

## Today's Class: Projects Mercury & Gemini

1. Reading: [http://en.wikipedia.org/wiki/Apollo\\_program](http://en.wikipedia.org/wiki/Apollo_program)
2. Homework #2 is due on Wednesday.
3. Exam #1 next Monday, Sep. 21.
4. **Complete Daily Health Form**



John Glenn – First American to orbit the Earth.

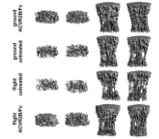
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1

## Space in the News: Buff space mice could stop astronauts from losing bone and muscle mass

Presented by: Jackson Wolle

- Astronauts can **lose up to 20%** of their muscle mass in ~ **2 weeks**
- This treatment blocks a protein that limits muscle growth
- The mice **with treatment didn't lose any muscle mass** on their trip in space, in some cases they even **gained muscle**
- Still takes time, could be years before any use on humans
- **Question: Are there any implications to using genetic modifying to explore space? To what extent should we stop?**



<https://www.space.com/mice-muscle-bone-loss-microgravity-myostatin.html>

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2

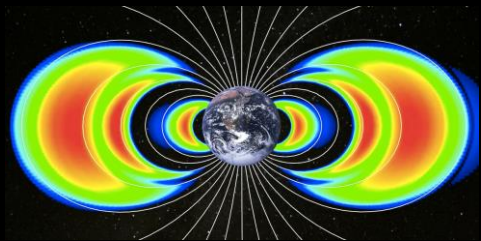
## Last Class

- **Early history of satellite programs** – success for USSR, failures for US.
- **US Explorer 1 satellite** – technology & science!
- **Discovery of Van Allen Radiation Belts** – Driven by activity from the Sun, solar wind
- **NASA's recent Van Allen Probes** – Discovery of new radiation belt

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3

## Van Allen Probe Data Assimilation: Three Radiation Belts



Courtesy of: Grant Stephens and Sasha Ukhorsky

4

## Class Exercise

Satellites in low-Earth orbits are more likely to crash to Earth near *solar activity maximum* because

- a) it is too dangerous to send humans to service satellites during solar maximum.
- b) Earth's upper atmosphere tends to expand during solar maximum, exerting drag on satellites in low orbits.
- c) of increased magnetic interference.
- d) they are more likely to have their electronics "fried" by a solar flare during solar maximum.

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5

## Class Exercise

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6

## Today's Class

- USSR first again – 1<sup>st</sup> man in space.
- Project Mercury
  - Program goals
  - First U.S. astronauts
  - Shepard & Glenn
- Project Gemini – bridge to the Moon

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7

## USSR with First Man in Space



First man in space, April 1961  
Yuri Gagarin, 1934-1968


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8

## Project Mercury Goals

Initiated in 1958, completed in 1963, Project Mercury was the United States' first human-in-space program. The objectives of the program, which made 6 manned flights from 1961 to 1963, were specific:

- To orbit a crewed spacecraft around Earth
- To investigate a human's ability to function in space
- To recover both astronaut and spacecraft safely



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9

## Mercury 7 Astronauts

Selected April, 1959



- [M. Scott Carpenter](#) - Mercury-Atlas 7 (deceased, Boulder native!)
- [L. Gordon Cooper](#) - Mercury-Atlas 9, Gemini 5 (deceased)
- [John H. Glenn Jr.](#) - Mercury-Atlas 6, STS-95 (deceased December 2016)
- [Virgil I. "Gus" Grisson](#) - Mercury-Redstone 4, Gemini 3, Apollo 1 (deceased)
- [Walter M. Schirra](#) - Mercury-Atlas 8, Gemini 6A, Apollo 7 (deceased)
- [Alan B. Shepard](#) - Mercury-Redstone 3, Apollo 14 (deceased)
- [Donald K. "Deke" Slayton](#) - Apollo-Soyuz Test Project (deceased)

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10

## Astronaut Alan Shepard – First American in Space

(1923-1998)



Launch of Freedom 7 on Redstone rocket  
May 5, 1961

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11

## Class Exercise

In 1961, the U.S. had completed only a single sub-orbital flight. How do we get to the Moon?

- Working with your neighbor in class, construct a list of challenges to overcome & space technologies to develop to permit astronauts to travel to the Moon by 1969.

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12

## Project Gemini – Bridge to the Moon

After Kennedy declared in 1961 the U.S. goal of reaching the Moon, Gemini was created as a bridge between Mercury & Apollo. The Goals included:

- To subject astronauts to long duration flights- a requirement for trips to the Moon;
- To develop methods of rendezvous & docking with other orbiting vehicles;
- To perfect methods of reentry & landing the spacecraft at pre-selected land-landing point;
- To gain additional information concerning the effects of weightlessness on crew & to record physiological reactions during long duration flights.

Program concluded in 1966 after 10 flights.



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13

## Images from Project Gemini



Commander Neil Armstrong (right) and pilot David R. Scott prepare to board the Gemini-Titan VIII.

Astronauts Edward H. White II (left) and James A. McDivitt inside the Gemini IV spacecraft wait for liftoff.

Mission Control during Gemini

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14

## What have we learned?

- **USSR first again** – 1<sup>st</sup> man in space.
- **Project Mercury**
  - Program goals
  - First U.S. astronauts
  - Shepard & Glenn
- **Project Gemini** – bridge to the Moon

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15