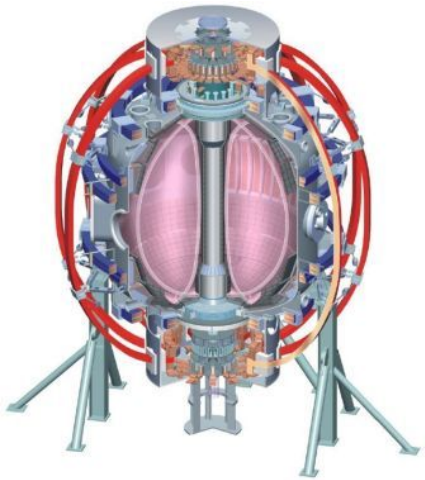
NSTX

Supported by

U.S. DEPARTMENT OF ENERGY | Office of Science

Presently Planned Vacuum-Side Diagnostics for the NSTX-Upgrade Center Column

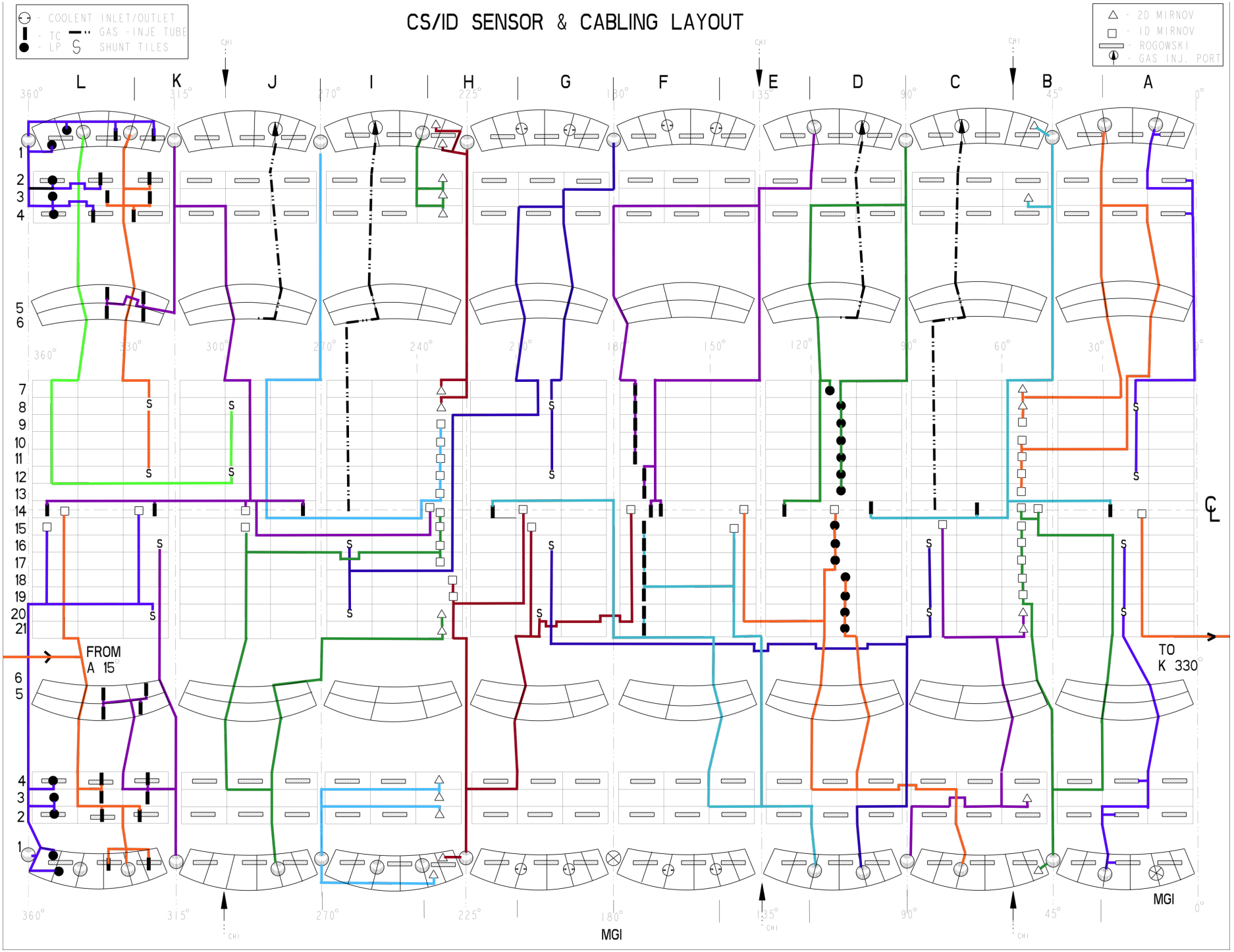
Columbia U
CompX
General Atomics
FIU
INL
Johns Hopkins U
LANL
LLNL
Lodestar
MIT
Nova Photonics
New York U
ORNL
PPPL
Princeton U
Purdue U
SNL
Think Tank, Inc.
UC Davis
UC Irvine
UCLA
UCSD
U Colorado
U Illinois
U Maryland
U Rochester
U Washington
U Wisconsin

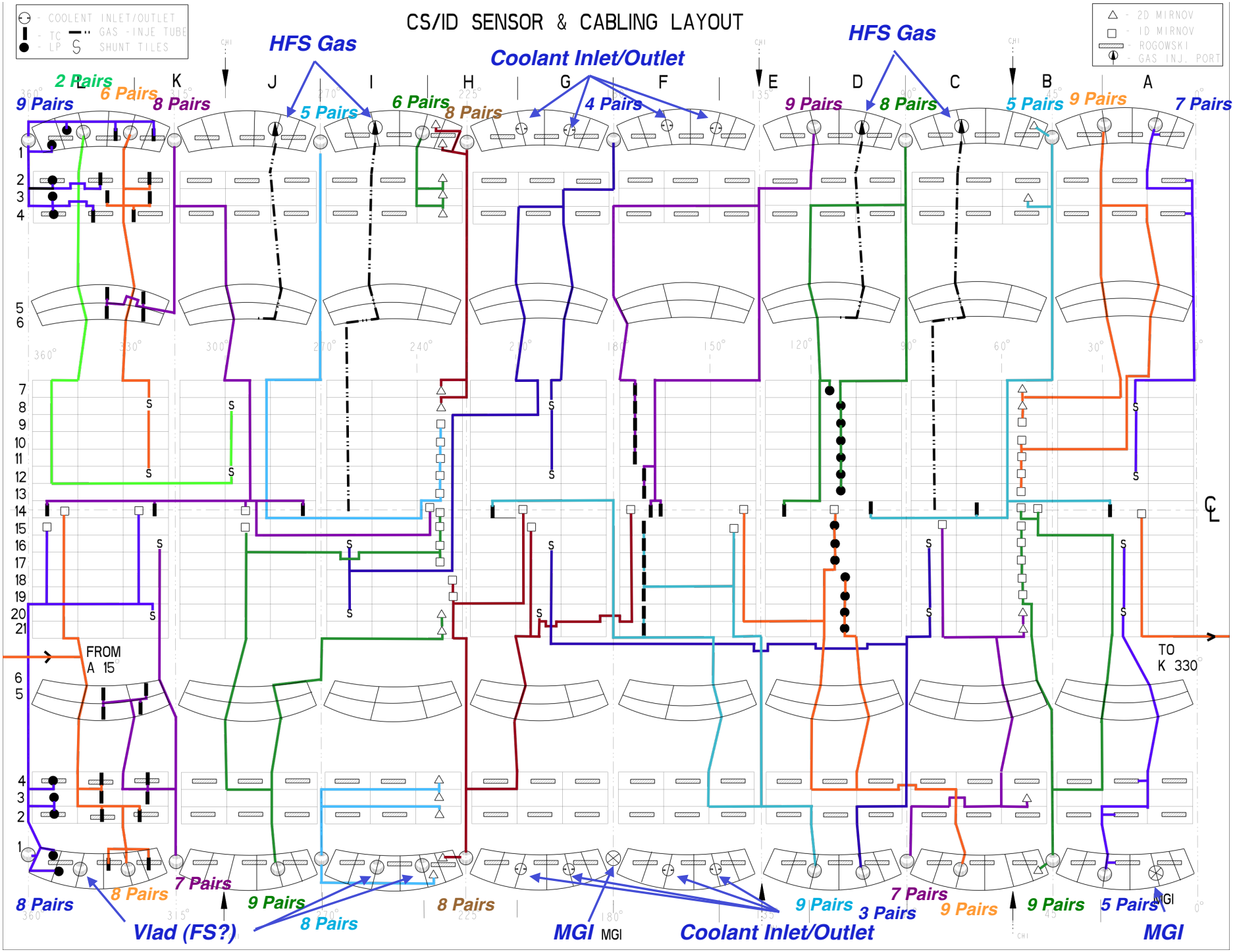


Culham Sci Ctr
U St. Andrews
York U
Chubu U
Fukui U
Hiroshima U
Hyogo U
Kyoto U
Kyushu U
Kyushu Tokai U
NIFS
Niigata U
U Tokyo
JAEA
Hebrew U
Ioffe Inst
RRC Kurchatov Inst
TRINITI
NFRI
KAIST
POSTECH
ASIPP
ENEA, Frascati
CEA, Cadarache
IPP, Jülich
IPP, Garching
ASCR, Czech Rep

Basic Information About the CS Diagnostics (Work by Bob, Kelsey, Ankita)

- 34 total organ pipes
  - 2 for MGI (both lower)
  - 3 for Vlad (presumably filter scopes, all lower)
  - 4 for HFS gas injection (all upper)
    - 2 shoulder
    - 2 midplane
  - 25 for LP, Magnetics, TCs, & Shunt Tiles
    - 13 uppper
    - 12 lower
  - None are unallocated
  - Each organ pipe can have a single 19 pin connector…9 twisted pairs
- Sensor allocations
  - 24 Langmuir Probes
    - 2 each on upper and lower horizontal divertor
    - 3 each on upper and lower vertical divertor
    - 14 on CS
    - Each probe uses a twisted pair.
  - 22 2-D Mirnovs
    - 14 in column at 230 degrees
    - 8 in a column at 50 degrees
  - 22 1-D Mirnovs
    - 11 in each column at 230 and 50 degrees
- Sensor allocations (continued)
  - 5 Rotated Mirnovs
    - Measure B_T
  - Used for CS halo current estimation
  - 6 Rogowskis
    - Measure the rod current (interlock?) and halo currents.
    - One is segmented to three parts.
  - 10 Midplane Mirnovs
    - Toroidal array for MHD studies
  - 18 Shunt Tiles
    - Halo current entrance and exit
    - All on the CS (not divertor)
  - 48 Thermocouples
    - 2 in each horizontal divertor
    - 6 in each vertical divertor
    - 4 in each of the diagnoal transition sections
    - 14 in a column at 170 degrees
    - 10 in a midplane toroidal array


CS/ID SENSOR & CABLING LAYOUT
- COOLENT INLET/OUTLET
- TC
- LP
GAS - INJE TUBE
SHUNT TILES
- 2D MIRNOV
- ID MIRNOV
- ROGOWSKI
- GAS INJ. PORT
L
K
J
I
H
G
F
E
D
C
B
A
CHI
FROM A 15°
TO K 330°
MGI
MGI
S
CL


CS/ID SENSOR & CABLING LAYOUT
COOLENT INLET/OUTLET
TC
LP
GAS INJE TUBE
SHUNT TILES
2D MIRNOV
ID MIRNOV
ROGOWSKI
GAS INJ. PORT
HFS Gas
Coolant Inlet/Outlet
HFS Gas
2 Pairs
6 Pairs
9 Pairs
8 Pairs
5 Pairs
6 Pairs
8 Pairs
4 Pairs
9 Pairs
8 Pairs
5 Pairs
9 Pairs
7 Pairs
FROM A 15
TO K 330
8 Pairs
8 Pairs
7 Pairs
9 Pairs
8 Pairs
8 Pairs
9 Pairs
3 Pairs
7 Pairs
9 Pairs
9 Pairs
5 Pairs
Vlad (FS?)
MGI
MGI
Coolant Inlet/Outlet
MGI

Constraints/Comments

- 9 pairs per organ pipe
- Must not cross gas tubes for HFS gas injection.
- At most 8 pairs allowed at the diagonal tiles above/below the lower/upper vertical divertors.
- All sensors for a given organ pipe will be brought, via a single field cable, to a single rack.
  - Processing equipment must be nearby