

Blindside (<http://www.blindside.co.uk>) Freeware. Blindside is a command-line utility that hides files in BMP's and has optional encryption. Also available are Linux, HP, Solaris, and AIX versions, with windows-based GUI promised soon.

BMP Secrets (http://www.pworlds.com/products/i_secrets.html) Freeware. BMP Secrets is a BMP-based stego product for Windows with a decent interface and a very large hiding capacity (~65% of carrier file). It includes built-in encryption and ability to hide data within specific sub-areas of the image.

Camouflage (<http://www.camouflagesoftware.co.uk/>) Freeware. Camouflage is an interesting Windows based program that allows you to hide files by scrambling them and then attaching them to the end of the file of your choice. The camouflaged file then looks and behaves like a normal file and can be stored or emailed without attracting attention. It works for pretty much any file type. Password protection is included. The hidden file can be detected by examining to raw file data and seeing that the hidden file has been added after the normal carrier data, but this will only appear as gibberish since the data is encrypted. It is not the most secure form of steganography, but what it lacks in strength is makes up for in being inconspicuous by using routine files (i.e. Word docs).

Contraband (<http://www.biol.rug.nl/hens/j/contrabd.exe>) Freeware. This is a Windows based program which embeds and extracts any conceivable file into 24-bit BMPs and includes source code.

Contraband Hell Edition (http://www.biol.rug.nl/hens/j/che_xmas-beta.zip). This is a BMP based stego program with strong encryption built in. It has a nice setup program and user interface and is free. It is still in beta, but only in so that it lacks helpfiles – easy to use.

Courier v1.0a (<http://pages.prodigy.net/robyn.wilson/courier.zip>) Freeware.

DataMark Technologies (<http://www.datamark-tech.com/products/products.htm>) Commercialware. DataMark Technologies has four stego products that hide information in BMP, JPG, GIF, TGA, TIF, PNG, MIDI, WAV, AVI, and MPEG formats.

- **StegComm** for confidential multimedia communication,
- **StegMark** for digital watermarking of digital storage media,
- **StegSafe** for digital storage and linkage, and
- **StegSign** for e-commerce transactions.

D.P.T. (Data Privacy Tools) (http://www.xs4all.nl/~bernard/home_e.html) Freeware. DPT has strong encryption with optional BMP steganography.

Data Stash (http://hosted.barrysworld.net/minimice/Body/Programs/ds_info.html) Shareware \$25, hides files in BMP or database files and comes with password protection.

dc-Steganograph (http://members.tripod.com/~Nikola_Injac/stegano/) Freeware. By Nikola Injac, this is a small, easy to use DOS-based stego program that hides data in PCX image files.

Digital Picture Envelope (<http://www.know.comp.kyutech.ac.jp/BPCSe/Dpenv-e/DPENVe-home.html>) Freeware. DPE is a Windows 95/98/NT program based on the BPCS-Steganographic technique which was invented by Eiji Kawaguchi in 1997. It is a BMP-based stego program that can hide an incredible amount of data in a single file, often 50-100% of the original image without changing the file size. This is the first time that the BPCS group has released the encoder (with the decoder) and due to security concerns, the exe will expire in April 2002.

Embed IFF24 and **Embed 256V**, (<http://us.aminet.net/pub/aminet/util/crypt/>) Freeware, hide data in IFF24 and 256 color images, respectively.

Empty Pic (<http://www.crtelco.com/~robertw/>) Freeware, provides simple GIF-based steganography.

Encrypt Pic (<ftp://ftp.elet.polimi.it/mirror/Winsite/win95/miscutil/encpic13.exe>) Shareware \$10. With Encrypt Pic, you can hide data in 24 bit BMP images. It has the

added benefit of offering data encryption via the BlowFish algorithm. French version also available.

EZStego (<http://www.stego.com/>) Freeware. EZStego is a GIF-based stego application from Romana Machado, the author of Stego for Mac. It has similar steganographic functions as its Mac-based predecessor, but is written in the platform-independent Java language instead.

FatMacPGP 2.6.3 (<ftp://ftp.euro.net/d6/pgp/OLD/mac/Fatmacpgp263v16.sea.hqx>) Freeware. FatMacPGP 2.6.3 is the most recent version of MacPGP optimized for PowerMacs. It has a Stealth option which strips off all identifying header information to leave only the encrypted data in a format suitable for steganographic use.

FFEncode (<http://www.rugeley.demon.co.uk/security/ffencode.zip>) Freeware. This is an interesting little DOS program that hides a file in a text file by using a Morse code of NULL characters. Unpack the zip file and type FFENCODE or FFDECODE at the DOS prompt for the simple command line parameters.

Gif-It-Up v1.0 (<http://crypto.radiusnet.net/archive/steganography/gif-it-up/>) Freeware. This is a Windows 95 based stego program that hides data in GIF files. It has a professional looking interface and includes a slick installation program and a data encryption option.

Gifshuffle (<http://www.darkside.com.au/gifshuffle/>) Freeware. Gifshuffle is a command-line-only program for Windows which conceals messages in GIF images by shuffling the colourmap. The picture remains visibly intact, only the order of color within the palette is changed. It works with all GIF images, including those with transparency and animation, and in addition provides compression and encryption of the concealed message.

GZSteg (<http://linkbeat.com/files/>) Freeware. GZSteg hides data in GZip compressed files and was compiled for DOS by Preston Wilson.

Hide4PGP v2.0 (<http://www.heinz-repp.onlinehome.de/Hide4PGP.htm>) Freeware. Hide4PGP v2.0 by Heinz Repp is a command-line steganographic program for Windows, DOS, OS/2, and Linux that hides data within BMP, WAV, and VOC files. It is designed to be used with both PGP and Stealth, but also works well as a stand-alone

program. Version 2.0 has several new features, including a new stego format which is much more robust against format conversions - only lossy compression formats will lose the hidden data. The source is also included and should compile on any platform without major problems.

Hide and Seek v4.1b (<ftp://ftp.ntua.gr/pub/crypt/steganography/hdsk41.zip>) Freeware. HandS provides data hiding/seeking using GIF image files. These DOS programs take data, usually text, including encrypted text, and hide it in a GIF file.

Hide and Seek v5.0 (<http://www.rugeley.demon.co.uk/security/hdsk50.zip>) Freeware. The latest version of Hide and Seek has been totally redesigned. It is still a DOS based program, but now includes a user interface (no more command line operations) to hide info in GIF files.

Hide and Seek for Win95 (<ftp://ftp.hacktic.nl/pub/crypto/incoming/hideseek95.zip>) Shareware \$15. HSWin95 is a BMP-based steganography program by Colin Moroney, the author of the dos versions of Hide and Seek. This version is a considerable step up from his previous efforts. Its professional looking interface makes it easy to use. The file wiping options and blowfish header encryption method are added bonuses.

Hide In Picture 2.0 (http://www.brasil.terravista.pt/Jenipabu/2571/e_hip.htm) Freeware, is a small, easy-to-use Win9x or DOS stego program with blowfish encryption that hides data in BMP images.

In Plain View (<http://www.9-yards.com/software.html>) Freeware, is BMP steganography with password protection.

In The Picture (<http://www.intar.com/ITP/itpinfo.htm>) Shareware \$25. ITP is a Windows 95-based stego program that hides data in BMP images. It offers multiple unique keys so you can encrypt data intended for multiple recipients into the same file. It has a drag and drop interface and can generate a random fractal image to use as a vessel image, if needed.

Invisible Encryption (IVE) (<http://www.fitin.com/>) Freeware, is a cool little steganographic program that works on GIFs in web pages. After clicking 3 times on the suspected encrypted image in the internet browser, a password-textbox appears. After entering the correct password the hidden text/message windows appear. A small Java

applet included provides for public access and online decryption with standard WWW browsers on all platforms. IVE is easy to handle and self explaining.

Invisible Secrets (<http://www.innovatools.com/software/isecrets/>) Sponsorware (free) Banner-free version \$19.95. IS is an interesting piece of software in that it is the first banner-supported stego software that has appeared. As such, you've got to be on the net to use it (so the banners can load). You can pay a modest fee (\$19.95) to lose the ads, which may be well worth it as there are a number of worthwhile features in this software. These include JPG, BMP and PNG hiding, strong encryption, FTP support, temp file wiping, and fake message generation. Also included is the ability to add additional encryption and image file modules.

Invisible Secrets 3 (<http://www.neobytesolutions.com/invsecr/index.htm>) Shareware \$34.95, encrypts and hides files in JPEG, PNG, BMP, HTML and WAV. It also provides strong encryption (Blowfish, Twofish, RC4, Cast128, and GOST), a shredder, and a password manager and generator. It interfaces nicely with Windows Explorer via right-click context-sensitive menus.

JP Hide and Seek (<http://linux01.gwdg.de/~alatham/stego.html>) Freeware. JPHS is a Win95/98/NT stego program with a no-frills GUI that hides data in the ever popular JPG image format. There are lots of versions of similar programs available on the internet but JPHIDE and JPSEEK are rather special. The design objective was not simply to hide a file but rather to do this in such a way that it is impossible to prove that the host file contains a hidden file. Given a typical visual image, a low insertion rate (under 5%) and the absence of the original file, it is not possible to conclude with any worthwhile certainty that the host file contains inserted data. As the insertion percentage increases the statistical nature of the jpeg coefficients differs from "normal" to the extent that it raises suspicion. Above 15% the effects begin to become visible to the naked eye. Of course some images are much better than others when used a host file - plenty of fine detail is good. A cloudless blue sky over a snow covered ski paradise is bad. A waterfall in a forest is probably ideal. Its small size is a major bonus as it easily fits on a disk. It uses encryption as well, but does not mention which type. DOS and Linux version also available.

JSteg (<http://linkbeat.com/files/>) Freeware. By Derek Upham, this hides data within the popular JPG format. Please note, JSteg does not directly read JPEG files as input. Prior to hiding data in a JPG file, you will need to save that file in the TGA (targa) format. After the data is stego'd into the image, the resulting output file will be in the JPG format, with all of the compression advantages that JPG entails. Previously only available for Unix, Preston Wilson and Randall Williams have been kind enough to compile this DOS version for your stego pleasure. If you plan to run this under bare DOS (not a Windows Dos shell), then download this support file.

JSteg Shell v2.0 (<http://members.tripod.com/steganography/stego/jstegshell.zip>) Freeware. JSteg Shell is a Win95/98/NT (not Win2000) interface to run JSteg DOS, a program by Derek Upham which hides data in the ever popular JPG image format. Includes 40 bit RC4 encryption, determination of the amount of data a JPG can hide beforehand, and user-selectable JPG options (ie degree of compression). JSteg Shell has a slick, easy to use interface that makes using JSteg DOS a snap. Jsteg Shell comes with the DOS executables, and the installer takes care of all of the setup details.

JSteg (<http://us.aminet.net/pub/aminet/util/crypt/jstegbin.lha>) Freeware. Amiga version of the popular command line DOS program to hide files in JPGs.

MandelSteg (<http://www.sevenlocks.com/steganog/MandelSteg1.0.tar.gz>) is a GIF based stego program .

Mimic Functions (<http://www.nic.funet.fi/pub/crypt/old/mimic/MimicTR.sit.hqx>) Freeware. Mimic Functions is a pseudo-random text-based stego program that uses context free grammar to hide data. By using the customizable dictionaries, one can hide any file with text that sounds like Shakespeare, Aesop's Fables, or other interesting styles.

MP3Stego (<http://www.cl.cam.ac.uk/~fapp2/steganography/mp3stego/>) Freeware. MP3Stego has both GUI and command-line versions that hide information in MP3 files, which are WAV file sound tracks that are compressed using the MPEG Audio Layer III format. They offer near-CD quality sound at a compression ratio of 11 to 1 (128 kilobits per second). MP3Stego will hide information in MP3 files during the compression process. The data is first compressed, encrypted and then hidden in the MP3 bit stream. Although MP3Stego has been written with steganographic applications in mind it might

be used as a copyright marking system for MP3 files (weak but still much better than the MPEG copyright flag defined by the standard). Any opponent can uncompress the bit stream and recompress it; this will delete the hidden information – actually this is the only attack we know yet – but at the expense of severe quality loss. MP3Stego is available as Windows 95/98/NT executables and Linux/Unix source code (found in the zip file).

Nicetext (<http://www.ctgi.net/nicetext/>) is a pseudo-random text-based stego using context-free grammar and customizable dictionaries

Outguess v0.2 (<http://www.outguess.org>) is a universal steganographic tool that allows the insertion of hidden information into the redundant bits of data sources. The nature of the data source is irrelevant to the core of OutGuess. The program relies on data specific handlers that will extract redundant bits and write them back after modification. In this version the PNM and JPEG image formats are supported – the only JPG stego product undetectable by Stegdetect (see below).

Paranoid (<ftp://ftp.hacktic.nl/pub/crypto/macintosh/Paranoid1.1.hqx>) Freeware. Paranoid is primarily an encryption program that allows you to encrypt files with IDEA, triple DES, and an algorithm written by the author Nathan Mariels. It is a steganography program in that it allows you to hide files in sounds. It comes with built-in file wiping function.

PGMStealth

(<ftp://ftp.ntua.gr/pub/crypt/mirrors/idea.sec.dsi.unimi.it/rpub.cl.msu.edu/crypt/other/PGM.stealth.c.gz>) hides data in PGM greyscale images.

PGPn123 (<http://www.pobox.com/~alpha1>) Freeware. PGPn123 is primarily a PGP "Windows clipboard" shell program that makes using PGP for Eudora, Agent, or Pegasus Mail very easy. The latest version includes a steganography option that is implemented after the message is pgp encrypted. The algorithm is based on the Textto program, making encrypted text files look like something between mad libs and bad poetry.

Piilo (<ftp://ftp.ntua.gr/pub/crypt/steganography/piilo061195.tar.gz>) Freeware. Hides data in PGM greyscale images.

Pretty Good Envelope v1.0 (<http://www.rugeley.demon.co.uk/security/pge10.zip>) Freeware. Pretty Good Envelope (PGE) is a DOS based program that hides a message in another file by the very simple method of appending the message to the file, and then appending a 4 byte little endian number which points to the start of the message. A companion program UNPGE retrieves the message. PGE can be used with graphic files (GIF and JPG) or any other binary files, including COM and EXE files.

Pretty Good Envelope v2.0 (<http://members.tripod.com/~afn21533/pge20.zip>) Freeware. Pretty Good Envelope v2.0 is a stego program that hides data in virtually any file. Version 2 includes a new program, PGECLEAR, to automate the clearing of the envelope after use.

Sam's Big Play Maker (<http://www.scramdisk.clara.net/play/playmaker.html>) Freeware. Sams Big Play Maker is a Windows based program that converts arbitrary text to an amusing play. It is only practical for small messages, otherwise the output "play" is quite large.

Scramdisk (<http://www.scramdisk.clara.net/>) Freeware. Scramdisk is a Windows 95/98 based disk encryption program that allows the creation and use of virtual encrypted drives. These can be created in a container file on a FAT formatted hard disk, on an empty partition, or stored in the low bits of a WAV audio file (which makes it steganography). It has a slick interface and comes with a number of 'industry standard' encryption algorithms, including Triple-DES, IDEA, MISTY1, Blowfish, TEA, and Square. It is also available as a French based EXE.

Scytale (<http://scytale.rever.fr/main.html>) Freeware. Scytale is a PGP shell program that has the added feature of hiding data in PCX images. Other strengths of the program include a built-in wiper and batch mode capabilities and it is available in both 16 and 32 bit versions.

SGPO (<http://glu.freesevers.com/sgpo.htm>) Freeware. SGPO (SteganoGifPalatteOrder) is a Java v1.1 based program with a nice interface that hides messages in GIF images by shuffling the colourmap. The picture remains visibly intact; only the order of color within the palette is changed.

S-Mail (<http://www.privacysoftware.com/>) Shareware v1.3 \$195 - v1.4 \$695 (high security). S-Mail is a stego program that runs under all versions of Windows and DOS

that uses strong encryption and compression to hide files in EXE and DLL files. Yes, you can hide files within full working programs! It has a nice user interface and takes measures to ensure that its hiding scheme is not detected by pattern or ID string scanners.

Snow (<http://www.darkside.com.au/snow/index.html>) Freeware. Snow is a text-based stego program by Matthew Kwan that conceals messages in text files by appending tabs and spaces on the end of lines. Tabs and spaces are invisible to most text viewers, hence the steganographic nature of this encoding scheme. Snow includes a compression function to allow you to stego more information into a given file and has some basic crypto functions via the ICE algorithm. Check out the homepage for DOS, Java, Java applet, and source code versions.

Stash-It v1.1 (<http://www.smalleranimals.com/stash.htm>) Freeware. Stash is a simple Windows 95/98/NT based stego program that will allow you to hide and extract any data file inside a perfectly normal BMP, GIF, TIFF, PNG or PCX file. It does not appear to have any additional encryption features.

Stealth (http://www.radiusnet.net/crypto/archive/pgp/pgp_stealth/) Freeware. Stealth is a simple filter for PGP which strips off all identifying header information to leave only the encrypted data in a format suitable for steganographic use. That is, the data can be hidden in images, audio files, text files, CAD files, and/or any other file type that may contain random data, then sent to another person who can retrieve the data from the file, attach headers, and PGP decrypt it.

Stealthencrypt (<http://www.stealthencrypt.com/>) Commercialware. Stealthencrypt is part of the Internet Security Suite which features BMP and TIF steganography and uses triple DES and Blowfish encryption. The software is available in the US and Canada at software stores such as CompUSA, Best Buy, Walmart, and Target.

Steganos v1.4

(<ftp://ftp.ntua.gr/pub/crypt/mirrors/idea.sec.dsi.unimi.it/code/steganos.zip>) Freeware. Steganos is a small, easy to use DOS based stego program by Fabian Hansmann that hides data inside BMP, VOC, WAV and even ASCII files!

Steganos 3 Security Suite (<http://www.steganos.com/>) Shareware/Commercialware \$49.95 (upgrade \$29.95). The Steganos 3 Security Suite is a complete, easy to use

security suite that uses strong encryption and steganographic techniques to hide data in graphic and sound files. Also included is The Safe (drive encryptor), Internet Trace Destructor, file shredder, e-mail encryption, password manager and computer locking. Available in English, German, Italian, French, and Spanish versions, Steganos just keeps getting better.

Steganosaurus (<ftp://ftp.ntua.gr/pub/crypt/steganography/stego.shar.gz>) Freeware. A text-based stego program.

Stegdetect (XSteg) (<http://www.outguess.org/detection.php>) Freeware. Stegdetect is an automated tool for detecting steganographic content in images. It is capable of detecting several different steganographic methods to embed hidden information in JPEG images. Currently, the detectable schemes are JSTEG, JPHIDE (Unix and Windows), Invisible Secrets, and Outguess 01.3b.

StegFS (<http://www.mcdonald.org.uk/StegFS/>) Freeware. A steganographic file system for Linux.

Steghide 0.3, release 1 (<http://www.crosswinds.net/~shetzl/steghide/index.html>) Freeware. Steghide, by Stefan Hetzl, is a command-line application that features hiding data in BMP, WAV and AU files, Blowfish encryption, 128 bit MD5 hashing of passphrases to Blowfish keys and pseudo-random distribution of hidden bits in the container data. Steghide is written in ANSI C so the source code should compile on many systems. Precompiled binaries are available for Windows and Linux.

Stego

(<ftp://ftp.ntua.gr/pub/crypt/mirrors/utopia.hacktic.nl/crypto/MAC/Stego1a2.sit.hqx>) Shareware \$15. Stego is a steganography tool that enables you to embed data in Macintosh PICT format files, without changing the appearance or size. Thus, Stego can be used as an "envelope" to hide a previously encrypted data file in a PICT file, making it much less likely to be detected (available as a binhexed StuffIt archive).

StegoDos (<ftp://ftp.ntua.gr/pub/crypt/steganography/stegodos.zip>) Freeware. This DOS based picture encoder consists of a group of programs designed to let you capture a picture, encode a message in it, and display it so that it may be captured again into another format with a third-party program, then recapture it and decode the message previously placed inside it.

Stego Wav (<ftp://ftp.externet.hu/pub/mirror/sac/sound/stegowav.zip>) Freeware. Written by Peter Heist, Stego Wav is a java 1.0 based stego program that hides data in 16-bit WAV files.

StegoWav (<http://www.geocities.com/SiliconValley/9210/stegowav.zip>) Freeware. StegoWav hides data in WAV file and has added encryption.

StegParty (<http://www.fasterlight.com/hugg/projects/stegparty.html>) Freeware. A text-based stego utilizing small changes in spelling and punctuation.

Stella (<http://www.stella-steganography.de/>) Freeware. Stella is a java-base stego program that uses two different stego techniques to hide data in GIF/BMP/JPG file formats. It has private key encryption and can hide decoy messages as well.

StirMark (http://www.cl.cam.ac.uk/~fapp2/software/StirMark_3_1_79.zip) and **UnZign** (<http://www.cl.cam.ac.uk/users/fapp2/software/unZign12.zip>) Freeware. Stirmark and UnZign are command-line programs that remove copyright and stego'd information from files. Like many other programs which break established security mechanisms, these programs are intended to demonstrate the weakness in current algorithms so that companies will be motivated to develop more robust watermarking and steganography technologies.

S-Tools 4 (<ftp://ftp.ntua.gr/pub/crypt/mirrors/idea.sec.dsi.unimi.it/code/s-tools4.zip>) Freeware. S-Tools v4 is an excellent Windows 95/NT based steganography tool that hides files in BMP, GIF, WAV files and the unused space on floppy disks. S-Tools v4 has a number of new improvements over the previous version.

TCP/IP (<http://www.psionic.com/papers/covert/covert.tcp.tar.gz>) Freeware. Conceals data within the headers of the TCP/IP protocol suite.

TextHide (<http://www.texthide.com>) Free Demo/Commercialware \$39 (Lite) 89.50 (Pro). SubiText (Texthide) is an interesting program that subtly changes text features, such as narration tense, perspective, and single word synonym replacements to hide data within any text file. For instance, "the auto drives fast on a slippery road over the hill" instead becomes "over the slope the car travels quickly on an ice-covered street." SubiText uses strong encryption (Twofish and RSA) to cover its tracks. The program's

GUI is currently written in German, making its use a bit challenging for this non-German-speaking user.

Textego (<http://www.soltec.net/~huson/atextego.lha>) Freeware. Textego, for the Amiga, is based on the Texto program by Kevin Maher (see below) with a few added improvements.

Texto (<http://linkbeat.com/files/>) Freeware. Texto is a text steganography program which transforms uuencoded or PGP ASCII-armoured data into English sentences. Texto text files look like something between mad libs and bad poetry and should be close enough to normal english to get past simple-minded mail scanners.

Visual Cryptography (<http://www.shareware.dabsol.co.uk/>) Shareware. Hides data in two transparent images and reveals the data when the two images are stacked.

Visual Encryption (VE) (<http://www.fitin.com/>) Shareware \$40. Visual Encryption is the more sophisticated brother of IVE (above) can encrypt GIF images AND hidden texts for public access and online decryption. Online guests can enter a password in the GIF area. If ok, the total GIF including additional message window appear. VE is the tool to secure parts of GIF images that contain important sketches, formulas, or news.

wbStego 4.1 (<http://wbstego.wbailer.com/>) Shareware \$20. BMP, TXT, HTML/XML, and PDF steganography for Windows. Includes a handy Wizard interface, a new (faster) engine, passphrase support to 2 GB, built-in encryption, and key generation. New to this version is a "copyright info manager" to add authorship information to files, although the legal enforceability of this feature is uncertain. English and German version are available.

Wnstorm (<ftp://ftp.ntua.gr/pub/crypt/steganography/wns210.zip>) Freeware. Wnstorm (White Noise Storm) is a cryptography and steganography software package which you can use to encrypt and hide files within PCX images.