

# HIL on the R&S SMBV100B



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**ROHDE & SCHWARZ**

Make ideas real



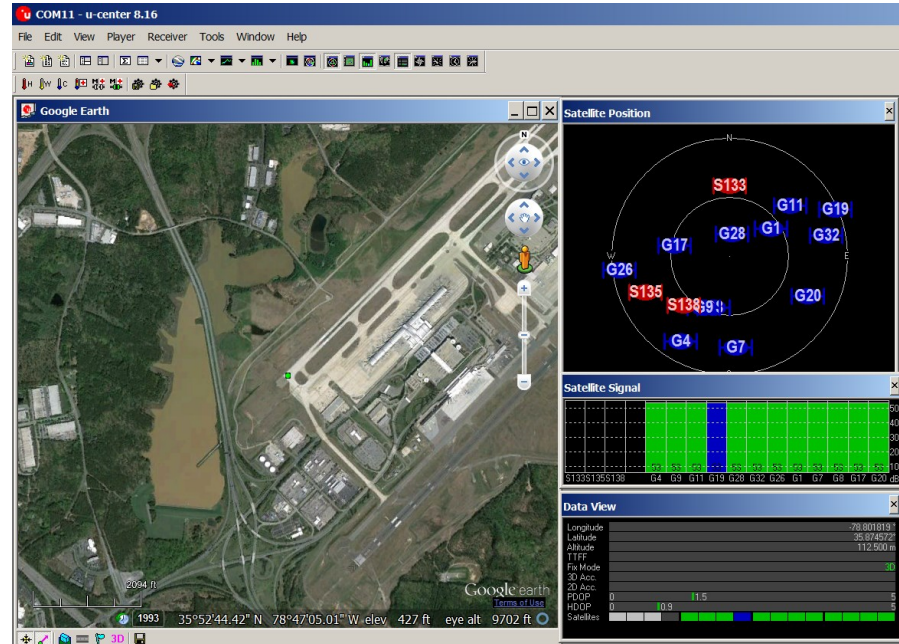
# About X-Plane™

- ▶ This demonstration guide uses X-Plane 10
- ▶ Program needs to be installed (two DVDs) on the PC
  - Installation can be somewhat time-consuming
- ▶ A USB dongle-based license can be used to enable the program without needing the installation media.
- ▶ For ease of controlled flight, use a joystick or flight yoke as a controller



# Install and configure uCenter

- ▶ Use the uCenter program to communicate with and display information from the uBlox receiver.
- ▶ To show the ground track, select the Google Earth view.
- ▶ uCenter also provides a sky view, position information, etc.



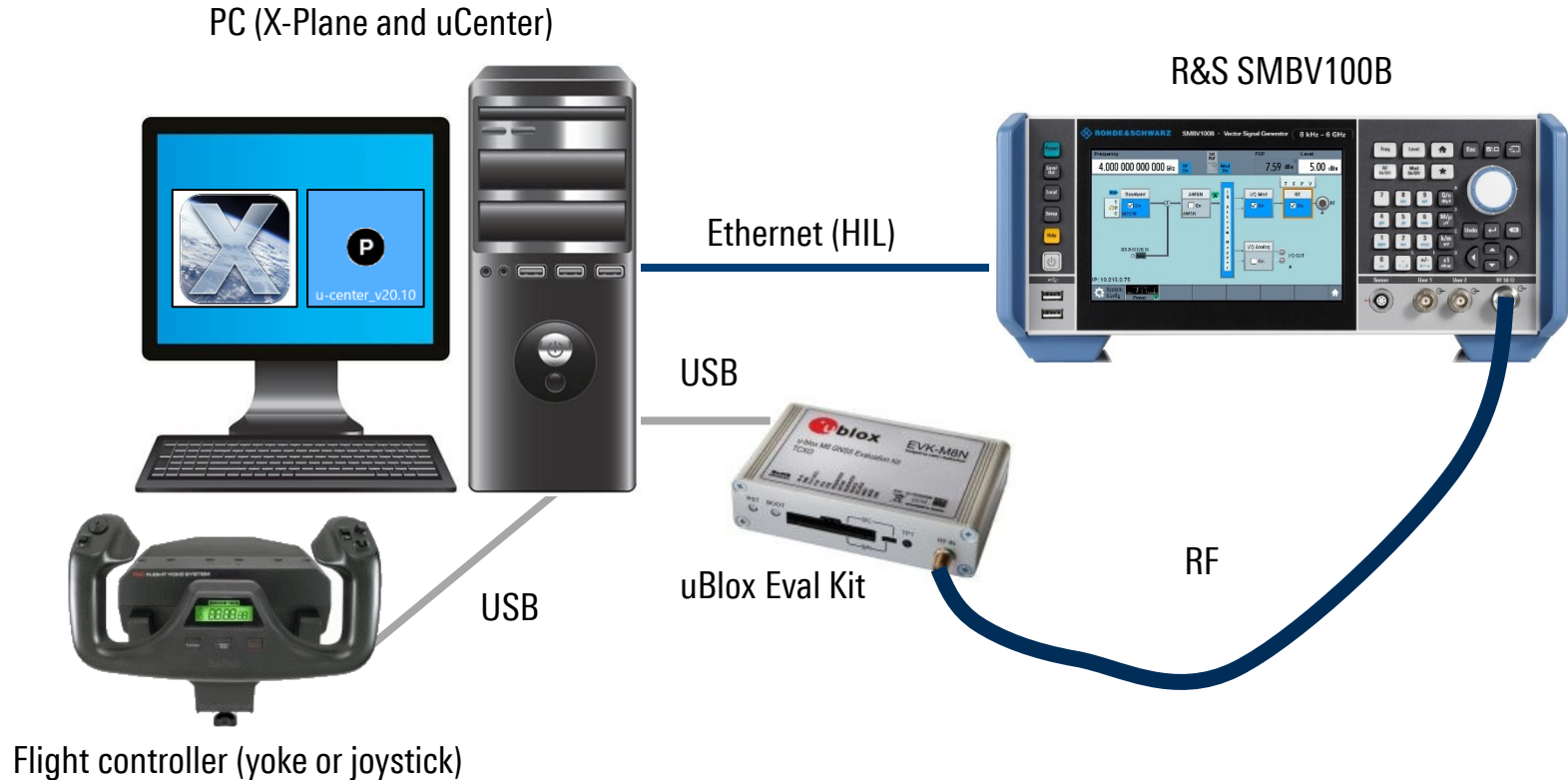
# SMBV setup

- The SMBV must be configured with an IP address / subnet / gateway

The screenshot shows the 'Remote Access' configuration window for the SMBV100B instrument. The 'Network' tab is selected and highlighted with an orange border. The window contains the following sections and fields:

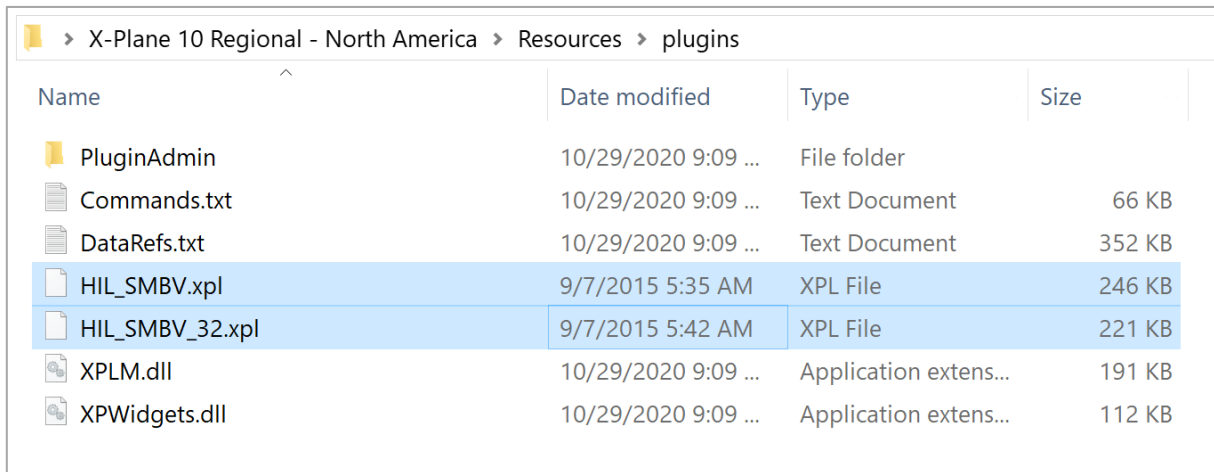
- Network Status:** Shows a green dot and the text 'Connected'. A 'Restart Network' button is located to the right.
- Instrument Name:** Contains two fields: 'Hostname' with the value 'SMBV100B-102049' and 'Workgroup' with the value 'INSTRUMENT'.
- Instrument Address:** Contains several fields:
  - Address Mode:** A dropdown menu set to 'Static'.
  - IP Address:** 192.168.1.99
  - Subnet Mask:** 255.255.255.0
  - Default Gateway:** 192.168.1.1
  - DNS Suffix:** (empty field)
  - DNS Server:** 192.168.1.1
  - MAC Address:** 00 e0 33 08 e3 30

# Demonstration setup (HIL)



# Installing the X-Plane plugins

- ▶ Communication between X-Plane and the SMBV100B requires a plugin.
- ▶ The plugins (HIL\_SMBV.xpl or HIL\_SMBV\_32.xpl) should be copied to the folder “\Resources\plugins” under the X-Plane installation folder.

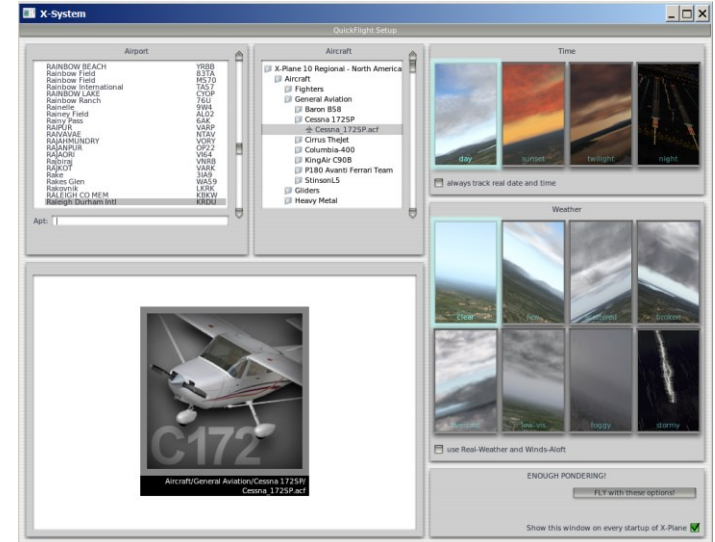


The screenshot shows a Windows File Explorer window with the address bar displaying the path: X-Plane 10 Regional - North America > Resources > plugins. The window contains a table of files and folders.

Name	Date modified	Type	Size
PluginAdmin	10/29/2020 9:09 ...	File folder	
Commands.txt	10/29/2020 9:09 ...	Text Document	66 KB
DataRefs.txt	10/29/2020 9:09 ...	Text Document	352 KB
HIL_SMBV.xpl	9/7/2015 5:35 AM	XPL File	246 KB
HIL_SMBV_32.xpl	9/7/2015 5:42 AM	XPL File	221 KB
XPLM.dll	10/29/2020 9:09 ...	Application extens...	191 KB
XPWidgets.dll	10/29/2020 9:09 ...	Application extens...	112 KB

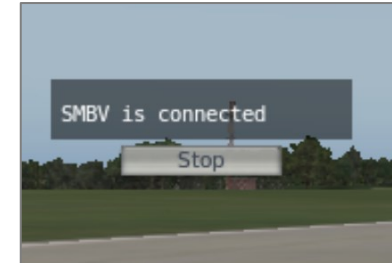
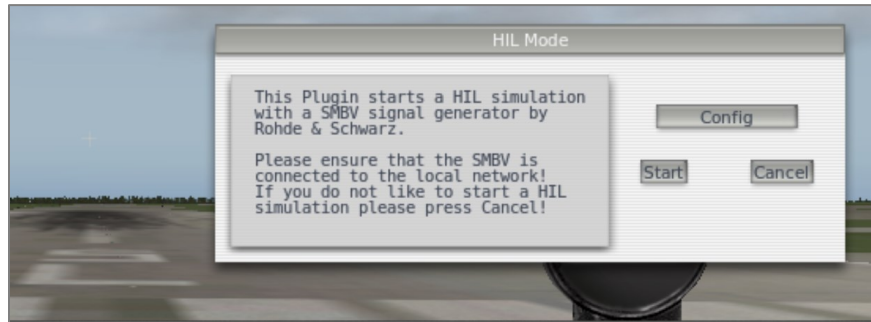
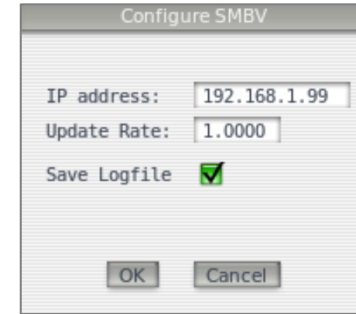
# Starting X-Plane

- ▶ X-Plane allows you to select an airport and aircraft
- ▶ Suggestions :
  - Choose an airport with familiar scenery / landmarks
  - Choose a slow, non-complex aircraft like the Cessna 172 (not airliners or fighters)
- ▶ Set time to “day” and weather to “clear”
- ▶ X-Plane may take some time to load



# Configuring the HIL plugin

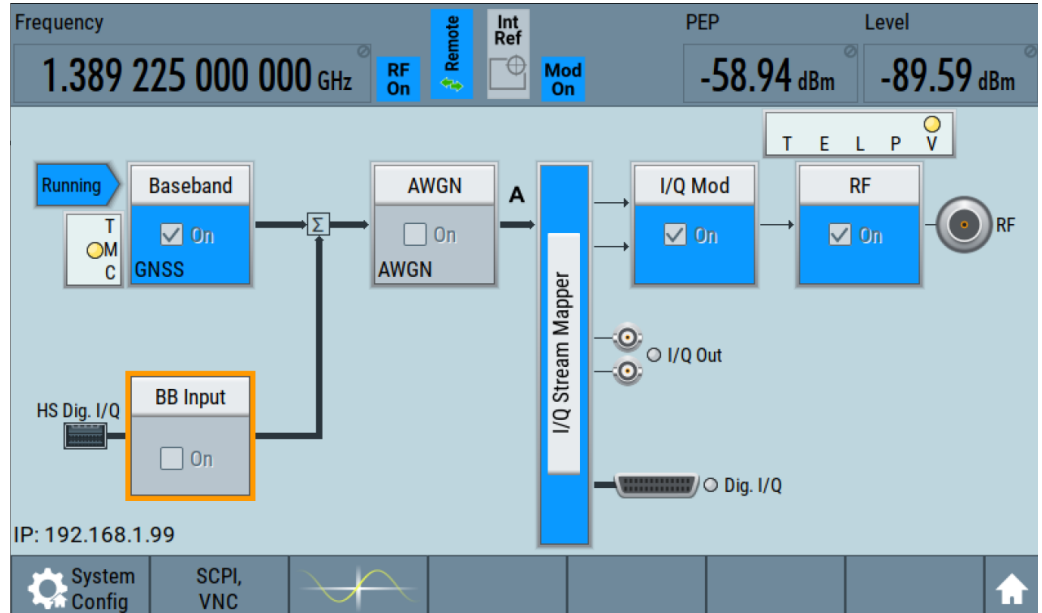
- ▶ The plugin dialog box will appear when X-Plane loads.
- ▶ Use the Config dialog to:
  - Enter the IP address of the SMBV
  - Configure the Update rate
  - Enable / disable logging
- ▶ Use the Start / Stop buttons to enable / disable the plugin





# After starting plugin

- Modulation type (GNSS), frequency, and power have all been automatically configured by the plug-in
- Default power level usually works: can be adjusted if necessary



# Verifying initial location

SMBV100B



X-Plane

Ex: Aircraft is  
on runway 5L  
(KRDU)

GNSS: Position Configuration

Initial Position				User Defined
Reference Frame				WGS-84
Position Format				DEG:MIN:SEC
Latitude	35 °	52 '	28.448 4 "	North
Longitude	78 °	48 '	6.555 6 "	West
Altitude	111.17 m			



Google Earth (uBlox)

# Getting moving

- ▶ Use the keyboard arrow keys to scroll down the instrument panel
- ▶ Click “BRAKES” to turn off the brakes.
- ▶ Push the throttle all the way in
  - Once airborne, you may want to pull the throttle halfway out to avoid excessive airspeed / altitude

Throttle fully open  
(pushed in)



# Getting airborne / flying hints

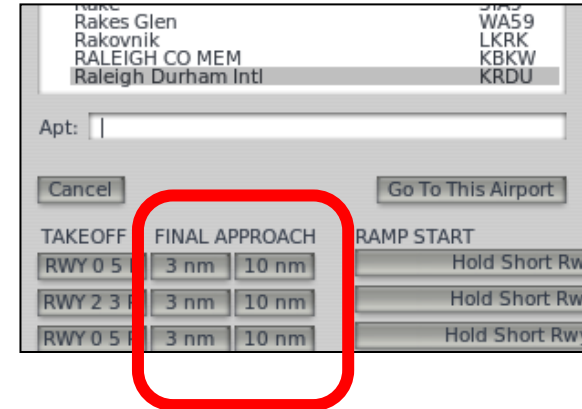
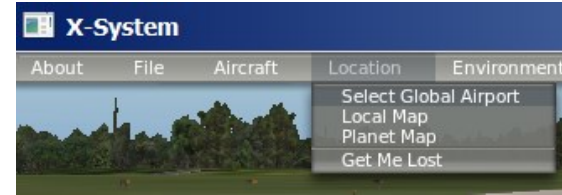
- ▶ Rotate (pull the yoke/joystick back) at when airspeed  $\approx$  60-65 knots.
- ▶ Avoid sudden control inputs and acrobatics – if you crash the plane, you'll have to restart.
- ▶ Try to stay between 80-120 knots and less than 1000' above terrain
  - Too high : lower chance of crashing, but hard to make out landmarks
  - Too low : higher chance of crashing



*\*Height above sea level, not terrain!*

# Starting in the air

- ▶ Alternatively, you can start already in the air on approach or final for a given airport / runway.
- ▶ Use Location → Select Global Airport and then choose FINAL APPROACH (3 NM or 10NM out)

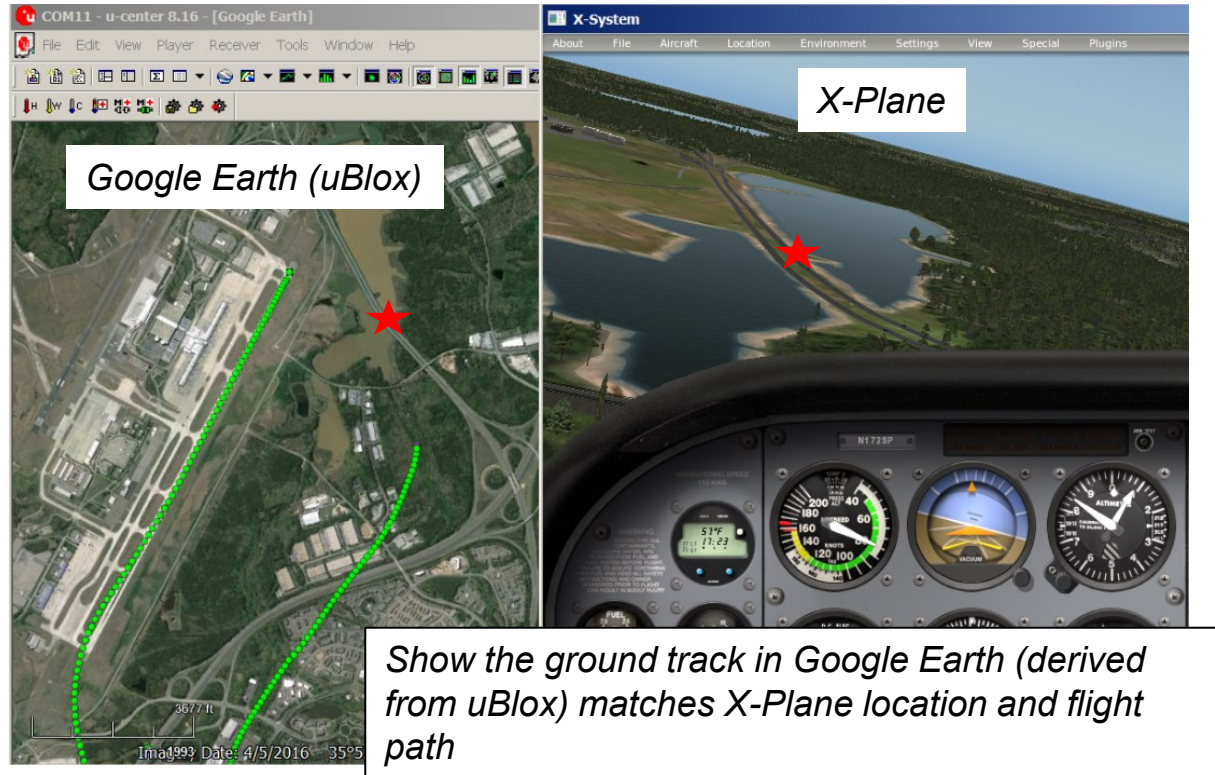


# Heading, altitude, and attitude



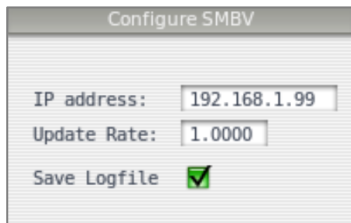


# Ground track



# HIL logfiles

- ▶ Logfiles are created each time the HIL plugin is started and stopped
  - Creation can be enabled / disabled
- ▶ Logs can be found in the \plugins\HIL\_LOG directory
- ▶ For information about the format of these files, please see the SMBV GNSS operating manual



X-Plane 10 Regional - North America > Resources > plugins > HIL_LOG			
Name	Date modified	Type	Size
2020-10-29_10_36_19_HIL_logfile.txt	10/29/2020 10:46...	Text Document	145 KB
2020-10-29_10_47_27_HIL_logfile.txt	10/29/2020 10:49...	Text Document	18 KB

2020-10-29\_10\_36\_19\_HIL\_logfile.txt - Notepad

File Edit Format View Help

HILMODEB: SimTime, longitude, latitude, altitude, VelocityNorth, VelocityEast, VelocityDown, AcclerNorth, AcclerEast, AcclerDown, Roll, Pitch, Yaw, dRoll, dPitch, dYaw, ddRoll, ddPitch, ddYaw

SOUR:BB:GPS:RT:HILP:MODE:B 1.091000, 35.874569, -78.801821, 111.169093, -0.000000, 0.000000, 0.000118, -0.000000, 0.000000, 0.002560, 0, 0, 0, 0.785572, 0.055448, -0.012156, 0.000000, -0.000409, -0.000030, 0.000000, -0.022399, -0.000449, 0, 0, 0

SOUR:BB:GPS:RT:HILP:MODE:B 2.111000, 35.874569, -78.801821, 111.169237, -0.000000, 0.000000, 0.000036, -0.000000, 0.000000, 0.000977, 0, 0, 0, 0.785573, 0.055310, -0.012156, 0.000000, -0.000377, 0.000033, 0.000000, -0.020785, 0.000556, 0, 0, 0

SOUR:BB:GPS:RT:HILP:MODE:B 3.150000, 35.874569, -78.801821, 111.169266, -0.000000, 0.000000, -0.000199, -0.000000, 0.000000, -0.000532, 0, 0, 0, 0.785573, 0.055328, -0.012146, 0.000000, 0.000604, 0.000046, 0.000000, 0.003848, -0.000069, 0, 0, 0

SOUR:BB:GPS:RT:HILP:MODE:B 4.161000, 35.874569, -78.801821, 111.169235, -0.000000, 0.000000, 0.000305, -0.000000, 0.000000, 0.003916, 0, 0, 0, 0.785574, 0.055241, -0.012086, 0.000000, -0.000077, -0.000108, 0.000000, -0.017928, 0.000153, 0, 0, 0



# Discussion / demonstration

