A Call for Strengthening Defense S&T Collaborations

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Agency for Defense Development

Operational S&T Conference
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Overview of Talk

- ADD Overview
- ROK-US S&T Cooperations

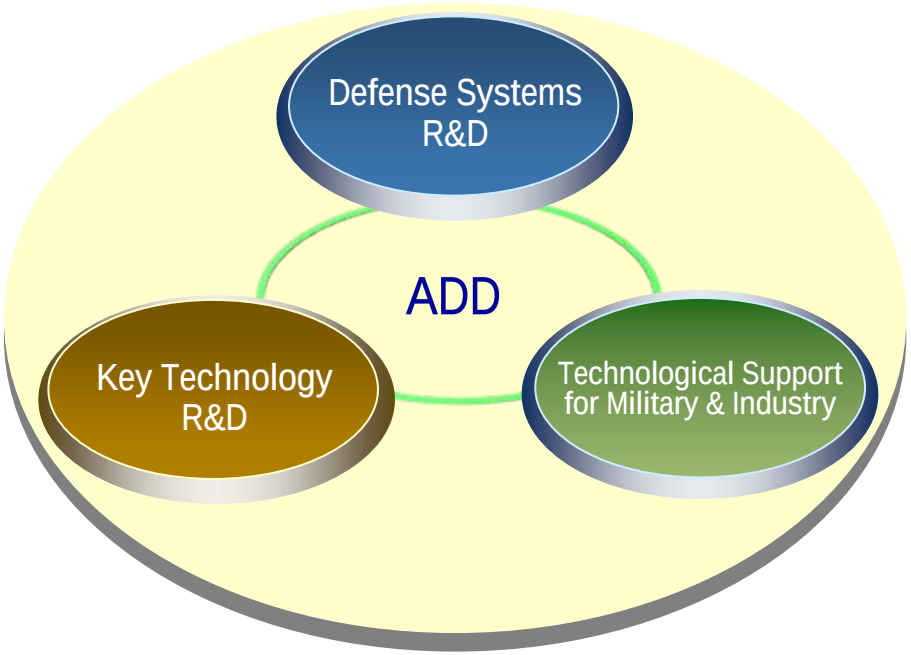
  : Past & Present
- Suggestions for Future
- Conclusions

We have green tea.

We have traditions.

We have mountains.

And we have… ADD



Mission :

Research, Development, Test and Evaluation of weapon systems, equipments and related technologies to reinforce defense capability for self-reliant national defense.

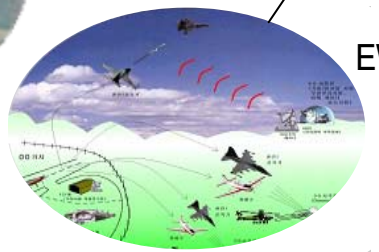
Location

Land : 1,094 Km²
Building : 559

Information/C2 R&D Center

Proving Ground

Aircraft Test Range



EW Test Range

Naval Test Range

Naval R&D Center

Automotive Proving Ground

Gunnery Test Range

Organization

Board of Trustees

MND & DAPA

President

Auditor

Executive V.P.

Directorates

- Policy Planning
- Plans & Programming
- Tech. Cooperation
- Analysis & Evaluation

Centers

- Joint M&S
- E-Information
- Training & Edu.
- Dual-Use Tech.

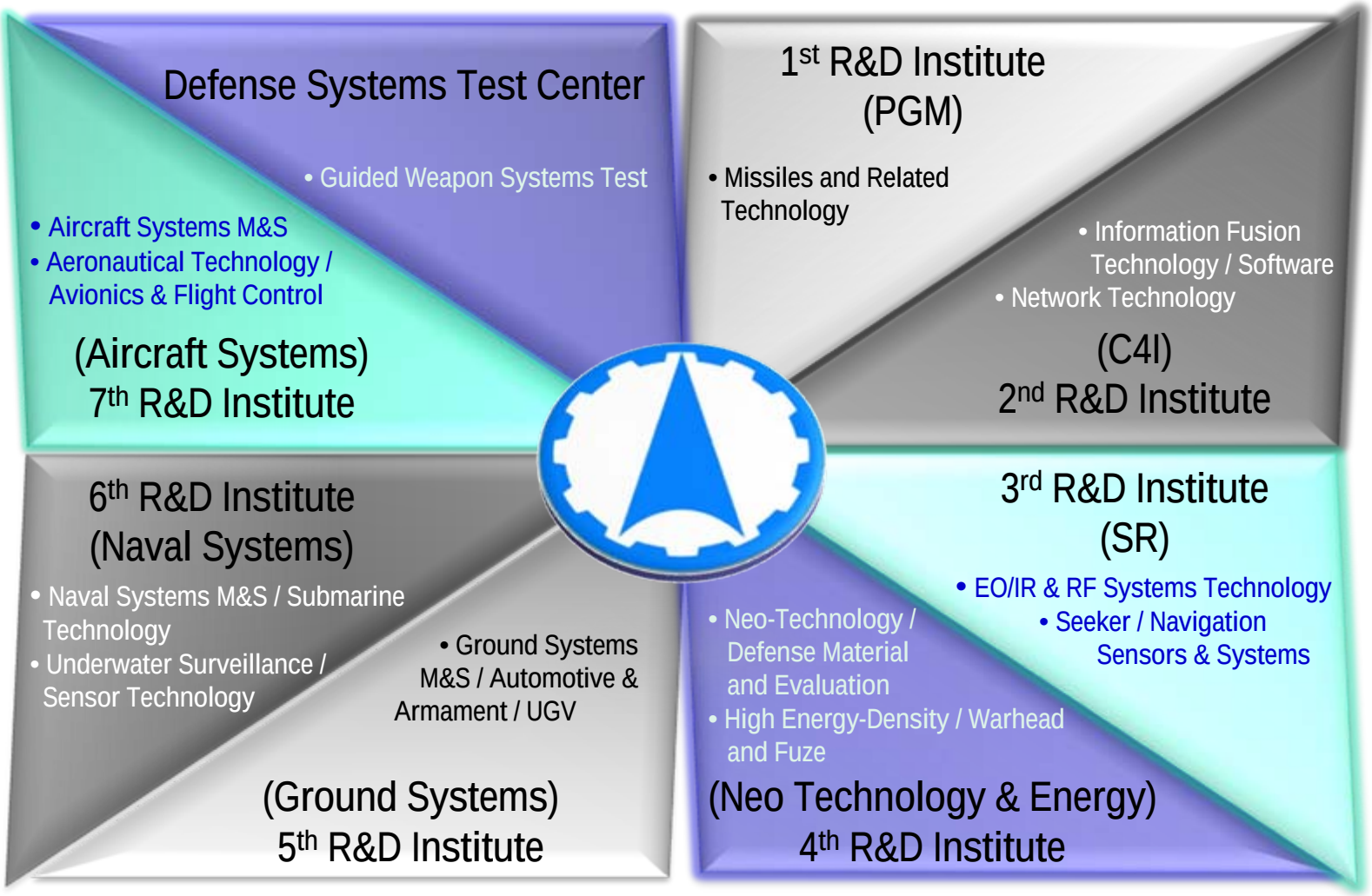
Admin Support & Security

R&D Institutes

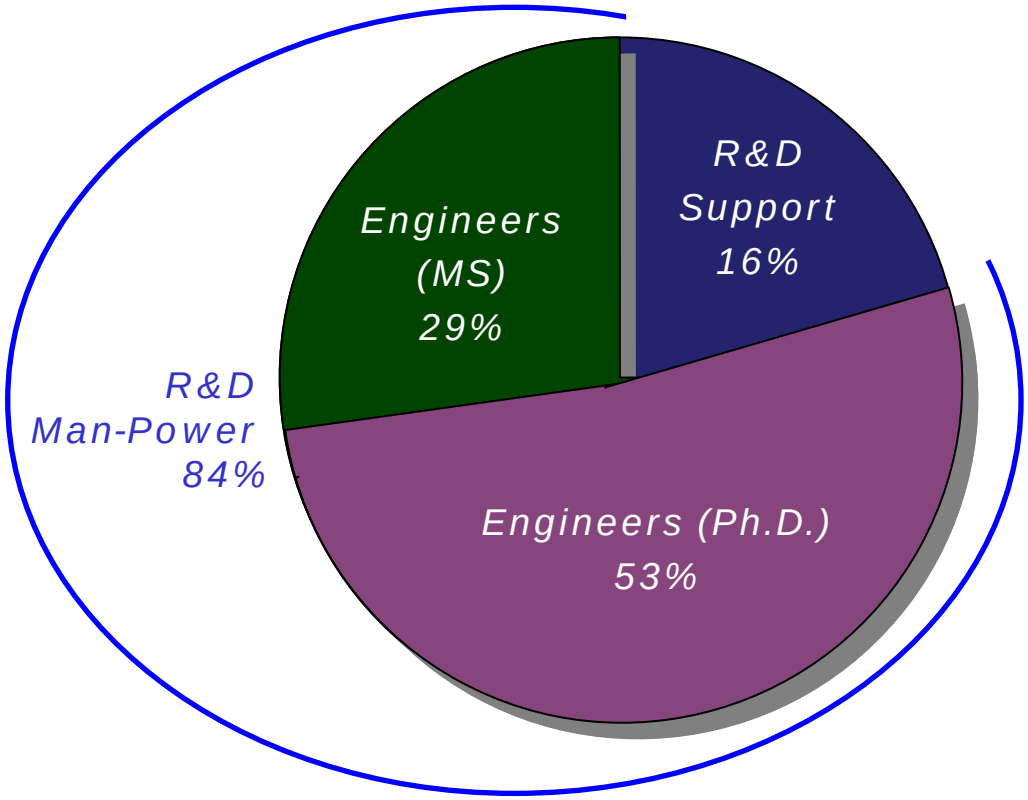
Systems Dev. PEOs

T&E Center

R&D Institutes

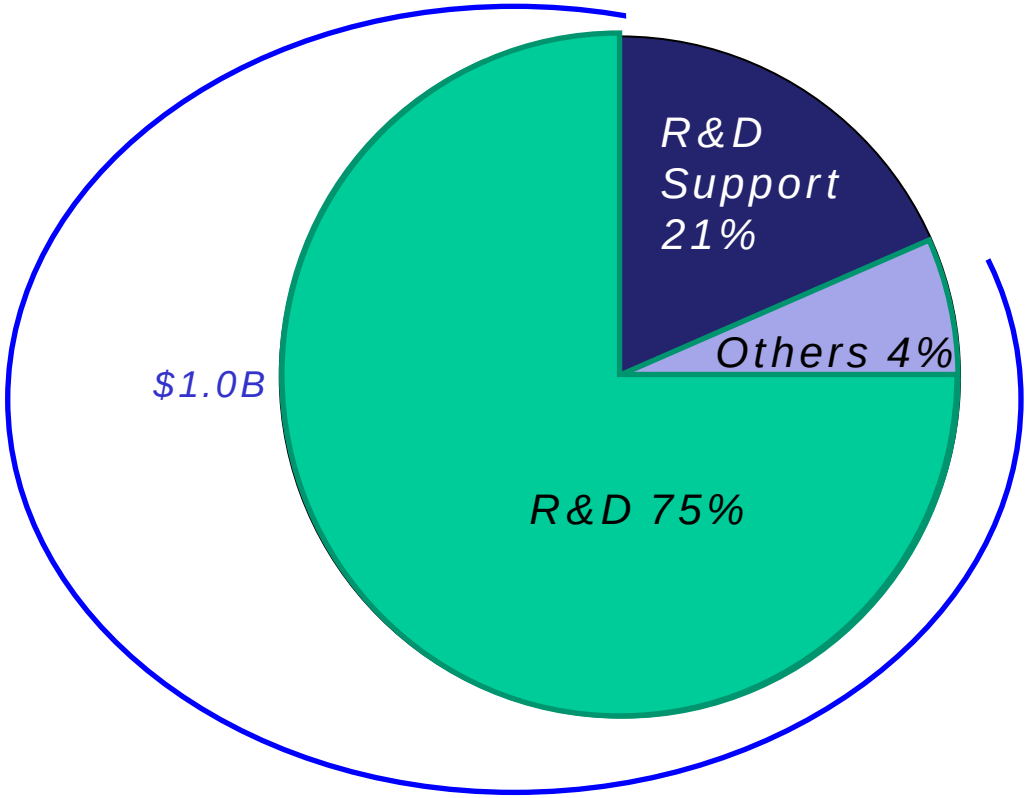


Man Power



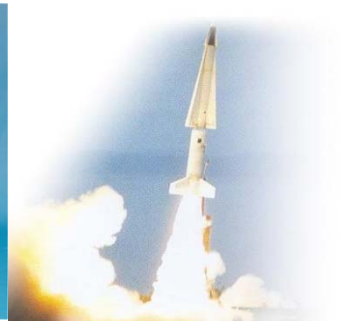
- Employees: 2,522
  - Daejeon: 74%
  - Chinhae: 10%
  - Anheung: 7%
  - Seoul: 5%
  - Changwon: 2%
  - Darakdae: 1.5%
  - Haemi: 0.5%

Budget



- Budget : ~$1.0B
  - R&D : $700M
  - R&D Support : $200M
  - Others : $100M

R&D History



Basic Systems Design and Build
Mortars, Howitzers, Recoilless Rifle, etc.

1970~

Expanding R&D Areas
Missile, Torpedoes, FM/AM Radios, Machine Guns, etc.

1980~

Complex Systems Development
K-9 (Self-Howitzer), KT-1(Basic Trainer Aircraft), Shipboard EW, etc.

1990~

Advanced R&D / Future Technology Build-up
Guided Missile, etc.

2000~

Laboratories

Area	Major Laboratories	56
Gun/Munitions	Warhead, Munitions Test	15
Maritime/Underwater	Underwater Acoustic Test	10
Missile	Guidance Control Test	21
Electronics/Optic	EMI/EMC Test	4
Aviation	Structure, Wind Tunnel Test	6

Structure fatigue test

Wind Tunnel test

EMI/EMC test

Guidance control test

Underwater acoustic

Test Facilities

▲Changwon Proving Ground : Test Track

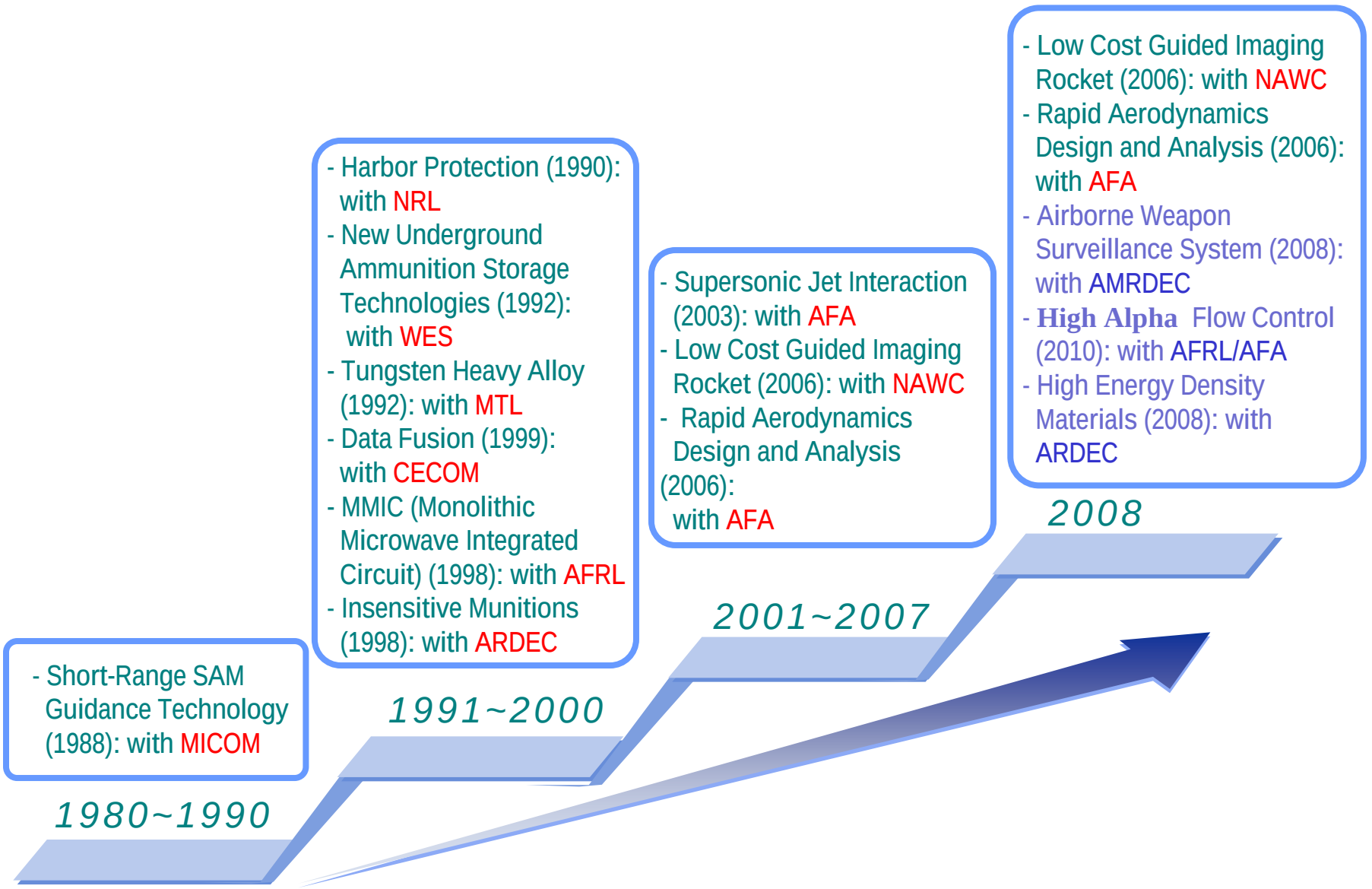
▲An-Heung Low-Temperature Chamber

▲Sled Test

▲Environmental Test (Under Construction)

ROK-US Defense Chiefs Reach Hands

US Labs – ROK(ADD) Joint Programs



US Labs-ADD Cooperative Programs

Collaborative R&D Projects Agreement (PA)

- 2 PA s are active
  - Low Cost Guided Imaging Rocket (LOGIR)
  - Rapid Aerodynamics Design and Analysis (RADA)
- 7 PAs are under discussion
  - Medusa JCTD
  - Airborne Weapon Surveillance System (AWSS) JCTD
  - High Angle-of-Attack Flow Control
  - Synthesis and Formulation Development of Insensitive High Energy Density Materials
  - Soft Recoil Technology
  - Cased Telescoped Ammunition and Gun Technology
  - The Transverse Acoustic Variability Experiment (TAVEX)
- 8 PA s have been completed since 1988

US Labs-ADD Cooperative Programs

Data Exchange Agreement (DEA)

- 27 DEAs are in activity
  - CBR Systems, C4I Systems, Tactical Communication Systems, etc.
- 6 DEAs are under discussion to open
  - Robotics & Unmanned Ground Vehicle (UGV)
  - Future Warrior System
  - Naval Battle Experimentation
  - Radar Target Signature (RTS)
  - Aerodynamics
  - Live Virtual-Constructive (LVC) Integration Technology of Ground Weapon Systems

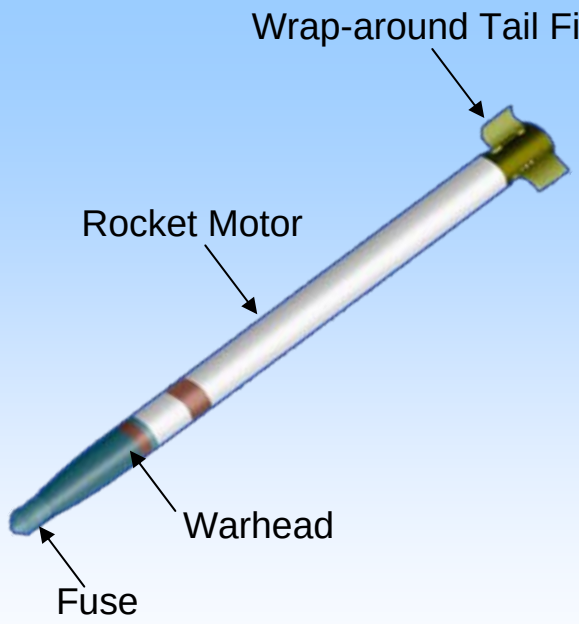
Engineers and Scientists Exchange Program (ESEP)

- 393 Engineers have been exchanged since 1974

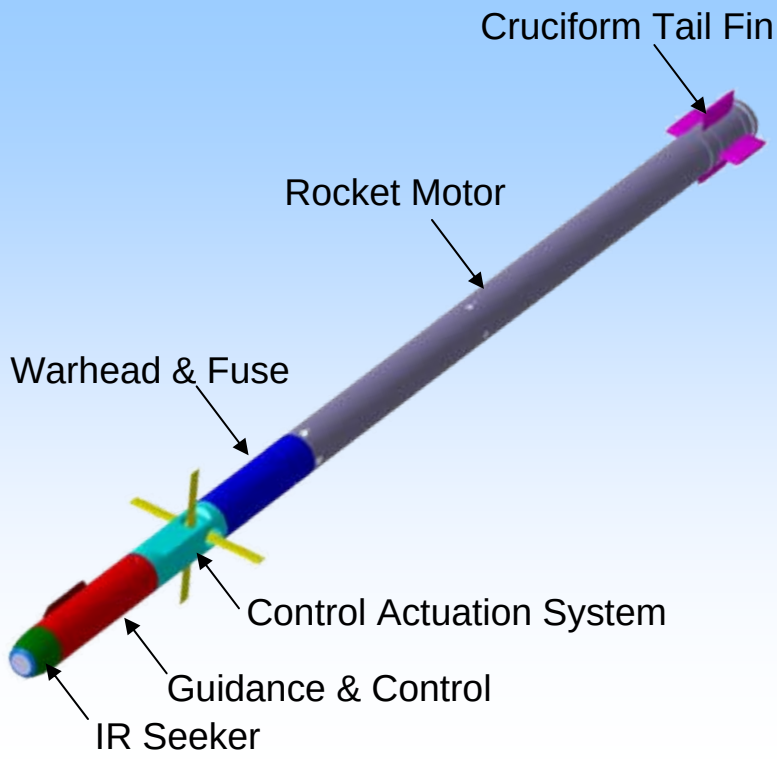
  (269 ADD Engineers and 13 US Engineers are included)

LOGIR S&T MOU

Hydra 70 (2.75-inch Rocket)



LOGIR (2.75-inch Guided Rocket)



Operational Concept of LOGIR

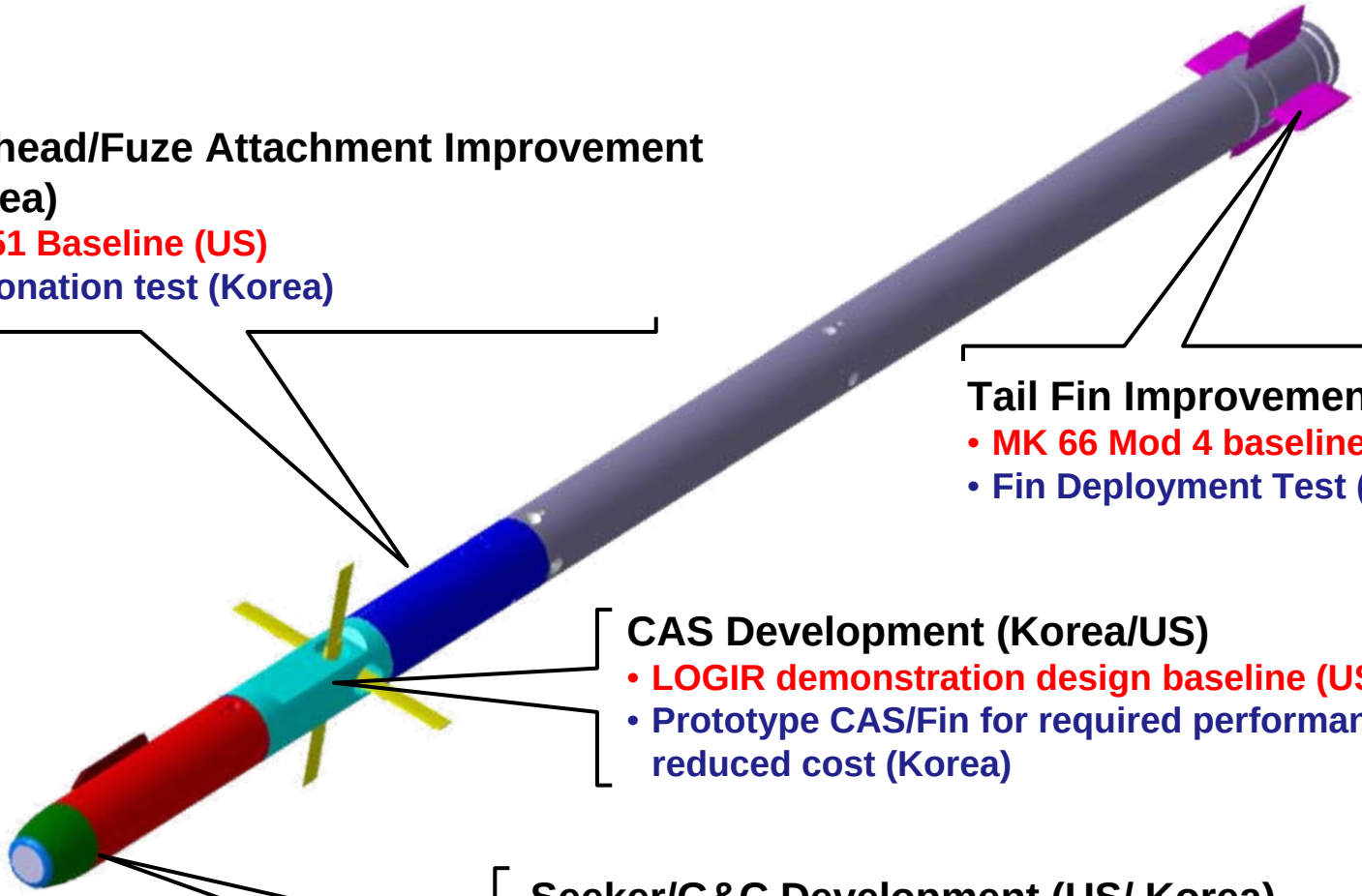
1. Target designated

2. Targeting data[1] passed to weapon

3. Flies to target coordinates

4. Seeker guides the rocket to target impact

Technology Complement



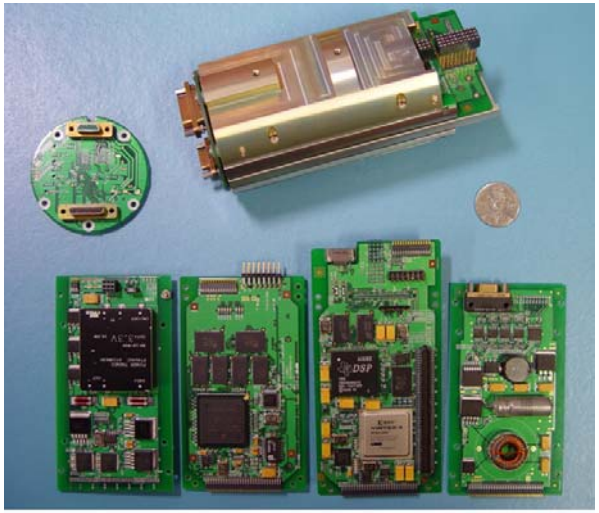
Warhead/Fuze Attachment Improvement (Korea)
- M151 Baseline (US)
- Detonation test (Korea)

Tail Fin Improvement (Korea)
- MK 66 Mod 4 baseline (US)
- Fin Deployment Test (Korea)

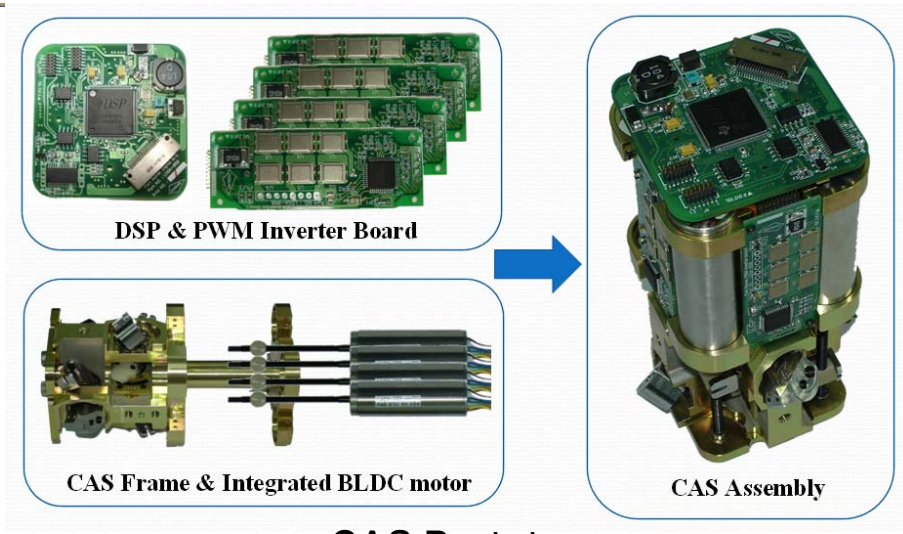
CAS Development (Korea/US)
- LOGIR demonstration design baseline (US)
- Prototype CAS/Fin for required performance at a reduced cost (Korea)

Seeker/G&C Development (US/ Korea)
- LOGIR demonstration design baseline (US)
- Improvements in electronic assembly design and hardware to reduce overall cost (Korea)

ROK Contribution for LOGIR

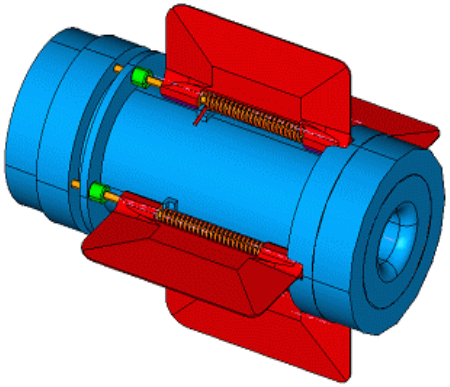


G&C Prototype

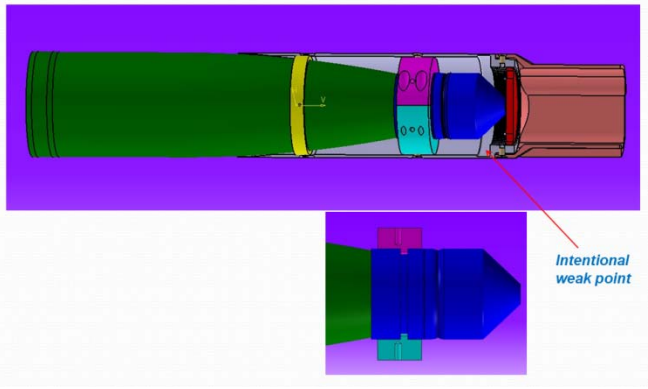


CAS Prototype

Structure and Fins Prototype



Cruciform Tail Fins and Nozzle Assembly



Warhead/Fuze Attachment Improvement

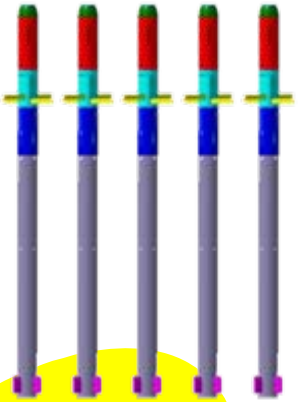
1st LOGIR S&T Meeting
May 2007

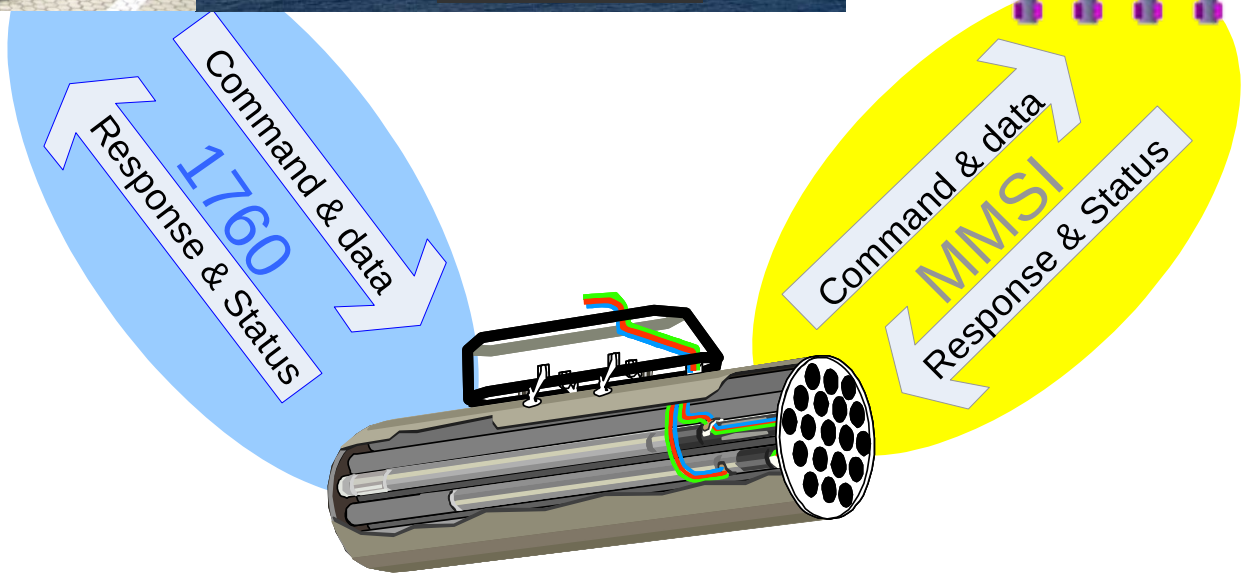
After 5th LOGIR S&T Meeting
March 2008, Jeju Island

Medusa JCTD

Aircraft Platform

Weapon (LOGIRs)





LOGIR Launcher

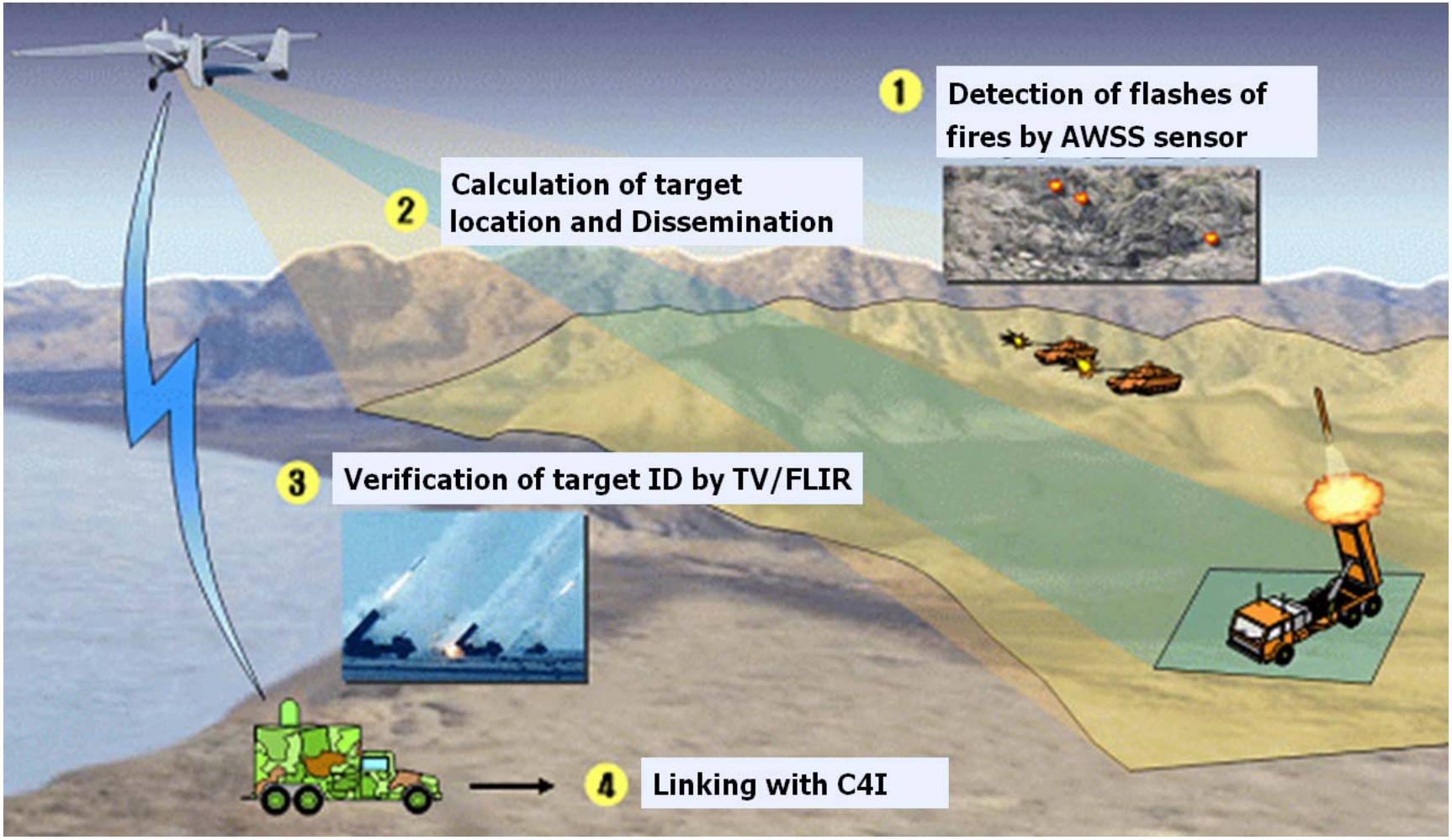
ADD's Capabilities for Medusa

- Wind tunnel testing: complete 6DOF
- Structural testing: static, dynamic and bending mode frequency
- Environmental testing for G&C and CAS: temperature, vibration, humidity,…
- Sled testing for impact detonation for fuze/warhead
- Structural testing for warhead assembly
- Thrust misalignment measurement


Medusa
JCTD Meeting
October 2007
국방과학관

AWSS JCTD:
Airborne Weapon Surveillance Systems

- To develop capability to detect, identify and locating/targeting weapon firings and reporting over tactical C4I system using airborne IR sensor system



Rapid Aerodynamic Design and Analysis

Collaboration

- Dr. John Schmisseur
- Implement the PA
- Oversee the progress

AFOSR

- Dr. Russ Cummings
- Wind-Tunnel Test & Validation

USAFA

RADA

ADD

- Dr. Seung K. Hong
- Develop RADASE
- Shape Design

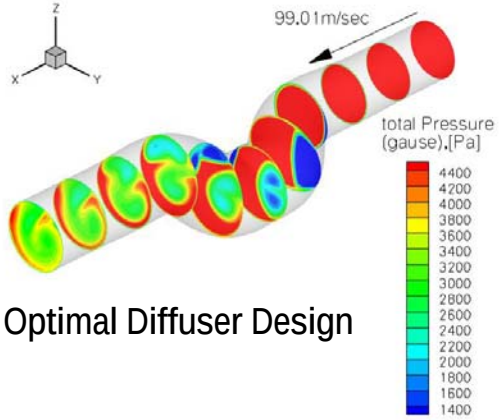
RUTGERS School of Engineering

- Prof. Doyle D. Knight
- Develop RADASE
- Training

Multi-disciplinary Design Optimization (MDO)

❖ Minimize the Pressure Loss & the Flow Distortion. (2006~ 2008)

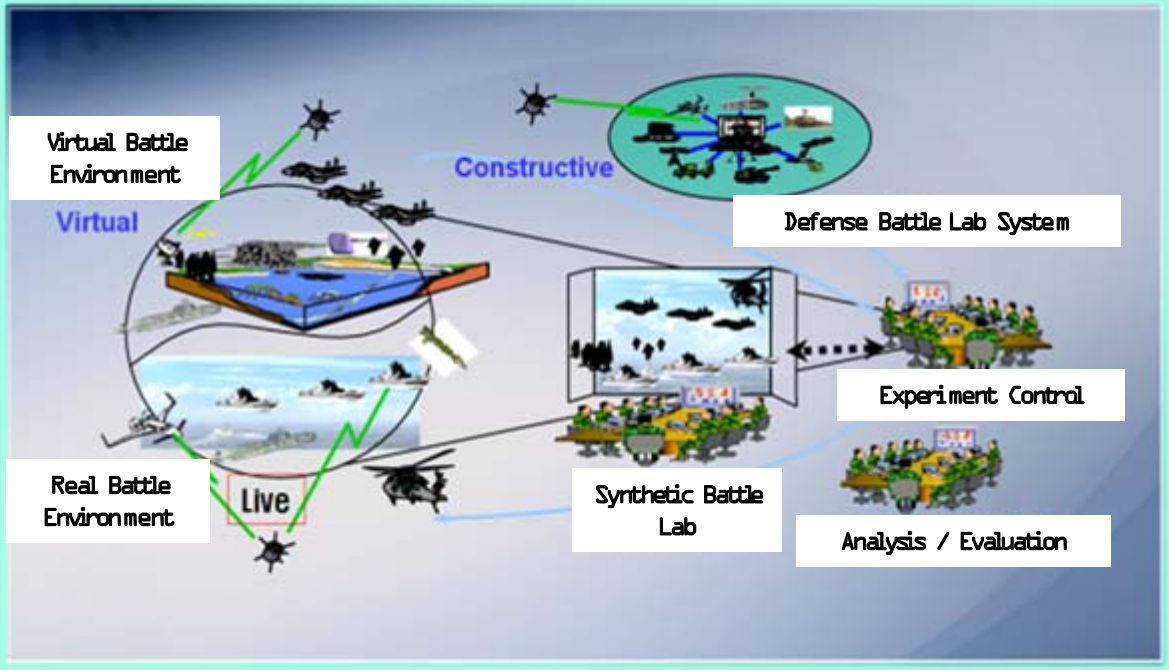
• Subsonic Diffuser



• Optimal Diffuser Design

Battle Experimentation

Systematic/Scientific Verification Process for Military Transformation



Real Battle Environment
+
Virtual Battle Environment
➡ Synthetic Battle Space

Need for International Collaboration

- **Economic strength depends on technology:**

  - Top five categories of US exports are high-tech items.

- **The pace of research/technology has grown exponentially.**

- **The obvious direction for maintaining strength and continuing growth is through international collaboration.**

- **Need to stimulate new collaborations from basic research to system level.**

Common Situation

- **It is hard to match programs once they are already started.**
- **Budgets are already set and not easy to allocate new funding to support cooperation.**
- **Long lead time before signing agreements:**

  - Some measures are already taken

Remedy for Better Solution

- **We need to factor in cooperation plan early enough when we have still influence on the planning and budget processes.**
- **It will take openness on both sides:**

  - Need to share our technology roadmaps

- **It will take a new level of cooperation and interaction between the service labs:**

  - e.g. LOGIR

Two-Level Approach

(1) Personal level:

- Need to find the common interest
- Want to work together
- Build a personal relationship

(2) High level/Management level:

- Agree the area of research is mutually beneficial
- Willing to commit resources

ADD Initiatives

- **Increase in funding for international cooperation**
- **Strengthen “International Co-op Office” to find matches**
- **Set up a “formal process” for early planning:**

  - Early dialogue and develop joint proposal

Reward:
Merits of International Joint Work

- **Shares resources and keeps risk low:**
  - **Manpower, Fund, Lab Facilities, Ideas**
  - **Complement technologies and more**
- **Reduces development cycle:**
  - **Joint DT and OT**
- **Opportunities for industrial collaboration**

Conclusions

- **ADD plans to Strengthen International Cooperation:**
  - **Expand Defense Cooperation in**

    Co-R&D and Co-Development
- **Propose a Formal Process for Early Planning**
- **S&T Cooperation will then Help Boost Defense Alliance between ROK and US**

Thank You

- For PACOM Conference Organizers
- For Opportunity to Participate