Matched filter | Delays | Weights
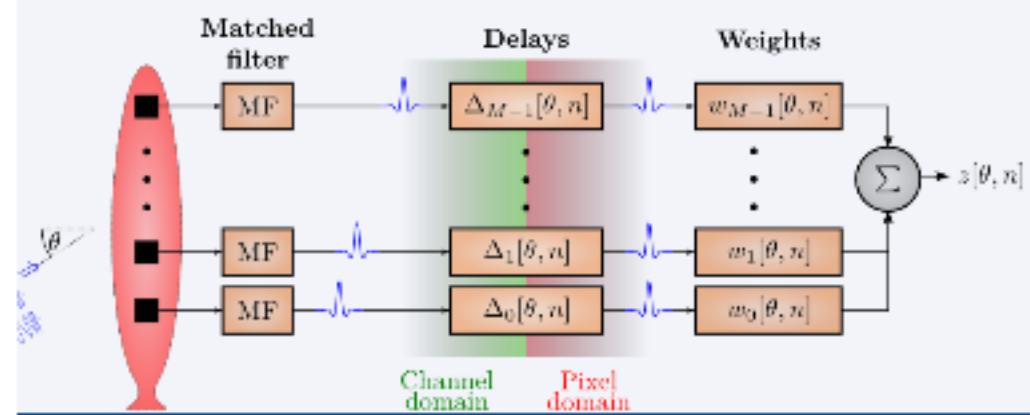
imal MVDR

DR

Focus on AUV. Moving platform, hard to navigate, slow wave propagation.

High frequency, 40% relative bandwidth, 25deg beam width.

Heavy processing, GPU or FPGAs needed in the AUV

Focus on cardiac images

High freqency, TX beamforming, multiple beam RX

Video requirement, real time processing

active systems. Must deal with correlated es / signal cancellation

Small M, stay in element space (exact)

Large M, consider beamspace (high accuracy approximation for narrow beams)

Inherently parallel

Need only 6 windows

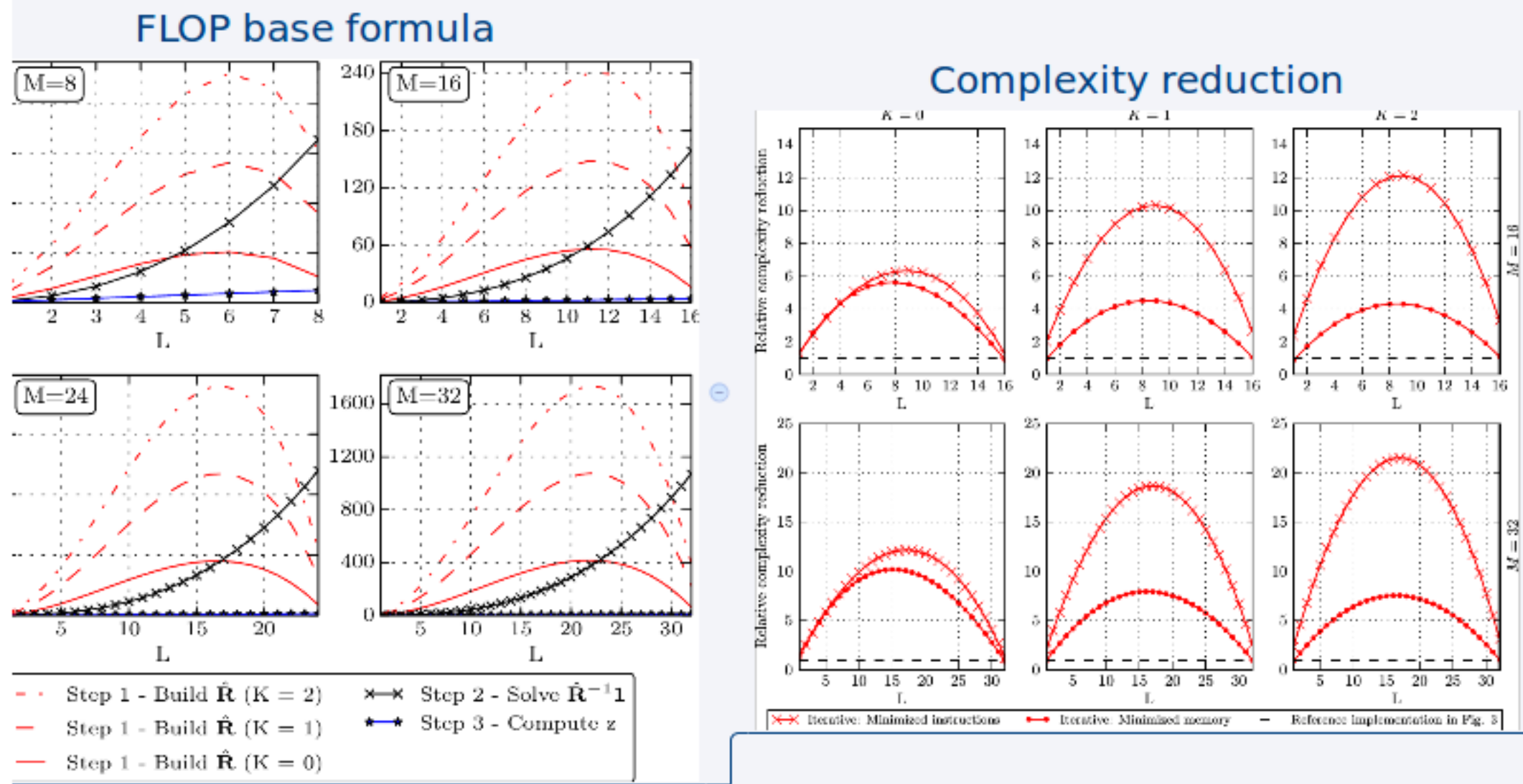Algorithmic reductions possible with trigonometric windows

Problem: MVDR computationally intensive. Build and invert R

Use case: Active sonar, M<=32, 100kHz, 40kHz bandwidth

Other work: Chen et. al. GPU implementation ultrasound, real data
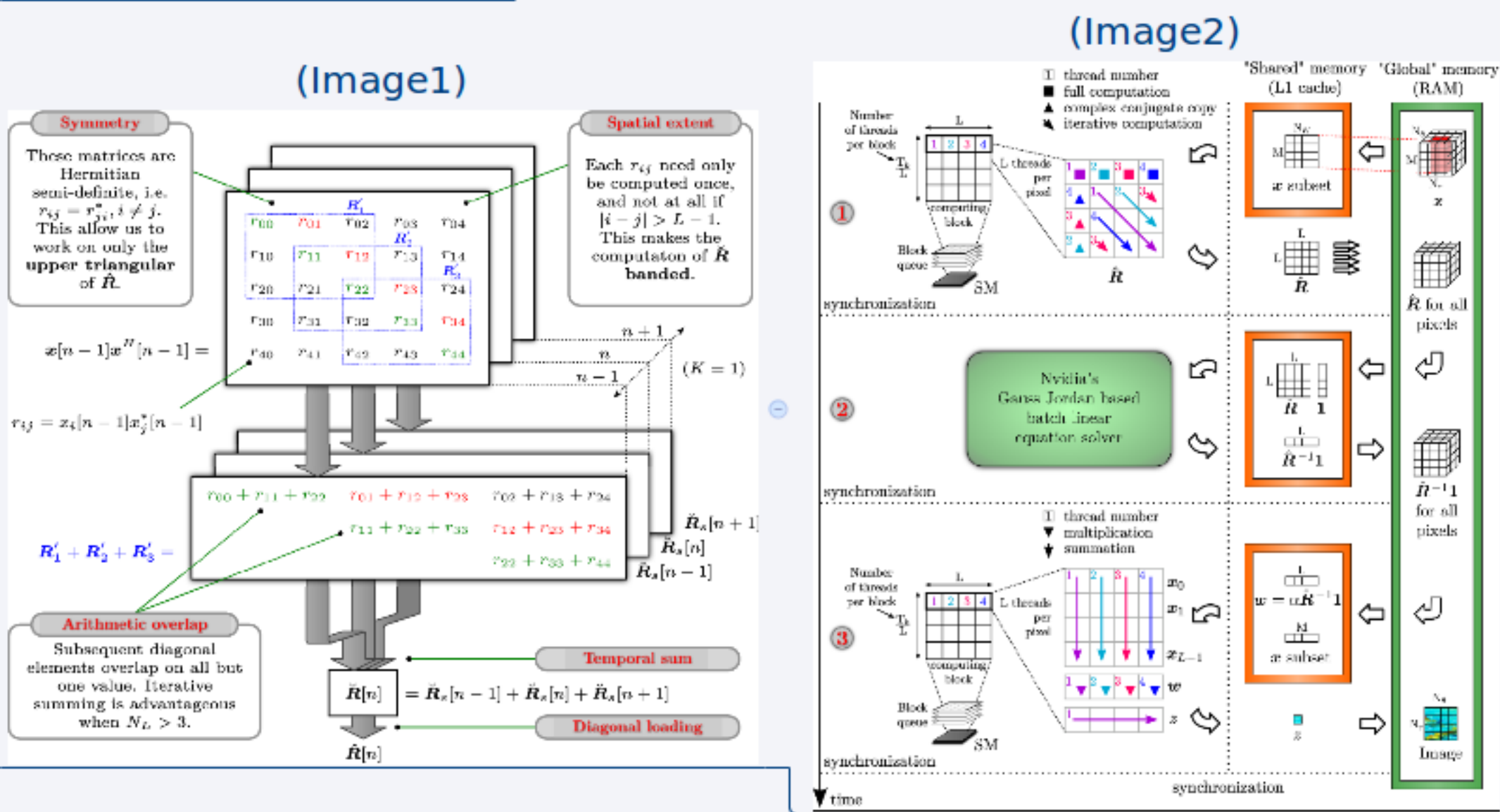
mforming

mputational complexity

FLOP base formula

Complexity reduction

Computing R

Solving R^-1a

Computing z

Implementation summary

(Image1)

(Image2)

to a GPU

Benchmark

Mem/arith bottleneck assessment