Novasar Planning User Document

I. Imaging Capacity

Imaging capacity available to ISRO is 40% of total Imaging capacity of Novasar satellite. Master Scheduler is located at SSTL UK and ISRO tasks Novasar daily using Atlas software provided by SSTL, along with other mission partners located across globe viz., Australia, Phillippenes and United states in addition to SSTL. Total Imaging capacity has to be shared by all the mission partners daywise.

40% of Imaging capacity leads to 1152 system cost per day. Depending on the imaging mode selected, number of strips in an orbit / day, length of each strip, total imaging duration that can be planned per day varies. On an average approximately 900 seconds of payload duration can be planned each day.

There are, on an average 3 orbits including ascending and descending orbits will pass over Indian Bounding box (Figure 1) and typical orbits over Indian region are shown in Figure-2.

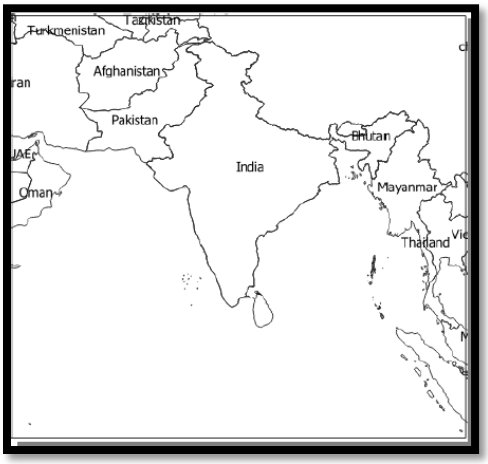

Figure 1 : Indian Bounding Box

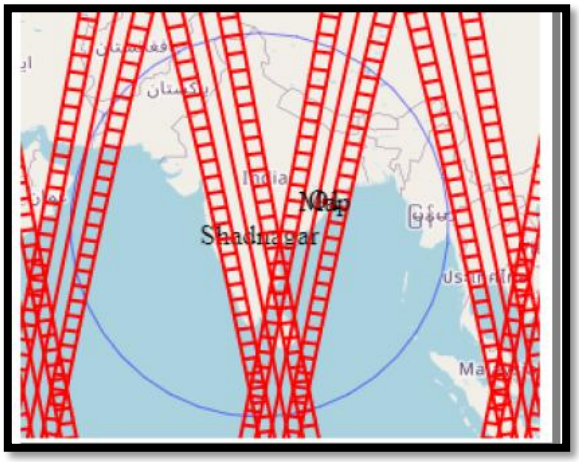

Figure 2 : Typical orbits over India

There can be payload imaging duration of maximum of 240seconds (1680km along track on ground) to minimum of 6 seconds (42km along track on ground) per orbit. In order to utilise 40% image share capacity of Novasar, global coverage also needs to be planned every day avoiding the orbits which pass through other mission partner areas. These requests are subjected to clash analysis with other mission partner requests at SSTL end.

Requests planned over Indian bounding box do get honored by SSTL unless there is a problem onboard and will be indicated as "Failed" in Atlas software on next day.

II. Imaging modes

Imaging Mode Type	Ground Range Resolution	Incidence Angles (Deg) (At 580 km Altitude)	Swath Width (Across track) (Km)	Worst Case Sensitivity (NESZ) (dB)	Polarization
Scan SAR	20m	18.1	100	<-20	(HH or VV)
Scan SAR	20m	24.33	50	<-21	HH or VV
Maritime	6m - range 13.7m - azimuth	40.85	400	<-9.5	(HH)
Strip Map	6m	15.54 – 22.3	20	<-20	(HH or VV)
Strip Map	6m	(22.94 – 24.03) / (24.74 - 27.04)	13 /15	<-19	(HH or VV)
Scan SAR Wide	30m	16.98 / 25	149 / 56	<-21	(HH or VV)
Scan SAR Wide	30m	26.99	55	<-19.5	(HH or VV)
Dual Polar	20m	18.46-25.28 / 15.51	50/60	<-20	(HH&VV)
Tri-Polar	30m	16.25/(20.61–24.47)	56/50	<-27	(HH&VV&HV)
Tri-Polar	35m	17.58,22.34	100	<-26dB	(HH&VV&HV)
Co + Cross Polar	40m	20.09	195	<-21dB	(HH & HV)
Co + Cross Polar	45m	20.09	195	<-26dB	(HH & HV)
Scan SAR Survey	33m / 20m	19.6 /13.11	195/27	<-19.5dB	HH / HH,HV

III. Constraints of Imaging

Following are the constraints of operations

- Maximum operable duration per orbit is 240seconds and minimum duration is 6 seconds. If image is split to multiple strips in an orbit, system cost spent for shorter strips will be more than spent for single strip of 240seconds. Hence imaging capacity reduces proportionately if shorter strips are opted for
- Maneuvering time varies accordingly for varying look angles or modes or left/right look in a particular orbit. With this condition, probability of honoring at SSTL Master Scheduler certain times indicate as "clashed" with other planned strips and one of the strips may get rejected at Master Scheduler located in UK
- Orbits passing over other mission partner areas have to be geographically observed to avoid these which amounts to 17 passes out of 28 passes (both ascending and descending put together)
- Feasibility can be checked for a maximum of one month
- Disasters will be given higher priority among all the user requests, hence time lines of honoring may shift
- With imaging mode of 195km, best repeativity possible is 13 days for a particular ascending or descending path. Repeativity varies as swath reduces and further varies with specifications of look angle/pass direction
- Fixed beam angles are only possible which are given in Imaging modes list
- Image locations adjoining Pakistan country are not possible to be covered as Pakistan country region is barred from imaging with some boundary margin at Master Scheduler,UK
- A few times, some of the requests are honored only partially by SSTL, details will be known only after successful download of the same
- Through highest priority tokens are allotted to global requests especially calibration requests mostly on Amazon area, due to requests clash with other mission partners, these requests may / may not get honored.

IV. Procedure to send Planning proposal

All the users are requests to follow the template of user proposals as given in this document and also arbitration logic which is followed by SSTL to resolve the clash scenario of mission partners is done every day at around 2.30PM. Hence user requests for any day has to be given by 2:00PM of previous day so that existing plan can be verified for requirement of re-scheduling the existing requests by incorporating the new one. There is a dedicated mail Id for Novasar and users are requested to send to following mail ids

To : novasar@nrsc.gov.in

cc : padmaja_y@nrsc.gov.in,ramani@nrsc.gov.in,aparna@nrsc.gov.in

Planning proposals will be reviewed with existing requests with requirements given like Ascending/Descending , look angle, left/right look requirements along with period and frequency of coverage. Actual shape file either in ESRI format or kml format will improve the coverage of core area of requirement.

V. Template to send planning proposals

Following is the template of User requirements. Preferably actual shape file is more suitable for planning for the study area requirement.

NRSC — Novasar Data Requirements

S.No	Group / Division	Application	Study Area (lat, long)	Mode of Acqusition	Type of Pass (Ascending /Descending)	Look Direction (left / Right)	Incidence Angle-Minimum (deg)	Incidence Angle-Maximum (deg)	Polarisation	Resolution (m)	Swath (km)	Period of Acquisition	Number of coverages required	Ground truth (yes / no)	Type of requirement (Urgent/Normal)	Completion date of project	Remarks, if any

VI. How user will get informed on status of proposals

Users will be informed of feasible dates and will be updated weekly on the successful status of their coverage of requests and same can be downloaded from Bhoonidhi