



September 30, 2022

Forest  
All Radios  
Litchfield Park, AZ

Quote: 2022-1044

Dear Forest:

Thank you for your interest in our products. Since 1981 Doppler Systems has provided radio direction finding systems to a variety of customers including the FCC, FAA, DEA, the intelligence community, and Coast Guard as well as various law enforcement and military agencies throughout the world.

### **Mobile Direction Finder**

Table 1 contains a quote for a component solution and Table 2 lists the specifications for the system. Our software is furnished with all of our equipment at no extra charge and the latest versions are always available on our web site. The only other equipment required is a narrow band FM receiver with an external speaker output, a laptop computer, and 4 antennas for the band of operation. The GPS receiver is optional; however, it is required if you plan on using our map based TargetTrack software. Figure 1 diagrams the configuration of the components in the system.

**Table 1: Doppler Mobile Radio Direction Finder Quote (100 - 500 MHz)**

Quantity	Part Number	Name	Price	Total
1	DDF7001	MPT DF Master Processor Assembly Mobile	\$ 1,045	\$ 1,045
1	DDF7080	MPT Mag Summer Assembly	\$ 1,365	\$ 1,365
1	DDF7055	Mag Mount USB GPS	\$ 250	\$ 250
			Sub Total	\$ 2,660
			Sales Tax	\$ 242
			Total	\$ 2,902

**Table 2: Mobile Radio Direction Finder Specifications**

Specifications	
DF Method	<a href="#">Synthetic-Doppler</a> with patented "Smooth Summing"
Frequency Range	100 - 500 MHz
Accuracy	< 2.5° rms
Resolution	0.1°
Sampling Rate	2 samples per second
Sensitivity	-123 dBm
Averaging	Adjustable from 1 to 20 samples
RF pulse detection	100 ms minimum
Commutation frequency	Adjustable (250, 500, 1000, 2000 Hz)
Voltage Range	11 - 14 VDC
Power	6 W @ 12 VDC (DF and Summer)
Temperature Range	-40 °C to 75 °C
CE Compliant	Per EN 61000-6-2, EN 61000-6-4 AND EN 301 489-1





Figure 3: Mobile Antenna and Summing Unit for 250 – 500 MHz



Figure 4: Garmin 16 GPS Receiver

## Software

A suite of software is furnished with Doppler's direction finding systems. The simplest program is the MPT User Interface program. This program allows a user to tune the receiver, display the measured bearing, and adjust all the direction finder settings. A screen shot of the MPT User Interface is shown in Figure 5.

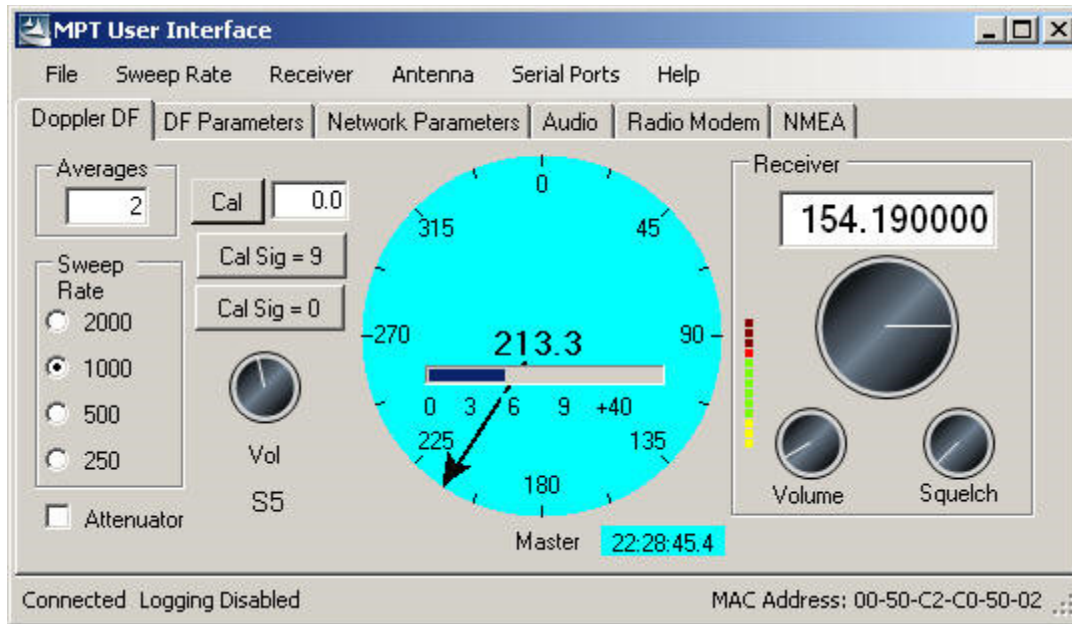


Figure 5: Screen Shot of MPT User Interface

## Android App

Our Android application has been recently updated and is available on the Google Play Store as Doppler Systems RDF User Interface. Using the app you can wirelessly connect to the direction finder and display the line of bearing from the vehicle to the transmission source. The received audio is also streamed to the phone allowing the operator to use a Bluetooth or equivalent headset to listen to the audio. Below is a screen shot from the app. To use the app requires the DF processor to be connected to a wireless router such as the TP-Link N300 or equivalent.

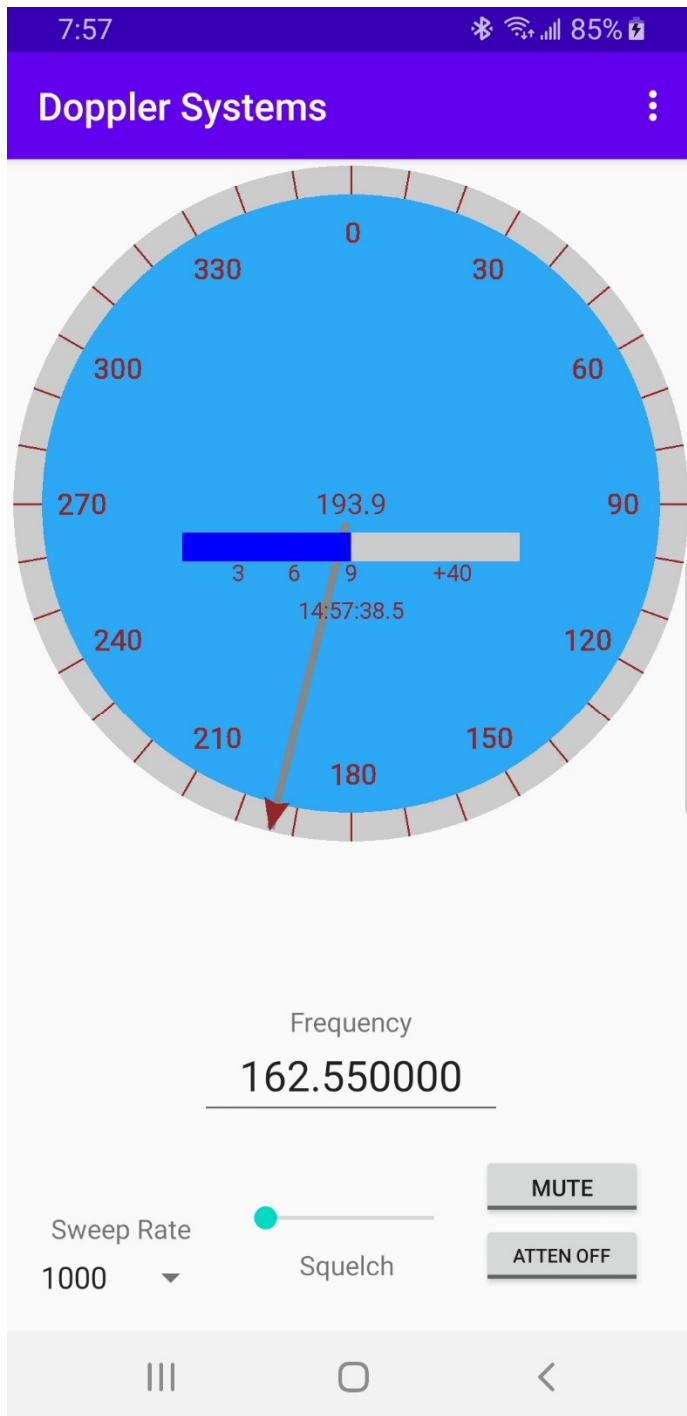


Figure 6: Our Android Application Provides Line-of-Bearing from the Vehicle to the Transmission Source

## TargetTrack

TargetTrack is our latest and most full featured radio direction finding software. It was designed around our new DDF7000 series direction finders. TargetTrack satisfies the needs of Signal and Communications Intelligence professionals in that it provides audio recording, evidentiary data, archival data, and the opportunity for post collection analysis of the bearing data. TargetTrack provides the following features

- Displays bearings from multiple sites
- Displays bearings and predicted locations of transmission sources on a map
- Identifies multiple transmission sources (targets)
- Audio monitoring and recording of the received signal
- Database storage of all audio and bearing data
- Database forms for user to entered descriptive information about the received data
- Database is searchable allowing user to search the fields in the descriptive information
- Ability to playback previously recorded received audio and data while simultaneously collecting new data
- Ability to connect a second monitoring receiver to the software and record received signals
- Receiver scan and search functions allow user to monitor an entire frequency band or many individual frequencies
- Unique audio file control that allows access of received audio and data using a visual time line
- Simplified set up and use
- Audio can be streamed over the network from the DDF7000 or connected via a sound card
- Automatic identification of DDF7000 series direction finders on a local area network
- Time synchronization of all bearing data collected on the network (requires GPS receiver at each site on the network)
- Allows users to import data into the database that was recorded on other computers so data can be consolidated on one computer
- Using our Great map facility maps can be obtained from any of the online mapping data sources such as OpenStreet, Google, Bing, etc. Once the map data is downloaded there is no need to remain connected to the Internet.
- Includes the ESRI ArcGIS Engine allowing use of a multitude of mapping formats (requires a separate license)

TargetTrack functions with fixed site or mobile direction finders. It can be used with a stand-alone mobile or fixed site direction finder or it can network multiple direction finders on an Ethernet based network. The location of each direction finder is shown on a map. When a signal breaks squelch TargetTrack begins recording the audio and collects and displays the measured bearings. If multiple direction finders are networked it will display the estimated location of the target and draw a 95% certainty ellipse about the target location. When the transmission ceases TargetTrack waits a user selected period of time and then saves the recorded audio and bearing data into an SQL database. The user can tag the data (referred to as an intercept) using a form that has several fields that can be used to identify the intercept. The SQL database can be searched on these tags and the data played back on the map display. A screen shot of a networked system with two fixed sites and one mobile site is shown in



Figure 7below. TargetTrack will run on Windows 7, 8.1, or 10 operating systems. A complete manual for TargetTrack can be found at

<https://www.dopsys.com/doppler-files/manuals/TargetTrack%20Users%20Manual.pdf> .



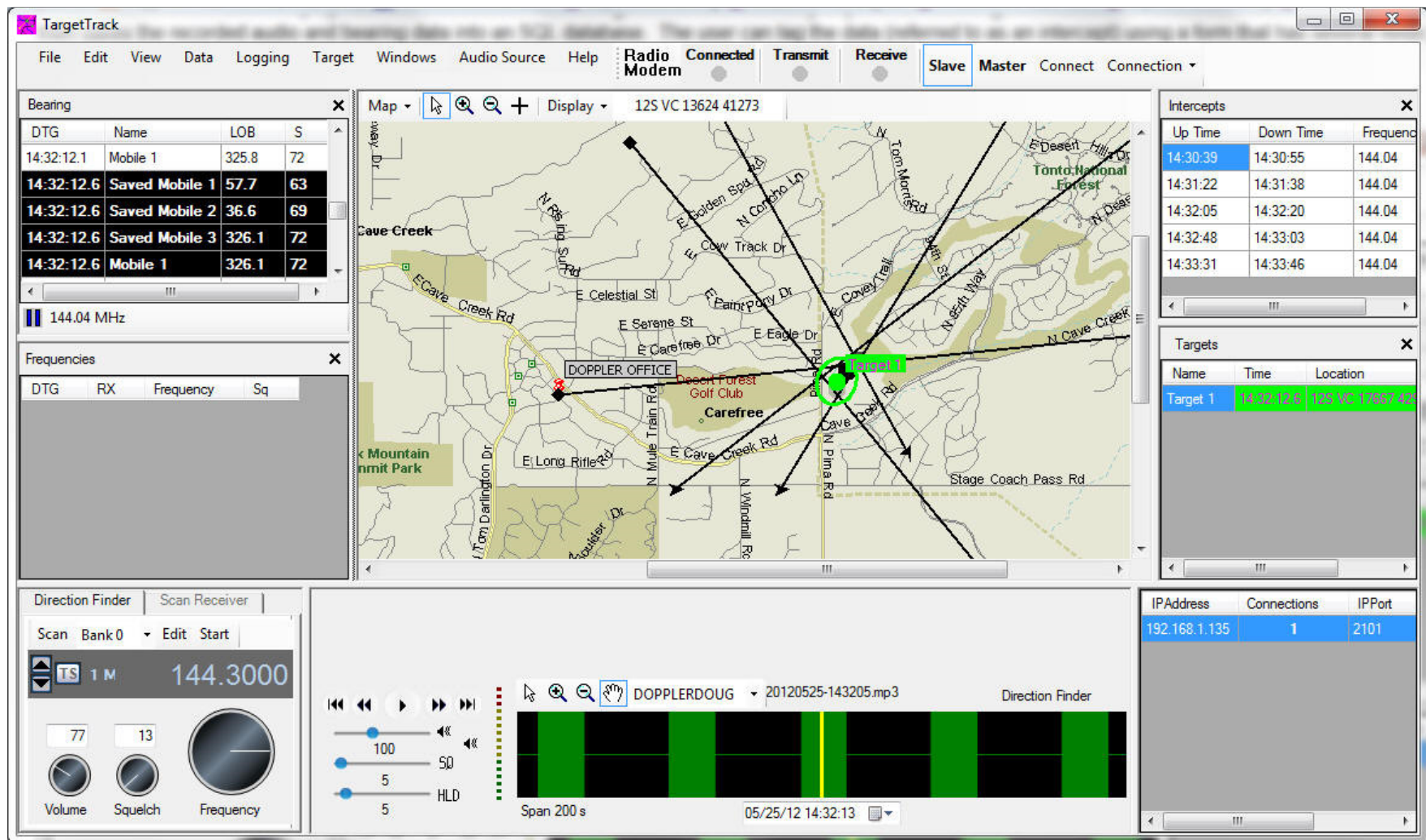


Figure 7: Screen Shot of TargetTrack Software Application

Payment is Net 30 with a purchase order and approved credit or we do accept VISA and MasterCard.

Shipping is FOB, Freight Prepaid, Tucson, AZ

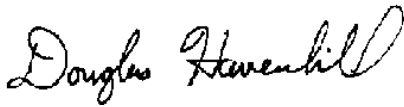
All Doppler Systems equipment is guaranteed for 1 year from the date of purchase.

Lead time is 1 week after receipt of the order.

This quote is valid for 60 days.

We appreciate the opportunity to serve you. Please feel free to contact me with any questions you may have or to place an order.

Best Regards,

A handwritten signature in black ink that reads "Doug Havenhill". The signature is written in a cursive, flowing style.

Doug Havenhill  
Doppler Systems LLC  
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