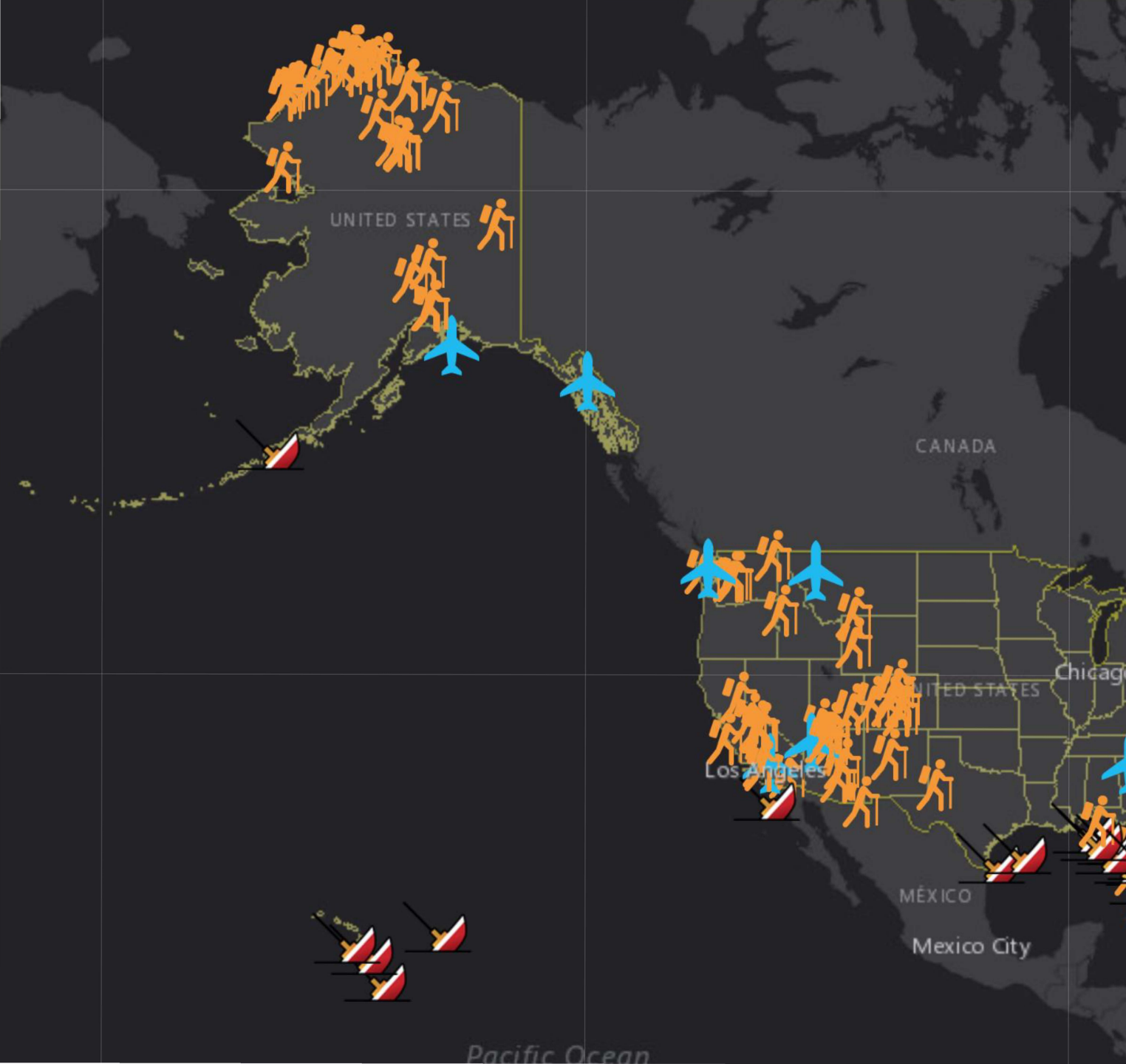


An aerial photograph of a dense green forest. In the lower-left quadrant, a red and white inflatable rescue raft is visible, partially obscured by the trees. The raft is oriented horizontally, with its bow pointing towards the left. The surrounding forest is thick and vibrant green, with some lighter patches of ground visible. The overall scene suggests a search and rescue operation in a remote, wooded area.

TAKING THE SEARCH OUT OF SEARCH AND RESCUE

**HOW NASA IS IMPROVING
FINDING PEOPLE IN DISTRESS**

*By Tony Foster
Search and Rescue
Deputy Mission Manager
July 23, 2019 - AirVenture 2019*



53

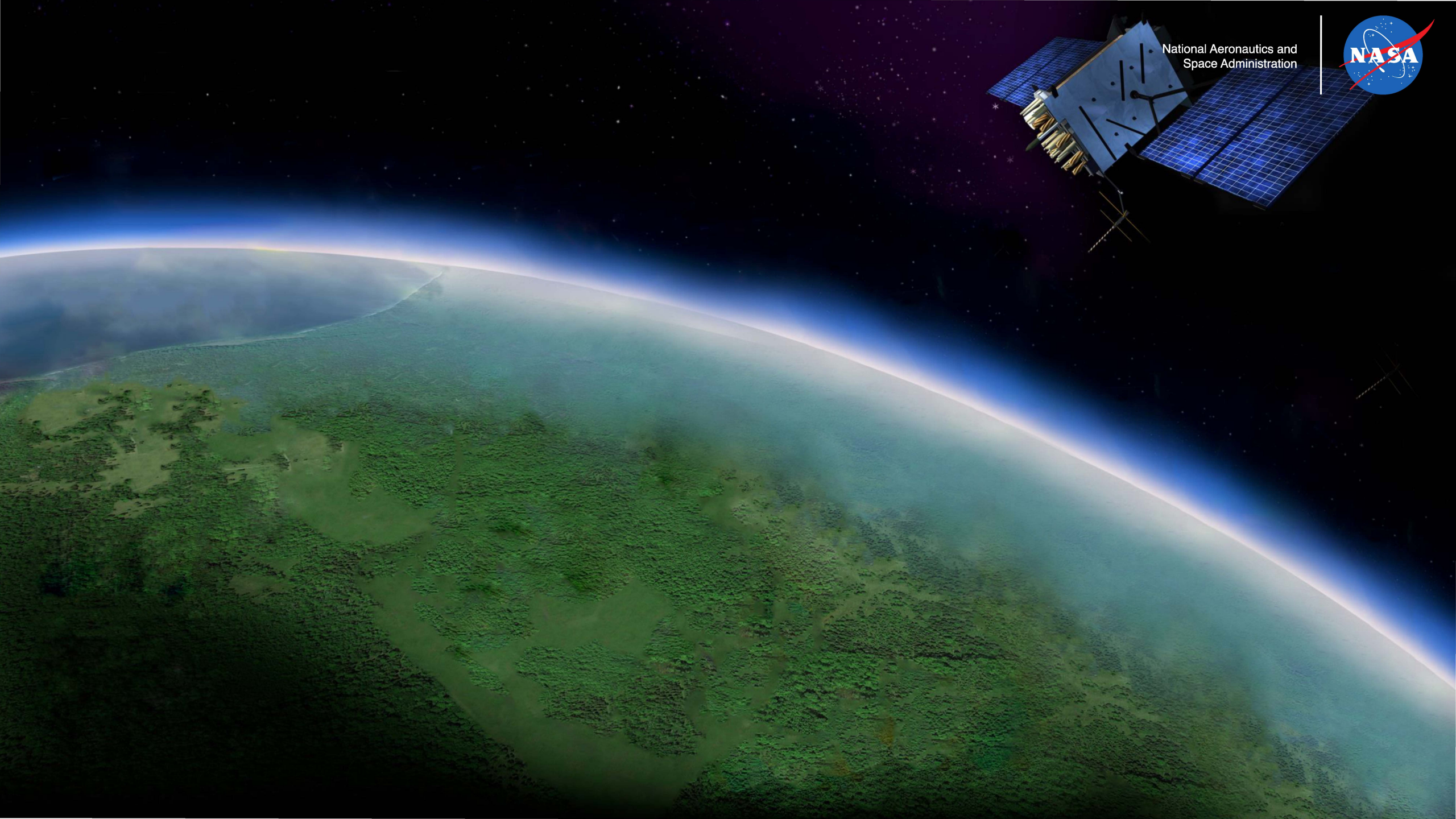
SOME STATISTICS...
PEOPLE RESCUED
SINCE JANUARY
IN THE UNITED STATES

RESCUED
IN 2018

340

43,000+

RESCUED WORLDWIDE
SINCE 1982



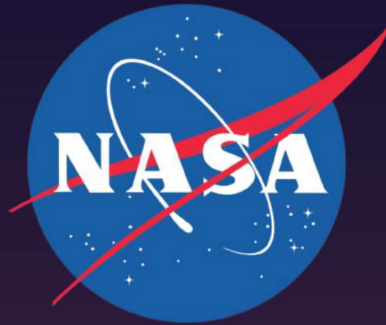
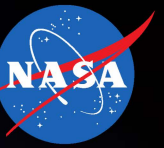
National Aeronautics and
Space Administration



NASA'S ROLE

in search and rescue

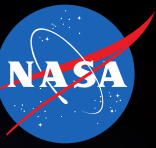
National Aeronautics and
Space Administration



THE POWER OF MEOSAR

our new system

National Aeronautics and
Space Administration



Near instantaneous beacon detection and location,
globally, at all times

Advanced location process using time and frequency
measurements of beacon signal to triangulate its location

Mitigates terrain blockage due to multiple look
angles from multiple moving satellites

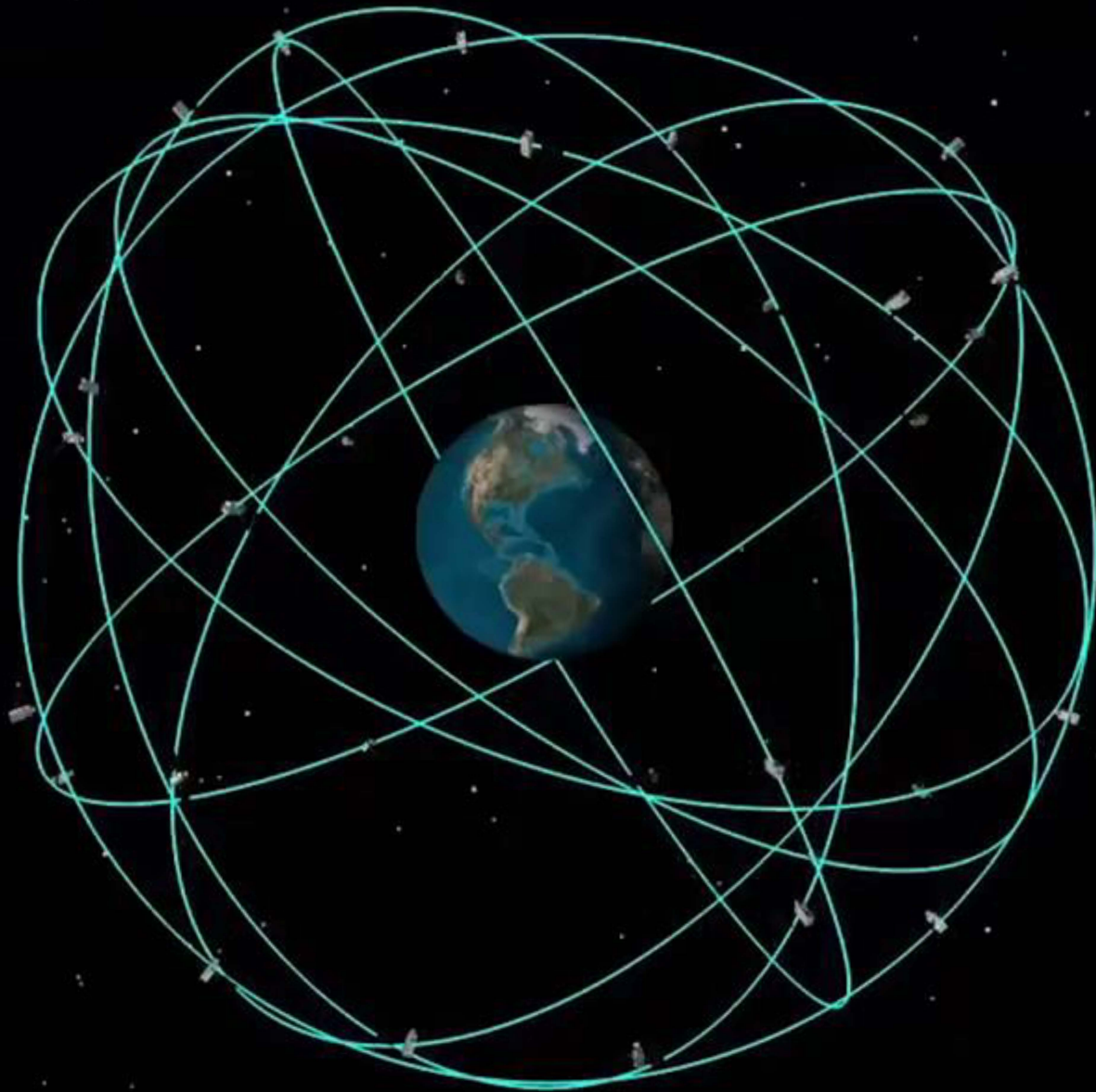
Robust space segment, well maintained
and highly redundant

Simple space segment repeater allows for
development of higher performance beacon signal

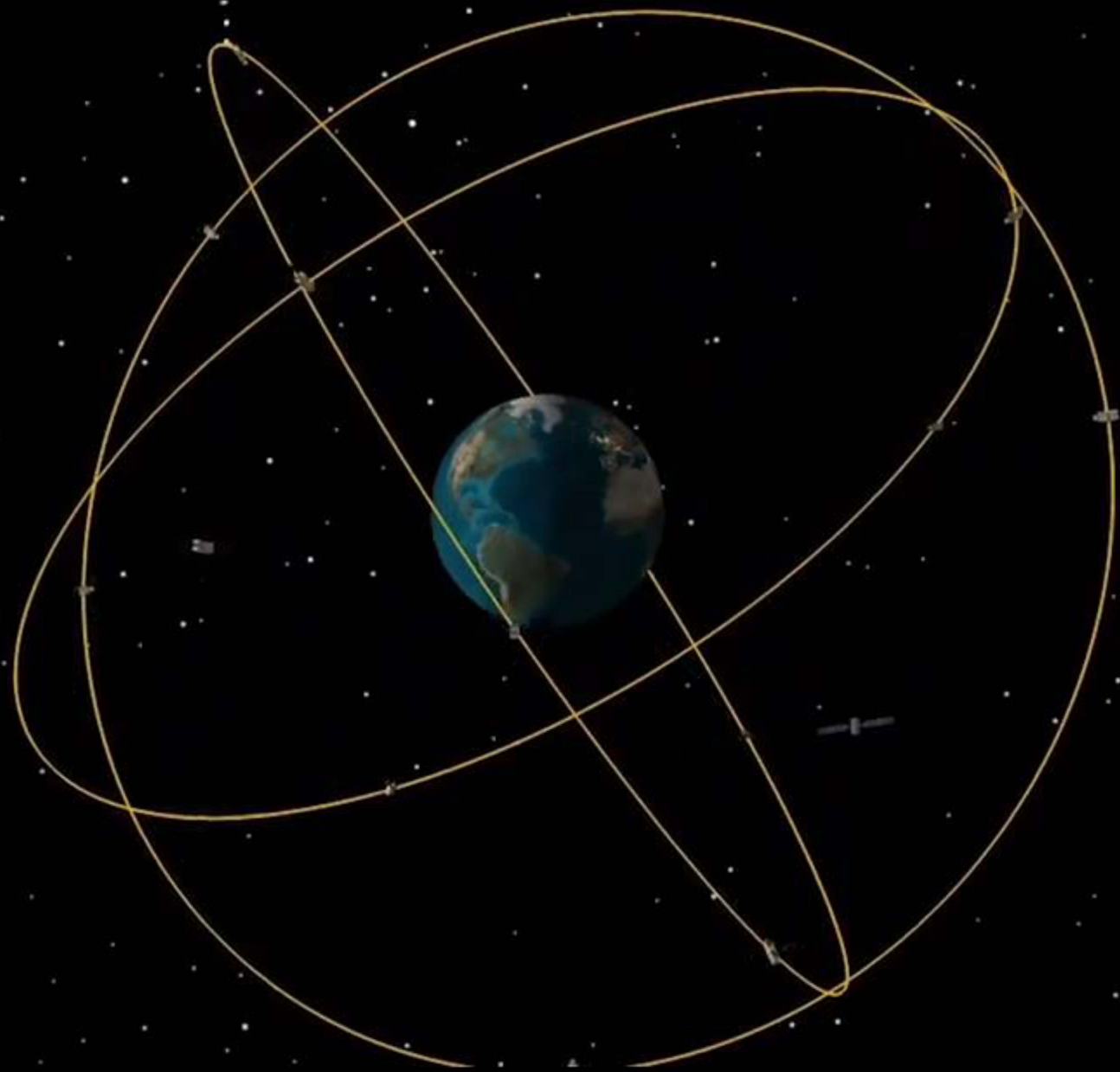




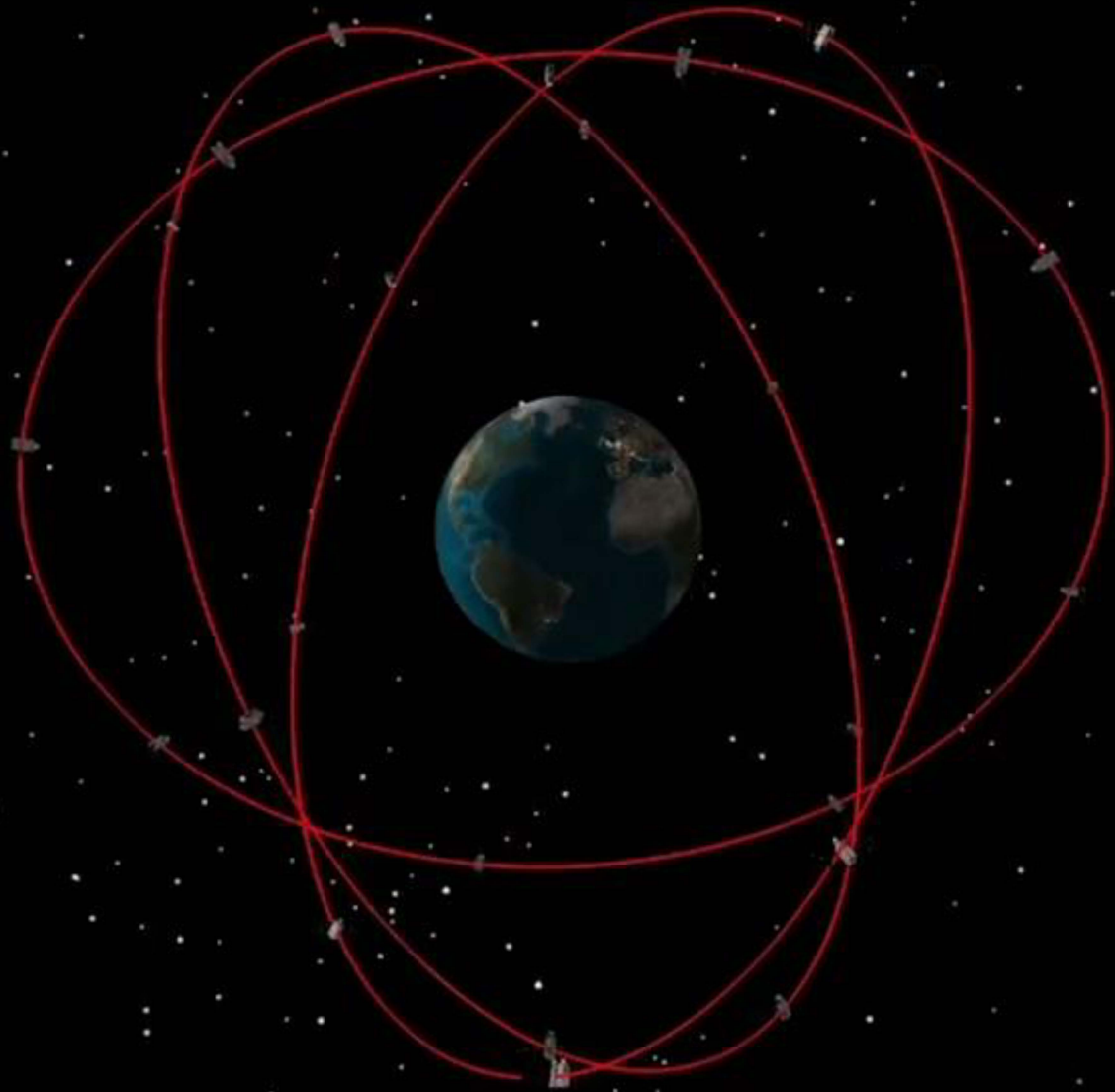
THE SPACE SEGMENT



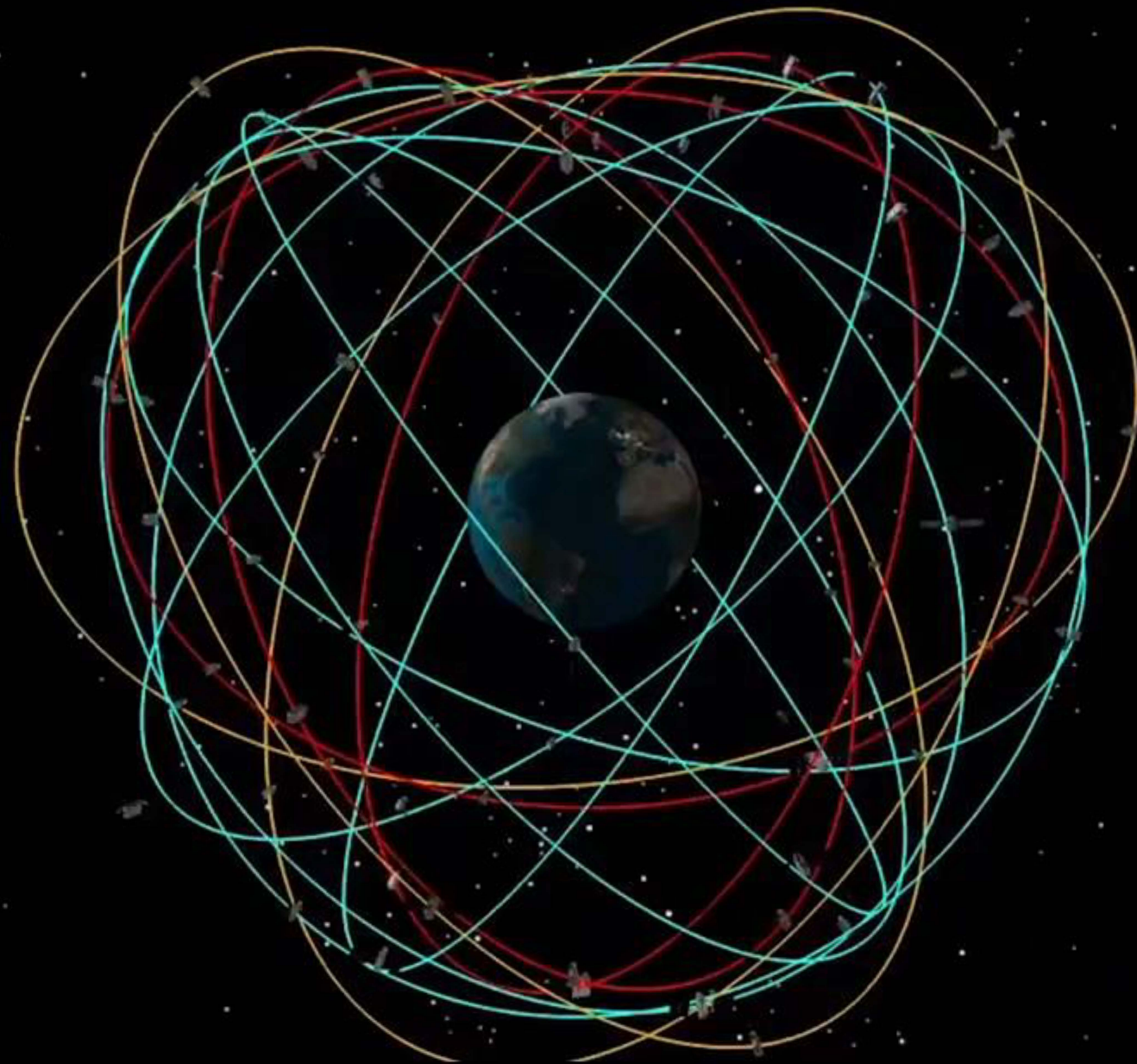
SAR/GPS



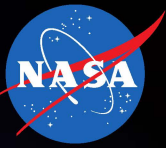
SAR/GALILEO



SAR/GLONASS



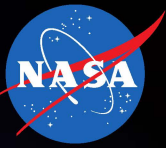
SAR/GNSS
Constellations



THE GROUND SEGMENT

THE SAR LAB

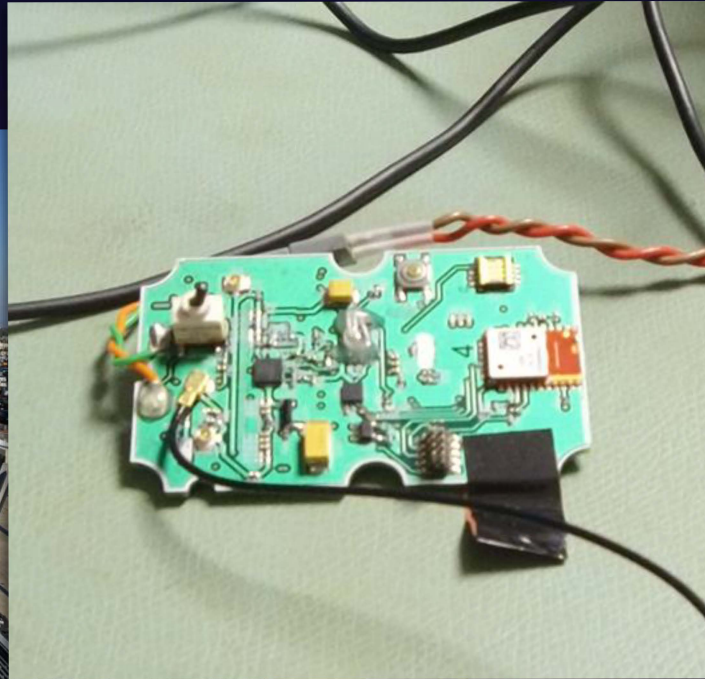
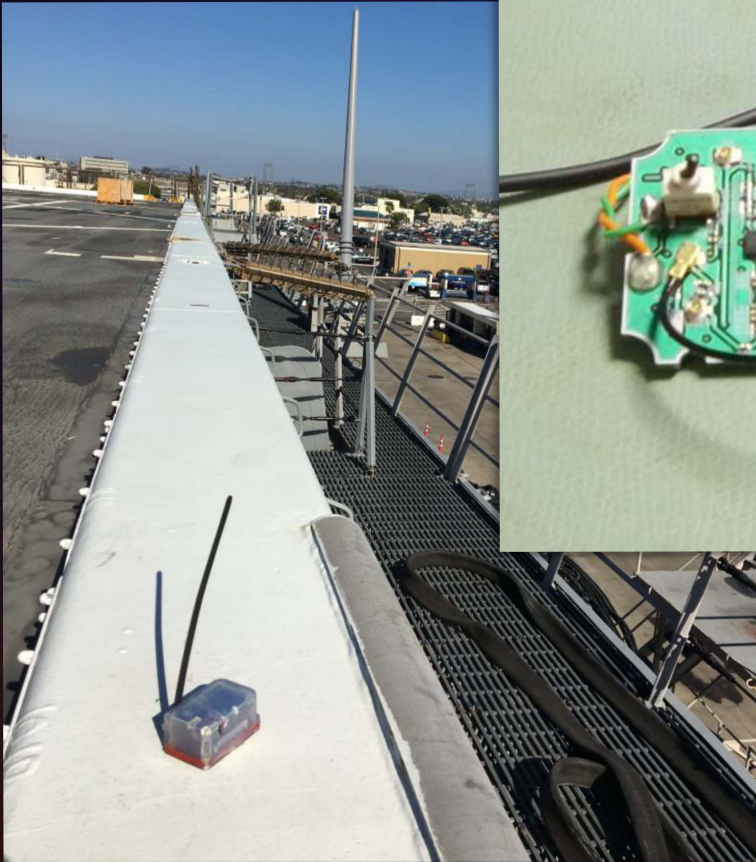




THE BEACON SEGMENT

NEW SECOND GENERATION BEACONS EQUAL:

Better accuracy
More data transmitted
Higher performance



SECOND GEN BEACONS

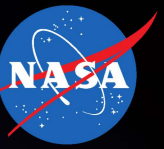


Capitalize on MEOSAR space segment
and improve system performance

- Detection probability, location accuracy and system capacity
- First burst location
- Intelligent transmitting
- Collaborate with manufacturers to obtain the most competitive end product
- Return Link Service: automatic acknowledgment, where return link message sent automatically when location of alert has been confirmed
- Cancellation function

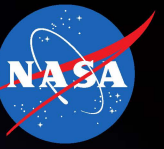






NASA'S ANGEL BEACONS

NASA astronauts
will be ANGEL's
first users



OPEN WATER TESTING WITH THE UNITED STATES COAST GUARD





OUTDOOR POOL TESTING

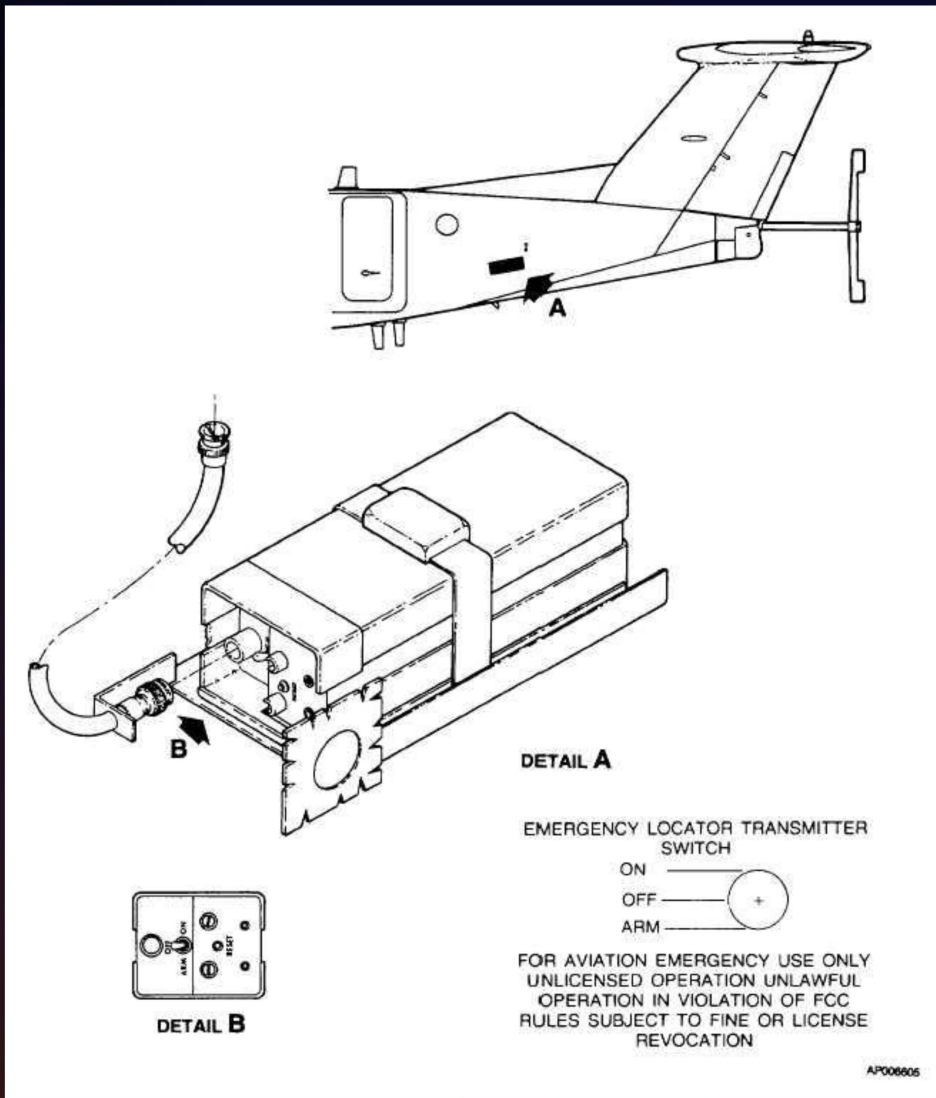


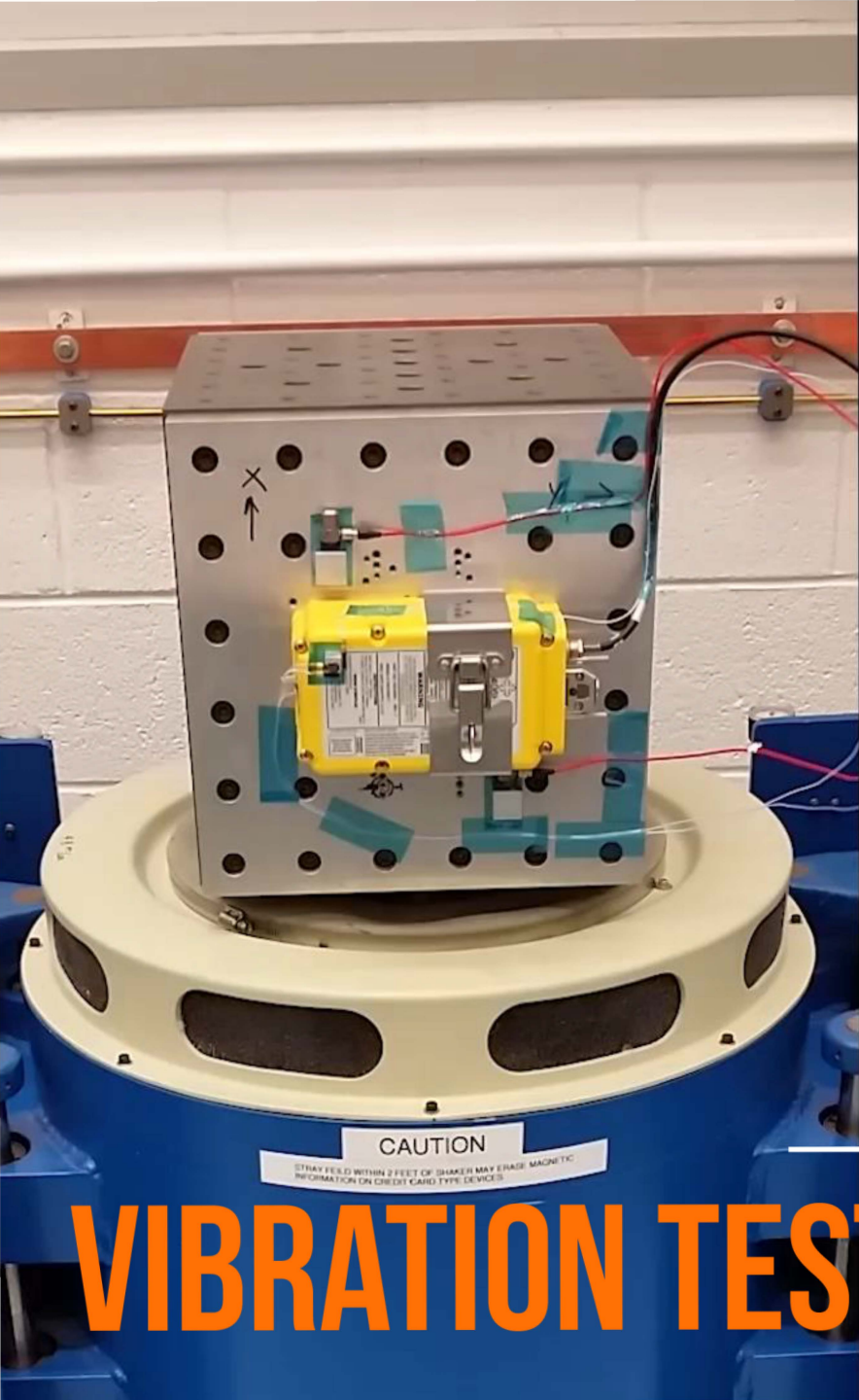
THE KEY TO SURVIVING A PLANE CRASH...

*is to have the right
equipment,
installed properly.*



WHAT IS AN ELT?





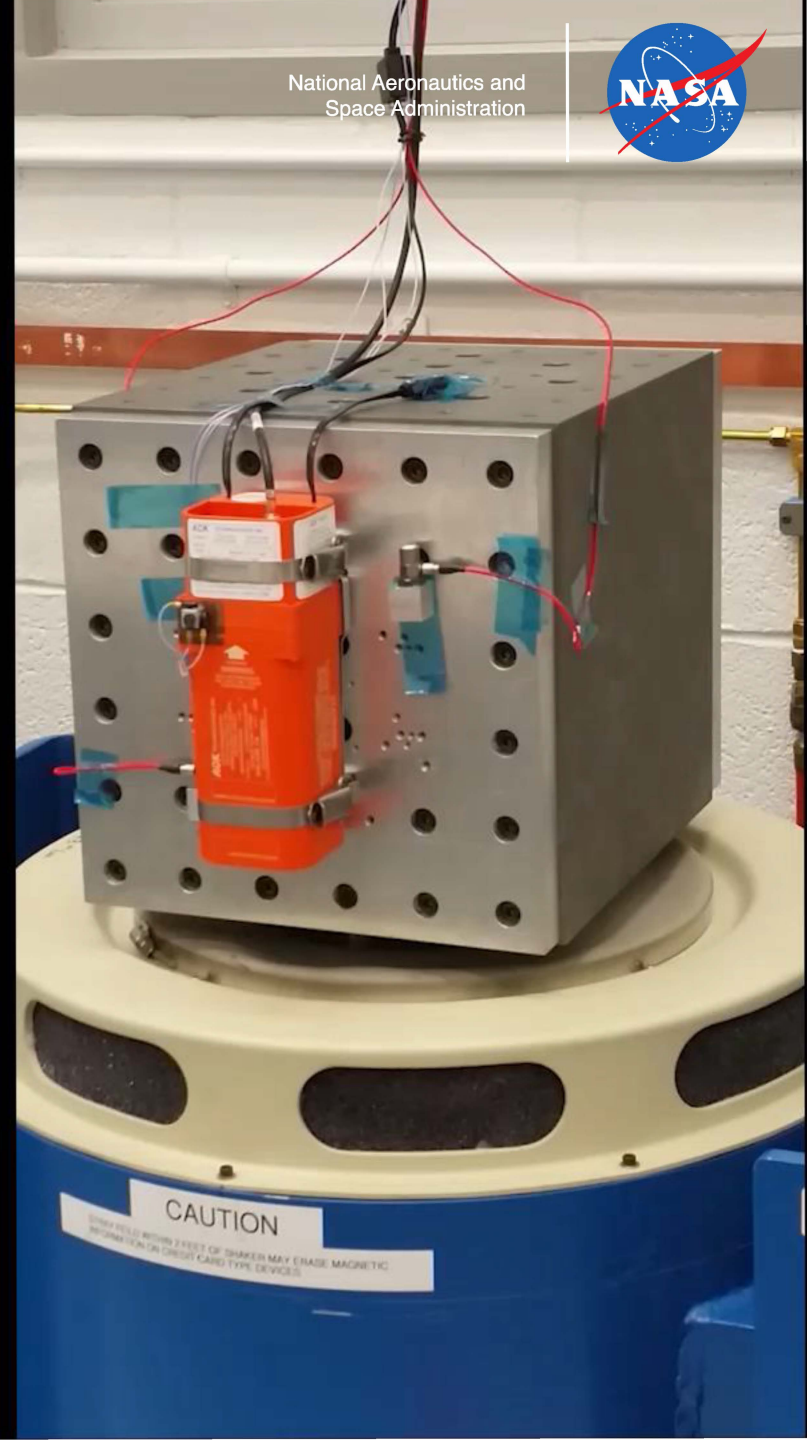
CAUTION
STRAY FIELD WITHIN 2 FEET OF SHAKER MAY ERASE MAGNETIC
INFORMATION ON CREDIT CARD TYPE DEVICES

VIBRATION TESTING



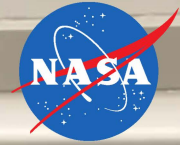
CAUTION

CAUTION

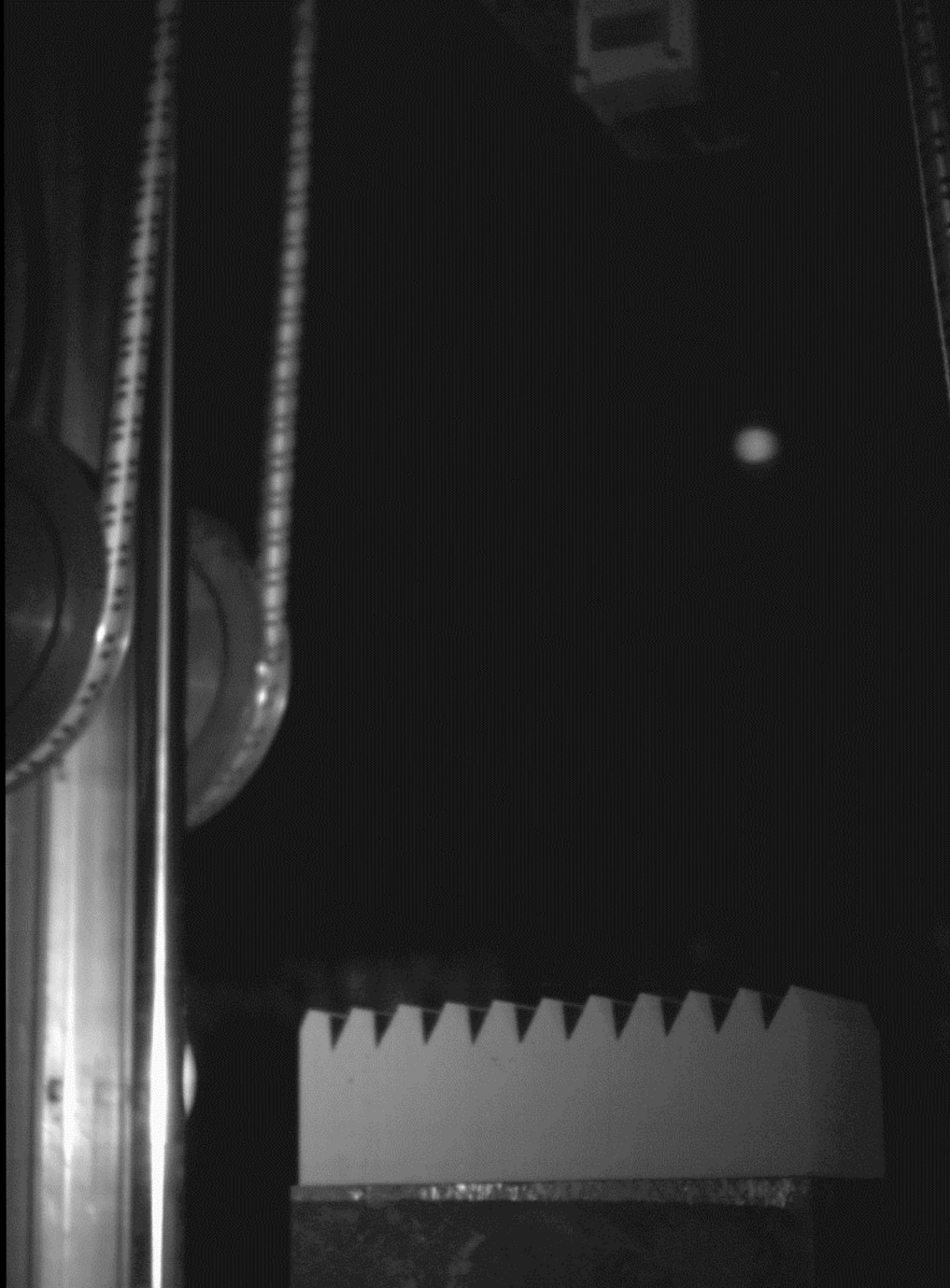
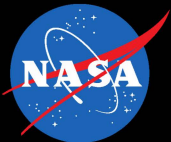


CAUTION
STRAY FIELD WITHIN 2 FEET OF SHAKER MAY ERASE MAGNETIC
INFORMATION ON CREDIT CARD TYPE DEVICES

National Aeronautics and
Space Administration



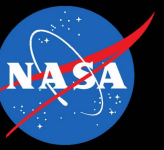
DROP TESTING



Wed Aug 20 2014 10:04:27.762 016 utc.S

FIRE TESTING

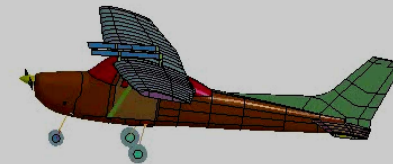
National Aeronautics and
Space Administration



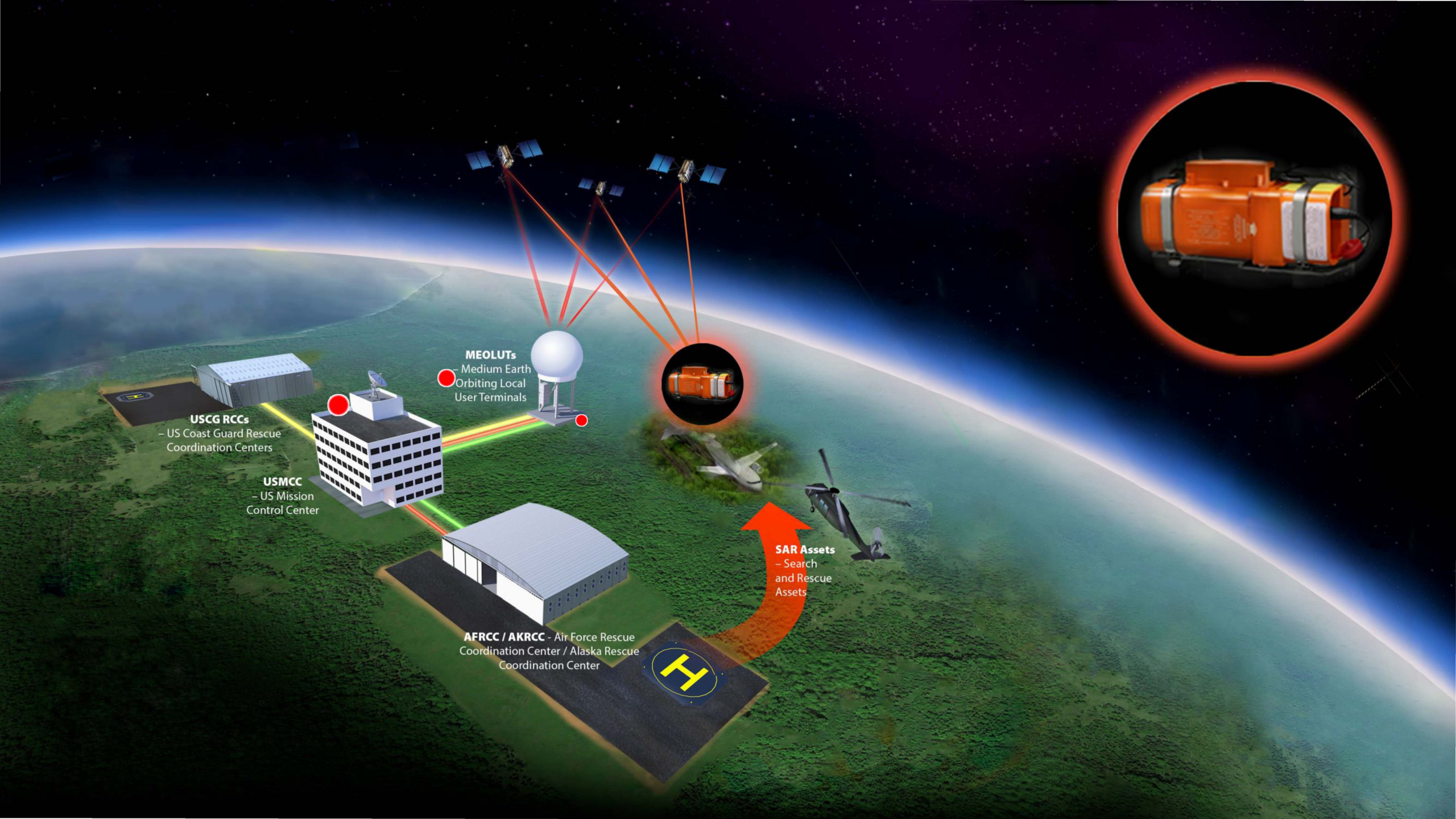
CRASH SIMULATION

Case 10 - Swept Wing Cruise into soil April 7, 2016

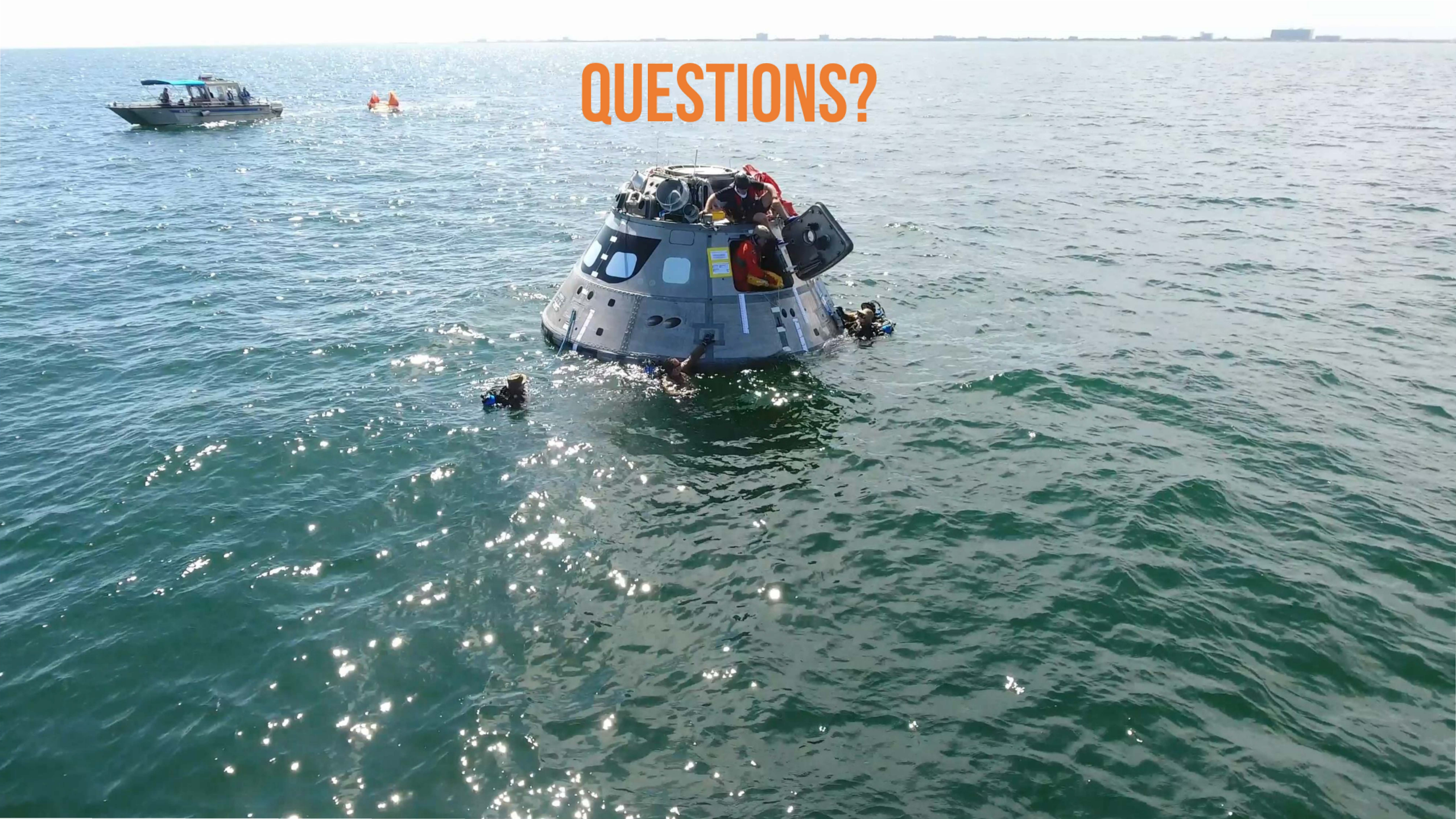
Time = 0







QUESTIONS?



FOR FURTHER INFORMATION...

ESC - Search and Rescue

<https://esc.gsfc.nasa.gov/sar>

SARSAT-NOAA

<https://www.sarsat.noaa.gov/>

COSPAS-SARSAT

<https://www.cospas-sarsat.int/en/>

Emergency Locator Transmitter Survivability & Reliability Study 2017

<https://ntrs.nasa.gov/archive/nasa/casi.ntrs.nasa.gov/20170002586.pdf>

