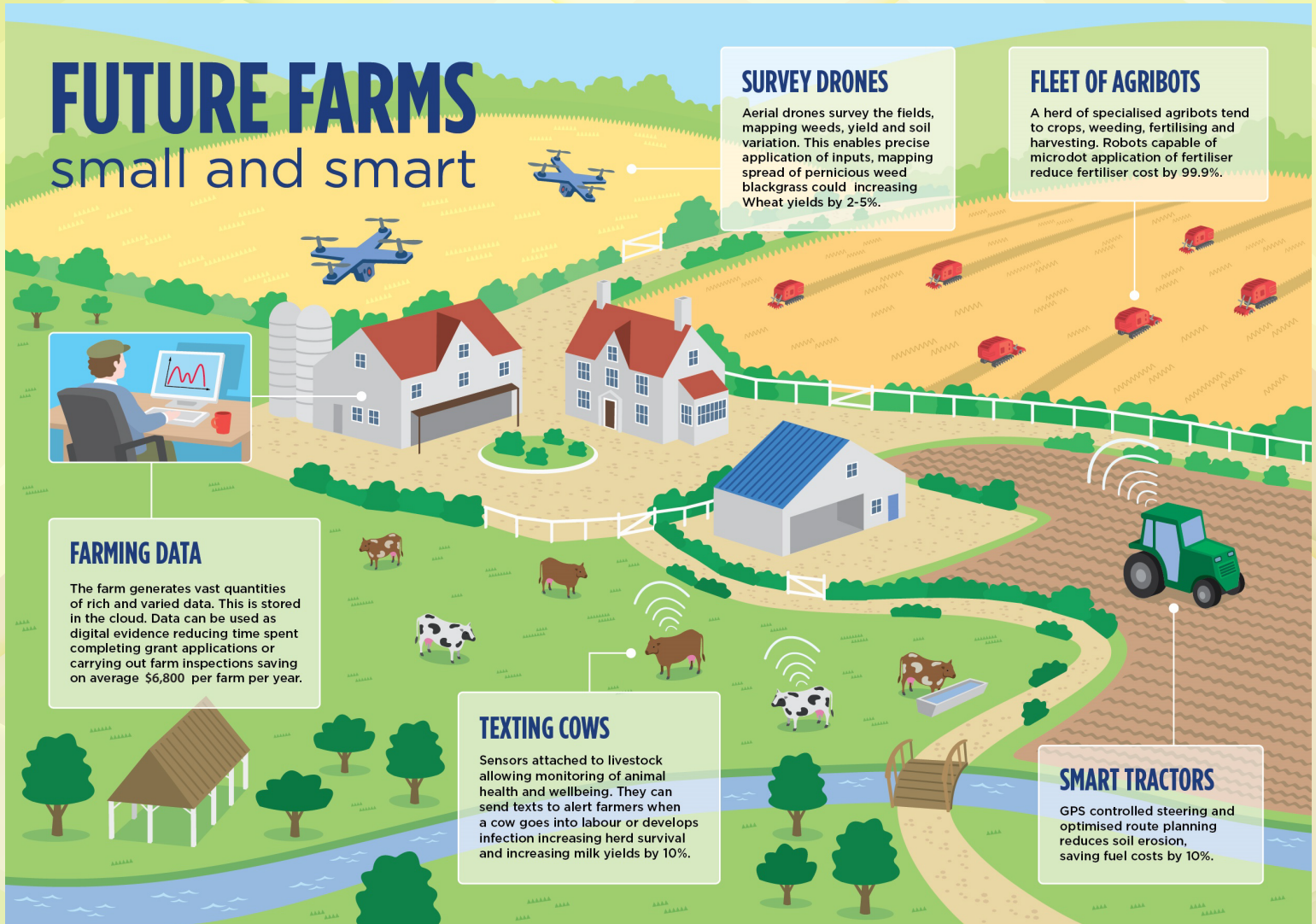


TECHNOLOGY TEARDOWN



FUTURE FARMS small and smart

SURVEY DRONES

Aerial drones survey the fields, mapping weeds, yield and soil variation. This enables precise application of inputs, mapping spread of pernicious weed blackgrass could increase Wheat yields by 2-5%.

FLEET OF AGRIBOTS

A herd of specialised agribots tend to crops, weeding, fertilising and harvesting. Robots capable of microdot application of fertiliser reduce fertiliser cost by 99.9%.

FARMING DATA

The farm generates vast quantities of rich and varied data. This is stored in the cloud. Data can be used as digital evidence reducing time spent completing grant applications or carrying out farm inspections saving on average \$6,800 per farm per year.

TEXTING COWS

Sensors attached to livestock allowing monitoring of animal health and wellbeing. They can send texts to alert farmers when a cow goes into labour or develops infection increasing herd survival and increasing milk yields by 10%.

SMART TRACTORS

GPS controlled steering and optimised route planning reduces soil erosion, saving fuel costs by 10%.

SENSORS

- Monitoring of animal health
- Environment Monitoring
- Collect farming data

REAL TIME LOCATION SYSTEM

- Sensor-based field & resource mapping
- Livestock tracking, geofencing, smart logistics & warehousing

SURVEY DRONES

- Survey fields & map weeds
- Monitor yield & soil variation
- Livestock monitoring

MICRO-CONTROLLER SYSTEM

- Compute and interface sensor data with wireless subsystems

SMART TRACTORS / VEHICLES

- GPS controlled steering and optimized route planning

CLOUD

- Remote Monitoring
- Data storage

SMART FARMS

PRODUCT	TECHNOLOGY	SUPPLIERS	SUGGESTED PRODUCTS	DEVELOPMENT KITS
SENSORS				
SENSORS	Optical, Humidity, Temperature, Biometric, Capacitive Touch, Hall sensors	Silicon Labs, Micronas, iC Haus	HALL 37xy, Si1132-A10-GMR	Sensor Puck, Thunderboard Sense, Hall Sensor In-a-Box kit
MICRO-CONTROLLER SYSTEM				
MCU	8051, ARM M0+, ARM M3, ARM M4	Silicon Labs, GigaDevice	Laser Bee, Pearl Gecko	SLSTK2030A, SLSTK3401A
REAL TIME LOCATION SYSTEM (RTL)				
ULTRA WIDE BAND	802.15.4	DecaWave	DW1000, DWM1000	EVK1000, TREK1000
CLOUD				
Wi-Fi	802.11a/b/g/n/ac	Digi, Silicon Labs, MediaTek, RealTek, Taiyo Yuden	WGM110, ConnectCore for i.MX6UL, PremierWave 2050 (802.11ac)	SLWSTK6120A
CELLULAR	3G, 4G LTE	Digi, Telit	Telit LE910 LTE 3GPP HSPA+, Telit LE910 Cat-1	LTE-IN-A-BOX-ATT (Telit: LTE w/ 3G Fallback)
LONG RANGE CONNECTIVITY				
LoRa	LPWAN	Multitech	MultiConnect® xDot, MultiConnect® Conduit	MultiConnect® mDot™ Developer Kit
SHORT RANGE CONNECTIVITY				
BLUETOOTH	BT 4.2, BT 5.0 (BLE, Classic)	Silicon Labs, Taiyo Yuden, Nordic Semiconductor	BGM123, BGM121, NRF52	SLWSTK6101C, nrf52 DK
RFID	RFID	CAENRFID	RFID E-seal (TAGS), R11701 - qIDmini (Reader)	R11701DK - QIDMINI
COMBO TECHNOLOGIES	802.11a/b/g/n + BT3.0, 11ac + BT4.1, Dual Mode BT + Wifi + Zigbee,	Taiyo Yuden, MediaTek, Digi	WYSBMVGXB	WBSBHVXGXG, MT3333/MT3337/MT3339
SMART TRACTORS / VEHICLES				
GNSS / GPS	GPS, GLONASS, Galileo or Beidou	TELIT, Taiyo Yuden, MediaTek	SL869, SE873	SL869-EVK, SE873-GNSS-EVK
ANTENNAS				
ANTENNA	External, Outdoor, Internal	EAD, Antenova, Hirschmann Solutions	LCO7270-WMB	A10204-01 -U2
SURVEY DRONES				
VIDEO ENCODER	Video compression for streaming via WiFi / Cellular	Averlogic	AL582	AL582C-CMOS-DMB-A2
CAMERA INTERFACE	Lattice image sensor bridge / ISP engine (FPGA based)	Lattice	LIF-MD6000	LIF-MD6000 Master Link Board