SIGNAKEY FOR THE PHARMACEUTICAL INDUSTRY

**BEFORE REVIEWING THIS PRESENTATION,
THE VISITOR IS ENCOURAGED TO CLICK
THE RED BOTTON AT THE BOTTOM OF THE
"ABOUT US" SECTION OF THE HOME PAGE**
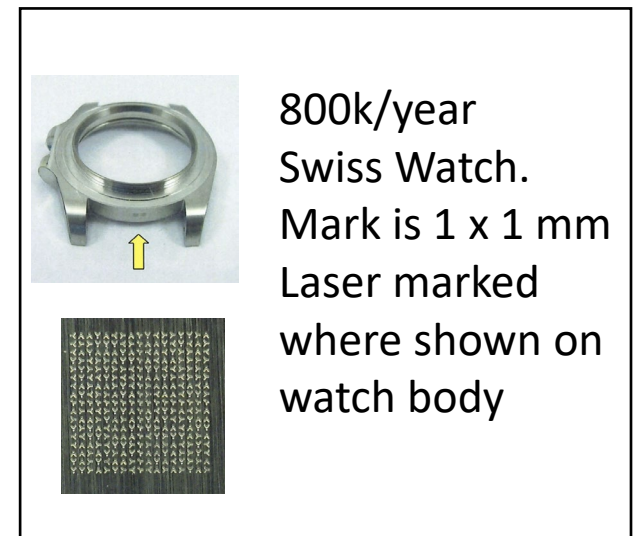
HOW ARE SIGNAKEY'S PRODUCED

- **PRINTED.**
  - ✓ Minimum practical printable Signakey 3 x 3 mm.
  - ✓ Substrate: paper, plastic, metal, glass.
  - ✓ High volume, complex, lowest cost.

- **LASER**
  - ✓ Minimum practical size 0.8 x 0.8 mm.
  - ✓ Substrate: metal, plastic, glass.
 - ✓ Variable volume, smallest footprint.

1.8 Billion/year Tax Stamp. Uses IR Fluorescing Signakey, cloaked by SARS logo, printed in IR transparent Ink.

800k/year Swiss Watch. Mark is 1 x 1 mm Laser marked where shown on watch body

SOME SIGNAKEY PROJECTS IN GLASS

Signakey has 10 years of customer funded developments for marking inside the wall of glass with the NAGINELS process using a Femto-seconds laser.

Signakey developed the knowhow to use the NAGINELS process to mark and decode at Phama line speeds.
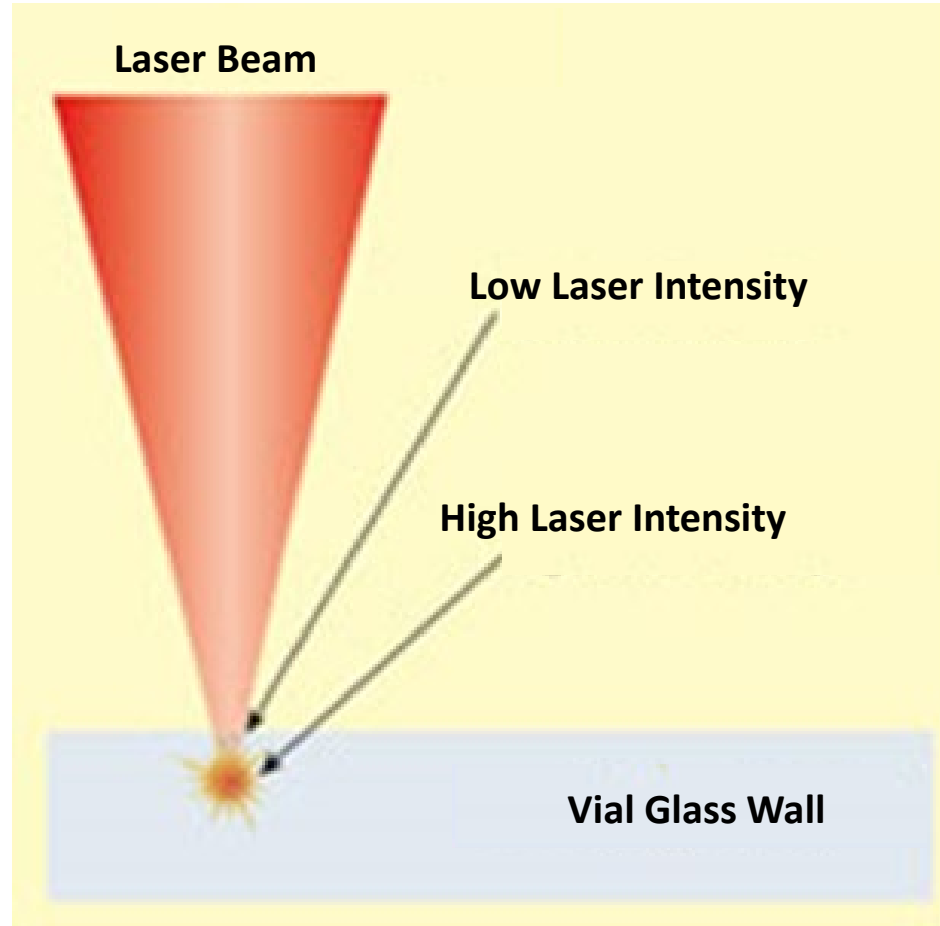
FEMTO-SECOND LASER

A FEMTO-SECOND LASER IS AN ULTRA-HIGH FREQUENCY LASER
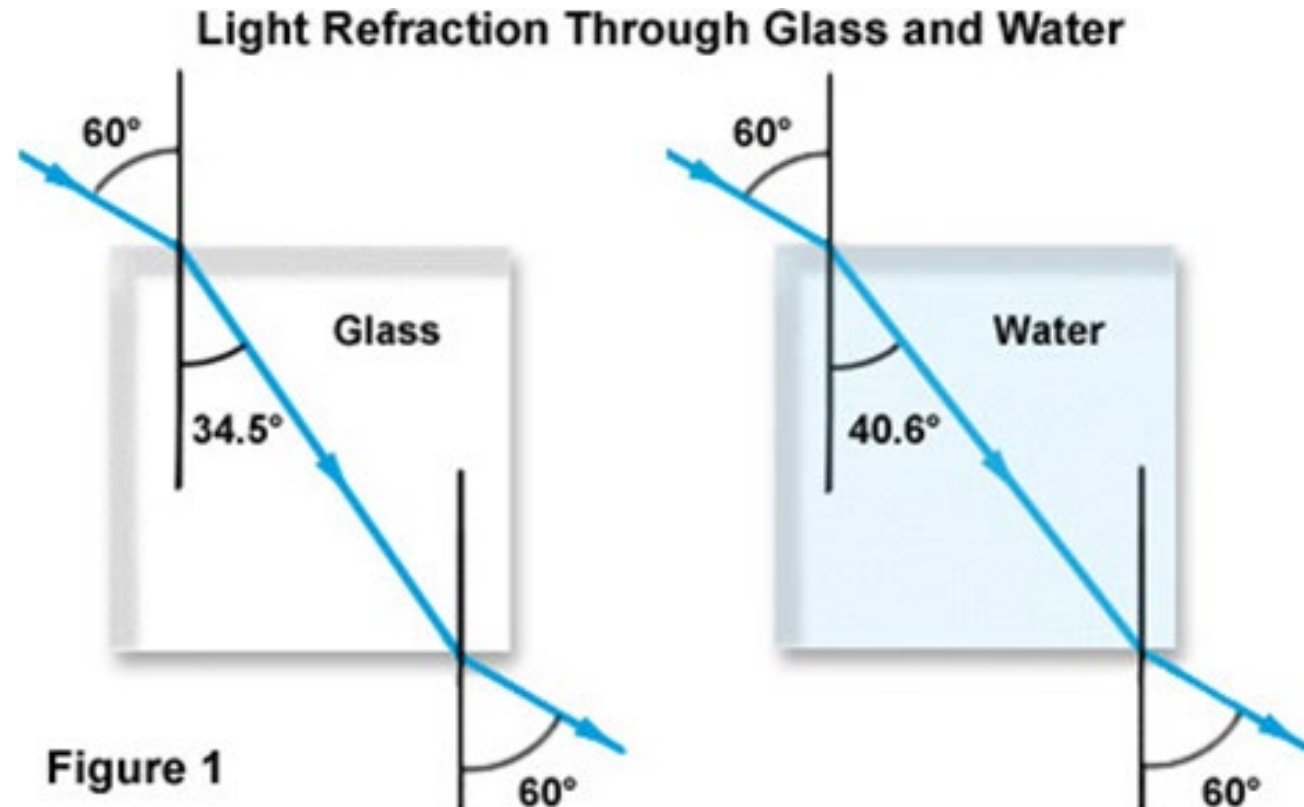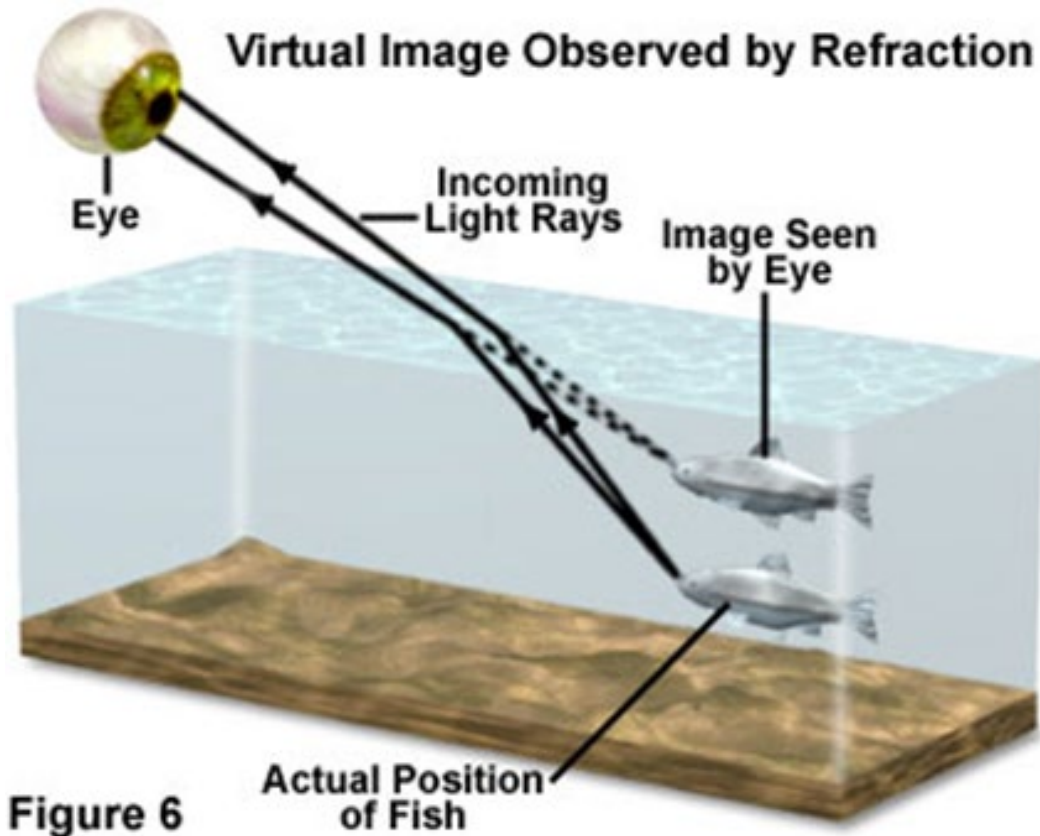LIGHT TRAVELING AT 186,262 MILES/SECOND WOULD MOVE <30 MICRON IN 1 PULSE
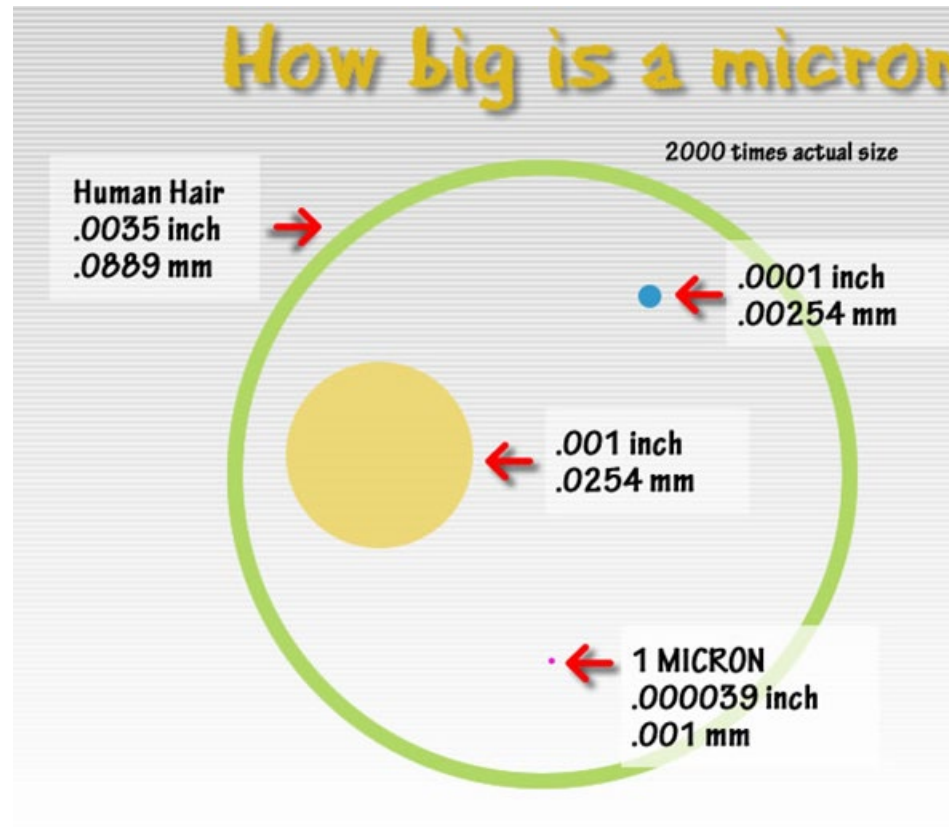
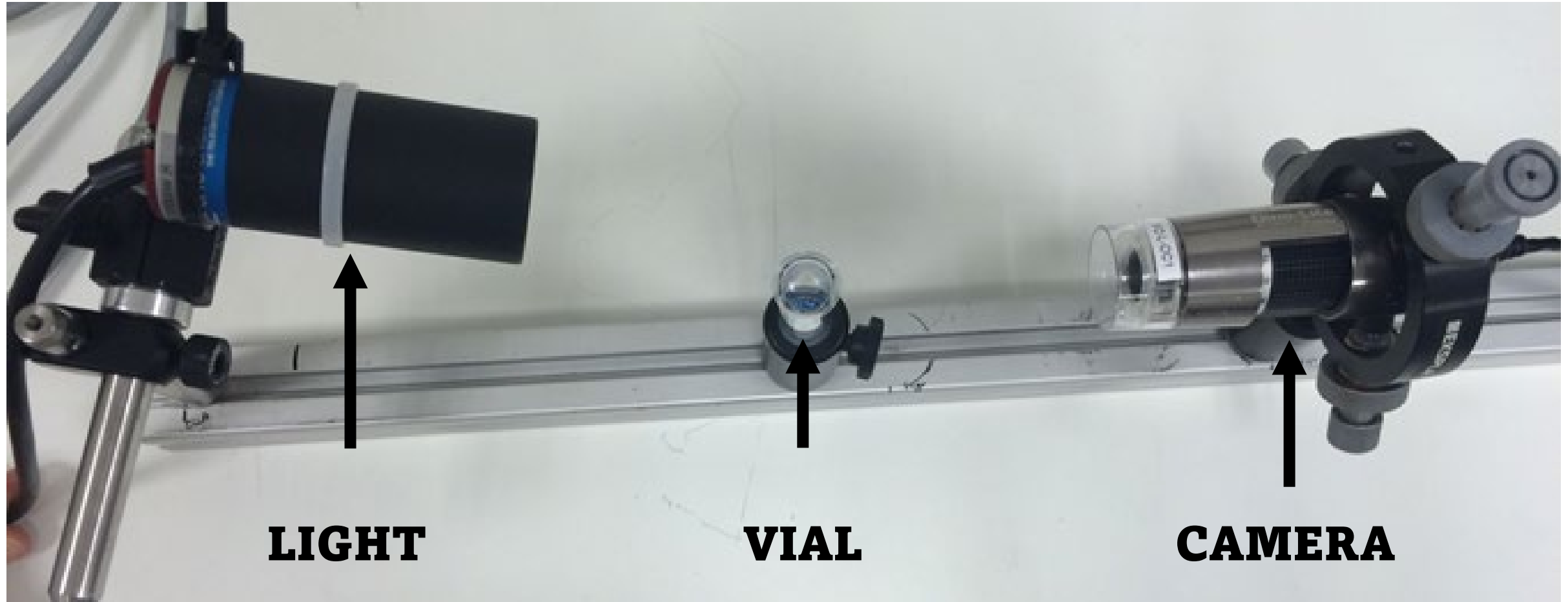BECAUSE OF THAT A FEMTO-SECOND LASER HAS A VERY SMALL SPOT SIZE

BEAM FOCUSES ON SMALL SPOT INSIDE

Laser Beam

Low Laser Intensity

High Laser Intensity

Vial Glass Wall

LASER ENERGY DISPLACES SILICON ATOMS AND CHANGES REFRACTIVE INDEX

REFRACTION CHANGES IMAGE LOCATION

Virtual Image Observed by Refraction

Eye

Incoming Light Rays

Image Seen by Eye

Actual Position of Fish

Figure 6

Light Refraction Through Glass and Water

60°

34.5°

Glass

60°

Figure 1

60°

40.6°

Water

60°

DESKTOP SETUP SHOWS REFRACTION

LIGHT   **VIAL**   **CAMERA**

NOTE: LIGHT AND CAMERA NOT ALINGED BECAUSE OF REFRACTION

NAGINELS TECHNOLOGY FOR GLASS

- Femtoseconds Laser is an ultra high frequency laser with a pulse width equal to size of a virus.

- NAGINELS® Process ensures no microfractures of the glass.

  Non-**A**ggressive **G**lass **In**ternal **E**ngraving **L**aser **S**ystem.

- Uses patented technology - changes the refractive index of the glass.

- Location of Signakey within the wall
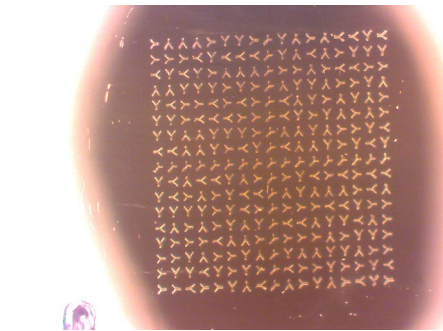
  held to within ± 2 µ in all x-y-z planes.
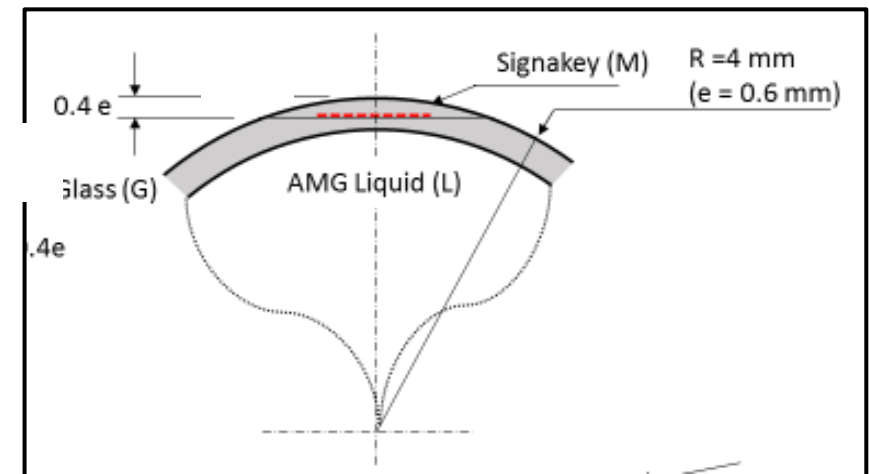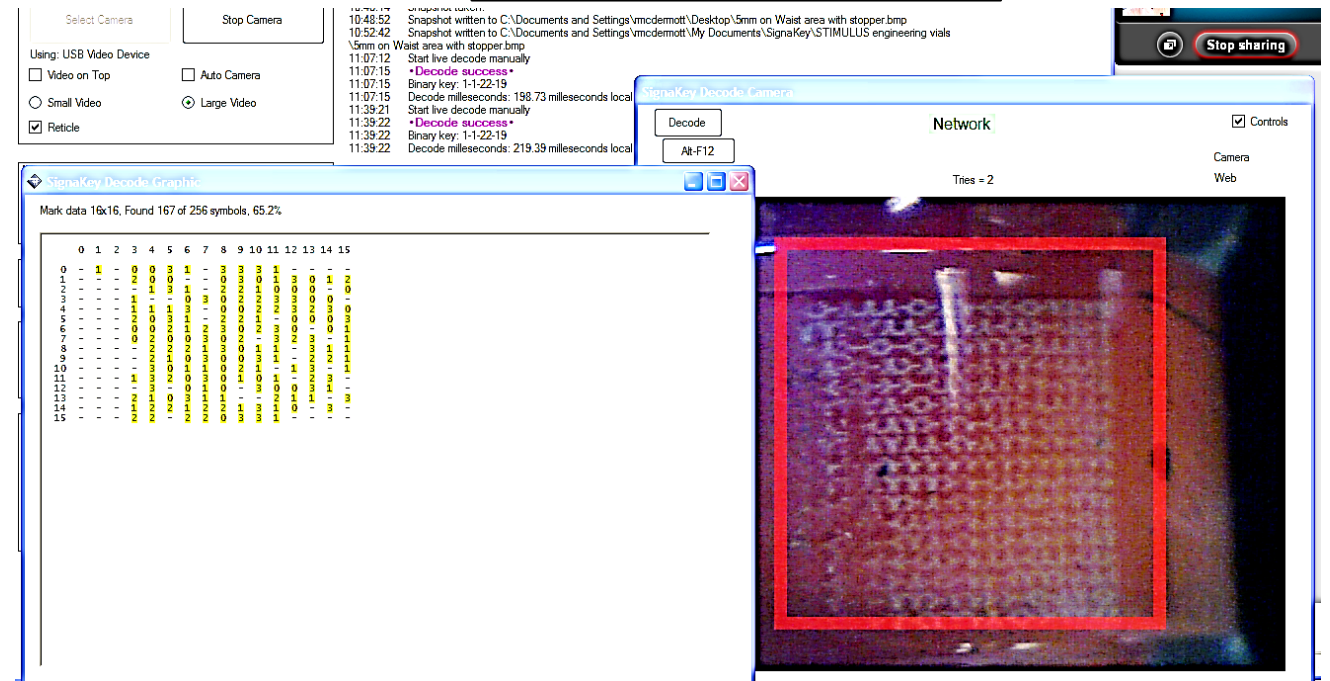
2012 WITH PFIZER ON ELELYSO VIAL

DEMO PACKAGING WITH EXTERNAL PRINTED LABEL

PROTOTYPE MARKED IN WALL WITH STOPPER

5 X 5 SIGNAKEY

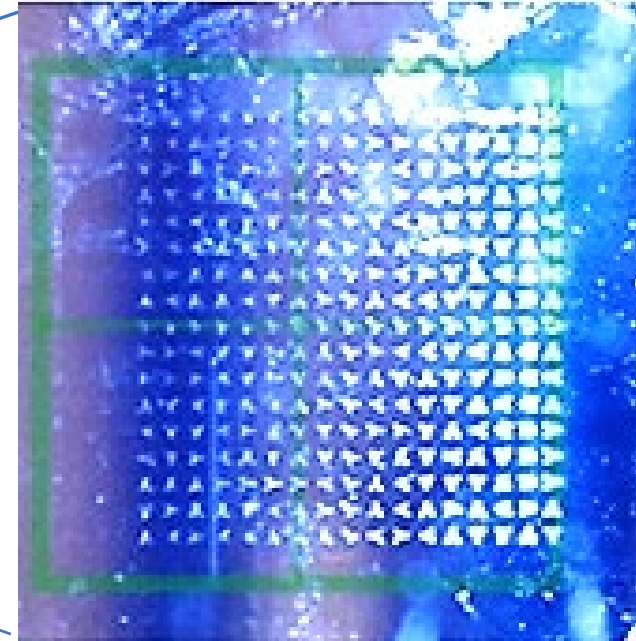**SIGNAKEY AND DECODING WITH STOPPER IN PLACE**

MARKING TIME: 7 SECS
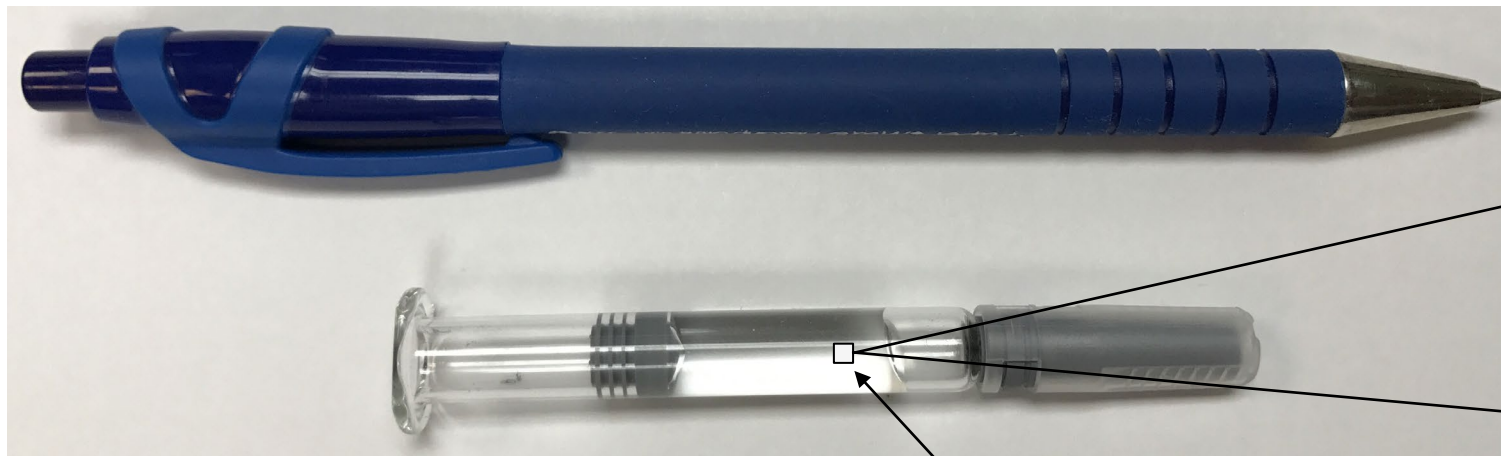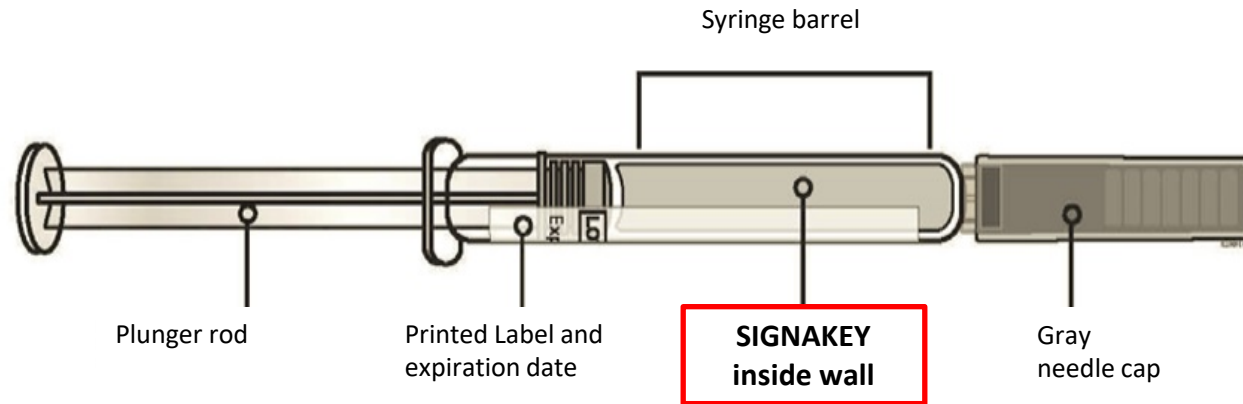
2017 BOTOX VIALS WITH ALLEGAN

**SIGNAKEY PILOT WITH ALLERGAN
FOR DIVERSION OF BOTOX – PRIOR
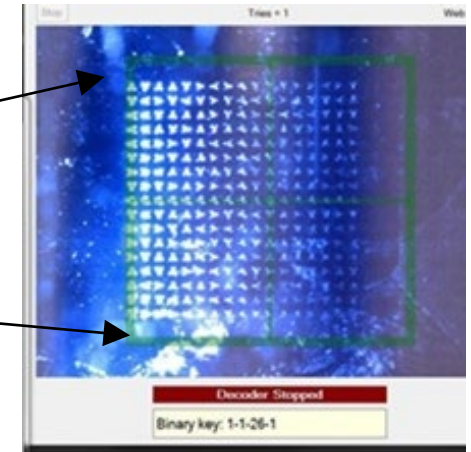TO ABBVIE MERGER. 2 X 2 mm MARK**

**DIVERSION OF DRUG THRU TURKEY AT
LOWEST COST EU PRICES TO CLINICS IN
CALIFORNIA AT 4X PRICES**

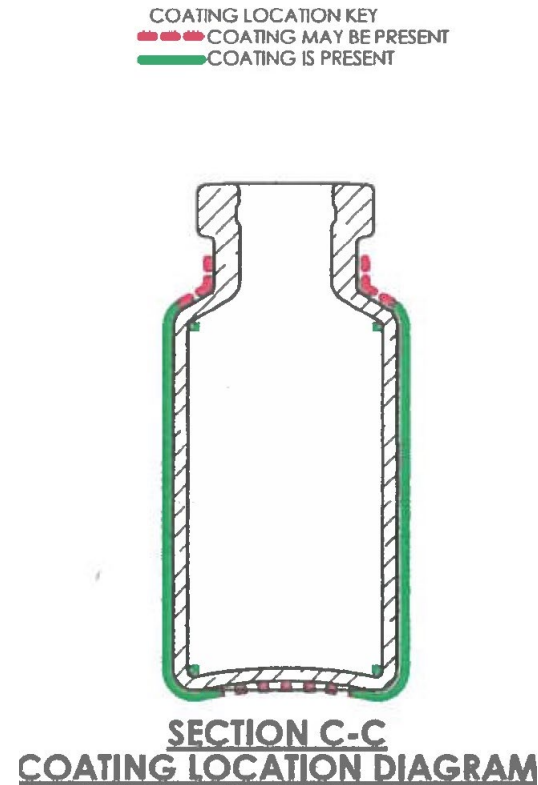**MARKING TIME: 4 SECS**

2019 GLASS SYRINGES FOR AMGEN

Syringe barrel
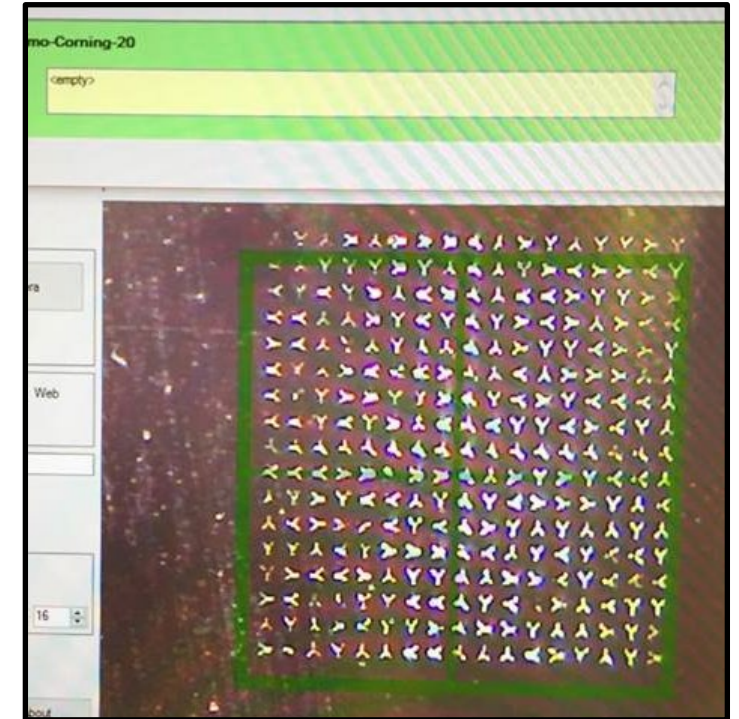
Plunger rod

Printed Label and expiration date

SIGNAKEY inside wall

Gray needle cap

2.3 x 2.3 mm Signakey

MARKING TIME: 2.5 SECS

2019 CORNING VALOR GLASS VIALS

5 X 5 SIGNAKEY

COATING LOCATION KEY
COATING MAY BE PRESENT
COATING IS PRESENT

SECTION C-C
COATING LOCATION DIAGRAM
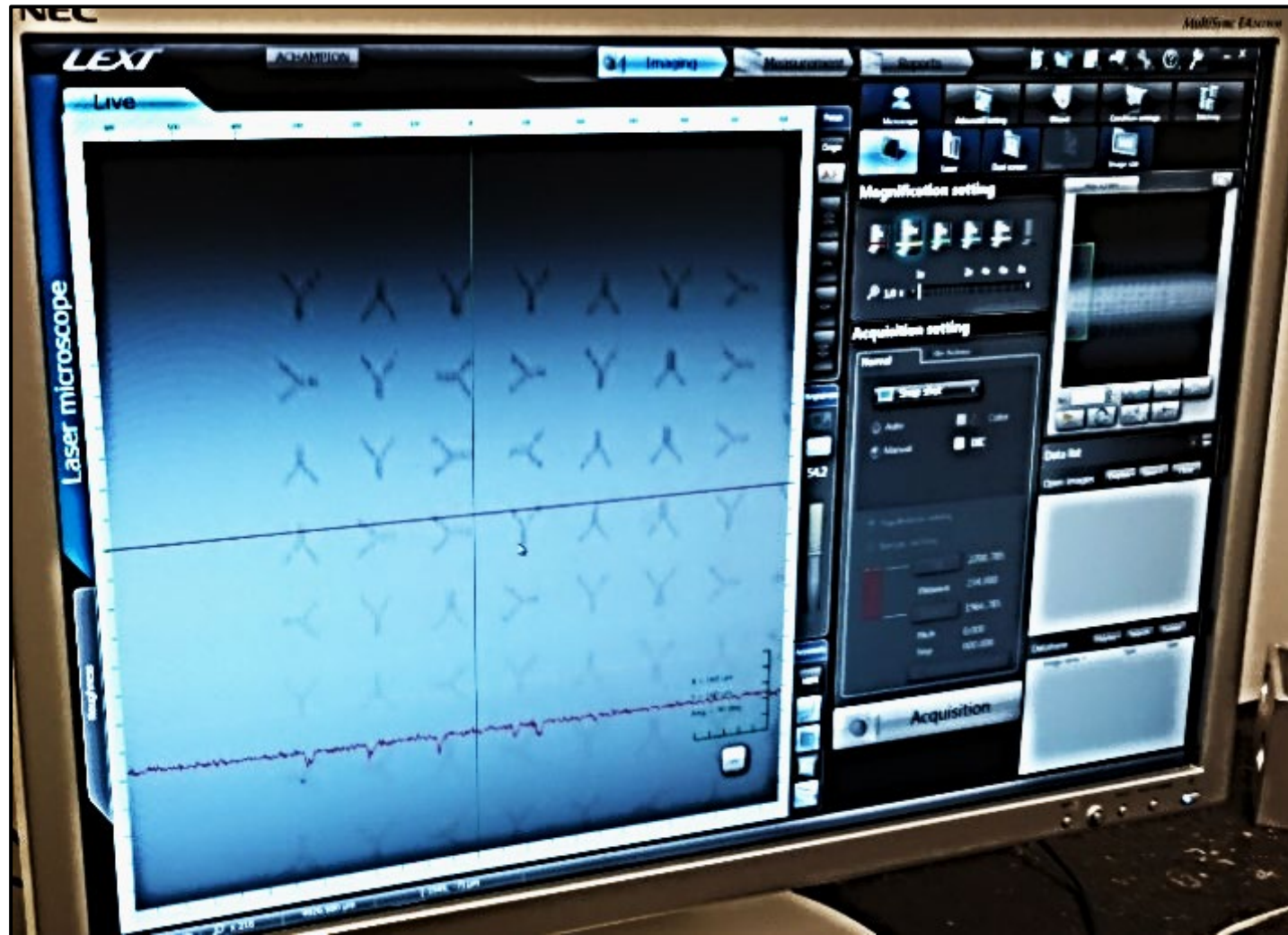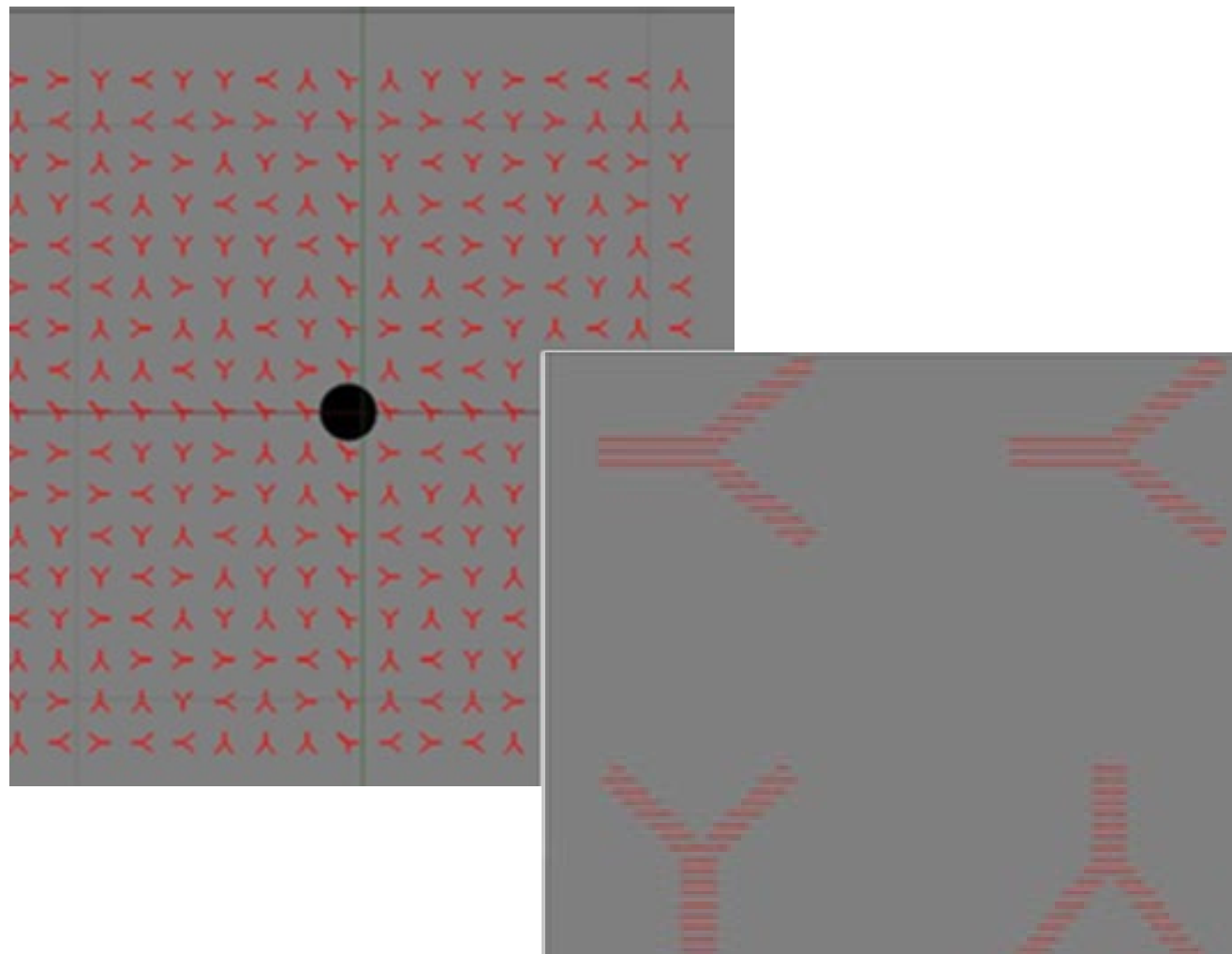
MARKING TIME: 2 SECS

PEERING WITHIN GLASS AT SIGNAKEY

Laser Confocal Microscope at x 200

HOW DOES LASER MARK SIGNAKEY

EACH Y IS DEFINED BY HASH LINES

HASH IN OMPI AND SCHOTT VIALS

5 DIFFERENT SIZED SIGNAKEY ON 2 BRANDS OF GLASS VIALS
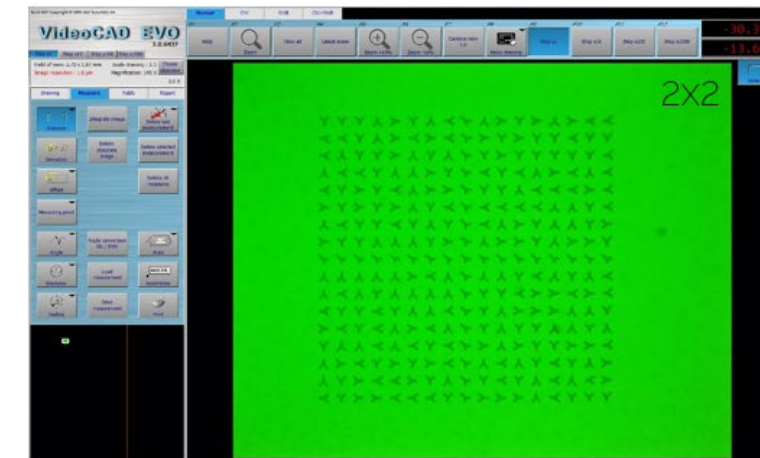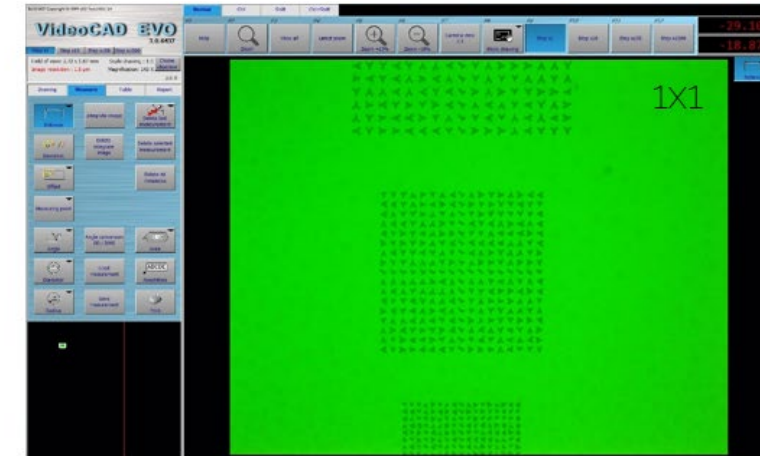
JAN 2022: SIGNAKEY - LASEA - CISEO

➢CONDUCT TRIALS TO OPTIMIZE MARKING SPEED.

➢FOUR VIALS: OMPI/SCHOTT/CORNING-VALOR/CORNING-VICTORY – SIX OF EACH MARKED.

➢FIVE DIFFERENT SIZE SIGNAKEY: FROM 2.0 X 2.0 TO 0.6 X 0.6 mm.

➢ALL DECODED - BUT 0.6 X 0.6 mm PROBLEMATIC.

➢PRODUCTION MARKING SPEED OF 300 PER MINUTE WAS CONFIRMED.

MARKING OF VIALS

MARK SIZE mm	MARKING TIME
2.0 x 2.0	700 ms
1.5 x 1.5	400 ms
1.0 x 1.0	250 ms
0.8 x 0.8	180 ms
0.6 x 0.6	130 ms

OPTIMIZED WITH 3 MICRON HASH

18

DECODING A 0.8 X 0.8 mm SIGNAKEY

SIGNAKEY CHANGED TO 12 X 12 SYMBOL FORMAT TO REDUCE DECODE TIME TO <35 MILLISECONDS

SIGNAKEY VISIT LASEA - CISEO

➢LASEA & CISEO LOCATED IN LIEGE SCIENCE PARK.

➢JOINT BUILD SANOFI SYRINGE LINE FOR 600/MIN.

➢CONFIGURED FOR 4-DIFFERENT SYRINGES – CHANGE OVER <1 HR.

_____

➢COST FOR PFIZER 300/MIN VIAL LINE $1.6 - $2.0 MILLION.

➢TOTAL LEAD TIME 24-MONTHS:
- ▪ 6-MONTHS FOR SOW
- ▪ 12 MONTHS FOR BUILD
- ▪ 6 MONTHS FOR SIGNOFF/MOVE/COMMISSION.

➢DLL NECESSARY FOR LOCAL READ/WRITE – LICENSE $0.5 MILLION

SIGNAKEY CURRENT CAPABILITY

➢ SIGNAKEY IS LIKE A LICENSE PLATE. ITS CONTENT IS THE PRIMARY SORT KEY LINKED TO ALL RELATED INFORMATION IN THE DATABASE.

➢ THE SIGNAKEY CONTENT IS AES-256 BIT ENCRYPTED AND EACH IS UNIQUE FROM 5.19×10^{33} POSSIBLE ITEMS *

➢ SIGNAKEY IS NOT AN OPEN-SOURCE 2D CODE. IT IS GS1 COMPATIBLE.** IT CAN BE INTEGRATED WITH EXISTING SERIALIZATION SYSTEMS.

➢ THE AMOUNT OF DATA AND AGGREGATION LEVELS ARE LIMITED ONLY BY THE DATABASE.   ALL INGREDIENTS, COMPONENTS, DEFECTS, SCANS, IMAGES, ETC. CAN BE LINKED TO THE PRIMARY SORT KEY AND TRACKED.

* estimated 10^{22} to 10^{24} stars in the Universe – source: ESA   **GS1 Type B Data Carrier

SIGNAKEY CURRENT CAPABILITY

➢A SIGNAKEY DLL* WITH BOTH ENCODE AND DECODE FUNCTIONS WOULD ELIMINATE INTERNET TRANSIT TIMES.

➢MARKING SPEED (ENCODE) OF 0.8 X 0.8 mm SIZE 12 X 12 SIGNAKEY NON-OPTIMIZED AT 180 ms   > 300 PER MIN.

➢READING SPEED (DECODE) OF 0.8 X 0.8 mm SIZE 12 X 12 SIGNAKEY, NON-OPTIMIZED AT 35 ms   > 1,500 PER MIN.

➢APG** FOR AGGREGATION – COGNEX CAMERAS.

➢WEB-BASED: DIFFERENT PLATFORM FOR FIELD PERSONNEL. SMARTPHONE APP.   SINGLE DECODE ~200ms.

*DLL – Dynamic Link Library   **APG – Assured Product Group, FL – partnered with SignaKey for Tobacco project