Technical Implementation of Nuclear Nonproliferation Cooperation to Complement IAEA Safeguards

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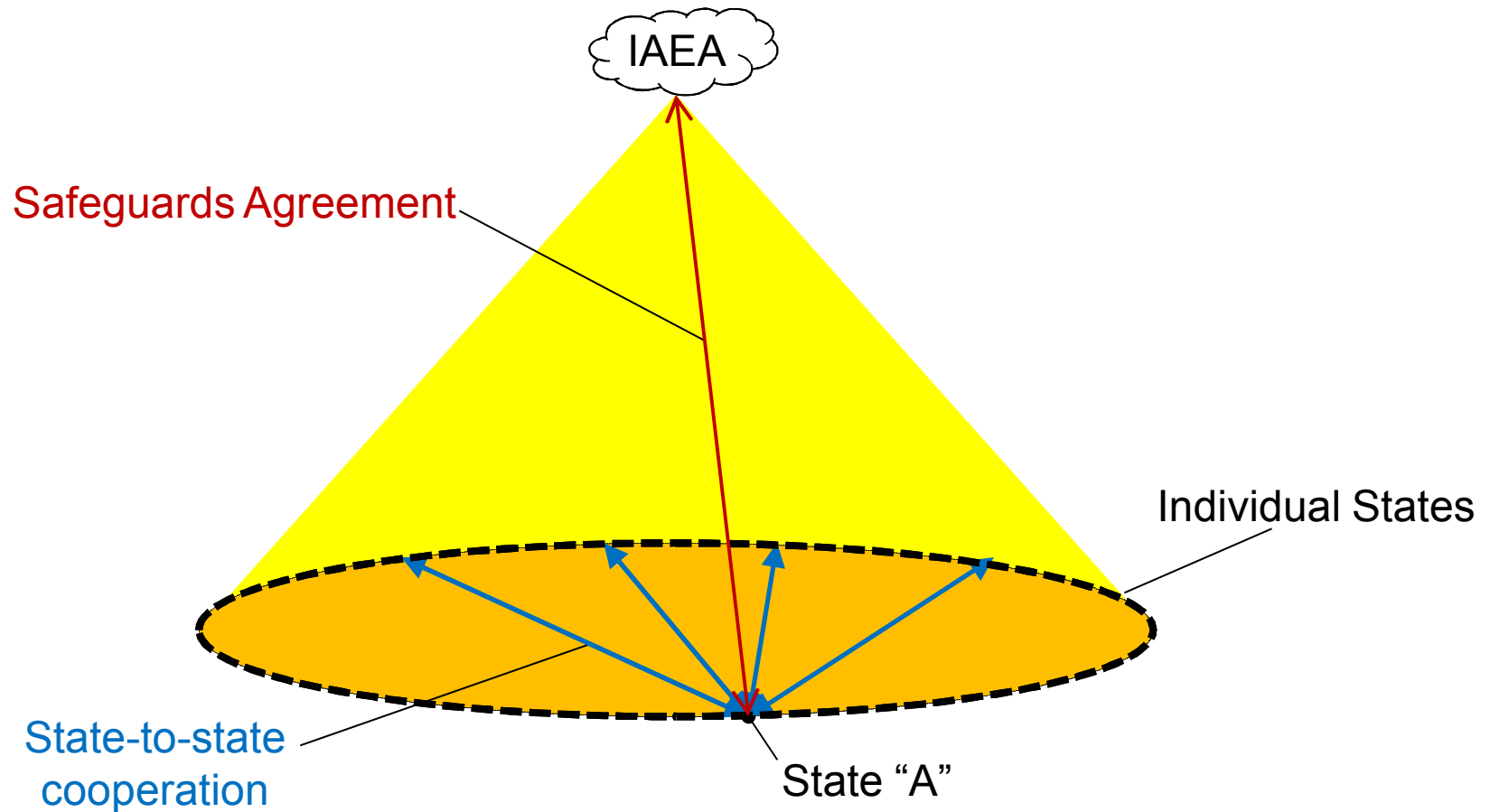Albuquerque NM USA

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Introduction:
Historical emergence of IAEA Safeguards

- **Supplier states had concerns about control of nuclear materials shared with another state**

- **IAEA was quickly recognized as an independent third party: Project Agreements**

- **With the advent of NPT, Comprehensive Safeguards Agreements greatly expanded the scope of IAEA safeguards**

- **The nonproliferation regime is evolving to provide assurance of the peaceful use of nuclear materials**

  - **International Safeguards: Additional Protocol, Integrated Safeguards**
  - **Other approaches: regional systems, bilateral arrangements**

Despite great success, the international safeguards system does have limitations.

- **The IAEA only shares its safeguards conclusion with member states.**
- **The safeguards conclusion is updated just once a year.**
- **Supporting details are not shared.**
    - **"Safeguards Confidential":
      to function as a trusted third party, the IAEA treats state-provided information confidentially**
- **Internal workings of the IAEA are largely independent and not accessible directly by the member states.**

- **IAEA safeguards is a *compliance* system.**
    - **A state enters into the agreement voluntarily; however…**
    - **the IAEA dictates what measures are necessary to support its safeguards conclusion**
- **IAEA safeguards is a *global* system.**
    - **Bilateral or regional-specific questions may not be addressed fully**

Direct state-to-state and regional cooperation can complement the international safeguards system.

Credit: Wan Ki Yoon, KINAC, Transparency Workshop, February 2008, Tokyo Japan

Approaches to direct state-to-state and regional nuclear nonproliferation cooperation can vary greatly.

- **Regional safeguards authorities (Euratom, ABACC)**
  - Are still compliance-based systems
  - Require coordination with IAEA safeguards
  - Their implementation can
    - Address regional needs
    - Leverage IAEA safeguards implementation
    - Avoid costly duplication of effort
- **Transparency**
  - Has no current precedent for a well-established system
  - Can provide various information openly, directly and voluntarily
    - Open release vs limited audience
    - Unilateral: information provision
    - Bilateral/ multilateral: information exchange
  - Promises benefits, but…
  - entails possible risks ?
  - No rules!

"Supplying" transparency: what are the issues?

- ***Why* be transparent?**
  - **What are the goals & objectives?**
  - **What results are expected?**
- ***Who* is the audience?**
- ***What* makes sense to share?**
- ***When* to share it?**
- ***How* to be transparent?**
  - **"Push" or "pull":**
    deliver the information, or just make it accessible?
  - **What is the process for implementation?**
  - **How to measure the results?**
  - **What to do about unexpected results?**
- **Assessment: do the results meet the goals & objectives?**

"Receiving" transparency: what are the issues?

- **Who is the responsible point of contact for us?**
- **Pull: we get to decide when and what to retrieve**
    - **How to utilize the information pull option**
    - **Deciding whether or not to monitor, when to monitor**
    - **What to monitor?**
        - the information itself, or just its availability?
        - avail ourselves of everything offered, or just a sampling?
- **Pushed to us: what to do with it?**
    - **Nothing?**
    - **Save until later**
    - **Analyze and evaluate it**
- **Analysis and Evaluation**
    - **How well do I trust this information?**
    - **How valuable is this information?**
    - **What does it tell me? What else does it tell me? What's missing?**
    - **Action: what are the next steps to take?**

Multilateral arrangements introduce significant complexities for transparency

- **Diverse audience**
- **Compartmentalization:**
  - Are there separate groups within the group?
- **Authentication:**
  - One trusted party should not be able to impersonate another
  - Multiple copies of information may exist: which is/are genuine?
- **Trust**
  - Are the parties to the arrangement already trusted?
  - More generally: trust needs to be the *outcome* of the transparency
    - The underlying system should not *assume* a trusted arrangement
- **Extensibility**
  - Can the system accommodate new members, or members departing?
- **Architecture / topology**
  - Hub and spoke: a centralized location where information is exchanged
  - Ring: each party connects to two others
  - Maze: bilateral communication between each pair of participants

Transparency: overarching issues for both parties

- **Security**
    - **What are the threats? Risks?**
- **Resilience**
    - **How to deal with unanticipated situations?**
- **Retention**
    - **How long is information available or retained?**
- **Metrics**
    - **How do we assess the cost/benefit of transparency**
- **Safeguards compatibility**
    - **If the same information would also be used for safeguards, are there any conflicts?**
- **Regional expandability**
    - **How might additional parties join the cooperation?**
- **Intermediary**
    - **Can we cooperate directly, or require a trusted third party to facilitate?**
- **Perception of others from *outside* the sharing arrangement**

Many other technical details are involved in implementing transparency

- **Methods used to transmit, store, archive, access, protect, and evaluate information**
- **Operations**
- **Proprietary and other sensitive information**
- **Reliability—how to assure availability**
- **Maintenance**
- **How to deal with technology obsolescence**
- **Personnel issues: training, turnover**
- **Approval for release of information**
- **Testing**

Conclusions

- **Voluntary information sharing ("transparency") between states is complicated**
    - **Supplier perspective**
    - **Receiver perspective**
    - **Multilateral introduces additional complexity**
    - **Many technical details are involved**
    - **Security measures are necessary to mitigate risks**
- **Nevertheless, such nuclear nonproliferation cooperation can complement IAEA safeguards and strengthen the nonproliferation regime**
- **A comprehensive, systematic approach is necessary to ensure successful implementation**