International Telecommunication Union

# ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

# F.922

(08/2020)

SERIES F: NON-TELEPHONE TELECOMMUNICATION SERVICES

Accessibility and human factors

# Requirements of information service systems for visually impaired persons

Recommendation ITU-T F.922

International Telecommunication Union

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# Recommendation ITU-T F.922

## Requirements of information service systems for visually impaired persons


### Summary

Recommendation ITU-T F.922 establishes requirements for an information service system for visually impaired persons (ISS-VIPs), based on the mobile Internet, which connects visually impaired persons (VIPs) and volunteers. With the assistance of volunteers, the system enables VIPs to solve problems not yet handled by automatic assistive technology. The ISS-VIPs is constructed in client/server mode, enabling VIPs and volunteers to access it through their client software and to use its services or to provide its services to another person. The ISS-VIPs provides three kinds of service: image recognition; video assistance; and trip companion. The ISS-VIPs also supports the use of other software tools for assisting VIPs, so as to save valuable volunteer resources for service provision in person. While provision of services to VIP is the top priority, the ISS-VIPs can also be used by non-VIP with special service requirements.



### History

| Edition | Recommendation | Approval | Study Group | Unique ID* |
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| 1.0 | ITU-T F.922 | 2020-08-13 | 16 | 11.1002/1000/14335 |

### Keywords

Accessibility, information service system, Internet, mobile network, visually impaired persons.


* To access the Recommendation, type the URL http://handle.itu.int/ in the address field of your web browser, followed by the Recommendation's unique ID. For example, http://handle.itu.int/11.1002/1000/11830-en.

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## Table of Contents

# Recommendation ITU-T F.922

## Requirements of information service systems for visually impaired persons

### 1 Scope

This Recommendation establishes requirements for an information service system for visually impaired persons (VIPs), including those for the system composition, service mode, server function, client function and service process procedure.

### 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.

None.

### 3 Definitions

#### 3.1 Terms defined elsewhere

This Recommendation uses the following terms defined elsewhere:

**3.1.1 accessibility** [b-ITU-T F.791]: The degree to which a product, device, service or environment (virtual or real) is available to as many people as possible.

**3.1.2 assistive technology** [b-ITU-T F.790]: Piece of equipment, product system, hardware, software or service that is used to enable, maintain or improve functional capabilities of individuals with disabilities.

**3.1.3 disability** [b-ITU-T F.791]: An evolving concept, which refers to the interaction between persons with impairments, and attitudinal and environmental barriers that hinder their full and effective participation in society on an equal basis with others.

#### 3.2 Terms defined in this Recommendation

This Recommendation defines the following terms:

**3.2.1 ISS-VIPs user**: A person who accesses the information service system for visually impaired persons (ISS-VIPs) through the mobile Internet, including VIPs and volunteers.

**3.2.2 information service system for visually impaired persons**: A service system which is established on the mobile Internet that provides information services to visually impaired persons (VIPs), the main purpose of which is to help VIPs to solve problems that cannot yet be solved by assistive technology. This system puts VIPs and volunteers in contact with each other and aids VIPs to get necessary timely visual information with the help of volunteers or to find a trip companion for going out.

### 4 Abbreviations and acronyms

This Recommendation uses the following abbreviations and acronyms:

| | |
|---|---|
| AI | Artificial Intelligence |
| APP | Application |
| CMS | Content Management System |
| ISS-VIPs | Information Service System for Visually Impaired Persons |
| OCR | Optical Character Recognition |
| PLMN | Public Land Mobile Network |
| VIP | Visually Impaired Person |
| Wi-Fi | Wireless Fidelity |

## 5 Conventions

None.

## 6 System description

This clause specifies the overall functional architecture of an ISS-VIPs that is established over the Internet and mobile Internet, and composed of server and client units. It also specifies the operation methods of the ISS-VIPs.

Figure 1 shows how VIPs and volunteers connect to the ISS-VIPs. They first connect to a public land mobile network (PLMN) or wireless fidelity (Wi-Fi) by using their mobile phone. Through the PLMN or Wi-Fi, they connect to the Internet. Through the Internet, they connect to the ISS-VIPs.

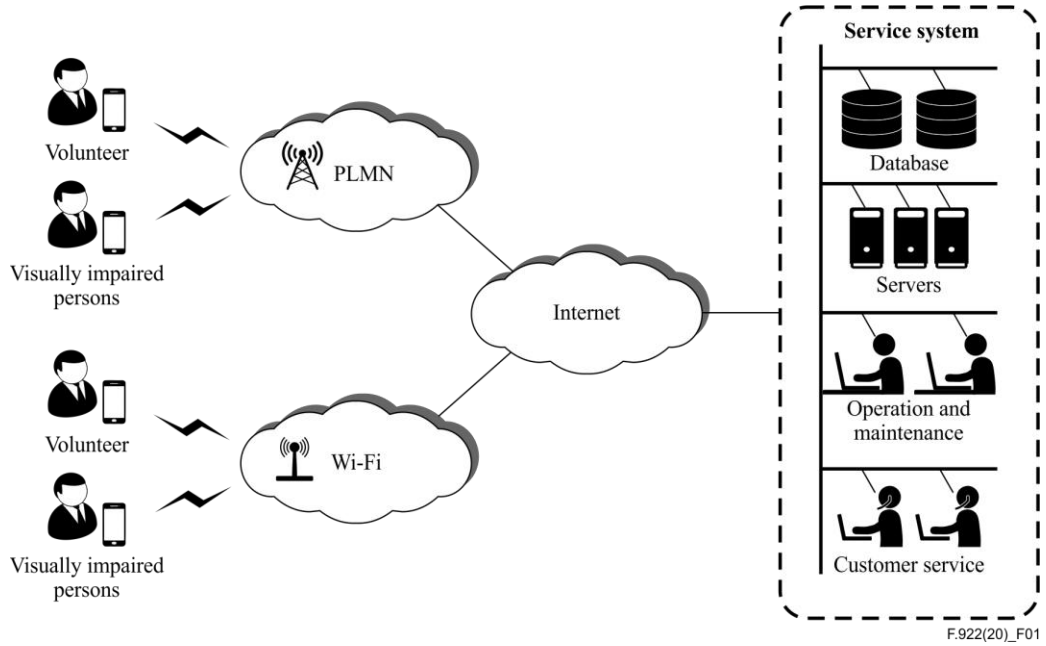


**Figure 1 – Schematic diagram of an information service system for visually impaired persons**

In the central part of Figure 1, one cloud stands for the Internet, with others to its left labelled Wi-Fi and PLMN have their connections to the Internet shown.

In the left part of Figure 1, VIPs and volunteers connect to the Wi-Fi and the PLMN cloud by using their mobile phones.

In the right part of Figure 1, the ISS-VIPs connects to the Internet, which is composed of database, servers, operation and maintenance staff and customer service staff.

The operation methods of the ISS-VIPs are as follows:

– the ISS-VIPs accepts and manages user information, assists users to communicate with each other, and provides technical and service support for users when they access the service system;
– VIPs and volunteers can access the ISS-VIPs via their mobile phones, request or accept service requirements after a communication connection is established and receive or provide voluntary service through the network.

## 7 Service provision method

When users use the ISS-VIPs application (APP), it provides two choices: local technology and remote in-person service. Users can choose to use local processing technology (such as optical character recognition (OCR)) to solve their problems, or use the in-person service of the ISS-VIPs to find a volunteer to help them.

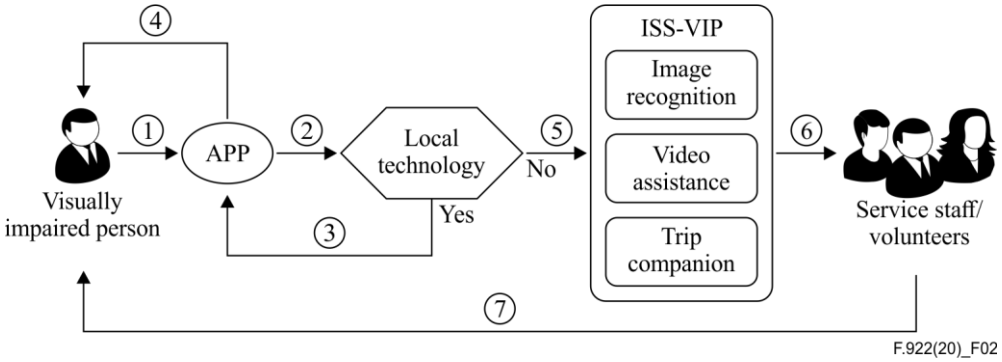


**Figure 2 – Service provision method**

Figure 2 shows how the ISS-VIPs provides services to VIPs, as follows:

(1) a VIP requests services;

(2) by using an artificial intelligence (AI) engine, the APP decides how to help a VIP select local technology or remote in-person service;

(3) if the APP chooses to use local technology, then local processing begins;

(4) the APP returns the results processed by local technology to the VIP;

(5) if the APP chooses to use the remote in-person service, the APP sends the VIP's service request to the ISS-VIPs;

(6) the ISS-VIPs forwards the service request to the staff or volunteer group and waits for the response of an available staff member or volunteer;

(7) the ISS-VIPs helps the VIP to establish contact with the staff member or volunteer, so that the latter can provide service for the former.

## 8 Service mode

This clause specifies the following service modes of the ISS-VIPs, which help volunteers provide service to VIPs:

– image recognition service: answer the questions of VIPs about images they upload;
– video assistance service: guide VIPs to do one thing according to their requests through a video connection;
– trip companion service: help a VIP to find an available volunteer to go to a destination together.

## 9 Server function

This clause specifies the functional requirements of servers for the ISS-VIPs, including user interaction, system management and web management.

### 9.1 User interaction

The user interaction function includes the following sub-functions:

– personal information interaction: process user's personal account information and service mode configuration information;

– service data interaction: receive users' requests in real-time, process service data, support the communication between user-to-system and user-to-user until an integrated service procedure is completed;

– system information interaction: issue system information in real-time, accept and process user feedback opinions.

### 9.2 System management

The system management function includes the following sub-functions:

– operation and maintenance management: perform the functions of system configuration, performance monitoring, failure detection, etc.

– data management: maintain and manage user account information, service information, user feedback opinions, etc.

– service management: perform the functions of service policy configuration, service status tracking, abnormal conditions processing, etc.

– security management: perform the functions of access control, permission control, data backup, disaster recovery, etc.

– statistical analysis: count and analyse user data, service data, operation data, etc.

### 9.3 Website management

The website of the ISS-VIPs is managed by its content management system (CMS), which performs the functions of information collection, information editing and input, information retrieval, access control, supervisory control, etc. The webmaster can access the CMS in the web manner, and manipulate the website through the CMS.

## 10 Client function

This clause specifies the functional requirements of clients of the ISS-VIPs, including clients for VIPs and volunteers.

### 10.1 Client for visually impaired persons

The client for VIPs performs the following functions:

– identity registration: provides personal information according to system requirements, so as to get the qualification to use the ISS-VIPs service;

– login authentication: provides personal account information according to ISS-VIPs requirements when accessing the ISS-VIPs;

– personal information maintenance: registers and manages personal information according to users' own needs;

– AI engine selection: selects the most suitable manner to help the VIP automatically, including selecting local technology or remote in-person service;

– image recognition: sends an image recognition service requirement to the ISS-VIPs, and accepts the reply from a volunteer;
– video assistance: sends a video assistance service requirement to the ISS-VIPs, and accepts the service of a volunteer through a video connection;
– trip companion: sends a trip companion service requirement to the ISS-VIPs, and gets in touch with a volunteer through the ISS-VIPs;
– service record: saves information related to services that a VIP has used;
– social network sharing: sends information related to the ISS-VIPs service to social networks.

### 10.2 Client for volunteers

The client for volunteers performs the following functions:
– identity registration: provides personal information according to system requirements, so as to get the qualification to use system service;
– login authentication: provides personal account information according to system requirements when accessing the ISS-VIPs;
– personal information maintenance: registers and manages personal information according to users' own needs;
– service mode set: sets service type and time, etc. according to personal situations;
– image recognition: accepts an image recognition service requirement from the ISS-VIPs, and provides a reply to the VIP;
– video assistance: accepts a video assistance service requirement from the ISS-VIPs, and provides service to a VIP through a video connection;
– trip companion: accepts a video assistance service requirement from the ISS-VIPs, gets in touch with a VIP through the ISS-VIPs and provides service.
– service record: saves information related to the services that a volunteer has provided;
– social network sharing: sends information related with the ISS-VIPs service to a social network.

## 11 Service process procedure

This clause specifies the complete information transmission and processing procedures of the image recognition service, video assistance service and trip companion service.

The image recognition service process procedure is as illustrated in Figure 3.

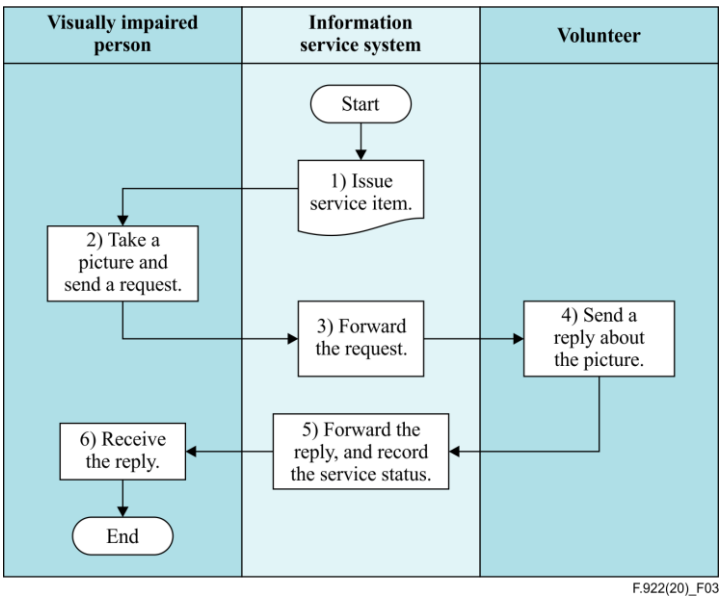


**Figure 3 – Image recognition service process procedure**

As shown in Figure 3, the image recognition service process procedure is as follows:

1) the ISS-VIPs issues service items that include image recognition;
2) after VIPs get the service information, they can take a picture and send a related question to the ISS-VIPs;
3) on receipt of a request from a VIP, the ISS-VIPs forwards it to several online volunteers;
4) the volunteers reply to the ISS-VIPs, to explain the content of the picture in response to the question from the VIP;
5) the system forwards the replies to the VIP; depending on the setting of the system or VIP user preference, the system sends the first reply, or the first three replies or all replies to the VIP;
6) the VIP receives the replies.

The video assistance service process procedure is as illustrated in Figure 4.

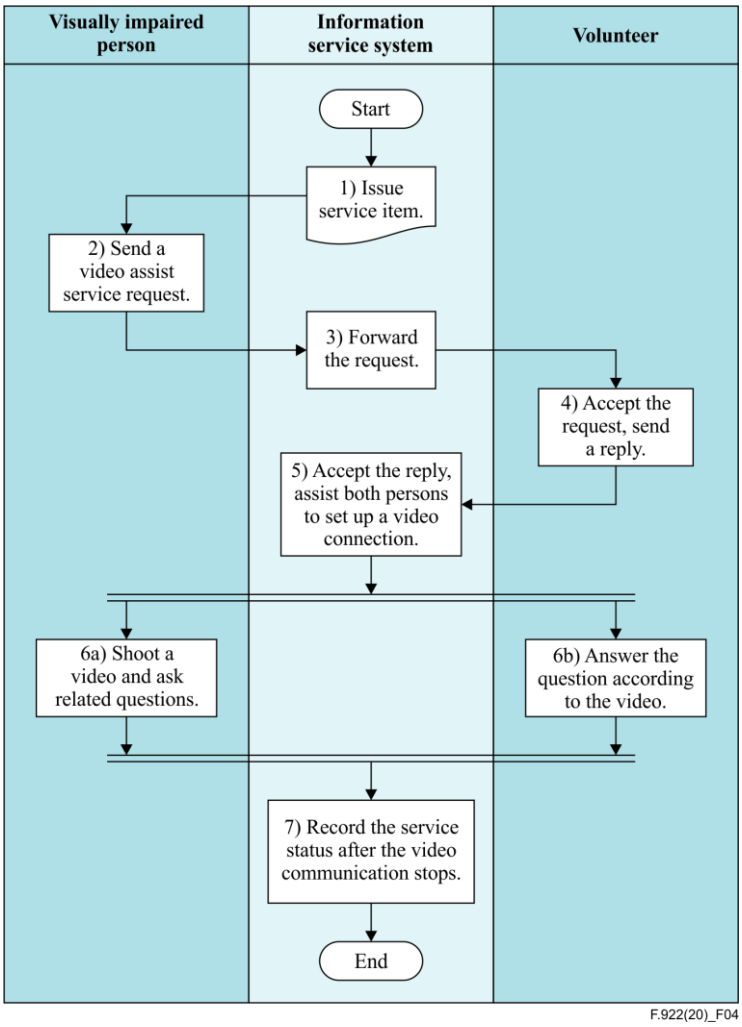


**Figure 4 – Video assistance service process procedure**

As shown in Figure 4, the video assistance service process procedure is described as follows:

1) the ISS-VIP issues service items that include video assistance;

2) after VIPs get the service information, they can send a video assistance service request to the ISS-VIPs;

3) on receipt of a request, the ISS-VIPs forwards it to several online volunteers;

4) the volunteers wishing to provide service reply to the ISS-VIPs;

5) when the ISS-VIPs receives the first reply, it establishes a video connection between the VIP and the volunteer;

6a) the VIP shoots a video and asks questions through the video connection;

6b) the volunteer answers the questions according to the video, until the VIP's problem is solved.

7) after video communication stops, the ISS-VIPs records the service status.

The trip companion service process procedure is as illustrated in Figure 5.

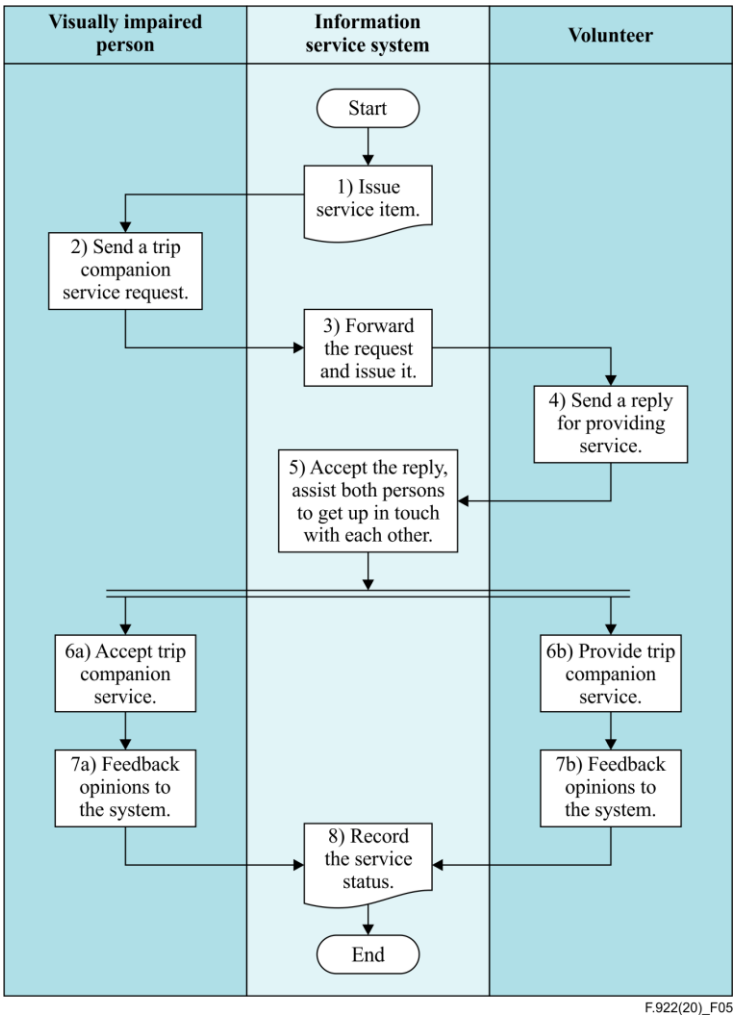


**Figure 5 – Trip companion service process procedure**

As shown in Figure 5, the trip companion service process procedure is described as follows:

1) the ISS-VIPs issues service items that include trip companions;
2) after VIPs get the service information, they can send a trip companion service request to the ISS-VIPs;
3) on receipt of a request, the ISS-VIPs forwards it to several online volunteers;
4) volunteers wishing to provide service reply to the ISS-VIPs;
5) when the ISS-VIPs receives the first reply, it puts the VIP and the volunteer in touch with each other;
6a) the VIP accepts the trip service and goes to the destination with the volunteer;
6b) after the trip, the VIP feeds opinions back to the ISS-VIPs;
7a) the volunteer provides service and goes to the destination with the VIP;
7b) after the trip, the volunteer feeds opinions back to the ISS-VIPs;
8) after the service is over, the ISS-VIPs records the service status.

# Bibliography


[b-ITU-T F.790] Recommendation ITU-T F.790 (2007), *Telecommunications accessibility guidelines for older persons and persons with disabilities*.

[b-ITU-T F.791] Recommendation ITU-T F.791 (2007), *Accessibility terms and definitions.*

[b-ITU-T F.921] Recommendation ITU-T F.921 (V2) (2018), *Audio-based indoor and outdoor network navigation system for persons with vision impairment.*

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