

COMPRESSIVE SENSING

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challenge 1

data too expensive



Case in Point: IR Imaging



[Home](#)

[Products](#)

[Software](#)

[Specials](#)

[Support](#)

[Home](#) > [Science Cameras](#) > [FLIR SC8303 InSb Infrared Camera - Demo](#)

FLIR SC8303 InSb Infrared Camera - Demo



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~~\$139,500.00~~

\$94,500.00

In Stock

Part #: 27525-203

★★★★★ [Write a Review](#)

With highly sensitive cooled InSb detectors, superb resolution, and all of the cutting edge functionality scientists and researchers have come to expect from FLIR, the SC8000 HD Series brings science and R&D thermography to a whole new level.

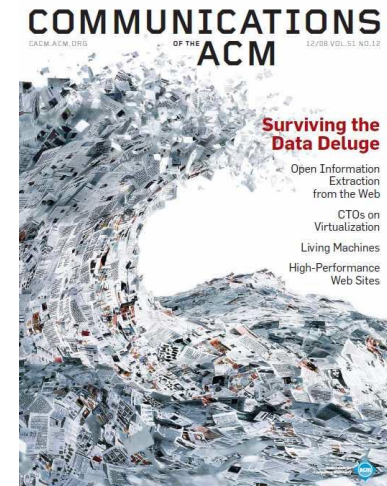
This camera was previously used as a demo camera.

Available in the USA only



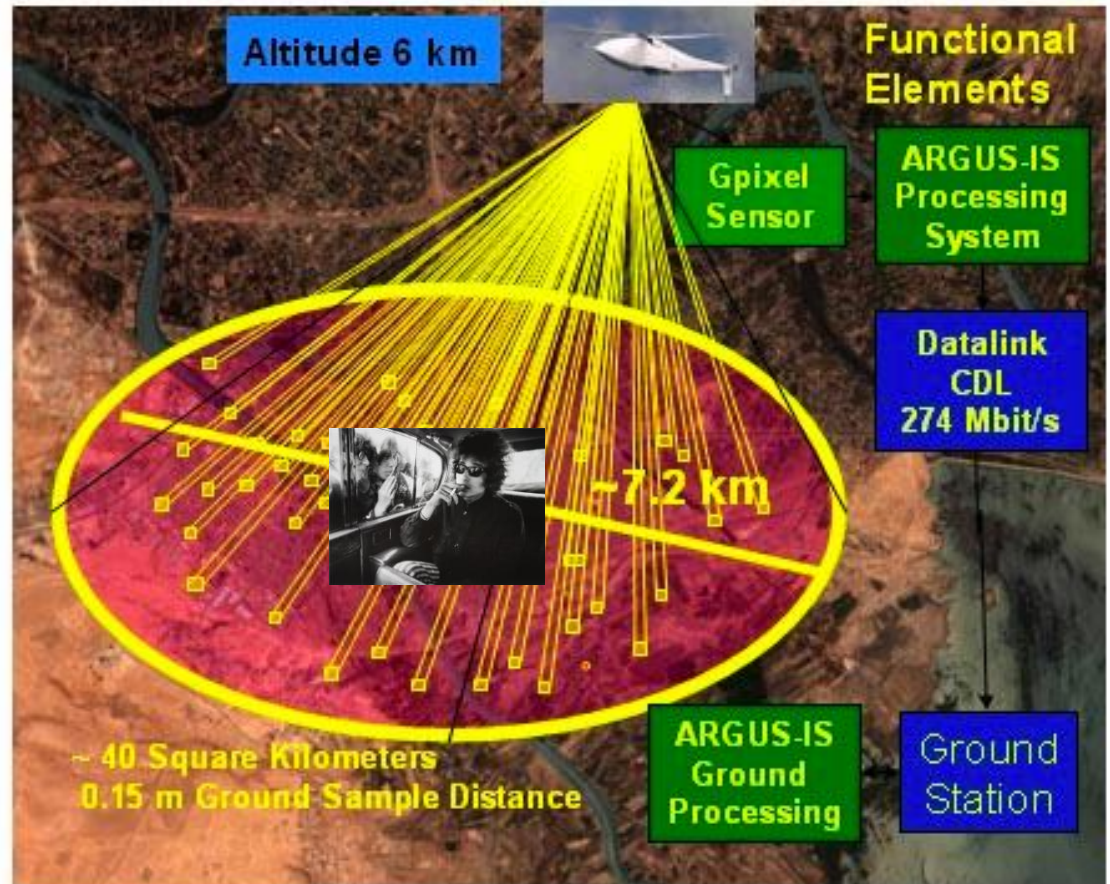
challenge 2

too much data



Case in Point: DARPA ARGUS-IS

- **1.8 GIGApixel image sensor**

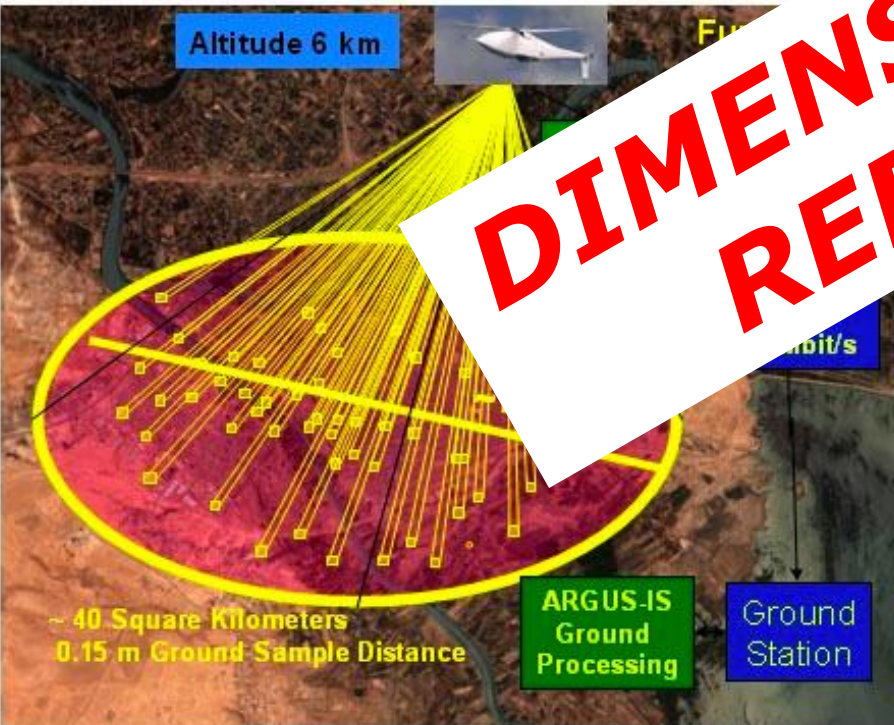


- ***Reconnaissance without conscience***

- too much data to transmit to a ground station
- too much data to make effective real-time decisions

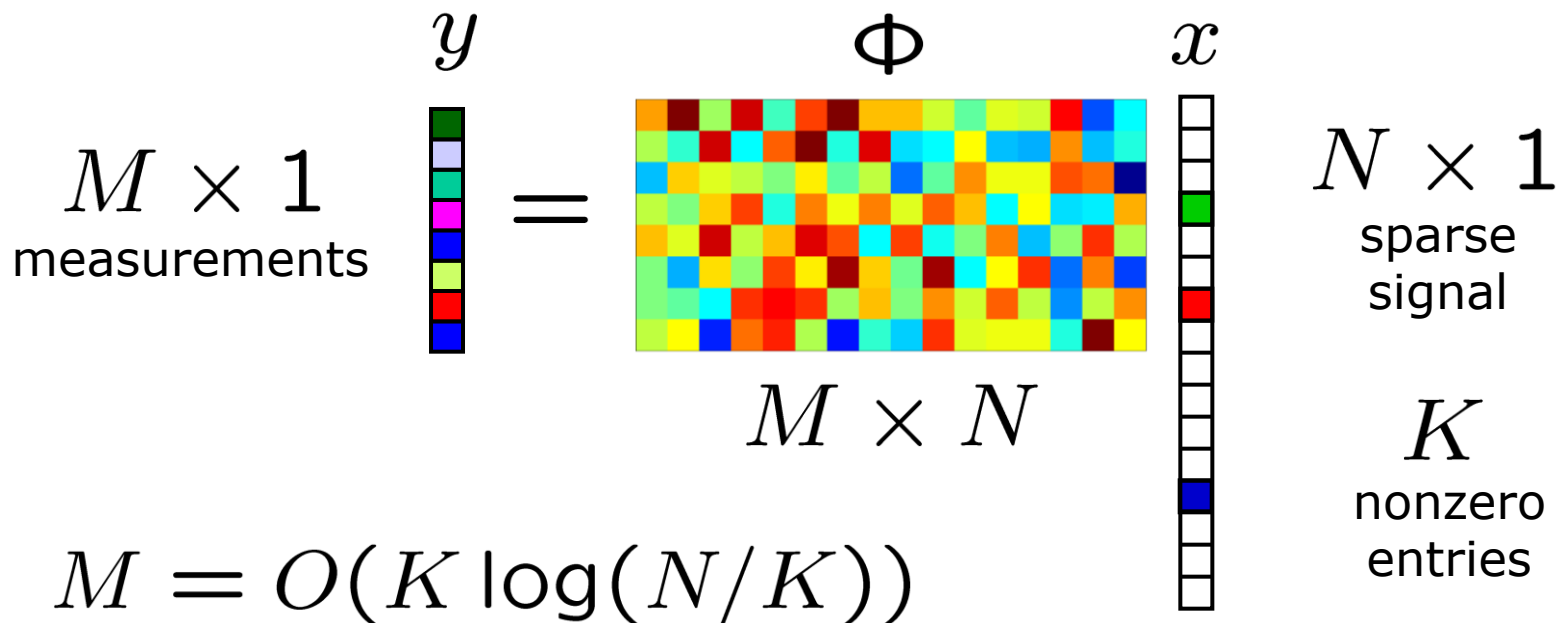


DIMENSIONALITY REDUCTION

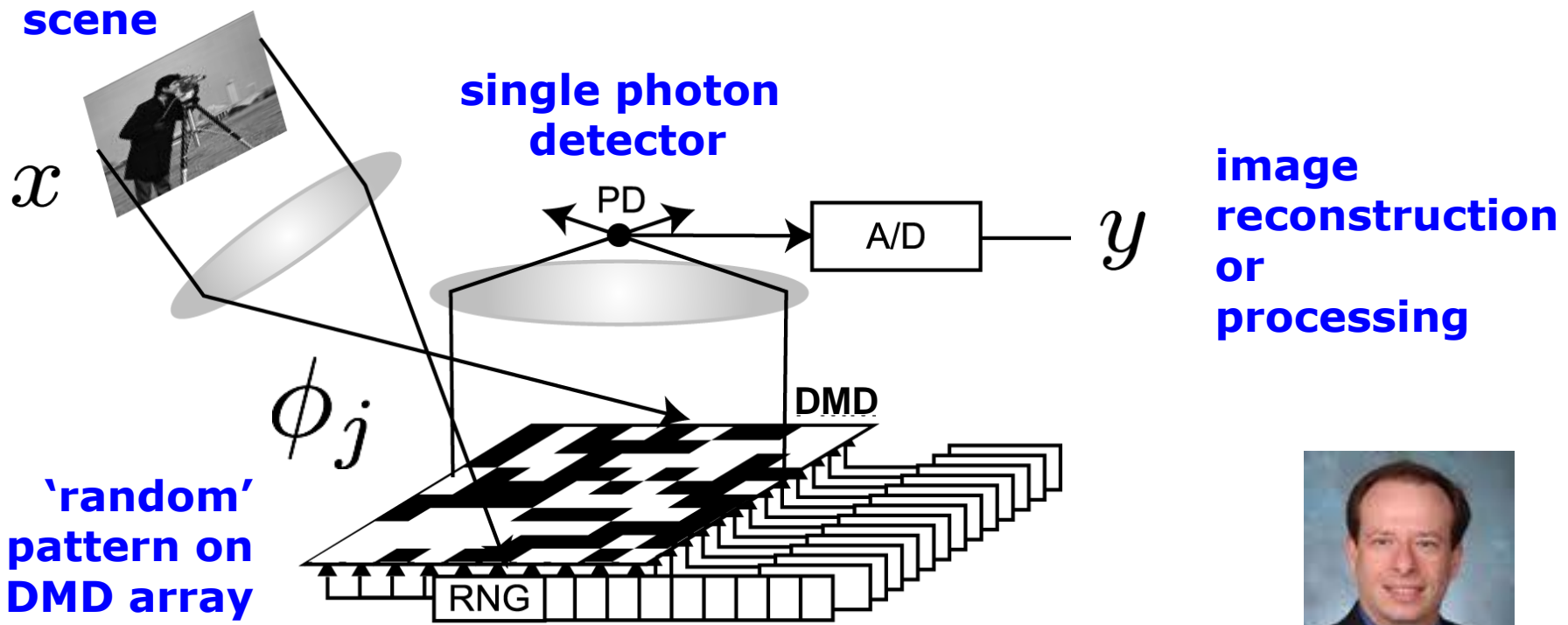


Compressive Sensing

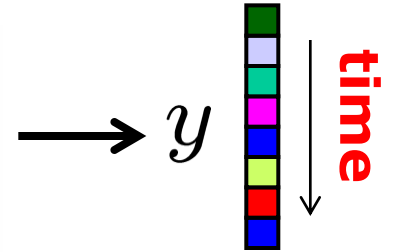
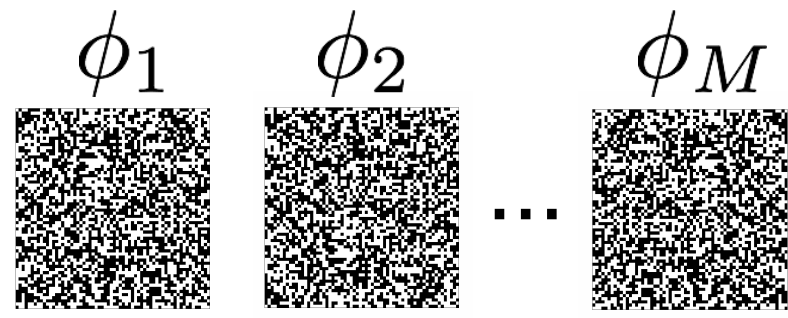
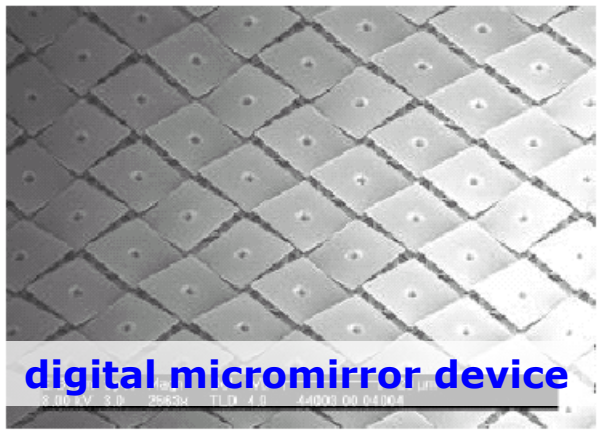
- Measurements $y =$ **random linear combinations** of the entries of x
- **No information loss** for sparse vectors x whp
- Can recover x from y via convex **optimization**



Single Pixel Camera

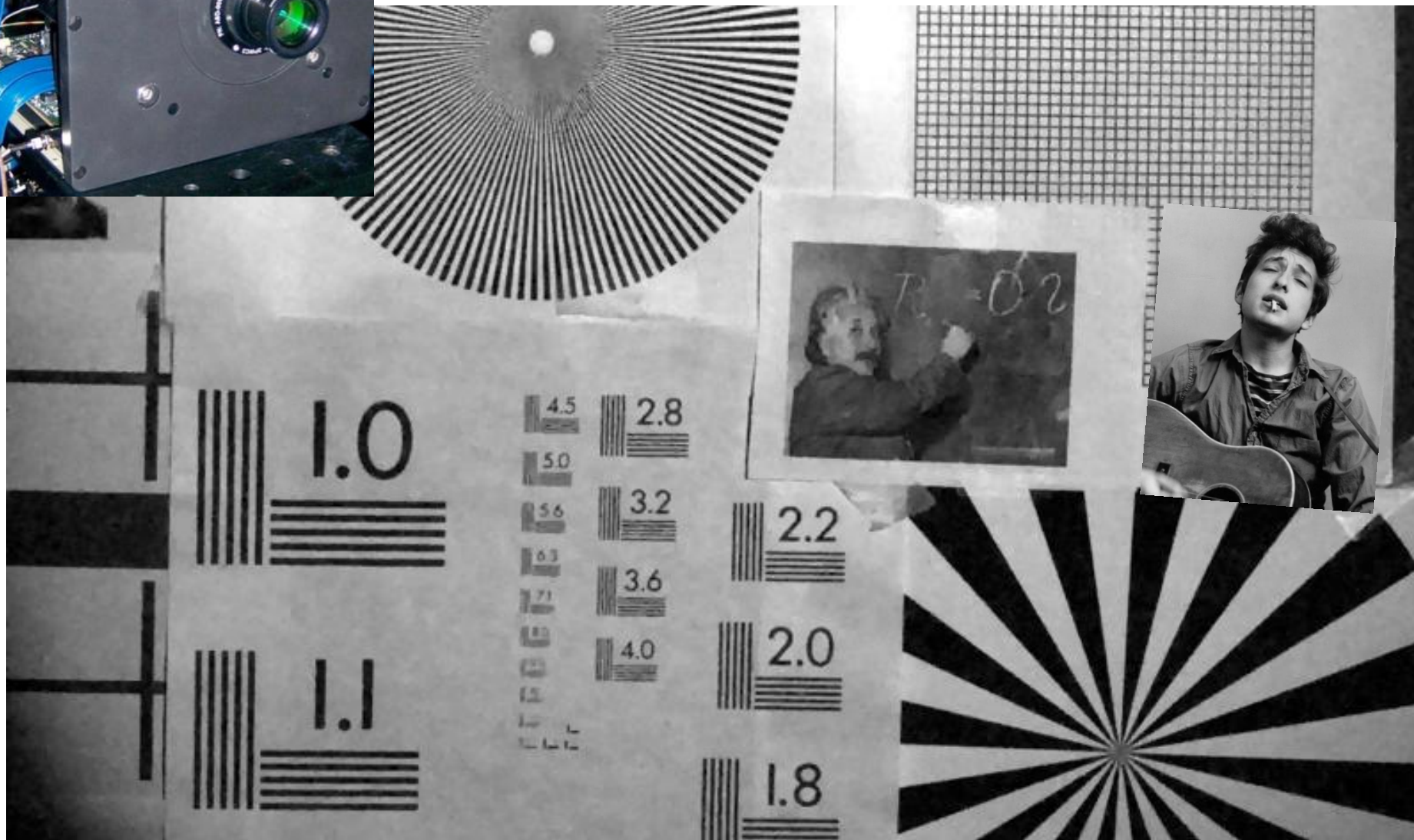


w/ Kevin Kelly



time

Still Images



challenge 1

data too expensive

$$M = O(K \log(N/K))$$

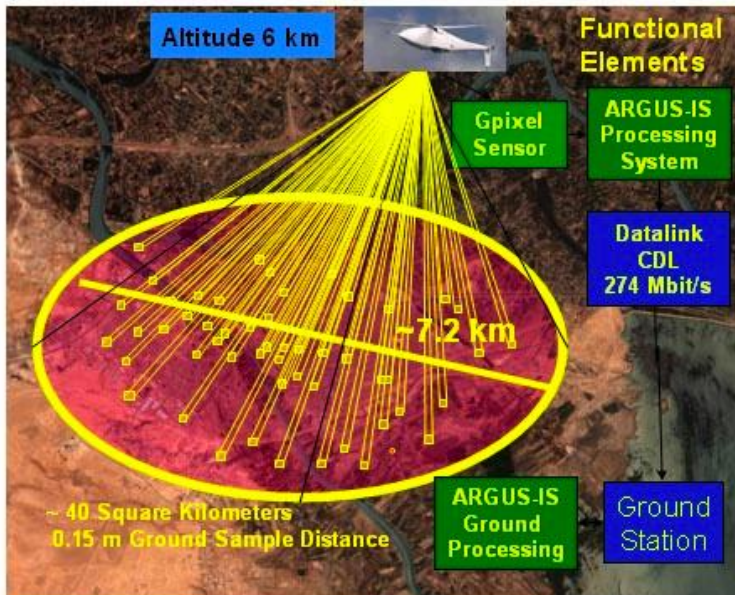


means **fewer expensive measurements** needed for the same resolution image

challenge 2

too much data

$$M = O(K \log(N/K))$$



means we **compress on the fly** as we acquire data