Near Infrared (NIR) Illuminators for Surveillance

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Overview

• Describe near infrared (NIR) illuminators for surveillance
• Examples
• Current FDA regulations and concerns
• Proposed solutions
• Questions for TEPRSSC
NIR Surveillance

- Passive daylight imaging
- Active night time imaging
NIR Surveillance

• Passive daylight imaging
• Active night time imaging
  – Short Range – NIR LEDs
  – Long range cameras – NIR lasers
    • Laser type: Solid State, continuous wave
    • Wavelengths: NIR, typically 810-940 nm
    • Power: 100 mW – 5 W
    • Divergence: varies with distance to target
    • Fixed location or mobile (e.g., vehicle or UAV)
NIR Surveillance

- Traffic monitoring
- Airport/seaport security
- Building complex security
- General public space monitoring
- Police surveillance
- Aid in firefighting
- Professional sports
- Border protection
- Military/defense
Current FDA Regulation & Concerns

• NIR illuminators are considered Survey, Levelling and Alignment (SLA) lasers [21 CFR 1040.10(b)(39)]
  – Output limited to Laser Class IIIa [21 CFR 1040.11(b)]
  – Class IIIa limit for NIR = Class 1 ≈ 0.1 mW
• IEC limits ≈ 30-40 mW
• NIR products that emit >0.1 mW may be sold to Department of Defense and law enforcement under a variance
Current FDA Regulation & Concerns

- Photothermal damage to retina may occur, possibly resulting in permanent detrimental effects to vision
- May be possible to intercept the NIR beam before the illumination target
  - Drone-mounted NIR laser product illuminates someone at close range when landing/take-off or during flight malfunction or general close proximity
  - Misuse by untrained persons
- Nominal Ocular Hazard Distance – 1 km (unaided), >2 km (aided)
- NIR illuminators are intentionally aimed toward faces for recognition
- Public is not aware of being illuminated

By U.S. Navy photo by Mass Communication Specialist 2nd Class Michael Russell [Public domain], via Wikimedia Commons
Current FDA Regulation & Concerns

• Administrative controls are not reliable
  – Labelling and signage not fail-safe or practical
    • Example: mobile systems
  – Training does not handle unpredictable situations well
    • Often the NIR laser is automated and not under direct control
Proposed Solutions

• Require engineering controls that provide a virtual protective housing
  – Virtual protective housing
    • laser range finder, ultrasound sensor, etc.
    • Include geometric calculations

• Do not enforce SLA class limitation for NIR illuminators used in surveillance systems

• NIR surveillance would not be limited to law enforcement

• FDA/industry burden greatly reduced

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Questions for TEPRSSC

• What is your opinion regarding the potential public safety hazard associated with NIR illuminators used in surveillance applications?
• What is your opinion regarding the effectiveness of using an engineering control to create a virtual protective housing to prevent hazardous exposures to NIR radiation?
• Can you suggest another type of engineering control or alternative solution that would better protect the public?