

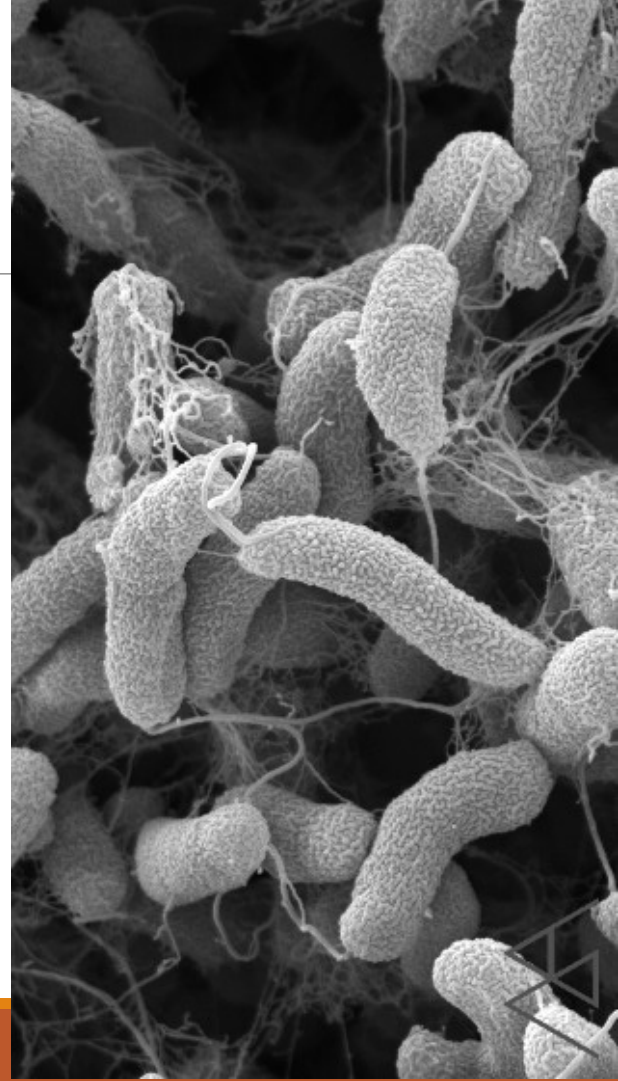
Biological weapons, and other bits

29.11. 2017
JAKUB DRMOLA

Types

- bacteria
 - anthrax, cholera, salmonella, tetanus, tularemia, yersinia pestis, rickettsia, typhus, Q fever, glanders
- viruses
 - encephalitis, smallpox, marburg virus, ebola
- fungus
- 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 1950



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.

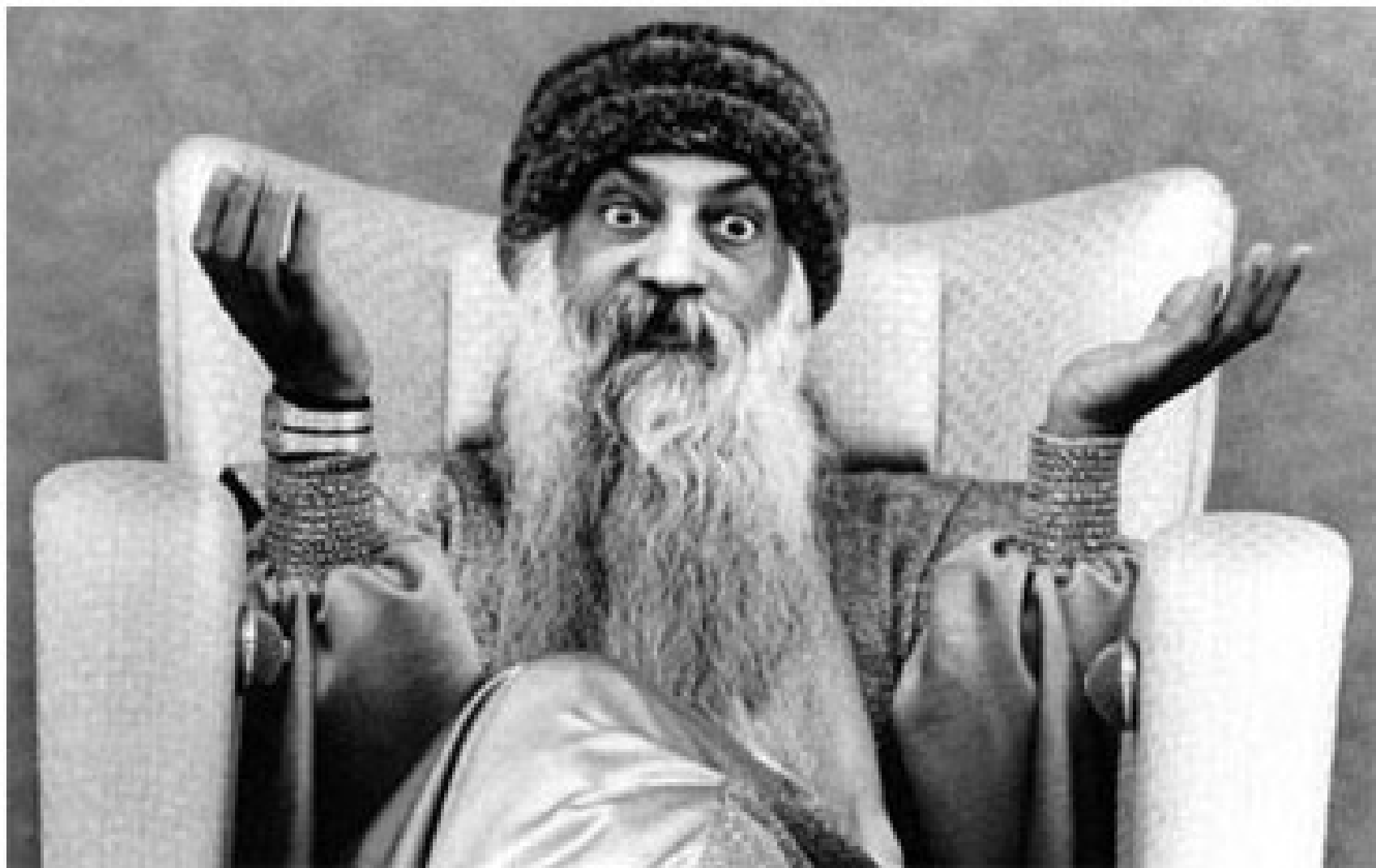
- Black Death:
 - 75-200 mil.

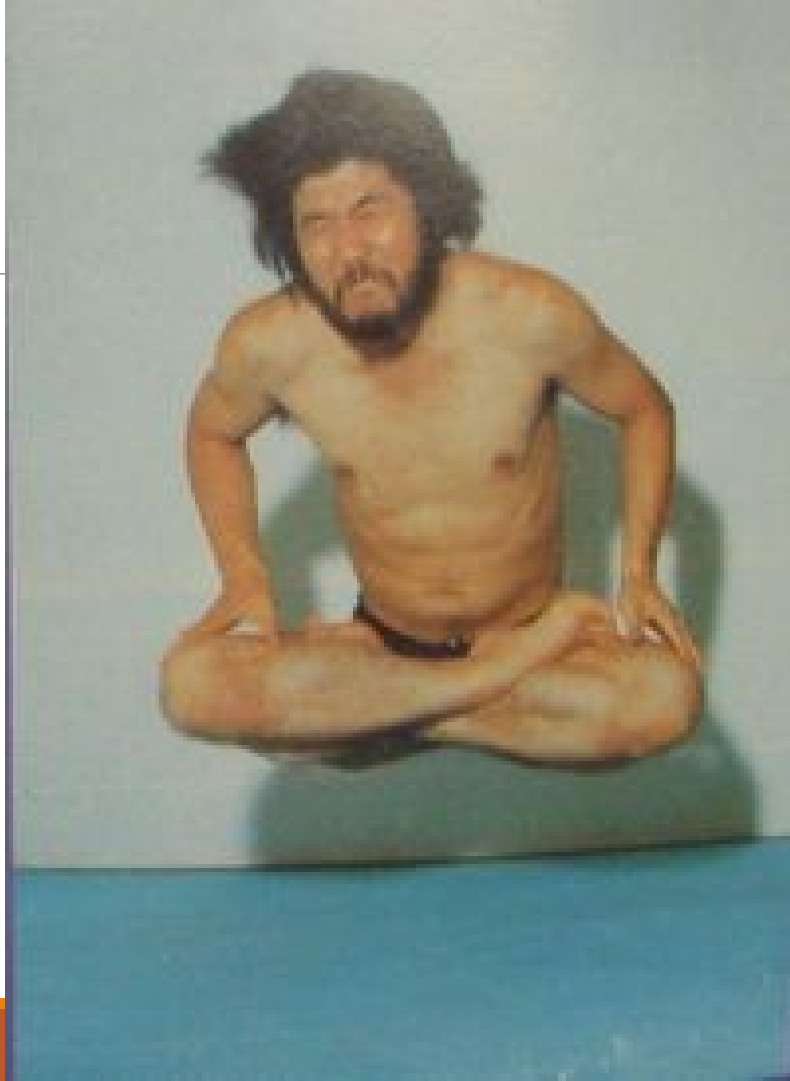


Terrorism and assassinations and others

- 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 unfulfilled threats and plans from a number of organizations







4TH GRADE
GREENDALE SCHOOL
FRANKLIN AVE NJ 08824

SENATOR DASCHLE
509 HART SENATE OFFICE
BUILDING
WASHINGTON DC 20540

09-11-01

YOU CAN NOT STOP US.
WE HAVE THIS ANTHRAX.
YOU DIE NOW.
ARE YOU AFRAID?
DEATH TO AMERICA.
DEATH TO ISRAEL.
ALLAN IS GREAT.

TOM BROKAW
NBC TV
30 ROCKEFELLER PLAZA
NEW YORK NY 10112

09-11-01

THIS IS NEXT
TAKE PENACILIN NOW
DEATH TO AMERICA
DEATH TO ISRAEL
ALLAN IS GREAT

Edison
New York Post
1211 Ave. of the Americas
New York NY 10036

09-11-01

THIS IS NEXT
TAKE PENACILIN NOW
DEATH TO AMERICA
DEATH TO ISRAEL
ALLAN IS GREAT



Current situation

- development relatively cheap, but difficult
- deployment very difficult
- growing bacterial resistance
 - <https://www.youtube.com/watch?v=plVk4NVIUh8>
- can be directly genetically modified now
 - chimeras, deimmunization, genetic targeting
- can accidentally leak or be acquired by terrorists
- engineered anti-material bioweapons possible

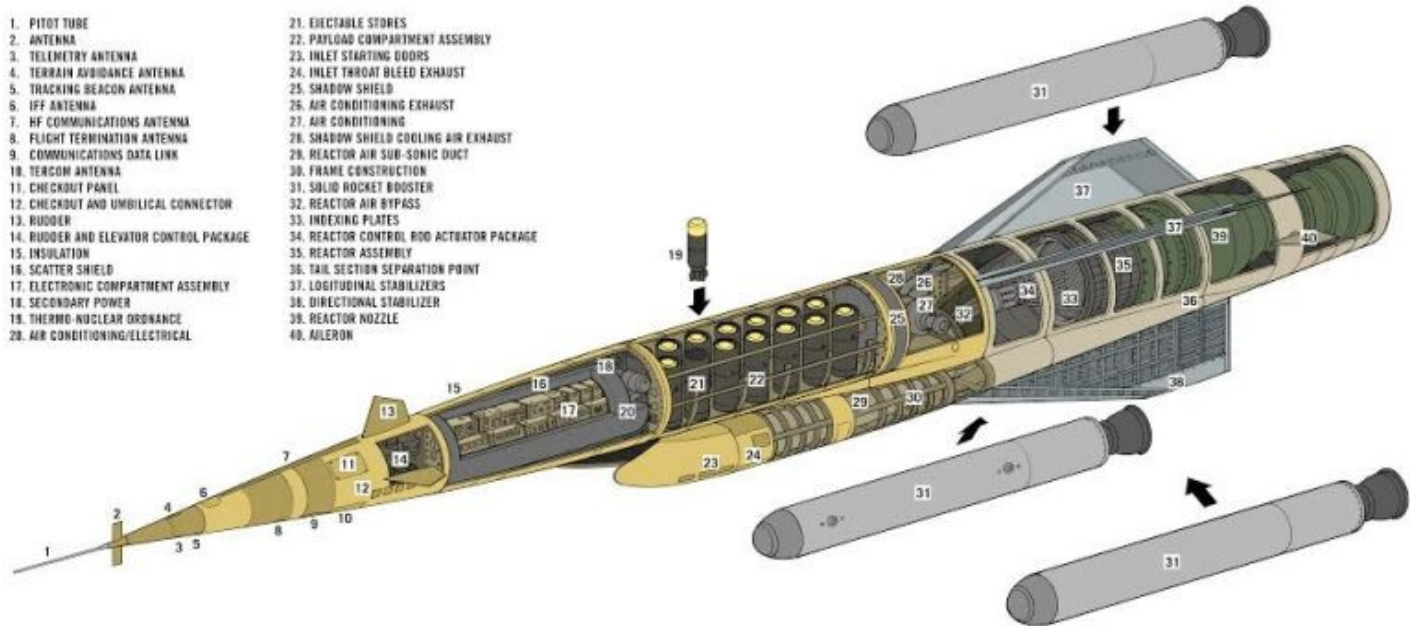


Some notable weapon systems

- SLAM (1955-1964)
doomsday weapon

LING-TEMCO-VOUGHT SLAM (PLUTO)

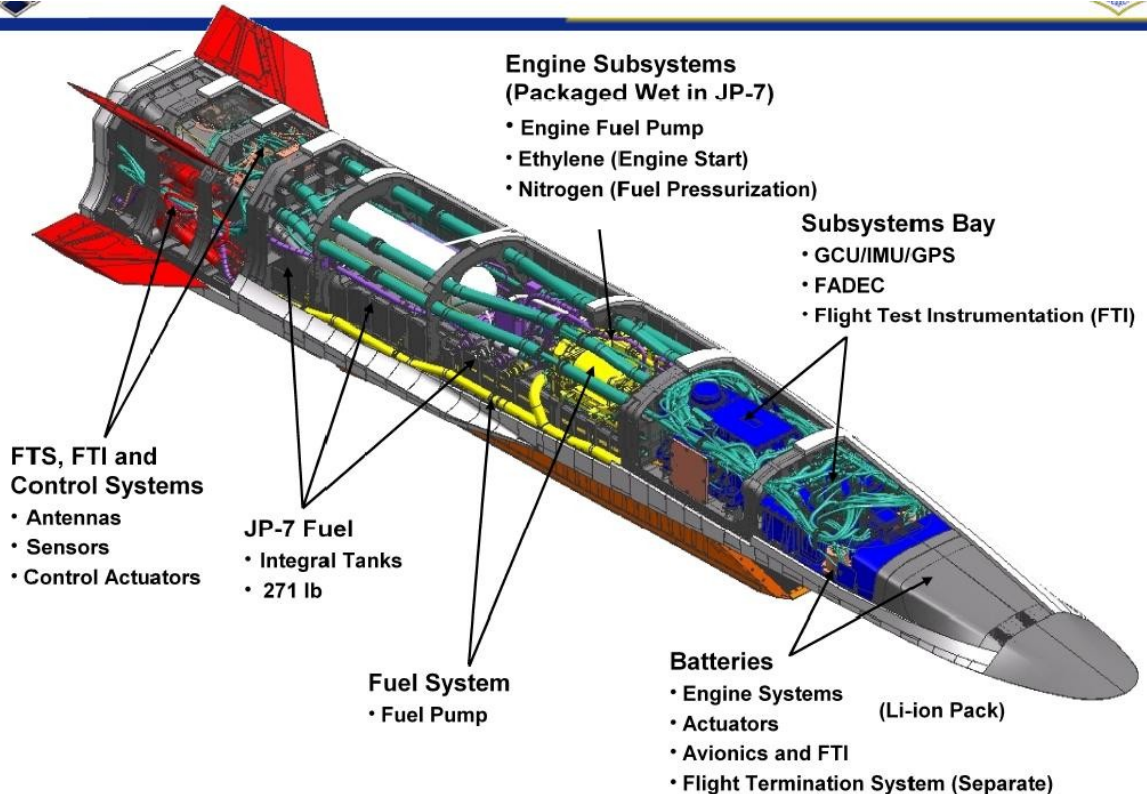
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|---|--|
| 1. PITOT TUBE | 21. EJECTABLE STORES |
| 2. ANTENNA | 22. PAYLOAD COMPARTMENT ASSEMBLY |
| 3. TELEMETRY ANTENNA | 23. INLET STARTING DOORS |
| 4. TERRAIN AVOIDANCE ANTENNA | 24. INLET THROAT BLEED EXHAUST |
| 5. TRACKING BEACON ANTENNA | 25. SHADOW SHIELD |
| 6. IFF ANTENNA | 26. AIR CONDITIONING EXHAUST |
| 7. HF COMMUNICATIONS ANTENNA | 27. AIR CONDITIONING |
| 8. FLIGHT TERMINATION ANTENNA | 28. SHADOW SHIELD COOLING AIR EXHAUST |
| 9. COMMUNICATIONS DATA LINK | 29. REACTOR AIR SUB-SONIC DUCT |
| 10. TERCOM ANTENNA | 30. FRAME CONSTRUCTION |
| 11. CHECKOUT PANEL | 31. SOLID ROCKET BOOSTER |
| 12. CHECKOUT AND UMBILICAL CONNECTOR | 32. REACTOR AIR BYPASS |
| 13. RUDDER | 33. INDEXING PLATES |
| 14. RUDDER AND ELEVATOR CONTROL PACKAGE | 34. REACTOR CONTROL ROD ACTUATOR PACKAGE |
| 15. INSULATION | 35. REACTOR ASSEMBLY |
| 16. SCATTER SHIELD | 36. TAIL SECTION SEPARATION POINT |
| 17. ELECTRONIC COMPARTMENT ASSEMBLY | 37. LONGITUDINAL STABILIZERS |
| 18. SECONDARY POWER | 38. DIRECTIONAL STABILIZER |
| 19. THERMO-NUCLEAR ORDNANCE | 39. REACTOR NOZZLE |
| 20. AIR CONDITIONING/ELECTRICAL | 40. AILERON |



DAMON MORAN
2008

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 \approx 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:
 - o gun wear and durability
 - o power demands

