

ACAMP **– Inertial Workshop**

Inertial Technology Overview



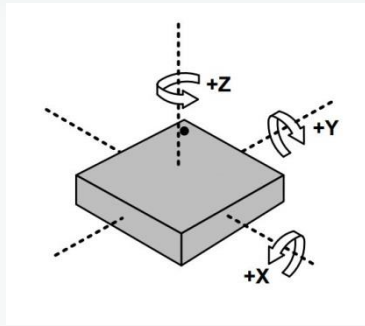
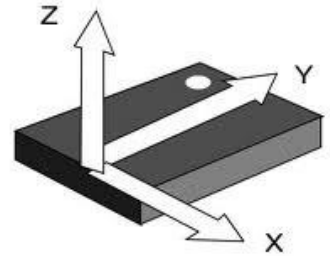
What is an IMU?

- ❖ An **inertial measurement unit** or IMU is an electronic device that measures:
 - ❖ Acceleration,
 - ❖ Rotation, and
 - ❖ Gravitational forces



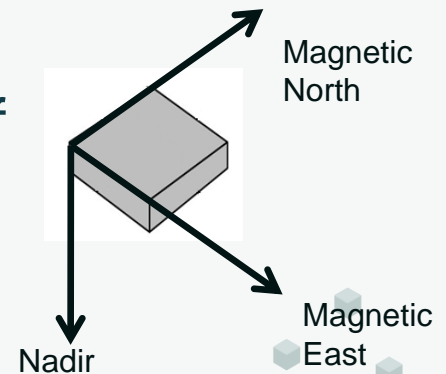
How does an IMU work?

Accelerometers – measure acceleration in 3 axis

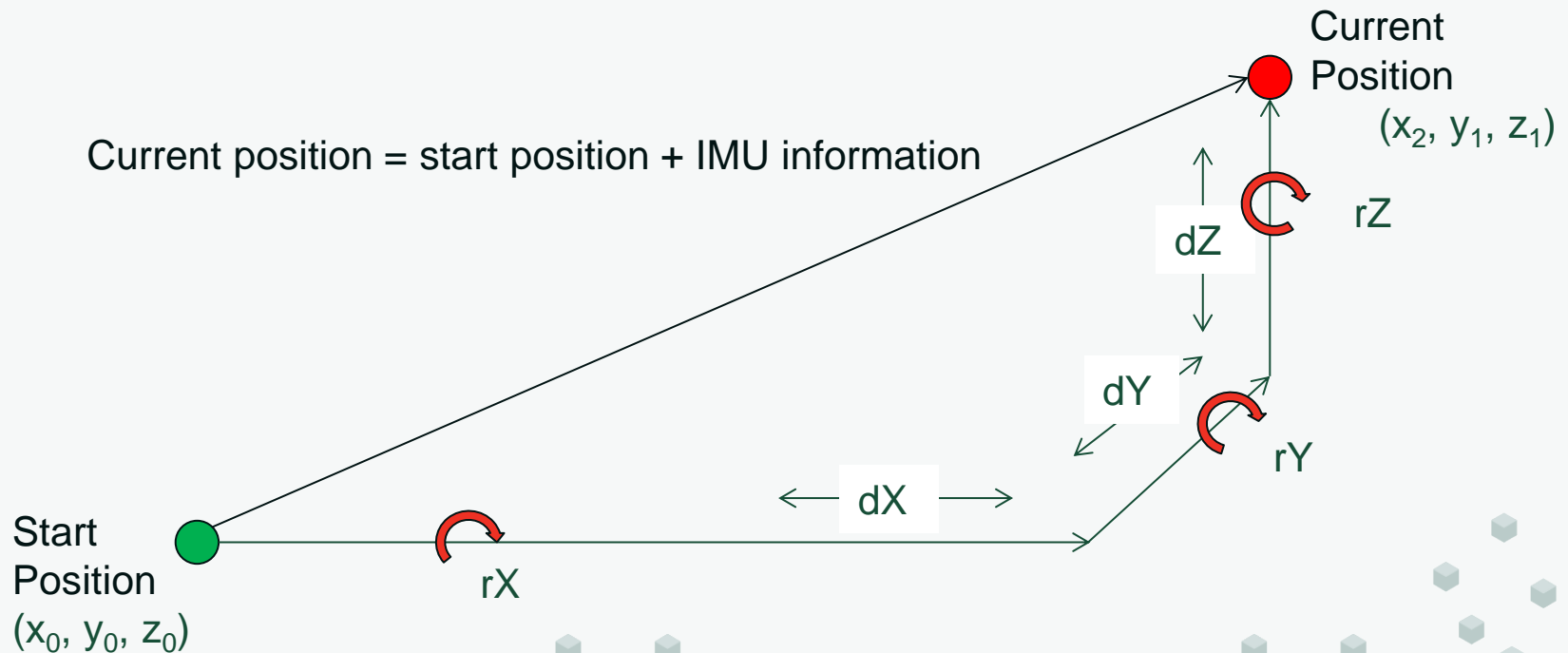


Gyroscopes – measure rotation in 3 axis.

Magnetometers – measure strength/direction of magnetic field in 3 axis
(Magnetometers are optional in IMUs.)

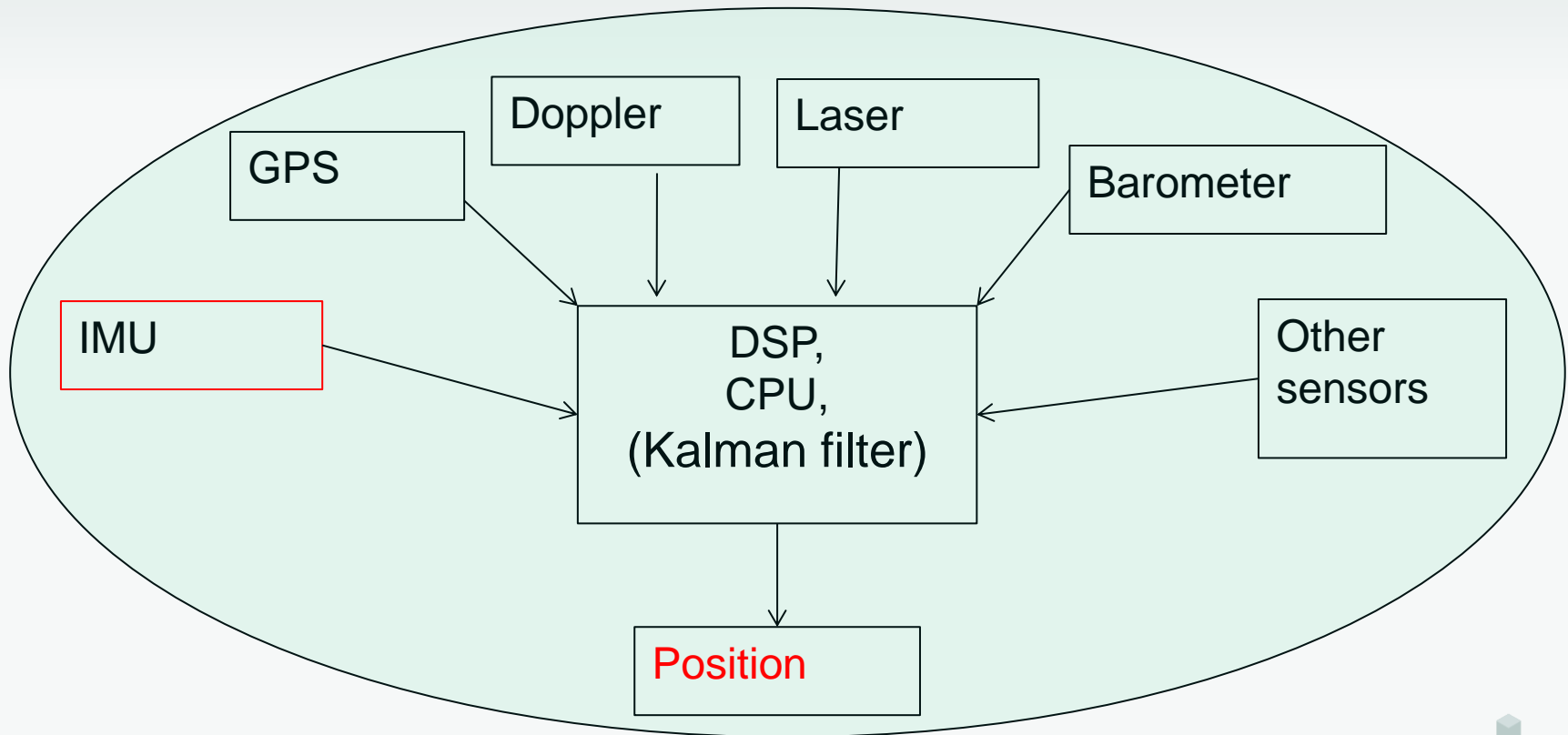


Deadreckoning – is the process of calculating your current position by using a previously determined position and advancing that position based upon information. In this case, information from the IMU.



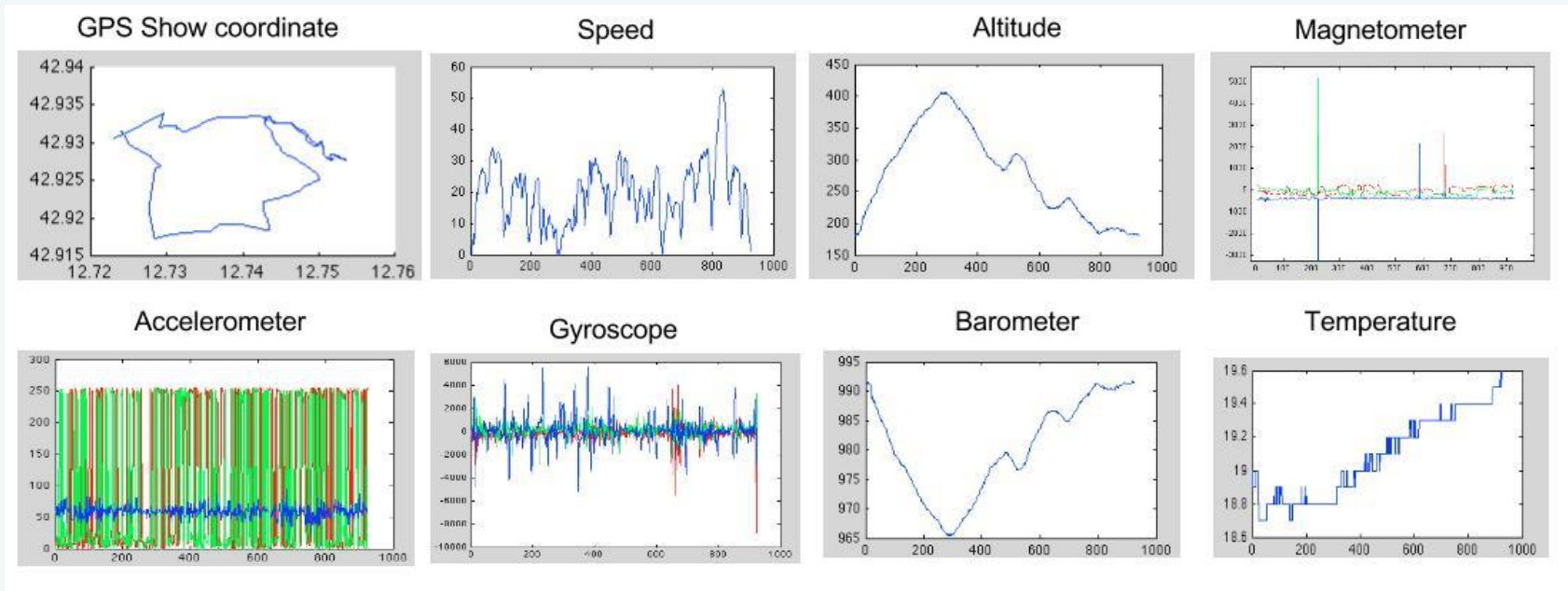
What is an INS?

An inertial navigation system (INS) includes an IMU and other sensors such as GPS.



INS Data (typical)

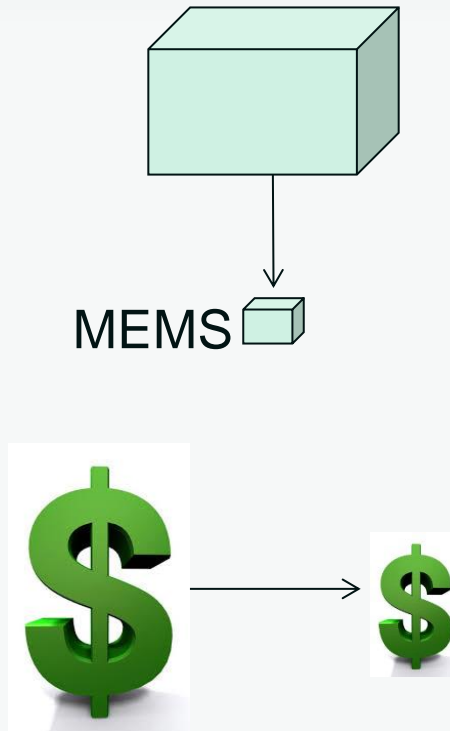
DSP and Kalman Filter very important part of an INS.
A large amount of data.



What are the trends in components?

Smaller

Cheaper



Performance



Sense, Acquire & Process

What does this mean?

→ More manufacturers

→ More product selection

→ Cheaper components

→ Easier to integrate



Traditional Markets

▣ Military/Defense



▣ Industrial

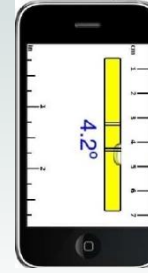


▣ Commercial Aviation



New / Emerging Markets

- Cell phones
- Gaming
- Health/Medical
- Sports / Fitness
- Navigation/Positioning/Mapping
- Building/structure monitoring
- Environmental monitoring
- Personal safety
- Robotics/UAVs
- ...etc.



Prevalence of Inertial Technology

Inertial Market growing¹

Sales

\$1.55B (2009) - expected \$2.60B (2015)

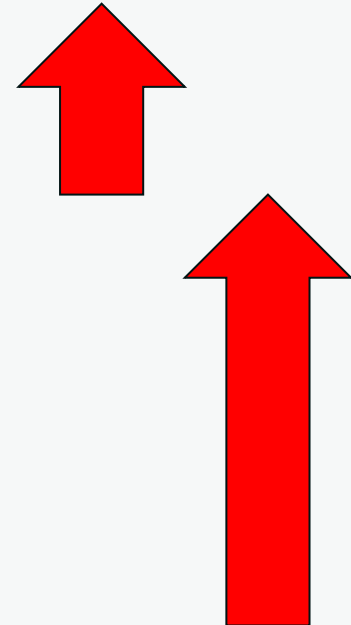
→ Expecting a 68% increase in 6 years

Units Sold

190K units (2009) - expected 650K units (2015)

→ Expecting a 242% increase in 6 years

Prevalence of Inertial Technology



1. Data from: Yole Reports (Available at ACAMP)

Working with MEMS Based Sensors

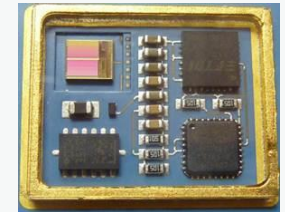
Sensors including IMUs that are small in size



LTCC

PCBs made out of a special type of ceramic

→ Enables miniaturization



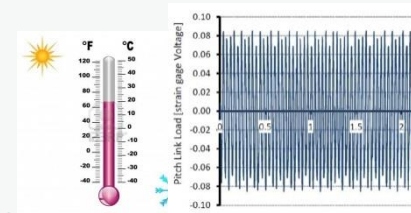
Product Development

Integrating, Packaging & Assembling



Characterization / Testing

Ensure products meet predefined specifications



MEMS IMUs, LTCC, Product Development, Testing...

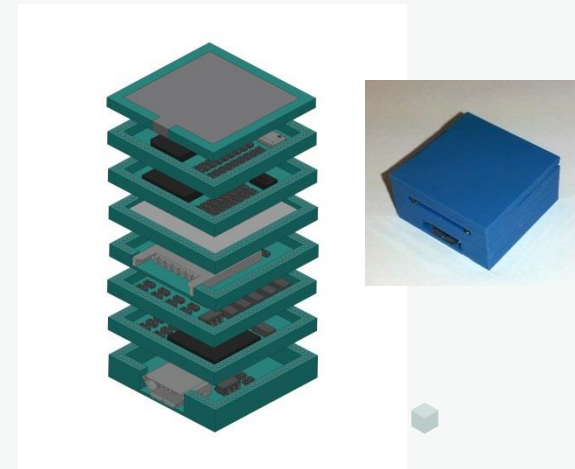
Great Combination of Expertise

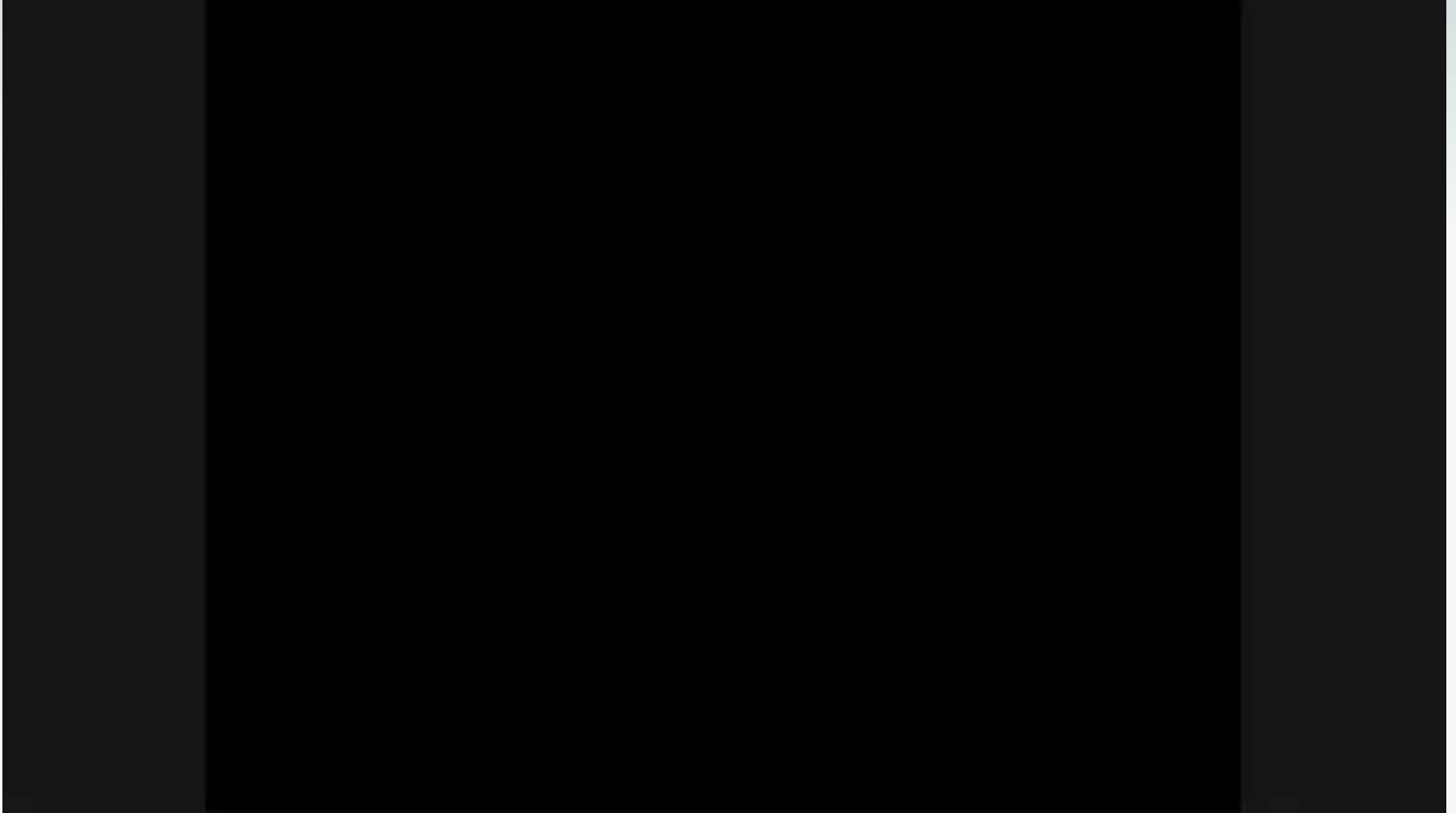
ACAMP provides clients with a **complete solutions**

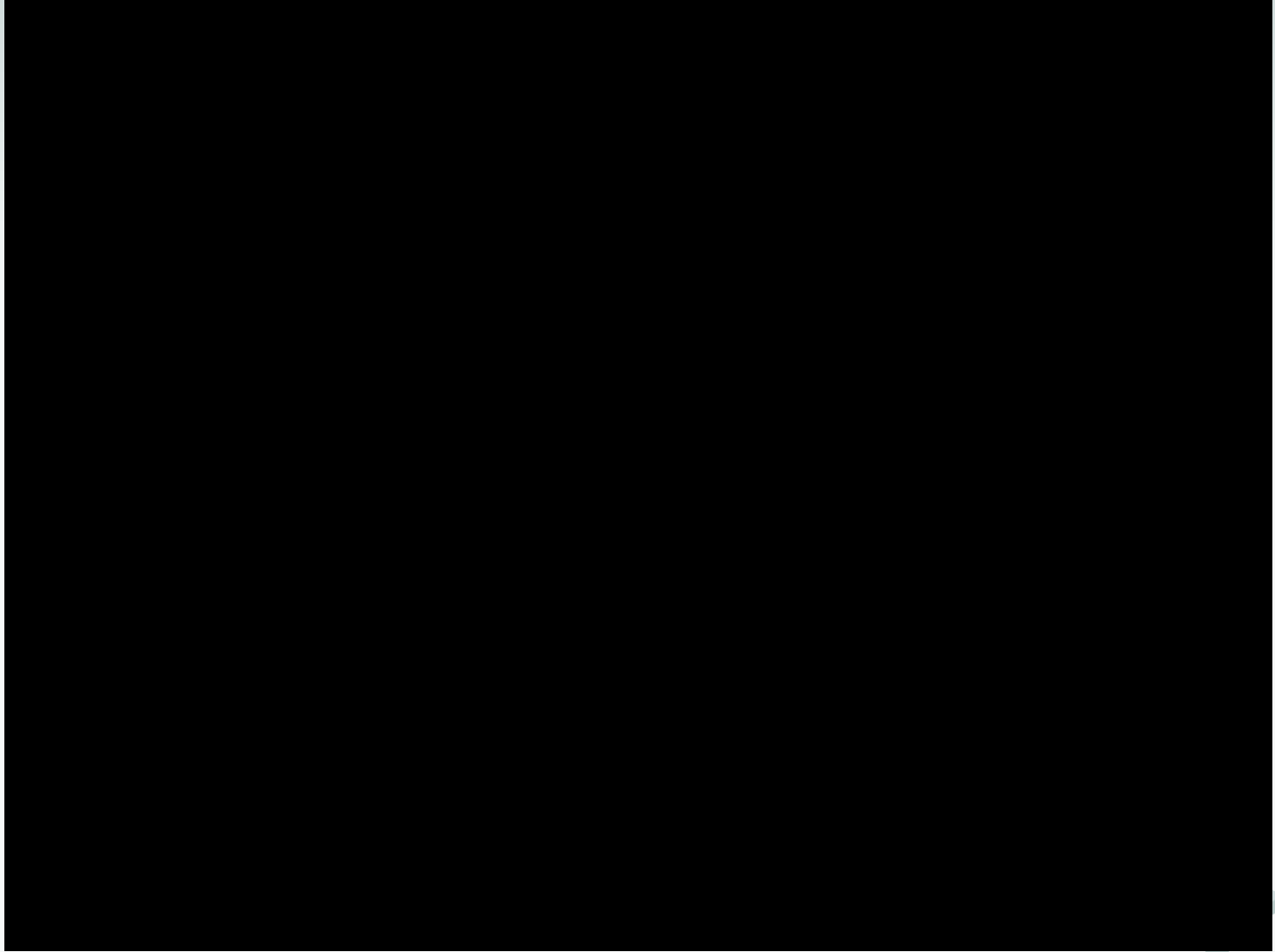
For example

→ ACAMP's SmartCube Product

(Will be discussed in more detail in the next presentation.)







QUESTIONS?

