

# Recommendation

## **ITU-T Y.2256 (09/2024)**

SERIES Y: Global information infrastructure, Internet protocol aspects, next-generation networks, Internet of Things and smart cities

Next Generation Networks – Service aspects:  
Interoperability of services and networks in NGN

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## **Overview of unmanned smart farms based on networks**

# ITU-T Y-SERIES RECOMMENDATIONS

## Global information infrastructure, Internet protocol aspects, next-generation networks, Internet of Things and smart cities

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# Recommendation ITU-T Y.2256

## Overview of unmanned smart farms based on networks

### Summary

Recommendation ITU-T Y.2256 provides an overview of unmanned smart farms based on networks. The scope of this Recommendation includes a reference architecture and identifies services required to support unmanned smart farms.

### History\*

| Edition | Recommendation | Approval   | Study Group | Unique ID          |
|---------|----------------|------------|-------------|--------------------|
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### Keywords

Smart farm machines, unmanned smart farm.

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## Introduction

At present, unmanned services in the agriculture sector are developed and utilized to perform simple tasks such as monitoring the growth environment of crops, as well as to handle various tasks that used to be done by human hands [b-FG-AI4A-I-162]. In order to enhance the competitiveness of the agriculture sector, demand for the development of unmanned services in the sector has been constantly growing to respond to the need for increased production and to find an alternative for performing simple, but labour-intensive, farm chores. In addition, it is essential to integrate smart machines with nearby smart farm equipment which use information and communication technology (ICT) to increase utilization and automation skills. In order to properly operate the agricultural smart machines which utilize ICT and take full advantage of cutting-edge technologies, it is necessary to define a new concept, and to standardize the requirements that should be met before implementing the new smart farm service. This Recommendation defines a reference architecture and an overview of services for the unmanned smart farm.

# Recommendation ITU-T Y.2256

## Overview of unmanned smart farms based on networks

### 1 Scope

This Recommendation addresses unmanned smart farms based on networks. The scope of this Recommendation includes:

- Concept of unmanned smart farm services;
- Reference architecture;
- Service requirements;
- Service scenarios.

### 2 References

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published. The reference to a document within this Recommendation does not give it, as a stand-alone document, the status of a Recommendation.

- [ITU-T X.1752] Recommendation ITU-T X.1752 (2022), *Security guidelines for big data infrastructure and platform*.
- [ITU-T Y.3101] Recommendation ITU-T Y.3101 (2018), *Requirements of the IMT-2020 network*.

### 3 Definitions

#### 3.1 Terms defined elsewhere

This Recommendation uses the following terms defined elsewhere:

**3.1.1 agro-industry** [b-ITU-T Y.2245]: The agricultural activity of an area viewed as an industrial sector of the economy.

**3.1.2 big data** [b-ITU-T L.1390]: A term that describes the large volume of data – both structured and unstructured – that inundates a business on a day-to-day basis.

**3.1.3 expertise data** [b-ITU-T Y.2244]: Values gathered from skilled service users, experts, service user communities that will help cultivation.

**3.1.4 log data** [b-ITU-T Y.2244]: Values tracked from past consultation, past cultivation records, final profits per variety of crop, etc.

**3.1.5 measured data** [b-ITU-T Y.2244]: Values recorded from sensors or measurement facilities, or gathered from agricultural product markets or distribution networks, or government agencies or statistic offices including cultivation data, market status data, production cost data.

**3.1.6 smart farm** [b-ITU-T Y.2245]: Farms that can control the growing environment for crops and livestock automatically and remotely by applying ICT to greenhouse farms, livestock farms, bare ground.

**3.1.7 smart farming service provider** [b-ITU-T Y.4450]: The service role that provides the requested Smart Farming services, such as providing a portal or consulting based on data gathered from agricultural fields, to requesting users.

## 3.2 Terms defined in this Recommendation

This Recommendation defines the following terms:

**3.2.1 smart farm machines:** Intelligent machines that can perform the entire process of farming (seeding, breeding, harvesting, etc.) by the use of mechanical devices (robots, drones, tractors, irrigation equipment, etc.) combined with ICT technologies such as IoT, big data, artificial intelligence and IMT-2020.

**3.2.2 unmanned smart farm:** A farm that works autonomously with limited human intervention by combining smart farm machines.

## 4 Abbreviations and acronyms

This Recommendation uses the following abbreviations and acronyms:

|        |                                               |
|--------|-----------------------------------------------|
| AAA    | Authentication, Authorization and Accounting  |
| AI     | Artificial Intelligence                       |
| DB     | Database                                      |
| DRM    | Digital Right Management                      |
| DT-ITS | Digital Twin for Intelligent Transport System |
| EC     | Electric Conductivity                         |
| ICT    | Information and Communication Technology      |
| IoT    | Internet of Things                            |
| LP     | Low Power                                     |
| LAN    | Local Area Network                            |
| NGN    | Next Generation Network                       |
| UAV    | Unmanned Aerial Vehicle                       |
| USV    | Unmanned Surface Ship                         |
| WAN    | Wide Area Network                             |

## 5 Conventions

In this Recommendation:

The keywords "is required to" indicate a requirement which must be strictly followed and from which no deviation is permitted if conformance to this document is to be claimed.

The keywords "is recommended" indicate a requirement which is recommended but which is not absolutely required. Thus, this requirement needs not be present to claim conformance.

The keywords "can optionally" and "may" indicate an optional requirement which is permissible, without implying any sense of being recommended. These terms are not intended to imply that the vendor's implementation must provide the option and the feature can be optionally enabled by the network operator/service provider. Rather, it means the vendor may optionally provide the feature and still claim conformance with the specification.