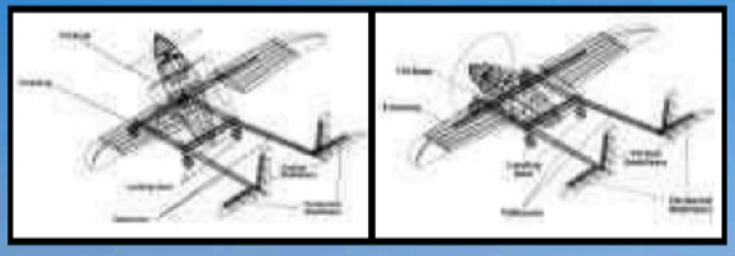


Briefing Slides

Freewing
Aerial Robotics Corp.

Commercial communications & military reconnaissance systems

Freewing Aerial Robots

Further information contact:
Hugh Schmittle
hs@freewing.com
(541) 222-0128

the Business:

an Overview & Update

Freewing Markets of Interest — Jun 00

- **Army Corps of Engineers UXO UAV project (unexploded ordinance detection, disposal)**
  - **Contradictory "high-fast" & "low-slow" missions favor Scorpion UAV system — thrust-vectoring, stability**
  - **24 million acres in US need to be cleared**
  - **Additional 20 million acres international controlled by US Army also targeted by UXO program**
  - **$100 million budgeted for first target**
  - **Freewing selected #1 on short list of 10**
  - **Invited to demo for high-fast mission**

- **Medium Range Endurance (MRE) UAV for Navy**
  - **RFP for comparative study selected four contractors**
  - **Freewing did not bid, will be considered by some selectees**
  - **1998/9 study by Center for Naval Analysis concluded Freewing one of 3 best candidates**

Freewing Markets of Interest — Jun 00

- **SE Asian military UAV program**
  - **Endorsed by heads of Army, Navy, Air Force**
  - **Freewing project being briefed to head of state mid-June**
  - **Possible teaming with Matra BAe Dynamics**

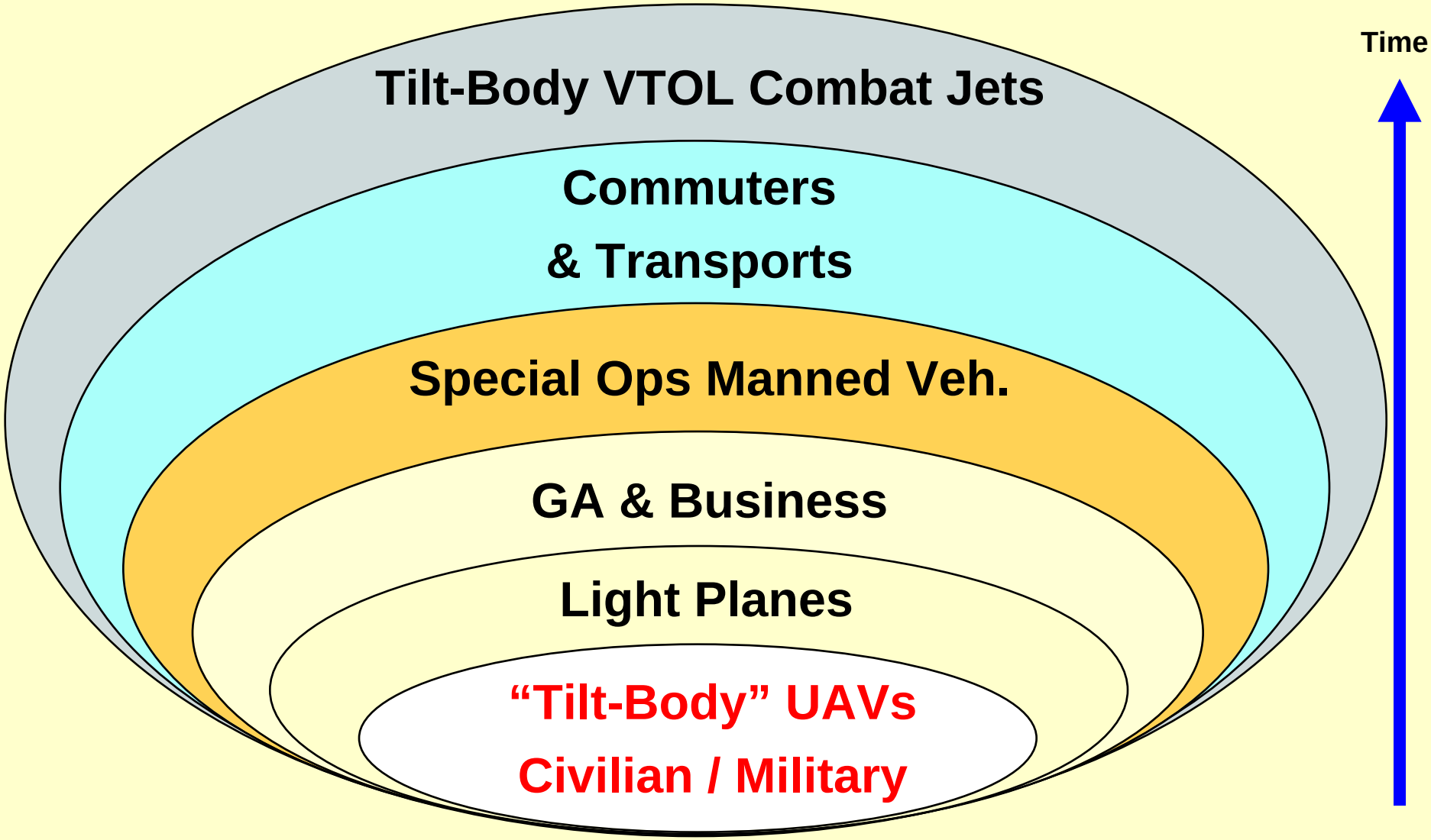
- **US Army TUAV program**
  - **Shadow 200 undersized for growth, limited by launchers**
  - **Program showing similar pattern to Outrider**
    - **Schedule slip**
    - **Major redesign efforts underway**
    - **Costs increasing**
  - **Freewing (and many industry analysts) believe Army must have a second Tactical UAV program for growth missions**
  - **Scorpion was rated highly by Army in TUAV competition; was eliminated by risk associated with Marconi avionics, not airframe performance**

Freewing Markets of Interest — Jun 00

Various commercial UAV programs

- Taiwan conglomerate — replace fish-spotting helicopters
  - 600 helicopter market replaceable at 3-to-1 ratio
  - $1/3 billion market potential, plus attrition systems
  - Equates to $175K per system
  - Freewing prefers to perform as UAV services
- US oil & gas pipeline inspection
  - Sub-meter resolution hyperspectral digital imagery
  - Extensive “mining” of data for customer
  - Currently provided by other platforms, e.g. satellites and helicopters
  - Teaming agreement in place with first firm
- Others (e.g. forestry, oil drilling platforms)

Business Strategy Follows from Broad Patent Coverage

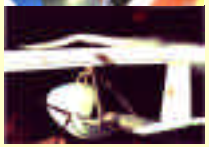


Freewing Air Vehicles & Wind Tunnel Models

1983 - 1992

Manned Freewings

Wind Tunnel Models

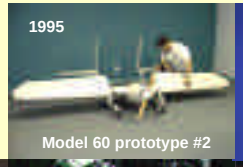


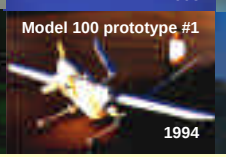
1992 - 1999

First Freewing Tilt-Body™ Prototypes

Scorpion Configuration

Freewing Tilt-Body™ Air Vehicles





Manta Configuration

Freewing Tilt-Body™ Air Vehicles

Freewing Tilt-Body™ Wind Tunnel Models (570 hours - 1990-97)

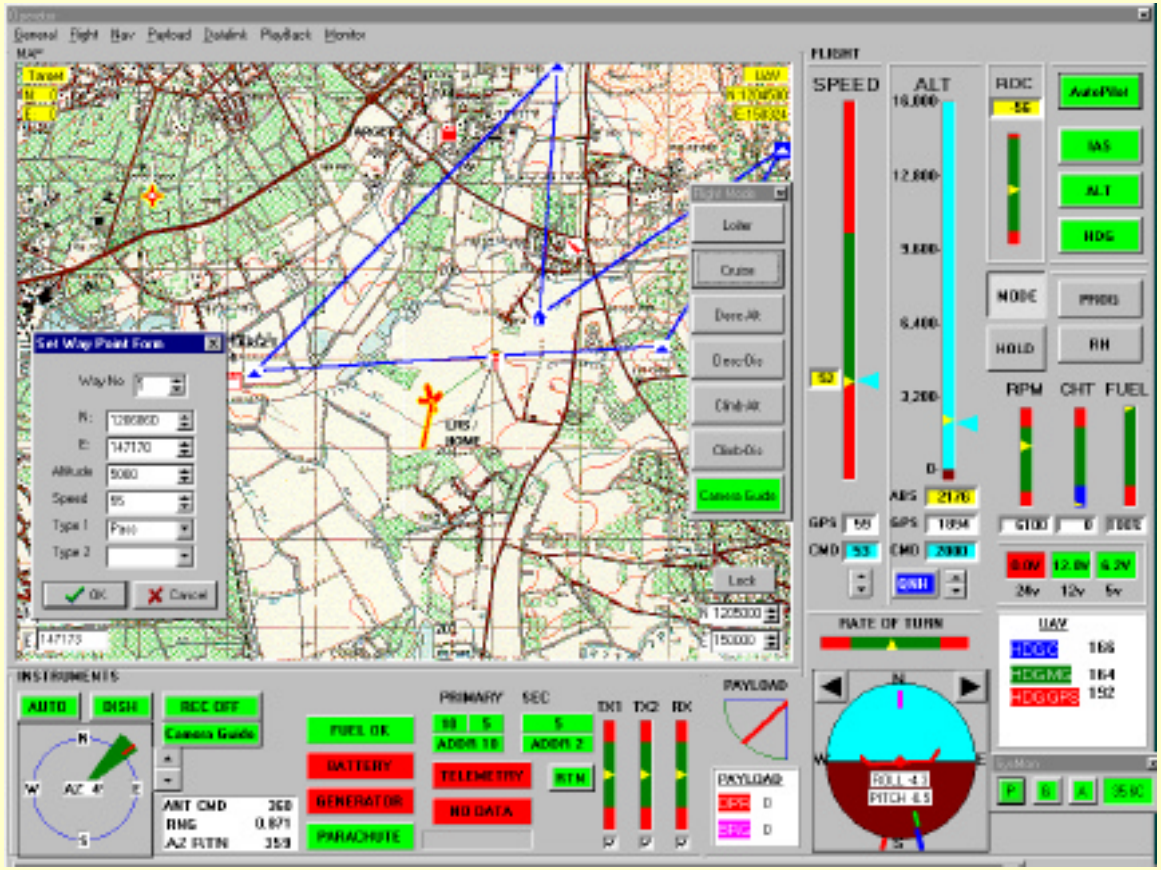
Commercial communications and military reconnaissance systems

Freewing
Aerial Robotics Corp.


Production Tooling
Scorpion Model 100-60

Computer Control Station with Data Link &

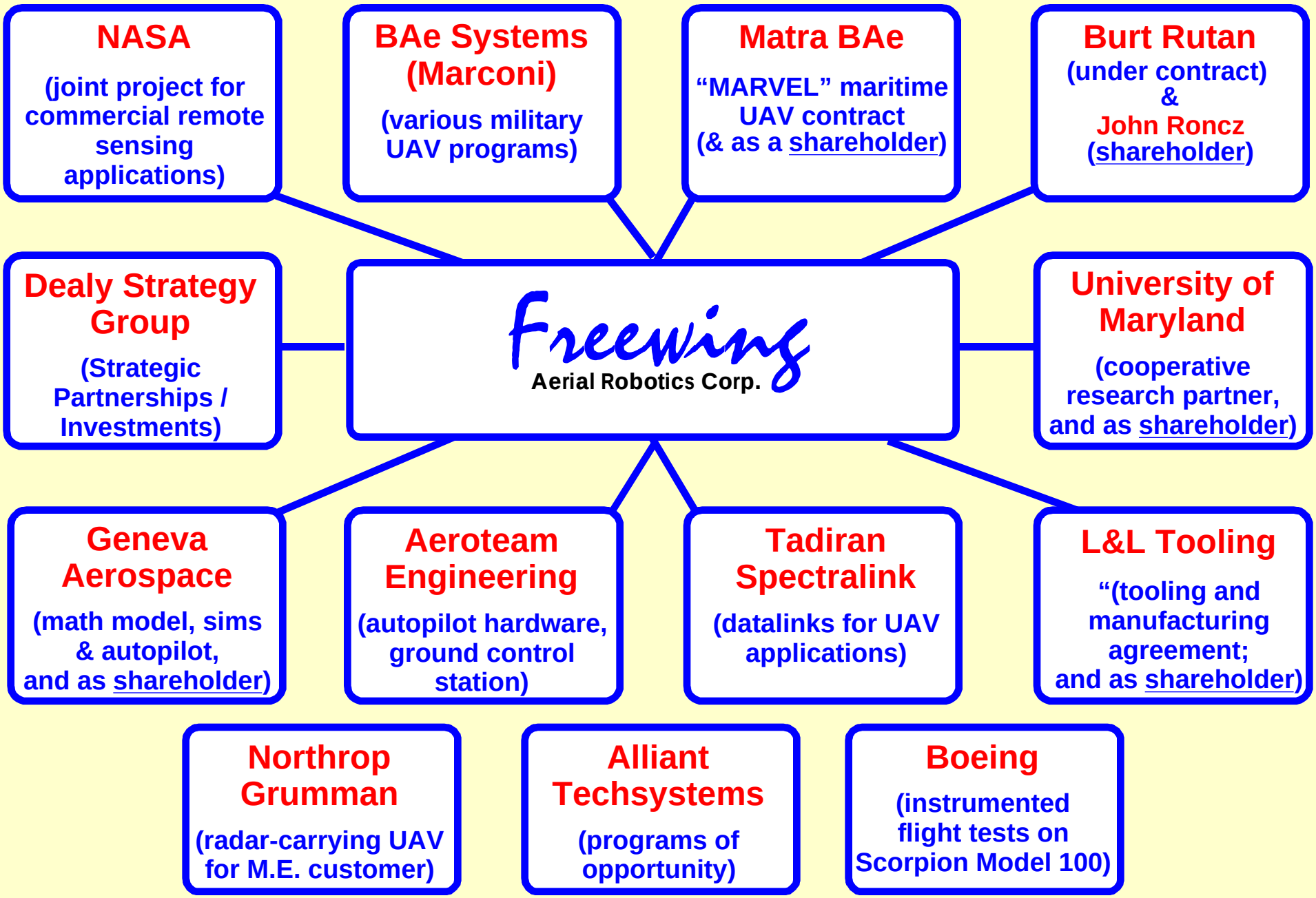
GPS Moving Map Display



Commercial communications and military reconnaissance systems

Freewing
Aerial Robotics Corp.

Freewing's Strategic Alliances



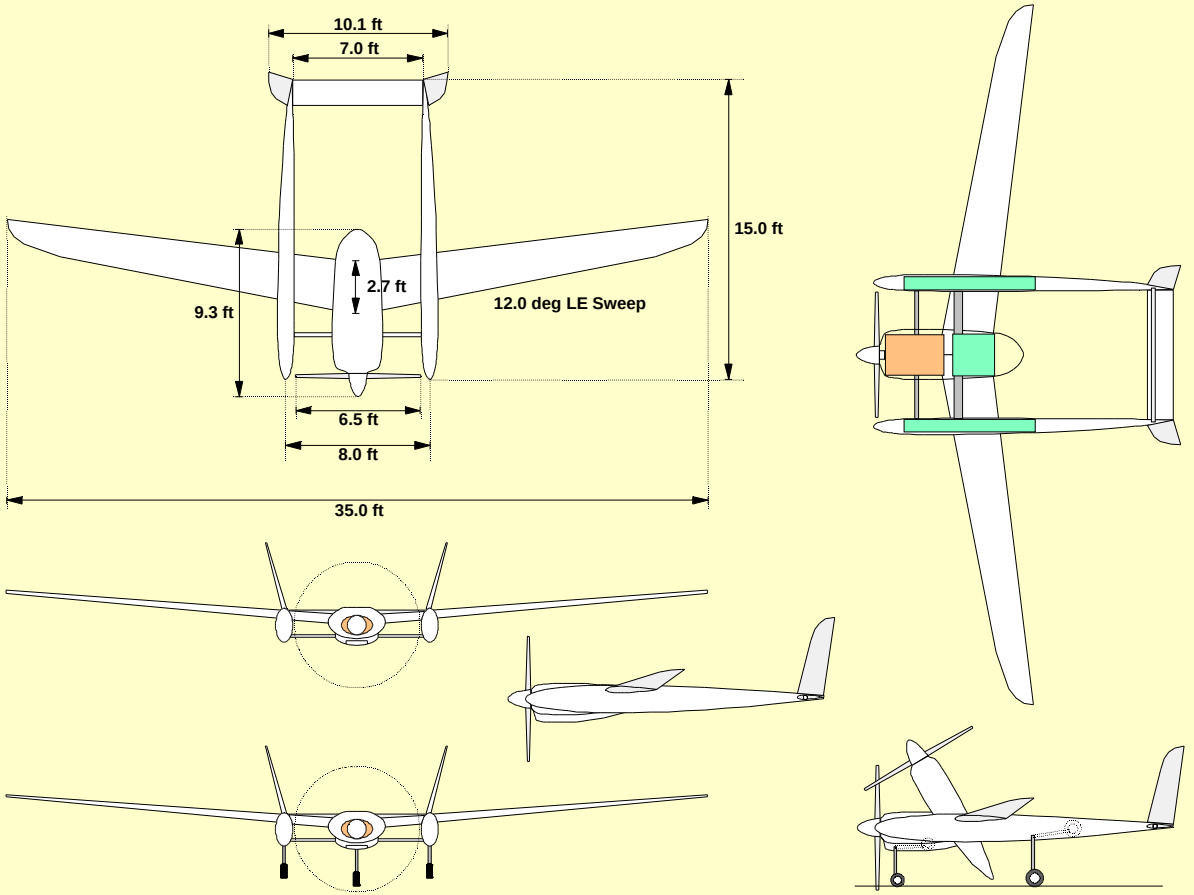
Freewing's "Exclusivity" World Map

2015
1995

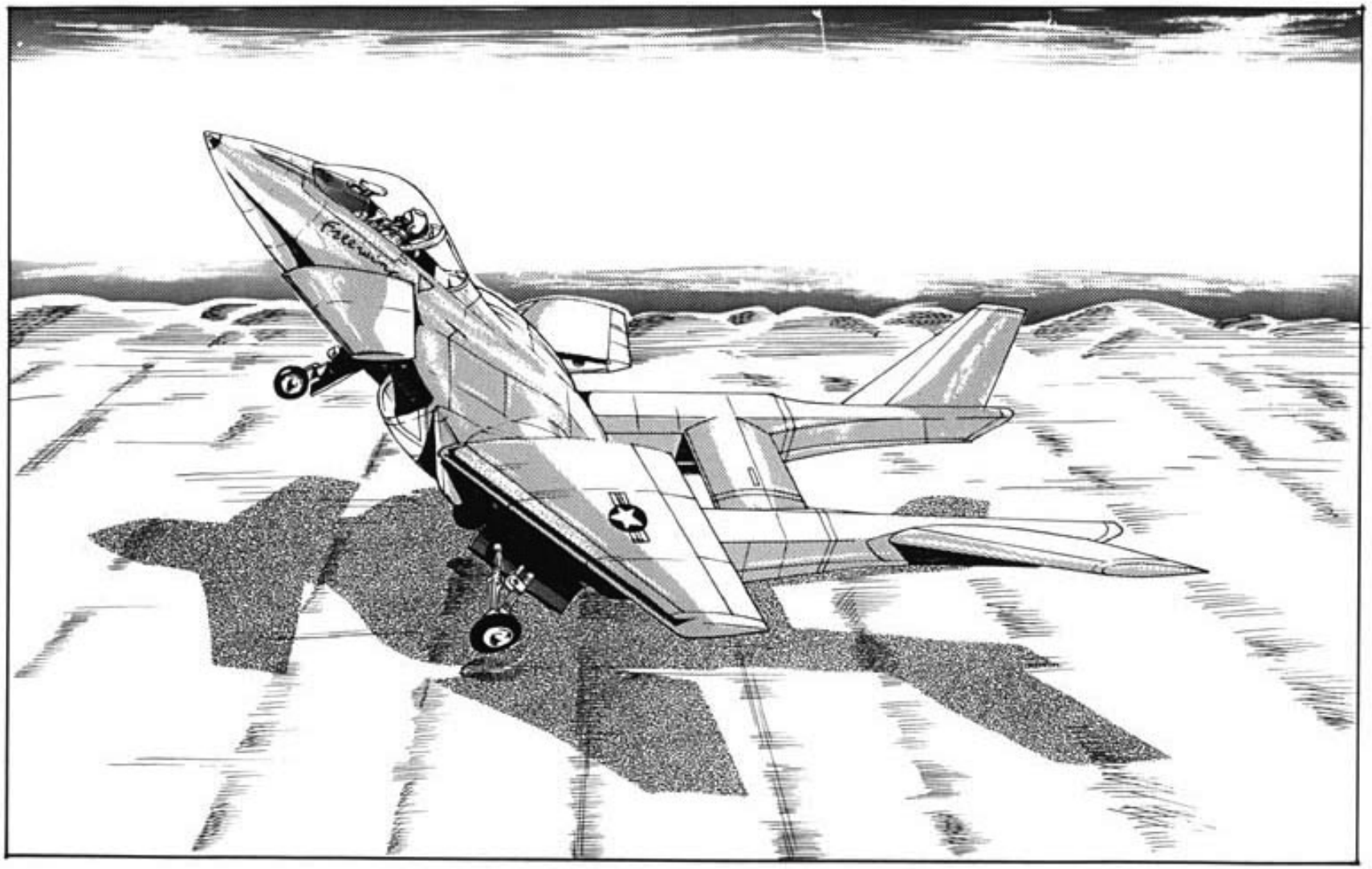
	USA	Canada	France/UK Germany	Other Europe	Middle East	Africa	Asia	Latin Amer.	Aus-tralia	Other Countries
MoD "Marvel" Tilt-Body UAV			Matra BAe '94 Contr.	Matra Exclusive	BAe thru '02					
Tactical UAVs for US Army	Marconi Astronics									
Non-MoD/DoD Tilt-Body UAV										
Med Altitude Endurance UAV										
Manta Tilt-Body (Full VTOL)										
UCAV Tilt-Body										
Spec Ops Manned Scorpion										
GA & Business Aircraft										
Commuter Aircraft										
Other Aircraft										
Non-aircraft (pumps, props...)										

Medium Altitude Endurance (MAE)
Scorpion Model 200-300

(Center for Naval Analysis (CNA) and Northrop Grumman Projects)



Rockwell / Freewing Combat Jet Design Study



UAV Market

- **1997 was $2 Billion – Twice all of General Aviation**
- **Projected growth : $42.4 Billion cumulative ’98-’08**

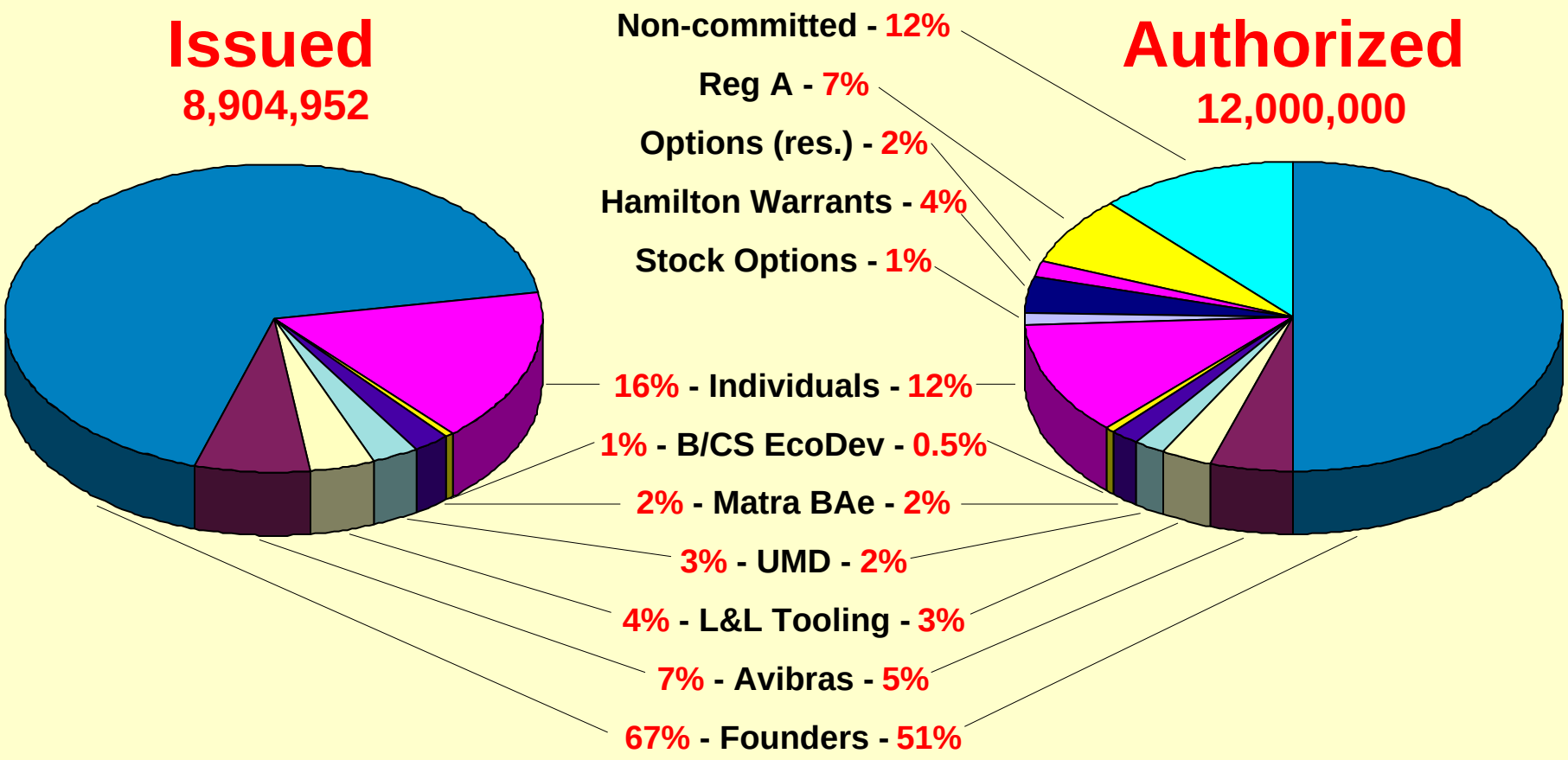
  — Annual UAV Market Forecast, Frost & Sullivan, Aug 1999
- **Civilian markets account for most future growth – Freewing ready to deliver services of wireless communications & remote sensing**
- **Military : — UAVs & UCAVs growing exponentially**

Fundamentally "Dual Use"

Civilian	Military
•Agricultural Support	•Surveillance
•Pipeline Digital Imagery	•Unexploded Ordnance
•Fish Spotting	•Data Relay
•Powerline Inspections	•Perimeter/Base Defense
•Remote Sensing (NASA)	•Bomb Damage Assess.
•Satellite Calibration	•Electronic Warfare
•Disaster Assessment	•Convoy Security
•Forest Fire Fighting/Prev.	•Lethal UAVs

ALL ARE BASICALLY TELECOMMUNICATIONS

Capital Structure



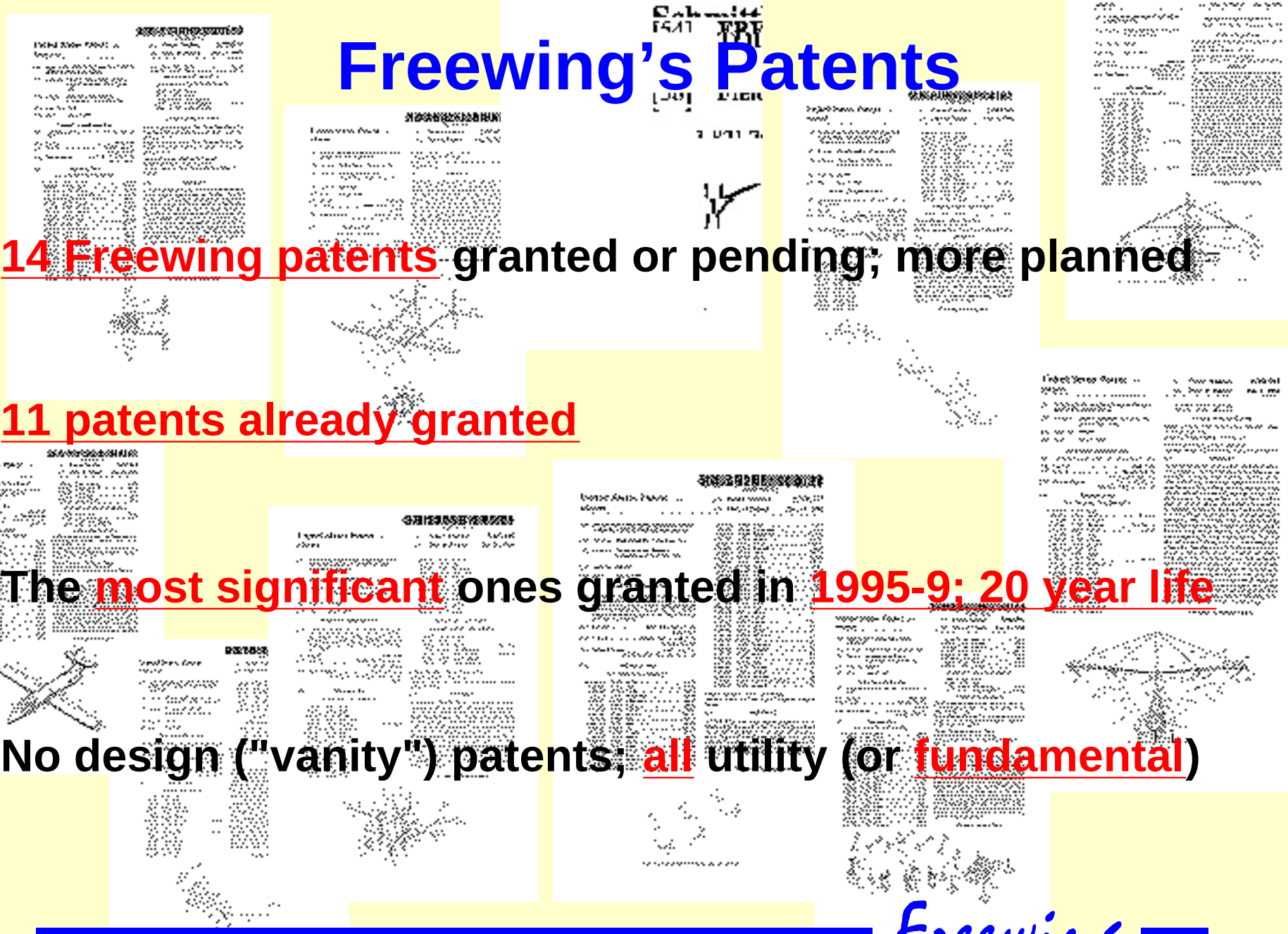
5-Year Projections

	Year 1	Year 2	Year 3	Year 4	Year 5
Total Sales	$3 M	$10 M	$18 M	$35M	$58 M
Earnings	($3 M)	($.1 M)	$2 M	$6 M	$12 M
UAV Services	$2 M	$7 M	$11 M	$22M	$39 M

5-Year Projections - UAV Services

	Year 1	Year 2	Year 3	Year 4	Year 5
Pipeline	**$1.3 M**	**$2.9 M**	**$4.1 M**	**$9.3M**	**$16.5 M**
Market $2.4B	0.1%	0.1%	0.2%	0.4%	0.7%
Forestry		**$2.1 M)**	**$2.3 M**	**$5.8 M**	**$12.4 M**
Market $1.4B		0.2%	0.2%	0.4%	0.9%
UXO	**$0.5 M**	**$2.2 M**	**$4.1 M**	**$6.3M**	**$10.2 M**
Market $1.8B	>0.1%	0.1%	0.2%	0.4%	0.6%

Freewing's Patents



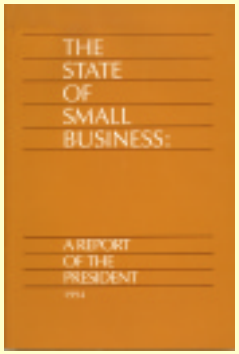
- 14 Freewing patents granted or pending; more planned
- 11 patents already granted
- The most significant ones granted in 1995-9; 20 year life
- No design ("vanity") patents; all utility (or fundamental)

Honors & Technology Prizes

Selected by the editors of *R&D Magazine* for their 1996 ***R&D 100 Award*** recognizing the 100 most technologically significant products developed over the past year.

FROST & SULLIVAN

1998 Market Engineering Entrepreneurial Company Award, presented to Freewing by this preeminent int'l market analysis firm. *"This award is given each year to a small company that has demonstrated entrepreneurial leadership and drive. [Freewing] is working harder, faster, and more efficiently than its more established competitors and is making solid inroads in the market despite the limitations of a small company."*



Added in 1994 to the US Small Business Admin. list of ***top innovations of the 20th century*** by small firms in the US, joining, *inter alia*, the integrated circuit, the helicopter, the Wright Brothers' airplane and air conditioning.

1994 Grand Prize Winner, ***Excellence in Design***, *Design News magazine*, recognizing the breakthrough technology of the Freewing Tilt-Body™ invention.

Experimental Aircraft Association gave Freewing in 1992 a special ***Award for Technological Innovation***, in recognition of the advanced safety and comfort of the Company's technology.

Selected by the editors of *Popular Mechanics* for their 1996 ***Design & Engineering Award***. (Rockwell with its X-31 hyper-maneuverable jet fighter was the other aerospace winner.)

1993 Discover Award for Technological Innovation, selected from thousands of candidates, including the McDonnell Douglas MD90 and NASA entries. Judges included astronauts Scott Carpenter, Buzz Aldrin and Wally Schirra.

Selected by the editors of *Chief Executive* magazine for their first annual 1996 ***Best New Products*** list compiling the best product innovations released during the past eighteen months.

Commercial communications and military reconnaissance systems

Freewing
Aerial Robotics Corp.

Freewing Partner Investments

sorted by total amount per partner

Partners (including predecessor companies)	Amount	Description	Year(s)
Matra British Aerospace Dynamics**	**$1,900,000**	Exclusive Distribution for Europe & the Middle East••	1998-2002
	250,000	Purchase of Scorpion Model 100 & Support••	1997-1998
	250,000	Exclusive Distribution for UK, France & Germany••	1994-1998
	200,000	Wind Tunnel Testing, Analysis & Modeling	1997
Avibras Industria Aerospacial	**610,000**	Investment by Brazilian Aerospace Company••	1994
University of Maryland & State of Maryland	**400,000**	MIPS Grants & Challenge Grant••	1990-1996
Geneva Aerospace, Inc.	**400,000**	Analysis, Simulator, Autopilot, Stock in Lieu of Cash	1998-1999
Marconi Astronics, Inc.	**350,000**	Bid Proposal - Engineering & Production Costs	1999
Veridien Corp.	**150,000**	Bid Proposal - Engineering & Production Costs	1997
	150,000	Bid Proposal - Engineering & Production Costs	1995
L&L Tooling and Manufacturing, Inc.	**280,000**	Tooling Work Billed - Stock in Lieu of Cash	1996-1999
National Aeronautics and Space Administration	**170,000**	Freewing UAV Project -- Mission to Planet Earth‡	1996-1999
The Boeing Company	**100,000**	Instrumented Flight Test Program	1998
	50,000	Combat Jet Design Feasibility Study	1996
Tadiran Ltd.	**80,000**	Tactical-level Datalink Development, Loan & Support	1999
Aeroteam Engineering Ltd	**80,000**	Autopilot, Ground Station Software	1998-1999
TOTAL	**$5,420,000**		

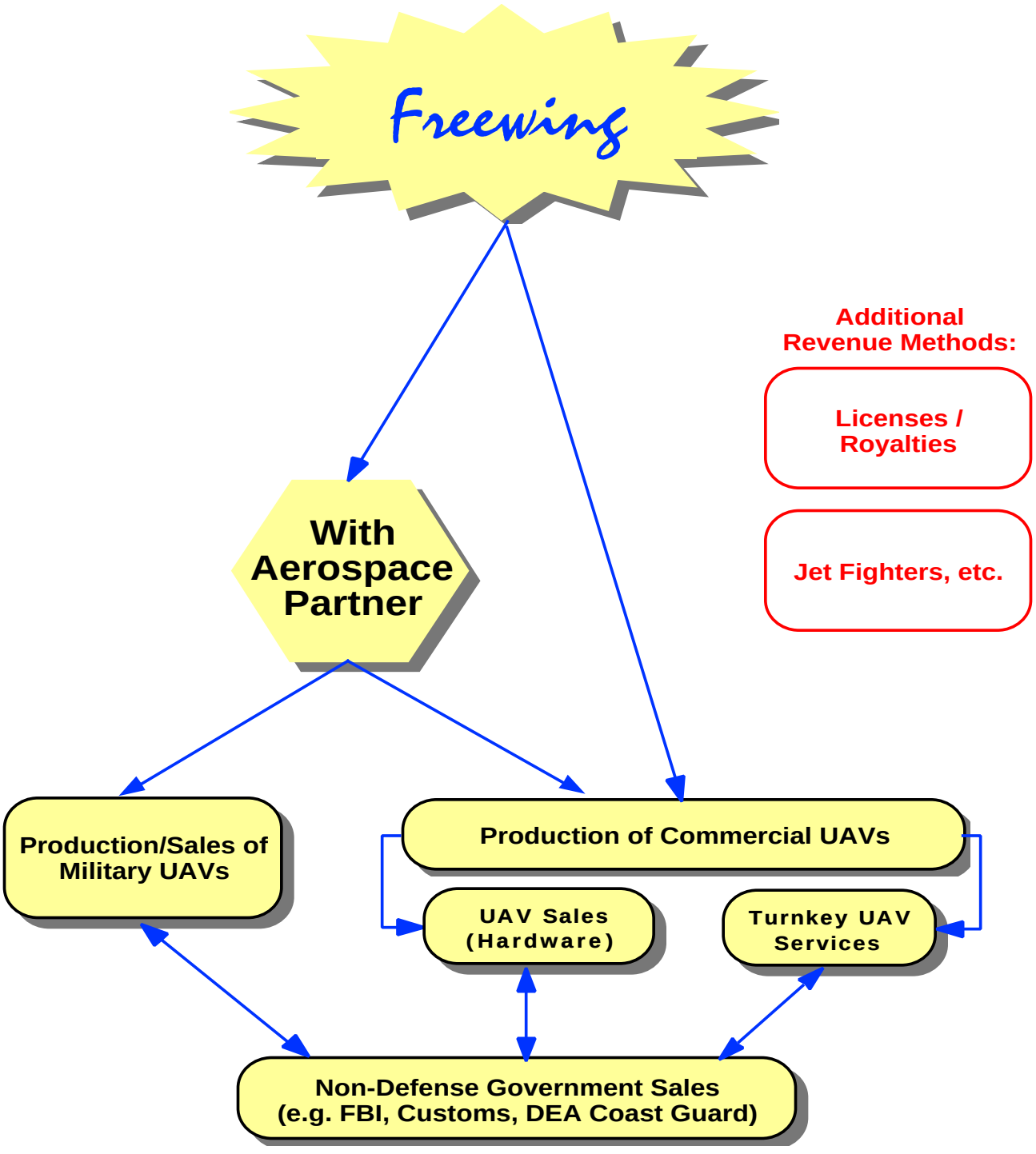
****Matra British Aerospace Dynamics is a Joint Venture between Lagadere Groupe SCA and British Aerospace plc.**

¨Represents Cash Directly to Freewing; Total Cash (Aggregate), $3,640,000.

‡Cash Portion from NASA, $130,000.

Note: Additional cash from individual equity investors not shown above brings Freewing's total to **approximately $7 million.**

Commercialization Strategy



Keys to Penetrating Commercial Market

- Early target customer markets should:
  - be flyable below approximately 1,000 feet
  - not require flight over densely populated areas or near heavy-use airports
  - be serviceable by keeping the UAV within visual range
  - already be purchasing remote sensing data
  - preferably by helicopter or expensive fixed wing vehicles to provide best margins

Keys to Penetrating Commercial Market

(Continued)

- These guidelines already validated in practice
  - Thorpe Seeop Corporation began commercial UAV service in 1989
  - Found being willing & able to provide free demonstrations is essential
  - Free demos are integral to Freewing system maturation plan (genesis of idea in ATR-42 North American tour in 1985)
  - Found high capture rate among customers if cost savings identified

Keys to Penetrating Commercial Market

(Continued)

- **Freewing's thrust-vectoring permits wider range of early potential civilian markets**
  - **International waters:**
    - * **Fish-spotting**
    - * **Oil drilling platforms**
    - * **Operations from research vessels**
  - **Missions serviced best by helicopters**
- **Non-defense government interested in UAV service; has "public use exemption"**

Barriers to Entry in Commercial Market

- **FAA Regulations silent on UAV use**
  - **Can be turned into advantage because (i) defense companies generally waiting for new regs so as to fly "military style", (ii) Freewing can begin revenue service now, (iii) aiming to be an established (or even dominant) player when regs permit wide access to National Airspace System**

Conclusions

- ☑ •Breakthrough Technology : Freewing Tilt-Body
- ☑ •Patents - 14 Granted & Pending (More planned)
- ☑ •Management Team w/ Strong Business Record
- ☑ •2nd Round Financing to Build Revenue
- ☑ •Marketing Partnerships & Sales Have Begun
- ☑ •Technology Applies to All Aircraft Types -- Could eventually Compete in Markets Totalling $100 Billion — Huge Growth Potential
- ☑ •Investor Exit Strategy : IPO or Acquisition

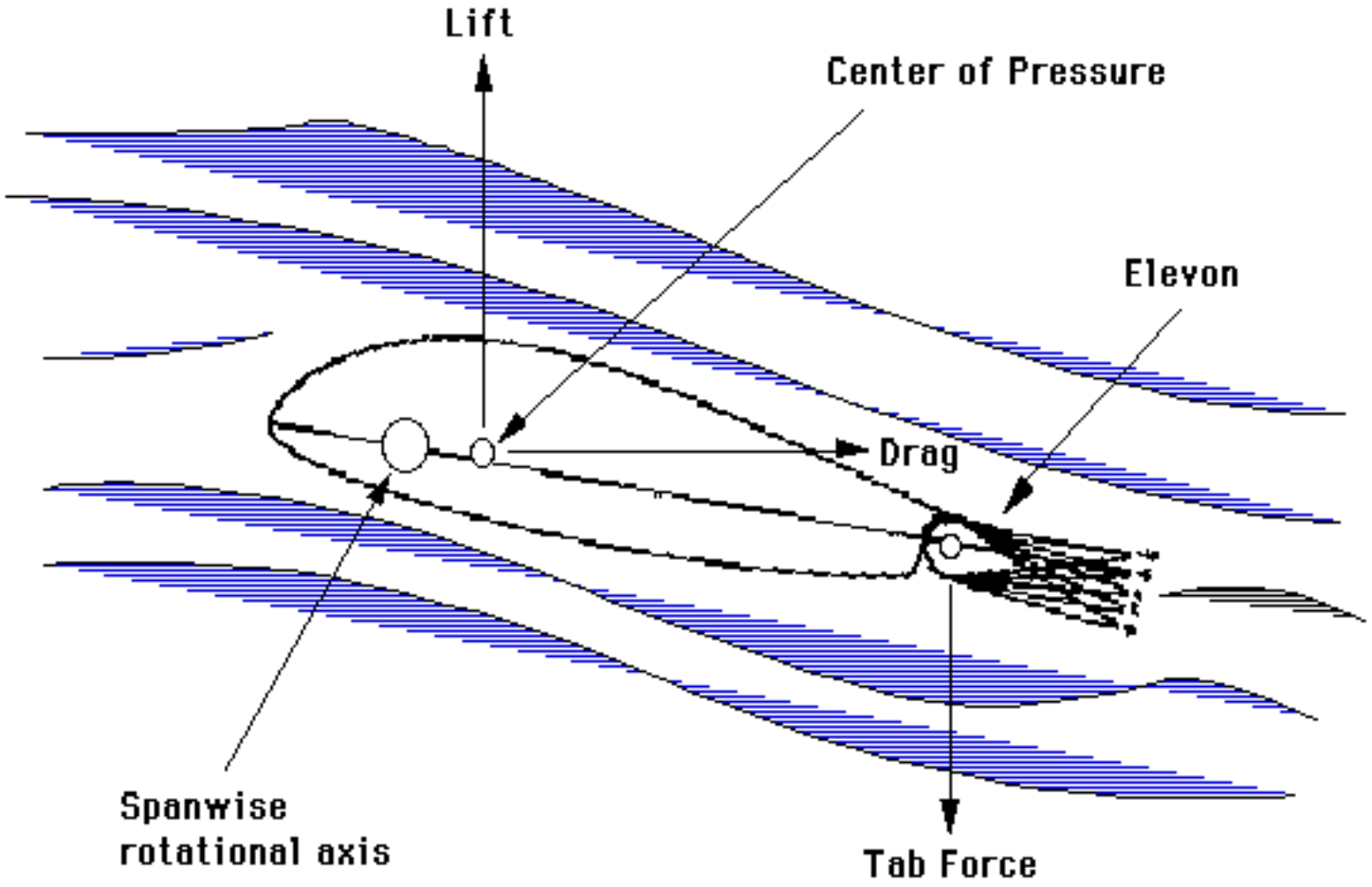
the Technology:

an Overview & Update

HOW A FREEWING WORKS

- **Hinged along a span-wise axis**
- **Floats freely in pitch**
- **Blends with changes in relative wind**
- **Simple, passive system -- based on "new" aerodynamic principles**

FREEWING CROSS SECTION



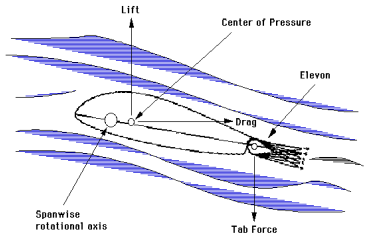
OPPOSING THEORIES: CONVENTIONAL WING vs. FREEWING

- Angle of incidence - relation of wing to fuselage
- Angle of attack - relation of wing to relative wind

CONVENTIONAL WING :	FREEWING:
Angle of incidence is constant	Angle of incidence is variable
Angle of attack is variable	Angle of attack is constant

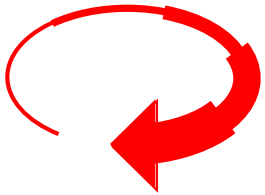
Freewing Tilt-Body is a Double Invention

Improved Freewing



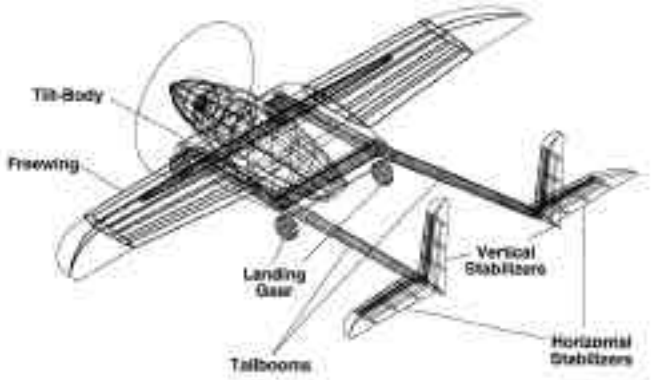
+

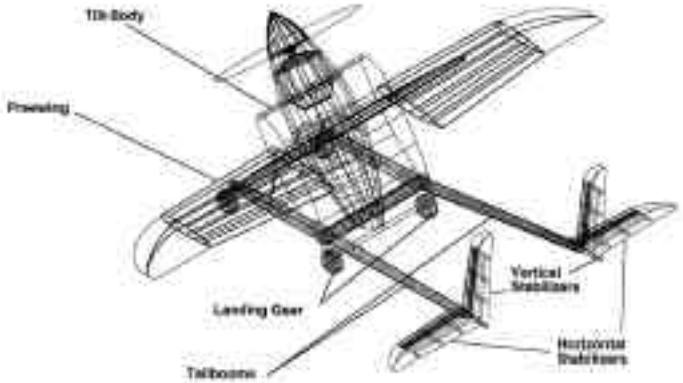
Novel Form of Thrust-Vectoring



=

Scorpion Tilt-Body

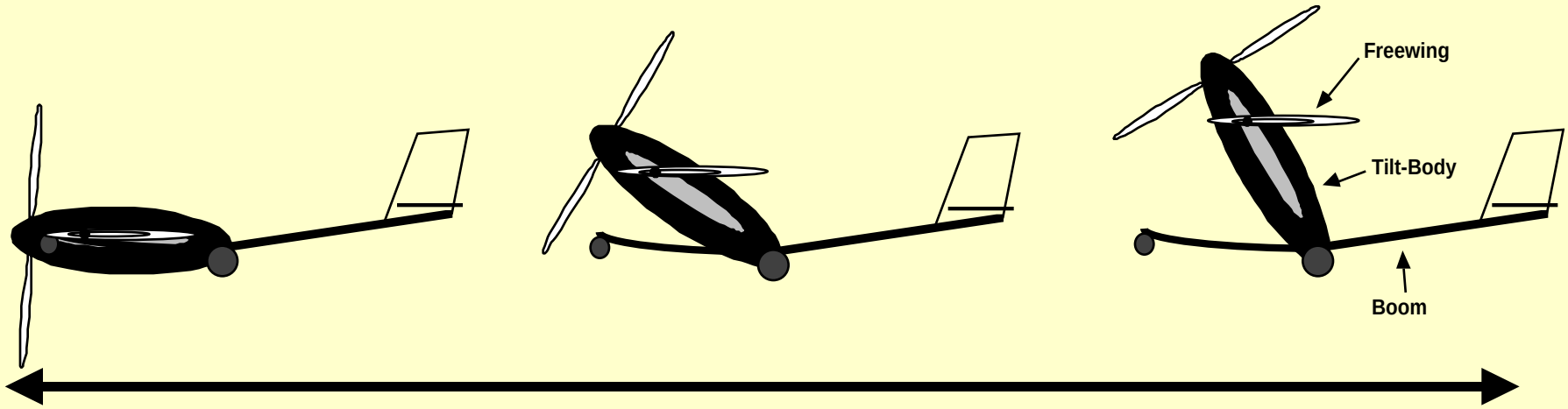




Scorpion Tilt-Body™ Advantages

- Can fly at a "near hover" or at dash speeds
- Very flexible center of gravity; the safe CG range can be 10 times greater than fixed wing aircraft.
  - Flexible payload arrangement
    * From mission to mission (c.g. of fuselage can move aft without affecting wing stability)
    * Accommodates long-term design/mission changes; more elastic growth potential

Easy Transitions with Tilt-Body



Freewing self-adjusts throughout transition :

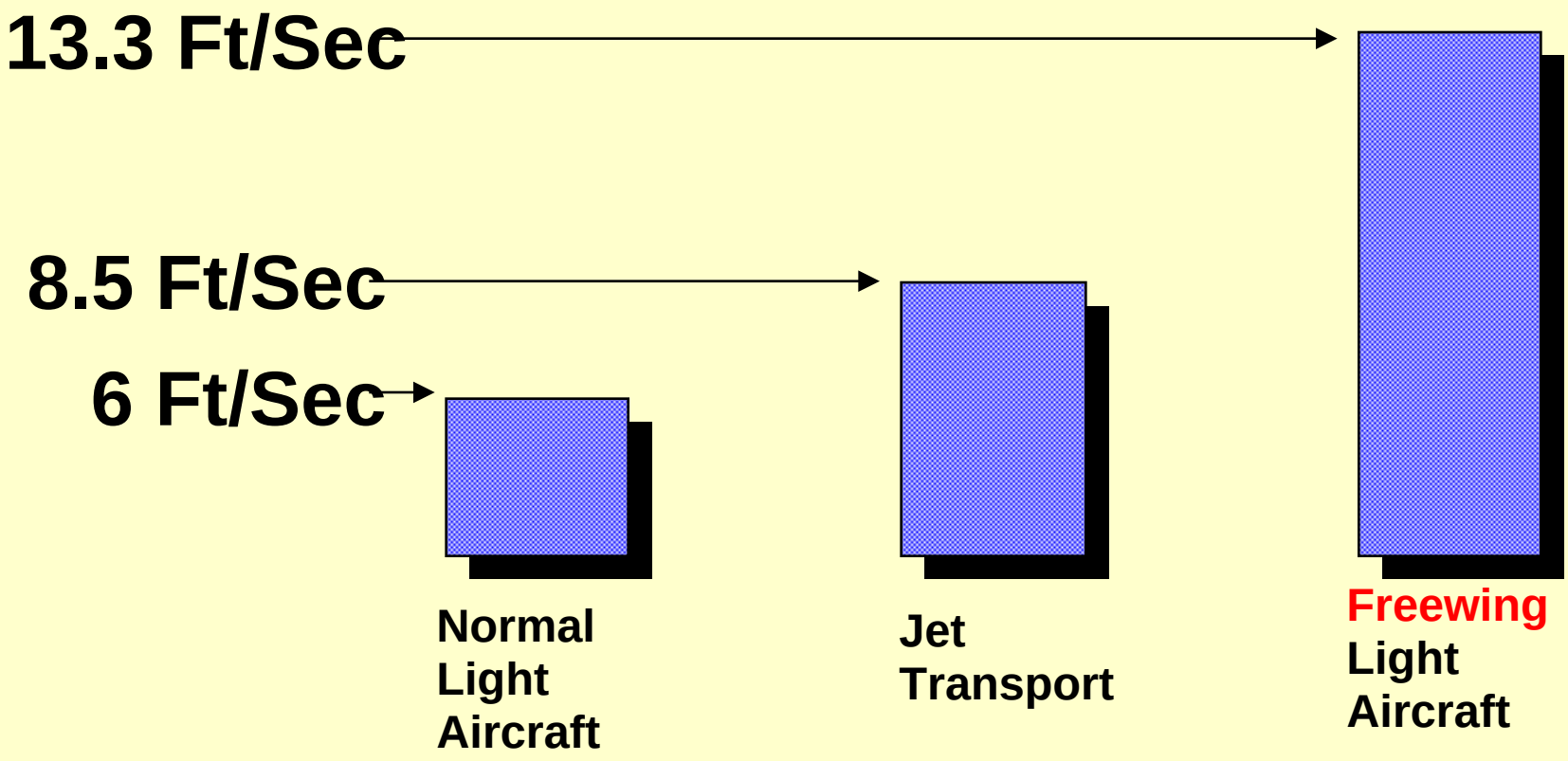
- **Automatically**
- **Passively**
- **Neutralizing turbulence throughout process**

Scorpion Tilt-Body™ Advantages (cont.)

- **Fuselage can be pointed independently of flight path**
  - **Thrust vectoring**
    - * **Simple (only a few moving parts)**
    - * **Autostable (even throughout transition)**
  - **Gross sensor vectoring**
    - * **Normal look-down sensor can also view forward**
    - * **Increase in effective scan area of sensor**
- **Up to 4-to-1 Reduction in Vertical Gust Sensitivity ("effective wing-loading" increased dramatically)**

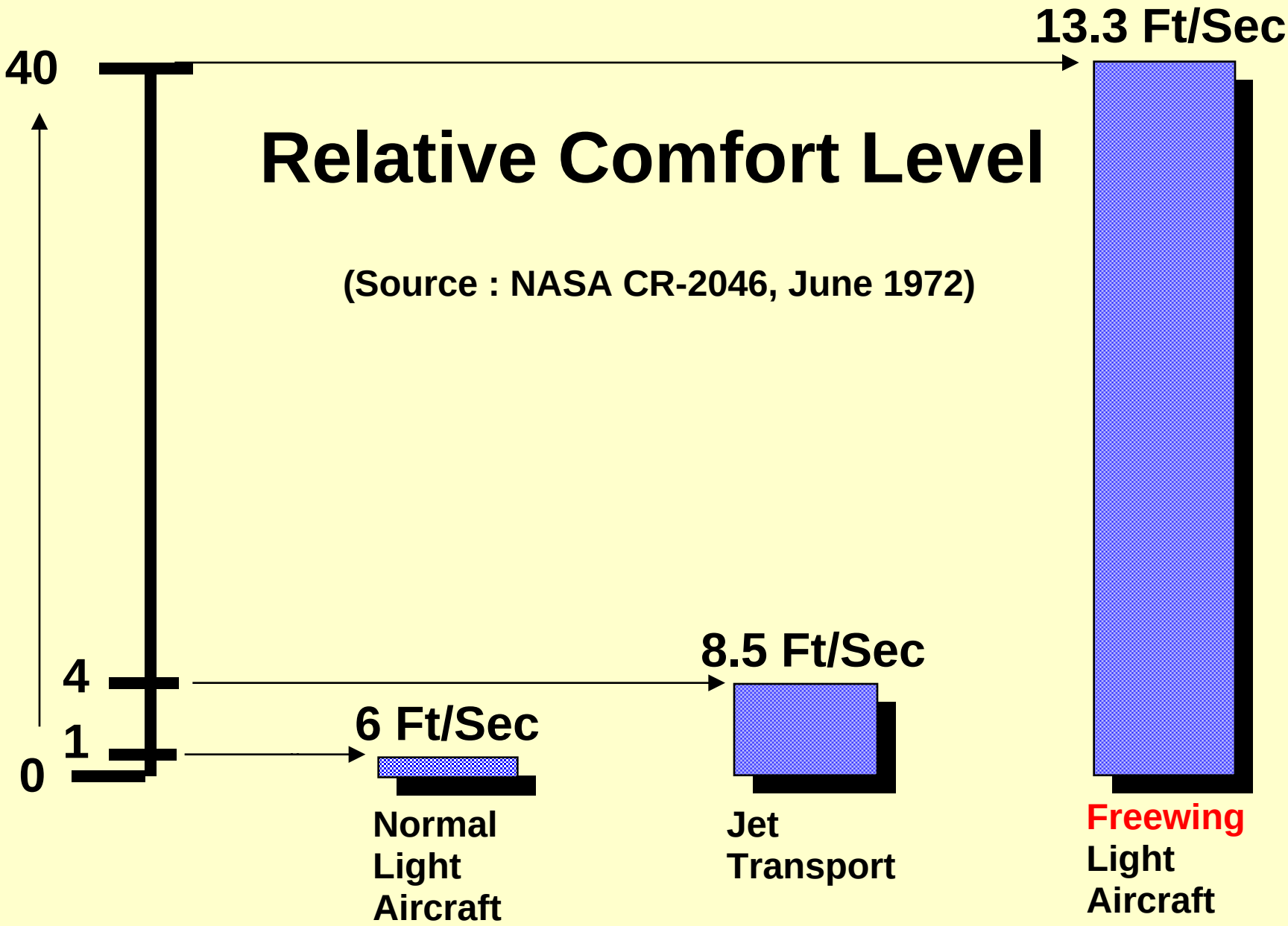
GUST LEVEL REQUIRED TO EXCEED "COMFORT INDEX"

(Source : NASA CR-1523, April 1970)



Relative Comfort Level

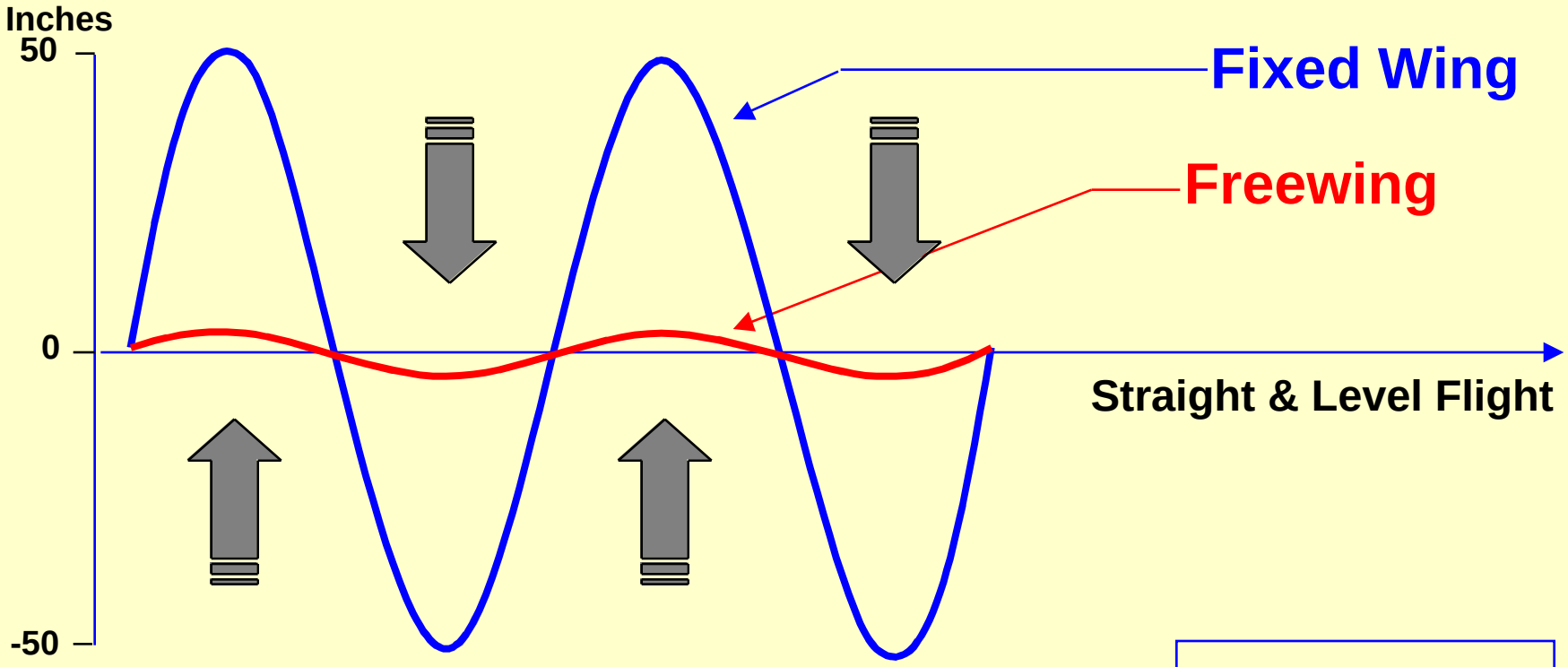
(Source : NASA CR-2046, June 1972)



Scorpion Tilt-Body™ Advantages (cont.)

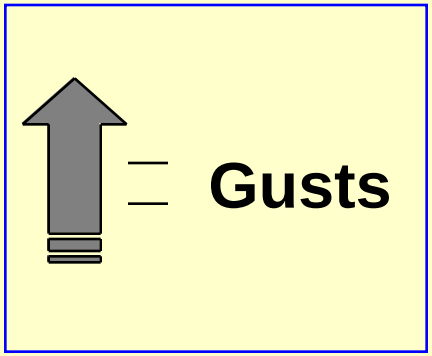
- **Significantly more stable sensor platform = better image**
  - **Valuable trait for E/O sensor missions**
  - **Invaluable for target designation missions**
- **Gust-induced vertical displacement from flight path on final approach is significantly reduced. Final approach is smoothed.**
- **Easy to transit through "burble" from ship superstructure**
- **No longer need to slow down in turbulent air; turbulence neutralization is so efficient V_{NE} occurs before V_{MO}**

Relative displacement from flight path:



•"Displacement by turbulence is more than an order of magnitude less for the freewing case."

-- NASA CR-1513, Sept. 1970

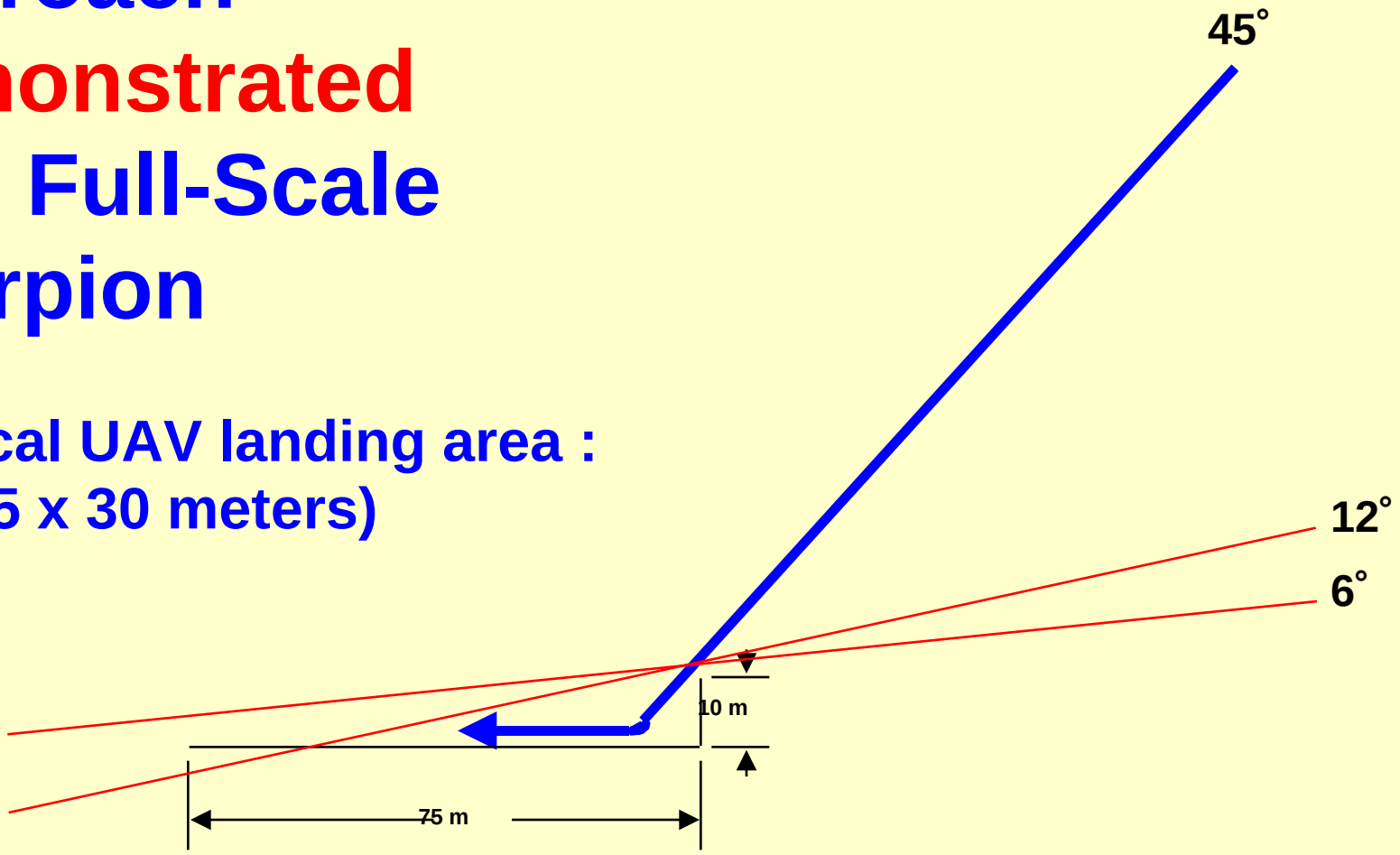


Scorpion Tilt-Body™ Advantages (cont.)

- **Inherently Stall Proof, Spin Proof**
- **Airframe/system degradation from turbulence reduced**
- **Freewing insensitive to changes in fuselage dynamics (can survive loss of tail surfaces and continue mission)**
- **Approach glide paths beyond 45° demonstrated from vectored thrust of Tilt-Body. No auxiliary drag devices or parachutes needed for obstacle clearance.**

> 45° Steep Slow-Speed Approach Demonstrated with Full-Scale Scorpion

(Tactical UAV landing area : 10 x 75 x 30 meters)

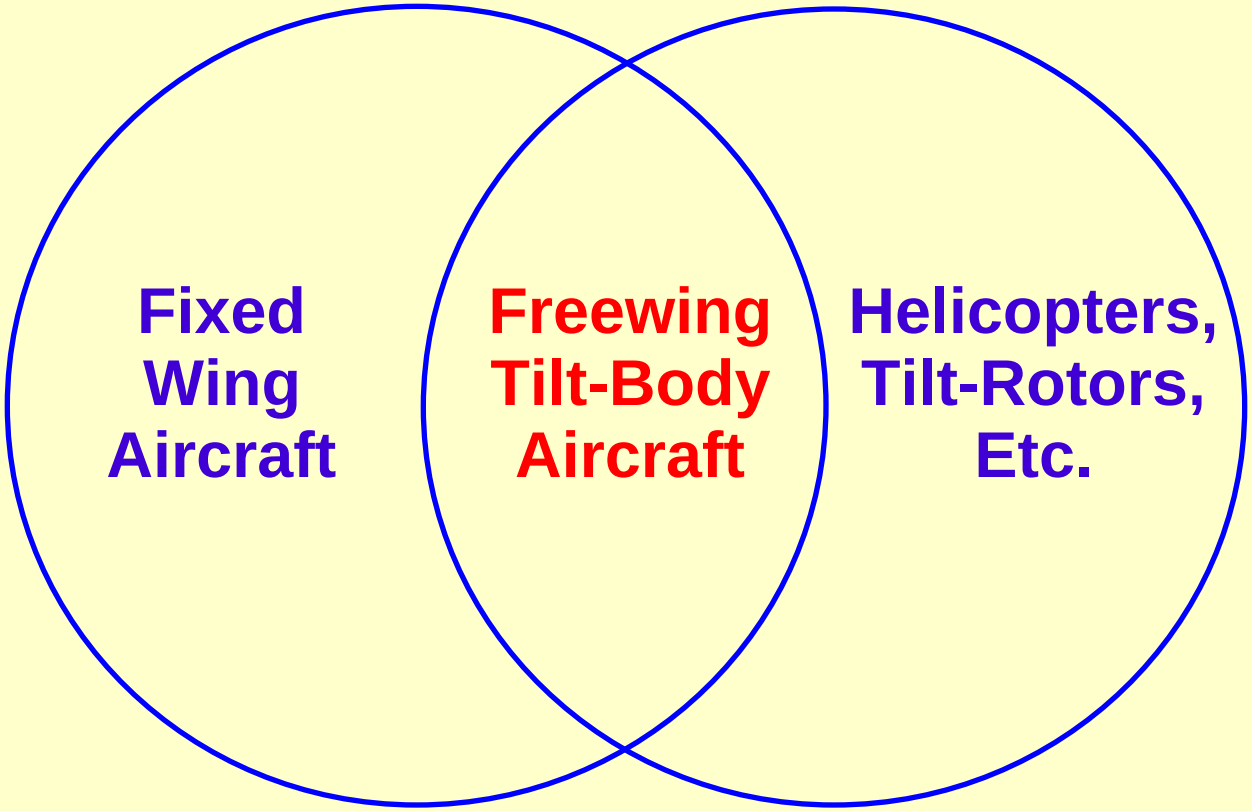


Scorpion Tilt-Body™ Advantages (cont.)

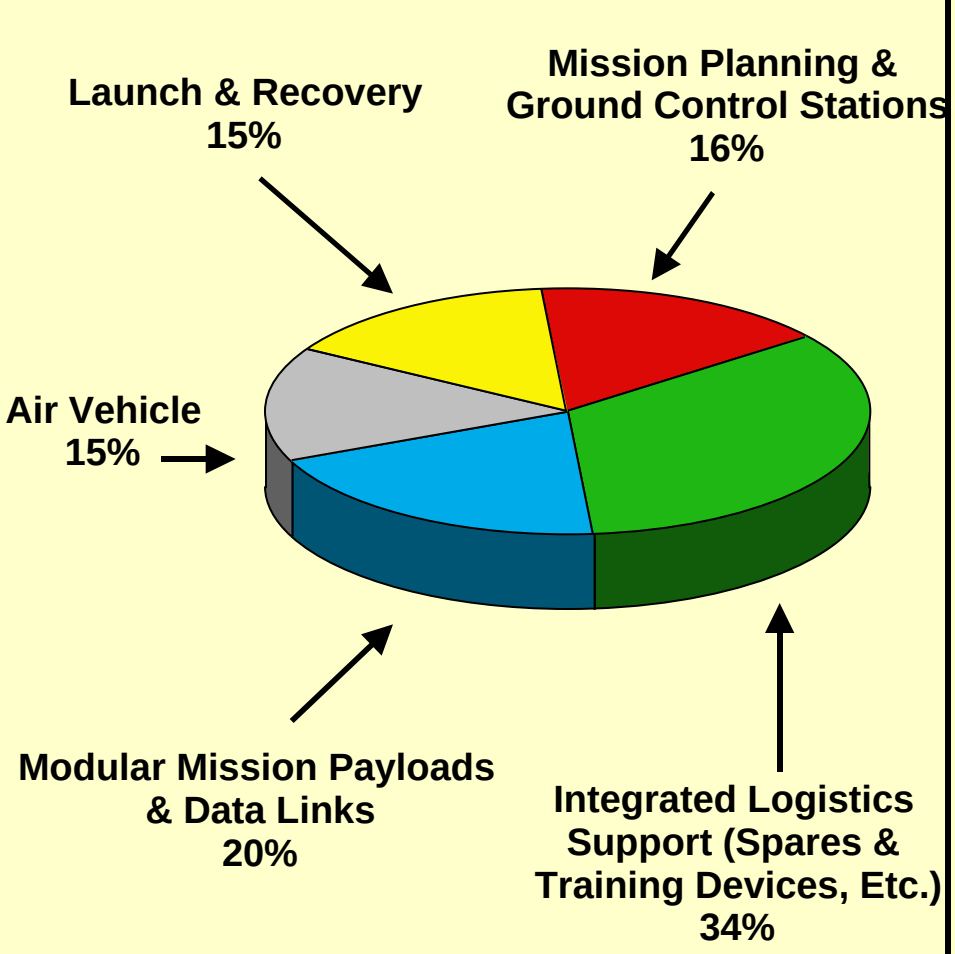
- **Low Cost:**
  - **V/STOL performance at the low cost of a fixed wing**
  - **Inexpensive:**
    (i) development
    (ii) unit flyaway
    (iii) maintenance
    (iv) life cycle

- **Freewing Tilt-Body™ concept is inherently modular**

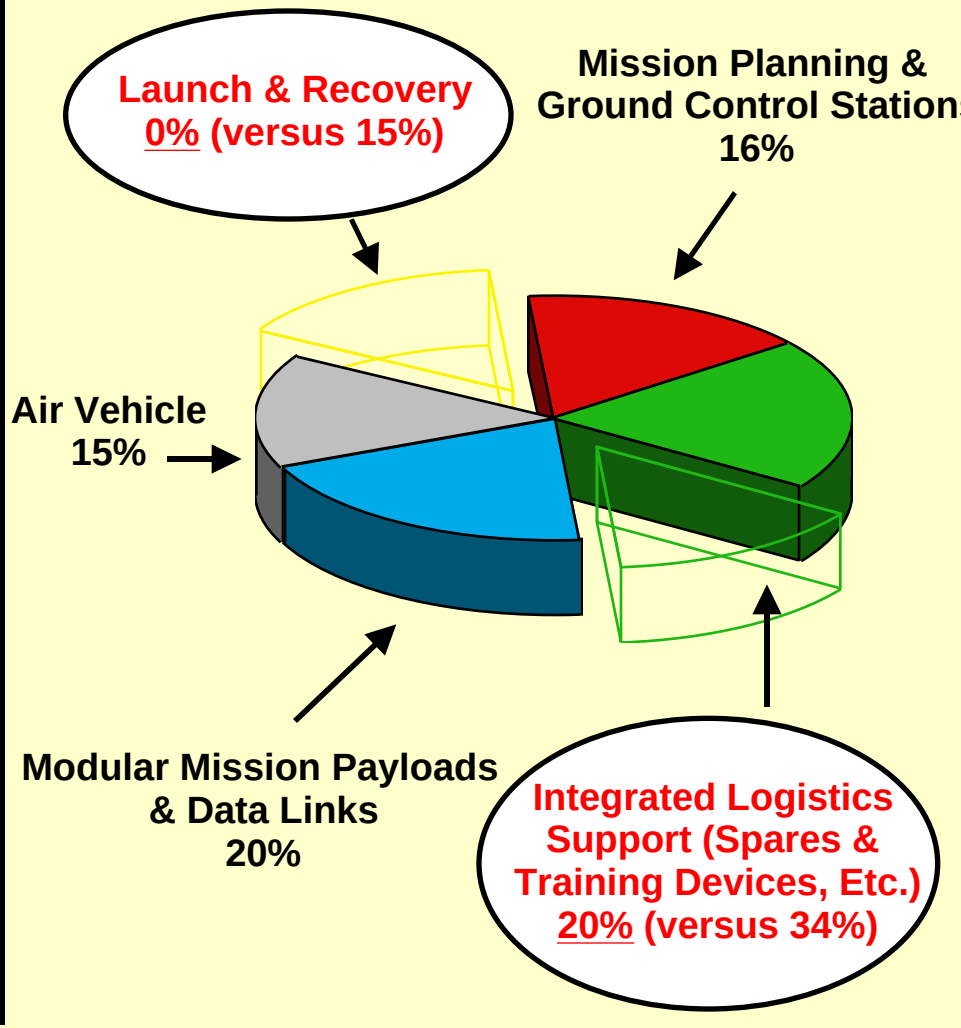
Unmatched Performance



UAV Program Cost Breakout *



Freewing Tilt-Body Effect on UAV Program Costs



* Source: DoD UAV Joint Project Office 1993 Master Plan

Scorpion Tilt-Body Inherently Modular

- **Quick release** wings and booms.

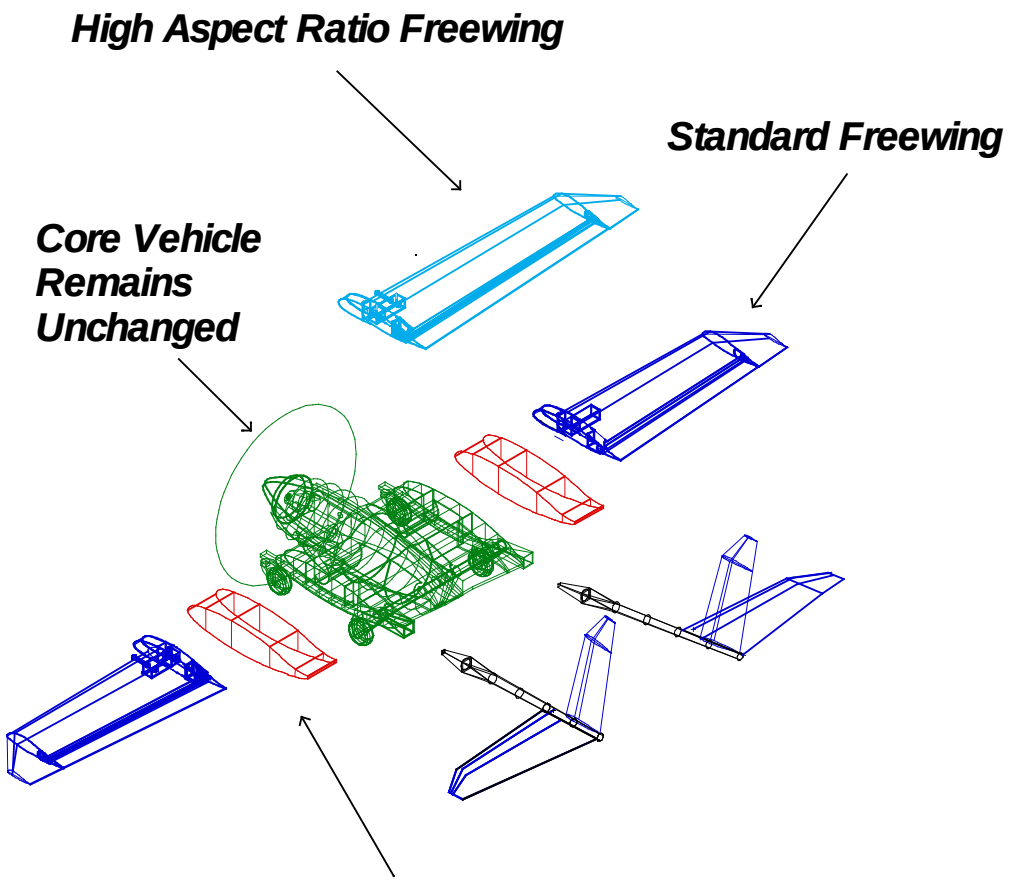
- **2-person portable.**

- Can **"mix & match"** wings for different range / endurance missions.

- **Compact** storage ; fast setup.

- **Replace** damaged wings or booms in the field **-- in just minutes.**

- Inherent modularity allows a **"family" approach**, with commonality and interchangeability of components.



Tilt-Body™ v. Tilt-Rotor

- **Wing structure much simpler**

  - **No transmissions, gearboxes, tip rotor structures**

- **Wing structure lighter**

- **Reduced procurement / maintenance costs**

- **More fuel-efficient due to "reverse snowball" effect in design; Payload/Range expanded**

- **Increased safety: fewer moving parts = reduced likelihood of catastrophic failure**

Other Tilt-Body ™ applications . . .

- **Revolutionary HALE (hi-alt long endurance) UAV**

  Good for: turbulence penetration; hi-altitude critical mach number; super-STOL launch/recovery; inherently stable sensor platform

- **Special Ops manned vehicles**

  Scaled-up Scorpion for infiltration, mountain resupply, etc.

- **Freewing-Rotor Helicopter**
  - **Can probably eliminate rotor hub and associated moving parts**
  - **Decreased cost, increased reliability, gust-insensitive rotor disk**

- **Micro Aerial Vehicles (“Micro UAVs”)**

  They’re low wing-loaded, susceptible to gusts, need wide speed range — a natural for Freewing Tilt-Body™

- **Uninhabited Combat Air Vehicles (UCAVs)**

  Simple, lightweight thrust-vectoring

Comparison of Tactical UAVs

(assumes Freewing as prime rather than sub)

Item	Freewing Tilt-Body "Scorpion" [Freewing Tilt-Body]	General Atomics "Prowler" [Fixed Wing]	AAI "Shadow 200" [Fixed Wing]	Alliant TechSystems "Outrider" [Joined Wing]	TRW / S-Tec "Sentry" [Delta Wing]	Canadair "Puma" or 'Peanut" [Rotary Wing]
Army "Shoebox" Launch / Recovery (30m×75m×10m)	●	O	O			●
System Maturity	O					
Cost (Life Cycle)						
- Lower Maintenance	●			●		O
- Mechanical Simplicity of Aircraft	●	●	●	●	●	O
- Stable Sensor Platform (Less stabilization needed)	●	O	O	O	O	O
Stall Free	●	O	O	O	O	O
C.G. Insensitivity (Flexible Payloading & Growth Pot.)	●	O	O	O	O	O
Both High Dash Speed & Near Hover	●	O	O		O	O
Loiter Efficiency (Time on Station)		●	●		●	O
Modularity of Aircraft Subsections (Repair / Performance)	●	O				O
Transportability	●	O	O	O	O	

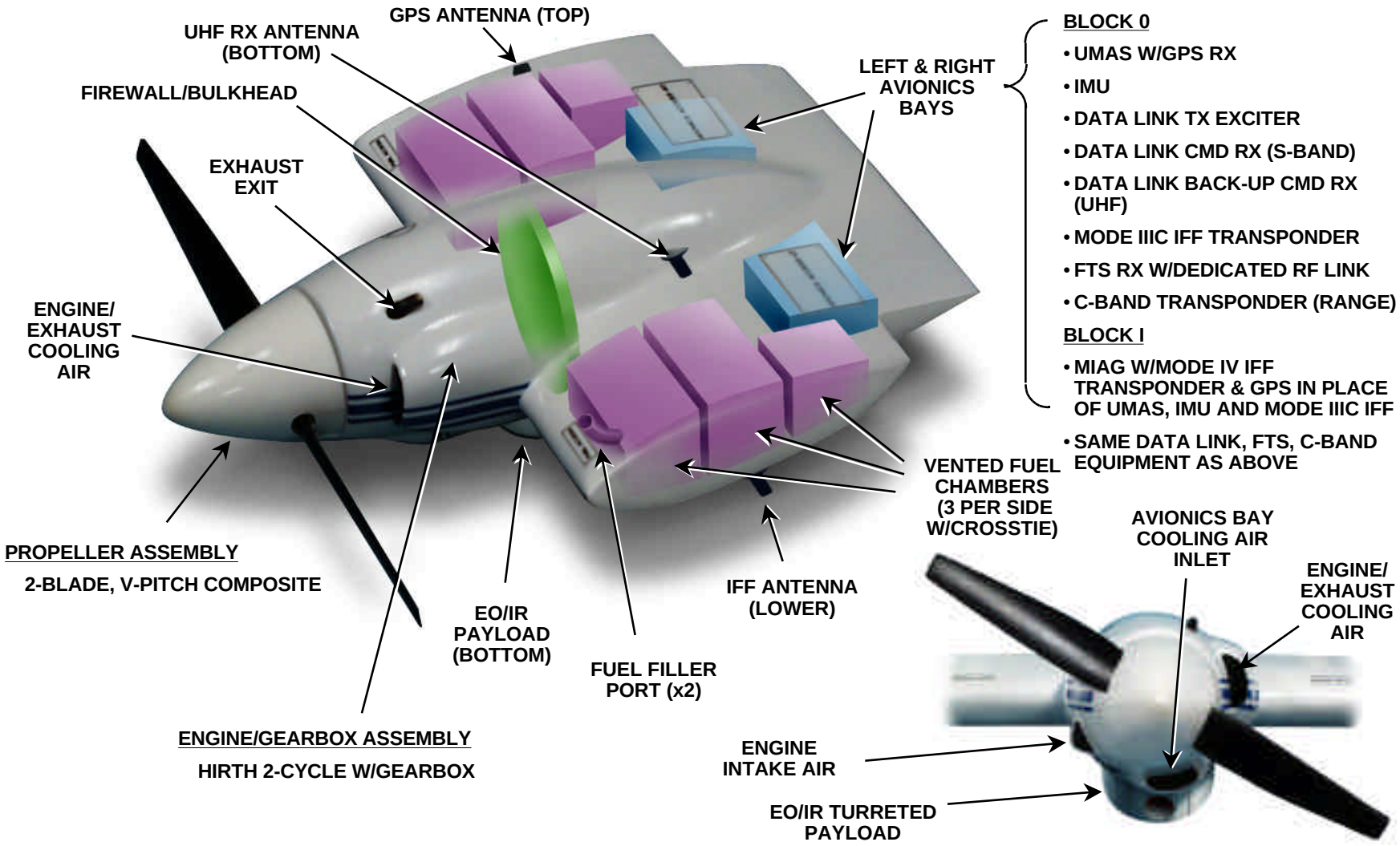
● Good Fair O Poor

Boeing's Comparison of 2 Thrust-Vectored UAVs

	Heliwing	Freewing
•TO / Land	•VTOL	•ESTOL
•TO Gross Weight	•1320 lb	•523 lb
•Payload	•200 lb	•200 lb
•Fuel Weight	•400 lb	•86 lb
•Engine HP	•240 hp	•85 hp
•Endurance, R = 0 nm	•5 hr	•6 hr
•Endurance, R = 110 nm	•3 hr	•3 hr
•Dash Speed	•180 kt	•175 kt
•Air Vehicle Cost *	•$500k	•$265k

* Assumes 500 vehicles, '96 US $

Scorpion Fuselage Assembly



AD1944-10

US Army rated Freewing portion of TUAV proposal high!

(Below is the U.S. Army's actual grading slide from the post-competition debriefing.)

IEW&S PROGRAM EXECUTIVE OFFICE

Block I Factor Rating
Marconi

JTUAV

Major Advantages:

- **The current AV possesses growth potential beyond the range and endurance objective capability**
- **ESTOL capability greatly enhances the capability to conduct operations within a Small footprint. Permits steep (>45deg) approach paths for obstacle clearance.**
- **Significant Payload growth capability**
- **Large static margin (71%) provides insensitivity to CG changes**

Major Disadvantages:

- **Significant re-work required for GCS (Block 0 to Block I)**
- **Significant changes to AV (Block 0 to Block I) to include Avionics, Datalink, Payload, and auto-land System**
- **Specific KPP and Group A requirements not attainable until Block I (EO/IR and TLE)**

Source Selection Information — See FAR3.704

Aerospace Daily

Daily Business Intelligence for the Aerospace and Defense Industry since 1963

U.S. Army selects four proposals for TUAV fly-off — August 12, 1999

The Freewing bid may have just been ahead of its time, said officials with one of the winning companies. "Ten years from now we may very well see tilt-body air vehicles as common in the UAV field," one said. "But for this competition it was just too far outside of the Army mindset of a proven air vehicle with very mature technology."