Enhanced Flight Vision Systems in Commercial Aviation

IASS 2019
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Evolution of Flight Deck

FAA Focus Area

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What is EFVS

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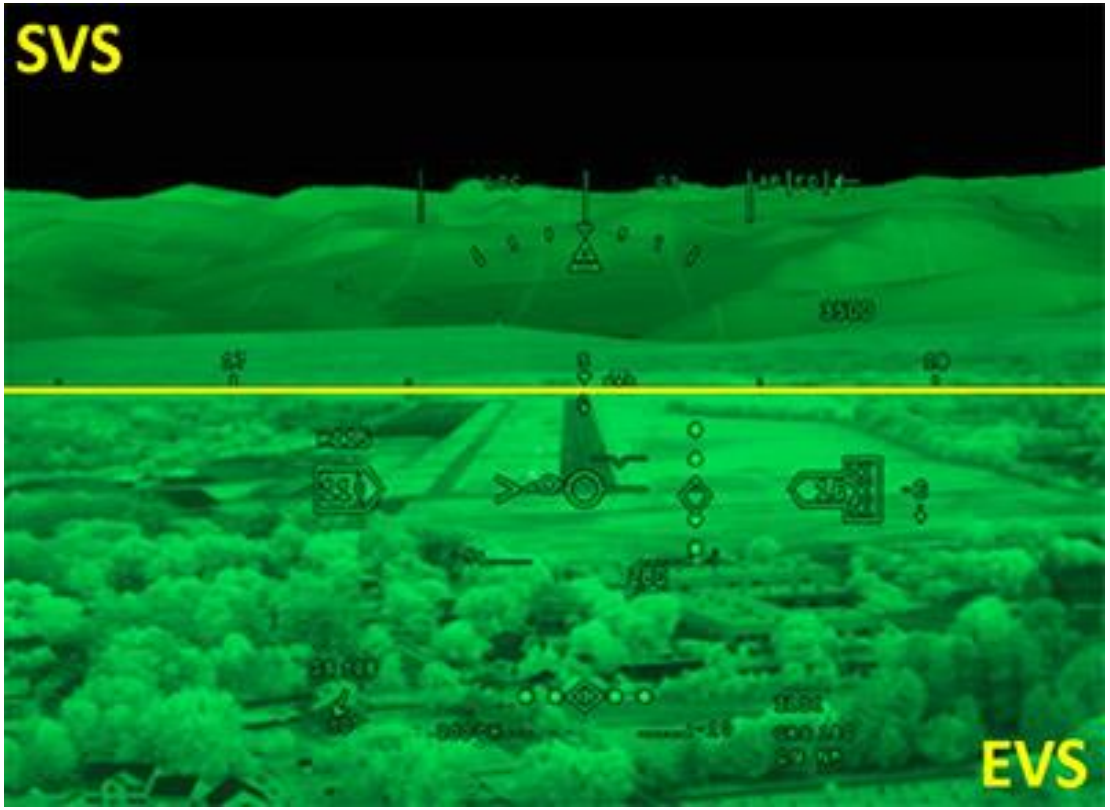
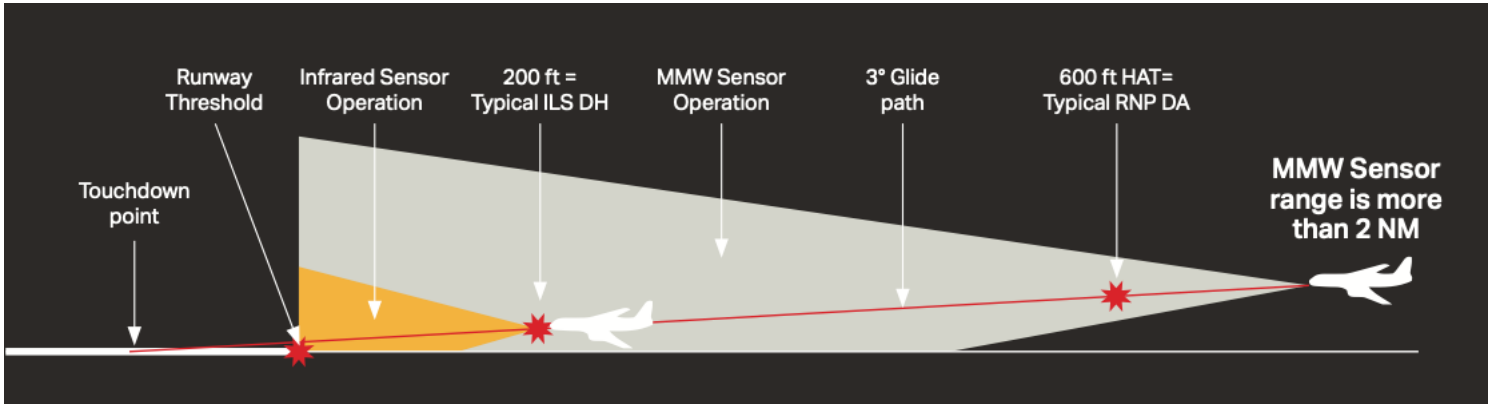
SVS and EVS Comparison



EFVS Equipment



Visual Advantage

- Flight test videos were evaluated at three different altitudes (decision altitude, 100 feet radar altitude, and touchdown) to determine the visual advantage afforded to the pilot using the EFVS/Forward-Looking InfraRed (FLIR) imagery compared to natural vision.
- Results indicate the EFVS provided a visual advantage of two to three times over that of the out-the-window (OTW) view.
- The EFVS allowed pilots to view the runway environment, specifically runway lights, before they would be able to OTW with natural vision.

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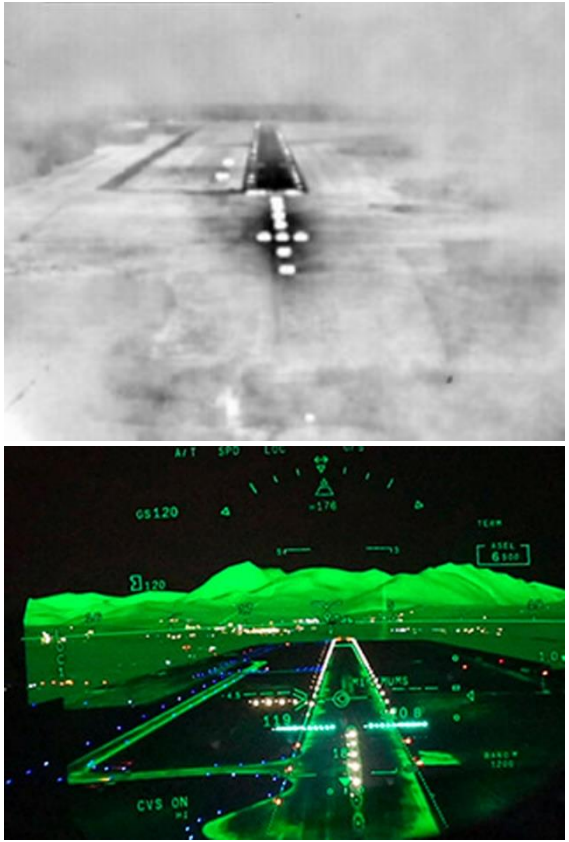
Operational Advantages

New Part 121 EFVS Operations – Regulations

- Permits operators to use an Enhanced Flight Vision System (EFVS) in lieu of natural vision
- Continue descending from 100 feet above the touchdown zone elevation to the runway and land

- Dispatch, Release, or Takeoff under IFR with less than CAT I weather
- Initiate and continue an approach when destination airport weather is below authorized visibility minimums



Enhanced Flight Vision System (EFVS) in lieu of natural vision

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Equivalent Visual Operations – Adaptive Technology

- Is reliable, all weather operation
- Enables dispatch in low visibility by rule
- Approach and landing, by rule, without delay
- All Runways are now lower than CATIII equivalent
- Any approach with Vertical guidance is permitted to landing and rollout, without natural vision
- Takeoff on runways with no guidance or centerline lights provided by EFVS
- Elimination Takeoff Alternates
- EFVS Is Strategic in value to all aspects of our operations for maintaining schedule and expansion to new airports with limited infrastructure
- Maintains schedule reliability
- Low training initial and recurrent

Regains lost capacity due to weather

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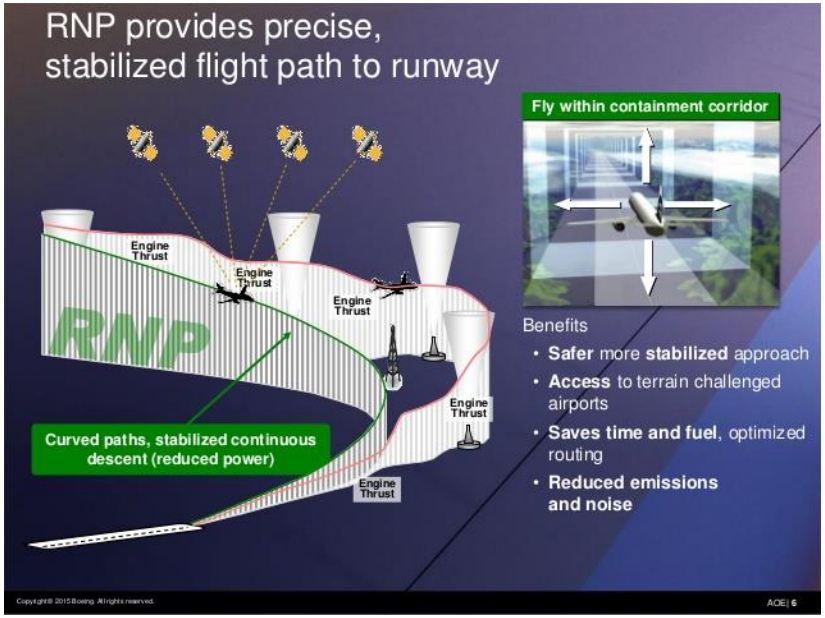
NextGen Ehancements



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Established on RNP (EoR)

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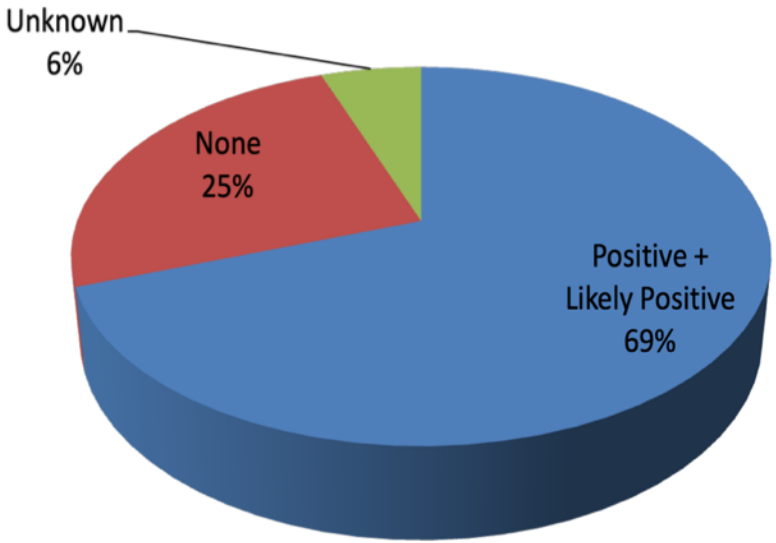
Safety Advantages

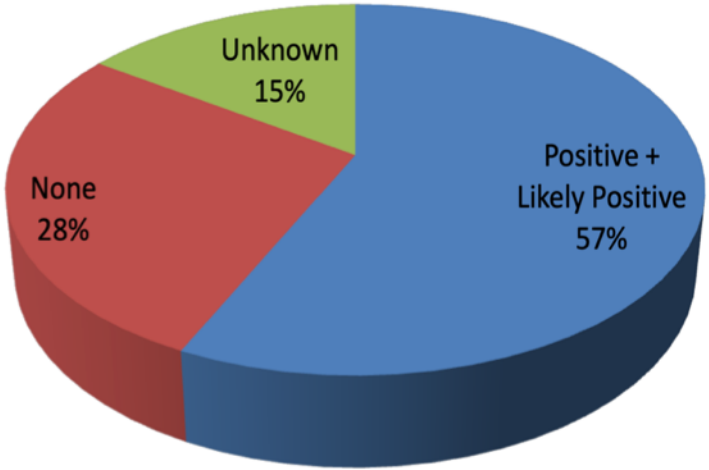
Flight Safety Foundation – Safety Benefits of HGS Technology

HGS would have highly likely or likely affected

Takeoff and Landing



Inflight Loss of Control – 123 Accidents



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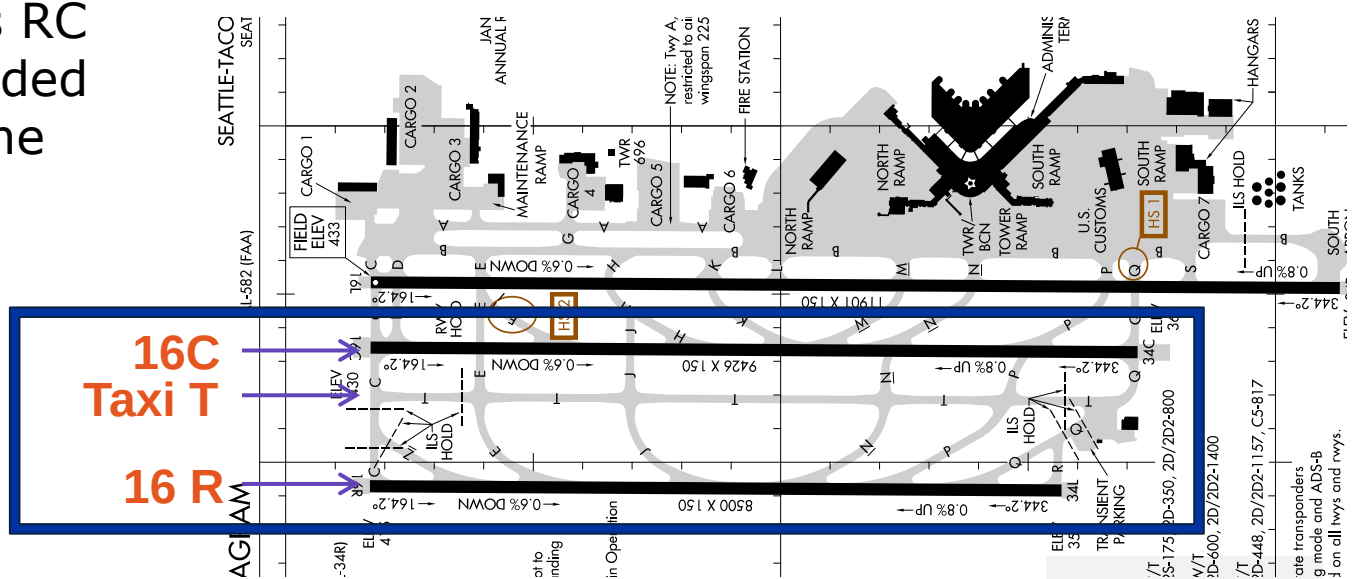
Top Safety Risks Mitigated by EFVS

- Misconfiguration on Takeoff
- Controlled Flight into Terrain - EGPWS events
- System Component failures (non-powerplant)
- High altitude stalls – improper response (between 20,000-30,000 feet)
- High rates of descent
- Wrong surface movements
- Use of Flight Level Change (FLCH) below 1000 feet

Synthetic Vision – Seattle Misaligned Approach

A number of incidents have occurred at Seattle (KSEA) where pilots confused Taxiway Tango with Rwy 16C and 16R to which they were cleared, and landed on the taxiway instead.

Next slide shows RC "Synthetic Extended Centerline" for the selected landing runway.



Landing Runway 16L, Aligned to Taxiway

Synthetic Vision

1000’ AGL

500’ AGL

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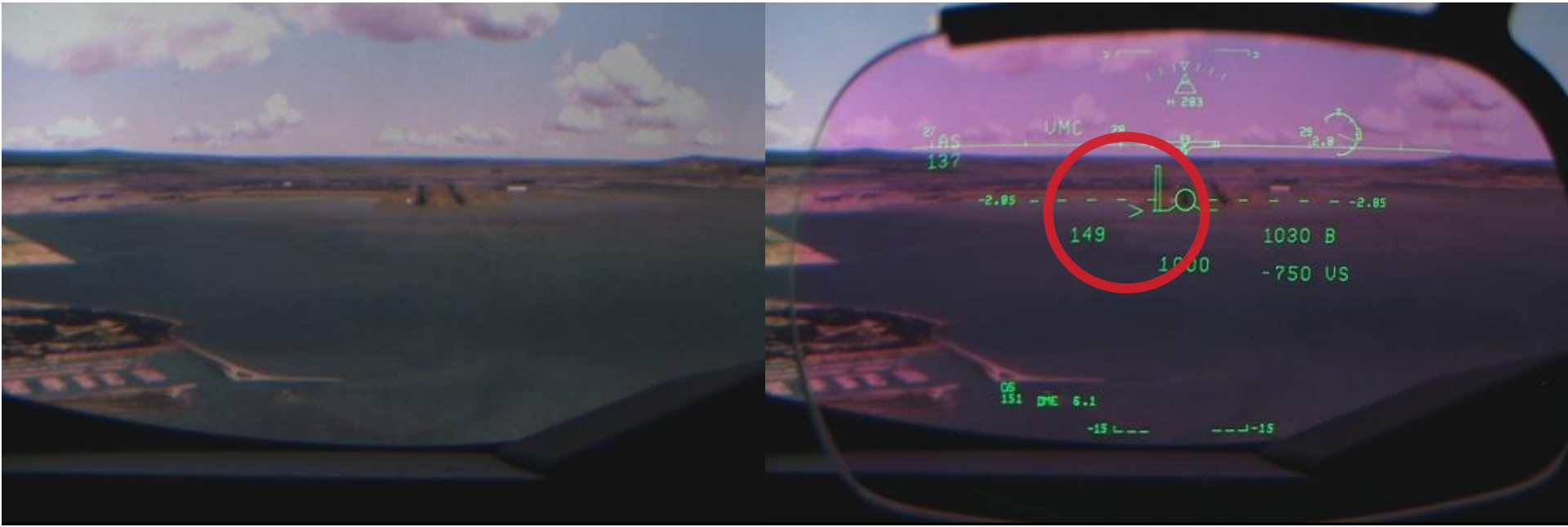
Unstabilized Visual Approach – at 1000’

San Francisco (SFO)



Unstabilized Visual Approach – at 200’

San Francisco (SFO)

Unstabilized Visual Approach – at 25’

San Francisco (SFO)

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72nd annual
INTERNATIONAL AIR SAFETY SUMMIT
IASS 2019

CONCLUSIONS

Enhanced Flight Vision Systems

- The EFVS sensor performance must be demonstrated to establish eligibility for operational credit
- The EFVS sensor performance should be quantified as an advantage the EFVS (sensor) provides over natural vision in the lowest *reported* visibility that the EFVS is to be authorized
- The EFVS sensor performance should be demonstrated by a manufacturer
- The FAA AEG must be engaged in the evaluation of demonstrated performance.
- Data from EFVS operations conducted during certification should be recorded to assist flight departments in determining eligibility for operational credit. (IAP, VIS, Assessment)
- Documented performance should be easily accessible to individual operators and regulators seeking operational credit

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Questions?

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