

# SDR: SNEAKING DETECTION RECALIBRATED

## THE MANUAL

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### INTRODUCTION

This mod features a variety of modifications to Oblivion's detection and sneaking system, using new tools and approaches that until recently were not even available. If you could care less about the mod's background and concept theory, skip down to the "UNDER THE HOOD" section for the nuts and bolts.

### ABOUT THE MANUAL

This manual only covers the inner workings of the mod. Installation instructions, requirements, compatibility, credits, and other information can be found in the Sneaking Detection Recalibrated - Readme.txt and the Sneaking Detection Recalibrated.ini. If you have any questions, comments, corrections, etc. please reach me through the official thread in the Bethesda Oblivion forums:

<http://forums.bethsoft.com/index.php?/topic/1194753-relz-sdr-sneaking-detection-recalibrated-2/>

### WHAT SDR DOES NOT DO

- It does not change the stats on any item or spell
- It does not change the player's stats
- It does not modify any AI packages
- It does not modify any NPC stats, EXCEPT Sneak skill, and then only temporarily.

### WHAT SDR DOES DO

- At the basic / advanced levels, it overrides and tweaks a number of the sneak/detection game settings
- At the hardcore level, it uses workarounds to rewrite how Oblivion processes sneaking/detection as follows:
  - o It takes into account all equipped gear in use, including clothing, armor, and weapons.
  - o It takes into account the lighting on the NPCs, as well as your character
  - o It completely replaces the benefits of Sneak mastery perks
  - o It takes into account other related skills to offset penalties to sound/movement
  - o It takes into account the Silence spell effects on the player
  - o Penalties against the player are not applied against the Sneak skill of the player, but instead are applied as temporary bonuses to the Sneak skill of the detecting NPCs
  - o Visuals are replaced (e.g. Chameleon refraction effect, and sneaking NPCs being transparent)

### HOW THIS MOD CAME ABOUT

It started with me wanting to have the "best of the best" mod load. I very quickly hit my esp limit, even with Wrye Bash. I started looking at various stealth mods to see how they worked, and if there was a way to combine them. That led to me learning about how to make mods, and stumbling across the actual detection formula that is used by the Oblivion.exe. This led to several realizations:

1. Detection/sneaking as described in the Oblivion user manual does not actually work that way.
2. No single stealth mod did quite what I wanted or how I would like to have it work.
3. If I wanted it, I was going to have to build it myself.

## SNEAKING DETECTION RECALIBRATED - MOD CONCEPT

The mod began as an alternative approach to other stealth mods that didn't quite "fit". Either I didn't agree with the philosophy on certain features, or there were too many conflicts or side effects in my particular modded game, or the feature was good but didn't go deep enough for my taste. Nonetheless, these mods were inspiring\*, and prompted me to try my hand at it. Following are some of the highlights of the SDR mod:

\*A list of those mods and their creators are credited in the SDR Read Me.

### HOW DETECTION IN OBLIVION REALLY WORKS

The short answer is that it combines factors of lighting, range, line of sight, sound, movement, player actions and the difference in Sneak skill levels between the player and the NPC (detector). The formula is very complicated, and it took me a long time to figure out how to short circuit it in order to get my mod working the way I wanted. The actual detection formula was deciphered by JRoush, and if you would like to check it out for yourself, you can find it here: <http://cs.elderscrolls.com/constwiki/index.php/Category:Detection>

### Detection Thresholds

Detection is calculated between every pair, in both directions. Based on the factors loosely described above, the detection relationship is quantified as a "Detection Level". "Detection Thresholds" are minimum numbers that when reached, determine how the detector interacts with the target. There are four "thresholds".

**Figure A.** Detection Thresholds

Threshold Setting	Default Values*	Description
<b>fSneakUnseenMin</b>	0	Applies to all unaware or non-ho NPCs.
<b>fSneakNoticedMin</b>	-20	Actors are aware that target is near and speak accordingly
<b>fSneakLostMin</b>	-20	Applies to hostile NPCs that are searching for the target
<b>iAICombatMinDetection</b>	-50	Applies to all hostile NPCs that are in combat with the target.

\*SDR provides the option to change these settings, and recommends values of 0, -15, -15 and -40 respectively. There may be other mods that change these values to suit AI changes, so just be aware of that when determining load order.

An example of the above values in play might go something like this:

You are sneaking into a lair of bandits. Because they are unaware of you, their detection level against you needs to be 0 or higher in order for them to notice you (*fSneakUnseenMin*). Let's say you are a fairly decent sneaker, but you get a little too close to one, and their detection level briefly goes above 0, but not long enough to spot you immediately. This puts the bandit on "alert". They need a -20 or better (*fSneakLostMin*) to figure out where you are, but luckily you stopped moving right away, and are not in their line of sight, so their detection level against you drops to -25. They say things like "Who's there?" and "Must be the wind". You wait until you think the coast is clear, but you blow it and walk right into one of them. They engage and start attacking. Now you can run away and try to hide, but since they are actively pursuing you, it becomes really difficult. Their detection level against you needs to drop below -50 (*iAICombatMinDetection*) in order to lose them. A potion of invisibility would come in very handy right about now.

Note that just because you drop out of sight and drop below -50 does not mean your opponent will stop looking for you right away. They might come over to your general direction, which means they may spot you again. This is entirely Radiant AI package dependent, and will vary depending on the creature type and level.

## CHANGING THE SIGHT FACTORS

All in all, I felt the sight calculations were fairly straight forward. Although if it was up to me, I would not put a maximum range on line of sight - in perfect lighting conditions, you can spot a lit candle three miles away. However, in practice, increasing the actual maximum detection distance had too many unexpected drawbacks, so I left it alone at the default value. However, there were a few other things I definitely wanted to change:

### **Lighting**

In the default Oblivion system, only the lighting on the player factors in. But if you have ever been near a camp-fire and try to stare out in the dark, or be out in the dark staring at the campfire, a more realistic approach is to take into account the lighting on the player as well as the detector. SDR does this.

### **Proximity**

In the default Oblivion system, you could be standing right in the path of a creature, and it could bump into you and go around you and not even realize you were there. SDR provides an option to provide a significant bump to a detector if they have line of sight (LOS) and are within very close range.

### **Invisibility, Chameleon, Light Spells, and Torches**

It always bothered me that you could be invisible, run around carrying a lit torch, and nobody would notice you. SDR has an option that will cancel any normal *Invisibility* magical effect on you if you are holding a lit torch. A similar option has been provided for *Light* spells, but is disabled by default. There is also the option to have torches negate the effectiveness of *Chameleon*, and *Light* halving it.

## CHANGING THE SOUND/MOVEMENT FACTORS

The way sound and movement was calculated in the default Oblivion detection system warranted a complete rewrite. The idea that you could wear a full set of heavy armor, remove the boots, and be perfectly silent as a Novice in Sneak just seemed silly to me. And then by the time you reached Journeyman, what you wore didn't matter at all. By the time you reached Expert, moving had no penalties whatsoever. That had to change.

### **Sneak Movement Speed Scaled to Sneak Skill**

This feature has been removed as of version 2.03, because it was causing too many problems with other mods. If some other magical way appears to do it without the conflicts, I'll throw it back in, but I wouldn't count on it. As a replacement feature, SDR now allows you to set the sneak speed multiplier, which applies to everyone.

### **Calculating Gear Penalties**

SDR takes into account every piece of armor, clothing and weapon that you have equipped and are actively using. The base penalty is determined by the type of item, its encumbrance, which gear slot it is being used in, and how you are moving. Clothing has the least penalties, followed by Light Armor, and then Heavy Armor. Boots, greaves and the cuirass create more noise than other pieces, especially when running. Items that take up multiple slots, such as robes, are broken down proportionally. Weapons, type and length, are also accounted for. These penalties can be offset by high Sneak skills and skill related to the equipment.

### **Standing Really Still Is Really Important**

In standard Oblivion, an NPC could be right next to you, and you could turn in place, and they wouldn't hear you. SDR has an option that has you make noise when you turn in place. It's about half of the sound you would make if you were walking. But if you are wearing noisy gear and in line of sight, watch out.

### **The Algorithm of Sound**

In the Oblivion default, light and sound are basically treated the same at the same distance, however in reality, they function very differently. Light continues directly until it is blocked by something, while sound loses energy exponentially as it travels, but can wrap around corners. I did my best to replicate these phenomena.

## CHANGING THE SKILL FACTORS

The default Sneak skill versus Sneak skill factoring seemed right to me. However, I wanted more options to help offset some of the new penalties. So other skills come into play, such as the Light / Heavy Armor, the Armorer skill, Acrobatics, and the three martial skills of Blade, Blunt and Marksman. In addition, SDR borrows a feature found in several other stealth mods that allows you to extend and customize the damage bonus multipliers for melee and marksman sneak attacks based on your Sneak perk level, all the way up to Master.

## CHEATING OBLIVION

Although the Basic and Advanced SDR settings didn't require too much work, getting the Hardcore features to work was much more difficult. All the other stealth mods I looked at modified the player's Sneak skill directly, which could cause problems on several levels, including leveling and disproportionate penalties. Meaning that the penalties against you for the NPC that is closest to you also apply to every other NPC, regardless of distance or line-of-sight. My goal was to avoid that, which was quite a challenge.

To do it required nullifying the standard methods Oblivion used to calculate factors for light, sound, and movement, replace them with new formulas, and apply them to the only setting that was left that could be modified: the Sneak skill of the detector. To do this required creating "unplayable tokens" that monitor what the player is doing/wearing/etc. as well as what the detector is doing. The result is that the sneak/detection relationship between each detector and the player is calculated and tracked separately. This provides a more accurate sneaking/detection system, as well as more compatibility with skill/leveling progression mods.

However, there can be a drawback, depending on where you are, who you are sneaking against, other mods that are installed, and whether or not there are any antagonistic factions near each other. The NPCs closest to you will have abnormally high Sneak Skills. Normally these all cancel out each other, but under certain conditions, there may be a side effect where instead of detecting and attacking you, they may detect an enemy faction, ignoring you all together, and go attack them. In general, this is not unusual behavior, as this happened in regular old Oblivion as well. However, these kinds of things may happen more often with SDR installed, depending on the other factors mentioned.

## VISUAL IMMERSION

With the release of version 1.04, several new features add to the immersion of the mod.

- The Chameleon refracted visual effect has been replaced with transparency shaders. Now you can have a much more genuine and visually accurate representation of how effective your Chameleon is.
- NPCs that sneak can fade from view. Using the same detection formulas of NPCs against the player, reversing the formula provides a method to display NPCs that sneak by making them more transparent.
- OBSE provides functions to calculate the angle from detector heading to the target. SDR uses this to determine how far into the detector's peripheral view they fall, and reduces detection bonuses accordingly. But peripheral vision doesn't affect every NPC, so be careful.
- Finally, using the peripheral angle techniques, if an NPC is sneaking, and they are behind you, you will not be able to see them by switching to 3 person point of view. You will have to rely on your ears, or just keep turning around a lot. Non sneaking creatures can be seen normally.

## IMPROVING THE MOD

I am currently working on a new method with an OBSE plug-in that allows me to completely replace the detection formula, instead of just work around it. This will allow me to calculate the detections pretty much however I want without modifying any skills or attributes. But it's going to be awhile, so in the meantime...

## UNDER THE HOOD

This section covers every single .ini option and goes into detail on the functionality. It is highly recommended that you have the "Sneaking Detection Recalibrated" readme.txt and .ini files open and available for reference.

*Note: All referenced variables have 'SaelniQ.' as a prefix in the .ini, but are dropped here for brevity.*

### **The Stealth Packages** (*vStealthPackage*)

There are three immersion packages: Basic, Advanced, and Hardcore. Advanced includes the Basic, and Hardcore includes Basic and Advanced. There are also Hardcore Plug-in Expansion options that requires the OBSE AV Uncapper plug-in to be installed. If you go with the Hardcore settings, you should install the plug-in.

#### BASIC PACKAGE

If you are mostly satisfied with how sneaking/detecting in Oblivion works, and just want to play with tweaking a few settings, then go with the options in the Basic Package. Set *iStealthPackage* to 0 in the ini.

### **Base Sneak Value** (*vBaseSneakValue*)

This is the base number to which all other detection settings are added. Although it says "sneak" in the name, it applies whether you are sneaking or not. Lower values make it harder to be detected, higher values make it easier. The default vanilla value is -25, and is recommended.

### **Light Level Offset** (*vLightLevelOffset*)

Light scales from a level of 0 to 100. Oblivion offsets the effective base "light level" that hits a player by the offset amount, before applying other detection modifiers and adjustments. Vanilla Oblivion has this set to -5, SDR's hardcore settings are designed around 0 offset.

### **Sneak Movement Rate Multiplier** (*vSneakMovementRate*)

By default, your speed when sneaking is .6 (60%) of your normal speed, whether walking or running. SDR provides an option to change this setting, with a new default value of .5 (50%).

### **Sneak Attack Multipliers** (*vSAttackOpt*)

This popular option can be found in several mods, to reduce conflicts, several settings are available:

- Choose 0 to keep default vanilla values. This also allows another mod to alter these values.
- Choose 1, 2, or 3 for a preset track that extends the multipliers all the way up through Mastery. You can see what the tracks are in the ini.
- Choose 4 to customize your own settings. And then modify each Sneak Attack Multiplier for each of the different Mastery levels, one set of five for melee, and another set of five for missile. Because SDR should be loaded towards the end of the load order, this is particularly ideal for mods that only affect the melee or the missile sneak attack bonus. Use this mod to imitate the other mod's bonuses, and then set the other set to whatever you like.

### **Torches / Light Spells Cancel Invisibility** (*vTorchInvisCancel* ; *vLightInvisCancel*)

Select 1 to enable a feature which automatically cancels any existing or recently cast *Invisibility* spells on a person holding a torch. Applies to player, and also NPCs if using Hardcore package. A similar option will cancel *Invisibility* effects if the player/NPC is under a *Light* spell effect - disabled by default.

*If you like Sneaking Detection Recalibrated, please drop by where you downloaded it from and give in an Endorsement/Vote.*

## ADVANCED PACKAGE

Tweaking the Advanced Package settings can have significant consequences, so choose wisely. Activate by setting *iStealthPackage* to 1 in the ini.

**Combat Penalty Adjustment** (*vBaseCombatPenalty*)

This is the penalty to your ability to remain undetected from NPCs if you are in combat with other NPCs. I bumped it up a bit from the default Oblivion setting of 25, but feel free to set it to taste.

**Max Detection Distance** (*vBaseMaxDistance* ; *vExteriorMult*)

This is the farthest distance between the NPC and the player at which the NPC can detect the player. The first setting (*vBaseMaxDistance*) applies to interior locations, and by default is 1500 units, (approx. 70 feet or 21 meters). The second setting (*vExteriorMult*) is the multiplier applied to the interior distance when in exterior settings, x2 by default. **Be careful with this setting.** A greater maximum detection distance could reduce performance because of the larger processing area. Any value below 1500 will probably feel unrealistic.

**Light Penalty Multiplier** (*vBaseLightPenaltyMult*)

This is a general multiplier that is applied towards the combined total of all other Sight based penalties and bonuses. The larger the number, the easier it is to be detected. Recommended values are 1.4 for Basic and Advanced packages (Oblivion default), and 1.0 for the Hardcore package, which uses different formulas.

**Sound Penalty Multiplier** (*vBaseSoundPenaltyMult*)

This is a general multiplier applied to all the noise you are making. With the Basic and Advanced package, the noise is based on the weight of your boots. For the Hardcore settings, it is based on the weight and type of your gear, as well as any weapons you have out and ready. The noise you make is also modified by how you move, and how skilled you are at Sneak in the Basic and Advanced packages, as well as other skills for the Hardcore settings. Recommended setting for Basic and Advanced packages is 1.6. Because the formula for the Hardcore package is totally different, 2.0 is the recommended Hardcore setting.

**No Line of Sight Sound Modifier** (*vNoLOSSoundMod*)

This is the multiplier to your total sound penalty when the detector does not have line of sight on you. The default vanilla setting is 1.0, which basically means your sound penalty is the same whether they have line of sight on you or not. I personally feel that it is a lot easier to narrow in on a sound when the cause of the sound is within your field of vision. So, I set the modifier to .8, which means it's a little more difficult to determine which direction you are coming from by sound alone.

**Running Penalty Adjustment** (*vRunningMult*)

This is a multiplier applied to your base sneak sound penalty when you run. The default vanilla is 1.3, but 1.5 seems a little more "real" to me. It is just not easy to stay quiet when running. For the Hardcore package, this setting only applies to the base movement/sound penalty. Gear sound penalties have their own fixed values.

**Sneak Detection Minimums** (*vSDRSneakDetectMins*)

These settings allow you to change the minimum detection level required in order for an NPC to spot your player. Higher values make it more difficult for opponents to spot the player. Specifics are in the .ini.

*Please visit the official SDR forum thread on the BethSoft forums, and let me know what you think of the mod, and also, what are your favorite stealth related mods you are using with SDR.*

## HARDCORE PACKAGE

**IMPORTANT!** The Hardcore settings override and replace both the Sound and Sight portions of the Oblivion detection formula. That means that the default Sneak mastery perks in regards to boot weight and movement at the Journey and Expert levels no longer apply! Instead, your Sneak skill mastery is used in conjunction with other applicable skills to help offset the various penalties incurred with the new system. This is the most experimental portion of the mod, and it is highly recommend you do a clean save before activating it.

### ***Disabled Auto-Move While Sneaking*** (*vNoAutoMove*)

This option prevents you from power skilling up by sneaking into a corner near an NPC while in “Auto-Move” mode. It checks to see if your character is moving forward, but not holding down the moving forward key (normally “w”). If so, it assumes you are in auto-move mode, and then “taps” the move backwards command once to stop it. If you are experiencing weird stuttering, disable this feature by setting it to 0 in the .ini.

### ***Sleeping Penalties and Modifiers*** (*vBaseSleepAdj* ; *vSleepProximityAdj*)

In standard vanilla, you only get a -10 bonus against sleeping NPCs. The first option allows you to set this value (SDR default is -40). The second option allows you to set how strong the “Short Range” bumps are around sleeping NPCs (SDR default is .4, i.e. 40%). See below for details on *Short Range LOS Boost*.

### ***Base Movement Sound Penalty*** (*vBaseMovementPenalty*)

Separately from any sound penalties for the gear you are wearing, this is the minimum movement/sound penalty you will receive. There are two settings, fixed and scaled.

- **Fixed** is a single value (8), and applies whether you are sneaking or not.
- **Scaled** has a higher starting value (16), which will always apply when you are not sneaking. But if you are sneaking, higher skills in Sneak and Acrobatics can eventually negate it. The formula for scaled movement sound penalty when sneaking is:  $20 - (\text{Sneak Perk Level} + \text{Acrobatics Perk Level}) * 2$

### ***Turning In Place Makes Noise*** (*vTurningMakesNoise*)

The amount of noise made when you turn is much less than noise you make when walking (about half), however, it does become critical when creatures are walking right past you. If a creature is in close proximity, and has line of sight of you, your best bet is to not move at all until they pass you. How quickly you turn is not considered. The idea being that whether you break a twig slowly or fast, you will still hear the twig break.

### ***Short Range LOS Boost*** (*vShortRangeBump*)

If the target gets within a short range, and the detector has line-of-sight (LOS), they get a big bump to detect you. There are three "circles" of range bumps. At 240 units, the first bump kicks in. At 120 units, the bump doubles. At 60 units, the bump doubles again. So unless you have a lot of chameleon or a lot of darkness on your side, it is nearly impossible to sneak up on someone from the front. You can set the bump in the ini file.

### ***Track Suspicious Activity*** (*vTrackSuspiciousActivity* ; *vTrackingBonus*)

This gives a bonus to detectors to continue to notice you once they notice you the first time. This bonus remains in effect as long as you continue to sneak and are within line-of-sight of the detector.

### ***Talking / Dialogue is Distracting*** (*vTalkPenalty* ; *vDialoguePenalty*)

This adds penalties to an NPC's ability to detect you if they are in the midst of a conversation with someone else, or if they are speaking themselves. These penalties at best will offset any other sound or sight penalties that are against the player, but cannot reduce the overall sound or sight bonuses below 0.

**Talking Penalty.** If an NPC is speaking, it is more difficult for the NPC to hear the player. Thus, the talking penalty applies against the detector's sound bonus to hear you.

**Dialogue Penalty.** Being in a conversation means having to focus visually on the person you are in a dialogue with, which will reduce any sight bonus for the NPC to detect the player.

**Silence Spell Effects** (*vSilencePerk*)

Silence spells cast on the player nullify all sound penalties for the duration of the spell.

**Line Of Sight Movement Penalties** (*vLOSmpWalk ; vLOSmpRunJump ; vLOSmpSwim*)

In addition to audio penalties, there are also visual movement penalties if you are within Line of Sight. These penalties only apply to the Target. There is a separate penalty for Walking, Running/Jumping, and Swimming. The penalty against the player is multiplied by the player's scale (a.k.a. Height), which is determined by race/sex. A full chart of the default races' heights can be found here:

<http://www.uesp.net/wiki/Oblivion:Races>.

**Sniper Sneak Skillup** (*vSkillUpBonus*)

With this setting turned on, if you successfully sneak attack with a bow shot, if your Marksman skill goes up, so does your Sneak skill, assuming you have remained undetected.

**Revised Sneak Skillup Ranges** (*vSkillupRangeMod ; vSkillupInteriorRange*)

By default, if you are sneaking near a creature within 1000 units (approx. 46 feet), and are not currently detected, your sneak skill will increase. This applies whether you are inside or not. This option allows you to set this more in scale with detection ranges. Set the interior skill up range, and that value will be multiplied by the exterior multiplier when outside.

**Gear Type Sound Multipliers** (*vSoundMultCloth ; vSoundMultLight ; vSoundMultHeavy*)

SDR's Hardcore settings completely replaces the movement/sound detection system based on the following:

- Gear equipped, type of gear (clothing, light armor, heavy armor), and which slot (legs, feet, etc.)
- Whether you have a weapon out or not, and the type of weapon
- Whether or not your shield is out, and the type
- How you are moving (walking, running, jumping, swimming)
- If standing still and/or whether or not you are turning in place

Base values are dependent on the piece of gear, which areas are covered, the type of gear, and its weight. Modifiers are then applied depending on your movement type. As of the latest version, NPCs also have gear penalties that interfere with their ability to hear if they are moving. So you have a much better chance and being undetected against a soldier in full metal armor on the march than one who is standing still. The formulas are fairly complex, and it took me a lot of time to get just the right overall flow. But if it doesn't seem to be working quite right for you, feel free to tweak some of the multipliers in the .ini, but I wouldn't change them more than a point or two.

On the next page is a chart that shows how the penalties and multipliers add up for various types of gear. The overall penalties end up being very similar to the default Oblivion penalties, however they are spread out over all of the gear, not just the boots. And SDR provides turning penalties, which default Oblivion does not.

**Notes on Offsetting Noise Penalties FOR GEAR**

Your other non-Sneak skills also come into play when calculating gear-noise penalties. For example, sneaking in heavy armor has massive sound penalties, but these can be offset by your combined mastery in Sneak, Heavy Armor, and Armorer. (The latter assumes that you have used the Armorer skill to tweak the armor to make it quieter). In this system, you cannot 100% nullify sound penalties for armor. With all relative skills at 100+, you can get Light Armor down to about 20% of its penalty, and Heavy armor down to 40%. Your weapon skills will also offset sound penalties for whichever weapon you have drawn. The concept is that the longer/heavier the weapon, the more likely you are to bang it against your clothing, the ground, a wall, or some nearby object. If you are wearing only clothing (no armor), have a Sneak skill of 100, and using a dagger with a 100 in Blade, you can nullify all sound penalties due to equipment.

**GEAR/MOVEMENT SOUND PENALTIES EXAMPLES**

Sneaking Detection Recalibrated (SDR) Multiplier	1.00
Default Oblivion (DO) Multiplier	1.60
Flat Adj. (base)	8.00
Cloth Multiplier	1.5
Light Armor Multiplier	2
Heavy Armor Multiplier	1.2

Gear Type Modifiers	Walk Mod	Run/Jump Mod	Turning Mod
Boots	0.60	1.20	0.30
Greaves	0.50	1.00	0.20
Cuirass	0.30	0.60	0.20
Gauntlets	0.20	0.30	0.10
Shield	0.20	0.30	0.10
Helmet	0.20	0.20	0.10

HEAVY ARMORS	Iron	Steel	Dwarven	Orcish	Ebony	Daedric	Avg.
Boots*	9.00	10.50	12.00	13.50	15.75	18.00	
Greaves	18.00	21.00	24.00	27.00	31.50	36.00	
Cuirass	30.00	35.00	40.00	45.00	52.50	60.00	
Gauntlets	6.00	7.00	8.00	9.00	10.50	12.00	
Shield	12.00	14.00	16.00	18.00	21.00	24.00	
Helmet	6.00	7.00	8.00	9.00	10.50	12.00	
<b>TOTAL WEIGHT</b>	<b>81.00</b>	<b>94.50</b>	<b>108.00</b>	<b>121.50</b>	<b>141.75</b>	<b>162.00</b>	
DO Sound Penalty (full set):							
Walking	36.80	39.20	41.60	44.00	47.60	51.20	43.40
Running	76.54	81.54	86.53	91.52	99.01	106.50	90.27
SDR Sound Penalty (full set):							
Turning	25.64	28.58	31.52	34.46	38.87	43.28	33.73
Walking	41.84	47.48	53.12	58.76	67.22	75.68	57.35
Running	72.08	82.76	93.44	104.12	120.14	136.16	101.45

CLOTH/LIGHT ARMORS	Cloth**	Fur	Leather	Chainmail	Mithril	Elven	Glass	Avg.
Boots*	2.50	1.50	1.50	2.00	3.30	3.90	4.50	
Greaves	1.50	3.00	4.50	5.40	6.60	7.80	9.00	
Cuirass	1.50	5.00	7.50	9.00	11.00	13.00	15.00	
Gauntlets	0.00	1.00	1.50	1.80	2.20	2.60	3.00	
Shield	2.00	2.00	3.00	3.60	4.40	5.20	6.00	
Helmet	4.00	1.00	1.50	1.80	2.20	2.60	3.00	
<b>TOTAL WEIGHT</b>	<b>11.50</b>	<b>13.50</b>	<b>19.50</b>	<b>23.60</b>	<b>29.70</b>	<b>35.10</b>	<b>40.50</b>	
DO Sound Penalty (full set):								
Walking	26.40	24.80	24.80	25.60	27.68	28.64	29.60	26.85
Running	54.91	51.58	51.58	53.25	57.57	59.57	61.57	55.85
SDR Sound Penalty (full set):								
Turning	10.93	12.90	14.90	16.40	18.78	20.74	22.70	17.74
Walking	13.85	17.40	21.20	24.08	28.68	32.44	36.20	26.67
Running	18.20	25.80	32.90	38.36	47.16	54.28	61.40	43.32

\* Only the weight of boots are used for calculating Default Oblivion Sound Penalties

\*\*Cloth - Regular Clothing, used heaviest of type of cloth gear possible

### **Lighting Bumps** (*vLightingBumpTorch ; vLightingBumpLightSpell*)

These settings increase the effective light that is hitting the target. The idea being that the center of the torch or light spell will be brighter and draw more attention than the dispersed light within the radius of the effect. For instance, if you see a group of three people close together, and one is holding a torch, your eyes will naturally gravitate towards the torch holder. These bumps are flat bonuses that can be set in the .ini file.

### **Exponential Lighting Bonuses** (*vLightingExpPercent*)

In general, especially at high levels of sneak skill, it is way too easy to sneak around in bright light in standard Oblivion. A linear multiplier or flat bonus doesn't help, because it ends up wrecking sneaking around in darkness. SDR takes a different approach by squaring a percentage of the total amount of light shining on the sneaker. Light ranges from 0 to 100, and a squared percentage ends up curving the bonus upwards exponentially. In brighter conditions, it makes it nearly impossible to sneak around, but in darker conditions, the bump would be fairly negligible. See the chart below for the effects of *vLightingExpPercent*.

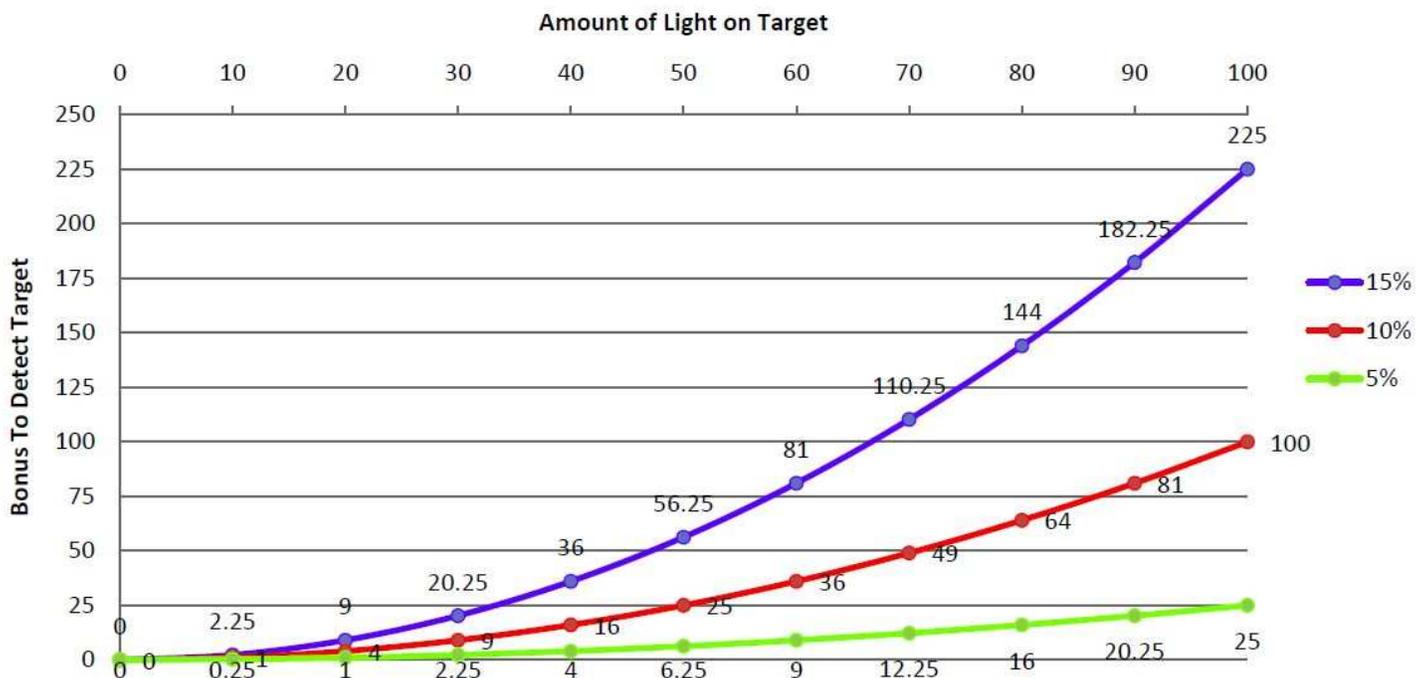


Figure 1. - Exponential Lighting Bonuses

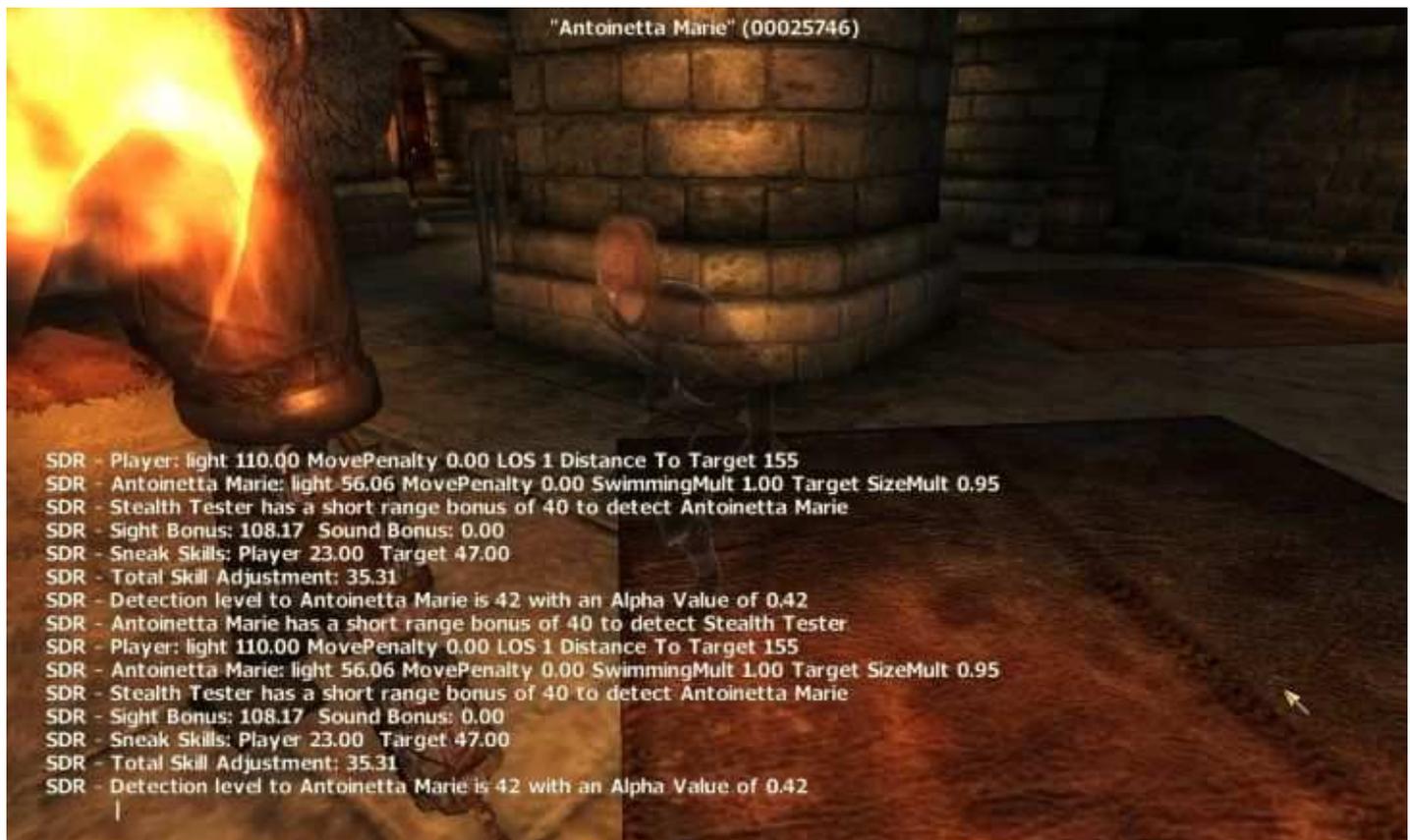
In my experiments, I found that 10% seemed to be about right. In order to sneak up on someone in broad daylight from the front, you needed to have a very high sneak skill in addition to a whole lot of chameleon effects on you, otherwise you would get spotted. Higher % tracks just made it too difficult, and lower % tracks seemed too easy to me. However, you can play with the numbers yourself in the .ini file.

### **Replace Chameleon Refraction effect** (*vNoChamRefraction*)

Another thing that has always bothered me is how the Chameleon effect works visually. It *feels* like you are invisible, and yet, it looks the same regardless of how good your chameleon is. 5% feels the same as 95%. With this option turned on, you can completely replace the default refraction effect with a transparency alpha shader. That means that the greater the Chameleon effect is, the more transparent your character becomes. Now the difference between 10% Chameleon, 30% Chameleon, 50% Chameleon and 80% Chameleon are very obvious. This effect applies both towards the player as well as NPCs.

***NPCs Fade When Sneaking (vSneakingNPCsFade; vDispoPercent)***

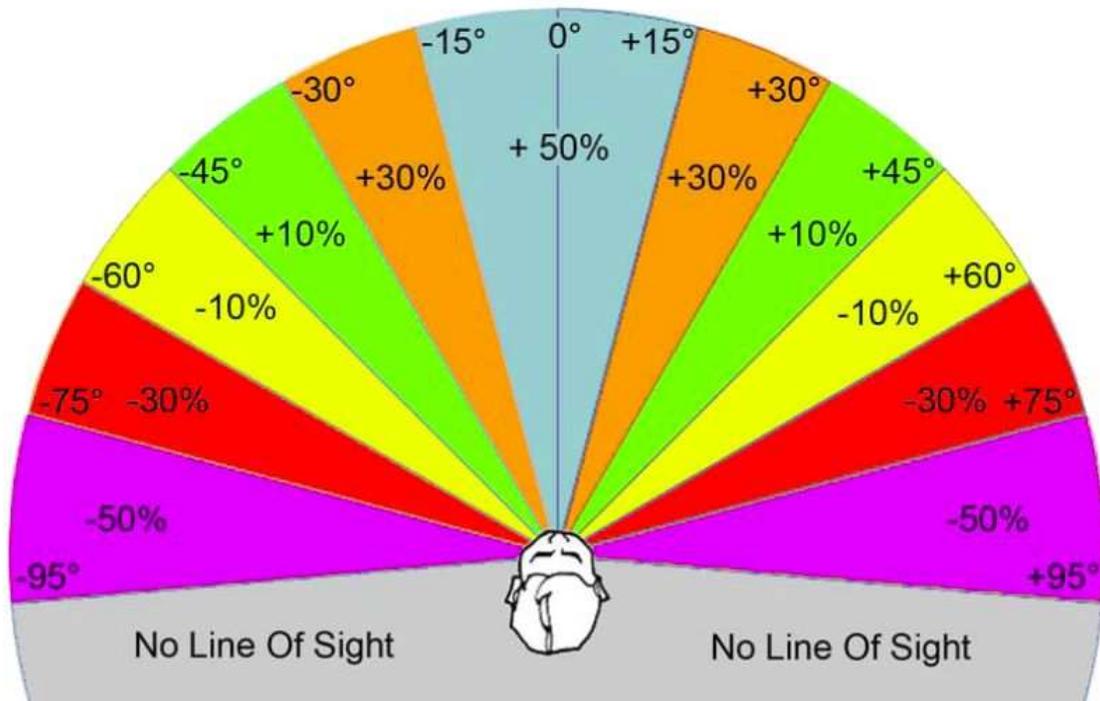
Inspired by Reneer's and Haldar's mods, SDR now has the option for greater immersion. If an NPC is sneaking, they will become transparent. The transparency is measure in "alpha" units, where 1.00 is 100% visible, and 0.0 is completely invisible. Determining the alpha value uses essentially the same formula for an NPC to detect the player, only reversed. Any value below the lowest detection threshold (which is the NPC is in combat with player) will result in 0, from there it scales up 100 "detection points" and anything beyond that is treated like 100. So in most cases, you will probably visually notice NPCs in a fashion similar to how they would notice you. Or at least, that's the goal. If the NPC has a very high sneak skill compared to the player and is in a darker environment, farther away, etc., you probably won't see the NPC at all until you are right on top of them, unless you use a torch or cast some light spells. So mind the shadows.

**Disposition affects visibility.**

One potential drawback of the transparent NPCs is when you are working with companions, or have a follower for a quest, or are working with members of the same faction. The assumption here is that when you are sneaking, you are trying to avoid people that don't like you and less so from those that do. This particular option allows you to have a better chance of not losing sight of your companions if they start to sneak around, but gives a greater advantage to hostile NPCs that are sneaking up on you. The more someone likes/dislikes you, the more or less effort they will put in to hiding from you. Rather than try to take in all the various races, classes, and factions, the simplest solution was using the NPCs disposition. Most dispositions range from 0 to 100. Hostile NPCs are usually at -100. The setting in the .ini determines what percentage (0-100) of the NPCs disposition (-100 to 100) should be applied to the base detection calculation to determine NPC's alpha value.

### **Peripheral Vision** (*vPeripheralScaling* ; *vNoPVScalingForCreatures* ; *vNoPVScalingForArgonians*)

The line-of-sight field of view extends 95 degrees in either direction from the axis line of the detector staring straight ahead. In Oblivion, regardless of where the target is within the field of view, the detector gets the same chance to see them. To add some spice, I decided to replicate the effects of peripheral vision. There is a base percentage that is applied to basic sight penalties/bonuses, upwards or downwards, depending on the viewing angle. The closer the target is to the main axis line of sight, the better chance the detector has to see the target. The further out on the edge of the field of view, the more difficult it becomes to see the target. Note these bonuses/penalties only apply to the basic sight adjustments. The adjustments for movement are applied after the peripheral vision adjustments because peripheral vision picks up motion fairly well.



#### Peripheral Scaling

If you feel the base percentages aren't exactly right, you can increase or decrease them on a sliding scale using the *vPeripheralScaling* setting. For example, the default scaling is .8, which means that instead of a range of +/-50% throughout the field of vision, the range would drop down to +/- 40%. A setting of 0 would disable peripheral adjustments all together, and a setting of 2 would double the percentages to +/- 100%, thus doubling the bonus to see everything in front of you, but pretty much not being able to see anything beyond 75 degrees unless it was moving. In play testing, with consideration for the two additional settings that follow, .8 seemed to be the most fair.

#### Peripheral Scaling Exceptions

In the real world, most creatures have a more balanced field of vision than people, if not an increased overall field of view. Consider a horse, rabbit, or lizard in which the eyes are set further back to either side of the skull. Unfortunately, the construction set doesn't really have any good method to identify the different types of creatures in useful clumps. Nor does it seem to have any variation on the line of sight field of vision, which in all honesty makes sense from a programming point of view. It would take a lot of research to figure all of that out and implement it. So the best simulation I could come up with is to provide options to disable peripheral vision adjustments for any NPC that returns a 1 with the *IsCreature* check, or returns the ID code for an Argonian, using the *vNoPVScalingForCreatures* and *vNoPVScalingForArgonians* settings.

### Line Of Sight and the 3<sup>rd</sup> Person Camera bug

One of the bugs in oblivion is that line of sight from the player's perspective is calculated from the camera's point of view. In first person mode, this isn't an issue. But in third person, it means that someone directly behind you is considered to be in line of sight. This causes several issues with my calculations and formulas, as well as other problems, such as being able to see an NPC sneak up on you from behind when they should be invisible to you with the *NPCs Fade When Sneaking* feature turned on. The peripheral vision addition fixes that bug for the Hardcore settings, and calculates true line of sight from the player's perspective. In game play with the Hardcore settings, if there is an NPC behind you, and you are using the 3<sup>rd</sup> camera point of view, you will not be able to see them if they are sneaking. So watch your back!

### Followers & Companions Patch (vFCPatch)

This feature prevents followers and companions from gaining the detection bonuses to their Sneak skill that they would normally get if they weren't following. This treats their Sneak Skill the same as the player's, and if they have a low Sneak skill and are following the player, they could become a liability if the player is trying to remain undetected. This makes sneaking with followers in tow more challenging.

### Torch / Light Spells interfere with Chameleon (vChamTorchEffect ; vChamLightEffect)

The first setting, *vChamTorchEffect*, negates the effects of *Chameleon* if the actor is holding a lit torch. The second setting, *vChamLightEffect*, reduces the effectiveness of *Chameleon* by 50% if the actor is under a *Light* spell effect.

## AV UNCAPPER - OBSE PLUG-IN EXPANSION OPTIONS

The AV Uncapper plug-in is not required for the Basic and Advanced packages. And although technically it is not required for the Hardcore package either, without it the Hardcore settings become less challenging and eventually ineffective as your character's Sneak skill level increases. I therefore **highly recommend** you install it. Detailed instructions on downloading and installing AV Uncapper are in the "Sneaking Detection Recalibrated - Readme.txt" file. If you do not install AV Uncapper, the following settings will be ignored.

### Sneak Detection Limit (avuSneakLimit)

In default Oblivion, regardless of what an NPC's adjusted Sneak skill is, for the purposes of detection, the Sneak skill is capped to 100. This makes sense under the standard detection formula. But since SDR's Hardcore settings replace two thirds of the formula (lighting/sound) and applies its own formulas for those areas by boosting the NPC's Sneak skill, the cap becomes problematic. By setting this value to 0, it uncaps the maximum Sneak skill detection limit, allowing the Hardcore bonuses/penalties to work as designed.

### Blindness Effectiveness (avuBlindnessDR; avuBlindnessDecay; avuBlindnessGrowth)

This scales the effects of **blindness** on detectors so that it never quite reaches 100, regardless of the bonuses. For example, if the detector has a total blindness value of 70, the actual game result would be 75, but if the total blindness value was 100, the actual game result would be 86. See Figure B chart below.

### Chameleon Effectiveness (avuChameleonDR; avuChameleonDecay; avuChameleonGrowth)

This scales the effects of **chameleon** on the player so that it never quite reaches 100, regardless of the bonuses. *Chameleon* uses the same DR chart values as *blindness*.

**Figure B: Diminishing Results.** Chart of how the raw values return with diminishing results for both *blindness* and *chameleon*.

growth*	0.2	raw value	-50	-40	-30	-20	-10	0	10	15	20	30	40	45	50	60	70	80	85	90	100	107	110	115	120	130	140	150
decay*	2.0	dr result	-50	-44	-37	-28	-16	0	18	26	33	45	55	59	63	70	75	80	82	83	86	88	89	90	91	93	94	95

\* You have the option of setting your own growth and decay values in the .ini file.

## MESSAGE SETTINGS

Messages print to the screen in the upper left corner during live game play.

### ***Suppress Initialization Message*** (*ptcSuppressInitMsg*)

Every time you load a saved game, SDR will re-initialize itself. This is fairly common behavior for most mods, and is necessary for SDR to work properly. By default, the initialization message will print to the screen, letting you know that you can relax, and all is well with the world. But for those of you who find the message annoying, you can use this setting to turn it off.

### ***Detector Tokens*** (*ptcDetectorTokens*)

When turned on, this setting will print a message every time a detector token is added or removed from an NPC. Unless you feel like there is something wrong with the mod, and an NPC is not behaving properly, there really isn't any reason to have it turned on.

### ***Follower Tracker*** (*ptcTrackFollowers*)

When turned on, this setting will print a message every time Oblivion updates an NPC's "follower" status. While Oblivion always accurately logs when an NPC starts following the player, there is often a lag between when an NPC stops following the player and when Oblivion updates the follower status. The update seems to only kick in when loading a new cell by going through a door. Turn this option on to witness this behavior.

## DEBUG TEXT SETTINGS

Debug Text send information to the console, which cannot normally be seen during live gameplay. Details on each of the SDR debug text settings are in the .ini. To pause the game, access the console, and see these messages, you will need to go into "console mode" (by default, press the ~` key). You can also have a live stream of these messages sent to your screen during game play by toggling on debug text mode. Using this feature may help you get a better sense of how the mod is functioning and trouble shoot any issues that come up. By default, all debug text options are turned off.

### ***Toggling on the live stream of debug display text***

To start/stop viewing the console debug text in real time on the screen:

1. Enter console mode (usually with the ~` key)
2. Type in "tdt" to toggle displaying the console text in real time.
3. Exit the console mode.

### ***Toggling on Sneak Detection statistics vs. an opponent***

To view how you are doing detection wise against a specific opponent:

1. In console mode, click on the opponent with your mouse.
2. Type in "tds"
3. Exit the console mode

A list of statistics and the detection level of your opponent will appear to the right side. Note that when using the Hardcore package settings, not all numbers you see will add up to the values you might think since several chunks of the detection formula have been redirected. To change your focus to a different opponent:

1. Enter console mode
2. Type "tds" to toggle off the detection on the current opponent
3. Click on the new opponent
4. Type "tds" to toggle on the detection display on the new opponent.
5. Exit the console.

## FREQUENTLY ASKED QUESTIONS

Q. ARE YOU GOING TO BUILD SOMETHING LIKE THIS FOR SKYRIM?

A. I'm hoping that the Bethesda folks will see this, steal the idea, and implement it so that I won't have to.

Q. IS THIS MOD COMPATIBLE WITH (INSERT MOD HERE)

A. Most likely yes, unless it messes with any of the sneak skills of the NPCs, or the Sneak skill of the player, with the intent of altering Sneaking and Detection. A list of known stealth related compatible and non-compatible mods is in the readme.txt.

Q. WHAT SHOULD THE LOAD ORDER BE?

A. If you want the full experience, put SDR towards the end, after all other stealth mods, after any related plug-in mods such as AV Uncapper, but before combat mods like Deadly Reflex or any of Duke Patrick's mods. If you have BOSS, it should take care of the load order for you.

Q. DO YOU HAVE FUTURE PLANS FOR THIS MOD?

A. Other than bug fixes in the current 2.xx series, I'm working on a 3.0 version that has it's own custom OBSE plug-in that will give me more power to do what I want, without the drawbacks that the current version has (such modifying the Sneak skill of the NPCs). So if you have any ideas for improvements, please feel free to drop me a suggestion either by private message or in the forums. Depending on the idea, the complexity, and how much time I have on my hands, I may try to incorporate it into the 3.0 release. But my time is limited, so it's going to be awhile.

## CONCLUSION

I hope you found this manual helpful (and not too wordy).

Please let me know through the Bethsoft forums if there are any points that could use clarification, questions you may have, or general comments and suggestions.

And don't forget to give it your endorsement/vote!

saebel