and active transponders to be indicated on the ATC system. Rather, TIS captures traffic information that appears on radar scopes at nearby air traffic control facilities and broadcasts that information to appropriately equipped aircraft. In order to use TIS, aircraft must be equipped with a transponder capable of receiving TIS broadcasts. When TIS is operational, TIS-capable aircraft can observe traffic information in the cockpit and receive traffic advisories for proximate aircraft.

There is an important limitation of TIS. TIS data is only transmitted from approach radar facilities. No information is broadcast from en route (air route traffic control center (ARTCC)) facilities, so the effective coverage of TIS is limited to larger metropolitan areas. Some approach radar facilities are not equipped to send TIS information. Note that the aircraft must be within range (approximately 50 NM) and within line of site of the TIS station to receive broadcasts.

Advanced Traffic Data Systems Based on ADS-B

Future traffic avoidance systems will probably be able to determine position and digitally exchange information with airborne and ground-based facilities. Using the automatic dependent surveillance—broadcast (ADS-B) system, participating aircraft will continuously broadcast their own position, altitude, airspeed, trajectory, and identification to air traffic control facilities. ADS-B aircraft continuously receive the same information from like equipped aircraft in the area (line of sight), which allows onboard displays for surrounding traffic. ADS-B has been used with much success in Alaskan trials and requires less infrastructure to be usable. ADS-B equipment is demonstrating promise for better traffic separation on transoceanic routes well out of range of land-based systems. ADS-B signals are transmitted on the 978 MHz channel. The information gathered from all participating aircraft can then be transmitted back to each TIS aircraft to provide a detailed picture of the traffic situation, even if those aircraft do not have ADS-B onboard.

Using a Traffic Data System

Setting Sensitivity on a Traffic Data System

Most traffic data systems allow you to adjust sensitivity and configure the system to track targets occurring only within a specified distance and altitude. More sophisticated traffic data systems automatically adjust sensitivity throughout different phases of flight. It is important to become familiar with the use of these controls and features.

Responding to Traffic Alerts

You must develop skill in the task of visually acquiring aircraft identified by an advanced avionics traffic data system. This task requires you to use angles and distances displayed on a traffic display to help guide your visual search out the window. Since both the directions and altitudes of intruding aircraft provided to the aircraft's traffic data receiver are subject to error, you must widen your scan to all areas around the location presented on the traffic display.

When responding to air traffic control requests to acquire and maintain visual separation from nearby targets, be careful not to acknowledge contact with targets that have been observed only on a traffic display. Do not report having the traffic "in sight" before visual acquisition of a target.

Error: Overreliance on Traffic Data System/Failure To Scan

Keep in mind that a traffic data system is designed to enhance "see and avoid" capabilities. You must avoid any tendency to rely too much on traffic data systems, or to use traffic data systems as a substitute for visual scanning and acquisition of surrounding traffic. Because of the limitations of advanced traffic data systems, think of them as supplemental to your traffic awareness while you continue to assume primary responsibility to see and avoid other aircraft. Remember, too, that systems can and do fail. Traffic data systems are quite complex and any failure from the other aircraft's transponder/GPS/encoder to your receiver/decoder/GPS/traffic computer and display encoder will reduce data on your display. Power spikes, weather (lightning), and other onboard aircraft disturbances are all unknown and changing. As experience is gained with the system, better designs will eliminate problems yet to be discovered.

Using a Traffic Data System on the Ground

Most traffic data systems automatically switch to a standby mode when the aircraft is on the ground or operating below a minimum speed. The same systems typically allow you to override this feature and manually activate the traffic data system at any time. There are a number of ways to exploit this capability. When departing from an uncontrolled airport, the traffic data system can help you learn of other traffic in the vicinity of the airport. When operating in low-visibility conditions, the same feature can help inform of other aircraft operating on the airport surface. One potential future application of ADS-B is allowing controllers and pilots to monitor aircraft better on taxiways and runways. You must check equipment documentation to determine when the transponder actually transmits, where the selection controls are located, and how to use those controls.

Fuel Management Systems

A fuel management system can help you make the fuel calculations needed for in-flight decisions about potential routing, fuel stops, and diversions. A fuel management system offers the advantage of precise fuel calculations based on time, distance, winds, and fuel flow measured by