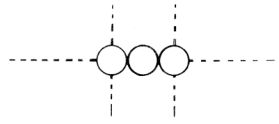
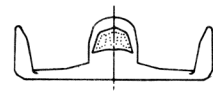
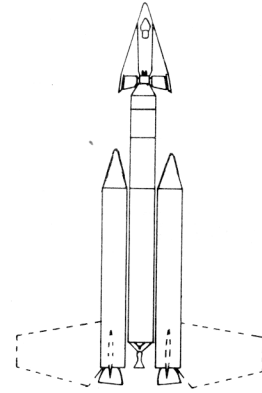
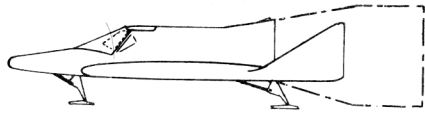


unclassified
~~CONFIDENTIAL~~

B1
Dyna Soar

Characteristics Summary

MILITARY TEST SYSTEM X-20 DYNA SOAR



2050D

BOEING

Air Vehicle: Length (overall)	153.9 ft	Glider: Wing Area	345 sq ft
Booster Length (overall)	110.5 ft	Wing Span	20.8 ft
Strap-on Stage Length	88.2 ft	Length (glider only)	35.4 ft
Horizontal Fin Span	80.0 ft	(glider and transition section) 43.4 ft	
Vertical Fin Span	35.0 ft		

PROCUREMENT

Number to be delivered in fiscal years

	FY 63	FY 64	FY 65	FY 66	FY 67	TOTAL
Glider	0	2	3	3	0	8
Refurbished Glider	0	0	0	3	0	3

STATUS

- | | | |
|---------------------------------------|-----------|------------------------------|
| 1. Orbital Program Go-Ahead | 11 Dec 61 | 3. Launch Dates: |
| 2. Multi-Orbit Go-Ahead | 13 Jul 62 | First Air Drop |
| | | First Unmanned Ground Launch |
| | | First Piloted Ground Launch |

POWER PLANT

Booster:
 Model Titan III
 Mfr SSD and their contractors
 Titan III consists of a transfer stage, the modified Titan II liquid propellant booster and two 'strap-on' solid propellant boosters.
 Glider:
 A solid propellant rocket is provided for escape purposes only in event of abort on the pad or during boost.
 Nr & Model . . . (1) XM92
 Mfr Thiokol
 Type Solid Rocket
 Duration 13.4 sec
 Thrust 40,000 lb@SL

FEATURES

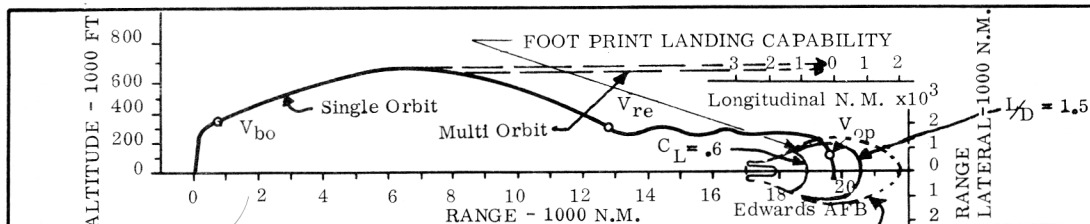
Crew 1
 Radiation Cooled Glider Structure with compartment water wall structure utilizing latent heat of evaporation for heat dissipation.
 Reaction plus aerodynamic controls.
 Full time three axis self-adaptive stability augmentation.
 Skid-type three point landing gear.
 Inertial guidance for boost, orbit and re-entry.
 SHF & UHF Communications.
 Large data handling capacity telemetry.
 Total glider abort escape system during boost with pilot seat ejection escape below .9 Mach.
 Pilot Vision
 Side windows only during boost and orbit.
 Side windows and forward windshield after re-entry and during the landing phase.
 Provides piloted, maneuverable vehicle and associated equipment for conducting experiments in the hypersonic and orbital flight regime in order to: (1) gather research data to solve design problems of controlled, lifting re-entry from orbital flight; (2) demonstrate piloted, controlled, maneuvering re-entry with tangential recovery at a pre-selected landing site; (3) test vehicle equipments and explore military man's function in space.

V.M. Yehito 3/4/60

DOWNGRADED AT 3 YEAR INTERVALS;
DECLASSIFIED AFTER 12 YEARS
DOD DIR 5200.10

57WC 4983

Characteristics Summary Basic Mission X-20 DYNA SOAR



TYPICAL TRAJECTORY DYNA-SOAR GLIDER Anticipated

PERFORMANCE		
LAUNCH	BOOST	VELOCITY
Site: Cape Canaveral Initial Heading: 105° (planned)	Thrust (nominal) 1st stage: 1,820,000 lb 2nd stage: 474,000 lb 3rd stage: 100,565 lb Trans. stage: 16,000 lb End of Boost Altitude (apogee): 680,000 ft (Orbital injection): 320,000 ft	V burnout 24,500 fps V apogee 24,100 fps V re-entry 24,570 fps V approach 290 knots
ACCELERATION	RANGE	LANDING
Peak load factor value during boost End Second Stage boost: 4.4 Glider acceleration rocket: 3.3	Longitudinal Range Orbital Once Around and multi-orbit* Distance (once around) 19,700 n mi Time (once around) . . . 104 min *minimum of 3 orbits with corresponding increase in distance and time.	Site: Edwards AFB Nominal Landing Speed: 175 knots Nominal Run-out Distance . . 2750 ft
TEMPERATURE	WEIGHTS	LOADS
Max during Flight Re-entry Nose Stagnation 4050° F ($\xi = 0.6$) Wing Leading Edge 2700° F ($\xi = 0.9$)	Launch (gross) . . . 1,182,377 lb Glider & Transition (launch) Max 28,000 lb Nominal 18,000 lb Glider (re-entry) 11,150 lb	Pay load: Compartment capacity 75 cu ft and 1000 lb Glider acceleration rocket: Solid Propellant . . . 2200 lb

- NOTES**
- Performance Basis:
 - Estimated data
 - Booster thrust, length of strap-on solids and size and shape of booster fins based on preliminary data.
 - Drone recovery employed in unmanned launches.
 - B-52C (AF53-399) will be modified for use as air launch vehicle and for ferry purposes.
 - Not shown in Procurement Section: one (1) static Test Glider - FY 64.
 - Revision Basis: Booster fins shown in phantom to show indetermination. Thrust revised. Range revised to show multi-orbit requirements. Gross weights revised to reflect booster weight change. Trajectory revised to show multi-orbit, minimum and anticipated footprint.