2010 NIKA on-sky test plan at the IRAM 30m telescope

S. Leclercq Oct 12 2010.

This document gathers information useful for the 2nd run of NIKA at the MRT.
Other details, updates and daily reports on the Wiki page:
http://www.iram.es/IRAMES/mainWiki/NikaRun2

Planning of the test run

day\hour	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
We 13																			Arrival of truck						
Th 14											Preparation				3-4h: Mount, align, cool down										
Fr 15														1-2h: tests, calibration, pointing											
Sa 16														1-2h: tests, calibration, pointing											
Su 17														1-2h: tests, calibration, pointing											
Mo 18								Observations 6h30 - 20h30																	
Tu 19											Maintenance						Observations 17h30 - 2h30								
We 20																	Observations 14h30 - 2h30								
Th 21																	Observations 14h30 - 2h30								
Fr 22										Observations 9h00 - 21h00															
Sa 23																			Observations 18h00 - 6h00						
Su 24																	Observations 14h30 - 2h30								
Mo 25					Warm up				Dismount		MAMBO-2 re-mount														

LST = 8h

On the telescope schedule (http://www.iram.fr/IRAMFR/PV/sche/10/s41v3.html) the project name is T16-10. The access times of the NIKA team to the receiver cabin for the afternoons of October 15, 16 and 17 are not explicitly written on the telescope schedule because it is more useful that the team has the liberty to choose the appropriate moments depending on the tests being conducted. The PIs of projects 228-09 and 054-10 know that NIKA may take 1 to 2 hours on their observing time for each of these days.

Hardware and people

Detectors to be tested

The new version of NIKA has two optical channels separated by a polarized grid. The telescope, new curved mirror, 3 HDPE lenses (4 lenses in total, 2 common to the 2 channels, plus 1 per channel), and cold pupil (Lyot stop) form a f/1.5 system. Each channel accommodates a different band-pass filter: 117-171 GHz and 180-270 GHz.
The arrays considered for the run according to the best lab tests are:
- **2.1 mm band**: 144 pixels Néel-IRAM LEKID array. Pixel size: 2.25 mm on the array → 0.7 Fλ angular size (not Nyquist, but beam over-sampling). With a pixel resonance around 1.5 GHz, 2 MHz between pixels, and 220 MHz bandwidth, the current Roach Boards electronics can read **112 pixels**, for a 2' field of view.
- **1.3 mm band**: 324 pixels SRON Antenna-KID array. Pixel size: 1.6 mm on the array → 0.9 Fλ angular size (beam sampling). With a pixel resonance around 5 GHz, 4 MHz between pixels, and 220 MHz bandwidth, the current Roach Boards electronics can read the **60 central pixels**, for a 1' FOV.

Backups:
- 144 pixels Néel-IRAM LEKID arrays for the 2.1mm band.
- 144 pixels Néel-IRAM LEKID array for the 1.3mm band.
- Roma/Trento LEKID array for the 1.2mm band

<u>List of material that will come to the 30m by truck:</u>

Cryostat, pumping system, LN2 trap, RF electronics rack and computers to run the instruments, laptop to run the cryostat, various other (but small) things.

<u>Fluids supplies</u>

- 8 (IRAM) + 2 (Néel) dewars of 100 liters each of liquid Helium.
- 6 bottles of 25 litters each of liquid Nitrogen for the cryostat cold trap.
- Compress air line in the receiver cabin.
- Compressed helium bottle, with 0.5-1 bar pressure regulator.

NIKA personnel and presence schedule at the telescope

Truck	= Travel by truck (and spend one night at hotel Kenia in Pradollano on arrival)
Plane	= Travel by plane and spend the night to the place scheduled for the next day (arrival) or come from the place of the preceding day (departure)
Granada	= Spend the night in the rooms at IRAM Granada or hotel Condor in Granada (with possibly a travel by air or road to get there on the same day)
Pradollano	= Spend the night the hotel Kenia in the Pradollano ski station (with possibly a travel by air or road to get there on the same day)
Pico Veleta	= Spend the night in the rooms at the 30m telescope
Pra/Pic	= Spend the night in Pradollano or in a 30m room if an extra room is available

		W 13-Oct	Th 14-Oct	F 15-Oct	Sa 16-Oct	Su 17-Oct	M 18-Oct	Tu 19-Oct	W 20-Oct	Th 21-Oct	F 22-Oct	Sa 23-Oct	Su 24-Oct	M 25-Oct	Tu 26	W 27	Th 28	F 29
A. Benoit	Néel	Pra/Pic	Pico Veleta (30m rooms)											Granada	Plane			
A. Bideau	Néel/IRAM	Truck	Pico Veleta (30m rooms)											Truck				
A. Monfardini	Néel	Truck	Pradollano or Pico				Pico Veleta (30m rooms)							Truck				
C. Hoffmann	Néel	Pra/Pic	Pradollano or Pico				Pico Veleta (30m rooms)							Granada	Plane			
P. Camus	Néel	Truck	Pico Veleta (30m rooms)				Granada	Plane										
A. Cruciani	Néel	Pra/Pic	Pico Veleta (30m rooms)									Granada	Plane					
L. Swenson	Néel	Pra/Pic	Pradollano or Pico				Granada	Plane										
F-X. Desert	LAOG					Granada	Pico Veleta (30m rooms)							Plane				
L. Ferrari	SRON		Pradollano							Plane								
A. Endo	SRON								Plane	Pradollano				Plane				
R. Zylka	IRAM						Granada	Pico Veleta						Granada		Plane		
S. Leclercq	IRAM	Pra/Pic	Pico Veleta (30m rooms)															Plane
NIKA staff / night (meals)		8	8	8 (9)	8 (9)	8 (9)	7 (8)	8 (9)	8 (10)	8 (10)	8 (9)	7 (9)	7 (8)	1 (8)	1	1	1	0
Planning			Mount	Cooldown	Pointing, Tests		Observations							Dismount				

<u>Contact and phone list:</u>

Pico Veleta (PV): +34 958 482 002 (Operator 24h, 7 days), +34 958 482 002 ext.9
(observing support/ emergencies (control desk)) **Pico Veleta fax**: +34 958 481 148

Xavier Désert	+33 (0)6 27 36 07 97
Aurélien Bideaud	+33 (0)6 79 44 02 60
Alessandro Monfardini	+33 (0)6 11 57 01 61
Alain Benoit	+33 (0)6 82 54 63 58
Christian Hoffmann	+33 (0)6 74 57 65 83
Loren Swenson	n/a
Philippe Camus	+33 (0)6 30 70 73 63
Lorenza Ferrari	+31 681 144 274 / +39 328 944 83 49
Samuel Leclercq	+33 (0)4 76 82 49 21 (Grenoble) / PV during the run
Carsten Kramer	+34 958 805 454

Preparation of the run

- A- Preparation in the receiver cabin
    1. Dismount M6 and free the lateral face of the M5-M6 tower (everything that stand lower than 750mm bellow the center of M5, between the 2 legs on the anti-vibration table side).
    2. Prepare a compressed air feed line (few mm diameter plastic tube) to plug on the NIKA cryostat.
    3. Prepare a helium gas feed line with a pressure regulator at 0.5 to 1 bar.
    4. Have 2 filled liquid helium bottles and 2 filled liquid nitrogen bottles in the cabin.
    5. If possible: access to a 380V three-phase socket and have a corresponding plug (to be mounted on a NIKA cable).
    6. Presence of somebody authorized to manipulate M3 for alignment during the access time slots to the cabin of the 1st 3 days (14 to 16).

→ Santiago Navarro will take care of the preparation of the receiver cabin by removing M6, Mambo and its frame, ABBA rack and any other non necessary equipment from the bolometer area. Contrary to the previous NIKA and GISMO runs we will receive the liquid helium in 450 liters dewars that will be transferred in the garage to the smaller 100 liters bottles before bringing them to the receiver cabin. Santiago will also check that we have the correct supply of helium gas and liquid nitrogen at the telescope. It is not sure yet we have a spare 380 volts line at the receiver cabin.

-B- Network and telescope data
    7. Mark 2 ethernet cables to be used by NIKA, in the cabin and in the control room.
    8. As an alternative to the 2 ethernet cables: check if it is possible to transmit the data packets between the cabin and the control room through 192.168.1.XX addresses on the IRAM network (a NIKA router would distribute packets of local NIKA computers in the control room to local NIKA machines in the cabin via the IRAM switches, which can work without conflict if the IRAM network at the telescope use permanent IPs and not DHCP).

9. Reserve 3 or 4 permanent IP addresses on the IRAM network for NIKA.
10. Was there any modification to the ELVIN server giving the telescope pointing compared to the 1st run last year ?

→ Walter Brunswig replied to this list: The receiver cabin is connected to the observatory computer/backend room via an optical link at 1Gb/s. We also have 1 100Mb/s cable as backup. We still have the same 2 numbers reserved for NIKA as last year (see annex below). 192.168.1 addresses can be used, but may need to be fixed as we use DHCP at the MRT for visitor systems. No change to ELVIN.

11. What is the MJD time server of the telescope ?
12. Is there a NTP server available at the telescope ?

→ Walter Brunswig inform that: We do not have a MJD time server, we only have an NTP server (150.214.224.197). We might refer to the messages distributed via ELVIN from the antenna control, like:

<Info TimeStamp='2010-10-04T16:33:37.001' LogId='antMD:trace' ><Data Name='MJD,LST,xOffset,yOffset,basisLong,basisLat,inSegment,MJDfast,actualAz,actualEl,trackAz,trackEl,slowRate,fastRate,SigTrAz,MaxTrAz,MinTrAz,SigTrEl,MaxTrEl,MinTrEl,FlagA,FlagE'>55473.690035,61985.792596,-0.000242,0.000000,4.674014,-0.464729,-1,55473.690000,170.011367,25.727144,1.824561,0.228070,1,128,5.991245,12.385965,-7.403509,0.297756,0.552632,-0.578947,0,0</Data></Info>

The MJD refers to the time given in the timeStamp and the error should be below 2ms. Note that the message has been extended and includes additional fields probably of no interest for NIKA.

-C- Astronomy

13. For the pointing the NIKA team idea is to use the pointing model of another instrument (EMIR, MAMBO, whatever) and observe point sources to deduce directly in the CAMADIA control software the translation, rotation and dilatation coefficients with respect to the detectors geometry. So no need to create a pointing model in the telescope control system specific to NIKA.

→ Robert Zylka disagree with this strategy, in particular because of dynamic effects (temperature, anomalous refraction,…) which necessitate to point various point sources at various time, which is exactly what is needed to do a pointing model, so better to do one specific for NIKA.

14. Source list: see next paragraph below.
15. List of observation goals and modes foreseen for the run: Geometry (pixel maps), Pointing model, Lobes structure, Sensitivity for point sources from strong to weak (and check the noise behave as the expected $1/\sqrt{t}$), Mapping (raster) of several point sources, Mapping of extended sources, Mapping + OnOff (or "OnOn" would be more appropriate since the idea is to stay in the array, from ~30" up to 2'), Study of sky noise, Skydips, Focus and pointing (crosses).

Alignment procedure of the cryostat in the 30m receiver cabin

There are two alignments to do:
1)   Center the image on the secondary pupil (entrance to the cryostat)
2)   Center the center of the focal plane at the center of the detector arrays.

This corresponds to 2 displacements and 2 orientation angles of the cryostat.
The most important is centering on the pupil since this will optimize illumination and reduce parasite fluxes.

Alignment with a LASER

 Moving the cryostat in 2 horizontal directions will do the alignment of the pupil (the height play only on the focus, which will be tuned anyway with the secondary mirror M2). The laser will be used to visualize the beam path on the cabin mirrors and the cryostat will be moved so that the laser illuminates the center of the entrance window.
Centering of the focal plane will be done by tilting the instrument around the X and Y axes. A small mirror on the entrance window of the cryostat will reflect the laser and the tilt will be adjusted to ensure the incoming and reflected laser rays coincide.

Verification with observations on the sky

 The alignment of the pupil will be checked by actions on the micrometer screws of M6 and the telescope pointing at zenith: we can verify that the total power reaches a minimum and increases symmetrically in a misalignment in all directions.
The position of the central beam on the matrix will be measured with the observation of a bright source, allowing to calculate the pointing of each detector from the pointing on the sky and the angle of elevation, which gives the image rotation around the central beam. More precise measurements can allow determining offsets due to the mounting.
The adjustment of the focus with M2 will be done simultaneously on this bright source.

List of possible astronomical observations

All coordinates are in J2000. Sources observed in the **previous NIKA run are highlighted in bold blue**, in **previous GISMO runs in bold green**, and in **both NIKA and GISMO runs in bold red**.

Planets (not needed in IRAM NIKA catalog), date of reference is Oct 20, 0h00 TU:

Name	RA	DE	Magnitude	Diameter	Distance from sun
Sun	13h37m43.12s	-10°09'56.7"			
Mercury	13h46m15.23s	-10°22'09.0"	-1.3	4.7"	+02°06'34.0"
Venus	14h22m07.85s	-21°41'26.9"	0.9	58.9"	+15°41'39.8"
Mars	15h25m49.30s	-19°12'12.6"	1.5	4.1"	+27°36'53.9"
Jupiter	23h43m23.93s	-03°29'53.9"	-2.9	48.3"	+148°25'41.4"
Saturn	12h39m52.31s	-01°55'14.2"	1.2	15.9"	+16°33'56.6"
Uranus	23h51m36.43s	-01°45'36.7"	5.7	3.6"	+151°01'31.4"
Neptune	21h53m05.32s	-13°21'44.2"	7.9	2.5"	+119°30'27.5"

Calibration sources

Usual bright Quasars for image quality and linearity checks (see F.X Désert sources, previous runs & IRAM catalog).
Ultra bright compact HII regions for photometric calibration checks (see F.X Désert sources, previous runs & IRAM catalog)

The following list of calibration targets are suggested by R.Neri because (1) they are targets we monitor closely (almost daily) with the PdB, (2) they are the strongest available = all above 1 Jy at 250 GHz, and (3) they cover the sky in the LST :
3C84
0923+392
1749+096
MWC349
3C454.3.

Sources Proposed by F.X. Désert

v1 starts from 2009 run and expand, FXD, 08/09/2010
v2 adds molecular bright clouds, cluster, and distant quasars
v3 final list before run FXD 12/10/2010
List formatted to be read by Read_source_list.scr for ingestion by Pako / NCS.

Radio sources from IRAM catalog

3C84,   03h19m48.154s, +41d30m42.16", =0316+413

OJ287,   08h54m48.9s,   +20d06'31",   Highly Variable. S(3.3) = 2.9 - 8.3 Jy.

4C+39.25, 09h27m03.0s,   +39d02'21",   S(3.3) = 1.3 - 3.2 Jy.

3C273,   12h29m06.70s, +02d03'08.6",   Variable. S(3.3) = 10 - 20 Jy.

3C279,   12h56m11.1s,   -05d47'22",   Variable. S(3.3) = 6.4 - 8.2 Jy.

B1418+546, 14h19m46.600s, +54d23'14.80",

3C345,   16h42m58.8s,   +39d48'37",   Variable. S(3.3) = 5.6 - 7.7 Jy.

NRAO530, 17h33m02.7s,   -13d04'50",   Variable. S(3.3) = 5 - 7 Jy.

B1800+440, 18h01m32.310s, +44d04'21.90",

3C380,   18h29m31.8s,   +48d44'46",   S(3.3) = 1.0 - 2.8 Jy.

Galactic sources

Strong source, complex map. Test of mapping procedures.

Crab,   05h34m31.95s, +22d00'52.1", Map should be 450x450", 200Jy totalflux, look at index variations, Bandiera

NGC2023, 05h41m26.73s, -02d18'18.5", (LBS 36 SM2) (SM1 is within 2 beams) Launhardt96, Peak1.3mm= 0.30 Jy, Total = 3.45 Jy (55x70)

NGC2071, 05h47m04.84s, +00d21'45.1", LBS 8SM Peak1.3mm=2.27Jy, Total 11.1Jy (70x80") Launhardt96

OrionLBS23SM, 05h46m08.81s, -00d10'39.9", Peak1.3mm=1.32 Jy, Total 4.80 (70x110") Launhardt96

IRC10216, 09h45m14.9s, +13d30'40", F1.1mm=3.764 Jy

G34.262, 18h50m47.0s, +01d10'49",

G34.3, 18h53m18.50s, +01d14'58.20", LSR 0.000 FL 12.50

G35.191, 18h59m14.5s, +01d08'46",

W49, 19h08m11.4s, +09d03'32", 2200Jy at 100micron

K3-50A, 20h01m45.70s, +33d32'43.518",

MWC349, 20h32m45.44s, +40d39'36.8", 1.55 Jy (Secondary Calibrator)

NGC7027, 21h07m01.59s, +42d14'10.183",

CasA, 23h23m27.85s, +58d48'42.8", 360x360" map, Look for contaminating dust, Dunne et al

NGC1333, 03h29m10.5s, +31d13'30.9", 5x5 arcmin map, centered on IRAS 4A in Perseus, expect 1Jy at 1mm

Horsehead, 05h41m00.0s, -02d27'00.0", 6x6 arcmin horsehead nebula PHBlant map with Mambo exists, Max Flux is low (10mJy/beam at 1mm)

Gal center SgrB2?
NGC1333

Weak galactic sources (stars?)

IRC10420, 19h24m26.7s, +11d15'09", F1.1mm= 460.7±27.8mJy

PCyg, 20h17m47.202s, +38d01'58.55", LSR 0.000 FL 0.120

WR147 20h36m43.640s, +40d21'07.60", LSR 0.000 FL 0.200

Nearby Galaxies (Test of mapping)

NGC1068, 02h42m40.7s, -00d00'48", =M77, F1.3mm = 22mJy, rising to 36 at 3mm

M82, 09h51m42.4s, +69d54'59", Expected 2mm flux 2Jy

NGC3690, 11h28m32.200s, +58d33'44.00", Galaxy pair F1.2mm = 95+-11mJy, Could be extended

M87, 12h30m49.40s, +12d23'28.00", Easy to detect NIKA1 run

M51,   13h29m52.37s, +47d11'40.8",   Too weak

Arp220,   15h34m57.10s, +23d30'11.00", S1.3mm=106mJy, S2.6mm=25mJy (Downes, Eckart 2007)

Distant Galaxy or faint quasars (Test of point source flux noise)

4C05.19,   04h14m37.8s, +05d34'42", (lensed by MG J0414+0534), z=2.64, S1.2mm=40±2mJy, nonthermal

J07561,   07h56m18.14s, +41d04'08.6", J075618.14+410408.6, z= 5.09, F1.3 mm = 5.5 ± 0.5 mJy Wang et al 2008, ApJ, 135, 1201

APM08279+5255, 08h31m41.6s, +52d45'17", z=3.91, S1.2mm=17.0±0.5mJy (is IRAS F08279+5255)

J09272,   09h27m21.82s, +20d01'23.7", J092721.82+200123.7, z= 5.77, F1.3 mm = 5.0 ± 0.8 mJy, F3.5 mm = 0.12 ± 0.03 mJy

F10214+4724,   10h24m34.56s, +47d09'09.5", SDSS J102434.56+470909.5, F1.3mm = 10 mJy, faint IRAS galaxy 2mJy expected at 2 mm

BR1202−0725,   12h05m23.08s, -07d42'32", z=4.69 S1.2mm= 12.6±2.3mJy

BRI1335−0417, 13h38m03.4s, -04d32'35", z=4.41, S1.2mm= 10.3±1.0mJy

SBS1408+567,   14h09m55.6s, +56d28'26", (other name: J1409+5628), z=2.56, S1.2mm=10.7±0.6mJy

H1413+517,   14h15m46.24s, +11d29'43.4", Cloverleaf z=2.558 F1.3mm 18+-2 mJy

PSS2322+1944, 23h22m07.2s, +19d44'23", z=4.12, S1.2mm=9.6±0.5mJy

Clusters of galaxies (mapping noise test)

CL0016+16,   00h18m33.3s, +16d26'36",

MS0451,   04h54m11.0s, -03d00'53", z=0.55, y0=3E-4, rc=60" seen by Bolocam

A665,   08h30m45.2s, +65d52'55",

RXJ1347-1145, 13h47m32.0s, -11d45'42", Beware of south extension. Coord OK

A2163,   16h15m45.91s, -06d08'53.5",

Sources Proposed by IRAM

G. Quintana-Lacaci:

IRC+10216 : Already in Désert source list, but apparently the current plan is just to observe it as a calibrator, rather than to map the dust distribution (i.e. the shells). Guillermo proposes to map it in order to detect shells, at least the two observed by Martin Groenewegen, but hopefully more.

M33: We aim to observe the central part of the galaxy. It has already been done with MAMBO so the 1mm data could be used for comparison between the instruments.

M87: This is proposed by A.Sievers, based in the same arguments as those given for Gismo.

YHG IRC+10420: Already in the source list, but Guillermo would be interested to participate in the analysis of the data.

K.Schuster:

Name	RA	DE	Expected 2mm Flux [mJy]	Approx int time [min]
FT Tau	04 23 39.19	+24 56 14.1	51	4
DH Tau	04 29 41.56	+26 32 58.3	17	20
AA Tau	04 34 55.42	+24 28 53.2	30	8
GM Aur	04 55 10.98	+30 21 59.5	70	4
DO Tau	04 38 28.58	+26 10 49.4	37	8
DR Tau	04 47 06.21	+16 58 42.8	51	4
V836 Tau	05 03 06.60	+25 23 19.7	15	20
GK Tau	04 33 34.56	+24 21 05.9	6	140

Sources observed in previous GISMO runs not listed above

Displayed on run #1 and run #2 reports:
0501-019 (Quasar)
J1849+670
J1148+5251
3C454
IRDC 43
W51
Cas A
Cygnus A
IRDC 30

Detected in run #3:
J0112+227, J0217+738, J0238+166, J0319+415, J0336+323, J0339-018, J0403+260, J0433+054, J0721+713, J0753+539, J0841+709, J0909+014, J0948+004, J0958+656, J1033+609, J1108+435, J1229+021, J1230+124, J1310+323, J1642+689, J2038+513
3C446
3C45
APM08279
AzTEC-3
DR21
GF9-3
HB1823+568

HB2145+067
IC342
IRC+10216
MWC349
UGC11130

Annex: summary of run #1 emails exchanges between A.Benoit and W.Brunswig to prepare interfacing NIKA with the telescope.

<u>WB:</u>
Link: 1GBit Ethernet link to the receiver cabin, or twisted pair cable that can run at 100Mb/s.
You can of course use a private 192.168... domain with up to 16^2 nodes.
Ethernet is NOT a real-time network, communication might take more than a second and be blocked sometime. Our software is prepared to handle those cases and the control software also has to take this into account.

<u>AB:</u>
The NIKA data acquisition is based on Ethernet network, using 192.168... domain. This network uses a small NAT router that can be connected on the public IRAM network. However, all the acquisitions computer have 2 Ethernet ports and are connected on the private network and on the public IRAM network (with a IRAM IP number).
The data flow will be a few Mega bit/sec.
For the NCS data, me have two requests:
1) Get the telescope position in "real time" by Ethernet. Ethernet transfer time is of order of msec, so a convenient way would be to send a UDP broadcast on the network at a rate between 1Hz and 10Hz with the corrected pointing position and the elevation of the telescope. With this information, we can reconstruct the pointing of each individual pixel of our array and make a map in real time.
2) However, the complete data reduction after the observations will be done using a pointing file with time stamp to get a perfect synchronization with the acquisition.
We need also to have a good time synchronization with the telescope and I think that this can be done also using the Ethernet network.

<u>WB:</u>
We distribute every second positional information of the antenna, a process can request it via a server program (Elvin) and we have code for this written in Python under Linux.
We also produce every minute a FITS file with more detailed position and information.
These files can be accessed via NFS (or sftp).

<u>AB:</u>
1) For real time acquisition, there is a client that requests the information of the antenna in each acquisition computer. We use 3 acquisition computers in parallel for redundancy.

2) For the secondary mirror, if we use it for chopping, we need a good synchronization. Does the TTL signal from the telescope still exists, witch level or do you have another way to achieve a good synchronization with the secondary?

3) When using the FITS file for reconstructing the pointing after the observations, we need good time synchronization. How can we synchronize the acquisition computer with the time stamps that are used in the FITS file? Do you have a time server?

WB: internet addresses for the NIKA computers at the telescope:

mrt-nika1   IN   A   150.214.224.22
mrt-nika2   IN   A   150.214.224.23

In order to access these computers when installed at the MRT, one should use the standard ssh entrance via gra-lx1.iram.es, account "hello", pw "ar1adne8".

The use of VNC may be considered to connect to these systems, also via gra-lx1.iram.es.

The telescope default router is on address 150.214.224.223 and the name-server has the address 150.214.224.100.

For communication from the receiver cabin we only use switches that should be collision free.

I have a program that generated a udp broadcast message for a specific NCS message, ex:

('150.214.224.59', 55735) <Info TimeStamp='2009-10-08T08:13:26.750' LogId='antMD: trace' ><Data Name='MJD,LST,xOffset,yOffset,basisLong,basisLat,inSegment,actualAz, actualEl,trackAz,trackEl,slowRate,fastRate,SigTrAz,MaxTrAz,MinTrAz,SigTrEl,MaxTr El,MinTrEl,FlagA,FlagE' > >55112.342674,32895.260441,0.000000,0.000000,1.549464, 0.352124, -1,260.999247,45.231991, -0.078947, -0.921053,8,16,0.120135, -0.070175, -0.166667,0.982799, -0.921053, -1.017544,0,0</Data></Info>