Bob Nuckolls differs from Klaus Savier on some aspects of LSE EI wiring

Thread “Z13-8 modification and LSE ignition wiring”:

- Thread fragment of Sept 22, 2020
- Thread fragment of Sept 28, 2020, this is where Bob responds.

Thread “Fusible Link for Lightspeed Ignition” of March 28, 2023.

Thread “LightSpeed Ignition wiring” of April 16, 2023. Talks more about how Bob would wire Light Speed ignition; not in the summary below.

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Bob, am I understanding correctly from your above statement that fusible links are NOT a good alternative for a fuse block AT the battery bus in this case?

> Correct

I was looking at the links to simplify and avoid the extra fuse block but are the links too slow for the crash safety aspect of this (say a 22AWG link and 18 AWG feeder wire with the 5A pullable breaker at the cockpit end as per the LSE recommendation)?. I will install a fuse block for the batt bus items if this is the recommended procedure.

> Installing those breakers in the cockpit on extended feeders from the battery bus has no foundation in physics or practice. Feeder protection needs to be as close as practical to the energy source that puts the feeder at risk. The time constant for operating that protection should be consistent with protection of that feeder from anticipated threats discovered in the FMEA for protection of that feeder. The crash safety issue is stacked on top of feeder protection intended to limit the electrical energy that raises risks of post crash fire ignited by always hot feeders.
>
> Hence the 5A limit (FARS) or my own suggestion for 7A fuses which would limit fault energy to much less than breakers.

Also, what are your thoughts on the LSE manual procedure of using the wire shield as a ground return versus a separate conductor? Seems to be possibly less robust?

> You are correct. I had some discussion with Klause with respect to shields in his system. I inquired as to any testing or analysis done that called for shielding his wires as either potential victims or antagonists.
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> He admitted to no such testing but thought it wasn't hard to do and was good insurance. Powering the hall sensors through twisted pair shields is probably a good thing to do. Shielding the power leads makes no sense. Those paths are not (or at least should never be) bad actors in the ship's electro-magnetic compatibility study.
>
> If ANYONE says that shielding power wires into or out of his product is a necessary thing, then they've admitted that their design falls short of some fundamental and easily achieved requirements of DO-160. Shielding breaks electro-static coupling which is very weak. No such risks exist on DC power feeders.
>
> Klause wasn't claiming that it was necessary, only easy and a good thing to do.
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> The recommended DC power feeder to the LSE system is a mish-mash of electrical joints that add complexity and failure points without adding EMC value. Asking for direct connections to batteries is also without foundation in physics or practice.
>
> You will never see such a recommendation in TC aircraft designs. I would ground the ignition electronics via wire to the firewall ground bus; feed DC power through contemporary, FAST protection at the battery bus and then through what ever switch is selected. Fuses are fine . . . if a fuse pops, something is broke and there is no value in fiddling with them in flight. That breaker-on-the-panel thing is simply not well thought out.
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> Bob . . .