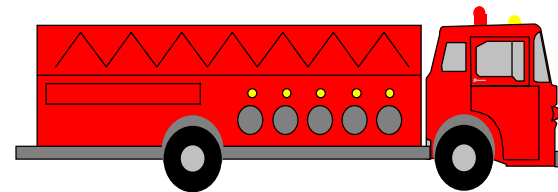
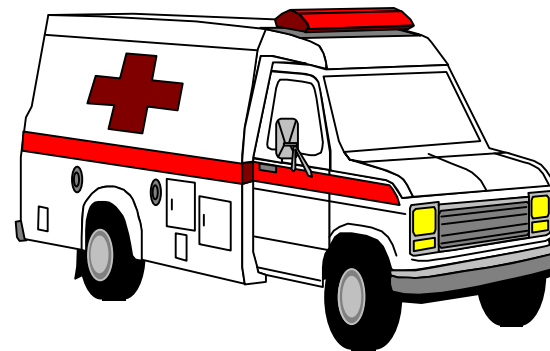
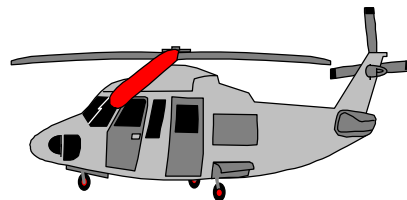


APCO/NASTD/FED Project 25



A Standard For Digital Communications Systems



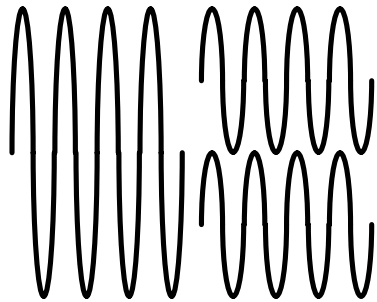
**A Joint Development Effort Of APCO, The National
Association Of State Telecommunications Directors,
And The U. S. Federal Government**

Supported By the

Telecommunications Industry Association (TIA)

Achievements Of Project 25

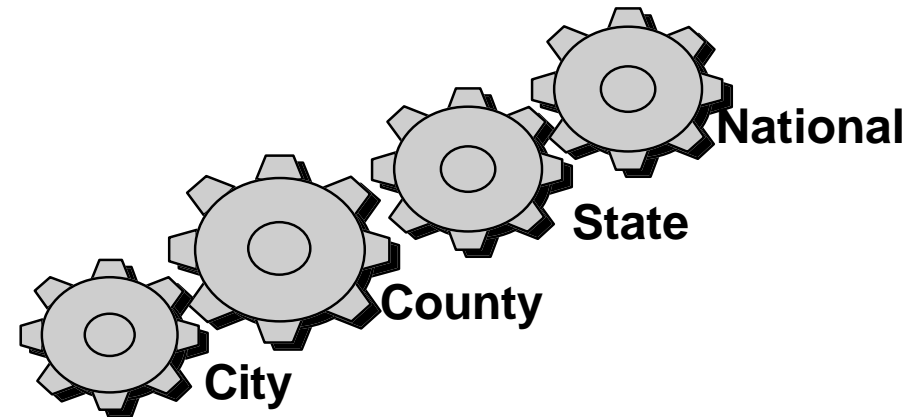
Objectives



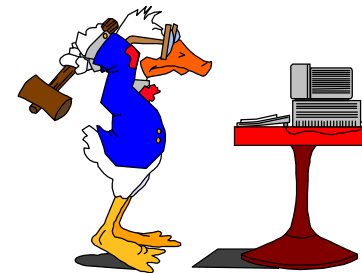
- Obtain Maximum Radio Spectrum Efficiency



- Ensure Competition In System Life Cycle Procurements



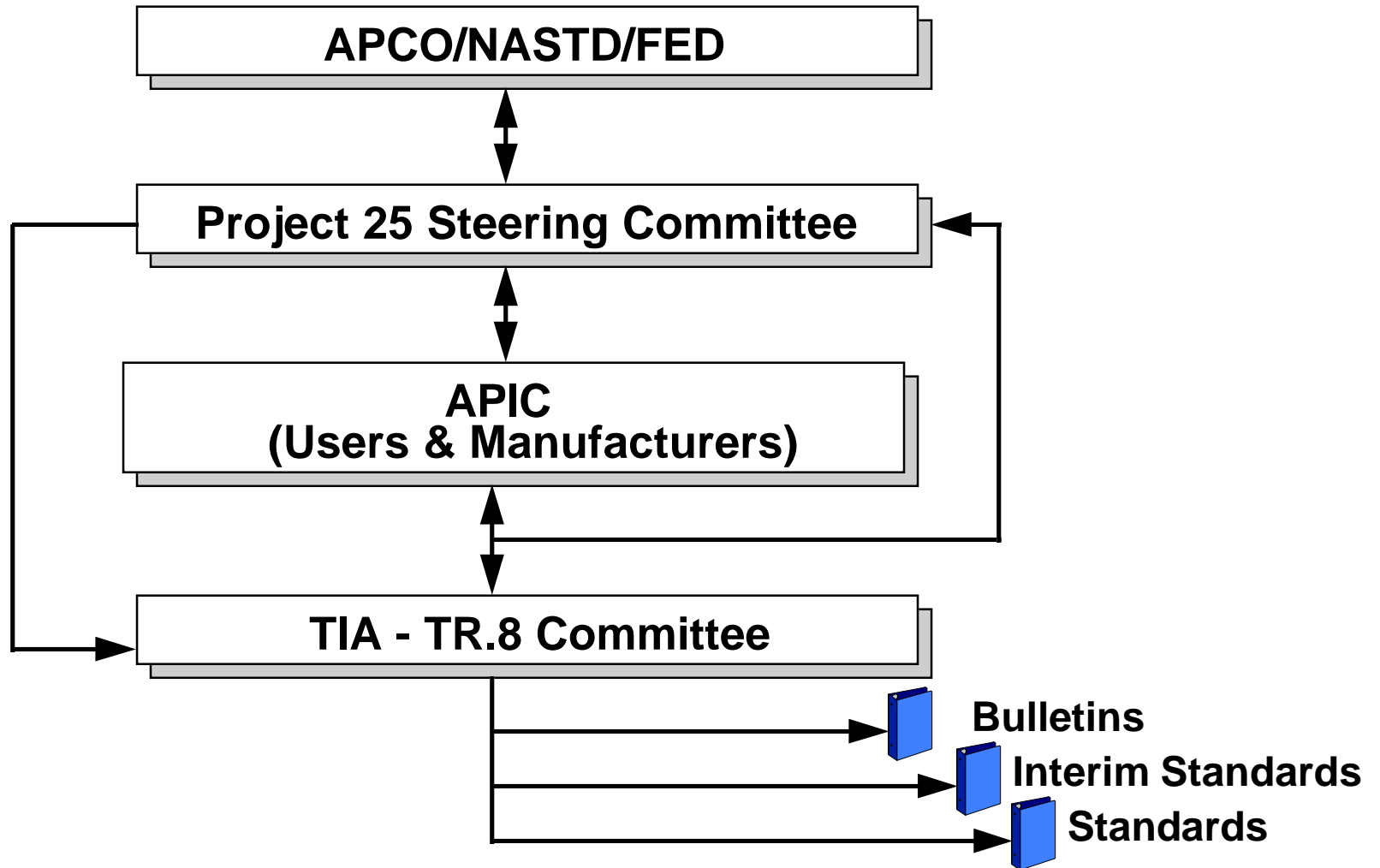
- Allow Effective, Efficient And Reliable Intra-agency And Inter-agency Communications



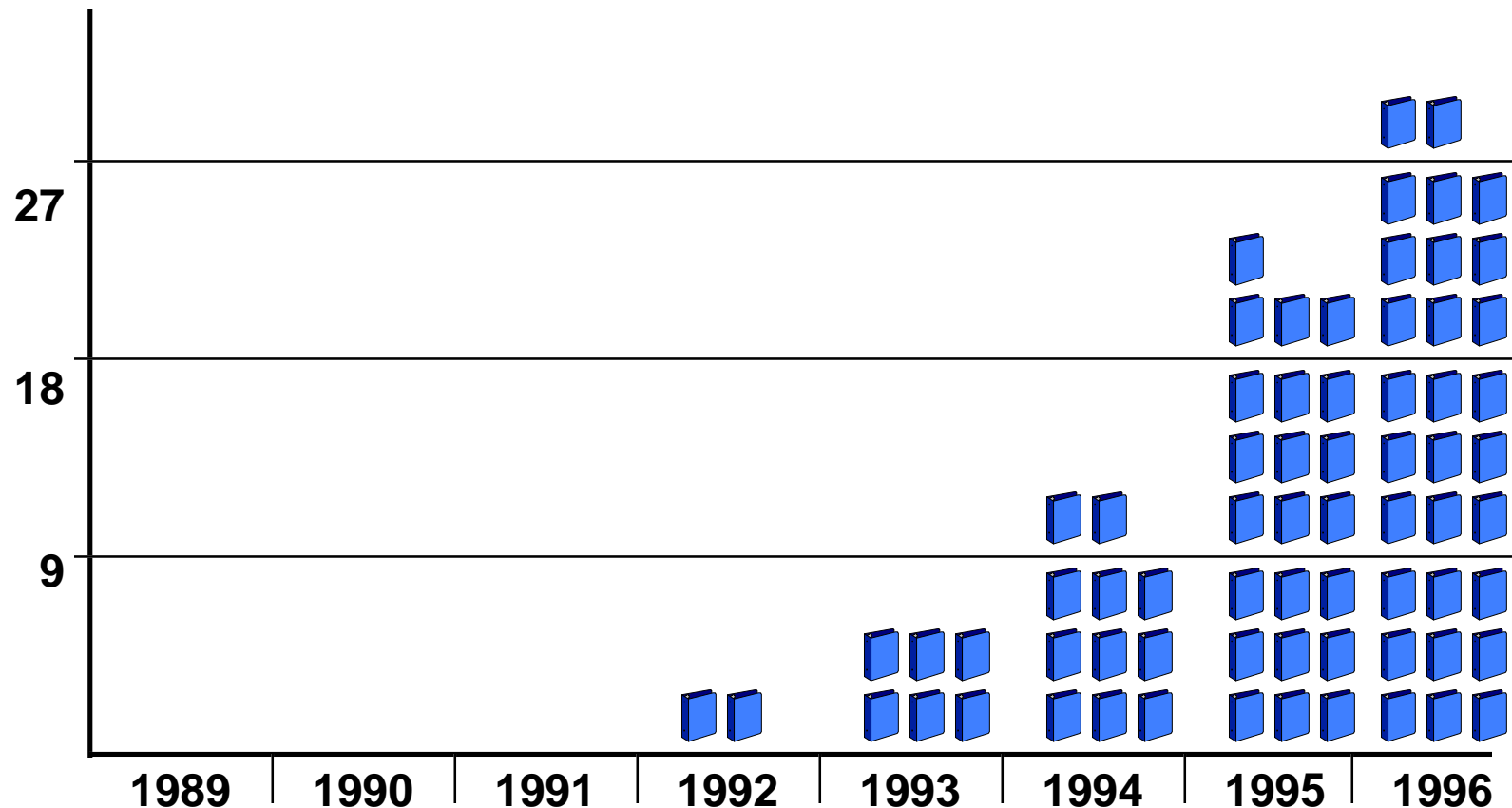
- Provide User Friendly Equipment

Achievements Of Project 25

Process

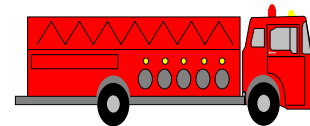


NASTD National Association of State telecommunications Directors
FED U. S. Federal Government
APIC APCO - Project 25 Interface Committee
TIA Telecommunications Industry Association



- The output of the process is a set of technical specifications that define the parameters of a Project 25 system. Manufacturers use these documents to develop equipment that meets the objective of interoperability.

A Global Market Place



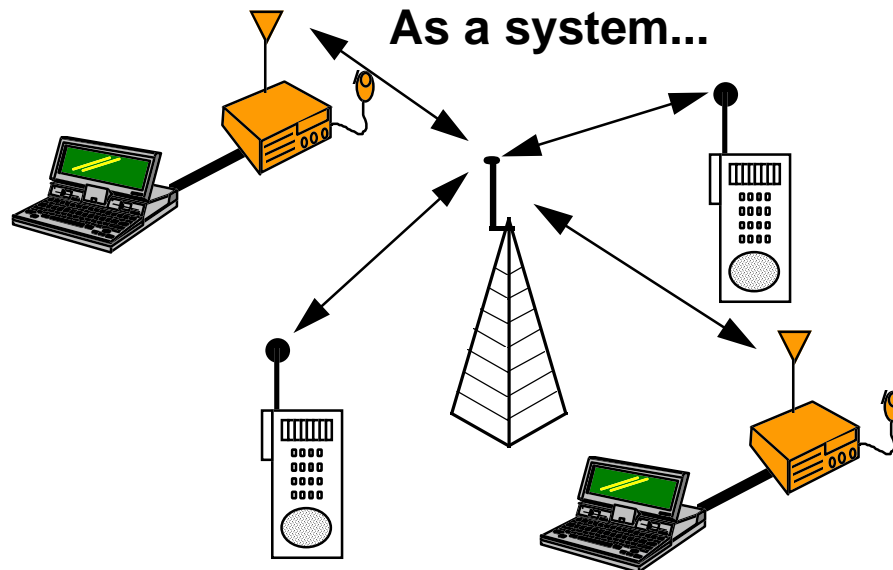
- In addition to North America, Project 25 has generated User interest in South America, Europe, the Middle East, Australia, New Zealand, and numerous regions of Asia.



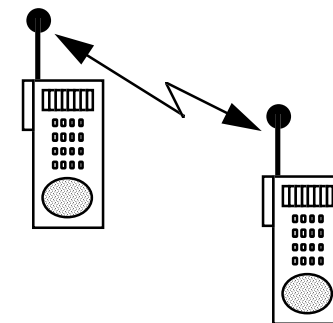
•Project 25 Technical Standards (Phase 1)

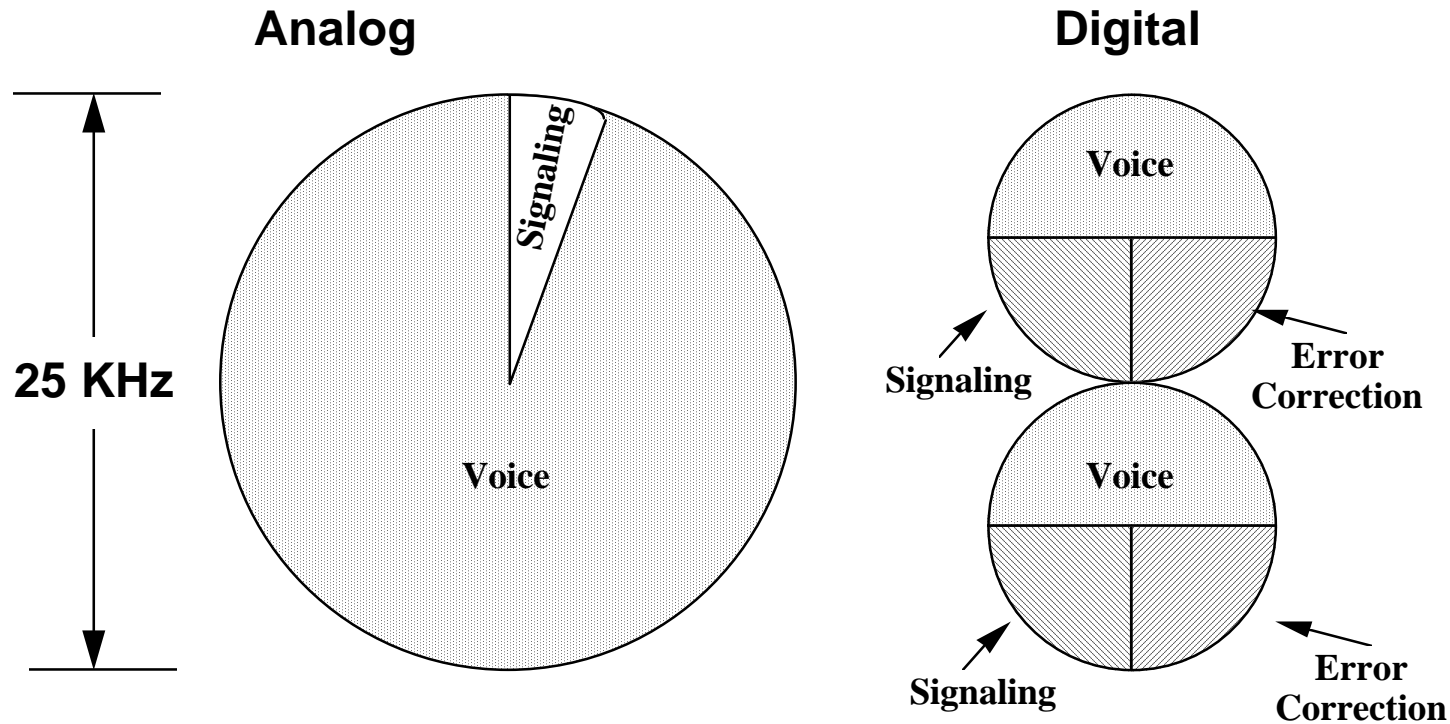
! Channel Access	FDMA
! Composite Digital Rate	9600 Baud
! Modulation	C4FM @ 12.5 KHz
! Encryption	DES
! Vocoder*	IMBE

* Vocoder = VOice COder / decoDER: The electronic process of converting speech into a digital representation.



Or direct radio to radio...



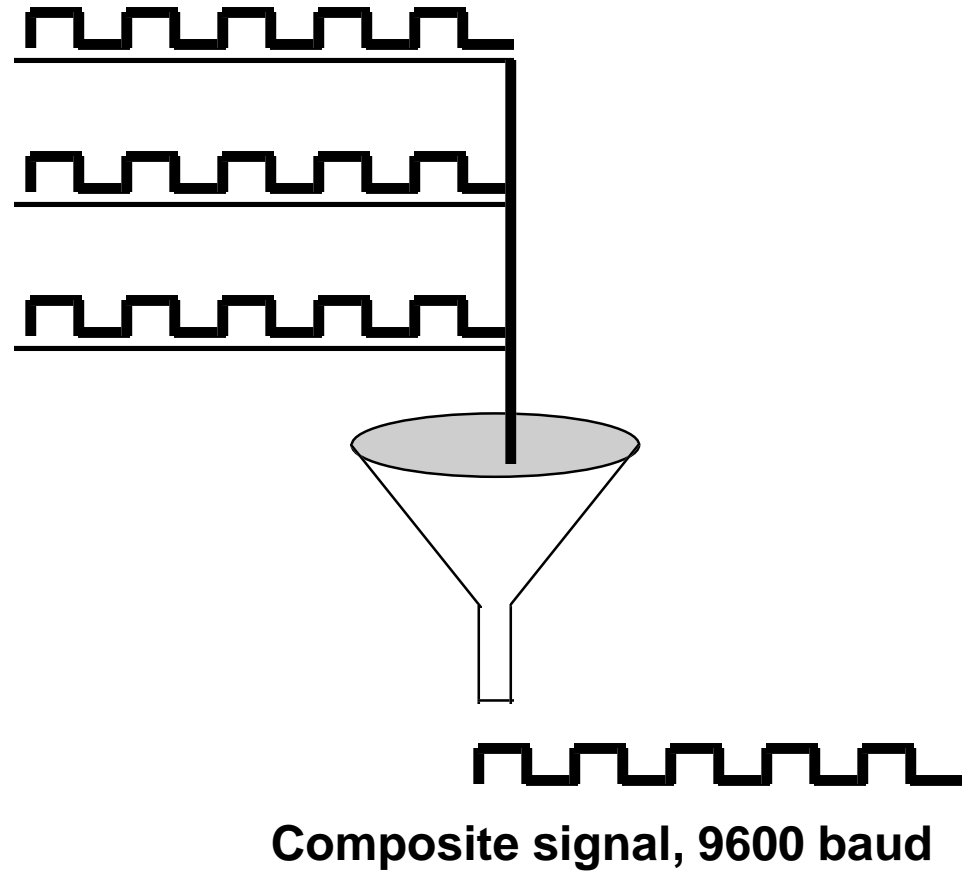


- In the band width where One typical analog channel currently resides, with limited signaling, and no error correction, TWO Project 25 digital channels WITH expanded signaling AND error correction can coexist.

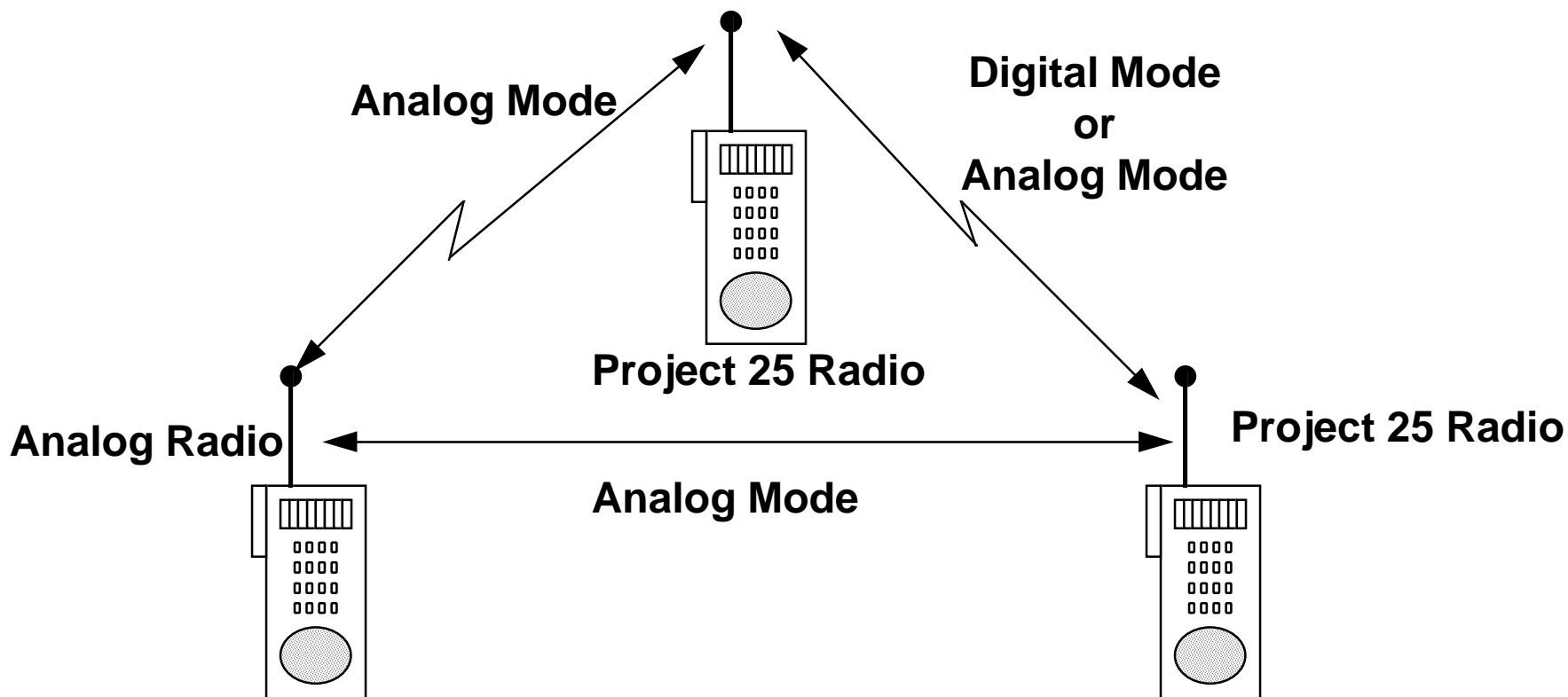
Achievements Of Project 25

- Digital voice, 4400 baud
- Channel signaling, 2400 baud
- Error correction, 2800 baud

Aggregate Data Rate



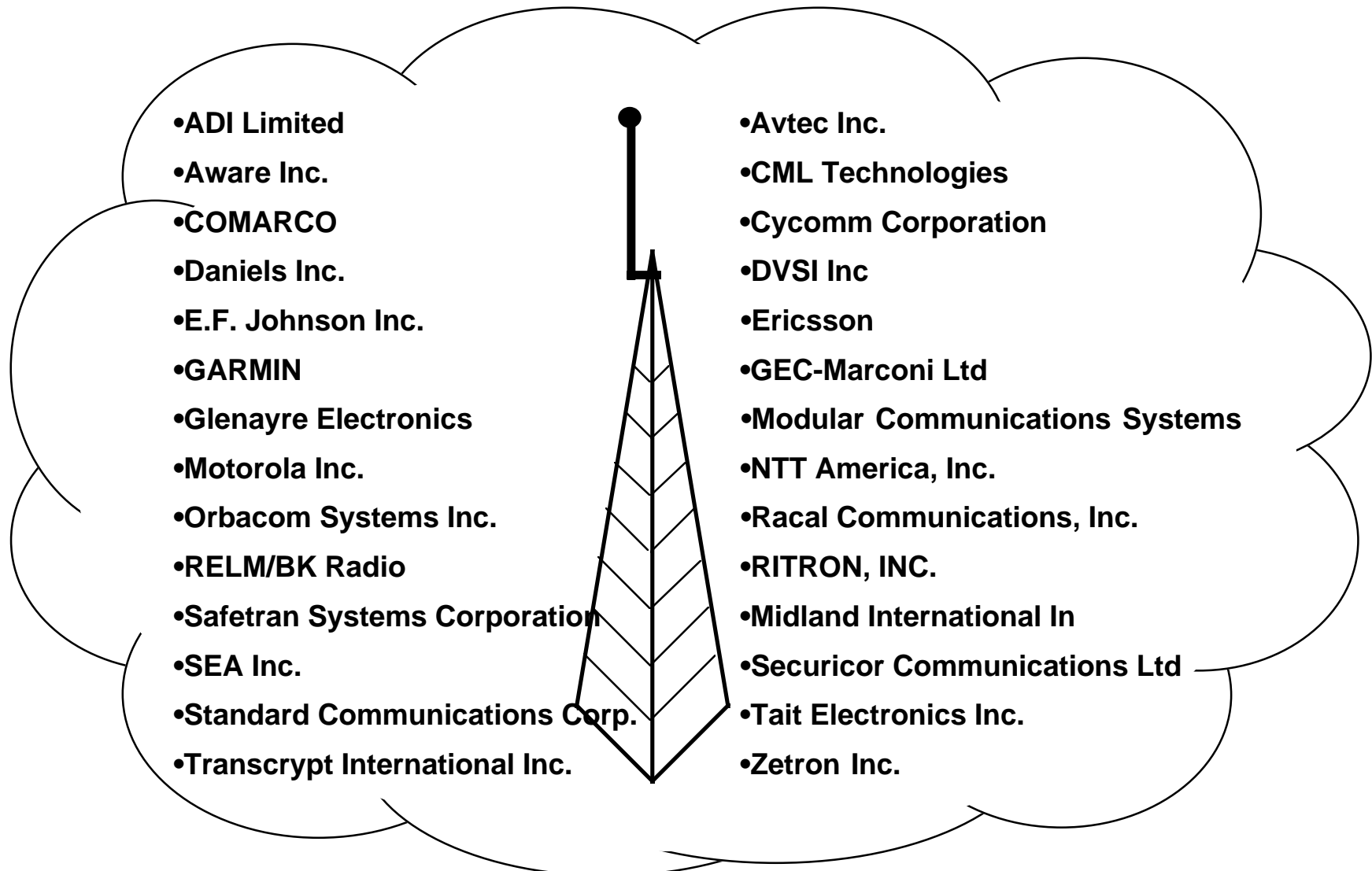
Backwards Compatibility



- Project 25 radios communicate in analog mode to older analog radios, and either digital or analog modes with new Project 25 radios.

Achievements Of Project 25

Interoperability



Signatories of the Project 25 Memorandum Of Understanding

- **Manufacturers Committed To Provide Compliant Product Include (As Of 12/96):**
 - Daniels Electronics Ltd.
 - E. F. Johnson
 - Motorola
 - RELM
 - ADI/Stanimite
 - Transcript

- **Project 25 Meets User Requirements, Delivering:**



- **One Standard, With Numerous Applications**
 - **Conventional topologies**
 - **Trunked topologies**
 - **Scalability**
 - » **One channel at one site**
 - » **Many channels at many sites**
 - » **Monocast, Multicast, and Simulcast**
 - » **Talk around, repeater, and voting applications**
 - **Frequency band independent**
 - » **Available in VHF, UHF, 800 MHz**
 - **Standardized overlay sub-systems**
 - » **Telephone interconnect**
 - » **Mobile data support**
 - » **Voice and data encryption**

• Feature	Analog FM Systems*	Project 25 Systems
• Unit ID	Proprietary	Standard
• Talk Group ID	Proprietary	Standard
• Network ID	Proprietary	Standard
• Emergency	Proprietary	Standard
• Call Alert	Proprietary	Standard Option
• Selective Call	Proprietary	Standard Option
• Selective Inhibit	Proprietary	Standard Option
• Status / Message	Proprietary	Standard Option
• Radio Check	Proprietary	Standard Option
• Interconnect	Proprietary	Standard Option
• Mobile Data	Proprietary	Standard Option
• Encryption	Proprietary	Standard Option
• And much more...		

* Conventional and APCO 16 Trunked Systems

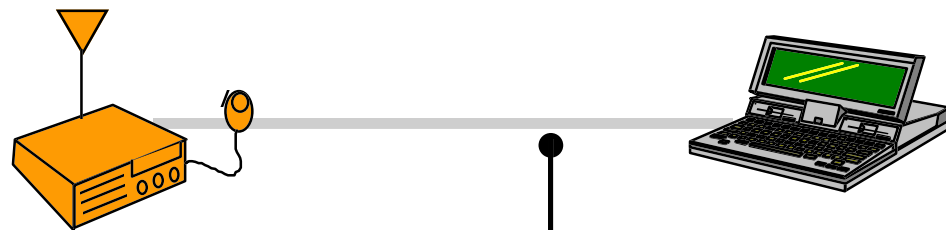
Overlay Sub-Systems

- Project 25 has defined the parameters for overlay subsystems, as options at the user's discretion, including:

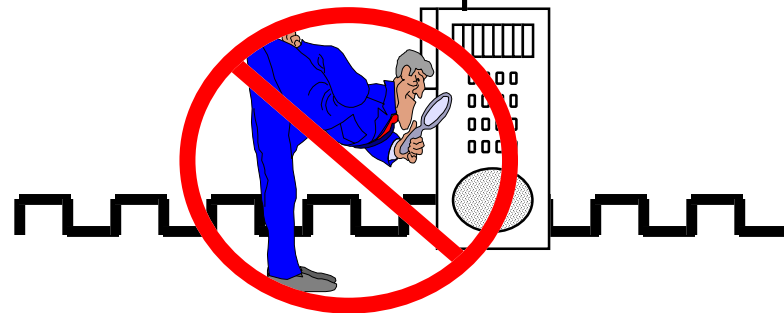
- Telephone Interconnect



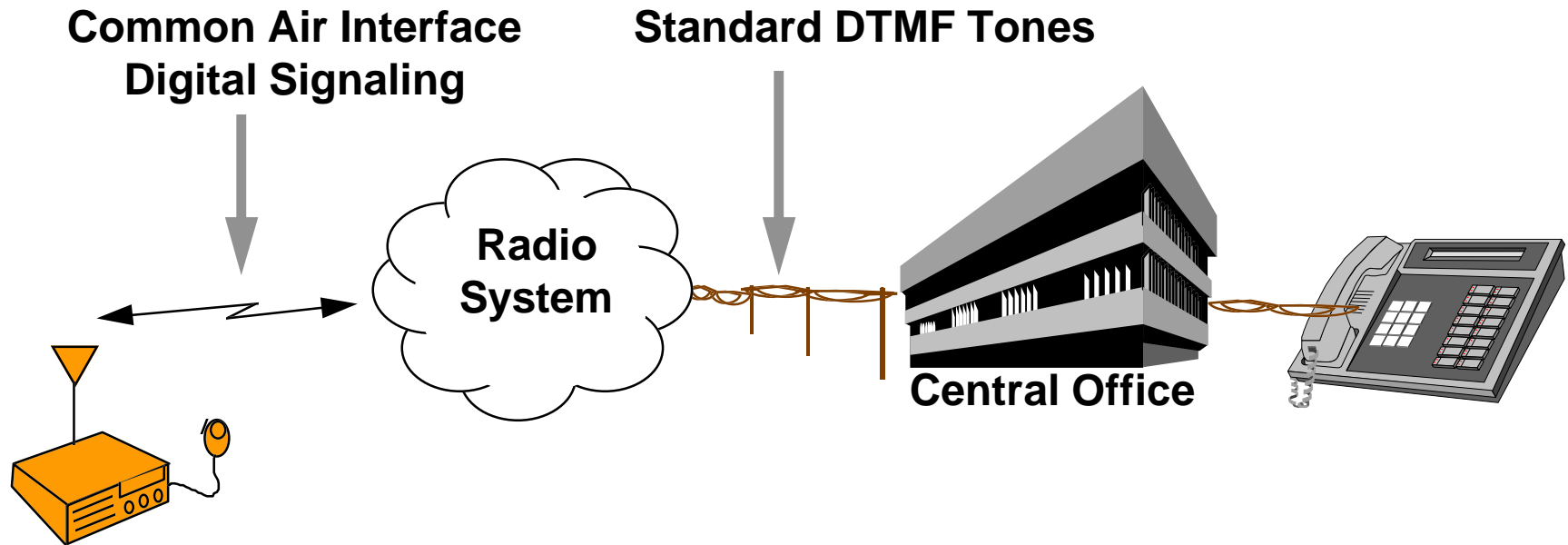
- Mobile Data Support



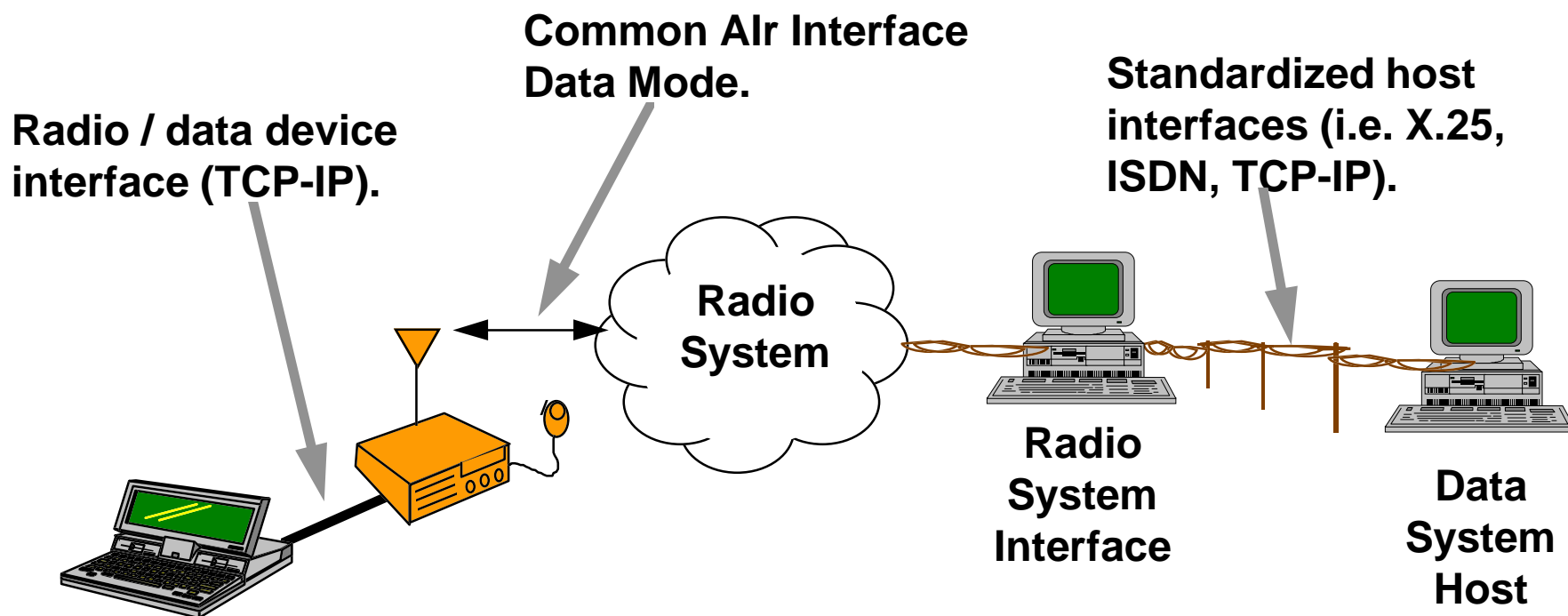
- Encryption



Telephone Interconnect

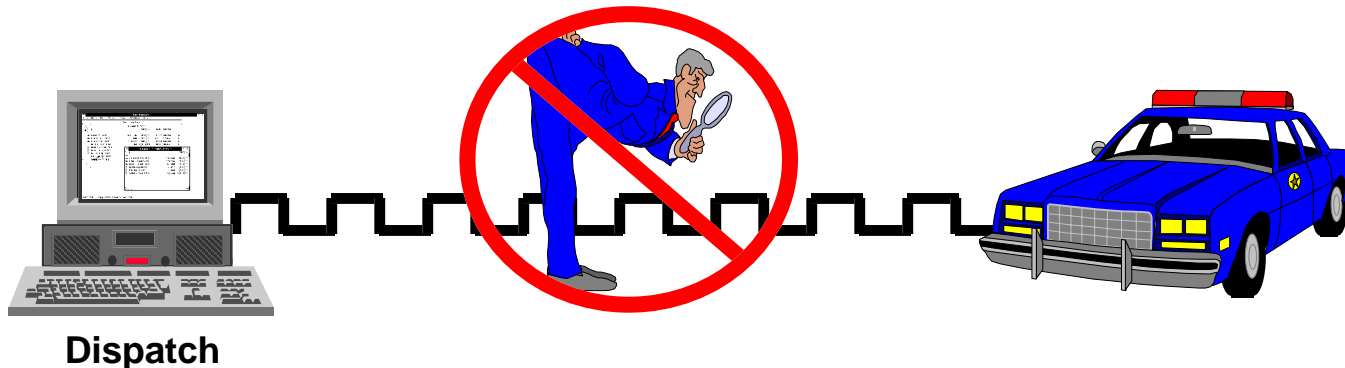


- **Standardized interface allow for telephone interconnect operation connectivity, regardless of the RF system design.**



- Standardized interfaces allow for terminal equipment and software to provide connectivity, regardless of the RF system design.

- Voice and data messages can be encrypted and transmitted without fear of unauthorized monitoring of confidential or sensitive information.



- * DES (Data Encryption Standard) As Defined By the U. S. Government
- * OFB (Output Feedback) For Synchronization

- **User Objectives Met:**
 - ! **Spectrum efficiency**
 - » Moving ahead in Phase II
 - ! **Interoperability**
 - » Standardized features and signaling
 - ! **Competitive environment**
 - » Several manufacturers have announced compliant product
 - ! **User Friendly**
 - » More ahead in Phase II