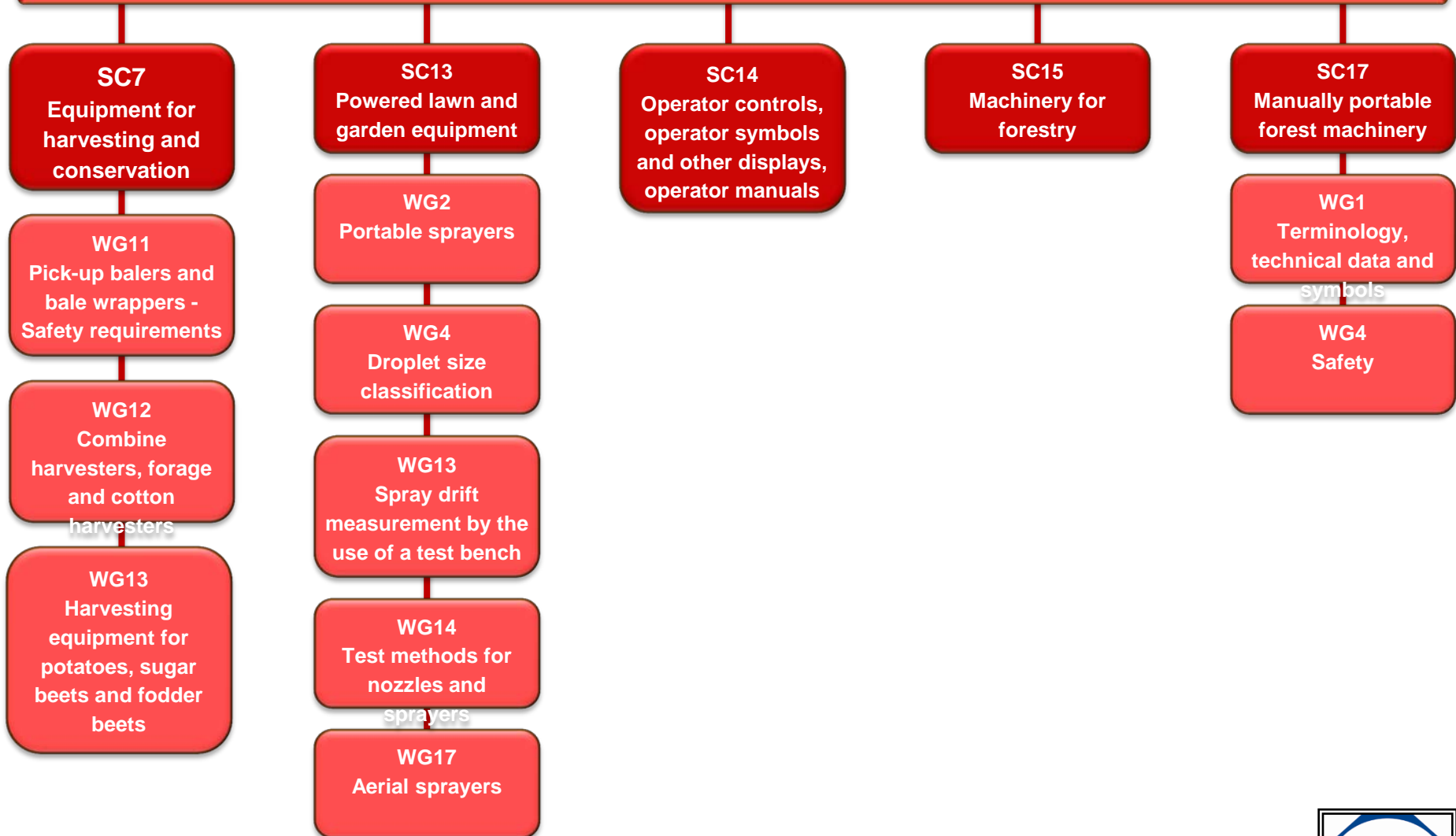
# TC23

## Tractors and machinery for agriculture and forestry



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## Tractors and machinery for agriculture and forestry

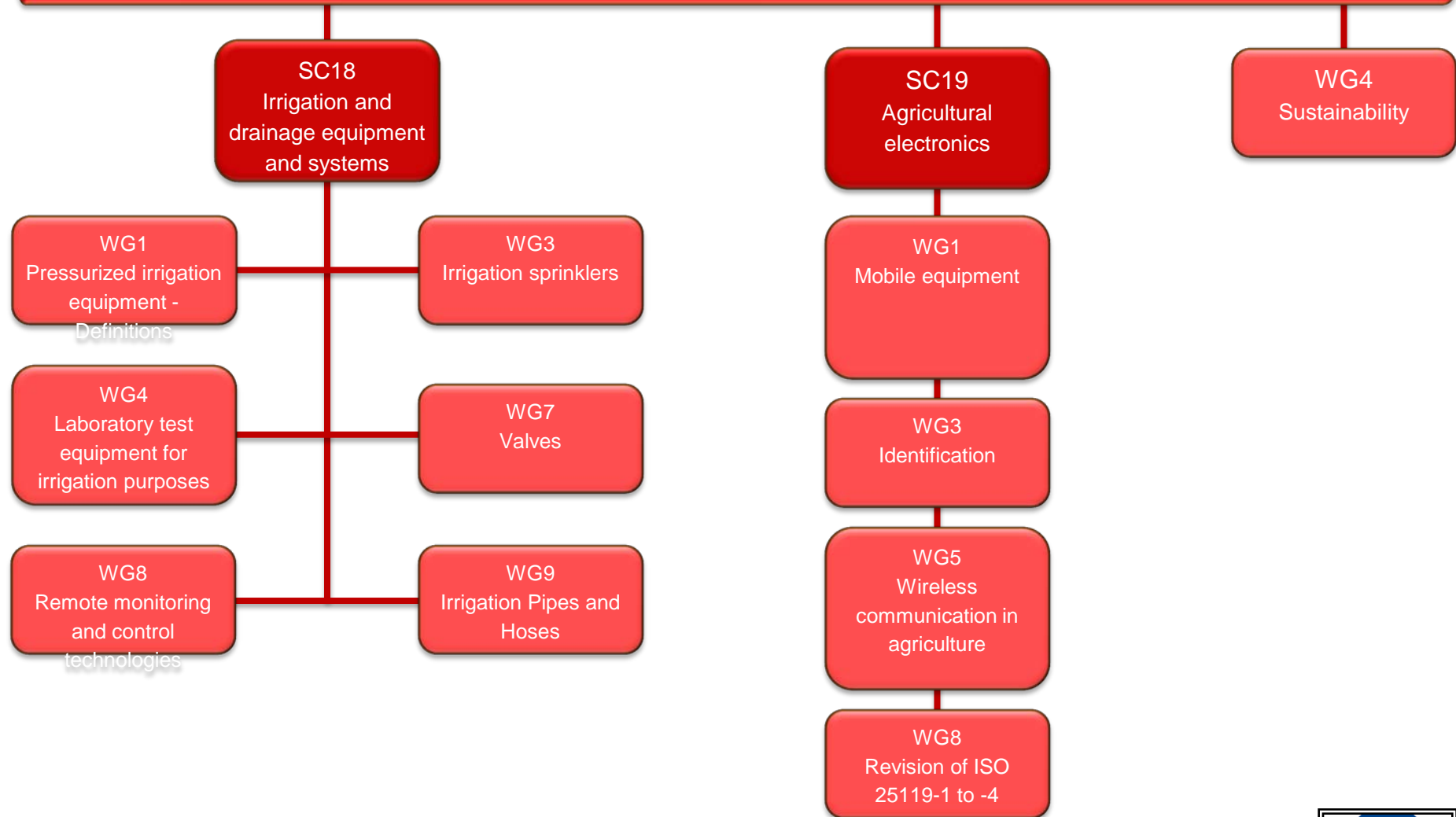


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# TC23

## Tractors and machinery for agriculture and forestry



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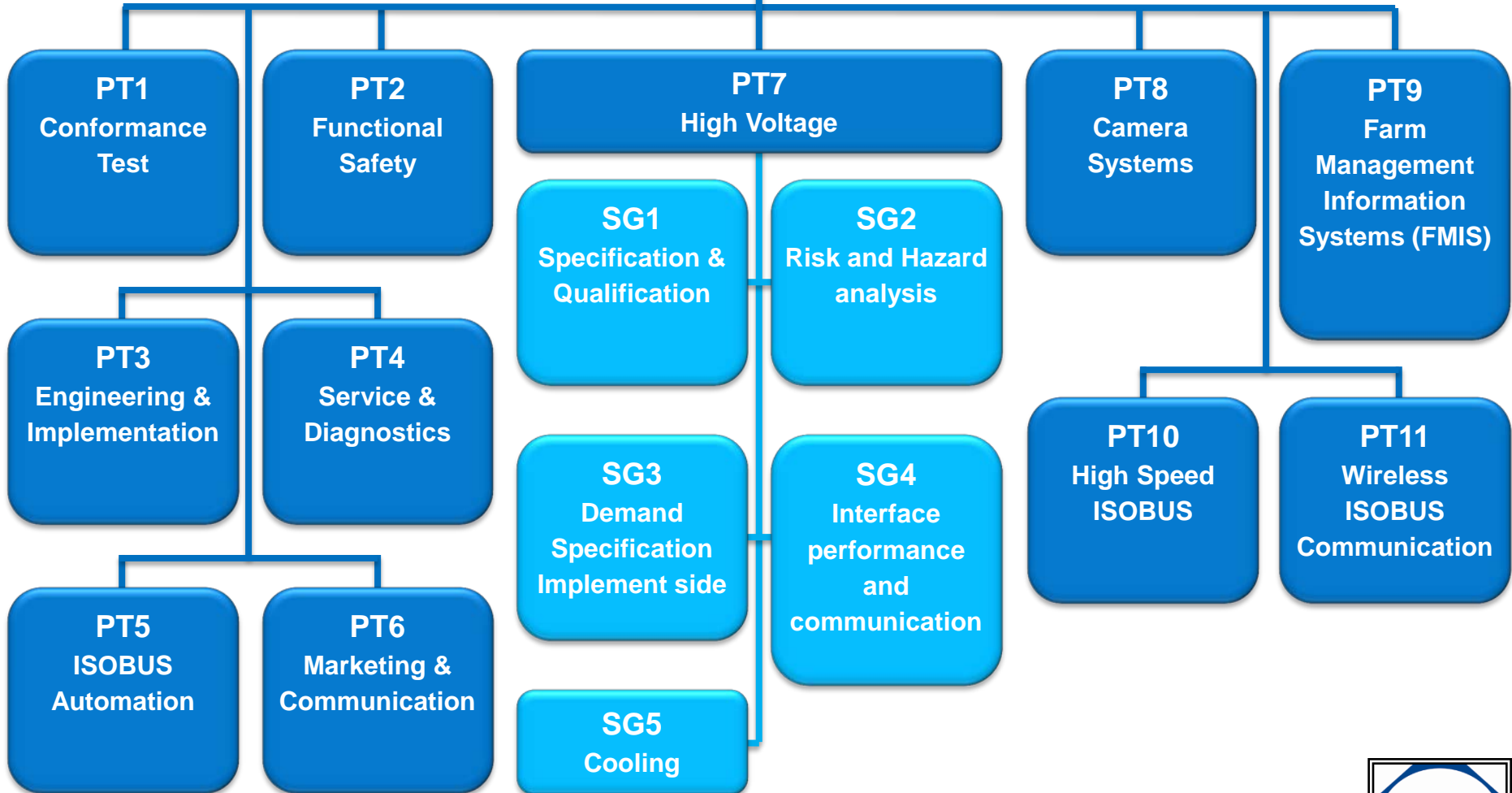




# AEF

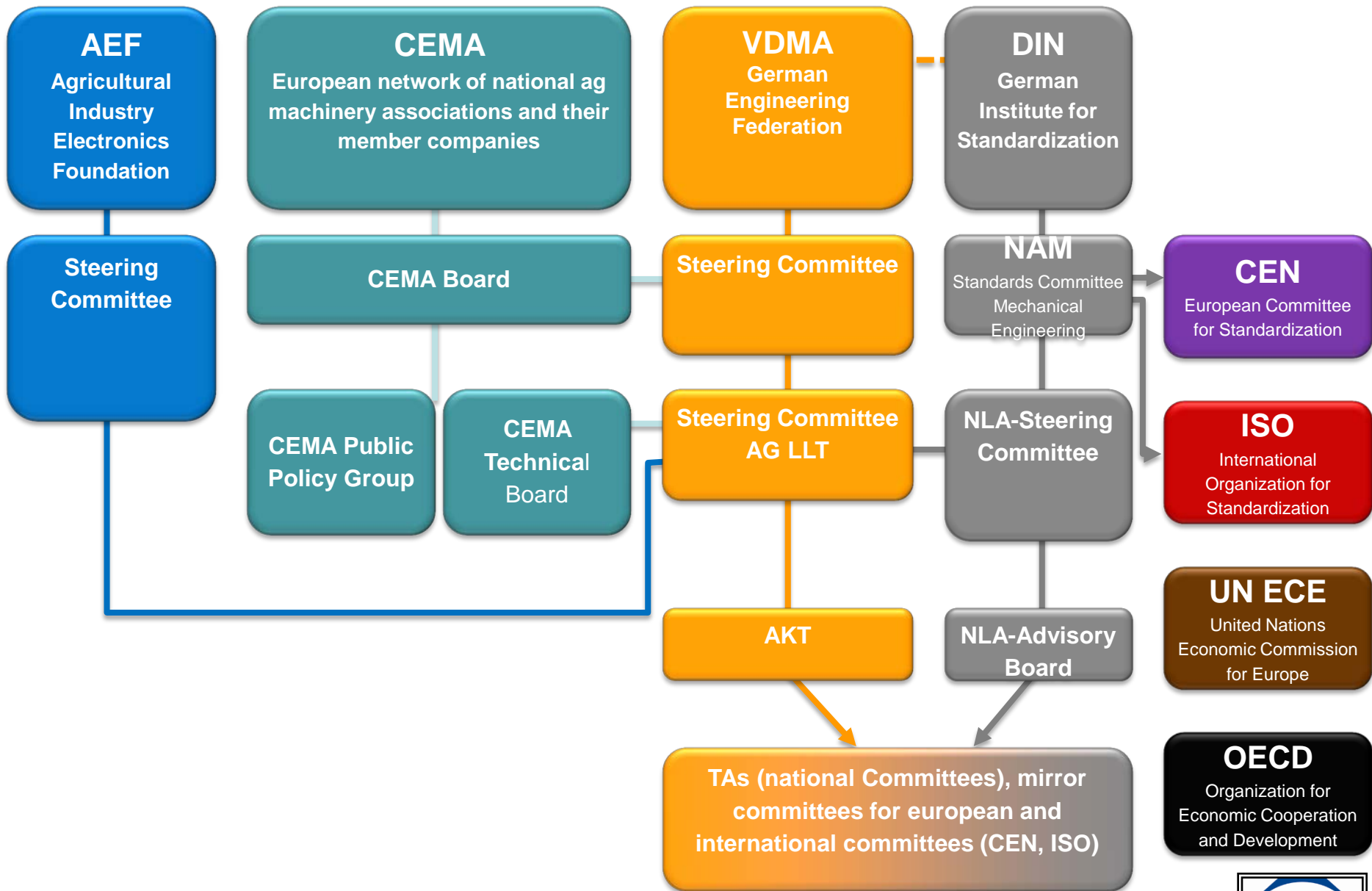
## Agricultural Industry Electronics Foundation

### Steering Committee



PT → project team    SG → sub group





**OECD**  
**Organization for Economic Cooperation and Development**

**OECD Code 3**

Testing of the strength of protective structures for agricultural and forestry tractors (dynamic test)

**OECD Code 4**

Testing of the strength of protective structures for agricultural and forestry tractors (static test)

**OECD Code 5**

Noise measurement at the driver's position(s)

**OECD Code 6**

Testing of front-mounted protective structures on narrow-track wheeled agricultural and forestry tractors

**OECD Code 7**

Testing of the rear-mounted protective structures on narrow-track wheeled agricultural and forestry tractors

**OECD Code 8**

Testing of protective structures on tracklaying tractors

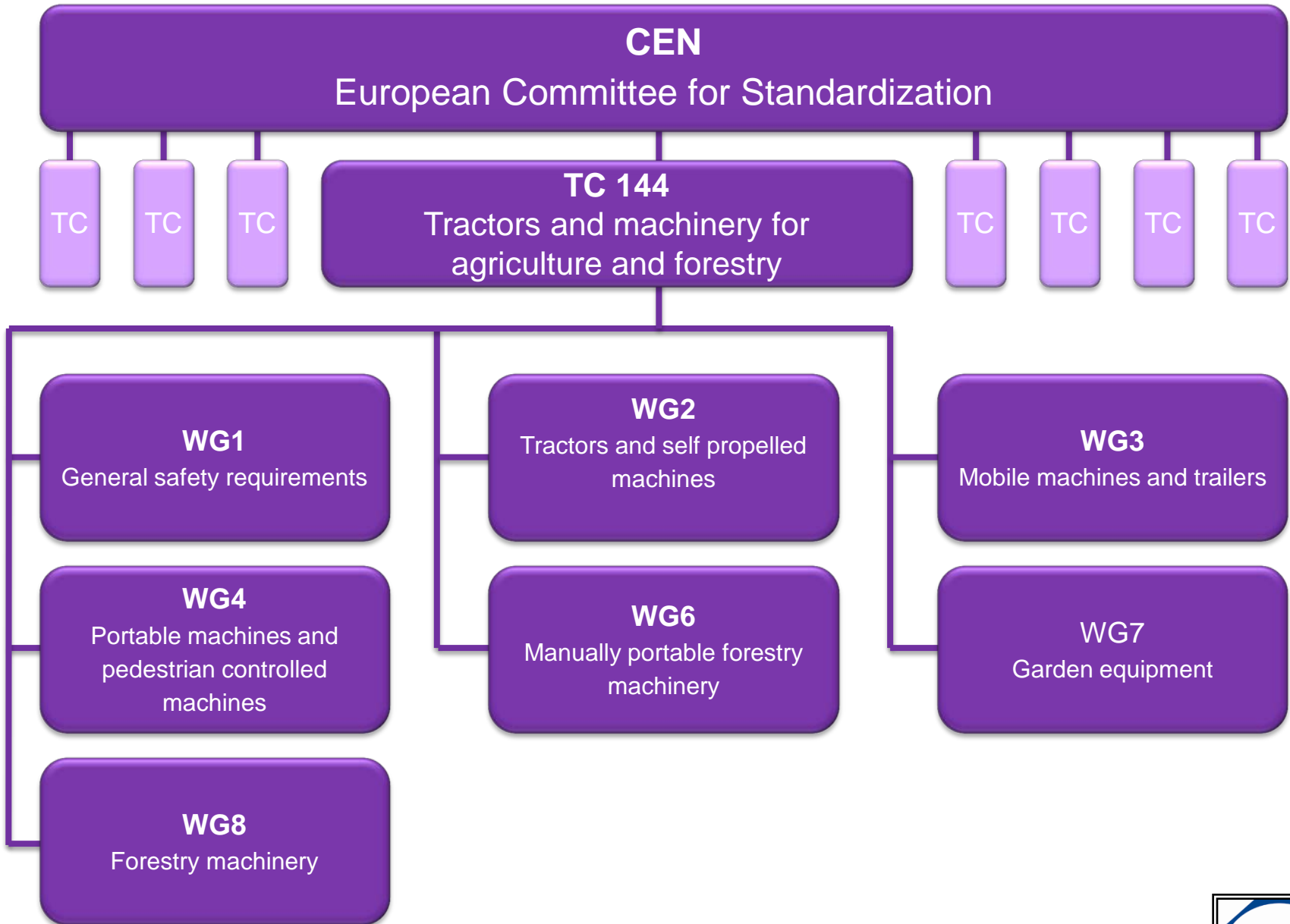
**OECD Code 9**

Protective structures for telehandlers (testing of falling-object and roll-over protective structures fitted to self-propelled variable reach all-terrain trucks for agricultural use).

**OECD Code 10**

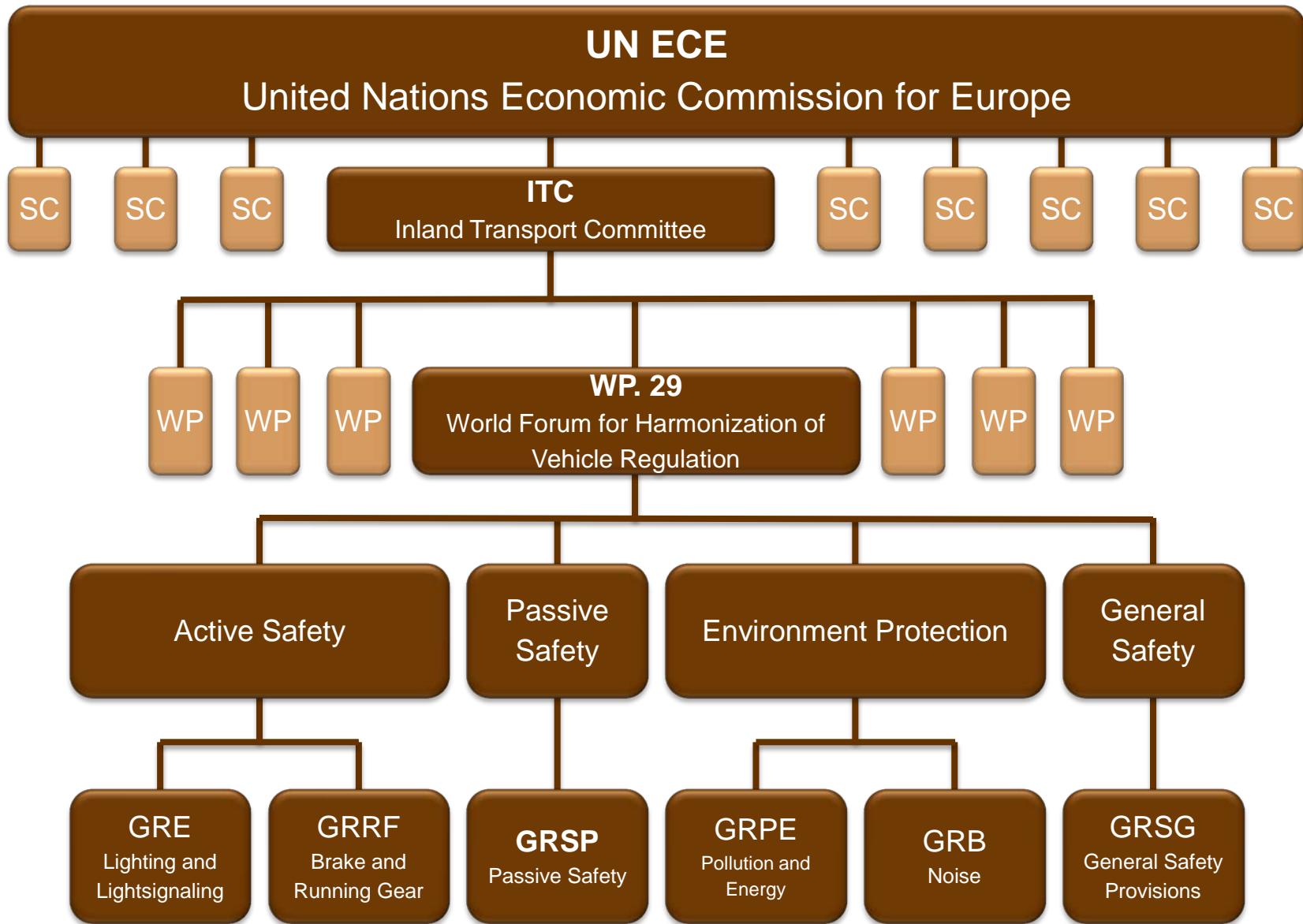
Testing of Falling object protective structures





TC → technical committee    WG → working group





SC → Sectorial Committees    WP → Working Parties    "GR" ≙ Groups des rapporteurs (working parties of experts)

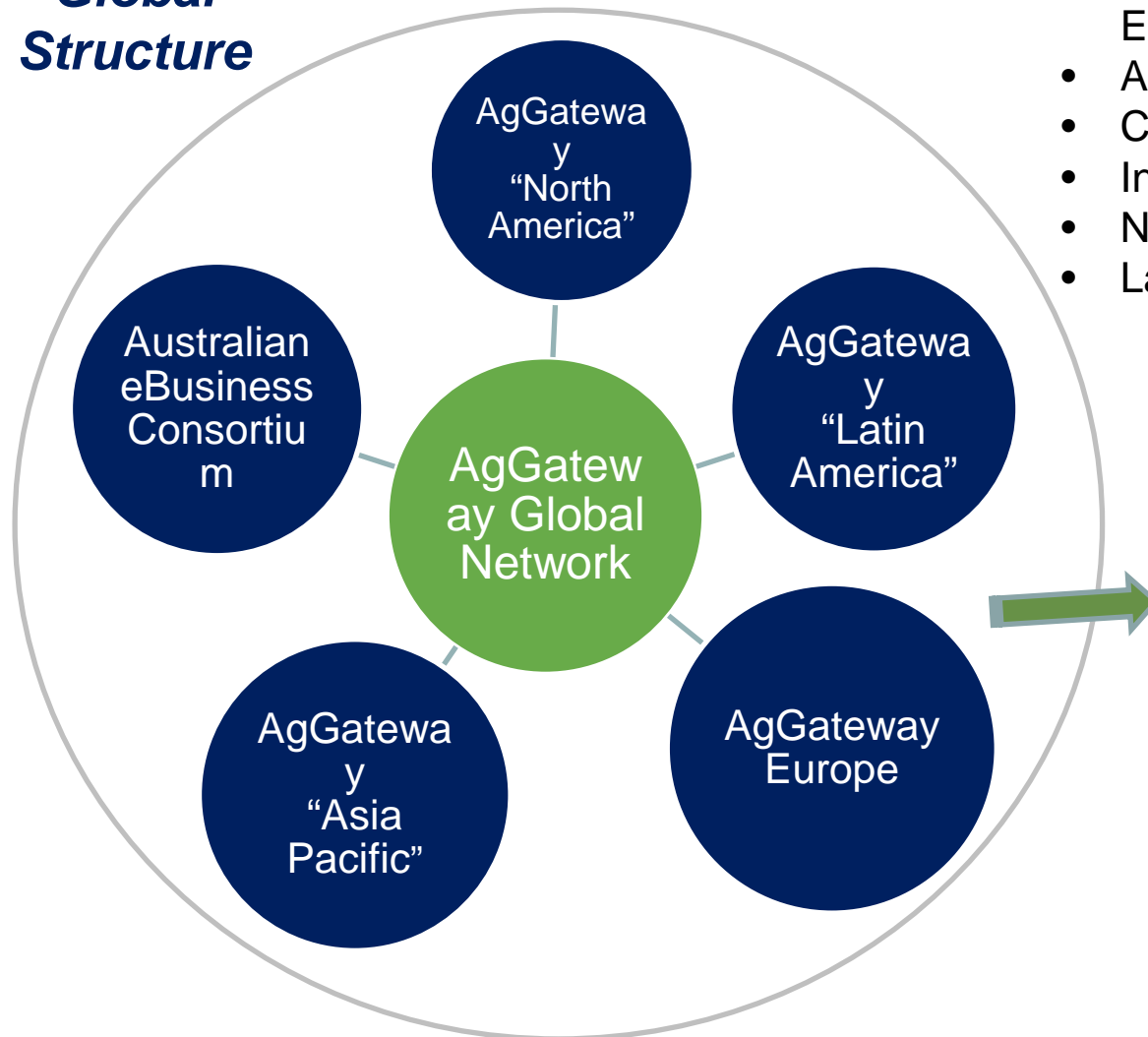


# **AgGateway: SPADE, PAIL and ADAPT**



# AgGateway Global Network Model

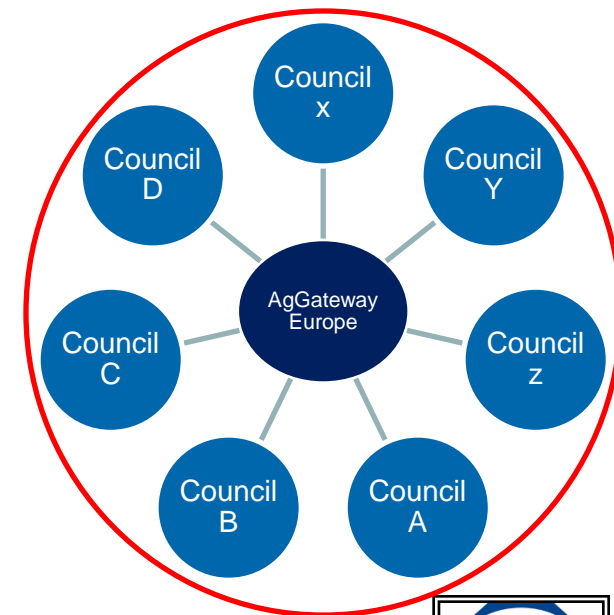
## Global Structure



## POTENTIAL REGIONS:

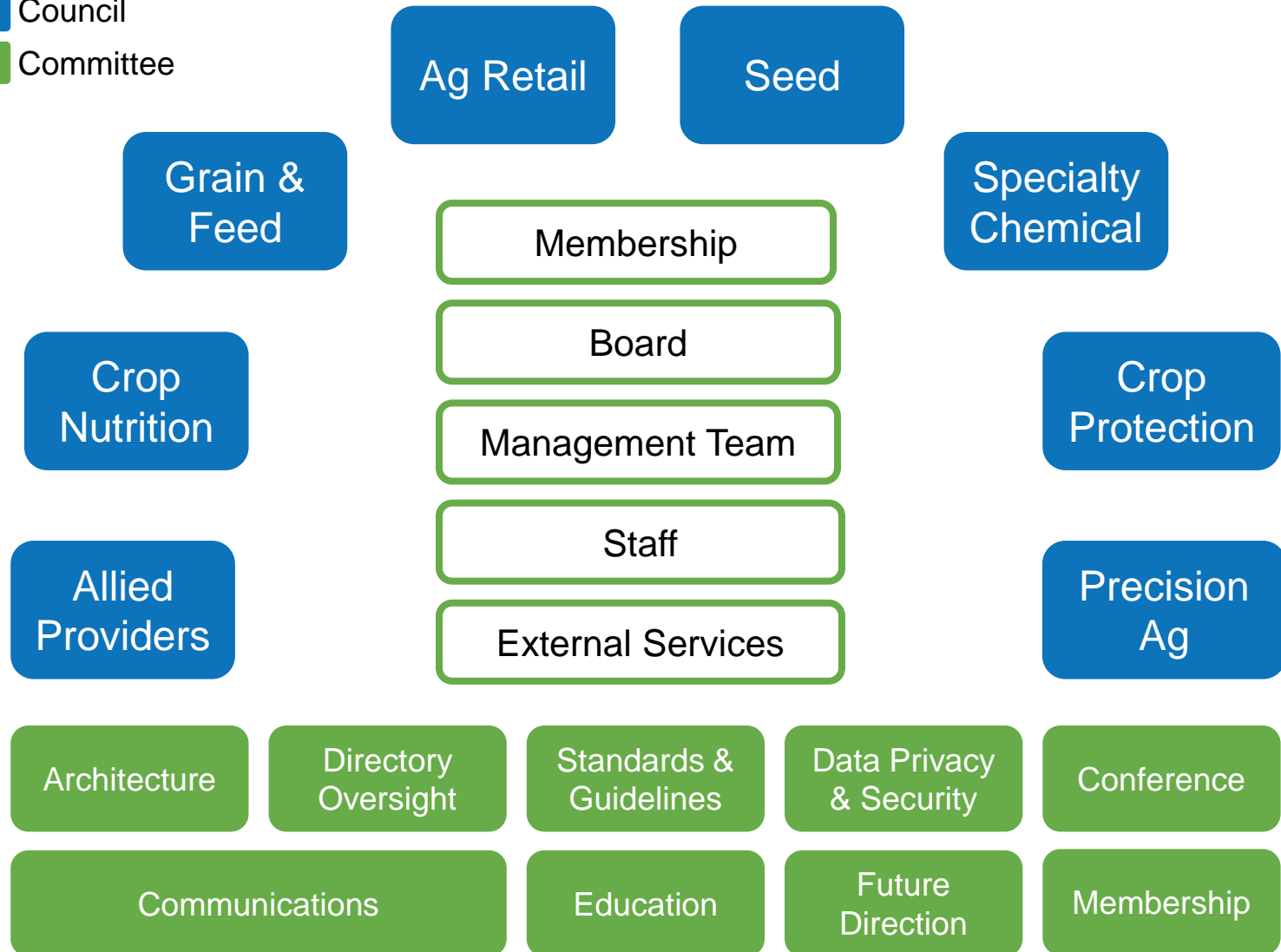
- Europe/Middle East/Africa
- Asia Pacific
- China
- India
- North America
- Latin America

## Regional Structure



# AgGateway North America: Structure

- Council
- Committee

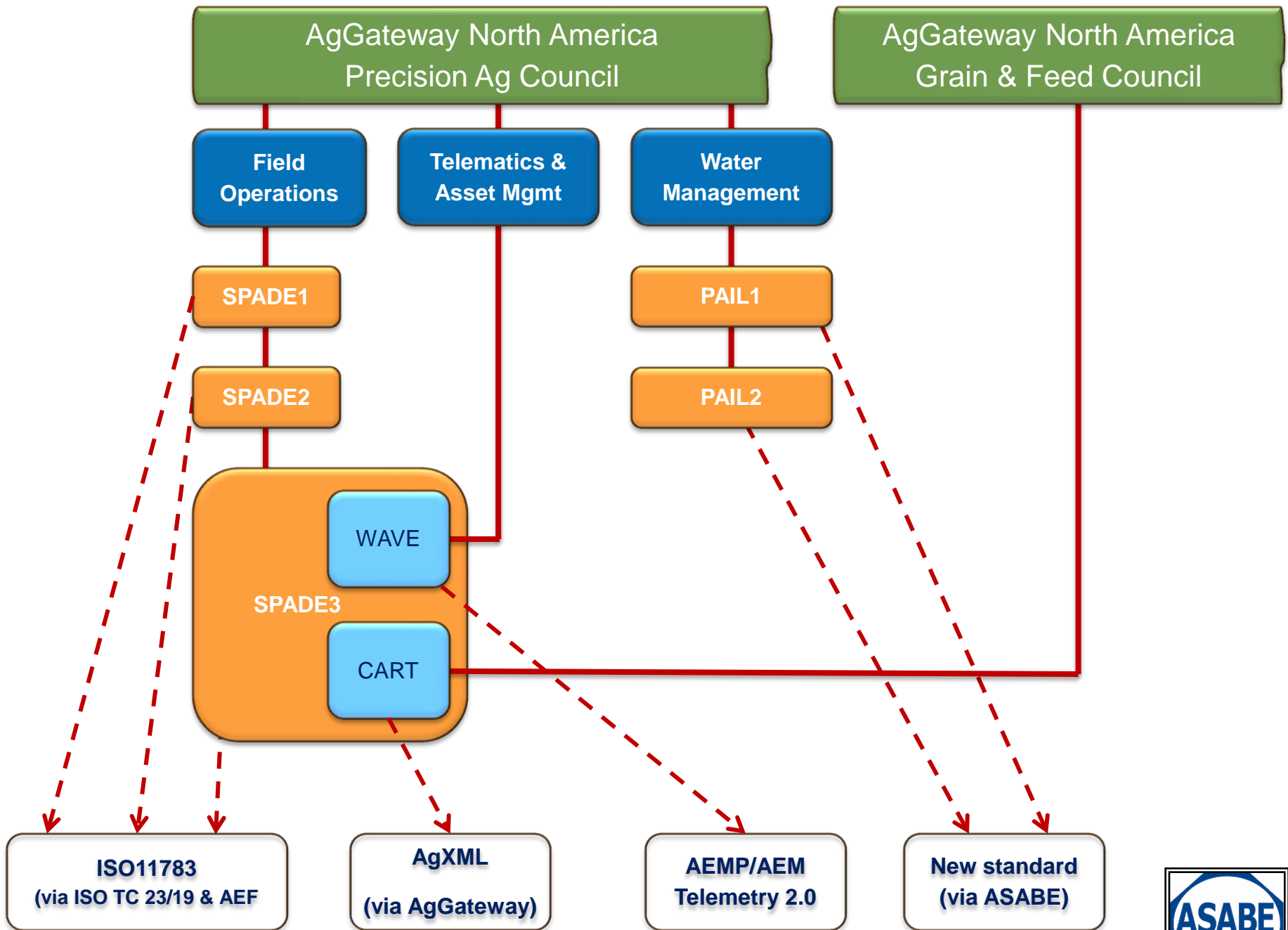




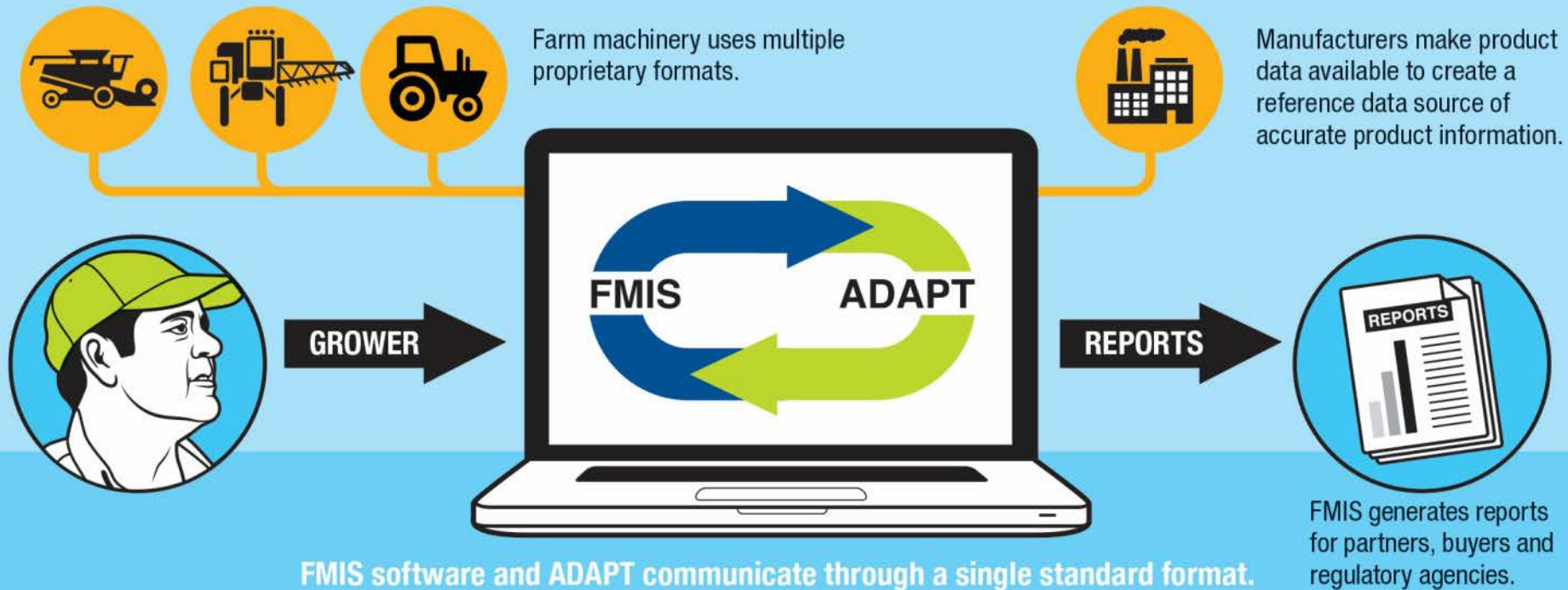
# AgGateway North America: Projects

- Supply Chain-Related Processes
  - Crop Protection
  - Seed
  - Crop Nutrition
  - Warehouse Management
  - Traceability
- Field Operations
  - Seeding Operations
  - Harvest Operations
  - Crop Input Applications
  - Irrigation
  - Scouting and other field data collection
- Grain
  - Contracts
  - Shipments
  - Weights
  - Grades
  - Settlement
  - Rail Transport Pricing





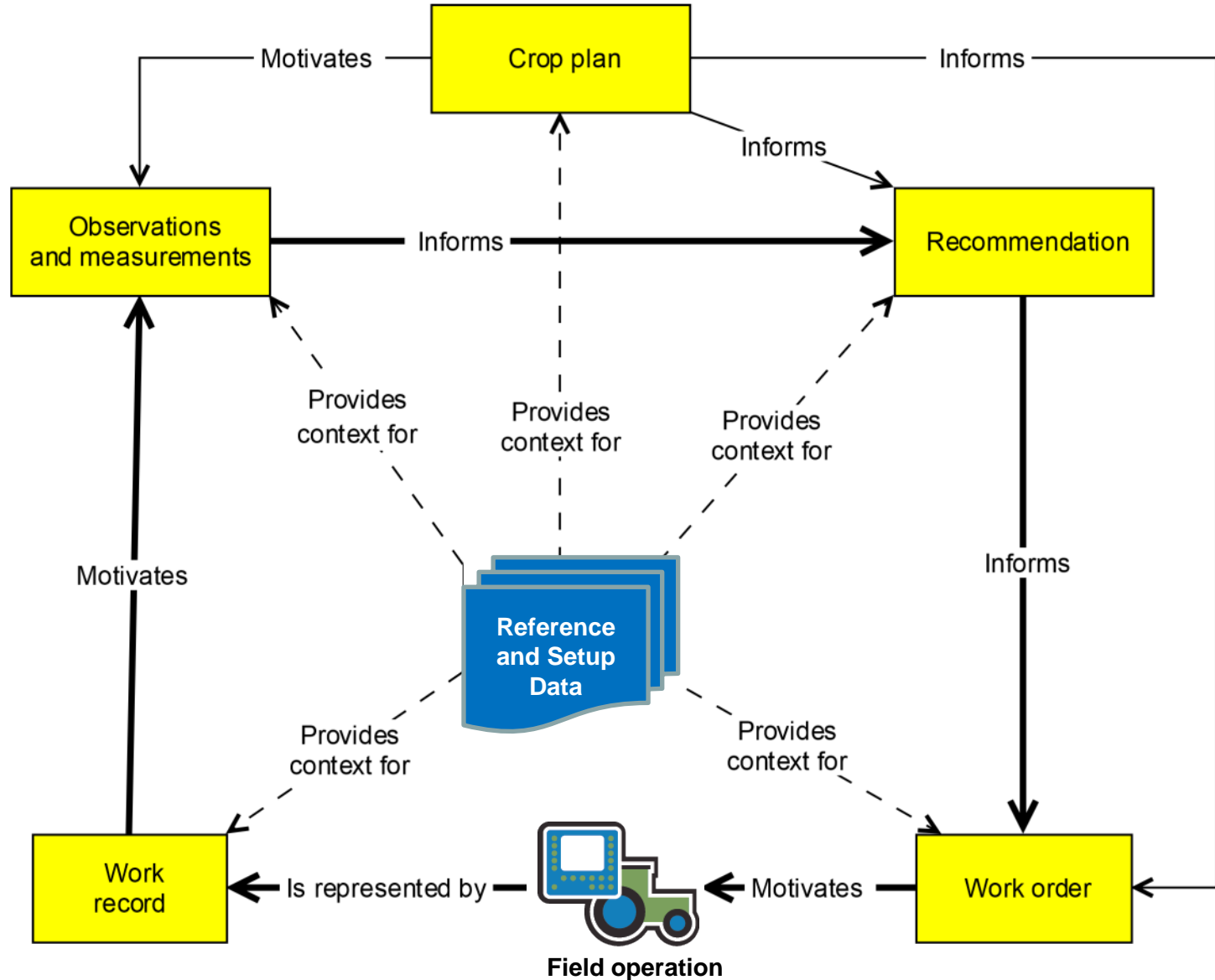
# AgGateway's Vision for Precision Ag



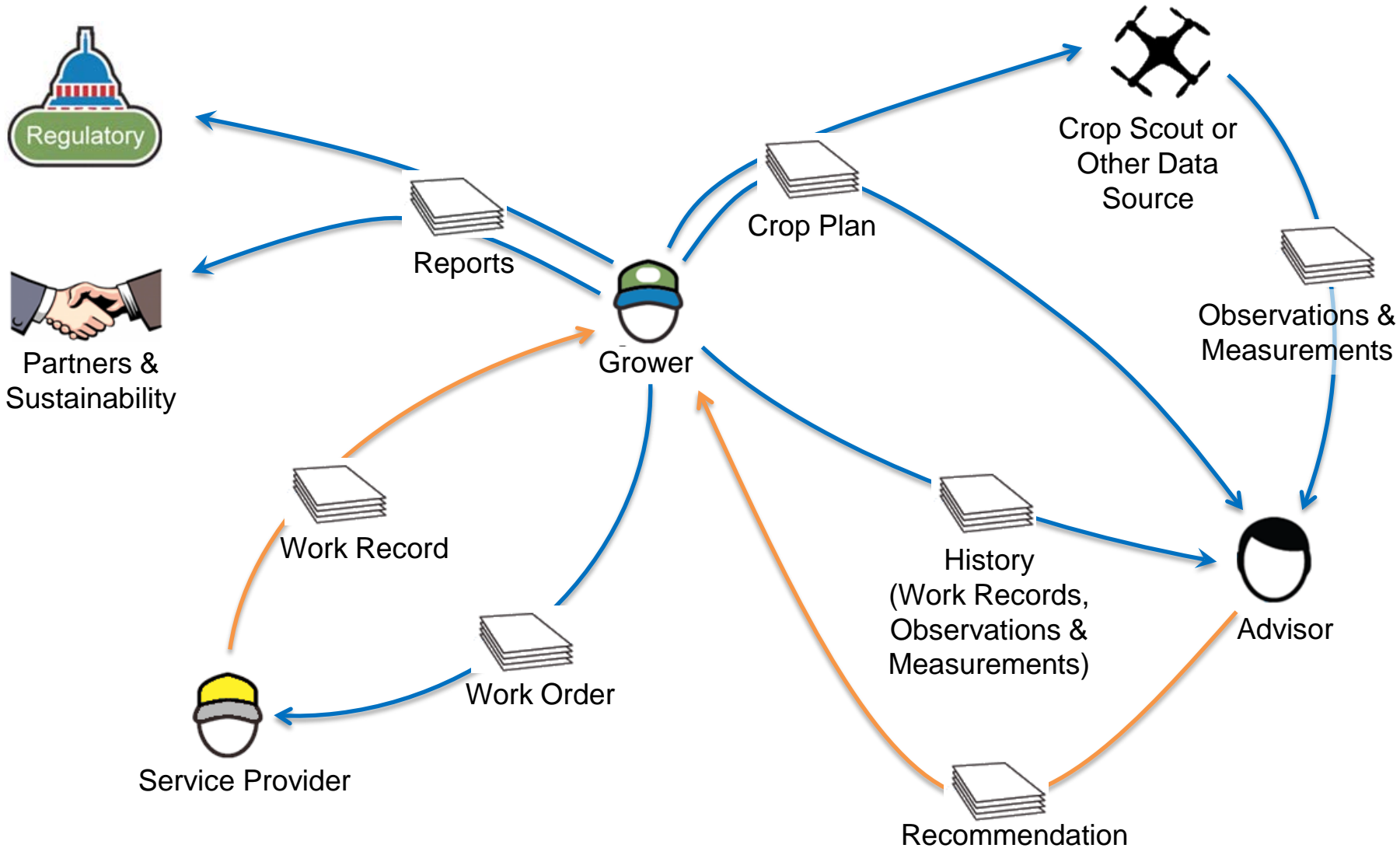
**Drive interoperability between software systems**



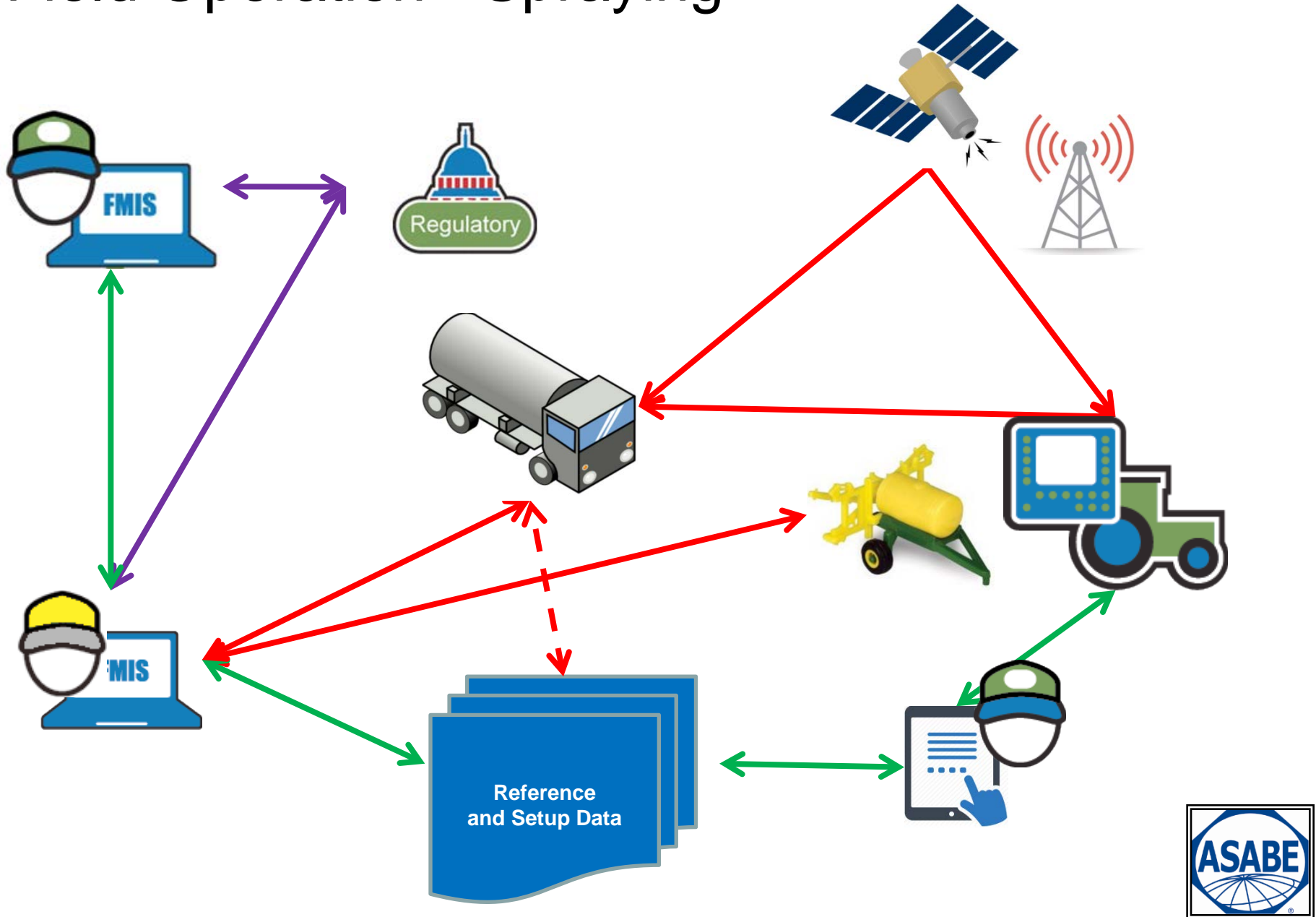
# Core Documents



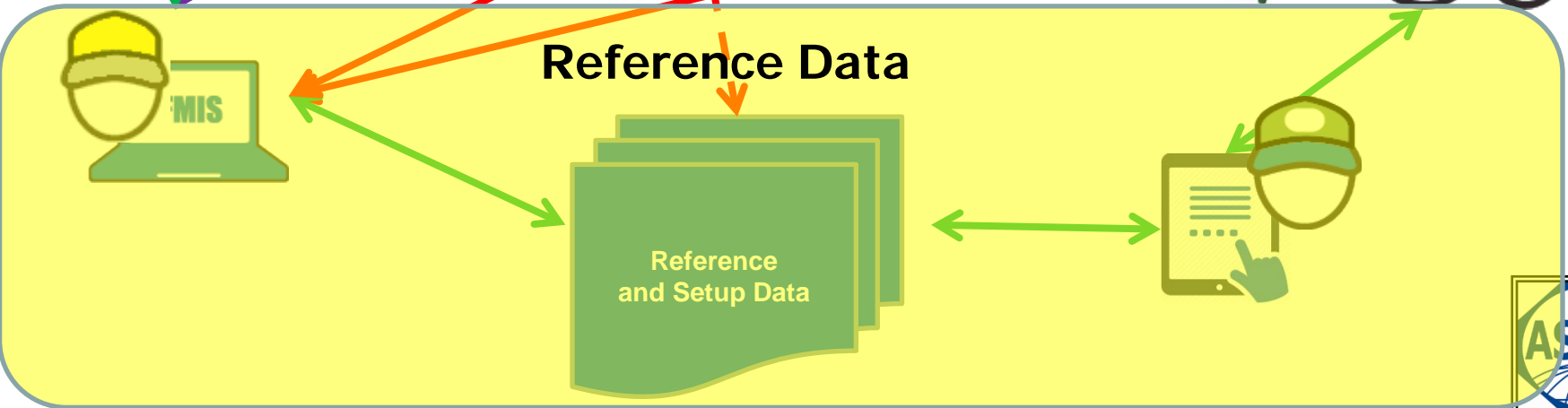
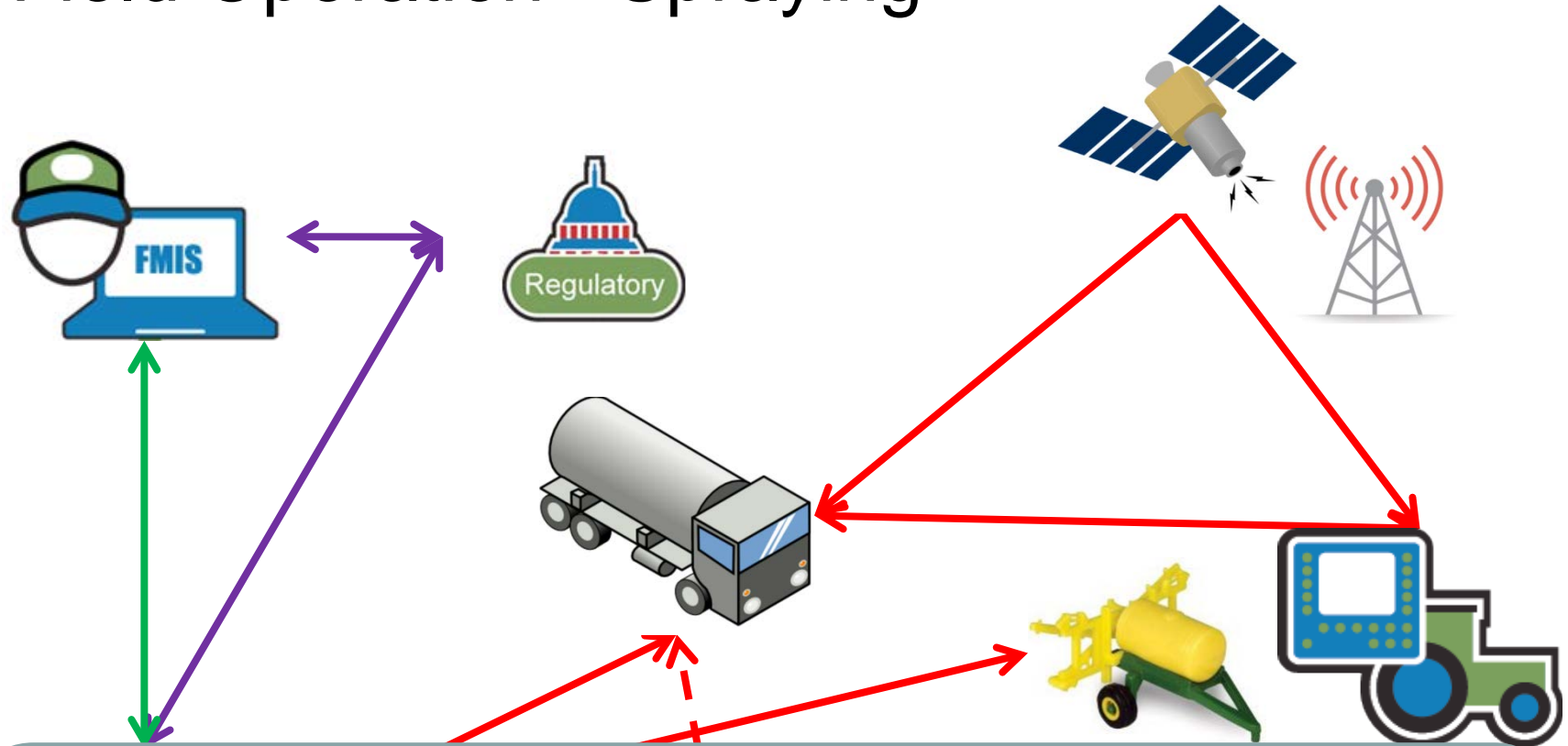
# Core Document Flow



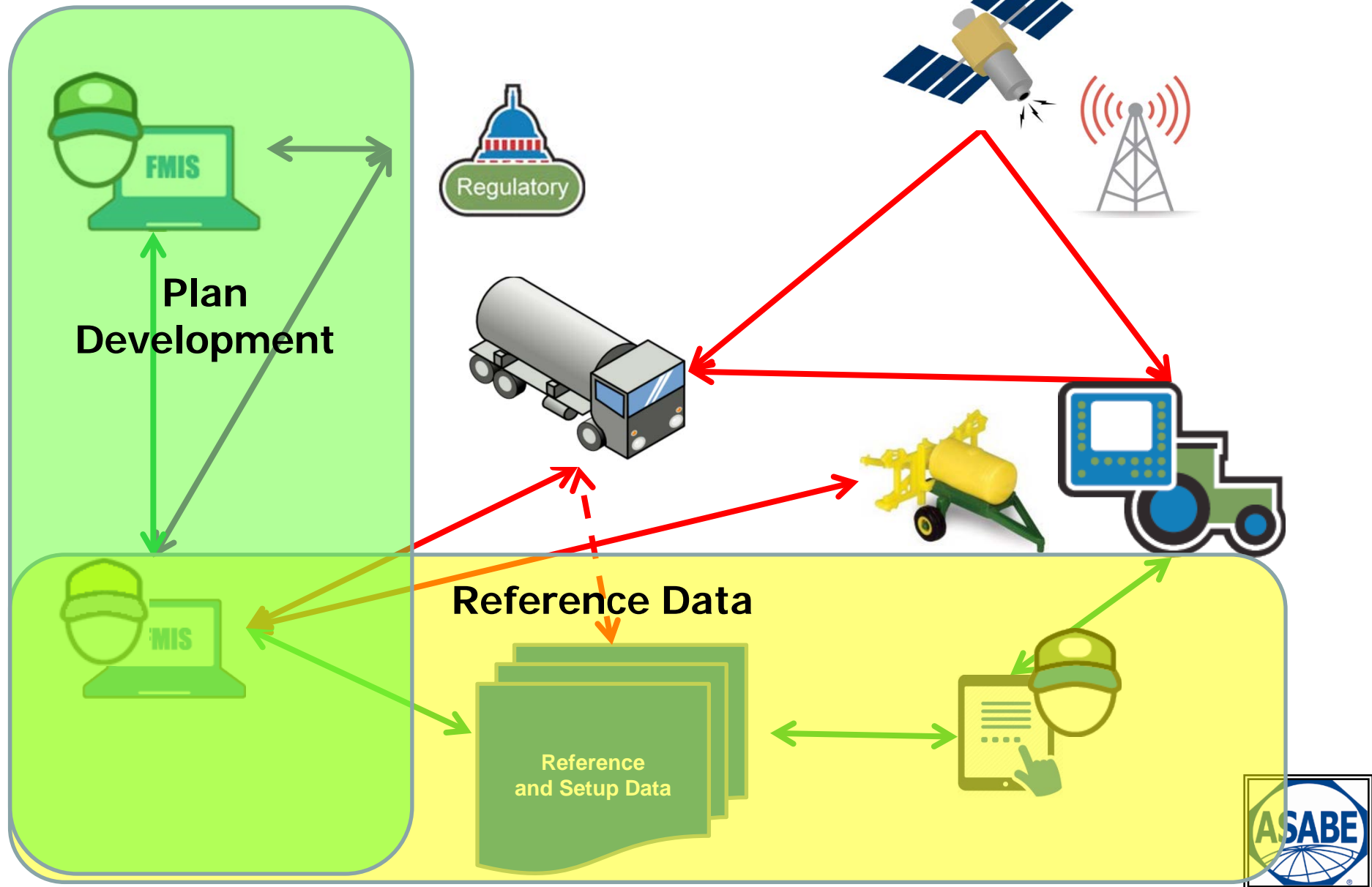
# Field Operation - Spraying



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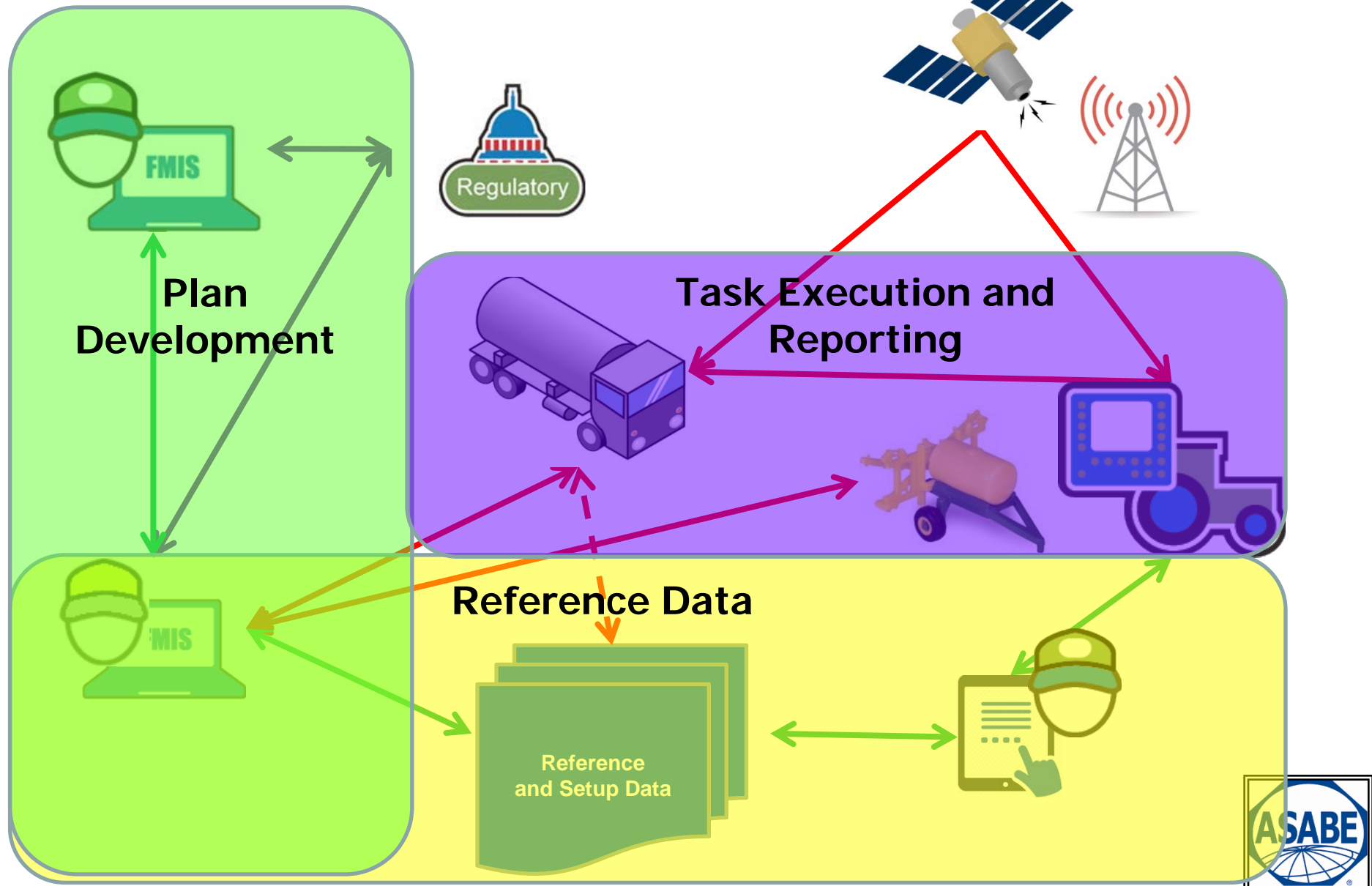


# Field Operation - Spraying

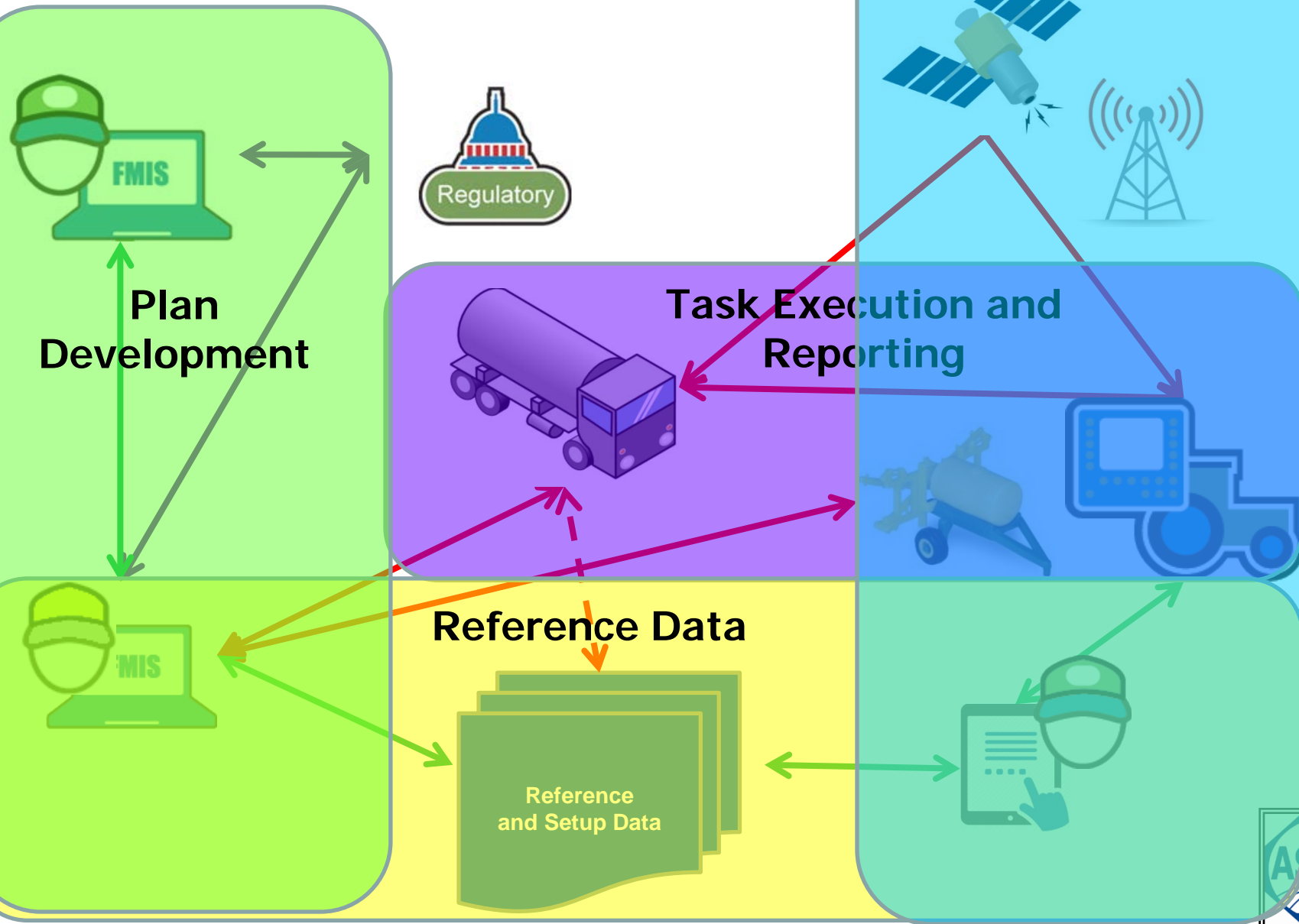




# Field Operation - Spraying



# Field Operation - Spraying



# Field Operation - Spraying

## Telemetry & Remote Machine Access

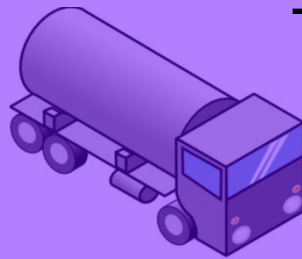
### Compliance Reporting



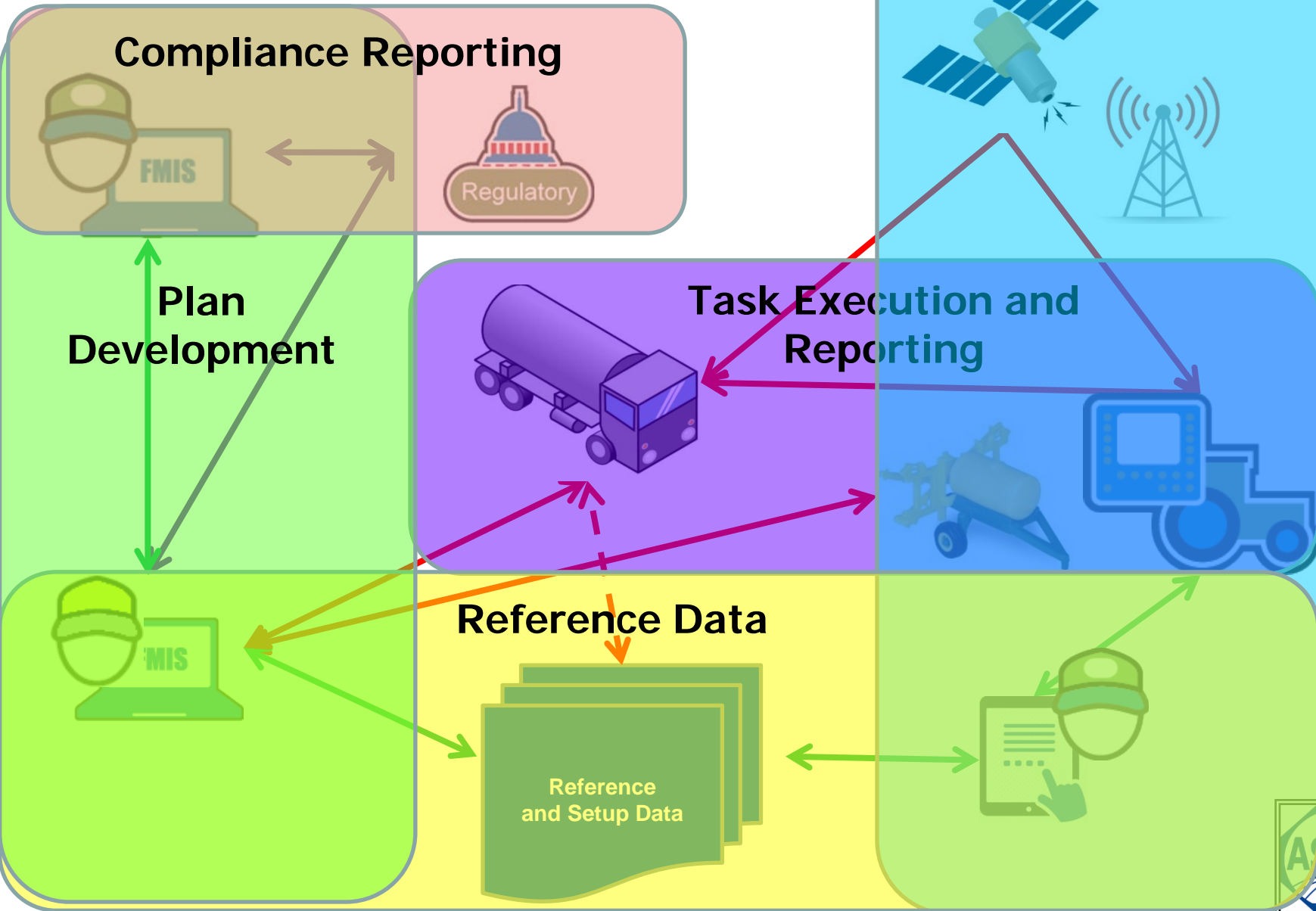
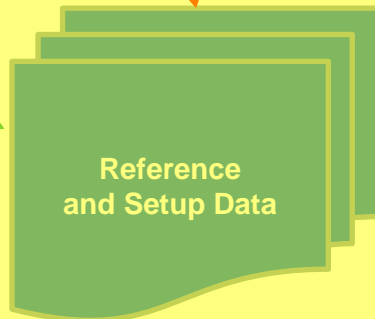
Plan  
Development



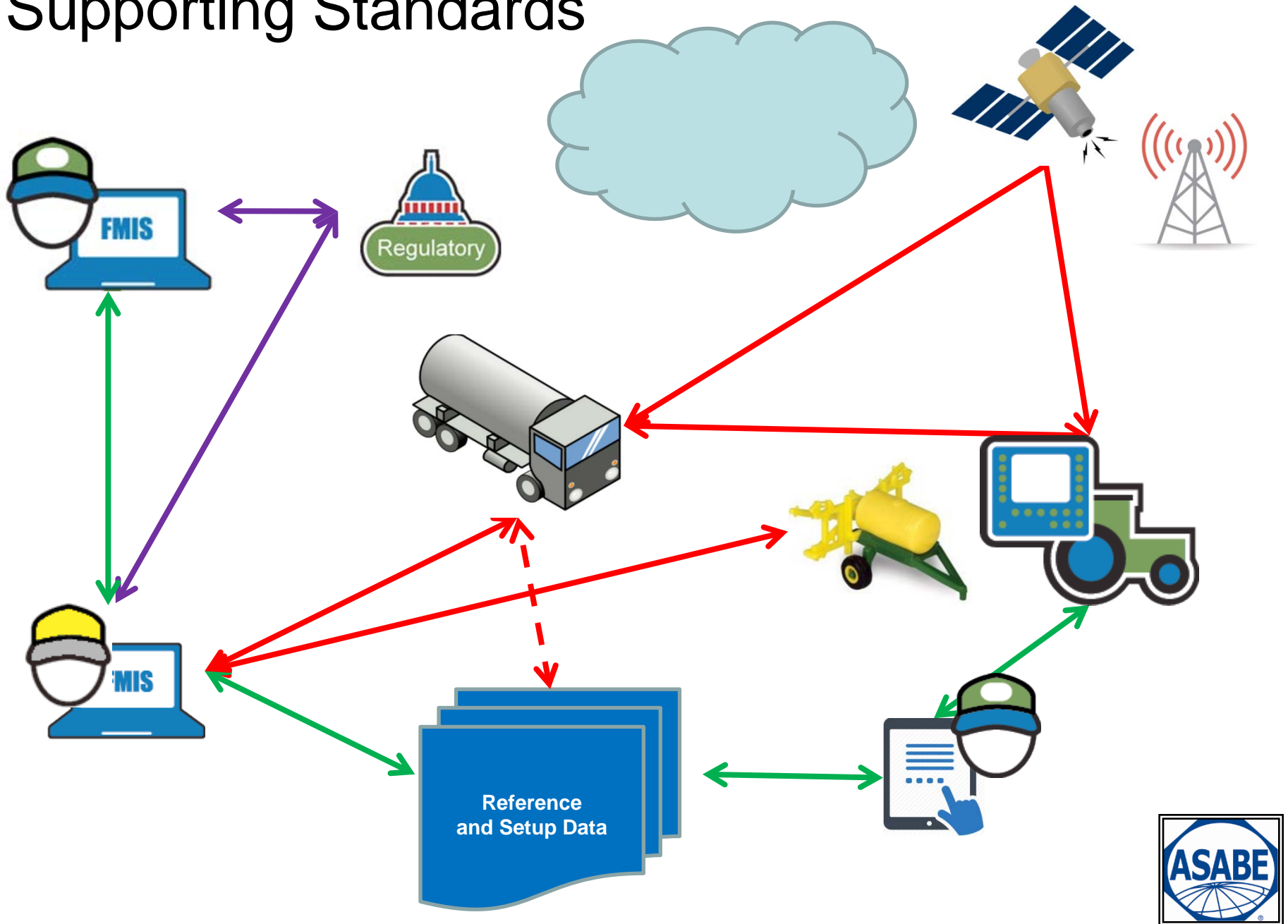
### Task Execution and Reporting



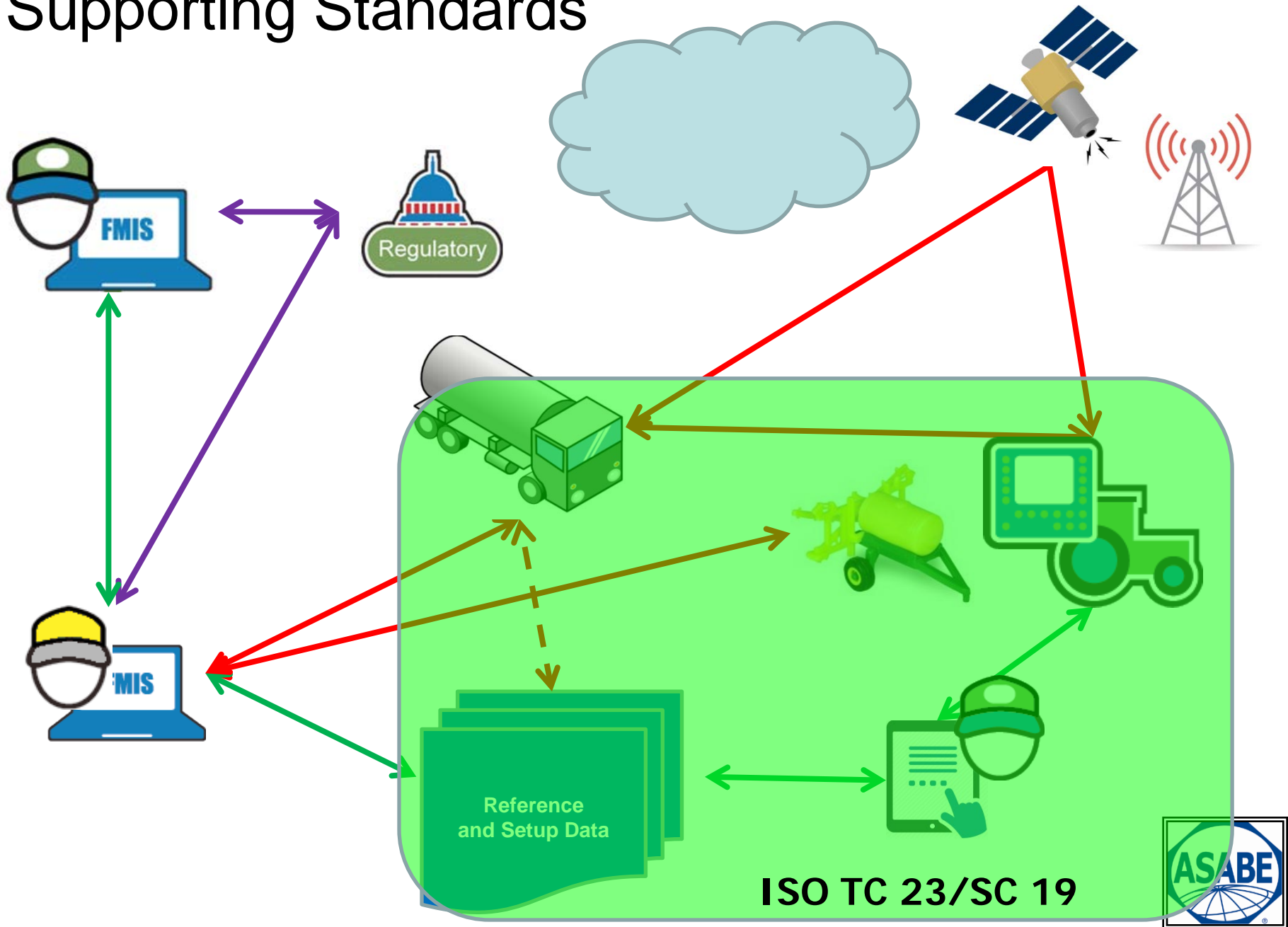
### Reference Data



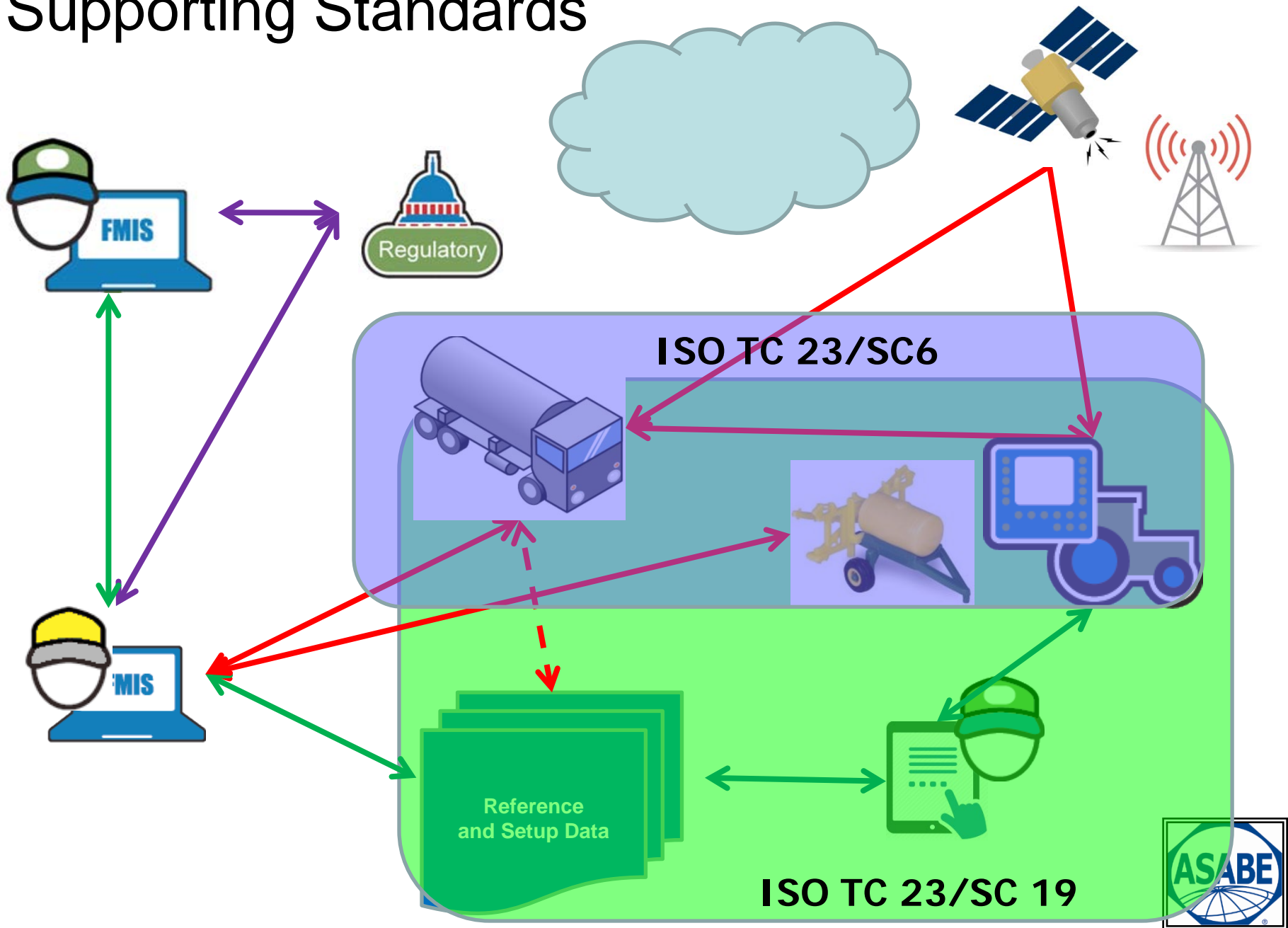
# Supporting Standards



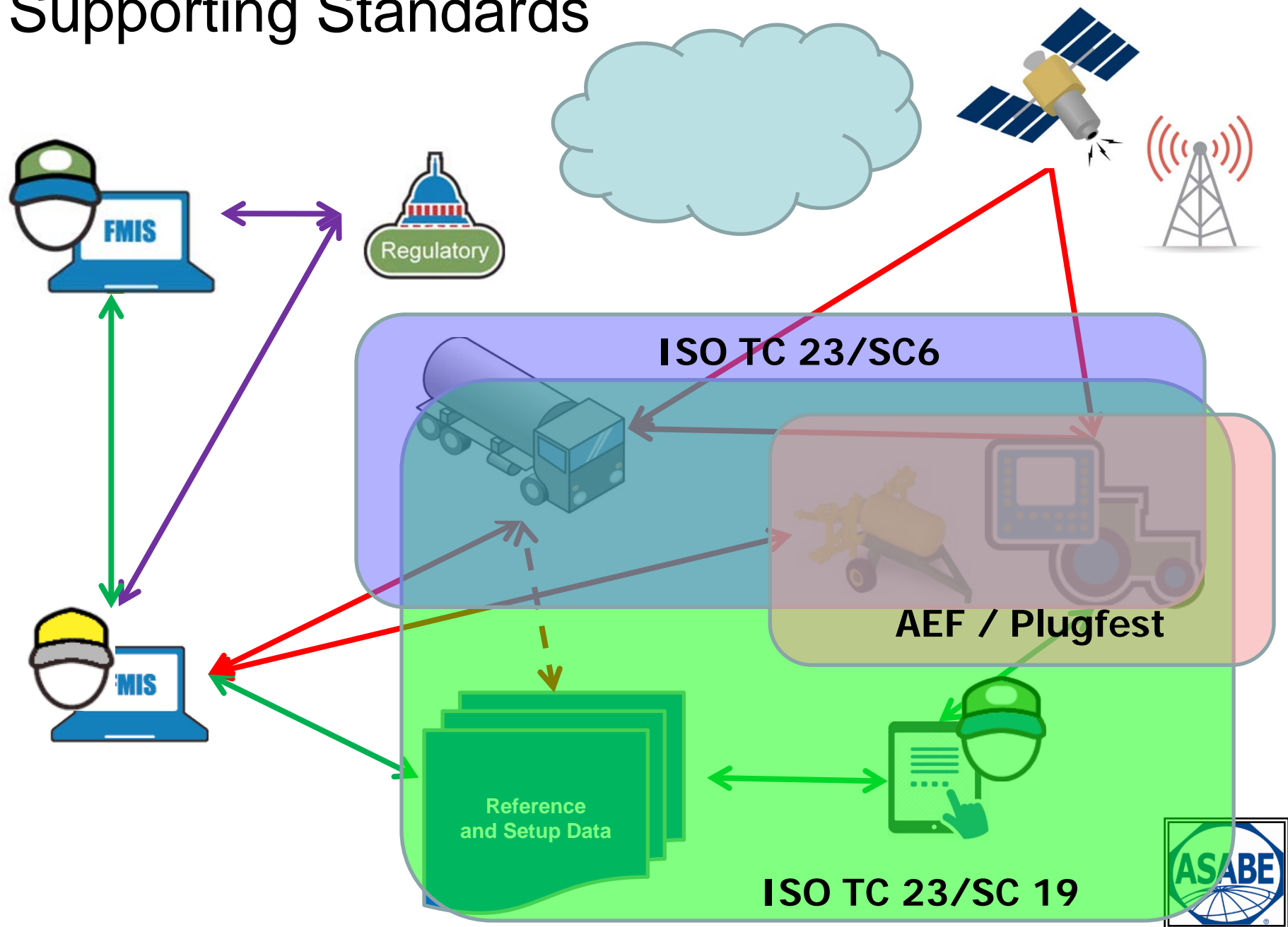
# Supporting Standards



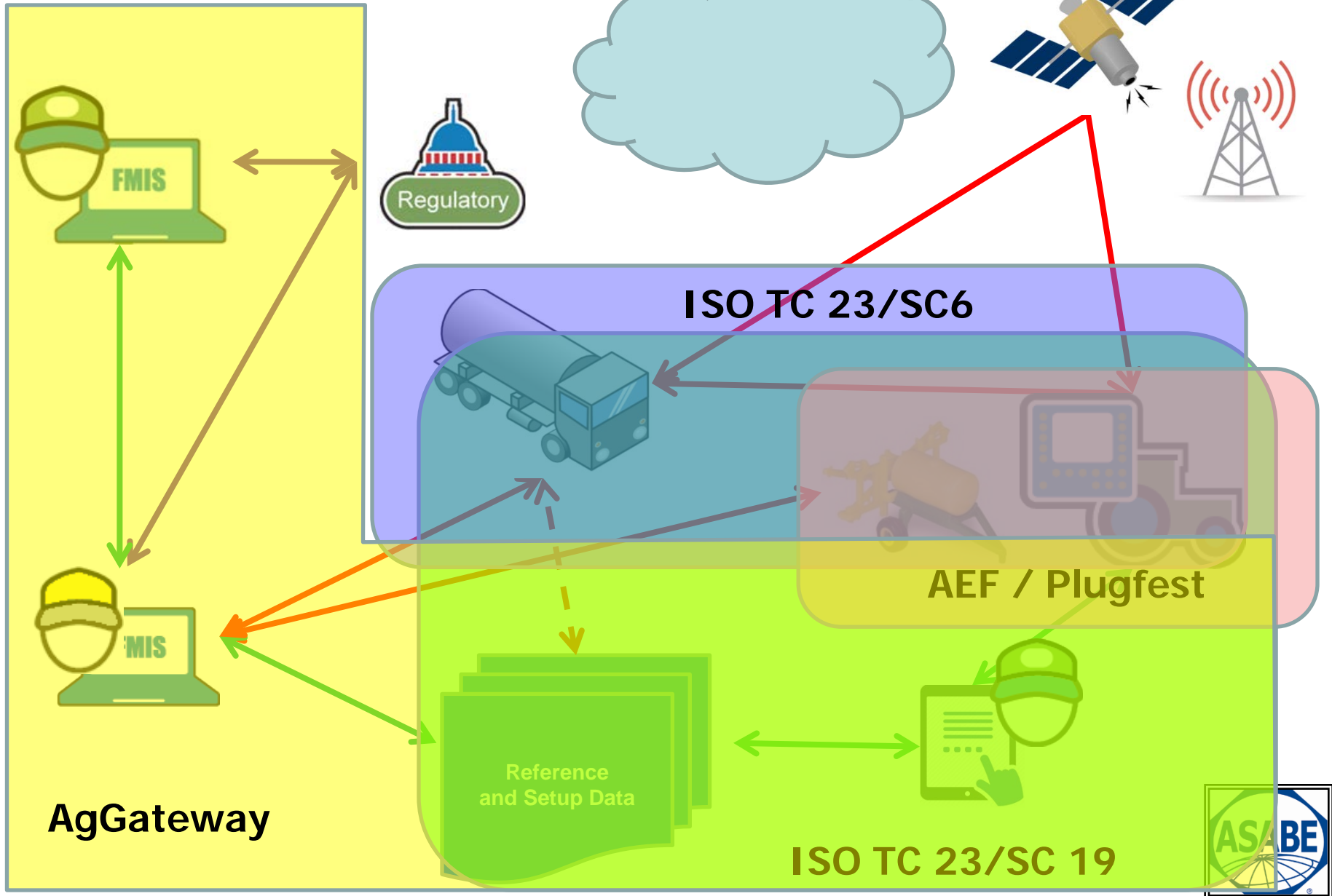
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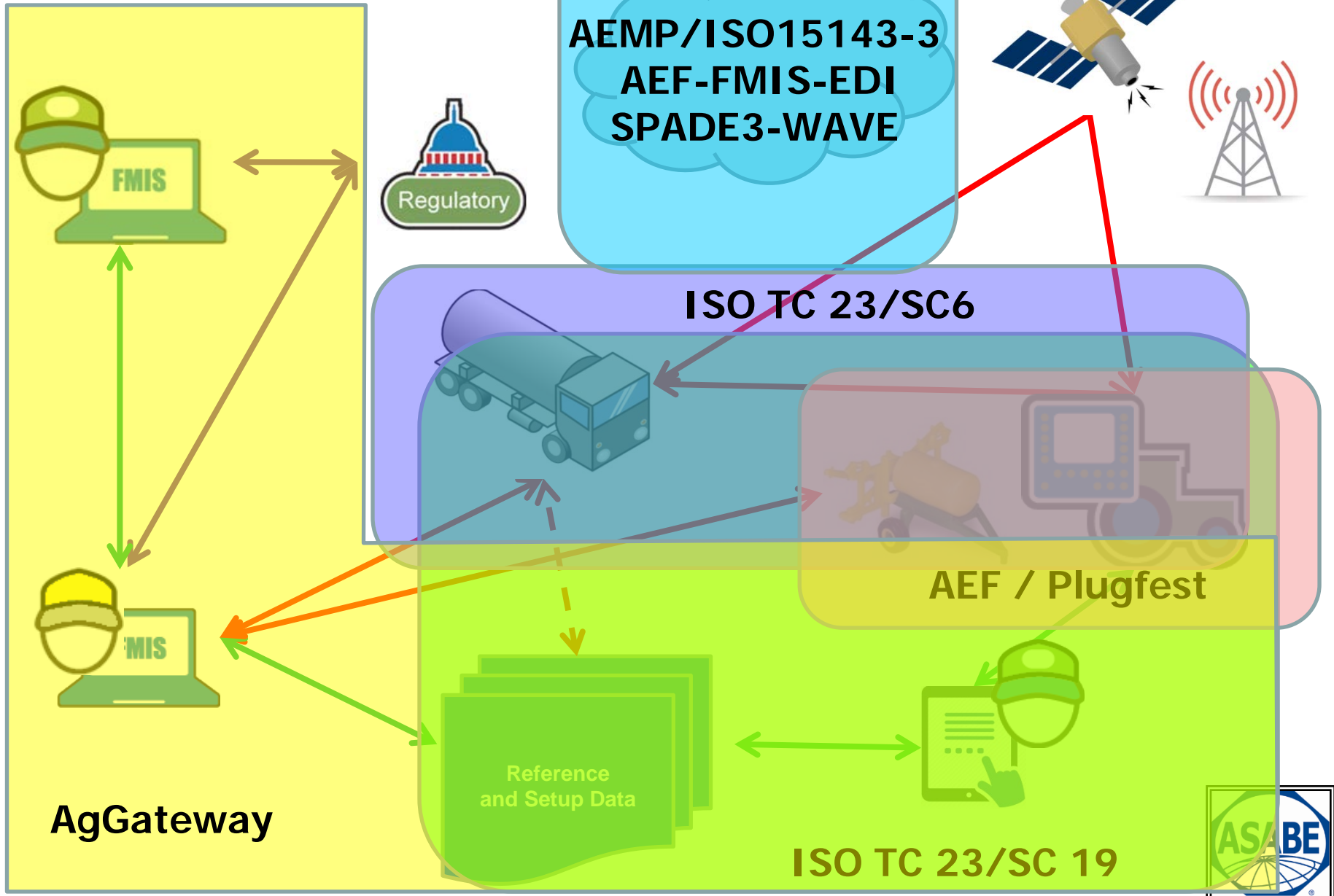


# Supporting Standards





# Supporting Standards





**AEF**  
 AGRICULTURAL INDUSTRY  
 ELECTRONICS FOUNDATION

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 AGRICULTURAL INDUSTRY  
 ELECTRONICS FOUNDATION



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 AGRICULTURAL INDUSTRY  
 ELECTRONICS FOUNDATION



**AgGateway**  
 Collaboration for eConnectivity

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# SPADE / PAIL / ADAPT

Process, Reference Data API and  
ContextItem

## The scope of SPADE3, and how it fits in with other AgGateway projects

Requirements      Process definitions      Data requirements      ISO Gap-checking      Infrastructure      Implementation

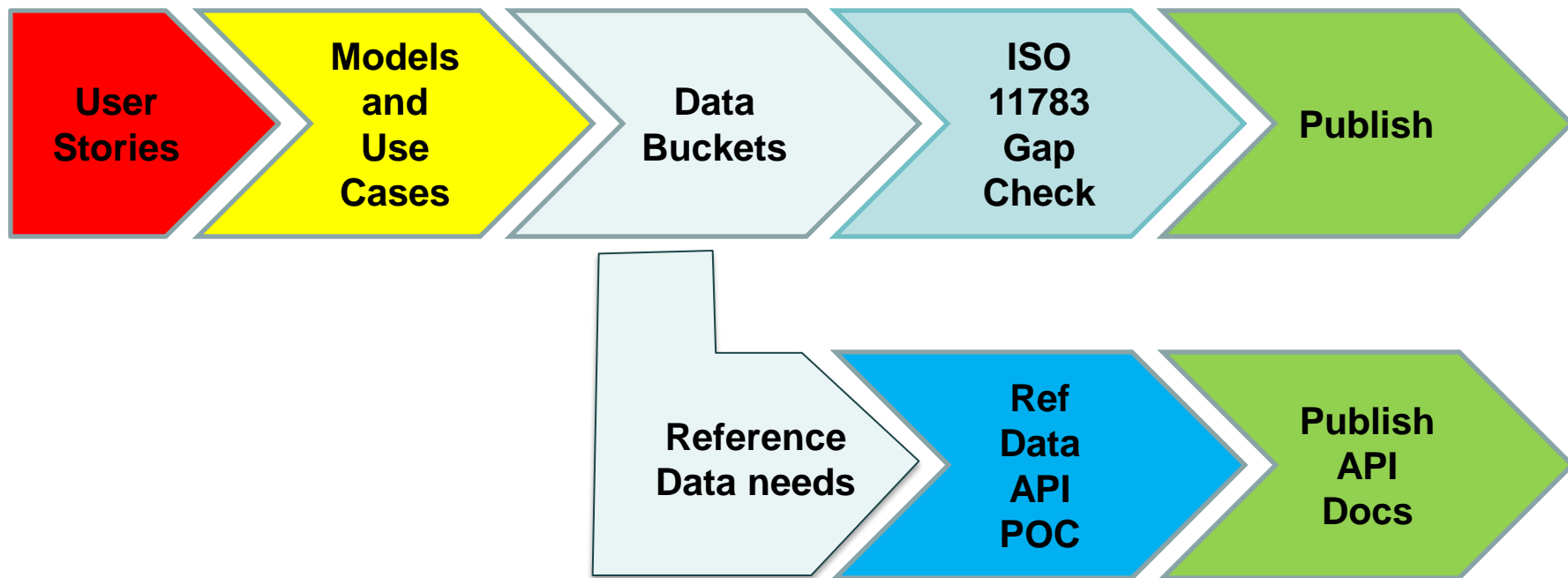
Reference data APIs	S1	S2	S2	-	S3	S3
Seeding operations	S1	S1	S1	S1	A	S3
Harvest operations	S2	S2	S2	S2	A	S3
Crop protection operations	S2	S2	S2	S2	A	S3
Crop nutrition operations	S3	S3	S3			
Grain handling (CART)	S3	S3	S3			
Crop scouting operations	S3	S3	S3			
Telematics (WAVE)	S3					
Sensor and weather data	P1	P1	P1	P1	P2	P2
Irrigation Operations	P1	P1	P1	P1	P2	P2



Much of the work in SPADE has followed the same process:

- User stories were obtained from growers and other SMEs.
- The processes described by the stories were modeled and translated into use cases usable by software companies.
- Data requirements or “Data Buckets” were identified by the SMEs and technical experts working together.
- The technical experts looked for, and proposed solutions for, gaps in ISO11783.
- The final step is publishing the materials.





- There are additional aspects to the workflow, such as identifying the Reference Data (e.g., product identifiers) that is needed to support the process.
- Reference Data APIs
  - Equipment
  - Seed
  - Crop Protection
  - “Other”

# PAIL

Precision Agriculture Irrigation Leadership



# Introduction to PAIL

- SPADE's irrigation-specific sister project
  - There are no existing formats for irrigation data exchange: developing data format as a result.
  - Working through ASABE (X632) / ANSI / ISO toward a national / international standard.
- Two main avenues
  - As-Applied Data: Irrigation equipment manufacturers
  - Observations & Measurements: Water content and weather sensors





# PAIL Goal and Deliverables

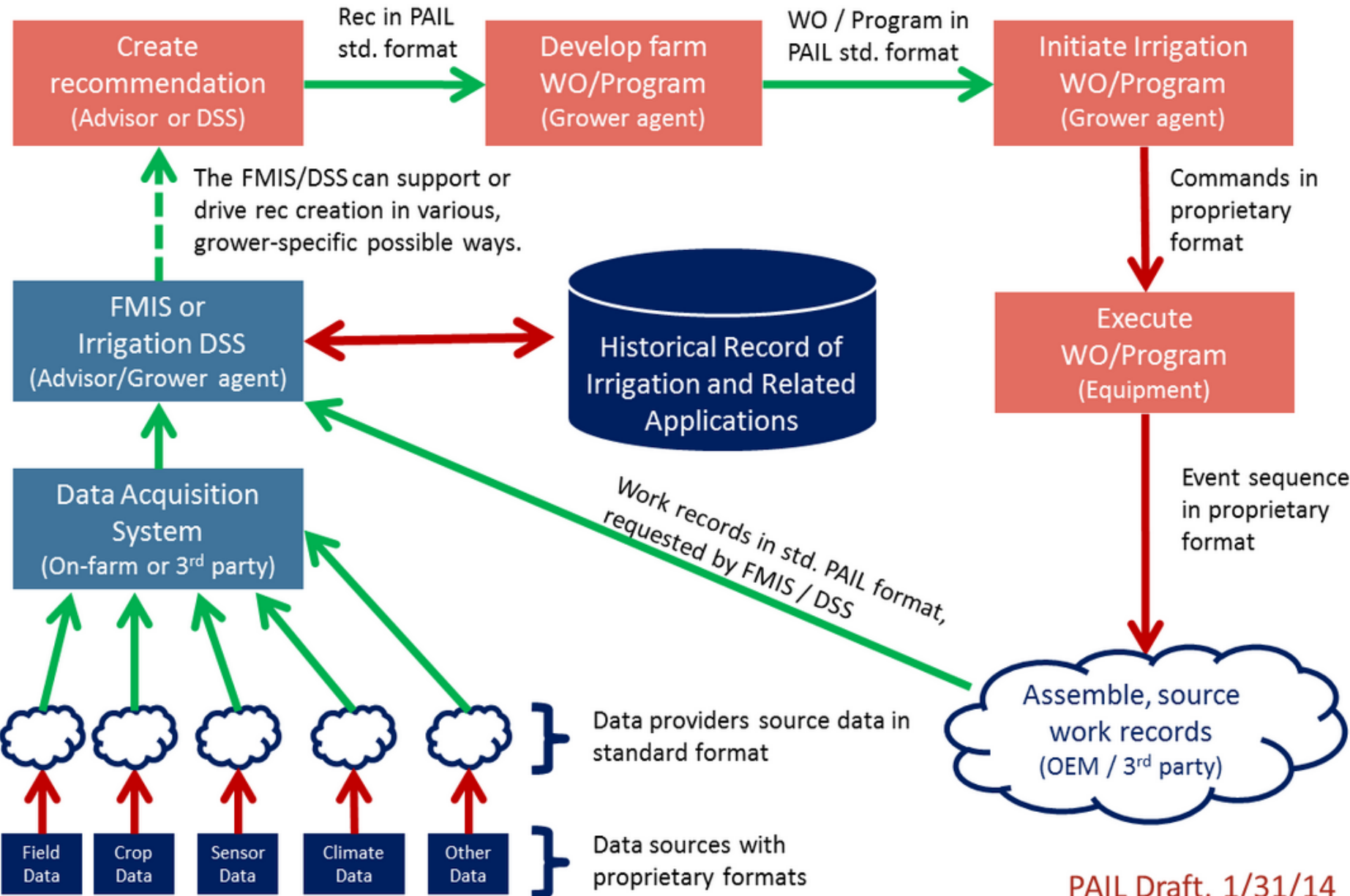
## Goal

Improve agricultural irrigation by developing a common set of data standards and formats to convert data for use in irrigation data analysis and prescription programs

## Deliverables

- Use Cases
- Data requirements
- Data schemas, formats
- Business Rules
- Glossary of terms
- Testing
- Documentation





# PAIL Data Exchange Standards

## Part 1: Core Concepts, Processes, and Objects

- ✓ Time, Space, People, Data pedigree, Geopolitical-context-dependent data

## Part 2: Irrigation System Operations

- ✓ Location and geometry of the irrigation system
- ✓ End gun, corner arm specification
- ✓ Flows and pressure Schedules (how much and when)
- ✓ Irrigation work orders to drive pivot controllers
- ✓ Error reporting
- ✓ Work records: Reporting how much, and where, water was applied
- ✓ Reporting how much energy was used

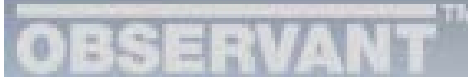
## Part 3: Observations and Measurements

- ✓ Weather and other environmental data (e.g., soil water content)
- ✓ Working toward a single schema that can be used by data producers and consumers, conditions & forecasts

## Part 4: Pumps, Drip



# Companies Participating in PAIL



# The ContextItem

An enabling technology for  
Regulatory reporting and other  
Geopolitical-Context-Dependent needs  
in SPADE, PAIL & ADAPT.



# Challenge: Contradictory Requirements

- AgGateway's SPADE project operates in the context of an international standard for FMIS-to-machine communication, ISO11783.
  - This drives us to keep our work generic.
- However, the processes we want to support include much US-specific data (FSA farm numbers, EPA numbers, and so forth.)
  - This drives us to make our work US-specific.



# More Contradictory Requirements

- The Case for a Controlled Vocabulary
  - If data is only taken from a controlled vocabulary (think dropdown menu) then everyone can understand its meaning (no free-form stuff).
- The case for flexibility / extensibility
  - There will continually be new things to keep track of. The system should readily accept new lists and new terms.
- Questions
  - Who controls the vocabulary? Single or multiple-source?
  - How are things added to it?



# The Geopolitical-Context Challenge

- We'd like for our solution to simultaneously:
  - Support US (or other jurisdiction)-specific data, yet
  - Not clutter the standard, that seeks to remain generic.
  - Support controlled vocabularies, yet
  - Allow for simple extensibility thereof.
- Enter ADAPT (Open-source programming toolkit)
  - Common object model
  - Format conversion library
    - Manufacturer-specific “plug-ins” that convert to/from the common object model





# The ContextItem

- ContextItems are generic tags that can be attached to the objects in the ADAPT common object model, containing geopolitical-context-dependent information.
- It represents a solution to the contradictory requirements.
  - Used in conjunction with a controlled vocabulary.
  - This vocabulary is a collection of data from different sources such as EPPO, USDA, etc.
  - Extensible: the vocabulary can be sourced through a reference data API.
  - Has been provided a streamlined process in AgGateway's Standards & Guidelines Committee, analogous to the one set up for the Ag Glossary.
- Note: We're not telling USDA, EPPO, etc. what to do: we're just trying to:
  - Provide a single-source for controlled geopolitical-context-dependent vocabularies needed by the industry
  - Installing mechanisms to provide for error-free data entry/reporting, while keeping the standard generic.



# The ContextItem Object

ContextItem
ContextItemType : Integer
Value [0..1] : RepresentationValue
ContextItems [0..*] : ContextItem

- The list of context items, along with information needed to enter and display them, will be fielded through a Reference Data API (targeting mid-March 2016).
- ContextItemType is a code that identifies what a given ContextItem means:
  - Is it a PLSS Township number? An FSA Tract ID? An EPA Number? A PLSS Prime Meridian string?
- The RepresentationValue encapsulates the value and its (UN Rec 20) standardized unit of measure.
- These objects can be nested (e.g., PLSS)





# Data Flow, Ownership and Security

Ag Data Transparency Evaluator





# THE AG DATA TRANSPARENCY EVALUATOR

Bringing transparency to ag data contracts.

# Addressing the Problems with Ag Data

## □ **Trust**

- American Farm Bureau poll shows that a majority of farmers do not know where their data goes after they upload to an ag technology provider.

## □ **Time**

- Farmers are busy and don't want or have time to read cumbersome privacy and data policies.

## □ **Confusion**

- Contracts for technology differ greatly from “normal” farming contracts.

# The Solution

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- Create an industry supported organization that reviews farm data contracts for transparency.
- Ag technology providers agree to have their contracts reviewed for transparency and in exchange are awarded an industry recognized seal.

# Guiding Principles

## Privacy and Security Principles for Farm Data

- November 2014
- Signed by over 30 ag technology companies and farm industry trade organizations
- Establishes principle for ownership, use and control of farm data.



# How it works: Overview

- Ag technology providers answer 10 questions about what happens to data after the farmer uploads.
- Scorecard answers are reviewed.
- Then results are published for farmers to use.

## Transparency Scorecard

	Question	Answer	Explanation/Link
1	What types of information does the product collect from me?	Agronomic Data	Agronomic data is defined here [link to provision]
2	Can I terminate the contract at any time? (Understanding that payment obligation may remain)	Yes	Link to provision
3	Can I delete my data upon termination?	Yes	Link to provision
4	Does the product allow the ATP to share my data with third parties without my authorization?	Yes	Link to provision
5	Does the ATP pledge not to sell, trade, or give my data to third parties without my consent?	Yes	Link to provision
6	Does the ATP confirm that marketing materials are consistent with contracts governing use of the product?	Yes	Link to provision
7	Does the ATP obligate itself to provide notice to me if its privacy policies change?	Yes	Link to provision
8	Does the ATP define any third parties that may have access to my data?	Yes	Link to provision
9	Will the ATP notify me if a breach of data security occurs, causing disclosure of my data?	Yes	Link to provision
10	Does the ATP take appropriate security measures to safeguard my data?	Yes	Link to provision

# How it works: a closer look.

- Farmers can click on links to the actual policies.

	Question	Answer	Explanation/Link
1	What types of information does the product collect from me?	Personal Information	Personal Information is name, address, phone number, and farm name. See definition in <a href="#">Privacy Policy</a> .
		Agronomic Data	Agronomic Data is yield data, soil information, seed information etc. See definition in the <a href="#">Privacy Policy</a> .
2	Can I terminate my contract at any time? (Payment obligation may remain).	Yes	<a href="#">Terms of Use</a> .



**FARM**server™

[SIGN UP FOR FREE](#) [LOG IN](#)

## The Information FARMserver Collects

FARMserver collects and stores two types of information you provide:

“Personal Information” includes identification information, including your name, farm name, username, address, email, telephone number and similar information you provide.


“Raw Data” includes information you provide related to soil, water, crop health, crop maturity, disease, nutrients, fertilizer, herbicides, pesticides, yield, geo-location, etc., in the form of text, files, records, location, messages, images, photos, audio, video, and all other forms of field data. We believe that you are owner the Raw Data submitted on your account.

# How it works: A searchable database

<http://www.fb.org/te/search>

**SEARCH**

FieldScripts



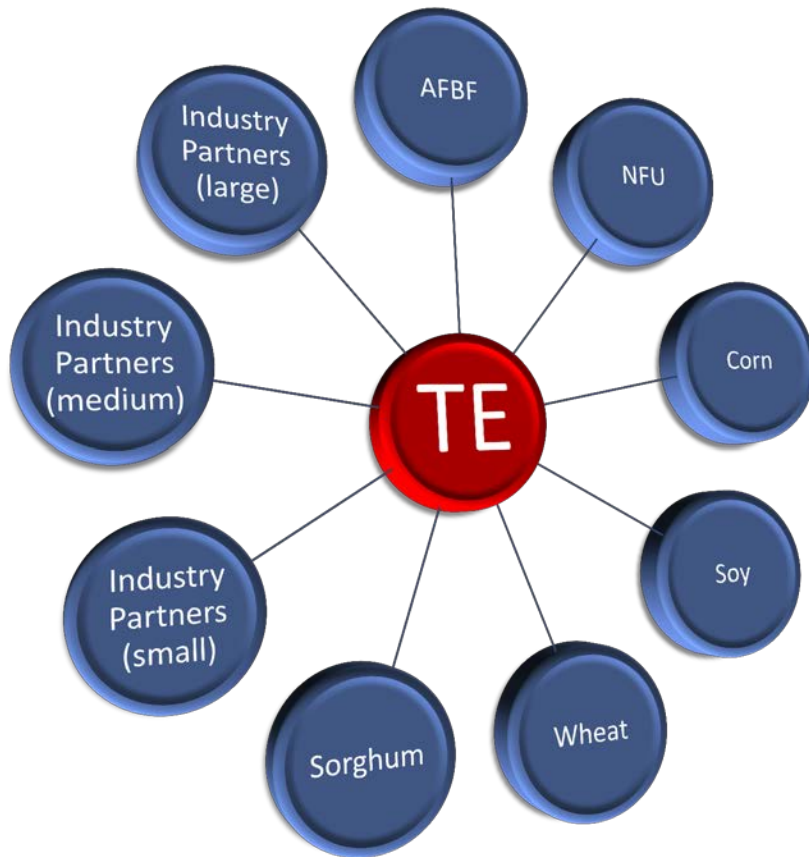
<http://www.fb.org/te/fieldscripts>

### Transparency Scorecard: FieldScripts

	Question	Answer	Explanation/Link
1	What types of information does the product collect from me?	Agronomic Data	Agronomic data is defined here [link to provision]
2	Can I terminate the contract at any time? (Understanding that payment obligation may remain)	Yes	Link to provision
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Farmers can search for the scorecard for the particular technology product they are considering using.

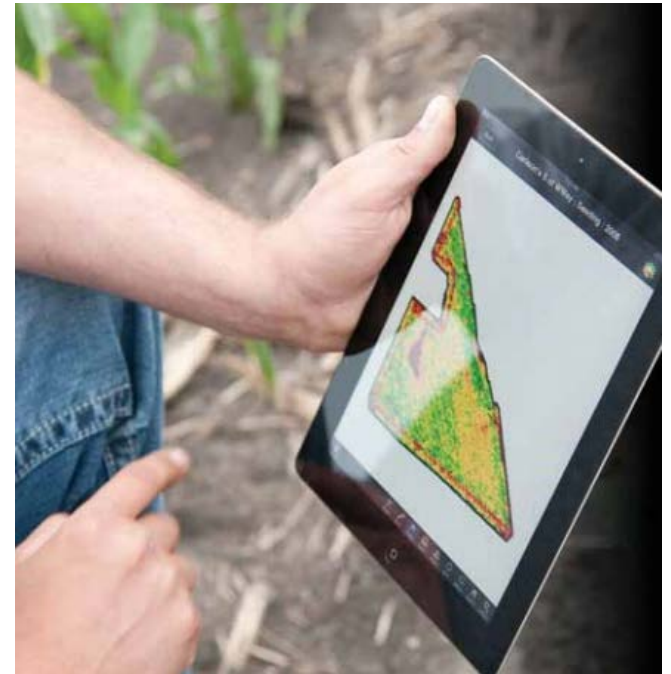
# Who is behind the Ag Data Transparency Evaluator?



- Farm Organizations (6)
  - AFBF, NFU, Corn, Soy, Wheat, Sorghum
- Industry Partners (9)
  - Small (3)
  - Medium (3)
  - Large (3)
- Farm Organizations must affirmatively approve board decisions (industry partners do not control decisions)

# Why do farmers use the Evaluator?

- Simple: 10 questions
- Quick: seal + 1 click
- Trustworthy: backed by farm industry trade organizations
- More information available, if farmers want to dig deeper
- Free



# Why do ATPs participate?

- Flexibility. No mandated contract terms.
- Builds trust with farmer/customers.
- Product specific. No corporate-wide mandates.
- Backed by farm industry trade organizations.



# The Transparency Evaluator

## Conclusion

- ☑ Simple
- ☑ Quick and easy
- ☑ Transparent

*Fixing the problem of data transparency!*



## Questions?

Direct questions to the Ag Data Transparency Evaluator administrator: Todd Janzen, [Janzen@aglaw.us](mailto:Janzen@aglaw.us), or the Ag Data Transparency Evaluator president: Mary Kay Thatcher, [mkt@fb.org](mailto:mkt@fb.org).



# Current Example



# “Future of Application Techniques” ISO TC 23/SC 6 Plenary Session

- Demands and ideas from the application technique industry in Europe
- Controlled boom section (CBS) systems (GPS)
- Electronic controls and assistance systems - new challenges for sprayer testing
- The UAV under application techniques in Asia
- Closed transfer
- Advances on environmental safe spraying in tree crops
- An Adaptive Machine Approach to Product Placement
- Smart Data for Application Compliance (Traceability and Regulatory Reporting)



# An Adaptive Machine Approach to Product Placement

## **Drift**

Pressure,  
Nozzle selection

## **Drift**

Variable conditions,  
Buffer needs

## **Drift**

Boom Position



## **Distribution**

Chem Injection

## **Distribution**

Verify even coverage

## **Distribution**

Tank Agitation

# "Paradigm"

- a theory or a group of ideas about how something should be done, made, or thought about (*Meriam-Webster*)
  - Constrained by technology
  - Based on prevailing wisdom
  - May limit possibilities

Today's approach to pesticide risk assessment  
is a paradigm.

## Fixed Risk Assessment Paradigm

- All factors combined into one label – Runoff, aerosol, vapor, evaporated liquid
- Conservative parameters applied to all scenarios, receive same assessment
- Assumption of constant meteorological conditions
- Prescriptive sprayer configuration
- Constant or limited buffer zone options

## Drift mitigation aligned with today's fixed risk assessment paradigm...

"Static" drift mitigation plan:

- Spray planning occurs in advance
- Minimal adaptation to weather factors
- Pre-configured sprayer
- Single set of installed nozzles
- Operator manually assess site-specific factors – i.e. weather, windbreaks, canopy, inversion factors
- Operator may spray multiple fields, many farms

...does not leverage  
*Precision Ag and Data Management*  
capabilities of modern sprayers:

- Continual access to mobile data and cloud services,
- Data analytics,
- On-board data processing and task planning,
- Spray parameter closed loop control,
- Cautions and recommendations assistance to operator.

## Flexible Risk Assessment Paradigm

- Sensitive areas and species documented and updated
- Runoff, aerosol drift and volatilization addressed independently
- Each scenario receives tailored risk assessment
- Meteorological data available throughout task
- Buffer zone is adapted based on risk assessment
- Sprayer configuration is adapted as needed throughout the task



Drift mitigation possible with  
a flexible risk assessment paradigm:

"Dynamic" drift mitigation will use available  
state-of-the-art and precision ag technologies.

### **Adaptive Sprayer:**

- Analyzes data to assess potential hazards,
- Adjusts configuration and parameters,
- Adjusts task or path,
- Ensures optimum spray characteristic at the time of spray release.

## Possibilities with an Adaptive Sprayer:

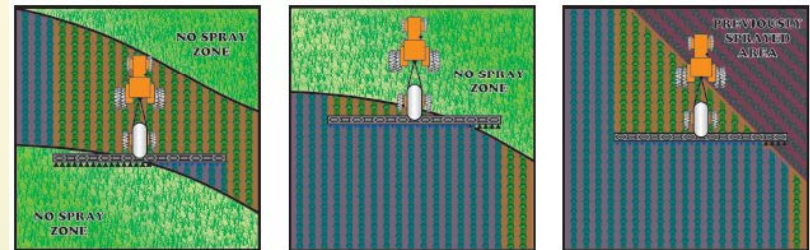
- The spray task is continually evaluated for ***"OK to Spray"***
- Spray parameters autonomously modified
- Variable buffers to optimize productive land use
- Variable application speed to optimize productivity
- Meteorology compliance
- Product as-applied documentation
- Sustainability metrics

## Future Path

- Machine – Process control
- Machine – Data and Communications
- Sensitive Areas
- Drift Characterization
- Weather
- Product Label
- Mechanistic Physics Modeling

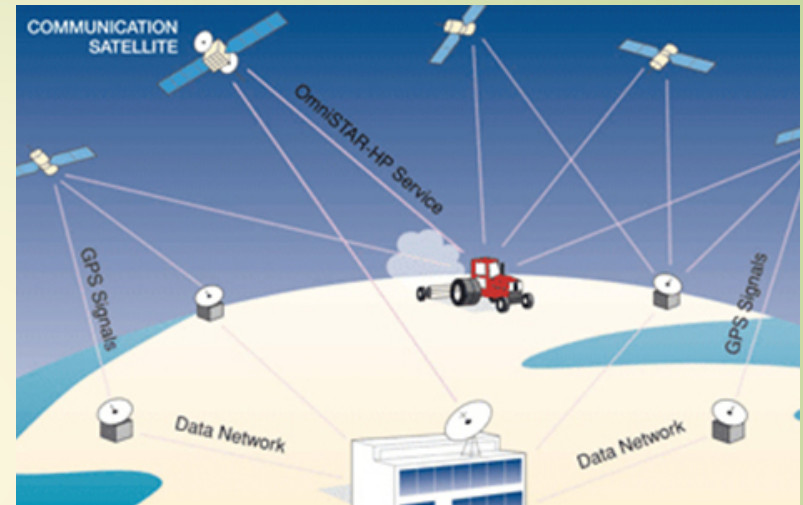
# Machine – Process Control

- Management of spray parameters
- Boom height
- Boom section control
- Spray volume / spray rate
- Distance to sensitive area
  - GPS/GIS data
- Travel speed



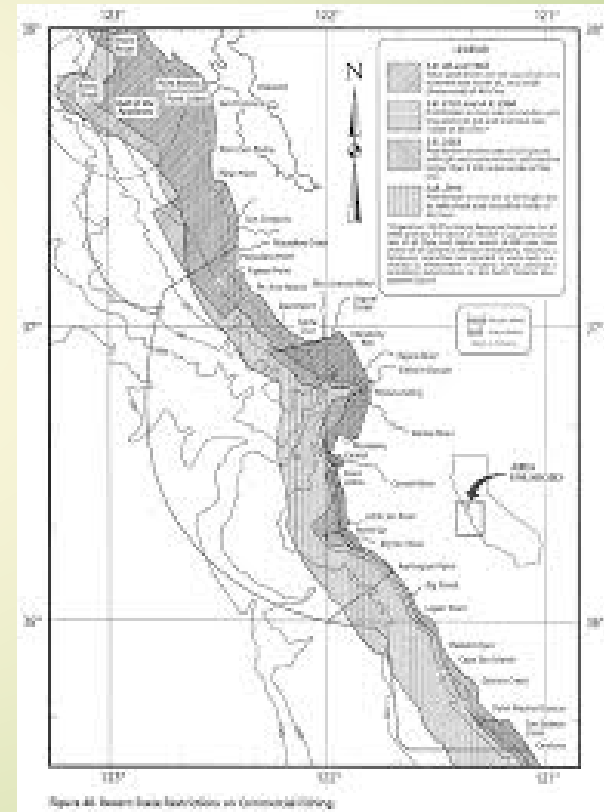
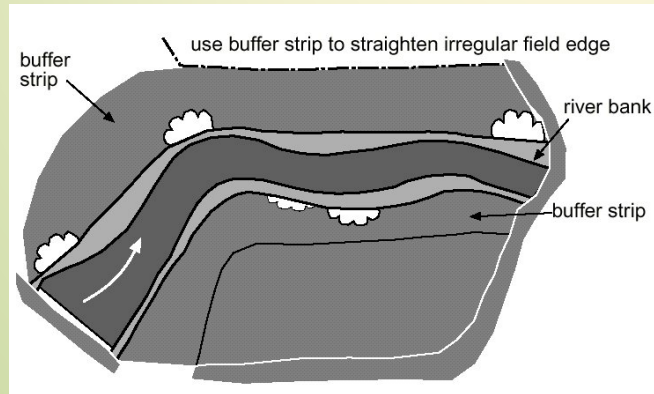
# Machine – Communication

- Machine operational data
  - Location
  - Sprayer configuration
  - Performance
  - Weather data
- Application Program Interface (API)
  - Data formatting
  - Program-to-program data share
  - Enable interoperability



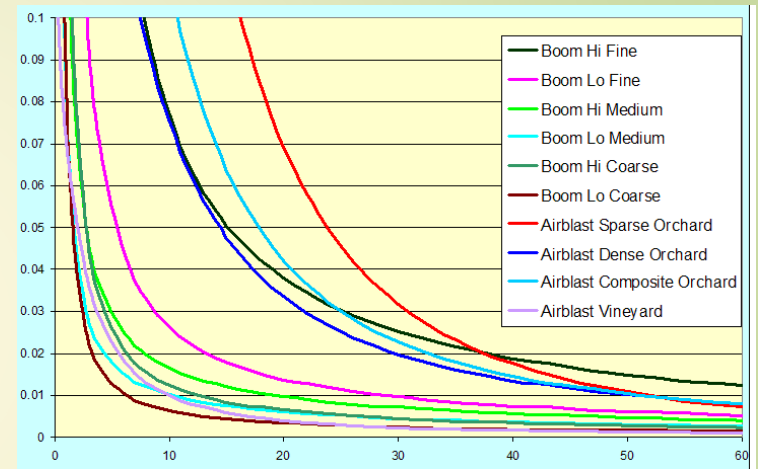
# Sensitive Areas

- Waterways, coastal land
- Endangered species
- Organic food production
- Non-compatible crops
- Populated areas



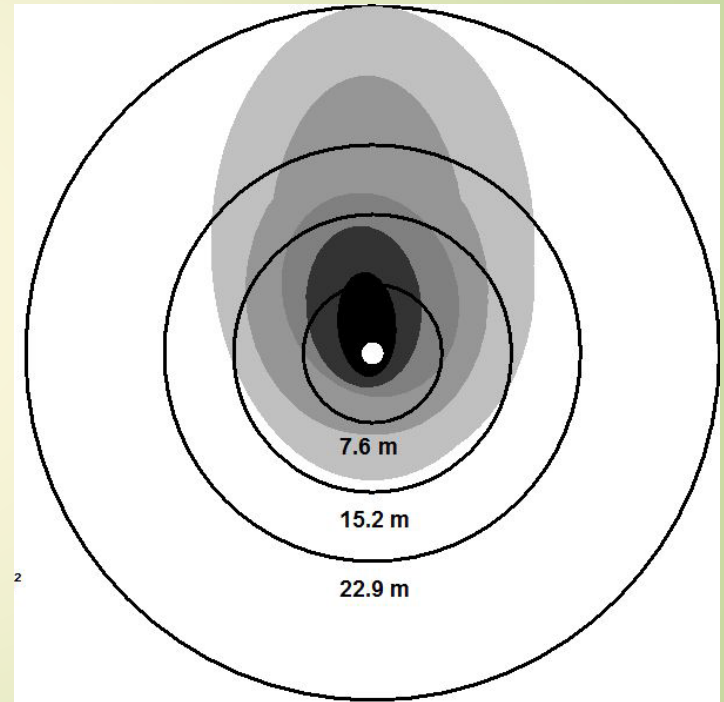
# Drift Characterization

- Empirical models
  - Step changes across curves
  - Interpolation within curves
  - Nozzle
  - Droplet size class
  - Release height
  - Wind speed
  - Travel speed



# Weather

- Macro
  - NOAA
- Regional
  - Mesonet (25 km)
- Local
  - Proprietary
  - Local ag networks
  - County Extension
  - Portable/mobile/on-board





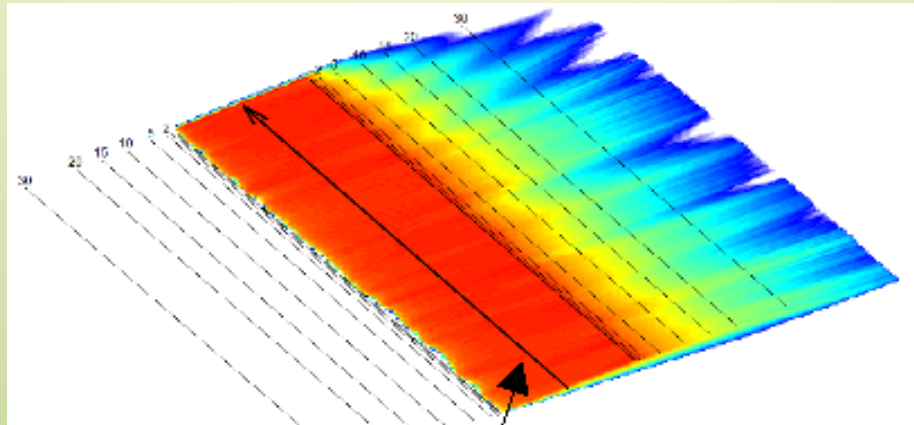
# Product Label

- Contents of label
  - Specific environmental, species restrictions
  - Approved tank mixes
  - Multiple rates
  - Buffer possibilities
- Electronic label access
  - Regulatory demands
  - CRISTAL – barcode and traceability



# Mechanistic Physics Models

- Atmospheric Models
  - AgDRIFT, AGDISP<sup>®</sup>, Spray Advisor (USFS), CALPUF, PERFUM, SOFEA, FEMS, -- *RegDISP/WTDISP*
- EPA Aquatic Models
  - SWCC, PFAM, KABAM, SWAMP, SCIGROW, SWIMODEL, Tier I Rice Model, PRZM-GW
- EPA Terrestrial Models
  - SIP, STIR, T-REX, TIM, T-HERPS, TerrPlant



# Standards

- ISO 5682 – Sprayer performance, section/nozzle control
- ISO/TS 11356 – Spray parameters
- ISO 11783-10 – ISOBUS communication
- CRISTAL – barcode
- SC6/WG21 – drift measurement protocols and capabilities
- ASTM – Adjuvants
- NOAA/ASTM – Weather, frequency of update, confidence
- Agricultural Meteorology – e.g. Wxdrift.com, regional array, task planning to avoid areas during wind
- AgGateway initiatives
  - 'PAIL' irrigation partnerships
  - ***“OK to Spray”***
  - ***Regulatory Reporting***

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MS-23 and ISO TAG's

MS-54 Prec'n Ag

MS-60 Aerial App'n

ASE-134 and ISO TAG Fertilizer

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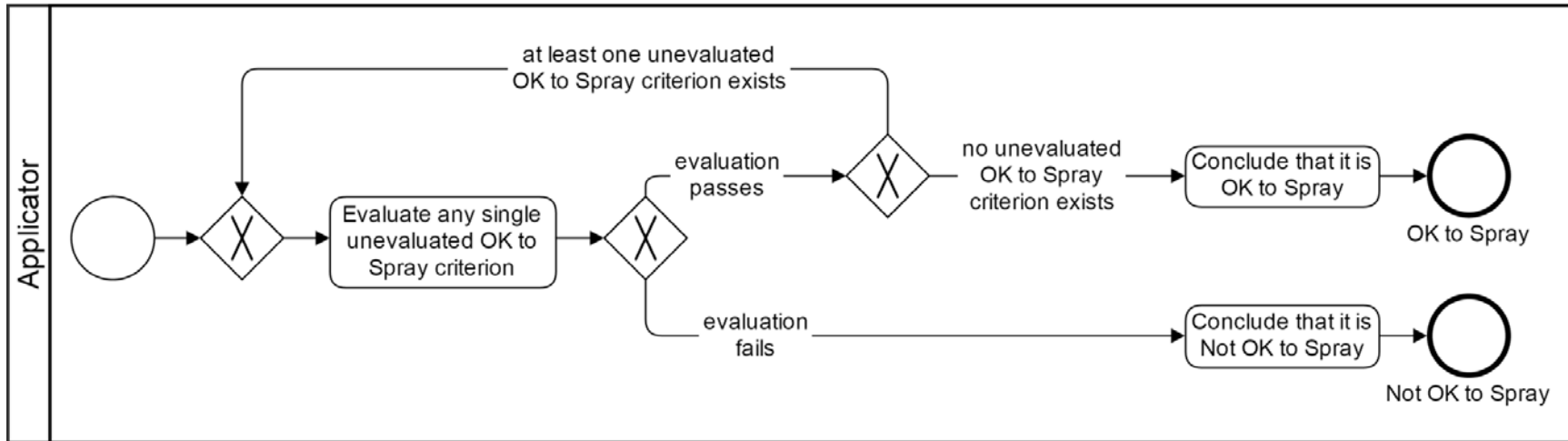
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**Adaptive Sprayer**

ISO 5682 – Sprayer performance  
 ISO/TS 11356 – Spray parameters  
 ISO 11783-10 – ISOBUS communication  
 NOAA – Weather  
 ASTM – Adjuvants  
 AgGateway – 'OK to Spray'  
 AgGateway – Regulatory Reporting



# SPADE Contribution: OK to Spray



A conceptual contribution emerging from the SPADE projects is “OK to Spray” (OK2S): a **process** where a **participant** in the **application of crop protection products on a field** evaluates, repeatedly as needed during **application planning, preparation, and execution**, whether the **conditions necessary to perform the application** are met.



# We need standards (they create opportunity)...

- Developing consensus standards around ideas such as OK2S would make it easier for the industry to leverage increased interoperability and provide richer solutions for common field operations problems.
- Spray drift is a good example:
  - An OK2S standard plus interoperable real-time data sources would enable accurate reporting of compliance or non-compliance. (1)
  - However, it would also enable real-time OK2S evaluation and the ability to **prevent noncompliance** by suspending product application under inadequate conditions. (2)
  - Further, it could enable machinery to **dynamically adapt** to changing conditions to **remain OK2S** under a wider set of conditions. (3)



# Level 1: Documenting the Problem

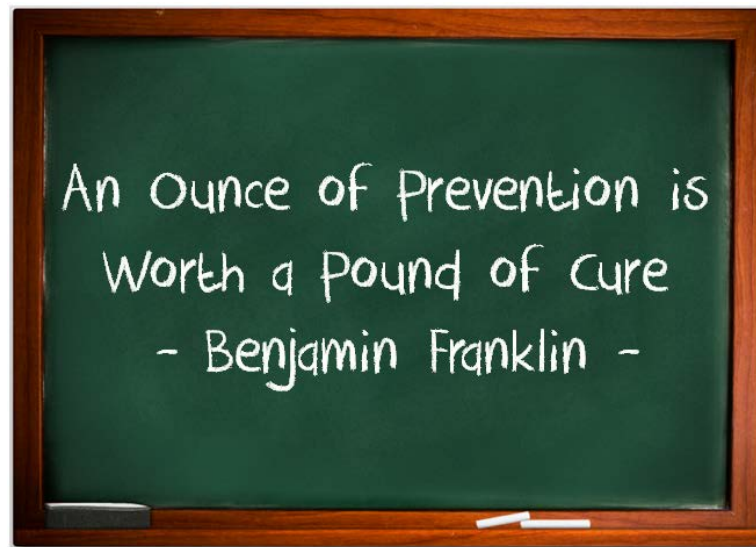
*An OK2S standard plus interoperable real-time data sources would enable accurate reporting of compliance or non-compliance.*

- Think of this in terms of:
  - Automated population of ISO11356 documents (and other data requirements, e.g., GlobalGAP), plus
  - A shared understanding of what constitutes compliance.
- A problem with this approach is that it can only identify a spray drift condition **once it has already happened**. Identifying issues is valuable and enables preventing them from happening again, but at that point any damage has already been done.



# Level 2: Preventing the problem

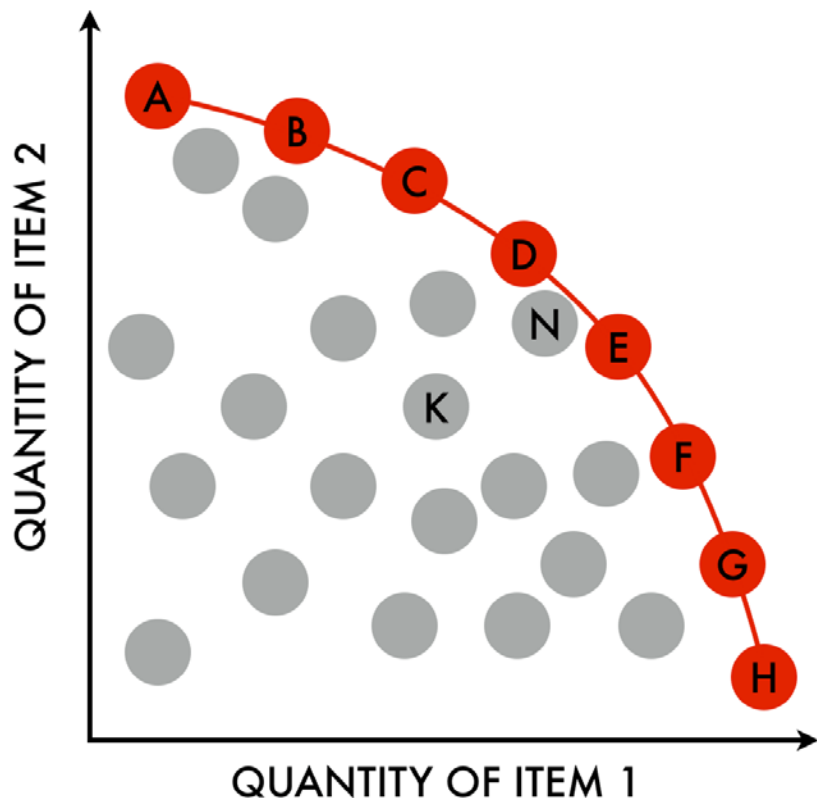
***An OK2S standard plus interoperable real-time data sources would also enable real-time OK2S evaluation and the ability to prevent noncompliance by suspending product application under inadequate conditions.***





# Level 3: Managing the problem

*An OK2S standard plus interoperable real-time data sources could enable machinery to dynamically adapt to changing conditions to remain OK2S under a wider set of conditions.*



Multi-objective optimization problem, constrained by the need to remain OK to Spray at all times.



# “Future of Application Techniques”

## Outcome of the Session:

- SC 6 CAG is exploring the need to expand and develop liaison approach
- Especially with respect to communication, data and systems approach
- Next SC6 CAG is meeting in April
- Concerns and suggestions of this session will be shared



# Comments

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# Other topics

Follow the data.

Is there a User Story?

What are the associated or  
emerging technologies?

Where are the experts?



# Other topics

- Autonomous Machines
- Aerial Drone Tasks
- Commodity Traceability



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**Autonomous Operation**

ISO 18497 – Automated Ag  
 ISO 17757 – Automated EM (TC127)  
 ISO 16001 – Detection systems (TC127)  
 Intelligent Transport Sys – US DOT “V2V”

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**Aerial Drone Tasks**

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Commodity Traceability

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# Wrap up

- Liaison roles
- Joint Working groups
- Projects
- Sequence, strategy in development work



# Questions? Contact us!

- Standards, Current example: Todd Howatt  
[todd.howatt@agcocorp.com](mailto:todd.howatt@agcocorp.com)
- AgGateway (SPADE PAIL, ADAPT): Andres Ferreyra  
[andres.ferreyra@agconnections.com](mailto:andres.ferreyra@agconnections.com)
- Data Transparency Evaluator: Ben Craker  
[ben.craker@agcocorp.com](mailto:ben.craker@agcocorp.com)

