

- **Regan Robertson** Mod • 15 days ago

Good Afternoon,

The video will start on this page at 12:00pm, and you may have to hit play or unmute. As a reminder this site works best in a Chrome Browser. You can write in comments through this feature to continue the conversation or ask questions.

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Carl Nerup • 15 days ago

At the risk of highlighting my total ignorance, where would I even find a SBIR opportunity with DARPA to bid?

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Raymond Richards Carl Nerup • 15 days ago

On this page, you can ask to see SBIR topics. <https://www.darpa.mil/work-...>

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Raymond Richards • 15 days ago

Sorry I'm late, I was listening to previous talk

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Douglas Schafer • 15 days ago

Ray, do you think if some of these topics were re-investigated now, perhaps some differing or just more topics would be supported?

Meaning, we have seen a lot of progress in the past 5 or so years (especially ISA) and lower-level work, coupled with some new pulls that didn't exist then....

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Raymond Richards Douglas Schafer • 15 days ago

Doug,

Indeed. That is why I brought them up. Plus, it has been my experience with SBIRs that the Phase 2 selection is often driven by available funds.



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Jerry Dussault • 15 days ago

It seems there's still significant interest in assured boot loaders for seL4. Are there multiple organizations working on this for different hardware platforms? Where does this fit in the overall scheme of priorities?

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Greg Shannon • 15 days ago

Raymond Richards have you invested in verified reference architectures for various systems or systems of systems?

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Raymond Richards Greg Shannon • 15 days ago

Greg, not intentionally. But, this work on the little bird 'retrofit' has become a recipe that we have used multiple times. Notably with NAVSEA's Platform Independent Machinery Control System (PIMCS), which is the HMI for shipboard SCADA.

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Noah Evans Raymond Richards • 15 days ago

Ray would this be a good use of the proxy architecture we talked about earlier? Maybe take a more capable RISC-V running seL4. I believe Lincoln Labs has some work we could potentially leverage there.

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Raymond Richards Noah Evans • 15 days ago

It has possibilities

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Greg Shannon Raymond Richards • 15 days ago

yes, i do see the work so far as recipes, and such work is a stepping stone to verified reference architectures. By reference architecture, i mean something that is a solid starting point for a domain/application. E.g. an expendable UAS.

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Douglas Schafer Greg Shannon • 15 days ago

Greg, the reference architecture was the fundamental objective for ARES, we then expanded to a "trusted" execution environment that could be leveraged as an implementation of that architecture with core services.

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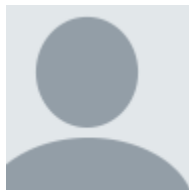
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Noah Evans Greg Shannon • 15 days ago

Greg, Not a direct answer to your question, but Lincoln Labs has done work on an seL4 based Cubesat using Rust for the userspace components. Sandia is looking at something similar but for more resource constrained systems (e.g. closer to microcontroller class) that would need a slightly smaller system than seL4 as it currently stands.

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Jason H Li • 15 days ago

Ray - with these prior investments and now that we are running the 3rd Summit, what would you recommend to the community here in terms of next steps? The technology has promise and hurdles as we expected. You advised putting our arms around challenges together, which is still solid. Anything additional?

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Raymond Richards Jason H Li • 15 days ago

I think we need some solid, deployed (meaning accredited) systems built from the ground up, on seL4, using the design philosophy from Data61. A reference implementation on how to build critical systems in such a manner.

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Jason H Li Raymond Richards • 15 days ago

Thanks Ray. seL4 is a great enabling technology. To build assured systems, a lot of work will be needed to architect carefully (including considering many times competing requirements like uServices) and provide the actual solution based on seL4 and other key technologies, and make it real and running.

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Ihor Kuz Raymond Richards • 15 days ago

I think that such reference platforms will be critical.

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Regan Robertson Mod • 15 days ago

We hope everyone is enjoying the first day of the summit. We are going into the lunch break and will be back at 1pm!

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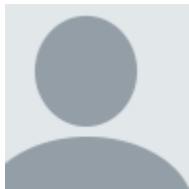
Jason H Li • 15 days ago

Many thanks to all the speakers in this session!

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Raymond Richards Jason H Li • 15 days ago

Thanks Jason

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Douglas Schafer • 15 days ago

Ray, I agree with your last (recorded) statement and see that reconciled with the issue of the lack of wide expertise and the ease of development at scale for DoD providers, So, I see that as a priority goal of the COE.

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Jerry Dussault Douglas Schafer • 15 days ago

Doug, could you reiterate what you think is a priority goal for the COE?

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Douglas Schafer Jerry Dussault • 15 days ago

The usability, development of capabilities on seL4, basically what would improve the ability of more developers (e.g. that may work for primes) to design and build with seL4.

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Jerry Dussault Douglas Schafer • 15 days ago

Got it. Thanks!!

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Renato Levy • 15 days ago

Next presentation will be at 13:00, so enjoy your lunch. See you then.

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Stuart Card • 15 days ago

If seL4 as such is moving beyond the stage appropriate for DARPA investment, are there closely related areas that are still in earlier research stages of interest to DARPA? I am wondering specifically about dynamic trust of autonomous (e.g. AI/ML) systems, but also wonder what else?

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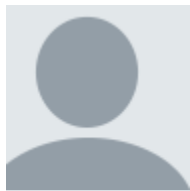
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Renato Levy Stuart Card • 15 days ago • edited

Great point! When Greg was presenting he mentioned usage of formal verification on autonomous systems (actually my area of action), and without formal methods, we saw over and over again, that minor behaviors become dominant. Exactly what we can't afford. More to the point, we have even verified standard procedural code, let alone ML/AI

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Jason H Li Renato Levy • 15 days ago

Agreed. Greg's point, seemingly counter-intuitive, is right on -- FM is probably the most efficient way to get rid of unwanted errors to start with.

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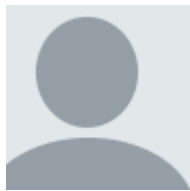
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Raymond Richards Stuart Card • 15 days ago

Stuart,

during tomorrow morning's keynote, Dr. Scherlis will talk about formal methods at scale.

Also, there is an Assured Autonomy Program, and it is likely that additional programs in this area will appear.

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