

This presentation runs on its own.

No user intervention is needed.

This presentation is designed to inspire the direction of major

Internal Research Funding

to seed a

Bold New Mission for LANL

Created by

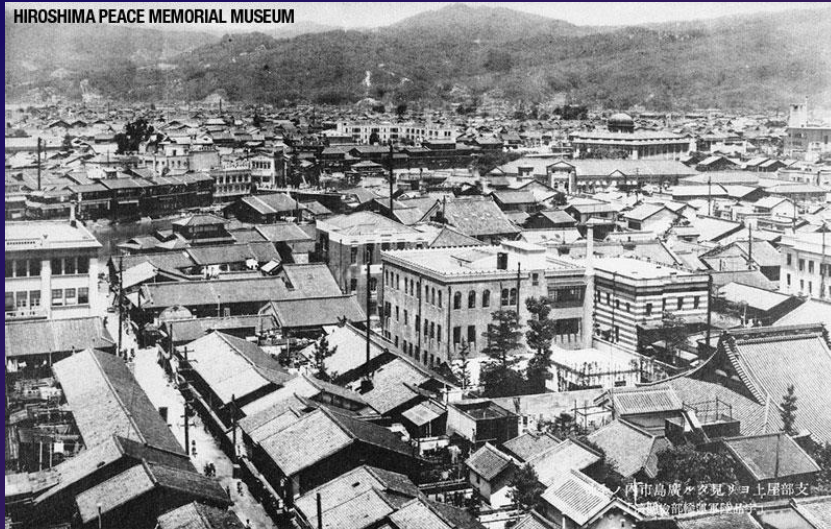
Scott R. Runnels, Ph.D.

Randy Bos, Ph.D.

Los Alamos National Laboratory

**The average American believes
there is no use in planning cities
to resist a nuclear attack.**

But this:



Hiroshima, before the atomic bomb

is not the same as this:



Midtown Manhattan

And this:



is not the same as this:



**Contrary to what the public
thinks, a nuclear attack can be
managed to reduce casualties.**

**But LANL's passiveness has
implied that there is no hope.**

**If only the public knew, they
would urge us to begin...**

Using Computer Simulation to Plan

Time = 59.00

The Nuke-Resistant City

Tracer_1
2.00e-03
1.50e-03
1.00e-03
5.00e-04
0.00e+00

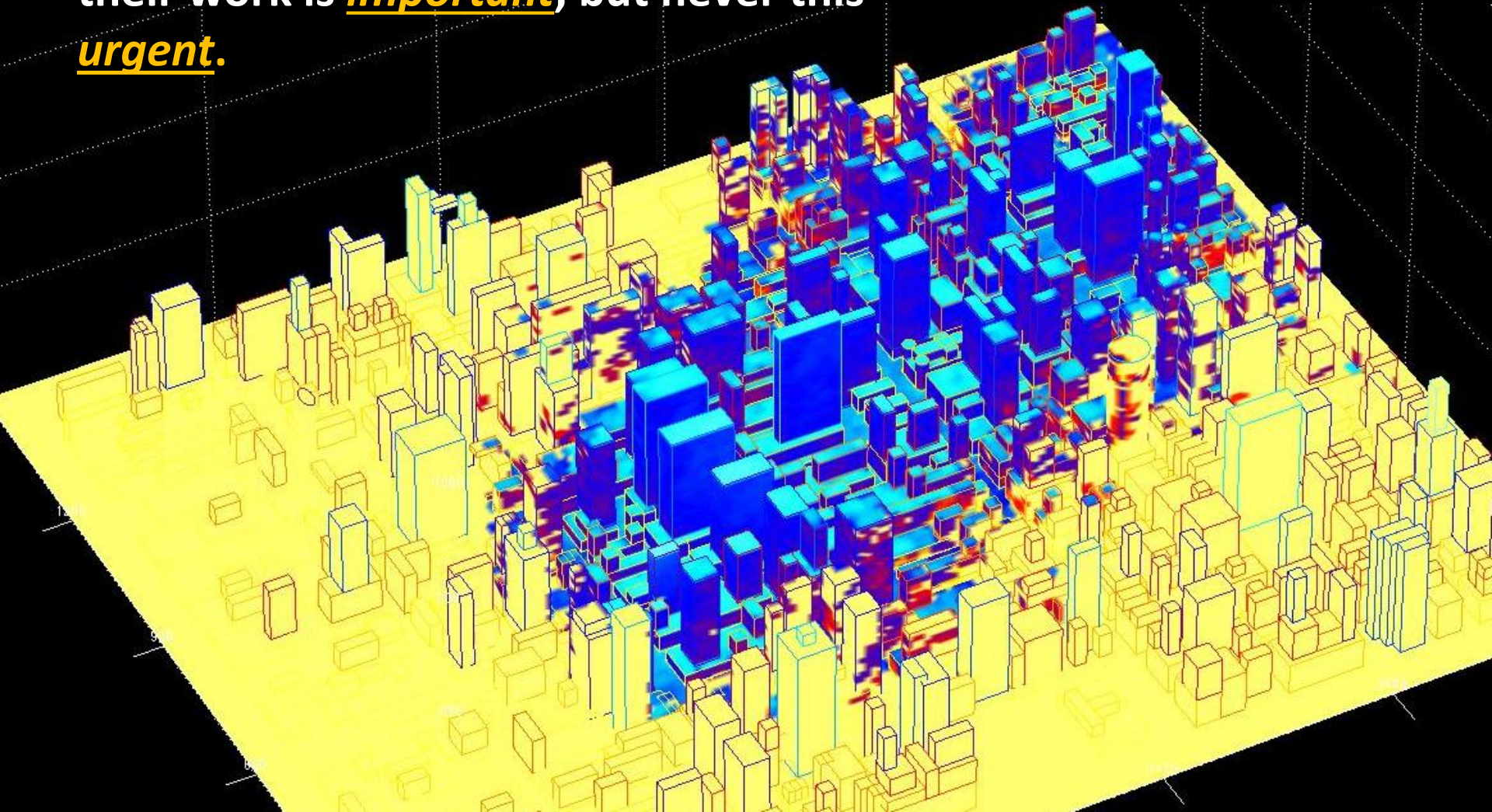
Tracer_2
2.00e-03
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1.00e-03
5.00e-04
-1.00e+04

Los Alamos National Laboratory

“The World’s Greatest Science Protecting America”

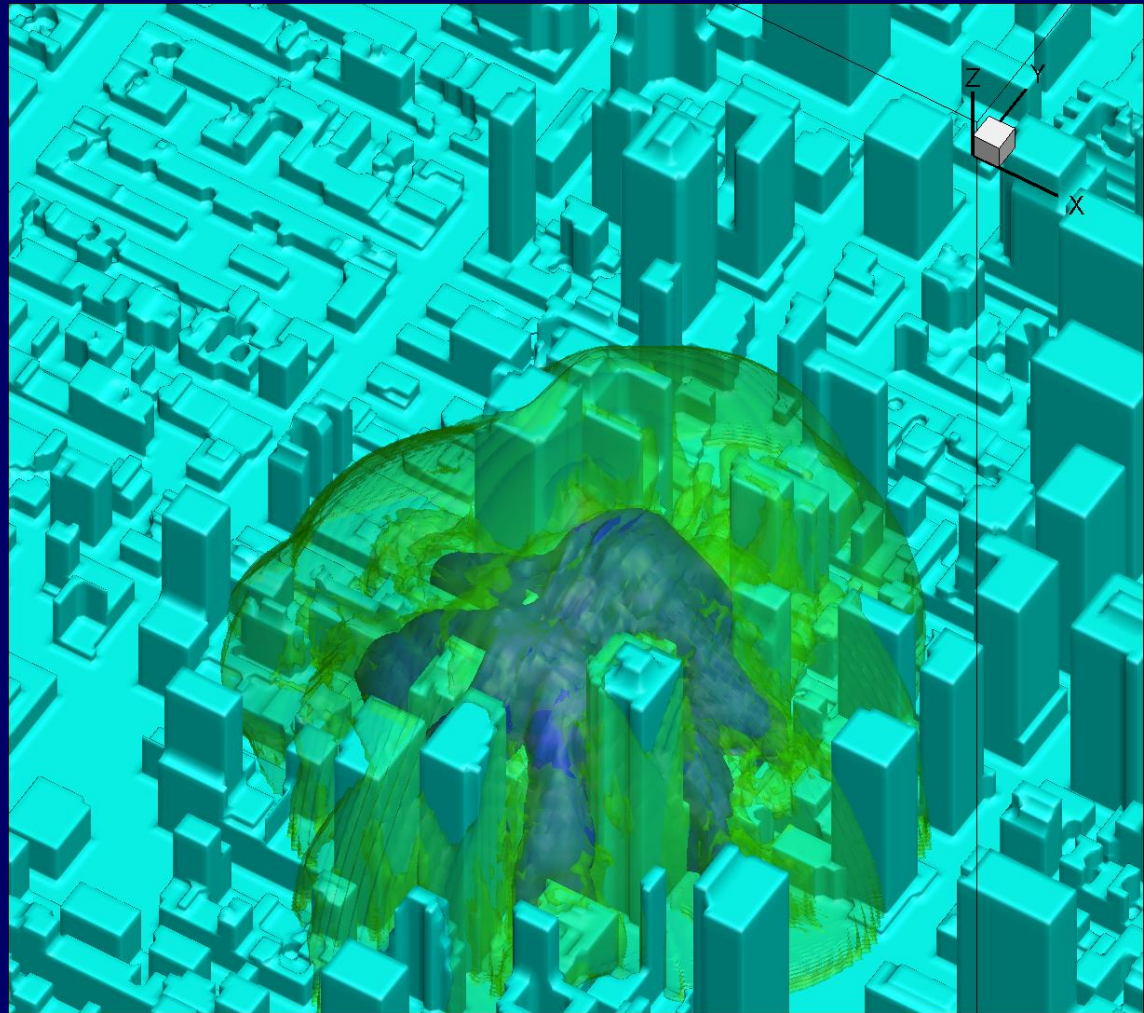
Seldom does science play a role of such importance and urgency.

Scientists are accustomed to thinking their work is important, but never this urgent.



The last time **importance** and **urgency** descended simultaneously in this way on science was the **Manhattan Project**.

It has descended again.



**The time is now to focus efforts on helping cities
prepare. And, in so doing...**

Save lives

Advance scientific understanding

**Secure the role of LANL and science
in the US for the next 50 years**

The Less Powerful Fission Bomb

of Hiroshima and Nagasaki

The massively destructive

Thermonuclear Bomb
of the Cold War

The policy of

**Mutually Assured
Destruction**

which kept the Cold War **cold**.

The strong possibility of a

Terrorist/Rogue Attack

The Less Powerful Fission Bomb

Thermonuclear Bomb

Mutually Assured Destruction

In the mind of the average American, these issues are **confused** and **mixed with disturbing images**, resulting in

Terrorist/Rogue Attack

The Less Powerful Fission Bomb

Thermonuclear Bomb

**Mutually Assured
Destruction**

DENIAL

Terrorist/Rogue Attack

The Less Powerful Fission Bomb

Thermonuclear Bomb

**Mutually Assured
Destruction**

**Unnecessary
Fear**

Terrorist/Rogue Attack

The Less Powerful Fission Bomb

Thermonuclear Bomb

**Mutually Assured
Destruction**

**POOR
PLANNING**

Terrorist/Rogue Attack

The Less Powerful Fission Bomb

Thermonuclear Bomb

**Mutually Assured
Destruction**

It is our responsibility
to tell the people
that...

Terrorist/Rogue Attack

The Less Powerful Fission Bomb

in a

~~Thermonuclear Bomb~~
...is manageable.

~~Mutually Assured
Destruction~~

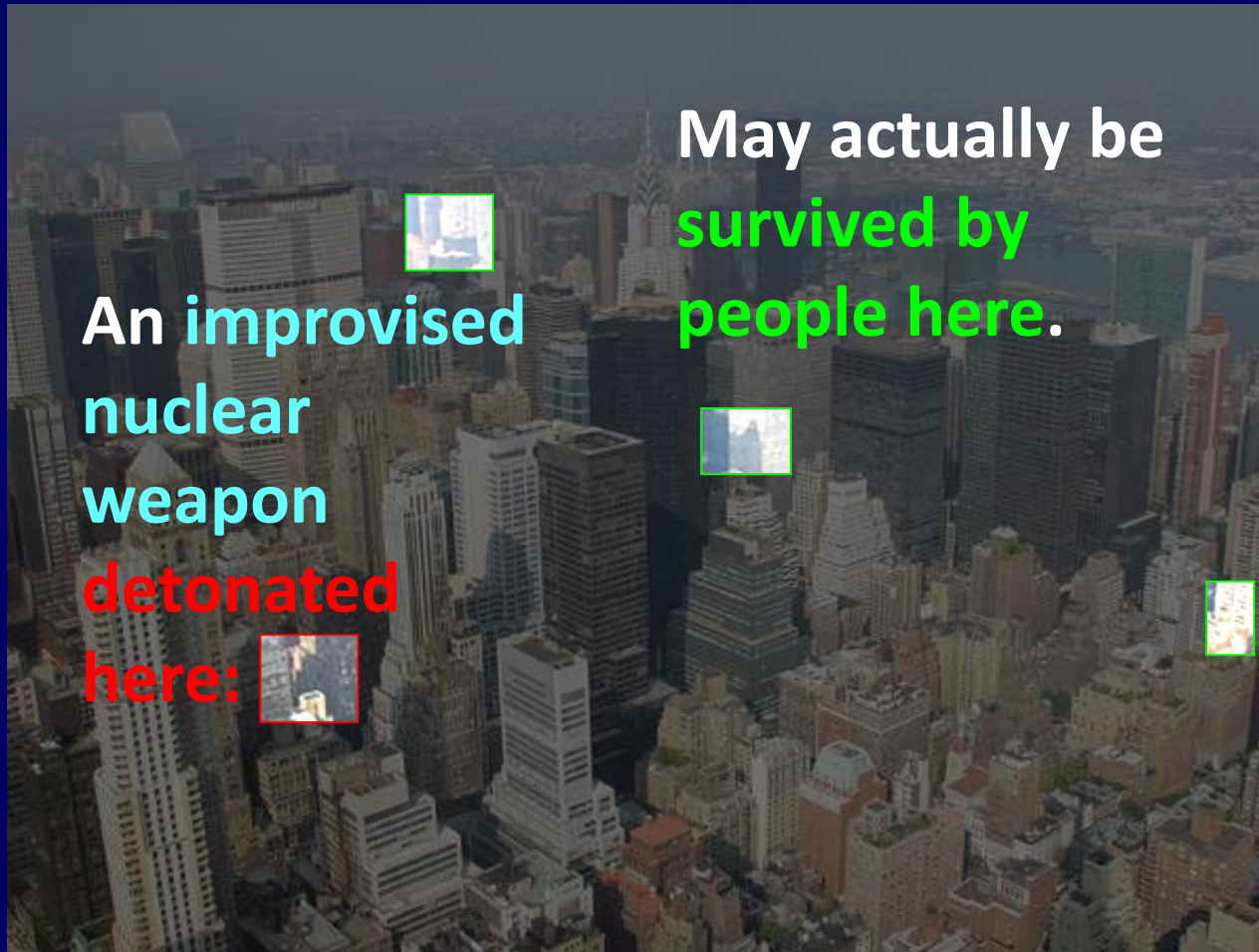
It is our responsibility
to tell the people
that...

There is hope.
Our new threat...

Terrorist/Rogue Attack

But we must prepare.

We must tell the people that



**An improvised
nuclear
weapon
detonated
here:**

**May actually be
survived by
people here.**

We must tell the people that

The Threat We Actually Face

can be managed to greatly reduce casualties

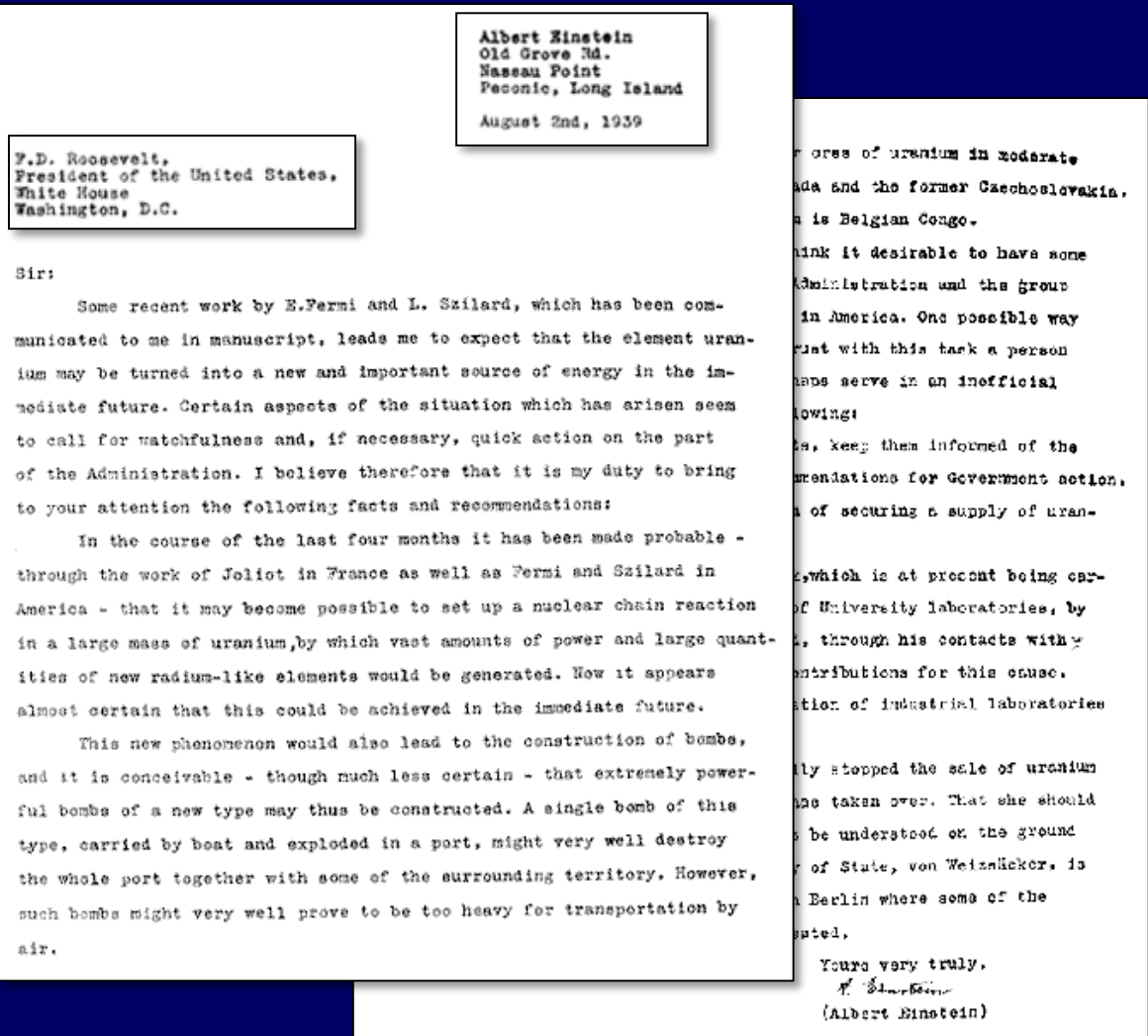
Scientists have swayed the government before.



Einstein and Szilard

Scientists have swayed the government before.

It took
a great name
and initiative
to get the
government's
attention.



It took
a great name
and initiative
to get the
government's
attention.

We have
the name.



We must take
the initiative.

And so, this message will hopefully do more than inspire the use of internal research and development funding at LANL.

It will hopefully...

Inspire LANL staff to become involved in this bold new mission.

Lead to technical work that helps the government fund these life-saving measures.

What we Propose

Use LANL

Internal Research and Development funding
to create information and technology
that demonstrates to the
government there is hope
and that more needs to be done.

The
information and technology
will emerge from a
Computational and Experimental Program
that will eventually grow under government
funding.

We will Deliver

Models will provide predictions of all the consequences of a nuclear attack for any point in any major US city.

High-Fidelity Integrated Models

Physics Sub-Models

Human Effects Models

Experimental Data

Experimental Data



Massive integrated computations



Validated by massive experimental program

The high-fidelity models will be used in advance to validate simpler fast-running models for use on the scene.

Laptop Nuclear Effects
Advising Software



Run on the scene

High-Fidelity Integrated
Models



Massive integrated
computations

Physics
Sub-Models

Human Effects
Models

Experimental
Data

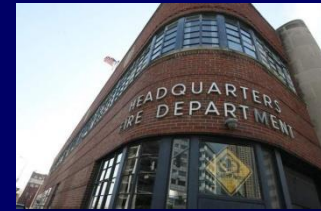
Experimental
Data



Validated by massive
experimental
program

It will answer

Laptop Nuclear Effects
Advising Software



Run on the scene

High-Fidelity Integrated
Models



Massive integrated
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Physics
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Experimental
Data



Validated by massive
experimental
program

Who is still alive?
Who should move, who should shelter in place?
How are the utilities and subways?
What's next?



**Laptop Nuclear Effects
Advising Software**



Run on the scene



**High-Fidelity Integrated
Models**



Massive integrated
computations



**Physics
Sub-Models**



**Human Effects
Models**



**Experimental
Data**



**Experimental
Data**

**LANL-
Communication
system will
provide real-
time updates to
adjust models.**



Validated by massive
experimental
program

Who is still alive?
Who should move, who should shelter in place?
How are the utilities and subways?
What's next?



**Laptop Nuclear Effects
Advising Software**



Run on the scene



**High-Fidelity Integrated
Models**



Massive integrated
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**Physics
Sub-Models**



**Human Effects
Models**



**Experimental
Data**



**Experimental
Data**

**LANL
Com. System**

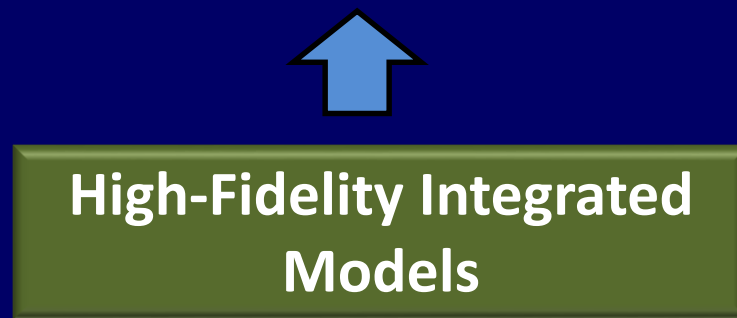


Real-time
data updates
model



Validated by massive
experimental
program

The high-fidelity models will also help cities plan in advance.



Validated by massive experimental program



Massive integrated computations

How many first responders might we need?
What should we train them to do?
What special equipment will they need?
What building codes need to change?

Comprehensive Planning Document

High-Fidelity Integrated Models

Physics Sub-Models

Human Effects Models

Experimental Data

Experimental Data



Validated by massive experimental program



Massive integrated computations

This endeavor will save lives through the application of

Broad Scientific Disciplines

in a tightly integrated effort.

How many first responders might we need?
What should we train them to do?
What special equipment will they need?
What building codes need to change?

Comprehensive Planning Document

High-Fidelity Integrated Models

Physics Sub-Models

Human Effects Models

Experimental Data

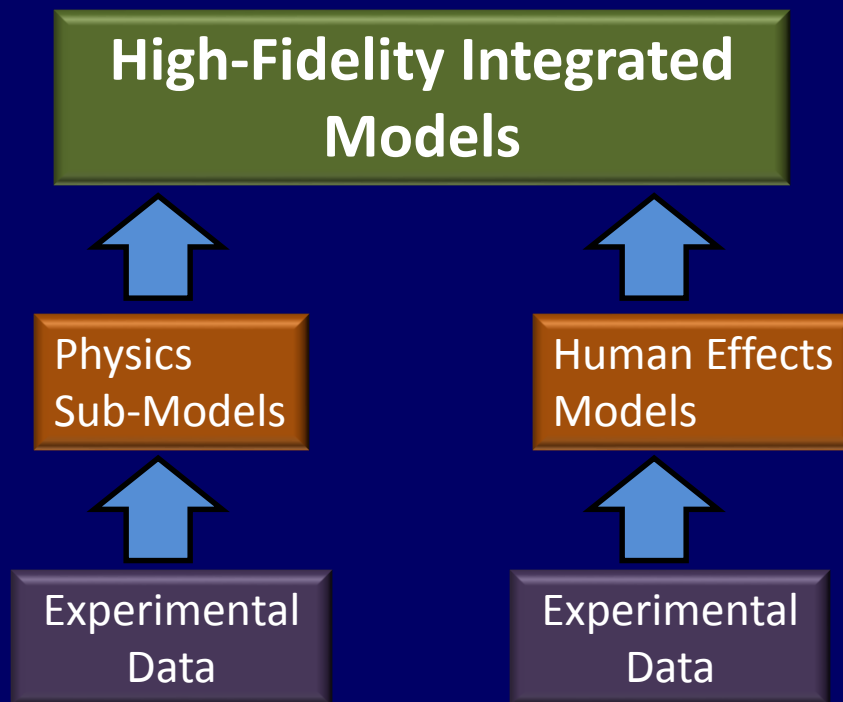
Experimental Data



Validated by massive experimental program



Massive integrated computations



Physics Sub-Models

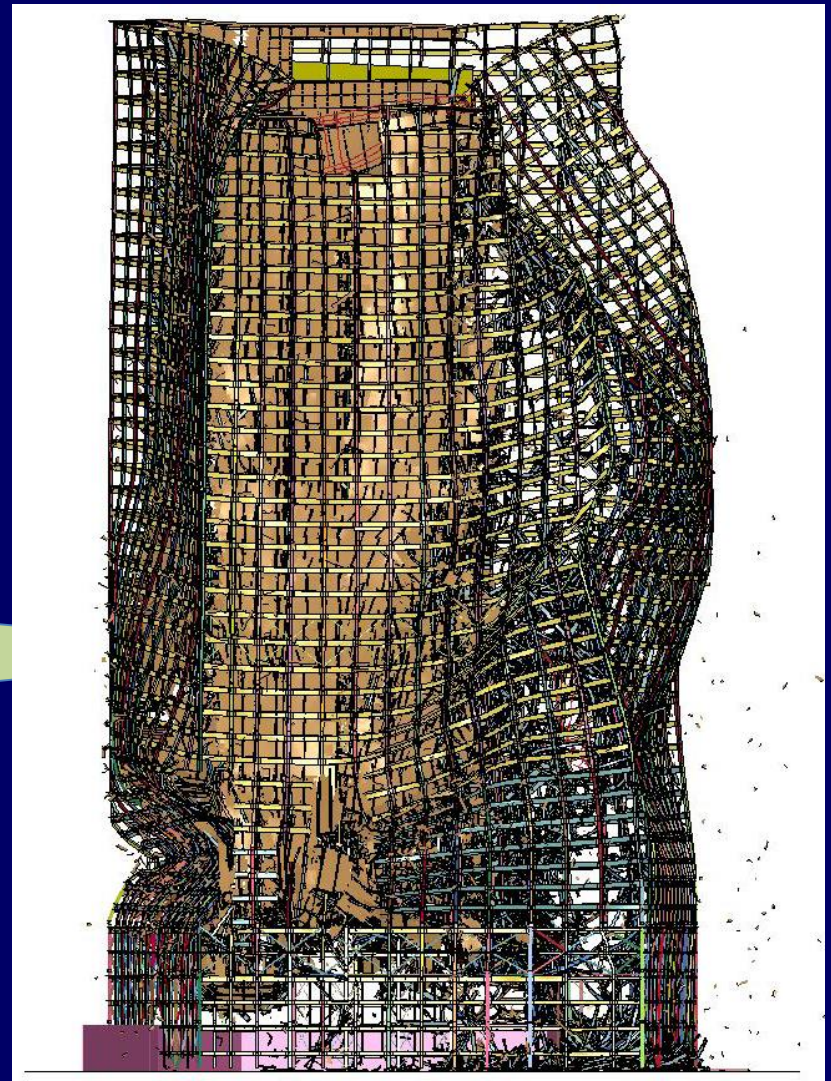
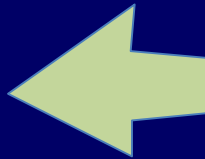
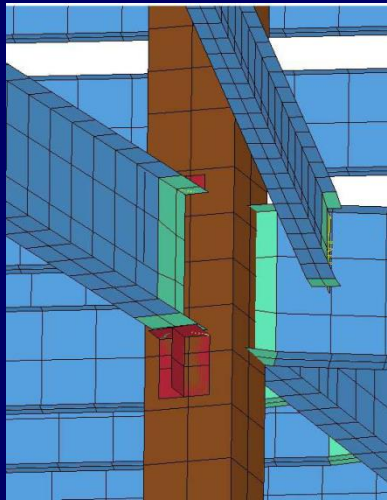
Modeling the impact of a nuclear detonation on a city is a daunting challenge.

But it is doable.



Physics Sub-Models

We can form highly detailed models for individual buildings...



911 Collapse as viewed from the South

Physics Sub-Models

And we can even
model multiple types
of buildings...

We know how
to model
physics such as
blast waves and
nuclear
radiation...



Physics Sub-Models

But we cannot do
that for every
building...

Physics Sub-Models

In every city...



Physics Sub-Models

We must think about modeling in new ways.

We must combine multiple geometric scales, forming new kinds of simple models for buildings.



Physics Sub-Models

We must model the
fireball

and the
electromagnetic
pulse



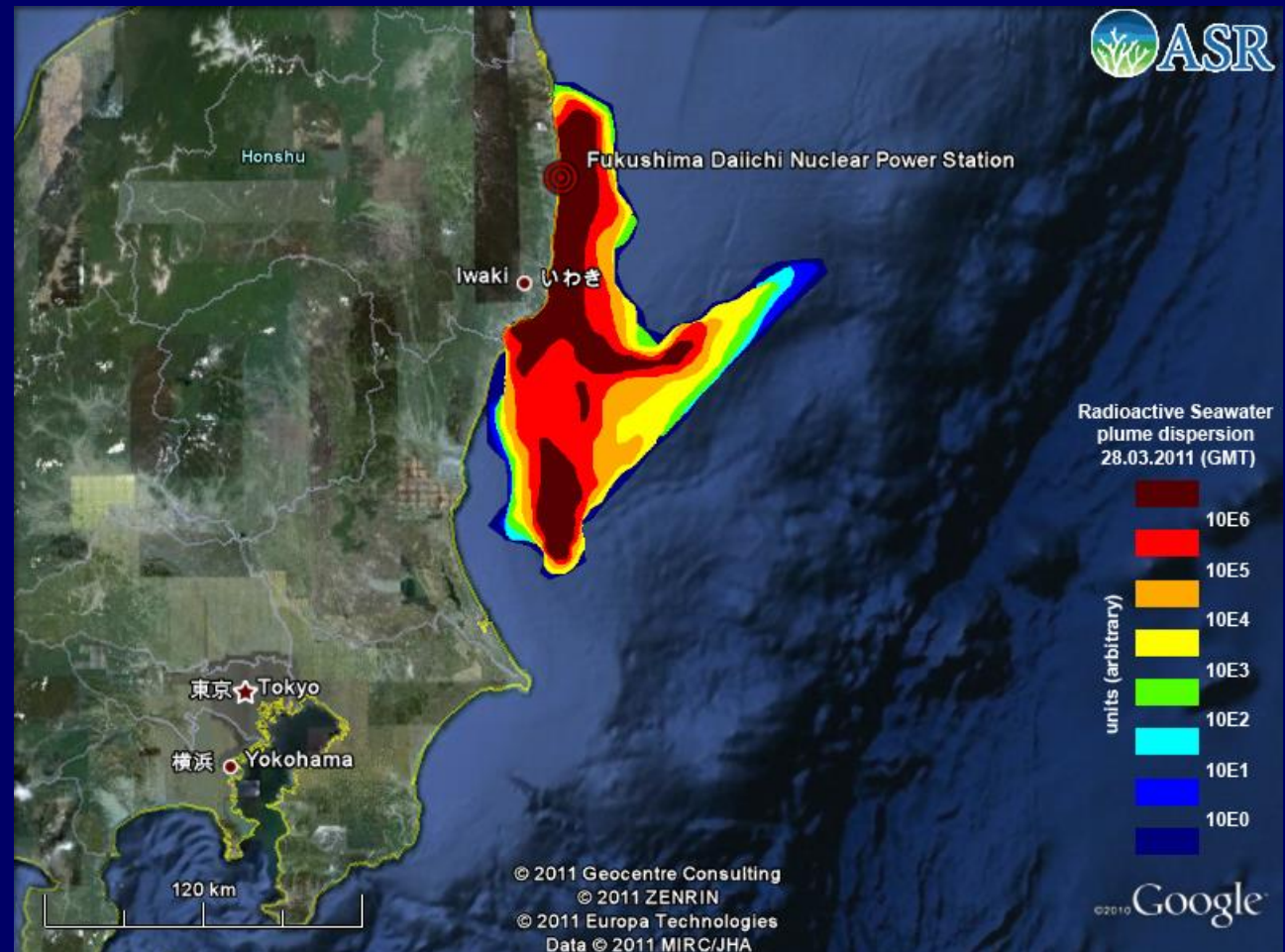
Physics Sub-Models

And the impact on
subways and
underground
utilities.



Physics Sub-Models

As well as
radiation
contamination
transport
through the
atmosphere



Physics

Sub-Models

These models will need massive computational and experimental efforts that will challenge multiple scientific areas.

And we will have to
model...

People

The people who
are paying us
and trusting us
to do the right
thing.



Physics
Sub-Models

Sensor &
Com. System

Experimental
Data

Human Effects
Models

Uniting LANL Behind a Bold New Mission

Helping to transform our funding agencies

**Providing technical leadership for the United
States and the world**

Physics
Sub-Models

Sensor &
Com. System

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Data

Human Effects
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Uniting LANL Behind a Bold New Mission

Helping to transform our funding agencies

**Providing technical leadership for the United
States and the world**

This will not be easy:

Helping to transform our funding agencies

We must integrate our technologies into tangible products (deployable software and real-time communication system).

LANL
Com. System



**Laptop Nuclear Effects
Advising Software**



Run on the scene

Real-time
data updates
model

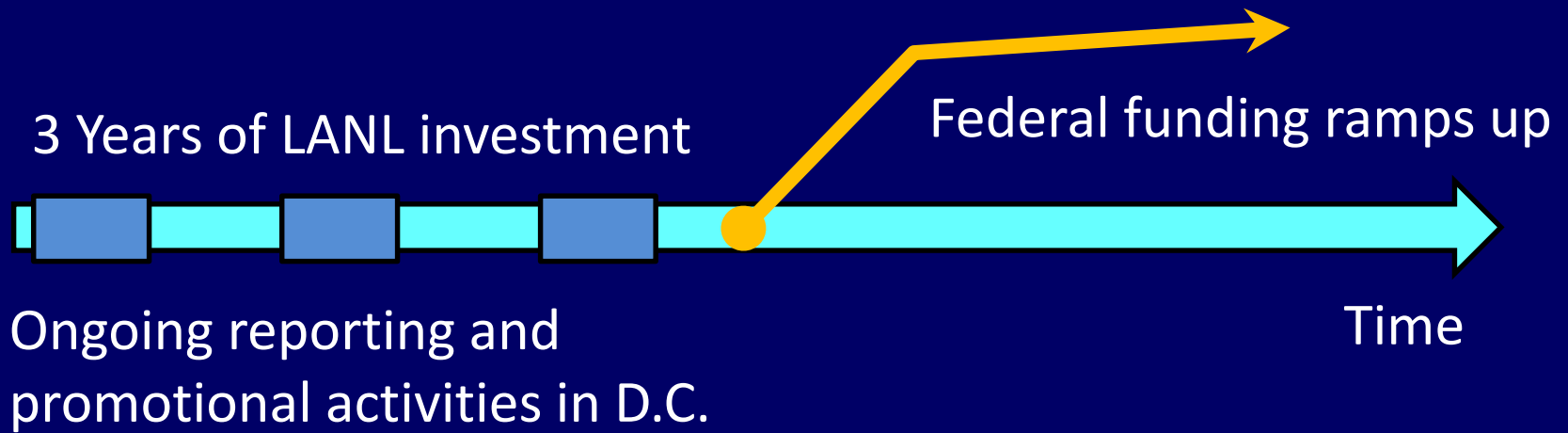


**High-Fidelity Integrated
Models**



Massive integrated
computations

We must combine our efforts with ongoing and organized promotional activities in Washington.



3 Years of LANL investment

This will be our Einstein Letter.

America has a reactive culture.

Rally calls for overpass at dangerous Maryland intersection

On behalf of Palmeiro Law Group posted in [Car Accidents](#) on Monday, October 3, 2011

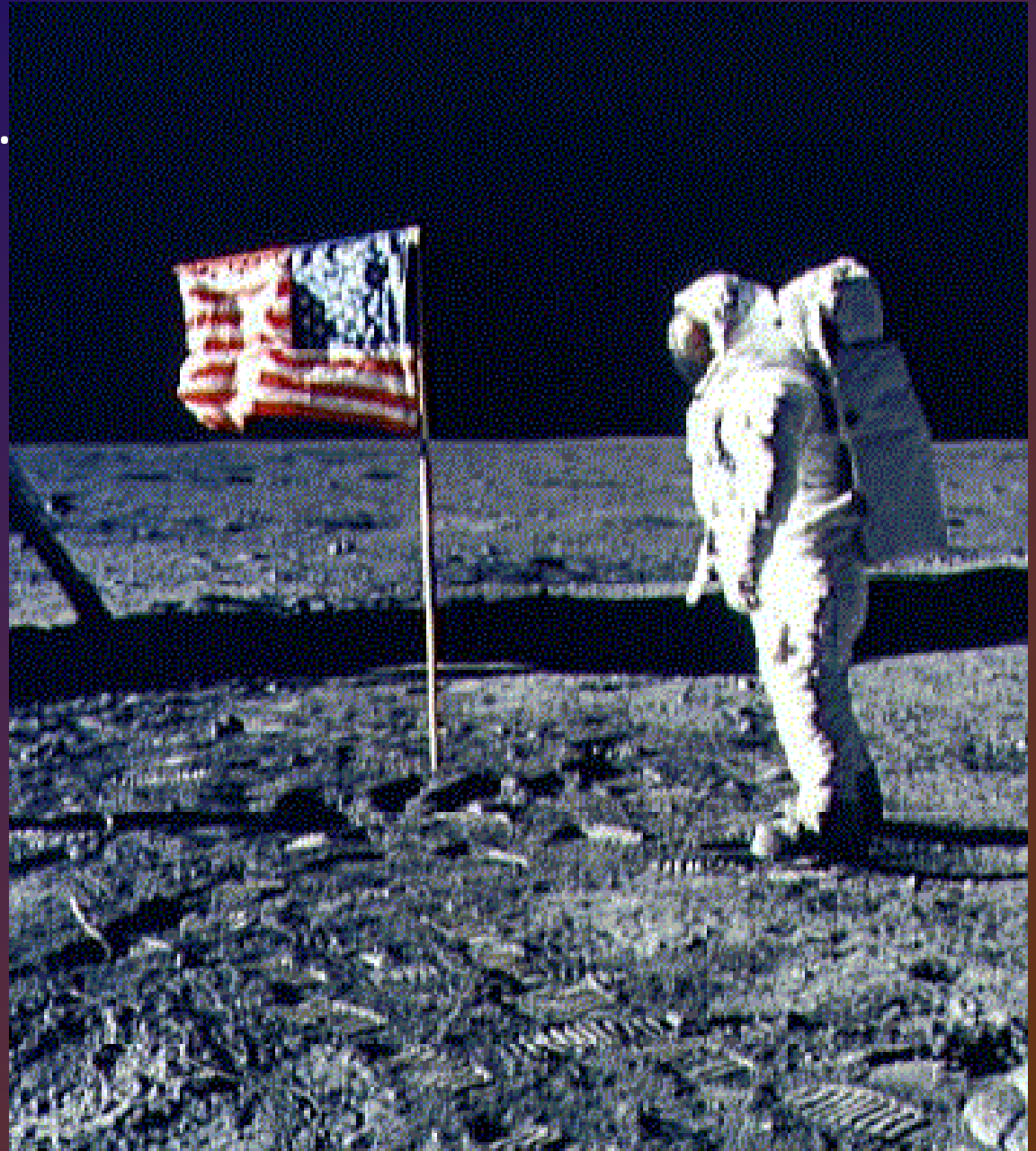
Parents and students rallied last week in Centreville, Maryland, to press the Queen Anne's County Board of Commissioners to fix a dangerous intersection that has been the site of multiple [car accidents](#). The rally was sparked by the death of a 15-year-old boy as he was traveling to school on Sept. 16.

The boy was riding with two other Queen Anne's County High School students on state Route 304 when they were struck by a pickup truck at the highway's intersection with U.S. Route 301. [Five people have died at the intersection since 2005](#), and area residents have complained that the Maryland State Highway Administration's remedy of a J-turn at the intersection is not good enough. Last week's rally was organized by Support an Overpass 4 Students, and many participants held signs that read "301/304 Kills."

One participant asked the county commissioners [why it has taken so long](#) to fix such a dangerous intersection. Commissioners said they agreed with the crowd, but that they could not fix the road because it is a state highway. They encouraged the crowd to take their complaints to the state government in Annapolis.

America has a
reactive culture.

And can react well
when prompted.



But the public prompt isn't always heard.



By **Brian Williams**

Anchor & "Nightly News" managing editor

NBC News

updated 8/28/2006 8:03:20 PM ET

Print | Font: + -

NEW ORLEANS — As Katrina built up steam, the warnings were clear.

This is going to be one of the strongest hurricanes ever to hit the United States, said National Hurricane Center Director Max Mayfield Aug. 28 as the storm approached.

One National Weather Service meteorologist even dispatched a prophetic Katrina bulletin, warning: "Most of the area will be uninhabitable for weeks."

Yet despite that dire of a warning, to a lot of people it seemed as if few in government had been listening.

And there isn't
always a gentle
learning curve...

There were four airplanes that day.



Seldom and powerful are the moments when science prompts a proactive response.



It is time to do so now.

Of what value is science if it does not rise to this challenge?

**The American people have preserved our capabilities
for a time such as this.**

Now we must deliver.

