



TVSTUDY

INSTALLATION AND UPGRADE GUIDE

Office of Engineering and Technology
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version 1.3.2 (Patched)

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TABLE OF CONTENTS

Upgrading From TVStudy 1.3.1 or Unpatched 1.3.2	
Downloading the TVStudy Files	4
Notes About the TVStudy 1.3.2 Upgrade	5
Compiling TVStudy from Source	6
Installing TVStudy for the First Time	
Installing TVStudy on a Mac	7
Installing and Configuring MySQL	7
Installing and Configuring TVStudy	8
TVStudy Directory Structure.....	9
Installing TVStudy on Linux	10
Installing and Configuring Prerequisites	10
Installing and Configuring TVStudy	10
TVStudy Directory Structure.....	12
Compiling TVStudy from Source	13
Comments Regarding TVStudy on Windows	14
Launching TVStudy	15
Change Log	
Differences Between 1.1.2 and 1.1.1	16
Differences Between 1.2.6 and 1.1.2	16
Differences Between 1.2.7 and 1.2.6	19
Differences Between 1.2.8 and 1.2.7	20
Differences Between 1.2.9 and 1.2.8	21
Differences Between 1.3 and 1.2.9	23
Differences Between 1.3.1 and 1.3	26
Differences Between 1.3.2 and 1.3.1	27
Differences Between 1.3.2 (Patched) and 1.3.2	29
Troubleshooting	
Problems Running TVStudy	30
Contact Information	30
Licensing Information	
TVStudy	31
MySQL Libraries	32
Apache Xerces Library	33

UPGRADING FROM TVSTUDY 1.3.1 OR UNPATCHED 1.3.2

The following text will guide you through the process of upgrading TVStudy 1.3.1 or unpatched 1.3.2 to the latest version, 1.3.2 (Patched). (Please note that version 1.3.2 (Patched) is the final version of the TVStudy software for purposes of the incentive auction.) With the exception of versions 1.3 and 1.3.1, the database structure in each release was modified to support new features, and the newer version of TVStudy would update the database structure of the previous version for compatibility. As a result, it is strongly recommended that you upgrade only from versions 1.2.9 or newer, since upgrading from older versions of the software could require you to drop and recreate the database. Otherwise, you should Uninstall and then Install the database again using the Manage Database window, instructions for which are found on Page 6 of the TVStudy manual.

Downloading the TVStudy Files

From the FCC TVStudy website, you will need to obtain one of the two files listed below.

2015Sep_tvstudy_mac_files.tgz – Contains all of the necessary code and executables to run TVStudy 1.3.2 on the Mac platform.

2015Sep_tvstudy_linux64_files.tgz – Contains all of the necessary code and executables to run TVStudy 1.3.2 on the Linux platform.

These files have been posted to <http://data.fcc.gov/download/incentive-auctions/OET-69/> and can be downloaded by the end user. The .tgz file should then be unzipped to the directory that TVStudy is contained in, overwriting some older files. The .tgz file has this file structure:

```
dev/
  build/                (empty)
  Makefile
  Manifest.txt
  src/                  (21 items) (this is the source code for compilation)
help/
  manual.pdf
lib/
  check_install
  mysql-jdbc.jar
  pair_study_post
  tvstudy
  tvstudy.jar          (Mac version only)
  xercesImpl.jar
pop_mx_2010.dat        (Beta 2010 Census data for Mexico)
pop_usterr_2000.dat    (2000 US territory population data)
pop_usterr_2010.dat    (2010 US territory population data)
TVStudy.app           (Mac version only)
tvstudy.jar           (Linux version only)
```

Move the pop_mex_2010.dat, pop_usterr_2000.dat, and pop_usterr_2010.dat files into the data/ directory after extracting. If you have not done so, you may want to download the [Terrain Database Test and Verification Utility](#) and place its files in the dbase/ directory. **Please see the notes on the next page before attempting to launch TVStudy 1.3.2.**

If you overwrote the existing files, you should now be done, unless you need to recompile TVStudy. (See page 6 for more information on recompiling TVStudy.)

Notes About the TVStudy 1.3.2 Upgrade

It is highly recommended that Mac users running Mac OS X 10.9 (“Mavericks”) or newer disable “App Nap” since that operating system feature will cause poor performance with TVStudy. First, click on the TVStudy.app launcher, click Get Info from the gear menu, and check the “Prevent App Nap” checkbox. Then, open a terminal and enter this command:

```
defaults write gov.fcc.TVStudy NSAppSleepDisabled -bool YES
```

Beginning with version 1.3, beta Mexican population data is available and supported. When upgrading the database structure to version 1.3, TVStudy will also attempt to reimport the Mexican population data to reflect this change. Be sure that the pop_mx_2010.dat file is in the data/ directory so this replacement is successful. To see results with this new population data in an existing study, you may need to clear the cache for that study.

Also beginning with version 1.3, the database structure for DTS stations has been changed to reflect recent changes to how DTS stations are represented in CDBS. Existing studies created in TVStudy versions prior to 1.3 cannot be run until they are opened and re-saved. The process of opening and then saving will trigger TVStudy to adjust the DTS station records to match the new format. Any studies that need to be opened and then saved will appear in **green** in the Study List window. Once those studies no longer appear in green, TVStudy can run them normally.

Beginning with version 1.3.2, TVStudy now includes population data for the US Virgin Islands, Guam, American Samoa, and the Northern Mariana Islands. When upgrading the database structure to version 1.3.2, TVStudy will attempt to import the additional population data to reflect this change. Be sure that the pop_usterr_2000.dat and pop_usterr_2010.dat files are in the data/ directory so this import is successful. To see results with this new population data in an existing study, you may need to clear the cache for that study. **It is strongly recommended that you clear all caches when upgrading to version 1.3.2.**

Compiling TVStudy from Source

These instructions assume the use of a Debian-based Linux distribution, such as the popular Ubuntu 12.04.2 operating system. If you are using a different distribution, you will need to adjust these instructions accordingly.

First, install the prerequisite applications for Java, Fortran, and MySQL needed to compile TVStudy. In your terminal, enter the following command:

```
sudo apt-get install openjdk-7-jdk gfortran libmysqlclient-dev
```

You are now ready to build TVStudy from the supplied source code. Enter:

```
cd dev
make
```

Waiting a few seconds should result in newly-compiled `tvstudy`, `pair_study_post`, and `tvstudy.jar` files. If it does not, you may need additional prerequisites or you may need to make additional modifications to `dev/src/tvstudy.h` or `dev/Makefile` in order to compile TVStudy successfully. Those modifications are beyond the scope of this document. Then enter:

```
make install
cd ..
```

These commands should place you back in the folder in which you placed the TVStudy files and allow you to continue on to the “Launching TVStudy” section of this manual on page 15.

INSTALLING TVSTUDY FOR THE FIRST TIME

Installing TVStudy is easy in most cases; both the Mac and 64-bit Linux versions come with pre-compiled executables. Compilation instructions are included in this document in case the user is attempting to install on a 32-bit Linux or would like to recompile after making modifications. (Modifications are not recommended if the intent is to produce results matching those produced by the FCC.) On the Mac platform, Mac OS 10.6 (“Snow Leopard”) or newer is required; the FCC is presently running Mac OS 10.9.5 (“Mavericks”).

Disclaimer: The TVStudy software was developed using MySQL Community Server version 5.5.29 and has been tested with version 5.6.21; it may or may not work with other versions. The MySQL server typically runs on the same computer as TVStudy itself, and these instructions assume that this is the case. Please note that you must have administrator privileges on your computer to complete this process; you will be prompted to enter your password several times.

Installing TVStudy on a Mac

Installing and Configuring MySQL

Download a copy of MySQL Community Server from: <http://www.mysql.com/downloads/mysql/>

Open the “mysql-5.6.21-osx10.9-x86_64.dmg” disk image file. Install the package “mysql-5.6.21-osx10.9-x86_64.pkg”. Use the default install location. When it is finished installing, open System Preferences, select the “MySQL” icon, and click the button “Start MySQL Server”. The box “Automatically Start MySQL Server on Startup” may be checked so the server is always running. This should not affect normal computer operations. If you do not check the box, you will have to open System Preferences and make sure the server is running before each use of TVStudy.

Launch the Terminal application. At the prompt, open the MySQL monitor by entering:

```
/usr/local/mysql/bin/mysql -u root
```

At the MySQL command prompt, enter the following commands, exactly as shown except for replacing the quoted text string ‘pass_here’ with your desired root password. Note: If you choose to copy and paste the commands from this manual, be aware that you should first copy the first line up to, but not including, the semicolon (;). Doing so will enable you to edit the ‘pass_here’ field in the terminal window. When you are finished editing your password, add the semi-colon at the end of the line and press return. Then, enter the command `flush privileges;`

```
update mysql.user set password = password('pass_here') where user = 'root';
flush privileges;
```

Close the MySQL monitor by entering the `exit` command. You may now close the terminal window.

Installing and Configuring TVStudy

From the FCC TVStudy website, you will need to obtain the two files listed below.

2013Jan_tvstudy_data_files.tgz – Contains all of the necessary data files.

2015Sep_tvstudy_mac_files.tgz – Contains all of the necessary code and executables.

Due to the large file size, **2013Jan_tvstudy_data_files.tgz** was split into seven segments of about 2 GB each. Those seven segments have been posted to <http://data.fcc.gov/download/incentive-auctions/OET-69/> and can be downloaded, verified, and concatenated by the end user as described below. The resulting .tgz file is then unzipped to recover four data directories and their contents. The unzipped files are approximately 25GB in size. The seven segments can be concatenated using a concatenation utility such as [Split & Concat](#) to recreate the .tgz file.

To minimize the possibility of uncorrectable transmission errors, parity archive (PAR2) files with Reed-Solomon error correction (5% redundancy) were created. While not strictly required to recover the original .tgz file, it is recommended that the user also download the PAR2 files and use appropriate software to verify (and correct if necessary) the .tar file is complete. A number of no-cost applications are available for utilizing the PAR2 functionality to verify and correct the .tgz segment files, including [MacPAR Deluxe](#).

You should extract the files into a directory called TVStudy/ in the /Applications/ directory. Once these files are extracted, you should have a directory structure which looks like the one shown at the end of this section. You may need to move any .dat files in the root to the data/ directory.

There was a change in the directory structure between TVStudy version 1.1 and version 1.2. If you are performing a fresh installation with newly downloaded data files, no changes will be needed. If you are using data files downloaded prior to August 2, 2013, please rename the sql/ directory to data/ in order for TVStudy to run successfully.

Two optional data files, **CDED** and **2013Mar_nlcd**, are also available at the URL above. These contain high-resolution terrain data for Canada (Canadian Digital Elevation Data) and U.S. National Land Cover Data. The CDED dataset is about 34 GB in size and the NLCD dataset is about 2 GB. There is some overlap of the USGS National Elevation Dataset (DEM, included with the 2013Jan_tvstudy_data_files) in Canada, so the CDED dataset should not be needed except for certain studies in Canada outside the U.S.-Canada border areas. Note, however, that the FCC uses the CDED dataset for all 1-second terrain calculations involving Canada and the NED and CDED elevation data are not identical. The NLCD is used as a reference for clutter adjustments in studies using the method of OET Bulletin No. 73 and is not used in the method of OET Bulletin No. 69.

It is highly recommended that Mac users disable “App Nap” since that operating system feature will cause poor performance with TVStudy. First, click on the TVStudy.app launcher, click Get Info from the gear menu, and check the “Prevent App Nap” checkbox. Then, open a terminal and enter this command:

```
defaults write gov.fcc.TVStudy NSAppSleepDisabled -bool YES
```

You may now proceed to the Launching TVStudy section of this manual on page 15.

TVStudy Directory Structure

```

/Applications/TVStudy/
  cache/                (directory is initially empty)
  cdb/
    22Feb2012/          (these are CDBS data from February 22, 2012)
    ant_make.dat
    ant_pattern.dat
    application.dat
    dtv_channel_assignments.dat
    elevation_ant_make.dat
    elevation_pattern.dat
    elevation_pattern_addl.dat
    facility.dat
    supp_facility.dat
    tv_app_indicators.dat
    tv_eng_data.dat
  data/
    country_poly.dat
    pop_ca_2006.dat      (this is 2006 Census data for Canada)
    pop_ca_2011.dat      (this is 2011 Census data for Canada)
    pop_mx_2010.dat      (this is beta 2010 Census data for Mexico)
    pop_us_2000.dat      (this is 2000 Census data for the US)
    pop_us_2010.dat      (this is 2010 Census data for the US)
    pop_usterr_2000.dat  (this is 2000 Census data for US territories)
    pop_usterr_2010.dat  (this is 2010 Census data for US territories)
  dbase/
    cded/               (empty)      (this is a placeholder for Canadian terrain data)
    cem/                (223 files)    (these are Mexican terrain data)
    gtopo/              (25,537 files) (these are 30-second terrain data)
    nadcon/             (28 files)    (these are data for converting between datums)
    ned/               (1,964 files) (these are 1-second terrain data)
    nlcd/              (empty)      (this is a placeholder for clutter data)
    srtm/              (719 files)  (these are SRTM terrain data)
    usgs/              (1,362 files) (these are U.S. 3-second terrain data)
  dev/
    build/             (empty)
    Makefile
    Manifest.txt
    src/               (21 items)   (this is the source code for compilation)
  help/
    manual.pdf         (instruction manual for TVStudy)
  lib/
    check_install
    mysql-jdbc.jar
    pair_study_post
    tvstudy
    tvstudy.jar
    xercesImpl.jar
  out/                 (directory is initially empty)
  TVStudy.app

```

Installing TVStudy on Linux

These instructions assume the use of a Debian-based Linux distribution, such as the popular Ubuntu 12.04.2 operating system. If you are using a different distribution, you will need to adjust these instructions accordingly. Additionally, the TVStudy executable provided was compiled for a 64-bit Linux system.

Installing and Configuring Prerequisites

To begin, you will need to install some prerequisites (MySQL server, Java, and PyPAR2). In a terminal window, enter the command:

```
sudo apt-get install mysql-server openjdk-7-jre pypar2
```

The system should install the prerequisite MySQL and PyPAR2 software, and should then ask you to set a root password for MySQL. Please make sure to note the root password for MySQL, as you will need it to configure and run TVStudy. If you are not prompted to create a root password, you will need to open a terminal and open the MySQL monitor by entering:

```
mysql -u root
```

At the MySQL command prompt, enter the following commands, exactly as shown except for replacing the quoted text string `'pass_here'` with your desired root password. Note: If you choose to copy and paste the commands from this manual, be aware that you should first copy the first line up to, but not including, the semicolon (`;`). Doing so will enable you to edit the `'pass_here'` field in the terminal window. When you are finished editing your password, add the semi-colon at the end of the line and press return. Then, enter the command `flush privileges;`

```
update mysql.user set password = password('pass_here') where user = 'root';
flush privileges;
```

Close the MySQL monitor by entering the `exit` command.

Installing and Configuring TVStudy

From the FCC TVStudy website, you will need to obtain the two files listed below.

2013Jan_tvstudy_data_files.tgz – Contains all of the necessary data.

2015Sep_tvstudy_linux64_files.tgz – Contains all of the necessary code and executables.

Due to the large file size, **2013Jan_tvstudy_data_files.tgz** was split into seven segments of about 2 GB each. Those seven segments have been posted to <http://data.fcc.gov/download/incentive-auctions/OET-69/> and can be downloaded and concatenated by the end user. The resulting `.tgz` file is then unzipped to recover the four data directories and their contents. The unzipped files are approximately 25GB in size. Once the seven segments are recovered, they can be concatenated using the `cat` command to recreate the `.tgz` file.

A sample command to concatenate the seven pieces is:

```
cat 2013Jan_tvstudy_data_files.tgz.001 2013Jan_tvstudy_data_files.tgz.002
2013Jan_tvstudy_data_files.tgz.003 2013Jan_tvstudy_data_files.tgz.004
2013Jan_tvstudy_data_files.tgz.005 2013Jan_tvstudy_data_files.tgz.006
2013Jan_tvstudy_data_files.tgz.007 > 2013Jan_tvstudy_data_files.tgz
```

To minimize the possibility of uncorrectable transmission errors, parity archive (PAR2) files with Reed-Solomon error correction (5% redundancy) were created. While not strictly required to recover the original .tgz file, it is recommended that the user also download the PAR2 files and use appropriate software to verify (and correct if necessary) the .tar file is complete. A number of no-cost applications are available for utilizing the PAR2 functionality to verify and correct the .tgz segment files, including the PyPAR2 utility installed previously.

Once these files are extracted, you should have a directory structure which looks like the one shown at the end of this section. You may need to move any .dat files in the root to the data/ directory.

There was a change in the directory structure between TVStudy version 1.1 and version 1.2. If you are performing a fresh installation with newly downloaded data files, no changes will be needed. If you are using data files downloaded prior to August 2, 2013, please rename the sql/ directory to data/ in order for TVStudy to run successfully.

Two optional data files, **CDED** and **2013Mar_nlcd**, are also available at the URL above. These contain high-resolution terrain data for Canada (Canadian Digital Elevation Data) and U.S. National Land Cover Data. The CDED dataset is about 34 GB in size and the NLCD dataset is about 2 GB. There is some overlap of the USGS National Elevation Dataset (DEM, included with the 2013Jan_tvstudy_data_files) in Canada, so the CDED dataset should not be needed except for certain studies in Canada outside the U.S.-Canada border areas. Note, however, that the FCC uses the CDED dataset for all 1-second terrain calculations involving Canada and the NED and CDED elevation data are not identical. The NLCD is used as a reference for clutter adjustments in studies using the method of OET Bulletin No. 73 and is not used in the method of OET Bulletin No. 69.

If you are using a Linux installation that is not 64-bit, or otherwise determine that you need to compile TVStudy from source, please continue to page 13. Otherwise, you may advance to the Launching TVStudy section of this manual on page 15.

TVStudy Directory Structure

```

cache/                                     (directory is initially empty)
cdbs/
  22Feb2012/                               (these are CDBS data from February 22, 2012)
    ant_make.dat
    ant_pattern.dat
    application.dat
    dtv_channel_assignments.dat
    elevation_ant_make.dat
    elevation_pattern.dat
    elevation_pattern_addl.dat
    facility.dat
    supp_facility.dat
    tv_app_indicators.dat
    tv_eng_data.dat
data/
  country_poly.dat
  pop_ca_2006.dat                           (this is 2006 Census data for Canada)
  pop_ca_2011.dat                           (this is 2011 Census data for Canada)
  pop_mx_2010.dat                           (this is beta 2010 Census data for Mexico)
  pop_us_2000.dat                           (this is 2000 Census data for the US)
  pop_us_2010.dat                           (this is 2010 Census data for the US)
  pop_usterr_2000.dat                       (this is 2000 Census data for US territories)
  pop_usterr_2010.dat                       (this is 2010 Census data for US territories)
dbase/
  cded/                                     (empty) (this is a placeholder for Canadian terrain data)
  cem/                                     (223 files) (these are Mexican terrain data)
  gtopo/                                   (25,537 files) (these are 30-second terrain data)
  nadcon/                                  (28 files) (these are data for converting between datums)
  ned/                                     (1,964 files) (these are 1-second terrain data)
  nlcd/                                    (empty) (this is a placeholder for clutter data)
  srtm/                                    (719 files) (these are SRTM terrain data)
  usgs/                                    (1,362 files) (these are U.S. 3-second terrain data)
dev/
  build/                                   (empty)
  Makefile
  Manifest.txt
  src/                                     (21 items) (this is the source code for compilation)
help/
  manual.pdf                               (instruction manual for TVStudy)
lib/
  check_install
  mysql-jdbc.jar
  pair_study_post
  tvstudy
  xercesImpl.jar
out/                                       (directory is initially empty)
tvstudy.jar

```

Compiling TVStudy from Source

These instructions assume the use of a Debian-based Linux distribution, such as the popular Ubuntu 12.04.2 operating system. If you are using a different distribution, you will need to adjust these instructions accordingly.

In your terminal, enter the following command:

```
sudo apt-get install openjdk-7-jdk gfortran libmysqlclient-dev
```

This will install the additional prerequisites necessary to compile TVStudy.

You are now ready to build TVStudy. Enter:

```
cd dev
make
```

Waiting a few seconds should result in newly-compiled `tvstudy`, `pair_study_post`, and `tvstudy.jar` files. If it does not, you may need additional prerequisites or you may need to make additional modifications to `dev/src/tvstudy.h` or `dev/Makefile` in order to compile TVStudy successfully. Those instructions are beyond the scope of this document. Then enter:

```
make install
cd ..
```

These commands should place you back in the folder in which you placed the TVStudy files and allow you to continue to the “Launching TVStudy” section of this manual on page 15.

Note: If you are using CentOS or another Red Hat-based operating system, you may need to adjust your Makefile. In CentOS, `libmysqlclient.a` is located in `/usr/lib64/mysql`, as opposed to `/usr/lib/x86_64-linux-gnu` as it is on Debian-based operating systems.

Comments Regarding TVStudy on Windows

An executable version of TVStudy is not provided for the Windows platform, but there is no reason to believe that it should not be possible to compile and run TVStudy on Windows. As such, this section is designed to obtain the appropriate files necessary, short of actual compilation of the code. As an alternative to compiling the TVStudy source code for direct execution under Windows, the user may wish to consider installing a virtual OS environment (such as Ubuntu under Oracle's VirtualBox) and running one of the supplied executables in a virtual machine.

From the FCC TVStudy website, you will need to obtain the data file and one of the two platform-specific files listed below.

2013Jan_tvstudy_data_files.tgz – Contains all of the necessary data files required to run TVStudy successfully. All users need to download this file.

2015Sep_tvstudy_mac_files.tgz – Contains all of the necessary code and executables to run TVStudy on Mac OS or to compile TVStudy for Mac OS.

2015Sep_tvstudy_linux64_files.tgz – Contains all of the necessary code and executables to run TVStudy on 64-bit Linux or to compile TVStudy for Linux.

Due to the large file size, **2013Jan_tvstudy_data_files.tgz** was split into seven segments of about 2 GB each. Those seven segments have been posted to <http://data.fcc.gov/download/incentive-auctions/OET-69/> and can be downloaded and concatenated by the end user. The resulting .tgz file is then unzipped to recover the four directories and their contents. The unzipped files are approximately 25GB in size. The seven segments can be concatenated using 7-Zip. Once 7-Zip is installed, right-click on the first segment (.001) and choose "Extract files..." from the menu.

To minimize the possibility of uncorrectable transmission errors, the seven segments have been used to create parity archive (PAR2) files with Reed-Solomon error correction (5% redundancy). While not strictly required to recover the original .tgz file, it is recommended that the user also download the PAR2 files and use appropriate software to verify (and correct if necessary) the eight segments comprising the .tar file. A number of no-cost applications are available for utilizing the PAR2 functionality to verify and correct the .tgz segment files, such as Multipar.

There was a change in the directory structure between TVStudy 1.1 and 1.2. If you are performing a fresh installation with newly downloaded data files, no changes will be needed. If you are using data files downloaded when TVStudy 1.1 was available, please rename the sql/ directory to data/ to allow for importation of population and other data the first time you run TVStudy.

Please note that you will need to install Java in order to use TVStudy.

LAUNCHING TVSTUDY

On the Mac, double-click on `TVStudy.app` (the `.app` extension may not be visible, depending upon the Finder configuration). On Linux, use your terminal to launch:

```
java -jar tvstudy.jar
```

On the Mac, if presented with a warning message saying that `TVStudy.app` is damaged, the “quarantine” security system in the MacOS may be preventing the application from running. You may be able to manually launch the application using right-click (option-click if you have a one-button mouse) and selecting “open.” Alternatively, you may need to go to the System Preferences menu, choose “Security & Privacy,” and then choose the “Allow Apps Downloaded from Anywhere” option from the “General” tab. Once you have launched `TVStudy.app` for the first time, you should be able to return your security settings to their original values and still launch `TVStudy` successfully. Returning security settings to their original values is strongly recommended.

Upon first login, `TVStudy` will open the “Manage Database” window and prompt you to update your database to the latest version if you are upgrading, or install the root database for a new installation. Click “Update” or “Install,” as appropriate, and it will do so automatically, taking up to about 10 minutes.

For instructions on using `TVStudy`, please refer to the `TVStudy` manual.

CHANGE LOG

Differences Between 1.1.2 and 1.1.1

Addressed an issue with calculation cell indexing that can result in the population of some cells not being correctly considered, and which may cause the program to crash in unusual instances.

Differences Between 1.2.6 and 1.1.2

Mac users no longer need to use a command-line interface to run a study. The TVStudy application can now control study engine processes directly, so the user can initiate and monitor all engine runs from within the graphical user interface. Direct command-line control of the study engine is still possible but is only needed in very unusual situations.

Database updates may now be performed directly by the TVStudy application when a new version first connects to an old database. Additionally, TVStudy may now automatically install its root database the first time it connects to a database server that has not been used with TVStudy before. There are no longer any separate installation or update scripts to run.

Users can access multiple database servers and study databases at once, and multiple users can access the same server and databases at the same time. The TVStudy application and the study engine use locking protocols to manage concurrent access to data.

The database login prompt can be re-opened to connect to more database servers. When the last open Study List window is closed, the login prompt re-appears. The login prompt contains a Quit button that only becomes active when it is safe to exit TVStudy. (Repeated warning to MacOS users: **Never use the “Quit” command!** Only use the “Quit” button at the login prompt.)

Study List windows now contain much more information, including the template and CDBS dataset used by each study, and the amount of disk space dedicated to cache files for each study.

Open Study List windows automatically update database information every minute, and rescan cache sizes every ten minutes. In the list, studies currently open in the study editor are blue, studies that have engine processes running are red, and studies in use by other users are gray.

A new Clear Cache command is available in the UI. This can be used to recover disk space from cache files for studies that are not actively being used. Cache file data can always be re-created by the study engine if needed again.

TVStudy 1.1 stored CDBS data within each study database. In 1.2, CDBS databases are separate from study databases so they can be shared and reused. When TVStudy updates a 1.1 database to 1.2, it will separate CDBS data embedded in existing studies and remove duplicate data.

The CDBS databases are identified by a date followed by a small number in parenthesis, *e.g.* “02/23/2012 (231)”. The date is the most recent last-change or last-update date found in the CDBS data, and the number is the count of records having that date. This identifier should be unique between any two downloads of CDBS data.

When importing new CDBS data into TVStudy 1.2.6, an optional name may also be provided. That name will appear in place of the identifying date and record count in the user interface. However the date and record count will still appear in output files, in addition to any name provided.

Output data file formats have been revised, and additional format options added. In particular, the CEL data format is now more compact, it avoids redundant repeats of the country, area, and population values, making the files significantly smaller. However any post-processing software written for the TVStudy 1.1 formats must be revised for the new 1.2 formats.

When starting a study run, the desired output files can be selected so that not all files have to be created if not needed.

Output files are now placed in a fixed directory hierarchy under the directory “out”, using the database server host name, study name, and scenario name to create directories and using fixed names for files such as “tvstudy.txt” and “tvstudy.csv”.

Warning: **Repeat runs of the same scenario and study will over-write existing files!** If you want to preserve a prior run's output you must manually copy or rename the files or enclosing folders before starting a new run.

It is now possible to run automated station-pair studies in TVStudy.

Study parameters have been broken out into tabs rather than a single long list.

Some existing study parameter descriptions are revised for clarity.

There are numerous new study parameters, including:

- Option to allow individual elevation or matrix patterns to be used during contour projection (previously generic patterns were always used even when an individual pattern was present)
- Option to assume all elevation pattern tilt values must be positive, and invert negative values
- Option to control truncation of DTS operation service area, and parameters to set the distance limits used if truncation is selected (previously DTS service was always truncated and the distance table could not be edited)
- Parameters to provide default values for missing ERP and HAAT values on Mexican data records in CDBS
- Option to set terrain-sensitive service thresholds independently of the noise-limited contour levels, and parameters to enter the independent values
- Parameters to set the FCC propagation curve sets used for noise-limited contour projection
- Option to apply pattern data mirroring to generic elevation patterns (individual elevation patterns are, and always have been, automatically mirrored)
- Option to disable use of generic patterns on Canadian records
- Parameters to set the legal TV channel range for the study, up to 2-69

Generic elevation pattern use can now be specified on a record-by-record basis. All records now have a flag indicating whether or not a generic pattern may be used on that record when there is no individual elevation or matrix pattern. By default the flag is set (except possibly for Canadian

records where it is set, or not, according to a study parameter). Any record can be made editable and the flag changed on that individual record if needed.

It is now possible to add desired or undesired stations at any time, instead of only when creating a scenario.

Scenarios can be imported and exported using an XML format.

In the pattern editor, pattern data can be imported and exported using a CSV file format. A graphical pattern plot display is present in the pattern editor.

In the new study dialog, study templates can be imported and exported using an XML file format.

In the study editor, when saving a new study template there is an option to lock the parameters of the template. When that flag is set, all study parameters will be non-editable in new studies created from that template, ensuring that settings cannot change between runs of the study.

In the scenario editor, instead of a single "Study" column there are now separate columns "Des" and "Und" (for "Desired" and "Undesired") that determine how each record will be considered in the study. "Des" must be checked for the record to have coverage studied and reported; that is equivalent to the old "Study" flag. "Und" must be checked for the station to be considered as a potential interferer to desired stations. If neither box is checked, the record is ignored. Commands in the Edit menu can be used to set and clear the desired and undesired flags on multiple records selected in the list.

In the CDBS search dialogs for adding desired and undesired records to a scenario, there is now an option to disable all MX checks. When that box is checked, all records matching the search criteria will be added regardless of MX conditions. However, in that case none of the records will be flagged as undesireds in the scenario; the records that should be undesireds must be selected manually in the scenario editor.

In the add-desireds dialog, there is also an option to add stations as "desired only", meaning the records added will be marked as desireds but will not be marked as undesireds.

Added a comment field in the study run dialog, any text typed there will appear in the output files for reference and identification.

Window sizing and layout code has been revised. Layout issues that resulted in "hidden" buttons and fields on some platforms are resolved.

Study engine memory management has been revised. Memory limits are based on the total amount of memory in the computer, and study grid sizes are limited so all terrain data for a grid can be kept in memory at once. This should eliminate situations in which the study engine became extremely slow due to disk activity for memory paging or terrain data retrieval. However the engine will now refuse to run if it does not have sufficient memory; the minimum requirement is 2 GB, 8 GB or more is strongly recommended.

Differences Between 1.2.7 and 1.2.6

New option in the pair study setup dialog to select the country for the study run, including a choice for all countries. (Previously the study country was limited to U.S. stations only.) Stations in the selected country are replicated to each study channel then paired with stations from all countries, replicated to appropriate channel relationships, to determine constraints for channel repacking of stations in the selected country. Stations not in the selected country are studied on their baseline channels only, with only stations in the selected country paired and replicated to appropriate channel relationships, to determine constraints for protection of the other-country stations on existing channels. In an all-countries study, all stations are replicated to the study channels and fully paired regardless of country..

Station records in the user interface and study output are now automatically sorted so the order in which stations appear in the editor and output files is consistent and repeatable. In a scenario editor, when the table listing station records is re-sorted by clicking on different column headings, the sort will use multiple columns and modified column contents as sort keys to produce a useful order. For example, sorting by file number will sort by ARN only, ignoring prefix.

Re-designed the logic for automatic selection among mutually-exclusive records when using the "Add Desireds..." and "Add Undesireds..." functions in the scenario editor. The previous logic could produce incorrect or inconsistent results in rare, complex situations involving multiple stations with conflicting records. The revised logic will return consistent results in all situations regardless of complexity; however even in simpler situations the revised logic may occasionally produce different results than the previous version. Study scenarios should always be checked carefully to be sure each station is represented by the appropriate data record for the intended study conditions.

Fixed bugs in the pair study setup code that were causing spurious out-of-memory and "no keys available" errors. The bugs only caused failures in study setup process, they did not cause errors in the results. If the application was able to set up and start a pair study run, the study results were correct.

Fixed a distance calculation bug that may cause interference to or from DTS stations to be under- or over-predicted in rare cases. The bug did not affect any DTS records in the February 22, 2012 reference CDBS database, but may have affected studies involving DTS station records from more-recent versions of CDBS.

Changed the name format used for SQL databases to reduce the risk of conflict with other applications sharing the same database server.

In the dialog used to add a single station record to a study scenario, search results are now presented in a table to make it easier to identify the appropriate record.

Differences Between 1.2.8 and 1.2.7

Fixed bugs in XML export of scenario data.

Made a change that should fix occasional errors from the “Add Desireds...”/”Add Undesireds...” commands when running in a Java 7 environment.

Added new check of CDBS record data. For U.S. Class A and LPTV records, check both ERP fields (effective_erp and max_erp_any_angle) and use the larger value.

Expanded the study parameter controlling use of mechanical beam tilt, it now has three choices: never use mechanical tilt, always use mechanical tilt, and use mechanical tilt only on real elevation patterns. Note it's important to remember there are multiple study parameters related to elevation patterns that interact. For example, for a station that has a real pattern and mechanical tilt, when the “Use real elevation patterns for contours” parameter is not selected, the “always” and “real only” mechanical tilt options will give different answers because a generic pattern is used for contour projection.

Changes to the cell file output format:

Added clutter category to P and R records. The new value immediately follows the population value in all P data records and in the R data record for the summary format in local grid mode. The value is always present, it will be 0 if clutter adjustment is not being used, and otherwise it will be one of the ILLR clutter categories 1 through 10 as listed in OET Bulletin No. 73 Table 3.

Added individual grid limits to desired source records. The new values are at the end of the records in the [source] block, but are only present for desireds. The values are in the same order as in the [grid] header record, which is south latitude, east longitude, north latitude, west longitude. Having these values helps post-processing software that is looking for data for a particular station; the software can know up front how big a grid is needed to store data for a particular station, and it can also skip over [grid] sections that don't overlap the station of interest.

Expanded precision of values for coordinates, areas, and field strengths in the output files. For example, field strengths were previously displayed to 0.01 dB; that is now 0.000001 dB.

Differences Between 1.2.9 and 1.2.8

Fixed several issues involved in validating cache contents. Spurious cache mismatch errors should no longer occur.

Adjusted the ordering of records in the study results files. Results should now be displayed in this order: country-state-city-channel.

Added new pair-study options. The pair study setup window now includes options to select output files from the baseline study, similar to a normal study run. The report, CSV, and map files can all be requested. This allows the user to obtain a report file listing study parameters. The run comment field is also present in the run setup window. In the report file, the comment area will show the pair-study setup parameters (country and channels) in addition to any user-provided comments.

Addressed a potential issue with the above-ground height calculation. Records that initially have an AMSL height representing an above-ground height less than the minimum set by study parameter are changed so that the above-ground height is at the minimum. Both the changed AMSL height and the computed above-ground height are saved back to the database record so they don't have to be re-computed on future runs. Previously, any changes to study parameters would trigger a repeat calculation of the above-ground height causing the above-ground height to change very slightly between the first and second calculations in that situation. Results are now consistent.

Added a new study option to calculate distances to DTS stations as the shortest distance to any individual transmitter in the DTS operation. Formerly, such distances were calculated using just the DTS reference point coordinates, regardless of the actual transmitter locations. The new method applies to both station-to-station checks when identifying potential interferers for a study, and station-to-cell checks of the culling distances. With the new method the station-to-cell check is applied to each individual DTS transmitter for a station that may interfere at a given study point. Undesired signals from individual transmitters that are inside the culling distance are included in the sum for the total undesired signal level and signals from transmitters outside the culling distance are excluded. With the existing (and still default) method, if the DTS reference point coordinates are inside the culling distance signals from all transmitters are summed, regardless of distance, potentially using signals from transmitters outside the culling distance. Similarly (and of greater potential concern), if the DTS reference point is outside the culling distance no undesired signal is checked at all, potentially ignoring signals from transmitters that are inside the culling distance.

Implemented coordinate conversion for DTS stations. The record coordinates for DTS transmitters were not being converted from NAD27 to NAD83 by the study engine as they should have been. Coordinates of the DTS reference records and all other non-DTS records were being converted, so this change affects only DTS stations.

Added a check for the maximum contour distance for a station compared to the rule extra distance parameter, with a warning message shown by the study engine when a contour distance is greater than the extra distance.

Window titles for windows with shortcut keys are now customized for Linux vs. Mac, so they say "Ctrl-0" etc. on Linux rather than always showing the Mac command-key character.

Fixed a window labeling issue in Linux.

Added "About TVStudy" and "Check for Updates" items in the "Help" menu. The "TVStudy Help" option now points to the manual PDF file. Note that the manual is now being distributed with the software (rather than as a separate download) and is automatically placed in the help directory.

Changed the default values for several study parameters:

- Mirror generic patterns, default changed from Yes to No
- Error-handling method, default changed from Disregard to Assume Service
- Rule extra distance, default changed from 129 km to 160 km

The study run dialog has a new menu to limit the amount of memory the engine process is allowed to use, expressed as a fraction of the maximum "allowed" memory ($1/2$, $1/3$, etc.). The maximum allowed memory is less than the installed physical memory to allow for operating system needs and other applications. You can use this feature to start several simultaneous study runs that will share the total available memory. Also, for either a normal or pair study run, when you click to start a new run the application will check the memory allocation for other studies already running and if the new one would exceed maximum allowed memory a warning appears suggesting that you wait until some of the other runs are done. The warning can be ignored and the run started anyway, but if multiple runs exceed the maximum allowed memory virtual memory disk paging may result and all runs will become very slow. Note that a pair study run does multi-process memory-sharing automatically so a pair study always tells the application it is using 100% of allowed memory. A pair study should be run only in isolation and when starting a pair study the warning will appear if any other studies are running regardless of how much memory they are using.

Revised the computation of the study engine memory limit in anticipation of the new 64 GB Mac Pro. The amount of memory excluded from use by the study engine is now capped at 8 GB. This will give more memory to the study engine when the total memory size is 32GB or more.

Differences Between 1.3 and 1.2.9

Fixed an issue with database login. Previously the user interface allowed a blank login password field, making it possible to launch the application when no MySQL login password was set. However the study engine process always required a non-empty password and when none was provided at login, study runs would stall waiting for the user interface to forward the non-existent password. The user interface now also enforces the non-empty password requirement and will not accept a blank password field at login. A MySQL login password must always be set.

Fixed a bug that could in unusual circumstances cause “silent” failures of operations that build station records from CDBS queries. In the identified test case this occurred when manually overriding the MX record selection logic, and the triggering circumstance was an antenna ID that did not have pattern data. However the bug itself had nothing to do with either the MX logic or pattern processing. The bug was that data warning flags from previous records were not being cleared and so could inappropriately affect the processing of later records. Warning flags are now explicitly cleared in all code paths.

Fixed an issue with AMSL height modifications. An AMSL height may be modified during a study run because it does not meet the minimum AGL height parameter, or because the AMSL height must be derived from the HAAT. Previously when a height was modified the new value would replace the original in the database record. However if there were subsequent changes to study parameters for minimum AGL height or HAAT terrain database selection, the AMSL height might not be re-computed correctly because the original value had been replaced. A second field has now been added to study records to store the as-modified AMSL height so the original height is preserved, allowing the as-modified value to be updated correctly in any circumstance. After a study run, if the as-modified height used in that run differs from the original height, it is displayed in the station record editor just below the AMSL height field showing the original value. The as-modified AMSL height is always used in all output files from a study run.

The capability to derive AMSL height from HAAT can now be triggered manually on any editable station record, by entering -999 in the AMSL height field.

When the equal-area replication method is selected, the iterative algorithm used to match the area of the replication contour to the original has been improved so the areas should match more closely. However despite this improvement, there will still be unavoidable variations in the areas reported in study result. During the replication process contour areas are computed directly from the geometric contour location, and by that method the area of the original and replication contours will match very closely. However areas reported in study results are computed by summing discrete areas of study cells when study points for those cells are inside the contour. Since the equal-area replication can result in a replication contour with a different shape than the original, there can be differences in the reported areas between the original and replication facilities because there are different sets of study points within the respective contours. These differences will tend to be greater with larger cell sizes.

On a replication record, elevation pattern tilt parameters from the original record are now preserved. The elevation pattern itself is still always generic on a replication record, but the tilt values are no longer reset to 0 as in previous versions.

For a DTS station, the reference facility defining the bounding contour for DTS service is now identified using the CDBS 'R' record status code or by finding a current non-DTS record for the facility ID. The station's post-transition FCD facility is used as reference only if no other record can be found (previously the FCD facility was always used).

A DTS station's maximum distance limit for the 73.626(c) check can now be a custom value provided in CDBS.

A DTS station's reference facility can now be on a different channel than the actual DTS operation, and when the DTS operation is replicated the reference facility itself is not replicated since the bounding contour does not need to change. Also the contour maximum-distance limit parameters no longer apply to DTS reference facility contours as those are not actual service contours, they are logical boundaries on the DTS composite service area.

Problems with XML import/export fixed. It is now possible to import multiple scenarios from the same XML file. Previously it was possible to export multiple scenarios; however, import of such a file would fail after the first scenario.

Changes to the XML format to support improved handling of DTS stations. As a result files exported from version 1.3 and later cannot be imported into earlier versions. If such an import is attempted, it will immediately fail with an "unknown element" error. Earlier exports can be imported into version 1.3, any old-format DTS station data will be updated during the import as needed.

Improved failure detection and logging in cases of missing/inaccessible terrain data files.

Added a Check Installation command to the Help menu. This command runs scripts to verify proper installation of the software and flat-file databases, *e.g.* terrain data files. **Note: when upgrading an existing installation of TVStudy, the verification scripts and related files must be manually installed in the "dbase" directories.**

Added new study parameters for minimum ERP values applied after replication of Class A stations.

Adjusted the default value for the "Rule extra distance" from 160 km to 162 km.

Fixed an issue with map (shapefile) output. Floating-point numerical fields in the record attributes were not correctly defined in the .dbf file header, causing some attribute values such as study point area and source ERP to be truncated to the whole number portion when loaded into some third-party GIS applications. Attribute fields widened as needed and fixed decimal precision count added to header fields.

Shapefile attribute field length for CDBS facility ID increased to 7 characters to support larger facility ID value range.

For a DTS station, the circular boundary around the DTS reference point is now included in the contours shapefile, in addition to the reference facility service contour and individual DTS transmitter service contours.

New option for a “points CSV” output file. This is a comma-separated text data file listing all study points considered in a run. It includes the same points placed in the existing “points” map shapefile output, but in CSV format with some additional data (ground elevation and clutter category). Note when running a study in global grid mode, there may be duplicate records in this file (as has always been true of the map shapefile as well). That occurs when memory limitations force the study grid to be divided into sub-grids each for a different sub-set of the stations being studied. The sub-grids may overlap, meaning two stations with overlapping service areas may be studied on different sub-grids and study points in the overlap area will be duplicated in the output. The duplicate records will always be identical.

New option for a “parameters CSV” output file from a study run. This is a comma-separated text data file with detailed facility parameters, including coordinates, height, ERP, and azimuth patterns, along with basic study results. The file may include only desired stations, or it may include all stations desired and undesired. For DTS stations, the file lists individual DTS transmitter parameters as well as the “parent” information from the reference facility.

Improvements to the user interface for management of TVStudy database installations. When connecting to a database host, a new management dialog will appear if the host does not have a current-version TVStudy database installation. From that dialog a database can be installed, uninstalled, or updated to the current version. Study lock flags can be cleared from the management dialog, in case locks are “stuck” due to aborted study runs when an update is needed. From the management dialog, local cache files for the database can be deleted. The management dialog will open automatically when it must be used, but may also be opened manually if desired with the new Manage button in the Open Database window.

TVStudy database installations are now identified by a UUID which is used to track database connections and local cache files. In previous versions, connections and cache files were tracked using the database host name. However it is not unusual for the same database host to be identified by several different names (*e.g.* “localhost” and “127.0.0.1”), which could result in multiple redundant connections to the same database, and redundant local caches from study runs. The new UUIDs uniquely identify each database installation regardless of the host name used for the immediate connection.

In the user interface, the Copy and Select All editing commands will now work in most major editor tables. Note if the selected interface component is a text field, editing commands will still first apply to that field if it is editable. The table action will occur only when the selected component is not an editable text field, or there is no selected component.

In the study list window, newly-created studies or those needing update following a version change will appear in green. Such studies cannot run until they are first opened and saved in the editor to update the database contents.

Differences Between 1.3.1 and 1.3

Fixed a bug in the XML import function which could cause stations with edited matrix patterns to fail to import.

Added more error-checking to the CDBS database build code. Data with duplicate records and other structural problems will now fail to import.

Added dynamic load balancing of multiple study engine processes during pair study runs. Note that a fringe benefit to this change, because the pair study window controller knows how many scenarios have been dispatched to the engines, it can keep a running status display of scenarios completed and estimated time remaining. This is in the “Settings” pane.

On the Mac, adjusted the TVStudy.app launcher to defeat the “App Nap” feature found in OSX 10.9 Mavericks. In order to ensure the fix is not removed and App Nap re-enabled with subsequent updates to OSX, you will need to right-click on the TVStudy.app launcher and check the “Prevent App Nap” checkbox. Then, open a terminal and enter this command:

```
defaults write gov.fcc.TVStudy NSAppSleepDisabled -bool YES
```

Differences Between 1.3.2 and 1.3.1

Updates the input data handling to process the latest modifications to the CDBS files. Additionally, in the /lib directory, a command line utility called fix_application can be used to convert older application.dat files to be compatible with TVStudy 1.3.2.

Limits the scroll-back buffer for messages in the study run windows to 15,000 lines (usually about 2 hours), when the buffer is full older messages are removed. The complete message log is written to a temporary disk file and can still be saved if desired. This resolves issues with out-of-memory conditions leading to failures for very long-running studies.

Sets the user interface language to U.S. English for all contexts so numeric display and parsing are consistent. The user selection of the country or locale in the computer's operating system no longer has any effect on the language in the TVStudy user interface.

Improves console logging in recent versions of MacOS by allowing error messages to be saved to a local file "tvstudy_err.log" in the "lib" directory.

Corrects the formula used to calculate the minimum required D/U ratio in cases of co-channel DTV-to-DTV interference where the desired predicted signal level is very near the threshold for reception consistent with section 73.623(a)(3)(i) of the rules. The formula applies only at locations where the S/N ratio is greater than 16 dB but less than 28 dB. For these instances the formula in TVStudy was $D/U = 15 + \log_{10}[1.0 / (1.0 - 10^{-x/10})]$ and the correct formula is $D/U = 15 + 10 \log[1.0 / (1.0 - 10^{-x/10})]$. The correction results in a slight change in study results in comparison to all previous TVStudy versions. The percentage of 2x2 kilometer global grid cells affected by the correction is approximately 0.25% for full-service TV stations and 0.1% for Class A TV stations.

Corrects an issue where unpopulated cells in the border regions of the US could be incorrectly assigned to Canada or Mexico when evaluating foreign stations. This issue only impacted area calculations for Canadian and Mexican stations in the border regions; area and population calculations for US stations and population calculations for international stations were not impacted by this issue.

Accounts for an issue in elevation pattern lookup that could cause unreasonable estimates of signal strength to be determined at extreme downward depression angles when relying on elevation patterns that have been entered manually or imported, if the pattern tabulation does not include a final point at 90 degrees. Rather than extrapolating, the lookup will now use the last point in the pattern data when beyond the tabulated range.

Displays the available disk space in the study list window. Disk space is checked when a study run is started and a warning is shown if disk space appears too low based on estimates of cache and output file sizes for the run.

Improves the user interface in study run windows. Time-to-completion estimates now appear at the bottom of all study run windows, including normal runs. Study runs will output messages indicating the status of the run. A "working" message will appear, including a completion status indication when possible, for operations within the run that may be lengthy. In TVStudy 1.3.1 these estimates appeared only for pair studies.

Updates the default study template to include a complete set of interference rules for evaluation of LPTV and Class A stations with regard to Canada and Canadian stations.

Allows for most study parameters to be set independently by country.

Enables the distance range parameters for average terrain calculations to be optionally set independently for each country.

Adds the capability to select alternative contour projection methods when out of the range of the propagation curve tabulations at small distances. In addition to using the free-space formula, which remains the default TVStudy 1.3.2 parameter as in previous versions, the free-space formula may now alternatively be scaled to match up with the curves, or may be disabled entirely so all lookups beyond the curve range just return the last point on the curves.

Enables new options for selecting how elevation patterns are to be used for contour projection. In addition to the use of elevation patterns for all contour projections in previous TVStudy versions, which remains the default TVStudy 1.3.2 parameter, now elevation patterns may alternatively be disabled entirely for contours, so contours are projected using only azimuth pattern data regardless of other parameter settings, or may be used only for full-service stations but not for Class A or LPTV stations. The latter option will allow TVStudy to match the practice of the Media Bureau.

Adds the capability to select whether the generic elevation pattern is doubled for Class A and LPTV stations. Previously, the generic patterns were doubled (in relative field) only when used with LPTV stations, and this remains the default TVStudy 1.3.2 parameter. The new options alternatively allow this doubling parameter to be disabled entirely, which will cause TVStudy to apply or not apply the elevation pattern to LPTV and Class A stations consistent with the “Use generic patterns by default” option in the CDBS tab and the “Use elevation patterns” option in the Contours tab, or to be applied to both LPTV and Class A stations, which will allow TVStudy to match the practice of the Media Bureau.

Includes the DTS site number in the cell output file for DTS undesired stations.

Includes in the parameters CSV file fields for emission mask and frequency offset.

Differences Between 1.3.2 (Patched) and 1.3.2

This release corrects some minor issues in the software. These issues did not impact the results provided in the FCC's June baseline, but may have been inconvenient for those attempting to use TVStudy for other purposes. Installation of this update is strongly recommended, as the FCC has upgraded to this patched build internally and results in the Mexican border region going forward may be incorrect using the original 1.3.2 build.

Corrects an issue where the software may incorrectly calculate the total available memory in Linux. This issue could have caused a study run to abort with an inappropriate "insufficient memory" error; however, if the run did not abort, this issue would not have affected the results. In some cases, this issue would have caused TVStudy run very slowly under Linux as compared to the Mac.

Corrects an issue where certain XML files could not be imported. This issue could have caused an inappropriate "XML structure" error that would incorrectly abort an import in some conditions. The issue occurred only when the scenario being imported contained an editable station record with a channel outside the allowed range for the study to which the data was being imported. The correct behavior is to ignore the record and import the parts of the scenario which fall within the allowable channel range. This issue did not affect study results.

Corrects issues with certain switch settings being ignored or incorrectly applied. For example, this issue could have caused obviously incorrect results (all 0's for coverage area and population) for all stations in any study run with the coordinate rounding option enabled. These issues did not affect results when TVStudy was used with the parameter switches provided by the FCC in the June baseline, but could have impacted results for users attempting to use alternative settings. One of these incorrectly applied switch settings is required to more efficiently perform analyses implementing the FCC's agreement with the Mexican government; correcting these switch settings will facilitate implementation of that agreement.

TROUBLESHOOTING

Problems Running TVStudy

Several errors have been reported. Here is a description of how to resolve each one.

- **Exception in thread "main" java.lang.UnsupportedClassVersionError: gov/fcc/tvstudy/AppManager : Unsupported major.minor version 51.0**

This message or one like it, seen on the command line in Linux, usually means that you have two versions of Java installed, and TVStudy is attempting to launch using the older one. To resolve this issue, remove the older version of Java from your system, using the normal method of removing such software.

- **The database needs to be updated, but studies are currently in use.**

Assuming your database is not currently in use by TVStudy by either yourself or another user, it is possible the database was left in an unclean state with locked databases. To unlock all of your databases and allow the update to proceed, in the Manage Database window, click "Unlock All," and then "Update." The update should complete successfully.

If the problem is not resolved, you may try to drop the database, as described below.

- **The database is being updated by another application, or is damaged.**

This can happen when a database update fails. If this happens, the simplest method of repair is to drop the database and rebuild from scratch. To do this, in the Manage Database window, click "Uninstall," and then "Install." Click "Open" and TVStudy should open successfully.

If, after doing the above steps, the database fails to install correctly, you most likely do not have the file structure correct. When TVStudy 1.1 was upgraded to 1.2, the sql/ directory was renamed to data/ which is the most common cause of this issue. Ensure that your sql/ directory is renamed to data/ and contains all of the appropriate files, then repeat the steps in the above paragraph.

The database can also fail to install correctly when TVStudy is running from a location other than the directory which contains the other TVStudy directories such as data/. If so, simply close TVStudy and launch it again from the correct location.

Contact Information

If you encounter any problems and wish to speak with someone at the FCC about TVStudy, please e-mail Mark J. Colombo at the following address: mark.colombo@fcc.gov

LICENSING INFORMATION

TVStudy

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Version 2.0, January 2004
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