

# GENERAL PROFICIENCY

## SMART DUST

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# MY TOPIC CONSIST OF:

- ◆ WHAT IS SMART DUST?
- ◆ ARCHITECTURE
- ◆ WORKING OF SMART DUST
- ◆ APPLICATION
- ◆ CHALLENGES
- ◆ CONCLUSION
- ◆ REFERENCES

# WHAT IS SMART DUST?

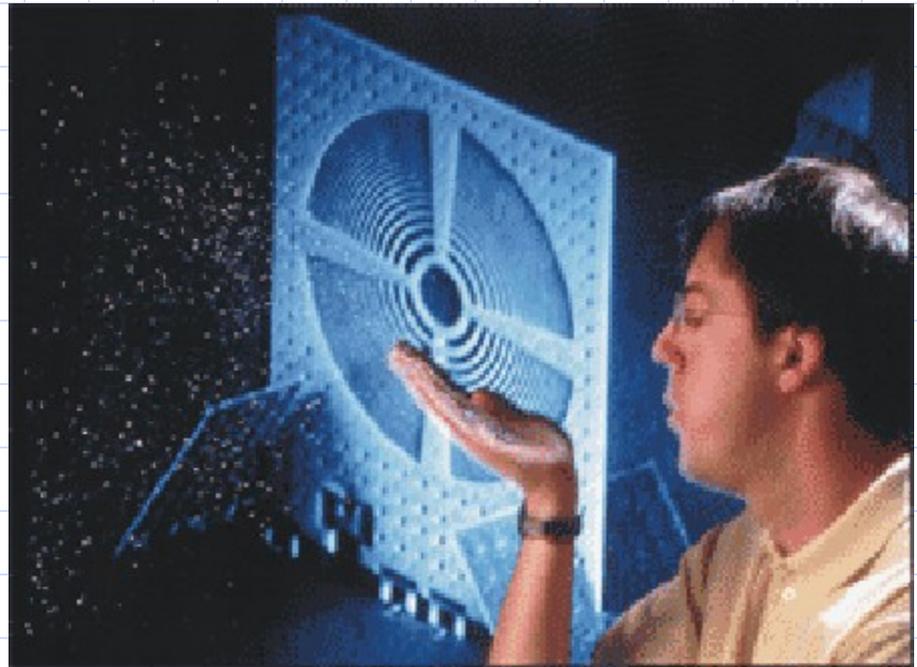
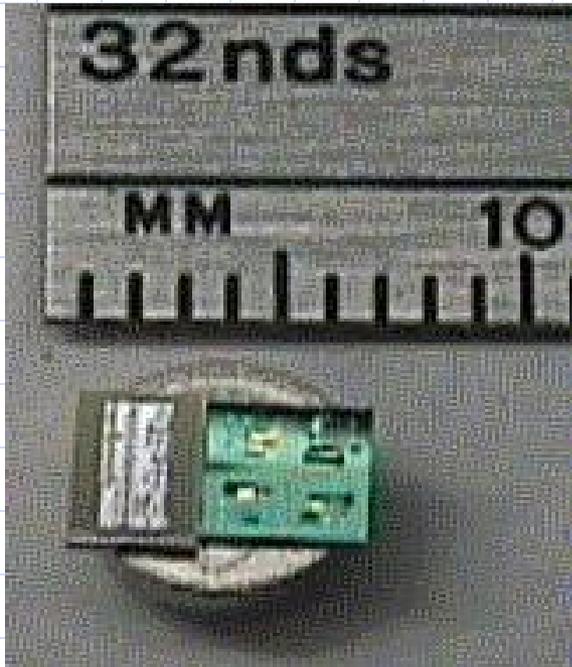
- ◆ A tiny dust size device with extraordinary capabilities.
- ◆ Often called *micro electro-mechanical sensors*
- ◆ Combines sensing, computing, wireless communication capabilities and autonomous power supply within volume of only few millimeters.
- ◆ Useful in monitoring real world phenomenon without disturbing the original process.

# Cont...

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- ◆ so small and light in weight that they can remain suspended in the environment like an ordinary dust particle.
- ◆ It is very hard to detect the presence of the Smart Dust and it is even harder to get rid of them once deployed.

# Smart Dust Mote



# ARCHITECTURE:

A single Smart Dust mote has:

- ◆ A semiconductor laser diode and beam steering mirror for active optical transmission.
- ◆ A MEMS reflector for passive optical transmission.
- ◆ An optical receiver.
- ◆ Sensors.
- ◆ A signal processing and control circuitry.
- ◆ A power source based on thick-film

# WORKING:

- ◆ Smart dust motes are run by a microcontroller.
- ◆ Microcontrollers consist of tiny sensors for recording various types of data.
- ◆ Sensors are run by timers.
- ◆ Timers work for specific period by powering up the sensors to collect data.
- ◆ Data obtained are stored in its memory for further interpretation or are send to the base controlling station.

# APPLICATIONS:

- ◆ Environmental protection (identification and monitoring of pollution).
- ◆ Habitat monitoring (observing the behavior of the animals in their natural habitat).
- ◆ Military application (monitoring activities in inaccessible areas, accompany soldiers and alert them to any poisons or dangerous biological substances in the air).
- ◆ Indoor/Outdoor Environmental Monitoring.

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- ◆ Security and Tracking
- ◆ Health and Wellness Monitoring (enter human bodies and check for physiological problems).
- ◆ Factory and Process Automation.
- ◆ Seismic and Structural Monitoring.
- ◆ Monitor traffic and redirecting it.
- ◆ Exploring of planets.
- ◆ Detecting onset of diseases like cancer.

# CHALLENGES:

- ◆ It is difficult to fit all these devices in a small Smart Dust both size wise and Energy wise.
- ◆ With devices so small, batteries present a massive addition of weight.
- ◆ High power consumption.
- ◆ Complicated design and mechanism.

# CONCLUSION:

There are many ongoing researches on Smart Dust, the main purpose of these researches is to make Smart Dust mote as small as possible and to make it available at as low price as possible. Soon we will see Smart Dust being used in varied application from all spans of life.

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**Thank You!**