Production Logistics for DVA-1 and SKA Quantities

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DVA-1 Requirements

Site Requirements for DVA-1 Dish Construction

- The building site should have:
- Power. If the site lacks sufficient power, then a generator would have to be added.
- Flat stable ground suitable for the pouring of a concrete slab.
- Access by road for delivery of supplies, mold pieces, and the necessary crane. Also the road must be capable of supporting the (possibly high axle loading) crane.

Building Requirements

- The building is large enough to house the mold with some additional workspace
- The building needs a concrete floor sufficiently strong to support the heavy mold assembly
- The minimum building would be dismantled to gain access for the crane
- The building is at least partially capable of temperature control.
- The building must be clean and capable of controlling the egress of dust and dirt.
- The workspace needs to be well lit.
- The building needs to have as a minimum a double man-door for the entry-exit,
- The workspace needs to have sufficient electrical outlets

A Typical Temporary Building

Vacuum Infusion Shop Requirements

- The necessary vacuum infusion shop equipment will be containerized and brought to the building site
- A bare minimum of connecting vacuum manifolds will have to be added to the temporary construction building
- A short list of other equipment such as a long fabric cutting bench will have to be added to the temporary shop

Mold Assembly and Testing

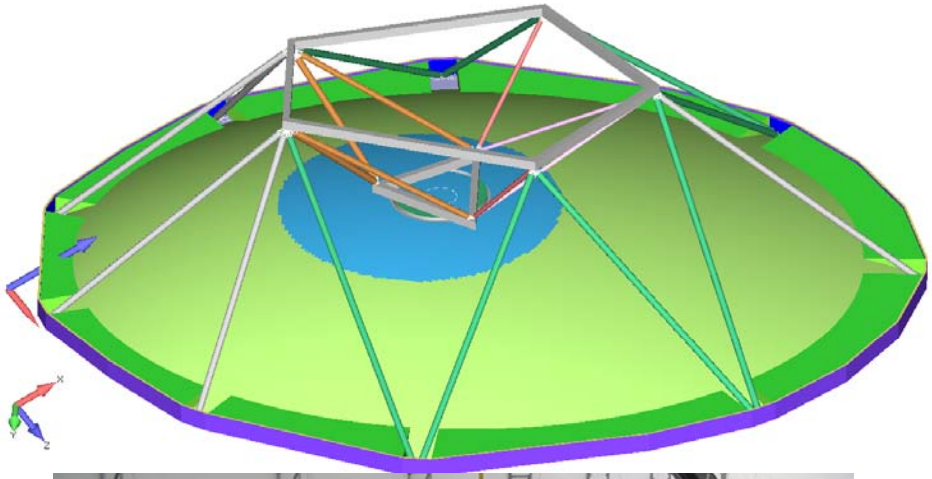
- The mold will be assembled either by a DRAO crew or;
- By a combination of a DRAO crew and a crew from the mold manufacturer
- Testing will include:
  - Overall shape specification
  - Alignment between pieces
  - Vacuum Integrity of joints

Vacuum Infusion of the Reflectors

- The primary reflector surface together with the reflector rim will be vacuum infused on-site in a single piece.
- The secondary reflector will be made in the same way but may be made off-site

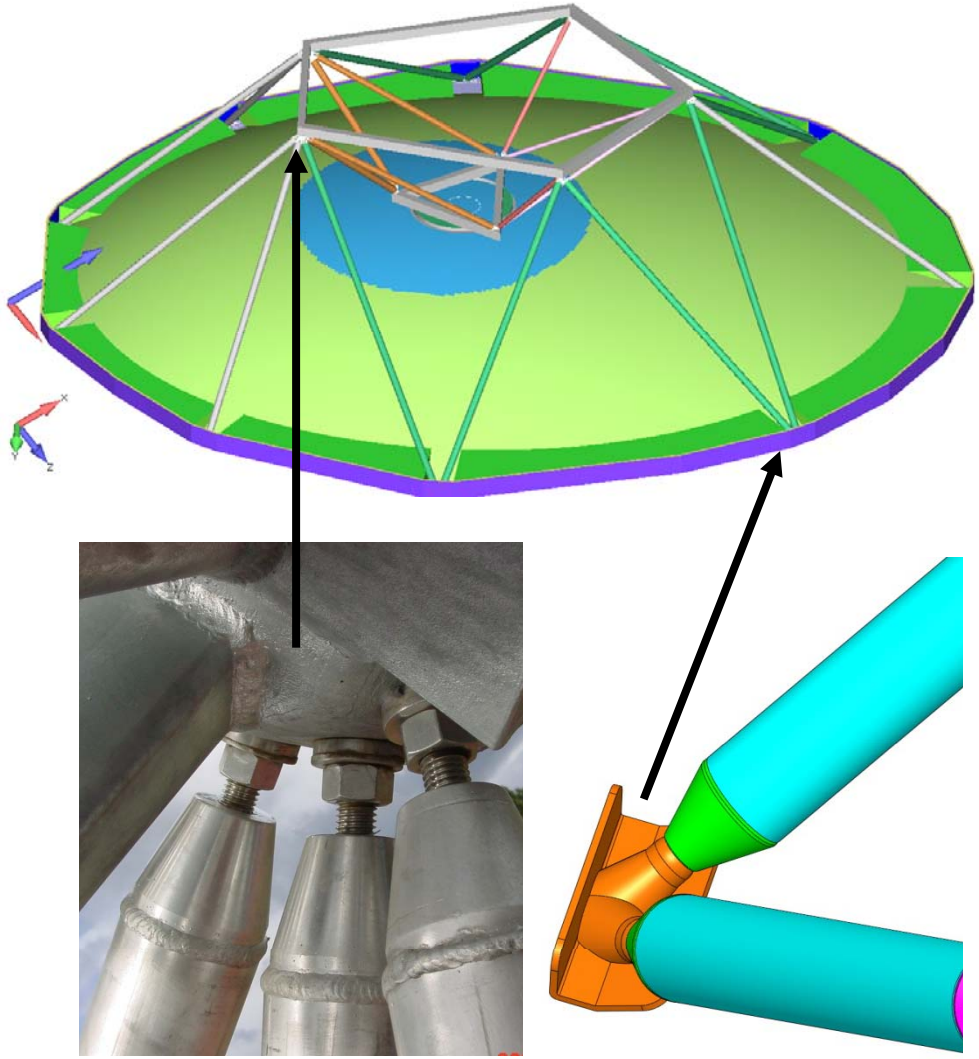
Assembling Back-up Structure

- The Backup structure will be assembled onto the back of the composite dish while it still rests on the mold
- The assembly will be similar to the ATA dish pictured at right, except that the central structure is more elaborate (upper right)



Assembling Back-up Structure

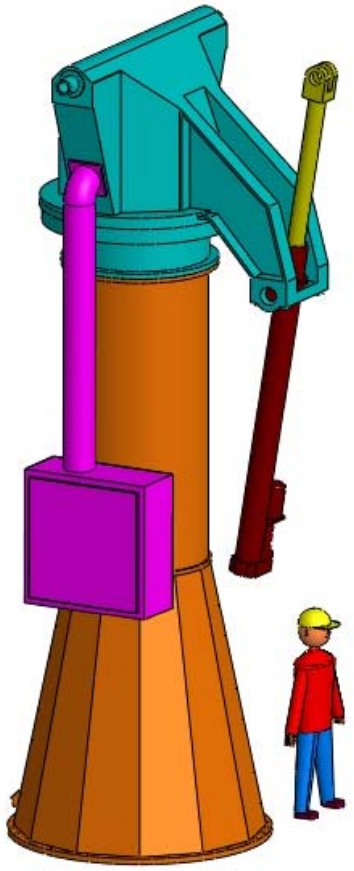
- The central Frame wil be preassembled and positioned over reflector with a crane
- Central connection to diaphragm will be bolted up
- Outer tubes will be installed and adjusted to insure uniform loading of rim



A method for rotating the dish by 180 degrees

Mount Assembly

- Prepare existing foundation pad with studs per base flange pattern.
- Lift, rotate and set pedestal base section over stud pattern.
- Secure base, perform preliminary levelling.
- Lift, place turn-head and secure per instructions.
- Perform detailed levelling.
- Install and connect wiring systems
- Connect drive and manual control system
- Exercise basic motions.
- Prepare for reflector-set installation.

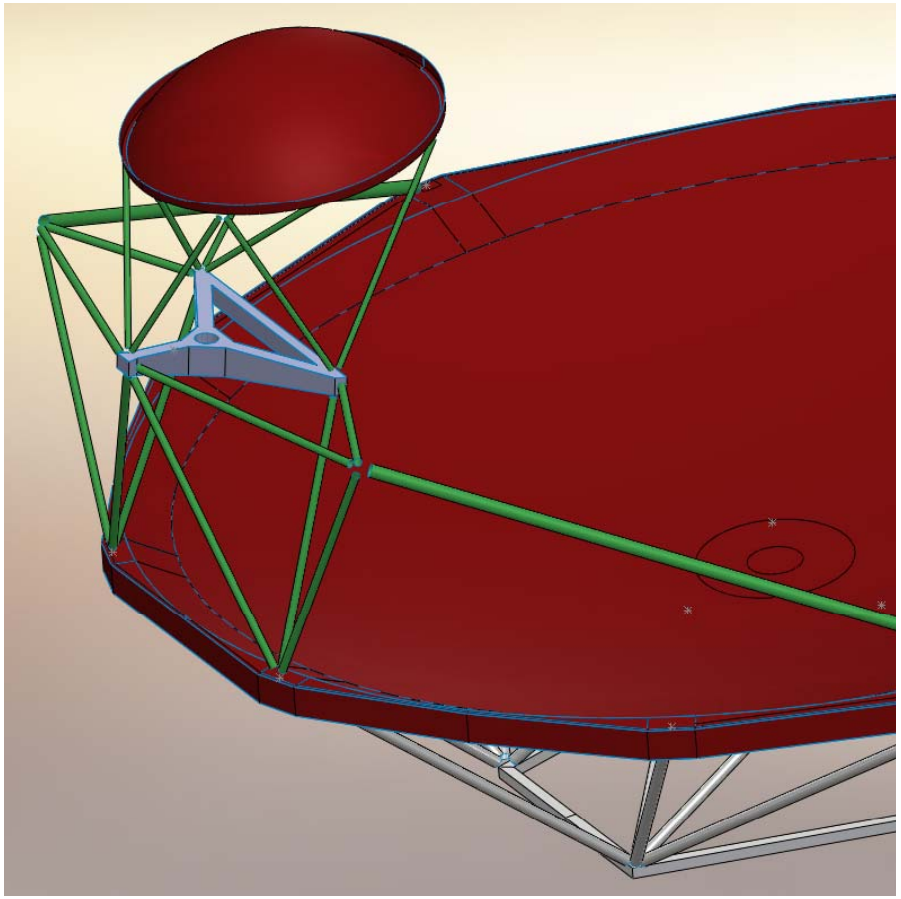


Reflector to Mount Assembly

- Dish is flipped over using a flipping frame
- Dish is picked up using slings
- Dish is lowered onto mount and fasteners connected
- Feed legs and secondary structure added after primary dish is secured

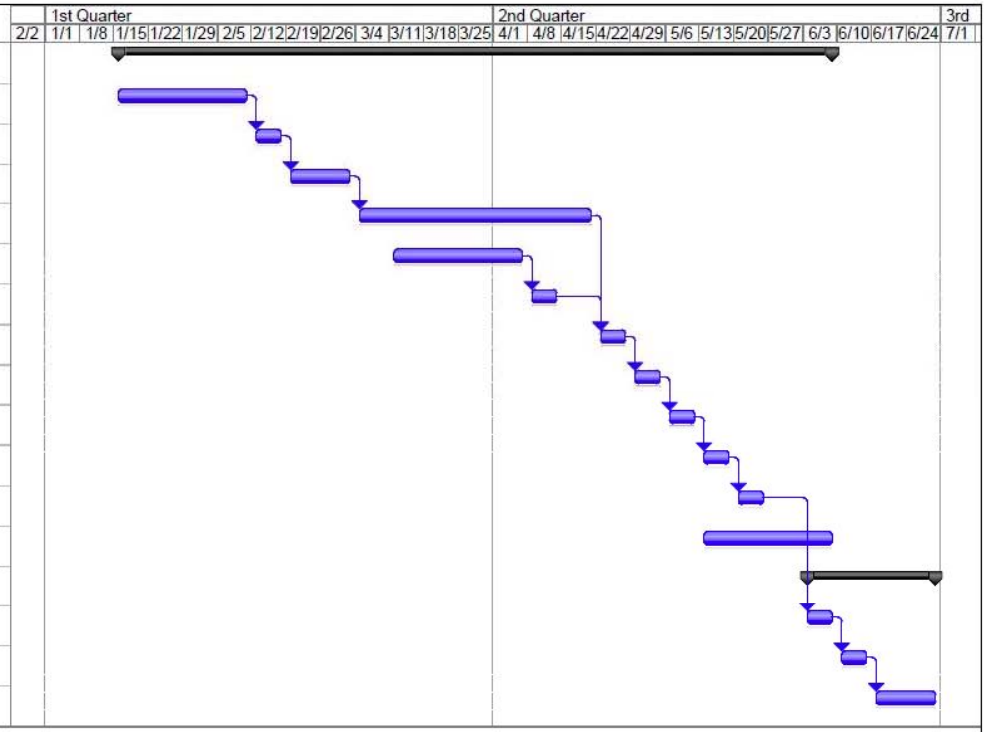
Installation of Secondary and Feed Support

- Lift feed support base into position with crane.
- Connect feed support lower carbon fibre tubes.
- Connect feed support outer carbon fibre tubes.
- Connect forward feed legs.
- Lift secondary mirror into place.
- Connect secondary mirror to feed support carbon fibre tubes.
- Install feeds and indexer.



Dish Fabrication Schedule

ID	Task Name	Duration	Start	Finish	Predecessors
1	**Dish Fabrication work**	**105 days**	**Mon 1/16/12**	**Fri 6/8/12**	
2	Setup and prep shop	4 wks	Mon 1/16/12	Fri 2/10/12	
3	Assemble and vacuum test	1 wk	Mon 2/13/12	Fri 2/17/12	2
4	Conduct large scale flow model	2 wks	Mon 2/20/12	Fri 3/2/12	3
5	Fabricate front part	7 wks	Mon 3/5/12	Fri 4/20/12	4
6	Fabricate secondary mirror	4 wks	Mon 3/12/12	Fri 4/6/12	
7	Fabricate clutch plate	1 wk	Mon 4/9/12	Fri 4/13/12	6
8	Post cure reflector and parts	1 wk	Mon 4/23/12	Fri 4/27/12	5,7
9	Assemble back structure and paint	1 wk	Mon 4/30/12	Fri 5/4/12	8
10	Tear building down	1 wk	Mon 5/7/12	Fri 5/11/12	9
11	Pre installation and install on mount	1 wk	Mon 5/14/12	Fri 5/18/12	10
12	Install feedlegs	1 wk	Mon 5/21/12	Fri 5/25/12	11
13	Prepare as built Documentation	4 wks	Mon 5/14/12	Fri 6/8/12	
14	**Test Reflector**	**20 days**	**Mon 6/4/12**	**Fri 6/29/12**	
15	Laser track surface	1 wk	Mon 6/4/12	Fri 6/8/12	12
16	Holography	1 wk	Mon 6/11/12	Fri 6/15/12	15
17	Other RF testing	2 wks	Mon 6/18/12	Fri 6/29/12	16



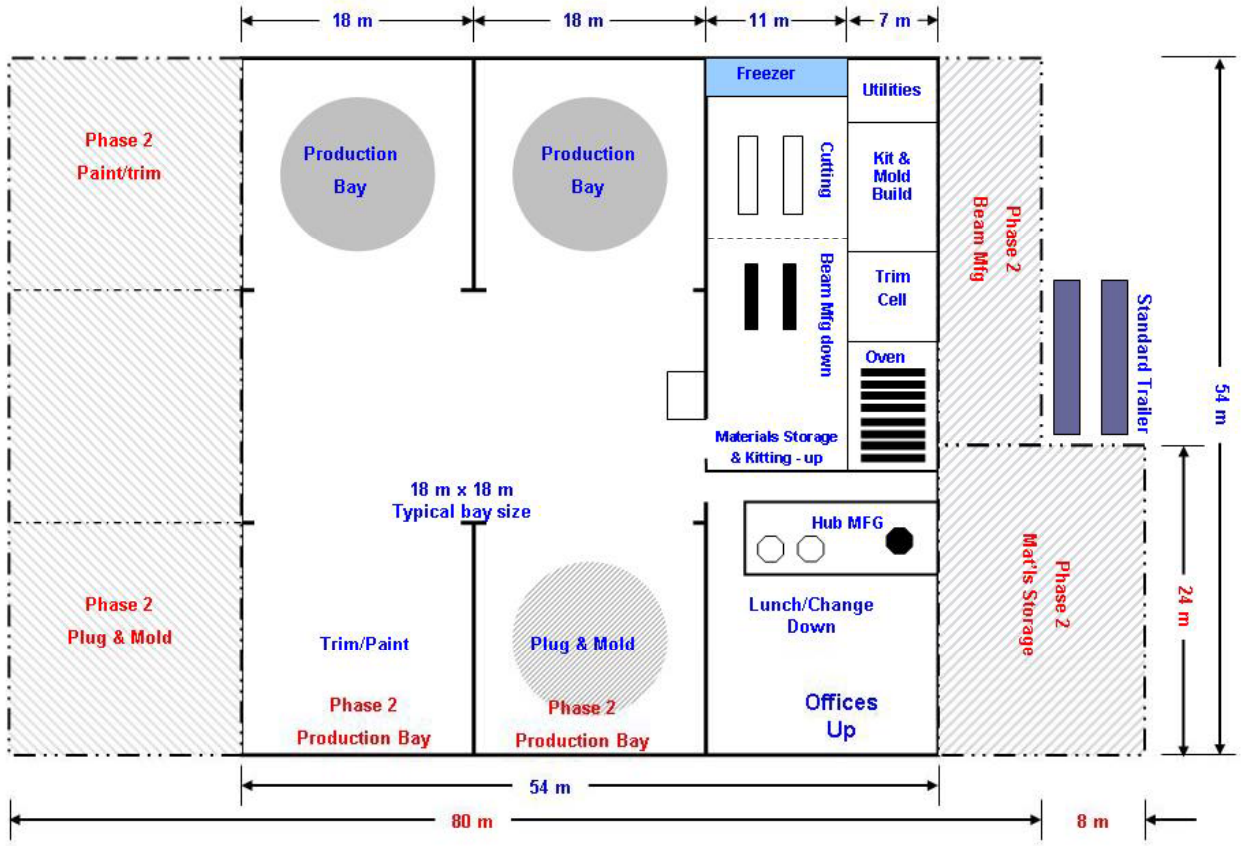
SKA Requirements, Phase 1 and Phase 2

Composite Dish Surface in SKA Quantities

	Phase 1	Phase 2
Total Reflector Production	620	3,000
Year 1 Production	100	600
Year 2 Production	175	800
Year 3 Production	175	800
Year 4 Production	175	800
Weekly Production	3.6	16.7
Daily Production	**0.73**	**3.3**
Number of Primary Molds	2	4
Primary Mold Turnaround (calendar days/part)	**2**	**1**
Parts required per mold	310	750
Mold lifetime, parts/mold before retiring	1,000	1,000
Spare Molds	0	0
Molds Fabricated/Amortized During Phase	**2**	**2**

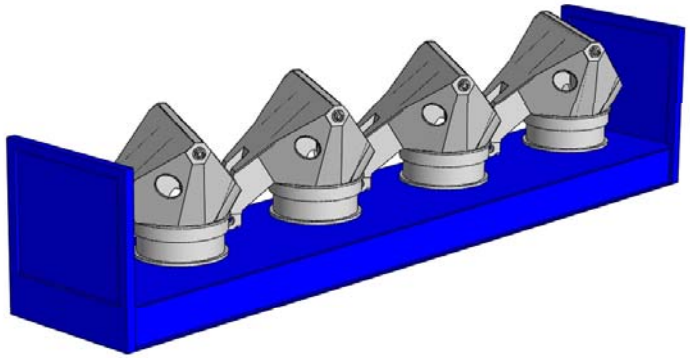
Table 5-1 from SKA Memo 116

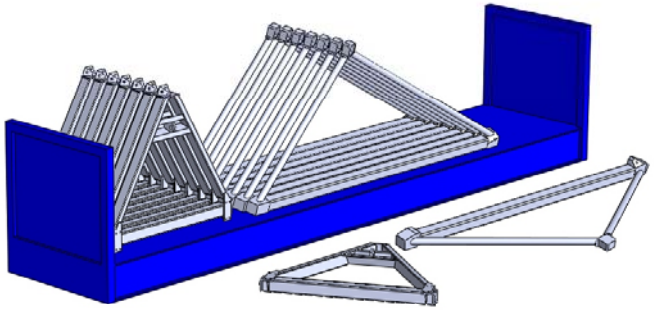
Typical Plant Layout for SKA Quantity of Composite Reflectors

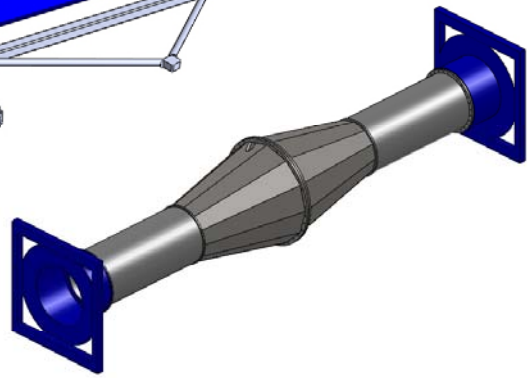


Potential Manufacturing Plant Layout for SKA Composite Reflectors

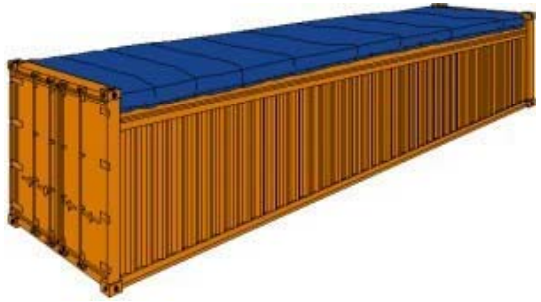
Shipments



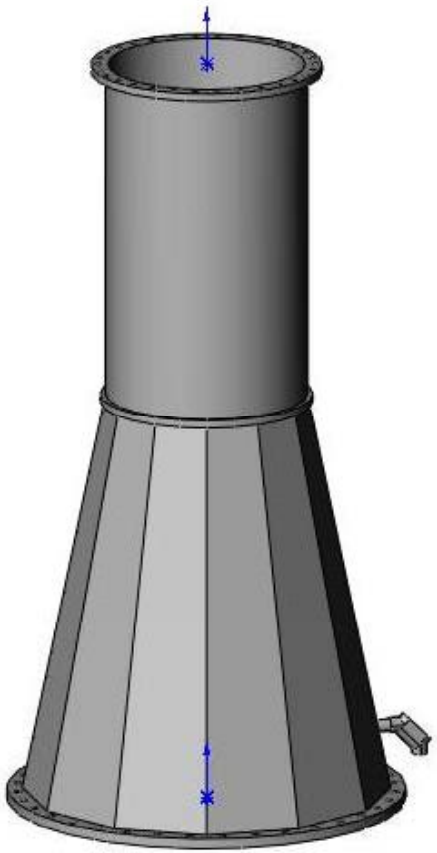


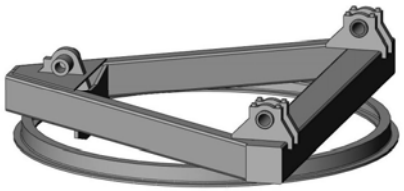


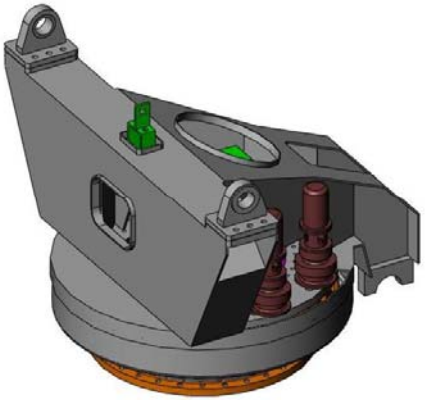
•Pedestal and Turning Head to be containerized and shipped to site preassembled
•Mount Final Assembly to be done directly on foundation; no preassembly in an enclosed building required.

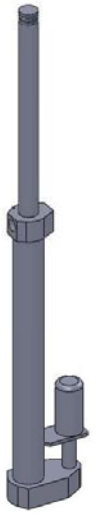


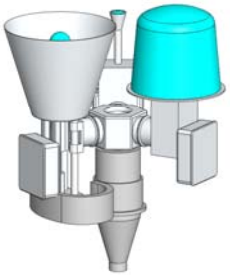
Deliverables

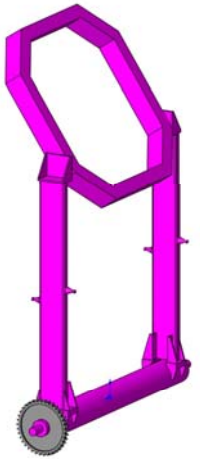


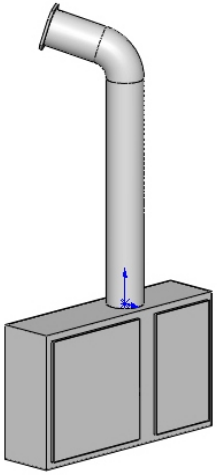


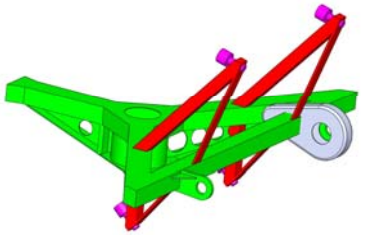












Final Assembly, SKA Quantities

•Composite dish surface to be mated to back-structure on mold to insure surface accuracy (same as prototype).
•Secondary dish and feed structure to be mated to dish + backing structure in a post-assembly building (different than the prototype).
    •This would allow final alignment checks and,
    •System checks before mounting on turning head

End