**Technical Report Documentation Page**

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| **16. Abstract**Blind spot intervention (BSI) is, technologically, a combination of two existing systems, namely Blind Spot Detection (BSD) and Lane Keeping Assist (LKA). Vehicles were reviewed for the presence of BSD, LKA, and BSI features and it was found that the 2016 – 2020 model year platform of the Jaguar F-Pace was uniquely qualified for this study by the addition of BSI functionality between model years on the same vehicle. The F-Pace control system hardware for steering, braking, blind spot monitoring, and lane keeping was evaluated and found to exhibit no evidence of changes that were necessary to enable BSI. The software development effort to enable BSI was also evaluated and was found to potentially require the inter-linking of the BSD and LKA algorithms along with functional safety validation, depending on the generation of software architecture, as shown in **Table 1**. Gen 1 vehicles have BSD and LKA existent but performing as stand-alone systems; Gen 2 vehicles likewise have BSD and LKA and are capable of communicating with each but do not do so; Gen 3 vehicles have fully-integrated ADAS systems including at least BSD and LKA but may not have enabled BSI functionality.**Table 1** Software development effort and cost required for BSI enablement

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| --- | --- | --- | --- |
|   | **Gen 1** | **Gen 2** | **Gen 3+** |
| Software design | BSD zone parametersLKA steering parametersBSI linkage parameters | BSI linkage parameters | n/a |
| Validation testing | BSD zone parametersLKA steering parametersBSI linkage parameters | BSD zone parametersLKA steering parametersBSI linkage parameters | BSI linkage parameters |
| Development hours | 800 - 1000 | 600 - 800 | 500 - 700 |
| Development costs | $80k - $100k | $60k - $80k | $50 k- $70k |
| Overhead (SG&A + Profit) | 24% |
| Dealer markup | 11% |
| Amortization volume | 1M units |
| Per vehicle end-user price increase | $0.11 - $0.14 | $0.08 - $0.11 | $0.07 - $0.10 |

Using these software development efforts, the total aggregated engineering costs, from the supply base to the OEM, was found to be on the order of $100,000. When calculated on a per-vehicle basis, amortizing over a 1M unit production run the costs are seen to be very small.It would appear that reluctance on the part of OEMs to advertise or offer the feature is due more so to the industry’s concern for keeping the driver engaged with the dynamic driving task for safety reasons than it is to cost pressures. Effective driver monitoring systems are crucial to ensuring a safe rollout of advanced driver assistance technologies. |
| **17. Key Words**BSI, Blind, Spot, Intervention, BSD, Detection, LKA, Lane, Keeping, Assist, OEM | **18. Distribution Statement**This report is free of charge from the NHTSA Web site at [www.nhtsa.dot.gov](http://www.nhtsa.dot.gov)  |
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