## TBM 1: Prepare Assembly Aid Tray for Force Fitting

Team name	:				
Referee I: _	, Referee II:				
Date and ti	me:				
Duration: _	$\Box$ Timeout				
Achievem	ents				
	orrectly grasp the assembly aid tray:		yes	nc	
The robot correctly grasp the first bearing box:  Comment:					
	orrectly grasp the second bearing box:				
The robot insert the first bearing box into the aid tray:  Comment:					
	sert the second bearing box into the aid tray:				
	orrectly deliver the tray to the force fitting static				
Penalized	Behaviors				
The robot b	umps into obstacles in the test bed:				
The robot d	rops an object (the object touches the ground):				
The robot st	ops working:				
Disqualify	ing Behaviors				
The robot d	amages or destroys the objects requested to man	ipulate: □			
The The rob	oot damages the test bed:				
Benchmarki	ng data delivered appropriately: $\square$ yes $/$ $\square$	no			
Team leader	signature:				
Referee sign	nature:				

### TBM 2: Plate Drilling

Team name:						
Referee I:, Refere	e II:					
Date and time:						
Duration:   □ Timeout						
Achievements						
The robot collect the cover plate box from the sl Comment:			yes  —	no		
The robot place the cover plate box to the correct workspace Comment:						
The robot correctly grasp the plates  Comment:			_			
The robot correctly sort the plates  Comment:			_			
The robot perform the drilling process for faulty Comment:	•		_			
Penalized Behaviors  The robot human into obstacles in the test had-						
The robot bumps into obstacles in the test bed:						
The robot drops a plate:						
The robot misses a report:						
The robot stops working:						
Disqualifying Behaviors						
The robot damages or destroys the objects reque	ested to manipulate:					
The robot damages the test bed:						
Benchmarking data delivered appropriately	: □ yes / □ no					
Team leader signature:						
Referee signature:						

## TBM 3: Fill a Box with Parts for Manual Assembly

Team name:	
Referee I:	Referee II:
Date and time:	
Duration:   □ Timeout	
Achievements	
The robot correctly grasp object:	part 1 part 2 part 3 part 4 part 5
The robot place object in the container:	
Comment:	
The robot correctly grasp the container	yes no
The robot correctly place the container (c	complete with all parts) $\Box$ $\Box$
Comment:	
Penalized Behaviors	
The robot bumps into obstacles in the tes	st bed:
The robot drops an object:	
The robot stops working:	
Disqualifying Behaviors	
The robot damages or destroys the object	ts requested to manipulate: $\Box$
The robot damages the test bed:	
Benchmarking data delivered approp	riately: $\square$ yes / $\square$ no
Team leader signature:	
Referee signature:	

# FBM 1: Object Perception

Referee	I:	, Re	eferee II:			
Date an	nd time:					
Notes:						
• Sta	art and end time are ba	sed on the ref	eree stop w	atch.		
	meout is checked when ration.	the robot car	nnot detec	t the object	within the	specified test
• GT	is the ground truth w	hich is the infe	ormation p	rovided by t	the referee b	OX.
• Ob	ject identifier:					
-	- EM-01(1)=aid tray,	EM-02(2) = cov	ver plate bo	ΟX		
	- AX-01(4)=bearing b				me B	
	- AX-02(6)=bearing,	,	` /	Ü	ро В	
	1111 02(0)—Bearing, 1	121 05(1)—11100	001, 1111 001	(9)—ams		
Run 1 I	Ouration:	☐ Timeout				
Object I	Detection					
OT	Container	Bearing	g Box		Transmissio	n
GT	EM-01(1) EM-02(2)	\ /	AX-16(3)	AX-02(6)	AX-09(7)	AX-03(5)
Robot	Container	Bearin			Transmissio	
	EM-01(1)   EM-02(2)	AX-01(4)	AX-16(3)	AX-02(6)	AX-09(7)	AX-03(5)
Pose					T	
GT	х у	$\theta$	Robot	X	У	$\theta$
~						
Commen	ts:					
Run 2 I	Ouration:	☐ Timeout				
Object I	Detection					
GT	Container	Bearing	~		Transmissio	
	EM-01(1) EM-02(2)		AX-16(3)	AX-02(6)	AX-09(7)	AX-03(5)
Robot	Container EM-01(1) EM-02(2)	Bearin AX-01(4)	$\frac{g \text{ box}}{AX-16(3)}$	AX-02(6)	Transmissio AX-09(7)	n AX-03(5)
Pose					( )	
GT	x y	θ	Dobat	X	у	$\theta$
C = 1	H	<del>   </del>	Robot		-	+

Joject L	Octoction							
	Detection		·		П			
GT	Conta		Bearin		III.	Transmission		
0.1	EM-01(1)	EM-02(2)	AX-01(4)	AX-16(3)	AX-02(6)	AX-09(7)	AX-03(5)	
Robot	Conta	ainer	Bearin	g box		Transmission	n	
TODOU	EM-01(1)	EM-02(2)	AX-01(4)	AX-16(3)	AX-02(6)	AX-09(7)	AX-03(5)	
Pose								
~~	X	у	$\theta$	D 1 .	X	у	$\theta$	
GT				Robot		V		
Common	its:							
Jonninen								
Run 4 I	Ouration:	Г	] Timeout					
Object L	Detection							
$\operatorname{GT}$	Container		Bearin	<u> </u>	-	Transmission		
	EM-01(1)	EM-02(2)	AX-01(4)	AX-16(3)	AX-02(6)	AX-09(7)	AX-03(5)	
Robot	Container		Bearing box			Transmission		
RODOL	EM-01(1)	EM-02(2)	AX-01(4)	AX-16(3)	AX-02(6)	AX-09(7)	AX-03(5)	
Pose					-11			
	37	77	$\theta$		37	37	θ	
GT	X	У	0	Robot	X	У	U	
Commen	its:							
Run 5 I	Ouration:		] Timeout					
Object I	Detection							
	Container		Bearing Box		Transmission			
GT	EM-01(1)	EM-02(2)	AX-01(4)	$\frac{AX-16(3)}{AX-16(3)}$	AX-02(6)	AX-09(7)	$\frac{1}{\text{AX-03(5)}}$	
	Conta	` ,	. ,	. ,		Transmission		
Robot	EM-01(1)	EM-02(2)	Bearing box   AX-01(4)   AX-16(3)		AX-02(6)	AX-09(7)	$\frac{1}{ AX-03(5) }$	
	DW-01(1)	DW-02(2)	1121-01(4)	7171-10(0)	1111-02(0)	1171-03(1)	1171-05(0)	
Pose			$\theta$		v	37	$\theta$	
Pose GT	X	У	0	Robot	X	У	U	

	$\frac{\text{Detection}}{\ }$	ainer	Bearin	g Roy		Transmission		
GT	EM-01(1)		AX-01(4)	$\frac{\text{g box}}{\text{AX-16(3)}}$	AX-02(6)	AX-09(7)	AX-03(5)	
	Cont	` '	Bearin	. ,	` ′	Transmissio		
Robot	EM-01(1)	$\frac{\text{EM-02}(2)}{\text{EM-02}(2)}$	AX-01(4)	$\frac{\text{AX-16}(3)}{\text{AX-16}(3)}$	AX-02(6)	AX-09(7)	AX-03(5)	
Pose		2111 02(2)	1111 01(1)	1111 10(0)	1111 02(0)	1111 00(1)	1111 00(0)	
	X	у	θ		X	у	$\theta$	
GT	A .	J J		Robot	A	J J		
 Comme	nts:							
Run 7	Duration:		] Timeout					
Object 1	Detection							
OTT.	Cont	ainer	Bearin	g Box		Transmissio	n	
GT	EM-01(1)	EM-02(2)	AX-01(4)	AX-16(3)	AX-02(6)	AX-09(7)	AX-03(5)	
Robot	Cont	ainer	Bearin	g box		Transmissio	n	
πουσι	EM-01(1)	EM-02(2)	AX-01(4)	AX-16(3)	AX-02(6)	AX-09(7)	AX-03(5)	
Pose								
GT	X	У	θ	Robot	X	У	$\theta$	
Comme	nts:							
Run 8	Duration:	Г	] Timeout					
			1 Imeout					
Jbject 1	Detection							
GT	Cont		Bearin			Transmissio		
O I	EM-01(1)	EM-02(2)	AX-01(4)	AX-16(3)	AX-02(6)	AX-09(7)	AX-03(5)	
———	Container EM 02(2)		Bearin AX-01(4)	Bearing box		Transmissio		
Robot	EM 01(1)		AA-01(4)	AX-16(3)	AX-02(6)	AX-09(7)	AX-03(5)	
Robot	EM-01(1)	EM-02(2)						
	EM-01(1)	EMI-02(2)						
Robot	EM-01(1)	у у	θ	Robot	X	у	$\theta$	

Run 9 I	Ouration:		] Timeout				
Object I	Detection						
GT	Container		Bearin	Bearing Box		Transmission	n
GI	EM-01(1)	EM-02(2)	AX-01(4)	AX-16(3)	AX-02(6)	AX-09(7)	AX-03(5)
Robot	Cont	ainer	Bearin	ng box		Transmission	n
10000	EM-01(1)	EM-02(2)	AX-01(4)	AX-16(3)	AX-02(6)	AX-09(7)	AX-03(5)
Pose							
C/T	x	у	θ	Dalas	X	у	$\theta$
GT				Robot			
	nts:  Duration: _		□ Timeout				
	Detection =						
C/T/	Cont	ainer	Bearin	ıg Box		Transmission	n
GT	EM-01(1)	EM-02(2)	AX-01(4)		AX-02(6)	AX-09(7)	AX-03(5)
Robot	Container		Bearing box		Transmission		
RODOL	EM-01(1)	EM-02(2)	AX-01(4)	AX-16(3)	AX-02(6)	AX-09(7)	AX-03(5)
Pose							
GT	X	У	θ	Robot	X	у	θ
Commen	nts:						
Benchn	narking dat	a delivered	l appropria	ately: 🗆 ye	es / 🗆 no		
Team le	eader signa	ture:					
Referee	signature:						

# FBM 2: Visual Servoing

Team name:			
Referee I:	, Refere	ree II:	
Date and time:			
Notes:			
• The start and the e	end time for each run are	re based on the referee stop watch.	
• Timeout is checked duration.	l when the robot canno	ot grasp the object within the specified	test
• The sequence of ob-	jects which are used in e	each run is defined by the team.	
v		=cardbox black, AX-01=bearing box type ng, AX-03=axis, AX-09=motor	e A,
Run 1 Duration:	Timeout		
Object id:	, Orientation:	, $\square$ Success, $\square$ Dropped, $\square$ Misse	d
Comments:			
Run 2 Duration:	Timeout		
Object id:	, Orientation:	, $\square$ Success, $\square$ Dropped, $\square$ Misse	:d
Run 3 Duration:	□ Timeout		
Object id:	, Orientation:	, $\square$ Success, $\square$ Dropped, $\square$ Misse	:d
Comments:			
Run 4 Duration:	□ Timeout		
Object id:	, Orientation:	, $\square$ Success, $\square$ Dropped, $\square$ Misse	d
Comments:			
Run 5 Duration:	Timeout		
Object id:	, Orientation:	, $\square$ Success, $\square$ Dropped, $\square$ Misse	d
Comments:			

Run 6 Duration:	$\square$ Timeout	
Object id:	, Orientation:,	$\Box$ Success, $\Box$ Dropped, $\Box$ Missed
Comments:		
Run 7 Duration:		
Object id:	, Orientation:,	$\square$ Success, $\square$ Dropped, $\square$ Missed
Comments:		
Benchmarking data deliver	red appropriately: $\square$ yes	s / $\square$ no
Team leader signature:		
Referee signature:		