



The World Through the eyes of an Inventor

Peter C. Salmon

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Outline

- Limited access drilling
 - Electrostatic motors
 - SBIR process
- Patents
 - Writing them
 - Selling them
- New Flip Chip Connector
- The Creative Process



Limited Access Drilling – SBIR background

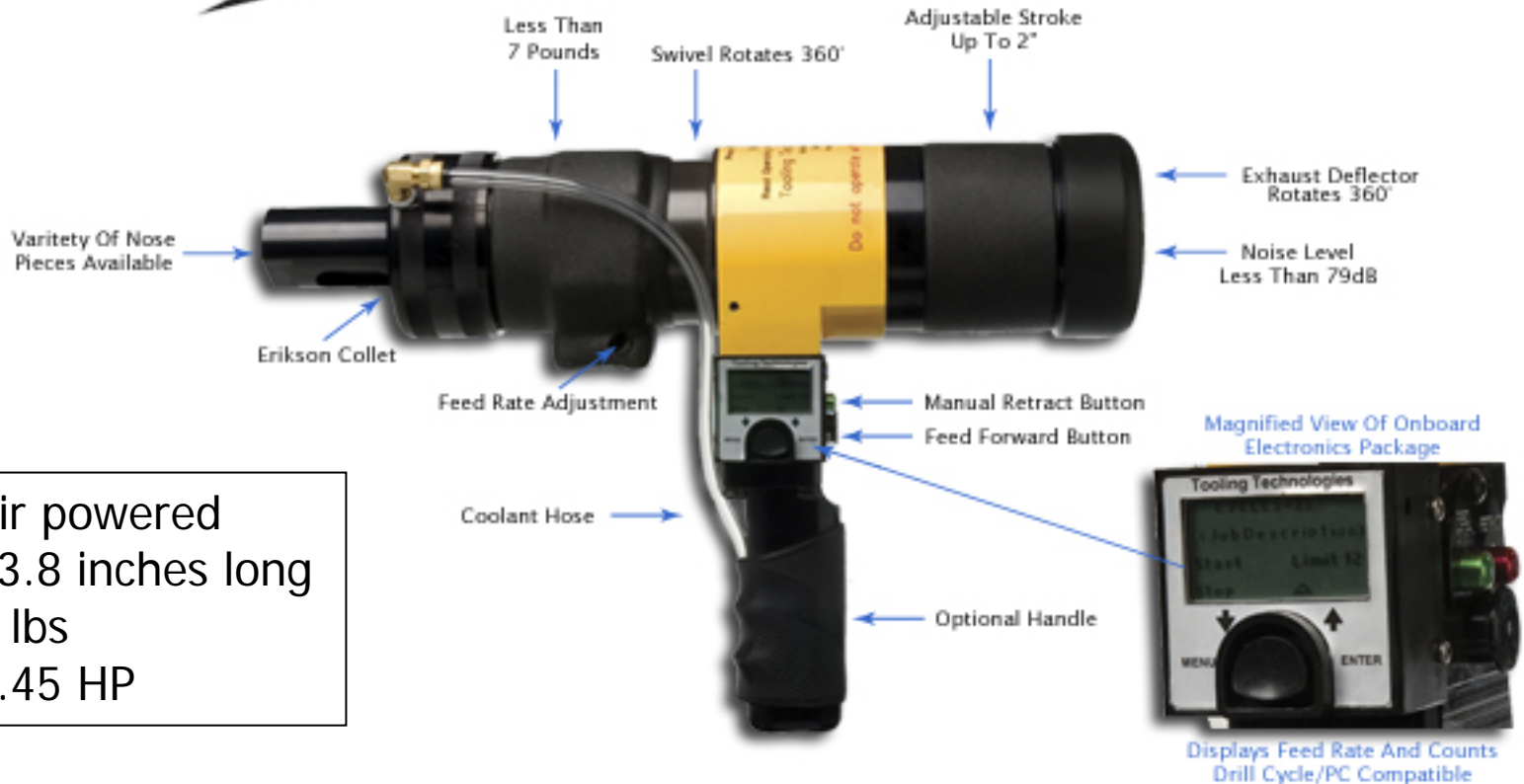
- Sponsored by the Navy
- F-35 Joint Strike Fighter plane
 - Solution for the next 4 decades
 - Joining the parts, e.g., nacelle and wings
- Government solicitations:
 - <http://www.acq.osd.mil/sadbu/sbir/solicitations/>
 - “subscribe to our listserv”
- SBIR 3 phase process
- Consultant:
 - Charles Powers, 408-723-1216, capcap@aol.com

Limited Access Drilling – the current solution

THE MULTI OPERATIONAL ALIGNED DRILL

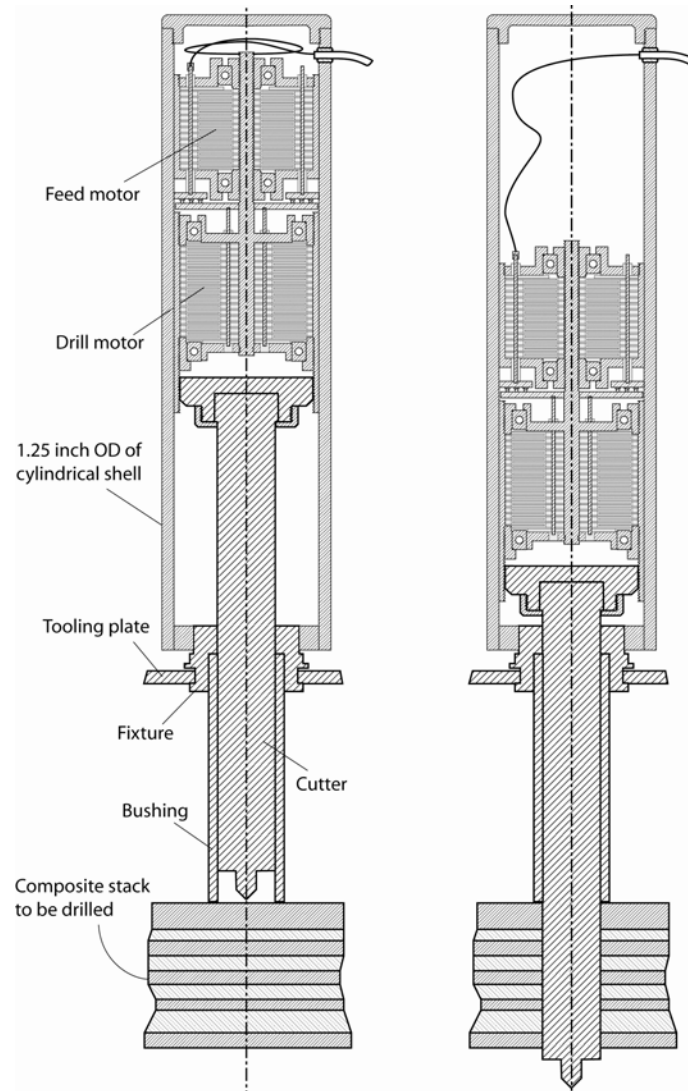
MOAD

YOUR ANSWER TO A REDUCED COST PER HOLE

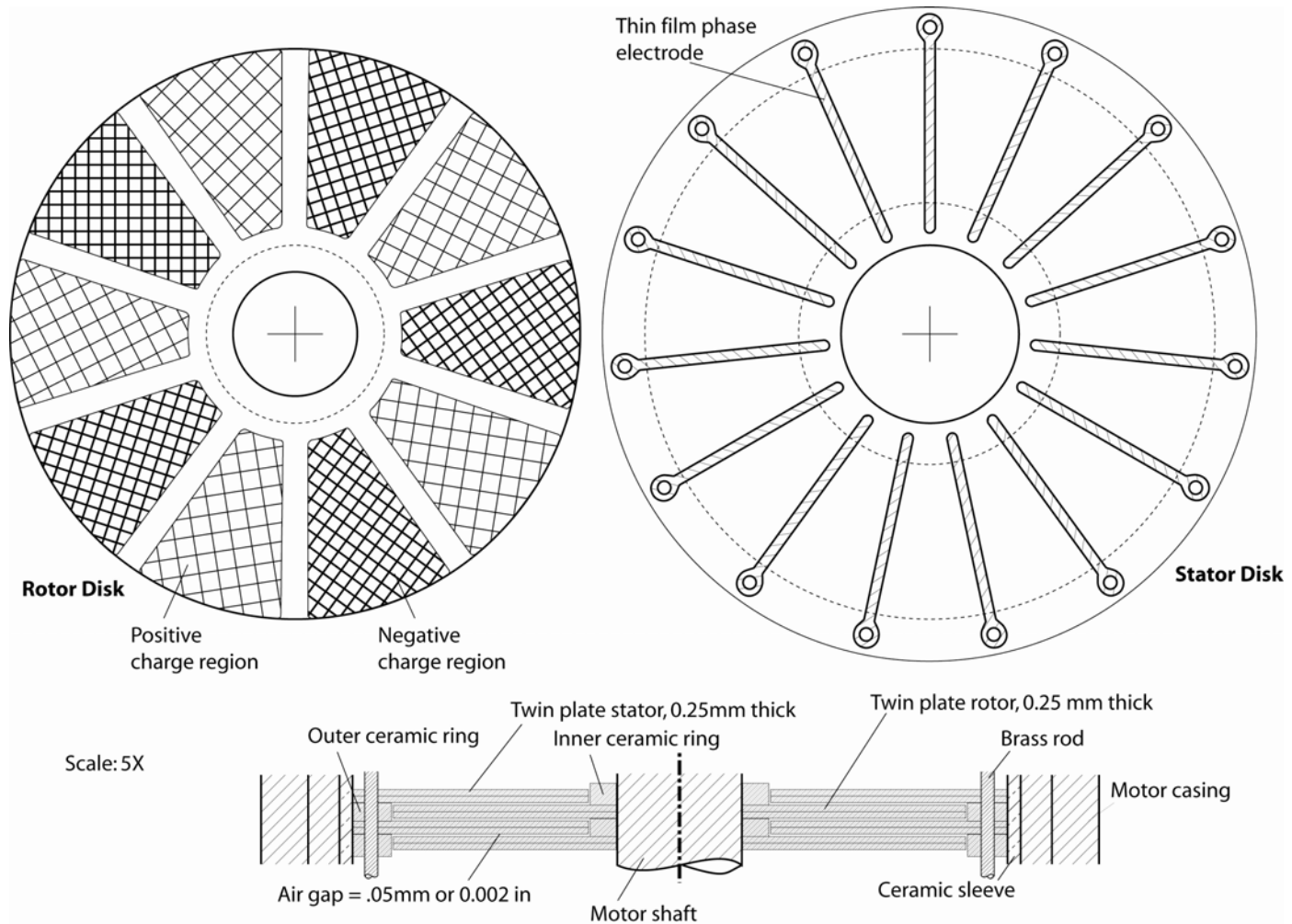


Air powered
13.8 inches long
7 lbs
0.45 HP

Limited Access Drilling: Proposed Sysflex solution

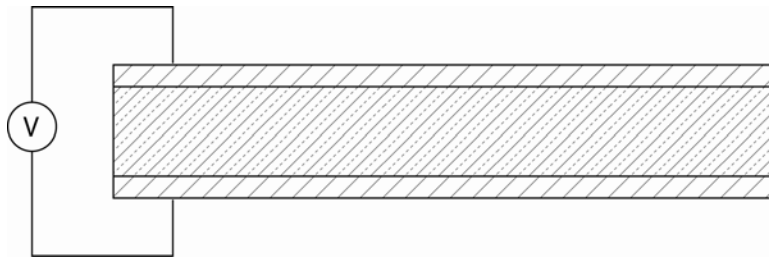


Electrostatic Motor – rotor & stator geometry



Electrostatic Motor – why it might work (1)

Parallel plate capacitor



Force between plates:

$$F = \frac{Q^2}{2\epsilon A} = \frac{\epsilon A (DS)^2}{2}$$

Material: Ultem 1000, polyetherimide

Dielectric strength = 6,820V/mil

Force per sq cm ~ 20lb



Electrostatic Motor – why it might work (2)

- qE force is linear with charge
- Ion Implantation is capable of 5×10^{15} ions/cm²
 - E.g., Use Innovion foundry in San Jose
- Ultracapacitors use charge stored on dielectric
 - Charge retention is good



Advantages of SBIR

- Retain equity
- Don't have to work with VCs
- Retain IP with minor exceptions
- A fair trade:
 - Generate new technology and jobs
 - Receive support to beat down the risks



Winning the SBIR

- Unknown factors
- Evaluation criteria:
 - Technical merit/innovation
 - Qualifications of principle investigators
 - Potential for commercialization (Govt. or private sector)
- Positive spin
 - From: “We plan to use subcontractor equipment and facilities”
 - To: “Sysflex has access to all of the equipment needed”
- Leverage Phases, 1 => 1 Option => 2 => 3



Writing Patents

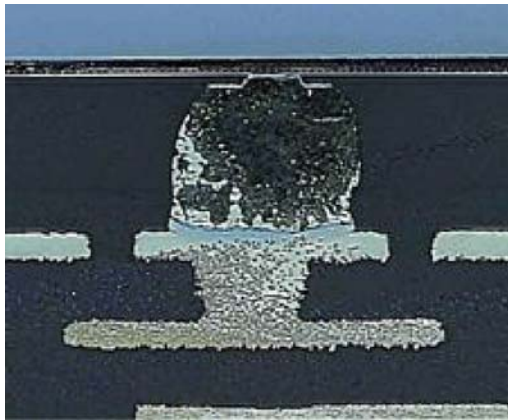
- The late Aldo Test, friend and patent attorney
- Typical costs by conventional methods
 - ~ \$50k for US and \$100k for international patents
 - Filing + office action amendments => issued patent
- Possibilities using personal effort
 - Leverage Provisional Patents
 - Prepare all the drawings
 - Use firm for filing credibility and selective critique
- Prior Art Trade-off:
 - Not needed if confident of novelty
 - But, may degrade value with some customers



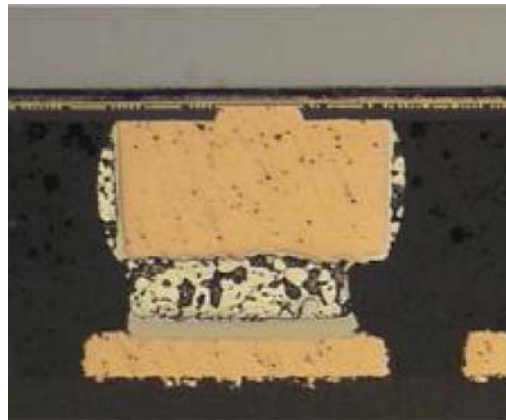
Selling Patents

- Solicitations, some of dubious origin
- License versus sell
- US versus International
- Align with specialty firm
 - E.g. Analytic Capital of Boston
- Typical value of a “good” patent
 - Element of luck

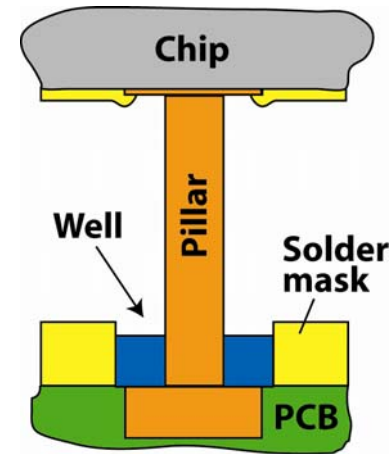
Background on flip chip connectors



IBM C4 Solder Bump



Intel Copper Pillar Bump



Sysflex Copper Pillar Well

- Connection density
- Electrical performance
- Thermal performance
- Mechanical strength
- Increased reliability



The hook that drove the invention

- Reworkability
 - Arbitrarily complex systems
 - 3D chip stacks with 1% of system size and weight
 - Potential for increased reliability
 - Potential for better CAD tools
- This led to over 20 new patent applications
 - Assembly, testing, rework, wafer-level processes

The Creative Process

- Recommended traits
 - (Curiosity + Ambition + Courage + Perseverance) => Tenacity
- Observing the trends
 - Faraday 1831 magnetic induction: magnets, wires, current
 - Today: new materials, disks, var. freq. controllers, efficiency
 - Ion Implantation: enabling technology
 - System perspective, generalist thinking, an inspirational vision

