

## Newsletter

**Dissatisfied with your antenna's performance? Then this newsletter just might provide the information you are looking for. Over the last 25 years MIRAD has gained the necessary experience to refurbish your antenna with a feed system that precisely will meet your new specifications. We provide the retrofitted system within a very short period of time to minimize the down-time of your antenna, at a reasonable price, as we integrate as many standardized MIRAD components and re-use as many of the existing components, as technically feasible. Read more in the following article and we are looking forward to learn more about your specific needs.**

### A. Advantages of retrofitting

This newsletter shall provide a detailed insight into one of our services that we were able to optimize over time. As a result, we are in a position to conduct this task within a very short time frame and exactly to your requirements.

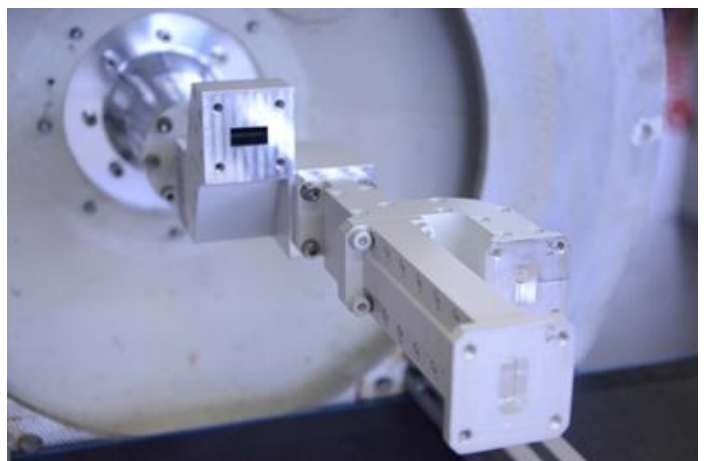
Reasons for retrofitting your feed system might be

- extension of frequency bandwidth
- integration of additional frequency bandwidth
- improvement of performance in the current frequency bandwidth
- change of the polarization mode
- integration of additional functionality (e.g. monopulse tracking, polarization switching, etc.)
- 1:1 replacement of existing feed due to erosion

A retrofit of the existing feed system is most advantageous in a case where the antenna (size and condition) is still appropriate. However, due to our broad experience, we are also in a position to provide guidance to obtain a solid comparison basis between a suitable complete replacement with a new feed system including horn and feed can versus a retrofit option.

Any type of existing feed systems can be retrofitted; the overall project cost obviously depend on your specific requirements; however, if we can apply standard components and due to our efficient work processes and our skilled staff, man hours are reduced to the absolute minimum. Please also refer to our homepage ([www.mirad.ch](http://www.mirad.ch)) that provides information of our most sought after components that might be suitable for your feed retrofit.

MIRAD has a wide range of components to compose your tailored feed system. Due to our experience we also are in a position to provide adaptations of standard components or completely new designs to exactly meet your individual needs in a cost and time effective manner.



Individual tuning of component

## B. Retrofit Process

### B.1 Definition of Scope of Work

Based on the following information you will provide to us like

- type of antenna
- interfaces
- frequency band
- RX or TX or a combination thereof
- performance specifications
- dimension of the current feed can

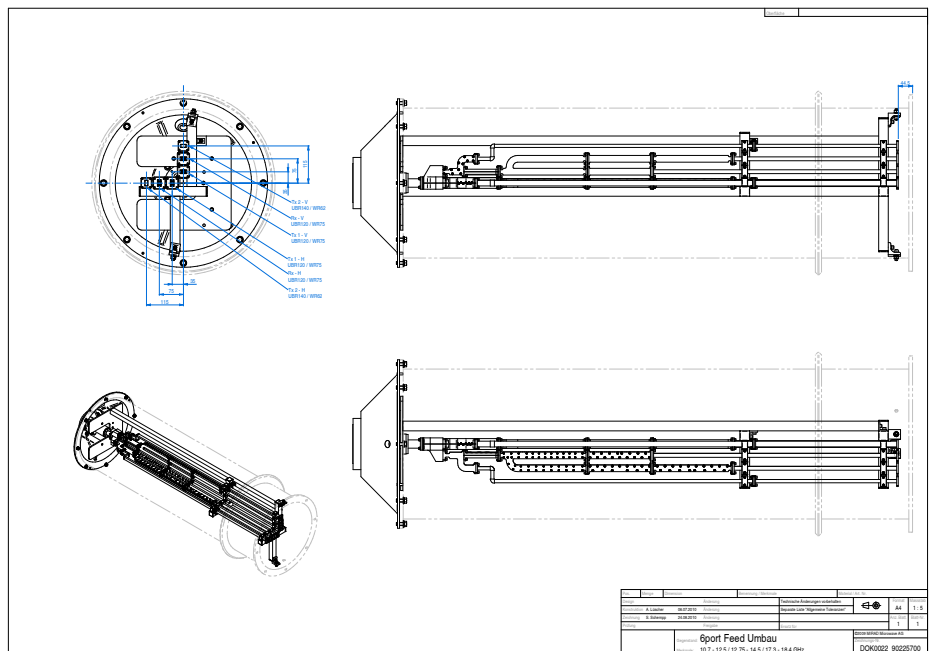
we will establish an initial financial and technical offer indicating prices of all required new components, dismantling and re-assembly activities as well as necessary measurements for verification. The offer includes a first layout of the new feed design, detailed information about the project timeframe – starting with your order confirmation – as well as general conditions like delivery and payment terms.

Once you have shipped your current feed system to us, our first activity is a thorough analysis consisting of performance testing and a mechanical inspection of the system and its main components and interfaces.

This important process generates the necessary information for the final financial and technical scope of work and the basis for the resulting feed design. This step is finished by the design review that provides the first result to our customers about the final result. This at the same time is the critical point to correct final issues with the later implementation of the refurbished feed back into its antenna.

You, as the recipient and user of the refurbished system, will be able to assess exactly the content and functionality of the retrofitted feed system and will be able to verify the correctness of all the interfaces. MIRAD, on the other hand, will have at hand the complete list of all components that need to be replaced.

However, if the down time of your antenna has to be reduced to an absolute minimum, MIRAD is also in a position to conduct initial analysis activities at your premises. For many types of antennas we are able to provide the refurbished feed can to be back on site within a period of three weeks (including transportation time).

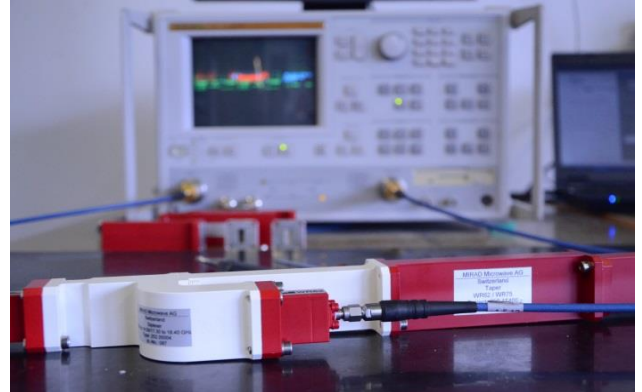


Typical drawing presented at the time of the design review

## B.2 Dismantling, production and reassembly process

The dismantling process is again accompanied by further measurement activities to ensure the exact documentation of the current performance status of your feed.

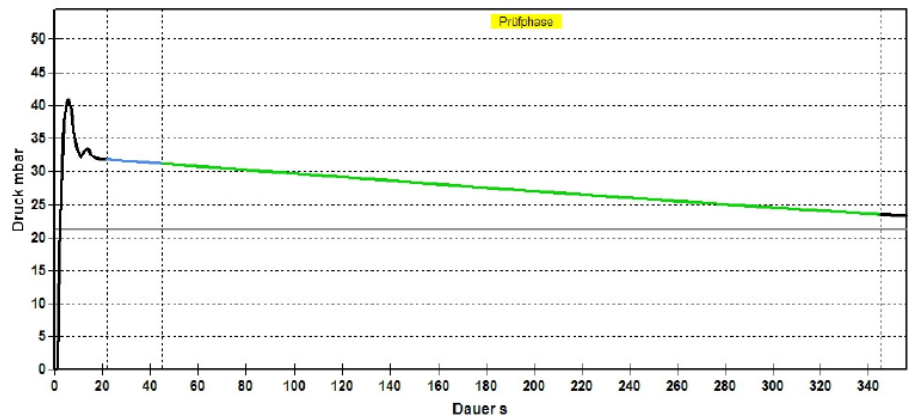
Our high precision components and products then are carefully integrated into your feed system, whereas the individual components undergo separate control measurements to ensure the compliance with the previously indicated specifications. The components are individually tuned to your specific system. Once the feed system is complete, final measurements in our anechoic chamber take place and are protocolled accordingly.



Quality control of subsystems for your individual refurbishment

The feed system documentation provides information about

- S-parameters
- beam characteristics
- mechanical layout
- pressure tightness of the new system



Pressure tightness test of the refurbished feed system

To enhance the project progress, we suggest that you take the time for a personal visit at our premises to attend the factory acceptance test.



### B.3 Shipment

The shipment with the corresponding tracking is done with utmost care. The delivery also contains our detailed project documentation that includes all relevant control measurement results.



Refurbished feed system ready for shipment

### B.4 Integration

On many occasions, to ensure the optimal antenna performance, we recommend that our specialists will conduct the integration of the feed into the antenna on-site; however, it is up to the client to take this decision. The same also applies to the on-site inspection of the feed prior to its removal. Such activities are advantageous, as the relevant interfaces can be identified by us to avoid misunderstandings at a later stage of the project. Therefore once again, we suggest that you attend the factory acceptance test at our premises.

## C. Examples/Illustrations

### C.1 Extension and change of frequency bandwidth

#### Old feed system

4-port

10.70-12.75 GHz  
13.75-14.00 GHz



#### New feed system

4-port

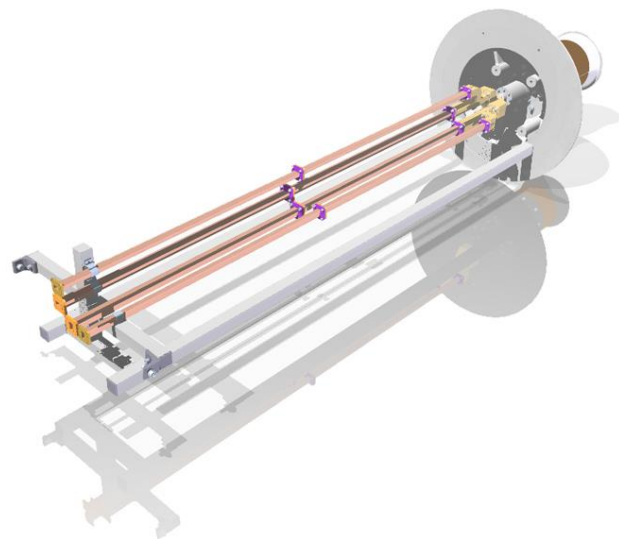
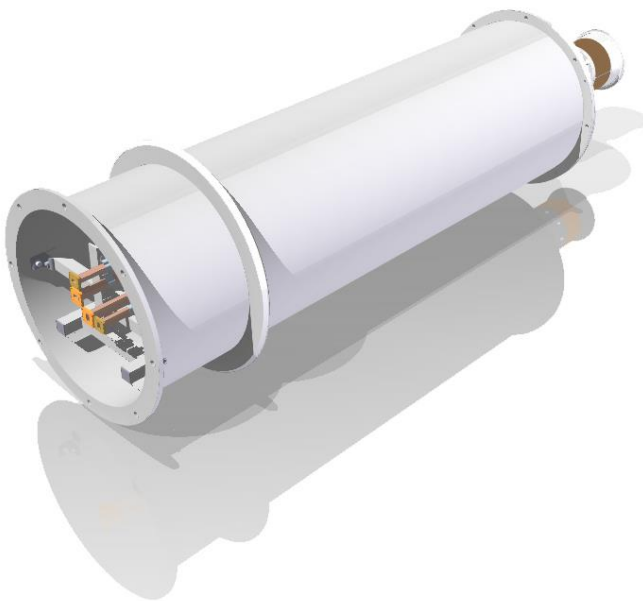
10.70-**14.50** GHz  
**17.30-18.40** GHz



Replaced elements:

- new feed horn
- new feed combiner
- new waveguides
- new brackets

Feed design

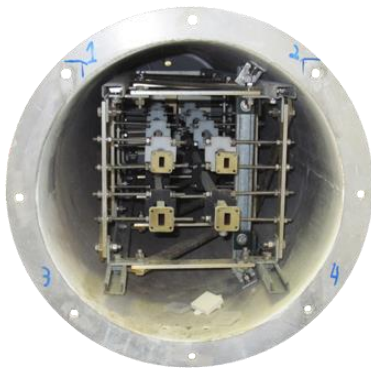


## C.2 Extension from 4-port feed to 6-port feed system

### Old feed system

4-port

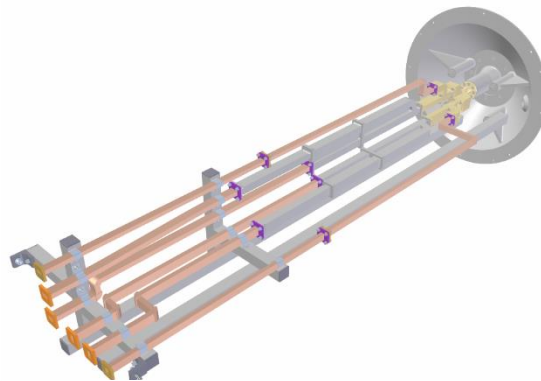
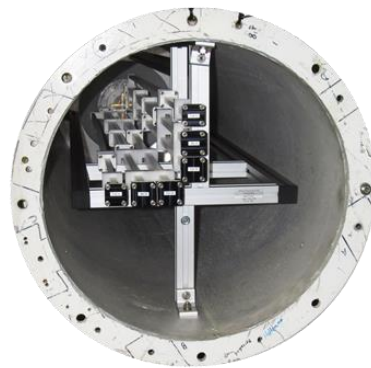
10.95-11.45 GHz  
14.00-14.50 GHz



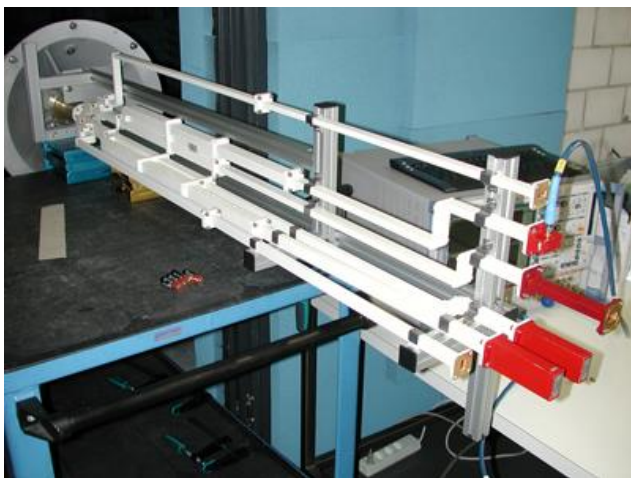
### New feed system

6-port

**10.70-12.50 GHz**  
**12.75-14.50 GHz**  
**17.30-18.40 GHz**



Design of the retrofitted feed



Further illustrations of this retrofitted system



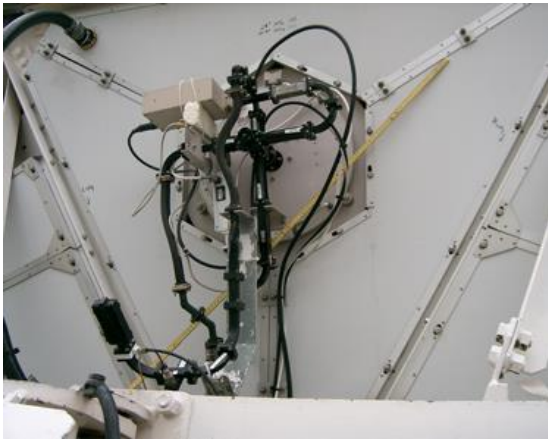
### C.3 Refurbishment of an existing antenna with reuse of feed horn and polarization adjustment mechanism

Old feed system

4-port

10.95-11.45 GHz

14.00-14.50 GHz



New feed system

4-port

**10.70-12.75 GHz**

**13.00-14.50 GHz**



The feed for this upgrade was pre-tuned at our premises and integrated on site. The final measurements of the complete antenna were successfully done by the customer. The challenge this antenna represented, was the integration of an axis cross over with limited space available and maximum filter length due to the wide operational frequency bands together with the high selectivity of the feed.

### Important remarks:

- ➔ General principle applied to all retrofits: existing components are being re-used as much as technically feasible!
- ➔ The position of connections can be altered in line with the customers' requirements!



We are looking forward to receive your call or e-mail with your questions and specifications. We are convinced to be able to provide to you the most suitable solution at a reasonable price within a competitively short delivery time.