Volant Technologies Company Overview

July 1st, 2009

Raj Gupta, Ph.D.
Owner
Volant Technologies
About Us

• Background:
  – Broad & deep expertise in silicon sensors / thin-film materials / nanofabrication.
  – Executive-level international business experience.
  – Proven commercial results.

• Focus areas:
  – Product & Technology Strategy.
  – Product Execution.
  – Foundry Partnering & Prototyping.
  – Sensor Integration & Customization.
Product & Technology Strategy

*Mating new MEMS IP to a profitable business plan.*

- **Technology Assessment** –
  - Investment diligence.
  - Maturity & commercialization assessment.
  - Needs assessment.

- **Product Strategy** –
  - Competitive benchmarking and strategy.
  - Market introduction planning.
  - Lifecycle management.

- **Product Plans & Roadmap** –
  - Product evolution, diversification & cost reduction strategies.
  - Creation & integration of supporting technology plans.
Product Execution

Management and execution of product manufacturing.

• Project Management –
  – Capability assessment.
  – Planning and execution: Manpower, budget, schedule, and tracking.
  – Risk mitigation and risk diversification.

• Engineering Management –
  – Developing company infrastructure.
  – NPI / stage gate & quality processes.
  – Resource planning, and staff recruitment.

• Strategic Alliances –
  – Acquisition of products & technologies.
  – Identification of & negotiation with supply chain partners and manufacturers.
Foundry Partnering & Prototyping

Shepherding MEMS foundry relationships.

- **Technology Transfer** –
  - Develop plan to support transfer of product / process / test capabilities:
    From concept → mask & run-cards → prototyping → “volume” processes
  - Documentation, qualification criteria, in-process testing, SPC.

- **Engagement** –
  - Develop foundry qualification criteria.
  - Identify ideally suited partners.
  - Conduct site audits & complete partner selection.
  - Negotiate product development & supply agreements.

- **Management** –
  - Ongoing foundry oversight, cost reduction and yield enhancement.
Sensor Integration

Developing *die-level components into fully-realizable solutions*.

- **Miniaturization** –
  - Use MEMS process to redesign, redevelop, and reinvent “macro-machined” sensors into micromachined MEMS-based sensor to reduce size and form factor.
  - Use product specifications to reduce system size by component integration.

- **Performance Improvement** –
  - Improve product performance by die and package redesign:
    - Using finite-element modeling and numerical analysis.
    - Leveraging new and evolving foundry capabilities.
    - Incorporating new and novel materials.
    - Choosing new integrated IC over legacy electronics.

- **Cost Reduction** –
  - Trim the fat of expensive process using alternate methods.
Sensor Customization
– Understanding End Needs –

*Example: piezoresistive pressure sensors*

**Die**

**Package Examples**

- DIP
- T0-8
- INP
- ... various others

**Applications**

- Meteorology
- Farming
- Military
- Medical
- Automotive
- HVAC
- ... many, many more

Variants may include open or closed bridge, absolute vs. gauge vs. differential

Typically 5 pressure ranges, with modest process changes required for each.
Sampling of Devices We’ve Built

- Torsional micromirror
- Piezoresistive pressure sensors
- Silicon optical bench
- AFM SiN cantilever tips
- Accelerometers
IP / Collateral

• Volant does not *per-se* bring IP into a new project.
  – Should extant Volant’s extant IP be needed, it will be called upon and referenced through patented work, and licensed accordingly.
  – Should trade secrets, e.g. unique unit processes, be required, they will be identified before work is begun, and licensing, royalty, and/or servicing arrangements can be made.

• Volant expects to develop IP for its clients. It assigns ownership of all IP developed under paid client’s services, to the client.
  – Volant notes that MEMS process IP is inherently application specific, and modification of unit process to fit into a full process will likely constitute most of client’s IP.
  – Volant prefers to engage in royalty agreements tied to volume of sales of finished product / die should it develop design, process, and package IP.
Industries Served in 2008

• Application areas:
  – Large-screen optical displays.
  – Construction & security.
  – Alternative energy.
  – Environment sensors.

• Public client list from 2008:
  – UniPixel Display Corporation, Inc.
  – Lockheed / Savi Technologies, Inc.  – AccuCrete, Inc.
  – Advanced Energy Capital.  – Goldman Sachs.

• Serve on the advisory board of 3 start-ups.
Owner Bio Highlights

• Achievements / Publications:
  – Co-founded 2 start-ups, raising $15M in total.
  – Managed production for ~$12M in nanofabrication and sensors business for Measurement Specialties, Inc.
    » On two product lines – increased GM from < 40% to ~60%.
  – Designed & led through production a sub-1PSI pressure sensor.
  – Invented InLight Communication’s fiber optical micromirror switches and successfully demonstrated the technology.
  – Co-authored about 20 research papers and 3 patents.
  – Currently editing a book titled “Sensors Testing for High Volume Manufacturing”

• Education:
  – PhD, 1997 & MS, 1993 – Electrical Engineering, MIT
  – BS, 1991 – Electrical Engineering, University of Illinois-Urbana
Contact Information

Raj Gupta, Ph.D.
Owner, Volant Technologies
33 Vandewater Street, Ste 205
San Francisco, CA  94133

OFF: +1.415.391.0426
DSK: +1.415.362.3694
FAX: +1.425.675.6006

gupta@terahz.org