

NATIONAL EISENHOWER MEMORIAL EDUCATIONAL MATERIALS

LESSON

Interstate to the Internet: President Eisenhower's Legacy



Duration

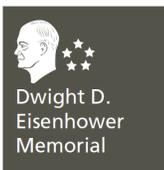
One 45-minute period

Grades

7–12

Cross-curriculum Application

U.S. History, Geography, Government



Historical Background

President Eisenhower established many infrastructure programs that still affect our lives today, notably in the areas of science and technology. Eisenhower promoted the importance of all types of transportation: land, sea, air, and space travel, and their significance to national security. During his second term as president he signed a number of acts into law, including the Federal Aid Highway Act to fund the Interstate Highway System and the Federal Aviation Act to regulate air travel. The St. Lawrence Seaway was constructed jointly with Canada to open sea lanes between the two countries and the Atlantic Ocean.

In addition, Congress passed a number of acts establishing the importance of the sciences in education and space exploration. The National Defense Education Act provided additional funding to all levels of educational institutions and the National Aeronautics and Space Administration (NASA) focused on space exploration. The Advanced Research Projects Agency (ARPA, renamed DARPA in 1972) was originally charged with the mission of ensuring U.S. missile superiority, but soon broadened its research projects to other technological advances, including an early networking system that was fundamental to the eventual creation of the internet. All of this legislation helped to shape the world of today—often in ways that no one in Eisenhower’s time could have anticipated.

Objective

In this lesson, students will analyze primary sources related to Eisenhower’s initiatives and go on a “scavenger hunt” to find examples in their classroom connected to these sources. Using these sources and items, students will think critically about Eisenhower’s emphasis on science and technology and his promotion of land, sea, air, and space travel.

Essential Questions

1. What is President Eisenhower’s legacy in improving infrastructure nationally and internationally?
2. How did President Eisenhower demonstrate leadership for science and technology?



Sources

- » “Space Race: Launching America’s Era of Space Exploration.” Eisenhower E-Memorial.
<https://www.youtube.com/watch?v=cEeqLJw6OcU>

Teacher Notes: A short video documentary (~9 minutes) on the space race between the United States and the Soviet Union, which began when the Russians launched the first satellite into space in 1957. The video covers President Eisenhower’s focus on science education and national security during his administration through some of the major milestones of the era.

Interesting details:

- *Eisenhower states that the technology that led to the creation of Sputnik is a scientific achievement that had been long expected and was not a threat to national security.*
- *Eisenhower believed that it was the ability to launch the satellite into space that was more significant, as that technology could potentially be used to launch nuclear missiles.*

- » “Space Race: Land, Air & Sea.” (3 slides) Eisenhower Memorial Commission.
http://eisenhowermemorial.gov/experience/#/space_race/585

Teacher Notes: These slides provide information on the Interstate Highway System, the Saint Lawrence Seaway, and the Federal Aviation Administration.

Interesting details:

- *The interstate highway system is a public works project and it is the largest in American history.*
- *The St. Lawrence Seaway enables “ocean traffic travel from the Great Lakes to the Atlantic Ocean.”*
- *The Federal Aviation Administration’s purpose was to monitor and control the safety of the airline industry.*

- » “California Interstate 80” (ca_13_180_NARA_1960_305.jpg). January 29, 1959. Federal Highway Administration.
<http://www.fhwa.dot.gov/highwayhistory/gallery.cfm>

Teacher Notes: Eisenhower signed the Federal Highway Act in 1956, which funded the Interstate Highway System. This photograph shows Interstate 80 in California with a new bridge under construction and an old highway on the right.

Interesting details:

- *Eisenhower thought the National Interstate Highway System would accommodate the increase in automobile transportation and would serve as part of national defense.*



- *This California interstate spans a varied landscape, including hills, waterways, residences, and an industrial work site.*

- » “Safety First.” FAA Aviation News. March 1963. Federal Aviation Agency.
<https://babel.hathitrust.org/cgi/pt?id=mdp.39015024327697;view=1up;seq=125> (page 98)
Teacher Notes: Eisenhower signed the Federal Aviation Act in 1958, which regulated air travel and safety.
Interesting details:
 - *This article instructs pilots in distress to fly in two triangular patterns spaced twenty-minutes apart to signal for an emergency.*
 - *As of September 1962, there were 18,000 FAA controllers, 260 Airport Traffic Control Towers, and 340 Flight Service Stations.*
 - *Radar aids were available to assist pilots in distress without a functioning radio.*

- » “Great Lakes and St. Lawrence Seaway” Map. 1959. U.S. Navy.
https://commons.wikimedia.org/wiki/File:Great_Lakes_and_St._Lawrence_Seaway_map_1959.png
Teacher Notes: This map shows the St. Lawrence Seaway in 1959, which is made up of canals, locks, and channels along the St. Lawrence River and the Great Lakes. This seaway opened up trade with the Great Lakes region to the Atlantic ocean for the United States and Canada. Grain is one of the goods exported through this waterway.
Interesting details:
 - *The map includes ports along the seaway, including Chicago, Toronto, and Toledo.*
 - *In the bottom right-hand corner is a list of sailing distances between the ports, canals, and waterways.*

- » “National Science Youth Month termed ‘Answer to Sputnik.’” October 5, 1958. Dwight D. Eisenhower Presidential Library.
https://www.eisenhower.archives.gov/research/online_documents/sputnik/10_5_58.pdf
Teacher Notes: Eisenhower signed the National Defense Education Act (NDEA) on September 2, 1958, which signified the federal government’s large-scale involvement in education. This document is a report from the President’s Committee on Scientists and Engineers and describes the involvement of youth in the sciences as the “answer to Sputnik.”
Interesting details:
 - *The NDEA provided funds for American schools; promoted education in science, technology, math, and foreign language; and aimed to bolster national security. The*

act also emphasized postsecondary education.

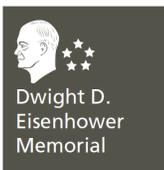
- *Dr. Howard Bevis, Chairman of President Eisenhower’s Committee on Scientists and Engineers, stated that “preparation of informed citizens of tomorrow, whether or not they ever become scientists or engineers, must begin in junior high school - even senior high school may be too late.”*

- » “Trajectory of Alan Shepard’s Historic Flight.” May 5, 1961. NASA.
https://www.nasa.gov/multimedia/imagegallery/image_feature_1939.html
Teacher Notes: Eisenhower signed the National Aeronautics and Space Act in July 1958, which established NASA. This image depicts Project Mercury, the first American man-in-space program. Alan Shepard was the first American in space, only 23 days after Russian [then Soviet Union] Yuri Gagarin became the first person in space.
Interesting details:
 - *Shepard’s flight lasted 15 minutes 28 seconds.*
 - *He launched from Cape Canaveral in a Freedom 7 capsule.*

- » “Conceptual Design of the ARPANET.” ARPANET Host to Host Access and Disengagement Measurements. 1978. J. A. Payne. Department of Commerce, National Telecommunications and Information Administration.
<https://babel.hathitrust.org/cgi/pt?id=uiug.30112075633526;view=1up;seq=17> (page 9)
Teacher Notes: ARPA [later DARPA] was initially in charge of U.S. missile superiority but then developed research projects including ARPANET, an early communications networking system that was fundamental to the eventual creation of the internet.
Interesting details:
 - *In this figure, the ARPANET is divided into the communications subnet, the host computer subnet, and the user subnet.*
 - *There is one Network Control Center and multiple Interface Message Processors (IMPs) and Terminal Interface Message Processors (TIPs).*

Materials

- » Interstate to the Internet Worksheet



Preparation

- Print three or four copies, depending on how many students are in the class, of each source [available at the end of the lesson] and number them 1– 6. Arrange each set of sources on separate tables in the classroom.
- Cue the “Space Race” video <http://eisenhowermemorial.gov/experience/#/space_race/585> from the Eisenhower E-Memorial to show students.
- Cue the three “Space Race: Land, Air & Sea” slides <http://eisenhowermemorial.gov/experience/#/space_race/585> from the Eisenhower E-Memorial to go over with students.

Procedure

1. Introduce Dwight Eisenhower, U.S president from 1953-1961. Explain that he enacted numerous programs during the second term of his presidency that improved transportation, science, and technology, such as the Interstate Highway System. Play the Eisenhower E-Memorial Space Race video: http://eisenhowermemorial.gov/experience/#/space_race/585. Essential questions to write on the board: How did President Eisenhower demonstrate leadership for science and technology? What is President Eisenhower’s legacy in improving transportation?
2. For additional context, show the students the Space Race slides. Make sure to read the accompanying text for definitions (also read the Historical Background section for context). Teachers can also print these slides out and pass them around to students to consult during the activity.
3. Have students get into three or four groups. Pass out one Interstate to the Internet Worksheet to each student.
4. Tell the students that each group will go to a table with the sources laid out. They will define the acts and agencies on the worksheet in their own words then write the corresponding source number for which source they think relates to that legislation.
5. Explain to the students that they will then be going on a scavenger hunt around the classroom to find items that relate to Eisenhower’s promotion of air, land, sea, and space transportation, as well as items related to science and technology. On the worksheet, they will either draw or describe the item that relates and articulate how that item connects to the



act or agency. For example, the Advanced Research Projects Agency (ARPA) influenced the development of the internet, so students could draw their smartphones or class computer. If there is no item in the classroom that relates to one of the acts or programs, have students think of items in their school or community.

6. Finally, to tie together the content of the lesson plan, have students answer the following prompt in twenty-five words using the primary sources from the lesson: What major achievements are part of Eisenhower's legacy in transportation, science, and technology?

Differentiation

If there is access to a computer or computer lab, teachers could have students go on a digital scavenger hunt. Students could take pictures of items with their phones or a camera and upload to the computer, or teachers could tell students to find images on the Library of Congress or another digital primary source repository that relate to the government acts and agencies.

Teachers could have students take the scavenger hunt part of the assignment home and find items in their house and/or community that relate to Eisenhower's acts and agencies. They could either photograph or draw the items.

Teachers may also make use of the Teacher Notes that accompany the above sources. Providing these notes to students may help them to notice important details within the sources.

Assessment

Students will be assessed on the Interstate to Internet Worksheet and scavenger hunt items and how they reflect an understanding of Eisenhower's influence on transportation, science, and technology. For example, did the item chosen for the Federal Highway Act relate to Eisenhower's improvement of national land transportation routes?

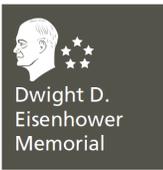
Related Resources

Lesson Plans

- » "Businesses on the Move." *America on the Move*. Smithsonian Institution.

<http://amhistory.si.edu/onthemove/learning/business.pdf>

This brochure includes self-guided activities for the *America on the Move* exhibit from the National Museum of American History.



Secondary Sources and Digital Resources

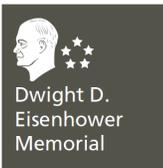
- » *History of the Interstate Highway System.* Federal Highway Administration. U.S. Department of Transportation.
<http://www.fhwa.dot.gov/interstate/history.cfm>
This website from the Federal Highway Administration contains articles, a video gallery, and an audio gallery of speeches on the history of the interstate highway system. The site also includes a bibliography for further reading and a map of the highway system.
- » *America on the Move Exhibit.* Smithsonian National Museum of American History.
http://amhistory.si.edu/onthemove/exhibition/exhibition_16_1.html
This portion of the exhibit covers the history of the interstate highway system. It includes images from the museum's transportation collections.
- » *The Great Lakes St. Lawrence Seaway System – A Vital Waterway.*
<https://www.youtube.com/watch?v=fbE2-TzWdzY>
This 10:26 minute video explores the history of the St. Lawrence Seaway System.
- » “A Brief History of the FAA.” Federal Aviation Administration.
http://www.faa.gov/about/history/brief_history/
This article covers the history of the Federal Aviation Administration, including its origins, duties, and technological innovations.
- » “Timeline of FAA and Aerospace History.” Federal Aviation Administration.
<http://www.faa.gov/about/history/timeline/>
This website features an interactive timeline of the Federal Aviation Administration that highlights important people and events with primary source images.
- » “National Defense Education Act (NDEA).” *Encyclopedia Britannica.*
<http://www.britannica.com/topic/National-Defense-Education-Act>
This encyclopedia article details the history of the 1958 National Defense Education Act, which aimed to improve American education in science and technology.
- » “Sputnik Spurs Passage of the National Defense Education Act.” United States Senate.
http://www.senate.gov/artandhistory/history/minute/Sputnik_Spurs_Passage_of_National_Defense_Education_Act.htm
This article provides background on the connection between Sputnik and federal aid to education through the National Defense Education Act and the involvement of the U.S. Senate.



- » “Defense Advanced Research Projects Agency (DARPA) History and Timeline.” DARPA. <http://www.darpa.mil/about-us/darpa-history-and-timeline>
This interactive timeline showcases the history of DARPA and can be searched by topic and date. It also includes highlighted events and images.

Primary Sources

- » Federal Aid Highway Act of June 29, 1956
<https://www.gpo.gov/fdsys/pkg/STATUTE-70/pdf/STATUTE-70-Pg374.pdf>
Established the Dwight D. Eisenhower System of Interstate and Defense Highways
- » *Statement by the President Upon Signing Federal Highway Act of 1958.* Dwight D. Eisenhower. The American Presidency Project.
<http://www.presidency.ucsb.edu/ws/?pid=11353>
Dwight D. Eisenhower delivered this statement about the Federal Highway Act on April 16, 1958. He discussed its favorable aspects, as well as the “grave defects” of the bill that he hoped would be removed in succeeding legislation.
- » National Interstate and Defense Highways Act of July 11, 1956
<http://www.archives.gov/historical-docs/todays-doc/?dod-date=629>
This law, an amendment to the Federal Highway Act, sanctioned the construction of highways throughout America and was the largest public works project in the history of the United States.
- » St. Lawrence Seaway. Dwight D. Eisenhower Presidential Library.
https://www.eisenhower.archives.gov/research/online_documents/st_lawrence_seaway.html
Archival materials related to the opening of the St. Lawrence Seaway.
- » Eisenhower Discusses Science Education 1957.
https://www.youtube.com/watch?v=Ok_2zsjTXVA
This 1:19 minute video shows Eisenhower discussing science education in the United States.
- » *National Aeronautics and Space Administration* (archives finding aid). Dwight D. Eisenhower Presidential Library.
https://eisenhower.archives.gov/research/finding_aids/pdf/NASA.pdf
This collection consists of duplicate copies of official documents relating to the space



program. The material includes copies of the NASA Long Range Plan for December 1959, January 1961, and January 1962.

- » *Organization and Early History of NASA, 1957-1961*. Dwight D. Eisenhower Presidential Library.

https://eisenhower.archives.gov/research/subject_guides/pdf/NASA.pdf

Subject guide for NASA papers. Includes papers from several White House offices, President's Science Advisory Committee, and oral histories.

- » "Eisenhower, Science and National Security, November 7, 1957."

<https://www.youtube.com/watch?v=V9dbBWA5dmA>

Video about 2 minutes.

Interstate to the Internet Worksheet

Background: President Eisenhower established multiple programs that affect our lives today, especially in the areas of science education and technology. Additionally, significant acts were signed into law during his administration that reflected Eisenhower's contributions to land, sea, air, and space transportation as important to national security.

Responsibilities: Briefly define in one or two sentences the following acts or agencies that play important roles in the lives of Americans today and fill in the Source box with the corresponding Source #. Find items in the classroom that illustrate some of the results of their existence. Draw or describe the items. Lastly, say how the item you picked relates to the act or agency.

Acts and Agencies	Definition	Source #	Classroom Item	How does this item relate to the act or agency?
Federal Highway Act				
Federal Aviation Act				



Interstate to the Internet Worksheet cont.

Acts and Agencies	Definition	Source #	Classroom Item	How does this item relate to the act or agency?
St. Lawrence Seaway				
National Defense Education Act				
National Aeronautics and Space Administration				
Advanced Research Projects Agency				



Federal Highway Act

Photo caption: California - Interstate 80 at Carquinez Straits with new bridge in foreground and the 8 million yard benched cut at left center beyond the Crockett interchange. Old U.S. 40 can be seen at the right. January 29, 1959.

SAFETY FIRST

MAYDAY... MAYDAY... MAYDAY

A pilot is in trouble. He calls for help—"Mayday!" Who hears?

On call, as of September, 1962, there were 18,000 FAA controllers and flight service specialists; 961 air/ground communications channels; 700 VORs and VORTACs, short range navigation aids; 140 Flight Service Stations; 260 Airport Traffic Control Towers; 200 approach control facilities; 67 military VHF/DF stations; 10 FAA HF/DF stations; 68 Airport Surveillance Radars; 49 Long Range Radars; 28 Precision Approach Radars; and 16 Air Route Traffic Control Centers.

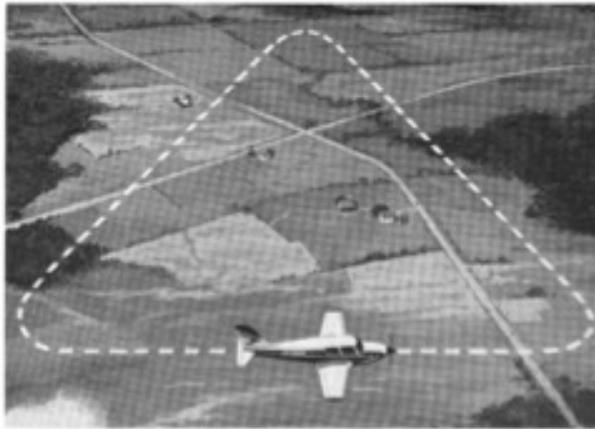
To receive help, a pilot declares an emergency by: (1) communicating with somebody—even IN THE BLIND—preceding the message three times with the word "MAYDAY"; or (2) flying a triangular pattern if lost or disoriented.

FAA Flight Service Station personnel are trained, by voice directions alone, to get pilots back on course or to an airport.

Direction Finding (D/F) aids, by electronically measuring the bearing of aircraft radio signals, establish a pilot's direction from a station and enable ground personnel to give magnetic headings toward a desired destination.

Radar aids—over 140 FAA-operated units plus many military installations—can help pilots who have no radio operating, transmitter alone or receiver alone. By flying a minimum of two triangular patterns, repeated every twenty minutes, a pilot's flight becomes apparent to radar operators who will transmit instructions on emergency frequency (121.5 mc) or dispatch Air Rescue Service aircraft for interception and guidance.

Details on D/F equipment, emergencies, radio failure, search and rescue and radar procedures are found in the current editions of the Flight Information Manual and the Airman's Guide.



Pilots in distress with both radio transmitter and receiver inoperative, or radio transmitter alone functioning, fly a minimum of two triangular patterns in two-minute legs as shown above. Those with radio receiver alone functioning, should follow the same procedure, except they make all turns to the right.

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Federal Aviation Act

Photo caption: Pilots in distress with both radio transmitter and receiver inoperative, or radio transmitter alone functioning, fly a minimum of two triangular patterns in two-minute legs as shown above. Those with radio receiver alone functioning, should follow the same procedure, except they make all turns to the right.

THE PRESIDENT'S COMMITTEE ON SCIENTISTS AND ENGINEERS
WASHINGTON 25, D.C
STERLING 3-2140, Ext. 483

FOR RELEASE:

Sunday, Oct. 5, 1958

NATIONAL SCIENCE YOUTH MONTH TERMED "ANSWER TO SPUTNIK"

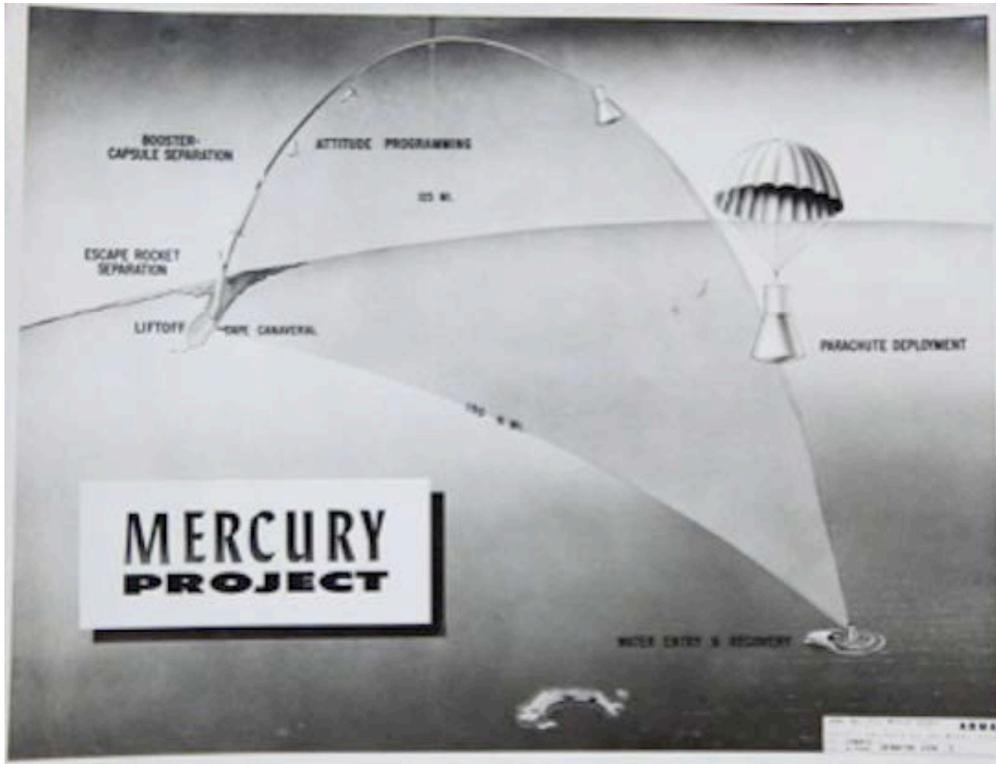
Dr. Howard L. Bevis, the Chairman of President Eisenhower's Committee on Scientists and Engineers last night called for nationwide support of October as National Science Youth Month, which he described as "a major answer to the intellectual challenge symbolized in Russia's launching of Sputnik a year ago today."

He was joined in asking citizens and citizens' groups to promote science activities in the Nation's classrooms this month by top spokesmen of the Department of Defense, Department of Health, Education and Welfare, Department of Labor, and the Office of Defense and Civilian Mobilization.

Dr. Bevis issued this statement: "On October 4, 1957, the world was startled with the news that Russia had sent a satellite into orbit. In the wake of that news, our need for more scientists and engineers became a national concern. In the year since, the American people have become aware that this Nation can no longer afford to delay pre-professional training of potential scientists or engineers until they reach college. Preparation of informed citizens of tomorrow, whether or not they ever become scientists or engineers, must begin in junior high school -- even senior high school may be too late.

(more)

National Defense Education Act



NASA

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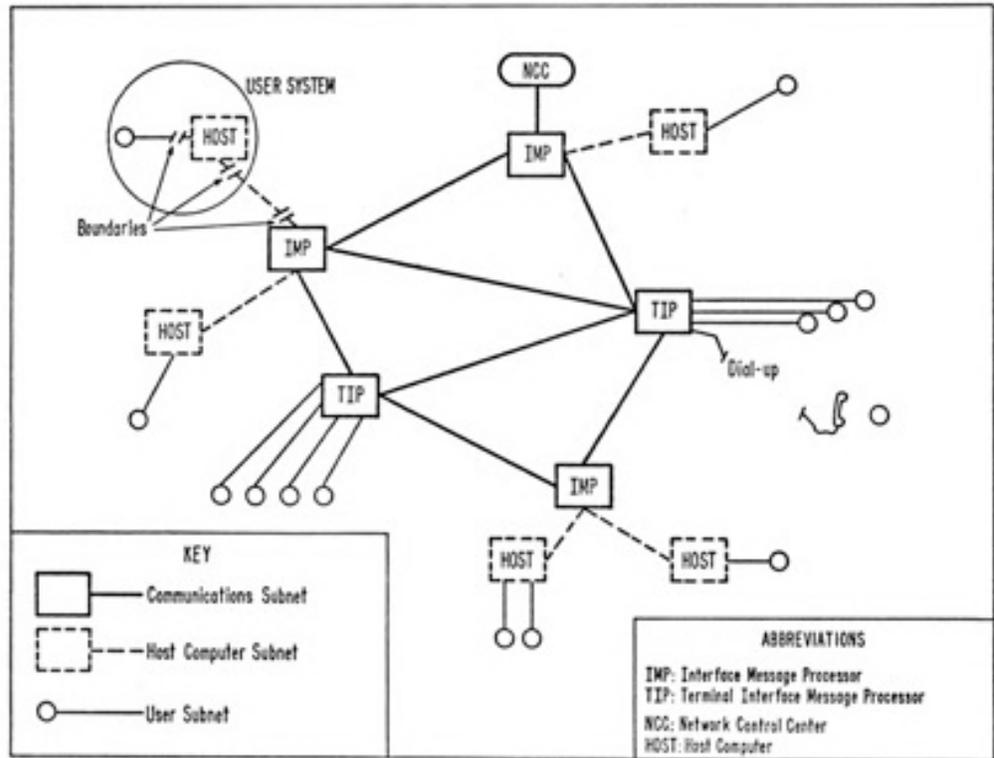


Figure 3. Conceptual design of the ARPANET.

Advanced Research Projects Agency