NEW GENERATION
Head-Up Display and EFVS Solutions

Air / Avionics Systems
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Safe and efficient

A Head Up Display (HUD) and Enhanced Flight Vision Systems (EFVS) play a vital role in the ability to adapt NextGen efforts towards Equivalent Visual Operations (EVO) while improving safety. Our experience as aircraft manufacturers of both commercial and military aircraft has helped us find creative solutions including options for integration with third party sensors to offer a game changing complete EFVS and Combined Vision System (CVS) solution.

Saab Avionics Systems solutions including revolutionizing long-range all-weather sensors will lead the way in changing the game towards EVO.

Saab Avionics Systems EFVS is the solution for:
- Achieving operational credits
- All weather airport access
- Reducing the risk of Loss Of Control In-flight (LOC-I) and Controlled Flight Into Terrain (CFIT)

The value of Saab’s EFVS solution

**Approach & Landing Credits HUD/EFVS**
HUD/EFVS systems are an established solution for transport and business aviation operations for achieving landing credit and expanding an aircraft’s operational capability. As of 2017 the same type of certifications are now available for all normal types of operations.

In addition the FAA and other regulatory agencies now allow dispatch to an airport forecasting visual conditions below minima. As of 2017, it is permitted to certify an EFVS system to be used in lieu with natural vision all the way to touch-down.

**All Weather Airport Access**
HUD/EFVS is available with a revolutionary long-range all-weather sensors with a reliable and predictable performance designed to provide an image of the runway on the HUD already at a distance of 2-3Nm thus allowing a standard pilot to fly approaches to marginally equipped runways even in severe visual conditions. The FAA’s NextGen effort has identified loss of airport capacity with marginally degraded visual conditions posing a major problem.

Saab Avionics Systems EFVS/CVS solution with long-range sensors presents an unrivalled alleviation of this problem.

**All Phases Of Flight**
HUD/EFVS provides superior intuitive and effective situational awareness as well as reduced workload minimizing the risk for Loss Of Control in-Flight (LOC-I) as well as Controlled Flight Into Terrain (CFIT).

Saab Avionics Systems HUD can comfortable be used for long periods of time and is therefore totally suited for use during all phases of flight.

**Performance Flight Design**
HUD/EFVS is designed with a unique Picture In Picture (PiP) display that further enhances the situational awareness. This feature is mainly used for navigation but may also include aircraft state information or non-conform video, etc. In addition, the HUD system is available with options allowing the best presentation of information on the ground. This includes information for taxiing.
As of 2017, there are new opportunities for multiple operators to benefit from EFVS certification. With HUD EFVS, SVS & CVS solutions Saab is leading the development of products and solutions, fully taking advantage of these new opportunities.

A short summary of the regulatory news:
Promoting Equivalent Visual Operation (EVO), FAA & EASA now permits Part 91, 121 & 135 EFVS operations during precision as well as non-precision approaches to touchdown and rollout without natural vision.
Permits use of EFVS with CAT 2 and CAT 3 Autoland operations at CAT 1 airports.
EFVS-equipped aircrafts are allowed to dispatch when destination reporting is below authorized minimums.
EFVS-equipped aircrafts are allowed to initiate and continue an approach when destination reporting is below authorized minimums.
Long-range sensors, detecting runways at 2-3NM, opens up for use of EFVS for non-precision approaches with typical MDA 6-800ft above threshold during marginal visual conditions.

Benefits of the regulatory news:
• Dramatically reduces the need for expensive airport infrastructure. In marginal weather this opens up countless additional approaches in North America alone.
• Using shortest approach saves fuel.
• Drastically increases airport capacities in marginal visual conditions.
Best equipped best served.
Saab Avionics Systems has developed a modularized and easily adaptable range of high performance large Field Of View HUD systems. Optical performance as well as image processing parameters are optimized to reduce fatigue and enhance readability for the HUD to be used in all phases of flight. Our HUDDs are the most comfortable to look through for long periods of time. Our modularized approach is designed for easier customer adaptations. NVG friendly solutions are available. The intuitive symbology provides the pilot with an at-a-glance means for intuitively assessing the state of the aircraft.

System architecture is highly adaptable. Multiple processor solutions for various levels of integration are available.

### A vision system for all solutions

**SVS**

The Synthetic vision component is compatible with most industry std databases for terrain elevation, obstacles, navigation etc. Synthetic Vision can be viewed as shaded or grid in the HUD depending on preference and situation. Available for both Head Down & Head Up Display.

**CVS**

The system offers a complete, game-changing EFVS certifiable CVS solution. The CVS application is developed as an integrated part of the HUD system but may also be offered as a separate solution driving third party displays.

**Sensors**

The system architecture utilizes Saab’s advanced EFVS sensor technology, and accepts third party or customer furnished sensors. Saab is leading the introduction of the next generation of EFVS sensors. This includes a revolutionary all-weather long-range sensor.

### Capabilities in brief

**Effective Flights**

- EFVS with new Saab technology that enables dispatch, approach and landing.
- EFVS equipped aircraft will enable operators a reliable schedule and greater airport access to airports with minimal infrastructural
- Saab’s EFVS and HUD systems are simple to use, and need only minimal training for all-weather operations

**Safety First**

- Reduce risk of LOC-I & CFIT
- Flight data presented to enable head up flight and navigation
- Intuitive presentation for faster decisions
- Conformal data for situational awareness
- HUD makes IFR/VFR transition more effective

**Effective Integration**

- Integrates with both own and third party electro-optical as well as sensors based on other technologies
- Compact and low weight for easier integration
- Modular approach and open architecture for effective adaption to multiple platforms
- Prepared to benefit from future vision and awareness subsystems

**Mission Compatible**

- Flexible and adaptable display modes
- Architecture prepared to host interface multiple mission specific functions and sub systems
- Integrated flight mission data

**Qualification**

- DO-160, 254 & 178C up to level A, pending
- ETSO 210, pending