

# Closing the Gap:

## How Government Can Help Scale Industries

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*GEORGETOWN UNIVERSITY*

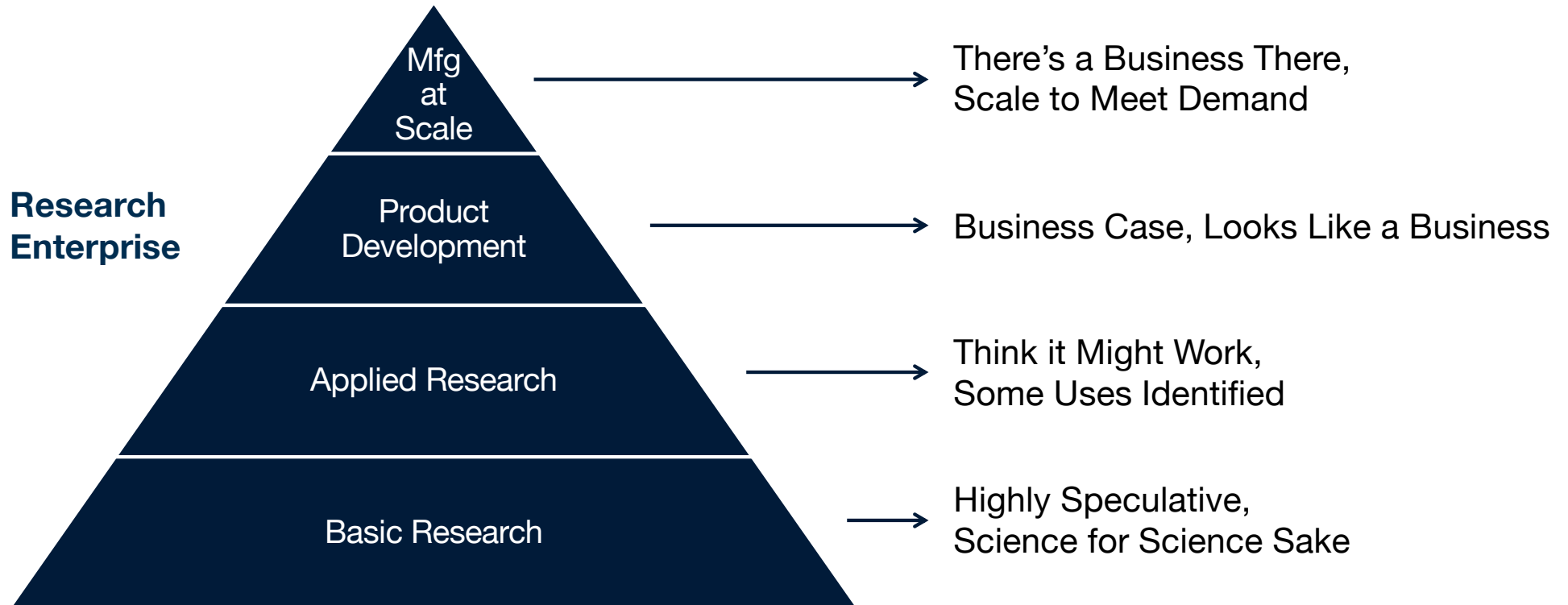
# Disclaimer

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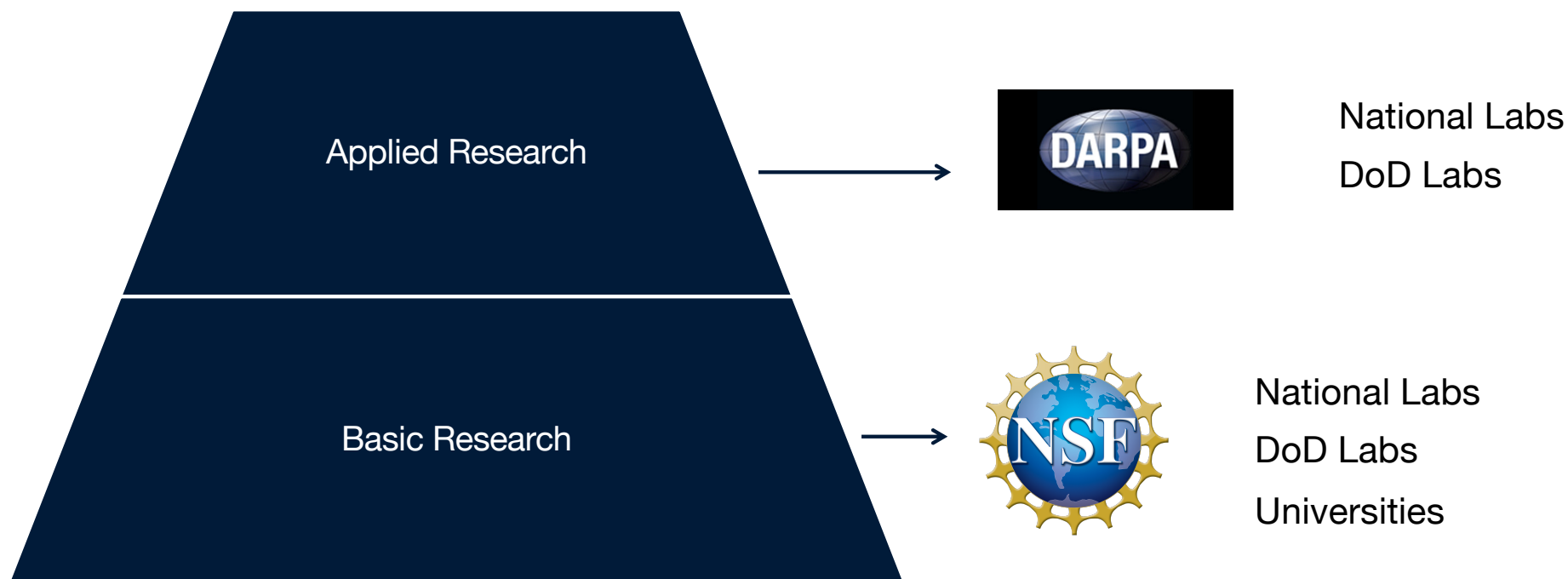
The opinions expressed here are those of Dr. Burger and do not necessarily reflect the positions or policies of the FCC or the current or prior Administrations.

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# From Ideas to Market

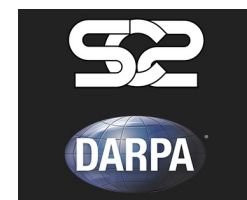
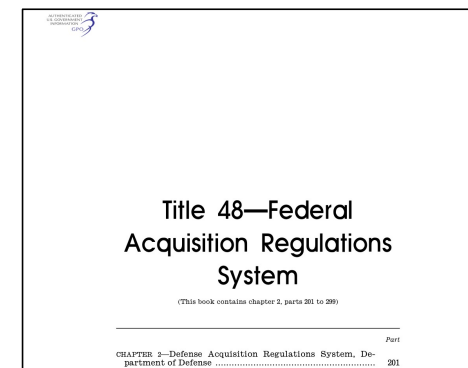
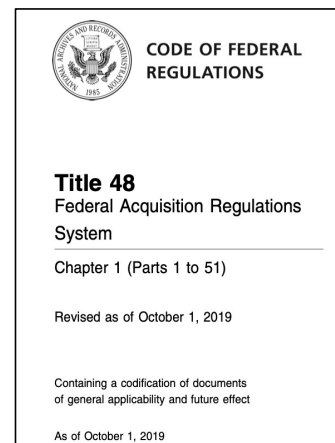
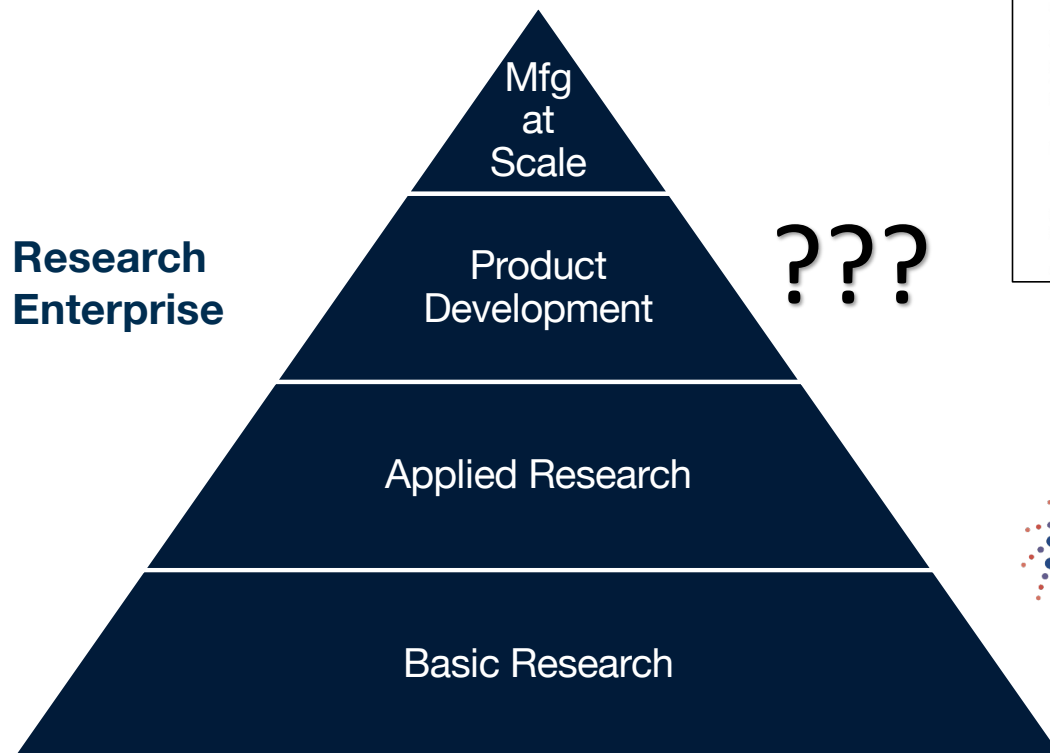


# Direct Government Involvement: Research





# ... to Market



# What We Are Good At

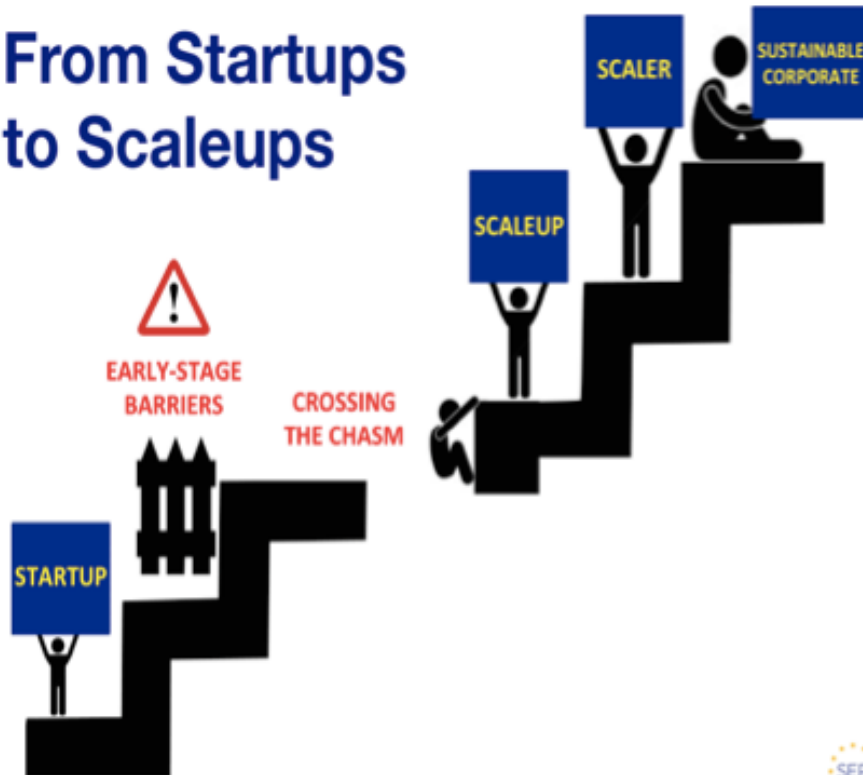


Two American woman athletes giving a hug to another after winning the competition by Jacob Lund from Noun Project

- Basic research leading to new inventions
- Applied research leading to new applications
- Capital markets to fund scaled companies

# Crossing the Chasm

## From Startups to Scaleups



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- Who wants to risk putting critical business functions or sourcing customer-facing products from untested, small companies?
- How does a small company earn the trust of large companies to grow?

# CASE STUDY: 5G MANUFACTURING

# 5G is Critical Infrastructure



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Young woman sitting on her couch working on laptop by Jacob Lund from Noun Project



Benjamin L. Granucci, <http://www.nycaviation.com/2017/08/williamsatc/42944>



<https://www.jems.com/operations/how-everyday-data-improves-ems-and-patient-care/>

# Integrated Manufacturers of 5G Equipment



**HUAWEI**



**ERICSSON**

**ZTE**



**NOKIA**

# Supply Chain Risks



# Government's Answer

PUBLIC LAW 115-232—AUG. 13, 2018

132 STAT. 1917

**SEC. 889. PROHIBITION ON CERTAIN TELECOMMUNICATIONS AND VIDEO SURVEILLANCE SERVICES OR EQUIPMENT.**

41 USC 3901  
note prec.

(a) PROHIBITION ON USE OR PROCUREMENT.—(1) The head of an executive agency may not—

(A) procure or obtain or extend or renew a contract to procure or obtain any equipment, system, or service that uses covered telecommunications equipment or services as a substantial or essential component of any system, or as critical technology as part of any system; or

(B) enter into a contract (or extend or renew a contract) with an entity that uses any equipment, system, or service that uses covered telecommunications equipment or services as a substantial or essential component of any system, or as critical technology as part of any system.

(2) Nothing in paragraph (1) shall be construed to—

(A) prohibit the head of an executive agency from procuring with an entity to provide a service that connects to the facilities of a third-party, such as backhaul, roaming, or interconnection arrangements; or

(B) cover telecommunications equipment that cannot route or redirect user data traffic or permit visibility into any user data or packets that such equipment transmits or otherwise handles.

(b) PROHIBITION ON LOAN AND GRANT FUNDS.—(1) The head of an executive agency may not obligate or expend loan or grant funds to procure or obtain, extend or renew a contract to procure or obtain, or enter into a contract (or extend or renew a contract) to procure or obtain the equipment, services, or systems described in subsection (a).

Federal Communications Commission

FCC 20-176

Before the  
Federal Communications Commission  
Washington, D.C. 20554

In the Matter of )  
)  
Protecting Against National Security Threats to the ) WC Docket No. 18-89  
Communications Supply Chain Through FCC )  
Programs )

**SECOND REPORT AND ORDER**

**Adopted: December 10, 2020**

**Released: December 11, 2020**

By the Commission: Chairman Pai and Commissioners O’Rielly, Carr, Rosenworcel, and Starks issuing separate statements.

**TABLE OF CONTENTS**

I. INTRODUCTION .....	1
II. BACKGROUND .....	2
III. REPORT AND ORDER.....	16
A. Requirement to Remove and Replace Covered Equipment and Services .....	17
1. Entities Required to Remove and Replace Covered Equipment and Services.....	19
2. Equipment and Services Requiring Removal and Replacement .....	32



## If Not Huawei or ZTE, Then Who?



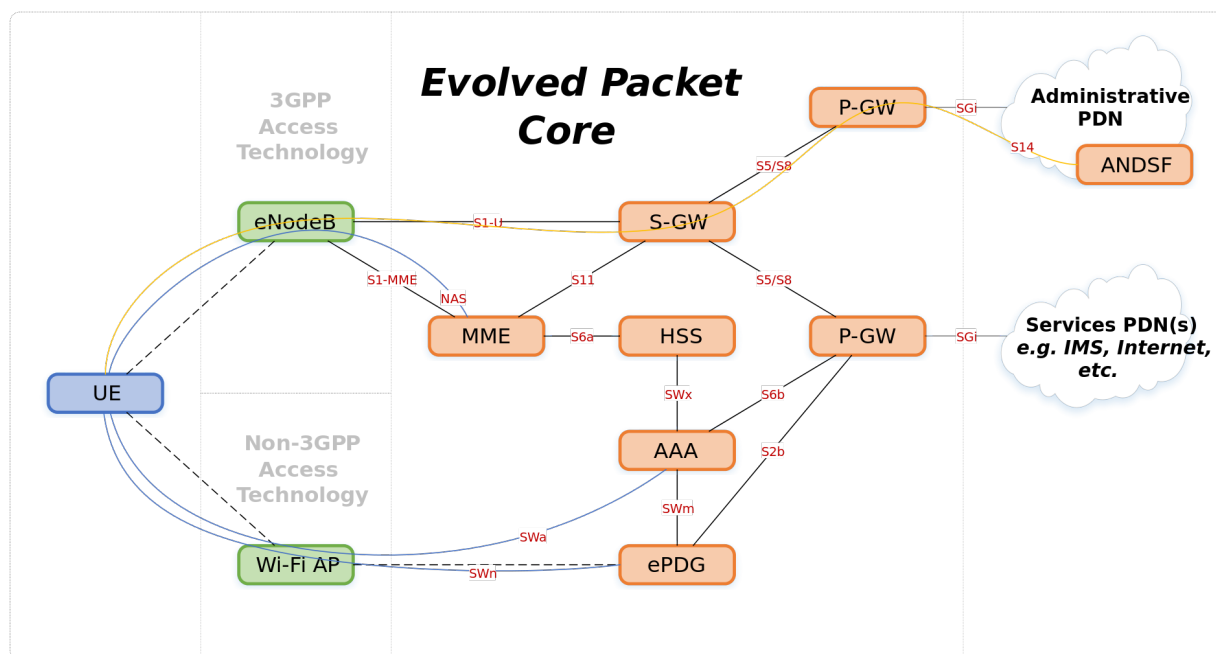
**NOKIA**

## Was Innovation Elsewhere?

- Underlying technology for 5G invented in U.S.
  - Beamforming
  - HF used to be 300 MHz. Today it's over 30 GHz.
  - Thought to be only useful for science (Earth observation); U.S. ingenuity showed it to be useful for communications
- But...
  - Commercialization happened in China, Finland, Korea
  - Where are the U.S. companies?

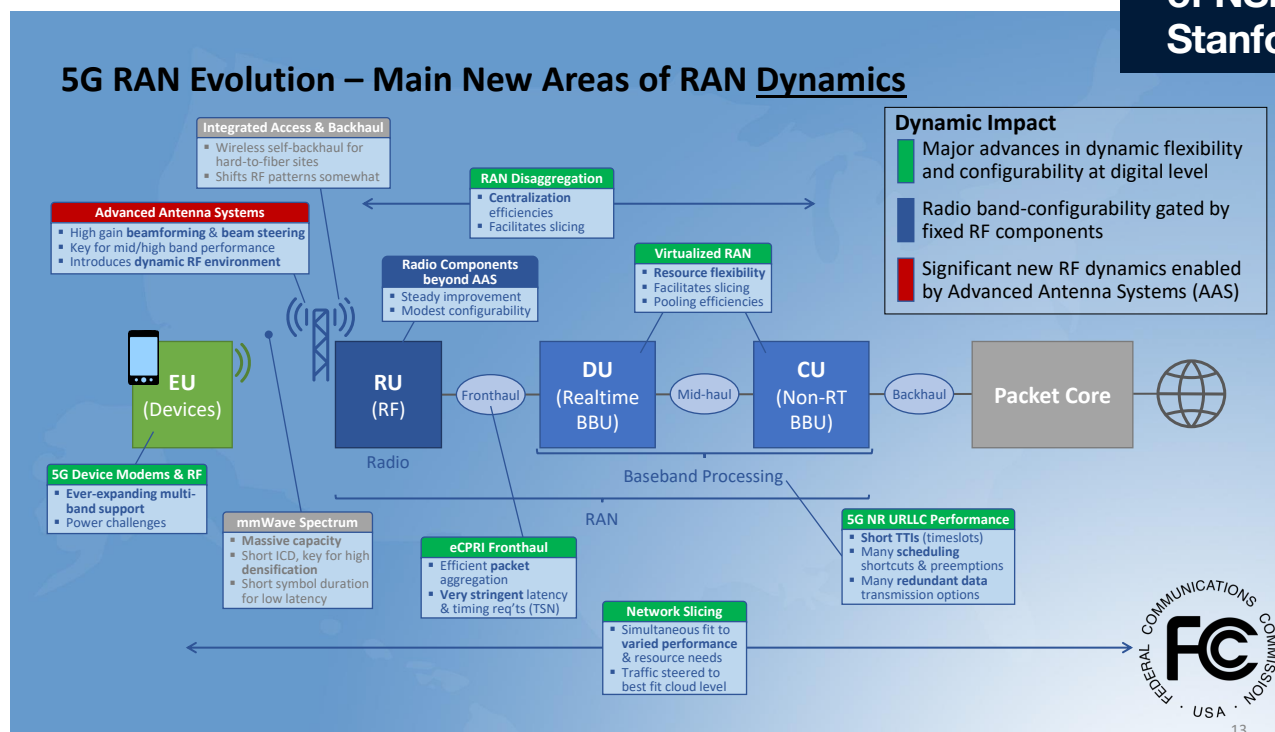
Is this where government steps in and imposes an industrial policy on the private sector?

# 3GPP Wireless Network End-to-End Architecture



# What is a 5G Radio Access Network?

Disaggregation courtesy  
of NSF-sponsored  
Stanford research



# What Is the Role of Government Here?

1   **SECTION 1. SHORT TITLE.**

2       This Act may be cited as the “Utilizing Strategic Al-  
3    lied Telecommunications Act of 2020” or the “USA Tele-  
4    communications Act”.

5   **SEC. 2. WIRELESS SUPPLY CHAIN INNOVATION GRANT PRO-**  
6                   **GRAM.**

7       (a) IN GENERAL.—From amounts made available  
8    under subsection (d), the Assistant Secretary shall, begin-  
9    ning not later than 18 months after the date of the enact-  
10   ment of this Act, make grants on a competitive basis to  
11   support the deployment and use of Open RAN 5G Net-  
12   works throughout the United States by—

13           (1) promoting the use of technology, including

## What Did the Government Do?

- Explained the threat to the U.S. private sector
- Explained the threat to the international community
- Became a cheerleader for the Open RAN *concept*
- Encouraged legislation that promoted the Open RAN concept
- Spending real money to move 5G technology and applications to market
  - \$650MM by DoD for 5G test beds

# DoD 5G Test Beds



VIRIN: 100414-N-ZZ999-001Y

VIRIN: 200321-D-LU733-002



VIRIN: 131212-A-NC823-192



IRIN: 120314-M-HA146-077



# What About that Chasm I opened with



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Long way from here to here!

# How Do We Help U.S. Companies Get from Hill to Mountain? : NIST



- Model for scaling companies “in the middle”
- Seed and A round worked, widget built, market identified
- Trouble with B round or scaling manufacturing know-how

## Lots of Tools in the Toolbox

- Seeding new technologies: NSF, DARPA, Labs, etc.
- Nurturing new technologies: SBIR, DARPA, AFWERX, In-Q-Tel, etc.
- Growing new technologies: DoD, Federal Procurement
- Growing companies: DoC/NIST, etc.

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# QUESTIONS