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Abstract—Advanced Research Projects Agency, or ARPA for short, is a highly successful high-risk, high-reward knowledge production technology born from the same organization that pioneered its use and whose former name was so before tacking on the 'D' for 'Defense'--DARPA. We closely analyze the success of DARPA, from its birth in the U.S. Military through the agency National Security to the federal reproduction of children: IARPA (Information, 2006), ARPA-E (Energy, 2009), ARPA-C (Climate, TBD), ARPA-H (Health, 2022), even HSARPA (Homeland Security, 2002). We specialize on three core components that put DARPA on the bleeding-edge of science. (I,) DARPA's agency structure sticks out like a sore thumb compared to its Federal peers: it is non-hierarchical, flexible, and accommodating. (II,) For better or for worse (it's the second), ARPA research and development requires a close relationship with the University, it is there on the so-called "front lines" where the university performs the labor of innovation. (III,) DARPA constructs self-contained competition frameworks for its research performers to push each other to their limits. We stress a critical lens on DARPA, it is first and foremost a military tool soaked in imperialist and warmongering philosophy; but this paper wants to decouple ARPA technology from the Department of Defense. It is here where we envision a future abstract technology, an ARPA model that is accessible to and benefits the public.

Outline–

A_ History of DARPA

I. Structure of DARPA

II. Universities and DARPA

III. Competition and Prize Money

B_ Conclusion: Reclaiming Advanced Research Projects

Sources–

+ DARPA and its ARPA-AE and IARPA clones: a unique innovation organization mode
+ Voices from DARPA, Episode 39: The What-if Chemist
+ The Pseudoscience Wars: Immanuel Velikovsky and the Birth of the Modern Fringe
+ Prize Challenges
+ The rise of 'ARPA-everything' and what it means for science

[36:10] The role in terms of scientific innovation and the ecosystem: the universities are sort of the front line. In department of defense terms, they are the tip of the spear. They are the ones in the labs doing the research with grad students, post-docs, and undergrads, and faculty, and research staff pushing the boundaries making the discoveries and innovating of course.
[36:40] The role of DARPA as well as other Fed agencies like the NSF, they are a critical part of that infrastructure because that tip of the spear, in the labs around univs, can't happen without federal support and funding. A place like DARPA not only provides the financial support to allow the research to function and proceed, but DARPA plays a very important point in pushing those boundaries.