Achieving the operational goals of Gripen E Electronic Warfare System, MFS-EW, from idea to operational product

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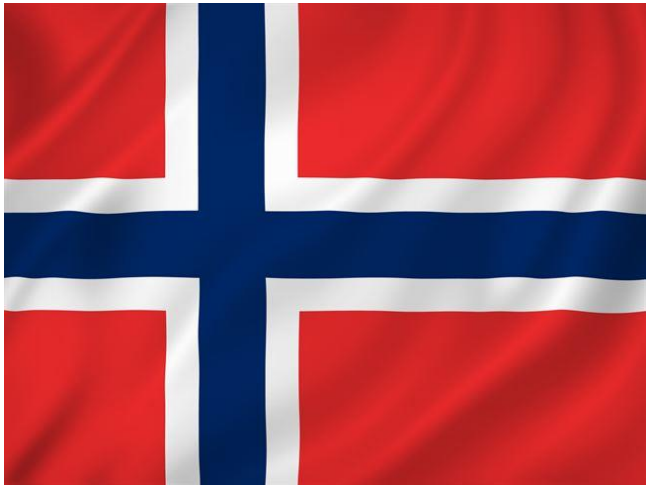
FMV

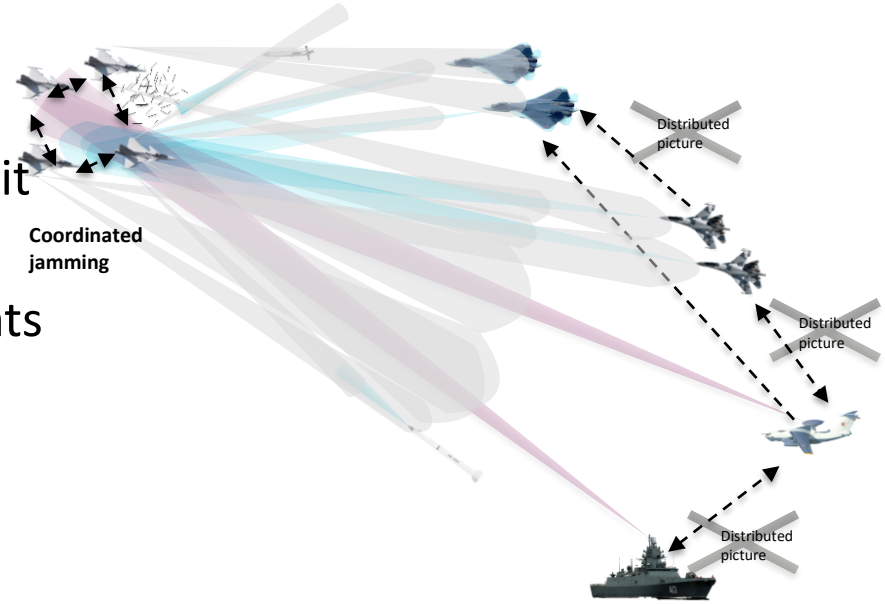
How it started

- It all started with Norway
- In November 2008 Norway did not select the Gripen NG
- Dissatisfaction with the EWS of the offered Gripen configuration
- Thorough scrutiny of the offered solution
- Operational capabilities studies SwAF, FMV and FOI
- Industry studies
- Around 2011 operational ambitions and a technical concept started to materialize



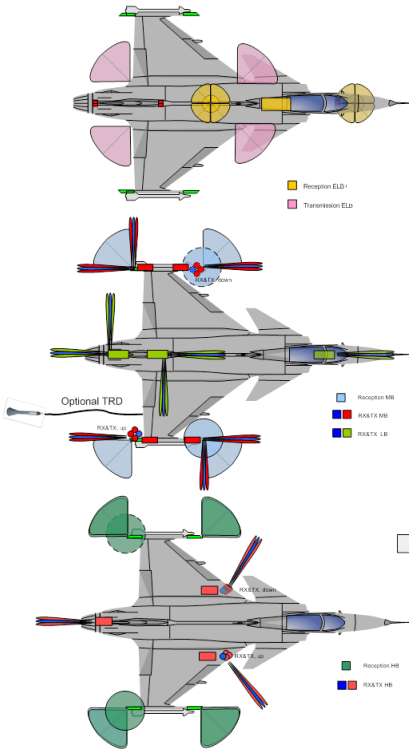
Example of operational capability, DCA

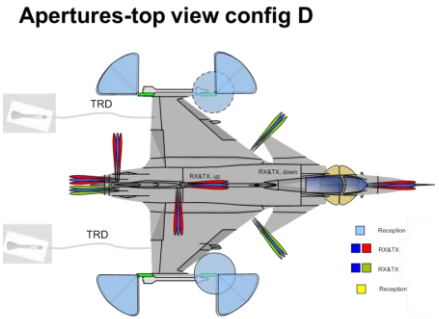
- Deny, or degrade, the enemy's SA
- Deny or degrade the enemy's TA
- Active low-signature platforms
- If the enemy manages to shoot at us, it shall be countered too
- Simultaneously against multiple threats
- Be able to do this coordinated and cooperatively within a TAU
- Maintaining own SA and low pilot workload

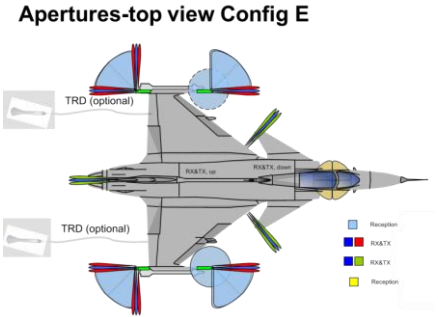


Configuration alternatives

- Several different configurations were studied
  - External configuration
  - Internal configuration, e.g. receiver configuration and technique generators
  - Evaluated on performance, feasibility, cost and risk.
- Requirement that the Electronic Warfare System should also act as a target acquisition sensor
- Finally a configuration fairly close to today's was recommended

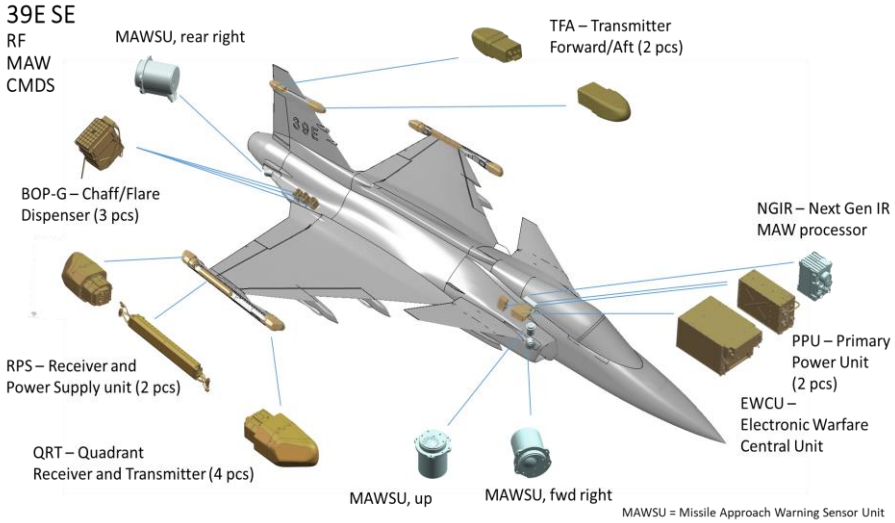


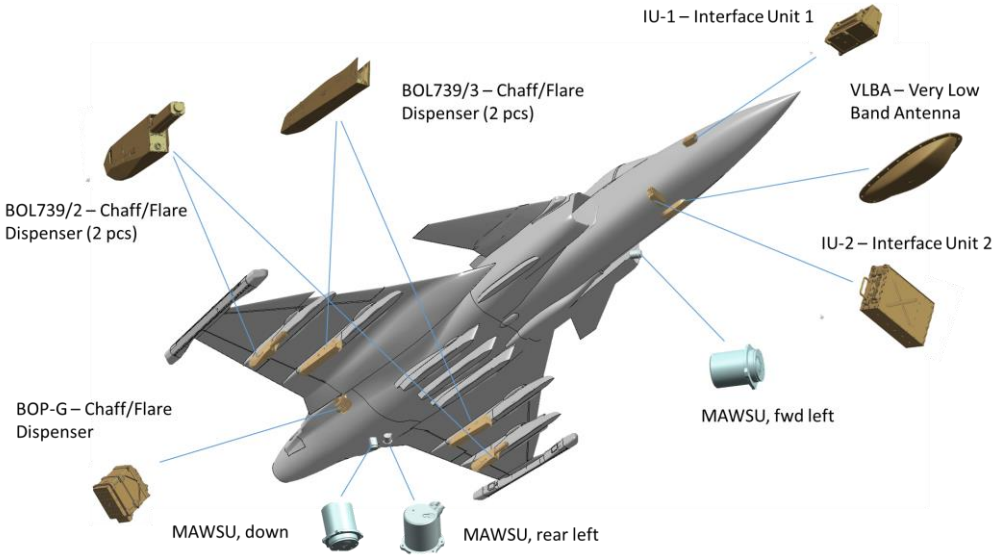




Configuration of MFS-EW

- In total up to 33 LRUs incl all dispensers (not all in picture) of up to 15 different types (Gripen C/D 18/8)





Contractual woes

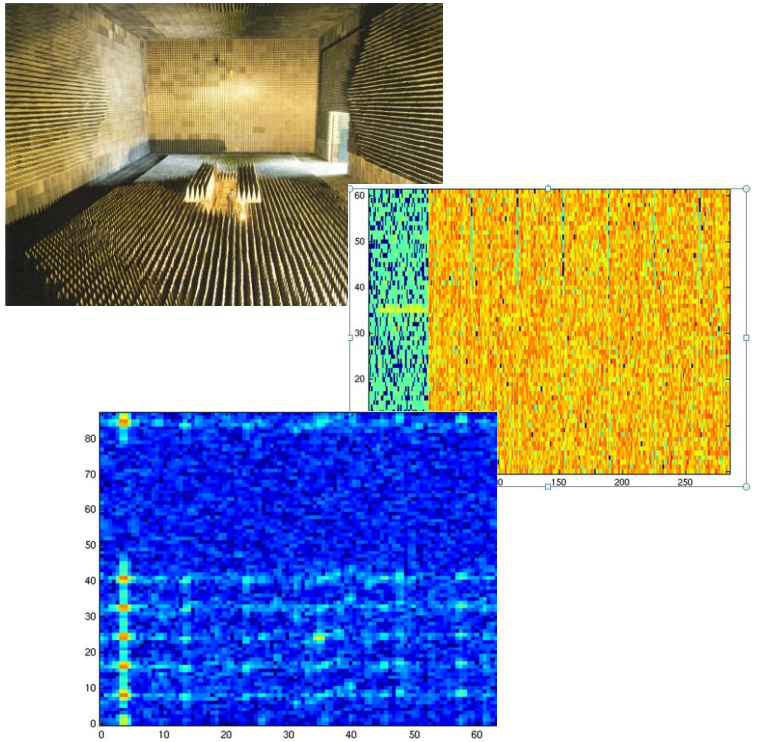
- Around summer 2012 we had a recommended configuration and a loose set of “requirements”
- However no official assignment - unable to negotiate on actual contractual requirements
- Decision came - ordered to sign a contract on the Gripen E, within 3 months time
- So, how to agree on contractual requirements for a revolutionary electronic warfare system in 3 months?

Alternatives for contractual requirement

- Full requirements coverage with detailed requirements
  - Deemed impossible
  - A detailed requirement set does not always get you the desired capabilities
- Fewer high level requirements
  - Tried that before, didn't work
- The middle way
  - Detailed requirements where it really mattered, more open requirements where possible performance was unknown during the negotiations
  - A definition period after contract signing to further detail and specify
- We chose the last alternative. For that to work – TRUST
  - Trust gotten from working with the Gripen C/D system

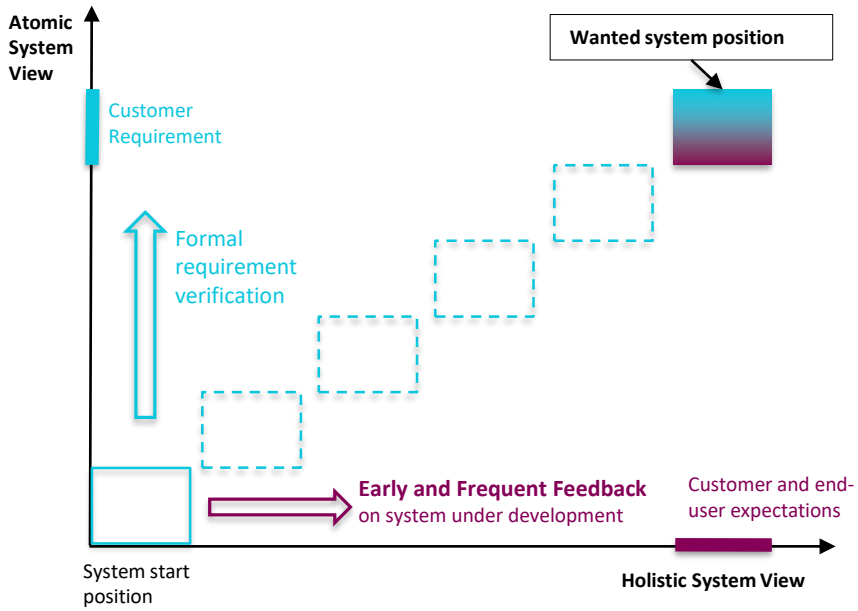
Continuously working with system capabilities

- A long project: ~10y from contract to operational capability with a fixed budget
- A lot of changes during that period
- Continuously assessing if the requirements are correct
- Continuously evaluating design
- Two large ‘balancing’ of requirements events performed



Reaching our wanted position

- There is more to getting an operationally relevant system than formal requirements
- Working with industry to clarify the actual operational needs behind the requirements
- Give feedback on proposed design solutions and on system behavior
- Delegated responsibility to suggest changes in design.
- Common Verification and Validation with industry, FMV and Air Force



Where we are today

- System being tested in several rigs
- H/W for version 21 fully qualified and are flying with a/c 39-9
- Performance of the system looks very good
- Perfecting integration into the complete tactical system of the a/c will be challenging
- H/W for version 22, e.g. the AESAs, is entering qualification

Future

- Development will continue to meet version 22 requirements
- Integration with the rest of the tactical systems to be finalized
- Intensive testing, both in rigs and in flight tests
- Development will continue after delivery of version 22
- Development of tactics to utilize the flexible and powerful toolbox that is MFS-EW

Questions?

Thank you for you time

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