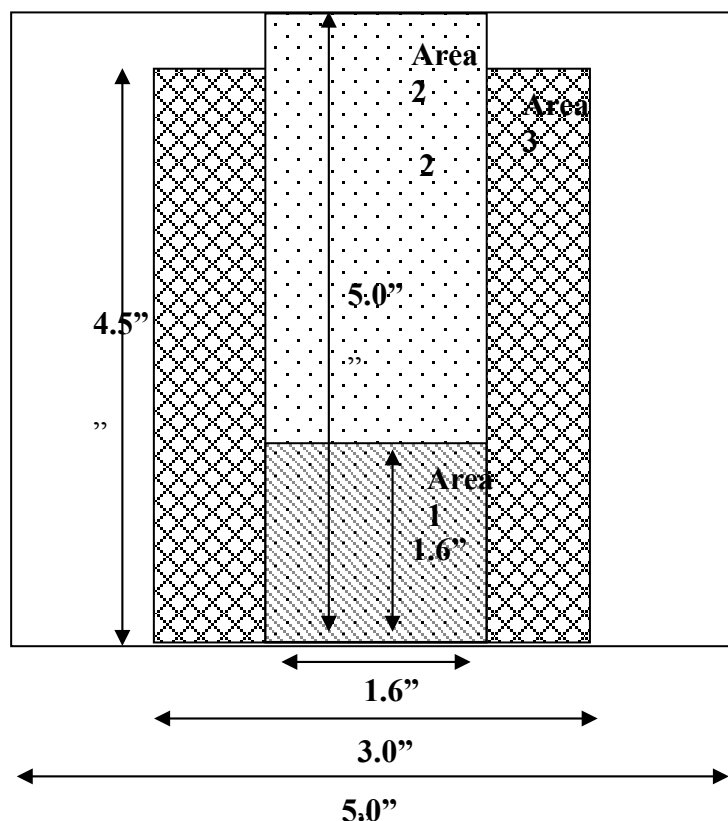


**Novel method of performing rolled finger/rolled thenar
acquisition using**

ADAPTIVE ROLL AREA POSITIONING

Usually, acquisition of any rolled object (fingertip, fingerprint, thenar) requires higher frame rate than flat acquisition due to moving nature of the scanned object. To achieve higher frame rate, a smaller scan area with normally predefined position is designed. So, as a usual approach, inside the entire scanner window there are one/several fixed-position roll scan areas dedicated to specific rolled objects. Each roll area (depending on roll object) has specific vertical and horizontal dimensions. See picture below as an example of multiple roll areas inside the entire scanner window (MultiScan527 scanner of Green Bit).



It is useful to note that to perform correct full-width rolling, it is necessary to allocate a rolled object near to one border (left or right) of roll area leaving maximum free space for rolling movement in opposite direction to avoid fingerprint cutting by opposite border and then roll object to this direction.

The borders of these roll scan areas can not be marked in a visible manner directly on glass of the scanner window as far as roll areas is a part of the entire scanner window. The only practical way to outline these areas is to use markers outside active scanner window. This could create a certain inconvenience in performing precise initial finger positioning along to the border of roll area (especially for a long rolled objects like full rolled finger – area 2, or rolled thenar – area 3) obliging to try several “put and check” attempts of initial finger positioning before rolling start.

Moreover, as far as rolled scans are usually used in law-enforcement applications (police stations), where subjects can be non-collaborative or even resisting to operator (police officer) actions, the necessity for precise initial finger positioning could be a real trouble.

A novel method to improve this situation is proposed. This method is consisting in adaptive roll area positioning depending on actual initial placement of object to be rolled within the entire scanner window.

An acquisition begins from preview phase (high-resolution or low-resolution) to detect where fingerprint (thenar) to be rolled is actually placed. Preview area is as wide as the entire scanner window to give a freedom in horizontal positioning and as high as specific rolled object needs (lower border of adaptive roll area is usually aligned with lower scanning window edge due to ergonomic aspects for easier rolling operation). In some implementations, however, especially for small-sized roll areas, preview area height could be as big as entire scanner window height to give a full freedom also in vertical positioning.

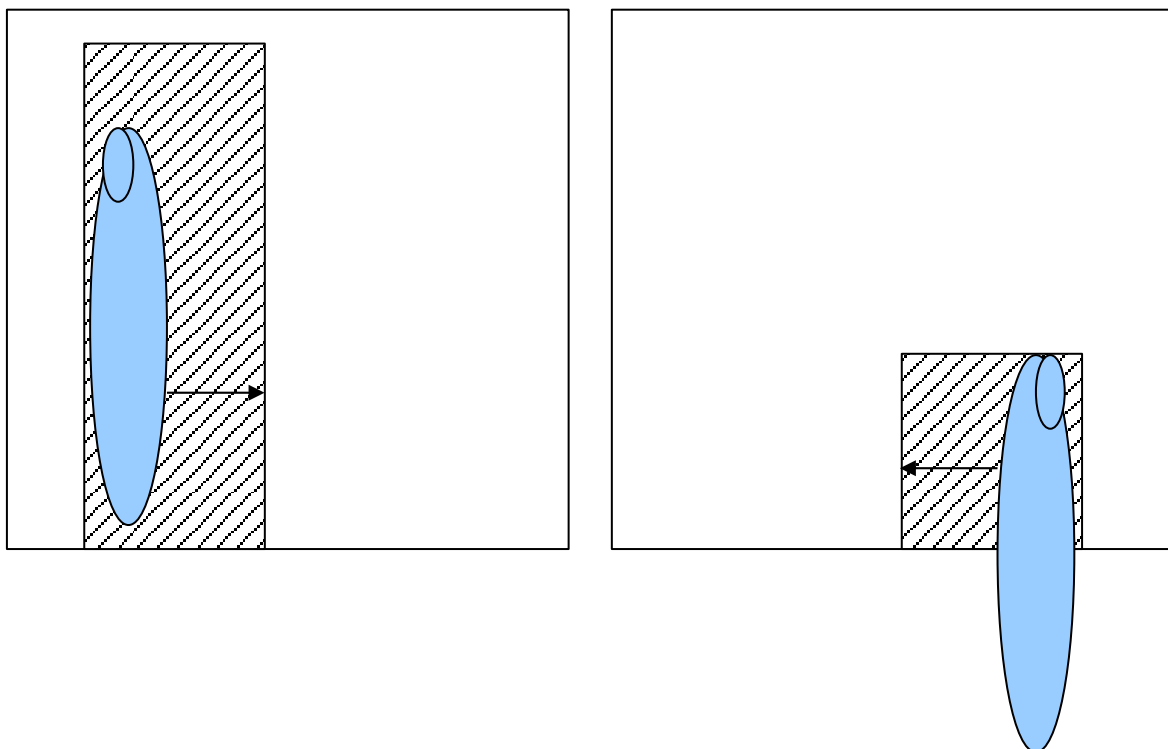
When the fingerprint position is detected, the preview phase ends and the acquisition switches to the corresponding high-resolution higher-frame-rate roll mode moving the roll area position where necessary. Such approach allows for operator to place a finger anywhere (horizontally and, if applied, vertically) within the entire scanner window and then system automatically adapts roll area position.

For horizontal positioning, specific behavior of adaptive roll area positioning algorithm should be synchronized with operator's expected behavior for the used roll preview mode.

For cases where rolling direction is NOT "implied" by preview method itself, system applies "roll to center" method as a general rule. It means that if fingerprint (thenar) to be rolled is allocated on the left half of preview scanning window, it has to be rolled to the right (toward the center of entire scanning window). To allow this, roll area left border will be automatically aligned with the left fingerprint edge in

preview image thus leaving maximum possible free space for rolling to the right. And, vice-versa, if fingerprint(thenar) to be rolled is allocated on the right half of preview scanning window, it has to be rolled to the left (toward the center of entire scanning window). To allow this, roll area right border will be automatically aligned with the right fingerprint edge in preview image thus leaving maximum possible free space for rolling to the left.

As an alternative to “roll to center” method, a constant roll direction can be specified (roll only to the left or only to the right) and system will use the predefined finger edge (right or left, correspondingly) as roll area start and the scan area will be extended to the corresponding opposite direction.



For the case where rolling direction is "implied" by preview method itself, when finger on preview phase is moving half-path to the direction opposite to the next rolling movement direction, there is no necessity to apply “roll to center” rule, because information about rolling movement direction is contained in the preview movement direction itself.