Biological weapons, and other bits

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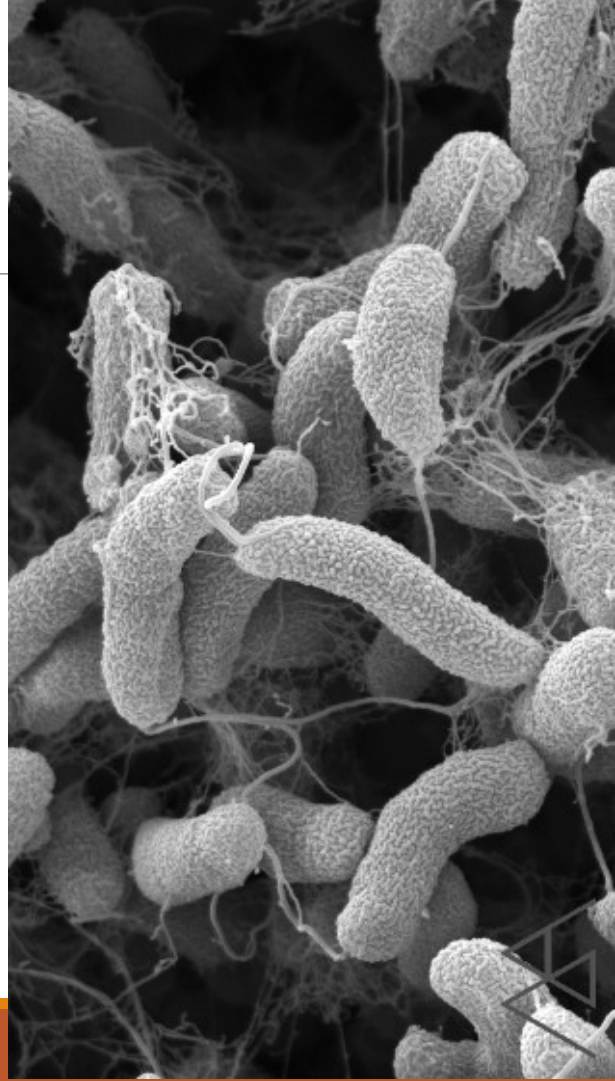
Types

- bacteria
  - anthrax, cholera, salmonela, tetanus, tularemia, yersinia pestis, ricketsia, typhus, Q fever, glanders
- viruses
  - encephalitis, smallpox, marburg virus, ebola
- fungis
- toxins
  - botulotoxin, ricin, enterotoxin

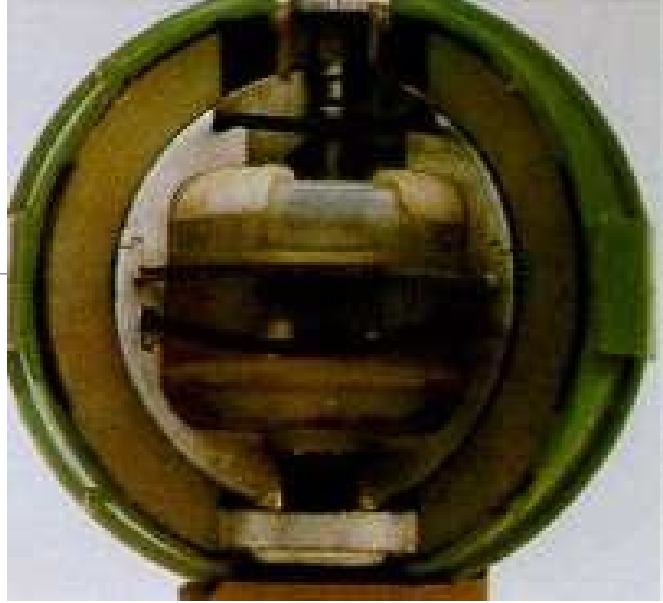
- in some cases, animals can also be considered as biological weapons (dogs, dolphins, snakes, bees, …)



Vectors of infection

- inhalation or consumption
- through blood or skin

- aerosol dispersal (trucks, planes, drones, missiles)
- detonation (problematic)
- infiltration (water, food, ventilation)
- other organisms (humans, rats, flees, mosquitos, ...)



Targets

- people
  - to kill
  - to incapacitate
- animals
  - as food
  - as transport
- plants
  - as food
  - against drugs

Strategic and tactical aspects

- operational support
- demoralize enemy
- attack population
- annihilation

- highly dependent on weather and environmental conditions
- quite unpredictable
- friendly fire
- latent and hard to detect

History

- ancient history (poisoned arrows, wells, during sieges, use of snakes and wasps, and even plague?)
- indians decimated by smallpox
- vaccination discovered 1796
- deployed during WW1
  - mostly against animals
- deployed during WW2
  - esp. by Japan in China (around 500 000 dead)
  - plans to attack USA: “Cherry Blossoms at Night”
  - other powers quite behind, eager to “learn”
- very active development during Cold War on both sides


GRUINARD ISLAND
THIS ISLAND IS
GOVERNMENT PROPERTY
UNDER EXPERIMENT
THE GROUND IS CONTAMINATED
WITH ANTHRAX AND DANGEROUS.
LANDING IS PROHIBITED
BY ORDER

Spanish Flu

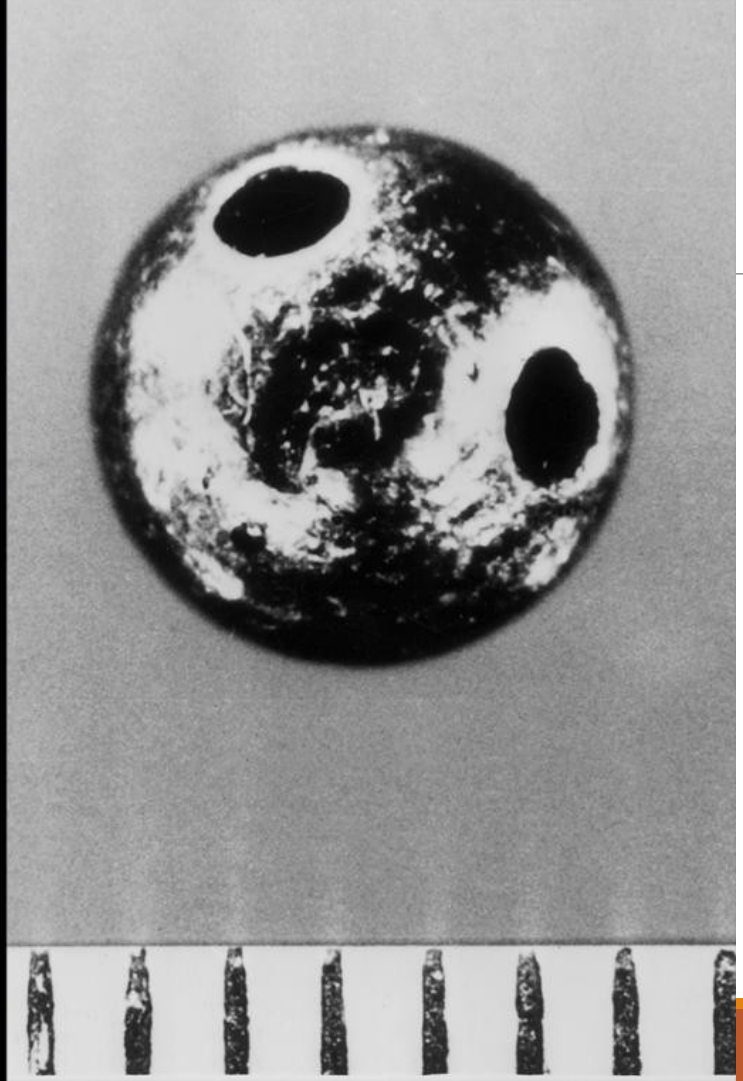
- 1918-1920
- global population around 1,75 bil.
- WW1 casualties:
  - 15-20 mil.
- WW2 casualties:
  - 40-100 mil.
- Spanish Flu:
  - 50-100 mil.

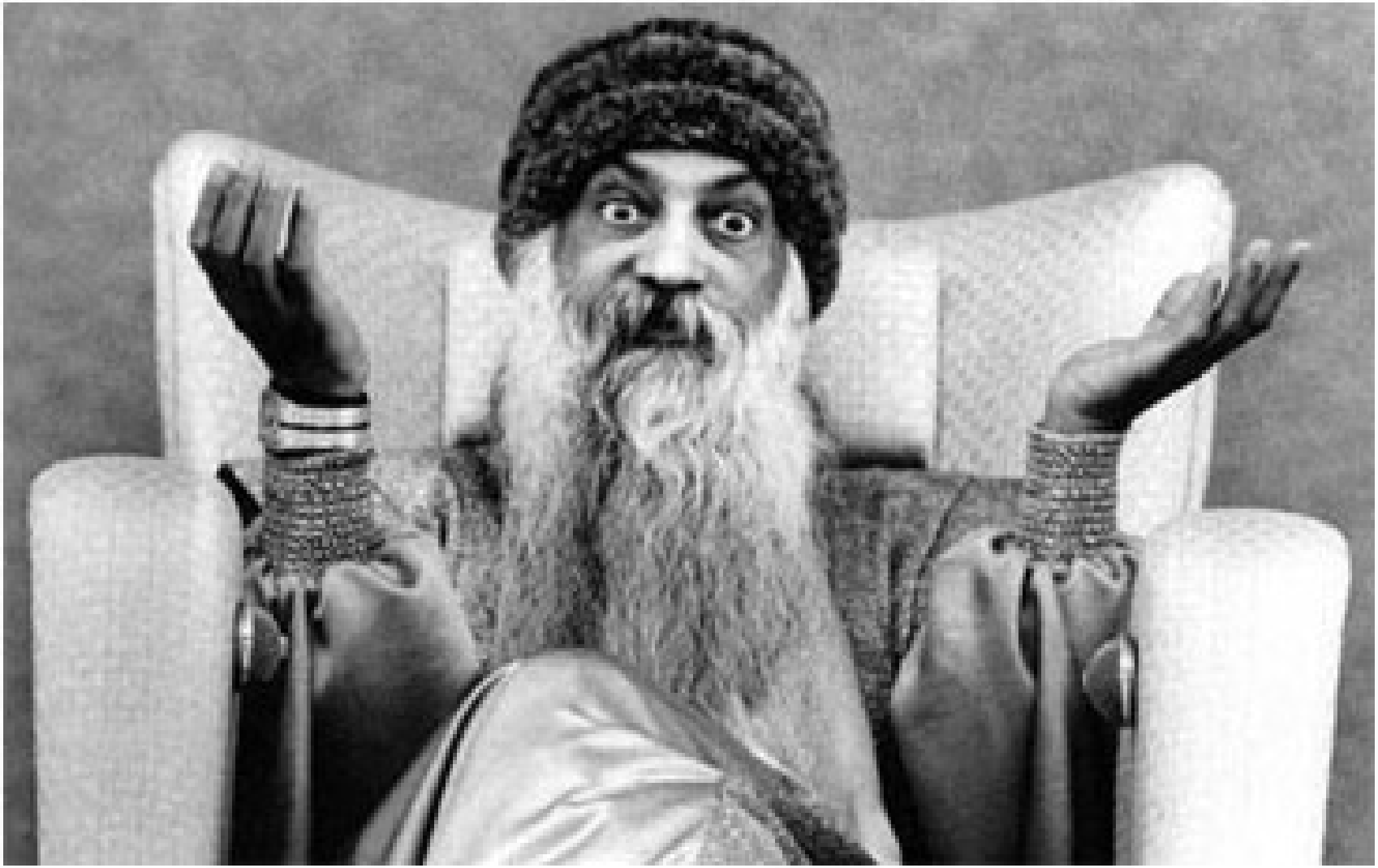
- Black Death:
  - 75-200 mil.

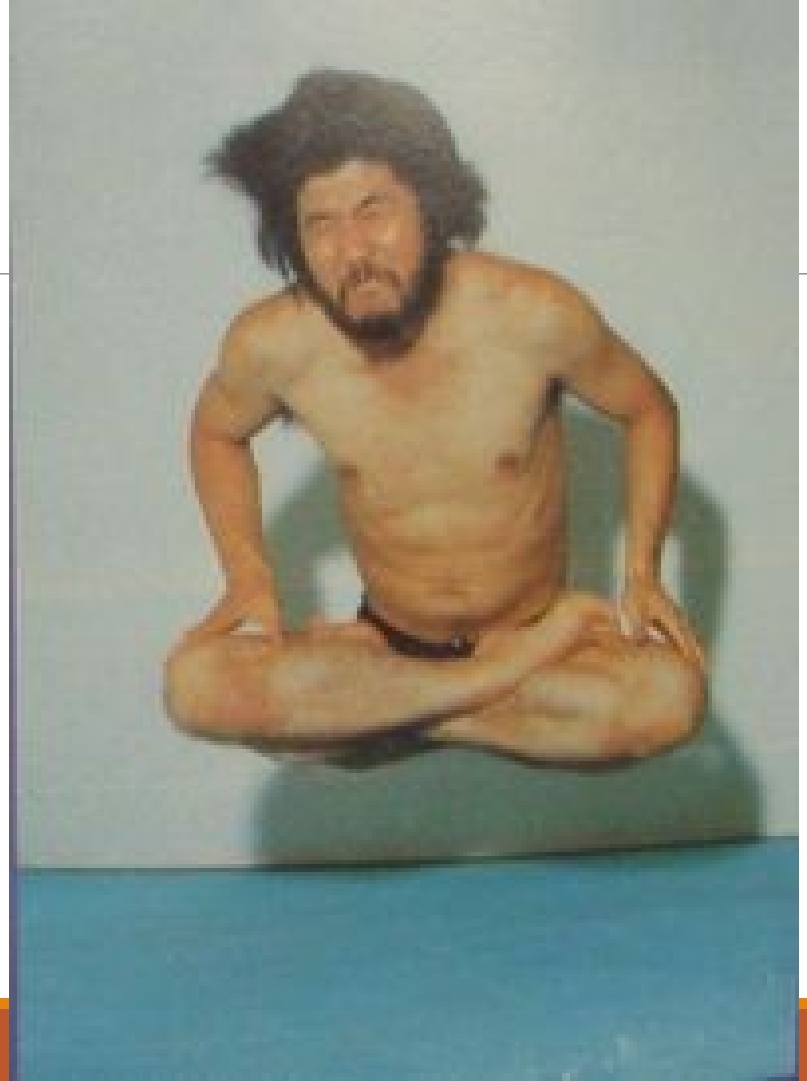
Terrorism and assassinations and others

- 1978, Bulgarian dissident, Georgi Markov killed by ricin pellet
- 1984, Dalles, Rajneesh and salmonella
  - 751 infected, 45 hospitalized
  - today known as Osho, still popular
- 1990-5, Aum Shinrikyo
  - unsuccessful attempts to deplot anthraxu, botulin and ebola
- 2001, Bruce Ivins, anthrax letters
  - 22 infected, 5 dead
  - ended with suicide, still unclear motivation

- many unfuliflled threats and plans from a number of organizations





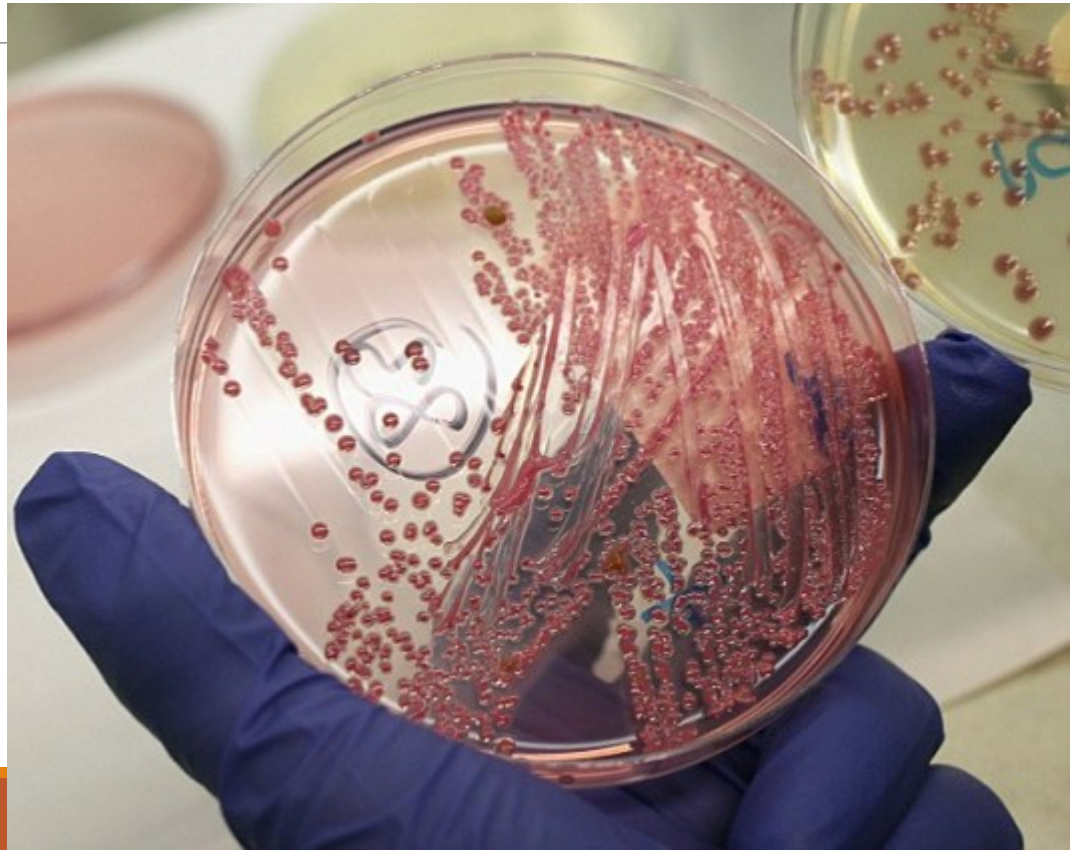


Source: FBI/AP

Current situation

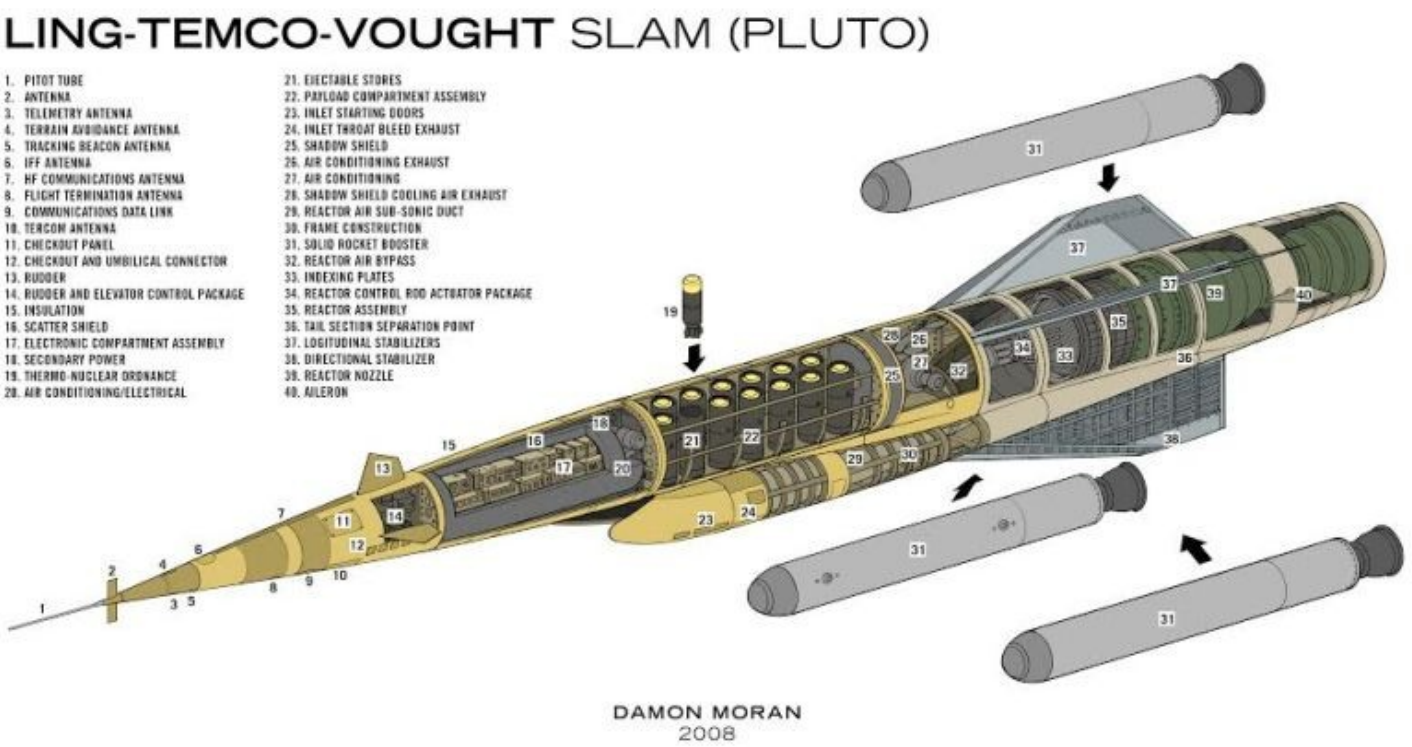
- development relatively cheap, but difficult
- deployment very difficult

- growing bacterial resistance
  - https://www.youtube.com/watch?v=plVk4NVIUh8
- can be directly gentically modified now
  - chimeras, deimunization, genetic targeting
- can accidentally leak or be acquired by terrorists
- engineered anti-material bioweapons possible



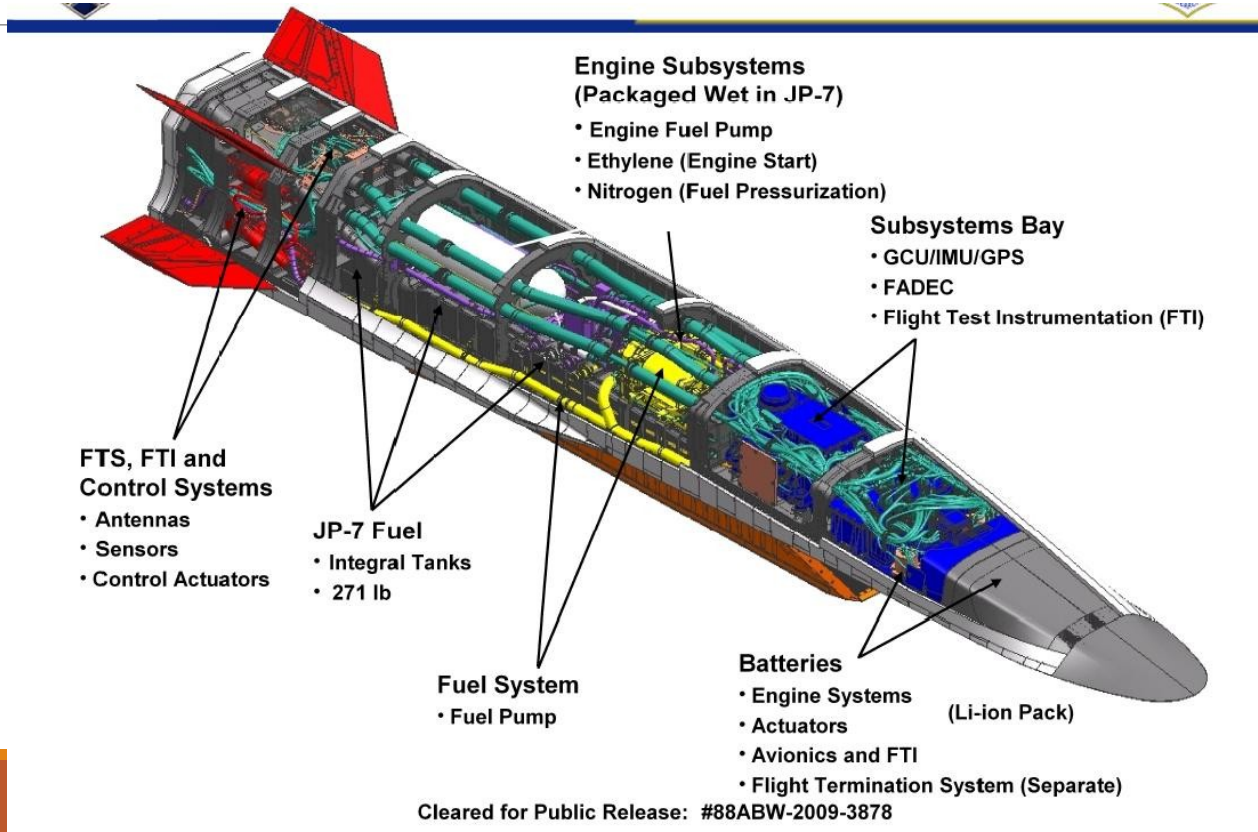
Some notable weapon systems

- SLAM (1955-1964) doomsday weapon



Some notable weapon systems

- scramjet
- goal is fastest possible reaction when ballistic missiles cannot be used and cruise missiles are too slow
- hypersonic (mach5+)
- flight across pacific in 1-2h
- theoretical basics known since WW2
- mixed success in tests



Some notable weapon systems

- Mach7+, range up to 200 km
- electromagnetic force instead of chemical combustion
- small “cheap” munition, less risky to store
- purely kinetic energy kill
- 11 kilograms @ Mach7 ≈ 87t @ 100 km/h (locomotive)
- targets at land, sea and air
- first deployments “soon”

https://www.youtube.com/watch?v=O2QqOvFMG_A&feature=youtu.be&t=8s

- problems:
  - gun wear and durability
  - power demands