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NANCY HOPKINS TIER

AIR RACER, TEST PILOT, WWII PATROL PILOT

1909 - 1997

OBJECTIVES

- Name the organization she joined in 1942.
- Describe two air derbies she participated in 1930.
- Name the museum where she presided as the inaugural president in 1986.
- List two of the awards Nancy Hopkins Trier received.
- Build a Piper J-3 Cub.

STANDARDS

(NGSS)

Science

- | | |
|-------------|------------|
| ■ MS-ETS1-1 | ■ MS-PS2-1 |
| ■ MS-ETS1-2 | ■ MS-PS2-2 |
| ■ MS-ETS1-3 | ■ MS-PS2-4 |
| ■ MS-ETS1-4 | ■ MS-PS3-5 |

ELA/Literacy

- | | |
|-------------|--------------|
| ■ RST.6-8.3 | ■ SL.8.5 |
| ■ RST.6-8.7 | ■ WHST.6-8.7 |
| ■ RST.6-8.9 | ■ WHST.6-8.8 |

Mathematics

- | | |
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| ■ MP.2 | ■ 7.EE.B.3 |
| ■ 6.RP.A.3 | ■ 7.EE.B.4 |

(NCSS)

- III.b.
- IV.f.

Nancy Hopkins Tier noticed early on in her aviation career the attitudes women faced from a male-dominated field. In fact, she saw the industry climate when she began taking flying lessons in 1927.

“There wasn’t much encouragement at airports,” she said, “because aviation was for men, and female aviators were just barely tolerated.”

Six decades later, in March 1986, the world had changed. The International Women’s Air and Space Museum was opening, and Tier was its president.

In between those years, Tier had been an air racer, a long-distance test pilot and had flown bomb patrols in World War II as a member of the Civil Air Patrol. Later in her career she was named the first female Civil Air Patrol colonel and Wing commander.

Achievements include

- Earned her limited commercial pilot's license (1929)
- Charter member of the Ninety-Nines (1929)
- Received her Federation Aeronautique Internationale (FAI) Sporting License signed by Orville Wright and her transport licence (1931)
- Flew solo coast-to-coast (1933)
- C.W. Post University award (1976)
- CAP Exceptional Service Medal (1981)
- CAP Meritorious Service Medal (1981)
- Wings Club award (1983)
- President of the International Women’s Air and Space Museum (1986)
- Member of United Flying Octogenarians (1989)
- Pioneer Women in Aviation Hall of Fame (1992)
- Honorary member of U.S. Air Force’s 38th Strategic Missile Wing (circa 1992)
- Enshrined in National Aviation Hall of Fame (2006)
- Congressional Gold Medal, CAP World War II Service (2015)

HER STORY

Nancy Hopkins Tier was born May 16, 1909, in Washington, D.C. During her high school years in the 1920s she became passionate about flying. In November 1927, she started flying lessons from Hoover Field in Arlington, Virginia, and earned her commercial license in 1929. In author George Vecsey's book "Getting Off the Ground," she said, "Ever since I was in high school, I had just one determination — to fly. I don't know why either."

When she made her first solo flight she made a perfect cross-wind landing, and the social reporters of the day wrote about her.

As early as 1930, she was an aircraft manufacturing company sales representative for the Viking Flying Boat Company. She began flying in the 5,000-mile Ford Reliability Tour and the 2,000-mile Women's Dixie Derby. She received her FAI (Federation Aeronautique Internationale) Sporting License — signed by Orville Wright — and her transport license in 1931.

By 1930, Henry Ford had proven the automobile was a safe machine for travel, having unveiled, in 1929, the

Model "A" as America's family car. Ford decided to build a "safe" Ford-produced airplane to prove aviation was really safe for everyone to use. The Ford Reliability Tour was one of the decade's (1930s) most noteworthy air events. Pilots were selected to test the airplanes and prove them reliable as well as setting up schedules for future airline routes.

Nancy Tier was chosen in 1930 as one of the pilots for this test, and, in fact, she was the only female pilot chosen.

In an age when even the air mail pilots sometimes rode the trains after losing a plane in blinding snow, the idea of flying 5,000 miles on a schedule was almost a fantasy dream. In her own words we have the schedule that was flown by Nancy Tier. "You started in Dearborn, Michigan," Tier recites, "flew on to Kalamazoo for lunch, then flew to Chicago and stayed overnight. Milwaukee, Eau Claire, Wasau, you kept going for sixteen days, regardless of weather. You were trying to show you could maintain your pace despite the weather. Down the Rockies, Great

Falls, Sheridan, Colorado Springs, Cheyenne, Garden City, Kansas."

In 1930, she listed her occupation as "aviation air pilot." She also entered the Women's Dixie Derby, 2,000 mile air race from Washington, D.C., to Chicago, Illinois.

In 1931, she received her Transport license and in 1933 flew solo coast-to-coast.

She joined the Civil Air Patrol in 1942, and served for over 18 years. She flew unarmed Civil Air Patrol bomb patrols during WWII in what she described as "...those little yellow CAP planes the Germans did not like to see."

In her Civil Air Patrol career, she rose to the rank of colonel to become the first female CAP Wing Commander in the Connecticut wing.

To her, one of her most important achievements was the creation of the International Women's Air and Space Museum in 1986, where she remained president until 1994. She died in 1997.



CAP photo

BUILD THE PIPER J-3

Students and cadets will build one of aviation's most famous airplanes, the Piper Cub. This was also the first airplane used by the Civil Air Patrol during its World War II patrol. Nancy Hopkins Tier flew a Piper J-3 Cub on anti-submarine patrol missions. This is one of two versions of the Piper J-3 in this booklet. The other is on Page 80.

BACKGROUND

A man by the name of Gil Taylor, and his brother, established the Taylor Brothers Aviation Corporation in 1929. One of their most famous designs was known as the Taylor Cub and it first flew in 1930. The company had a difficult time during the Great Depression and, in 1937, an oilman by the name of William T. Piper took over the ownership and formed the Piper Aircraft Corporation. When first produced by Piper, the Cub was powered by a 40-horsepower Continental A40-4 engine. A very successful version, especially popular during World War II, was powered by a 65-h.p. engine. This had the designation of J-3C-65, but was more commonly known as the J-3 Cub.

Just before entry into World War II, the United States government implemented what was known as the Civilian Pilot Training Program. The aircraft of choice for the "CPT" was the Piper Cub. In 1940, 3,016 Cubs were built and at the wartime peak, a new one left the factory every 20 minutes. It was recorded that over 50,000 trainees began their flight training in Piper Cubs during WWII.

In 1941, the U.S. Army selected the Cub for artillery spotting. It was soon learned that this versatile airplane had capabilities far beyond the Army's initial expectations. The Army's version, modified for various tasks, was known as the L-4 and designated the "Grasshopper." The U.S. Navy had a number of these airplanes designated the NE-1.

Specifications for the 65-h.p. version gave it a maximum speed of 85 mph, and a service ceiling of 12,000 feet. The range was just under 200 miles and the gross weight was 1,220 pounds. The airplane had a 35' 2"

wingspan and a length of 22' 3".

Civil Air Patrol has a history with this airplane that dates back to WWII. During this time, civilian pilots flew their private aircraft, many of which were Piper Cubs, in patrol along the Atlantic Coast. They conducted exhaustive searches for German submarines, known as U-boats. When a U-boat was sighted, CAP pilots would call in air strikes. German U-boat commanders quickly realized the threat of these tiny aircraft.

Many U-boats would crash-dive upon sighting a CAP aircraft. Some of the submarine crews would try to shoot them down, and, as a result, the Army Air Corps began arming the CAP airplanes with bombs. During the war, two German U-boats were sunk by CAP air crews. If a CAP airplane was shot down, and several were, there was little chance for survival in the cold Atlantic. As a result of this threat, CAP developed a program of search and rescue, which remains one of its three main missions to this day.

Because of the nature of the mission of the early CAP air crews, they became known as the "Flying Minutemen!" They would leave their homes in the morning, go fight in a war during the day, and return for dinner in the evening. This is how the "minutemen" fought during the Revolutionary War.

After the German surrender in 1945, one of Hitler's high-ranking naval officers was asked why the Nazi U-boats had been withdrawn from the U.S. coastal waters early in 1943. The answer: "It was because of those damned little red and yellow airplanes!" (quoted from Robert E. Neprud's publication, *Flying Minutemen*).

ABOUT THE PLANE

GENERAL CHARACTERISTICS

- **Crew:** 1
- **Length:** 22 ft. 5 in (6.83 m)
- **Wingspan:** 35 ft. 3 in (10.74 m)
- **Height:** 6 ft. 8 in (2.03 m)
- **Wing area:** 178.5 ft.² (16.58 m²)
- **Empty weight:** 765 lb. (345 kg)
- **Max takeoff weight:** 1,220 lb. (550 kg)
- **Powerplant:** 1 × Continental A-65-8 horizontally opposed four cylinder air-cooled, 65 hp (48 kw) at 2,350 rpm

PERFORMANCE

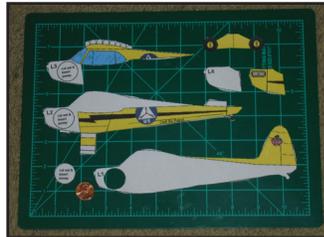
- **Maximum speed:** 87 mph (140 km/h)
- **Cruise Speed:** 75 mph (121 km/h)
- **Range:** 220 miles (354 km)
- **Service ceiling:** 11,500 ft. (3,500 m)

MATERIALS:

1. Pattern printed on white heavy index card stock
2. 1 U.S. penny, one 2 Euro cent piece, lead foil or other suitable weight (approx. 2.5 grams) for use as a nose weight
3. 1 pair of scissors
4. Stick glue (Elmer's Glue will work but it tends to be a little messy)
5. Ruler or straight edge

PROCEDURE:

1. Rough cut all pieces to separate.
2. Carefully cut out all pieces.
3. Use a U.S. penny as a nose weight. Cut out penny slot in L1, L2, L3, R1, R2, & R3.
Note: If a United States one cent piece is unavailable, find a weight of approx. 2.5 to 3 grams. (A two Euro Cent coin works fine.)
4. Glue L1 and R1 together.
5. Fold up horizontal stabilizer tabs and crease the landing gear brace on R2 & L2. (See drawing on the pattern.)
6. Glue L2 to L1 and R2 to R1.
7. Fold up main wing tabs on R3 & L3 before gluing to R2 and L2.
8. Insert penny and glue R4 to R3 and L4 to L3.
9. Glue R5 to R4 and L5 to L4.
10. Fold under the "wing stiffener portion" of the wing and glue to main wing. Note: At this point, if time is available, press main wing and fuselage under a heavy book and allow to dry overnight.

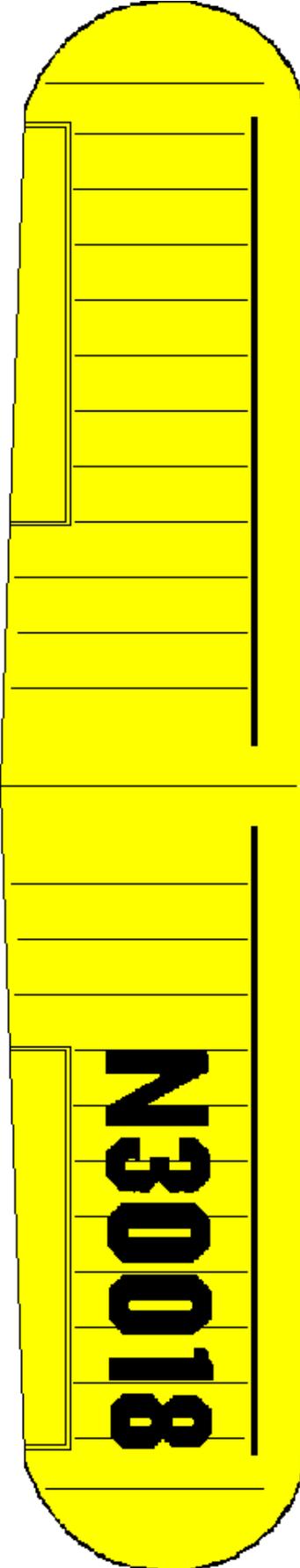


11. Cut slots in leading and trailing edge in the main wing at the wing root.
12. Warp the leading edge of the main wing and make a slight dihedral (upward angle from horizontal of wings).
13. Fold up and glue the first section of the landing gear brace to the fuselage.
14. Fold the other three sections of the brace around and under and glue the bottom section to the fuselage forming a triangle.
15. Glue the three sections of the main landing gear together.
16. Crease the landing gear at the center and bend slightly.
17. Crease and fold down the main gear wheel pants so that they are straight up and down.
18. Glue main gear to the landing gear brace.
20. Attach the main wing to the tabs on the fuselage.
21. Attach the top window piece over the cuts in the main wing.
22. Insert the horizontal stabilizer in the slot at the tail of the fuselage and glue to the tabs.
23. Trim, fly and enjoy.



“ Ever since I was in high school, I had just one determination — to fly. I don't know why either. ”

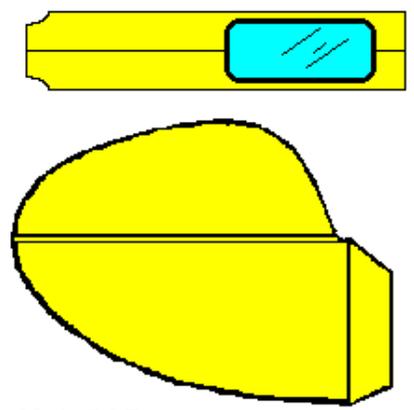
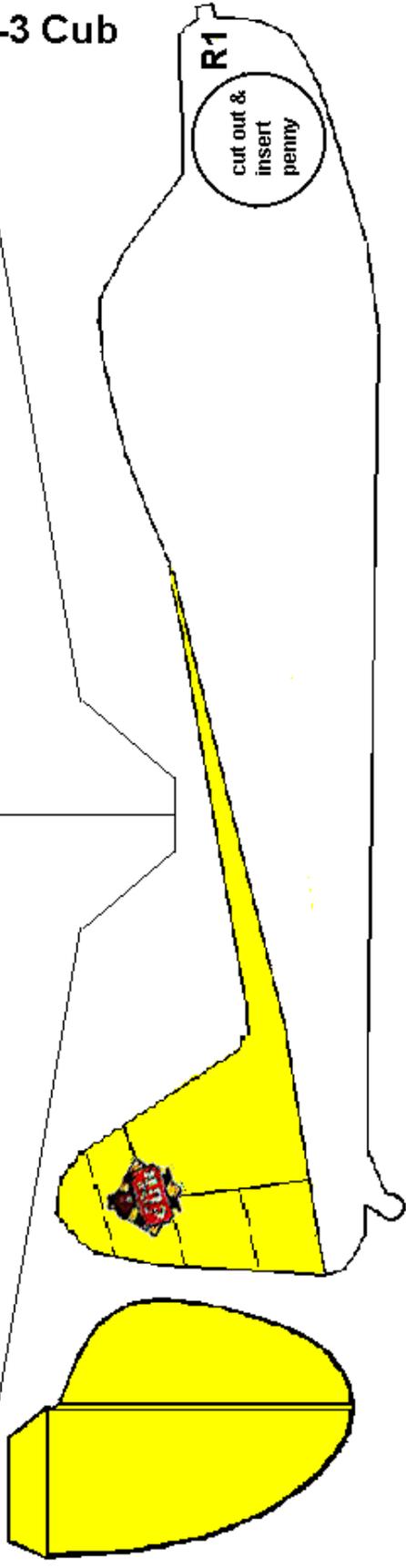
— Nancy Hopkins Tier



Piper J-3 Cub

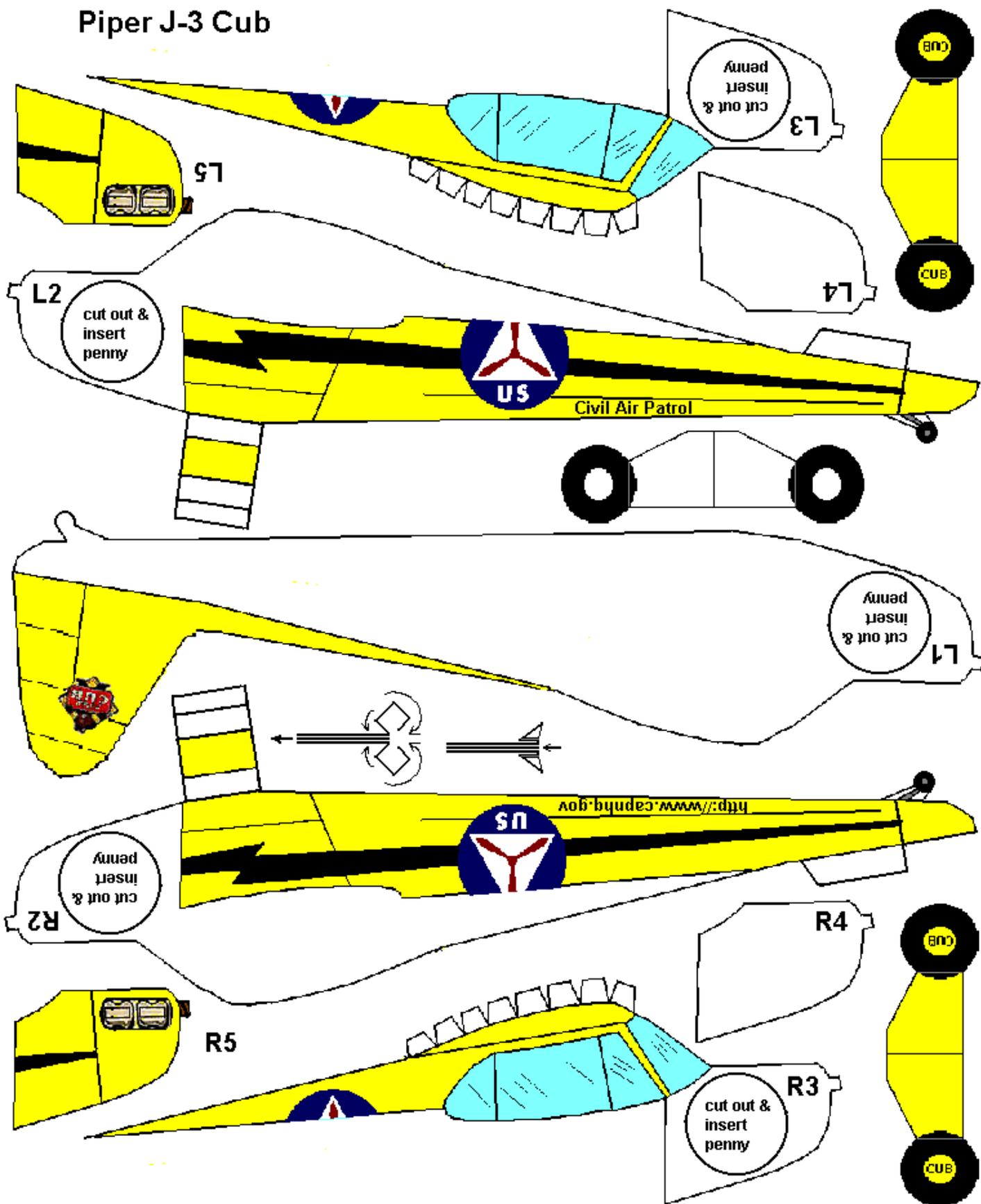
This J-3 Cub and other flying card models can be downloaded free of charge from the website <http://internet.cybermesa.com/~bjackson>

During WWII, the Civil Air Patrol used aircraft like this Piper J-3 Cub in homeland security operations along the Atlantic Coast.



designed by William H. Jackson, Maj, CAP

Piper J-3 Cub



designed by William H. Jackson, Maj, CAP



EXTENSION

Flying schedules for test pilots in the 1930s were rigorous. Below is the first segment of a sixteen-day trip Nancy Hopkins Tier once described.

NANCY HOPKINS TIER'S TRIP: Dearborn Michigan to Kalamazoo, Michigan (lunch)
Kalamazoo, Michigan to Chicago Illinois (overnight).

Using the map on the next page, label Tier's journey and compute the distance in miles.

- PRESENT DAY CONNECTION:**
- Research hour limits to which commercial pilots today must adhere.
 - Plot the longest flight you or a member of your family has ever taken.
 - Plot a flight to a place in the country you would like to visit.

REFERENCES

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2. Flowers, John (2015, January 25). Pioneering pilot earns belated praise from her country, Addison County Independent. Retrieved from <http://addisonindependent.com/201501pioneering-pilot-earns-belated-praise-her-country>
3. Our History. Retrieved from <https://www.ninety-nines.org/charter-members.htm>
4. Vecsey, George, & Dade, George C. (1979). Getting Off the Ground. New York: E.P. Dutton.



nationalmuseum.af.mil



U.S. MAP FOR
EXTENSION EXERCISE

