International Journal of Scientific Engineering and Research (IJSER)
www.ijser.in
ISSN (Online): 2347-3878, Impact Factor (2015): 3.791

Automatic Terminal Information System (ATIS)

Durwa Dandegaokar[1], Sandeep Katre[2], S. V. More[3]

[1]Padmabhooshan Vasantdada Patil Institute of Technology, Department of E&TC, PVPIT, Pune, Maharashtra, India

Abstract: ***Automatic Terminal Information System, or ATIS, is an innovative concept used to update the pilot about the latest runway conditions and other emergency detail (may change from time to time) necessary while landing and take-off. The main aim of the project is to convert the data acquired from Automatic Weather Station (AWS) into Human voice and broadcast it from Air Traffic Control (ATC) and simultaneous transmission of digital data that can be displayed in the cockpit. The wireless transmission uses VHF band (allocated for Aviation).***

Keywords: Automatic Terminal Information System, Air Traffic Control (ATC), broadcasting network

1. Introduction

To convert the weather information (Text) into standard ATIS voice message by Text to Speech conversion and simultaneous broadcast of voice. Recovery of voice is done and data is displayed simultaneously in the cockpit. **Automatic Terminal Information System**, or **ATIS**, is a continuous broadcast of recorded uncontrolled information in busier terminal (i.e. airport) areas. ATIS broadcasts contain essential information, such as weather information, which runways are active, available approaches, and any other information required by the pilots. Pilots usually listen to an available ATIS broadcast and simultaneously can read same information displayed at cockpit if necessary before contacting the local control tower, in order to reduce the controllers' workload and relieve frequency congestion. The following are the necessary parameters of weather during the landing/take-off.

a. Wind Speed
b. Wind Direction
c. Visibility
d. Temperature
e. Humidity
f. Pressure

a. Wind Speed

A wind speed is required for aircraft landing and takeoff. It play a very vital role as the pilot should know the wind speed at ground (at air strip).So as to take up the control on engine. Speed of the aircraft is measured with respect to wind speed.

b. Wind Direction

The aircraft has to always land/take-off into the wind, as this has a direct relation with the stability of the aircraft. The rudder (the vertical surface of the tail) & fin are to be adjusted so that the effect of the wind direction can be notified.

c. Visibility

Minimum visibility required while take-off depends on the facilities at the air-base, like runway dimension, runway illumination & navigational aids like the Instrument Landing System (ILS, GPS, DME, VOR). With ILS landing/take-off is possible at zero visibility. But this is not the case with all the aircrafts. Still there are aircrafts which are postponed due to poor visibility.

d. Temperature

Temperature has a direct effect on engine performance and required take-off speed. High temperatures generally result in reduced air-density. In the reduced air density the power generated by the engine of the aircraft is very less. Thus to maintain itself in the air (i.e. to maintain the lift) the engines require more power input.

e. Humidity

Humidity indicates the moisture content in the atmosphere. Moisture content in the air results in very high power consumption.

f. Pressure

Pressure measured at the aerodrome base is used as a reference for the altimeter in the aircraft. The altimeter generally gives the pressure with reference to the ICAO's International Standard Atmosphere (I.S.A). When pilot reaches land, the altimeter shows zero reading. But if it is not set or the reference to altimeter is not proper, the aircraft may not be able to land safely.

g. Height of Clouds

Height of clouds acts as an advanced warning for the pilot about the height at which he'll be able to see the runway markings, edge lights etc. Clouds can severely obstruct the vision of a pilot.

Table 1.1: Cloud Classification

Phrase	*Meaning*	*Cloud coverage*
SKC	Sky Clear	No Cloud
FEW	Few	1 to 2 OKTAS
SCT	Scattered	3 to 4 OKTAS
BKN	Broken	5 to 7 OKTAS
OVC	Overcast	8 OKTAS

2. System Architecture

Automated Terminal Information Service (ATIS) flight deck oriented research will be conducted in three phases. This report describes the first phase, which was a part-task oriented study of basic design variables. The objective of this research effort was to have airline pilots formally comment on human factors issues pertinent to the flight deck display of ATIS information. Preliminary design data can then be provided to workstation system designers for their use in the initial maintenance update by Aeronautical Radio, Inc. (ARINC). Phase II will be the field studies at Airport. Phase III will consist of evaluation in the Federal Aviation Administration (FAA) Technical Center's Reconfigurable Cockpit Simulator (RCS) mockup, and high fidelity simulators, in an operational evaluation-typesetting.

Figure 2.1: ATIS control

a. Automatic Weather Station (AWS): An Automatic Weather Station (AWS) is defined as a station at which instruments make measurement and either transmits or record observations automatically the conversion to code form. The different weather parameters to be broadcast using ATIS are measured and monitored here. The monitoring is done on a continuous uninterrupted basis. The coded values are sent to the ATC.

b. ATC & Computer:
Here the weather parameters obtained from AWS are stored in computer. It is placed where the data available is converted into voice message using text to speech conversion software and digital values are also transmitted in RS232 format for display purpose at the receiver. The voice message is given to the transmitter- FM aviation band radio as a modulating signal input. The computer also sends control signals for transmitting radio for on/off purpose and maintains synchronization between PC & receiver.

3. Application's

- The ATIS is the systems which can be used along with Airport Metrological Observatory Systems (AMOS) as well as Instrumental Landing System (ILS), where the Runway Visibility Range (RVR) is almost zero.

- This system is also efficient for Automatic Railway Announcement System where the system keeps the Station Master aware of incoming Train.

4. Flow Chart

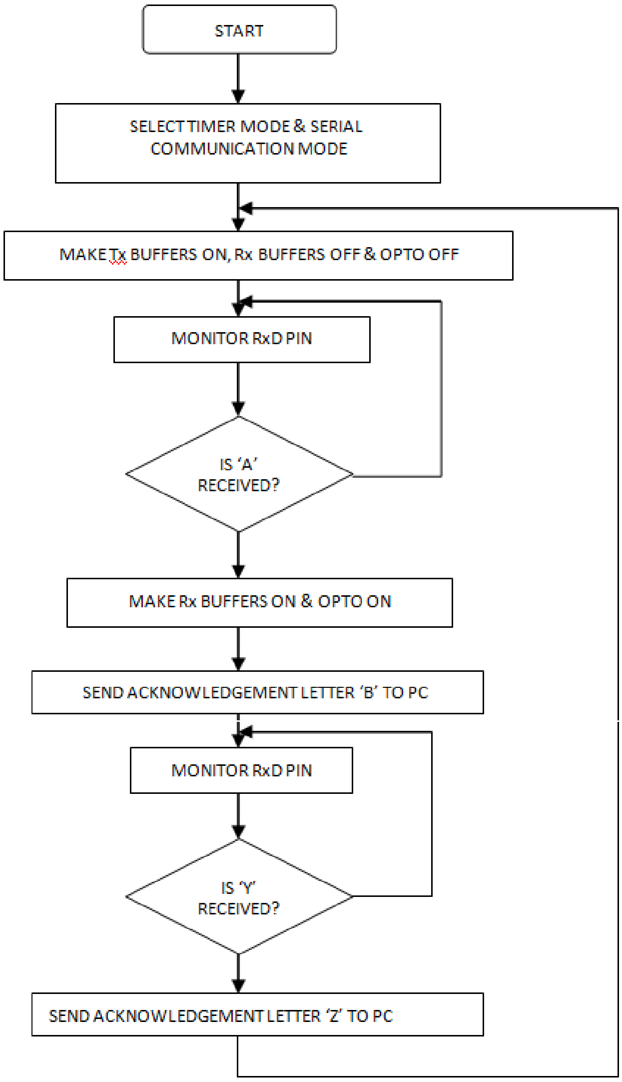

Figure 1: LCD Display of receiver

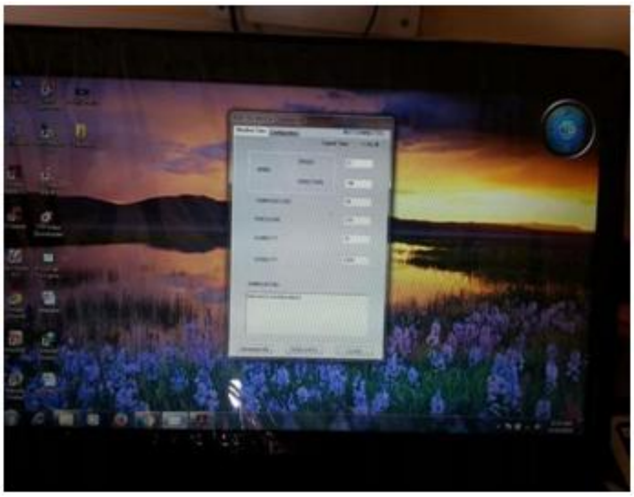

Figure 2: Text to speech software Application

5. Results

Here In this project, we entered the text, (Fig.2) where this Text is converted to speech. So this signals are transmitted through the transmitter circuit Fig.3.receiver. At the receiver end there is one receiver circuit so this transmitted signals are received by receiver circuit (Fig.4) and text is converted to speech and displayed on LCD Screen as shown in (Fig.1) as shown below.

Figure 3: Transmitter circuit kit

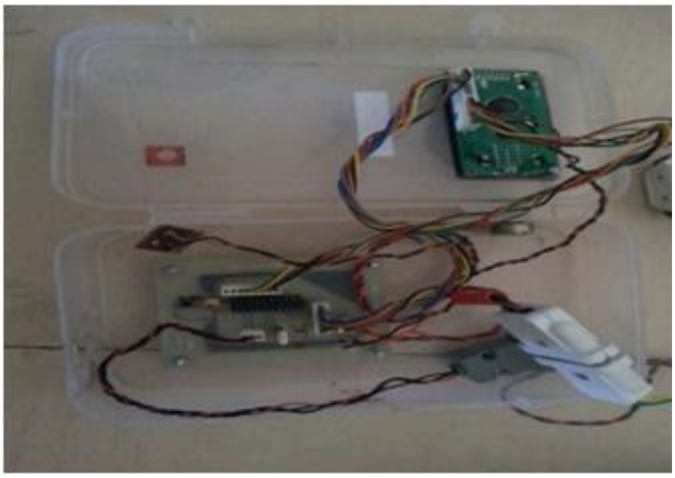

Figure 4: Receiver Circuit kit

6. Conclusion

1. Wind speed
2. Wind direction
3. Visibility
4. Temperature
5. Air Pressure
6. Humidity

Are successfully displayed on LCD at the receiver section. The text value which is to be converted into speech by using Visual Basic are successfully received.

7. Future Scope

Figure 5: Automatic Railway Announcement System

The status of the train is conveyed to the station master by the nearest observatory. The data is entered by the data entry operator/ Station Master by entering Train number, Arrival/ departure time and status of the train in the screen format. This particular information is converted into synthesized voice (Text to Voice conversion) with the help of simple VB application program.

References

[1] AASANA (Administración de Aeropuertos y Servicios Auxiliares a la Navegación Aérea). (2012a). Anuario del Servicio de Tránsito Aéreo (ATS). Bolivia
[2] VATSUR (Simulación Virtual de Tráfico Aéreo Sud América). (2010). Estándares Globales para el Control de Tráfico Aéreo. EE.UU:
[3] Universidad de Madrid (2012). Estadística básica. Red Iberoamericana de Colaboración Universitaria, 23
[4] Quintana A. (2011). Manual de fraseología Pilotos/Controladores. Bolivia: INAC (Instituto Nacional de Aviación Civil).
[5] AASANA - CNS (Comunicación Navegación y Vigilancia). (2010). Plan de Acción para las Mejoras de los Sistemas de Comunicación. Bolivia
[6] Cejudo P. (2010). Gestión Aeronáutica y Aeroportuaria. España: Universidad San Pablo (CEU)
[7] Chávez Rimort, (2013). Control de Tráfico Aéreo, Bolivia: INAC (Instituto Nacional de Aviación Civil).
[8] DGAC (Dirección General de Aeronáutica Civil), (2011a) ATM/01/03 (Manual de Procedimientos para los Servicios de Tránsito Aéreo, V.01, Apéndice 03).
[9] DGAC (Dirección General de Aeronáutica Civil), (2011b) DOC. 4444 (Gestión del Tránsito Aéreo).

Books Referred

- Flight Without Formulae Author: Kermode
- Meteorology Of Airfields Author: C.S. Durst

Web Sites

- www.pilotfriend.com
- www.abbysenior.com/aviation/
- dcaa.slv.dk:8000/icaodocs
- www.icao.int
- www.faa.gov

External Guides

- Mr. Mukund V.Bhopale (Mihir Enterprises, Pune)
- Mr. Aniruddha Kulkarni (AKADEMICALABS, Pune)
- Mr. Ajit Mahindrakar (Dy. S. P. Police Wireless)
- Mr. Abhijeet Kode (PSI Sinhagad Repeater in charge)
- Mr. Rajan Juwekar (Cubs Adventure, Pune)