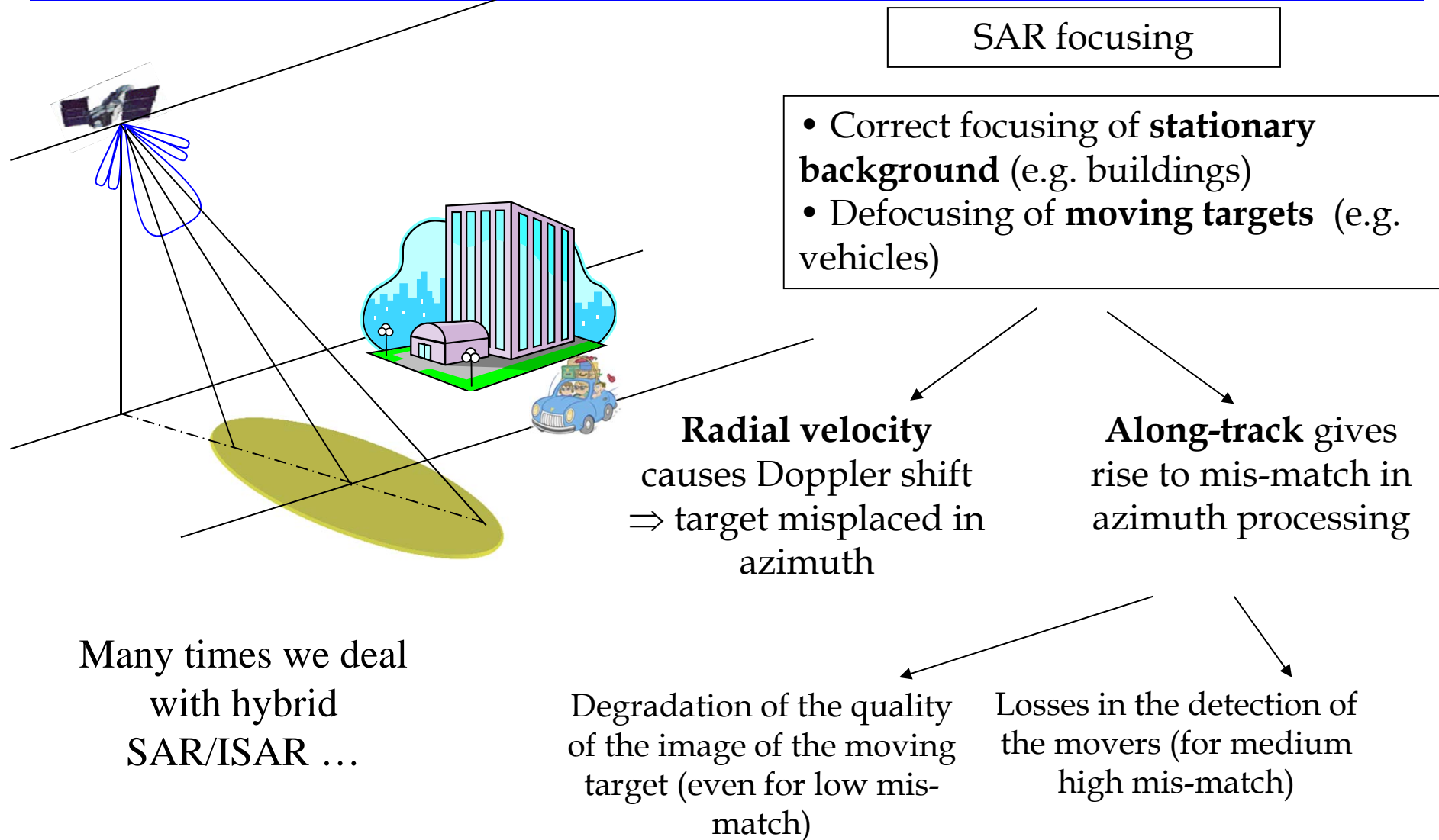
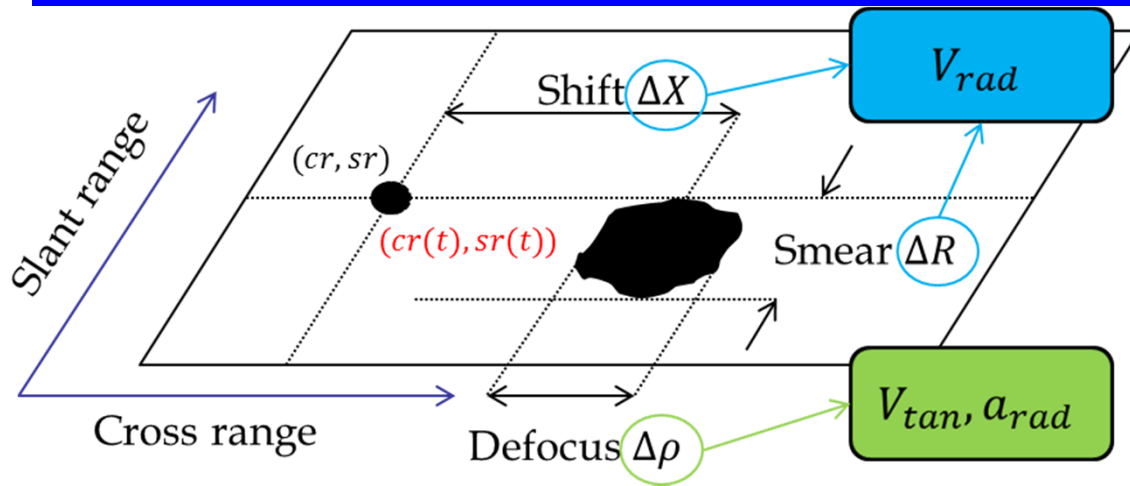

Introduction to ISAR imaging systems Parte II

Moving targets in SAR images (1/2)



Moving targets in SAR images (2/2)



- ΔX : range shift
- $\Delta \rho$: azimuth defocus
- ΔR : range smear

Azimuth chirp rate :

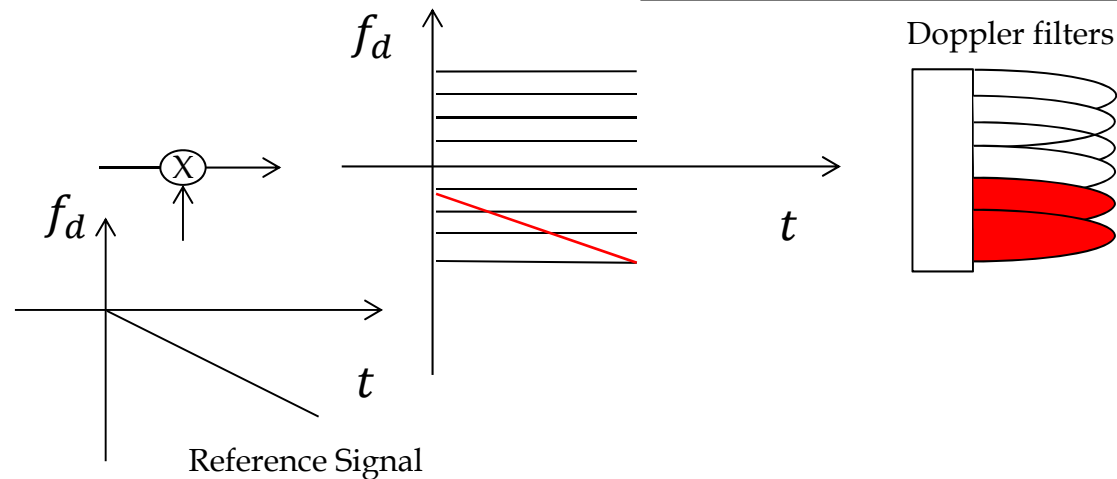
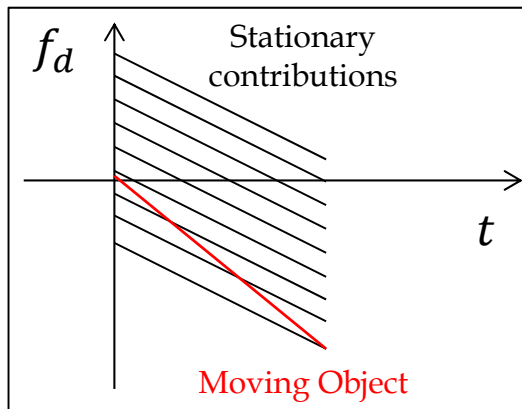
- $\beta = \frac{2V^2}{\lambda R_0}$

Stationary scene:

$$V = V_p$$

Moving objects:

$$V = V_p \pm V_{tan}$$



Moving vehicles in CSK SAR images (1/4)

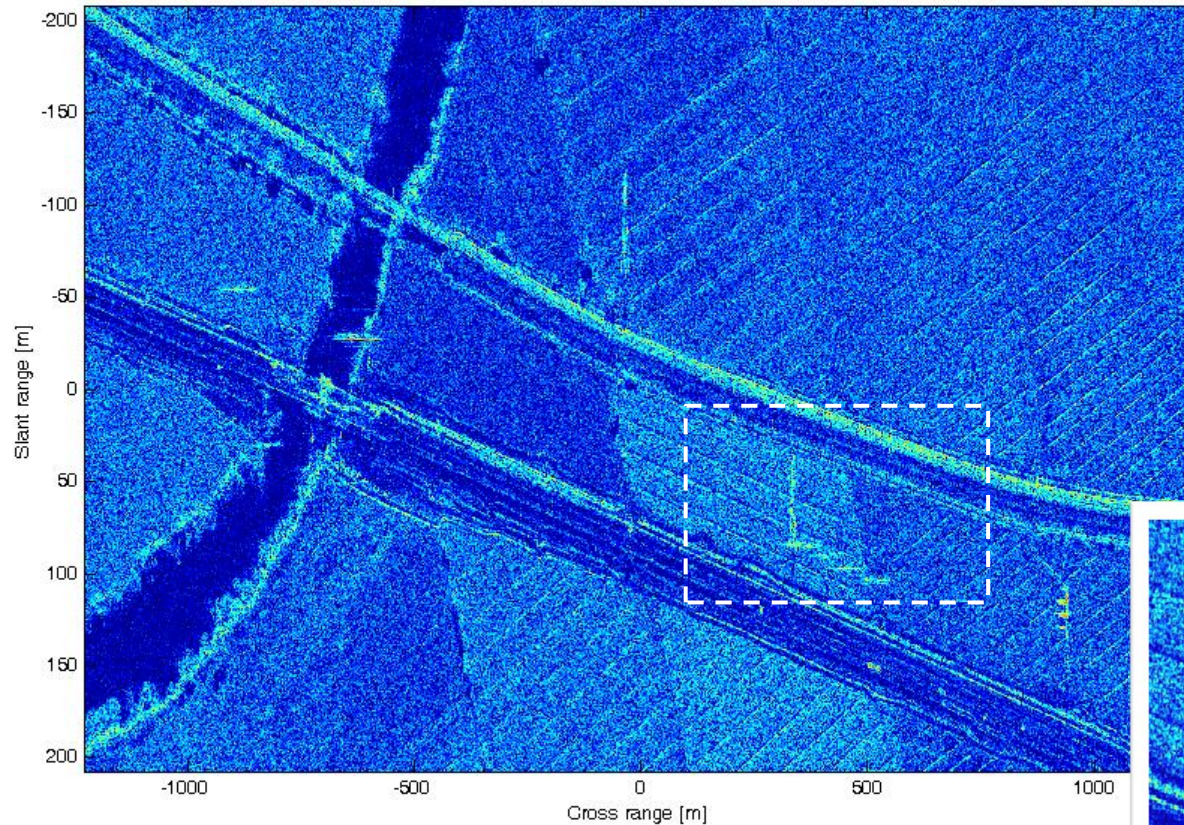


COSMO-SkyMed E-Spotlight
SLC SAR image.
Data provided by Italian Space Agency.

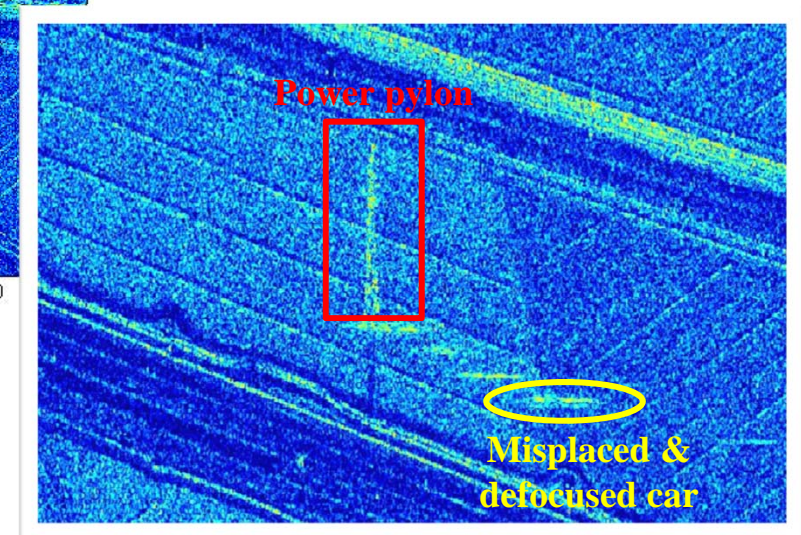
- **Dataset properties :**
 - ❑ Product Level : 1A SSC
 - ❑ Acquisition Mode : E-Spotlight
 - ❑ Covered Area : $D_{cr} \times D_{sr}$ (10.01 × 6.22) [km]
 - ❑ Spatial resolutions : $r_{cr} = 1.13$ [m]; $r_{sr} = 0.48$ [m]
 - ❑ Acquisition duration : 1,39 [s]

- **Scene features :**
 - ❑ Area location : North of Rome
 - ❑ Acquisition date : May 5 2010
 - ❑ Acquisition time : 18:01:21
 - ❑ Image content : A1 motorway (Milan-Naples), Tiber river

Moving vehicles in CSK SAR images (2/4)

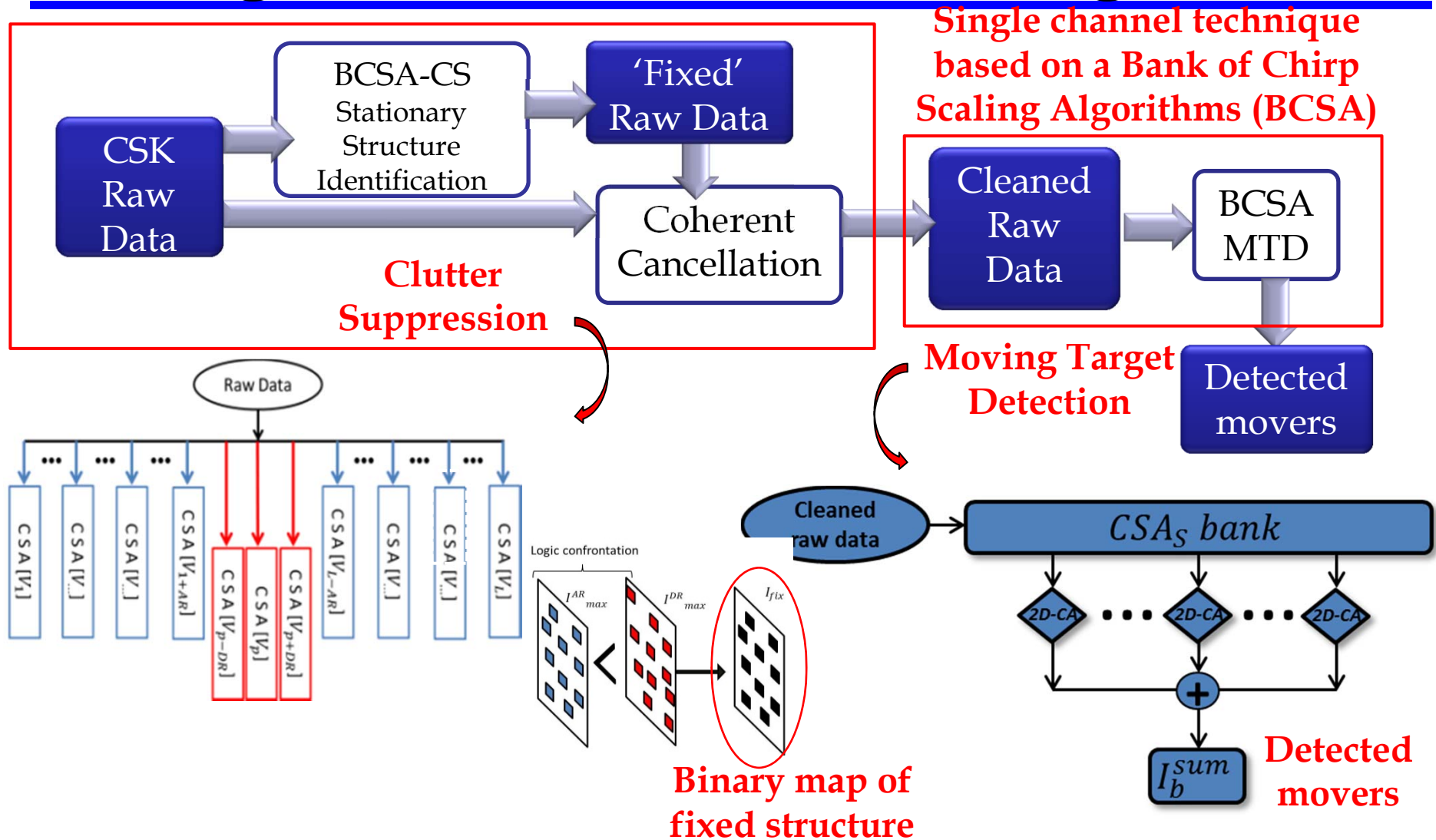


- Main patch features:
 - Predominant distributed clutter presence
 - Sparse man-made stationary structure (e.g. Power pylons in red frames)
 - The motorway is oriented forming an angle of about 10° with the cross-range direction

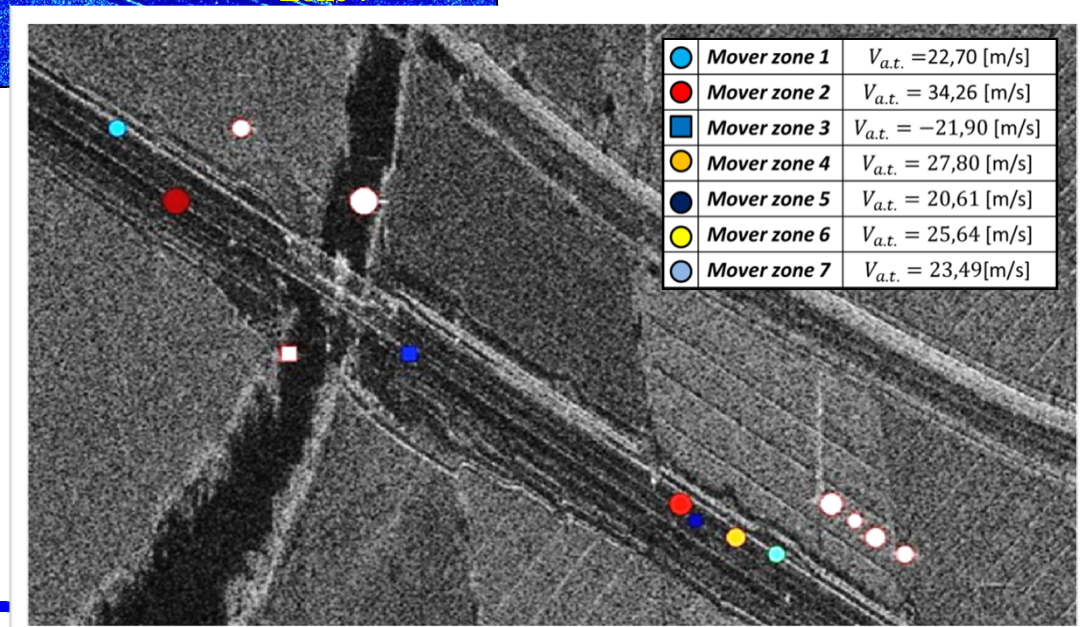
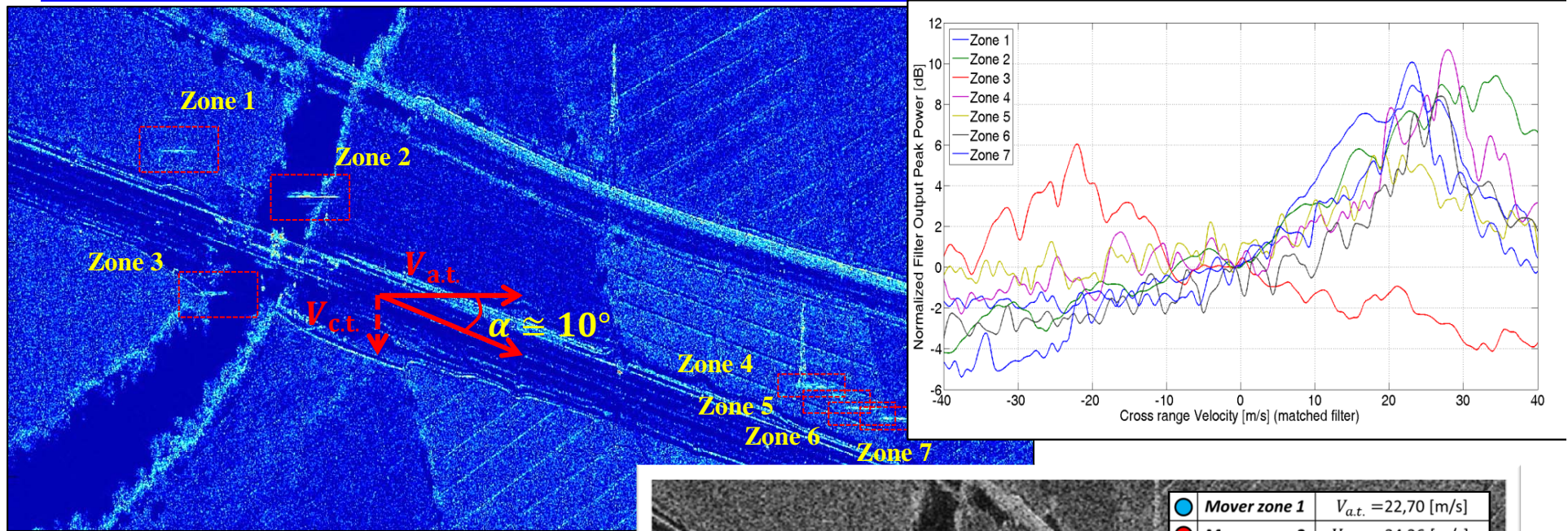


- ❖ Moving vehicles on the motorway are mainly interested by an along track velocity.

Moving vehicles in CSK SAR images (3/4)

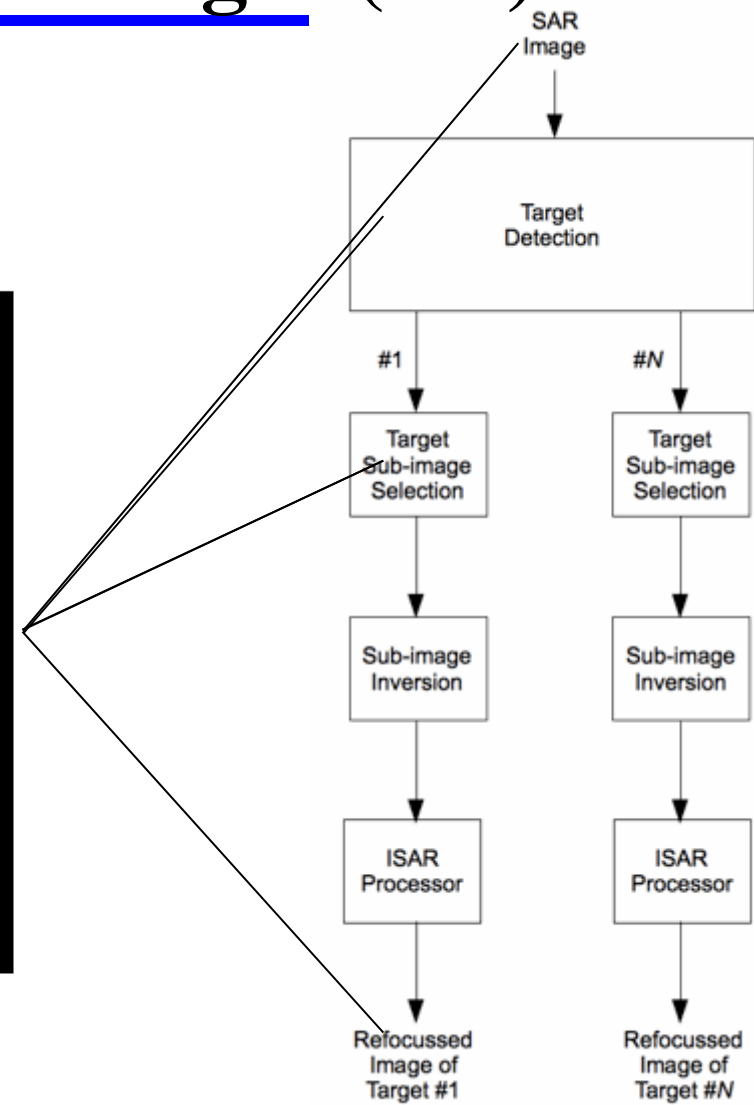
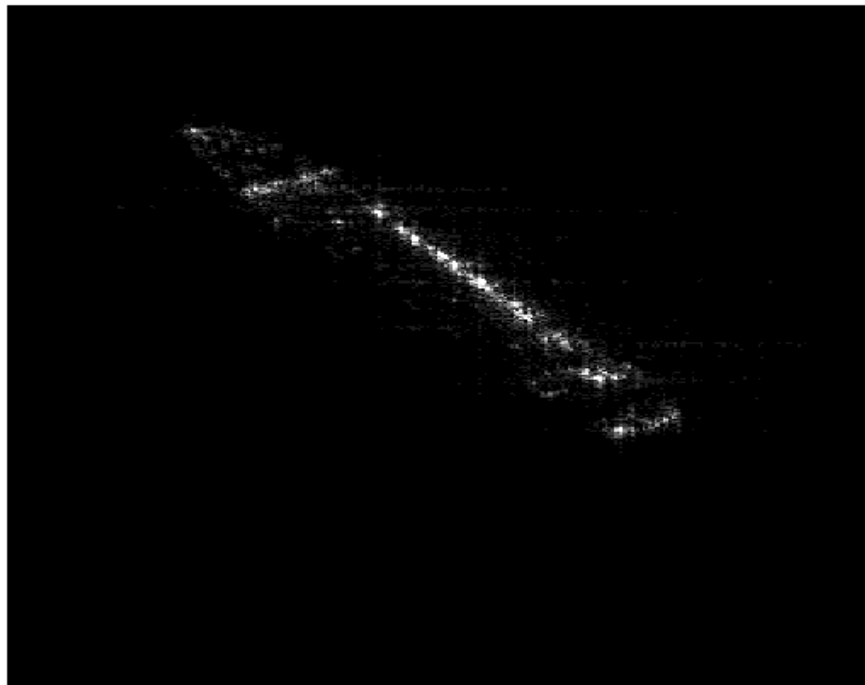


Moving vehicles in CSK SAR images (4/4)

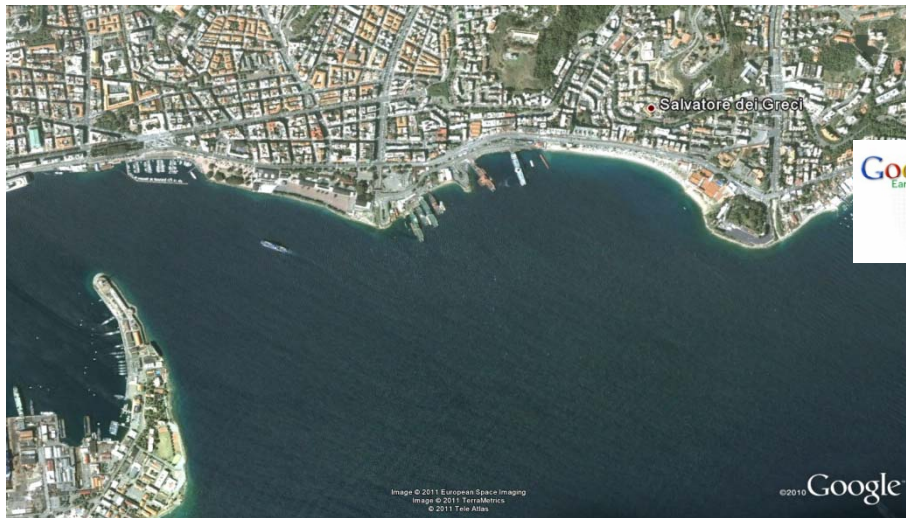


Sistemi Radar

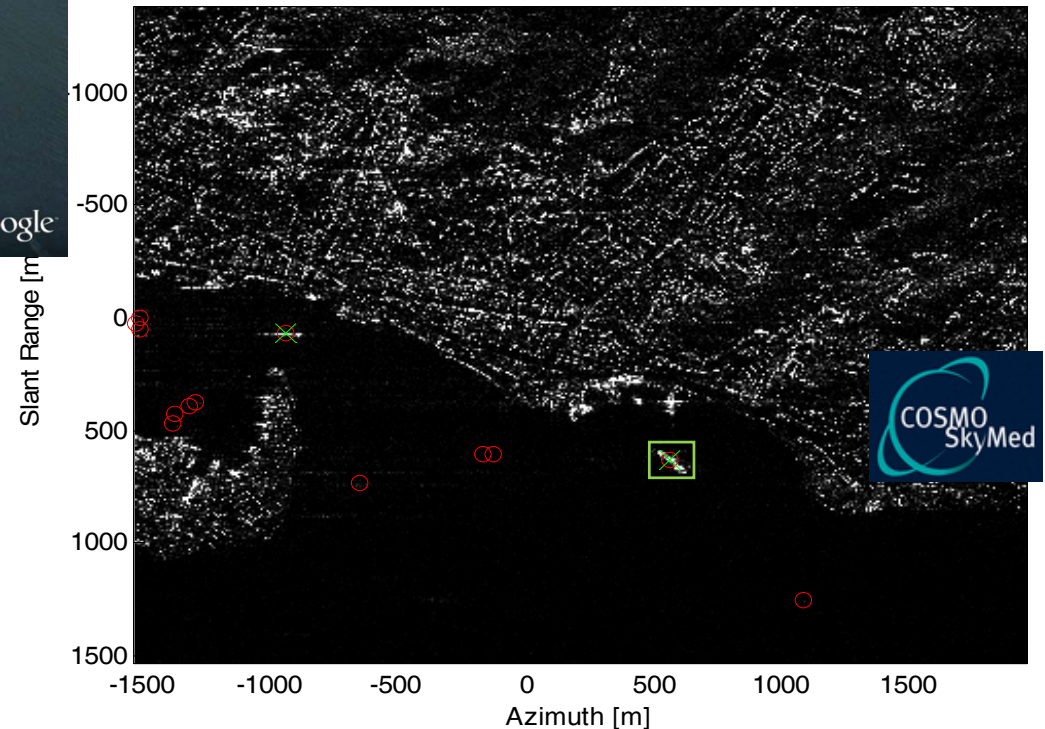
Moving ships in CSK SAR images (1/3)



Moving ships in CSK SAR images (2/3)



Example: ship target near Messina harbour



Ship targets detected in SAR scenes can be properly focused in order to feed ATR procedures.

Data provided by ASI (Italian Space Agency).

Moving ships in CSK SAR images (3/3)

Autofocus applied to the patch of the CSK image containing the defocused target.

