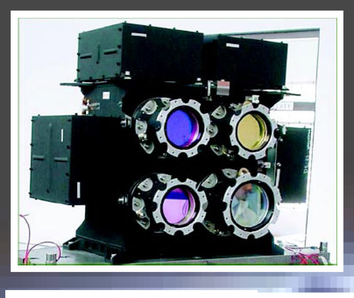
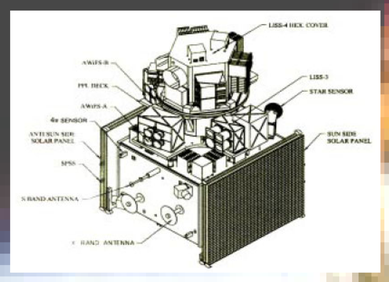
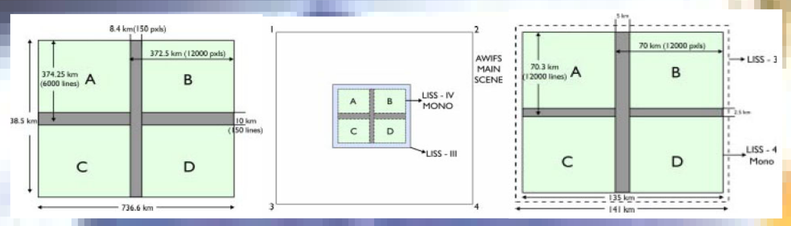
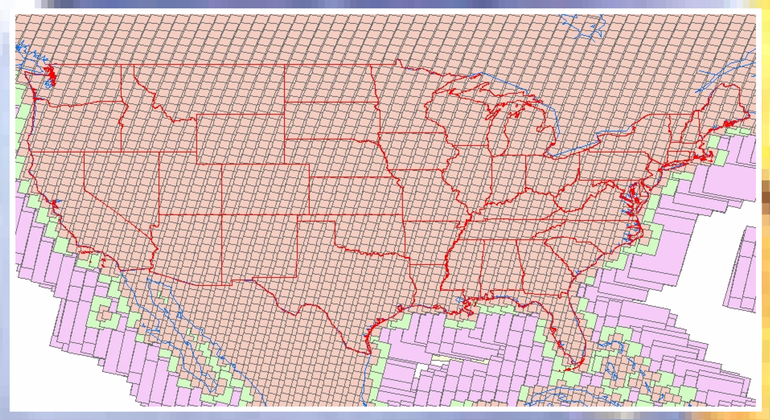
Optimizing Resourcesat-1 AWiFS Acquisitions





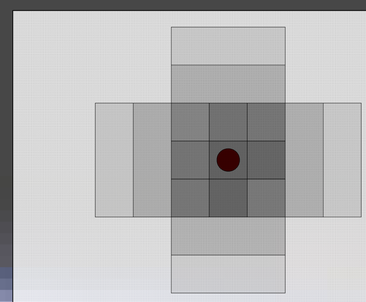




For Small, Irregular, or North-South Elongated AOI's use:

$O_{Areal} = 1 - (\sum_i w_i A_i)/ (\sum_i A_i)$

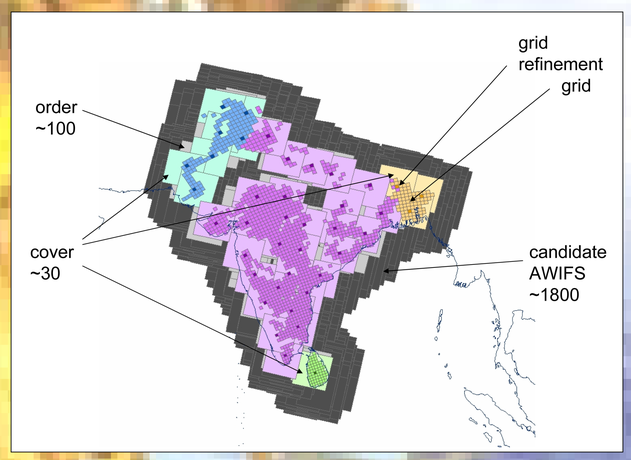
A_i = Area(footprint$_i$)
A_{ki} = A(footprint$_k$ ∩ footprint$_i$)
$w_i = (\sum_k A_{ki})/ n A_i$; n = FOI
$\sum_i$ ~ sum over all footprints in the cover
$\sum_k$ ~ sum from 1 to FOI (= n)



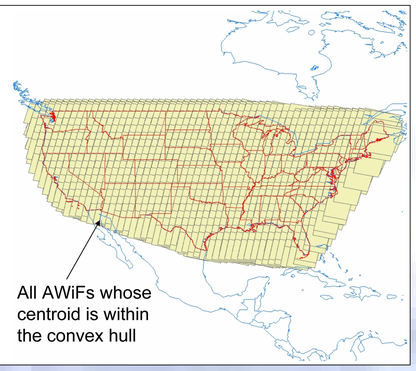
For Large AOI's or Point-like AOI's use:

$O_{Point} = 1 - \sum_i \sum_k S_k(pixel_i) / n \sum_i (pixel_i)$

$S_i(pixel_k) = 1$, footprint i contains $pixel_k$
0, footprint i does not contain $pixel_k$
$\sum_i$ ~ sum over all pixels in AOI
$\sum_k$ ~ sum from 1 to FOI (= n)
Non-overlapping rows



AWiFS quads have significant overlap, supporting a high revisit frequency, as often as 5 days.



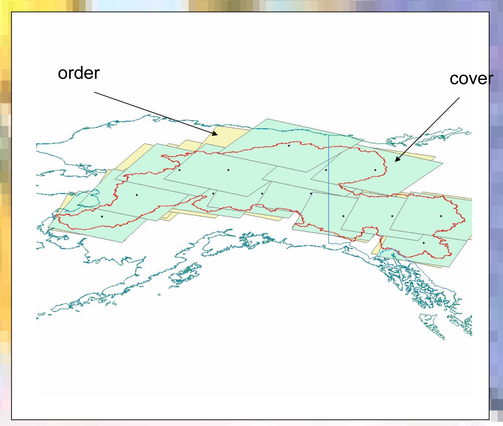
Problem Statement

Given

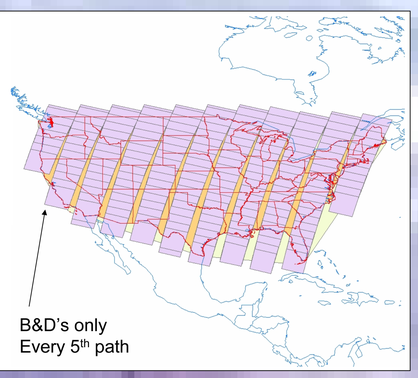
- an area of interest (AOI)
- a period of interest (POI)
- a frequency of interest (FOI)

Determine

- opportunities whose footprints cover the AOI during the POI with a FOI that minimizes the selection objective function (areal or point)



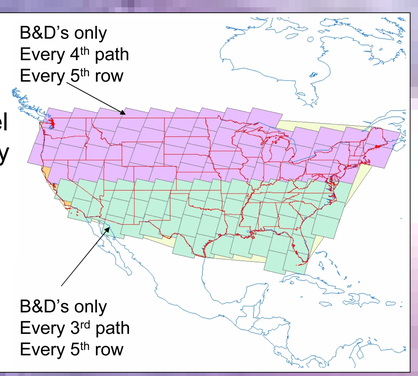
Paths separate more at more equatorial latitudes, resulting in lower revisit frequency.



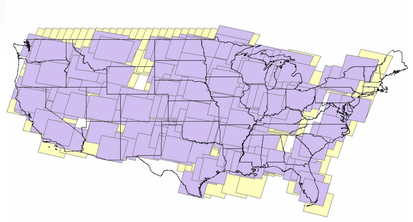
Useful Definitions

Scene	digital image of the earth's surface acquired by a sensor
Opportunity	scene that could be acquired at a given time
Footprint	the geographic area of an opportunity or scene
Area of Interest (AOI)	locations for which *scenes* are desired
Period of Interest (POI)	the date range associated with the AOI
Frequency of Interest (FOI)	the number of *scenes* desired for a given AOI and POI

Paths below 37th parallel selected more frequently to avoid gaps due to path separation.



before



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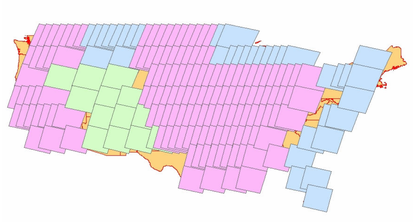
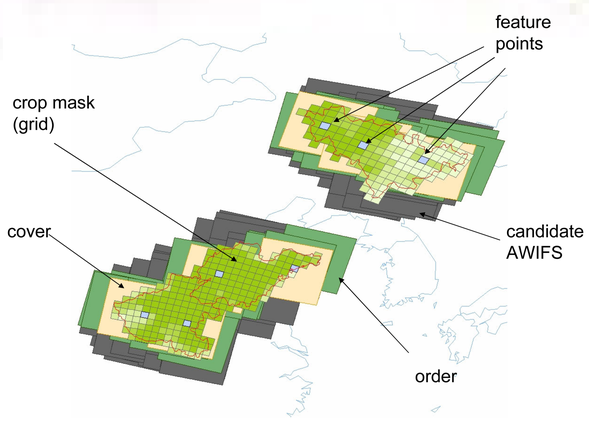
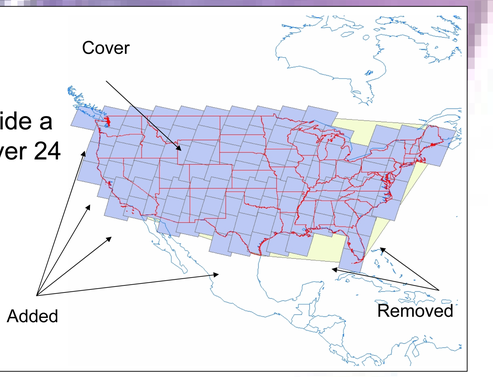




These scenes provide a complete picture ever 24 days with minimal overlap.



Foreign Agricultural Service;
Office of Global Analysis
Joseph Godfrey; JGodfrey@winset.com