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# Automation in Drip Irrigation

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The Toro Company

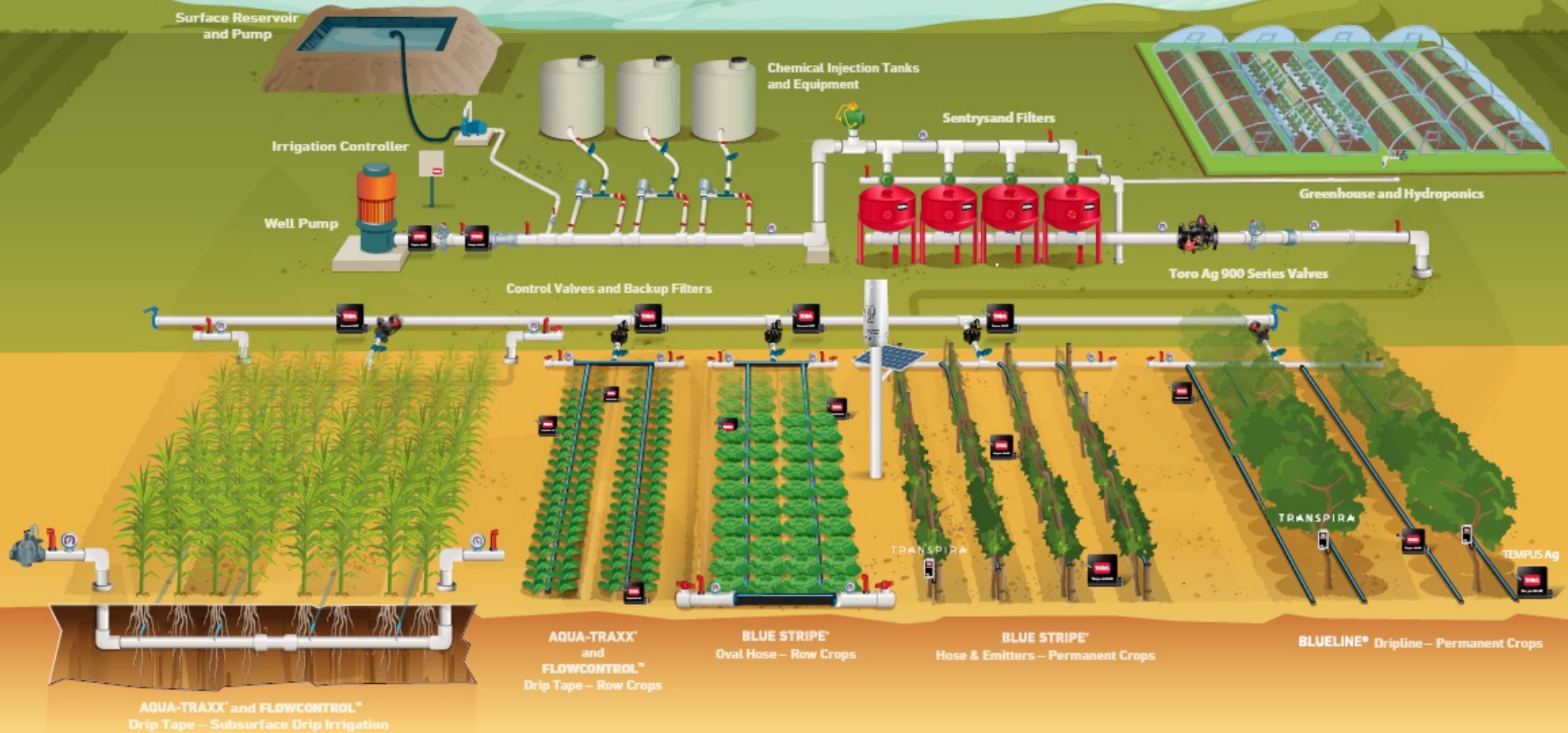


# Automation in Drip Irrigation

## Agenda

- Where does automation fit in a drip system?
- The job of irrigation management
- Benefits of automation
- Automation system components
- System architecture
- Considerations in selecting an automation system

# Typical Drip Irrigation System





# Typical Drip Irrigation System



Potential for Automation

Pumps

Fertigation

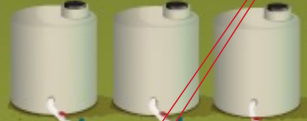
Filtration

Climate Control

Field Valves

Monitoring

Surface Reservoir and Pump

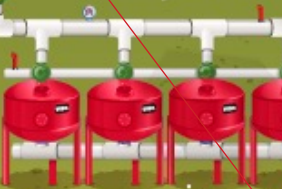


Chemical and Equipment

Irrigation Controller



Centrifugal Filters



Greenhouse and Hydroponics



Toro Ag 900 Series Valves

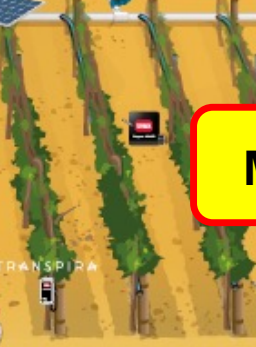
Control Valves and Backup Filters



AQUA-TRAXX<sup>®</sup> and FLOWCONTROL<sup>™</sup>  
Drip Tape – Subsurface Drip Irrigation



AQUA-TRAXX<sup>®</sup> and FLOWCONTROL<sup>™</sup>  
Drip Tape – Row Crops



BLUE STRIPE<sup>®</sup>  
Hose & Emitters – Permanent Crops



BLUELINE<sup>®</sup> Dripline – Permanent Crops

TRANSPIRA

TRANSPIRA

TEMPUS Ag

# Automation in Drip Irrigation

*Focus on the job...*

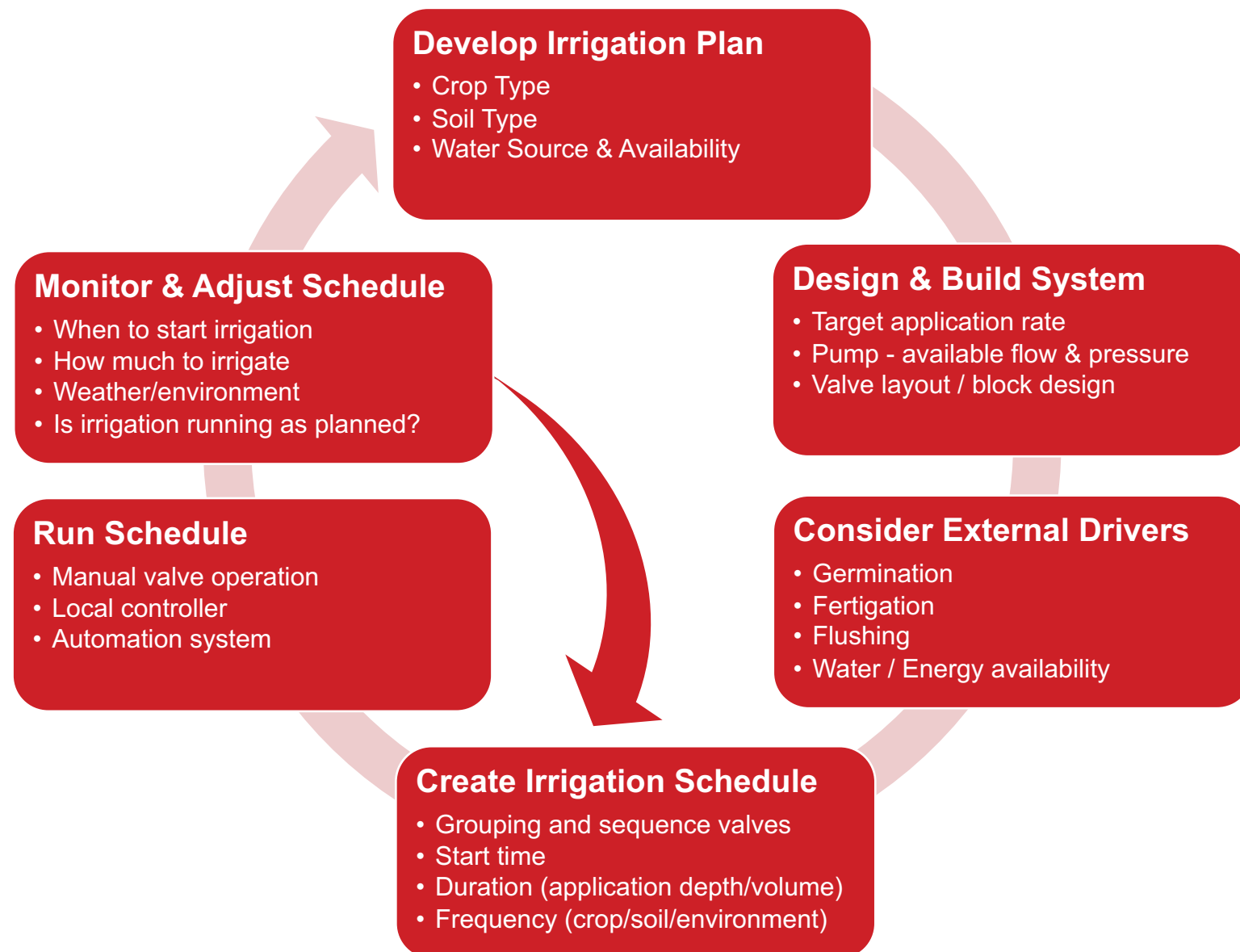
## Irrigation Management

*...and how to make it:*

*Easier*

*More efficient*

*More productive*



# Benefits of Automation

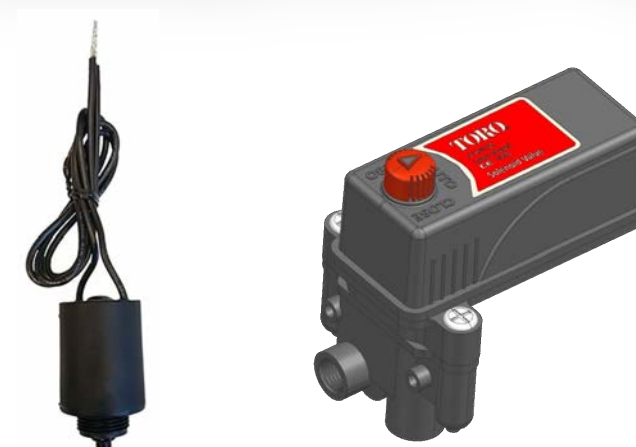
## Easier – More Efficient – More Productive

- Less effort to build & implement an irrigation schedule.
- Reduce time & labor to run irrigations.
- Ensure the schedule runs as planned.
- Apply water and fertilizer more precisely and at any time.
- Match water and fertilizer applications to crop needs.
- Adjust as conditions change over the season.

# Automation System Components

## Valves and Solenoids

- Irrigation valves with electric control option.
- AC / DC / DC Latching solenoids react an electrical signal from controller to open/close the valve.



# Automation System Components

## Controller

- Direct interface to valves and pumps.
- Programmable to run on a schedule or run on demand.
- Options for local or remote programming
- AC or DC power

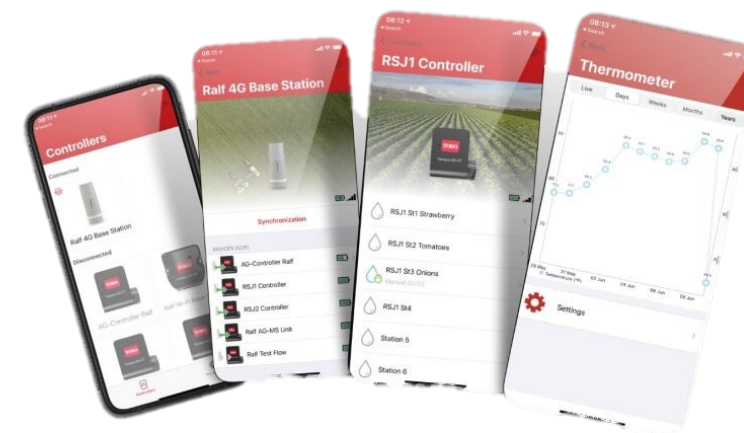




# Automation System Components

## Programming Interface

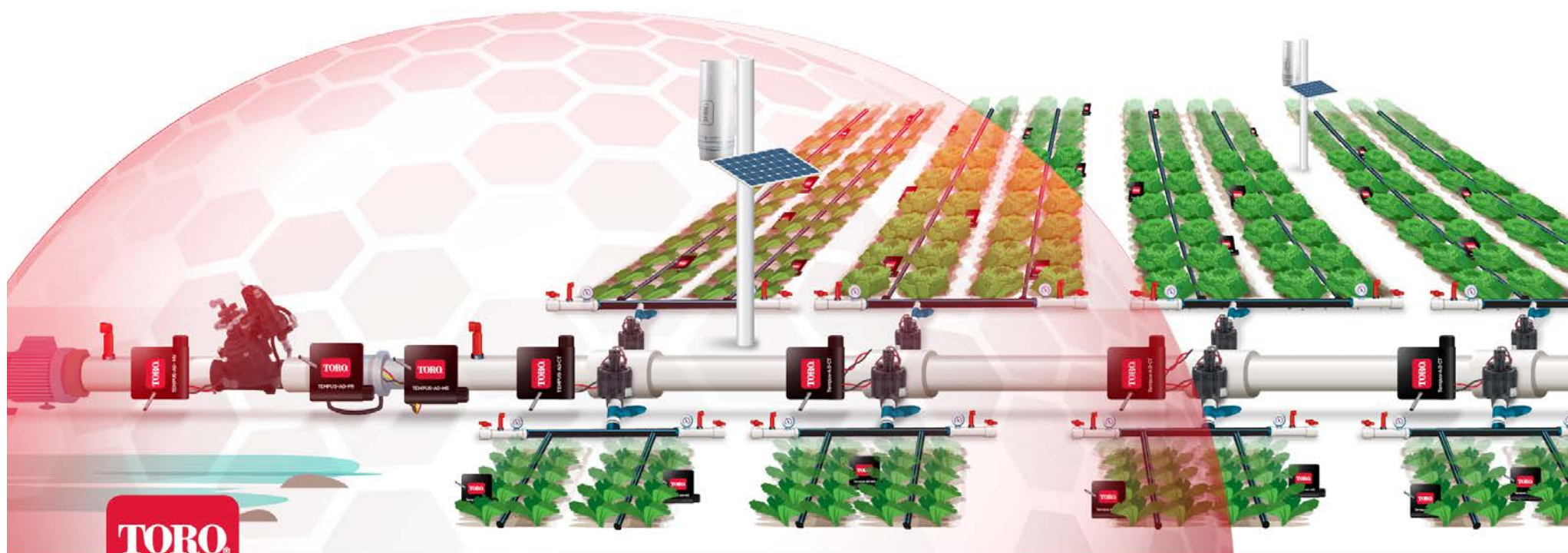
- Local via controller display or mobile app (Bluetooth).
- Remote options via app or web interface.



# Automation System Components

## Optional: Remote Control

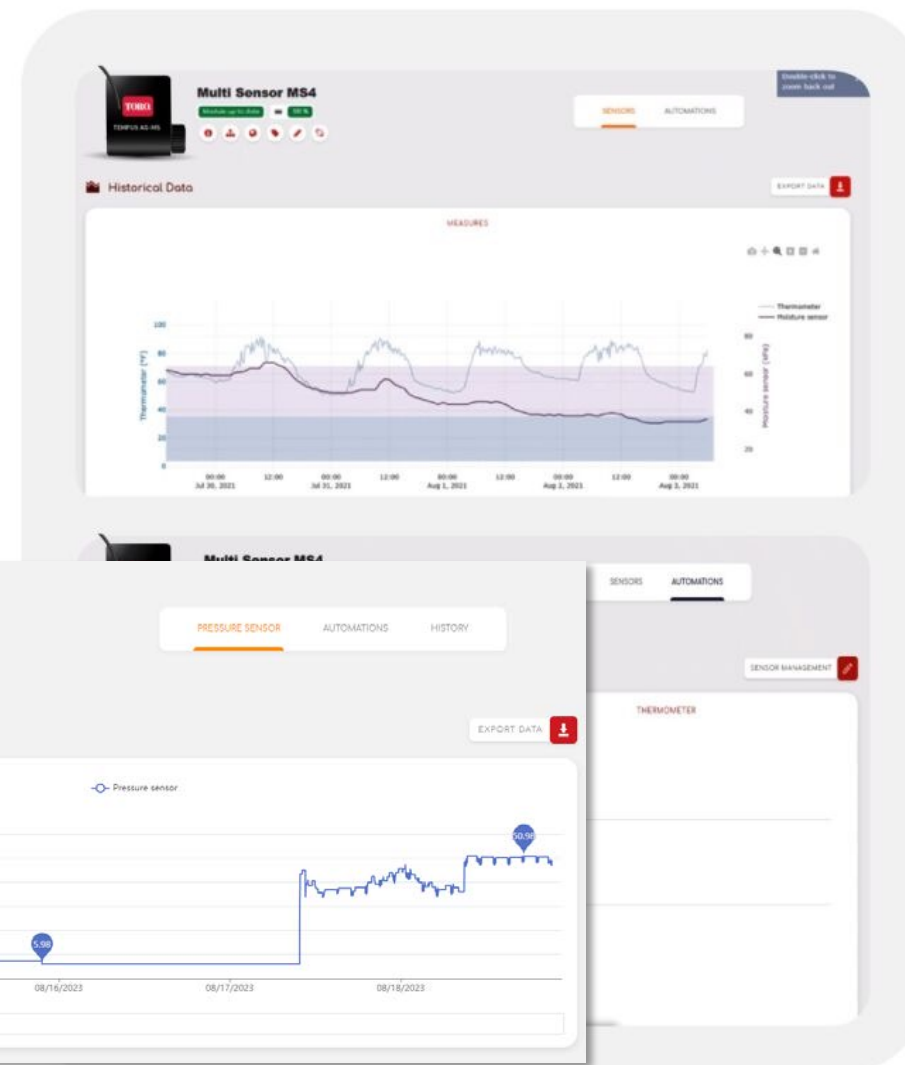
- Manage your irrigation system from anywhere



# Automation System Components

## Optional: Field Monitoring

- Use field insights to drive irrigation decisions
  - Pressure
  - Flow
  - System on/off
  - Soil Moisture
  - Weather





# System Architecture

- Modularity – systems can be designed to grow with your needs



## LOCAL CONTROL WITH MOBILE DEVICE

- Directly schedule and operate valves without long wire runs
- Build confidence in Automation
- Cost effective (no data plan)



## WI-FI OR CELLULAR BASE STATION

- Remotely manage from anywhere
- Operate multiple controllers with one schedule - no wires!
- Add monitoring devices to confirm the system is running as planned

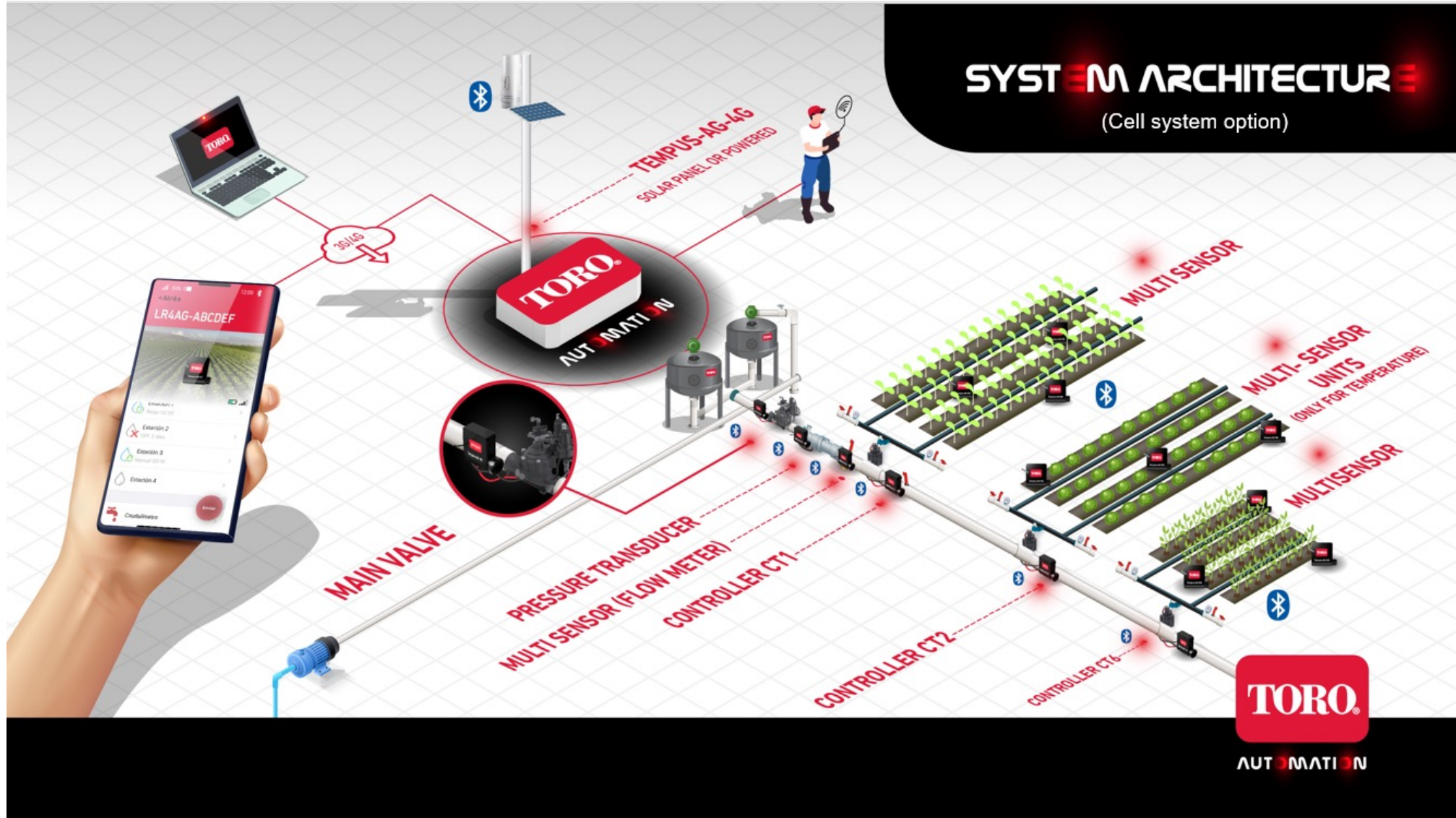


## MULTIPLE BASE STATIONS

- Manage large areas as one system
- Easy setup in the field
- Mix-and-match Wi-Fi and 4G base stations

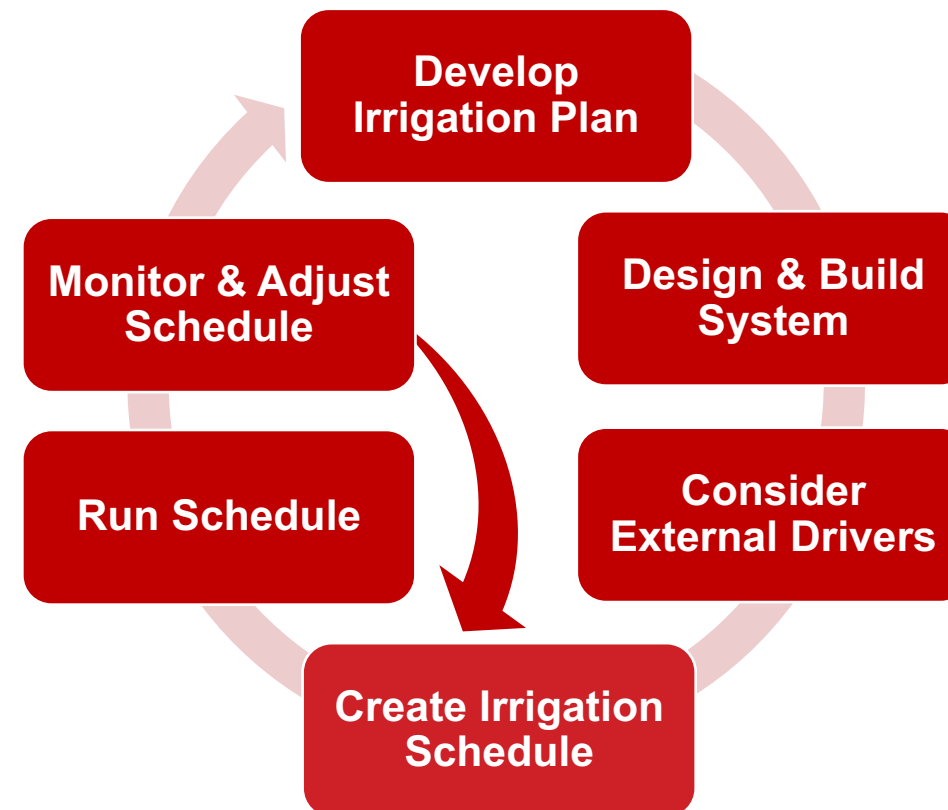


# System Architecture



# Considerations for an Automation System

- **Fits my workflow**
- **Easy to use / operate**
- **Easy to install**
- **Features / expandability**
- **Support**
- **Price / budget**





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